

Climate Resilient Development Framework Law

Land Use Law Center



A Framework Law for Climate Resilient Development

Climate change is no longer a distant crisis—it is reshaping communities across the United States in real time. From devastating wildfires and rising seas to chronic flooding and extreme heat, local governments are facing intensifying threats to health, infrastructure, and economic stability. These challenges require more than emergency response—they demand forward-looking legal tools to adapt, mitigate, and build resilience in the face of a changing climate.

Climate Resilient Development (CRD) is a place-based strategy that “integrates adaptation measures and their enabling conditions with mitigation to advance sustainable development for all.” CRD is the principal strategy relied upon by the Intergovernmental Panel on Climate Change (IPCC) of managing climate change. CRD reveals the close relationship between adaptive and mitigative development and land use law, particularly the authority delegated to local governments to regulate and incentivize private land development and conservation. Land development in the U.S. is shaped and regulated by legal authority delegated by state legislatures to local governments. Local governments hold the legal tools—zoning, planning, and development review—that shape how we grow, build, and protect our communities.

The IPCC’s Sixth Assessment Report defined CRD and its several components carefully but did not explain how it can be implemented. To fill that gap, the Land Use Law Center at Pace Law School designed a Framework Law that integrates over 150 local legal strategies, organized into 12 mitigation and adaptation topics, as a guide for advocates and officials to use to implement climate management aimed at their particular climate change risks.

How to Use the Framework

The CRD Framework law is a tool for local governments to use when searching for innovative mechanisms to implement in their communities to mitigate and adapt to the effects of climate change. There are twelve topics of CRD listed below. If you see a topic that corresponds to a challenge your community is facing or you want to learn more about, click on the topic title below and you will be directed to that section of the framework.

There you will find a narrative explaining the topic in depth, followed by ten or more case studies of local governments around the country that have successfully implemented CRD practices. The mechanisms found within the case studies can be adapted to fit your community’s needs. During your search through our selection of case studies, hyperlinks are embedded throughout code provisions that will take you to that ordinance or resource. As local governments update their plans and zoning codes, some of the hyperlinks might lead to outdated plans or codes that have since been amended or repealed.

Additionally, if you would like to read a law review article discussing the CRD framework, see [*The Mysterious Power of Land Use Law: Constructing a Framework Law for Climate Resilient Development*](#) by John R. Nolon and Maureen Hartwell.

For an audio overview of the Framework Law, listen to [*Climate Resilient Development: A Framework for Local Action*](#), a half-hour podcast that explains the Framework Law. The podcast was generated by Google NotebookLM, which only uses material that is provided in the form of PDF documents that the user uploads. Therefore, this podcast, while AI-generated, contains only information originating from content written by those at the Land Use Law Center.

The Twelve CRD Topics

1. [Distributed Energy](#)

Local laws enable renewable energy systems like solar microgrids, which reduce emissions, cut utility costs, and provide reliable power during disasters. Municipalities can incentivize installation and partner with utilities to enhance grid resilience and equity.

2. [Low Carbon Building](#)

By addressing the full lifecycle of building materials from sourcing to demolition, municipalities can use permitting, zoning, and incentives to dramatically cut emissions in the construction sector.

3. [Infill and Adaptive Reuse](#)

Rather than developing new land, municipalities are using zoning overlays, incentive programs, and form-based codes to promote the redevelopment of vacant parcels and underused buildings. These strategies limit sprawl, reduce emissions, preserve green space, and meet community needs without expanding environmental risk.

4. [Disaster Mitigation](#)

Local disaster management plans integrate land use tools like overlay zoning, resilient building codes, and lot mergers to reduce the impact of hurricanes, earthquakes, wildfires, and other hazards. This is essential in a nation that experienced nearly \$1.4 trillion in disaster damages over the past decade. Case studies from North Carolina, Hawai'i, and California illustrate how tailored regulations can improve preparedness and reduce long-term recovery costs.

5. [Wildfires](#)

Municipalities are adopting defensible space rules, fire-resistant building codes, and post-disaster recovery ordinances to reduce risks in the wildland-urban interface. Risk assessments and overlay zones guide smarter, safer development.

6. Inland Flooding

Zoning overlays, stormwater regulations, and development restrictions in flood-prone areas help prevent property loss and protect natural flood buffers. The framework highlights how communities can implement FEMA model codes and local innovations.

7. Sea Level Rise

Coastal communities use overlay zones, elevation standards, and transfer of development rights (TDRs) to adapt to sea-level rise. These strategies protect people and property while preserving public access and environmental integrity.

8. Vegetated Urbanism

Green infrastructure strategies, such as tree canopy protection and stormwater infiltration systems, cool urban areas, improve air and water quality, and strengthen community health and climate resilience.

9. Public Health

Land use law supports healthier communities through access to parks, affordable housing, and nutritious food. These policies address the unequal health burdens of climate change and improve long-term outcomes for marginalized populations.

10. Water Conservation

Local ordinances support efficient water use, protect wetlands, and promote reuse. Through drought policies and infrastructure investments, communities can safeguard water supplies and reduce climate vulnerability.

11. Local Climate Action Plans (CAPs)

CAPs formalize emissions reduction and adaptation strategies through community endorsement of zoning reforms, transportation policies, educational programing and green infrastructure investments. The plans function as resolution documents that work toward accountability and progress measurement, often with an expectation of legal integration.

12. Parking and Pavement

Reforming traditional parking requirements and encouraging permeable surfaces reduce flooding and the urban heat island effect. Municipalities are using zoning codes to incentivize shared parking, alternative transportation, and greener materials.

Distributed Energy

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Distributed Energy

Narrative

The Pace Land Use Law Center created a framework law guiding municipalities on how to implement climate resilient development practices by showcasing current local laws addressing the matter. The purpose is to encourage municipalities to review these laws and draft their own to address the five components of Climate Resilient Development (CRD): adaptation, mitigation, resiliency, enabling conditions, and equity. Land use law is the driving force behind municipalities adapting and mitigating growing climate change impacts. Increased resiliency not only leads to cost benefits but can also reduce greenhouse gas emissions and overall reliance on gas, coal, and oil. The framework law covers twelve topics under climate resilient development. This section of the framework focuses on distributed energy. Distributed energy consists of small scale energy generation and storage systems, relying on renewable energy resources, to provide energy closer to the consumer. The case studies in this section reflect how current municipalities have addressed the topic with the law.

Climate change continues to test the bounds of resilient communities. As more natural disasters devastate towns and cities across the U.S., local municipalities can better equip themselves to mitigate damages. One option to address climate change through energy efficiency is microgrids. Microgrids are a form of distributed energy that uses renewable resources such as solar panels and microturbines to generate electricity; the electricity connects to a system that feeds the electricity back into a larger grid that stores any leftover energy. These systems can operate both independently and through interconnection. However, distributed energy is more efficient when connected to a larger network system.

Municipalities can benefit from an interconnected distributed energy system by reducing energy costs, improving energy grid reliability, and fostering a stronger relationship between the private sector and the municipality. By implementing renewable energy resources, municipalities can create climate-resilient buildings. Local land use law also helps enable the implementation of renewable resources in commercial buildings and can further facilitate it through incentivization. Incentivization can occur through tax rebates, net metering, or increasing floor area building limits. The case studies provided illustrate specific examples within current local laws.

The CRD components include adaptation, mitigation, resiliency, enabling conditions, and equity. These components can be seen in the framework law or an amendment to the code. The framework law offers a wide range of resources municipalities can utilize to publish and pass CRD components. All of the CRD components are represented when distributed energy is implemented. Adaptation is present when local laws address energy-efficiency, such as with rooftop solar panels or microturbines. Mitigation is addressed when distributed energy intersects with other topics, such as wildfires. Wildfires are known to start in dry areas where the local utility power grid is overloaded, and combustion often leads to sparks that cause wildfires. Distributed energy can address mitigation by alleviating the burden on overloaded utility energy grids, and provide greater resiliency to consumers during power outages, grid congestion, and natural disasters. With worsening climate change impacts, strengthening energy resiliency with microgrids and updated renewable energy systems can ensure consumers can safely access necessities such as electricity, water, and light. Equity is the CRD component that is oftentimes neglected. However, as shown in

the Burlington, Vermont case study, municipalities can set up funds based on carbon usage to install distributed energy systems within lower income communities. The equity component also falls into the enabling conditions component. As municipalities generate more funds that make distributed energy accessible for a broader range of people, the distribution of these systems will grow for all communities. Additionally, incentivization tactics allow consumers to determine whether their infrastructure can support a distributed energy system, and if not, can inspire consumers to make the necessary infrastructure changes to allow it.

Distributed energy resources are expensive, and successful implementation often requires partnerships with other network partners. Potential partners include utility companies and architecture companies. Utility companies can provide specific incentives for renewable energy use. Meanwhile, architecture companies can provide insight into how these technologies can be best integrated into existing buildings and environments. One of the most critical network partners in distributed energy is the National Renewable Energy Laboratory (NREL). The NREL has funded various local municipal projects and consistently updates their renewable energy technology, sharing the implementation benefits. These partners are vital when local municipalities consider energy efficiency and how best to implement distributed energy systems.

As municipalities begin to address climate resilient development within their law, they first must look at the CRD topics most compatible with their community. If distributed energy is feasible, municipalities should determine what resources it can provide to the private sector. This can include looking at state initiatives and other potential funding opportunities. Additionally, they should explore local partnerships with utility companies or renewable energy companies. Municipalities should then consider climate and geographical considerations. This involves determining the type of renewable energy readily available to utilize. Municipalities should also consider how climate change impacts could affect accessing those resources. Finally, a municipality must decide how to address distribution within their ordinance. The case studies below offer a range of programs, incentivization options, and regulations that can steer municipalities towards the practices that work best for them.

Final Report

Distributed energy is small scale energy generation and storage systems, utilizing renewable energy resources to provide closer access to consumers. A prime case study for distributed energy systems is Burlington, Vermont, requiring certain buildings to implement a thermal energy system. If they do not implement a geothermal system (i.e. renewable energy), developers must pay into a fund to install thermal energy systems in low-income communities. The takeaway is local governments have the power to implement Climate Resilient Development (CRD) that can produce more sustainable practices for all communities. As municipalities move forward, they consider working with utility companies as well as the National Renewable Energy Laboratory for assistance in funding projects.

Case Studies

Topic Title: Distributed Energy

Resource Title: Borrego Springs Microgrid

Resource Type: Comprehensive Plan

Municipality: Borrego Springs

State: California

Date of adoption: 2011

Abstract: Borrego Springs Microgrid

Borrego Springs aims to reduce energy consumption and demand by 30% over the next five years through the goals located in its community plan. The community plan is part of the San Diego General Plan. The San Diego Planning Commission adopted the community plan in 2011, focusing on energy concerns in construction standards. Under construction standards, all residential and commercial standards are encouraged to meet specific energy standards. Individuals gain points for implementing specific construction provisions, such as installing solar hot-water panels for swimming pools and incorporating solar-electric panel systems. The Energy section of the community plan aims to establish a long-term electrical utility that utilizes both solar power and a distribution system to generate sufficient energy via photovoltaic systems. These standards intend to create a microgrid within the community of Borrego Springs. The microgrid will be used to make efficient and reliable energy in a distributed system within one community. CRD components, including as resiliency, are met through this project. As the municipality continues to implement energy-efficient measures, it mitigates future energy use impacts, such as a grid overload. Additionally, incentives like tax rebates foster a strengthened partnership between the private sector and climate resiliency in Borrego Springs.

Code Provisions:

County of San Diego General Plan

[Borrego Springs Community Plan](#)

Construction Standards

Issue-LU-3.7 Desert-Inappropriate Insulation and Roofing. Appropriate building design in hot desert climates relies on suitable active- and passive-cooling techniques that are different from techniques routinely used in colder climates. Heat transfers in the desert are generally in the form of radiant heat gain through the roof and exposed walls from the hot summer sun, rather than conductive or convective heat loss through roofs, walls, doors and windows. Passive techniques such as shading and ventilation are critical to deflect the effects of radiant energy making summer habitation in the desert comfortable. Current standards do not adequately consider these differences.

Goal-LU-3.7 Buildings that are constructed according to techniques best-suited to our hot, arid desert environment.

Policy-LU-3.7.1 Encourage all residential and commercial construction (both new and significant renovation) within the CPA to meet passive energy efficiency conservation goals by accumulating a number of “efficiency points” in the suitable alternative ways:

- Orienting building forms to maximize positive and minimize negative climatic and environmental effects;
- Incorporating overhangs and permanent shade structures over non-north-facing windows, doors and exposed exterior walls;
- Using thermal massing to reduce temperature fluctuations in interior spaces;
- Using higher R-value roof insulation than is currently required in California, along with light-colored roof surfaces to reduce HVAC loads;
- Limiting overall height of building structures to limit solar exposures; and/or
- Including passive energy efficiency elements in the Landscaping Plan.

Policy-LU-3.7.2 Encourage all residential and commercial construction (both new and significant renovation) within the CPA to meet active energy efficiency conservation goals by accumulating a minimum number of “efficiency points” in the following (and other suitable) alternative ways:

- Using higher efficiency (S.E.E.R.) heating, ventilation and air-conditioning (HVAC) systems than specified by California or Federal regulations;
- Using light dimming;
- Installing solar hot-water panels for swimming pools; and/or
- Incorporating solar-electric panels systems.

Implementation-LU-3.7.2

1. DPLU to establish an efficiency point system in consultation with the BSCSG.
2. Create educational materials to inform permit applicants of the system and requirements.
3. Incorporate into DPLU plan check procedures for construction in the CPA.

Energy – Natural Gas & Electricity

Borrego Springs does not have access to natural gas, and relies entirely on San Diego

Gas & Electric for its electric power. As a low desert community, electric power used for residential and business lighting is less of a consideration than the need for heating and air conditioning. Temperatures during summer days can exceed 120 degrees F and fall to below 20 F degrees during winter nights.

Issue-CM 10.4 Extremely high outdoor summer temperatures and the high cost of electricity have a significant negative economic impact on the community. Borrego Springs remains a seasonal business and residential community – tourism that peaks in March of every year drops substantially during the June thru October timeframe, and nearly 50% of our residents live in other cooler locations during the same period. Many businesses close during the summer months as they cannot operate profitably with low demand and excessive electrical (A/C) costs. The service reliability from SDG&E is poor, especially during the summer peak season. A close look at the facilities and distribution systems associated with electric utilities in the Valley show an emphasis on low-cost engineering and technology over compatibility with the natural ecosystems.

Above-ground utility poles interrupt our panoramic views and are highly susceptible to damage in high winds, often disrupting service during storms.

Goal-CM 10.4 Establishment of long term electrical utility for the creation of a localized solar power and distribution system and generate sufficient energy to satisfy local demand via photovoltaic systems.

Policy-CM 10.4.1 Encourage the activation of latent powers of the Borrego Water District to establish and operate an electrical utility for a localized solar power and distribution system.

Implementation-CM 10.4.1

1. Create a “New or Renewable Energy” task force for the exploration and implementation of new local energy sources.
2. Establish a forum of community stakeholders to advise and support the development and siting of new energy facilities in the Borrego Springs CPA with an emphasis on pre-existing agriculture lands in the north part of the Valley.

Topic Title: Distributed Energy

Resource Title: Planned Unit Development Districts

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Cambridge

State: Massachusetts

Date of Adoption: 2021

Abstract: Planned Unit Development Districts

Cambridge, Massachusetts promotes energy efficiency through renewable energy systems. Cambridge is experiencing a surge in new residential and commercial development, generating a growing demand for power. Buildings in Cambridge are responsible for more than eighty percent (80%) of the city's greenhouse gas emissions – more than transportation and waste combined. In an effort to reduce emissions and increase energy efficiency, the city created incentives and regulations to better address the issues within the city.

In Cambridge's Zoning Ordinance, Article 13.000 discusses requirements for planned unit development districts. Each district has a variety of uses such as residential, commercial, institutional, and mixed-use development. They also have their own section under the article highlighting the use and requirements of each district. Districts 5 and 7 include a sustainability section outlining the new building construction requirements that applicants must follow. Both discuss energy conservation, requiring the developer to evaluate the site for potential on-site energy generation or the construction of co-generation facilities. For commercial buildings, a development proposal must include a study prepared by the developer, considering the feasibility of connecting the building to an existing steam system. The Planning Board may grant zoning relief in order to permit the construction of an energy system that allows developments to minimize energy usage. In District 7, the sustainability section also discusses the importance of supporting renewable energy production.

Code Provisions:

Cambridge, MA Zoning Ordinance

Article 13.80: [Planned Unit Development 5 District](#)

A. Purpose

13.81: "The PUD-5 District is intended to provide for Kendall Square's continued prominence as a world-renowned center of innovation and a vibrant neighborhood through the creation of a mixed-use district of high quality general and technical office and laboratory uses with significant retail activity proximate to the MBTA station. The PUD-5 District helps organize placement of commercial and institutional buildings and establishes an additional mixed-use development containing a significant residential component to support the burgeoning residential corridor along Third Street and the strong links to existing neighborhoods and the riverfront. The PUD-5 District allows for continued support of the academic mission at MIT and encourages connective links, physical and otherwise, between the Institute and adjacent neighborhoods.

The PUD-5 District responds to the Kendall Square planning process and is intended to be a smart-growth, transit-oriented district and therefore allows for replacing surface parking lots with larger scale development in Kendall Square and the major public

transit services located there. The PUD-5 District encourages low parking ratios, shared parking strategies, the use of public transportation and improved pedestrian and bicycle environments. The PUD-5 District furthers the City's goals for sustainable development through buildings and sites that are planned, designed and constructed in a sustainable way so as to minimize adverse environmental impacts as they are initially constructed and as they are occupied and operated over the course of their useful lives. [...]

13.91: The PUD-7 District is intended to provide for the creation of a vibrant mixed-use district of high quality general and technical office and retail activity, with significant components of residential use and open space. The retention of government office facilities on the site is desired, as well as space for smaller innovation companies as a component of the commercial space that is created. The creation of open space to serve residents of the District and the surrounding neighborhoods, as well as workers, students from nearby institutions, and visitors, is desired. The PUD-7 District permits larger scale development and supporting commercial activities and residences close to Kendall Square and the major public transit services located there. It encourages strong connections between new development at Kendall Square, the East Cambridge riverfront, the PUD-7 area and the neighborhoods of eastern Cambridge. It also promotes permeability at the edges of the district, public spaces that will feel welcoming and comfortable to all users, ground floors that will activate public streets and spaces, and civic functions and amenities serving residents and visitors of all ages and all socioeconomic backgrounds. The expectation is for the District to transform into a recognizable center of activity and civic life for Kendall Square and the surrounding neighborhoods. Development in the PUD-7 District is expected to meet high standards for urban design, architectural design, environmental sustainability and open space design.”

B. Sustainability

13.89.4: “New buildings in the PUD-5 District must incorporate an integrated design approach and incorporate the best practices for meeting sustainability in the following five (5) areas:

a. Energy and Emissions; Steam. Each new building must conserve building energy and, to the extent applicable, reduce carbon/GHG emissions. The Developer, with each Development within the PUD-5 District, must evaluate the potential for on-site energy generation or the construction of co-generation facilities within the PUD-5 District that will serve the new building and other buildings located within the PUD-5 District. A Development Proposal for a commercial building shall include a study, prepared by the Developer, considering the feasibility of connecting the building identified in the Development Proposal to the existing district steam system.

[...]

h. In connection with the approval of a Final Development Plan or in connection with the granting of a Special Permit pursuant to Article 19 of the Ordinance, the Planning Board may grant dimensional and other zoning relief in order to permit the construction of a co-generation facility or other energy systems that allow developments to develop shared solutions to minimize energy usage.

13.91.2(i): Sustainability Plan — describing: (1) how the sustainability requirements set forth in Section 13.96.4 below will be met; (2) expected greenhouse gas emissions from the development and strategies employed to improve energy efficiency and support renewable energy production, through individual building design and by utilizing existing or new district-wide energy systems; and (3) expected vulnerability of the development to the effects of climate change, including increased precipitation, flood risk, temperature, and urban heat island effect, and strategies to promote resiliency within individual building sites and at a larger district-wide level, including natural stormwater management systems, increased vegetation and shade, and measures to withstand and recover from extreme climatological events.

13.96.4: New buildings in the PUD-7 District must incorporate an integrated design approach and incorporate the best practices for meeting sustainability in the following five (5) areas:

(a) Energy and Emissions; Steam. Each new building must conserve building energy and, to the extent applicable, reduce carbon/GHG emissions. The Developer, with each Development within the PUD-7 District, must evaluate the potential for on-site energy generation or the construction of co-generation facilities within the PUD-7 District. A Development Proposal for a commercial building shall include a study, prepared by the Developer, considering the feasibility of connecting the building(s) identified in the Development Proposal to the existing district steam system.

[...]

(e) In connection with the approval of a Final Development Plan or in connection with the granting of a PUD or other special permit pursuant to this Zoning Ordinance, the Planning Board may grant dimensional and other zoning relief in order to permit the construction of a co-generation facility or other energy systems that allow developments to develop shared solutions to minimize energy usage.”

Topic Title: Distributed Energy

Resource Title: Development Standards and Incentives

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Colorado Springs

State: Colorado

Date of Adoption: 2023

Abstract: Development Standards and Incentives

Colorado Springs, Colorado residents spend an average of forty (40%) lower costs of electricity bills than the national average. The municipality continues to provide residents with incentives to promote and use renewable energy systems. The Colorado Springs Code of Ordinance offers incentives for development and redevelopment utilizing sustainable and resilient practices. For Mixed-Use or Industrial zone districts, applicants must demonstrate at least four of the six practices outlined in the chapter. This includes parking covered by energy generation systems, particularly solar; on-site solar panels covering at least fifty percent (50%) of the total roof area or an area equal to one hundred percent (100%) of estimated annual electricity usage in the building; and building efficiency design that improves the building's energy performance. Incentives for the energy efficiency include exemptions from certain zoning regulations for the City; applicants may add one to two additional floors of building height depending on their zone district. The chapter also provides examples of buildings that cannot utilize these incentives. Additionally, the number of required off-street parking spaces outlined by the City's ordinance may be reduced by an additional ten percent (10%).

Code Provisions:

Colorado Spring, CO Code of Ordinances

7.4.202: [Article 4 Development Standards and Incentives](#)

A. Purpose

Section 7.4.202(A): "The purpose of this Subsection A is to implement the Colorado Springs Comprehensive Plan guidance to encourage development that is sustainable and resilient."

B. Eligibility

"A project seeking the sustainable and resilient development incentives established in this Subsection A shall be located in a Mixed-Use or Industrial zone district and shall satisfy at least one (1) of the following two (2) options below:

a. Option 1: Demonstrate compliance with at least four (4) of the following six (6) criteria:

1. [...]

2. [...]

3. Covered Parking: At least sixty-five (65) percent of parking spaces shall be provided under a cover or roof that has a three- (3) year aged SRI of at least thirty-two (32) or is covered by energy generation systems, such as solar thermal collectors or photovoltaics. Parking calculations shall include all existing

and new off-street parking spaces that are leased or owned by the project. Parking spaces within a parking structure shall count toward meeting this standard.

4. [...]

