

Losing Ground: Innovations in Disaster Mitigation and Planning

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Basic Land Use Tools for Resiliency



Existing Zoning Map from the Town of Southampton Riverside Revitalization Action Plan (2015)

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The New York State Department of State (DOS) has prepared a collection of model local laws, in consultation with the New York State Department of Environmental Conservation (NYSDEC) and other stakeholders, as fulfillment of the Community Risk and Resiliency Act's requirement that DOS, in cooperation with NYSDEC, develop model local laws that include consideration of future risk due to sea-level rise, storm surge and/or flooding.

This publication does not establish any legally binding standards or criteria for state or local government to follow. Use of this guidance by a municipality should not substitute for consultation with an attorney working on behalf of the municipality.

1. Basic Land Use Tools for Resiliency

There are many tools available to local governments in New York State to regulate the use and development of land in accordance with a comprehensive plan. Basic tools include zoning, subdivision review, and site plan review. Statutory authority for municipalities to regulate development via zoning and special use permits, subdivision review, and site plan review is granted in New York State General City Law, Town Law, Village Law, and Municipal Home Rule Law.

Zoning can control the height of buildings, lot coverage, minimum distances (setbacks) from buildings to property lines or other features, the density of development, façade lines, building scale and bulk, allowable uses, requirements for certain uses, site access, utilities, parking, and more. The original intent of zoning was to avoid incompatible uses and nuisances, but it has developed into a powerful tool that can regulate the percentage of lot coverage and protect environmentally sensitive areas.

Carefully crafted land use laws can provide protection from erosion due to human actions; sea-level rise; storm surge; and flooding. Zoning allows the community to target regulations to areas at risk from damage. This can be done by creating discrete districts, amending existing districts, or by creating overlay districts that specifically address flooding issues. It can even be done by creating floating zoning districts with performance standards or specific criteria which would be applied in the event certain types of development were proposed.

Several basic tools can be used to reach the same goals. For example, to protect forested lands, which retain stormwater and reduce flood risks, the governing board of a municipality may:

- adopt a new subsection in the existing zoning law addressing woodland and forest protection and make those requirements applicable to all zones;
- draft similar protection language but add the new requirements only to specific districts through amendments to those chapters of the zoning law; or
- create a new chapter or subsection creating a “forest protection zone” and then amend the zoning map to show where the forest protection zone is located.

Without adequate zoning, development and redevelopment can continue in ways that place people, property, and critical infrastructure at risk from storm damage. Large structures in at-risk areas create damages, increase emergency costs, impact adjacent properties and are difficult to relocate or restore. Local coastal laws that establish setbacks based on rates of coastal erosion help secure community assets, reduce exposure to damages, and provide adaptive capacity for both human uses and environmental assets.

1.1 Zoning Districts

A zoning map divides a municipality into various land use districts, such as residential, commercial, industrial or manufacturing, or mixed-use districts. The zoning law or ordinance describes the permissible land uses in each of the various zoning districts identified on the zoning map, and the dimensional standards for each district, such as the height of buildings, minimum distances (i.e., setbacks) from buildings to property lines, and the density of development.

Landforms, historical development patterns, transportation, compatible uses, and available resources are a few of the factors that go into determining the list of allowed uses, whether they be as-of-right or by special permit, and how those uses might be developed. Another consideration should be how potential zoning changes can impact the resiliency of the community to prepare and respond to sea-level rise, storm surge, flooding and other natural disasters.

Zoning District Techniques	
TOOL	CONTEXT
Waterfront Zoning District	A district intended to enhance development deemed important to the waterfront, such as commercial, residential, and recreational uses and public access. It can reflect the cultural and historical heritage of a waterfront while it protects the visual, environmental and transportation links to and from the waterfront while emphasizing enhanced public access to the waterbody.
Waterfront Overlay District	A district of any shape or size that is superimposed over the underlying “base” zoning district(s) in order to protect a particular resource or guide development within a special area. The overlay district essentially adds to the base zoning requirements a layer of safeguards, standards, or incentives that may not be needed for the base zoning uses.
Transfer of Development Rights	A voluntary, incentive-based program that allows landowners in a “sending district” to sell development rights from their land to a developer for use in a “receiving district” as defined by the municipality. It usually involves maintaining density in one district by allowing density to be increased in other districts.

RESOURCES

Model Conservation Zoning District and Natural Resource Protection Standards. (2010). Lancaster County Planning Commission. ¹

Conservation Advisory Councils and Boards: A Guide to the Organization and Operation of Local Environmental Advisory Councils. (1997). Westchester County Environmental Management Council.²

Haeckel, I. and L. Heady. *Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed*. (2014). Department of Natural Resources, Cornell University, and New York State Department of Environmental Conservation, Hudson River Estuary Program.³

Conserving Natural Areas and Wildlife in Your Community: Smart Growth Strategies for Protecting the Biological Diversity of New York's Hudson River Valley. (2008). New York State Department of Environmental Conservation.⁴

Town of Clinton Recommended Model Development Principles for Protection of Natural Resources in the Hudson River Estuary Watershed: Consensus of the Local Site Planning Roundtable. (2006). Town of Clinton et al.⁵

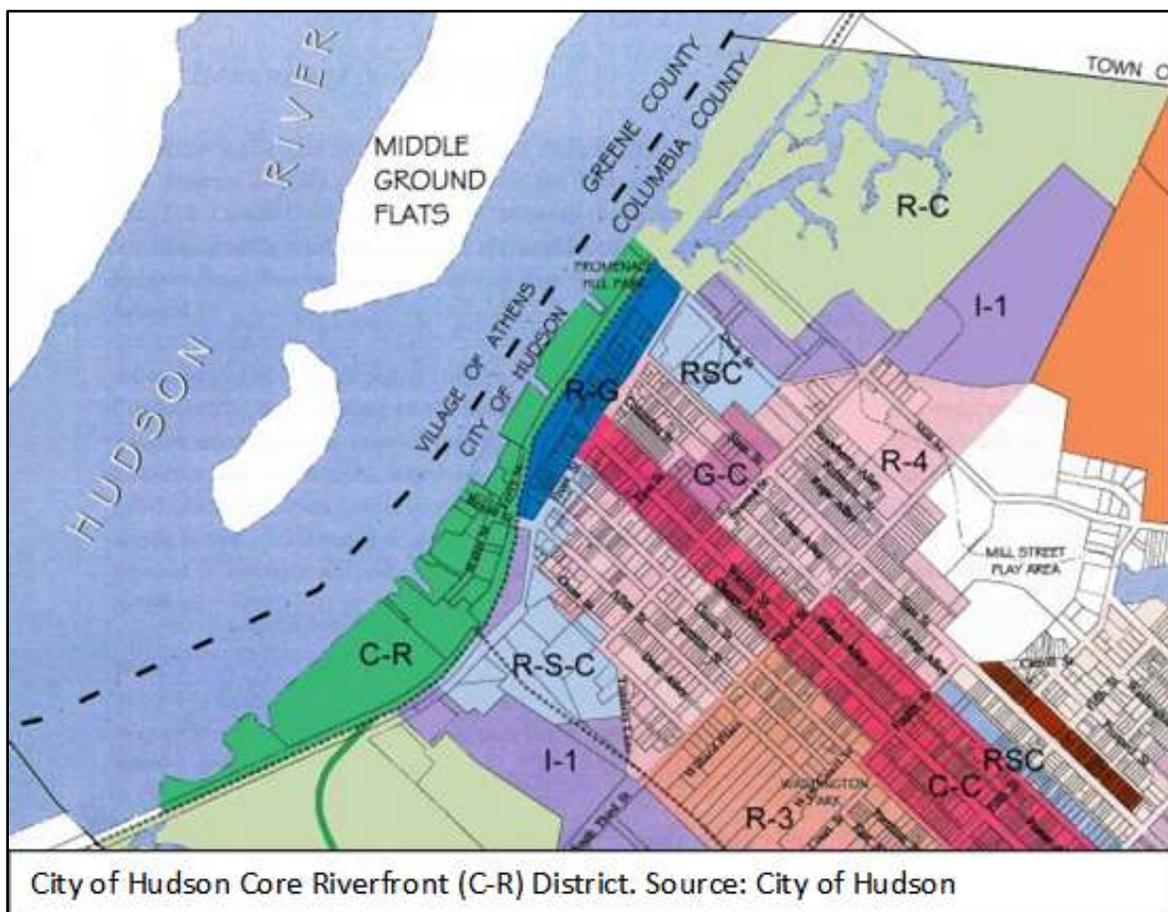
New York State Association of Conservation Commissions website at <http://www.nysaccny.org/>⁶

1.1.1 Waterfront Zoning District

A zoning district may be created that is located along the waterfront. The requirements can help the community achieve several goals, including:

- Enhancing commercial development important to the waterfront;
- Protecting existing views;
- Protecting and enhancing marine-related uses of the waterfront;
- Providing for maximum public benefit in new development or redevelopment of land while increasing public access to and from the waterfront;
- Eliminating or mitigating adverse environmental impacts; and
- Addressing the potential for flooding, coastal storm surge, or sea level rise.

The image below is a portion of the City of Hudson (NY) zoning map which shows the Core Riverfront (C-R) District, as well as the nearby Recreational Conservation (R-C) District and Riverfront Gateway (R-G) District.⁷ All three districts were added to the municipal zoning law in 2011, which states that the purpose of the C-R District is to “encourage a mixture of compatible uses at the riverfront; to provide access to the riverfront for water-dependent transportation and recreational uses and water-enhanced uses such as restaurants and publicly accessible walking and biking trails; to ensure that such uses are compatible; and to protect the visual, cultural, natural, ecological and historical resources of the City's core riverfront area.”⁸



The model below regulates a number of things, including uses on existing docks. Municipalities that wish to regulate the construction of docks, wharves, etc. may need specific authority, if located outside of Long Island. That authority may be achieved through the following methods:

- Adoption of a NYS Department of State-approved Harbor Management Plan (see Executive Law Section 922);
- Participation in the Hudson River Valley Greenway Compact (see Environmental Conservation Law Article 44);
- Inclusion by special legislation in Navigation Law Section 46-a.

The example below contains resiliency provisions in the standard for special uses. While the resiliency provisions may not be extensive, the law would establish a framework in which additional resiliency measures could be enacted to protect the riverfront.

USAGE

Amend the section of the municipal zoning law establishing zoning districts to include a new district and amend the municipal zoning map to show the location of the district. Amend use and dimensional standards to include requirements related to the new zoning district.

ADAPTED FROM THE FOLLOWING SOURCE

City of Hudson (NY) Municipal Code, Chapter 325 Zoning, Article III District Use Regulations and Attachment 1, Section 325-17.1 Core Riverfront C-R District⁹

LANGUAGE

Section X. Riverfront District (RD)

A. District purpose. The purpose of the Riverfront District is to encourage a mixture of compatible uses at the riverfront; to provide access to the riverfront for water-dependent transportation and recreational uses and water-enhanced uses such as restaurants and publicly accessible walking and biking trails; to ensure that such uses are compatible; and to protect the visual, cultural, natural, ecological and historical resources of the [city/town/village]'s core riverfront area.

B. Site plan approval. All new uses or change of uses in the Riverfront District will be subject to site plan approval by the Planning Board pursuant to [insert section number and title for site plan review].

C. Permitted uses. Subject to the bulk and area regulations of the Riverfront District, no building shall be erected, moved, altered, rebuilt or enlarged, nor shall any land or building be used, designed or arranged to be used, in whole or in part, for any purpose in the Riverfront District except the following:

- (1) Public docks and launches for pleasure or recreational watercraft.

(2) Public parks, including but not limited to public beaches, boat launch areas, and playing fields.

(3) Public and private recreation facilities and amenities, including but not limited to snack bar or cafe to service public parks, walking and biking trails, boat rental facilities, information kiosks.

(4) Tour, commercial, charter, and/or fishing boat operations.

(5) Boating instruction schools.

(6) Water taxis and ferries.

D. Special uses. Other than the permissible uses set forth in Paragraph C above and the accessory uses set forth in Paragraph E below, and subject to the bulk and area regulations of the Riverfront District, no building shall be erected, moved, altered, rebuilt or enlarged, nor shall any land or improvement thereon be constructed, altered, paved, improved or rebuilt, in whole or in part, for any purpose in the Riverfront District, except that the following special uses are permitted, subject to the approval of the Planning Board in accordance with *[insert section number and title for special use permit review]*. These uses are further subject to the regulations specified below and elsewhere in this chapter.

(1) Continuation of existing commercial dock operations for the transport and shipment of goods and raw materials, including loading and unloading facilities, and storage of such goods and raw materials, and associated private roads providing ingress and egress to or from such commercial dock operations, as such uses existed on the effective date of this law. Any existing commercial dock operation may continue to operate as a nonconforming use until such time as one or more of the actions or events specified in Paragraph D above is proposed to be undertaken. Where one of the actions or events specified in Paragraph D above is proposed, in addition to the provisions of *[insert section number and title for special use permit review]*, and as more fully set forth in Paragraph G(2) below, the Planning Board shall impose additional conditions on such use as may be necessary to protect the health, safety and welfare of residents living in close proximity to commercial docks and the public while recreating and using public facilities adjacent to commercial docks *[add the following if applicable, "as authorized in the Local Waterfront Revitalization Program"]*.

(2) A private causeway or private road that provides ingress to or egress from the property upon which a commercial dock operation is conducted as set forth in Paragraph G (2) below.

(3) Public and private marinas.

(4) Annual or private membership clubs providing private playgrounds, swimming pools, tennis courts, marina and boat launch facilities, related recreational buildings. [See *City of Hudson (NY) Zoning Law section 325-7, Paragraph B (3).*]¹⁰

(5) Railroad, public utility, radio and television transmission and receiving antennas, rights-of-way and structures necessary to serve areas within the [city/town/village].

(6) Multiple dwellings, hotels (not including rooming houses and boardinghouses) and motels.

(7) Telecommunications towers as provided for [insert section number and title for zoning provisions addressing telecommunications facilities].

(8) Eating and drinking places.

E. Accessory uses. Customary and accessory uses, including off-street parking as regulated in [insert section number and title for parking regulations], permitted accessory uses as provided for in [insert section number and title for accessory use section of the one-family residential district or include list here] and signs as regulated in [insert section number and title for supplementary sign regulations]. [Note that the City of Hudson provides for customary home occupations, professional offices or studios, private garages or carports, and household pets.]

F. Dimensional Standards. Dimensional standards for the Riverfront District are: [either provide a table as illustrated below or refer to a schedule of dimensional standards. The table below is based on the City of Hudson law. Consider adding a percentage for maximum impervious surface coverage; see discussion in section 1.2.3 Maximum Lot Coverage.]

District	Riverfront District
Minimum Required:	
Lot area:	
Total	6,000 square feet
Per dwelling unit	1,000 square feet
Lot width	100 feet
Lot depth	100 feet
Front yard	10 feet
Each side yard	10 feet
Rear yard	20 feet
Usable open space per dwelling unit	400 square feet
Off-street parking spaces per dwelling unit	1
Maximum Permitted:	
Lot coverage	30%
Building height:	
Number of stories	3
Feet	35 feet
Building length (feet)	-

Walls intersecting at an interior angle of more than 135° shall be considered one building wall. To be considered as a separate wall, any break in said plane shall have a minimum length and depth of at least 60 feet.

The Planning Board may approve a front yard setback that conforms with the prevailing building setback for the respective street on which a property is located.

G. Standards for special uses.

(1) For all uses allowed by special use permit, where the subject property abuts the water, the Planning Board shall consider the quality and extent of views from the adjacent public streets through the property to the water as well as the design and relationship of development to the waterfront as viewed from the water.

(2) Standards for commercial dock operations (including private roads providing ingress and egress to the commercial dock operations):

(a) Emissions of dust, smoke, gas, odor or air pollution, or by reason of the deposit, discharge or dispersal of liquid or solid wastes in any form in a manner or amount as to cause permanent damage to the soil or waters shall not adversely affect the surrounding area or create a nuisance. See [*insert section number and title of zoning section that prohibits uses in all districts*].

(b) In order to minimize nuisance noise from loading dock operations to residential receptors and nearby uses, noise shall be kept within the limits established in [*insert section number and title of zoning section that regulates noise*]. Control measures may include, as the Planning Board deems appropriate, the placement of noise-attenuating barriers and landscaping around loading docks.

(c) Loading or unloading operations at the docks and truck arrivals and departures shall be limited to the hours of 7:00 a.m. to 7:00 p.m. This limitation shall not apply to on-water operations by tugboats and barges.

(d) Truck engine idling is prohibited at loading docks.

(e) Artificial lighting facilities of any kind with light sources visible beyond the lot lines or which create glare beyond such lines are prohibited pursuant to [*insert section number and title of zoning section that prohibits uses in all districts*], subject to lightening devices deemed necessary for the public safety and welfare by federal, state or [*city/town/village*] authorities.

(f) Visual impacts associated with such operation shall be minimized. Corridors from a public street or tract of land that provide a direct and unobstructed view to the water from a vantage point within a public street, public park or other public

place shall be protected wherever possible. Outdoor storage of goods and raw materials shall be screened from the public view to the greatest extent possible.

(g) As far as practical, public access to and along the river shall be incorporated into site designs for conditional uses but shall not substantially interfere with the established uses on the property.

(h) In areas of annual flooding, floodplains and wetlands shall be preserved in their natural state to the maximum possible extent practicable to protect water retention, overflow and other natural functions.

(i) Loading and unloading operations at the docks shall be conducted in a manner designed to minimize adverse effects on water quality, fish and wildlife, vegetation, bank stabilization, water flow, and permitted uses on adjoining property.

(j) Construction, reconstruction or resurfacing of and other improvements to the dock operations (including private roads providing ingress and egress to the commercial dock operations) shall be performed in a manner which preserves natural features and drainways, minimizes grading and cut and fill operations, ensures conformity with natural topography, and retains natural vegetation and vegetative buffers around water bodies to the maximum extent practicable in order to prevent any increase in erosion or the volume and rate or velocity of sedimentation or surface water runoff prior to, during, and after site preparation and work.

(3) Standards for a private causeway or private road that provide ingress to or egress from the property upon which a commercial dock operation is conducted include in areas of annual flooding, floodplains and wetlands shall be preserved in their natural state to the maximum possible extent practicable to protect water retention, overflow and other natural functions.

(4) Special conditions for public and private marinas include the following:

(a) Docks and moored vessels must be situated so as not to interfere with the free and direct access to such waters from the property, wharf, dock or similar structure of any other person unless written permission is obtained therefor from such other person.

(b) Any application for a dock to be constructed at the end of a right-of-way will require written consent from all parties having an interest in the right-of-way.

(c) All docks 50 feet or longer in length must be equipped with a U.S. Coast Guard approved regulatory navigation light at the seaward end of the dock facility.

(d) As far as practical, public access to and along the river shall be incorporated into site designs for marinas.

(5) Special conditions for multiple dwellings, motels and hotels include the following:

(a) The design, scale, and appearance of units, structures, and the entire facility shall be compatible with present and potential uses of adjacent properties and structures.

(b) The size, scale or configuration of a proposed facility must be found not to create an undue increase in traffic congestion on adjacent and nearby public streets or highways.

(c) Structures and outdoor activities will be reasonably screened from adjacent properties. Landscaping and buffer zones will be provided to reduce noise, dust, and visibility.

(d) Outdoor lighting shall be contained on the site and shielded to assure that lighting is not visible from neighboring lots.

(e) There shall be no outdoor public address or music system audible beyond the limits of the site.

(f) The number of guest rooms may be limited to the availability of public water and sewage facilities.

(6) Special conditions for eating and drinking places include the following:

(a) There shall be no outdoor public address or music system audible beyond the limits of the site.

(b) The maximum customer capacity of the restaurant shall be calculated in order to determine potential sewage and kitchen waste disposal. A plan demonstrating how the disposal of sewage and kitchen wastes will be handled shall be provided.

(c) Structures and outdoor eating areas will be reasonably screened from adjacent properties. Landscaping and buffer zones will be provided to reduce noise, dust, and visibility.

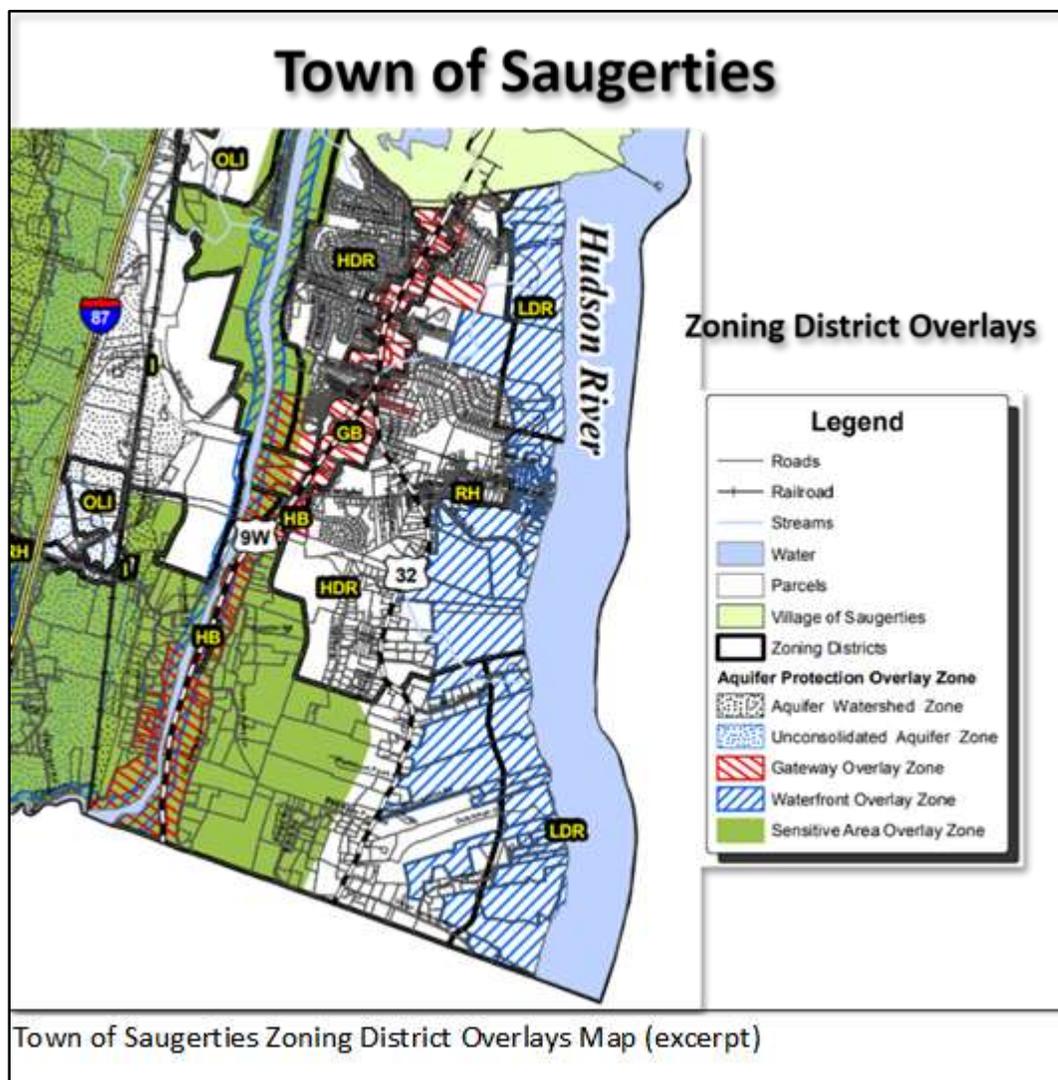
(d) Outdoor lighting shall be contained on the site and shielded to assure that lighting is not visible from neighboring lots.

G. Salt storage. The stockpiling or storage of road salt is not a permitted, conditional or accessory use.

1.1.2 Waterfront Overlay District

An overlay district is a district of any shape or size that is superimposed over the underlying “base” zoning district(s) to protect a resource (e.g., a river or historic area), address a special problem, or guide development within a special area. The overlay district essentially adds a layer of safeguards, standards or incentives that may not have been considered for the base zoning uses. The base zoning requirements still apply but overlay district standards apply in cases where the base and overlay requirements conflict.

Shown below is an excerpt from the Town of Saugerties zoning map, which shows several different overlay districts, including a Waterfront Overlay Zone along the Hudson River. The district, represented by the area within the blue slashes, overlays several districts like the Low Density Residential (LDR), Residential Hamlet (RH), and High Density Residential (HDR) districts.¹¹



Waterfront overlay districts can be designed to protect waterfront property for the community, promote high quality development sensitive to the unique environmental resources and enhance public enjoyment and use of the waterfront by having additional requirements for review and

approval of site plans. These requirements are based around ensuring that all development is done in a way that protects the waterfront for public use while protecting private and public property to the extent possible. This can be done by looking at current master plans, zoning and public vision.

The purpose of the following waterfront overlay district example is to protect and enhance the shoreline with a focus on improving water quality and preventing erosion. In the example below, a buffer strip is required to reduce soil erosion and runoff. A waterfront buffer might be larger.

RESOURCES

*Guidance on Natural Resiliency Measures.*¹²

USAGE

Identify the area(s) of the municipality that would be included in the Waterfront Overlay District and prepare a map showing those areas as an overlay to the municipal zoning map. Amend the section of the zoning law establishing zoning districts to include the new overlay district and amend use and dimensional standards to include requirements related to the new zoning district.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Saugerties (NY) Municipal Code, Chapter 245 Zoning, Article VI General Regulations, Section 245-26 Waterfront Overlay District¹³

LANGUAGE

Section X. Waterfront Overlay District

A. Purpose. The purpose of this district is to protect and enhance the shoreline, through protecting water quality and preventing erosion along the [____ River/Creek/Lake] within the [Town/Village/City of _____], by allowing property owners to enjoy their property and access to the waterfront while protecting the environmental and scenic quality of the shoreline from degradation. To further this purpose, this section establishes criteria to be followed by applicants in the design of projects and to be followed by the Planning Board as part of the site plan approval process as set forth in [insert zoning section]. All development in the Waterfront Overlay District will be reviewed on a case-by-case basis via the site plan review process to ensure appropriate layout and design of all properties.

B. Applicability and location.

(1) The Waterfront Overlay District is superimposed over the basic zoning districts as set forth on the [town/village/city] Zoning Map. The regulations presented in this section shall only apply to those lands located within the boundaries of the Waterfront Overlay District as overlaid on the [town/village/city] Zoning Map. In such overlay district,

proposed land uses are subject to the requirements set forth in this section, in addition to those requirements and standards ordinarily applicable to the underlying district. In case of conflict, the more restrictive regulation requirements shall apply.

(2) The following areas of the [town/village/city] are hereby designated as Waterfront Overlay Districts: properties or portions of properties located within [insert number of feet, such as 1,000] feet of the [_____River/Creek/Lake]'s mean-high-water mark. If any portion of the property is located within the boundaries of this overlay district, the entire property is subject to the regulations set forth in this section.

C. Effect on Schedule of Uses. All uses in a Waterfront Overlay District shall be subject to the site plan approval process, as set forth in [insert chapter or section number for site plan review]. As such, the Schedule of Uses is modified in this respect for lands contained in a Waterfront Overlay District.

D. Effect on Schedule of District Area and Bulk Regulations. All uses in a Waterfront Overlay District, except water-dependent uses, including docks, boathouses and storage sheds for water-related uses, shall have a minimum [insert number of feet, such as 150] feet setback from the mean-high-water mark.

E. Waterfront Overlay District standards. In addition to the standards set forth throughout this chapter, the following site plan review standards shall apply throughout a Waterfront Overlay District:

(1) General standards.

(a) There shall be no clear-cutting of trees. In addition, measures will be taken to protect and preserve as much mature vegetation as possible on the site, including but not limited to trees of six inches in diameter or more measured at 4 1/2 feet above grade.

(b) There shall be no destruction, damage or modification of, or interference with, the natural, scenic, topographic or physical features of the site.

(c) Landscaping and setbacks shall protect and be compatible with local and regional scenic quality, adjacent fish and wildlife habitats, freshwater wetlands and coastal waters.

(d) Structure height and bulk shall not detract from the natural topography and natural visual quality of the local area or region and shall be compatible with the site and the adjacent sites.

(e) Any new on-site sewage disposal systems must comply with [cite applicable standards, such as the county health or New York State Department of Health standards].

(f) Outdoor lighting shall be shielded to prevent glare hazard on the waterfront and adjacent properties.

(g) Existing trails shall be retained whenever possible.

(2) Shoreline vegetative buffer.

(a) Shoreline buffer strips of no less than [*insert number of feet, such as 100*] feet in width from the mean-high-water mark are required. Buffers shall consist of trees and shrubs for purposes of preserving the natural and aesthetic quality of the shoreline, protecting against shoreline erosion, providing a filter strip for stormwater runoff, and providing wildlife habitat.

(b) No more than [*insert percentage, such as 30%*] of vegetation within the buffer may be thinned during any five-year period. Thinning may be done to provide views of the water, but mature trees shall remain. Property owners may raise the tree canopy by trimming lower branches or top trees to slow growth to maintain their views of the [_____ *River/Creek/Lake*].

(c) The property owner may remove mature trees only if such trees are diseased or damaged. Such trees shall be replaced with appropriate species that will help protect water quality and prevent erosion.

(d) In the event that the shoreline is already cleared, such as former cropland, a buffer strip consisting of native vegetation that will help protect water quality and prevent erosion shall be reestablished.

(e) Limited access to the [*river/creek/lake*] may be created by a contiguous clear-cut opening in the buffer strip that does not exceed [*insert number of feet, such as ten*] linear feet in width. The pathway created should be constructed or surfaced to be effective in controlling erosion.

(3) Properties on steep slopes. The following standards shall apply to steep slopes (areas of greater than [*insert percent of grade, such as fifteen*] percent grade) at or near the water's edge that exceed fifteen feet in elevation measured from the high-water line or bottom of the slope, whichever is higher, to the top of the slope. "At or near the water's edge" shall mean within thirty feet of the mean-high-water mark.

(a) Building setbacks from the shoreline as specified herein shall be measured from the edge of the steep slope.

(b) No construction shall take place within [*insert number of feet, such as one hundred*] feet of the top edge of the steep slope. No land clearance or grading involving motorized equipment shall take place within [*insert number of feet, such as one hundred*] feet of the top edge of the steep slope.

(c) No vegetation shall be removed from the steep slope.

(d) Stairways or walkways constructed on the steep slope shall require a special use permit from the [*Planning Board/Zoning Board of Appeals*].

1.1.3 Waterfront Bluff Overlay District

One consequence of sea level rise and increased precipitation is the accelerated rate of erosion along beach or river bluffs. Historically, the nation’s shorelines have been receding at an average rate of slightly more than 1 foot per year,¹⁴ but local rates vary tremendously.

Municipalities may develop an overlay district where additional regulations are layered over the underlying district in an area along a waterfront bluff. The district can require buffers that will address current and future risk. Buffers can restrict the location of structures and protect the bluff from erosion due to the consequences of development such as clear-cutting and runoff. Buffers can ensure new structures are set back far enough inland from the bluff edge such that they will not be endangered by erosion over the life of the structure and will not drive the use of a hardening shoreline protective measures.

The Town of Lloyd (NY), home to the Walkway Over the Hudson, adopted a Waterfront Bluff Overlay District local law which emphasizes protection of the views to and from the bluff, while also protecting water resources and addressing erosion control. To reduce the number of structures perched at the edge of the bluff, the law provides close review of proposed development and minimization of vegetation removal. The law restricts cutting of trees with a diameter greater than 18 inches at 4 1/2 feet above grade, but communities could improve resiliency by preserving trees with an even smaller diameter.

USAGE

Identify the area(s) of the municipality that would be included in a waterfront bluff overlay district and provide a map showing those areas as an overlay to the municipal zoning map. Amend the section of the municipal zoning law which established zoning districts to include a new overlay district. See the Town of Lloyd overlay district for language related to other standards, requirements, and enforcement provisions.

Amend other sections of law as necessary to reflect the existence of the new overlay district, such as the definition section, bulk standards, and use standards. Supplement this law with additional restrictions from cutting trees greater than a specific diameter, as well as standards related to stormwater drainage.

Amend the general requirements section of the subdivision law to mention conformity to the overlay district provisions.

LOCAL LAW ADAPTED AS A MODEL

Town of Lloyd (NY) Municipal Code, Chapter 100 Zoning, Article V Overlay and Other District Regulations, Section 100-25 Waterfront Bluff Overlay District¹⁵ and Chapter 90 Subdivision of Land, Section 90-3 General Requirements¹⁶

LANGUAGE

Add the following definitions to the list of zoning definitions in the municipal code:

Bluff Line - The bluff line is hereby defined as the line at the top bluff, cliff or steep slope rising from the *[insert name]* River shoreline or at the upper elevational limit of a slope of 20% or more above the *[insert name]* River shoreline.

Erosion Protection Structure - A structure specifically designed to reduce or prevent erosion such as a groin, jetty, revetment or breakwater or artificial beach nourishment project.

Add the following to the zoning regulations:

Section X. Waterfront Bluff Overlay District (WBOD)

A. Authority and purpose.

(1) These regulations are enacted under the authority of §10 of the Municipal Home Rule Law, *[Article 2-A of the General City Law/Article 16 of the Town Law/Article 7 of the Village Law]* and Article 42 of the Executive Law of New York State, in order to protect and enhance the physical and visual environment of the *[City/Town/Village of ____]* and for the protection, order, conduct, safety, health and well-being of people and property within the *[City/Town/Village]*.

(2) The Waterfront Bluff Overlay District is hereby established. It is the purpose of the Waterfront Bluff Overlay District (WBOD) to afford priority to waterfront-compatible, well-designed uses and to control development in ways that protect and enhance the *[insert name]* River waterfront's natural, scenic and cultural resources. Further, it is the purpose of the WBOD to protect and preserve sensitive environmental areas; prevent soil erosion, sedimentation and slope failure due to removal of vegetation; protect and enhance, to the maximum extent possible, the scenic qualities of the *[City/Town/Village]'s* waterfront area by maintaining, creating and continuing the vegetative corridor of the *[insert name]* River region; prevent, to the maximum extent possible, the loss, alteration or diminution of public view of the *[insert name]* River and opposite shore; prevent activities which will cause water pollution; and to implement the policies and purposes of the *[City/Town/Village of ____]* comprehensive plan *[if the community has a local waterfront revitalization program, substitute Local Waterfront Revitalization Program in place of comprehensive plan]*. Further, it is the intent of the *[City/Town/Village of ____]* to protect and preserve the scenic resources of the *[City/Town/Village]*, to ensure that the benefits provided by the *[insert name]* River views will not be lost for present and future generations and to protect the broader public interest.

(3) The WBOD regulations are to be superimposed on the primary zoning district provisions and should be considered as additional requirements to be met by the applicant or developer, prior to project approval. If there should arise a conflict between

the provisions of the WBOD and the provisions of the underlying zoning district, the more restrictive shall apply.

(4) Regulated land use activities proposed in the WBOD, as defined by Chapter *[insert number]* of this Zoning Law, shall require site plan review and approval by the *[City/Town/Village of ____]* Planning Board, pursuant to the provisions of the WBOD and all other applicable sections of this Zoning Law. *[If the community has a local waterfront revitalization program, add: The Planning Board will at the same time review the proposed use for consistency with the policies and purposes of the Waterfront Revitalization Program, pursuant to specific provisions of the Waterfront Consistency Review Law.]*

B. Location, boundaries and maps.

(1) The location and boundaries of the *[City/Town/Village of ____]* Waterfront Bluff Overlay District shall be delineated on the Official *[City/Town/Village of ____]* Zoning Map on file in the *[City/Town/Village]* Clerk's office and the *[City/Town/Village]* Building and Zoning Department.

(2) The *[City/Town/Village of ____]* Waterfront Bluff Overlay District shall be mapped as that area from *[insert description of area]*.

C. Permitted uses. All uses permitted in the underlying zoning district are permitted in the WBOD, subject to applicable standards of the underlying zoning district and of the WBOD and subject to site plan review and approval.

D. Regulated activities. No person shall conduct any of the following regulated activities within the WBOD, unless such person has first applied for and obtained site plan approval by the Planning Board in accordance with the provisions of the WBOD and in accordance with all applicable provisions of the underlying zoning district. Other permits may be necessary from state or federal agencies pursuant to requirements of other state and federal laws.

(1) Construction of new residential structures or structural additions to or modifications of existing residential structures. This shall not include interior alterations, or normal and routine maintenance and repair of existing structures, provided that the use does not change.

(2) Construction of all new nonresidential structures or structural additions to existing nonresidential structures.

(3) A significant and substantial change in use of an existing nonresidential structure. A significant and substantial change in use shall be deemed to have occurred if there is:

(a) Any change in use affecting 2,000 or more square feet of an existing nonresidential structure;

(b) An increase of 50% or more in total square footage of an existing nonresidential structure;

- (c) An increase of 50% in water and sewer demand;
- (d) An increase of 50% in the generation of solid wastes;
- (e) An increase of 50% in required parking; or
- (f) Potential use of hazardous materials.

(4) Construction or placement of any new on-site sewage disposal system, including individual sewage disposal systems, septic tanks, septic drainage or leach fields.

(5) Filling or excavating activities in excess of 200 cubic yards of material.

(6) The cutting down of any trees over [*insert diameter of tree, such as 12 inches*] in diameter measured 4 1/2 feet above the base of the tree on any property within the district. Also included shall be any tree and vegetative clearing and removal activities that either directly or indirectly will cause soil to be exposed and subject to erosion. This shall not include normal and routine tree and shrub care and maintenance, including removal of only dead trees and vegetation.

(7) Discharge of stormwater associated with human activity and/or construction and placement of stormwater runoff systems.

(8) Permanent outside storage of materials and equipment on property within the district. This shall not include normal accessory residential storage activities.

(9) Construction of vehicular public or private roads, trails and bridges.

(10) Construction of docks, boat launching facilities and fishing facilities, including associated parking areas.

(11) The construction, modification or restoration of erosion-protection structures within the district.

E. Exempt activities. The following activities are exempt from the provisions of the WBOD:

(1) Lawn care and maintenance.

(2) Home gardening activities.

(3) Normal and routine tree and shrub care and maintenance, including removal of dead vegetation. However, this shall not include any tree and vegetative clearing and removal activities that either directly or indirectly will cause the soil to be exposed and subject to erosion.

(4) Removal of structures.

(5) Repair and maintenance of existing structures.

(6) Replacement, repair and maintenance of faulty or deteriorated on-site sewage disposal systems, including individual sewage disposal systems, septic tanks, septic drainage or leach fields.

(7) Commercial agricultural activities, except those activities involving the construction or reconstruction of structures or the cutting down of any trees over [*insert diameter of tree, such as 12 inches*] in diameter measured 4 1/2 feet above the base of the tree. However, this shall not include any tree and vegetative clearing and removal activities that either directly or indirectly will cause the soil to be exposed and subject to erosion.

(8) Any actual or ongoing emergency activity which is immediately necessary for the protection and preservation of life, property or natural resources.

F. Development standards and review procedures during site plan review.

(1) General provisions

(a) Applications for site plan approval within the WBOD shall be made in writing to the Planning Board on forms available in the Planning Board office. Such an application shall be signed by the property owner and may be made by the property owner or his/her agent and shall be accompanied by any materials or information deemed appropriate by the Planning Board, including but not limited to all of the information required by the site plan review provisions and the following additional information, specific to the WBOD:

[i] The location of all existing and proposed impervious surfaces such as roads, driveway, sidewalks, etc., on the property or within 100 feet of the proposed work site.

[ii] Existing and proposed contour levels for the property at two-foot contour intervals within 100 feet of the proposed work site or within the property limits. For purposes here, the term "work site" shall be defined as that area for which human disturbance activities are proposed.

[iii] The location of all proposed waterfront public access/recreation provisions, if applicable.

[iv] The location and types of all existing and proposed tree, shrub and vegetation masses, as well as all trees with a diameter of [*insert diameter of tree, such as 12 inches*] or more, measured 4 1/2 feet above the base of the tree within 100 feet of the work site or within the property limits.

[v] The location of fire and other emergency zones, including the location of the nearest water supply for fire emergencies.

[vi] For all new structures proposed, except accessory structures, a comprehensive scenic landscape protection report shall be provided. Such report shall include, at a minimum, information about existing and proposed vegetation, color of structures and landscaping proposed in order to protect, enhance and continue the vegetative corridor of the [insert name] River region. Color of structures and landscaping shall be an integral part of the report. The report shall include but not be limited to the following:

1. A detailed narrative description, with accompanying maps, sketches, photographs, simulations, etc., of how the proposed development or activity will provide a scenic buffer and blend into the landscape of the WBOD. Such information shall include a description of existing and proposed vegetation, proposed color of structures and proposed landscaping. The types of information that shall be included in this report are: a general description of the condition of existing trees and vegetation; the general location, size and species of trees to be preserved, and those to be removed; and the general location, size and species of proposed trees and other vegetation to be planted.

2. The report shall describe in a detailed narrative, and accompanied by any other pertinent maps, drawings or similar information, how the proposed development will be consistent with the scenic elements and aesthetic significance of any areas of Scenic Areas of Statewide Significance (19 NYCRR Part 602).

3. The report shall address the functional aspects of landscaping such as ongoing maintenance, drainage, erosion prevention, wind barriers and reduction of glare. Any plant material proposed shall be selected for its ability to survive the climate in the region, its structure, texture and color and for its ultimate growth. Plants that are indigenous to the area and others that will be hardy, harmonious to the design and of attractive appearance should be selected.

[vii] The location, design and size of all signs and lighting facilities.

[viii] The approximate locations and dimensions of areas proposed for neighborhood parks, playgrounds and other permanent open space.

[ix] Description and location of erosion control measures including proposed location of sediment sink/settling ponds and interceptor swales, etc.

[x] The location and design of all stormwater management facilities.

[xi] A drainage report including supporting design data and copies of computations used as a basis for the design capacities and performance of closed drainage facilities.

[xii] Record of application and approval status of all necessary permits from federal, state and county officials.

[xiii] A completed SEQR visual environmental assessment form.

(2) Development standards. Site plan approval to undertake any regulated activity within the WBOD shall not be issued by the Planning Board unless the applicant can adequately demonstrate to the Planning Board's satisfaction that:

(a) To the extent possible, structures, storage and parking areas shall be set back from the identified *[insert name]* River bluff ridgeline to reduce opportunities for erosion, sedimentation and slope failure and to protect the scenic qualities of the waterfront area by maintaining, creating and continuing the vegetative corridor of the *[insert name]* River region. Structures proposed below the bluff ridgeline shall make use of natural vegetation and topography and shall be designed in such a way as to enhance visual, scenic and cultural character of the *[insert name]* River waterfront area.

(b) The proposed land use activity will avoid excessive or unnecessary grading, indiscriminate earthmoving or the clearing of property and removal of trees and vegetation which would disfigure natural land forms.

(c) As appropriate to the type of proposed land use activity, the scenic landscape protection buffer measures should protect and enhance, to the maximum extent possible, the scenic qualities of the WBOD area, and the Scenic Areas of Statewide Significance by maintaining, creating and continuing the vegetative corridor of the *[insert name]* River region. While complete vegetative screening is not required, sufficient plant material shall be provided to protect, enhance and continue the vegetative corridor of the *[insert name]* River region.

(d) All proposed buildings and structures are to be clustered together to the maximum extent possible, where appropriate, and depending on the nature of the proposed activity, to ensure that the surrounding visual/natural environment is maintained as much as possible, to retain the quality and extent of view from adjacent public streets through the property to the *[insert name]* River, to save open space and to provide visual organization to the development.

(e) Excavations or cuts made to the steep slope associated with a bluff shall only be permitted where such activities involve bluff cuts made in directions that take advantage of the natural contours of the land or are at oblique angles to the shoreline in order to minimize erosion, control runoff and protect scenic

resources. Side slopes and other disturbed on-roadway areas must be stabilized with vegetation or other approved physical means. Completed paths, accessways or roadways must be stabilized and appropriate drainage provided. *[Note: the source law describes steep slopes as those with 15 percent gradient or greater. A municipality may wish to further restrict development of steep slopes. See Chapter 5 Stormwater Control Measures.]*

(f) Plants or other acceptable ground cover shall be reestablished in disturbed areas immediately upon completion of development activity so as to prevent uncontrolled erosion or slipping of soil or cause sediment to be discharged into the *[insert name]* River, wetlands or into the tributaries, or both, and in order to maintain the natural resource and scenic characteristics of the *[insert name]* River coastal area.

(g) Additional stormwater drainage associated with proposed construction (during and after construction) shall not cause erosion or siltation, contribute to slope failures, pollute surface waters or cause damage to or flooding of property. Drainage systems shall be designed and located to ensure slope stability. Best management practices shall be used to prevent erosion and the introduction of runoff contaminants from entering the waters within the WBOD.

[i] Runoff or other nonpoint pollutant sources from any specific development activity must not be greater than would be the case under natural conditions. Appropriate techniques to minimize such effects shall include but not be limited to the use of stormwater detention basin, rooftop runoff disposal, rooftop detention, parking lot and impervious surface storage and cistern storage systems.

[ii] Natural ground contours should be followed as closely as possible and grading minimized.

[iii] Extreme care should be exercised to locate artificial drainageways so that their final gradient and resultant discharge velocity will not create additional erosion problems.

[iv] The amount of time that disturbed ground surfaces are exposed to the energy of rainfall and runoff water should be limited.

[v] Natural protective vegetation should remain undisturbed if at all possible; otherwise, plantings should compensate for the disturbance.

[vi] The velocity of runoff water on all areas subject to erosion should be reduced below that necessary to erode the materials.