5. Solar Energy: Install on-site solar panels covering an area anywhere on the building or lot equal to fifty (50) percent of the total roof area of all primary buildings, or an area equal to an amount required to provide one hundred (100) percent of estimated annual average electricity used in all primary buildings, at the applicant's option. Other renewable energy devices may be used in place of on-site solar panels so long as evidence of equivalent electricity generation capacity is provided.

6. Building Efficiency: Design the project to achieve improved building energy performance beyond the minimum required building code standards by demonstrating that the project qualifies for a minimum of fifteen (15) points from the LEED version 4.1 BD+C Optimize Energy Performance credit.

b. Option 2: Submit proof acceptable to the City that the project is being reviewed and expects to receive certification by the following verified third-party sustainability programs:

1. Silver Certification by the U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) rating system;
2. Another verified third-party sustainability program producing equal or greater sustainability benefits as LEED Silver Certification, as determined by the Manager.”

C. Incentives

“Additional Allowances for Incentive Developments: For projects that satisfy either the Sustainable and Resilient Development standards in Subsection A above or the Transit-oriented Development incentives in Subsection B above, the following incentives are available.

1. Building Height:

a. The maximum height of the primary structure height shall be increased as follows.

i. One (1) additional floor of building height, not to exceed twelve (12) feet, for projects in the MX-M zone district.

ii. Two (2) additional floors of building height, not to exceed twenty-four (24) feet, for projects in the MX-L or MX-I zone districts.

b. The two (2) incentives may not be combined to earn more than twelve (12) feet of additional height in the MX-T or MX-M zone district or more than twenty-four (24) feet of additional height in the MX-L or MX-I zone district.

c. The height incentive may not be used on any portion of a building within seventy-five (75) feet of the property line of an adjacent property as follows:

- i. For a property with a multi-family or non-residential land use, the height incentive may not be used on any portion of a building located within seventy-five (75) feet of any property line adjacent to a lot in the R-E, R-1 9, R-1 6, or R-2 zone districts or a lot designated for attached or detached single-family or two-family dwellings in a PDZ district.
- ii. For a property in a Mixed-Use or Industrial zone district, the height incentive may not be used on any portion of a building located within seventy-five (75) feet of any property line adjacent to a lot in a residential zone district or a PDZ district that is developed with, or designated for development with, a residential use.

2. Parking: The number of required off-street parking spaces required by Part 7.4.10 (Parking and Loading), may be reduced by an additional ten (10) percent.”

D. Incentive Procedure

“The Manager shall determine whether an application complies with the requirements of this Section 7.4.202. If the Manager has confirmed that the application complies with the requirements for one (1) or more incentives under this Section, but the underlying application is subject to approval by the of the Planning Commission or City Council, the decision-making body shall consider the application through the applicable decision-making criteria in Article 7.5: Administration and Enforcement assuming that all approved incentives will be constructed, and shall not condition its approval on removing or limiting an earned incentive.”

Topic Title: Distributed Energy

Resource Title: Electricity Deregulation

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Lubbock

State: Texas

Date of adoption: 2024

Abstract: Electricity Deregulation

Lubbock, Texas, adopted ordinances addressing renewable energy through design standards for nonresidential properties. Among the listed subdivision design standards is the requirement for renewable energy. Properties should be “designed to take full advantage of sun and shade, and, where appropriate, wind, and other renewable energy sources.” In 2024, the city of Lubbock deregulated electricity, allowing consumers to choose their utility company. Design standards are relevant to the private sector because developers can consider design standards in conjunction with electric companies offering renewable energy incentives for buildings.

Additionally, Lubbock has a Reduction Overlay district, where developers are incentivized to promote energy-efficient design standards. Incentives for implementing solar or wind energy include commercial tax abatement, rebates, fixed-price plans, and renewable energy at night. Electricity deregulation provides a wide range of renewable energy opportunities and incentives for the private sector. CRD components such as equity and adaptation are met in this deregulation ordinance. Lubbock is adapting to the needs of residents by including the private sector and broadening the scope of choice implementation. Equity is also met because some electricity companies offering solar incentives may provide a wider range of incentives for all income levels.

Code Provisions:

City of Lubbock, Texas

Title I: General Ordinances; Title II: Buildings, Development, Property Maintenance

§39.04.003 [Design principles](#); §22.02.141 [Commercial property](#); §39.02.014 [Reduction Overlay \(RO\)](#)

§39.04.003 Design Principles

a. [Generally](#).

b. [Compatibility](#). The proposed subdivision plat shall be designed in a way that:

c. [Connectivity](#). Subdivisions are to be designed as a group of interconnected residential neighborhoods with appropriate commercial and industrial and public facilities. Space for religious, recreational, educational, and shopping facilities to serve the residents of and visitors to the area should be provided and designed as an integral part of each neighborhood, as appropriate.

d. [Topography and natural features](#). The arrangement of lots, blocks, and the street system should be designed to conserve or cause minimal disruption to topography and natural physical features.

e. [Street arrangement](#). The general arrangement of streets should conform to the functional street classification system and the network alignments of the current City of Lubbock Master Thoroughfare Plan.

f. Tree preservation. Where not required for preservation, trees and other plant materials should be preserved where practicable.

g. Renewable resources. The blocks, lots, and buildable areas of a subdivision should be designed to take full advantage of sun and shade, and, where appropriate, wind, and other sources of renewable energy.

ARTICLE 22.02 ELECTRIC UTILITY

CHAPTER 22 UTILITIES

§22.02.14 Division 4. Commercial Properties

Sec. 22.02.141 Scope

This division shall apply to all persons owning and/or operating commercial properties (referred to in this division as “customer”) within the corporate limits of the City of Lubbock and who receive electric utility service from either an electric utility, as that term is defined in the Texas Utilities Code, or a municipally owned utility, each operating within their respective certificated service territories within the corporate limits of the City of Lubbock (collectively referred to in this division as “utility”). (1983 Code, sec. 9-40; Ordinance 2004-00100, sec. 1, adopted 9/28/2004).

Sec. 22.02.142 Properties one acre or less in size

A customer owning a commercial property within the corporate limits of the City of Lubbock that is one acre or less in size shall be subject to the following provisions:

(1) The customer shall install, own and maintain and be solely responsible for providing all underground secondary service conductors from the customer’s facility receiving the electric service to the appropriate facilities of the utility located in the public right-of-way and as designated by the utility.

(2) The customer shall, at no cost to the utility, grant, convey and/or otherwise devise to the utility any and all necessary right-of-way easements and/or covenants, if any, at or near the customer’s property line so that the utility may properly install any and all utility equipment necessary to provide proper electric utility service to the customer.

(1983 Code, sec. 9-41; Ordinance 2004-00100, sec. 1, adopted 9/28/2004)

Title II: Buildings, Development, Property Maintenance

Ch 39 Art 02 Div 2.2 Zoning Districts

§39.02.014 Reduction Overlay (RO)

§39.02.014 Reduction Overlay (RO)

a. Purpose. The purpose of the Reduction Overlay District (ROD) is to allow development that deviates from the standards of the underlying base zoning district, by reducing or restricting these standards and removing permitted or accessory uses. It also provides regulatory flexibility in the following manner:

1. *Regulatory flexibility.* It is intended to permit regulatory flexibility to:

A. Achieve development that is in accordance with the City's Comprehensive Plan;

B. Achieve economy and efficiency in the use of land, natural resources, energy, and in the provision of public services and utilities; and/or

C. Provide appropriate development to satisfy the needs of residents of the City of Lubbock.

2. *Land use compatibility.* It is further intended that development permitted pursuant to this Section allow uses, buildings, and site improvements to relate to each other and to adjoining existing uses and to the public realm in such a way that they will be compatible.

3. *Redevelopment.* It is further intended that these regulations bring about reuse and/or redevelopment of sites where an orderly change of use is determined to be desirable, especially where reuse is restricted because of existing nonconformities, physical development, or the constraints of conventional zoning standards.

4. *Purpose not intended.* The Reduction Overlay shall not be used for the sole purpose of securing an agreement between an applicant and the City to receive zoning approval.

Topic Title: Distributed Energy

Resource Title: Thermal Heating Systems

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Burlington

State: Vermont

Date of Adoption: 2021

Abstract: Thermal Heating Systems

The Building and Building Construction chapter of the Burlington Code of Ordinance discusses the implementation of thermal heating systems. The purpose is to implement practices that help reduce greenhouse gas emissions and achieve a higher degree of energy conservation from buildings. All new buildings are required to utilize a renewable energy thermal energy system, and any existing buildings seeking to replace space conditioning or heating systems shall utilize renewable energy. If new or existing buildings cannot utilize thermal systems, applicants must provide a written explanation. Applicants are permitted to use fossil fuel thermal energy systems, but the building shall be subject to a carbon pollution impact fee. The carbon pollution impact fee is determined by the greenhouse gas emissions from the applicant's building or buildings that are attributable to the applied-for fossil fuel thermal energy systems. There are exceptions to the fee for specialized reasons. The carbon pollution impact fee funds are placed in a renewable energy fund to, in part, provide financial assistance to help low-income residents with funding initiatives promoting reduced greenhouse gas emissions, including the installation of thermal energy systems. Utilization of a fossil fuel thermal energy system is only allowed if the applicant can demonstrate that a renewable energy thermal energy system is unduly burdensome. The article additionally encourages applicants to access available local, state, or federal incentives, rebates, or tax credits for the thermal systems.

Code Provisions:

Burlington Code of Ordinances

Chapter 8. Buildings and Building Construction

[Article V. Thermal Heating Systems](#)

A. Purpose and Authority

8-76: "(a) *Purpose.* It is in the public interest and in the interest of public health and safety to achieve a high degree of conservation of energy and reduce emissions of greenhouse gases by requiring buildings to meet specified energy efficiency performance standards and maximum allowable heat loss standards.

(b) *Authority.* All provisions in this article relating to thermal energy systems are adopted pursuant to the authority and powers granted by a majority of the legal voters of the city who voted at the annual city meeting on March 7, 2023, in accordance with Section 48(66) of the City Charter and its provisions on the regulation of thermal energy systems in residential and commercial buildings, including the assessment of carbon impact or alternative compliance payments, for the purpose of reducing greenhouse gas emissions throughout the city. The provisions in this article are further adopted pursuant to the authority and powers granted by the Vermont Legislature in 24 V.S.A. § 3101 (Chapter 83. Building Inspectors and Regulation of Building; Bylaws and ordinances; penalties), as

reasonably necessary to improve the health, safety, and welfare of the public from fuel leaks and explosions, and from air pollution, including that which is causing climate change and thereby threatens the city and its inhabitants.”

B. Definitions

8-77: “(a) A “thermal energy system” shall mean any space condition, domestic hot water, cooking, appliance, process heat, or other building system that relies on thermal energy. [...]

(c) “Renewable energy” shall include all of the electrification, geothermal, and solar measures, and renewable fuels included in (d) and (e) of 30 V.S.A. § 8127. Renewable energy measures that do not rely on electrification, geothermal or solar will be subject to the applicable requirements of Section 8-78(a).

(d) Any “renewable energy” fuel or measure set forth in subsection (c) of this section shall be considered excluded from the definition of “renewable energy” if the Vermont Public Utility Commission determines a renewable measure or fuel source is not eligible for renewable heat credits under the requirements of a State of Vermont Renewable Heat Standard or any similar State thermal energy policy. [...]

C. Renewable Energy Requirements

8-78: “(a) *New buildings*. Applicants seeking permits pursuant to this chapter for new buildings shall demonstrate that the new building will utilize renewable energy thermal energy systems. If an applicant utilizes a primary thermal energy system that relies on renewable energy other than electrification, geothermal, or solar measures, the applicant must certify prior to receiving a permit that the use of electrification, geothermal, or solar measures is not technically feasible, is economically unduly burdensome, is not permitted by applicable regulation, or is not feasible for other similar reasons demonstrated to the satisfaction of the department of permitting and inspections. If an applicant utilizes a nonprimary thermal energy system that relies on renewable energy other than electrification, geothermal, or solar measures, the applicant must provide the department of permitting and inspection a written explanation of the reason for not using a thermal energy system that relies on electrification, geothermal, or solar measures.

(b) *Large existing buildings*. Applicants seeking permits to replace space conditioning systems or domestic water heating systems that are in large existing buildings shall demonstrate the new space conditioning or domestic water heating systems will utilize renewable energy. This subsection (b) shall also apply to existing city buildings, except that existing city buildings are not subject to the carbon pollution impact fee established in Section 8-79.

(c) *Annual certification*. If an applicant utilizes renewable energy in a thermal energy system capable of also using fossil fuels, the applicant must certify prior to receiving a permit and annually thereafter that the renewable energy fully offsets the annual usage for the thermal energy system. This certification may include, but shall not be limited to, submitting a contract, invoice, or proof of a subscription to or participation in a tariff program that demonstrates the applicant’s purchased renewable energy fully covers the annual need of the thermal energy system. If the applicant fails to provide annual certification for any thermal energy system capable of also using fossil fuels, that thermal

energy system shall be considered a fossil fuel thermal energy system that may only be utilized pursuant to subsection (d) of this section, subject to the carbon pollution impact fee established in Section 8-79 prorated to the remaining lifetime of the fossil fuel thermal energy system.

(d) *Utilization of fossil fuel thermal energy systems.* An applicant covered by this section may alternatively utilize a fossil fuel thermal energy system and the applicant's building shall be subject to the carbon pollution impact fee established in Section 8-79, but no permit shall be issued to an applicant utilizing a fossil fuel thermal energy system unless the applicant establishes that the cost of a renewable energy thermal energy system is unduly burdensome. To establish that the cost of a renewable energy thermal energy system is unduly burdensome, the applicant must demonstrate to the satisfaction of the department of permitting and inspections that the twenty-five (25) year capital and operational cost of the least expensive renewable energy thermal energy system, including any available incentives, rebates, or tax credits, is more than the twenty-five (25) year capital and operational costs of the applicant's fossil fuel thermal energy system and the carbon pollution impact fee that will be assessed on the applicant's building.

(e) *Supporting incentives, rebates, or tax credits.* Nothing in this article prevents or prohibits applicants from utilizing any and all available local, State, or federal incentives, rebates, or tax credits that support implementation of renewable energy for their buildings, and applicants are encouraged to access available incentives, rebates, or tax credits."

D. Carbon Pollution Impact Fee

8-79: "(a) *Assessment of fee.* Applicants utilizing a fossil fuel thermal energy system pursuant to Section 8-78(c) shall be assessed a carbon pollution impact fee on the greenhouse gas emissions from the applicant's building or buildings that are attributable to the applied-for fossil fuel thermal energy systems. In no event should an applicant pay a carbon pollution impact fee twice for the same ton of carbon, and the department of permitting and inspections should ensure in application of the fee that it is not duplicative for applicants with multiple buildings or campuses.

(b) *Amount of fee.* Effective January 1, 2024, the carbon pollution impact fee shall be equal to one hundred fifty dollars (\$150.00) per ton of greenhouse gas emissions attributable to a building's fossil fuel thermal energy systems over their lifetime, based on a net present value calculation (using a discount rate that is the lower of the rate used by either the environmental protection agency or the State of Vermont in calculating the social cost of carbon) at the time the permit application is submitted. The emissions attributable to a building's fossil fuel thermal energy systems will be based on the expected lifetime of the system and its expected annual emissions. Applicants shall be required to submit this information during the permit process, and the department of permitting and inspections may work with Burlington electric department energy services staff to assess and verify applicant information for expected lifetime and emissions of a system in a building. On each subsequent January 1, the carbon pollution impact fee shall be increased by any percentage increase of the Consumer Price Index, CPI-U, U.S. city average, not seasonally adjusted, or successor index, as calculated by the U.S. Department of Labor or successor agency for the twelve (12) months preceding the previous September 1, but in no event shall the increase be greater than five (5) percent. The carbon pollution impact fee shall be rounded off to the nearest dollar.

(c) *Exceptions.*

(1) For large existing building applicants, the carbon pollution impact fee shall be capped at no more than seventy-five (75) percent of the installed cost of the proposed space conditioning or domestic water heating system.

(2) An applicant building a new, residential multi-unit dwelling with four (4) or more units shall not be subject to the alternative compliance carbon pollution impact fee as it applies to domestic water heating systems until January 1, 2026.

(3) If an applicant with one (1) or more buildings is seeking a permit pursuant to this chapter, and is already using one (1) or more thermal energy systems that rely on renewable energy, the applicant may apply for a credit toward any carbon pollution impact fee equal to the carbon value of the renewable energy used for any thermal energy system permitted by the City of Burlington since January 1, 2024, and not regulated under this article.

(d) *Renewable energy fund.* All carbon pollution impact fee proceeds, except those funds needed to administer this article, shall be placed in a renewable energy fund established and managed by the department of permitting and inspections with technical support from the Burlington electric department. Renewable energy fund proceeds shall be made available as follows:

(1) Half of the proceeds paid into the renewable energy fund by a large existing building applicant shall be available to the payor for projects to reduce greenhouse gas emissions at any site owned by the payor in the City of Burlington. The large existing building applicant must request these proceeds within one (1) year following payment of their carbon pollution impact fee; the applicant shall demonstrate to the satisfaction of the department of permitting and inspections that the proceeds will be used to meaningfully reduce greenhouse gas emissions; the proceeds may not be used to subsidize the cost of thermal energy systems regulated by this article, and any proceeds not requested within that year shall be made available under subsection (d)(2) of this section.

(2) Any remaining proceeds collected from large existing building applicants and all proceeds paid into the renewable energy fund by new construction applicants shall be available to provide financial assistance to help low-income Burlington residents with funding initiatives that reduce greenhouse gas emissions, including, but not limited to, the installation of renewable energy thermal energy systems, weatherization projects, or subsidizing utility costs associated with purchasing renewable energy rather than fossil fuel. This funding may be delivered either through direct payments to homeowners and renters who are income-qualified per the most recent income-qualification levels published by the community and economic development office ("CEDO"), or through payments to property owners of multifamily buildings where at least twenty-five (25) percent of the tenants in the building are income-qualified; provided, that the property owner must commit to not raising the rent of income-qualified tenants as a result of costs associated with the funded initiatives to reduce greenhouse gas emissions."

E. Effective Date and Reporting Requirement

8-80: "(a) The provisions of this article shall take effect on January 1, 2024.

(b) The department of permitting and inspections shall maintain records on applications submitted pursuant to this article, including, but not limited to, information on applicant type, the size of an applicant's building(s), the thermal energy system(s) applied for,

whether the thermal energy system(s) utilize fossil fuel or renewable energy, and information submitted in support of an applicant utilizing fossil fuel or renewable energy. The department of permitting and inspections shall also maintain records on any carbon pollution impact fee proceeds paid into the renewable energy fund and how these proceeds have been distributed. The records required under this section shall be reported to the city council no later than January 1, 2026, and biannually thereafter, or otherwise upon request."

Topic Title: Distributed Energy

Resource Title: Net Metering and Interconnection

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Fort Collins

State: Colorado

Date of adoption: 2012

Abstract: Net Metering and Interconnection

Fort Collins, Colorado, is making strides in the distributed energy field. In 2012, the city adopted the Interconnection and Net Metering Participation Agreement. The agreement provides net metering for residents and businesses who connect to the energy grid with renewable sources, such as solar. Listed distributed energy sources include solar, geothermal, and wind. Net metering allows individuals to receive credits for unused energy, which is produced from renewable technology installed and connected to a grid system. The net metering agreement also provides a time-of-day provision allowing individuals to pay for energy and receive more credits based on peak and off-peak hours.

The Fort Collins microgrid is a part of a larger grid that connects other city areas. FortZED (Zero Energy District), established in 2012, is a partnership led by Fort Collins, Colorado State University, and Colorado Clean Energy Cluster businesses. This partnership creates an open forum for collaboration to advance the renewable energy sector, focusing on connecting local resources to the private sector. One initiative under FortZED is the Renewable and Distributed Systems Integration (RDSI). RDSI focuses on testing technologies that can reduce energy usage during peak hours. The tested technologies are renewable sources, such as solar panels, which are integrated into the city's electrical energy system.

Overall, Fort Collins is meeting multiple components of the CRD framework through net billing and the FortZED program. Net billing incentivizes the private sector to install and integrate renewable energy by providing credits for individuals producing unused excess energy. The city is mitigating damages and displaying resiliency by implementing technologies that handle overcapacity when the grid is overloaded, looking to decrease peak loads by 20-30% to improve the efficiency and reliability of the grid. The net metering and initiatives under FortZED showcase a prime example of how local governments can integrate distributed energy systems that provide incentives for the private sector and enhance resiliency for the city.

Code Provisions:

GS 750 Net Metering Rates

Consumption of energy for net metering customers will be measured on a monthly basis and billed at the applicable seasonal rate. Excess energy produced and delivered to the utility will be credited based on the Net Metering Credits table at the bottom of the page.

E-400* (GS-750) Monthly Electric Rates
includes PILOT - payment in lieu of taxes

Electric Energy

Fixed Charge, per account	\$35.05
Additional charge for metering each additional metering point	\$21.38
Energy Charge	
Summer (Jun-Sept)	4.37¢ per kWh
Non-Summer (Oct-May)	4.37¢ per kWh
Facility Demand Charge	
First 750 kW of Facility Demand, per kW	\$11.75 per kW
All additional kW of Facility Demand, per kW	\$6.94 per kW
Coincident Peak Demand Charge	
Summer (Jun-Sept)	\$14.73 per kW
Non-Summer (Oct-May)	\$11.55 per kW
Actual rates charged may vary slightly due to rounding.	

E400-E420+ are the rate codes printed on the monthly bill. Rate codes may also begin with the letter A or B for service in annexed areas where additional Rural Electric Association (REA) service rights fees apply. Fees equal to 5% are added to A rates and 25% service rights fees are added to B rates.

Prices effective January 2022.

Check out our [printable rates sheet](#) for more information.

Net Metering Credits	
Energy credit	4.13¢

Fort Collins Municipal Code Sec. 26-469

Fort Collins, CO
Article VI – Electric

<i>Description</i>	<i>Unit</i>	<i>Component Credit</i>	<i>Bill Credit</i>
1. Distribution facilities credit (applied to credits in 2. and 3. below)	Per kWh	\$0.0217	
2. Energy and demand credit - For billings based on generation during the months of May, June, July, August and September			
a) On-Peak (Mon-Fri, 2 pm to 7 pm, excluding holidays)	Per kWh	\$0.2293	\$0.2510
b) Off-Peak	Per kWh	\$0.0419	\$0.0636
3. Energy and demand credit - For billings based on generation during the months of January through April and October through December			

<i>Description</i>	<i>Unit</i>	<i>Component Credit</i>	<i>Bill Credit</i>
a) On-Peak (Mon-Fri, 5 pm to 9 pm, excluding holidays)	Per kWh	\$0.1962	\$0.2179
b) Off-Peak	Per kWh	\$0.0419	\$0.0636

Community-based project shall mean a net metering service installation that meets all of the following criteria:

- i. is comprised of one or more qualifying facilities with a generating capacity of less than one mega-watt;
- ii. uses a qualifying renewable technology;
- iii. is operated for the benefit of individual electricity customers of a defined development community; and
- iv. the operating community organization or cooperative has formally dedicated beneficial use of the aggregated energy generated by the qualifying facility to individual electric customers in the defined community.