[vii] Sufficient ground cover should be applied to restrain erosion on that portion of the disturbed area undergoing no further active disturbances.

[viii] Runoff from a work site should be controlled to avoid transportation of sediment from the site.

[ix] The angle for graded slopes and fills should be limited to an angle no greater than that which can be retained by vegetative cover or other erosion control devices or structures.

[x] The length, as well as the angle, of graded slopes should be minimized to reduce the erosive velocity of runoff water.

(h) Any new parking lot or area, road, trail or bridge shall be so located, designed and constructed so as to minimize its visibility from the river and minimize alteration or destabilization of the soils.

Add the following to the general requirements section of the subdivision regulations:

X. Conformity to Zoning Code, Official Map and Comprehensive Plan. Subdivisions shall conform to the roads and parks shown on the Official Zoning Map of the [City/Town/Village]. Additionally, subdivisions shall be designed to ensure that subdivision development, including but not limited to the construction of dwellings and the roads therein, complies with the standards of the Waterfront Bluff Overlay District, properly conforms to the requirements of the [City/Town/Village] Zoning Code and shall be consistent with the Comprehensive Plan.

1.1.4 Transfer of Development Rights

Transfer of Development Rights, or TDR, is a land use regulation technique that can be used to advance the open space goals of the municipality without causing a financial burden to landowners or restricting needed development. The Department of State *Transfer of Development Rights* publication describes TDR as a zoning technique designed to preserve or protect natural or man-made property resources for the public's benefit.¹⁷ "A well thought out and administered TDR program ultimately generates development that is more cost-effective and efficient. The use of TDR reduces the prospect of litigation over preservation policies; it avoids the use of municipal funds to purchase land while helping to ensure preservation goals; importantly, it means that the municipality can increase its tax base but does not have to settle for less preservation than it really wants."¹⁸

"In essence, TDR permits all or part of the density potential (established in the local zoning law or ordinance) of one tract of land to be transferred to a noncontiguous parcel or even to land owned by someone else. The development rights become a separate article of property, which can be sold to a landowner whose property is better suited to greater densities. After selling the development rights, a landowner still retains title and all other rights to his land. These other rights permit farming, forestry, some recreational uses, and other non-intensive uses. In addition, the owner may sell or exchange the title to the land just as if the development rights had not been transferred."¹⁹ While the intent is very broad, TDR for natural resource protection means that development is prohibited on the designated property, but allowed in a more suitable location, in order to preserve open space and/or protect a natural resource that provides a valuable service, such as flood risk reduction.

"TDR involves attaching development rights (the right to develop land) to specified lands desired by the municipality to be kept 'undeveloped' and permitting these rights to be transferred from that land, so the development they represent may occur somewhere else. The rights are considered severable for the land ownership so that they may be sold. The 'somewhere else' would be lands for which more development and higher density would be acceptable."²⁰

When developing a local transfer of development rights law, the municipality will need to consider the overall land use policy of the community when designating both sending districts and receiving districts, as well as the potential environmental impacts of TDR. In addition, state statutes require municipalities to avoid creating a negative impact on the potential for development of low- or moderate-income housing as a result of TDR.

There are several variations of TDR programs. No variation has been singled out as a model for this chapter. For municipalities interested in TDR, keep in mind that local laws adopted in other states may not meet the requirements of the statutes in New York State. Also, many examples of TDR laws from communities on Long Island were adopted to implement the 1993 Long Island Pine Barrens Act.

Local TDR laws adopted by a New York State municipality will be highly specific to the needs, desires, and capacity of the municipality adopting it. The following are examples of communities in New York State with TDR Laws. Others may also exist.

- Town of Riverhead, adopted in 2018²¹
- Town of Lysander, adopted in 2008 and repealed in 2015.²²
- Town of Warwick, adopted in 2008²³
- Town of Clifton Park, adopted in 2005²⁴
- Town of Eden, adopted in 1977²⁵

RESOURCES

Transfer of Development Rights. (2010). New York State Department of State. ²⁶

Fact Sheet: Transfer of Development Rights. (2001). American Farmland Trust.²⁷

Siders, A. *Managed Coastal Retreat: A Handbook of Tools, Case Studies, and Lessons Learned.* (2013). Columbia Center for Climate Change Law Columbia Law School.²⁸

Otto, K. *Smart Growth through the Transfer of Development Rights.* (2010). New Jersey.²⁹

1.2 Height, Bulk, and Area Regulations

Height, bulk, and area regulations control the size and placement of structures on a building lot, as well as the dimensions of the lot itself. By controlling those factors, municipalities set the development capacity of designated areas. The following table is a summary of the techniques illustrated in this section that can be used to control development, with a goal of making the community more resilient to the effects of increased flooding and the effects of impervious surfaces, runoff, and pooling water.

Tool	Context
Minimum Lot Size	In flood-prone areas, it may be desirable to establish a higher minimum lot size to reduce the number of building lots that may be created, providing greater area for natural systems to process stormwater and reduce flood risk. This approach would ideally be combined with maximum lot coverage standards.
Maximum Building Height	Allows an increase in the maximum building height (with restrictions on ground-level uses) for buildings in a district where building elevation is necessary due to flood risk, enabling property owners to elevate existing buildings without the need for a zoning variance. Can also be used where a community implements a higher design flood elevation to allow new construction to accommodate the same amount of square footage as a non-elevated building that complies with prior maximum building height.
Maximum Lot Coverage	Specifies that the calculation of percentage of lot coverage includes impervious surfaces like driveways, accessory structures, and pools that can contribute to stormwater runoff.
Setbacks	Requires setbacks from water courses and water bodies in order to preserve shorelines and protect development from flooding, coastal storm surges, and sea-level rise. See examples in the <i>Coastal Shoreline Protection Measures</i> chapter.

1.2.1 Minimum Lot Size

Reducing development in flood-prone areas allows the natural landscape to absorb more floodwaters, reducing flood damage to structures and human life and providing a natural storm protective buffer. Through the zoning enabling statutes, local governments have the authority to limit development in the floodplain on the basis of risk to health, safety and welfare. For example, it may be desirable to have larger minimum lot sizes in some zoning districts to reduce the number of building lots and to protect natural resources which process stormwater runoff and reduce flood risk. Combining minimum lot size with additional zoning regulations, such as limits on the number of principal uses or a cap on maximum lot coverage, enhances the goal of limiting risk to persons and property.

Minimum lot size is established in the zoning law for each zoning district and is part of the calculation of buildable land for subdivision purposes. As minimum lot size is increased, the number of building lots allowed in a subdivision will decrease. Because larger minimum lot sizes can contribute to sprawl, cluster or conservation subdivision are alternative approaches to consider for some areas of a community. (See Section 1.5.7 of this chapter for more information.)

In addition to requiring conformance with zoning, planning boards are also charged with ensuring lots on a subdivision plat can be used safely for building purposes without danger to health or peril from flood, drainage or other hazards. (See Section 1.5 of this chapter for more information.) In fulfilling this duty, planning boards may require lots on subdivision plats to be larger than the minimum required by zoning in order to safely accommodate development.

USAGE

Amend the general standards and requirements provision of the subdivision law to include a statement relating to the need for buildable areas where the subdivision includes lots in the floodplain.

Amend the dimensional regulations of the municipal zoning law as they relate to the floodplain district.

ADAPTED FROM THE FOLLOWING SOURCE

City of Middletown (CT) Municipal Code, Section 46 Flood Area Managements Regulations, Section 46.06 Design Standards for Subdivision Proposals, Section 46.06.07³⁰

Town of Wheatland (NY) Municipal Code, Chapter 130 Zoning, Article II Zoning Map; District Regulations, Section 10-11 Floodplain and Residence Districts: Table of Dimensional Regulations³¹

LANGUAGE

Amend the general standards and requirements section of the subdivision law:

(X) All subdivision proposals shall be consistent with the need to minimize flood damage. All proposed lots shall have a minimum buildable area outside the natural (non-filled) 100-year floodplain. The buildable area shall be large enough to accommodate any primary structures and associated structures such as sheds, barns, swimming pools, detached garages, on-site sewerage disposal systems, and water supply wells, if applicable.

Amend the District Regulations – Area Schedule in the zoning law.

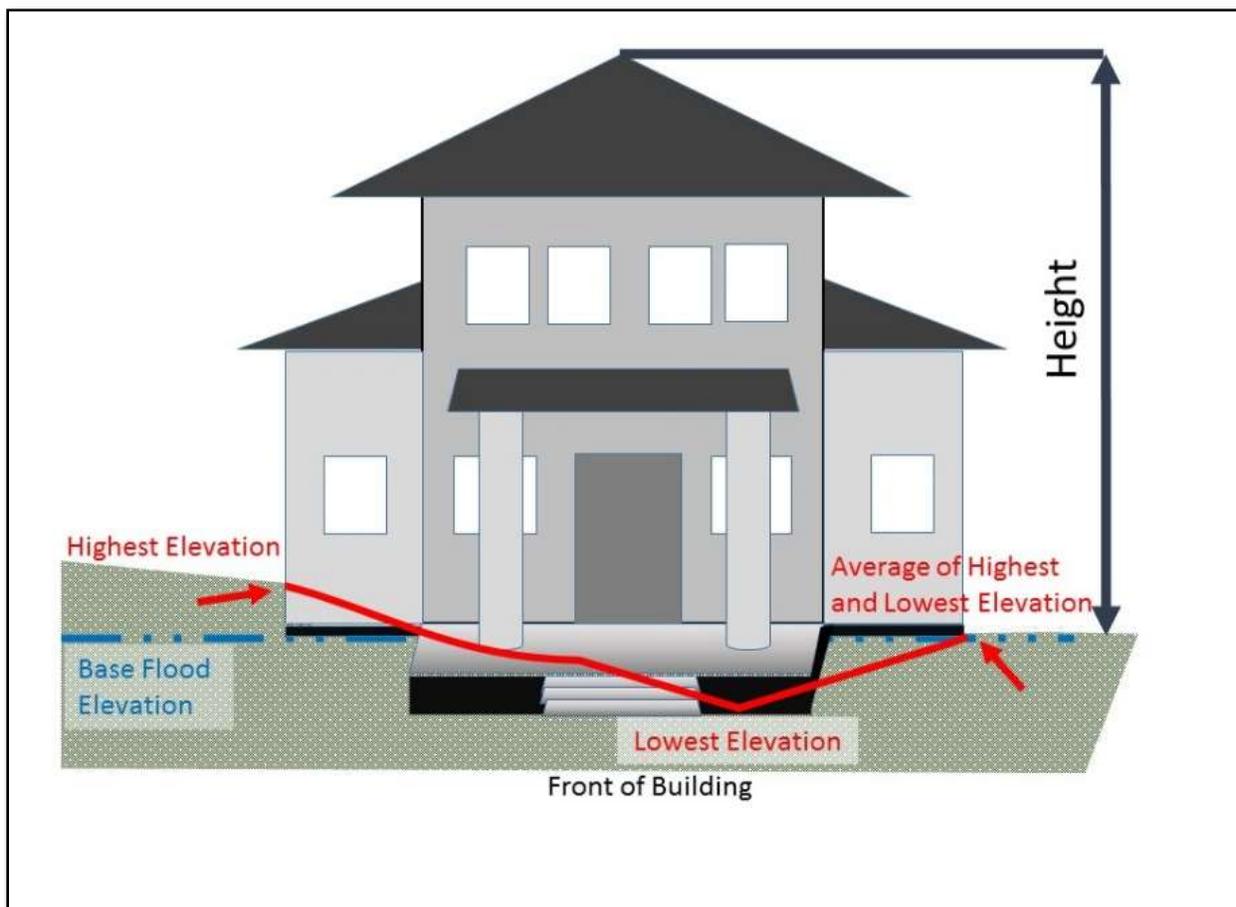
Floodplain and Residence Districts: Table of Dimensional Regulations	
Dimensional Provisions	Flood Hazard District (F-1)
Lot area, minimum	5 acres
Lot coverage, percent of total area occupied by main and accessory buildings	1 percent
Lot width, minimum	300 feet
Front Yard, minimum as measured from the street line	100 feet
Side Yard, minimum for one	50 feet
Side Yard, total for both on interior lot	100 feet
Side Yard abutting side street on corner lot, minimum	100 feet
Rear Yard, minimum	50 feet
Where public sewers are not available, no lot shall be built upon which has insufficient space for a private sanitary waste disposal system, as determined by the [<i>insert name of applicable health department</i>].	

1.2.2 Maximum Building Height

Zoning laws typically establish a maximum building height based on the use or district in which the structure will be located. The height selected might factor into the availability of firefighting equipment, the circulation of air, access to sunlight, neighborhood character, protection of views, and impact on building density. Allowing taller buildings while limiting lot coverage is a way to maintain density and provide increased building square footage without increasing building footprints and the amount of impervious surfaces. Less impervious surface will reduce stormwater runoff, which contributes to flooding.

Following Superstorm Sandy in 2012 and other recent weather events, many municipalities received requests for permits to reconstruct buildings that were significantly damaged due to storm-related flooding or other hazards. Reconstruction in many areas involves elevation of the structure to comply with the building code and to reduce federal flood insurance premiums; however, elevation in compliance with the building code could result in a violation of the height restrictions of the zoning district, thus requiring homeowners to seek height variances from the zoning board of appeals.

The Town of Islip (NY) found that homeowners seeking to elevate their homes after Hurricane Sandy often required height variances from the Town of Islip zoning board of appeals. Height measurements at the time were taken from the ground level, which were often below FEMA's



flood lines. To address this, the Town of Islip amended the zoning law to relax height restrictions on dwellings located in FEMA-designated Special Flood Hazard Areas.

To address the potential burden on storm-damaged property, and to encourage pro-active elevation to avoid future storm damage, a municipality could provide for taller structures through an increase in height restrictions; a change in the way height is calculated; or a reclassification of buildings that will need elevation as legal non-complying buildings after the elevation.

BUILDING RELOCATION

In the context of sea level rise and flooding, the maximum height allowed can impact the cost or degree of difficulty of reconstruction of a storm damaged structure, the cost of relocation, and the amount of stormwater runoff. Smaller homes face fewer obstructions than larger or taller ones that could require detour around overpasses or the raising of utility lines, increasing the cost of relocation. The short-term economic disincentive for moving a structure could increase the likelihood the structure will stay in place and face repetitive damage, ultimately resulting in personal and societal costs associated with insurance and rebuilding.

RESOURCES

Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures. (2012). FEMA P-259.³²

USAGE

Add to the general provisions of the municipal zoning law an explanation of how to determine the building height of a single-family residence and any accessory structures in areas of special flood hazards. Select one of the two options provided to complete the explanation.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Islip (NY) Municipal Code, Chapter 68 Zoning, Article 1 General Provisions, Section 68-3³³

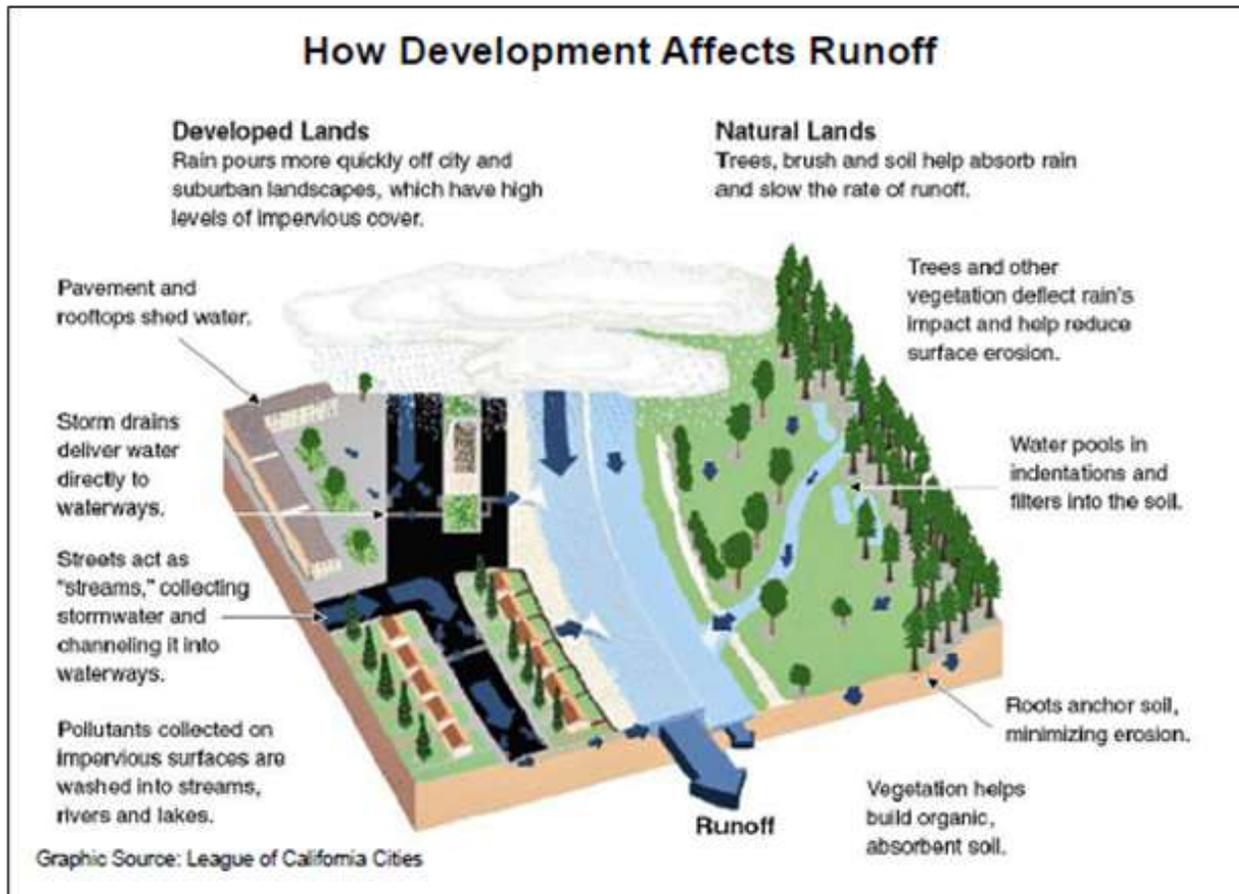
LANGUAGE

Building Height, Single-Family Residence. Unless otherwise stated, the building height for any single-family residence and any structure(s) accessory thereto is the vertical distance from the average grade of the ground at the base of the structure, or the average grade at the street, whichever is less, to the highest point of the roof, provided that chimneys, spires and similar permitted projections shall not be included in the height. Within an area of special flood hazard as defined by the [City/Town/Village of _____] Flood Damage Prevention Law, building height shall be measured from the average grade of the ground at the base of the structure or the

minimum elevation necessary to meet the prerequisites for federal flood insurance as determined by the National Flood Insurance Program/FEMA shown on any applicable Flood Insurance Rate Map. The [*Commissioner of Planning/Zoning Enforcement Officer/Building Inspector or his/her designee*] shall be responsible for any interpretations concerning average grade and/or base flood elevation.

1.2.3 Maximum Lot Coverage

Maximum lot coverage is a zoning standard that limits the amount of land in a developable lot that can be covered by buildings, structures and impermeable areas such as asphalt driveways and concrete patios. An impervious surface is land cover that cannot effectively absorb or infiltrate water, such as non-porous asphalt or asphalt sealants, non-porous concrete, roofing materials, and certain gravel surfaces used in roadways or parking lots. Some municipalities require a certain percentage of planting area, with the remainder available for pavement and buildings installed pursuant to zoning.



Source: <http://planning.westchestergov.com/images/stories/reports/FLOODGUIDE.pdf>

The “maximum lot coverage for structures” requirement ensures open space on a lot which helps to maintain a consistent land use pattern in residential neighborhoods, provides for adequate light and air to all properties, and prevents public nuisances like increased storm water runoff and other environmental hazards.

Lot coverage regulations vary on the types of impervious surface which is factored into the coverage equation. A less restrictive approach for residential properties would only be to count permanent structures such as homes, garages, porches, and sheds. A moderate approach would add to the list sidewalks, driveways, paved patios, sport courts, and other impervious surfaces.

The most inclusive approach would also include wooden or composite planked decks without spacing between the planks and impervious area underneath, ponds, and swimming pools.

Chapter 178 of the City of New Rochelle (NY) Zoning Law is dedicated to impervious surfaces. The purpose statement says:

Natural, pervious surfaces have a direct relationship to the health, safety and welfare of the community since the percolation of rainfall through soils reduces erosion and flooding, contributes to the replenishment of groundwater and groundwater ecosystems, provides for the removal of pollutants contained in surface waters, reduces the need for the public construction of storm drains, basins, and other off-site structures, provides a medium for the planting and maintenance of groundcover and trees, reduces heat and the need for air conditioning, absorbs air pollution, and adds to the aesthetic quality of the community. The covering of natural pervious surfaces with macadam, concrete, tiles, bricks, roofs, and other impervious surfaces for the creation of subdivisions and for residential and nonresidential development on private lots, even when dry-wells and other on-site storage and treatment systems are utilized, contributes to higher ambient temperatures and greater demand for energy, increased loss of habitat for insects, birds, and other wildlife, covering of productive topsoil, global warming and ozone depletion, water pollution, all of which adversely affect the inhabitants of the City of New Rochelle. Trees are recognized as being able to mitigate the negative effects described above.³⁴

New Rochelle requires applicants for building permits for new construction, building expansion, parking area, driveway, swimming pool, or other structures that will create or expand impervious surfaces by more than 200 square feet to get a permit specifying the allowed amount of impervious surface and the required environmental mitigation. Mitigation includes the planting of trees or, where technically impractical or impossible, the payment of fees to the City Tree Fund to defray the City's costs for acquisition, maintenance, and planting of trees elsewhere.³⁵

Other ways to minimize impervious surfaces may be accomplished by municipalities through local policies and road development standards. For example:

- Reduce required roadway widths
- Change requirements related to sidewalk widths and allow construction with permeable materials
- Reduce required driveway widths and consider requiring porous pavement or other permeable surfaces for some or all of the driveway
- Minimize the number and size of cul-de-sacs

USAGE

Insert into the definitions and general standards sections of a municipal zoning law, and into the schedule of dimensional regulations for each zoning district.

ADAPTED FROM THE FOLLOWING SOURCE

LANGUAGE

Add the following definitions to the list of zoning definitions in the municipal code:

Building - Any structure over four feet high having a roof, self-supporting or supported by columns, walls, air pressure, or similar supports, which is affixed to the ground and intended for the housing or enclosure of persons, animals or chattel.

Diameter at Breast Height (DBH) - A standard measurement of trees made at 4 1/2 feet above ground level on the uphill side.

Impervious Surface - Any surface or material through which water will not flow under ordinary hydrostatic pressure and including structures, parking areas, driveways, sidewalks, terraces and paved areas.

Lot Coverage, Total - That percentage of lot area covered by the ground floor area of all buildings sited thereon, together with all other structures, including pavement and other impervious surfaces.

Structure - Anything constructed or erected, the use of which requires location in the ground or attachment to something having location in the ground. Included are buildings, swimming pools, parking garages, decks, paddle tennis courts, or any assembly of materials over four feet in height, but not anything requiring only simple paving or surfacing of the ground, such as parking lots, driveways or sidewalks.

Add to the General Standards section of the zoning law:

(1) Creation or expansion of impervious surface.

(a) On private property, no person who requires or will require a building permit for new construction, building expansion, parking area, driveway, swimming pool, or other structure shall be permitted to create impervious surface or to expand any existing impervious surface by more than 200 square feet, utilizing macadam, concrete, tiles or bricks with mortar, asphalt shingles, slate, plastic, or other similar impervious material, through the construction of buildings, carports, driveways, walkways, patios, pools, roadways, sidewalks, or other similar structures without first obtaining a permit from the [*Code Enforcement Officer/Building Inspector*] and without required mitigation as approved by the approval authority.

(b) Approval authority. Where the building permit approval process requires prior approval by the Planning Board, as in the case of site plans, subdivisions, and some special permit uses, the Planning Board shall be the approval authority. In all other

cases, where a building permit is required for construction, demolition, site work, or development, the [Code Enforcement Officer/Building Inspector] shall be the approval authority.

(c) Permit process. The permit to create or increase impervious surface by more than 200 square feet shall be part of the existing building permit application and approval process. The applicant shall provide a schedule precisely calculating the increased area of impervious surface on the parcel or lot for which the building permit is being sought, which schedule shall be clear enough to allow verification by Bureau of Buildings staff. The applicant shall also clearly calculate and summarize the total additional diameter of trees proposed to be planted. Plans submitted with the building permit application shall indicate where trees are proposed to be planted and shall identify species and DBH of proposed trees to enable Bureau of Buildings staff verification.

(d) Mitigation. To mitigate the negative environmental impacts associated with the creation or expansion of impervious surfaces, for every 200 square feet of impervious surface created or expanded or part thereof in excess of the first 200 square feet, the property owner shall plant one tree with a minimum DBH of two inches. Trees with a greater DBH may satisfy this requirement in a mathematically proportionate manner, so that, for example, a tree with four-inch DBH may be planted for 400 square feet of newly created or expanded impervious surface beyond the first 200 square feet. Such trees shall be planted in accordance with the specifications of the landscape nursery from which the tree(s) is purchased or of a licensed design professional.

Add to the Schedule of Dimensional Regulations for each district.

District/Use	Maximum Dimensional Requirements	
	Coverage	
	Buildings	Impervious Surfaces
General Commercial	100%	100%
Light Industry	60%	90%
Two-Family	30%	60%
One-Family Waterfront Residence	25%	45%
One-Family Residence	20%	35%

[A schedule of dimensional regulations or bulk standards chart will typically include other information, such as allowed density (dwelling units per gross acre), minimum lot frontage, front setback, side setbacks, rear setbacks, and height limits. The chart here is abbreviated to focus on lot coverage and impervious surface area.]

1.2.4 Setbacks

A setback is a minimum distance that a structure must be placed away from a property line or another structure. Setback distance is an important decision as it can determine the life of the structure and prevent costly shore protection measures down the line by property owners attempting to stop the natural process of coastal retreat. There are a variety of methods that can be used as the basis of a setback. While ideally, setbacks should take into consideration all factors comprehensively, it may be more straight-forward for local law development to identify a single component to establish as a basis of setback.

Municipalities may also wish to establish setbacks from natural features such as a river's mean highwater mark or the center of a stream by enactment of a separate local law, independent of the zoning regulations and the zoning variance process. When doing so, consideration should be given as to how local code enforcement officials can determine compliance with such standard. When drafting a local law that would establish setbacks from such features, the municipal attorney must draft the separate local law to include a provision superseding the State zoning enabling statutes in Town Law or Village Law (as appropriate), citing the authority to adopt local laws under the New York State Constitution Article IX and Municipal Home Rule Law § 10. Additional guidance regarding supersession of State statutes can be found in the Department of State publication, *Adopting Local Laws in New York State*.³⁷ The *Coastal Shoreline Protection Measures* chapter of these model local laws contains several model setback provisions that require supersession.

Model flood damage prevention laws that communities can adopt to join the National Flood Insurance Program (NFIP) are available from the NYS Department of Environmental Conservation. Flood damage prevention laws are typically separate from zoning and contain their own variance procedures. Such laws are enforced by a "Local Administrator" whose duties include reviewing subdivision and other proposed new development to determine whether building sites will be reasonably safe from flooding. If a proposed building site is located in an area of special flood hazard, all new construction and substantial improvements must meet the applicable standards contained in the construction standards section of the flood damage prevention law. The example below, which is adapted from a similar model from the State of Mississippi, would add to the construction standards section a paragraph describing the need for building sites to be setback from a special flood hazard area a distance that factors in the slope of the land. The *Management of Floodplain Development* chapter of these model local laws includes information about flood damage prevention laws and additional ways they can be enhanced to increase resiliency.

USAGE

Incorporate language into the local flood damage prevention law in the section generally presented under the heading “Construction Standards; General Standards; Subdivision and Development Proposals.”

ADAPTED FROM THE FOLLOWING SOURCE

City of Gulfport (MS) Flood Damage Prevention Ordinance (2008 Version), Article 5 Provisions for Flood Hazard Reduction, Section D Standards for Subdivision Proposals³⁸

Mississippi Emergency Management Agency Model Flood Damage Prevention Ordinance, Article 5 Provisions for Flood Hazard Reduction, Section F Standards for Subdivision Proposals and Other Proposed Development³⁹

LANGUAGE

Add the underlined language and table to the section of the flood damage prevention local law that establishes general standards for subdivision and development proposals:

5.1-1 SUBDIVISION AND DEVELOPMENT PROPOSALS

The following standards apply to all new subdivision proposals and other proposed development in areas of special flood hazard (including proposals for manufactured home and recreational vehicle parks and subdivisions):

(8) Each proposed lot must have a designated buildable site above the special flood hazard area (SFHA) as shown on the most current Flood Insurance Rate Map. The distance of the buildable pad or site above the SFHA shall depend on the slope of the ground and in accordance with the following table:

Distance from Special Flood Hazard Area	Minimum Slope from Special Flood Hazard Area to ground level at pad
20 feet	5.0 percent
30 feet	3.33 percent
40 feet	2.5 percent
50 feet	2.0 percent
60 feet	1.67 percent
70 feet	1.43 percent
80 feet	1.25 percent
90 feet	1.11 percent
100 feet	1.0 percent

1.3 Nonconformance

Adopting new land-use laws often leads to *nonconformance* for uses, structures or lots in existence at the time the new laws are adopted. “A nonconforming use is a use of property that was allowed under the zoning regulations at the time the use was established but which, because of subsequent changes in those regulations, is no longer a permitted use. A nonconforming structure is a structure that complied with zoning and development regulations at the time it was built but which, because of subsequent changes to the zoning and/or development regulations, no longer fully complies with those regulations.”⁴⁰ A non-conforming lot is one that was of lawful size at the time it was created but was rendered substandard in area by an increase in the minimum lot size requirements of the zoning.

The doctrine of nonconforming uses recognizes the implicit right of a property owner to continue to use his or her property as he or she has been doing in the past, however, the continuance of nonconforming uses “has been characterized by the courts as a ‘grudging tolerance’ of them, and the right of municipalities to adopt reasonable measures to eliminate or prohibit their expansion has been recognized.”⁴¹

Local laws can be enacted to extinguish nonconforming uses and structures, as well as substandard-sized lots. In developing local laws to extinguish them, a municipality must consider “the nature of the business of the property owner, the improvements erected on the land, the character of the neighborhood, and the detriment caused the property owner.”⁴²

Communities which embark on a rezoning, such as a town seeking to add resiliency components, may find that some resistance to the effort is driven by land owner uncertainty as to how the new law applies to property that is made nonconforming. Providing a nonconformance section will give landowners, local legislators, and administrative personnel clarity on how the new law applies.

In some cases, the desire may be to “hold the line” against further nonconformity, or to allow small changes in exchange for other concessions that would have a positive effect on the community. For example, in some lakeside communities consisting of tiny lots with inadequate stormwater control and wastewater disposal, municipalities allow summer camps to be rebuilt or converted to year-round homes. Rather than taking actions that might lead to disinvestment in lakeside structures and devaluation of lakeside property, the municipal strategy may be to encourage replacement of aging septic systems and require steps to reduce runoff. The NYS Clean Water Infrastructure Act of 2017 established the *State Septic System Replacement Fund* and allocated \$75 million to support the multi-year effort.⁴³

Two model local law provisions related to nonconformance are presented below. The first model local law (Section 1.3.1) would prohibit repairs to a flood-damaged structure that would equal or exceed 50% of the structure’s market value prior to the flood. The intent here is to discourage continued investment in structures in a flood-prone area. The model would also require flood insurance for the remaining nonconforming structures, making property owners responsible for compliance with the National Flood Insurance Program.

The second model (Section 1.3.2) would allow nonconforming structures in certain districts to be demolished and a new structure built without a variance or special use permit provided that the structure and lot on which it is situated comply with applicable maximum impermeable surface requirements. This provision is focused on decreasing stormwater runoff, rather than eliminating nonconforming structures.

1.3.1 Prohibit Substantial Improvements to Nonconforming Uses or Structures in Flood Prone Areas

Current and projected trends show increasing flood risk in New York. One factor in this increased risk will be increases in the frequency and severity of heavy-precipitation events, exacerbated by development. As land is covered with buildings or pavement, water runs off more rapidly and streams have higher flood peaks.

While many areas subject to flooding are shown on flood insurance rate maps, others are not due to assorted reasons, such as their small size or changed conditions since the map was prepared. This leaves many structures at risk for flood damage and without obligation for flood insurance.

The example below does not seek to actively phase out nonconforming uses or structures, but it does prohibit “substantial improvements” of nonconforming uses and/or structures. Most flood damage prevention laws define “substantial improvement” as any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. The term includes structures which have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

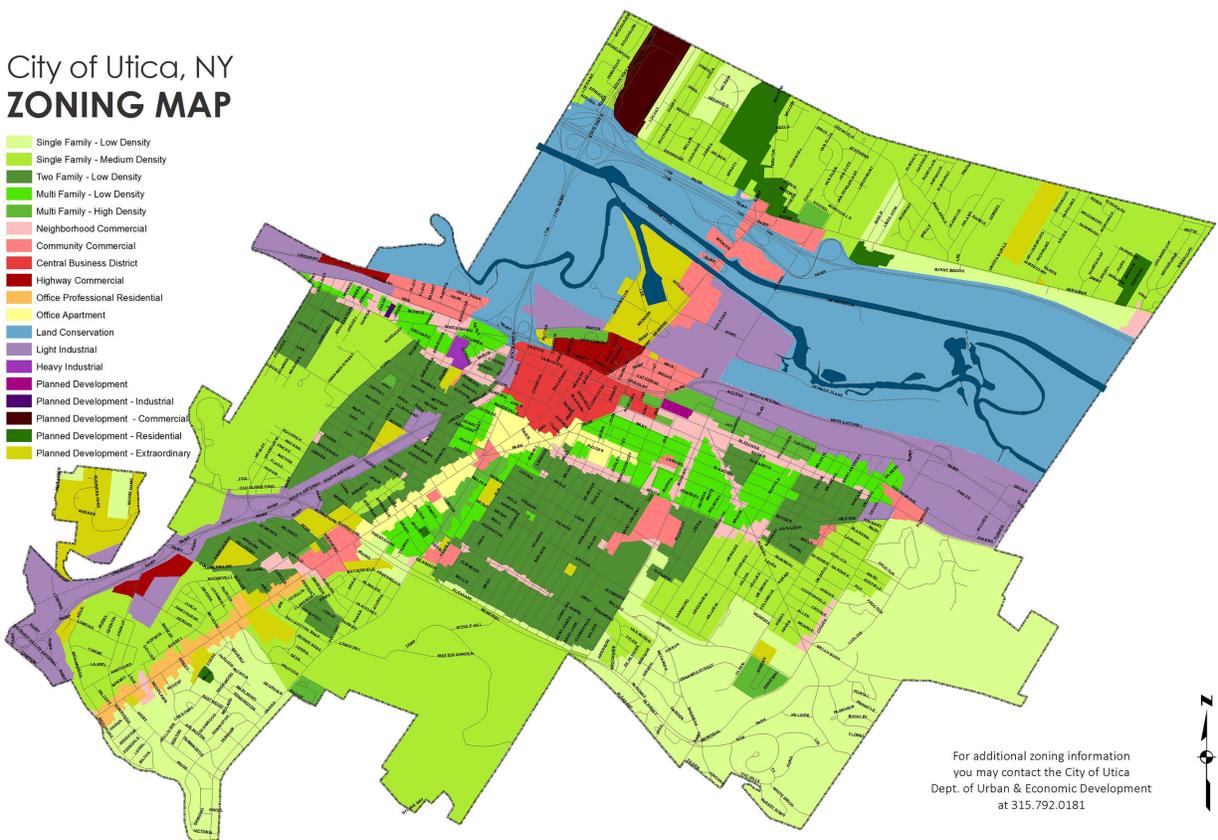
- (1) any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or
- (2) any alteration of a "Historic Structure," provided that the alteration will not preclude the structure's continued designation as a "Historic Structure."

Practically speaking, the model local law below would prohibit repairs to a flood-damaged structure that would equal or exceed 50% of the structure's market value prior to the flood. It is based on an ordinance adopted by the City of Utica in 1994 that made comprehensive revisions to city zoning, including creation of a Land Conservation District that encompassed the 100-year floodplain and floodway (see map⁴⁴).

The City of Utica's code lists a number of purposes for the district, such as protection of public health, safety and welfare; minimization of public and private property damage; minimization of the need for rescue and relief efforts at public expense; and putting potential home buyers, property owners, and tenants on notice that a particular piece of property is in a flood-prone area.

In recognition that some uses or structures within the newly formed district would no longer conform to the permitted uses in that district, the City of Utica included language describing the consequences for those uses, including the inability to make substantial improvements to nonconforming uses or structures. The City of Utica also included a provision requiring flood

hazard insurance, thereby making property owners responsible for meeting the requirements of the National Flood Insurance Program.⁴⁵



Source: City of Utica

The NFIP requires that if a community participates in the program, flood insurance is a prerequisite for receiving money from a federal agency or federally-supported financial programs, among which is mortgage loans regulated by the Federal Deposit Insurance Corporation and mortgages purchased by Fannie Mae or Freddie Mac. The mandatory purchase requirement applies to buildings located in Special Flood Hazard Areas (SFHAs) seeking such federal assistance. This requirement affects loans and grants for the purchase, construction, repair, or improvement of any publicly or privately-owned building in the SFHA.⁴⁶

USAGE

Add a new restriction and requirement to the zoning district regulations for a zoning district that includes large areas of land subject to periodic flooding, such as a district that encompasses a one-hundred-year floodplain.

ADAPTED FROM THE FOLLOWING SOURCE

City of Utica (NY) Municipal Code, Chapter 2-29 Zoning, Article IV District Regulations, Division 6 Land Conservation District, Section 2-29-255 Uses and/or Structures Rendered Nonconforming by the Adoption⁴⁷

LANGUAGE

A. Following the adoption of these provisions, any use or structure which is situated within the boundaries of the [*insert name of district, such as Land Conservation District or Flood Overlay Zone*] and which does not conform to the permitted uses specified for such district, shall be a nonconforming use or structure, regardless of its conformance to the district in which it is located without consideration of these provisions. Therefore:

- (1) Existing nonconforming uses and/or structures shall not be expanded.
- (2) Substantial improvements of nonconforming uses and/or structures will be not be allowed, irrespective of the cause for the need of the substantial improvements.
- (3) Uses and/or structures which continue to operate and/or exist within the boundaries of the one-hundred-year floodplain after nonconformance has been established will be required to obtain flood hazard insurance from the federal insurance administration. The [*City/Town/Village*] will simultaneously request a submission to rate on the structure to the Federal Emergency Management Agency. In the event the owners of structures or operations subject to this requirement fail to obtain flood hazard insurance within a reasonable period of time, the [*City/Town/Village*] shall secure such insurance and place the annual insurance premium costs as a lien against the title to the land and/or structure.

[Note: Liens placed on property may not be collected through taxation but may be collected at the time a property is sold, or through voluntary payment by the property owner who may be motivated by the need for a clean title.]

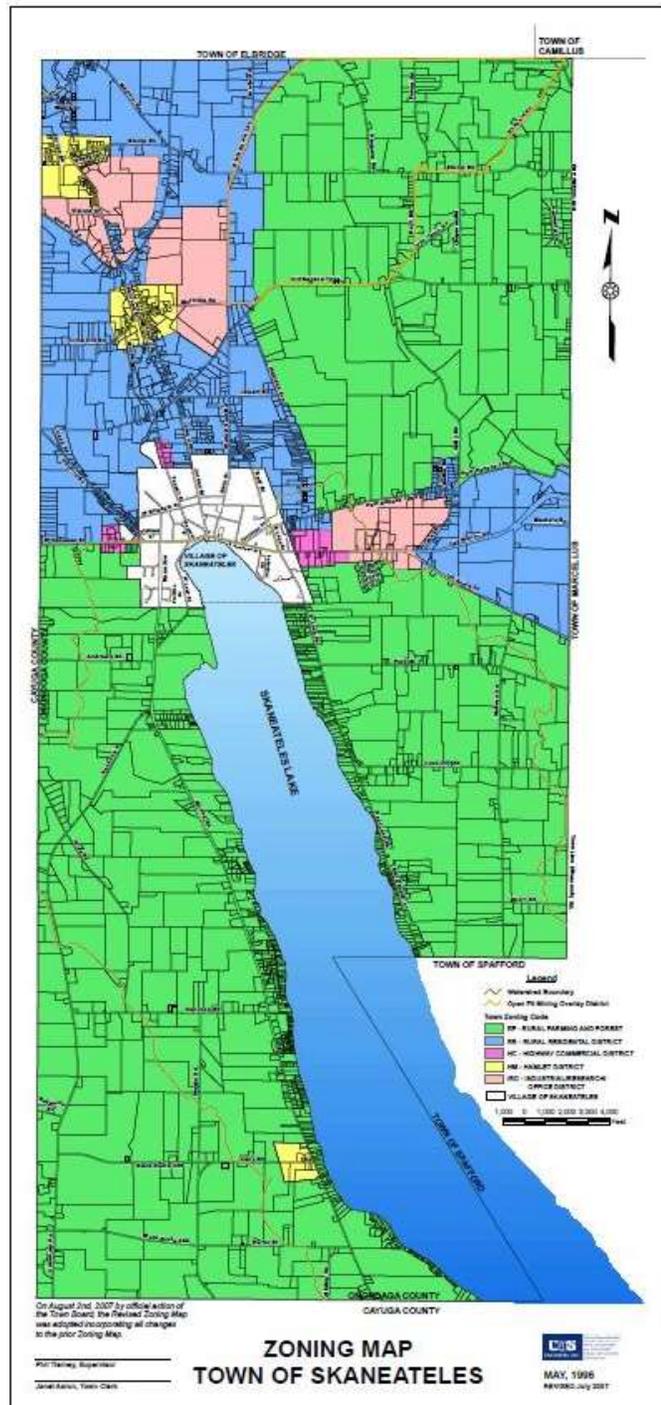
1.3.2 Nonconformance of Impermeable Surface Coverage

The establishment of a maximum percentage of impermeable surface coverage on a lot is one way of limiting the density of development and addressing stormwater runoff. This tool can be effective in areas that are already developed where the amount of impermeable surface increases over time as patios, sheds, basketball courts, parking pads and other amenities are added to residential lots. It can also be used where smaller lots are being redeveloped because of the desirability of the location, such as along lakes and rivers.

The Town of Skaneateles (NY) has adopted a set of minimum open space and maximum impermeable surface requirements to address stormwater runoff and to protect water quality of the town's surface waters, especially Skaneateles Lake.

According to town impermeable surface interim guidelines:⁴⁸

- The Minimum Open Space requirement specifies the amount of land to be retained as undeveloped green land (lawn, shrubs, trees, plantings, gardens and other forms of vegetated area) and limits the total amount of development that might occur on a lot. It varies from 80% to 30% of lot area depending on the district and land use. A typical residential lot with an 80% Minimum Open Space requirement could have a maximum of 20% of the lot developed or occupied by manmade improvements (house, garage, shed, walks and driveways).
- A portion of the 20% developable space must be below the Maximum Impermeable Surface requirement (typically 10% of total lot area). This requires the Town of Skaneateles and property-owner



to distinguish between improvements that are considered permeable (allowing water to penetrate into the ground) and those improvements that are impermeable (designed to shed water to adjacent areas). Guidelines help determine whether permeable paving systems, walls, mechanical pads, signs, pools, driveways and parking lots qualify as permeable or impermeable surfaces.

The Town of Skaneateles’ zoning law contains a variety of provisions relating to impermeable surface coverage. The strictest provisions apply in the Lake Watershed Overlay District where maximum impermeable surface coverage is 10%, except on lots which contain structures that are nonconforming as to impermeable surface coverage. The town allows legal nonconforming *lots* to be redeveloped by special use permit granted by the Planning Board, subject to applicable requirements, reduction of impermeable surface coverage on the lot to the maximum extent feasible, and use of practicable measures to minimize the impact of impermeable surface coverage on streams, lakes and groundwater.⁴⁹ If the proposed redevelopment would reduce impermeable surface coverage to bring the lot within compliance with zoning requirements, no special use permit would be required.

The town allows nonconforming *structures* to be demolished and a new structure built (to the same or lesser height and floor space and on the same or lesser footprint) without a variance or special use permit provided that the structure and lot on which it is situated comply with applicable maximum impermeable surface requirements. Especially interesting is the ability of the planning board to require mitigation if the structure and/or the lot on which it is situated do not comply with applicable maximum impermeable surface coverage requirements.⁵⁰

To illustrate the approach taken by the Town of Skaneateles:

A 10,000 sq. ft. lot that has 1,300 sq. ft. of impermeable surface coverage (ISC) is nonconforming where only ten percent ISC is allowed. That means the lot has 300 more square feet of ISC than allowed by zoning.

Formula	Example
Existing lot size x 10% = ISC allowed	10,000 x 0.10 = 1,000 sq. ft.
Existing ISC – ISC allowed = excess ISC	1,300 – 1,000 = 300 sq. ft.

The granting of a special use permit in Skaneateles would be conditioned upon the applicant obtaining either a conservation easement or making a monetary contribution to a fund. The mitigation amount is based on the additional square feet in size the lot would need to make the impermeable surface coverage meet guidelines. In this case, the amount would be an additional 3,000 sq. ft.