Community solar project shall mean a photovoltaic electric generating installation that meets all of the following criteria:

- i. is a qualifying facility;
- ii. uses a qualifying renewable technology;
- iii. is operated by Fort Collins Utilities or Platte River Power Authority directly or by any party pursuant to an "Interconnection Agreement" and/or "Power Purchase Agreement" with Fort Collins Utilities;
- iv. is located within the Platte River Power Authority electric service territory; and
- v. all electric power it produces is consumed within such territory.

Component energy charge/credit shall mean the base rate for energy consumption or net-metered generation, which is combined with the PILOT and distribution facilities charge (where indicated) for the "billed charge" or "bill credit" reflected on a customer's utility bill.

Customer-generator shall mean an electricity customer of the utility that generates electricity on the customer's side of the meter using a qualifying renewable technology or has beneficial use of such generation through a community-based project.

Topic Title: Distributed Energy

Resource Title: Greensburg Parallel Generation Interconnection

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Greensburg

State: Kansas

Date of adoption: 2014

Abstract: Greensburg Parallel Generation Interconnection

In the wake of a devastating tornado in 2007, Greensburg, Kansas, began to rebuild its community through a green community model. Greensburg worked with the U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL) to help rebuild the town with renewable energy solutions after the tornado destroyed the city's electrical distribution system. The outcome of the NREL report shows the importance of local nonprofit organizations advocating for energy efficiency in the community. The partnership between DOE/NREL is a stricter interpretation of the Greensburg code. Energy Design Guides described in this report include the same provisions as the municipal code but held a higher rate of achievement at 30%.

In 2007, an NREL member introduced community-scale wind systems to Greensburg, and it soon adopted the slogan "a wind-wind situation" due to the ironic use of wind power post-tornado. After considering other forms of renewable energy, the town found wind power was the best option based on its location. The code below outlines the provision for the parallel generation interconnection, which allows residential and commercial customers with renewable energy generation to connect to the wind power grid. The net billing provision of the code encourages the installation of distributed wind and solar energy because it allows the system owner to receive payment if their wind or solar electricity costs more than the grid operator's wholesale rate of electricity. The net billing tariff discourages entities from installing distributed energy systems large enough to compete with municipal utilities. Additionally, this municipal code integrates the CRD framework by mitigating further natural disasters through the implementation of a community grid that decreases energy consumption from one local grid source.

Code Provisions:

Greensburg, Kansas Municipal Code

Chapter XV Utilities

Article 3: electricity

15-302. Parallel generation interconnection.

15-302. Parallel generation interconnection.

(a) AVAILABILITY: Electric service is available under this tariff at points on the city's existing distribution facilities located within its franchise service area.

(b) APPLICABILITY: Applicable only to contracting residential and commercial/industrial customers with renewable energy generation as provided for by K.S.A. 66-1,184. Contracts for service shall be where part or all of the electrical requirements of the customer are provided by the customer on the premises by Renewable Energy Generator (REG), and where the customer's source of electricity is connected for parallel operation of the customer's system with the system of the city. In no event shall this schedule be applicable

to customers with REGs greater than 25 kilowatts for residential customers or 200 kilowatts for commercial/industrial customers or schools with a capacity of 1.5 megawatts or greater unless written consent is given by the city.

The city shall not be obligated to supply any electrical transformation and service facilities (except as modified under other terms and conditions with regard to metering equipment) in excess of those facilities required for an ordinary customer using annual kilowatt-hours in an amount equal to the annual kilowatt-hours supplied by the city to the customer. The customer's REG shall be appropriately sized for the customer's anticipated electric load.

The city reserves the right to limit the number and size of REGs to be connected to the city distribution system due to the capacity of the distribution line to which the REG would be connected and in no case shall the city be obligated to purchase an amount of electricity from REG's greater than 4% of the city's peak power requirements but the city may elect to do so.

(c) CHARACTER OF SERVICE: Alternating current, 60 cycles, at the voltage and phase of the city's established secondary distribution system immediately adjacent to the service location.

(d) BILLING AND PAYMENT: For electrical energy generated by REGs and delivered by the customer to the city, the city shall pay for energy received every 30 days according to the following subsections.

(e) NET BILLING: Electric customer's may install electric REGs, such as wind turbines and solar photovoltaic panels, and interconnect them to the city's electric system. This net billing procedure shall only apply to REGs that have been permitted and installed in accordance with the requirements of the city. If the REGs are connected on the customer's side of the city's electric meter, the city will install and provide, at no additional cost to the REG facility, a dual register meter capable of measuring kWh inflow (received by the REG facility) and kWh outflow (received by the city) and recording both quantities separately. The city will add \$1.00 (one dollar) to the monthly minimum service charge to help cover the extra cost of the dual meter and higher administrative billing costs.

Customer's using REGs shall select one of two billing procedure options.

OPTION 1: BUY AND SELL ARRANGEMENT

The first option is to utilize a buy and sell arrangement. Under a buy and sell arrangement, all kWh recorded by the inflow meter will be billed to the customer under the city's standard electric rates applicable for that customer class. For REGs with a nameplate size of 200 kW or smaller, all kWh recorded by the outflow meter will be sold monthly to the city at 150% of the city's monthly system average cost of energy per kWh. For REGs with a nameplate size larger than 200 kW, all kWh recorded by the outflow meter will be sold monthly to the city at 100% of the city's monthly system average cost of energy per kWh.

OPTION 2: NET BILLING ARRANGEMENT

The second option is to utilize a net billing arrangement. Under a net billing arrangement, the amount of kWh billed to the customer for the month will be the total energy inflow less the total energy outflow and will be based on the city's standard electric rates applicable to the customer class. Any outflow kWh balances shall be carried forward to the next billing month and be subtracted from the next month's inflow kWh readings. The energy outflows from one meter shall not cover inflows on another meter nor shall it be converted to cash. Any energy outflow balance after the customer terminates service shall become property of

the city. The customer's monthly bill shall include applicable monthly service charges and any excess facilities charges.

If a customer's REG has total nameplate generating capacity larger than 100kW, then the amount of kWh outflow that is subtracted from the kWh inflow for net billing purposes will be reduced proportionately and the balance sold monthly to the city at its avoided cost rate.

For example, if a customer has a 250 kW wind turbine which creates an outflow of 30,000 kWh for the month, then the amount of kWh outflow that is credited toward the customer's inflow for net billing purposes is 12,000 kWh for that month. $(100 \text{ kW cap} / \text{Actual Nameplate kW}) \times \text{Outflow}$, or $(100 / 250) \times 30,000 = 12,000 \text{ kWh}$. The remaining 18,000 kWh not credited for net billing purposes is sold back to the city that month at its monthly system average cost of energy per kWh.

(f) OTHER TERMS AND CONDITIONS:

(1) Inspection and Testing: Prior to parallel operation of the REG Facility, the city may inspect it for compliance with industry standards, the city's tariffs, and the Rules and Regulations of the Kansas Corporation Commission. The city's inspection may include a witness test and the city may schedule appropriate metering replacement, if necessary. If the witness test is not satisfactory in the sole judgment of the city, the city has the right to disconnect the facility. The REG customer shall no right to operate in parallel until a witness test has been performed, or previously waived in writing by the city. The city must complete the witness test within ten (10) business days of receipt of a "Certificate of Completion" by the REG.

(2) Suspension of Interconnection: It is intended that the interconnection should not compromise the city's protection or operational requirements. The operation of the REG by the customer and the quality of electric energy supplied by the REG shall meet the standards as specified by the city. If the operation of the REG or quality of electric energy supplied (in the case of power export) does not meet the standards as specified, then the city will notify the REG customer to take reasonable and expedient corrective action. The city shall have the right to disconnect the REG, until compliance is reasonably demonstrated. Notwithstanding, the city may in its sole discretion disconnect the REG from the city's distribution facility without notice if the operating of the REG imposes a threat, in the city's sole judgment, to life or property.

(3) Maintenance Outages: Maintenance outages will occasionally be required on the city's system. Compensation will not be made for unavailability of city's facilities due to outages.

(4) Access: The city shall have access to the disconnect switch and metering equipment of the REG customer's facility at all times. The city shall provide reasonable notice to the REG customer when possible prior to using its right of access.

(5) Limit on Distribution: The REG customer may not sell or distribute electricity generated by its REG system to any other person or entity.

(6) Liability and Indemnification: The REG customer shall assume all liability for and shall indemnify the city for any claims, damages, losses, costs, and

expenses of any kind or character including attorney's fees to the extent that they result from interconnection of the REG facility to the city's system.

(7) Termination: The interconnection may be terminated by the REG customer with thirty (30) days written notice to the city. In the event REG customer terminates this agreement, the city shall have a reasonable amount of time to remove the facilities it may have. This agreement may be terminated by the city for cause for nonperformance by the REG customer under the terms of this agreement, the city's tariff, or for violation of any commission rule. The REG customer shall have thirty (30) days from the date that the city sends written notice to the REG customer to remedy the item of non-performance. Upon expiration of the thirty (30) day remedy period and if the item of non-performance has not been corrected, the city may terminate this agreement. Unless terminated early by the REG customer or the city as described in this Article, this Agreement shall terminate when the REG is permanently removed from service or becomes inoperative for a period in excess of one year.

(8) Information Required: The customer must complete and furnish to the city REG facility information as required by the city electric department prior to interconnection.

(Ord. 949; Code 2014)

Topic Title: Distributed Energy

Resource Title: Real Property Tax Credits

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Harford County

State: Maryland

Date of Adoption: 2021

Abstract: Real Property Tax Credits

In 2023, the Maryland General Assembly passed legislation turning a solar pilot program into a permanent program, allowing solar panels on land statewide. Prior to this legislation, the Assembly capped energy production at 418 megawatts statewide. Harford is a large solar community, and the county will be generating 13 megawatts of community solar energy. The county is at the forefront of renewable energy in the state of Maryland and expanded its ordinance to provide tax credit for solar or geothermal systems utilized by commercial buildings. This allows Harford to incentivize its community to construct and use geothermal and solar energy systems attached to the infrastructure, and provide applicants with financial assistance in installing these types of systems.

The article passed provides definitions of both geothermal and solar energy devices. It further explains who is eligible to receive credits along with the timeframe to apply. This credit works to cover construction and installation costs for the system, and applicants can receive tax credit of up to \$2,500. However, the credit cannot exceed the applicant's total property tax bill for that year. If the tax credit is higher than the property tax bill, the applicant may carry forward the unused portion for up to two more years. The article also discusses the requirements for documentation in an application and clarifies there is a cap of total tax credit the county is permitted to administer. Therefore, applicants are awarded credits on a first come first served basis.

Code Provisions:

Harford County, Maryland

Article II. Real Property Tax Credits

123-44. [Credit for Qualifying Energy Conservation Devices](#)

A. Definitions

“Geothermal Energy Device: Shall mean an energy conserving device that uses energy derived from naturally occurring heat in the interior of the earth to heat or cool a structure, to provide hot water for use in the structure or to generate electricity to be used in the structure and meets national safety and performance standards set by a nationally recognized testing laboratory for that kind of device.

Solar Energy Device: Shall mean an energy conserving device, including collectors, panels, storage tanks and all other hardware that is necessary and used as a part of the operating mechanism, that uses energy derived from the sun's radiation that is converted into thermal or electric energy to heat or cool a structure, to provide hot water for use in the structure or to generate electricity to be used in

the structure and meets national safety and performance standards set by a nationally recognized testing laboratory for that kind of device.”

1. Credit authorized

“In accordance with the provisions of Section 9-203 of the Tax-Property Article of the Annotated Code of Maryland, there is hereby created a tax credit from County real property taxes levied on residential or nonresidential buildings or other structures that use solar energy devices or geothermal energy devices for heating and cooling buildings or structures or for supplying hot water for use within the buildings or other structures or generating electricity to be used in the structure. The tax credit shall be credit from the taxes levied on the buildings or other structures and not from the land.”

C. Timely filing of applications

“An application for a tax credit for using a solar energy device or geothermal energy device shall be filed on or before the first day of October immediately prior to the taxable year for which the tax credit is first sought. If the application is not so filed, it will be disallowed that year.”

D. Amount of credits.

1. “Per qualifying energy device. The total real property tax credit allowed under the provisions of this section shall be the lesser amount of up to a maximum of \$2,500 per qualifying conservation energy device for the cost of materials and installation or construction of either the solar energy device or geothermal energy device, to apply against 1 year of property taxes, or the total amount of the real property taxes levied against the buildings or structures that is to be paid by the taxpayer for 1 year following the approval of the application.
2. Tax credit limit per property. In any fiscal year, the total credits issued under this section shall not exceed \$5,000 per property.
3. Unused tax credit. The tax credit can be applied against, and cannot exceed, the amount of the County property tax on the property. The tax credit may be granted in the year in which the credit is applied for, or carried forward. Any unused credit amount can be carried forward for an additional 2 years. When a tax credit is carried over under this subsection, the full amount of the tax credit shall be deducted from the total annual limit set forth in Subsection E of this section in the year in which the application is granted.”

E. Submission of application

“All applications for tax credits under this section shall be submitted to the Director of Administration only on forms prepared by that office. An application

shall be filed one time only for the duration of the tax credit. Each application shall be made under oath or affirmation and shall contain a declaration preceding the signature of the applicant to the effect that it is made under the penalties of perjury as provided for by Section 9-203 of the Tax-Property Article of the Annotated Code of Maryland. Each application shall be accompanied by documented receipts of such purchase of materials or supplies and actual installation cost, if available; otherwise, the application shall be accompanied by a statement of the cost of the materials, supplies and installation cost, verified in the same manner as the application by a person competent to so certify.”

F. Annual limit on amount of credits granted

“The total tax credit allowed by Harford County for any 1 year may not exceed \$500,000. The granting of credits shall be on a first-come-first-served basis, and, when the limitation is reached, any subsequent applications will be carried over to the next succeeding year or years.”

Low Carbon Building

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Low Carbon Building

Narrative

Low carbon building refers to the development of communities with decreased fossil fuel emissions by encouraging action to minimize emissions for the lifecycle of a building. Focusing on embodied carbon, this topic considers extraction and transportation of materials along with building practices, ending with the deconstruction and disposal of materials. Low carbon buildings are crucial for addressing climate change as the building and construction sector is a major source of fossil fuel emissions. By using low carbon materials, utilizing existing green building certifications, and regulating deconstruction and material diversion, construction projects may drastically reduce their carbon footprint and mitigate further contributions to climate change.

Research for this topic was greatly advanced by the resources available from the Carbon Leadership Forum (CLF) on Embodied Carbon Policy. [CLF's Policy Toolkit](#) includes a Policy Tracking Map, where visitors can review a variety of embodied carbon actions at federal, state, and local levels. This resource also provides foundational information on embodied carbon and decarbonizing more broadly. Additional resources at the conclusion of the narrative aid interested actors in embarking on low-carbon building reform or in developing private, low carbon building.

Land use regulations are uniquely positioned to address progress on the low carbon building topic as municipal governments can regulate the establishment of private buildings in a community, as well as to promote low carbon building in infrastructure and public projects. Through land use controls, local governments may implement policies to minimize carbon contributions in the lifecycle of a building. Through zoning, permitting, and incentives, local governments hold the key to creating a wave of embodied carbon regulation. Individuals who are interested in developing these policies are encouraged to examine these materials and propose relevant changes to local leaders.

Low carbon building regulation of private action at the local level is still in its embryotic stages. As a result, action is concentrated primarily within the comprehensive planning and the special topic or area plans portions of the framework. Action in zoning use and dimensional requirements, as well as supplemental substantive zoning provisions, function as incentives as opposed to affirmative regulation. The early incentive and planning policies are functioning to collect additional information relevant to regulation as well as to begin motivating embodied carbon conscious practices within the building industry.

The incentive-based nature of most existing regulations means the private sector has not yet begun to experience much effect because of these policies. Affirmative action thus far has targeted public actors, but action will likely become more controlling in the future as it becomes increasingly regulatory. Action under low carbon building most prominently serves the mitigation aspect of CRD, limiting the production of carbon and thereby contributions to climate change.

Future action should capitalize on the momentum created by existing policies to alter practices and values within local building industries to promote practices that involve less carbon intense processes throughout the lifecycle of a building. Utilizing information gathered through pilot programs and incentive programs, local leaders can craft policies to assert increasing control over private development in order to transition towards requiring

reductions and conscious consumption of carbon emissions over the cradle to grave life of a structure.

The following resources serve this topic and are valuable to interested actors looking to get involved in low carbon building action:

- [Carbon Leadership Forum](#)
- [Carbon Cure](#)
- [Lower-Carbon Concrete Task Force](#)
- [ECOM – Embodied Carbon Estimator](#)
- [HomebuildersCAN, RMI](#)
- [Climate Positive Design](#)

Case Studies

Topic Title: Low Carbon Building

Resource Title: Albany, CA Climate Action Plan & Embodied Carbon

Resource Type: Special Topic or Area Plans

Municipality: Albany

State: California

Date of Adoption: 2019

Abstract: Albany, CA Climate Action Plan & Embodied Carbon

Albany, California's 2019 Climate Action Plan considers reductions in embodied carbon emissions through a variety of means, with the goal of carbon neutrality in the city by 2045. The plan to reach this goal includes three implementation activities, one of which is "[e]xpeditious shift to exclusively low-carbon buildings and transportation." One approach included under the "Facilitate a carbon-free economy" goal of the plan is to "[r]educe emissions embodied in goods and materials." Relevant actions under the approach include: partner with regional entities to encourage carbon-smart building materials, adopt voluntary green building tiers, promote and facilitate utilization of the sharing and repair/reuse economy through events and outreach, and partner with the Albany unified School District to implement low-carbon solutions. All actions under the embodied carbon reductions approach are considered near-term and are analyzed on the basis of the required investments and the associated benefits for each respective action.

Code Provisions:

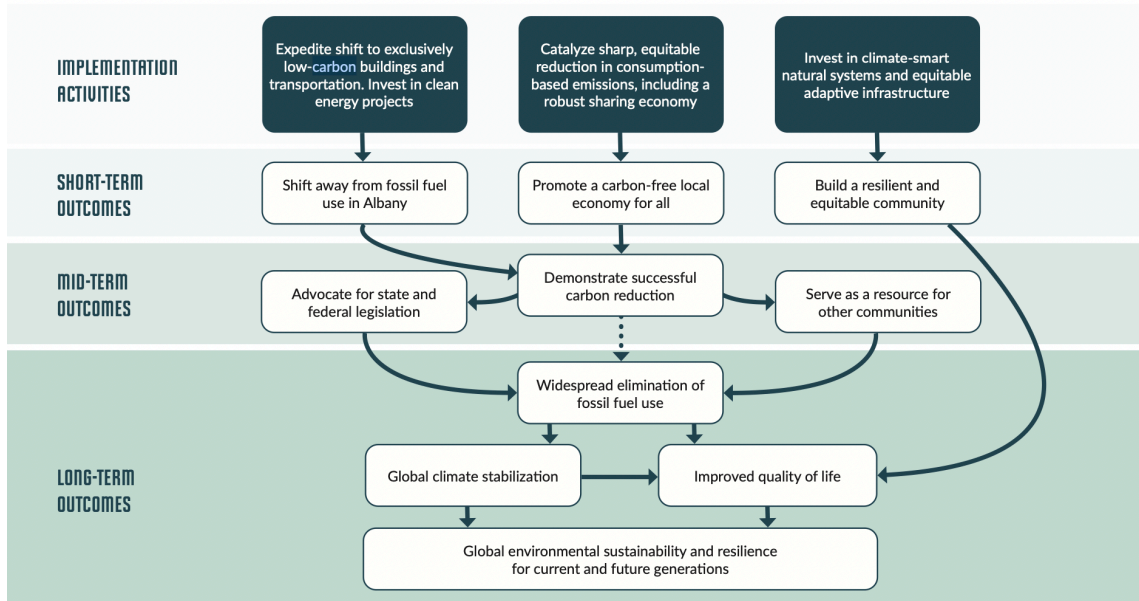
[City of Albany Climate Action and Adaption Plan](#)

Albany in 2045: How We'll Get There (p.7)

3. Facilitate a Carbon-Free Economy: Goal 2: Promote the development of a low-carbon economy (p.45–46)

ALBANY IN 2045: HOW WE'LL GET THERE

As we work toward our vision, we hope Albany's pioneering climate action will inspire others to act and have a ripple effect with global impact.



CITY OF ALBANY CLIMATE ACTION AND ADAPTATION PLAN | 7

Embodied emissions:

Approach: Reduce emissions embodied in goods and materials.			
3.2.5	Partner with regional entities to encourage carbon-smart building materials. This includes educating architects, designers, and contractors. This action would enable and promote carbon-sequestering building materials in new construction and renovations. Ultimately, this action could lead to requirements for the disclosure and/or limit the embodied carbon emissions of buildings through whole-building or material-specific policies.		Near-term
3.2.6	Adopt voluntary green building tiers. Adopting CALGreen voluntary tiers can promote efficient and sustainable development.		Near-term



CITY OF ALBANY CLIMATE ACTION AND ADAPTATION PLAN | 45

ACTION	INVESTMENTS	BENEFITS	TIMEFRAME
Approach: Reduce emissions embodied in goods and materials. (Continued)			
3.2.7	Establish a Farmers' Market. Local, seasonal produce and locally crafted goods avoid additional greenhouse gas emissions associated with packaging and transport. They also support local small businesses, keeping revenue in Albany.		Near-term
3.2.8	Promote and facilitate utilization of the sharing and repair/reuse economy through events and outreach. The City will expand current sharing economy programming such as fix-it clinics, swap events, the Albany Tool Pool, and "Shop Local" campaigns. Increased offerings and awareness of available options such as tool-lending libraries, carshare, swap events, and service websites support the growth of a local reuse economy and discourage consumption of high-carbon materials. It is important to ensure that the sharing economy is equitable and avoids exploitative business models.		Near-term
3.2.9	Partner with Albany Unified School District to implement low-carbon solutions. This may include working with the schools on energy efficiency and electrification, waste reduction and recycling, and sustainable purchasing.		Near-term

Topic Title: Low Carbon Building

Resource Title: Kirkland Zoning Code, High Performing Buildings

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Kirkland

State: Washington

Date of Adoption: 2022

Abstract: Kirkland Zoning Code, High Performing Buildings

Kirkland Washington's zoning code contains section 115.62, "High Performance Buildings," which integrates embodied carbon considerations and other performance standards to allow applicants to receive expedited review. Applicants may demonstrate certification for one of following programs: International Living Future Institute's (ILFI) Living Building Challenge™, Living Community Challenge™, Petal Recognition (energy, water and materials petals at a minimum), or Zero Energy™ (ZE) and Core programs; Built Green's 4-Star™ program; the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design™ (LEED) Platinum program. Demonstration of certification must be paired with adherence to the following seven performance standards at time of submitting development permit: 1) where maximum density is specified, must attain maximum density or exceed through bonuses; 2) provide an embodied carbon assessment of existing/proposed building and limits and reductions attainable; 3) provide a minimum 20% parking spaces for EVs, with 10% equipped for charging; 4) provide bicycle storage with outlets/charging; 5) provide deconstruction and material diversion plans; 6) demonstrate reductions in water use, between both construction and operation, at least 20% over code requirements; 7) demonstration that buildings are all electric (except gas commercial cooking appliances with guidelines). Per city of Kirkland, WA: "This performance standard stems from an aim to understand and begin to reduce a building's embodied carbon emissions. This standard does not prescribe any specific emissions reductions or material performance. The aim of this standard is to help instill a new practice in the building industry. The City will use the collected embodied carbon calculations and work with leaders in this industry in developing future policy and regulations."

Code Provisions:

115.62 High Performing Buildings:

1. Purpose and Intent – The purpose of this section is to establish high performing building standards (HPBS) for developments in residential, commercial and mixed use zones to further reducing energy use in buildings and move towards decarbonizing the built environment. The benefits to occupants of these buildings are healthy indoor air quality, lower energy and water bills, and in some cases where solar and water collection is utilized, no energy or water bills. The benefits the community can expect are a reduction in pollution generation and water consumption, which in turn can promote public health and reduce natural resource use.

2. Requirements

- a. To be considered a high performing building, a development shall be certified to meet the current versions of one or more of the following programs: International Living Future Institute's (ILFI) Living Building Challenge™, Living Community Challenge™, Petal Recognition (energy, water and materials petals at a minimum), or Zero Energy™ (ZE) and Core programs; Built Green's 4-Star™ program; the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design™ (LEED) Platinum program.
- b. An applicant may propose, and the Planning Official may approve, alternative certification(s) if the Planning Official determines that the alternative certification(s) is equal or superior to the programs listed above in terms of the resulting building performance.
- c. Proof of registration in one of the certification programs in subsection (2)(a) or (b) of this section must be provided prior to development permit submittal.
- d. Performance Standards – All projects shall adhere to the following performance standards and show compliance with them at the time of the development permit submittal:
 - 1) In zones where a maximum density is specified the development shall attain that maximum density, or exceed the maximum density through allowed bonuses;
 - 2) Provide an embodied carbon assessment of existing and proposed buildings and set embodied carbon limits and reductions;
 - 3) At least 20 percent of all required parking spaces shall be electric vehicle (EV) ready parking spaces. In addition, at least 10 percent of all required parking shall be EV ready parking spaces that are complete with a functioning electric vehicle charger;
 - 4) All bicycle storage areas shall include electrical outlets to charge electric bicycles and other micro-mobility modes;
 - 5) Provide a deconstruction and material diversion plan;
 - 6) Achieve a reduction in water use in buildings and development by at least 20 percent over Washington State code requirements;
 - 7) Demonstrate that buildings are all-electric. Excepted from this requirement are gas commercial cooking appliances; provided, that a corresponding and appropriately sized electrical outlet and all related infrastructure are installed for future replacement appliances.

The above requirements must be demonstrated in conjunction with the applicant's necessary permit/approval applications under [KMC Title 21, Buildings and Construction](#).

- KMC Title 21, Buildings and Construction outlines all necessary approvals and permits for projects, e.g. building code, plumbing code, property maintenance, etc.

The referenced density bonus is available through [112.25 Additional Affordable Housing incentives](#) therefore all projects must have attained maximum allowable density or have attained a density bonus for affordable housing, such that the "High Performing Buildings"

portion of the code may have a secondary incentive effect on encouraging density bonuses and affordable housing.

Topic Title: Low Carbon Building
Resource Title: Pittsburgh Performance Points
Resource Type: Zoning Use and Dimensional Requirements
Municipality: Pittsburgh
State: Pennsylvania
Date of Adoption: 2024

Abstract: Pittsburgh Performance Points

Pittsburgh's zoning code includes a section assigning performance points and associated incentives for different focus areas within a building. The Zero Energy or Zero Carbon Buildings section assigns points for achieving various International Energy Conservation Code green building standards. The building reuse section of Pittsburgh's Performance Points system awards bonus points for three criteria related to building reuse: 1) Exterior design elements are in harmony with nearby structures of similar age. 2) 75% or more of street-facing building facades from structures over 50 years old are restored and seamlessly integrated into the new development. 3) The existing building shell is restored and retained. Up to an additional 15 feet of development is awarded for each point.

Code Provision:

§ 915.07 [Performance Points System.](#)

A. Purpose. The City of Pittsburgh recognizes that communities that embrace innovation and livability while remaining affordable to all citizens will be more sustainable both in their demands on the environment and their ability to continue to grow and succeed over time. This set of incentives for development seeks to increase the provision of affordable housing, increase the number of green buildings constructed, and incent the retention of existing structures that represent the city's built heritage.

B. Applicability. The following incentives are available within designated zoning districts that include the following elements:

1. Provision enabling use of this bonus system;
2. Bonus Goals and Points section specifying the points awarded for each option; and
3. Bonus section specifying how points earned through the incentives can be used.

C. [Definitions.](#)

1. (Reserved)
2. **95TH PERCENTILE RAIN EVENT** shall mean the measured precipitation depth accumulated over a 24-hour period for the period of record that ranks in the 95th percentile rainfall depth based on the range of all daily event occurrences during this period.
3. **AFFORDABLE HOUSING** shall mean housing with a gross cost, including utilities, that does not exceed thirty (30) percent of the occupant's income.

4. **AREA MEDIAN INCOME (AMI)** shall mean the average medium income of the metropolitan area (MSA) or Non-Metropolitan areas (counties) as established annually by the U.S. Department of Housing and Urban Development (HUD).
5. **BUILDING ENERGY MODEL (BEM)** shall mean the use of a physics-based software simulation of building energy use. A BEM program takes as input a description of a building form and materials, the building's use and operation including schedules for occupancy, lighting, plug-loads, and thermostat settings, and combines these inputs with information about local weather and uses physics equations to calculate thermal loads, system response to those loads, and resulting energy use, along with related metrics like occupant comfort and energy costs.
6. **DISTRIBUTED ENERGY SYSTEMS** shall mean a range of smaller-scale technologies designed to provide electricity and thermal energy closer to consumers. These approaches include fossil and renewable energy technologies, micro-grids, on-site energy storage, and combined heat and power systems. Technologies could include: existing district energy facilities combined heat and power systems, microgrids, fuel cells, and batteries.
7. **FRESH FOOD MARKET** [...]
8. **GREEN INFRASTRUCTURE** shall mean systems and practices that use or mimic natural processes to infiltrate, evapotranspire, or reuse stormwater on the site where it is generated.
9. **ON-SITE RENEWABLE ENERGY** shall mean renewable sources, such as wind, solar, and co-generation, that are generated on the project site, thereby relieving reliance on the grid and providing alternative sources of electricity.
10. **NATIVE PLANTS** shall mean plants indigenous to Western Pennsylvania. This includes plants that have developed or occurred naturally, excluding invasive species.
11. **NETWORKED WALKSHED** shall mean the land area within a defined walking range, traversable on established streets or pathways.
12. **RAPID SERVICES** shall mean all modes of transit which use an exclusive right-of-way or have at least seventy-five (75) percent of route miles along a fixed guideway.
13. **PREFERRED STORMWATER MANAGEMENT TECHNOLOGIES** shall mean stormwater management practices that can provide additional co-benefits, increased reliability, or better performance than other technologies. Preferred Stormwater Management Technologies must be in accordance with the City of Pittsburgh Stormwater Design Manual.
14. **LOCAL WORKFORCE GROUP** shall mean an organization that provides publicly available workforce development services, career training services, entrepreneurial services, or business incubation and startup services or a local, non-franchise business owned and operated by City of Pittsburgh resident.
15. **UNDERREPRESENTED GROUPS** shall mean existing residents of the Pittsburgh Metropolitan Statistical Area with incomes at or below eighty (80) percent AMI; or lack a

four-year degree; or reside in a City of Pittsburgh neighborhood with an unemployment rate that is more than double the City of Pittsburgh average.

D. [Bonus Goals and Points.](#)

Goal		Points
1. Zero Energy or Zero Carbon Buildings		
1.a	Demonstrate compliance with International Energy Conservation Code Section C407 Total Building Performance criteria or ASHRAE Standard 90.1-2019 Appendix G Building Performance Rating Method.	1
1.b	Demonstrate compliance with International Energy Conservation Code Section C407 Total Building Performance criteria or ASHRAE Standard 90.1-2019 Appendix G Building Performance Rating Method and buildings shall be designed and constructed with no gas or fossil-fuel fired equipment as described in Zero Code 2.0.	2
1.c	Demonstrate compliance with International Energy Conservation Code Appendix CC: Zero Energy Commercial Building Provisions.	3
2. (Reserved)		
3. On-Site Energy Generation		
[means for achieving points through relevant actions]		
4. Affordable Housing		
[means for achieving points through relevant actions]		
5. Rainwater		
[means for achieving points through relevant actions]		
6. Building Reuse		
6.a	Exterior design of new development is compatible with nearby structures more than fifty (50) years old including the use of similar window and door sizes and materials, cladding materials, bays, cornices, and other primary structure elements.	1
6.b	At least 75% of street facing building facades from structures more than 50 years old are restored and integrated into new development.	2
6.c	Existing building shell is restored and retained.	3
7. Riverfront Public Access Easements, Trails and Amenities		
[means for achieving points through relevant actions]		

Goal	Points
8. Neighborhood Ecology	
[means for achieving points through relevant actions]	
9. Public Art	
10. Urban Fabric	
[means for achieving points through relevant actions]	
11. Transit-Oriented Development	
[means for achieving points through relevant actions]	
12. Equitable Development	
[means for achieving points through relevant actions]	
13. Fresh Food Access	
[means for achieving points through relevant actions]	

E. [Compliance and Enforcement.](#)

1. If a project is awarded a height or riparian buffer bonus pursuant to this subsection, the Developer shall provide the Department of City Planning with satisfactory evidence of having completed the procedures as developed by the Department of City Planning and the following steps in the process toward achieving the requirements of the bonus:

a. Zero Energy or Zero Carbon Buildings:

(1) Application and predesign phase: Submission of intent to comply with International Energy Conservation Code Section C407 Total Building Performance criteria or ASHRAE Standard 90.1-2019 Appendix G Building Performance Rating Method and how the project intends to meet this requirement.

(2) Design completion and prior to construction: Provide design narrative and construction documents. A BEM will be required showing that the building is designed to comply with International Energy Conservation Code Section C407 Total Building Performance criteria or ASHRAE Standard 90.1-2019 Appendix G Building Performance Rating Method.

(3) Construction completion and building occupancy: Provide final performance-based commissioning report and/or a building energy model reflecting the as-built condition showing International Energy Conservation Code Section C407 Total Building Performance criteria or ASHRAE Standard 90.1-2019 Appendix G Building Performance Rating Method.

(4) Following first-year operations completion: Provide proof of whole building energy consumption, verified with utility invoices or digital meter data for energy consumed and produced or third party verified by Professional Engineer or equivalent.

b. Affordable Housing:

- (1) All projects shall comply with On-Site Inclusionary Standards 907.04.A.6 (e) through (j).
- (2) Application and predesign phase: Provide a matrix that documents the unit count and includes AMI of occupants. Identify in writing all subsidies and/or financing programs the project will utilize in the provision of affordable housing. Provide letters of commitment for any subsidies and/or financing secured.
- (3) Design completion and prior to construction: Provide floor plans that identify housing unit types and location of amenities, entrances, lobbies with American Disabilities Act (ADA) accessibility, and documenting compliance with On-Site Inclusionary Standards 907.04.A.6 (e) through (j). Provide letters of commitment for any subsidies and/or financing secured. Where letters of commitment are forthcoming, this requirement can be met by submitting the project for review by the Housing Department of the Urban Redevelopment Authority which will provide a memo to the Department of City Planning.

c. Rainwater:

- (1) Application and predesign phase: Provide a conceptual stormwater management plan in accordance with Title 13: Stormwater Management and clearly identifying how the project will satisfy the bonus.
- (2) Design completion and prior to construction: Provide a Stormwater Management Site Plan in accordance with Title 13: Stormwater Management and clearly identifying how the project will satisfy the bonus.
- (3) Construction completion and building occupancy: Provide documentation of completion of all Record Drawings, Completion Certificate, and Final Inspection requirements in accordance with Title 13: Stormwater Management.
- (4) Following first-year operations completion: Provide a performance-based report following one (1) year of operation that shows stormwater management installations are performing as specified in the project's Stormwater Management Site Plan and in accordance with Title 13: Stormwater Management requirements.

d. On-Site Public Art: [...]

e. Equitable Development:

- (1) For projects providing the percentage employment from Underrepresented Groups, initial compliance report shall be submitted to the Department of City Planning no later than three (3) years following issuance of the Certificate of Occupancy and shall meet standards set by the Department of City Planning at the time of reporting. After that time, compliance reports must be submitted every two (2) years through the first ten (10) years the building is operational.
- (2) For projects contributing to the City's Equitable Development Trust Fund per rentable commercial square foot (RCSF), seventy-five (75) percent of the structure's Gross Floor Area must contain commercial, non-residential uses. For purposes of this calculation, shared spaces shall be excluded from Gross Floor Area.

Topic Title: Low Carbon Building

Resource Title: City of Seattle Green Building Incentive Programs

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Seattle

State: Washington

Date of Adoption: 2016

Abstract: City of Seattle Green Building Incentive Programs

The City of Seattle has several green building permit incentives that center around clean electric energy, water, and resource conservation with a focus on human health. Projects can gain additional height, floor area, or a faster building permit in exchange for meeting specific green building goals and certifications. The Expedited Permitting program includes an embodied carbon related requirement to provide Environmental Product Declarations (“EPDs”) for structural concrete and primary structural frame for steel.

Code Provisions:

Chapter 23.58D - [GREEN BUILDING STANDARD](#)

(Gives additional development capacity in specific zones in exchange for meeting green building requirements.)

23.58D.002 - [Green building standard](#)

A. When a commitment to meet the green building standard is required in the applicable zone, the owner shall make a commitment that the proposed development will meet the green building standard, or a substantially equivalent or superior standard, and shall demonstrate compliance with that commitment in accordance with the provisions of Section 23.58D.004 – [Demonstration of compliance](#).

B. If a site contains existing structures developed according to a version of the Land Use Code in effect before April 19, 2011, the existing structures and any additions to those structures are not required to be upgraded to the current green building standard. Any entirely new structure proposed to be built on the lot shall meet the current green building standard. If a site contains existing structures developed according to a version of the Land Use Code in effect on or after April 19, 2011, the existing structures and any additions to those structures shall be updated to the current green building standard.

C. The Director shall adopt and amend rules establishing the green building standard and enabling an owner to demonstrate compliance with a commitment to meet the standard using a substantially equivalent or superior standard.

(Ordinance No. 125791, § 98, 2019; Ordinance No. 125163, § 16, 2016)

23.58D.004 - [Demonstration of compliance](#)

A. The Director may adopt and amend rules establishing procedures for documenting an owner's commitment that a proposed development will meet the green building standard and determining whether the development complies with that commitment. No rule may assign authority for making a final determination to any person other than an officer of the Department or another City agency with regulatory authority and expertise in green building practices.

B. No later than 180 days after issuance of a final Certificate of Occupancy for a development (or after the final inspection if a Certificate of Occupancy is not required), or by such later date as may be allowed by the Director for good cause, the owner shall demonstrate to the Director the extent to which the development complies with the commitment to meet the green building standard. Compliance shall be demonstrated through a report from an independent third party.

C. If the Director determines that the report provides satisfactory evidence that the development complies with the owner's commitment, the Director shall send the owner a written statement that the development complies with the commitment. If the Director determines that the report does not provide satisfactory evidence that the development complies with the owner's commitment, the Director shall send the owner a written statement that the development does not comply with the commitment.

D. No later than 180 days after the Director sends notice that the report does not provide satisfactory evidence that the development complies with the owner's commitment, or by such later date as may be allowed by the Director for good cause, the owner shall demonstrate, through a supplemental report from an independent third party, that the development complies with the owner's commitment. If the Director determines that the supplemental report demonstrates compliance, the Director shall send the owner a written statement that the development complies with the owner's commitment. If the owner does not timely submit a supplemental report, or if the Director determines that the supplemental report does not demonstrate compliance, the Director shall send the owner a written statement that the development does not comply with the owner's commitment.

(Ordinance No. 125163, § 16, 2016)

23.58D.006 - Penalties

A. Failure to timely submit the report required by subsection 23.58D.004.B is a violation of the Land Use Code. The penalty for such violation shall be \$500 per day from the date when the report was due to the date it is submitted. The penalty shall accrue even if the owner is not notified of the violation.

B. Failure to demonstrate compliance with the owner's commitment to meet the green building standard is a violation of the Land Use Code. The penalty for each violation is subject to a maximum penalty of two percent of the construction value set forth in the building permit for the development based on the extent of noncompliance with the commitment.

C. Failure to comply with the owner's commitment that the development will meet the green building standard is a violation of the Land Use Code independent of the failure to

demonstrate compliance; however, failure to comply with the owner's commitment shall not affect the right to occupy any floor area, and if a penalty is paid in the amount determined under subsection 23.58D.006.B, no additional penalty shall be imposed for the failure to comply with the commitment.

D. Use of penalties. An account shall be established in the SDCI Construction and Inspections Fund to receive revenue from penalties under this Section 23.58D.006. Revenue from penalties under this Section 23.58D.006 shall be allocated to activities or incentives to encourage and promote the development of sustainable buildings. The Director shall recommend to the Mayor and City Council how these funds should be allocated.

(Ordinance No. 126685, § 48, 2022; Ordinance No. 126157, § 47, 2020; Ordinance No. 125791, § 99, 2019; Ordinance No. 125492, § 39, 2017; Ordinance No. 125163, § 16, 2016)

Topic Title: Low Carbon Building
Resource Title: City of Seattle Green Building Pilot Programs
Resource Type: Zoning Use and Dimensional Requirements
Municipality: Seattle
State: Washington
Date of Adoption: 2021

Abstract: City of Seattle Green Building Pilot Programs

The City of Seattle has several green building permit incentives that center around clean electric energy, water, and resource conservation with a focus on human health. Projects can gain additional height, floor area, or a faster building permit in exchange for meeting specific green building goals and certifications through relevant pilot programs. Seattle's code features a provision that allows departures from standards to effectuate the incentives and deviation from the otherwise required densities, floor areas, review times, etc. Pertinent pilot programs include: (1) [Living Building Pilot Program](#): offers additional height, floor area ratio (FAR), and Design Review departure requests for projects that meet aggressive energy and water requirements and Living Building Petal Certification; and (2) 2030 Challenge: offers additional height, FAR, and Design Review departure requests for projects that meet the 2030 Challenge. Departure from standards are permitted under 23.42.012D for both programs.

Code Provisions:

23.41.012 - [Development standard departures](#)

D. Departures for the Living Building and 2030 Challenge High Performance Existing Building Pilot Programs

1. Criteria for departures. Departures from Land Use Code requirements for projects qualifying for the Living Building and 2030 Challenge High Performance Existing Building Pilot Programs pursuant to Sections 23.40.060 and 23.40.070 may be allowed if an applicant demonstrates that the departure would result in a development that better meets the intent of adopted design guidelines or that the departure would result in a development that better meets the goals of the Living Building Pilot Program or the 2030 Challenge High Performance Existing Building Pilot Program and would not conflict with adopted design guidelines.

2. Scope of departures. In addition to the departures allowed under subsection 23.41.012.B, departures for projects qualifying for the Living Building and 2030 Challenge High Performance Existing Building Pilot Programs established under Sections 23.40.060 and 23.40.070 may also be granted for the following:

- a. Permitted, prohibited, or conditional use provisions, but only for accessory uses that would directly address the standards contained in subsection 23.40.060.B and subsection 23.40.070.B, including but not limited to uses that could re-use existing waste streams or reduce the transportation impacts of people or goods;
- b. Residential density limits;

- c. Maximum size of use;
- d. Quantity of parking required, minimum and maximum parking limits, and minimum and maximum number of drive-in lanes;
- e. Standards for storage of solid-waste containers;
- f. The quantity of open space required for major office projects in Downtown zones in subsection 23.49.016.B;
- g. Standards for the location of access to parking in Downtown zones; and
- h. Standards for structural building overhangs and minor architectural encroachments in Section 23.53.035.

Topic Title: Low Carbon Building
Resource Title: Denver Green Construction Code
Resource Type: Supplemental Substantive Zoning Provisions
Municipality: Denver
State: Colorado
Date of Adoption: 2022

Abstract: Denver Green Construction Code

This amendment to Denver’s Green Construction code requires projects to comply with material specific limitations for total global warming potential, considering both their concrete mixes and their structural steel. The code treats both concrete and steel individually and imposes a table to be referenced for each building material in order to determine the applicable limits, integrating considerations such as the compressive strength of concrete and the fabrication of steel. Concrete calculations impose CO2 limits for concrete used within a project. Steel calculations consider the milling and fabrication processes associated with structural steel, hollow steel section, steel plate, and concrete reinforcing steel bar products used in the building project. Disclosures on both concrete and steel considerations must be made publicly available, as well.

Code Provisions:

Denver Green Construction Code 2022

[901.3.2 Embodied CO2e](#)

[MR02: Embodied Carbon Dioxide: Concrete](#)

[901.3.2.1 Embodied CO2e of Concrete Materials](#)

Projects shall comply with either Section 901.3.2.1.1 or 901.3.2.1.2.

Exception: Projects using precast concrete and concrete masonry units are not required to comply with this section.

TABLE 901.3.2.1
CO2e LIMITS FOR CONCRETE

MINIMUM SPECIFIED COMPRESSIVE STRENGTH f'_c , psi	MAXIMUM kg/m (SI)	HIGH-EARLY STRENGTH MAXIMUM kg/m ³ (SI)	LIGHTWEIGHT CONCRETE MAXIMUM kg/m ³ (SI)
up to 2,499	222	305	578
2,500-3,499	336	439	578

3,500-4,499	376	490	626
4,500-5,499	409	533	675
5,500-6,499	433	566	N/A
6,500 and greater	485	631	N/A

Informative Note: Values in this table represent limits for concrete produced in the United States and are based on the 50th percentile of EPDs collected by Building Transparency as of April 2021. They may or may not pertain to concrete production in other countries, and therefore CO₂e, is always based on the unique availability in any location at any particular time of aggregate, cement, supplements, admixtures and other factors.

901.3.2.1.1 CO₂e Mixture Limit

The total CO₂e of the concrete mixes used in the project shall not exceed the value given in Table 901.3.2.1 based on the compressive strength of the product. CO₂e content shall be documented by a product specific Type III Environmental Product Declaration (EPD) for each product. Type III EPDs shall be certified as complying with the goal and scope for the cradle-to-gate requirements in accordance with ISO Standards 14025 and 21930 and be available in a publicly accessible database.

Exceptions:

1. Projects where no concrete suppliers with product-specific EPDs for concrete are located within 100 miles of the project site, shall use Type III industry-wide EPDs in accordance with [Section 901.4.1.4](#) for compliance with this section and provide an inventory of CO₂e values for all concrete mixes to the *Agency*.
2. Projects where the total use of new concrete is less than 50 cubic yards.

901.3.2.1.2 CO₂e Project Total Limit

Project Total CO₂e (CO₂e_{proj}) of all concrete placed at the building project shall not exceed the project limit (CO₂e_{allowed}) determined using Table 901.3.2.1 and Equation 901.3.2.2.