Formula	Example
(Existing ISC x 10) – existing lot size = additional land needed	(1,300 x 10) – 10,000 = 3,000 sq. ft
Land Needed x Prevailing Rate per sq. ft. = Payment for fund	3,000 x \$1.09 = \$3,270

The prevailing rate that Skaneateles uses is based on sales of vacant land (town-wide) for a rolling 5-year period to determine the cost of purchasing one acre of vacant land and is verified yearly. The model local law provisions below are based on the mitigation provisions in the Skaneateles zoning law. While they were developed for nonconforming structures and lots, they could be modified to apply to other cases where applicants are unable to meet municipal stormwater standards.

USAGE

To use this provision, a municipality must first incorporate requirements relating to maximum impermeable surface requirements into their zoning law. It must also create a fund to collect voluntary contributions related to mitigation measures and establish the value of the fair market cost to protect one acre of undeveloped land in a defined area.

Insert this language in the nonconforming lot and structure section of the zoning law, or into a new section of the stormwater chapter of the municipal code.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Skaneateles Zoning Law, Section 148-12 Nonconforming Uses, Structures and Lots and Section 148-56 Definitions⁵¹

LANGUAGE

Insert the following definitions in the Definitions section of the zoning law:

Impermeable Surface: Any roofed or other solid structure or material covering the ground through which water does not readily penetrate, including but not limited to concrete, oil and stone, tar or asphalt pavement, or compacted gravel. Regardless of the construction materials, any area which is used for driveway or parking purposes, including disturbed grass, ground cover, or dirt, shall be considered impermeable. A deck with spaced boards at least 1/8 inch apart and a patio with a permeable paving system shall not be considered impermeable. [*The Skaneateles law included swimming pools in the list of things not considered impermeable.*]

Redevelopment: Any change, modification, rehabilitation, or alteration of a preexisting and nonconforming lot whose total calculation of impermeable surface currently exceeds the maximum permitted by [*this chapter/the Zoning Law*], which expands or alters the existing footprint of structure located thereon.

Section X. Redevelopment of nonconforming lots and structures.

- A. A nonconforming structure may be demolished and a new structure built to the same or lesser height and floor space and on the same or lesser footprint without a variance or special permit, provided that the structure and the lot on which it is situated comply with applicable

maximum impermeable surface requirements. If the structure and/or the lot on which it is situated do not comply with applicable maximum impermeable surface coverage requirements, the Planning Board shall require the applicant to reduce impermeable surface coverage on the property to the maximum extent feasible as a condition of the special permit. The Planning Board may also require mitigation as provided in Paragraph B below. In no event may the special permit allow an applicant to increase the nonconforming impermeable surface coverage.

- B. If an applicant for a building permit to expand the floor area ratio or demolish and rebuild a legally nonconforming structure would be unable to reduce maximum impermeable surface coverage on the lot sufficiently to bring a lot proposed for redevelopment into compliance with applicable maximum impermeable surface coverage limitations for conforming lots, such applicant must apply to the *[Planning Board/Zoning Board of Appeals]* for a special use permit. The *[Planning Board/Zoning Board of Appeals]* may condition any approval of such a special use permit on either, at the applicant's option:

(1) The use of mitigation measures that result in the permanent protection by conservation easement of 10 square feet of land in the same general area for each square foot of impervious surface coverage greater than the area required to bring the lot into compliance with applicable coverage limitations for conforming lots sufficient to offset any drainage or environmental impact that might occur as a result of the lot exceeding the applicable coverage limitations. The determination as to the appropriate location of such protected land shall be made by the *[Planning Board/Zoning Board of Appeals]* in consultation with the *[City/Town/Village]* *[Engineer/Environmental Conservation Commission/Open Space Committee]*. The applicant shall bear the expenses associated with establishing the conservation easement. The conservation easement shall satisfy the requirements of § 247 of the General Municipal Law and/or §§ 49-0301 through 49-0311 of the Environmental Conservation Law, and shall be filed and recorded in the County Clerk's office; or

(2) A monetary contribution, equal to the cost to protect 10 square feet of land with a conservation easement for each square foot of impermeable surface coverage greater than the area permitted to bring the lot into compliance with applicable coverage limitations for conforming lots, to the *[City/Town/Village]*'s *[insert name of fund]*, established to acquire development rights or conservation easements on undeveloped land to promote permanent protection of the lake *[add wetland, river or coast if desired]* and other natural resources, which monetary contribution shall be determined by resolution or local law adopted from time to time by the *[City Council/Town Board/Village Board of Trustees]* in an amount equal to the fair market cost to protect one acre of undeveloped land in the *[define area, such as by zoning district or watershed]*.

1.4 Zoning For Post-Disaster Activities

To become more resilient in event of a disaster, communities should undertake a planning process that includes pre-disaster planning and post-disaster implementation steps. This can help communities recover from disasters more quickly, a sign of resilience. By developing post-disaster plans and implementing local laws, municipal officials and the community-at-large can anticipate the special needs of the community following a disaster; establish expectations related to community services; and lay the groundwork for more resilient land use patterns.

As a starting point for communities interested in planning for post-disaster activities, the following publications should be consulted. Just keep in mind when reading them that the laws and government structure in New York differ from many other states and what works in one state may not be permissible in another.

- *Post-Disaster Redevelopment Planning: A Guide for Florida Communities.*⁵² A guide developed by the Florida Department of Community Affairs and Florida Division of Emergency Management presents a process for vulnerable communities to do pre-disaster planning and post-disaster implementation. It includes brief case studies of issues pilot communities faced during their planning process.
- *Planning for Post-Disaster Recovery: Next Generation.*⁵³ How-to guidance prepared by the American Planning Association through a cooperative agreement with FEMA. The report includes a model recovery ordinance for communities that want to enhance their disaster recovery planning before a disaster strikes, and domestic and international case studies that share recovery lessons.

Some of the techniques included in this model local law publication use a zoning technique called a “Special Use Permit.” Special uses are permitted uses subject to certain criteria in local regulations and review by a designated review board--usually the planning board or zoning board of appeals, but sometimes the local governing board or a special board. Generally, the more specific the criteria for review, the more effective the special use permit regulations will be. If the review criteria are satisfied, the special use permit must be granted. If the applicant fails to meet the conditions required by the regulations, the review board must deny the special use permit and provide reasons for denial in its decision. If the review board denies the special use permit without explaining its basis for denial, the board's decision will have increased likelihood of being overturned if challenged. Greater specificity in the criteria or standards by which members of review boards evaluate applications for special use permits make those regulations easier for review boards to administer and their decisions easier to defend if challenged.

The special use permit is often the zoning tool that review boards engage for applications in overlay zones or other districts in which zoning laws have been written to protect a sensitive resource from the effects of development. When contemplating the issuance of special use permits, review boards evaluate the conditions needed to permit or deny development within or in close proximity of a flood hazard, wetland, steep slope, coastal erosion, and other sensitive areas.

In this section, we present several model local law provisions that anticipate storm recovery.

Technique	Description
Temporary Emergency Dwelling Permits	Allows the placement of an emergency dwelling on a lot where a dwelling damaged by flood, fire, or other disaster is located with the grant of a special use permit or other administrative permit.
Emergency Staging Bases	Allows the use of property as an emergency staging facility for public utility service providers when a special use permit is granted.
Temporary Mobile Office Units	Allows for the temporary use of mobile office units to serve established businesses that supply critical services necessary for storm recovery in the event of an emergency declaration.
Design Requirements for Elevated Buildings	Allows for existing residences in designated zoning districts to be elevated, even when doing so will create a non-compliant building height or setback. Requires mitigation of the visual effects of the elevation.
Non-Conversion Agreements	Requires homeowners to affirm an understanding of the limitations on construction and use of the enclosed areas below elevated homes.
Phased Reconstruction Moratorium	Sets up a process for a temporary phased reconstruction moratorium on building permits and land use approvals that is triggered by an emergency declaration or a significant scale of damage to structures in the municipality.
Emergency Activities	Authorizes private property owners to take emergency action, in certain situations, to protect privately-owned structures in coastal erosion hazard areas from damage caused by coastal flooding or erosion. See the <i>Coastal Shoreline Protection Measures</i> chapter.

RESOURCES

Post-Disaster Redevelopment Planning: A Guide for Florida Communities. (2010). Florida Department of Community Affairs and Florida Division of Emergency Management.⁵⁴

Planning for Post-Disaster Recovery: Next Generation. (2014). American Planning Association.⁵⁵

1.4.1 Temporary Emergency Dwelling Permits

The community may experience a shortage of suitable temporary dwelling units following a natural disaster that causes widespread damage to housing units, such as a hurricane or flood. It may be that the quantity of available units is too low; the quality of available units is poor; or the location of the units too distant from work or school. For example, Hurricane Irene destroyed 57 homes and severely damaged 367 other homes in Schoharie County in 2011, representing almost twenty percent of the total housing stock within the six communities affected.⁵⁶

One solution to sudden housing shortages is to allow temporary housing units to be located on the same lot as the damaged property. This allows residents to keep close watch on their damaged property and work to repair it. It also reduces the effects of dislocation on children. For example, York County (SC) developed an application form for a temporary emergency dwelling permit and requires a site plan showing the proposed location of the temporary dwelling in relation to existing buildings and driveways. Part of the form requires the applicant to acknowledge certain requirements, such as:

- The applicant is in the process of repairing or rebuilding a permanent dwelling.
- The applicant occupied the permanent dwelling prior to the emergency and intends to occupy it once repaired.
- If a recreational vehicle is used, the vehicular license will be maintained.
- The temporary emergency dwelling will be maintained in a manner which will facilitate its removal.
- The unit will meet and maintain state requirements for water and wastewater connections and county requirements for temporary electrical service.⁵⁷

Prior to adopting the zoning changes to allow for emergency dwellings, the community should consider how it will handle circumstances where property owners do not vacate temporary emergency dwellings at the end of the permitted time.

USAGE

Add language to the general regulations that apply to all zoning districts or to the description of uses allowed by special use permit. If the Zoning Board of Appeals or Planning Board administers the permit, it should be treated as a special use permit; if the zoning enforcement officer issues the permit, it should be treated as an administrative permit.

Amend the schedule of uses to indicate in which districts a permit for an emergency dwelling may be granted. In doing so, consider whether you want to exclude property in the 100-year flood zone.

ADAPTED FROM THE FOLLOWING SOURCE

Village of Aurora (NY) Zoning Law, Article IV Use Regulations, Section 405 Special Conditions, P3 Emergency Dwellings⁵⁸

LANGUAGE

Section X. Temporary Emergency Dwelling Permits

- A. In the event that a dwelling is rendered uninhabitable by fire, flood, or by a similar natural or manmade disaster, the [Zoning Board of Appeals/Planning Board/Zoning Officer] may issue a permit that authorizes the placement of one temporary emergency dwelling upon the lot where said damaged dwelling is located. The [Zoning Board of Appeals/Planning Board/Zoning Officer] may waive such terms of the zoning law so as to allow the placement and use of such a dwelling upon the same lot as the damaged dwelling, for occupancy during the period that the damaged dwelling is being repaired or replaced.
- B. The following requirements must be met for a parcel to be considered for a temporary emergency dwelling permit:
- (1) A temporary emergency dwelling shall be permitted only if it is located on a lot that is [*insert number of square feet, such as 10,000*] square feet in area or greater.
 - (2) The principal use of the lot shall be residential and the principal structure on the lot shall be a detached single-family residential building.
 - (3) The principal structure on the lot is in the process of being repaired or rebuilt on that lot because a State or local state of emergency has been declared pursuant to Executive Law Article 2-B and the emergency was caused by a fire, flood, or other accident rendered the permanent dwelling uninhabitable.
 - (4) No more than one temporary emergency dwelling shall be permitted on any single parcel of record and shall be permitted only if a principal dwelling unit is located on the affected parcel or a principal dwelling unit is being constructed.
- C. An emergency dwelling shall meet the following specific standards:
- (1) It shall be a safe and healthful dwelling unit that meets all applicable building, fire, health or other codes.
 - (2) It must have running water and must be connected to a totally enclosed septic system or public sewer.
 - (3) It shall be served by the driveway that serves the principal dwelling.
 - (4) It shall be located in the rear or side yard only.
 - (5) It shall be maintained in a manner which will facilitate its removal by the expiration date of the permit.

(6) The owner or his agent must enter into a written agreement with the [city/town/village] to remove such structure upon expiration of the permit.

[If a recreational vehicle will be allowed, include the following:]

(7) A current vehicular license shall be maintained for any recreational vehicle used as a temporary emergency dwelling.

D. Removal:

(1) An emergency dwelling shall be removed within ten (10) days of the issuance of the Certificate of Occupancy for the repaired or replaced dwelling.

(2) The maximum length of time such an emergency dwelling may be on a lot is *[insert time frame, such as one year]*. One extension of *[one year]* making a total period of time of *[two years]* from the initial permit may be granted by the Zoning Board of Appeals in cases of documented hardship. The hardship must result from circumstances beyond the control of the applicant that prevent the applicant from complying with the requirements of this Section. An extension may be granted only once.

(3) No variance to the requirements of this Section, except as outlined in (2) above, may be granted.

E. To apply for a temporary emergency dwelling permit, the parcel owner shall submit a completed application on a form supplied by the *[Zoning Board of Appeals/Planning Board/Zoning Officer]*. The temporary emergency dwelling permit application shall be accompanied by:

(1) A site plan drawn to a scale large enough to allow determination of the following:

- a. The size and boundaries of the parcel;
- b. The size and location of access, including driveways and access easements, from the parcel to a county, state or public road;
- c. The approximate location and size of all existing structures on the parcel; and
- d. The proposed location and size of the temporary dwelling;

(2) A description of the proposed dwelling;

(3) A notarized statement signed by all owners of the parcel (excluding lien holders) setting forth the circumstances which necessitate the temporary dwelling.

F. Revocation of the permit. If the *[Zoning Board of Appeals/Planning Board/Zoning Officer]* determines that any of the requirements of this section have not been satisfied; if any of the conditions attached to the permit have not been met; or the grounds authorizing the permit

no longer exist, then the temporary emergency dwelling permit may be revoked after notice to the holder of the permit.

1.4.2 Emergency Staging Bases

Some storm events result in extensive damage to public utilities, and repairing the damages requires a large amount of material and equipment. Emergency staging facilities are established which may create temporary disturbances and inconveniences to the surrounding neighborhood. In recognition of the potential future need for temporary emergency staging facilities, a community could provide for their establishment through zoning. Through zoning, they can also define what can be stored on the site long-term, as well as establish requirements for site plan review.

In 2014, North Salem (NY) added zoning requirements related to public utility emergency staging facilities. The action was prompted by a request from New York State Electric and Gas (NYSEG)⁶⁰ to use property it owns to stage crews just before and after a storm. Finding other suitable locations in the area, such as the parking lot of a superstore, an airport, or fairgrounds, was difficult. The town recognized the need for such a facility and developed special use permit requirements that were adopted by the town board as zoning amendments to address material storage, buffers, landscaping, fencing, lighting, stormwater and the temporary nature of the use.

USAGE

Add to the list of definitions in the zoning law definitions for “public utility emergency staging facility” and “storage, open.”

Amend the section of the Zoning Law that describes uses allowed by Special Use Permits to add a section on Public Utility Emergency Staging Facilities. Grant authority to issue special use permits to a local board, such as the Zoning Board of Appeals or Planning Board.

Amend the schedule of zoning uses to indicate the district(s) in which public utility emergency staging facilities would be allowed by special use permit.

ADAPTED FROM THE FOLLOWING SOURCE

North Salem (NY), Chapter 250 Zoning, Article XIII Conditional Use and Special Permit Standards, Section 250-67 Public Utility Emergency Staging Facility⁶¹ and Article II Terminology, Section 250-4 Word Usage⁶²

LANGUAGE

Add the following definitions to the list of zoning definitions:

- (x) Public utility emergency staging facility. An installation used by a public utility, primarily on a temporary and short duration basis, to muster, park, stage, and deploy vehicles, crews, equipment and related supplies immediately prior to and during emergency conditions. Specifically excluding the permanent installation onsite of

collection, transmission and/or distribution facilities of any public utility, except that used to facilitate the purpose and operation of the emergency staging functions.

(y) Storage, open. Outside land areas used for the keeping of goods, wares or supplies ancillary to a principal use located within a building or structure on the same lot.

Section X. Public utility emergency staging facility

A. Intent.

(1) The intent of these regulations is to provide for and permit in a controlled manner temporary emergency staging facilities needed to better ensure a timely and efficient response to a natural disaster or other health and safety emergencies by public utility service providers. Land use activities associated with a temporary emergency staging facility are characterized by their short term (i.e., for the duration of an emergency condition) and need for a coordinated location to mobilize public utility crews in greater numbers than otherwise utilized to maintain standard daily operations. Such temporary emergency staging activities, which if permanent, would not otherwise be allowed by the underlying district. Such temporary use has no inherent rights within the zoning district in which located.

(2) The nature of the permitted temporary use shall be such that normally it will be in harmony with the general purposes of this chapter and in harmony with the appropriate and orderly development of the district in which it is situated and adjacent districts, and will not cause or result in:

(a) Contravention of the performance standards set forth in [*insert zoning section containing provisions relating to noise, vibration, traffic, etc.*].

(b) Dissemination of dust, smoke, gas or fumes, odor, noise, vibration or excessive light beyond the boundaries of the lot on which the use is conducted.

(c) Harmful discharge of waste materials into the ground, water or atmosphere or which constitutes a menace to persons, surrounding properties or plant growth by reason of fire, explosion or other physical hazard.

(d) Unusual traffic hazards or congestion due to the type or amount of vehicles required, or idling vehicles on site for prolonged periods.

(e) Dangerous conditions affecting the comfort, peace, enjoyment, health or safety of the community or abutting areas or tend to its disturbance or annoyance.

B. Location. A site for a public utility emergency staging facility and its access driveway shall be located no more than 2,000 feet from a full interchange with [*insert name of road*] as measured from the center line of the site's access driveway at the adjoining street to the center point of the full exchange. [*Alternatively, establish a different geographic description, such as proximity to a state highway.*]

C. Permitted uses and activities.

(1) During emergency events. The following limited uses and activities shall be permitted, in accordance with conditional use and site development plan approvals, during a period of an emergency event:

- (a) Temporary emergency staging activities of a public utility during a natural disaster or other health and safety emergency.
- (b) Emergency response support services within permanent and/or temporary buildings and structures, which may be constructed to support staging activities and to provide short-term shelter for logistic and field crew prior to and following deployment when at the facility.
- (c) Indoor and outdoor storage of materials and equipment utilized during an emergency event that which is associated with the deployment and support of emergency response crews.

(2) During nonemergency periods. The use of an approved emergency staging facility shall be limited to the following during nonemergency periods:

- (a) The use of any permanent buildings and structures shall be limited to storage of materials and equipment, which otherwise will not be used or deployed until a subsequent emergency event, including the replenishment or stocking of new emergency supplies and materials.
- (b) Any approved temporary buildings and structures used during an emergency event shall be promptly dismantled following conclusion of an emergency response and removed from the property or stored on site according to an approved operations and maintenance plan as required herein.
- (c) Outdoor storage of approved oversized materials brought to the site during a preceding emergency event, which materials were not deployed or ultimately needed in response to the emergency, and which are stored in an appropriate manner and location as indicated on the approved site development plan.

E. Prohibited uses and activities. To protect the surrounding neighborhood, adjacent properties and the orderly use and development otherwise permitted in the underlying zoning district, the following uses shall be strictly prohibited:

- (1) Uses and activities not specifically permitted above.
- (2) Nonemergency use, staging and storage activities (i.e., use and activities otherwise associated with regular maintenance or standard daily operations and services).
- (3) Utility installation and construction staging and storage unrelated to an active and ongoing response to an emergency event.
- (4) Bulk fuel storage used for vehicles and equipment.
- (5) Installation and use of temporary buildings and structures during nonemergency periods.

F. Supplemental bulk standards.

- (1) Maximum building coverage, including permanent and temporary buildings and structures shall not exceed [*insert percentage, such as 2%*] of the lot area.
- (2) No single building or structure shall exceed a gross floor area building footprint of [*insert size, such as 8,000*] square feet.
- (3) No single building or structure shall exceed one story and [*insert height, such as 20*] feet in height.
- (4) Maximum development coverage shall not exceed [*insert percentage, such as 30%*] of the lot area.
- (5) All buildings, structures, internal circulation driveways (except at point of street access) and staging activities shall be no closer than [*insert setback, such as 100*] feet to any property line.

G. Supplemental site design standards.

- (1) Abutting streets shall be of adequate capacity to handle safely and without undue congestion the traffic associated with the use to which access is given.
- (2) Access and service driveways shall be laid out in such a manner that connections with abutting streets on which the lot has frontage are located and designed so as to avoid unsafe conditions.
- (3) An adequately configured and designed internal circulation system shall be provided, including a surface treatment deemed acceptable by the Planning Board [*alternatively, the Zoning Board*]. Pervious surface material shall be used to the maximum extent practicable. Appropriate stormwater management controls shall be required.
- (4) Existing site vegetation shall be preserved to the maximum extent practicable, thereby minimizing site clearing and disturbance.
- (5) Buildings, structures and staging areas shall be located so as to minimize visibility from adjacent properties and abutting streets.
- (6) At minimum, perimeter screening and buffering, as approved by the Planning Board [*alternatively, the Zoning Board*], shall be provided and maintained within the area of applicable setbacks. The Planning Board [*alternatively, the Zoning Board*] may require expanded screening and buffering between any component of the site and adjoining properties, given the site proposed use, the use of adjoining parcels, and the natural topography and vegetative cover.

(7) The Planning Board [*alternatively, the Zoning Board*] may require security fencing be located around staging areas to address safety concerns given the temporary nature of the use.

H. An operations and maintenance plan shall be provided, which plan shall describe and detail how the site would be utilized and maintained during emergency and nonemergency conditions, including:

(1) Site staging operations.

(2) Location and containment of all materials and equipment storage.

(3) Safety measures to be employed to control the site, staging activities and the well-being of crew personnel and the surrounding neighborhood and adjacent land uses.

(4) Schedule for breakdown and site cleanup to be implemented following an emergency event.

(5) Schedule for ongoing site maintenance controls and measures.

(6) Copies of typical "Notices" to be sent to the Building Inspector at the onset of an emergency (at a time convenient) and within seven days of site cleanup following an emergency event utilizing the facility.

(7) A reporting component as deemed acceptable by the Planning Board [*alternatively, the Zoning Board*].

I. No permanent signs, except a single site identification sign with emergency contact information at the site entrance shall be permitted. The size of such sign shall not exceed four square feet and shall be placed at least 10 feet from any property line. Said sign shall not be illuminated.

J. Lighting during nonemergency events shall be minimized to that need for site safety and maintenance. All lighting, including during permitted emergency staging activities, shall not be directed on adjacent streets or properties. All lighting shall be directed downward and inward to the site so the light source is not visible from any adjacent property. Fully fixed shield lights with timing devices shall be utilized on light fixtures to control and direct the illumination pattern and to prevent spillage horizontally and/or across property lines.

1.4.3 Temporary Mobile Office Units

Natural or other disasters may result in damage to both residential and commercial property. When that property is for a business that is critical to disaster recovery, such as a building supply store, insurance agency, or engineer’s office, recovery may be complicated or delayed. In order to provide for the rapid return of such services, a safe and secure location will need to be secured until repairs can be made. A temporary mobile office unit may serve that function if allowed by a municipality’s zoning law.

The Town of Islip (NY) has an application for a temporary trailer/portable storage unit permit. Permits are valid for three months after issuance, with two renewals of three months each possible. They require such permits (other than storage units) to be in conjunction with a building permit, and for the unit to be insured.⁶³

The Town of Warwick regulates by special use permit temporary trailers typically associated with the supervision of construction trades on a site where a building permit has been issued. The town requires a performance bond to insure the proper removal of the temporary trailer office.⁶⁴

The Village of Brockport in Monroe County (NY) requires that temporary office trailers be located at least four feet from any property line or structure, except in residential districts where they must be at least ten feet from all property lines and/or any other structure on the property or an adjacent property.⁶⁵

USAGE

Add language to the general regulations that apply to all zoning districts or to the description of uses allowed by special use permit. If the Zoning Board of Appeals or Planning Board administers the permit, it should be treated as a special use permit; if the zoning enforcement officer issues the permit, it should be treated as an administrative permit.

Amend the schedule of uses to indicate in which districts a permit for a temporary mobile office unit may be granted. In doing so, consider whether you want to exclude property in the 100-year flood zone.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Nags Head (NC) Municipal Code, Chapter 32 Storm Reconstruction, Section 32-5 Temporary Mobile Office Units⁶⁶

LANGUAGE

Section X. Temporary Mobile Office Units

A. Following the declaration of the [city/town/village] as a disaster area by the Governor of New York State or the [City Mayor or Manager/Town Supervisor or Manager/Village Mayor or

Manager] pursuant to New York State Executive Law Article 2-B, a self-contained mobile office unit shall be permitted on the site of the business requesting the mobile office unit subject to the following conditions:

- (1) The business requesting placement of the mobile office unit shall be an established business within the *[city/town/village]*.
- (2) The business requesting placement of the mobile office unit shall be involved in supplying critical services necessary for disaster recovery related to the construction or reconstruction of structures or infrastructure damaged by the disaster, including, but not limited to, insurance offices, engineers and surveyors and financial institutions.
- (3) The mobile office shall not be located closer than *[insert number of feet, such as four]* feet from any property line or structure.
- (4) The mobile office shall be removed within *[insert timeframe, such as seven days]* following the restoration of all utilities or upon issuance of a certificate of occupancy if repairs are needed to the building housing the business, however mobile office units shall not be on site for greater than *[insert timeframe, such as six months]* following declaration of the disaster.
- (5) The mobile office unit shall meet all applicable regulations including, but not limited to the state building code, flood and health regulations.

1.4.4 Building Elevation

While residential structures should be discouraged or prevented from locating in flood-prone areas, many already exist in such areas. Flooding in these areas is likely in the future given increased precipitation, sea-level rise, and the impacts of upland development. If such buildings are not currently elevated, they can be required to be elevated if they receive substantial damage in the future. Some home owners may even voluntarily decide to elevate their homes to reduce their risks from flooding and to lower their flood insurance premiums.



Despite the benefits to the home owners and the community of having homes elevated, elevation can provide esthetic challenges as well as temptations to use the extra space under the elevated structure in ways not permitted by the building code or flood damage protection laws. The model law provisions presented below include design requirements for elevated buildings, as well as agreements where homeowners acknowledge an understanding of the limitations on construction and use of the enclosed areas below elevated homes.

Special consideration should be given to historic resources within State and National Register listed historic district, or individually listed or eligible structures. Two of the key issues with elevating such structures are (1) preservation of structural integrity and character defining features, and (2) limiting total height of elevation so buildings maintain the historic character of the streetscape or individual setting.

Be aware that the elevation of a home may change the way that the number of stories is calculated according to the Residential Code of New York State (RCNYS). For example, elevation of an existing one- or two-family dwelling that formerly had two stories above grade *may* then

be considered to have three stories above grade, which would trigger the need for a sprinkler system. The Department of State Division of Building Standards and Codes has issued a technical bulletin explaining how to determine the number of stories above grade in elevated one- and two-family dwellings in flood hazard areas.⁶⁷

RESOURCES

Elevated Residential Structures. (1984). FEMA 54⁶⁸

Elevation Design Guidelines for Historic Homes in the Mississippi Gulf Coast Region. Mississippi Development Authority.⁶⁹

Technical Bulletin: Determination of Stories Above Grade in Elevated One- and Two-Family Dwellings in Flood Hazard Areas. (2013). NYS Department of State, Division of Building Standards and Codes⁷⁰

Recommended Residential Construction for Coastal Areas: Building on Strong and Safe Foundations. (2009). FEMA P-550, Second Edition.⁷¹

Coastal Construction Manual: Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas (Fourth Edition). (2011). FEMA P-55.⁷²

Floodplain Facts #8: Enclosed Areas below the Flood Protection Level. (2009). Southern Tier Central Regional Planning and Development Board.⁷³

1.4.4.1 Design Requirements for Elevated Buildings

In order to preserve neighborhoods in flood hazard areas after Superstorm Sandy, New York City adopted special height and setback regulations for residential buildings existing on October 28, 2012, providing an alternative way to measure height in certain zoning districts, establishing design requirements for elevated buildings, and addressing how the elevated structures would be treated under the nonconformance provisions of the New York City zoning law.⁷⁴



The image on the left, provided by Larry Moss, an architect, Hazard Mitigation Specialist, and Historic Preservation Specialist, is a good example of design treatment. The brick elevation wall is in keeping with the modern-four square style of the house; the porch has open lattice work under it; the elevation wall and under-porch wall match the scale of the house; and landscaping elements disguise the height of the house.

The following model language is based on the New York City approach. While not suitable for every community, the concept could be adapted to fit the character of some zoning districts. Examples of elevated buildings that incorporate mitigating elements are available from the NYS Office of Historic Presentation and the Federal Emergency Management Agency (FEMA).

BASIC DESIGN PRINCIPLES FOR ELEVATED STRUCTURES

- 1) Retain the scale of the original house.
- 2) Retain the color of the original house.
- 3) Make the elevation height as small as necessary.
- 4) Disguise the height of the elevation:
 - Use landscaping elements to cover it.
 - Raise the grade at the house wall.
 - Paint the elevation wall a darker color.
- 5) Three feet of smooth surface (concrete, concrete block, stucco) is acceptable visually, but any hard, smooth surface greater than that should be covered with the same material as the upper body of the house.
- 6) A one-story porch, at grade level, can usually be added to provide a visual transition from the two- or three-story elevated house to the ground level.

Source: Larry K. Moss, Historic Preservation Specialist, NYS Office of Parks, Recreation, and Historic Preservation

USAGE

Add language to the general provisions of the zoning law if the intent is to apply throughout the municipality. To limit applicability, the language could be added instead to the description of the zoning district or zoning overlay district that applies to the 100-year flood zone. Or, for additional resilience, make the provisions apply to structures in the 500-year flood zone.

ADAPTED FROM THE FOLLOWING SOURCE

New York City (NY) Zoning Resolution, Article VI: Special Regulations Applicable to Certain Areas, Chapter 4 Special Regulations Applying in Flood Hazard Areas, Sections 64-431, 64-334, and 64-61⁷⁵ and Article I General Provisions, Chapter 2 Construction of Language and Definitions, Section 12-10 Definitions⁷⁶

LANGUAGE

Section X. Special height requirements for existing single- and two-family residences

A. Elevation of existing residences in [*zoning district _____*]. Single- and two-family residences existing on [*date*], may be vertically elevated, or reconstructed to a higher elevation, in order to raise the lowest horizontal structural member supporting the lowest floor containing habitable space, located at or above the adjoining grade as of [*date*], to flood-resistant construction elevation, and in doing so, may create a noncompliance as to height and setback to the extent that such lowest horizontal structural member is elevated or reconstructed to flood-resistant construction elevation. [*Note that alternative language could be used by a municipality to allow the properties to be elevated without being classified as non-complying structures. See Section 1.2.2 of this chapter.*]

B. Legal non-complying status. This section shall not preclude the construction of complying enlargements or other complying structures on the zoning lot. Buildings that were complying on [*date*], and vertically elevated or reconstructed to a higher elevation, pursuant to this Section, shall be considered legal non-complying buildings.

C. Alternative height measurement. Where flood-resistant construction elevation of single- and two-family residences is between six and nine feet above curb level, building height may be measured from a reference plane nine feet above curb level, provided that at least two mitigating design elements are provided. However, no mitigation shall be required where more than 50 percent of the street wall of a building is within three feet of the street line. For the purposes of this Section, a “street wall” is a wall or portion of a wall of a building facing a street, and a “street line” is a lot line separating a street from other land.

D. Mitigating elements include the following.

- (1) Porch. Where provided as a mitigating element, a porch shall have a finished floor at least six inches below the lowest occupiable floor and have a width at least 70 percent of the aggregate width of all street walls within 25 feet of the street line. The depth of the

porch must be at least five feet, and the porch may not be closer to the street line than five feet. Open porches shall count as one mitigating element and roofed porches shall count as two mitigating elements, provided that for such roofed porches, all structural elements shall have a minimum width or depth of at least three inches, and such roof shall have a depth of at least five feet measured perpendicular to the street wall and extend along at least 70 percent of the width of the street wall. A balcony directly above a porch and a trellis or arbor with structural members spaced no further than 30 inches on center that cover such porch may be considered a porch roof for the purposes of this Section.

(2) Stair direction change. Where provided as a mitigating element, stairs shall be constructed between grade and the lowest occupiable floor or porch, as applicable, which shall change direction at least 90 degrees in plan at a point no lower or higher than two feet from the beginning and end of the stair run.

(3) Raised front yard. Where provided as a mitigating element, the grade between the street line and street walls within 25 feet of the street line, and their prolongations, shall be elevated above curb level so that a line drawn midway between the street line and such street walls and prolongations is at least 18 inches above curb level at all points, except for pedestrian ways, vehicular access and off-street parking spaces. The area with final grade above curb level must be greater than 50 percent of the total area between the street line and street walls within 25 feet of the street line and their prolongations.

(4) Trees or shrubs at least three feet high. Where provided as a mitigating element, trees or shrubs that attain a height of at least three feet shall be provided between the street line and street walls within 25 feet of the street line and their prolongations. Planting beds shall be at least three feet wide in plan, measured parallel and perpendicular to the street line. The length of each planted area shall be measured by inscribing each planted area within a rectangle and measuring the longest dimension of such rectangle. The total length of planted areas shall be greater than 60 percent of the lot width and be planted to screen at least 50 percent of the length of the street wall.

1.4.4.2 Non-Conversion Agreements

Enclosed areas below the flood protection level are designed to be flooded and should not be converted to uses that are incompatible with the flood hazard. Conversion to finished living space, blockage of flood vents, or installation of unprotected equipment (appliances, heating/cooling equipment, plumbing fixtures, etc.) violates the conditions of the floodplain development permit.

For new construction, elevated structures, or substantially improved structures (which must comply with floodplain development standards), the enclosed areas below the flood protection level can only be used for parking of vehicles, building access, or limited storage. The interior portion shall not be partitioned, temperature-controlled, or finished into separate rooms.

Because these areas are intended to flood, storage should be limited to items that have a low damage potential or can be easily moved to the elevated portion of the building if there is a flood.⁷⁷



The municipality may require owners to sign non-conversion agreements to document their understanding of the limitations on construction and use of the enclosed area under an elevated structure. An example of a conversion agreement was developed by the Southern Tier Central Regional Planning and Development Board (STCRPDB) for the Town of Horseheads (NY).⁷⁸ STCRPDB suggests that the agreement be required as a condition of issuance of the final Certificate of Occupancy.

Enforcement of non-conversion agreements may result in up to 60 Community Rating System (CRS) points for Element ENL 3b (Enclosure Limits) of Activity 430 (Higher Regulatory Standards).

USAGE

Add a new subsection to the municipal flood damage prevention law section establishing standards for residential structures (generally 5.3)

ADAPTED FROM THE FOLLOWING SOURCE

Village of Freeport (NY) Municipal Code, Chapter 87 Flood Damage Prevention, Section 87-16 Standards for all Structures.⁷⁹

Higher Floodplain Development Standards: Recommendations for the Town of Horseheads. (2015). Southern Tier Central Regional Planning and Development Board.⁸⁰

FEMA. *Model Acknowledgement of Conditions for Mitigation of Property in a Special Flood Hazard Area with FEMA Grant Funds.*⁸¹

LANGUAGE

Add to a new paragraph (4) to section on Certificate of Compliance (Generally Section 4.4-7 of the municipal Flood Damage Prevention Law):

(4) For any fully enclosed area below the lowest floor elevation in which the interior height is more than 4 feet, a signed non-conversion agreement prohibiting the conversion of the area below the lowest floor to a use or condition contrary to the building's originally approved design, shall be presented as a condition of issuance of the final Certificate of Occupancy. This agreement must give the [City/Town/Village of _____] the right to periodically enter and inspect the enclosed area.

Add to the end of paragraph (3) in section on Construction Materials and Methods (Generally Section 5.2-2 of the municipal Flood Damage Prevention Law):

Enclosed areas below the lowest floor shall not be subsequently modified or used in a manner that renders the enclosure non-compliant with the requirements of this section.

Add a new Sub-Section under Residential Structures (Generally Section 5.3 of the municipal Flood Damage Prevention Law):

Section 5.3-2 Non-Conversion Agreement.

The following standards shall apply to residential structures in areas of special flood hazard as follows:

(1) Any owner who has applied for a permit to construct or elevate a structure on a property located in the areas of special flood hazard must enter into a non-conversion agreement with the [insert name of municipality].

- (2) Such agreement shall be signed by the owner prior to the issuance of any building permits and recorded by the owner with the *[insert name of County]* Clerk's office. *[Alternatively, in the office of the building inspector/code enforcement officer].*
- (3) With this agreement the owner shall agree that all construction below the allowable lowest floor will meet all requirements of the National Flood Insurance Program; shall be in compliance with all local, county, state, and federal laws rules and regulations; and will allow upon consent inspection by the *[insert name of building department, such as Department of Buildings]* to verify such conditions continue to exist.
- (4) Content of Notice of Agreement. The notice shall include the name of the current property owner (including book/page reference to record of current title, if readily available), The floodplain development permit number, a legal description of the property, and the following notice of flood insurance requirements:

"This property has received Federal hazard mitigation assistance. Federal law requires that flood insurance coverage on this property must be maintained during the life of the property regardless of transfer of ownership of such property. Pursuant to 42 U.S.C. §5154a, failure to maintain flood insurance on this property may prohibit the owner from receiving Federal disaster assistance with respect to this property in the event of a flood disaster. The Property Owner is also required to maintain this property in accordance with the flood plain management criteria of Title 44 of the Code of Federal Regulations Part 60.3 and the *[City/Town/Village]* Code."

1.4.5 Phased Reconstruction Moratorium

As shown by Tropical Storm Lee, Hurricane Irene, and Superstorm Sandy, weather-related and other disasters can have a significant impact on municipal infrastructure and private property. They can strain the ability of municipal officials to meet the high demand for services of all types, including the inspection of buildings and issuance of building permits. Municipalities are then faced with determining how to allocate time and resources to focus on activities most important to immediate storm recovery needs.

Given limited municipal resources, municipalities should prioritize applications and inspection needs in the aftermath of a natural disaster. That can be done through enactment of a Phased Reconstruction Moratorium local law. The enactment of a moratorium would constitute a change to the zoning law and should be undertaken with the same deliberateness of other zoning changes.

This Phased Reconstruction Moratorium model local law addresses post-disaster situations and describes temporary changes in land use administration and its effect on approvals. The provisions of the law would remain dormant until a pre-determined happening, such as a Proclamation of Local Disaster or a finding by the Local Administrator that a minimum amount of structures have received major damage or have been destroyed. By proactively enacting this law, the municipality avoids the need to gather board members and conduct a deliberate and slow legislative process in the wake of a storm.

If there are no procedures in place for differentiating between the types of permit applications and when they will be processed, local government staff could be overwhelmed and the critical permits that need to be processed for recovery to advance could be delayed. A moratorium may provide for rapid disaster repairs while maintaining a reasonable amount of time for permitting officials and property owners to assess the situation and make smart redevelopment decisions. The moratorium may be based on the degree of damage to the individual structure. Post-disaster moratorium is a useful tool to maintain the quality of reconstruction.

When citing the authority for enactment of the local law the municipality should cite the New York State Constitution Article IX and Municipal Home Rule Law §10. They may also cite New York State Executive Law Article 2-B, which provides for the creation of emergency management plans to minimize the effect of disaster by identifying local ways to prevent disasters, coordinate resources and manpower after disasters, and provide for recovery and redevelopment after disasters. When creating such plans, cities, towns and villages are encouraged to be consistent with county disaster preparedness plans.

In enacting the provisions of this floating zone chapter, each municipality should inquire into county or local comprehensive emergency management plans to ensure consistency and cooperation.

A word of caution. Because provisions of the model moratorium temporarily restrict the approval of preliminary and final subdivision plats, the model local laws should provide for the

supersession subdivision statutes and the suspension of timeframes for decision-making on such plats by the planning board. This is done to avoid a default approval and in recognition that administrative support for the planning board may be engaged in storm recovery activities. For additional information about moratoria, please see the New York State Department of State publication, *Land Use Moratoria*.⁸²

Preliminary Damage Assessment Team

A Preliminary Damage Assessment Team typically consists of a combined team of local, State and Federal engineers, that inspects damaged facilities and infrastructure and develops an estimate of the cost required to restore the facilities to their pre-disaster condition.

According to the New York State Comprehensive Emergency Management Plan, many state agencies have the resources and capabilities to support the preliminary damage assessment process. If activated, the request and utilization of those resources will be coordinated through the State Emergency Operations Center and Function Groups and communicated through Agency Departmental Operations Centers.⁸³

USAGE

Adopt as a new chapter in the zoning section of the municipal code.

ADAPTED FROM THE FOLLOWING SOURCE

Nags Head (NC) Municipal Code, Chapter 32 Storm Reconstruction⁸⁴ and Chapter 48 Zoning, Article XX Hurricane and Storm Reconstruction and Redevelopment; General Use Standards for Ocean Hazard Areas⁸⁵

Hillsborough County (FL) Municipal Code, Chapter 22 Emergency Management and Emergency Services, Article III Reconstruction Following Emergencies⁸⁶

LANGUAGE

Chapter X Phased Reconstruction Moratorium

Section 1: Title

This local law establishes a Phased Reconstruction Moratorium on the issuance of building permits, land use approvals, and variances in the immediate aftermath of a natural or other disaster. The local law sets up a procedure to orderly address the construction and reconstruction of structures based on the condition of damaged or destroyed properties.

Section 2. Authority

This moratorium is enacted by the [City/Town/Village of _____] pursuant to its authority to adopt local laws under the New York State Constitution Article IX and Municipal Home Rule Law § 10. To the extent that any provisions of this local law are different from applicable provision(s) in the New York State [General City Law/Town Law/Village Law], amendments thereto, and any applicable charter, the [City/Town/Village of _____] hereby declares its intent to supersede the section(s) of that New York State Law, to the extent permitted by the New York State Municipal Home Rule Law and the Statute of Local Government through adoption of a local law. Also, New York State Executive Law Article 2-B authorizes certain emergency actions which can be taken by the chief executive officer of the [City/Town/Village] following proclamation of a local state of emergency.

Section 3. Purpose and Intent

A. The [City Council/Town Board/Village Board of Trustees] finds that the effects of periodic natural or other disasters, such as flooding, may present a serious threat to the lives and property of the residents of the [City/Town/Village of _____]. Thus, in order to protect the health, safety, and welfare of the people and property of the [City/Town/Village] in local emergency situations; and for the purposes of preventing material losses and reducing the cost to the public of rescue and relief efforts caused by the unwise occupancy of areas subject to these disastrous effects; the provisions of this chapter are necessary.

B. Following a natural disaster or other disaster, sufficient time must be provided to conduct a damage assessment, classify and categorize damage to individual structures, and perform other emergency and disaster recovery efforts. The purpose of the Phased Reconstruction Moratorium is to encourage construction and reconstruction in an orderly or appropriate manner following natural disasters or other disasters that cause destruction or loss of private and public property, damage to public facilities, and injury to and loss of human life in certain locations within [city/town/village]. The Phased Reconstruction Moratorium seeks to control the issuance of building permits and other land use approvals in order to manage the location, timing, and sequence of reconstruction and repair of damaged structures.

Section 4. Definitions

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section:

Chief Executive. The [mayor/city manager OR supervisor/town manager OR mayor/village manager].

Destroyed Structure. A structure that is a total loss or damaged to such an extent that repairs are not technically or economically feasible. The indicator for this category is if the cost of repairing the structure exceeds 50 percent of the replacement cost of the structure at the time of damage or destruction.

Major Damaged Structure. A structure that can be made habitable with extensive repairs. Damage may include foundation, roof structure, and major structural components. The

indicator for this category is if the cost to repair is greater than twenty (20) percent and up to and including fifty (50) percent of the replacement cost at the time of damage.

Minor Damaged Structure. A structure that can be made habitable in a short period of time with minimal repairs. Damage may include doors, windows, floors, roofs, mechanical systems, and other minor structural damage. An indicator for this category is if the cost to repair is less than or equal to twenty (20) percent of the replacement cost at the time of damage.

Natural or Other Disaster. The occurrence or imminent threat of wide spread or severe damage, injury, or loss of life or property resulting from any natural or man-made causes, including, but not limited to, fire, flood, earthquake, hurricane, tornado, high water, landslide, mudslide, wind, storm, wave action, explosion, or radiological event.

Preliminary Damage Assessment Team. A Preliminary Damage Assessment Team typically consists of a group of local, state, and federal engineers who inspect damaged facilities and infrastructure and develop an estimate of the cost required to restore facilities to their pre-disaster condition.

Proclamation of Local State of Emergency. Pursuant to New York State Executive Law 2-B Section 24(1), a proclamation by the chief executive in the event of a disaster or in the event of reasonable apprehension of immediate danger thereof and upon a finding that the public safety is imperiled thereby, such chief executive may proclaim a local state of emergency within any part or all of the territorial limits of such local government.

Replacement Cost. Replacement cost means the actual cost to repair, reconstruct, rebuild or replace a damaged structure. For purposes of this ordinance, the replacement cost shall be compared to the structure's building value contained in the most recent assessment roll taking into account the municipality's uniform percentage of value to determine the full market value.

Section 5. Designation of Local Administrator

The [city/town/village] [*insert title, such as Code Enforcement Official*] is hereby appointed the Local Administrator to administer and implement this chapter by granting or denying building permits, certificates of occupancy, and other actions authorized by the New York State Uniform Fire Prevention and Building Code in accordance with this Chapter. The Code Enforcement Official shall be a certified code enforcement official.

Section 6. Powers and Duties of Local Administrator

A. The Local Administrator or his or her agent shall conduct rapid evaluations of buildings in the area affected by the natural or other disaster and complete an evaluation form for each building. He or she may be assisted by a Preliminary Damage Assessment Team.

B. The Local Administrator shall categorize the buildings as 1) minor damaged structures, 2) major damaged structures, and 3) destroyed structures.

C. The Local Administrator shall advise the Chief Executive Officer when the combined number of major damaged structures and destroyed structures exceeds *[insert number or percentage]*, such as *[one hundred structures or thirty percent]* of structures.

[In municipalities with many multi-family structures, the municipality may want to specify the number or percentage of multi-family housing units.]

D. The Local Administrator shall enforce the moratoria provisions in accordance with this Chapter.

Section 7. Applicability

A. The provisions of this chapter shall apply upon the occurrence of the following:

(1) The *[city/town/village]* is proclaimed a disaster area by the Chief Executive of *[city/town/village]* pursuant to Executive Law 2-B; or

(2) At least *[insert number or percentage of]* structures in the *[city/town/village]* have received major damage or have been destroyed as determined by the Local Administrator.

B. The provisions of this chapter relating to the initial phase of the moratorium shall apply to all structures and the lots upon which they are located within the *[city/town/village]*. Phase Two shall limit land use approvals related to all structures categorized as major damaged or destroyed pursuant to Section 6 and the lots upon which the structures are located. Phase Three shall apply limit land use approvals related to all structures categorized as destroyed and the lots upon which the structures are located. Following the proscribed time frame the Phased Reconstruction Moratorium shall end.

C. Phased Reconstruction Moratorium may be enacted multiple times provided one of the occurrences described in Paragraph A are met.

Section 8. Notice

A. Public notice of the effective date of the Phased Reconstruction Moratorium shall be conspicuously posted at the *[City/Town/Village Hall]*, in a newspaper of general circulation in the area affected by the moratorium, and on the local government's web page if one exists. Such notice shall clearly identify the properties subject to the Minor Damaged, Major Damaged, and Destroyed Structure Moratorium. The public notice shall also specify the exact nature of the development permits that are temporarily held in abeyance.

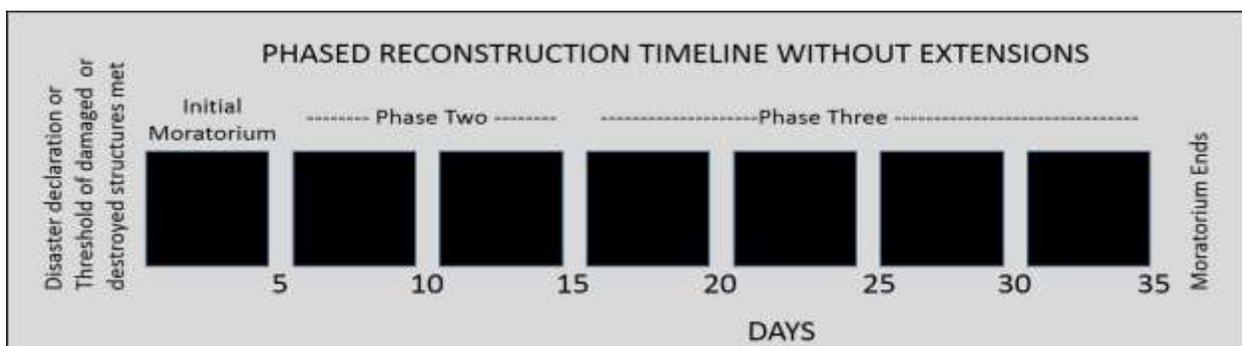
Section 9. Phases and Duration of Moratoria

The Phased Reconstruction Moratorium shall consist of three phases which initially apply to the entire [city/town/village]. Each subsequent phase removes restrictions on certain categories of structures and the lots on which they are located based on the level of damage sustained by the structure. There is a minimum length of time the first phase is in effect, which can be extended, modified, replaced, or terminated by the [City or Common Council/Town Board/Village Board of Trustees] upon a finding that the extension, modification, replacement, or termination is necessary for the protection of lives, safety, and property or is needed due to the inability of the [city/town/village] to maintain acceptable levels of public order and services. Each subsequent phase takes effect based on a prescribed timeline designed to allow municipal officials to prepare for an additional demand for services.

A. Phase One - Initial Moratorium. The initial moratorium shall be in effect for a minimum period of [insert number of days, such as five] days throughout the [city/town/village]. During this period, no building permits shall be issued nor shall any applications for building permits, subdivision plats, site plans, special use permits, variances, or rezoning requests be accepted or reviewed. This [city/town/village]-wide moratoria is intended to allow municipal officials to focus on damage assessment and disaster recovery. Existing building permits and land use approvals shall remain in force and effect throughout the initial moratorium for lots and the structures on them that were not damaged or destroyed by the disaster.

B. Phase Two. After expiration of the initial moratorium, building permits may be issued and any applications for building permits, subdivision plats, site plans, special use permits, variances, or rezoning requests may be accepted or reviewed for any structure or lots not categorized as a major damaged structure or destroyed structure. When a building permit is issued, minor damaged structures can be repaired to their original condition, subject to current building and zoning codes.

C. Phase Three. Commencing [insert number, such as 10] days following the expiration of the initial moratorium, building permits may be issued and any applications for building permits, subdivision plats, site plans, special use permits, variances, or rezoning requests may be accepted or reviewed for any structure or lot not categorized as a destroyed structure. When a building permit is issued, major damaged structures can be stabilized or repaired to their original condition, subject to current building and zoning codes.



D. Expiration of Phased Reconstruction Moratorium. Commencing [insert number, such as 30] days following the expiration of the initial moratorium, the Phased Reconstruction Moratorium

shall no longer be in effect. Building permits may be issued and any applications for building permits, subdivision plats, site plans, special use permits, variances, or rezoning requests may be accepted or reviewed. Destroyed structures may be rebuilt in compliance with zoning, building, flood damage prevention laws, and all other applicable laws.

Section 10. Emergency Repairs and Activities Exempt from this Chapter

A. No construction or reconstruction activity may be undertaken without a building permit while the Phased Reconstruction Moratorium is in effect, except for emergency repairs or activities required to protect the public health, safety, and welfare.

B. Emergency repairs or activities include repairs necessary to prevent injury, loss of life, imminent collapse or other additional damage to the structure or its contents. This may include temporary roof repairs to avoid further water damage; removal of drywall; minor repairs to steps; temporary shoring up of a structure to avoid imminent collapse; repairs to potable water, waste water, power and communications facilities; emergency stabilization of roadways; repairs to police, fire and medical facilities; repairs to essential governmental facilities; debris removal; and stabilization or removal of structures about to collapse.

[The State's Comprehensive Management Plan suggests emergency work can be either Category A, which is debris removal, or Category B, which involves emergency protective measures, such as sandbagging, erecting warning devices and search and rescue.⁸⁷]

[If the municipality provides for emergency dwelling on the lot or for temporary mobile office units, they should be included in the exemptions.]

C. Nothing in this article shall be construed to exempt New York State and federal permit regulations.

Section 11. Interpretation and Conflict with Other Laws

A. In their interpretation and application, the provisions of this chapter shall be held to be minimum requirements, adopted for the promotion of the public health, safety and welfare. Whenever the requirements of this chapter are at variance with the requirements of any other lawfully adopted rules, regulations or ordinances, the most restrictive or that imposing the highest standards shall govern.

B. This article shall supersede any other land development regulations regardless of when they were adopted. If any phrase or portion of this article is held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct and independent provision and such holding shall not affect the validity of the remaining portion.

C. Pursuant to the New York Municipal Home Rule Law Section 22, the provision of this local law suspends any subdivision approval time requirements and also supersedes and suspends any "default approval" provision of the Subdivision statutes of *[General City Law Section 32, Town*

Law Section 276, Village Law Section 7-728] and the [City/Town/Village of _____] code which are inconsistent herewith.

Section 12. Penalties

A. Any person, firm, company or corporation who refuses to comply with or violates any section of this chapter, or the emergency measures which may be made effective pursuant to this chapter, shall be punished by a fine not to exceed [*insert amount of fine, such as \$500.00*]. Each day of continued non-compliance or violation shall constitute a separate offense. In addition to this penalty, any construction licensee of the [city/town/village] who violates any provision of this article or the emergency measures which are effective as a result of this article, shall be charged with said violation and have the matter heard before the appropriate administrative proceeding or court of law.

B. Nothing contained herein shall prevent the [city/town/village] from taking such other lawful action in any court of competent jurisdiction as is necessary to prevent or remedy any refusal to comply with, or violation of, this chapter or the emergency measures which may be made effective according to this chapter. Such other lawful action shall include but shall not be limited to, an equitable action for injunctive relief or an action at law for damages.

Section 13. Effective Date

Establishment of the Phased Reconstruction Moratoria constitutes an amendment of the [city/town/village] zoning law at the time the chapter is adopted. The provisions of such law shall not go into effect until such time as one of the occurrences in Section 7 Paragraph A has occurred.

1.5 Subdivision Regulations

The regulation of the subdivision of land is authorized by Town Law §277, Village Law §7-730, and General City Law §33. In authorizing subdivision review, the statutes require planning boards to “require that the land shown on the plat be of such character that it can be used safely for building purposes without danger to health or peril from fire, flood, drainage or other menace to neighboring properties or the public health, safety and welfare.”⁸⁸

Subdivision regulations govern the division of land and provide for adequate sewers, drainage, parks, streets, sidewalks, and lighting. They may also be used to conserve natural protective features, green infrastructure, and environmentally sensitive areas.

The design of a subdivision plat is constrained by the physical characteristics of the site. When reviewing a subdivision plat, the planning board considers the topography of the site, the slopes, drainage, land cover types, environmentally sensitive areas, soils and other factors such as roadway and sewer system capacities. For greater resiliency, it is a wise best management practice to ensure that developers design subdivision layouts in a manner that:

- Minimizes land disturbance (tree clearing, land grading, soil compaction);
- Avoids steep slopes, flood-prone areas and wetlands;
- Protects important natural areas and habitats;
- Limits impervious surfaces;
- Does not negatively impact public infrastructure;
- Does not overload the roadway system, and
- Provides effective stormwater control.

To address sea-level rise and increased flooding from more severe storm events, local subdivision review laws may need to be updated to reflect the potential for wetland migration, to reserve areas for inland migration of natural resource areas, or to increase the horizontal extent of the riverine floodplain to absorb floodwaters.

Open space or cluster development provides the most flexible approach to drawing lot lines, and the use of conservation easements, recreational or open space dedication, or proper land management would facilitate the location of physical development further away from hazards or sensitive resources. These approaches can be combined with clear methods of determining lot yields, including elimination of underwater lands from the calculation; and establishing setbacks from waterbodies. (See *Wetland and Watercourse Protection Measures* chapter.)

Several techniques related to subdivision are presented. They should be coordinated with municipal zoning laws and supported by municipal plans.

Subdivision Techniques	
Technique	Description
Subdivisions in Flood Prone Areas	Prohibits the subdivision of land in flood prone areas for residential use while allowing residential uses on existing lots.
Consideration of Long-Term Risk	Enhances disaster resilience by incorporating provisions in local subdivision regulations to account for long term risk.
Drainage Improvements in a Subdivision	Requires subdivision applicants to make adequate provision onsite for stormwater runoff.
Protection of Natural Features in a Subdivision	Requires building lots on a subdivision plat to be laid out in a way that avoids impacts on natural features that would have increased flood risk, erosion, or additional stormwater runoff.
Subdivision Woodlands	Restricts land clearance activities prior to the approval of a subdivision plat.
Lot Yield Calculations	A method of calculating the number of allowed lots in a subdivision which subtracts land which is unsuitable for development or which provides important natural protective functions. The result is fewer lots, which provides greater ability to design a subdivision plat in a way that protects natural features that minimize risks from flooding and erosion.
Cluster Open Space and Conservation Development	Providing for or requiring more compact development of home sites in a subdivision in order to preserve important environmental or cultural features.
Environmental Constraint Disclosures	A consumer protection measure to alert potential buyers to environmental constraints on the land; and the impact of those constraints on subdivision plat design and construction costs.

RESOURCES

Subdivision Review in New York State. (2015) New York State Department of State⁸⁹

Subdivision Design and Flood Hazard Areas. PAS Report 584. American Planning Association.⁹⁰

1.5.1 Subdivision in Flood Prone Areas

The American Planning Association publication “*Subdivision Design and Flood Hazard Areas*” lists five general principles for mitigating flood hazards within subdivision design:

1. Maintain natural and beneficial functions of the floodplain.
2. Adopt a No Adverse Impact approach to floodplain management.
3. Avoid new development in the floodplain whenever feasible
4. Focus on data-driven decision making, using only the best available data to assess risk and inform decisions.
5. Consider future conditions of the floodplain, including development impacts and climate change.⁹¹

The National Flood Insurance Program does not prohibit new buildings, development or lots from being built in floodplains. Municipalities, however, may restrict land subject to flooding from being subdivided for residential or commercial development, or for any other use that may increase danger to life, health, or property or aggravate the flood hazard.⁹² The natural limitations of land, such as the existence of flood hazard areas, stream beds, wetlands, or steep slopes should be considered by the planning board in its review of a subdivision plat.

The approach below does not prohibit new residential uses on existing lots, assuming such uses can comply with building code requirements, nor does it make existing residential uses nonconforming or prohibit the use of the property.

USAGE

Insert text into the design standards of a standalone subdivision law or the section of the zoning law dealing with subdivision.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Pendleton (NY) Municipal Code, Chapter 220 Subdivision of Land, Article V General Requirements and Design Standards for Major Subdivision, Section 220-27 Drainage improvements⁹³

Douglas County (OR) Municipal Code, Article 30 (FP) Floodplain Overlay, Section 3.30.440 Subdivision and Partitioning Proposals⁹⁴

LANGUAGE

X. Land subject to flooding. Land subject to flooding or land deemed by the [city/town/village] to be uninhabitable shall not be platted for residential occupancy nor for such other uses as may increase danger to health, life or property or aggravate the flood hazard. All lots approved only for nonresidential uses shall have the explanation "Not for residential use" printed on the face of the final survey map or plat.

1.5.2 Consideration of Long-Term Risk

To enhance disaster resilience, a municipality can incorporate provisions in local subdivision regulations to account for long term risk. For example, the local subdivision law can require that lots in flood prone areas include land of adequate size and elevation to provide building sites that will keep structures out of the floodplain and secure from erosion and storm surge, and can also require that such lots provide adequate space for future adaptation in flood or erosion prone areas.

The *Wetland and Watercourse Protection Measures* chapter of the Model Local Laws has examples of buffer requirements that would put distance between a structure and a flood hazard, and in the case of stream migration, provide a wider buffer to address shifts in the stream over time. Review of plats for this purpose should be coordinated with the local flood plain administrator. Before choosing this approach, the municipality should consider the potential costs associated with the utility services and infrastructure needed to serve flood prone building sites.

USAGE

Amend the design or general requirements standards of the subdivision law.

Amend the definitions section of the zoning law and the table of dimensional requirements.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Watertown (CT) Subdivision Regulations, Section 5 Design Standards, 5.16 Requirements Regarding Flooding⁹⁵

Village of Homer (NE) Zoning Law, Article 13 Subdivision Design Standards, Section 13.05 Subdivision Design Standards; Lots⁹⁶

LANGUAGE

Amend the subdivision regulations by adding the following language to the design or general requirement standards.

A. Requirements regarding flooding. Land subject to flooding, as identified on the Federal Flood Insurance Rate Map (FIRM) on file with the [City/Town/Village] Clerk and Planning and Zoning Office, shall not be subdivided unless the following conditions are met:

- (1) The Planning Board determines that the proposed subdivision is reasonably safe from flooding. Such determination does not imply such land or uses permitted within the subdivision will be free from flooding or flood damage. When a proposed subdivision is all or partially in an Area of Special Flood Hazard as shown on the FIRM the Planning Board shall review the subdivision plan to assure that:

(a) All proposals are consistent with the need to minimize flood damage within the flood-prone area.

(b) All public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage.

(c) Adequate drainage is provided to reduce exposure to flood hazards.

(d) New and replacement water supply systems are designed to minimize or eliminate infiltration of flood waters into systems.

(e) New and replacement sanitary systems are designed to minimize or eliminate infiltration of flood waters into systems and discharges from the systems into flood waters.

(f) On-site disposal systems are located to avoid impairment of them or contamination from them during flooding.

(2) Applicants for subdivisions within Special Flood Hazard Areas shown on the Federal Flood Insurance Rate Map (FIRM) shall be required to submit within their applications the following additional materials:

(a) Elevation and flood profiles sufficient to demonstrate that the house sites will be completely free from the danger of flooding.

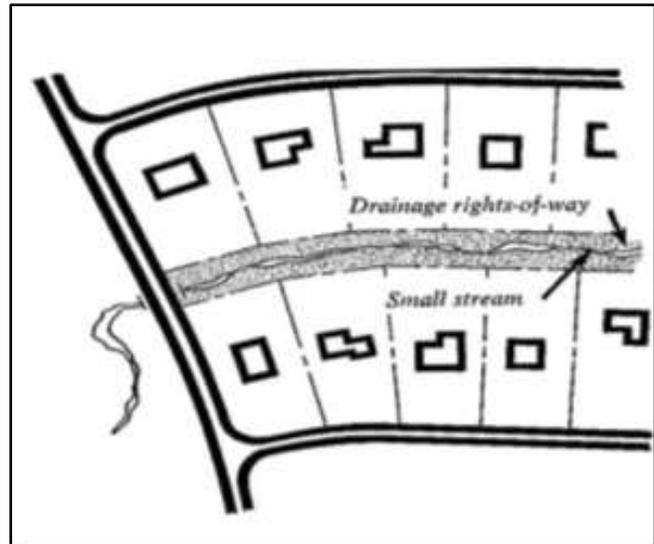
(b) The plat plan shall provide for an easement or right-of-way along the stream for a floodway if a stream flows through or adjacent to the proposed subdivision. The floodway easement shall be wide enough to provide for future enlargement of the stream channel as adjacent areas become more highly developed and runoff rates are increased.

(c) Materials demonstrating that the flood-carrying capacity shall be maintained with any altered or relocated portion of any water course.

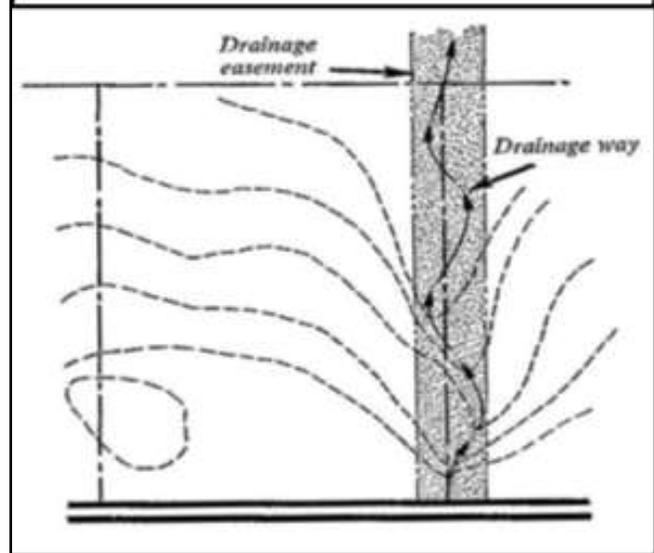
1.5.3 Drainage Improvements in a Subdivision

A subdivision plat with a drainageway or a small stream can present special problems. Lots should be laid out so that the drainage way will not be near the center of a lot. More desirable and usable lots can be created by letting the side lot line follow the center of the drainage way and by providing drainage easements on each side. The lot width can be increased to allow for the easement and still provide a suitable building site. This type of site should not be extensively graded if the water flow and runoff patterns as altered will be directed to neighboring properties or public streets.

When a small stream traverses a subdivision site, desirable lots can be created by providing a drainage right-of-way or easement on each side of the stream and backing the lots up to it. This treatment tends to preserve the stream bed in its natural state, provide continuous public or private open space and eliminates the need for costly and undesirable driveway culverts that would be required if lots were fronted on the stream. A drainageway at the back of the property may offer a more natural and sustainable stormwater management system for the property owner and the community, and the easement provides additional legal protection, which safeguards this environmentally sensitive area against disruption or encroachment. A municipality can include in its subdivision law a provision relating to drainage from storms or floods.



Above: Drainageway easement/right-of-way at back of building lot.
Below: Drainageway easement on side of building lot.
Source: Subdivision Review in New York State. (2015). New York State Department of State.



USAGE

Insert text into a stand-alone subdivision law or the zoning law section establishing general requirements and standards for subdivisions.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Middleburgh (NY) Subdivision Regulations, Article IX General Requirements and Design Standards, Section F Drainage Improvements⁹⁷

LANGUAGE

Section X: Drainage Improvements.

The Planning Board may require that the applicant make adequate provision for storm or flood water runoff channels or basins. The storm water drainage system shall be separate and independent of any sanitary sewer system.

A. Removal of spring and surface water. The applicant may be required by the Planning Board to protect an existing stream bed, or to carry away by pipe or open ditch any spring or surface water that may exist either previous to, or as a result of, the subdivision. Preservation of natural watercourses and drainage patterns is generally preferable to the construction of drainage channels or the diversion of flow into other drainageways. Such drainage facilities shall be located in the road right-of-way where feasible, or in perpetual unobstructed easements of appropriate width, and shall be constructed in accordance with the town construction standards and specifications.

B. Accommodation of upstream drainage areas. Drainage facilities shall be large enough to accommodate potential runoff from the upstream drainage area, whether inside or outside of the subdivision, based on a fifty (50) year storm and assuming conditions of maximum potential development within the water shed. The applicant shall be responsible for submitting such computations to the Planning Board in sufficient detail to make possible the ready determination of the adequacy of the proposed drainage installations. Concentrated drainage from lots onto the road right-of-way shall not be permitted.

C. Effect on downstream drainage area. The Planning Board may also require a study of the effects of the subdivision on existing downstream drainage facilities. Where it is anticipated that the additional runoff incident to the development of the subdivision will overload an existing downstream drainage facility, the Planning Board shall notify the owner of such downstream facility and the [City Council/Town Board/Village Board of Trustees] of such potential condition and may withhold approval of the subdivision until provision has been made for the correction of said potential condition.

D. Drainage easements. Where a subdivision is traversed by a watercourse, drainageway, channel or stream, there shall be provided a storm water easement or drainage right-of-way conforming substantially to the lines of such watercourse, and of such width and construction as will be adequate for the purpose as required by the [name body] Committee, and in no case less than twenty feet in width. Where topography or other conditions are such as to make impractical the inclusion of drainage facilities within road right-of-way, perpetual unobstructed easements shall be provided for such across properties outside the road lines and with satisfactory access to the road. A note to this effect shall be shown on the Final Plat.

1.5.4 Protection of Natural Features in a Subdivision

Important natural features and areas such as undisturbed forested and native vegetated areas, natural terrain, riparian corridors, wetlands and other important site features, help to preserve a site's natural hydrology and water balance, and can act as a non-structural stormwater feature to promote additional filtration and infiltration. Municipalities can require that subdivision plats be laid out in a way that avoids interfering with the natural processes of a floodplain in order to avoid an increase in flood risk from erosion or additional stormwater runoff.

One way a municipality may avoid disturbance in such areas is to include in its subdivision law provisions related to the protection of natural features. These standards can apply to both new subdivisions and redevelopment of previously subdivided land. The language below represents an approach which is both simple and general. Protection of natural features could be strengthened by more detailed standards relating to specific natural features, such as those presented in the *Wetland and Watercourse Protection Measures* chapter of the Model Local Laws. The municipality may also authorize a cluster or "conservation" subdivision in which a subdivision applicant must avoid developing natural areas and environmentally sensitive areas by incorporating those areas into common open space on the subdivision plat.

RESOURCES

Better Site Design. (2008). Division of Water, NYS Department of Environmental Conservation ⁹⁸

Town of Clinton Recommended Model Development Principles for Protection of Natural Resources in the Hudson River Estuary Watershed. (2006). Town of Clinton et al⁹⁹

1.5.4.1 Design Standards to Protect Natural Features

The example below includes general design standards to protect natural features.

USAGE

Insert text as a new paragraph in the design standards section into a standalone subdivision law or the municipal section of the zoning law dealing with subdivision.

It could also be used in conjunction with conservation subdivision review.

ADAPTED FROM THE FOLLOWING SOURCE

Town of North Salem (NY) Municipal Code, Chapter 200 Subdivision of Land, Article III Design Standards and Required Improvements, Section 200-21 Natural Features¹⁰⁰

LANGUAGE

Section X. Natural features.

The planning and design of the plat, including related infrastructure, streets, drainage, parks and other improvements, shall provide for preservation of significant natural features of the tract as follows, provided that the Planning Board may approve plans which modify such natural features after consideration of the alternatives to such modification and the community benefits which may be achieved and when any required permission for modification has been obtained by the applicant from any regulatory agency having jurisdiction:

- A. By avoiding cuts or fills which result in potential soil erosion and excessive tree removal or which disturb water resources.
- B. By avoiding construction which results in relocation of or encroachment upon watercourses and water bodies.
- C. By avoiding filling or excavation of or encroachment upon wetlands, floodplains and other land subject to potential flooding.
- D. By avoiding removal of large isolated trees and mature woods and other desirable vegetation and removal of stone walls.
- E. By providing for preservation of wetlands, watercourses and water bodies and for the protection thereof by easement, reservation area or other controls to prevent excavation, filling or encroachment.
- F. By avoiding rock excavation by blasting which may cause unintended damage or injury to property or persons in the vicinity.

1.5.4.2 Subdivision Woodlands

Clearing of trees may occur in advance of a subdivision or site plan review proposal, eliminating trees and damaging undergrowth that played an important role in retaining stormwater; reducing flood risk; and providing wildlife habitat. Adoption of land clearance standards will provide more options later as a subdivision is platted, and potentially minimize the need for structural stormwater solutions. For example, subdivision and site plan review standards can require the retention of specified minimum-diameter trees on site or may require the replacement of any such trees that are removed with new trees of a specified minimum diameter.

Because land clearing may occur in advance of a subdivision or site plan review proposal, municipalities should consider adoption of a timber harvesting law to ensure sustainable site development. Applicants could be required to implement a selected harvest rather than land clear their property, thereby minimizing any environmental damage should the property later be developed.¹⁰¹ Because the objectives of land clearing differ from that of sustainable forestry management, review standards should be separate from a planned timber harvesting review process.

Land clearing standards can help reduce erosion and stormwater discharges and may help a municipality demonstrate compliance with the Phase II Stormwater requirements of the Clean Water Act. The Clean Water Act requires permits for stormwater discharges from land clearing that disturbs one or more acres.

RESOURCES

A Municipal Official's Guide to Forestry in New York State. (2005). New York Planning Federation, Department of Environmental Conservation, and Empire State Forest Products Association.¹⁰²

USAGE

Insert in the zoning section of the municipal code, including references to the requirements in the subdivision review and site plan review sections of the municipal code. Most effective if used in conjunction with required permits for timber harvesting.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Corning (NY) Subdivision Law, Article IV Design Standards and Required Improvements, Section 4.12 Woodlands¹⁰³

LANGUAGE

Section X. Woodlands.

A. Woodlands as resource. Woodlands occur extensively throughout the [city/town/village], often in association with stream valleys and wet areas, poor and erodible soils, and moderate to

steep slopes. Woodland conditions within the [city/town/village] vary with respect to species composition, age, stocking, and health. Most woodlands in the [city/town/village] represent one or more of the following resource values:

- (1) Erosion Control. As soil stabilizers, particularly on moderate to steep slopes, thereby controlling erosion into nearby streams, ponds, impoundments and roads. A closely related function is their enhancement of ground water recharge.
- (2) Climate Moderation. As a means of ameliorating harsh microclimatic conditions, in both summer and winter.
- (3) Economic Value. As a source of wood products, i.e., poles, saw timber, veneer and firewood.
- (4) Habitat. As habitats for woodland birds, mammals and other wildlife.
- (5) Recreation. As recreation resources for pedestrians, equestrians, birders, photographers, artists and others engaging in similar outdoor activities.
- (6) Visual Buffers. As visual buffers between areas of development and adjacent roads and properties

B. Evaluation required. Because of their resource values, all woodlands on any tract proposed for subdivision or land development shall be evaluated by the applicant to determine the extent to which such woodlands should be designated partly or entirely as open space or buildable lands. Evaluation criteria may include:

- (1) Configuration and Size.
- (2) Present Conditions, i.e., stocking health and species composition.
- (3) Site Potential, i.e., the site's capabilities to support woodlands, based upon its topographic, soil and hydrologic characteristics.
- (4) Ecological Functions, i.e., in protecting steep slopes, erodible soils, maintaining stream quality and providing for wildlife habitats.
- (5) Relationship to woodlands on adjoining and nearby properties and the potential for maintaining continuous woodland areas.

C. Report required. The evaluation of the tract's woodlands shall be undertaken by a forester, landscape architect, horticulturist or another qualified professional acceptable to the [city/town/village]. This evaluation shall be submitted as a report and made a part of the application for a final plat, if requested by the [City/Town/Village] Planning Board. At a minimum, that report shall include one or more maps indicating boundaries and conditions of woodland areas accompanied by a report addressing the criteria in paragraph (1) above.

D. Standards. In designing a subdivision plat, the applicant shall be guided by the following standards:

(1) Over One Acre. Healthy woodlands exceeding one acre shall be preserved and designated as open space areas, the maximum extent possible. Proposed site improvements shall be located, designed and constructed to minimize the loss or degradation of woodland areas.

(2) Buffer Requirements. Subdivisions shall be designed to preserve woodland along roadways, property lines and lines occurring within a site such as streams, swales, stone fences and hedgerows. Such lines and the native vegetation associated with them shall be preserved as buffers between adjacent properties and between areas being subdivided within a property. Preservation shall include ground, shrub, understory and canopy vegetation.

(3) Sensitive Areas. Disturbance or removal of woodlands occupying environmentally sensitive areas shall be undertaken only when approved by the Board and on a limited, selective basis to minimize the adverse impacts of such actions. This shall include but not necessarily be limited to, vegetation performing important soil stabilizing functions on wet soils, stream banks and sloping lands.

(4) Clearing Restrictions. No clearing or earth disturbance (except for soil analysis for proposed sewage disposal systems) shall be permitted on a site before the completion of subdivision agreements. The determination of sight distance clearances along roadways shall be made graphically and not by clearing on-site prior to final plan approval.

1.5.5 Lot Yield Calculations

Lot yield calculations are used to determine the number of allowable lots in a subdivision application. Zoning dictates the density of development in each zoning district (for example, an R2 district may require a minimum lot size of 0.5 acre). The simplest calculation would be to divide the size of the parcel by the minimum lot size for the zoning district to get the number of allowed lots. For example, using a minimum lot size requirement of 0.5 acre in a 10-acre parcel to be subdivided would result in 20 half-acre lots. However, that simple calculation does not take into account roads and other infrastructure, or environmental constraints like wetlands and steep slopes.

In the absence of a state or local regulation prohibiting development of environmentally sensitive lands, a planning board has no authority to exclude environmentally sensitive lands from lot count computations or the buildable area on the site. This doesn't mean that sensitive land can be built upon; rather, it cannot be excluded from computing density or buildable area. As a result, the subdivision applicant may be entitled to more lots (i.e. higher density) than would be ideal from an environmental standpoint.¹⁰⁴ The overall number of lots in a cluster or conservation subdivision should be the same as for conventional subdivisions in the applicable zoning district.

Subtracting from density calculations land that is unsuitable for development or that provides an important natural protective function will reduce the number of allowed lots in a subdivision and protect natural features that minimize risks from flooding and erosion. It will also reduce developer's soft costs by eliminating potential lots that would require extra engineering to be buildable.

While not presented here, a sliding scale method of determining the number of lots in a subdivision can also be used. While more commonly applied as a means of preserving agricultural land, it could also be used to help preserve a site's natural hydrology and water balance. This approach tracks development of the original, or "parent" parcel. Examples can be found in the Town of Ogden (NY)¹⁰⁵ and Town of Seneca (NY)¹⁰⁶ zoning laws.

RESOURCES

Design Guidelines for Conservation Subdivisions in Wallkill, New York. (2009). Behan Planning Associates¹⁰⁷

Conservation Subdivision Handbook: A Guide for North Carolina Communities in the use of Conservation Design for Land Use Planning. (2011). Department of Forestry & Environmental Services, North Carolina State University. ¹⁰⁸

Conservation Subdivision. (2018) GREENPLAN, Inc.¹⁰⁹

1.5.5.1 Simple Density Calculation

The following approach may be taken to calculate the number of lots that may be created in either a conventional subdivision or cluster/open space subdivision. The description of unbuildable land could be expanded to include, for example, rock outcroppings of a certain size or other natural features.

USAGE

Insert text into a standalone subdivision law or the municipal section of the zoning law dealing with subdivision.

ADAPTED FROM THE FOLLOWING SOURCE

Town of Hornby (NY), Subdivision Regulations, Section 1.5 General Policy for Subdivision Design and Review¹¹⁰

LANGUAGE

Section X. Buildable Land Calculations.

A. Density of a subdivision is calculated on net acreage, not gross acreage, of buildable land according to the following guidelines:

(1) Unbuildable Land. To determine net buildable acreage, the applicant shall identify and subtract all acreage considered to be unbuildable as follows:

(a) Steep slopes [*insert percentage, such as 25%*] or greater;

(b) Areas within the Federal Emergency Management Agency designated one-hundred- and five-hundred-year floodplains and floodways;

(c) Wetlands, including New York State designated wetlands, those regulated by the US Army Corps of Engineers and those on the National Wetlands Inventory;

(d) Lands covered by water bodies;

(e) Stream corridors, defined for this calculation as [*insert number of feet, such as fifty feet, or use a methodology described in the Wetlands and Watercourses Chapter of the Model Local Laws*] setback from each streambank of any perennial or intermittent stream indicated in blue on the US Geological Survey topographic quadrangle map); and

(f) Hydric soils as mapped in the Soil Survey of [*insert county name*] County, New York, U.S. Soil Conservation Service, as revised. These are defined as Alden (Aa),

Atherton (At), Canandaigua (Ca), Carlisle (Cc), Chippewa (Ck), Edwards (Ed), Fluvauquents (FL), Kanona (Ka,A, KaB, KaC), Palms (Pa), Warners (We) and Wayland (Wn).

(2) Density calculation. The applicant shall then calculate the acreage that is determined to be buildable and apply the bulk density control schedule minimum square footage per dwelling units or principal buildings as defined in the [*City/Town/Village of _____*] Zoning Law to the net acreage. All density values shall be rounded to the nearest whole number of dwelling units or principal buildings.

1.5.5.2 Buildable Yield Formula

This calculation determines the buildable yield for a major subdivision. Once the amount of buildable land area is determined (the buildable yield), the zoning law and map must be consulted to determine the number of units which are allowed in the district in which the property is located.

USAGE

Insert text into a standalone subdivision law or the municipal section of the zoning law dealing with subdivision.

Add to the list of definitions in the subdivision and/or zoning law a definition for “buildable yield.””

ADAPTED FROM THE FOLLOWING SOURCE

Town of Bethlehem (NY) Municipal Code, Chapter 103 Subdivision Regulations, Section 103-25 Maximum density unit calculation for major subdivisions and Section 103-8 Terms defined ¹¹¹

LANGUAGE

Add the following definitions to the list of definitions in the [select one or both Zoning Law section ____ and/or Subdivision Law section ____]:

(x) Buildable yield is the maximum unit density for a proposed subdivision after deduction of constrained land areas.

Section X. Buildable Yield Calculation.

A. The maximum number of density units (i.e., units per acre or DU) shall not exceed the maximum allowable DU for a subdivision in the district in which the property is located. Any regulations contained in this chapter and in the zoning law restricting the number of dwelling units permitted in a subdivision shall apply. The calculation of buildable yield for a [major] subdivision shall be based on the formula herein. The buildable yield (BY) shall be used to determine the allowable density units per the area, yard and bulk charts in Section ____ of the Zoning Law.

B. The buildable yield (BY) calculation shall be determined by subtracting the constrained land areas of the property (New York State designated wetlands, US Army Corps of Engineers regulated wetlands, lands within the one-hundred-year floodplain area, and steep slope areas of greater than 20%) for which the applicant has not secured and has not submitted to the Planning Board permits or approvals that would allow development in such constrained land areas, as follows:

$$T - (W+F+S) = BY$$

Where:

T = Total acreage inside the boundary lines of the project parcel.

W = Total acreage inside the boundary lines of the project parcel and within a NYSDEC or USACOE regulated wetland (exclusive of any buffer area).

F = Total acreage inside the boundary lines of the project parcel and within the one-hundred-year floodplain area where the base elevations and flood hazard are determined exclusive of any flood area within a regulated state or federal wetland or wetland.

S = Total acreage inside the boundary lines of the project parcel and containing slopes of twenty percent (20%) or greater.

BY = Maximum number of acres that can be developed and that form the basis for determining the maximum number of residential dwellings that may be created per the area, yard and bulk chart.

C. The buildable yield calculation set forth in Paragraph B above shall be adjusted to include, in whole or in part, the constrained land area(s) for which the applicant has secured the necessary permits or approvals from applicable local, state or federal agencies authorizing development in such area(s) and has submitted copies of said permits or approvals to the Planning Board. If the parcel is not proposed for connections to central sewage disposal facilities, the plan shall also include an assessment and certification by a professional engineer as to the suitability of the soils to accommodate individual sewage disposal systems. The [*Planning Board/Department of Planning and Economic Development*], in its sole discretion, shall determine whether the plan is realistic and reflects a development pattern that could reasonably be implemented.

1.5.6 Cluster, Open Space and Conservation Development

As described in the Department of State’s publication, *Subdivision Review in New York State*, a conservation subdivision is a type of cluster subdivision designed to permanently protect a large portion of a site with important environmental or cultural features, while compact building lots are clustered on the remainder of the land. In New York State, the cluster subdivision process is used to achieve conservation subdivisions; State statutes do not specifically mention conservation subdivisions.¹¹²

“As with cluster subdivisions, conservation subdivisions typically result in more compact development and can reduce the cost to the developer of installing and maintaining roadways, sewer lines, and other infrastructure. The approach to creating a conservation subdivision is one of building within and around the natural landscape rather than building on top of it. The environmental benefits of a conservation subdivision - where, for example, stream corridors, woodlands, fields, wildlife habitat, steep slopes and/or wetlands, are protected and storm water is managed entirely onsite - can be significant.”¹¹³

“Cluster subdivision” is a technique authorized by State Statute whereby the local legislative body empowers the planning board, when approving subdivision plats, to modify the dimensional requirements of the zoning law to group or “cluster” structures or lots at a higher density on the most suitable portion of the land, leaving other areas open “to preserve the natural and scenic qualities of open lands.”

A “conservation subdivision” is a type of cluster subdivision designed to permanently protect a large portion of a site with important environmental areas or cultural features, while clustering compact building lots on the remainder of the land.

Source of Definitions: NYS Department of State, *Subdivision Review in New York State*

Key benefits include preserving:

- Conservation areas on a development site;
- Natural hydrology and drainageways;
- Natural conservation areas and other site features;
- Topography, with reduced need for grading and land disturbance;
- Resilience, with reduced infrastructure needs and overall development costs; and
- Flexibility for developers to implement creative site designs including better stormwater management practices.

“Along with reduced impervious surfaces, conservation design provides a host of other environmental benefits lacking in most conventional designs. These benefits reduce potential pressure to encroach on conservation and buffer areas because enough open space is usually reserved to accommodate these protection areas. As less land is cleared during the construction process, alteration of the natural hydrology and the potential for soil erosion are also greatly

diminished. Conservation design reserves 25 to 50 percent of the development site in conservation areas that might not otherwise be protected.”¹¹⁴

“A sound open space planning process can lay the foundation for a community’s application of conservation subdivision regulations. Foundations of the plan include:

- Inventory of natural and scenic resources for preservation - This may include identification of resources by the community through meetings, surveys or planning charettes; the inventory of environmental resources (such as significant wetlands and stream corridors); and integration of resource information identified by state or regional agencies (such as floodplains and productive agricultural lands) into the comprehensive plan for local systems.
- Open space plan or component of comprehensive plan - This includes the development of an open space plan and its components, which may include a community vision plan, recreation plan, bikeway plan, and farmland preservation plan.
- Recreation and trail planning - This includes the development of a recreational lands master plan or component of comprehensive plan, a recreational access plan for the disabled, a recreational facility plan for a neighborhood, or a system of trails (both intra- and inter-community). It may also include the assessment of the impact of new development on such resources, or the development of strategies for obtaining land or easements on land for recreation and trail purposes.”¹¹⁵

Once established, natural conservation areas must be protected during construction and managed after occupancy by a responsible party able to maintain the areas in a natural state in perpetuity. Typically, conservation areas are protected by legally enforceable deed restrictions, conservation easements, or a maintenance agreement.¹¹⁶

Sometimes, a municipality will allow higher densities than permitted under the regular zoning district as an incentive to keep new construction out of flood-prone areas.

The model language below is based on subdivision regulations from the City of Saratoga Springs (NY), which describes itself as the “City in the Country.” While the model addresses conservation subdivisions, the source regulations address both conservation subdivisions and cluster development with cluster development applied in more densely developed areas.¹¹⁷

RESOURCES

Arendt, Randall. *Enhancing Subdivision Value through Conservation Design*. (2001). Oncommonground.¹¹⁸

Local Open Space Planning Guide. (2004). New York State Department of State.¹¹⁹

Lacy, Jeffrey R.; Ritchie, Robert W; and Russell, Joel S. *Natural Resource Protection Zoning: The Green Side of Smart Growth*.¹²⁰

Subdivision Review in New York State. (2015) New York State Department of State. ¹²¹

New York State Stormwater Management Design Manual. (2015). NYS Department of Environmental Conservation.¹²²

Conservation Subdivision Handbook: A Guide for North Carolina Communities in the use of Conservation Design for Land Use Planning. (2011). Department of Forestry & Environmental Services, North Carolina State University.¹²³

USAGE

Insert text as a new section into a standalone subdivision law or the municipal section of the zoning law dealing with subdivision. The text would include authorization to review and approve cluster subdivision plats either at the developer’s option (discretionary cluster), at the municipality’s option (mandatory cluster), or a combination of both (optional in some areas but required in others such as rural zoning districts, flood-prone areas, or other natural resource areas).

ADAPTED FROM THE FOLLOWING SOURCE

City of Saratoga Springs (NY) Municipal Code, Chapter 241 Subdivision Regulations, Article IV Conservation Subdivision Regulations.¹²⁴ Omitted here are provisions related to submission requirements; permanent open space; and rural design and siting standards.

LANGUAGE

Add the following to the definitions section of the subdivision or zoning law:

CLUSTER: A development design technique that concentrates buildings and structures on a limited area of a parcel to allow the remaining parcel area to be permanently left as open space.

CONSERVATION EASEMENT: A perpetual restriction on the use of land, created in accordance with the provisions of Section 49, Title 3 of the Environmental Conservation Law and/or Section 247 of the General Municipal Law, for the purposes of conservation of open space, agricultural land, and natural, cultural, historic, and scenic resources.

CONSERVATION SUBDIVISION: A pattern of development that places housing units on those portions of a property most suitable for development, while leaving substantial portions as undeveloped open space. Such subdivisions may include a variety of lot sizes, ranging from large farms or estate lots to lots similar in size to those found in hamlet or village settings.

CONSTRAINED LAND: As used in the conservation subdivisions, land classified as wetlands, watercourses, 100-year floodplains, and slopes over twenty-five percent (25%) (2,000 square feet or more of contiguous sloped area).

CONVENTIONAL SUBDIVISION: Any subdivision that is not a clustered or conservation subdivision and that satisfies the area requirements in [insert article number] of the Zoning ordinance.

Chapter X. Conservation Subdivision Regulations

Section 1. General Regulations

A. Purpose and Applicability:

(1) The purpose of this article is to achieve a balance between well-designed residential development, meaningful open space conservation, and natural resource protection by requiring conservation subdivisions instead of conventional subdivisions.