Equation 901.3.2.1.2:

$$CO_2e_{proj} < CO_2E_{allowed}$$

where

$$CO_2E_{proj} = \sum CO_2E_n \ v_n \text{ and } CO_2E_{allowed} = \sum CO_2E_{lim} \ v_n$$

and

n = the total number of concrete mixtures for the project

$CO2E_n$ = the global warming potential for mixture n per mixture EPD, kg/m³

$CO2E_{lim}$ = the global warming potential limit for mixture n per Table 901.3.2.1, kg/m³

v_n = the volume of mixture n concrete to be placed

MR03: Embodied Carbon Dioxide: Steel

901.3.2.2 Embodied CO2e for Steel Products

Structural steel, hollow steel section, steel plate, and concrete reinforcing steel bar products used in the building project shall comply with Sections [901.3.2.2.1](#) and [901.3.2.2.2](#).

TABLE 901.3.2.2
CO2e LIMIT PER STEEL PRODUCT

	STEEL PRODUCT	MILL kg CO2e/kg (a)	FABRICATION kg CO2e/kg (b)
Structural Steel	Structural Sections	1.49	1.83
	Hollow Structural Sections	2.57	2.99
	Plate	2.21	2.60
Concrete Reinforcing Steel Bars		0.89	1.01

- Use this column to determine compliance when an EPD declares mill-only material (cradle to mill gate).
- Use this column to determine compliance when an EPD declares mill material plus U.S. industry average fabrication impacts (cradle to fabricator gate).

901.3.2.2.1 EPD Disclosure

Product-specific Type III Environmental Product Declarations (EPDs) shall be submitted for a minimum of 75% of steel products, based on cost or weight. Type III EPDs used for compliance with this section shall be certified as complying with the goal and scope for the cradle-to-gate requirements in accordance with ISO Standards 14025 and 21930 and be available in a publicly accessible database.

901.3.2.2.2 Steel Performance

A minimum of 75% of steel products listed in this section, based on cost or weight, shall be produced in a facility or facilities that comply with one or more of the following:

1. A minimum of 80% of steel products listed in this section, based on cost, shall not exceed the total CO₂e values in [Table 901.3.2.2](#) based on product type.
2. On the date of procurement is independently, or as part of an aggregation of facilities, a Green Power Partner in the US EPA Green Power Partnership program, or an equivalent renewable power procurement registry for production outside of the United States.
3. Not less than 50% of the energy sourced for production at the facility is a renewable energy resource as documented from one or more of the following:
 - a. On-site renewable energy system
 - b. Off-site renewable energy system owned by the production facility owner
 - c. Community renewable energy facility Physical Renewable Energy PPA
 - d. Financial Renewable Energy PPA

Topic Title: Low Carbon Building
Resource Title: Portland Design Overlay Zone Amendment
Resource Type: Supplemental Substantive Zoning Provisions
Municipality: Portland
State: Oregon
Date of Adoption: 2022

Abstract: Portland Design Overlay Zone Amendment

The Design Overlay Zone Amendments (DOZA) project has updated the tools and processes for Portland’s design overlay and design review program, addressing the changes made within the Comprehensive Plan with a focus on areas of growth. It includes points for low-carbon concrete and for using wood products from sustainably managed forests. The Design overlay zone is applied to current and emerging urban locations, including centers and corridors, along with the areas outside of these centers and corridors that are considered to have distinct features with important development context, and to specific zones identified through the Comprehensive Plan. These areas are projected to hold 60% of Portland’s projected new housing units over the next 20 years, encouraging the city to prioritize this action to “ensure that new development meets the needs of current and future residents.”

Code Provisions:

33.420 Design Overlay Zone

33.420.010 Purpose

The Design overlay zone ensures that Portland is both a city designed for people and a city in harmony with nature. The Design overlay zone supports the city’s evolution within current and emerging centers of civic life. The overlay promotes design excellence in the built environment through the application of additional design standards and design guidelines that:

- Build on context by enhancing the distinctive physical, natural, historic and cultural qualities of the location while accommodating growth and change;
- Contribute to a public realm that encourages social interaction and fosters inclusivity in people’s daily experience; and
- Promotes quality and long-term resilience in the face of changing demographics, climate and economy.

33.420.020 Map Symbol [Design overlay zone shown on Zoning Maps with a letter "d" symbol]

33.420.021 Applying the Design overlay zone

The Design overlay zone is applied to current and emerging urban locations including centers and corridors. The Design overlay zone is also applied to areas outside of centers and corridors that have distinct features with important development context, and to specific zones identified through the Comprehensive Plan. Application of the Design overlay

zone must be accompanied by adoption of design guidelines, or by specifying which guidelines will be used.

Some areas of the Design overlay zone are referred to as design districts. A design district may be divided into subdistricts. Subdistricts are created when an area within a design district has unique characteristics that require special consideration and additional design guidelines. The location and name of each design district and subdistrict is shown on maps 420-1 through 420-4 at the end of this chapter.

33.420.025 Where These Regulations Apply

The regulations of this chapter apply to all design overlay zones. Meeting the regulations of this chapter may also be a requirement of a plan district, other overlay zone, or as a condition of approval of a quasi-judicial decision. This chapter does not apply to sites located within the boundary of a Historic Landmark, Conservation Landmark, Historic District, or Conservation District.

33.420.030 Neighborhood Contact

Neighborhood contact is a set of outreach steps that must be taken before certain developments can be submitted for approval. Neighborhood contact is required as follows:

- 1. When the proposed development will add at least 10,000 square feet of net building area to a site, the neighborhood contact step of 33.705.020.C., Neighborhood contact III, are required.**
- 2. If the proposed development has already met the neighborhood contact requirements as part of a land use review process, it is exempt from the neighborhood contact requirements.**

33.420.041 When Design Review or Meeting Design Standards is Required

Unless exempted by Section 33.420.045, Items Exempt From This Chapter, the following must meet the design standards or be approved through design review:

- A. New development;
- B. Exterior alterations to existing development;
- C. Nonstandard improvements in the public right-of-way such as street lights, street furniture, planters, public art, sidewalk and street paving materials, landscaping, and new bridges. Nonstandard improvements in the public right-of-way must receive approval from the City Engineer prior to applying for design review. Improvements that meet the City Engineer's standards are exempt from this chapter;
- D. Items identified in the Citywide Policy on Encroachments in the Public Right-of-Way or Title 17, Public Improvements, as requiring design review;
- E. Removal of trees 6 or more inches in diameter in the South Auditorium plan district;
- F. Where City Council requires design review of a proposal because it is considered to have major design significance to the City. In these instances, the City Council will provide design guidelines by which the proposal will be reviewed, and specify the review procedure; and
- G. Floating structures, except individual houseboats.

33.420.045 Items Exempt From This Chapter

The following items are exempt from the regulations of this chapter:

A. General exemptions:

[Development that does not require a permit; Development when: only use on the site will be Household Living; There will be no more than four dwelling units total on the site; All new buildings and additions to existing buildings on the site are no more than 35 feet in height; and The site is not zoned RX, EX, or CX; Houseboats in a houseboat moorage; Manufactured dwelling parks; Outdoor shelters; Development associated with a Rail Lines and Utility Corridor use; Development associated with a Parks and Open Areas use when the development does not require a conditional use review; Anemometers, and small wind energy turbines that do not extend into a view corridor designated in the Scenic Resources Protection Plan; and New bridges in the right-of-way, and alterations to existing bridges in the right-of-way. However, a new bridge in the right-of-way with a horizontal span more than 100 feet must complete a design advice request with the Design Commission as specified in 33.730.050.B.]

B. Exterior alterations

1. Repair, maintenance, and replacement with comparable materials;
2. Exterior alterations to a structure required to meet the Americans With Disabilities Act's requirements, or as specified in Section 1113 of the Oregon Structural Specialty Code;
3. Exterior work activities associated with an Agriculture use;
4. Detached accessory structures when the structure has a building coverage no more than 300 square feet in area and is located at least 20 feet from all street lot lines, or located within an existing vehicle area;
5. Exterior alterations for parking lot landscaping, short-term bicycle parking, and pedestrian circulation systems when all relevant development standards of this Title are met;
6. Electric vehicle chargers and equipment.
7. Except in the South Auditorium plan district, signs with a sign face area of 32 square feet or less;
8. The following alterations to the facade of a building:
 - a. Awnings as follows:
 - (1) If awnings were approved on the same facade through design review, then a new or replacement awning is exempt if it meets the previous design review conditions of approval; or
 - (2) If there are no previous conditions of approval for awnings on the same facade, then a new or replacement awning is exempt if the awning projects at least four feet from the wall, and the area of the awning does not exceed 200 square feet measured from the building elevation, except in the Central City, where it does not exceed 100 square feet measured from the building elevation;
 - b. Alterations to an existing ground floor storefront glazing and mullion system that uses the same materials and profile as the existing system without reducing the percentage of ground floor windows on the facade;
 - c. Louvers or vents for mechanical systems that meet the following:

- (1) The louver or vent opening affects 1 square foot or less of the facade and is the same color as the adjacent facade; or
 - (2) The louver or vent is placed within an existing window mullion, is the same color as the mullion, and is at least 8 feet above the adjacent grade;
- d. Radon systems on non-street facing facades;
- e. The removal of fire escapes;
- f. Seismic bracing, except on street-facing facades within the Central City plan district; or
- g. Any other alteration to a facade when the total area of the alteration is 200 square feet of the facade or less measured from the building elevation and the alteration meets one of the following. This exemption does not apply to signs or within the Central City plan district:
 - (1) On street-facing facades, the alteration is above the ceiling of the ground floor or is setback at least 20 feet from the street lot line; or
 - (2) The alteration is on a facade that does not face the street;
- 9. The following alterations to the roof of a building when the roof has a 1/12 pitch or less: [...]
 - d. Radio frequency transmission facilities [...]
- 10. The following alterations and additions to the roof of a building when the roof has a pitch that is greater than 1/12 [...]
- 11. Public Art as defined in Chapter 5.74, or a Permitted Original Art Mural as defined in Title 4.

C. Geographically specific:

- 1. In the South Auditorium plan district shown in Map 420-1, signs that meet the following:
 - a. Except within 50 feet of the Halprin Open Space Sequence historic district, signs with a sign face area of 32 square feet or less; and
 - b. Within 50 feet of the Halprin Open Space Sequence historic district, signs with a sign face area of 3 square feet or less;
- 2. In the Marquam Hill Design District shown on Map 420-3:
 - a. Additions of less than 25,000 square feet of floor area;
 - b. Exterior alterations that affect less than 50 percent of the area of the facade where the area affected is also less than 3,000 square feet;
 - c. Exterior improvements that are less than 5,000 square feet in total area, except for exterior improvements affecting areas counting towards the formal open area requirements of Section 33.555.260; and
 - d. Landscaping not associated with formal open areas required under 33.555.260.

33.420.050 Design Standards

The design standards provide an alternative process to design review for some proposals. Proposals that are eligible to use the design standards are stated in Subsection A. The standards for signs are stated in Title 32, Signs and related Regulations. Proposals that do not meet the design standards stated in Subsection C — or where the applicant prefers more flexibility — must go through the design review process.

A. Unless excluded by Subsection B, proposals that are within the maximum limits of Table 420-1 may use the design standards stated in Subsection C as an alternative to design review

Table 420-1	
Maximum Limits for Use of the design standards [1]	
Zones	Maximum Limit—New Floor Area
RM2, RM3, RM4, C, E, I, & CI Zones	40,000 sq. ft. of floor area
IR Zone	See institution's Impact Mitigation Plan or Conditional Use Master Plan.
Zones	Maximum Limit—Exterior Alterations
All except IR	• For street facing facades less than 3,000 square feet, alterations affecting less than 1,500 square feet of the facade. • For street facing facades 3,000 square feet and larger, alterations affecting less than 50% of the facade area.
IR Zone	See institution's Impact Mitigation Plan or Conditional Use Master Plan.

Notes:

[1] There are no maximum limits for proposals where any of the floor area is in residential use.

B. The design standards may not be used as an alternative to design review as follows:

1. In the Central City plan district. See Map 420-1;
2. In the Gateway plan district as follows. See Map 420-4;
 - a. New development and alterations to existing development when any portion of the new development or alteration exceeds 35 feet in height not counting additional height allowed through a base zone height standard exception; and
 - b. Development subject to the requirements of 33.526.240, Open Area;
3. New buildings or additions when any portion of the new building or addition exceeds 75 feet in height not counting additional height allowed through a base zone height standard exception;
4. For Institutional uses in residential zones, unless specifically allowed by the base zone, overlay zone, plan district, or an approved Impact Mitigation Plan or Conditional Use Master Plan;
5. Non-standard improvements in the right-of-way or other encroachments identified in City Titles as requiring design review;
6. In the CM3 zone within the St. Johns plan district, structures that exceed 45 feet in height;
7. For motor vehicle fuel sales in the 122nd Avenue subdistrict of the East Corridor plan district; and
8. In the North Interstate plan district proposals taking advantage of the additional height allowed by 33.561.210.B.2.

C. Design standards

1. New development.

- a. Required design standards. New development must meet all the design standards identified in Table 420-2 as required standards. Only the standards applicable to the development apply; and
- b. Optional design standards. New development must meet the optional design standards as follows. Unless otherwise stated, if a standard is required, no optional points are earned:

(1) Buildings up to 55 feet tall. New development with buildings that are 55 feet tall or less must meet enough of the standards identified in Table 420-2 as providing optional points to total 20 points, or one point for every 1,000 square feet of site area, whichever is less. For sites that are required to earn 20 points, at least one point must be earned in each of the context, public realm, and quality and resilience categories;

(2) Building more than 55 feet tall. New development with buildings that are more than 55 feet tall must meet enough of the standards identified in Table 420-2 as providing optional points to total 20 points, or two points for every 1,000 square feet of site area, whichever is less. For sites that are required to earn 20 points, at least one point must be earned in each of the context, public realm, and quality and resilience categories.

2. Alterations to existing development must meet all the design standards identified in Table 420-2 as required. Only the standards applicable to the alteration apply. In addition, major remodels must meet enough of the standards identified in Table 420-2 as optional to total 5 points, or one point for every 1,000 square feet of site area, whichever is less.

	QR18	Sustainable Wood		
	Building using wood products where allowed as an exterior material in Table 420-3	Provide at least one of the following Forest Stewardship Council (FSC) certified materials on at least 500 square feet of the exterior of a building: - Salvaged/reclaimed wood having "FSC Recycled" certification. - Wood from well-managed forests having a "FSC 100%" certification.	1	
Required (X)	APPLIES TO:		THE DESIGN STANDARD	
	QR19	Low Carbon Concrete		
	New building using concrete as allowed for an exterior material in Table 420-3	Use mixes that have a global warming potential (GWP) that is 15 percent lower than the GWP limits referenced in the City's Pre-Approved Concrete Mix Design List maintained by the Bureau of Environmental Services' materials testing lab.	1	

Topic Title: Low Carbon Building
Resource Title: San Diego Green Building Regulations
Resource Type: Supplemental Substantive Zoning Provisions
Municipality: San Diego
State: California
Date of Adoption: 2012

Abstract: San Diego Green Building Regulations

San Diego's Green Building Regulation Program covers the construction of all new buildings in San Diego, apart from public right-of-way and utilities. The Green Building Regulations specify different materials, methods of construction, and other requirements to be considered during construction. The provision adopts the 2022 California Green Building Standards Code, published by the California Building Standards Commission (BSC), as amended by the State Department of Housing and Community Development (HCD). The code is enforced by the Building Official and that official is empowered to enforce any amendments to California Green Building Standards Code as made by BSC and HCD. Regulations are not intended to prevent alternative design, material, etc. that achieves equivalent compliance. The 2022 California Green Building Standards Code or CALGreen code features regulations for “energy efficiency, water efficiency and conservation, material conservation and resource efficiency, environmental quality, and more. Mandatory provisions for commercial, residential, and public school buildings,” as well as other voluntary provisions are featured, as well.

Code Provisions:

[Article 10: Green Building Regulations](#)

(“Green Building Regulations” added 7-31-2012 by O-20187 N.S.)

Division 1: Adoption and Applicability of the Green Building Regulations

(“Adoption and Applicability of the Green Building Regulations” added 7-31-2012 by O-20187 N.S.)

Purpose and Scope of the Green Building Regulations

The purpose of the Green Building Regulations is to improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts that will reduce negative environmental impacts or create positive environmental impacts and encouraging sustainable construction practices in the following categories:

1. (a) Planning and design
2. (b) Energy efficiency
3. (c) Water efficiency and conservation;
4. (d) Material conservation and resource efficiency; and

5. (e) Environmental quality.

(“Purpose and Scope of the Green Building Regulations” added 7-31-2012 by O-20187 N.S.; effective 8-30-2012.)

§1410.0102

When the Green Building Regulations Apply

1. (a) This article shall be known as the Green Building Regulations of the City of San Diego and shall regulate the construction of new buildings within this jurisdiction, except work located primarily in a public right-of-way, public utility towers and poles, mechanical equipment not specifically regulated in the California Green Building Standards Code, and hydraulic flood control structures. The Green Building Regulations shall apply to City owned buildings.
2. (b) Where in any specific case different Sections of the Green Building Regulations specify different materials, methods of construction, or other requirements, the most restrictive Section shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall apply.
3. (c) Wherever in the Green Building Regulations reference is made to the Appendix, the provisions in the Appendix shall not apply unless specifically adopted pursuant to San Diego Municipal Code Section 1410.0107.
4. (d) The City of San Diego shall administer and enforce the Green Building Regulations of the City of San Diego in accordance with the applicable provisions of Chapters 11 and 12 of the San Diego Municipal Code.

(“When the Green Building Regulations Apply” added 7-31-2012 by O-20187 N.S.; effective 8-30-2012.)

Adoption of the California Green Building Standards Code

1. (a) The 2022 California Green Building Standards Code, published by the California Building Standards Commission (BSC), and as amended by the State Department of Housing and Community Development (HCD), is adopted by reference except as otherwise provided in this Article. A copy of the 2022 California Green Building Standards Code is on file in the office of the City Clerk as Document No. OO-21181-6.
2. (b) When reference is made to the California Green Building Standards Code, it shall be the 2022 California Green Building Standards Code, California Code of Regulations Title 24, Part 11, as published by the California Building Standards Commission.
3. (c) Each of the regulations, provisions, conditions, and terms of the 2022 California Green Building Standards Code is made a part of this Article as if fully set forth in this Article.

§1410.0103

Ch. Art. Div.

14 10 1 2

San Diego Municipal Code Chapter 14: General Regulations

(6-2023)

§1410.0104

4. (d) Numbering of Sections and Subsections in this Article is cross referenced to Sections in the 2022 California Green Building Standards Code.
5. (e) The adoption of the 2022 California Green Building Standards Code shall in no way limit, prohibit, impede, or prevent the City Council from adopting ordinances limiting or preventing the issuance of any type, number, or geographical distribution of permits for construction or demolition of any facility for which a permit is required.
6. (f) The Building Official is authorized to enforce only those amendments made by the following state agencies:

(1) California Building Standards Commission (BSC).

(2) The California Department of Housing and Community Development (HCD).

§1410.0108

Use of Alternate Materials, Design, or Construction Methods

1. (a) The provisions of the Green Building Regulations are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, method, design or method of construction not specifically prescribed by the California Green Building Standards Code, provided that any such alternative has been approved by the Building Official.
2. (b) An alternate material, design or construction method shall be approved on a case-by-case basis where the Building Official finds that the proposed alternate complies with the intent of the provisions of the California Green Building Standards Code and is at least the equivalent of standards prescribed in the Code for planning and design, energy, water, material conservation and resource efficiency, environmental air quality, performance, safety and the protection of life and health.
3. (c) When considering the use of alternate materials, design, or construction methods, the Building Official shall evaluate equivalency based on the compliance provisions of the California Green Building Standards Code for occupancies regulated by adopting state agencies as are found in the Sections listed below.
 1. (1) Section 1.2.2 in the California Building Code (CBC) for the California Building Standards Commission.
 2. (2) Section 1.8.7, Chapter 1, Administration, Division 1, of the California Building Code and Section 1.2.6, Chapter 1, Administration,

Division 1, of the California Residential Code for the Department of Housing
and Community Development.

[2022 California Green Building Standards Code, Title 24, Part 11 \(CAL Green\)](#)

Topic Title: Low Carbon Building

Resource Title: Boulder Sustainable Deconstruction

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Boulder

State: Colorado

Date of Adoption: 2020

Abstract: Boulder Sustainable Deconstruction

Boulder, Colorado's deconstruction ordinance requires that any building being torn down, regardless of age and whether it is commercial or residential, be deconstructed (versus demolished). The Boulder ordinance also includes a "mandatory minimum," setting a recyclable/reusable material diversion target such that 75% of a building's weight must be kept out of landfills, via reuse or recycling. The ordinance aims to reduce the downstream carbon footprint associated with a building, as well as provide future construction projects with the potential to minimize their lifecycle carbon footprints with recycled/reused materials. The method of manual deconstruction produces fewer emissions in the removal of the building at the end of its life cycle and provides greater opportunities for diversion and reuse of materials. The requirement for deconstruction encourages longer use of buildings and makes the option of reuse of a building more feasible where there is a deconstruction process associated with building removal.

Code Provisions:

[Ordinance 8366](#)

- See Ch. 36 "COMMERCIAL CONSTRUCTION WASTE RECYCLING" (p.17/53 of PDF) attached below

1 **CHAPTER 36. COMMERCIAL CONSTRUCTION WASTE RECYCLING.**

2 **3601.1 Commercial construction recycling requirement.**

3 An applicant for a building permit to construct a new building shall demonstrate all recyclable
4 wood, metal and cardboard materials were donated, reused or recycled.

5 **3601.1.1 Reporting.**

6 Within sixty days following the completion of the project and prior to final inspection, the
7 applicant shall submit documentation to the city manager which proves that all recyclable wood,
8 metal and cardboard was donated, reused, or recycled. The documentation shall consist of a final
9 completed waste diversion report in a form as prescribed by the city manager showing the
10 tonnage of materials salvaged for recycling and reuse, supported by original weight receipts or
11 other waste documentation that reasonably verifies that materials generated from the site have
12 been accepted for recycling, reuse, salvage or otherwise diverted. For construction debris for
13 which weighing is not practical due to size, lack of scales at the facility, or other considerations,
14 a volumetric measurement shall be used. For conversion of volumetric measurements to weight,
15 the applicant shall use the standardized conversion rates established by the city manager.

16 **3601.2 Commercial deconstruction waste recycling.**

17 An applicant for a full demolition shall adhere to the requirements of 3601.2.1 through 3601.2.5.

18 **3601.2.1 Diversion requirements.**

19 The applicant shall divert from landfills at least seventy-five percent of the waste tonnage of
20 demolition debris generated from the project by using recycling, reuse, and diversion programs.
21 The city manager may modify this requirement if the applicant demonstrates it is unfeasible as
set forth in section 3601.2.2. The materials diverted must also include at least three of the
material types set forth in the in the deconstruction plan form established by the city manager.

3601.2.2 Information required before issuance of demolition permit.

The applicant shall submit a properly completed deconstruction plan in a form as established by
the city manager. The applicant must propose to divert at least three of the material types
identified by the city manager in the deconstruction plan form. No building permit or demolition
permit shall be issued prior to the approval of the deconstruction plan by the city manager. In
estimating the volume or weight of materials identified in the deconstruction plan, the applicant
shall use the standardized conversion rates established by the city manager. The city manager
may modify the required diversion percentage if the applicant demonstrates in the deconstruction
plan that the percentage is not feasible because the maximum weight of materials that can be
reused or recycled is less than the required diversion rate, or due to the presence of materials that
are unable to be diverted due to special waste conditions such as environmental hazards.