(2) These regulations apply to all properties within the [insert rural and/or conservation zoning districts in the municipality] Districts, which encompass most of the area described in the [City/Town/Village of _____] Comprehensive Plan as the [insert references to rural and natural resource areas]. The use of conservation subdivisions is intended to preserve tracts of environmentally and scenically significant undeveloped land in the [insert references to rural and natural resource areas] part of the [city/town/village], including road corridors and buffers, in order to maintain the historic settlement pattern and implement the Comprehensive Plan's vision. Conservation subdivisions result in the preservation of contiguous open space and important scenic and environmental resources, while allowing compact development, more walkable neighborhoods, and more design flexibility than conventional subdivisions. Conservation subdivisions must satisfy the

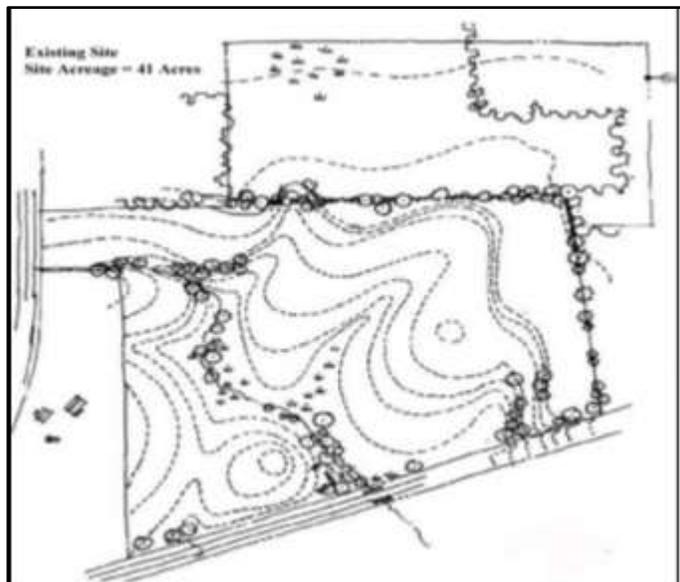
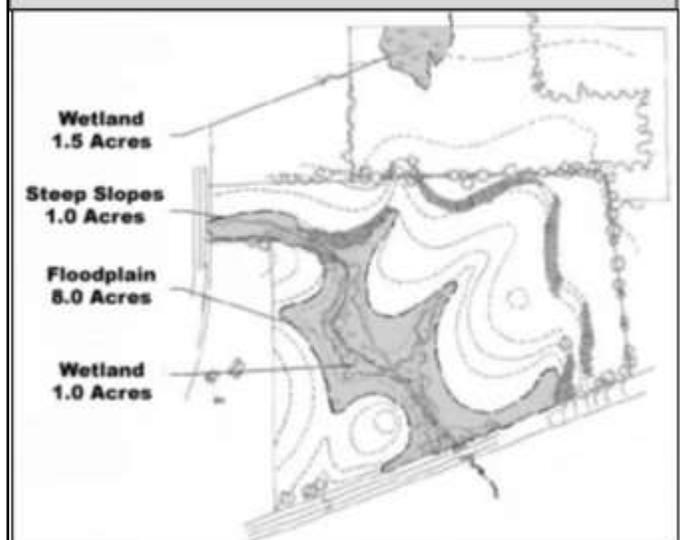


Figure IV.1a Existing Conditions Site Boundary



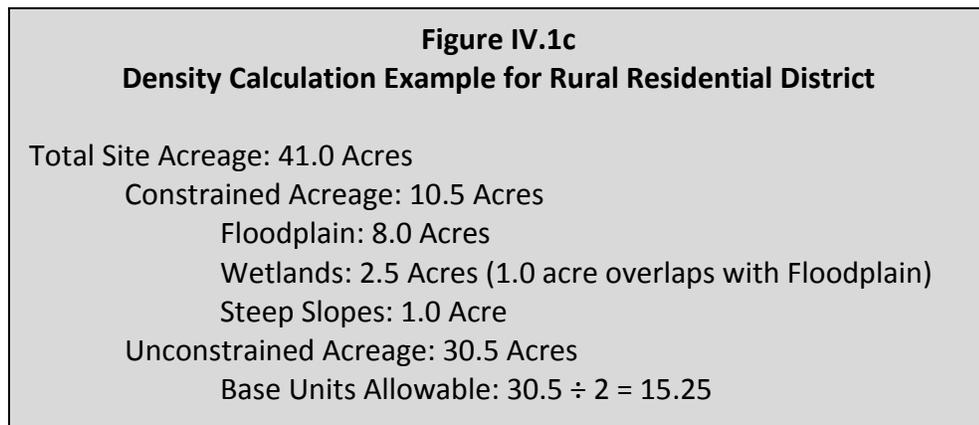
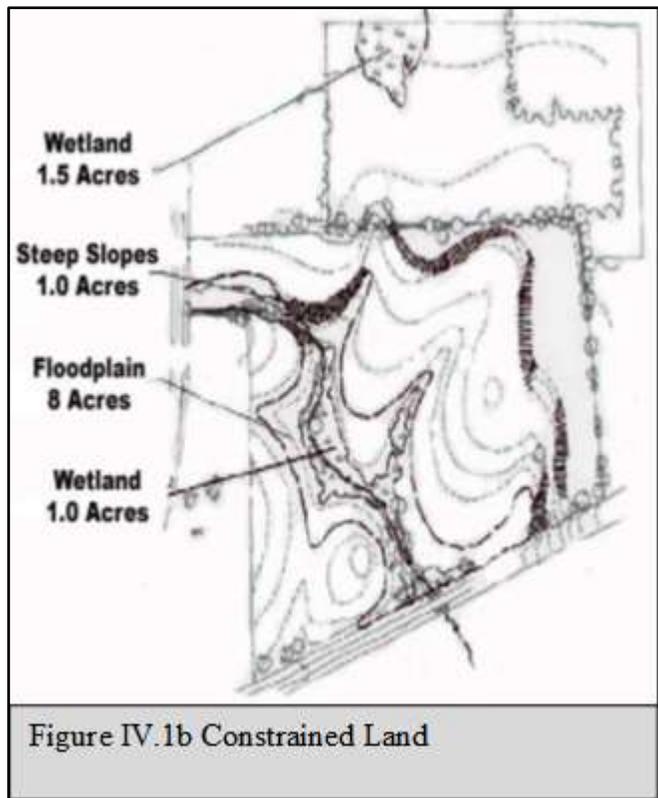
standards in Sections 1, Paragraphs B, C, and D herein. The procedure for approving conservation subdivisions is described in Section 2. Graphics in these regulations are included for illustrative purposes only.

B. Standards for Conservation Subdivisions:

(1) **Density Calculation.** The maximum density allowed for residential units is calculated by a formula based upon the acreage of unconstrained land on the property.

(a) To determine unconstrained acreage, subtract from the total or gross acreage of the proposed development parcel, the acreage of constrained land.

(b) To determine the number of allowable residential units or “base density” on the site, divide the unconstrained acreage by the allowable number of acres per unit required within the zoning district. Round down fractional units of 0.5 or less and round up fractional units greater than 0.5. Figure IV.1a through Figure IV.1c illustrates a density calculation on a site in a hypothetical conservation subdivision in a [insert name(s) of rural or conservation zoning district in the municipality] District.



(c) The base density in Paragraph B(1)(b) may be increased by up to twenty percent (20%) at the sole discretion of the Planning Board if permanent public access will be granted to the protected open space land and any associated improvements as described in Section 1 Paragraph C below.

(d) The density permitted by this section shall not be reduced as a result of the conservation analysis required in Section 1 Paragraph B(2) below, or as a result of the reservation of parkland during the subdivision process.

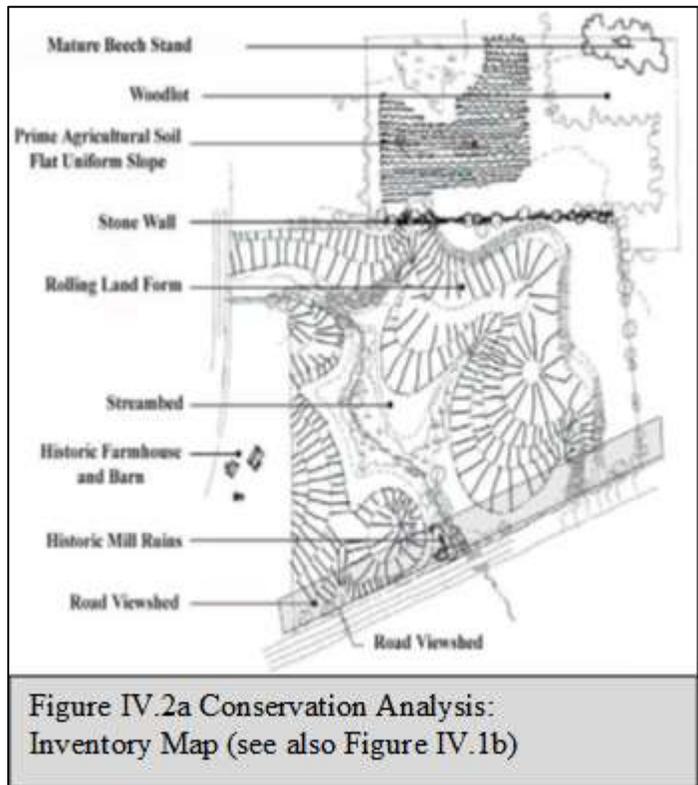
(2) Conservation Analysis.

(a) As part of a preliminary subdivision plat application procedure, an applicant shall prepare a conservation analysis, consisting of inventory maps, description of the land, and an analysis of the conservation value of various site features. *[The municipality should develop a conservation analysis checklist. See the City of Saratoga Springs law for an example.]* The conservation analysis shall show lands with conservation value, including but not limited to the following:

- [i] Constrained land;
- [ii] Open space and recreational resources described in the *[City/Town/Village of _____] Open Space Plan*;
- [iii] Buffers to provide an area for installation of screening to obscure and enhance the view of new development from adjoining parcels; and
- [iv] Land exhibiting present or potential recreational, historic, ecological, agricultural, water resource, scenic or other natural resource value.

(b) The conservation analysis shall describe the importance and the current and potential conservation value of all land on the site. In the course of its initial preliminary subdivision plat review, the Board shall indicate to the applicant which of the lands identified as being of conservation value are most important to preserve.

(c) The outcome of the conservation analysis and the Planning Board's determination shall be incorporated into the approved preliminary subdivision plat showing land to be permanently preserved by a conservation easement. The preliminary subdivision plat shall also show preferred locations for intensive development as well as acceptable locations for less dense development.



(d) The Planning Board shall make the final determination as to which

land has the most conservation value and should be protected from development by conservation easement. Whenever the Board approves a plan with protected open space, it shall make written findings identifying the specific conservation values protected and the reasons for protecting such land (the "conservation findings"). The Planning Board shall deny an application that does not include a complete conservation analysis sufficient for the Board to make its conservation findings.

(e) The preliminary subdivision plat shall show the following as land to be preserved by conservation easement:

- [i] An amount of land no smaller than the total amount of constrained land identified in the analysis in Section 1 Paragraph B(2); and
- [ii] In the *[insert name of rural or conservation zoning district]* District, at least fifty percent (50%) of the land not preserved in Section 1 Paragraph B(2). In the *[insert name of residential district]* at least thirty-five percent (35%) of the land not preserved in Section 1 Paragraph B(2).

(f) If, based upon the conservation analysis, the Planning Board determines in its conservation findings that there is no reasonable basis for requiring a conservation subdivision; the Planning Board may approve a conventional development of the site. In order for the Board to make such a determination, the applicant must demonstrate at least one of the following:

- [i] The land contains no substantial resources with conservation value; or
- [ii] The acreage is too small to preserve a substantial amount of land with conservation value (this criterion shall not be evaded by piecemeal subdivision of larger tracts); or
- [iii] The lot configuration is unique and precludes preservation of a substantial amount of land with conservation value; or
- [iv] That there are extraordinary circumstances unique to the parcel that demonstrates that conventional subdivision is in the best interest of the adjacent neighborhoods.



Figure IV.2b Conservation Analysis: Sample Preliminary Plan

(g) An approval of a conventional subdivision shall refer to the conservation findings and may be conditioned upon the protection by conservation easement of portions of the site identified in the conservation analysis and findings as having conservation value.

(3) Types of Development in a Conservation subdivision. The allowable residential units may be developed as single-family or two-family residences. Within a conservation subdivision, a maximum of *[indicate percentage, such as 25%]* of the units may be placed in structures containing two units.

(4) Lot Sizes in Conservation Subdivisions. There shall be no minimum lot size in a conservation subdivision. The Planning Board shall determine appropriate lot sizes in the course of its review of a conservation subdivision based upon the purposes and design criteria established in this Article. In order to permit a clustered lot configuration, wells and septic systems may be located in areas of protected open space, provided that necessary easements are provided for maintenance of these facilities.

(5) Other Area and Dimensional Requirements

(a) There shall be no required area, bulk, or dimensional standards in a conservation subdivision, except that where such subdivision abuts an existing residence in a residentially zoned area, a suitable buffer area with suitable screening shall be required by the Board. This buffer shall be at least the same distance as the minimum rear or side yard setback in the district in which the abutting land is located.

(b) The applicant shall specify dimensional requirements for a proposed conservation subdivision by identifying setbacks and other lot dimensions to be incorporated into the final subdivision plat.

(6) Conservation Subdivision of a Portion of Larger Tract. The Planning Board may entertain an application to develop a portion of a parcel if a conservation analysis is provided for the entire parcel and the approval to develop a portion of the parcel is not a basis for the applicant or successor in interest to subsequently request an exception under Section 1, Paragraph B(2) of this Article for the remainder of the parcel.

(7) Conservation Subdivision Design Guidelines. Lots shall be arranged in a manner that protects land of conservation value and facilitates pedestrian and bicycle circulation. The lot layout shall to the extent feasible comply with the design guidelines in Section 1, Paragraph D of this Article. Permitted building locations or areas (“building envelopes”) shall be shown on the final subdivision plat.

(8) Permanent Open Space. *[Omitted, see City of Saratoga Springs Subdivision Regulations]*

(9) Rural Design and Siting Standards. *[Omitted, see City of Saratoga Springs Subdivision Regulations]*

Section 2. Procedures for Review of a Conservation Subdivision

A. Review Process

(1) The conservation subdivision review process may involve the following two steps with an optional sketch plan review:

(a) Preliminary subdivision plat review

(b) Final subdivision plat review

(2) Optional sketch plan review. An applicant may request a sketch plan discussion with the Planning Board prior to the applicant making any formal subdivision submission.

(a) The submission of a sketch plan is an option available to the applicant. It is a pre-application procedure. The applicant may exercise this option for a pre-application discussion for the purpose of seeking advice and direction.

(b) During the sketch plan discussion, the applicant and the Planning Board may discuss the possible requirements of the project in relation to standards for street improvements, grading, drainage, sewerage, water supply, fire protection and similar aspects, as well as the availability of existing services and other pertinent information.

(3) Preliminary subdivision plat review. Review of a preliminary plat is mandatory for conservation subdivisions containing four or more lots.

(a) The preliminary subdivision plat shall be reviewed by the Planning Board, which shall hold a public hearing and make its conservation findings as required by [*insert article number*], Section 1, Paragraph B.2. The notice and hearing procedures shall be the same as those for a conventional subdivision contained in [*site section number*]. In order to approve a preliminary subdivision plat, the Planning Board must find that it complies with all relevant provisions of the Zoning Ordinance.

(b) SEQRA compliance for the preliminary subdivision plat shall be the same as required by these regulations for a preliminary subdivision plat application for a conventional subdivision.

(c) Preliminary subdivision plat approval shall expire one (1) year from the date of approval if final plat approval has not been granted. Upon a written request from the applicant, the Board at its discretion may grant an extension of the approval. The length of the extension will vary depending on the basis of the request made.

(4) Final subdivision plat review. The procedure for final subdivision plat review, including notice and hearing procedures, shall be the same as those for a conventional subdivision plan contained in [*site section number*]. In order to approve a final subdivision plat, the Planning Board must find that it is consistent with the preliminary subdivision plat and complies with all relevant provisions of the Zoning Ordinance.

(a) SEQRA compliance for the final subdivision plat shall be the same as required for a conventional subdivision plat. Final subdivision plat approval shall expire one (1) year from the date of the approval. Upon a written request from the applicant, the Planning Board at its discretion may grant an extension of the approval. The length of the extension will vary depending on the basis of the request made.

1.5.7 Environmental Constraint Disclosures

Local officials are occasionally asked by new property owners to make exceptions for their property by not enforcing land use laws or by somehow curing a problem discovered after the property was purchased. Most prospective buyers do not take the time (or know how) to investigate whether a property is subject to a hazard. In many cases a property may not be near a stream or shoreline; past flooding may have been minor; or there may be no history of flooding since the area was settled. As a result, many people are caught by surprise when their property is flooded. One of the best times to learn of a flood hazard is at the time when the purchase of property is being considered. The result may be avoidance of the flood prone areas; awareness of higher flood insurance premiums; fewer headaches for municipal officials; and more resilient construction.¹²⁵

In New York State, sellers are required to either provide a form disclosing environmental constraints on their property, such as the presences of floodplains or wetlands, or provide a \$500 credit toward the purchase price.¹²⁶ Municipalities may not require real estate agents to make those disclosures in their real estate listings. However, municipalities may provide other avenues for that information to be discovered by prospective purchasers. The model law provides two ways to provide notice to prospective buyers: a note on the subdivision plat and a notification covenant attached to the deed.

Municipalities may require a number of items to be shown on a subdivision plat, such as streets, water supply and sewage disposal systems, street lights, electric lines, telecommunication cables, lot lines, topographic lines, and drainage ways. More recently, to alert prospective lot owners and head off potential conflicts between neighbors, some municipalities have required subdivision plats to indicate the presence of adjacent land that is part of a working farm. A similar consumer awareness and protection action a municipality can enact is a requirement that the applicant for a subdivision of land show the presence of flood hazard areas on the subdivision plat, with accompanying base flood elevations.

Municipalities may also establish various requirements regarding deeds for lots created by the subdivision, such as submission of a draft of all proposed restrictions which will become covenants in the deed for the lots. For example, deeds may disclose drainage easements, paper streets (streets that may be built in the future), or nearby farm operations. In the model below, the deed must note the existence of special flood hazard areas and coastal erosion hazard areas.

Requiring the types of disclosures above may qualify a community participating in the Community Rating System for credit points under the category of initiatives that will reduce future flooding damages. (See the *Management of Floodplain Development* chapter of the Model Local Laws for more information on the Community Rating System.) With enough credit points, flood insurance premiums for the residents in the community may be reduced.

USAGE

Insert text into the municipal subdivision law or the section of the municipal zoning law dealing with subdivision.

Paragraphs X and Y should be added to the section which lists items which must appear on a subdivision plat.

Paragraph Z should be added to the requirements for final plat approval.

ADAPTED FROM THE FOLLOWING SOURCE

Gallatin County (MT) Subdivision Regulations, Section 10: Flood Hazard Evaluation¹²⁷

Maine Model Floodplain Management Ordinance (ME), Article IX Review of Subdivision and Development Proposals¹²⁸

LANGUAGE

Add to Section of Subdivision Law listing what must appear on subdivision plat

X. Flood hazard data. The preliminary and final plats of all new subdivisions within any land located in a 100-year floodplain shall show the Base Flood elevations and the limits of the 100-year floodplain based on where the Base Flood elevations intersect surveyed ground elevations. The municipal Floodplain Administrator may require additional flood data and flood hazard notes to be shown on the final plats or other applicable development document (final site plan, covenants, etc.). Such information includes, but is not limited to, the elevation of the existing ground, flood water depth, lowest permissible floor elevations, and the boundary of the 100-year floodplain and floodway through the subdivision.

Y. Construction standards in Special Flood Hazard Areas. Where any portion of a proposed subdivision lies within a special flood hazard area, the subdivision plat shall include a notation stating that structures on any lot in the development having any portion of its land within a Special Flood Hazard Area, are to be constructed in accordance with the development standards of the Municipal Flood Damage Prevention Law. The note shall clearly articulate that the [City/Town/Village] may enforce any violation of the construction requirement.

Add to Section of Subdivision Law on Final Plat Approval

Z. Covenants. The [City/Town/Village] Planning Board shall have the authority to require that the applicant or owner execute covenants as it may deem to be required in order to notify prospective buyers that a lot is in a special flood hazard area as determined by the Flood Insurance Rate Map in effect on the date the deed is filed [optional: or in a coastal erosion hazard area as determined by the New York State Department of Environmental Conservation], and such lot may be subject to federal, state and local regulations on limitations regarding construction and flood insurance. Said covenants shall be recorded in the office of the [_____] County Clerk and constitute a covenant running with the land. Such covenant or agreement may be modified or released only as set forth in said covenant or agreement or by the Planning Board.

1.6 Site Plan Review

While subdivision review can be used to control the division of land and the layout of new lots, site plan review is a technique that allows local review boards to review the development of individual lots. When reviewing site plans, local review boards may be given authority to look at parking, means of access, screening, signage, landscaping, architectural features, location and dimensions of buildings, adjacent land uses and physical features meant to protect adjacent land uses as well as any additional elements specified in a local law.

With proper authorization, review boards can also consider vulnerability to disaster, stormwater control, erosion control, future conditions, lighting, and public service needs. They may also incorporate flood mitigation requirements into conditions placed on site plan approval.

Site plan review may also be a vehicle for applying natural resource protection standards. For example, the Town of Coxsackie zoning law contains natural resource protection standards that address steep slopes, watercourses, wetlands, and wildlife habitat.¹²⁹ The standards apply to all development activities within the Town after the effective date of the law, except land alteration activities that improve single-family or two-family residential lots in single lot ownership, or minor subdivisions (generally 5 or fewer lots on existing streets).

Municipal authorization for site plan review is contained in Town Law 274-a, Village Law 7-725-a, and General City Law 27-a.

RESOURCES

Recommended Residential Construction for Coastal Areas: Building on Strong and Safe Foundations (Second Edition). (2009). FEMA P-550.¹³⁰

Coastal Construction Manual: Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas, FEMA P-55 (2011)¹³¹

National Flood Insurance Program, Floodplain Management Bulletin: Historic Structures. FEMA P-467-2 (May 2008)¹³²

1.6.1 Stormwater Site Design Plans

Stormwater management is another issue that can be addressed through site plan review. Municipalities may consider the extent to which the proposed site plan addresses higher volumes of stormwater that result from buildings, walkways, parking, roads and other impermeable surfaces. As alternatives or in conjunction with structural solutions, site design practices that can avoid or reduce the impacts of stormwater fall into three categories:

Preservation of Natural Features and Conservation Design: Preservation of natural features includes techniques to foster the identification and preservation of natural areas that can be used in the protection of water resources. Conservation design includes laying out the elements of a development project in such a way that the site design takes advantage of a site's natural features, preserves the more sensitive areas and identifies any site constraints and opportunities to prevent or reduce effects.

Reduction of Impervious Cover: Reduction of impervious cover includes methods to reduce the amount of rooftops, parking lots, roadways, sidewalks and other surfaces that do not allow rainfall to infiltrate into the soil, in order to reduce the volume of stormwater runoff, increase groundwater recharge, and reduce pollutant loadings that are generated from a site.

Use of Natural Features and Source Control for Stormwater Management: Use of natural features for stormwater management includes design strategies rather than structural stormwater controls to help manage and mitigate runoff. Source control for stormwater management includes elements to mitigate or manage stormwater in a natural or lower-impact manner.¹³³

Additional examples of model local law provisions may be found in the *Stormwater Control Measures* chapter.

RESOURCES

Stormwater Management Guidance Manual for Local Officials. (2004). NYS Department of Environmental Conservation.¹³⁴

New York State Stormwater Management Design Manual. (2015). NYS Department of Environmental Conservation.¹³⁵

Draft Green Infrastructure Guide. (2015). City of Newburgh Conservation Advisory Council.¹³⁶

Better Site Design. (2008). Division of Water, NYS Department of Environmental Conservation.¹³⁷

USAGE

Insert text in section of zoning law or separate site plan review law which lists the requirements for a site plan.

Village of Voorheesville (NY) Zoning Law, Article XIX Special Regulations, Site Plan Review¹³⁸

LANGUAGE

Section X. Stormwater Site Design Practices; uses, restrictions, and regulations.

A. Site Plan and special use permit applications to the [*insert name of board reviewing such applications, such as the Planning Board*] shall be subject to review and approval for conformance to stormwater site design practices.

B. The site owner/applicant/designer shall submit a Stormwater Site Design Plan (SSDP) to the [*Planning Board*]. The standard used to meet the requirements of this local law shall be the *New York State Stormwater Management Design Manual* (NYSSDM). The applicant shall submit a conceptual SSDP to the [*Planning Board*] for review and conceptual approval prior to the submission of the actual site plan or plans associated with a special use permit.

The conceptual SSDP shall include a narrative outlining the how the conceptual SSDP addresses the initial steps in the process for stormwater site planning and practice as expressed in the NYSSDM, including Step 1 Site Planning, Step 2 Determine Water Quality Treatment Volume (WQv), and Step 3 Apply Runoff Reduction Techniques and Standard SMPs with RRv Capacity to Reduce Total WQv.

C. Where such practices are deemed applicable and practical to the site by the [*Planning Board*], the final SSDP shall incorporate the practices and techniques listed below.

- (1) Practices for preservation of undisturbed areas and buffers; reduction of clearing and grading; locating development in less sensitive areas; open space design, soil restoration, roadway reduction, sidewalk reduction, driveway reduction, cul-de-sac reduction, building footprint reduction and parking reduction.
- (2) Techniques for green infrastructure and standard stormwater management practices with Runoff Reduction Volume capacity incorporating conservation of natural areas, sheetflow to riparian buffers or filter strips, vegetated open swales, tree planting or tree box, disconnection of rooftop runoff, stream day-lighting, rain gardens, green roofs, stormwater planters, rain tanks/cisterns, porous pavement, infiltration practices, bioretention practices and or dry swales (open channel practices).

A narrative addressing the listed practices and techniques shall accompany the final SSDP for review and approval by the [*Planning Board*], and also outline how the final SSDP addresses the following steps in the process for stormwater site planning and practice as expressed in the NYSSDM: Step 4 Determine the minimum RRv required and Step 5 Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume.

D. The [Planning Board] shall review the final SSDP and narratives and determine whether or not the SSDP conforms to the purpose and intent of the local law.

E. The [City/Town/Village] may retain an engineer to review and make recommendations to the [Planning Board] regarding runoff reduction criteria, water quality volume, application of stormwater management practices, peak rate control practices and whether or not quantity control requirements have been met. The [City Council/Town Board/Village Board of Trustees] shall establish a fee schedule related to such review.

1.6.2 Encroachments on Drainageways

Planning board review should include the potential for offsite impacts such as localized flooding. Localized flooding can result from even minor storms. Runoff overloads drainageways and flows into streets and low-lying areas. Sewers back up; yards are inundated; and basements or first floors are flooded. Damage may even occur to sidewalks, streets, and other public property.

Many lots have utility or drainage easements designed to carry surface water away from the buildings and to the street, storm sewer, or other drainage facility. To function properly, drainage easements must be kept open. Unfortunately, many property owners do not know that drainage easements exist or understand why they are needed. They install garages, playsets, sheds, planters, stone walls, fences, or swimming pools in the drainage easements, disrupting the drainage pattern and pushing surface water onto other properties.

Municipalities may address the problem of encroachment in easements through education, regulation, and enforcement.

RESOURCE

Reducing Damage from Localized Flooding: A Guide for Communities. (2005). FEMA 511.¹³⁹

Site Plan Review. (2012). New York State Department of State.¹⁴⁰

USAGE

Insert text in section of zoning law which regulates encroachments. If encroachments are not addressed separately, add to a section in the zoning law on supplemental uses or accessory uses.

ADAPTED FROM THE FOLLOWING SOURCE

Orland Hill (IL) Municipal Ordinance, Title 15 Land Usage, Chapter 152 Fences¹⁴¹

LANGUAGE

A. Encroachments on drainageways. No structure may be erected without complying with the following:

(1) Construction. No structure or barrier shall be constructed in such a manner as to impede or alter the natural surface water drainage of the property upon which the structure or barrier is constructed or any adjoining property. The bottom of the structure or barrier shall be a minimum of three inches above the drainage area.

(2) Enforcement. If the [Code Enforcement Officer or Building Inspector] considers a structure or barrier to be a public safety hazard, either prior to, during, or after construction or placement he or she may issue a stop work order. The property owner may appeal the stop work order and the

[*Code Enforcement Officer's or Building Inspector's*] interpretation that the structure or barrier constitutes a public safety hazard to the Zoning Board of Appeals. If the Zoning Board of Appeals upholds the decision of the [*Code Enforcement Officer or Building Inspector*], they may direct that such structure or barrier be removed or reinstalled in compliance with Paragraph X(1).

1.7 Local Road Standards

Transportation infrastructure including roads, bridges and culverts often require costly repairs or replacements if damaged by extreme weather events. With a changing climate, the Northeast is experiencing more frequent heavy precipitation events, increasing the risk of failure for transportation infrastructure, especially assets nearing the end of their design life. To reduce such risk and increase resiliency, transportation infrastructure replacements should be built to the most current engineering standards and appropriate design flows. “Resiliency” is defined as “the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.”¹⁴²

Municipalities should consider incorporating current and resilient design standards into their transportation infrastructure engineering approaches through adoption of road design standards. Such design standards should be appropriate to the location and needs. A local roads classification system based on traffic volume such as average daily traffic (ADT) counts, can help determine appropriate design standards to use. For these purposes and in general, low volume roads are defined by the Cornell Local Roads Program as having a current Average Daily Traffic (ADT) count of 400 vehicles per day or less. Roads with a greater than 400 ADT count are considered high volume roads. By adopting appropriate standards for low- and high-volume roads, a local government can assure consistent design approaches.

In addition to having a set of design standards to improve the flood resiliency of transportation infrastructure, municipalities should consider adopting such design standards for the additional benefits standards they can bring, such as greater overall safety for the general public, improved planning and scheduling, reduced future impacts to transportation assets and the ability to provide consistent information to the public. In addition, reasonable design standards can be used to help identify where such design standards are not met and develop transportation infrastructure management plans to address these conditions.

Several options for highway standards are available to municipalities in New York State. To incorporate resiliency, the following standards explained below, are recommended:

- New York State Department of Transportation (NYSDOT) Highway Design Manual, Chapter 4 and Chapter 8;¹⁴³
- NYSDOT Bridge Manual¹⁴⁴
- Cornell Local Roads Program Highway Standards for Low-Volume Roads in New York State¹⁴⁵ or
- Or equivalent locally developed municipal-specific standards.

NYSDOT Highway Design Manual

The NYSDOT Highway Design Manual (HDM) provides requirements and guidance on highway design methods and policies which are as current as practicable and assures uniformity of design practice consistent with the collective experience of the NYS Department of Transportation (NYSDOT), the American Association of State Highway and Transportation Officials (AASHTO), and the Federal Highway Administration (FHWA). The

objective of the design process is the construction of highways which provide adequate safety and convenience to all highway users while maintaining proper balance among highway functional classifications, environmental concerns and fiscal restraints. The HDM was developed taking into consideration national references. Portions of the manual may be superseded by subsequent Official Issuances of the NYSDOT. The HDM Chapter 4 is titled “Design Criteria & Guidance for Bridge Projects on Low Volume Highways” and Chapter 8 is “Highway Drainage.”

NYSDOT Bridge Manual

The NYSDOT Bridge Manual (BM) provides guidance for decisions in the bridge project process, documents or references policies and standards that need to be considered and provides a commentary on good bridge engineering practice. The manual is intended to provide assistance to designers to ensure that “quality” bridges are constructed. “Quality” bridges are durable, economical, aesthetically pleasing, safe, and environmentally sound. Although the manual provides guidance on design procedure, many subjects presented only highlight criteria and practice. A complete analysis and design to produce a safe, economical and maintainable structure is the responsibility of the designer. This manual applies to all bridges constructed under contracts with the NYSDOT. In addition, its use is encouraged for all bridges in New York State.

The NYSDOT BM was developed taking into consideration national references. Bridge designers consider these references and their provisions where applicable.

Highway Standards for Low-Volume Roads (LVRs) in New York State

Using a set of standards originally developed in 1992 by the NYS Local Roads Research and Coordination Council, the Cornell Local Roads Program (CLRP) developed a full set of standards for roads. *The Manual: Guidelines for Rural Town and County Roads* was developed specifically for classification and management of low-volume roads (i.e., less than 400 average number of vehicles per day, also known as “average daily traffic” or ADT) in New York State. These guidelines establish appropriate standards for speed, construction and maintenance which are consistent with the needs and uses of these low-volume roads (LVRs). The Highway Standards for LVRs in NYS can be adopted by any municipality or agency but are not recommended on highways with more than 400 ADT. The standards include common options used by municipalities in New York State.

Locally Developed Municipal-Specific Standards

A municipality may elect to develop its own standards and adopt them as the official municipal policy. They must be legally sufficient so as to survive a legal challenge. The municipality should have the standards developed by a Professional Engineer and reviewed by the municipal attorney. A municipality may elect to use portions of the above standards but should include an order of precedence to avoid any potential conflicts.

Which Standard to Use

Unless a municipality develops its own standards, it should choose among the standards listed below. For roads with more than 400 average number of vehicles per day (400 ADT), the NYSDOT Manuals are the standards that should be followed. Local governments can adopt standards for low-volume and high-volume roads.

Traffic Volume	Closed Drainage/Culverts/Ditches	Bridges
≤ 400 ADT	<ul style="list-style-type: none">• NYSDOT Highway Design Manual (Chapter 4 and 8), or• Highway Standards for Low Volume Roads (Cornell Local Roads Program)	NYSDOT Bridge Manual
> 400 ADT	<ul style="list-style-type: none">• NYSDOT Highway Design Manual (Chapter 8)	NYSDOT Bridge Manual

Note: It is acceptable to add municipal specific options in highway standards if reviewed and properly vetted.

Implementation Process for Roadway Standards

Having standards will provide consistent requirements for new construction of roads, bridges and culverts. The standards will also support the development of a transportation infrastructure management plan and consistency in repairing deficiencies in construction. Requiring that such a plan be followed would reduce the risk of future damages to transportation assets, provide greater overall safety for the traveling public and provide consistent information to the public.

Standards should be adopted by local law. As with any legislation, a public hearing must be held prior to adoption. Additionally, the law should be reviewed for legality, completeness and proper language by the municipal attorney. After the law is passed by the county, city, town, or village, it must be filed with the New York State Department of State. Instructions and necessary forms for filing local laws are available online from the New York State Department of State. For more information, the municipality may contact the Cornell Local Roads Program.

Following adoption, the following implementation process is recommended:

- Classify local roads by volume. Additional classifications evaluating factors such as types of vehicles, land use, and seasonality of use are further refined in the cited standards.
- Determine existing conditions of pavement, roadside, signs, drainage, and alignment.
- Identify what work needs to be completed to meet adopted highway standards.
- Rank the needs and prioritize the work.
- Develop and implement an action plan.
- Identify funding needs and obtain funding.

The model local law presented here will be useful to municipalities that are considering adopting and incorporating resilient design standards into their engineering infrastructure approaches for their local roads, including low-volume roads. Adopting the design standards referenced hereby will help municipalities increase infrastructure resilience.

This model local law and background narrative was prepared by the Cornell Local Road Program, NYS Department of Transportation, and NYS Department of State.

RESOURCES

Guidelines for Geometric Design of Very Low-Volume Local Roads. AASHTO.¹⁴⁶

Manual: Guidelines for Rural Town and County Road. Local Roads Research and Coordination Council.¹⁴⁷

A Policy on Geometric Design of Highways and Streets (known as the *AASHTO Greenbook*). AASHTO.¹⁴⁸

Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤400), 1st Edition. AASHTO.¹⁴⁹

Local Roads Research and Coordination Council Manual: Guidelines for Rural Town and County Roads. Cornell Local Roads Program.¹⁵⁰

Highway Standards for Low-Volume Roads in New York State. Cornell Local Roads Program.¹⁵¹

Resilience and Transportation Planning. (2017). Federal Highways Administration. FHWA-HEP-17-028.¹⁵²

USAGE

While road standards may be adopted by regulation or resolution, it is strongly recommended that they be passed as law.

ADAPTED FROM THE FOLLOWING SOURCE

Model prepared by the NYS Department of Transportation in cooperation with the Cornell Local Roads Program.

LANGUAGE

Section 1. Legislative purpose.

The [*County/City/Town/Village*] hereby enacts this local law for the purpose of adopting design standards for transportation infrastructure including [*insert as appropriate - highways, roads, culverts, bridges, drainage systems*] on its local roads including low-volume roads. While there

are generally accepted standards for the design rehabilitation and repair of roads, bridges, culverts and drainage systems on high-volume roads, there are no such comparable standards for roads, bridges, culverts and drainage systems for low-volume roads. Adopting standards that support the design of resilient transportation assets for local roads including low-volume roads could result in greater overall safety for the general public and reduce future impacts to transportation assets. The [County/City/Town/Village] recognizes that resilient design standards should be incorporated as appropriate to the location and needs. A local roads classification system based on traffic volumes defined in Section 3 below will help determine appropriate standards to use.

In addition to having a set of standards to improve the flood resiliency of local transportation infrastructure, the [county/city/town/village] is adopting such standards (per Section 2) for added benefits such as improving planning and scheduling transportation infrastructure improvements, reducing impacts to the traveling public and providing consistent information to the public. In addition, reasonable standards will be useful to help define deficiencies and develop transportation infrastructure management plans.

The increase in heavy precipitation and flooding events is subjecting transportation assets to greater hydraulic stressors, resulting in greater need for maintenance, repair and/or replacement of infrastructure. Given the need to manage this risk, it is incumbent upon the [County/City/Town/Village] to target investments to the most applicable, practical and cost-effective solutions using consistent engineering standards and a risk-based engineering approach.

Section 2. Adoption of Standards.

The [County/City/Town/Village] hereby adopts by reference the following standard(s): *[select as appropriate - New York State Department of Transportation (NYSDOT) Highway Design Manual (Chapter 4 and Chapter 8); NYSDOT Bridge Manual; Highway Standards for Low-Volume Roads in New York State, 2017, Cornell Local Roads Program; or equivalent locally developed municipal-specific standards.]*

Section 3. Classification of Local Roads by Volume.

The [County/City/Town/Village] [identify position of Responsible Official] in consideration of the best interests of the [County/City/Town/Village], may classify one or more (or all) roads, or portions thereof, as one of the following types of roads by volume meaning “average daily traffic” (ADT): either less or equal to (\leq) 400 ADT (low-volume), or greater than ($>$) 400 ADT (high volume).

The classification of any road or designated portion thereof shall be based on available data or the working knowledge and records of the [County/City/Town/Village] [highway superintendent/director of public works]. Upon the classification of any road or portion thereof by the [County/City/Town/Village] [Responsible Official], such designation shall be filed in the office of the [County/City/Town/Village] clerk and a copy shall be presented to each member of the [County Legislature/City Council/Town Board/Village Board of Trustees] by the

[County/City/Town/Village] clerk within 10 days of such filing. Such designation shall be accompanied by a finding by the [Responsible Official], which shall contain the information upon which the [Responsible Official] relied when designating such road or portion thereof. The [County Legislature/City Council/Town Board/Village Board of Trustees] may at a [County Legislature/City Council/Town Board/Village Board of Trustees] meeting following the filing of such designations adopt a resolution accepting such designations. Upon the adoption of such resolution, the road or roads or portion thereof shall be classified as determined by the [County/City/Town/Village] [Responsible Official] and such [County/City/Town/Village] [Responsible Official] shall take into consideration the guidelines for designing, repairing and constructing transportation infrastructure [insert as appropriate - roads, bridges, culverts, drainage systems or portion thereof] as set forth in section two of this local law.

Section 4. Traffic Volumes and Standards.

The following tables and accompanying data shall be used as guides by the [County/City/Town/Village] [Responsible Official] to assign adopted standards of Section 2 to local roads in the [County/City/Town/Village]. Such standards shall be used to enable the [County/City/Town/Village] [Responsible Official] to determine the guidelines he or she may follow to enable him or her to determine the manner in which low-volume rural roads may be designed, maintained and operated.

Road Traffic Volumes	Standards: Closed Drainage/ Culverts/Ditches	Standards: Bridges
≤ 400 ADT	<ul style="list-style-type: none"> • NYSDOT Highway Design Manual (Chapters 4 and 8) • Highway Standards for Low Volume Roads, Cornell Local Roads Program 	NYSDOT Bridge Manual
> 400 ADT	<ul style="list-style-type: none"> • NYSDOT Highway Design Manual (Chapter 8) 	NYSDOT Bridge Manual

Section 5. Certification by Others.

All roadways to be adopted by the [County/City/Town/Village] shall be certified that they are in compliance with these standards by a professional engineer licensed to practice in New York State.

Section 6. Acceptance of Roadways.

Before a roadway is to be adopted by the [County/City/Town/Village], a set of as-built plans approved by the project engineer shall be submitted to the [County/City/Town/Village] [Responsible Official]. Approval by the [County/City/Town/Village] [Responsible Official] that the road project including roadways, culverts, bridges, drainage systems and appurtenances meets the above standards then in effect shall be required prior to acceptance by the [County Legislature/City Council/Town Board/Village Board of Trustees]. The [County/City/Town/Village]

reserves the right to not to accept any roadway project, notwithstanding that all portions of these standards have been met.

Section 7. Discontinuance.

The [*County Legislature/City Council/Town Board/Village Board of Trustees*] may adopt a local law discontinuing such design standards contained in Section 2 and such road classifications contained in Section 3 in the event it determines such discontinuance to be in the public interest.

Endnotes

- ¹ *Model Conservation Zoning District and Natural Resource Protection Standards*. (2010). Lancaster County Planning Commission. Retrieved 12/11/18 from <http://www.lancastercountypanning.org/DocumentCenter/Home/View/154>
- ² *Conservation Advisory Councils and Boards: A Guide to the Organization and Operation of Local Environmental Advisory Councils*. (1997). Westchester County Environmental Management Council. Retrieved 12/13/18 from <https://clctrust.org/wp-content/uploads/2018/03/CAC-Guide.pdf>
- ³ Haeckel, I. and L. Heady. *Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed*. (2014). Department of Natural Resources, Cornell University, and New York State Department of Environmental Conservation, Hudson River Estuary Program. Retrieved 12/11/18 from http://www.dec.ny.gov/docs/remediation_hudson_pdf/nriall.pdf
- ⁴ *Conserving Natural Areas and Wildlife in Your Community: Smart Growth Strategies for Protecting the Biological Diversity of New York's Hudson River Valley*. (2008). New York State Department of Environmental Conservation. Retrieved 12/11/18 from http://www.dec.ny.gov/docs/remediation_hudson_pdf/hrebch.pdf
- ⁵ *Town of Clinton Recommended Model Development Principles for Protection of Natural Resources in the Hudson River Estuary Watershed: Consensus of the Local Site Planning Roundtable*. (2006). Town of Clinton et al. Retrieved 1/30/19 from http://www.dec.ny.gov/docs/remediation_hudson_pdf/hrewbsdclin.pdf
- ⁶ New York State Association of Conservation Commissions Website at <http://www.nysaccny.org/>
- ⁷ City of Hudson (NY) Existing Zoning Map from the 2000 Update to the Comprehensive Plan. Retrieved 12/11/18 from http://www.cityofhudson.org/document_center/Code%20Enforcement/Zoning%20Map.pdf
- ⁸ City of Hudson (NY) Municipal Code, Chapter 325 Zoning, Article III District Use Regulations, Section 325-17.1 Core Riverfront C-R District, Paragraph A. Retrieved 1/23/19 from <https://ecode360.com/16031827>
- ⁹ City of Hudson (NY) Municipal Code, Chapter 325 Zoning, Article III District Use Regulations and Attachment 1, Section 325-17.1 Core Riverfront C-R District. Retrieved 5/14/19 from <https://ecode360.com/16031827>
- ¹⁰ City of Hudson (NY) Code, Chapter 325 Zoning, Article III District Use Regulations, Section 325-7 One-Family Residence R-1 District. <https://ecode360.com/5082289>

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- ¹¹ Town of Saugerties Zoning District Overlay Map. Retrieved 5/14/19 from <https://townsaugerties.digitaltowpath.org:10234/content/Generic/View/184:field=documents;/content/Documents/File/60.pdf>
- ¹² The Community Risk and Resiliency Act provides that the Department of Environmental Conservation, in consultation with the Department of State, will develop guidance on the use of natural resources and natural processes to enhance community resiliency. When available, a link will be provided at <https://www.dec.ny.gov/energy/102559.html>
- ¹³ Town of Saugerties (NY) Municipal Code, Chapter 245 Zoning, Article VI General Regulations, Section 245-26 Waterfront Overlay District. Retrieved 12/11/18 from <http://www.ecode360.com/13646672>
- ¹⁴ Leatherman, Stephen P. Shoreline Change Mapping and Management Along the U.S. East Coast. Coastal Education & Research Foundation, Inc. (Fall 2003). Retrieved 5/22/19 from https://www.jstor.org/stable/25736596?seq=1#page_scan_tab_contents
- ¹⁵ Town of Lloyd (NY) Municipal Code, Chapter 100 Zoning, Article V Overlay and Other District Regulations, Section 100-25 Waterfront Bluff Overlay District. Retrieved 5/15/19 from <https://www.ecode360.com/14350367>
- ¹⁶ Town of Lloyd (NY) Municipal Code, Chapter 90 Subdivision of Land, Section 90-3 General Requirements. Retrieved 5/20/19 from <https://www.ecode360.com/14347010>
- ¹⁷ Transfer of Development Rights. (2010). New York State Department of State. Retrieved 12/11/18 from http://www.dos.ny.gov/lg/publications/Transfer_of_Development_Rights.pdf
- ¹⁸ Ibid.
- ¹⁹ Ibid.
- ²⁰ Ibid.
- ²¹ Town of Riverhead (NY) Municipal Code, Chapter 301 Zoning and Land Development, Article XLII Transfer of Development Rights. Retrieved 2/14/19 from <https://ecode360.com/29712487>
- ²² Town of Lysander (NY) Local Law No. 8, adopted June 8, 2015. Retrieved 2/14/19 from https://locallaws.dos.ny.gov/sites/default/files/drop_laws_here/ECMMDIS_appid_DOS2015_0218075528_35/Content/090213438000dc5a.pdf
- ²³ Town of Warwick (NY) Municipal Code, Chapter 164 Zoning, Article IV Regulations, Section 164-47.4 Transfer of Development Rights (TDR). See also Section 164-47.3 Agricultural Protection Overlay District and Section 164-47 Traditional Neighborhood Overlay (TN-O) District. Retrieved 2/14/19 from <https://www.ecode360.com/11978554>

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- ²⁴ Town of Clifton Park (NY) Municipal Code, Chapter 208 Zoning, Article VB Open Space Incentive Zoning. See also Article VA Hamlet Mixed Use (HM) District. Retrieved 2/14/18 from <https://ecode360.com/6715253>
- ²⁵ Town of Eden (NY) Municipal Code, Chapter 225 Zoning, Article VI Supplementary Regulations, Section 225-34 Transfer of Development Rights. Retrieved 2/14/19 from <https://ecode360.com/10572248>
- ²⁶ *Transfer of Development Rights*. (2010). New York State Department of State. Retrieved 12/11/18 from http://www.dos.ny.gov/lg/publications/Transfer_of_Development_Rights.pdf
- ²⁷ *Fact Sheet: Transfer of Development Rights*. (2001). American Farmland Trust. Retrieved 12/11/18 from http://conservationtools.org/library_items/64/files/57
- ²⁸ Siders, A. *Managed Coastal Retreat: A Handbook of Tools, Case Studies, and Lessons Learned*. (2013). Columbia Center for Climate Change Law Columbia Law School. Retrieved 12/11/18 from https://web.law.columbia.edu/sites/default/files/microsites/climate-change/files/Publications/ManagedCoastalRetreat_FINAL_Oct%2030.pdf
- ²⁹ Otto, K. *Smart Growth through the Transfer of Development Rights*. (2010). New Jersey. Retrieved 12/11/18 from <http://www.njfuture.org/wp-content/uploads/2011/07/Case-Studies-in-Transfer-of-Development-Rights-8-10-Intern-report.pdf>
- ³⁰ City of Middletown (CT) Municipal Code, Section 46 Flood Area Managements Regulations, Section 46.06 Design Standards for Subdivision Proposals, Section 46.06.07. Retrieved 5/17/19 from <http://www.middletownct.gov/DocumentCenter/View/1552/Section-46--Flood-Area-Management-Regulations-PDF?bidId=>
- ³¹ Town of Wheatland (NY) Municipal Code, Chapter 130 Zoning, Article II Zoning Map; District Regulations, Section 10-11 Floodplain and Residence Districts: Table of Dimensional Regulations. Retrieved 5/17/2019 from <https://ecode360.com/10501218>
- ³² *Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures*. (2012). FEMA P-259. Retrieved 12/12/18 from http://www.fema.gov/media-library-data/20130726-1506-20490-2593/fema259_complete_rev.pdf
- ³³ Town of Islip (NY) Municipal Code, Chapter 68 Zoning, Article 1 General Provisions, Section 68-3. Retrieved 12/12/18 from <http://ecode360.com/7703256>
- ³⁴ City of New Rochelle (NY) Municipal Code, Chapter 178: Impervious Surfaces. Retrieved 12/12/18 from <https://ecode360.com/6735551>
- ³⁵ Ibid.

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- ³⁶ City of New Rochelle (NY) Municipal Code, Chapter 178 Impervious Surfaces; Chapter 331 Zoning Article II Definition and Word Usage and Attachments 1 and 3 containing schedules of dimensional regulations. Retrieved 5/15/19 from <https://ecode360.com/NE0964>
- ³⁷ See the Department of State publication, *Adopting Local Laws in New York State*. Available online at https://www.dos.ny.gov/lq/publications/Adopting_Local_Laws_in_New_York_State.pdf
- ³⁸ City of Gulfport (MS) Flood Damage Prevention Ordinance (2008 Version), Article 5 Provisions for Flood Hazard Reduction, Section D Standards for Subdivision Proposals. Retrieved 5/16/19 from <http://www.gulfport-ms.gov/URBANDEV/2574.Amend.Flood.Ord.pdf>
- ³⁹ Mississippi Emergency Management Agency Model Flood Damage Prevention Ordinance, Article 5 Provisions for Flood Hazard Reduction, Section F Standards for Subdivision Proposals and Other Proposed Development. Retrieved 5/22/19 from <http://www.msema.org/wp-content/uploads/2018/10/MississippiB-EModelOrdinanceApril2011.pdf>
- ⁴⁰ *Nonconforming Uses, Structures, and Lots*. MRSC. Retrieved 1/24/19 from <http://mrsc.org/Home/Explore-Topics/Planning/Development-Regulations/Nonconforming-Uses-Structures-and-Lots-Regulatio.aspx>
- ⁴¹ *Non-Conforming Users*, Series I Basic Tools and Techniques, Issue Number 4. Elisabeth Haub School of Law, Pace University. Retrieved 12/11/18 from <http://law.pace.edu/non-conforming-users>
- ⁴² *Matter of Harbison v. City of Buffalo*, 4 N.Y.2d 553, 564 (1958). Retrieved 1/30/19 from <https://law.justia.com/cases/new-york/court-of-appeals/1958/4-n-y-2d-553-0.html>
- ⁴³ Starting in 2018, New York State began funding the replacement of aging septic systems in communities adjoining waterways (including lakes and rivers). The Clean Water Infrastructure Act of 2017 established the State Septic System Replacement Fund and allocated \$75 million to support the multi-year effort. For more information, visit the Environmental Facilities Corporation website at <https://www.efc.ny.gov/SepticReplacement>.
- ⁴⁴ City of Utica (NY) Zoning Map. Retrieved 12/12/18 from
- ⁴⁵ Unit 9, *Managing Floodplain Development Through the National Flood Insurance Program, Home Study Course*. French & Associated, Ltd. (1998). Retrieved 12/7/18 from https://www.fema.gov/media-library-data/20130726-1535-20490-8858/is_9_complete.pdf
- ⁴⁶ Unit 9, *Managing Floodplain Development Through the National Flood Insurance Program, Home Study Course*. French & Associated, Ltd. (1998). Retrieved 12/7/18 from https://www.fema.gov/media-library-data/20130726-1535-20490-8858/is_9_complete.pdf

-
- ⁴⁷ City of Utica (NY) Municipal Code, Chapter 2-29 Zoning, Article IV District Regulations, Division 6 Land Conservation District, Section 2-29-255 Uses and/or Structures Rendered Nonconforming by the Adoption. Retrieved 12/7/2018 from <http://ecode360.com/14015839>
- ⁴⁸ Town of Skaneateles (NY) Open Space - Impermeable Surface Interim Guidelines (March 2011). Retrieved 12/12/18 from <https://www.townofskaneateles.com/assets/Uploads/surface.guidelines.pdf>
- ⁴⁹ Town of Skaneateles (NY) Zoning Law § 148-12 Nonconforming Uses, Structures, and Lots, Paragraph G, Subparagraph (6). Retrieved 12/12/18 from <https://www.townofskaneateles.com/assets/Uploads/Town-Code/chapter.148.zoning.pdf>
- ⁵⁰ Town of Skaneateles Zoning Law, Section 148-12 Nonconforming Uses, Structures and Lots, Paragraph C, Subparagraph (5). Retrieved 12/12/18 from <https://www.townofskaneateles.com/assets/Uploads/Town-Code/chapter.148.zoning.pdf>
- ⁵¹ Town of Skaneateles (NY) Zoning Law § 148-12 Nonconforming Uses, Structures, and Lots and Section 148-56 Definitions. Retrieved 12/12/18 from <https://www.townofskaneateles.com/assets/Uploads/Town-Code/chapter.148.zoning.pdf>
- ⁵² *Post-Disaster Redevelopment Planning: A Guide for Florida Communities*. (2010). Florida Department of Community Affairs and Florida Division of Emergency Management. Retrieved 12/12/18 from <http://www.floridajobs.org/docs/default-source/2015-community-development/community-planning/pdr/pdrpguide.pdf?sfvrsn=2>
- ⁵³ *Planning for Post-Disaster Recovery: Next Generation*. (2014). American Planning Association. Retrieved 12/12/18 from https://www.fema.gov/media-library-data/1425503479190-22edb246b925ba41104b7d38eddc207f/APA_PAS_576.pdf
- ⁵⁴ *Post-Disaster Redevelopment Planning: A Guide for Florida Communities*. (2010). Florida Department of Community Affairs and Florida Division of Emergency Management. Retrieved 12/10/18 from <http://www.floridajobs.org/docs/default-source/2015-community-development/community-planning/pdr/pdrpguide.pdf?sfvrsn=2>
- ⁵⁵ *Planning for Post-Disaster Recovery: Next Generation*. (2014). American Planning Association. Retrieved 12/10/18 from https://www.fema.gov/media-library-data/1425503479190-22edb246b925ba41104b7d38eddc207f/APA_PAS_576.pdf
- ⁵⁶ *NY Rising Community Reconstruction Plan for the Towns and Villages of Esperance, Schoharie, and Middleburgh*. (March 2014). NY Rising Community Reconstruction Program. Retrieved 12/12/18 from https://stormrecovery.ny.gov/sites/default/files/crp/community/documents/esperance-schoharie-middleburgh_nyrcr_plan.pdf
- ⁵⁷ York County Council Temporary Emergency Dwelling Permit Instructions & Application. Retrieved 12/10/18 from

<https://www.yorkcountygov.com/DocumentCenter/View/627/Emergency-Temporary-Dwelling-Permit-PDF?bidId>

- ⁵⁸ Village of Aurora (NY) Zoning Law, Article IV Use Regulations, Section 405 Special Conditions, P3 Emergency Dwellings. Retrieved 12/12/18 from <http://village.auroranewyork.org/wp-content/uploads/2010/11/Local-Law-4-of-2016-.pdf>
- ⁵⁹ York County (SC) Code of Ordinances, Chapter 156 Temporary Dwelling Permits. Retrieved 12/10/18 from <https://www.yorkcountygov.com/DocumentCenter/View/643/Temporary-Emergency-Dwelling-Permits-PDF?bidId>
- ⁶⁰ North Salem (NY) Planning Board Minutes, October 2, 2013. Retrieved 12/10/18 from <http://northsalemny.org/sites/default/files/minutes/planning2013-10-02.pdf>
- ⁶¹ North Salem (NY), Chapter 250 Zoning, Article XIII Conditional Use and Special Permit Standards, Section 250-67 Public Utility Emergency Staging Facility. Retrieved 12/10/18 from <http://ecode360.com/8330593>
- ⁶² North Salem (NY), Chapter 250 Zoning, II Terminology, Section 250-4 Word Usage. Retrieve 1/25/19 from <https://ecode360.com/8330082>
- ⁶³ Town of Islip (NY) Temporary Trailer/Portable Storage Unit Permit. Retrieved 12/11/18 from http://islipny.gov/i-want-to/download-forms-and-guides/doc_view/810-temporary-trailer-and-portable-storage-unit-permit-application
- ⁶⁴ Town of Warwick Municipal Code, Chapter 164 Zoning, Article IV Regulation, Section 164-43 Supplementary Regulations for All Districts, paragraph (D). Retrieved 12/11/18 from http://www.farmlandinfo.org/sites/default/files/Warwick_ag_overlay_district_1.pdf
- ⁶⁵ Village of Brockport (Monroe County NY) Municipal Code, Chapter 51 Trailers, Trailer Camps and Camping, Section 51-5 Trailers and Camping Regulations, Paragraph J. Retrieved 12/11/18 from <https://ecode360.com/12204766>
- ⁶⁶ Town of Nags Head (NC) Municipal Code, Chapter 32 Storm Reconstruction, Section 32-5 Temporary Mobile Office Units. Retrieved 12/11/18 from https://library.municode.com/nc/nags_head/codes/code_of_ordinances?nodeId=PTIICOOR_CH32STRE_S32-5STEMOOFUN
- ⁶⁷ Technical Bulletin: Determination of Stories Above Grade in Elevated One- and Two-Family Dwellings in Flood Hazard Areas. NYS Department of State, Division of Building Standards and Codes (2013). Retrieved 12/10/18 from http://www.dos.ny.gov/DCEA/pdf/TB_DetermineStoriesAboveGrade2013.pdf
- ⁶⁸ *Elevated Residential Structures*. (1984). FEMA 54. Retrieved 12/10/18 from <http://www.fema.gov/media-library-data/20130726-1509-20490-6744/fema54.pdf>

-
- ⁶⁹ *Elevation Design Guidelines for Historic Homes in the Mississippi Gulf Coast Region*. Mississippi Development Authority. Retrieved 12/10/18 from http://www.nj.gov/dep/hpo/hrrcn_sandy_pdf%20files/mississippi.pdf
- ⁷⁰ Technical Bulletin: Determination of Stories Above Grade in Elevated One- and Two-Family Dwellings in Flood Hazard Areas. NYS Department of State, Division of Building Standards and Codes (2013). Retrieved 12/10/18 from http://www.dos.ny.gov/DCEA/pdf/TB_DetermineStoriesAboveGrade2013.pdf
- ⁷¹ *Recommended Residential Construction for Coastal Areas: Building on Strong and Safe Foundations*. (2009). FEMA P-550, Second Edition. Retrieved 12/10/18 from http://www.fema.gov/media-library-data/20130726-1517-20490-9361/fema_p550_rev3.pdf
- ⁷² *Coastal Construction Manual: Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas (Fourth Edition)*. (2011). FEMA P-55. Retrieved 12/10/18 from https://www.fema.gov/media-library-data/20130726-1510-20490-2899/fema55_voli_combined.pdf
- ⁷³ *Floodplain Facts #8: Enclosed Areas below the Flood Protection Level*. (2009). Southern Tier Central Regional Planning and Development Board. Retrieved 12/10/18 from http://www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Floodplain%20Management/NFIP_08_Enclosed_Areas.pdf
- ⁷⁴ New York City (NY) Zoning Resolution, Article VI: Special Regulations Applicable to Certain Areas, Chapter 4 Special Regulations Applying in Flood Hazard Areas, Sections 64-431, 64-334, and 64-61. Retrieved 12/10/18 from https://up.codes/viewer/new_york_city/nyc-zoning-resolution/chapter/VI/special-regulations-applicable-to-certain-areas#VI_4
- ⁷⁵ Ibid.
- ⁷⁶ New York City (NY) Zoning Resolution, Article I General Provisions, Chapter 2 Construction of Language and Definitions, Section 12-10 Definitions. Retrieved 1/25/19 from https://up.codes/viewer/new_york_city/nyc-zoning-resolution/chapter/I/general-provisions#12-10
- ⁷⁷ *Floodplain Facts #8: Enclosed Areas Below the Flood Protection Level*. (2009). Southern Tier Central Regional Planning and Development Board. Retrieved 12/10/18 from http://www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Floodplain%20Management/NFIP_08_Enclosed_Areas.pdf
- ⁷⁸ *Higher Floodplain Development Standards: Recommendations for the Town of Horseheads*. (2015). Southern Tier Central Regional Planning and Development Board. Retrieved 12/10/18 from http://www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Floodplain%20Management/THorseheads_Proposed_FP_Standards.pdf

-
- ⁷⁹ Village of Freeport (NY) Municipal Code, Chapter 87 Flood Damage Prevention, Section 87-16 Standards for all Structures. Retrieved 12/10/18 from <https://ecode360.com/13754579>.
- ⁸⁰ *Higher Floodplain Development Standards: Recommendations for the Town of Horseheads*. (2015). Southern Tier Central Regional Planning and Development Board. Retrieved 12/10/18 from http://www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Floodplain%20Management/THorseheads_Proposed_FP_Standards.pdf
- ⁸¹ Model Acknowledgement of Conditions for Mitigation of Property in a Special Flood Hazard Area with FEMA Grant Funds. (2013) FEMA Retrieved 12/10/18 from https://www.fema.gov/media-library-data/20130726-1650-20490-6091/model_acknowledgement_of_conditions_for_mt_in_sfhas_final.doc
- ⁸² Land Use Moratoria. (2010) New York State Department of State. Retrieved 1/25/19 from https://www.dos.ny.gov/lg/publications/Land_Use_Moratoria.pdf
- ⁸³ New York State Comprehensive Emergency Management Plan Volume 2: Response and Short-Term Recovery. (2018). P. IV-3. NYS Disaster Preparedness Commission. Retrieved 12/10/18 from <http://www.dhSES.ny.gov/planning/cemp/documents/NYS-CEMP-Volume-2-Response-and-Short-Term-Recovery.pdf>
- ⁸⁴ Nags Head (NC) Municipal Code, Chapter 32 Storm Reconstruction. Retrieved 12/10/18 from https://www.municode.com/library/nc/nags_head/codes/code_of_ordinances?nodeId=PTII COOR_CH32STRE&showChanges=true
- ⁸⁵ Nags Head (NC) Municipal Code, Chapter 48 Zoning, Article XX Hurricane and Storm Reconstruction and Redevelopment; General Use Standards for Ocean Hazard Areas. Retrieved 12/10/18 from https://www.municode.com/library/nc/nags_head/codes/code_of_ordinances?nodeId=PTII COOR_CH48ZO_ARTXXHUSTREREREGEUSSTOCHAAR&showChanges=true
- ⁸⁶ Hillsborough County (FL) Municipal Code, Chapter 22 Emergency Management and Emergency Services, Article III Reconstruction Following Emergencies. Retrieved 12/10/18 from https://library.municode.com/fl/hillsborough_county/codes/code_of_ordinances_part_a?nodeId=HICOCOORLA_CH22EMMAEMSE_ARTIIIREFOEM
- ⁸⁷ New York State Comprehensive Emergency Management Plan Volume 2: Response and Short-Term Recovery. (2018). P. IV-4. NYS Disaster Preparedness Commission. Retrieved 12/10/18 from <http://www.dhSES.ny.gov/planning/cemp/documents/NYS-CEMP-Volume-2-Response-and-Short-Term-Recovery.pdf>
- ⁸⁸ See Town Law Section 277 (1), Village Law Section 7-730 (1), and General City Law Section 33 (1)

-
- ⁸⁹ Subdivision Review in New York State. (2015) New York State Department of State. Retrieved 12/10/18 from https://www.dos.ny.gov/lg/publications/Subdivision_Review_in_NYS.pdf
- ⁹⁰ Subdivision Design and Flood Hazard Areas. PAS Report 584. American Planning Association. Retrieved 1/30/19 from https://www.fema.gov/media-library-data/1477942538916-25aa685572bdd20758da7bccb3de8905/5-PAS584_SubdivisionDesignAndFloodHazardAreas1.pdf
- ⁹¹ Ibid.
- ⁹² Town Law § 277(1), Village Law § 7-730 (1), General City Law § 33(1). If a proposed subdivision will cause flooding, a town planning board has a duty either to deny approval of the plans or condition its approval upon correction of the deficiencies. 26 Op.State Compt. 98, 1970
- ⁹³ Town of Pendleton (NY) Municipal Code, Chapter 220 Subdivision of Land, Article V General Requirements and Design Standards for Major Subdivision, Section 220-27 Drainage improvements. Retrieved 12/11/18 from http://www.ecode360.com/5124353?highlight=flooding,flood&sm_au=iVVkkMLvJS5085Tq
- ⁹⁴ Douglas County (OR) Municipal Code, Article 30 (FP) Floodplain Overlay, Section 3.30.440 Subdivision and Partitioning Proposals. Retrieved 1/31/19 from http://www.co.douglas.or.us/Land/documents/2018/3_502_River_Bend_Rd/Zoning_FP_FloodPlain.pdf
- ⁹⁵ Town of Watertown (CT) Subdivision Regulations, Section 5 Design Standards, 5.16 Requirements Regarding Flooding. Retrieved 12/11/18 from http://www.watertownct.org/filestorage/10298/4365/8433/11272/051311_Subdivision_Regulations_-_MASTER.pdf
- ⁹⁶ Village of Homer (NE) Zoning Law, Article 13 Subdivision Design Standards, Section 13.05 Subdivision Design Standards; Lots. Retrieved 12/11/18 from <http://www.homerne.net/zoning.pdf>
- ⁹⁷ Town of Middleburgh (NY) Subdivision Regulations, Article IX General Requirements and Design Standards, Section F Drainage Improvements. Retrieved 12/11/18 from <http://www4.schohariecounty-ny.gov/PdfFiles/TMID/TwnMidSubdivisionRegs.pdf>
- ⁹⁸ *Better Site Design*. (2008). Division of Water, NYS Department of Environmental Conservation. Retrieved 12/11/18 from http://www.dec.ny.gov/docs/water_pdf/bsdcomplete.pdf
- ⁹⁹ *Town of Clinton Recommended Model Development Principles for Protection of Natural Resources in the Hudson River Estuary Watershed*. (2006). Town of Clinton et al. Retrieved 1/30/19 from http://www.dec.ny.gov/docs/remediation_hudson_pdf/hrewbsdclin.pdf

-
- ¹⁰⁰ Town of North Salem (NY) Municipal Code, Chapter 200 Subdivision of Land, Article III Design Standards and Required Improvements, Section 200-21 Natural Features. Retrieved 12/11/18 from <http://ecode360.com/8329287?#8329287>
- ¹⁰¹ *A Municipal Official's Guide to Forestry in New York State*. (2005). New York Planning Federation, Department of Environmental Conservation, and Empire State Forest Products Association. Retrieved 12/11/18 from http://www.dec.ny.gov/docs/lands_forests_pdf/guidetoforestry.pdf
- ¹⁰² Ibid.
- ¹⁰³ Town of Corning (NY) Subdivision Law, Article IV Design Standards and Required Improvements, Section 4.12 Woodlands. Retrieved 12/11/18 from <http://www.stcplanning.org/usr/Program Areas/Local Plans Laws/Local Laws/13 7 9 Corning SUBDIVISION%20REGULATIONS revROADS.pdf>
- ¹⁰⁴ Done Holding Co. v. State of New York, 144 A.D.2d 528, 534 N.Y.S.2d 406 (2d Dept. 1988). Retrieved 1/30/19 from <https://www.leagle.com/decision/1988672144ad2d5281319>
- ¹⁰⁵ Town of Ogden (NY) Municipal Code, Chapter 300 Zoning, Article V District Regulations, Section 300-25 RA Rural Agricultural District. Retrieved 12/11/18 from <https://ecode360.com/31894517>
- ¹⁰⁶ Town of Seneca (NY) Zoning Law, Article IV AG Agricultural Zoning District, Section 10.0. Retrieved 12/11/18 from https://www.townofseneca.com/uploads/1/8/4/9/18490564/zoning_with_2018_changes.pdf
- ¹⁰⁷ *Design Guidelines for Conservation Subdivisions in Wallkill, New York*. (2009). Behan Planning Associates. <http://www.townofwallkill.com/index.php/documents/building-department-applications-and-forms/20-conservation-subdivision-guidelines/file>
- ¹⁰⁸ *Conservation Subdivision Handbook: A Guide for North Carolina Communities in the use of Conservation Design for Land Use Planning*. (2011). Department of Forestry & Environmental Services, North Carolina State University. Retrieved 12/11/18 from <https://content.ces.ncsu.edu/conservation-subdivision-handbook>
- ¹⁰⁹ *Conservation Subdivision*. (2018) GREENPLAN, Inc. Retrieved 12/11/18 from https://issuu.com/mrplanit/docs/training_brochure
- ¹¹⁰ Town of Hornby (NY), Subdivision Regulations, Section 1.5 General Policy for Subdivision Design and Review. Retrieved 12/11/18 from <http://www.stcplanning.org/usr/Program Areas/Local Plans Laws/Local Laws/536 Hornby SubdivisionRegs.pdf>

-
- ¹¹¹ Town of Bethlehem (NY) Municipal Code, Chapter 103 Subdivision Regulations, Section 103-25 Maximum density unit calculation for major subdivisions and Section 103-8 Terms defined. Retrieved 12/11/18 from <https://ecode360.com/8992988>
- ¹¹² Subdivision Review in New York State. (2015) New York State Department of State. Retrieved 12/10/18 from https://www.dos.ny.gov/lg/publications/Subdivision_Review_in_NYS.pdf
- ¹¹³ Ibid.
- ¹¹⁴ *New York State Stormwater Management Design Manual*. (2015). NYS Department of Environmental Conservation. Retrieved 12/12/18 from https://www.dec.ny.gov/docs/water_pdf/swdm2015entire.pdf
- ¹¹⁵ Subdivision Review in New York State. (2015) New York State Department of State. Retrieved 12/10/18 from https://www.dos.ny.gov/lg/publications/Subdivision_Review_in_NYS.pdf
- ¹¹⁶ *New York State Stormwater Management Design Manual*. (2015). NYS Department of Environmental Conservation. Retrieved 12/12/18 from https://www.dec.ny.gov/docs/water_pdf/swdm2015entire.pdf
- ¹¹⁷ City of Saratoga Springs (NY) Municipal Code, Chapter 241 Subdivision Regulations, Article IV Conservation Subdivision Regulations. Retrieved 12/11/18 from <http://www.saratoga-springs.org/DocumentCenter/Home/View/2613>
- ¹¹⁸ Arendt, Randall. *Enhancing Subdivision Value through Conservation Design*. (2001). Oncommonground. Retrieved 12/11/18 from <http://www.greenerprospects.com/PDFs/EnhancingSubdivisionValue.pdf>
- ¹¹⁹ *Local Open Space Planning Guide*. (2004). New York State Department of State and New York State Department of Environmental Conservation. Retrieved 12/11/18 from http://www.dos.ny.gov/lg/publications/Local_Open_Space_Planning_Guide.pdf
- ¹²⁰ Lacy, Jeffrey R. and Robert W. Ritchie and Joel S. Russell. *Natural Resource Protection Zoning: The Green Side of Smart Growth*. (2010). Retrieved 12/11/18 from https://www.ioelrussell.com/articles/10_12_Lacy_Ritchie_Russell_The_Green_Side_of_Smart_Growth.pdf
- ¹²¹ Subdivision Review in New York State. (2015) New York State Department of State. Retrieved 12/10/18 from https://www.dos.ny.gov/lg/publications/Subdivision_Review_in_NYS.pdf
- ¹²² *New York State Stormwater Management Design Manual*. (2015). NYS Department of Environmental Conservation. Retrieved 12/11/18 from <http://www.dec.ny.gov/chemical/29072.html>

-
- ¹²³*Conservation Subdivision Handbook: A Guide for North Carolina Communities in the use of Conservation Design for Land Use Planning.* (2011). Department of Forestry & Environmental Services, North Carolina State University. Retrieved 12/11/18 from <https://content.ces.ncsu.edu/conservation-subdivision-handbook>
- ¹²⁴City of Saratoga Springs (NY) Municipal Code, Chapter 241 Subdivision Regulations, Article IV Conservation Subdivision Regulations. Retrieved 12/11/18 from <http://www.saratoga-springs.org/DocumentCenter/Home/View/2613>
- ¹²⁵*Maine Floodplain Management Handbook.* (2007). Maine Department of Agriculture, Conservation and Forestry. Retrieved 12/11/18 from <http://maine.gov/dacf/flood/handbook.shtml>
- ¹²⁶New York State Real Property Law, Section 462 Property Condition Disclosure Statement. Retrieved 1/30/19 from <https://www.dos.ny.gov/forms/licensing/1614-a.pdf>
- ¹²⁷Gallatin County (MT) Subdivision Regulations, Section 10: Flood Hazard Evaluation. Retrieved 12/11/18 from http://gallatincomt.virtualtownhall.net/Public_Documents/gallatincomt_plandept/1SUBDIVISION/REGS/SEC-10-JANUARY-2012.pdf
- ¹²⁸Maine Model Floodplain Management Ordinance (ME), Article IX Review of Subdivision and Development Proposals. Retrieved 12/11/18 from http://maine.gov/dacf/flood/docs/handbook07/06-Chapter01-model_ord_sample.pdf
- ¹²⁹Town of Coxsackie Municipal Code, Chapter 201 Zoning, Article VI Natural Resource Protection Standards. Retrieved 1/30/19 from <https://ecode360.com/13876388>
- ¹³⁰*Recommended Residential Construction for Coastal Areas: Building on Strong and Safe Foundations (Second Edition).* (2009). FEMA P-550. Retrieved 12/11/18 from http://www.fema.gov/media-library-data/20130726-1517-20490-9361/fema_p550_rev3.pdf
- ¹³¹*Coastal Construction Manual: Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas (Fourth Edition).* (2011). FEMA P-55. Retrieved 12/10/18 from https://www.fema.gov/media-library-data/20130726-1510-20490-2899/fema55_voli_combined.pdf
- ¹³²Floodplain Management Bulletin: Historic Structures. (2008). National Flood Insurance Program, FEMA P-467-2. Retrieved 12/12/18 from http://www.nj.gov/dep/hpo/Index_HomePage_images_links/FEMA/FEMA%20historic_structures.pdf
- ¹³³*Better Site Design.* (2008). Division of Water, NYS Department of Environmental Conservation. Retrieved 12/11/18 from http://www.dec.ny.gov/docs/water_pdf/bsdcomplete.pdf

-
- ¹³⁴*Stormwater Management Guidance Manual for Local Officials*. (2004). NYS Department of Environmental Conservation. Retrieved 12/12/18 from https://www.dec.ny.gov/docs/water_pdf/localall.pdf
- ¹³⁵*New York State Stormwater Management Design Manual*. (2015). NYS Department of Environmental Conservation. Retrieved 12/12/18 from https://www.dec.ny.gov/docs/water_pdf/swdm2015entire.pdf
- ¹³⁶*Draft Green Infrastructure Guide*. (2015). City of Newburgh Conservation Advisory Council. Retrieved from https://www.cityofnewburgh-ny.gov/sites/newburghny/files/u576/cac_green_infrastructure_guide_final_2-28-2015.pdf
- ¹³⁷*Better Site Design*. (2008). Division of Water, NYS Department of Environmental Conservation. Retrieved 12/11/18 from http://www.dec.ny.gov/docs/water_pdf/bsdcomplete.pdf
- ¹³⁸Village of Voorheesville (NY) Zoning Law, Article XIX Special Regulations, Site Plan Review. Retrieved 12/12/18 from <http://www.villageofvoorheesville.com/DocumentCenter/Home/View/128>
- ¹³⁹*Reducing Damage from Localized Flooding: A Guide for Communities*. (2005). FEMA 511. Retrieved 12/11/18 from <http://www.fema.gov/media-library-data/20130726-1446-20490-0539/FEMA511-complete.pdf>
- ¹⁴⁰*Site Plan Review*. (2012). New York State Department of State. Retrieved 12/11/18 from http://www.dos.ny.gov/lg/publications/Site_Development_Plan_Review.pdf
- ¹⁴¹Orland Hill (IL) Municipal Ordinance, Title 15 Land Usage, Chapter 152 Fences. Retrieved 12/11/18 from [http://library.amlegal.com/nxt/gateway.dll/Illinois/orlandhill_il/villageoforlandhillsillinoiscodeofordina?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:orlandhill_il](http://library.amlegal.com/nxt/gateway.dll/Illinois/orlandhill_il/villageoforlandhillsillinoiscodeofordina?f=templates$fn=default.htm$3.0$vid=amlegal:orlandhill_il)
- ¹⁴²*Resilience and Transportation Planning*. (2017). Federal Highways Administration, FHWA-HEP-17-028. Retrieved 12/12/18 from <https://www.fhwa.dot.gov/environment/sustainability/resilience/publications/ratp/index.cfm>
- ¹⁴³*Highway Design Manual*. New York State Department of Transportation. Retrieved 12/12/18 from <https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm>
- ¹⁴⁴*Bridge Manual*. (2017). New York State Department of Transportation. Retrieved 12/12/18 from <https://www.dot.ny.gov/divisions/engineering/structures/manuals/bridge-manual-usc>
- ¹⁴⁵*Highway Standards for Low-Volume Roads in New York State*. (February 2017). Cornell Local Roads Program, CLRP No. 17-02. Retrieved 12/12/18 from <https://cornell.app.box.com/v/clrp-pb-hslvrnys>

-
- ¹⁴⁶*Guidelines for Geometric Design of Very Low-Volume Local Roads*, the AASHTO policy book known as the *AASHTO Greenbook*, and low-volume road guidelines can be obtained from AASHTO via their web site at www.transportation.org, or by calling: (800)231-3475.
- ¹⁴⁷*The Manual: Guidelines for Rural Town and County Road*. Local Roads Research and Coordination Council can be obtained from the Cornell Local Roads Program via the web at www.clrp.cornell.edu or by calling (607)255-8033.
- ¹⁴⁸ *A Policy on Geometric Design of Highways and Streets* (known as the *AASHTO Greenbook*). (2018). AASHTO. Available from the AASHTO web site at www.transportation.org, or by calling: (800)231-3475.
- ¹⁴⁹*Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤400), 1st Edition*. (2001). AASHTO. Available from the AASHTO web site at www.transportation.org, or by calling: (800)231-3475.
- ¹⁵⁰Local Roads Research and Coordination Council Manual: Guidelines for Rural Town and County Roads (2012). Cornell Local Roads Program. Retrieved 11/29/18 from <https://cornell.app.box.com/v/clrp-pb-mgrtcr>
- ¹⁵¹ Highway Standards for Low-Volume Roads in New York State. (2017). Cornell Local Roads Program. Sample adoption law page 5 onward. Retrieved 11/29/18 from <https://cornell.app.box.com/v/clrp-pb-hslvrnys>
- ¹⁵²Resilience and Transportation Planning. (2017). Federal Highways Administration. FHWA-HEP-17-028. Retrieved 12/11/18 from <https://www.fhwa.dot.gov/environment/sustainability/resilience/publications/ratp/index.cfm>

RESILIENCE IMPLEMENTATION AND STRATEGIC ENHANCEMENTS (RISE)



LOCAL ASSESSEMENT TOOL



FEMA

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GLOSSARY OF TERMS

1% Annual Chance of Flood (formerly 100-year flood)	A flood that has a 1 percent chance of being equaled or exceeded in any single year. ¹
.2% Annual Chance of Flood or (formerly 500-year flood)	A flood that has a 0.2 percent (1 in 500) chance of being equaled or exceeded in any single year. ²
Accessibility	The ability to access products, services, or environments; this context refers to access to transportation and emergency services.
Capacity building	Activities and improved access to knowledge and tools that provide individuals and organizations with the skills necessary to function at the highest possible level.
Critical infrastructure	A community's essential systems and networks; includes transportation, utilities, health care, water, wastewater, etc.
Community Rating System	A voluntary program for National Flood Insurance Program participating communities to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. ³
Dry floodproofing	A structure is made watertight below the level that needs flood protection to prevent floodwaters from entering; requires sealing the walls with waterproof coatings, impermeable membranes, or a supplemental layer of masonry or concrete. ⁴
Equity	(1) The fair, just and equitable management of all institutions serving the public directly or by contract; the fair, just and equitable distribution of public services and implementation of public policy; and the commitment to promote fairness, justice, and equity in the formation of public policy. ⁵ (2) Providing various levels of support based on specific needs to achieve greater fairness across environmental and social dimensions.
Economic vulnerability	The level of risk faced by a local economy or to an individual's ability to earn income. For example, local economies that are highly dependent on a single employer or producer face a higher level of economic vulnerability than does a more diversified local economy.
Environmental justice	The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. ⁶
Floodplain	The flat or nearly flat land adjacent to a stream or river that experiences occasional flooding; includes the floodway (consists of the stream channel and adjacent areas that carry flood flows) and the flood fringe (areas covered by the flood, but which do not experience a strong current). ⁷ Floodplain maps typically indicate the 100-year and 500-year flood areas.
Green infrastructure	Vegetation, soils, and other elements and practices that reduce and treat stormwater at its source while delivering environmental, social, and economic benefits. ⁸
Inclusion	The action of including/involving people or groups in activities. This context refers to the inclusion of underrepresented groups in the planning processes.
Living shoreline	A variety of structural and organic materials, such as wetland plants, submerged aquatic vegetation, oyster reefs, coir fiber logs, sand fill, and stone utilized to provide shoreline protection and maintain valuable habitat. ⁹
Low impact design/development	Systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration, or use of stormwater to protect water quality and associated aquatic habitat. ¹⁰

¹ www.fema.gov/portal

² www.fema.gov/portal

³ https://www.fema.gov/media-library-data/1503240360683-30b35cc754f462fe2c15d857519a71ec/20_crs_508_oct2017.pdf

⁴ www.fema.gov/media-library-data/20130726-1608-20490-9182/fema_551_ch_07.pdf

⁵ <https://www.napawash.org/about-us/who-we-are/>

⁶ www.epa.gov/environmentaljustice

⁷ www.sciencedaily.com/terms/floodplain.htm

⁸ www.epa.gov/green-infrastructure/what-green-infrastructure

⁹ www.habitat.noaa.gov/restoration/techniques/livingshorelines.html

National Flood Insurance Program	A program that aims to reduce the impact of flooding on private and public structures by providing affordable insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations. ¹¹
Non-conforming uses/structures/lots	A use of property, a structure, or a lot size that was allowed under the zoning regulations at the time the use was established, the structure was erected, or the lot was platted, but which, because of subsequent changes in those regulations, is no longer a permitted use/structure/lot. ¹²
Risk	The possibility that a natural disaster will occur that will have adverse effects. A risk calculation is a function of impact (i.e., consequences if the risk occurred) and the likelihood of the risk occurring.
Smart growth practices	A range of development and conservation strategies that help protect health and the natural environment and make communities more attractive, economically stronger, and more socially diverse. ¹³
Social vulnerability/ socially vulnerable populations	Socioeconomic and demographic factors (age, income and poverty, education, housing, race, disability, social isolation, and more) that may affect an individual's ability to respond to hazard events.
Special Flood Hazard Area (SFHA)	The land area covered by the floodwaters of the base flood as identified on a National Flood Insurance Program map; the area where the National Flood Insurance Program's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. ¹⁴
Substantial improvement	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which 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. ¹⁵
Substantial damage	Damage of any origin sustained by a structure whereby 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. ¹⁶
Vulnerability	The diminished capacity of an individual or group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard. The concept is relative and dynamic. ¹⁷
Vulnerability assessment	A study characterizing the physical location of hazards and identifying the social, environmental, and economic assets which may be impacted
Watershed	A watershed is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. ¹⁸
Wet floodproofing	Permanent or contingent measures applied to a structure or its contents that prevent or provide resistance to damage from flooding while allowing floodwaters to enter the structure or area. ¹⁹

¹⁰ www.epa.gov/nps/urban-runoff-low-impact-development

¹¹ www.fema.gov/national-flood-insurance-program

¹² mrc.org/Home/Explore-Topics/Planning/Development-Regulations/Nonconforming-Uses-Structures-and-Lots-Regulatio.aspx

¹³ www.epa.gov/smartgrowth/about-smart-growth

¹⁴ www.fema.gov/special-flood-hazard-area

¹⁵ www.fema.gov/floodplain-management-old/substantial-improvement#0

¹⁶ www.fema.gov/floodplain-management-old/substantial-improvement#0

¹⁷ <https://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/what-is-vulnerability/>

¹⁸ water.usgs.gov/edu/watershed.html

¹⁹ www.fema.gov/wet-floodproofing

COMMON ACRONYMS

BFE: Base Flood Elevation

BMP: Best Management Practice (stormwater)

CFM: Certified Floodplain Manager

CIP: Capital improvement plan

CRS: Community Rating System

EPA: Environmental Protection Agency

FAR: Floor area ratio

FEMA: Federal Emergency Management Agency

FIRM: Flood Insurance Rate Map

GI: Green infrastructure

GIS: Geographic Information Systems

LEED: Leadership in Energy and Environmental Design

LID: Low-impact design

LiMWA: Limit of Moderate Wave Action

NFIP: National Flood Insurance Program

NPDES: National Pollution Discharge Elimination System

PDR: Purchase of Development Rights

RCD: Resource Conservation District

RL: Repetitive loss properties

SBA: Small Business Administration

SD: Substantial damage

SFHA: Special Flood Hazard Area

SI: Substantial improvement

SLAMM: Sea Level Affecting Marshes Model

SLOSH maps: Sea, Lake and Overland Surge from Hurricanes flood maps

SRL: Severe repetitive loss properties

TDR: Transfer of Development Rights

INTRODUCTION

What does it mean to be resilient? Climate-resilient communities understand potential hazards, risks and vulnerabilities, and are prepared and able to adapt when faced with change or unexpected circumstances. These communities can offer greater protection to the lives and property of residents and recognize that building resilience requires both hard and soft measures, from infrastructure enhancements to policies and governance, at the local and regional levels, and beyond.

In response to recent disasters and hazard-related events, more communities are working towards building resilience. But even motivated communities often find that challenges stand in the way – particularly when it comes to implementation. There might be political barriers or objections to resilience-building efforts in the community, such as an unwillingness to confront future problems, concerns about private property rights, or an expectation of high costs. Some communities may not prioritize resilience, choosing to focus their resources on other issues such as attracting business and jobs, or stimulating housing development. However, with some foresight and the help of model strategies, resilience can be effectively incorporated into a broad spectrum of community planning efforts and policies, allowing communities to avoid an “either/or” choice.

The **Resilience Implementation and Strategic Enhancements (RISE) Local Assessment Tool** helps you approach hazards and risks comprehensively; and assess and refine your laws and policies in a way that improves resilience and helps achieve desired community outcomes. The tool works by assessing two critical elements of building resilience:

- the “how” – once identified, resilience-enhancing measures can be successfully integrated into existing land use laws, building codes, and planning policies; and
- the “what” – gaps in policies and regulations that support resilience.

It does so by walking communities through the following Resilience Focus Areas:

1. Ensure comprehensive understanding of known hazards, risks and vulnerabilities, and their potential effects (physical, economic, social)
2. Conserve land in critical coastal areas, river corridors, and other hazard-prone environments
3. Reduce risk to people, buildings, and facilities in vulnerable areas
4. Plan for and encourage development in safer areas
5. Implement comprehensive stormwater management techniques
6. Improve the community capacity needed to enhance resilience
7. Build community support for improving resilience and remove barriers to implementation

Once you have completed the assessment, you will have a more comprehensive understanding of how your community is currently addressing resilience and working towards community goals of enhancing resilience. While the assessment won’t prescribe a solution for your community, it allows you to see your successes and strengths, and your gaps and challenges. In addition, it connects these factors to specific and applicable resources and strategies for improving resilience, including applicable land use codes and tools.

WHO WILL BENEFIT FROM USING THIS TOOL?

This tool specifically addresses the challenges that face communities affected by coastal or riverine hazards but can be used by any community that desires to enhance its resilience. To focus on implementation more directly, **this tool presumes that your community has done some preliminary work on developing a community vision or goals focused on resilience.** While there is an emphasis on land use laws, codes, and zoning regulations, the assessment extends beyond regulatory issues to help your community also take stock of local initiatives, strategies, and plans.

GETTING READY TO COMPLETE THE TOOL

Who Can Help Fill This Out?

The assessment is often most effective when communities approach it collaboratively, with a variety of expertise present at the table. Forming a steering committee or review group is an efficient way to ensure that the necessary information can be accessed and interpreted. Additionally, forming a group to assess resilience may help to cultivate buy in from officials with the authority to make decisions and allocate funding. A well-functioning group generally consists of three to six (or more) people who are sources of key community information as well as individuals who are willing to be on-going champions of building resilience.

Working through this type of tool can bring communities together in unexpected ways and can lead to long-lasting partnerships. New connections are critical when moving into the implementation phase. Remember that some of these potential partners may be in your applicable state and federal agencies/offices.

What Will I Need to Complete the Tool?

Successfully working through the assessment tool also requires access to key information and documents. It helps to have certain baseline information on hand or know where you can find the information you need (or who can help you find it).

Every community is different and has different needs and staffing structures. Table 1 provides suggestions to help get you started, recommends options for steering committee members, and provides examples of documents, plans, policies, and ordinances that may be useful to you as you work through the tool.

Table 1. Preparing to Complete the Tool – Useful Resources

PERSON/ AGENCY/ ORGANIZATION	RELEVANT RESILIENCE FOCUS AREA(S)	CAN ALSO HELP PROVIDE	STEERING COMMITTEE
Certified floodplain manager/ County Soil and Water Conservation District staff	All focus areas	<ul style="list-style-type: none"> Hazard/flood insurance rate maps (FIRM) Hazard mitigation plan Emergency operations plan Post-disaster recovery plans and studies Municipal zoning code 	X
Chief Resilience	All focus areas	<ul style="list-style-type: none"> Hazard mitigation plan 	X

Officer		<ul style="list-style-type: none"> • Post-disaster recovery plans and studies • Context-appropriate environmental codes/regulations (for example, a coastal area plan) 	
City or land use attorney	Focus area 2 Focus area 7	<ul style="list-style-type: none"> • Municipal zoning code 	
Coastal zone manager/planner	Focus area 1 Focus area 2 Focus area 6 Focus area 7	<ul style="list-style-type: none"> • Hazard/flood insurance rate maps (FIRM) • Hazard mitigation plan • Post-disaster recovery plans and studies • Context-appropriate environmental codes/regulations (for example, a coastal area plan) 	X
Code enforcement officer	Focus area 3 Focus area 5 Focus area 6	<ul style="list-style-type: none"> • Municipal zoning code • Municipal building code 	
Community and economic development staff	Focus area 4 Focus area 6 Focus area 7	<ul style="list-style-type: none"> • Comprehensive/master plan • Municipal zoning code 	X
Developer liaison(s)	Focus area 3 Focus area 4 Focus area 6 Focus area 7	<ul style="list-style-type: none"> • Comprehensive/ master plan • Municipal zoning code • Municipal building code • Subdivision regulations 	
Emergency manager/ planner	All focus areas	<ul style="list-style-type: none"> • Hazard/flood insurance rate maps (FIRM) • Hazard mitigation plan • Emergency operations plan • Post-disaster recovery plans and studies 	X
Health department/ public health staff	Focus area 1 Focus area 3 Focus area 4 Focus area 6 Focus area 7	<ul style="list-style-type: none"> • Community health assessment 	X
Land use planner	All focus areas	<ul style="list-style-type: none"> • Comprehensive/master plan • Municipal zoning code • Subdivision regulations 	X
Local environmental organizations	Focus area 2 Focus area 7	<ul style="list-style-type: none"> • Context-appropriate environmental codes/regulations 	
Natural resources planner or department	Focus area 1 Focus area 2 Focus area 4 Focus area 5 Focus area 6 Focus area 7	<ul style="list-style-type: none"> • Subdivision regulations • Context-appropriate environmental codes/regulations (for example, a coastal area plan) 	
Parks and recreation staff	Focus area 1 Focus area 2 Focus area 5 Focus area 7	<ul style="list-style-type: none"> • Parks/ open space master plan 	

Public works	Focus area 1 Focus area 3 Focus area 5 Focus area 6	<ul style="list-style-type: none"> • Emergency operations plan • Capital improvements plan 	X
Relevant municipal board members (including volunteer) or elected officials	Focus area 1 Focus area 6 Focus area 7	<ul style="list-style-type: none"> • Municipal zoning code • Subdivision regulations • Comprehensive/master plan 	X
Stormwater manager/utility	Focus area 1 Focus area 5 Focus area 6	<ul style="list-style-type: none"> • Stormwater management plan • Subdivision regulations • Context-appropriate environmental codes/regulations 	X
Sustainability planner	All focus areas	<ul style="list-style-type: none"> • Comprehensive/master plan • Municipal zoning code • Municipal building code • Subdivision regulations • Context-appropriate environmental codes/regulations (for example, a coastal area plan) 	
Transportation planner and engineer	Focus area 1 Focus area 3 Focus area 5	<ul style="list-style-type: none"> • Comprehensive transportation plan • Road conditions reports 	
Zoning administrator	Focus area 2 Focus area 3 Focus area 4 Focus area 5	<ul style="list-style-type: none"> • Municipal zoning code • Subdivision regulations 	X

Potential Challenges

The U.S. EPA report “Smart Growth Fixes for Climate Adaptation and Resilience” presents a selection of potential challenges that a community might face when working to implement strategies to improve resilience.²⁰ Table 2 provides a summary of example challenges that might be encountered. These are helpful to think about when completing the Assessment. Often a solution will emerge from a more comprehensive view of a problem.