Topic Title: Low Carbon Building

Resource Title: The Lake Oswego Demolition Tax

Resource Type: Other Municipal Code Chapters Regulating Land Use (Special Taxes Chapter)

Municipality: Lake Oswego

State: Oregon

Date of Adoption: 2022

Abstract: The Lake Oswego Demolition Tax

Lake Oswego, Oregon imposed a tax on all residential projects that involved the demolition of 50% or more of the total surface area of exterior walls or perimeter foundation. When a project is within the scope of the tax (involving demolition of 50% or more as described above), the developer must obtain a residential demolition permit, fulfill neighborhood noticing requirements, and pay the City's Demolition tax. Projects are exempted if they utilize manual deconstruction by a Certified Deconstruction Contractor. The method of manual deconstruction is *required* for demolition of any residential dwelling built in 1940 or before. The method of manual deconstruction both produces fewer emissions in the removal of the building at the end of its life cycle and also provides greater opportunities for the diversion and reuse of materials. The imposition of the tax for deconstruction or exemption for manual deconstruction also encourages longer use of buildings and makes the option of reuse of a building more feasible.

Code Provisions:

§ 24.06.010 Purpose.

[Ord. No. 2831, Added, 12-3-2019; Ord. No. 2916, Amended, 11-15-2022]

The demolition of residential structures in the City of Lake Oswego has contributed to the waste stream through disposal of building materials. Demolition has also reduced the diversity of housing stock and decreased the availability of affordable housing within the City. Subsequent redevelopment has contributed to increases in housing prices that make it more difficult to provide affordable housing. The permit fees relating to building demolitions cover the administrative costs of the regulatory program, but do not address other impacts of demolition of residential structures. The tax imposed under this article is not for the purpose of recovering administrative costs and is not regulatory in any manner. The tax is strictly for revenue purposes, to provide funding to maintain City park properties and facilities. The tax shall be in addition to any regulatory demolition permit fees established from time to time by the City Council and all other applicable regulatory fees and charges

§ 24.06.050 Tax Exemption for Deconstruction of Residential Structures.

[Ord. No. 2831, Added, 12-3-2019; Ord. No. 2916, Amended, 11-15-2022]

1. The demolition tax imposed in LOC § **24.06.030** shall be waived where the demolition permit is issued for removal of a residential structure through deconstruction by a certified deconstruction contractor.

2. To be eligible for the demolition tax exemption for reconstruction, a pre-deconstruction form, in a form approved by the City Manager, must be completed and submitted as part of the application for the demolition permit. The form must be completed by the certified deconstruction contractor assigned to the project. Information required on the form must include, but is not limited to:

- a.** Name of the certified deconstruction contractor;
- b.** Whether heavy machinery will be used on the deconstruction project (exclusive of foundation removal); and
- c.** List of materials that are intended to be salvaged for reuse;
- d.** List of materials that are not salvageable and the reason why the materials cannot be salvaged;
- e.** Expected dates for deconstruction activity.

3. A post-deconstruction form, in a form approved by the City Manager, must be completed by the certified deconstruction contractor assigned to the project and submitted to the City Manager no more than 30 days after completion of the deconstruction work. The City Manager must review and approve the post-deconstruction form before the demolition permit can be finalized. The form must include responses to all of the following in order to be considered complete:

- a.** Name of the certified deconstruction contractor.
- b.** List of materials salvaged for reuse.
- c.** List of materials not salvaged for reuse, as indicated on the pre-deconstruction form, and the reasons materials were not salvaged.
- d.** Copies of the following:
 - i.** Itemized receipt of materials and quantities donated to a nonprofit.
 - ii.** Itemized receipts for materials and quantities sold.
 - iii.** Photos of salvaged material that will be reused on site or at another site.
 - iv.** Transaction receipts of weight tickets for the disposal of hazardous material abated during the course of deconstruction.
 - v.** List and photos of materials given or sold to members of the public.

Proposed project must also comply with all demolition and related permit requirements, as contained within [Chapter 45, Building Code](#) which entails different requirements based on the structure sought to be demolished.

Infill Development & Adaptive Reuse

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Infill Development and Adaptive Reuse

Narrative

The human population continues to expand, creating a need for additional built structures such as housing or schools. These new buildings are often placed on fresh, undeveloped land known as green fields. Rather than expanding into green fields, municipalities can use their zoning authority to ‘build in place’ through infill development or adaptive reuse. Infill development involves constructing new buildings on vacant or underused parcels within already developed areas, while adaptive reuse focuses on repurposing existing buildings, such as warehouses, schools, or offices, for new uses like housing or retail. Both strategies reduce development pressure on natural land while making better use of existing infrastructure.

Repurposing existing structures reduces construction waste and minimizes the environmental impact of new developments. Adaptive reuse projects extend the operational lifespan of buildings by updating them to better address the needs of their communities. Rather than demolish and build an entirely new building, many adaptive reuse projects aim to recycle and reclaim as much of the original building as possible, both keeping these materials out of landfills and preventing the need to build new materials. Infill development can take development pressure off nearby green spaces because it encourages development, or redevelopment, on underused or vacant land in existing built areas. Infill development primarily occurs on brownfields and grey fields. Both practices also reduce greenhouse gas emissions by limiting sprawl, shortening vehicle commutes, and avoiding emissions tied to demolition and new material production. Both strategies have gained traction in recent decades as cities respond to the challenges of climate change, aging infrastructure, and the need for more efficient land use.

Municipalities are uniquely poised to address the needs of their communities while preserving green spaces and natural areas. These local governments are not developers but rather provide incentives and regulations for developers to accomplish their goals. This research analyzed the zoning codes, UDOs, overlay districts, and planning frameworks of twelve municipalities across the country to identify the tools they use to enable infill and adaptive reuse.

The twelve case studies in this report fall into four broad categories that illustrate the varied legal and planning strategies used to promote infill development and adaptive reuse. Some municipalities use overlay zones and special districts—such as Charlotte’s Residential Infill Overlay and San Antonio’s Infill Development Zone—to apply tailored regulations without overhauling the base code. Others rely on incentive-based tools and procedural flexibility, like South Bend’s pre-approved building plans and Chandler’s parking reductions, to encourage redevelopment by easing financial and administrative burdens. A third group integrates infill and adaptive reuse directly into unified development codes or form-based codes, such as in Sherwood and Buffalo, embedding climate and design priorities into core zoning frameworks. Finally, several jurisdictions combine historic preservation with adaptive reuse, using zoning flexibility and state or federal tax incentives to transform older buildings into modern housing and mixed-use projects, as seen in St. Louis, Barrington, and Baltimore. Together, these approaches reveal how land use law enables climate-resilient development (CRD) by adapting regulatory systems to promote density, reduce emissions, preserve neighborhood character, and support inclusive, sustainable growth.

Case Studies

Infill Development

Topic Title: Infill Development

Resource Title: Wholistic Approach to Blight in South Bend, Indiana

Resource Type: Zoning Use and Dimensional Requirements

Municipality: City of South Bend

State: Indiana

Date of Adoption: 2024

Abstract:

In 2013, Mayor Pete Buttigieg launched the “1,000 Houses in 1,000 days” initiative. This well-intentioned program focused on addressing blight, through the demolition and repairs of homes. Unfortunately, this initiative “relied on aggressive code enforcement that caused ‘poor people’ and ‘people of color’ to be displaced from homes when repairs couldn’t be made swiftly”. While not everyone agrees with this sentiment. The issue of what to do with these vacant lots remains.

Through public-private partnerships the city worked with nonprofits and community development corporations who led the construction on many of these parcels. One of the first steps South Bend took was to amend many of their zoning policies to allow for a broader range of housing typologies that naturally occurred in many of these neighborhoods. South bend shrank the minimum lot sizes, reduced front setbacks, and adjusted or eliminated parking requirements. Additionally, something the planning board did to address the permitting process was create a series of pre-approved housing plans developers can get for free. This addresses the cost of design, planning and permitting to speed up the process and reduce the cost of construction, which in turn leads to a more affordable property.

Code Provisions:

[South Bend, Indiana – Code of Ordinances](#)

[CHAPTER 2 - ADMINISTRATION](#)

[ARTICLE 5. - BOARDS AND COMMISSIONS](#)

[Sec. 2-57. - Redevelopment Authority.](#)

The South Bend Redevelopment Authority is hereby created, for the purposes and with all powers and duties now or hereafter granted to it by law, as a separated body corporate and politic and as an instrumentality of the City of South Bend to finance local public improvements for lease to the South Bend Redevelopment Commission.

[ARTICLE 6. - TAX ABATEMENT PROCEDURES](#)

Sec. 2-82.1. - Industrial development in Urban Enterprise Zone and Redevelopment Blighted Areas.

- a. Generally. The Council believes that the following general standards have a reasonable relationship to the development objectives for industrial development within the Urban Enterprise Zone and Redevelopment Blighted Areas, and would warrant tax abatement consideration as set forth herein.
- b. Base abatement general standards. Proposed Industrial developments which are to be located within the UEZ or RBA, may be considered for a base abatement consisting of three (3) years real property tax abatement.

Infill Pre Approved Building Types

1. The land is of such a character that it is in the community's best interest to encourage high-quality development through flexible development standards to further the goals and objectives of the City's Comprehensive Plan;
2. The land consists of unusually configured parcels that cannot be developed efficiently under the base district standards.

Topic Title: Infill Development

Resource Title: Chandler's Infill Program

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Chandler

State: Arizona

Date of Adoption: 2023

Abstract:

The City of Chandler's Planned Area Development zoning process, which has been in place since the 1980s, allows for density bonuses, mixed-use integration, increased height and other factors that can support housing developments. [Chandler's Infill Incentive Program](#), updated in November 2023, provides financial tools and flexibility for infill and redevelopment of underutilized retail and Class C office space to support housing and mixed-use projects for areas of the community north of the Loop 202 freeway. This new Chandler housing development will add to the 363 public housing rentals and 563 housing choice vouchers administered by the city's public housing authority. Nonprofit organizations offer another 102 affordable housing properties in Chandler. The Arizona Revised Statutes ("ARS") § 9-499.10 enables cities and towns to establish infill incentive districts and adopt an infill incentive plan to encourage redevelopment in the district. Further, State statutes require that each city identify, in its [General Plan](#), specific policies to promote infill development and locations where such development should be encouraged.

Within the city of Chandler's Strategic Framework, they emphasize the importance of infill and redevelopment, identifying it as a focus area for the city and calling for: (1) Targeted use of adaptive reuse, infill, mixed-use and redevelopment tools and plans supporting the vitality of commercial centers and neighborhoods. (2) A predictable development process based on exceptional customer service and finding creative ways to get to "yes." To implement these goals, Chandler's zoning ordinance provides flexible standards for infill development—such as reduced setbacks, shared parking, and density adjustments—that make projects like the 29-unit apartment development possible. The following code provisions show how these requirements are written into law.

Code Provisions:

35-1703. - [Intensity of land use.](#)

Densities and intensity permitted in the PAD zoning designation shall be determined by the quality of the PAD designation and shall be consistent with the Chandler General Plan.

In order to accommodate, encourage, or promote infill development or redevelopment on properties located within the infill incentive district, the Zoning Administrator may reduce front-yard building setbacks by up to twenty-five (25) feet for arterial streets and up to fifteen (15) feet for collector streets after having made a finding in writing that all of the following criteria have been met:

A. Such deviation, on balance, will result in a superior environmental and design quality through items such as but not limited to;

- i. Increased level of architectural quality
- ii. Greater material diversity
- iii. enhanced usable space and/or pedestrian connection
- iv. Activation of street frontage
- v. Higher level of landscape design
- vi. Creative design solutions for back-of-house functions
- i. Increased levels of architectural quality
- ii. Greater material diversity
- iii. Enhanced usable space and/or pedestrian connection
- B. The site is designed to ensure safe and adequate on-site traffic circulation;
- C. Sufficient parking is provided on-site;
- D. The development will enhance the quality of a neighborhood by developing a vacant lot, or redeveloping an existing dilapidated building or development;
- E. The development complies with required setbacks and landscape buffers from adjacent residential properties; and
- F. The reduced setback maintains the goals of providing landscaping along streets and street intersections as identified in section 35-1903.1.

35-1503. - Height and area regulations.

(1) Height regulations: No building shall exceed thirty (30) feet in height at a front building setback line, except a building may exceed such height provided that at no point it projects above a line sloping inward and upward at a forty-five-degree angle at the required height and setback line.

(2) Front yard: Buildings shall be set back at least fifty (50) feet from the right-of-way line along arterial streets and at least thirty (30) feet from the right-of-way line along all other streets. In the proximity of street intersections, see section 35-1902(4).

In order to accommodate, encourage, or promote infill development or redevelopment on properties located within the infill incentive district, the Zoning Administrator may reduce front-yard building setbacks by up to twenty-five (25) feet for arterial streets and up to fifteen (15) feet for collector streets after having made a finding in writing that all of the following criteria have been met:

- A. Such deviation, on balance, will result in a superior environmental and design quality through items such as but not limited to;
 - i. Increased levels of architectural quality
 - ii. Greater material diversity including generous amounts of glazing incorporated
 - iii. Higher level of landscape design
 - iv. Screening of rear yards and all dock doors
- B. The site is designed to ensure safe and adequate on-site traffic circulation;

- C. Sufficient parking is provided on-site;
- D. The development will enhance the quality of the area by developing a vacant lot, or redeveloping an existing industrial building or center;
- E. The development complies with required setbacks and landscape buffers from adjacent residential properties; and
- F. The reduced setback maintains the goals of providing landscaping along streets and street intersections as identified in section 35-1903.1.

35-1800. - Purpose.

The purpose of this article is to establish standards for off-street parking, loading and maneuvering spaces for the uses permitted in this Zoning Ordinance. The standards of this article are intended to:

- (3) Encourage higher densities, mixed-use developments, infill developments, and adaptive reuse of existing buildings in areas as set forth by the General Plan by allowing parking reductions for uses sharing parking and/or utilizing public parking facilities

35-1807. - Parking reductions.

(1) Purpose: The intent of the parking reduction provisions included in this section is to provide flexibility in responding to land uses with atypical parking needs and to encourage mixed use developments, infill development, redevelopment, and adaptive reuse of existing buildings by allowing parking reductions and more efficient use of parking.

(2) Shared Parking:

- (a) Applicability. Shared parking may be applied to mixed use developments or two (2) or more nonresidential uses in which the uses operate at different peak times from one another.

(b) Procedure.

- 1. A shared parking report shall be submitted that demonstrates compliance with criteria set forth in subsection (c), Approval Criteria, below.
- 2. Shared parking reports shall be reviewed by and are subject to approval of the Zoning Administrator.
- 3. The property owners involved in an approved shared parking request shall submit a written agreement approved by the Zoning Administrator requiring that the parking spaces be maintained as long as the uses requiring parking exist or unless the required parking is provided elsewhere in accordance with the provisions of this Article. Such written agreement shall be recorded by the property owners with the Maricopa County Recorder's Office and a copy filed in the City of Chandler's project review file prior to the issuance of a building permit or, for existing buildings, prior to the issuance of certificate of occupancy.
- 4. For mixed use developments, the owner or manager of the property approved for shared parking shall maintain an accurate up-to-date record of

the uses, both occupied and vacant, according to the type of use. The Zoning Administrator may require this record be provided when the owner applies for a new land use or development approval for the subject property.

(c) Approval Criteria. Shared parking approval shall be subject to compliance with the following criteria:

1. The Shared Parking Calculations Table set forth in subsection (d) of this section shall be used to calculate the required number of parking spaces for a particular mix of uses. The Zoning Administrator may require the applicant to submit sufficient data to demonstrate compliance with the general land use classifications and/or the time of use distribution indicated in the Shared Parking Calculations Table. If one (1) or more of the land uses proposing to utilize shared parking spaces do not conform to one (1) of the general land use classifications and/or the time of use distribution in the Shared Parking Calculations Table, the applicant shall submit sufficient data to indicate that there is not substantial conflict in the principal operating hours of the uses and that the various uses sharing parking have peak parking demands at different periods of the day or week. The Zoning Administrator may require said data to include information from a professional publication such as those published by the Institute of Transportation Engineers (ITE) or the Urban Land Institute (ULI), or by a professionally prepared parking study.
2. The combined shared parking requirement shall not exceed the available parking supply.
3. A parking plan graphically describing the location and size of all parking stalls, driveways, walkways, landscaped areas, building footprints, retention basins, lighting, and all other improvements shall be submitted for review and approval. Said parking plan shall demonstrate reasonable pedestrian access from off-site parking spaces to the uses being served.
4. Shared parking rights shall be protected through a written agreement as set forth in Section 35-1807.2(b)3.
5. Shared parking spaces shall be generally located within six hundred sixty (660) feet of the use, measured from the entrance of the use to the nearest parking space within the shared parking lot.

35-1902. - Site development plan design standards.

(2) Applicability:

(c) In order to accommodate, encourage, or promote infill development or redevelopment for properties located within the infill incentive district, the Zoning Administrator may depart from landscape setbacks prescribed herein after having made a finding in writing that such deviation, on balance, will result in environmental and design quality superior to that otherwise attainable without such deviation.

Topic Title: Infill Development

Resource Title: Mills Redevelopment Project

Resource Type: Supplemental Zoning Provision

Municipality: Philadelphia

State: Pennsylvania

Date of Adoption: 2023

Abstract:

Overland Property Group (OPG) is preserving a key piece of its hometown history as well as providing needed housing in downtown Salina, Kansas. OPG, with partner Flint Hills Holdings, has converted a historic warehouse that was the birthplace of Lee jeans into 53 apartments and its corporate headquarters on the ground floor. Of the 53 units, 38 are affordable for households earning 40%, 50%, and 60% of the area median income, while the remainder are market rate. While most of the original facade was preserved to maintain the historic value of the building, individual HVAC systems for each unit and common areas were installed as well as new mechanical, fire suppression, and electrical systems. The roof was replaced, and a new elevator was added to the building. The building also touts energy-efficient and water-saving measures, such as LED lighting and Energy Star appliances.

This development was primarily led by the private sector, and the municipality did not need to utilize as many incentives as other municipalities have. The \$10.8 million H.D. Lee Mercantile Lofts, which opened in September 2020, benefited from 9% low-income housing tax credits as well as state and federal historic tax credits. Financing partners included Kansas Housing, Red Stone Equity Partners, Bennington State Bank, and Commerce Bank. The redevelopment was made possible by Salina's zoning framework, which allows apartments above ground-floor commercial uses in the Central Business District while also protecting historic resources through its Heritage Conservation overlay. These code provisions demonstrate how zoning flexibility and historic preservation policies intersected to enable the Lee Mercantile Lofts project.

Code Provisions:

[Salina, Kansas – Code of Ordinance](#)

[Chapter 42 - ZONING REGULATIONS](#)

[ARTICLE VI. - DISTRICT REGULATIONS](#)

[DIVISION 14. - C-4 CENTRAL BUSINESS DISTRICT](#)

Sec. 42-302. - [Permitted uses.](#)

Permitted uses in the C-4 district are as follows:

(68)Residential dwellings, accessory to and located above or below the ground floor of another principal use;

ARTICLE IX. - HERITAGE CONSERVATION DISTRICT

DIVISION 1. - GENERALLY

Sec. 42-466. - Property owned by public agencies.

In the city many of the historically and architecturally significant buildings, sites, structures and objects are owned by government entities. The preservation of such buildings, sites, structures and objects is established as national policy in the National Historic Preservation Act of 1966, as amended. The Kansas Historic Preservation Act, as amended, declares that the historical, architectural, archeological and cultural heritage of Kansas is an important asset of the state and that its preservation and maintenance should be among the highest priorities of government. To accomplish the adopted policies of the federal and state governments and to accomplish the purposes of this chapter, the following regulations promote the preservation of publicly owned historically and architecturally significant buildings, sites, structures and objects:

1. For properties in the city, the city commission may authorize the submittal of an application to list a building, site, structure, object or district owned by a unit of government on the Kansas or the National Register of Historic Places. The authorization of the pertinent unit of government, if other than the city, should be obtained before submittal of such an application if required by applicable state or federal law and regulations.
2. To further the purposes of this chapter, the city may enter into agreements with other units of government. The city shall specifically seek to negotiate an agreement with the state historic preservation officer whereby the state delegates certain responsibilities to the city, including, but not limited to, the review of building and/or demolition permit applications. The commission may recommend, and the city commission shall authorize in behalf of the city, entering into such agreements. Such agreements may address:
 - a. Designation of landmarks and historic districts;
 - b. Administration or the use of preservation fund resources;
 - c. Improvements to landmarks or properties in historic districts, and properties adjacent to landmarks or historic districts;
 - d. Demolition and clearance of all or a portion of landmarks, properties in historic districts, and properties adjacent to landmarks or historic districts;
 - e. Efforts to encourage the maintenance of landmarks and properties in historic districts; and
 - f. Other mutually acceptable provisions.
3. Proposed improvements to a building, site, structure or object owned by the city (designated as a landmark or located in an historic district) shall be reviewed and approved according to the procedures and regulations listed herein. Proposed demolition and/or clearance of a building, site, structure or

object owned by the city (designated as a landmark or located in an historic district) shall be reviewed and approved according to the procedures and regulations listed herein.

Sec. 42-469. - Purpose.

The conservation district is designed as an overlay district to supplement designated historic landmarks and districts and may be used in conjunction with any existing zoning district. The purpose of the conservation district is to:

1. Develop and maintain the appropriate environment for buildings, structures, sites and areas that reflect varied planning and architectural styles and distinguished phases of the city's history;
2. Maintain and enhance the many private and public elements that are unique to the fabric, theme and character of each neighborhood and area, including but not limited to, lighting, pathways, street trees, natural areas and other features that may, from time to time, be identified by the citizens and property owners of neighborhoods, areas and subsections thereof;
3. Abate the removal and demolition of historic structures, and cultivate civic pride in the accomplishments of the past; and
4. Retain and enhance those properties which contribute to the character of the conservation district and to encourage their adaptation for appropriate use.

ARTICLE VIII. - FLOOD PLAIN ZONING DISTRICT

DIVISION 5. - FLOODPLAIN MANAGEMENT VARIANCE PROCEDURES

Sec. 42-450. - Conditions for approving floodplain management variances.

a. Generally, variances may be issued for new construction and substantial improvements to be erected on a lot of one-half ($\frac{1}{2}$) acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood elevation, providing items two (2) through six (6) below have been fully considered. As the lot size increases beyond the one-half ($\frac{1}{2}$) acre, the technical justification required for issuing the variance increases.

b. Variances may be issued for the reconstruction, repair, rehabilitation, or restoration of structures listed on the National Register of Historic Places, the State Inventory of Historic Places, or local inventory of historic places upon determination, provide the proposed activity will not preclude the structure's continued historic designation and the variance is the minimum necessary to preserve the historic character and design of the structure.

ARTICLE XIV. - DEFINITIONS

Sec. 42-673. - Flexible zoning.