Table 2. Potential Challenges to Implementing Resilience Strategies

BARRIERS	EXAMPLES
Regulatory and Policy	<ul style="list-style-type: none"> • Allowing development in floodplains • Outdated flood maps • Conflicting regulations • Policy/regulations not guided by data/projections
Fiscal	<ul style="list-style-type: none"> • Perceptions of high cost • Inefficient public spending
Uncertainty	<ul style="list-style-type: none"> • Absence of reliable data about resilience risks

²⁰ Resource material for this section was sourced from the publication “Smart Growth Fixes for Climate Adaptation and Resilience,” U.S. EPA, Office of Sustainable Communities, 2017. <https://www.epa.gov/smartgrowth/smart-growth-fixes-climate-adaptation-and-resilience>

	<ul style="list-style-type: none"> • Perceptions of data complexity
Societal Disparities	<ul style="list-style-type: none"> • Areas most at risk affect those most vulnerable • Conflicting priorities/needs
Timeframe of impacts	<ul style="list-style-type: none"> • Discounting future impacts • “It won’t affect me”
Legal issues	<ul style="list-style-type: none"> • Authority to legislate (Home Rule states versus Dillon’s Rule states) • Conflicts with existing state or local law • Regulatory “takings”
Community Consensus	<ul style="list-style-type: none"> • “Not in My Back Yard” opposition

TOOL STRUCTURE

The **RISE Local Assessment Tool** is organized by the seven Resilience Focus Areas identified above, each broken into four activity types and collectively containing nearly 160 specific local land use and policy strategies. Within the tool, each goal is described, including how it helps build resilience. Examples of practical applications offer information about communities that illustrate focus areas. To dig deeper into the “how” and “what,” you are asked to answer a few context-setting questions and to work through a checklist of strategies to consider how you currently (or could): 1) study, adopt plans, and educate; 2) remove barriers and build partnerships; 3) adopt incentives; and 4) enact policies and supportive regulations. Each focus area includes targeted resources for these strategies that are included to both inform and inspire. These resources are examples of approaches that different communities have used to improve their resilience and, in the process, improve their economies, environment, health, and quality of life. The tool concludes with prioritization guidance and an action planning exercise to help synthesize what’s been learned.

TOOL NAVIGATION

To ensure usefulness to a wide variety of communities, it was necessary to incorporate many resilience-building strategies. However, it is recognized that not all strategies will apply to every community attempting to enhance their resilience. For example, a city that is in the floodplain and fully built out may not find Focus Area 4 - *Plan for and encourage development in safer areas* - to be highly relevant to their community. Answering the questions in the Worksheet on page 60 and tabulating the results will help direct you to the most applicable and relevant resilience focus areas for your community.

Understanding Key Challenges

Before you begin to evaluate the resilience strategies in each focus area, you may choose to start by answering the “Understanding Key Challenges” questions for each section. These questions are intended to help you define your community’s resilience priorities and can help stimulate steering committee discussions, particularly if you’re not sure where to begin. There are no right or wrong answers to these open-ended questions – use them in the way that makes the most sense for your community!

Quick-Start Strategies



RISE identifies a few strategies in each focus area with a lower level of effort required for implementation. These strategies are useful for communities who are new to resilience implementation or who aren't sure where to start and are identified by an orange thumbs-up. Quick-start actions are those that require few resources or those that are fundamental to enhancing community resilience. Examples include identifying and cataloguing waste facilities located in hazardous areas, offering pre-disaster information to businesses, and educating the public about the risks of developing in environmentally sensitive areas.

Community Rating System



The National Flood Insurance Program (NFIP) provides federally backed flood insurance within communities that enact and enforce floodplain regulations. To be covered by a flood insurance policy, a property must be in a community that participates in the NFIP. To qualify for the NFIP, a community adopts and enforces a floodplain management ordinance to regulate development in flood hazard areas. The objective of the ordinance is to minimize the potential for flood damage to future development. Under the Community Rating System (CRS), communities can be rewarded for doing more than simply regulating construction of new buildings to the minimum national standards. Under the CRS, the flood insurance premiums of a community's residents and businesses are discounted to reflect that community's work to reduce flood damage to existing buildings, manage development in areas not mapped by the NFIP, protect new buildings beyond the minimum NFIP protection level, preserve and/or restore natural functions of floodplains, help insurance agents obtain flood data, and help people obtain flood insurance. **RISE** helps communities identify actions that may meet the qualifications of CRS credited activities and thus make an informed decision as to whether they will pursue full CRS certification. These strategies and actions are identified by a blue wave icon. ²¹

Equity and Resilience



RISE integrates equity while addressing the social, economic, and environmental aspects of enhanced resilience. A resilient community understands that hazards and disasters have disproportionately adverse impacts on vulnerable populations (including economically disadvantaged, racial and ethnic minorities, the uninsured, low-income children and elderly residents, the homeless, and those with chronic health conditions) and works to understand and meet the needs of all. Strategies with an equity component are identified using a green icon representing a group of people.

²¹ For more information on the CRS program, including procedures, creditable activities, credit points assigned to each activity, and examples of activities and how their credit is calculated click www.CRSresources.org. Please note that final, or verified, credit can only be calculated by an ISO/CRS Specialist after a review of documentation provided by the community and the community's implementation of its activities at a verification visit (see National Flood Insurance Program Community Rating System Coordinator's Manual, Section 232 for additional information). Please also note that there are baseline requirements for participation in NFIP that may not be reflected in this assessment.

Targeted Resources

Each focus area includes targeted resources for each strategy. These resources are examples of approaches that different communities have used to improve their resilience and, in the process, improve their economies, environment, health, and quality of life. Several types of resources are provided and identified by an icon. These include:

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

TALKING POINTS FOR LOCAL PLANNERS

To enhance resilience local planners must effectively communicate with both the general public and elected leaders. In this capacity, planners should discuss the importance and usefulness of the **RISE** Local Assessment Tool with other staff and elected officials. To facilitate these conversations and begin to build support for enhanced resilience, planners should anticipate questions and concerns, minimize the use of jargon or politically charged statements, and keep conversations simple. Gaining the support of government leaders is critical to local resilience-building efforts. Elected officials can help secure funding for resilience programs and infrastructure investments, ensure vulnerability and hazard concerns are integrated into local land use plans, and enact policies that promote community resilience.

FUNDING RESILIENCY

Funding is often a barrier to implementing resilience-related projects. However, research indicates a high return on these investments. Every \$1 invested in hazard mitigation and resilience can generate savings of between \$4 and \$11 in future disaster costs.²² One common nature-based solution - conserving wetland buffer zones to preserve critical ecosystem services – was demonstrated to have prevented an estimated \$625 million in additional direct flood damages resulting from Hurricane Sandy.²³

A variety of local, state, and federal funds are needed to support comprehensive resilience efforts. This funding may be in the form of grants, capital improvement funds, utility fees, and more. Private funding is another form of investment towards resilience building that is gaining traction. Campaigns and public outreach efforts can generate support from stakeholders such

²² <https://www.nibs.org/page/mitigationsaves>

²³ <https://www.nature.com/articles/s41598-017-09269-z>

as businesses and individuals that may have an interest in protecting their own assets and investments. Innovative funding schemes can also be in the form of public-private partnerships, philanthropic opportunities, and regional funds. Examples of several resilience financing mechanisms are provided below.

[Rhode Island Infrastructure Bank](#): issues bonds, loans, and grants to finance infrastructure projects with a growing focus on resilience and sustainability.

[Regional Greenhouse Gas Initiative](#): a mandatory market-based cap-and-trade program for multiple states in the New England region in which proceeds are put towards strategies that mitigate flood damage to public infrastructure.

[Climate/Green bonds](#): While not a widespread practice in the United States, other nations have established these types of bonds that are used to finance climate or environmental projects that improve a community's resilience.

[Kresge's Environmental Program](#): an initiative providing grants that help communities and non-profit organizations increase their community's resilience capacity and make development more equitable and more resilient to a range of environmental factors.

FOCUS AREA 1: Ensure Comprehensive Understanding of Known Hazards, Risks and Vulnerabilities, and their Potential Effects (Physical, Economic, and Social)

This focus area addresses the importance of recognizing the hazards that could affect your community and the people and places that are most at risk. Although this tool is geared towards communities that have already considered resilience issues, it does not mean that all information pertaining to hazards and risk is complete and up to date. This focus area ensures comprehensive understanding of key issues. A resilient community has a thorough understanding of the hazards it can expect to face, the potential range in severity of those hazards, and where they are most likely to occur. Potential impacts are investigated, mapped, and recognized. A resilient community recognizes that vulnerabilities are not limited to physical structures, and that social and economic vulnerability are equally important to address.

EXAMPLES OF PRACTICAL APPLICATIONS

New York Rising Community Reconstruction Program: A recovery and resilience initiative to assist 124 communities severely affected by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. The program directly engages residents and business owners through planning committees and public engagement events. At such meetings, community members coordinate with the state to develop reconstruction plans and identify projects to strengthen resilience. Thus far, 66 plans have been created. Each plan includes a thorough accounting of hazards, risks, and vulnerabilities. In most cases, projects will be implemented by local stakeholders, with support and technical assistance provided by the Governor's Office of Storm Recovery, which allocated over \$700 million in federal funds to support the planning and implementation of such community-developed projects.

Louisiana Coastal Protection and Restoration Authority (CPRA) 2017 Coastal Master Plan: Updated every five years, the Coastal Master Plan is designed to respond to the loss of coastal land and the threats from storm surge events by identifying, funding, and completing projects that build or maintain land, reduce risk, and improve resilience. Since CPRA was created and the first Coastal Master Plan was released in 2007, it has completed or funded 135 projects, resulting in over 36,000 acres of land benefits, 282 miles of levee improvements, and over 60 miles of barrier islands and berms. In addition, the plan provides individual fact sheets for 24 parishes, detailing hazards and risks, the projected impacts of future land use change and flood depths, as well as the 2017 Coastal Master Plan projects for each parish.

A. Understanding Key Challenges

- ◆ To what natural hazard events is your community most susceptible? What were the primary physical, economic, and social impacts of recent hazard events?
- ◆ Has your community been involved in the development of a Multi-Jurisdictional Hazard Mitigation Plan approved by the Federal Emergency Management Agency (FEMA)? Did you develop your own hazard mitigation plan? Document its name, date of plan, and URL, if available.
- ◆ Are there specific challenges you've faced in identifying your community's hazards and related community impacts?

B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess your community's current capacity for comprehensive understanding of known hazards and their potential physical, economic and social effects. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

STRATEGY		CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES	
	Equity component		Quick-start strategy		CRS linkages
Study, Adopt Plans, Educate					
1.1	Comprehensive plan has a hazard mitigation or resilience chapter/section				
 1.2	Location of socially vulnerable populations (e.g. age, income and poverty, education, housing, race, disability, social isolation) is identified in comprehensive plan, relative to hazards/hazard-prone areas				
 1.3	Waste facilities identified in hazard-prone areas				

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	1.4 Community floodplain data is accessible, current, useful, and/or accurate so that this information contributes to the improvement of local regulations, insurance rating, planning, disclosure, and property appraisals. This includes: implementing digital or paper systems that improve access, quality, and/or ease of updating flood data within the community; maintaining copies of all Flood Insurance Rate Maps (FIRMs) that have been issued for the community; maintaining benchmarks so surveyors can find them and can depend on them to be accurate; and maintaining coastal erosion data			
	1.5 Flood maps consider both historical events and projected flood lines and coastlines			
	1.6 Flood-prone areas (i.e. river corridor hazard areas and shallow, sheet flow flooding areas, or urban flooding areas) are identified in comprehensive plans/land use maps			
	1.7 V130/VE zone areas ²⁴ or Limit of Moderate Wave Action (LiMWA) ²⁵ identified in comprehensive plans (if applicable)			
	1.8 Erosion studies exist for vulnerable coastal areas			
	1.9 Erosion-prone areas (i.e. fluvial (riverine) erosion hazard areas; beach, dune, cliff and bluff erosion/accretion areas; inlet movement; and oyster reef and coral reef sedimentation zones) identified in comprehensive plans			
	1.10 Future flood-prone or erosion-prone areas have been identified by considering an increase in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			
 	1.11 A current inventory of structures located in floodplains and their current elevation status is maintained			

²⁴ National Flood Insurance Program flood zone classifications. V130 means coastal flood with velocity hazard (wave action) and BFEs have not been determined. VE means an area inundated by 1% annual chance flooding with velocity hazard (wave action); where base flood elevations have been determined, and flood elevation includes wave heights equal to or greater than 3 feet. www.fema.gov/zone-ve-and-v1-30

²⁵ A FEMA mapping standard for Flood Insurance rate maps; the inland limit of the area expected to receive 1.5-foot or greater breaking waves during the 1-percent-annual-chance flood event; may be included on more recent Flood Insurance Rate Maps. www.fema.gov/vi/media-library/assets/documents/96413

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	1.12 A current inventory of repetitive loss properties (RL) ²⁶ and severe repetitive loss properties (SRL) ²⁷ is maintained			
	1.13 A current inventory of National Flood Insurance Program (NFIP) claims (and amounts) that have been paid out is maintained			
	1.14 A current inventory of critical community facilities (e.g., fire stations, town hall, hospitals, emergency shelters, utilities, schools, etc.) located within the Special Flood Hazard Area (SFHA) (or the 1%/100-year floodplain) is maintained			
	1.15 A current inventory of public infrastructure (e.g., bridges, roads, power and communication lines, etc.) located within the SFHA (or the 1%/100-year floodplain) is maintained			
	1.16 Locations where floods or high tides can infiltrate the water, sewer, or stormwater system(s) have been identified			
	1.17 A high-water mark campaign that records high water elevations following flood events to validate existing mapping and map hazards ²⁸ is used			
	1.18 Maintain Federal Emergency Management Agency (FEMA) Elevation Certificates and other needed certifications for new and substantially improved buildings in the SFHA			
 	1.19 Community ensures timely identification of impending flood threats, disseminates warnings to appropriate floodplain occupants, and coordinates flood response activities to reduce the threat to life and property. This may include flood threat recognition system, emergency warning dissemination, flood response operations, critical facilities planning, and StormReady and/or TsunamiReady community designation			

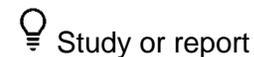
²⁶ A property for which two or more flood insurance claims of more than \$1,000 have been paid by the National Flood Insurance Program within any 10-year period since 1978. crsresources.org/files/500/mapping_repetitive_loss_areas.pdf

²⁷ A 1–4 family property that has had four or more claims of more than \$5,000 or two to three claims that cumulatively exceed the building's value; for the Community Rating System, non-residential buildings that meet those same criteria are also considered severe repetitive loss properties. crsresources.org/files/500/mapping_repetitive_loss_areas.pdf

²⁸ A community-based awareness program that increases local communities' awareness of flood risk and encourages action to mitigate that risk using signs and high-profile launch events. www.fema.gov/high-water-mark-initiative

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	Remove Barriers & Build Partnerships			
1.20	County or regional planning efforts for hazard mitigation and/or disaster recovery have been joined or initiated			
	Adopt Incentives			
 1.21	Pre-disaster assistance and information is offered to businesses using Small Business Administration (SBA) and FEMA resources for developing Business Recovery Plans			
	Enact Policies & Supportive Regulations			
1.22	Cross-referencing of plans (e.g. comprehensive plan, hazard mitigation plan, disaster recovery plans, coastal management plan, etc.) is required prior to plan adoption			
1.23	Coastal setbacks reflect erosion rates, as established through erosion studies			
1.24	Annexation policies consider an increase in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			

C. Targeted Resources



STRATEGY	TYPE	Study, Adopt Plans, and Educate
1.1		Integrating Hazard Mitigation into the Local Comprehensive Plan : A fact sheet from FEMA with a link to a guidebook from the American Planning Association (APA).
1.2		Community Based Vulnerability Assessment: A Guide to Engaging Communities in Understanding Social and Physical Vulnerability to Disasters : A step-by-step guide to conducting a social vulnerability hazard assessment, by MDC and sponsored by FEMA.
		Social Vulnerability Index : Tool developed by the Centers for Disease Control and Prevention (CDC) analyzes a variety of risk factors at a census block level.
1.3		Fort Worth, TX Floodplain Management Plan : Wastewater facilities included on critical facilities hazard map.
1.4		Adoption of Flood Insurance Rate Maps : Fact sheet produced by FEMA explains the flood insurance program, availability of maps, and more.
1.5		Fort Worth, TX Floodplain Management Plan : Open Channel Studies.
		FEMA Flood Insurance Study data
		Getting to Resilience: A Community Planning Evaluation Tool : An online self-assessment tool to assist communities to reduce vulnerability and increase preparedness by linking planning, mitigation, and adaptation.
1.7		Limit of Moderate Wave Action (LiMWA) Fact Sheet
1.8		Manasota Key, FL North Beach Erosion Study Update
		State of Florida Critical Erosion Reports : Conducted by county by the Florida Department of Environmental Protection.

		State of North Carolina Coastal Erosion Study
1.11 – 1.15		Fort Worth, TX Floodplain Management Plan
1.17		FEMA High Water Mark Initiative : A community-based awareness program for recognizing flood risk and encouraging action to mitigate that risk.
STRATEGY	TYPE	Remove Barriers and Build Partnerships
1.20		FEMA Local Mitigation Handbook : general guidance on multi-jurisdictional mitigation planning.
		Governors' South Atlantic Alliance : Governors of North Carolina, South Carolina, Georgia and Florida spearhead collaboration around ocean and coastal challenges and opportunities, including environmental sustainability and disaster preparedness.
		Other regional collaboration examples: www.beachapedia.org/State_of_the_Beach/Model_Programs/Regional_Planning
		Adopt Incentives
1.21		U.S. Small Business Administration Prepare My Business
		FEMA Emergency Preparedness Resources for Business
		Hawaii Natural Disaster Economic Recovery Strategy
		Florida Division of Emergency Management Get a Plan!
		Enact Policies & Supportive Regulations
1.23		Rhode Island General Laws, Title 46 Chapter 23 : Rhode Island Coastal Resources Management Program, Section 140 specifies that setbacks should be calculated from regularly updated erosion rates.

FOCUS AREA 2: Conserve Land in Critical Coastal Areas, River Corridors, and Other Flood-Prone Environments

Encouraging development outside of vulnerable areas allows land to perform natural flood-reducing functions and reduces the risk that might be faced by people or structures located in flood-prone locations in your community. A resilient community protects lands in critical, flood-prone areas so that nature can perform its flood-reducing functions. Resilient communities encourage growth away from these sensitive environments to preserve the land and reduce risk to people and structures that might locate in dangerous flood-prone areas.

EXAMPLES OF PRACTICAL APPLICATIONS

Lancaster County Pennsylvania Growth Management Planning: Establishes a framework for future land use and provides tools to assist municipalities in achieving growth management goals. Lancaster County provides two zoning tools to help municipalities incorporate natural resource identification and protection into subdivision and development proposals through site specific performance standards.

Portland, OR Conservation Easements and Buyouts: Portland, Oregon has placed conservation easements along critical watercourses designated as Environmental protections zones (Title 33, Chapter 33.430). The purpose of these zones is to protect resources and functional values that have been identified by the city as providing benefits to the public. The environmental regulations encourage flexibility and innovation in site planning and provide for development that is carefully designed to be sensitive to the site's protected resources.

Charles City, IA Floodplains as Amenities: After decades of fighting against the often-flooded Cedar River, Charles City transformed it into an asset. Using land acquired through FEMA flood buyouts, Charles City created a vibrant, inviting riverfront park with a whitewater course. Capitalizing on the river's natural features to help prevent future flooding, Charles City turned the river from an obstacle into an ecological and social benefit.

A. Understanding Key Challenges

- ◆ Has your community been successful in conserving open space and natural areas in the past?
 - a) If yes, what has worked?

 - b) What, if anything, has been a challenge to conservation efforts?

- ◆ Are there key partners you need to help you conserve open space and natural areas? Are you working with them now or do you need help making connections?

- ◆ Are there concerns that your community’s efforts to conserve land in critical coastal areas, river corridors, and other flood-prone environments may result in a regulatory “taking” of private property?

B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community’s current capacity to identify, acquire, and conserve land in critical coastal areas, river corridors and other flood-prone environments. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	Study, Adopt Plans, Educate			
 	2.1 Identify and designate important natural resource areas, including adopting plans that protect one or more natural functions within the community’s SFHA			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	2.2 Land conservation is considered when planning/designing capital improvements			
	2.3 A long-term tree canopy and/or open space goal has been established, and street trees are identified as critical infrastructure in comprehensive plan			
	2.4 A strategic plan for acquiring priority open space/critical conservation areas exists			
	Remove Barriers & Build Partnerships			
 	2.5 A plan or program to acquire (through purchase or donation) conservation easements on property with sensitive natural features to ensure long-term protection is in place			
	Adopt Incentives			
	2.6 Dedicated funding sources are available for open space acquisition and management (e.g. bonds, sales taxes, or transfer taxes)			
	2.7 Incentives (e.g. tax abatements, fee waivers, expedited permitting, etc.) are provided for voluntary conservation/restoration of riparian buffers, open space, and/or wetland restoration			
	2.8 Wetland mitigation banking program ²⁹ is available			
	2.9 Incentives are provided to preserve open land, such as a Purchase of Development Rights (PDR) ³⁰ program			

²⁹ The creation, restoration, or under certain circumstances the increased protection, of an area of functioning wetland in advance of, and to offset anticipated wetland impacts within the same ecoregion. www.water.ncsu.edu/watershedss/info/wetlands/mitbank.html

³⁰ A way to financially compensate willing landowners for not developing their land; an easement is purchased from the landowner that (usually) permanently restricts (all or certain types of) development on the land. The landowner retains ownership of the land and can use or sell it for purposes specified in the easement. plannersweb.com/2004/01/purchase-of-development-rights-preserving-farmland-and-open-space/

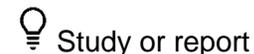
	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	2.10 Critical open space and natural resources are conserved through participation in a land banking program ³¹			
	Enact Policies & Supportive Regulations			
	2.11 Mandatory consistency reviews are performed to ensure that zoning districts are compatible with identified natural resource areas			
	2.12 Open space and natural features (e.g., water body buffer zone; source water protection zone) are conserved using overlay zoning districts			
	2.13 Open space and natural features are conserved through cluster/conservation requirements in subdivision regulations			
	2.14 Subdivision regulations restrict some/all tree/vegetation clearance			
	2.15 Subdivision regulations use Buildable Land Calculations ³² to remove vulnerable lands from development consideration			
	2.16 “Transition zones” near tidal marshes are designated and protected			
	2.17 Future projections are considered when determining regulatory setbacks for land adjacent to tidal waters			
 	2.18 Density standards ³³ are established to conserve open space and natural areas by regulating the size and dimensions of lots and structures within sensitive areas			

³¹ Governmental entities or nonprofit corporations that acquire title to land, to conserve open space and natural resources.

³² Land that is deemed not suitable for development (subject to flooding, erosion, improper drainage, and more) is not included in adequate building site calculations. This includes area such as steep slopes, floodplains, wetlands, stream corridors, riparian areas, and other important natural features.

³³ The permissible number of units (houses, square feet, people) in each area; typically measured in dwelling units per acre (residential) or by floor area ratio (FAR) for non-residential uses.

C. Targeted Resources



STRATEGY	TYPE	Study, Adopt Plans, Educate
2.1		Raleigh, NC Greenprint Plan : Adopted as part of the city's comprehensive plan, the Green Print Map and Plan highlight and connect environmentally sensitive areas throughout the city.
2.2		Rye, NH Capital Improvement Plan
2.3		Phoenix, AZ Comprehensive Plan : Establishes a goal of 25% tree canopy coverage of the city by 2030.
2.4		Durham, NC Third Fork Creek Watershed Management : This plan prioritizes important natural areas to preserve in the Third Fork Creek Watershed and assesses the land acquisition cost compared to potential pollution reduction/prevention in selecting sites. It also prioritizes sites that connect existing green space areas and provide "green gems" in the more urbanized landscape.
		Pennsylvania Municipal Planning Code Quick Guide to Official Maps : A guide for municipalities to implement an official map which can be used as a conservation tool by designating conservation areas, stormwater areas, open space reservations etc.
		State of Washington Growth Management Act : Requires the identification and regulation of "critical areas", which include frequently flooded areas as well as ecologically sensitive areas. The critical area regulations establish buffers and setbacks for identified critical areas.
Remove Barriers & Build Partnerships		
2.5		Orange County, NC Land Legacy Program : The county works with other local governments, non-profits, state and federal agencies to acquire high priority land legacy sites. It also works successfully with landowners on estate planning and compact development design so they or their heirs may continue to use the land while dedicating a portion to conservation.
Adopt Incentives		
2.6		Suffolk County, NY Peconic Bay Region Community Preservation Fund : A conservation program to preserve open space and farmland in five Long Island townships; the fund is financed by a 2% tax on real estate sales.
		King County, WA Conservation Futures Program : For more than 30 years, government and nonprofit groups across King County have used the Conservation Futures Tax (CFT) to protect from development 111,000 acres of land, forests, shorelines, greenways and trails. Funding has supported such diverse projects as Seattle's Duwamish Head Greenbelt, development rights on the Snoqualmie Forest and Puget Sound shoreline in Burien.
2.7		Virginia Land Preservation Tax Credit : Allows an income tax credit for 40% of the value of donated land or conservation easements.
		Portland, OR Offsite Mitigation : This report summarizes the issues and feedback received to date regarding the feasibility of a program that would allow mitigation for the environmental impacts of development to occur off-site rather than on the site where the impacts occur. Off-site mitigation could be one component of a natural resource management program that enhances watershed

		health while allowing industry to thrive along the North Reach of the Willamette River.
2.8		King County, WA Wetland Banking Program : King County has adopted administrative rules that establish criteria governing the creation and use of wetland mitigation banks in King County in accordance with the Metropolitan King County Council's directive codified at King County Code (KCC) 21A.24.345.
2.9		Suffolk County, NY Farmland Program : Initiated in 1974, the first Purchase of Development Rights (PDR) program to preserve farmland in the United States. The Suffolk County Farmland program has acquired 10,500 acres into the program to date.
2.10		The Nantucket Land Bank : The oldest land bank in the nation created to acquire, hold, and manage important open spaces, resources and endangered landscapes for the use and enjoyment of the public. To date, nearly half of Nantucket is forever-protected open space.
		Orange County, NC Land Legacy Program : The Lands Legacy Program uses leveraged local funds with State and Federal dollars to protect highly important natural and cultural resource lands via outright purchase and through donated or purchased conservation easements.
2.11		Rye, NH Master Plan (page 22)
		Deerfield, NH
Enact Policies & Supportive Regulations		
2.12		Chapel Hill, NC Resource Conservation District (RCD) Ordinance : The Town's RCD overlay district ordinance requires natural vegetated buffers along all water bodies, including 150 buffers along each side of perennial streams and 50-foot buffers along each side of intermittent streams.
2.13		Saratoga Springs, NY Municipal Code : Chapter 241 Subdivision Regulations, Article IV Conservation Subdivision Regulations. Addresses conservation subdivisions and cluster development with cluster development applied in more densely developed areas.
2.14		New Rochelle, NY Municipal Code : Chapter 178: Impervious Surfaces. For development over a certain threshold a permit is required specifying the allowed amount of impervious surface and the required environmental mitigation.
2.15		Redmond, WA Municipal Code : Section 20C.30.25 Site Requirements for Residential Zones. Establishes several density standards including Net Buildable Area Calculation, maximum lot coverage, minimum open space.
2.18		Islip, NY Municipal Code : Chapter 68 Zoning, Article 1 General Provisions, Section 68-3. Amended zoning to relax height restrictions on dwellings located in FEMA-designated Special Flood Hazard Areas to accommodate elevations to increase flood protection.

FOCUS AREA 3: Reduce Risk to People, Buildings, And Facilities in Vulnerable Areas

Your community's economic, social, and cultural assets may be in vulnerable areas or residents may dwell or construct buildings in vulnerable areas despite known risks. If so, there are steps that can reduce (though not eliminate) future risk and enhance resilience. A resilient community recognizes the risk facing people and assets in vulnerable areas and takes steps to reduce that risk through a combination of proactive and protective land use laws, building codes, and planning policies.

EXAMPLES OF PRACTICAL APPLICATIONS

Alquist Priolo Earthquake Fault Zoning Act California: The main purpose of this policy is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.

Planning for Rising Waters: Final Report of the City of Kingston Tidal Waterfront Flooding Task Force: Report of Task Force charged with evaluating the present and future vulnerability to flooding, storm surge, and sea level rise along the Rondout-Hudson waterfront.

Watertown, CT Subdivision Regulations, Section 5 Design Standards, 5.16 Requirements Regarding Flooding: Land subject to flooding, as identified on the Federal Administration Flood Insurance Rate Map (FIRM) on file with the Town Clerk and Planning and Zoning Office, shall not be subdivided unless certain conditions are met.

Hornby, NY Subdivision Regulations, Section 1.5 General Policy for Subdivision Design and Review (BLE): Determines allowable density based on net acreage once unsafe areas (e.g., steep slopes, floodplains) are subtracted from gross acreage.

Roseville, CA General Plan - Safety Element: Implemented a series of tools to reduce risk in vulnerable areas including future conditions floodplains, compensatory storage requirements, two feet of freeboard, and stormwater provisions that assume total blockage of flow paths for setting pad elevations everywhere in the city.

A. Understanding Key Challenges

- ◆ How would you characterize your community’s approach/attitude towards risk and vulnerability? Are there populations or places in your community that bear a disproportionate share of risk or vulnerability resulting from potential hazards?

- ◆ How has the community responded to proposals or new regulations to reduce risk? What about incentives?

- ◆ Are there specific challenges you’ve faced in reducing risk to people, buildings, and facilities in vulnerable areas?

- ◆ Does your community participate in NFIP’s Community Rating System (CRS)? What is your current class rating?

B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community’s current capacity to reduce risk to people, buildings, and facilities in vulnerable areas. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	3.1 Study, Adopt Plans, Educate An up to date vulnerability assessment identifies current and projected vulnerable areas and associated risks to life and property			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
 	3.2 High quality, recent maps have been created and are used to identify and regulate development at risk from flood hazards. This includes new studies (as relevant) producing base flood elevations of floodways; review and approval of flood studies by a state or regional agency; new studies that exceed FEMA mapping criteria; more restrictive floodway standards; and mapping and regulation of special flood related hazard areas (ex. coastal erosion, tsunami hazard areas)			
	3.3 Vulnerability assessment results are incorporated into relevant plans (e.g. comprehensive plan, hazard mitigation plan, land use plans, etc.)			
 	3.4 The public is educated about the risks of developing in environmentally sensitive areas			
 	3.5 Provide the public with information needed to increase flood hazard awareness and to motivate actions to reduce flood damage, encourage flood insurance coverage, and protect the natural functions of floodplains. This includes outreach projects, flood response preparations, program for public information, and stakeholder delivery of flood-related information			
	3.6 Current and future flooding risks to critical infrastructure (such as water supply or wastewater treatment plants) have been assessed			
	3.7 Development incentives are regularly evaluated to ensure they do not encourage development in vulnerable areas			
 	3.8 Information is available to inquirers about the local flood hazard and about flood-prone areas that need special protection because of their natural functions including basic FIRM information, additional FIRM information (protected coastal barriers, floodways, or lines demarcating wave action), flood problems not shown on FIRM, flood depth data, special flood related hazards (like erosion, ice jams, or tsunamis), historical flood information, and natural floodplain functions			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	3.9 Capital improvement planning accounts for current and future hazards (i.e. bridges and culverts are designed to accommodate 1% annual chance flood events)			
	3.10 Real estate agents and/or landlords provide brochures or handouts advising potential buyers to investigate the flood hazard for a property			
	3.11 Provide the public with information about flood protection that is more detailed than that provided through outreach projects including a flood protection library (nine designated FEMA publications on flood protection topics housed in the public library), locally pertinent documents (additional references on the community's flood problem or local or state floodplain management programs housed in the public library), and/or flood protection website (including more information on the messages conveyed in the community's outreach projects; real-time gage information to see current water levels; flood height predictions; Elevation Certificates or the data from Elevation Certificates)			
	3.12 FEMA Emergency Management Institute (EMI) training on retrofitting and grant programs provided to flood protection advisors (see strategy 3.16)			
	3.13 Technical assistance is available to support improvement/expansion of flood insurance			
	3.14 A community-wide floodplain management plan has been adopted, containing an overall strategy of programs, projects, and measures to reduce the adverse impact of flood hazards on the community			
Remove Barriers & Build Partnerships				

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	3.15 A “seller’s disclosure” provision has been adopted, requiring any seller and/or their agent of real property within the regulated floodplain to disclose to the prospective buyer that the property is in a regulated floodplain (and/or that other flood hazards exist such as subsidence, erosion and/or wetlands), and whether the property has suffered damages from flooding			
 	3.16 Provide one-on-one flood protection assistance to people who are interested in protecting their property from flooding including one-on-one property protection advice (may include site visit) and/or financial assistance advice for flood protection projects)			
 	Adopt Incentives			
 	3.17 Flood insurance coverage assessment has been conducted assessing community’s current level of coverage and identifying gaps			
	3.18 Historic districts or preservation requirements to slow reconstruction post disaster are in place			
	3.19 A flood insurance coverage improvement plan has been prepared by a committee including representation from local insurance agents			
	3.20 Projects included in the flood insurance coverage improvement plan are being/ have been implemented			
	3.21 Incentives (e.g. tax abatements, fee waivers, insurance premium discounts, expedited permitting, etc.) are provided for first floor elevations and elevated systems (in the SFHA) above minimum NFIP standards			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component	 Quick-start strategy	 CRS linkages	
	3.22 Land swaps ³⁴ are coordinated to relocate development from hazard areas to safer areas			
	3.23 Incentives (e.g. tax abatements, fee waivers, insurance premium discounts, expedited permitting, etc.) are provided for wet or dry floodproofing of private structures			
	3.24 A plan or program is in place for strategic acquisition (buyout) of repetitive loss properties in hazard areas and their re-use as open space and/or green infrastructure			
	3.25 Alternative parking requirements are in place that encourage efficient land use and preservation of trees (i.e. parking, payment in-lieu of parking, reduced minimum parking requirements)			
	Enact Policies & Supportive Regulations			
	3.26 A Green Area Ratio ³⁵ is used to determine the required amount of green space/green cover for new development			
	3.27 International Code Series (ICS) building code standards adopted and enforced			
	3.28 Development code requires a minimum tree canopy coverage for building sites (25% to 40% for residential development and 10% to 15% for non-residential development)			
	3.29 Overlay zoning districts (e.g. limited development districts, hazard zoning districts, waterfront overlay districts, etc.) are used in hazard areas to limit allowable uses, provide for adequate setbacks, and apply additional standards			
	3.30 Flood damage prevention law is in place			
	3.31 Special use permit procedures include a review for conformance with special standards in hazard areas			

³⁴ An exchange of municipally owned land for privately owned land, used to strategically assemble and re-purpose large areas to increase resilience through open space, green infrastructure, and more.

³⁵ A zoning regulation that sets standards for landscape and site design to help reduce stormwater runoff, improve air quality, and mitigate urban heat islands by dedicating a certain proportion of a building site to landscaping and/or permeable surfaces. doee.dc.gov/GAR

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component	 Quick-start strategy	 CRS linkages	
	3.32 Design flood elevation ³⁶ expands regulations applying to floodplains into adjacent areas that are vulnerable to flooding but not designated floodplains on the 100-year FIRM, including areas subject to shallow flooding			
	3.33 Elevation requirements are available with design guidelines for streets and infrastructure			
	3.34 New commercial or industrial facilities are required to have dry land ³⁷ access to ensure emergency personnel and employees can reach facilities in the event of a flood			
	3.35 Subdivision/ land development/ site plan review ordinances prohibit development in flood prone areas and/or require that any regulatory floodplain in a subdivision be set aside as open space (i.e. used as drainage/flowage easements or back yards)			
	3.36 Development review process requires fiscal impact analyses that includes costs related to projected increases in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			
	3.37 Subdivision/land development/site plan review ordinances require inclusion of BFE and notation of structures in relation to the SFHA with preliminary and final plat submissions ³⁸			
	3.38 Steep slope ordinance is modified to account for slopes exposed to increased moisture due to projected increases in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			

³⁶ The NFIP refers to the Base Flood Elevation (BFE) for lowest floor elevation requirements, while the International Codes (I-Codes) and ASCE 24 refer to the Design Flood Elevation (DFE). The DFE will always be the BFE or higher. www.fema.gov/media.../fema_quick_ref_guide_flood_areas_022713_508.pdf

³⁷ A vehicular access route that is above the base flood elevation and which connects land located in the floodplain to land outside the floodplain. www.municode.com/library/wi/whitewater/codes/code_of_ordinances?nodeId=TIT19ZO_CH19.09DE_19.09.195DRAC

³⁸ Base flood elevations are the computed elevations to which floodwater is anticipated to rise during the base flood; shown on FIRMS and flood profiles; the regulatory requirement for the elevation or floodproofing of structures. www.fema.gov/base-flood-elevation

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	3.39 Appropriate construction standards regulated in areas subject to a tsunami			
	3.40 Appropriate construction standards and setbacks regulated in areas subject to significant coastal erosion			
	3.41 Regulations state that, to the extent possible, if a lot in a new subdivision does not have a buildable site out of the regulatory floodplain, all new structures, pavement, and other development must be sited where they have the least impact on habitat			
	3.42 Building code and/or design guidelines contain regulations/restrictions for development in the SFHA including prohibiting fill, buildings, and/or storage of materials in the SFHA			
				
	3.43 Building code requires elevation of the first floor of a structure in the SFHA above BFE and/or has a freeboard requirement for buildings and building systems in the SFHA (above and beyond the minimum NFIP standards (i.e. increase the requirement from 1' above BFE to 2-3' above BFE)			
	3.44 Building code requires elevation of essential systems (i.e. heating, ventilation, and air conditioning) above the BFE			
	3.45 Design requirements for elevated structures include provisions for the height, scale, aesthetic, and materials for elevated buildings			
	3.46 Non-conversion agreements ³⁹ are required to permanently restrict the use of spaces below first floors in elevated homes			
	3.47 Engineered foundations required in SFHA			
	3.48 Policies are in place to address non-conforming uses, structures, and/or lots ⁴⁰			

³⁹ A legal document that requires property owners to agree to refrain from altering their buildings in ways that would not meet the standards of local laws and regulations for flood damage prevention. www.kdhnc.com/523/Non-Conversion-Agreement

⁴⁰ Policies may cover the allowable re-building of non-conforming structures following hazard damage as well as non-conforming uses or lots created because of zoning ordinance changes.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	3.49 A pre-event law is adopted, enabling local land use moratoriums that suspend certain development activities within defined areas to allow a municipality time to develop new studies, plans, or land-use laws			
	3.50 Substantial improvement/damage provision in the flood damage prevention ordinance is amended to require cumulatively tracked improvements and repairs to structures within the regulated floodplain over a specified timeframe			
	3.51 The substantial improvement/damage threshold has been lowered below the minimum requirement of 50%			
	3.52 Regulations prohibit the use of fill for the elevation of structures, and/or require floodplain storage compensation at an appropriate site when fill is used			
	3.53 Enclosures below the base flood elevation in the SFHA are prohibited or limited			
	3.54 Elevation exemption for manufactured homes placed in existing manufactured home parks is eliminated			
	3.56 V-Zone rules enforced inland from the V-Zone boundary			

C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, Educate
3.3		San Francisco, CA Creating Safe Growth Strategies for the San Francisco Bay Area : provides a model other regions or communities could use to assess the vulnerability of their housing and residents and develop strategies to make development safer.
3.4		Hazus : Hazus uses Geographic Information Systems (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure.
3.9		Salem and Keene, NH (page 271), compensatory storage ordinance :

3.7		King County, WA Basin Planning Program : Basin plans were developed using future conditions hydrology to assure the design of capital facilities have enough capacity for projected future conditions.
Remove Barriers & Build Partnerships		
3.15		Novato, CA Residential Resale Program : Code Enforcement Resale Inspectors research properties prior to inspections, noting permits issued, permit status and pending code violations. All residential properties are required to set appointments for inspection prior to sale and only the property owner or the listing agent may order a resale inspection.
Adopt Incentives		
3.21		FEMA Community Rating System (CRS) Website : Provides resources, guidance and sample programs to support the enhancement of Community's CRS programs.
3.24		Portland, OR Johnson Creek Willing Seller Program : In 1997, Environmental Services developed the Johnson Creek Willing Seller Land Acquisition Program. The program helps move people and property out of areas that frequently flood. Restoration projects on land acquired through the program increase flood storage, improve fish and wildlife habitat, restore wetlands and create passive recreational activities for city residents.
3.25		Greensboro, NC Tree Preservation and Landscape Manual : To allow a new development to preserve trees within or adjacent to a parking lot, a specified number of required off-street parking spaces may be reduced by the City Urban Forester or Environmental Officer by up to 10%.
		Cary, NC Town Development Ordinance Section 7.2.10.A.2 : Up to a 20% reduction in the number of parking spaces required in the site is allowed, to the extent that the reduction in the amount of required pavement will preserve existing healthy trees in an undisturbed, natural condition.
		Phoenix Code Incentive for Tree Preservation : To increase tree preservation, reduce heat island effect, provide more shading for pedestrians and buildings, the following provision was added to the city code: Minimum parking may be reduced by one parking space for each tree 12" in diameter or larger that is preserved. A maximum of 2 parking spaces or 10% of the total required may be reduced, whichever is greater.
Enact Policies & Supportive Regulations		
3.26		Seattle Green Factor : A score-based code that is designed to improve the quantity and quality of urban landscaping through zoning-based requirements. Each zoning district has a green factor score that must be achieved.
		Washington, DC Green Area Ratio : An environmental sustainability zoning regulation that sets standards for landscape and site design to help reduce stormwater runoff, improve air quality, and keep the city cooler. It is similar in design to the Seattle Green Factor (see above).
3.28		Chapel Hill, NC Minimum Tree Canopy Requirements : The Town's regulations require a minimum tree canopy coverage of 30% for multifamily and commercial development, and 40% canopy coverage for all other development.
3.29		Perinton, NY Municipal Code, Chapter 208, Article VIII, Limited Development District : Establishes a limited development district to ensure appropriate development is required to preserve water and air quality, preserve fish, wildlife and plant habitat, prevent the irretrievable loss of natural resources and maintain the aesthetic character of the community.