Flexible zoning is zoning which permits uses of land and density of buildings and structures different from those which are allowed as of right within the zoning district in which the land is situated.

Topic Title: Infill Development

Resource Title: OR's Infill Development Chapter

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Sherwood

State: Oregon

Date of Adoption: 2010

Abstract:

This study examines Sherwood, OR's Infill Development Chapter, Municipal Code Chapter 16.68, which sets forth a comprehensive framework for the development of infill properties— parcels that have been bypassed by larger subdivisions due to their proximity to established residential neighborhoods. The chapter is designed to promote housing choice, enhance transportation efficiency, and ensure compatibility between new developments and existing residential areas. It achieves these objectives by allowing for greater flexibility in lot sizes, dimensions, and setbacks while imposing stringent controls on the type, height, size, and scale of new buildings on infill sites.

Key standards within the chapter permit modifications to minimum lot requirements under specific conditions that preserve adequate open space and neighborhood character. Moreover, detailed guidelines govern building design on infill lots, including maximum floor area ratios based on residential density, interior side setback requirements to mitigate bulk, and specific criteria for garage orientation to ensure a harmonious streetscape. Through these measures, Sherwood's infill ordinance not only facilitates efficient land use and sustainable urban growth but also reinforces the community's aesthetic and functional integration. This case study provides insights into how targeted regulatory flexibility can balance development incentives with rigorous design controls to enhance the quality and compatibility of infill projects.

Code Provisions:

[Sherwood, Oregon – Code of Ordinances](#)

[Title 16 - ZONING AND COMMUNITY DEVELOPMENT CODE](#)

[Division II. - LAND USE AND DEVELOPMENT](#)

[Chapter 16.68 - INFILL DEVELOPMENT STANDARDS](#)

16.68.10 - Purpose and Intent

This chapter provides standards for infill development, or the development of properties that have been skipped over by larger subdivisions and, due to their proximity to established residential neighborhoods, require special design controls and flexibility in the City's zoning and land division standards. This Chapter is intended to:

- A. Promote housing choice, transportation efficiency and compatibility between existing residential areas and new development;
- B. Allow for greater flexibility in lot size, dimensions and setbacks; and

C. Control the type, height, size and scale of new buildings on infill properties.

16.68.020 - Lot Sizes and Dimensions for Infill

The Approval Authority may approve modifications to the minimum lot size and/or lot dimensions of this Code for residential developments containing less than five (5) acres (i.e., is not otherwise eligible for a Planned Unit Development), subject to all of the following requirements:

A. Lot area may be reduced below the minimum standard of the applicable zoning district through the land division or lot line adjustment process when the Approval Authority finds:

1. The resulting lot size(s) and dimensions are not less than eighty-five percent (85%) of the standard minimum lot area of the zone; and
2. The resulting average lot size of the development (partition or subdivision) shall be no less than the minimum lot size of the zone in which it is located; the resulting density shall be no more than the allowable density of the zone. Areas reserved as open space, such as central greens, plaza, and other common open space may be counted toward the average lot size and density of the development when such areas are centrally located and accessible to every lot in the development; and
3. The reduction in lot size and/or dimensions shall not be detrimental to any designated natural feature; the Approval Authority may require mitigation to protect and enhance such features, as applicable; and
4. All required local street connections, pedestrian access ways, utility easements, emergency access, and other Code requirements are met; the Approval Authority may require shared driveways (i.e., for two dwellings) for paired lots that individually have less than 40 feet of street frontage, except where driveway access is provided from an alley; and
5. The land division shall be conditioned, and a deed restriction recorded on each lot that contains less than the minimum lot size of the zone, requiring that building elevations and floor plans be submitted to the Planning Department for review and approval prior to issuance of a building permit on such lot, and such plans be binding on future building. Building plans required under this section shall meet the following standards as provided in Section 16.68.030;
 - a. Floor area ration
 - b. Side setback plane; and
 - c. Garage orientation and design stand
6. The land division shall be conditioned, and a deed restriction shall be recorded on each lot that contains less than the minimum lot size of the zone, requiring that a landscape plan be submitted to the Planning Department for review and approval prior to issuance of a building permit on such lot. Landscape plans required under this section shall provide plant materials and irrigation that are equal to or better than those existing residential landscapes in the vicinity. The Approval Authority

may consider plant species, quantity/volume of plant material, irrigation, slope, aspect, soil, and other relevant factors in determining the adequacy of landscape plans and in requiring additional landscaping.

B. Lot dimension(s) may be reduced below the minimum standards of the applicable zoning district through the land division or lot line adjustment process provided that the development conforms to Section 16.68.020A, above, and all other applicable Code requirements are met.

C. Lot width and frontage standards may be waived for rear lots created through partitioning where an access easement or tract of not less than twenty (20) feet in width connects the subject lot to a public street with a driveway meeting City standards and the yard requirements for rear lots, as provided in Section 16.68.050, are met. The Approval Authority may require that such driveway be dedicated as a public alley and extended in accordance with local street network plans and connectivity requirements.

16.68.030 - Building Design on Infill Lots

Structures exceeding twenty four (24) feet in height shall conform to the following standards:

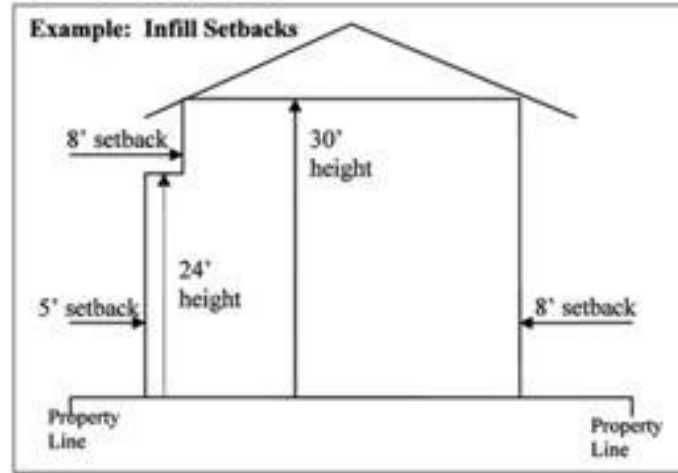
A. Floor Area: Floor area in any dwelling with a height greater than twenty four (24) feet shall not exceed the following floor area ratios, except that the first 200 square feet of floor area in a detached garage or other accessory structure shall be exempt, when the accessory structure is located behind a dwelling (dwelling is between accessory structure and abutting street), the lot is not a through lot, and the accessory structure does not exceed a height of fifteen (15) feet. Floor area shall not exceed:

1. Low Density Residential (LDR): 50% of lot area
2. Medium Density Residential Low (MDRL): 55% of lot area
3. Medium Density Residential High (MDRH): 60% of lot area
4. High Density Residential (HDR): 65% of lot area
5. The floor area standards in this section do not apply to cottage clusters.

B. Interior Side Setback and Side Yard Plane. When a structure exceed twenty four (24) feet in height:

1. The minimum interior side setback is five (5) feet, provided that elevations or portions of elevations exceeding twenty four (24) feet in height shall be setback from interior property line(s) an additional one-half ($\frac{1}{2}$) foot for every one (1) foot in height over twenty four (24) feet (see example below); and
2. All interior side elevations exceeding twenty four (24) feet in height shall be divided into smaller areas or planes to minimize the appearance of bulk to properties abutting the side elevation: When the side elevation of such a structure is more than 750 square feet in area, the elevation shall be divided into distinct planes of 750 square feet or less. For the purposes of this standard, a distinct plane is an elevation or a portion of an elevation that is

separated from other wall planes, resulting in a recessed or projecting section of the structure that projects or recedes at least two (2) feet from the adjacent plane, for a length of at least six (6) feet. The maximum side yard plane may be increased by ten percent (10%) for every additional five (5) feet of side yard setback provided beyond the five (5) foot minimum.



1.

B. Garage Orientation. On lots with a minimum width of sixty (60) feet or less, the garage shall meet the following orientation and design standards:

1. The garage shall not be located closer to the street than the dwelling, unless the combined width of garage opening(s) does not exceed fifty percent (50%) of the total width of the front (street-facing) elevation. For the purpose of meeting this standard, the exterior wall of at least one room of habitable space, which may include habitable space above the garage, shall be located closer to the street than the garage door. Any garage opening width beyond fifty percent (50%) standard shall be set back at least (2) feet further from the front property line than the facade of the other garage volume. Alternatively, and subject to the Approval Authority's approval, the front elevation may incorporate a decorative trellis, pergola or other architectural feature that provides a shadow line giving the perception that the garage opening is recessed;
2. The standard in subsection c.1. above, does not apply where the average slope of a parcel of a lot exceeds twenty percent (20%) where the garage is proposed to be set back at least forty (40) feet from the public right-of-way, or where the garage is to be accessed from an alley;
3. When the side or rear elevation of a front-loading garage is exposed to the street or an abutting property, such elevation(s) shall have more than one plane (offset or projection of 2 feet or more) or shall have window area equal to at least ten percent (10%) of the exposed garage wall.

Topic Title: Infill Development

Resource Title: Charlotte Unified Development Ordinance

Resource Type: Supplemental Zoning Provision

Municipality: Charlotte

State: North Carolina

Date of Adoption: 2022

Abstract: Unified Development Ordinance

Charlotte's **Unified Development Ordinance (UDO)** was adopted to create a more consistent, predictable, and sustainable framework for development across the city. As outlined in [§1.3 Purpose and Intent](#), the UDO is intended to promote orderly growth, preserve community character, diversify housing options, and encourage sustainable land use practices. A key component of this effort is the **Residential Infill Overlay (RIO) District**, which helps manage new development in established neighborhoods by ensuring that infill construction aligns with the scale, design, and character of existing homes.

The purpose of the RIO is to balance Charlotte's rapid growth with the need to maintain neighborhood identity. By regulating setbacks, building heights, and lot coverage, the overlay prevents excessive densification while still allowing for housing development. Unlike traditional zoning regulations, the RIO is customizable- neighborhoods can petition for its adoption, tailoring its guidelines to local conditions. This empowers residents to take an active role in shaping development patterns while providing clarity for developers.

By integrating the RIO within the broader goals of the UDO, Charlotte is working to protect neighborhood character, promote equitable housing opportunities, and ensure sustainable urban growth. This approach reflects the city's commitment to balancing preservation with progress, offering a model for communities facing similar infill development challenges.

Code Provisions:

[Charlotte Unified Development Ordinance](#)

[Part VI. Special Purpose & Overlay Zoning Districts](#)

[Article 14. Special Purpose & Overlay Zoning Districts](#)

Purpose: §14.4(A)

"The RIO Residential Infill Overlay District is intended to facilitate residential infill development in the Neighborhood 1 Zoning Districts that maintains and complements existing neighborhood pattern and scale through specific controls addressing height and dwelling unit size."

Standards: §14.4 (C)

1. Development Standards

The development standards of the underlying zoning district apply except for the following:

a. **Front Setback from Street**

The required front setback from the street for a residential building on a lot within the RIO District shall be the average of the two closest residential buildings on the same block face, but no less than 10 feet. A survey of the setbacks of the two closest residential buildings on the same blockface will be required at the time of permitting.

b. **Maximum Sidewall Height**

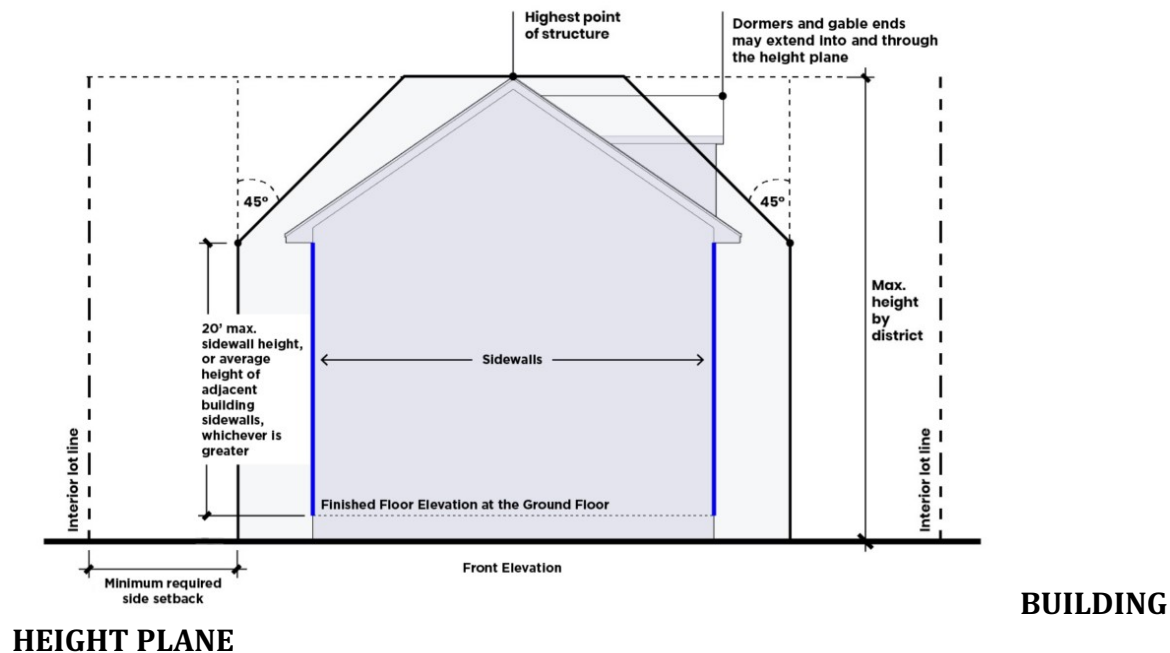
All residential buildings on any lot within the RIO District shall meet the maximum sidewall height regulations below.

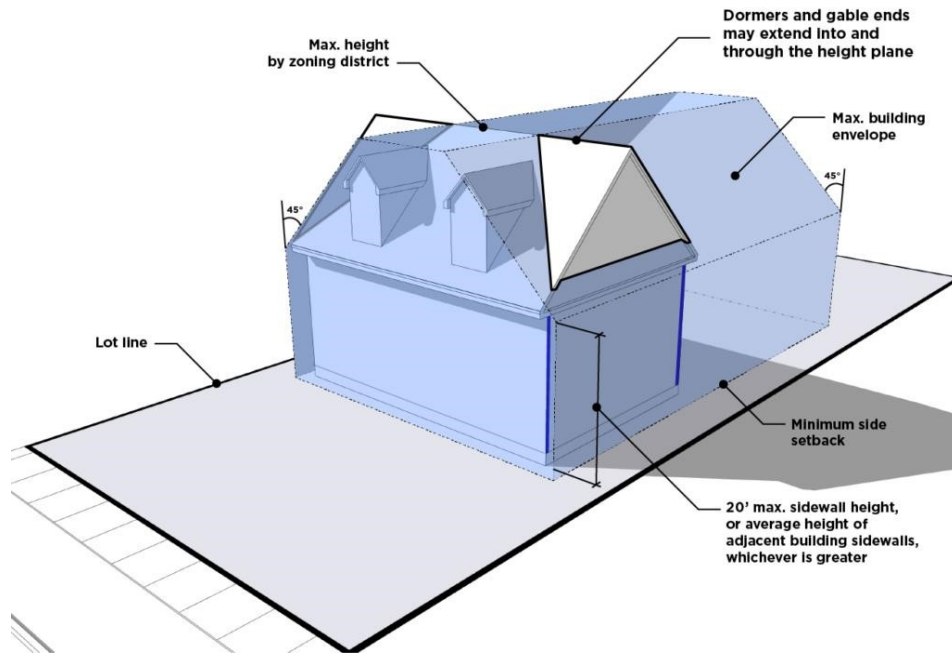
- The sidewall height for all residential buildings is limited to 20 feet. The sidewall height may be increased above 20 feet if the average height of the facing sidewalls of residential buildings within the RIO District on both sides of the lot exceeds 20 feet. In such case, the sidewall height of the subject residential building may be increased up to this average height.
 - A. Sidewalls shall be measured from the finished floor elevation at the ground floor to the eave or, if no eave is present on the building, to the bottom of the finished roof plane.
 - B. For a lot that does not have residential buildings within the RIO District on both sides of the lot, the two closest residential buildings on the same blockface are used for averaging.
 - C. When a sidewall height of greater than 20 feet is proposed, a sidewall height survey of the relevant residential building sidewalls is required at the time of plan submittal.
- If no residential buildings exist on the same blockface as a new residential building under development, the maximum building height for the zoning district controls.
- When an existing local street is extended for a new subdivision, as defined by Section 30.3.A, a 50' wide landscape yard may be used to establish a new blockface if it meets the following:
 - A. The landscape yard shall be planted to Class B standards, per Table 20-2, for each 25' of width of landscape yard.
 - B. The landscape yard shall abut, and be the depth of, the last existing residential lot(s) prior to the new local street extension.
 - C. The new blockface shall only be for the purposes of establishing the maximum sidewall height requirements of this Section.

c. **Building Height Plane**

In addition to the maximum building height requirement for the zoning district, all residential buildings within the RIO District shall meet the building height plane regulations below.

- One additional foot of height, above the maximum permitted sidewall height at the required minimum side setback, is allowed for each additional one foot in distance the portion of the building is located from the required minimum side setback. This establishes a building height plane of 45 degrees. The building height plane does not allow an increase in the maximum sidewall height. Buildings may not exceed the maximum building height of the district.
- Dormers and gable ends may extend into and through the 45 degree building height plane but shall comply with the maximum building height. The cumulative width of dormers extending into and through the building height plane shall be limited to 25% of the depth of the sidewall.





d. **Maximum Building Size**

All principal residential buildings on any lot within the RIO District are limited to a maximum building size, calculated as total heated square footage, as follows:

- The total heated square footage of single-family dwellings on the subject blockface will be averaged. The applicant will be required to furnish Mecklenburg County tax records documenting this average at the time of permitting.
- The maximum size of a single-family, duplex, or triplex building will be the greater of the following:
- The average single-family dwelling size based on total heated square footage; or
- The number of residential units to be constructed multiplied by 800 square feet per unit.
- Single-family dwellings are permitted to exceed the maximum dwelling unit size by an additional 25%.

2. **Uses**

The uses allowed in the underlying zoning district apply. No uses allowed within the underlying district may be prohibited as part of the RIO District.

Topic Title: Infill Development

Resource Type: San Antonio, Texas Unified Development Code

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: San Antonio

State: Texas

Date of Adoption: 2023

Abstract: Unified Development Code

San Antonio's [Unified Development Code \(UDC\)](#) serves as the city's regulatory framework for land use and development, aiming to promote orderly growth, sustainable urban design, and housing diversity. A key provision within the UDC is the Infill Development Zone (IDZ), outlined in Sec. 35-343, which is designed to facilitate the redevelopment of vacant or underutilized properties within the city's urban core. The IDZ offers greater flexibility in zoning requirements, allowing for higher density, mixed-use developments, and relaxed parking and setback standards to encourage revitalization while maintaining neighborhood character.

The purpose of the IDZ is to remove barriers to infill development, making it easier to repurpose land in areas where conventional zoning might otherwise limit redevelopment. By streamlining approval processes and modifying certain design requirements, the IDZ fosters walkable, mixed-use neighborhoods that support economic growth and urban sustainability. These provisions align with San Antonio's broader comprehensive planning goals, which focus on reducing urban sprawl, increasing housing availability, and making efficient use of existing infrastructure.

As part of the broader UDC, the IDZ contributes to San Antonio's vision for smart growth and equitable development, ensuring that older neighborhoods can evolve while preserving their historic and cultural integrity. The city has also incorporated design guidelines in [Appendix G](#), which provide additional structure for infill projects to blend seamlessly with their surrounding communities. By integrating flexible zoning with strategic urban planning, San Antonio's approach to infill development serves as a model for cities seeking to balance growth, sustainability, and historic preservation.

Code Provisions:

[San Antonio, Texas Unified Development Code](#)

[ARTICLE III - ZONING](#)

Purpose: [Division 5- Special Districts](#)

"To provide flexible standards for the development and reuse of underutilized parcels. Urban design standards are required in order maintain a neighborhood commercial scale, to promote pedestrian activity, and to maintain the unique character of the center. Pedestrian circulation is required as are common parking areas. Any use may be permitted within an "IDZ" so long as it complies with the standards of this section.

The purpose of this section is to encourage and facilitate development on vacant, bypassed lands, or the redevelopment of underutilized buildings or structures, within existing built-up areas. The specific purposes of this section are:

- To provide a more flexible approach to design and development of infill projects.*
- To use the objectives of smart growth as the basis for evaluating proposed infill projects.*
- To encourage infill development by simplifying procedures for plan approval and public involvement.*
- To encourage planning and design flexibility and innovations.*
- To create a community environment that is enhanced by a mix of residential, commercial, recreational, open space, employment and institutional uses.*
- To assure community compatibility through high standards of land planning, site and architectural design.*
- To encourage efficient use of land and public services.*
- To ensure adequate public facilities and other community amenities by simplifying and streamlining the approval of private development activities in areas with existing public facilities and infrastructure."*

Sec. 35-343. - "IDZ" Infill Development Zone Complete Change of Zoning Applications submitted prior to November 1, 2018.

(a) Locational Criteria.

(1) Generally.

- A. An "IDZ" may be located within Community Revitalization Action Group (CRAG) target area as defined in 35-A101, which area generally includes the territory located inside the corporate boundaries of the city as they existed in 1940.
- B. An "IDZ" may also be located in a census tract inside of Interstate Loop 410 in which at least two (2) of the following factors are present:
 1. At least ten (10) percent of the structures are abandoned; or
 2. At least ten (10) percent of the platted lots are vacant; or
 3. At least ten (10) percent of the lots or structures are subject to tax liens.

C. An "IDZ" may also be designated for a location inside of Interstate Loop 410 that meets one (1) of the following:

1. Within the boundaries of a community development reinvestment plan adopted by the city council;
2. Within the boundaries of a neighborhood, community, perimeter, sector, or sub-area plan adopted by city council at a location designated by the plan that is suitable for "IDZ" designation;
3. On properties currently owned by the federal, state, county or city government; or
4. On properties previously owned by the federal, state, county or city government on or after June 4, 2001.

(2) **Mapping.** The "IDZ" district may be considered by the city council as an amendment to the official zoning map when it meets one (1) of the location criteria established by subsection (1) above.

(b) **Use Regulations.** The "IDZ" may be approved as either a base zoning district or an overlay zoning district. The standards provided in this section shall apply whether "IDZ" is requested as either a base district or as an overlay except where otherwise specifically stated.

(1) **Overlay District.** When the ordinance designates the "IDZ" as an overlay zoning district: A. A proposed infill development with frontage on a local street may be approved for any use permitted in the base zoning district in which it is located.