		Coxsackie, NY Municipal Code : Chapter 155 Zoning, Article III Districts, Boundaries and Regulations, Section 155-10, Waterfront Residential District, establishes a waterfront residential district to protect the waterfront, maintain the existing residential character and allow for low impact water-dependent and water-related recreational uses appropriate for the community and the river.
3.34		Whitewater, WI Code of Ordinances : Title 19 – ZONING, Chapter 19.09 DEFINITIONS, 19.09.195 - Dryland access
3.35		Pendleton, NY Municipal Code : Chapter 220 Subdivision of Land, Article V General Requirements and Design Standards for Major Subdivision, Section 220-27 Drainage improvements. Prevents land subject to flooding from being platted for residential occupancy or any other uses that may increase danger to health, life or property or aggravate the flood hazard.
		Watertown, CT Subdivision Regulations : Section 5 Design Standards, 5.16 Requirements Regarding Flooding. Restricts subdivisions in the SFHA to ensure that development is reasonably safe from flooding.
		CRS Coordinators Manual : Section 422.e, page 420-20. Credit criteria and example language is provided for regulations that set aside all the regulatory floodplain in a subdivision as open space (such as drainage or flowage easements or back yards) or otherwise keep them free from development
3.37		King County, WA Title 21A.24.170: Notice of Critical Areas : County Critical Areas ordinance requires notice on title and final plans of the presence of identified critical areas; provision is pursuant to mandates under the WA State Growth Management Act.
3.41		CRS Coordinators Manual : Section 422.e, page 420-20. Credit criteria and examples are provided for regulations require that each lot in a new subdivision provide a building site that is on natural high ground, out of the regulatory floodplain
3.43		New Hampshire model ordinance language (page 281) :
3.45		Elevation Design Guidelines for Historic Homes : Provides guidelines for protecting historic resources through structural elevation.
3.46		Roseville, CA Deed Restriction Requirements : Chapter 9.80, section 160.C.1 of the Roseville Municipal Code requires a formal restriction on the deed that restricts the allowed uses of the spaces below elevates floors for structures in the regulated floodplain.
		Horseheads Higher Floodplain Development Standards Recommendations : Regulates the use of space in elevated structures below the elevated living space.
		CRS Resources guidance for higher regulatory standards :
3.48		Utica, NY Municipal Code : Chapter 2-29, Zoning, Article IV District Regulations, Division 6 Land Conservation District, Section 2-29-82 Uses and/or Structures Rendered Nonconforming by the Adoption, Provides regulations for non-conforming uses
3.49		James A. Coon Local Government Technical Series : Land Use Moratoria (2015), guidance on post-disaster land use moratoria which suspends a landowner's right to obtain development approvals.
3.50		CRS Coordinators Manual : Section 432.d, page 430-18. Provides credit criteria and example language for the cumulative substantial improvements element.

		<u>CRS Coordinators Manual</u> : Section 432.e, page 430-19. Provides credit criteria and example language for the lower substantial damage threshold element.
		<u>Roseville, CA Cumulative Substantial Improvement Requirements</u> : The city has adopted regulatory standards in its flood damage prevention ordinance that will track the cumulative improvements and repairs to structures in its regulated floodplain, for a period of 10-years. This requirement can be found in section 9.80.040 of the Roseville Municipal code.
3.51		<u>CRS guidance for higher regulatory standards</u> :
3.52		<u>Pierce County, WA Municipal Code</u> : Title 18E.70.40.C.4a requires new excavated storage volume be provided that is equivalent to the storage volume lost by the placement of fill or grading of a parcel within the designated floodplain.

FOCUS AREA 4: Plan for and Encourage Development in Safer Areas

By proactively determining where growth can safely be accommodated now and in the future, your community can provide incentives for development in these locations to contribute to enhanced community resilience. A resilient community accommodates new growth while still protecting residents and assets and reducing hazard risks. New development is guided by principles that help to further enhance the community's ability to withstand hazards and unexpected events.

EXAMPLES OF PRACTICAL APPLICATIONS

Pinelands Development Credit Program: The Pinelands Development Credit (PDC) Program is a regional transfer of development rights program that preserves important agricultural and ecological land. PDCs are allocated by the commission to landowners in the Preservation Area District, Special Agricultural Production Area and Agricultural Production Area, which are the sending areas. These credits can be purchased by property owners and developers who are interested in developing land in Pinelands Regional Growth Areas, which serve as the receiving areas. Typically, PDCs are used to increase residential densities in Regional Growth Areas. They may also be used in association with municipal variances in Regional Growth Areas, Pinelands Villages and Pinelands Towns, as well as for waivers of strict compliance approved by the Commission in any Pinelands management area.

Snoqualmie, WA: Guiding Safe Growth: The City of Snoqualmie made a conscious decision to guide new growth out of the floodplain and direct it towards safer areas. This created two distinct divisions within the City: the historic core, which contains development in or near floodplains and Snoqualmie Ridge which is where all the new planned unit development occurred. By planning for growth in safer areas they successfully reduced flood risk for new development.

A. Understanding Key Challenges

- ◆ Is encouraging development in safer areas a priority for your community? If not, what issues tend to stand in the way?
- ◆ Are there key partners you need to help you encourage development in safer areas? Are you working with them now or do you need help making connections?

B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community’s current capacity to plan for and encourage development in safer areas. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

STRATEGY		CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
 Equity component  Quick-start strategy  CRS linkages				
Study, Adopt Plans, Educate				
	4.1	Safe development areas have been identified and designated as targeted growth areas in local comprehensive plan; a safe growth audit has been conducted		
	4.2	Current hazard information and future projections have been incorporated into capital improvement planning and Infrastructure investments in safer growth areas are prioritized		
	4.3	Data is used to identify safe growth areas, inform hazards analysis, and develop future projections		
	4.4	Community has a detailed mitigation plan for repetitive loss areas.		
				

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	4.5 Community has a plan to acquire, relocate, or otherwise clear buildings and critical facilities out of the special flood hazard area and out of the V-Zone and/or coastal A-Zone ⁴¹			
	Remove Barriers & Build Partnerships			
	4.6 Community has planned for managed retreat			
	Adopt Incentives			
	4.7 Incentives are provided for infill development in areas with existing development and infrastructure, directing development away from designated conservation areas			
	4.8 “Receiving” areas of Transfer of Development Rights (TDR) program are targeted the community’s safe growth areas			
	4.9 Incentives are provided (e.g. height or density bonuses, tax abatement, expedited permitting, fee waivers, etc.) for development in safer growth areas			
	Enact Policies & Supportive Regulations			
	4.10 Flexible zoning, such as dynamic zoning or floating zones, to encourage development in safer areas has been adopted			
	4.11 Regulations state that, to the extent possible, each lot in a new subdivision must provide a building site that is on natural high ground, out of the regulatory floodplain			
	4.12 New municipal buildings are required to be constructed in well-connected, safe areas			

⁴¹ According to FEMA and the National Flood Insurance Program, any building located in an A or V zone is considered to be in a Special Flood Hazard Area, and is lower than the Base Flood Elevation. V zones are the most hazardous of the Special Flood Hazard Area.

C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, Educate
4.3		New York Community Risk and Resiliency Act, State Generated Sea Level Rise projections : Data helps identify safe growth areas, inform hazard analysis, and develop future projections.
		Remove Barriers & Build Partnerships
		Adopt Incentives
4.8		New York Department of State Transfer of Development Rights (TDR) : Technical guidance for New York municipalities to implement a Transfer of Development Rights program as a resource preservation tool.
		Lancaster County, PA TDR Practitioner’s Handbook : A detailed guide to TDR programs.
		Transfer of Development Rights American Farmland Trust : An overview of the history, purpose, benefits and potential drawbacks of a TDR program.
4.9		CRS Coordinators Manual : Section 422.e- page 420-20. Provides credit criteria and examples for local requirements and incentives that relocates development from flood-prone portions of property.
		Enact Policies & Supportive Regulations
4.11		CRS Coordinators Manual : Section 422.e, page 420-20. Credit criteria and examples are provided for regulations require that each lot in a new subdivision provide a building site that is on natural high ground, out of the regulatory floodplain.

FOCUS AREA 5: Implement Comprehensive Stormwater Management Techniques

Effectively managed stormwater flow slows and spreads out, allowing time for the water to infiltrate the ground instead of running off into water bodies or storm drains. This is as important in developed areas where urban flash flooding occurs as it is in rural areas where river or stream flooding occurs. A resilient community recognizes that stormwater does not stop at municipal boundaries and that mitigation is best approached at the regional, watershed level. A resilient community employs multiple systems that share the mitigation workload rather than relying on a single system to carry excess water away.

EXAMPLES OF PRACTICAL APPLICATIONS

Portland, OR Stormwater Management Plan and Program: Specifies that BMPs, including sustainable stormwater management systems, will be implemented to reduce pollutants in stormwater and the volume of runoff. To ensure that private property owners implement the BMP requirements, the city amended its codes governing new and redevelopment to remove barriers and create incentives for green infrastructure. A key feature of the program includes Green Streets. Another notable element is the Ecoroof Program, which provides an incentive in Central City for eco-roof installation by providing a floor area bonus. The Green Streets and Ecoroofs have generated significant city- and nation-wide interest, and self-guided walking and biking tours are available, connecting the green sites.

Hoboken, NJ Green Infrastructure Strategic Plan: Between July 2002 and July 2012, the city recorded 26 dates with greater than 2 inches of precipitation and tides of 4 feet or higher. During these storm events, Hoboken's sewer infrastructure is severely overtaxed. This plan identifies the most cost-effective, place-based green infrastructure projects to address current and anticipated stormwater management and flooding issues. It considers city assets most important to protect and evaluates how the measures can improve transit resiliency as

A. Understanding Key Challenges

- ◆ Does your community have experience with green infrastructure/low-impact design?

- ◆ How has green infrastructure been received by the community? Are people interested, or is there a feeling that it will be too expensive/not effective?

- ◆ Do your community’s codes and ordinances provide for the protection of natural features with stormwater management benefits (e.g., trees, open space, riparian areas, etc.), or do you typically rely on structural stormwater management methods?

B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community’s current capacity to think about stormwater at a regional scale and manage it effectively. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	Study, Adopt Plans, Educate			
	5.1 Goal(s) within comprehensive plan encourages green infrastructure (GI) in new development			
	5.2 A municipal stormwater design manual that illustrates context-appropriate green infrastructure is available			
	5.3 Development and redevelopment are regulated according to a watershed management master plan			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	5.4 Regional source water supply protection plan or strategy is in place			
	Remove Barriers & Build Partnerships			
	5.5 A green infrastructure cost share or fee credit program is available			
	5.6 Green infrastructure is featured in a sustainable-streetscapes program			
	5.7 Green infrastructure techniques and/or other integrated stormwater management methods are required in capital improvement plan (CIP)			
	5.8 A stormwater utility is used as a funding source for green infrastructure and other stormwater management activities			
 	5.9 County or regional efforts to discuss managing stormwater at the watershed level have been joined or initiated			
	Adopt Incentives			
	5.10 Incentives (e.g. tax abatements, fee waivers, development intensity bonus, expedited permitting, etc.) are provided for green infrastructure			
	5.11 Incentives (e.g. tax abatements, fee waivers, development intensity bonus, expedited permitting, etc.) are provided for on-site stormwater retention/management			
	Enact Policies & Supportive Regulations			
	5.12 Submission and approval of a stormwater site design plan is required during site plan review and development is regulated on a case-by-case basis ensuring peak flow of stormwater runoff does not exceed pre-development runoff			
	5.13 Stormwater performance standards are required for new development or redevelopment sites (e.g. capture and infiltrate the first 1-1.5 inches of rain using green infrastructure)			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	5.14 Site plan requirement that requires development to retain all stormwater on site has been adopted			
	5.15 Natural channels on public and private property are inspected and debris removed as appropriate. Interference with proper stormwater drainage is prohibited in zoning ordinance regulations			
	5.16 Clean Water Act Section 402 National Pollution Discharge Elimination System (NPDES) permits have been updated to consider projected increases in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			
	5.17 Green- and complete-streets design standards have been adopted			
	5.18 Local building code requires check valves on wastewater pipes to prevent sewage from backflowing into basements			
	5.19 Density standards are in place to improve stormwater management, limit development in vulnerable areas, and reduce future damages			
	5.20 Natural storm and flood mitigation strategies are implemented (e.g. restoring natural ('living') shorelines, mangrove planting, natural or artificial reefs, and/or dune restoration)			

C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, Educate
5.1		Imagine Austin Comprehensive Plan : Has several key themes, including compact and connected growth; green infrastructure (integrating nature into the city); and sustainable management of water resources.
		City of Raleigh, NC 2030 Comprehensive Plan : Policies and strategies encourage use of green infrastructure in new development and redevelopment.

5.3		Handbook for Developing Watershed Plans to Restore and Protect Our Waters : Helps communities develop and implement watershed plans to meet water quality standards and protect water resources.
		Athens-Clarke County, GA Watershed Management Program : Describes process for assessing the conditions of watersheds and developing plans to protect, restore, and improve them.
		Durham, NC Third Fork Creek Watershed Management Plan : Helped the city prioritize and implement projects to clean up and revitalize Third Fork Creek. Helped the city prioritize and implement projects to clean up and revitalize Third Fork Creek.
		Vista, CA Agua Hedionda Watershed Management Plan : A regional, comprehensive plan for preserving, restoring, and enhancing watershed functions and minimizing future degradation in this urbanizing watershed.
5.4		Beaver Lake Watershed Protection Strategy; Northwest AR : A regional, multi-jurisdictional strategy for protecting a high-quality drinking water supply and recreation area and for restoring impaired streams.
		Lake Maumelle Watershed Management Plan, Central AR : A comprehensive, regional plan for protecting high-quality drinking water supply.
Remove Barriers & Build Partnerships		
5.5		City of Durham, NC Rain Catchers Project, Ellerbee Creek Watershed : A residential incentive program including outreach to homeowners; a reverse auction; selection of participants; and city funding of design, and installation of green infrastructure BMPs.
		Washington, DC River Smart Homes Program : A residential green infrastructure incentive program in which the city performs audits and installs the BMPs for interested property owners. In turn, the property owner typically provides about a 10% cost-share and signs a maintenance agreement.
		Philadelphia, PA Rain Check Program and Stormwater Incentive Program : A homeowner education program for cost-sharing and installing green infrastructure BMPs with individual homeowners; also targets non-residential sites most impacted by stormwater fees and provides grants up to \$100,000 per impervious acre managed.
		City of Raleigh, NC Stormwater BMP Cost-Share : Provides cost share funds for green infrastructure BMPs for new and existing developments going beyond the city's stormwater management requirements. For priority watershed areas, the cost share is 90% of design and installation of the BMP; developments in non-priority watersheds receive 75% cost share.
		Portland, OR Green Streets Program : Supports green infrastructure retrofits of streets in residential, commercial, and industrial areas to capture the storm peak and reduce combined sewer overflows.
5.7		Nashville, TN Integrated Ordinance : An ordinance directing coordination among four city departments in developing an annual list of priority green infrastructure projects to fund in the city's CIP.
		Austin, TX Integrated Mission Project Selection : An adopted city protocol that requires maximizing multi-benefits across city divisions in selecting CIP projects.

		Adopt Incentives
5.10		<u>The Stormwater Calculator - Identifying Green Infrastructure Solutions</u> : EPA's desktop application that estimates the annual amount of rainwater and frequency of runoff from a specific site anywhere in the United States.
		<u>Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scale</u> (2009): Guides local government staff through a review of relevant local codes and ordinances across multiple departments ensuring that codes work together to support a green infrastructure.
		<u>Seattle, WA Floor Area Ratio (FAR) Bonus</u> : The green building FAR incentive in the Low-Rise zones increases FAR by 0.2 for green building. The greatest bonus is for apartment uses in zone LR3 inside the urban centers and urban villages: increase from base FAR of 1.5 to 2.0 for green building.
		<u>Austin, TX Density Bonus</u> : The city's Green Roof Density Bonus gives a density bonus of up to seven square feet for every square foot of green roof installed. Projects incorporating Green Stormwater Quality Infrastructure (biofiltration, rainwater harvesting, and other GI water quality controls) may receive additional credit if including green roofs in the project design.
		<u>Raleigh, NC Advancing Green Infrastructure</u> : Actions to advance green infrastructure on a voluntary basis include a new expedited review process, code revisions to remove barriers, green street design templates, educational factsheets to use in the early phases of concept plan review, an enhanced green infrastructure cost-sharing program, and more.
		<u>Philadelphia, PA Expedited Post-Construction Stormwater Plan Review</u> : Two types of expedited review for applicants proposing green infrastructure strategies: Disconnection Green Review (applicable to redevelopments exempt from city's channel protection requirements that meet 95% stormwater disconnection criteria) and Surface Green Review (applicable to all new development and redevelopment that meet 100% disconnection criteria).
		<u>Minneapolis, MN Stormwater Fee Credit</u> : New development and redevelopment are eligible for a stormwater fee credit if they install a BMP that goes beyond the stormwater requirements.
5.11		<u>Seattle, WA Priority Green</u> : A prerequisite for the city's expedited review program, Priority Green, is the Green Stormwater Infrastructure Calculator showing 100% green infrastructure or all flat surfaces outside of building footprint as permeable pavement.
		<u>Chicago, IL Green Elements Permit</u> : Two-tiered approach to green permitting. Tier 1 is high number of green elements and LEED certified. Tier 2 includes one or more green elements—including green infrastructure—from an approved menu.
		<u>Durham, NC Building Height Bonus</u> : Offers incentives for the development applicant to provide desired amenities on the development site including 15 to 25 additional feet of building height for sustainable stormwater management.
		Enact Policies & Supportive Regulations
5.12		<u>New York State Stormwater Management Design Manual</u> : Provides designers with a general overview on how to size, design, select, and locate stormwater management practices at a development site to comply with state stormwater performance standards.

		Voorheesville, NY Zoning Ordinance : Article XIX Special Regulations, Site Plan Review. Establishes requirements for stormwater site design practices.
5.13		Chapel Hill, NC Stormwater Performance Standard : Includes a volume requirement encouraging the use of green infrastructure: “runoff volume leaving the site post-development shall not exceed the stormwater runoff volume leaving the site pre-development (existing conditions) for the local 2-year frequency, 24-hour duration storm event.”
		Phoenix, AZ Stormwater Performance Standards : All developments shall not increase the 100-year, 2-hour peak runoff, change the time of the peak, nor increase the total runoff from its predevelopment values; all new developments must make provisions to retain the stormwater runoff from a 100-year, 2-hour duration storm (translating to a 2.5-inch storm event); standard used for water quality, channel protection and flood control.
		Washington, DC Stormwater Standard : Requires development to retain the 90 th percentile storm (1.2 inches of rainfall). At least 50% of the rainfall must be retained on site; up to 50% may be retained off site. The city operates a retention trading program so development can achieve the retention goal cost-effectively.
		Georgia Stormwater Management Manual : The 2016 edition has a runoff reduction standard that requires development to retain the first 1.0 inch of rainfall on the site to the maximum extent practicable.
5.15		Reducing Damage from Localized Flooding: A Guide for Communities : Intended to help local offices in cities, towns, villages, and counties understand what they can do to reduce the damage, disruption, and public and private costs that result from localized flooding.

FOCUS AREA 6: Expand Community Capacity to Enhance Resilience

To enhance resilience, your community can investigate and understand its barriers to success and identify possible solutions. A resilient community has the capacity, resources, and tools necessary to prepare for, withstand, and respond to system shocks and unexpected events.

EXAMPLES OF PRACTICAL APPLICATIONS

Palm Beach County, FL Comprehensive Planning for Resilience: Palm Beach County has taken a proactive and inclusive approach to planning and implementing resilience building strategies. This has been accomplished through the development of three separate plans that have been cross-checked for conflicts and integrated to take advantage of conflicts. Palm Beach County has a widely recognized comprehensive plan with a vision for the future that guides the county's growth and development. This comprehensive plan contains a robust coastal management element, as required by Florida law. They have also developed a hazard mitigation plan and a post-disaster redevelopment plan (PDRP). Instead of trying to make decisions in the hectic days following a disaster, the PDRP builds resilience by planning and developing goals for recovery and redevelopment. The plan also contains actions that can be taken before a disaster occurs, to support the capacity of residents, businesses, and other community stakeholders. Examples include identifying sites for post-disaster temporary office space, maintaining inventories of land or vacant buildings that can be used for temporary housing, assisting small businesses with business continuity planning, facilitating mutual aid agreements (both public and private), and more.

A. Understanding Key Challenges

- ◆ Does your community have a pre- or post-disaster recovery plan? If yes, when was this plan created and was it a successful process? If no, has your community considered developing a pre-disaster recovery plan?

- ◆ Do you feel your staff has the expertise necessary to address resilience challenges? Does your community encourage or provide incentives for advanced training or certifications for staff members that could support greater capacity for community resilience (such as the trainings provided by the Association of Climate Change Officials)?

- ◆ What is the source of your community's authority to legislate (ex. Home Rule state or Dillon's Rule state)?

- ◆ What are some tools your community could use to help address resilience challenges?

- ◆ Are there specific challenges you've faced in building the capacity needed to enhance community resilience?

B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community's current capacity to handle system shocks. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	Study, Adopt Plans, Educate			
	6.1 Staff is trained in long term flood resilience planning and/or implementation, including: <ul style="list-style-type: none"> • GIS and GIS-based scenario planning tools • Sea, Lake and Overland Surge from Hurricanes (SLOSH) flood maps • Sea Level Affecting Marshes Model (SLAMM) • FIRM 			
	6.2 A program to build technical capacity among local developers to support resilient development practices has been implemented			
	Remove Barriers & Build Partnerships			
	6.3 A Certified Floodplain Manager (CFM) is on staff			
	6.4 Local government emergency response personnel, floodplain manager, department of public works personnel, hazard mitigation planner, and/or marine resources agent (or the like) is involved in developing/updating the community's comprehensive plan			
	6.5 The local government planner or zoning administrator is involved in developing/updating the community's hazard mitigation plan			
	6.6 Groups such as local businesses, schools, hospitals/medical facilities, agricultural landowners, water and wastewater utilities, and others who could be affected by floods are involved in the hazard mitigation plan drafting process			
	6.7 Small businesses are assisted with continuity planning and mutual aid agreements			
	6.8 Partnerships are developed to help local businesses evaluate their exposure to natural events and take steps to reduce exposure			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
6.9	Public-private partnerships are developed to promote renewable energy			
	Adopt Incentives			
 	6.10 Resources are devoted to promoting commercial/residential mitigation activities that can reduce flood insurance rates			
	6.11 Financial incentive packages are available to assist businesses remaining in the community following a disaster			

C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, and Educate
6.1		NOAA Office for Coastal Management Digital Coast Academy : Offers a variety of methods and mediums of information, including classroom, instructor-led; online, instructor-led; self-guided resources; case studies; publications; quick references; and videos and webinars.
		Community Flood Resilience Toolkit : A roadmap for municipal leaders to increase their community's resilience to flooding. Action E-1 (p26) supports training for staff and volunteers.
6.2		California, Regional Resilience Toolkit : A toolkit designed for government agencies and community groups to address multi-hazard resilience, with a focus on the San Francisco Bay Area, the Central Coast region, and Mt. Shasta area of northern California.
Remove Barriers & Build Partnerships		
6.3		Association of State Floodplain Managers : To become a CFM, must pass Association of State Floodplain Manager's (ASFPM) Certified Floodplain Manager exam.
		FEMA Floodplain Management Requirements : Desk reference to reinforce understanding of government officials administering and enforcing local floodplain management regulations.
6.5		Local Mitigation Planning Handbook, Task 2 – Build the Planning Team : Identifies planning/community development department as important partner with authority to regulate development and involved in hazard mitigation activities, thus critical to the planning team.

6.6		<u>FEMA Local Mitigation Planning Handbook, Task 3 – Create an Outreach Strategy</u> : Identifies stakeholders and how to engage them. Stakeholders listed include businesses, academia, non-profit and for-profit institutions, and local and regional agencies involved in hazard mitigation activities. Emphasizes the importance of stakeholder input to the planning process.
		<u>Coastal Resilience Index</u> : An index that provides a method of self-assessment of a community’s resilience to coastal hazards, identifying weaknesses a community may want to address prior to the next hazard event and guiding community discussion.
		<u>Community Resilience Assessment</u> : An assessment for community members and decision-makers to identify their community’s resilience strengths, challenges, and priorities.
		<u>U.S. Climate Resilience Toolkit</u> : Online toolkit maintained by NOAA to assist communities with resilience building by exploring hazards, assessing vulnerability and risks, investigating options, prioritizing and planning improvements, and taking action.
6.7		<u>FEMA Business Continuity of Operations Plan template</u> : Continuity planning improves resiliency by identifying key products and services.
Adopt Incentives		
6.10		<u>Mississippi Development Authority Disaster Recovery Division, Homeowner Elevation Grant Program</u> : Program awards \$30,000 grants to approved applicants in targeted counties to offset costs of elevating homes to FEMA elevation requirements to reduce flood insurance rates.
6.11		<u>U.S. Department of Commerce Economic Development Administration’s Public Works and Economic Adjustment Assistance Program</u> : Grant program to “leverage existing regional assets and support the implementation of economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities”. Can be used to support economic recovery, specifically aimed at job creation or retention projects and initiatives to keep employers from leaving a disaster area.

FOCUS AREA 7: Build Support for Improving Community Resilience and Remove Barriers to Implementation

It is important to inform and engage a range of community groups to improve your chances of earning their “buy-in.” Proactively identifying and overcoming challenges and barriers to strategy implementation is key to moving your efforts forward. A resilient community builds support through frequent, innovative, and robust engagement with citizens, stakeholders, and elected officials who are representative of the whole community.

EXAMPLES OF PRACTICAL APPLICATIONS

Norfolk, VA City Manager’s Office of Resilience: As a part of the Rockefeller Foundation’s 100 Resilient Cities program, the City of Norfolk developed “Norfolk Resilient City,” a resilience strategy and action plan aimed at improving the resiliency of individuals, systems and neighborhoods. The actionable recommendations from the strategy can all be characterized as “collective and coordinated action to build resilience.” The Office of Resilience supports the implementation of these actionable recommendations by 1) defining and translating a resilient Norfolk, 2) coordinating the city and its partners to support this vision of resiliency, and 3) fostering an environment for business innovation and economic growth. The Office also provides updates on the steps the City has taken to implement the strategy’s actionable recommendations.

New Orleans Mayor’s Office of Resilience and Sustainability: As a part of the Rockefeller Foundation’s 100 Resilient Cities program, the City of New Orleans developed “Resilient NOLA”, a resilience strategy to meet urgent threats, amend their history of inequity and risk, adapt to a shifting natural environment, invest in equity, develop flexible and reliable systems, and prepare for the future. The Mayor’s Office of Resilience and Sustainability and the Chief Resilience Officer, in coordination with the City Planning Commission and Hazard Mitigation Office, are responsible for implementing the strategy, integrating it into existing policies and procedures, and assessing the regional implications of policy changes.

A. Understanding Key Challenges ⁴²

- ◆ What concerns do residents have about planning for resilience?
- ◆ Are there political impediments or community objections to resilience-building efforts in your community (ex. an unwillingness to confront future problems, concerns about protecting private property, perception of high costs for improving resilience or reducing vulnerability to hazards)?
- ◆ Do your community’s efforts meet or exceed existing state or federal laws?
- ◆ Are there specific challenges you’ve faced in building the capacity needed to enhance community resilience?

B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess how a community handles potential barriers to implementation of resilience-enhancing strategies. The targeted examples at the end of this goal area provide more information about specific strategies. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component	 Quick-start strategy	 CRS linkages	
	Study, Adopt Plans, Educate			
 	7.1 A website or regularly mailed bulletin informs the public about upcoming/ongoing/complete community resilience efforts			
 	7.2 Multilingual outreach is conducted to inform the public about upcoming/ongoing/complete community resilience efforts			

⁴² Questions adapted from Beatley, Timothy, *Planning for Coastal Resilience: Best Practices for Calamitous Times*. Island Press, Washington: DC, 2009.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
				
				
	7.3	An annual plan of actions is produced, prioritizing the year's resilience building projects and efforts		
	7.4	A post-disaster recovery/redevelopment plan is created		
	7.5	A post-disaster redevelopment ordinance is adopted		
	7.6	An initiative established to promote/ensure equitable considerations throughout the process of resilience planning		
	Remove Barriers & Build Partnerships			
	7.7	Hazard mitigation plan identifies projects that could be included in pre-disaster grant applications		
	7.8	A dedicated Resilience Officer or Office of Resilience is established to plan and coordinate resilience building efforts and to identify funding opportunities for resilience projects		
	7.9	Development review for resilience requirements and permitting activities is conducted from a centralized location that streamlines processes and eliminates inefficiencies		
	7.10	A developer liaison is available to assist developers in meeting resilience goals		
	7.11	State and regional agency financial support for public infrastructure that supports resilience has been sought/identified		
	7.12	Special assessment districts ⁴³ are created to fund resilient infrastructure improvements		
	7.13	A capital reserve fund is created to save for resilient infrastructure improvements		

⁴³ A flexible tool that can be used to channel property tax revenue increases for extraordinary needs (such as flood mitigation or resilience strategies); typically apply only in defined districts that will benefit from the project(s) being funded. urbanland.uli.org/infrastructure-transit/using-special-assessments-to-fund-transit-investments/

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
 	7.14 The current inventory of non-conforming structures located in the regulatory floodplain is maintained and frequently updated to prevent rebuilding in hazard areas, in the event of significant damage			
	Adopt Incentives			
	7.15 Expedited development review/permitting is available for proposals that improve resilience in high hazard areas or for proposals located outside of high hazard areas			
	7.16 A voluntary incentive program is available for strengthening buildings beyond code requirements			
	Enact Policies & Supportive Regulations			
	7.17 Zoning and building codes are reviewed every five years and updated, if needed			
	7.18 Code is amended or ordinances adopted to allow renewable energy on individual properties and in communal installations (microgrids) ⁴⁴			

C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, and Educate
7.1		Roseville, CA Floodplain Management website
		King County, WA Flood Information website

⁴⁴ A microgrid is an energy system capable of operating in parallel with, or independently from, the main power grid. The primary purpose is to ensure local, reliable, and affordable energy security. www.generalmicrogrids.com/about-microgrids

		Pierce County, WA Flood Information website
7.2		National Resource Center on Advancing Emergency Preparedness for Culturally Diverse Communities (“Diversity Preparedness”) : A web-based library of resources and information on disaster preparedness for culturally diverse communities and other at-risk populations. The planning tools, fact sheets, trainings, and other materials available through this site have been developed by academic centers, government agencies, and non-profit organizations from across the United States. They are geared for public health, healthcare, emergency management, and social service providers who work with diverse and high-risk communities.
7.4		Leon County, FL Post Disaster Redevelopment Plan : Post-disaster recovery/redevelopment plan.
		Chatham County GA Redevelopment Plan : Post-disaster recovery/redevelopment plan.
Remove Barriers & Build Partnerships		
7.6		Seven Principles for Equitable Adaption : Research article that focuses on domestic law, that describes climate change and its impacts and the role of socioeconomic factors in determining their magnitude.
		Equity in Building Climate Adaption Planning : Provides a guide to localities to enable them to integrate an equity lens as they seek to build resilience in designing adaptation plans
7.8		New Orleans, LA Chief Resilience Officer : Oversees the implementation of the nation’s first Comprehensive Resilience Strategy, development of the city’s climate action plan and sea level rise and climate adaptation strategies.
7.11		Delta Regional Authority (DRA) Community Infrastructure Fund : As a complement to the SEDAP investments, the DRA created the Community Infrastructure Fund (CIF) to target physical infrastructure projects that help build safer, more resilient communities in the Delta region. CIF investments can be used for projects that address flood control, basic infrastructure development, and transportation improvements.
		Clean Water State Revolving Fund (CWSRF) : The U.S Environmental Protection Agency’s (EPA) Clean Water State Revolving Fund (CWSRF) program is the largest public source of water quality financing in the country. Each CWSRF program has a priority system that evaluates and ranks projects. Ranking criteria primarily focus on public health and water quality but can also address other concerns including infrastructure resiliency. States may encourage projects promoting system resiliency through targeted rating criteria, such as offering priority points, and funding incentives, such as reduced interest rates and waiver of fees.
		Incorporating Resilience into Transportation Planning and Assessment A report initiated to explore how to incorporate resilience into long-term transportation planning for state departments of transportation and metropolitan planning organizations and to inform the Transportation Research Board.
7.14		FEMA guidance for hazard mitigation planning : Assists with creating an inventory of non-conforming structures located in the floodplain.
Adopt Incentives		
7.16		Going Beyond Code: A Guide to Creating Effective Green Building Programs for Energy-Efficient and Sustainable Communities : Designed to help state and local governments design and implement successful “beyond code” programs for new commercial and residential buildings. While focuses on energy efficiency and green building standards, recommends a voluntary

		incentive program, among other financing strategies.
		Enact Policies & Supportive Regulations
7.18		Delaware Valley Regional Planning Commission (DVRPC) Renewable Energy Ordinance Framework for Solar PV : A resource for municipalities as they develop and update zoning ordinances to govern the siting of small-scale solar PV energy systems in their community.

PRIORITIZATION, ACTION PLANNING, AND IMPLEMENTATION WORKSHEETS

Use the results of the Resilience Focus prioritization; the inventory of local programs, policies, and codes; and the targeted examples to help set your action agenda for next steps. Fill in the following worksheets to get started.

Resilience Focus Prioritization Questions

Answer the following questions to help prioritize resilience goal areas and focus staff time and resources. Mark the number of topics you are interested in for each goal area in the tabulation table.

QUESTION	Y	N	CONSIDER COMPLETING:
Does my community have a thorough understanding of the hazards it can expect to face, the potential range in severity of those hazards, and where they are most likely to occur?			Focus Area 1
Is information pertaining to coastal hazards and risk in my community (maps, plans, risk assessments) up to date?			
Does my community understand and consider our social and economic vulnerabilities? ⁴⁵			
Does my community protect lands in critical, flood-prone areas so that nature can perform its flood-reducing functions?			Focus Area 2
Does my community have dedicated funding sources for open space acquisition and management (for example bonds, sales taxes, or transfer taxes)?			
Does my community encourage growth away from sensitive environments to preserve land and reduce risk to people and structures that might locate in dangerous flood-prone areas?			
Has my community taken steps to reduce risk through a combination of proactive and protective land use laws, building codes, and planning policies?			Focus Area 3
Are there populations and/or places in my community that bear a disproportionate share of risk or vulnerability resulting from potential hazards?			
Has my community conducted a vulnerability assessment to identify current and projected vulnerable areas and associated risks to life and property and has it incorporated the results of that assessment into relevant plans (e.g. comprehensive plan, hazard mitigation plan, land use plans, etc.)?			
Has my community identified where growth can safely be accommodated now and in the future?			Focus Area 4
Does my community provide incentives for development			

⁴⁵ Social vulnerability refers to the increased burden of hazard impacts on certain populations within the community, based on race, income, education, language spoken and more; economic vulnerability refers to the local or regional economy's ability to recover following an unexpected shock to the system.

QUESTION	Y	N	CONSIDER COMPLETING:
in safe growth locations to enhance community resilience?			
Is new development guided by smart growth principles helping to further enhance my community's ability to withstand hazards and unexpected events in my community?			
Does my community manage stormwater using a wide variety of measures spreading the burden of mitigation instead of relying on a single system to carry excess water away?			Focus Area 5
Does my community have experience with/uses/requires green infrastructure/low-impact design?			
Does my community coordinate with neighboring jurisdictions to explore watershed-based approaches to floodplain management, stormwater management, and green infrastructure?			
Do my community's codes and ordinances provide for the protection of natural features with stormwater management benefits (e.g., trees, open space, riparian areas etc.)?			
Does my community encourage and/or provide incentives for advanced training or certifications for staff members to support greater capacity for building community resilience (such as the trainings provided by the Association of Climate Change Officials, requiring CFMS for staff, or participating in the Community Rating System)?			Focus Area 6
Has my community considered/developed a post-disaster recovery plan?			
Do my community's resilience efforts meet and/or exceed existing state or federal laws?			
Does my community's staff have the range of expertise necessary to address resilience challenges?			Focus Area 7
Has my community identified and involved anchor institutions (hospitals, colleges, other major employers) that can support the community's vision for greater resilience?			
Does my community have a community champion/group who is advancing resilience efforts and building coalitions?			
Does my community have forward-thinking community leaders who understand the long-term challenges of building resilience?			
Does my community prioritize spending for hazard mitigation, disaster recovery, and improved resilience?			

FOCUS AREAS	TOPICS OF INTEREST (#)	IDENTIFIED PRIORITY? Y/N
Focus Area 1. Ensure comprehensive understanding of known hazards, risks and vulnerabilities, and their potential impacts (physical, economic, and social)		

FOCUS AREAS	TOPICS OF INTEREST (#)	IDENTIFIED PRIORITY? Y/N
Focus Area 2. Conserve land in critical coastal areas, river corridors, and other flood-prone environments		
Focus Area 3. Reduce risk to people, buildings, and facilities in vulnerable areas		
Focus Area 4. Plan for and encourage development in safer areas		
Focus Area 5. Implement comprehensive stormwater management techniques		
Focus Area 6. Build capacity and develop tools to enhance resilience		
Focus Area 7. Build support for improving community resilience and remove barriers to implementation		

Identify Priority Strategies

For each of the focus areas you responded to in the tool, identify three to five priority strategies that you would like to implement or explore further.

FOCUS AREA:

STRATEGIES

FOCUS AREA:

STRATEGIES

FOCUS AREA:

STRATEGIES

Develop Action Agenda

The following matrix will help you to clarify, prioritize, and define roles and responsibilities for moving forward for each of the resilience strategies that you have identified as a priority. For each strategy, identify the following:

- **Lead role:** The individual, agency, office, or organization who will champion this resilience strategy
- **Supporting cast:** Other individuals, offices, organizations, etc. who can help move the strategy further towards implementation or assist once the strategy has been implemented
- **Timeframe:** The amount of time estimated to complete the strategy or action being discussed; typically described as short term (0-6 months), mid-term (6 months- 1 year), or long-term (beyond one year)
- **Next Steps:** Actions that can be taken in the next 90 days to move the strategy towards implementation
- **Resources:** Time, funding, and/or materials – anything you will need to fully implement the action

A sample strategy has been filled out to show how the action agenda can be used.

RESILIENCE STRATEGY	LEAD ROLE	SUPPORTING CAST	TIMEFRAME	NEXT STEPS	RESOURCES NEEDED
<p>Example: A green infrastructure cost share or fee credit program is made available</p>	<p>Office of Stormwater Management</p>	<p>Planning Dept. Public Works Public Affairs Local environmental Groups</p>	<p>Mid-term: 6 months – 1 year</p>	<p>Research existing cost share/fee credit programs and produce a feasibility study</p> <p>Identify likely users or residents/businesses who would be most interested</p> <p>Investigate funding support resources</p>	<p>Staff time to research best practices and determine feasibility</p> <p>Funds to support cost sharing/ fee credits</p>

RESILIENCE STRATEGY	LEAD ROLE	SUPPORTING CAST	TIMEFRAME	NEXT STEPS	RESOURCES NEEDED

ADDITIONAL RESOURCES

The **National Flood Insurance Program's Community Rating System** is a comprehensive resource for strategies that may help reduce risk to hazards and build community resilience.

www.fema.gov/national-flood-insurance-program-community-rating-system

US EPA's **Smart Growth Fixes for Climate Adaptation and Resilience** is a publication that aims to help communities address some of the expenses and political challenges of preparing for and adapting to climate change.

www.epa.gov/sites/.../smart_growth_fixes_climate_adaptation_resilience.pdf

Community Risk and Resiliency Act (CRRRA), **Projected Sea Level Rise** for New York

www.dec.ny.gov/energy/102559.html

New York Department of State, **Model Local Laws to Increase Resilience**

<https://www.dos.ny.gov/opd/programs/resilience/index.html>

National Academies of Sciences, Engineering, and Medicine, **Building and Measuring Community Resilience: Actions for Communities and the Gulf Research Program**

<https://www.nap.edu/catalog/25383/building-and-measuring-community-resilience-actions-for-communities-and-the>

NOAA Climate Program Office, **U.S. Climate Resilience Toolkit** <https://nemac.unca.edu/us-climate-resilience-toolkit>

FEMA **Community Resiliency Toolkit** <https://www.fema.gov/media-library/assets/documents/129896>

New Jersey Resilient Coastal Communities Initiative **Getting to Resilience A Community Planning Evaluation Tool** <http://www.prepareyourcommunitynj.org/>

Community Resilience Organizations, **Community Resilience Assessment** <https://tools.gocros.org/community>

U.S Climate Resilience Toolkit, **Coastal Resilience Index** <https://toolkit.climate.gov/tool/coastal-resilience-index>

RAND Corp., **Incorporating Resilience into Transportation Planning and Assessment** https://www.rand.org/pubs/research_reports/RR3038.html

US EPA, **Creating Safe Growth Strategies for the San Francisco Bay Area** <https://www.epa.gov/smartgrowth/creating-safe-growth-strategies-san-francisco-bay-area>

US EPA, **Regional Resilience Toolkit: 5 Steps to Build Large-Scale Resilience to Natural Disasters** <https://www.epa.gov/smartgrowth/regional-resilience-toolkit>

Tools, Resources, Best Practices, Databases, Models eCatalogs, Exemplary Case Studies

Resource Pages at U.S Environmental Protection Agency (US EPA)

<https://www.epa.gov/chp/chps-role-providing-reliability-and-resiliency>

CHP's Role Providing Reliability and Resiliency

On this page:

- [CHP's role providing energy reliability](#)
- [CHP's role providing energy resiliency](#)
- [CHP's role in microgrids](#)
- [Additional resources](#)

Additional Resources

DOE, [Combined Heat and Power Technology Fact Sheet Series: Microgrids \(pdf\)](#), February 2021

- [CHP for Resiliency Accelerator](#). Led by the U.S. Department of Energy (DOE), this program supported the use of CHP as a resilient power solution for critical infrastructure through the development of a planning guide, a screening tool, and other resources.
- [REopt Lite Tool](#). Developed by the National Renewable Energy Laboratory, this tool allows users to evaluate the economic viability of distributed energy technologies including solar PV, wind, battery storage, and CHP. The tool identifies economical system sizes and dispatch strategies for different combinations of technologies that can sustain operation of critical loads during grid outages. For facilities with substantial thermal energy requirements, CHP can provide an economic and highly resilient option.
- [Combined Heat and Power: Enabling Resilient Energy Infrastructure for Critical Facilities. \(pdf\)](#) Developed by Oak Ridge National Laboratory, this report provides case studies of facilities that continued operation during grid outages because of CHP, information on the design and use of CHP for reliability and resiliency purposes, and key state and local policies designed to promote CHP in critical infrastructure applications.

- [*Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings. \(pdf\)*](#) Created by EPA and DOE, this report provides an overview of CHP and examples of how it can help improve the resilience and reliability of key infrastructure.
- [*Combined Heat and Power Technology Fact Sheet Series: Microgrids. \(pdf\)*](#) A DOE resource, this fact sheet provides an overview of microgrids and CHP's role in supporting microgrids.

Resource Pages at U.S Department of Energy (US DOE) Better Buildings Program

Better Buildings is an initiative of the U.S. Department of Energy

The Combined Heat and Power (CHP) for Resiliency Accelerator

<https://betterbuildingssolutioncenter.energy.gov/accelerators/combined-heat-and-power-resiliency>

The Combined Heat and Power (CHP) for Resiliency Accelerator worked to support and expand the consideration of CHP solutions to keep critical infrastructure operational every day and night regardless of external events. As a collaborative effort with states, communities, utilities, and other stakeholders, Partners examined the perceptions of CHP among resiliency planners, identified gaps in current technologies or information relative to resiliency needs, and developed plans for communities to capitalize on CHP's strengths as a reliable, high-efficiency, lower-emissions electricity and heating/cooling source for critical infrastructure.

Featured Solutions

[Distributed Generation \(DG\) for Resilience Planning Guide](#) Technical Assistance

The DG for Resilience Planning Guide provides information and resources on how DG, with a focus on combined heat and power (CHP), can help communities meet resilience goals and ensure critical infrastructure remains operational regardless of external events.

[Distributed Generation for Resilience Planning Guide](#) Report

The Guide provides information and resources on how DG, with a focus on combined heat and power (CHP), can help communities meet resilience goals, and ensure critical infrastructure remains operational regardless of external events.

[CHP for Resilience Site Screening Tool \(Excel Version\)](#) Technical Assistance

The CHP Site Screening Tool is an Excel-based tool that can provide an individual site screening assessment for CHP at up to 200 individual sites based on a variety of user inputs and pre-determined metrics.

[CHP for Resilience Site Screening Tool \(Web-Based\)](#) Technical Assistance

The web-based version of the CHP Site Screening Tool can provide a quick individual site screening assessment for CHP based on a few simple user inputs and pre-determined metrics.

[Resilience Risk Evaluation Tool \(Excel-Based\)](#) Technical Assistance

This Excel-based tool can provide a resilience screening assessment for up to 200 individual sites. The tool is based solely on evaluating site resiliency factors and does not take into account onsite economics.

[Distributed Energy Resources Natural Disaster Affects Brief](#) Report

This brief explores how different distributed energy resources (DERs) are impacted by various types of natural disasters to assist stakeholders in evaluating the technology options best able to meet their resilience priorities.

[Combined Heat and Power for Resiliency Accelerator Results Fact Sheet](#)

The accomplishments fact sheet provides summaries for the key deliverables from the Combined Heat and Power (CHP) for Resiliency Accelerator and recognizes partner success in resilience planning and the implementation of CHP/distributed generation programs and initiatives.

[CHP for Resiliency in Critical Infrastructure](#) Fact Sheet

This fact sheet highlights the benefits that CHP systems can offer to critical infrastructure facilities, provides information on current and potential CHP installations at critical facilities, and reviews details on the economic impacts of grid outages.

US DOE's Combined Heat and Power eCatalog {hosted by Oak Ridge National Laboratory (ORNL)}

<https://chp.ecatalog.ornl.gov/>

Combined Heat & Power eCatalog of Recognized Packaged CHP & WHP Systems

Packaged CHP Systems: Rigorous Recognition Process

News and Events

<https://chp.ecatalog.ornl.gov/news-events>

The eCatalog News and Events information posted here and on the Home Page of the eCatalog have been carefully selected from online newsletters, websites and blogs to present current information on all things related to Combined Heat and Power systems, technologies, applications, and markets. These items are publicly available and beneficial to CHP stakeholders

Searchable by nearly 300 keywords, including information from the United States, North America, Caribbean, European Union, international in scope