B. When "IDZ" is adopted as an overlay district, the base zoning district standards shall remain in effect.

(2) **Base District and Site Plan Requirements.** When the ordinance designates the "IDZ" as a base zoning district it shall be accompanied by a list of permitted uses and a zoning site plan which shall be filed with the application for rezoning and be incorporated into the ordinance designating the "IDZ" as a base zoning district. The zoning site plan shall be reviewed by the zoning commission and approved by the city council concurrent with the approval of the "IDZ" district. A master development plan is not required where "IDZ" is established as a base zoning district that has filed the requisite site plan. A zoning site plan for an "IDZ" shall include:

A. Legal description and exhibit of the property at appropriate scale showing the area to be zoned "IDZ."

- B. The location of all comprehensive land use categories as defined in Sec. 35-A101. - Definitions and Rules of Interpretation. Multi-family uses shall include an indication of gross density as defined in sections 35-A101 in units per acre, provided there is no limit on the level of density. *For example, a 2.5-acre site with a sixty-five thousand (65,000) square foot building footprint consisting of two hundred seventy-five (275) units in a three-story building with the balance of the site used for amenities and off-street loading facilities shall be considered one hundred ten (110) dwelling units per acre. $(275/2.5 = 110)$*
- C. The location of all streets and, if applicable, ingress/egress facilities in accordance with subsection (c)(1) below.
- D. When "IDZ" is adopted as a base zoning district, the standards for conventional subdivision, in accordance with [Sec. 35-202. - Conventional and Enclave Subdivision](#), shall remain in effect where not specifically provided alternative standards within this section.
- E. A site plan shall not be required for city-initiated "IDZ" rezoning cases.

Topic Title: Adaptive Reuse

Resource Type: Zoning Use and Dimensional Requirements

Resource Title: Pairing Adaptive Reuse and Affordable Housing

Municipality: City of Baltimore

State: Maryland

Date of Adoption: 2024

Abstract:

This community addressed homelessness through the adaptive reuse of vacant buildings. The significance of this project lies in the continued support residents will receive after the completion of development. After community members move into their units, social workers and case managers will continue to work very closely with residents to ensure their continued success after signing a lease. Once the purchase of the abandoned buildings was approved by the board of estimates, the redevelopment moved forward. To encourage redevelopment and increase flexibility in their historic districts, Baltimore amended their zoning code in 2017. This new code removed parking restrictions and height requirements. Furthermore, the Governor of Maryland established clear goals of reducing the number of vacant buildings throughout the state. This provided funding and spurred local governments to address adaptive reuse. These goals are reflected in Baltimore's zoning code, which authorizes exceptions for adaptive reuse projects that provide public benefits such as affordable housing and historic preservation. The code also exempts downtown projects from parking minimums, giving developers greater flexibility to rehabilitate vacant structures for housing.

Code Provisions:

[Baltimore City Code](#)

[Article 32 Zoning](#)

[Title 13 Planned Unit Developments](#)

[§ 13-204. Exceptions from district regulations.](#)

(a) Considerations In determining whether to grant an exception from district regulations, the Planning Commission and City Council must consider whether the exception will:

- (1) enhance the overall merit of the planned unit development;
- (2) promote the objectives of both the City and the development;
- (3) enhance the quality of the design of the structures and the site plan;
- (4) enable the development to offer environmental and pedestrian amenities;
- (5) not cause such an adverse impact on neighboring properties so as to outweigh the benefits of the development;
- (6) not negatively affect the value and enjoyment of surrounding property, the provision of municipal services, or the flow of traffic;
- (7) be compatible with the land use policies of the Comprehensive Master Plan;

- (8) provide a substantial public benefit to the City, as illustrated in subsection (d) of this section; and
- (9) allow uses that predominantly match or are compatible with uses allowed in the underlying zoning district and the zoning districts of adjacent properties.

Examples of substantial benefit to the City. Examples of substantial benefits to the City are as follows:

- (1) use of sustainable design and architecture, such as green roofs, white roofs, and other energy efficient design concepts, new building technologies, and qualifying as a Leadership in Energy and Environmental Design ("LEED") or LEED-equivalent structure;
- (2) enhanced design characteristics, including mixed-use development, circulation systems that utilize alleys or traffic-calming techniques, and a pedestrian-oriented environment;
- (3) community amenities, including plazas, malls, formal gardens, places to congregate, outdoor seating, public art, and pedestrian and transit facilities;
- (4) preservation of natural areas and site design that is sensitive to environmental features;
- (5) historic preservation and adaptive reuse of historic structures;
- (6) additional open-space and recreational amenities, such as recreational open space and playgrounds, including athletic fields, dog parks, natural water features, and conservation areas;
- (7) additional public infrastructure improvements, in addition to the minimum needed by the planned unit development, such as new or repaved streets, bicycle paths, gutters and sewers, and traffic control devices to improve traffic flow;
- (8) senior housing set-aside;
- (9) affordable housing set-aside;
- (10) provision of accessible dwelling units with accessible features beyond those required by the Americans with Disabilities Act or any other applicable codes; and
- (11) provision of public car or bike share facilities.

Title 10 Commercial Districts

§ 10-207. C-5 Downtown District.

(b) Standards.

The C-5 District standards are crafted to:

- (1) maintain or improve the pedestrian environment;
- (2) ensure that new construction is compatible with existing development; and
- (3) develop a greener downtown.

(2) C-5-DC Downtown Core Subdistrict.

- (i) The purpose of the C-5-DC Downtown Core Subdistrict is to establish these standards for structures located within the majority of Downtown.
- (ii) The standards recognize that this subdistrict is to be the most intensely developed portion of Downtown and is to be predominately pedestrian-oriented in nature.

§ 10-503. Parking and access.

- (a) District exempt from parking requirements. The C-5 District is exempt from the parking requirements of this Code.

Topic Title: Adaptive Reuse

Resource Type: Comprehensive Plan

Resource Title: The Redevelopment of Denver's Union Station

Municipality: City of Denver

State: Colorado

Date of Adoption: 2004

Abstract:

Denver Union Station's unique assets make it an ideal location for this new type of multimodal transportation facility. Denver Union Station will create an exciting crossroads for transportation, improving connections between transportation modes, respecting the character and historical significance of this station and its adjacent neighborhoods, and providing a stimulating environment for public activity and economic vitality. These goals are embedded in Denver's zoning code, which uses transition mixed-use (T-MU-30) and overlay (UO-1) designations to guide redevelopment while respecting the landmark status of the station. The overlay and downtown district provisions ensure that new development is pedestrian- and transit-oriented, consistent with Union Station's role as the centerpiece of Denver's regional transportation system.

Code Provision:

Article 9. Special Contexts and Districts

Union Station lies within a district zoned for (T-MU-30) and overlay (UO-1). T-MU-30 indicates this structure is a multi-unit structure with a transition special use. UO-1 indicates the use of overlay zones to accomplish the newly intended use for this structure.

The rezoning of the DUS site to T-MU-30 included a waiver of the GDP process for specific RTD early-action transit elements. Denver's Development Review Committee (DRC) reviews GDP applications. However, T-MU-30 districts require the additional steps of a public hearing and approval by the Denver Planning Board.

Once the station and a portion of the site are designated as a Denver Landmark, the Landmark Preservation Commission must approve exterior alterations to the station requiring a permit, including additions and new construction. Landmark design review has no formal notice requirement. The Landmark Commission also has the authority to adopt site-specific design guidelines as rules and regulations, which requires legal notice and a public hearing at which any person may testify

9.4.2.1 Process to Establish Overlay Zone Districts. Text Amendment & Rezoning Required Creation of an overlay zone district shall be by text amendment according to Section 12.4.11, Text Amendment, to codify the standards established within the overlay, and by an

official map amendment (rezoning) according to Section 12.4.10. With the Manager's approval, the map amendment may be filed and reviewed concurrent with the text amendment according to Section 12.3.3.9, Concurrent Applications. In no case, however, shall the map amendment be approved until the text amendment creating the overlay zone district is approved.

9.4.2.3 Effect of Overlay Zone District Designation. All zoning applications within a specific overlay zone district shall comply with the applicable provisions of that overlay zone district, and the underlying zone district, and shall be reviewed under this Code to assure such compliance. Where the provisions of the overlay zone district are different from (e.g., in the case of an overlay use district), or more restrictive than (e.g., in the case of a neighborhood conservation overlay zone district) the provisions of the underlying zoning designation, the provisions of the overlay zone district shall apply. A change in the underlying zone district does not change the content or applicability of the overlay zone provisions.

Article 8. Downtown (D-) Neighborhood Context

Section 8.1.6 Mobility. The highest priority is given to the pedestrian, transit, and alternative modes of transportation. The Downtown context is the center of the Denver region multi-modal transit transportation system. Key elements of this system are: Denver Union Station as the hub of the regional transit system; 16th Street Mall Shuttle, light rail on downtown streets; local, regional and express bus service; bike lanes and access to the Platte River and Cherry Creek Greenway trails; and detached sidewalks on every street.

Topic Title: Adaptive Reuse

Resource Title: Utilizing Historic Preservation for a Thoughtful Reuse Project

Resource Type: Zoning Use and Dimensional Requirements

Municipality: St. Louis

State: Missouri

Date of Adoption: 2020

Abstract: Utilizing Historic Preservation for a Thoughtful Reuse Project

A little over two decades ago, a blighted 200-acre industrial district on the southern edge of Midtown St. Louis was populated with abandoned, underutilized buildings reminiscent of many distressed neighborhoods in post-industrial cities. In 2002, those 200 acres of land became a vibrant, mixed-use community. One building which now houses a biotech company, used to contain a printing plant for the *St. Louis Post - Dispatch*. The developers retained the historic facade of the building and designed the interior to celebrate the building's past. "The entire building spans 80,000 square feet, with expansive open floor plates that also enabled HOK to create unique third-floor offices that align with an existing mezzanine on the building's west side. To preserve the facade and make use of natural light, the architects pulled the third-floor plate away from the 20-foot-tall windows on the north side of the building. This is a subtle, high-impact move because inside, it connects spaces across stories, letting sound and sight lines travel vertically, reminding users of their place in a larger facility".

New scientific opportunities are creating an increased demand for laboratory space. For academic and teaching institutions, this demand often leads to renovating and expanding existing research labs to accommodate new practices and technology. Converting existing buildings into scientific labs is cheaper and more environmentally friendly than creating a new building. These projects can cost half as much as the creation of a new building and generally do not require replacing carbon-heavy concrete and steel structural systems. Additional climate resilient measures for this project include its walkable location and energy efficient construction by primarily building the structure with bricks.

Code Provisions:

[St. Louis, Missouri – Code of Ordinances](#)

[Chapter 24.36 - PRESERVATION REVIEW DISTRICTS](#)

Preservation review districts may be established by ordinance for areas of the City in which the Board of Aldermen finds, by ordinance, reviews of the effects of demolitions on the area are in the public interest. Prior to adoption of a preservation review district ordinance, (1) the Alderman for the ward in which the proposed district is located shall have requested the Cultural Resources Office and the Preservation Board to assess the architectural and/or cultural quality of the proposed district, and (2) within forty-five (45) days thereafter the Cultural Resources Office and the Preservation Board shall have reported its findings to the Planning Commission and the

Board of Aldermen. The Cultural Resources Office and the Preservation Board shall assess the proposed district as having (1) high historic district potential; (2) possible historic district potential; (3) low historic district potential; (4) demolitions within the last two years in excess of the average for similar areas in the City. Districts which are reported as being in categories (1), (2) or (4) may be designated preservation review districts. Preservation review district ordinances may be repealed by ordinance at any time without Cultural Resources Office or Preservation Board action.

24.12.030 - Waiver of certain building and maintenance standards.

Insofar as they are applicable to a landmark, landmark site or improvement in an historic district, any provision of the building, housing maintenance and fire prevention codes of the City or of the minimum nonresidential standards law, may be varied or waived, on application, by the Building Commissioner or, with respect to the Fire Prevention Code, by the Fire Marshal, provided that the construction or alteration as contemplated will provide substantially equivalent safety and assurance of public health as would be otherwise required by such provisions.

26.60.020 - Use regulations.

In the unrestricted district buildings and premises may be used for any purpose whatsoever not in conflict with any ordinance of the City regulating nuisances or Section 26.60.025, or is not a wireless facility provided that motor fuel pumping stations shall meet the site requirements specified in Section 26.40.027 and carry-out restaurants that sell to customers in cars or who consume the sold products in cars parked on the carry-out restaurant premises, or sell products through a sales window, to customers who are in cars, for immediate consumption by the customer either on or off the premises shall meet the site requirements specified in Section

26.40.026.B.1 or 2 as appropriate. Provided, however, that no building shall be hereafter erected, nor shall any existing building be converted, reconstructed or structurally altered for dwelling purposes, including boarding houses, dormitories, homeless shelters, and rooming houses.

26.60.025 - Conditional uses.

The following conditional uses may be allowed in the "K" Unrestricted District, subject to the provisions of Section 26.80.010:

- A. Acid manufacture;
- B. Alcohol and/or drug abuse treatment centers;
- C. Daycares, 24 hours, adult or children;
- D. Bathhouses, including massage establishment(s), as defined and subject to the additional provisions of Chapter 8.24;
- E. Billiards and pool rooms, as defined and subject to the additional provisions of Chapter 8.26;
- F. Cement, lime, gypsum, or plaster-of-paris manufacture;

- G. Fireworks, exposures, manufacture or storage;
- H. Fertilizer manufacture and potash refining;
- I. Fuel manufacture;
- J. Group homes;
- K. Garbage, offal, or dead animals, reduction or dumping;
- L. Glue manufacture, fat rendering, or distillation of bones;
- M. Halfway houses;
- N. Hotels;
- O. Pawnbrokers, as defined and subject to the additional provisions of Chapter 8.72;
- P. Penal institutions;
- Q. Petroleum refining;
- R. Salvage storage, wholesaling or retailing;
- S. Smelting or refining of metals;
- T. Social rehabilitation facilities;
- U. Stockyards or abattoir;
- V. Telephone, outdoor pay, if the proposed telephone is located on a lot that is located contiguous with or directly across a street, alley, public or private easement from a dwelling district;
- W. Transitional living facilities.

Topic Title: Adaptive Reuse in Barrington, Rhode Island
Resource Title: Barrington, Rhode Island, Municipal Code
Resource Type: Zoning Use and Dimensional Requirements
Municipality: Barrington
State: Rhode Island
Date of Adoption: 2023

Abstract: Barrington, Rhode Island, Municipal Code

In Barrington, Rhode Island, Section 185-30 of the local zoning ordinance establishes a framework for adaptive reuse that preserves the town's historic character while accommodating evolving development needs. This provision allows existing nonconforming structures to be repurposed—transforming underutilized or outdated buildings into residential, commercial, or mixed-use spaces without necessitating complete demolition. Although the approach is designed to encourage sustainable redevelopment, it also presents challenges in balancing modern building standards with historic preservation.

The adaptive reuse strategy outlined in §185-30 has fostered collaboration among developers, preservation advocates, and community members. These stakeholders work together to ensure that repurposed buildings contribute to the community's vitality while maintaining Barrington's traditional architectural aesthetics. As a result, projects that leverage these guidelines have played a significant role in local revitalization efforts, providing a pathway for sustainable development that respects the town's heritage.

Code Provisions:

[Town of Barrington, RI](#)

[Chapter 185 Zoning](#)

[Article IX Nonconforming Uses and Structures](#)

[§ 185-30 Existing nonconforming development and adaptive reuse.](#)

[§185-30 B. Adaptive reuse](#)

- (1) Permitted use. Adaptive reuse for the conversion of any commercial building, including offices, schools, religious facilities, medical buildings, and malls into residential units or mixed-use developments is a permitted use, under the criteria described below under Eligibility.
- (2) Eligibility.
 - (a) Adaptive reuse development must include at least 50% of existing gross floor area developed into residential units.
 - (b) There are no environmental land use restrictions recorded on the property preventing the conversion to residential use by RIDEM or the US EPA.
- (3) Density calculations.
 - (a) For projects that meet the following criteria, the residential density shall be no less than 15 dwelling units per acre, except where the developer proposes a project of lower density:

[1] Where the project is limited to the existing footprint, except that the footprint is allowed to be expanded to accommodate upgrades related to the building fire code, and utility requirements.

[2] The development includes at least 20% low- and moderate-income housing. [3] The development has access to public sewer and water service or has access to adequate private water, such as well and/or wastewater treatment systems approved by the relevant state agency for the entire development as applicable. (b) For all other adaptive reuse projects, the residential density permitted in the converted structure shall be the maximum allowed that otherwise meets all standards of minimum housing and has access to public sewer and water services or has access to adequate private water, such as well and wastewater treatment systems approved by the relevant state agency for the entire development, as applicable. The developer may propose a project of lower density.

(c) The density proposed for any adaptive reuse project shall be determined to meet all public health and safety standards.

(4) Dimensional requirements.

(a) Notwithstanding any other provisions of this section, existing building setbacks shall remain and are considered legal nonconforming

(b) No additional encroachments shall be permitted into any nonconforming setback unless relief is granted by the permitting authority.

(c) Notwithstanding other provisions of this section, the height of the structure shall be considered legal nonconforming if it exceeds the maximum height of the zoning district in which the structure is located.

[1] Any rooftop construction necessary for building or fire code compliance, or utility infrastructure is included in the height exemption.

(5) Parking requirements.

(a) Adaptive reuse developments shall provide one parking space per dwelling unit. The applicant may propose additional parking in excess of one space per dwelling unit. (b) The parking requirements set forth in Article XV shall apply to all uses proposed as part of the project unless otherwise approved by the applicable authority. The number of parking spaces required shall apply for uses other than residential.

(6) Allowed uses within an adaptive reuse project.

(a) Residential dwelling units are a permitted use in an adaptive reuse project regardless of the zoning district in which the structure is located, in accordance with the provisions of this section.

(b) Any nonresidential uses proposed as part of an adaptive reuse project must comply with the provisions of Article IV for the zoning district in which the structure is located.

(7) Development and design standards. Site design shall be in accordance with the development regulations.

(8) Procedural requirements.

(a) Adaptive reuse project shall be subject to the procedural requirements of Article XXIV and undergo development plan review as determined in that section, except where land development project review is required pursuant to state law

(b) In addition to the checklist requirements for the applicable review process, the applicant shall provide the following information:

[1] The proposed residential density and the square footage of nonresidential uses. [2] A floor plan to scale for each building indicating, as applicable, the use of floor space, number of units, number of bedrooms, and the square footage of each unit.

(9) Specific and objective provisions.

(a) The specific and objective criteria for adaptive reuse projects are set forth in the regulations.

Topic Title: Adaptive Reuse

Resource Title: Buffalo Green Code Unified Development Code (UDC)

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Buffalo

State: New York

Date of Adoption: 2016

Abstract: Buffalo Green Code Unified Development Code (UDC)

Buffalo's Unified Development Code (UDC) establishes a forward-thinking framework that enables adaptive reuse of historic properties by permitting new uses in buildings that might not otherwise qualify under standard zoning. The adaptive reuse permit, initiated by a property owner or their authorized representative, targets significant structures—those of at least 5,000 square feet that are recognized as local landmarks or contributing elements to historic districts. This provision is carefully designed to exclude uses deemed incompatible with the preservation goals of the city, ensuring that only appropriate, community-enhancing activities are considered.

The procedure for obtaining an adaptive reuse permit under the UDC is clearly delineated. Once an application is filed and deemed complete, the City Planning Board reviews and recommends action within 30 days. This recommendation, along with a subsequent public hearing conducted by the Common Council, ensures a transparent process where the proposed adaptive reuse is evaluated against rigorous standards. These standards assess consistency with the spirit of the Comprehensive Plan, compatibility with the surrounding environment, and the ability to operate without adverse impacts on public health, safety, and local infrastructure.

By integrating these structured procedural steps and approval criteria, Buffalo's UDC supports adaptive reuse as a practical tool for urban revitalization. This regulatory approach not only preserves the city's historic character but also transforms underutilized properties into vibrant assets that contribute to economic development and community well-being.

Code Provisions:

[Buffalo greencode: Unified Development Ordinance](#)

11.3.4 Adaptive Reuse Permit:

Purpose:

- A. Description. An adaptive reuse permit allows for certain historic buildings to be adapted for new uses that may not otherwise be allowed in the zone.
- B. Initiation. The property owner, or person expressly authorized by the property owner in writing, may initiate an adaptive reuse permit.
- C. Applicability. The applicant is eligible to apply for an adaptive reuse permit only if both of the following criteria are met:
 1. The application applies to a building of at least 5,000 square feet in gross floor area; and that is a local landmark or is a contributing structure to a local historic district, or is listed on, or determined by

the State Office of Historic Preservation to be individually eligible for, the National Register of Historic Places, or is a contributing structure to a National Register historic district.

2. The application seeks approval for any use allowed within the Ordinance, with the exception of the following uses: halfway house; rooming house/S.R.O.; adult establishment; car wash; drive-through facility; gas station; human service facility; kennel; retail and service, heavy; vehicle repair, major or minor; industrial, light or heavy; junk/salvage yard; recycling facility; storage yard; vehicle rental or sales; warehouse/distribution; waste transfer station; freight terminal; heliport; helipad; parking lot, commercial or neighborhood; parking structure; railway facilities; stables; truck stop; and utilities and services, minor and major.

D. Authority. The Common Council, after receiving a recommendation from the City Planning Board, must take action on requests for an adaptive reuse permit.

E. Procedure

1. An adaptive reuse permit application must be filed, including payment of the applicable fee, with the City Clerk in accordance with Section 11.2.1. Once it is determined that the application is complete, the City Clerk must forward the application to the City Planning Board.
2. Within 30 days of the determination of completeness, the City Planning Board must review the application and make a recommendation to approve, approve with modifications, or disapprove the application, and forward the recommendation to the Common Council.
3. Within 62 days of the determination of completeness, the Common Council must hold a public hearing on the proposed adaptive reuse permit. Notice of the public hearing is required in accordance with Section 11.2.2.
4. Within 62 days of the closing of the public hearing, the Common Council must approve, approve with modifications, or disapprove the application. This 62-day period may be extended only by mutual consent of the applicant and the Common Council.

F. Approval Standards. The City Planning Board must make written findings of fact on, and the Common Council decision must consider, the following criteria:

1. The proposed use is consistent with the spirit and intent of this Ordinance and the Comprehensive Plan.
2. The proposed use will be established, maintained, and operated so as to not endanger the public health, safety, or welfare.
3. The proposed use will be established, maintained, and operated so as to be harmonious with the surrounding area and will not impede the development, use, and enjoyment of adjacent property in any foreseeable manner.

4. The proposed use will be of a character that does not produce noise, odors, glare, and/or vibration that adversely affect the surrounding area.
 5. The proposed use will not place an excessive burden on public improvements, facilities, services, or utilities.
 6. The proposed use will not result in the destruction, loss, or damage of any feature determined to be of significant natural, scenic, or historic importance.
- G. Conditions. In granting an adaptive reuse permit, reasonable conditions and restrictions as are directly related to and incidental to the proposed special use permit may be imposed. Such conditions may include, but are not limited to, limits on location, scale, intensity, design, lighting, signs, and hours of operation, or provision for recreation, open space, and buffers and screening. Failure to comply with any condition or restriction constitutes a violation of this Ordinance and, in addition to any other civil or criminal remedy or enforcement procedure, is grounds for modification, suspension, or revocation of the adaptive reuse permit.

Topic Title: Adaptive Reuse

Resource Title: Long Beach, CA- Adaptive Reuse Ordinance

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Long Beach

State: California

Date of Adoption: 2014

Abstract: Long Beach, CA- Adaptive Reuse Ordinance

The city of Long Beach, California has enacted an adaptive reuse ordinance to promote the revitalization and use of underutilized buildings. The goal of the adaptive reuse ordinance in Long Beach is to enhance or maintain the character of the area, extend the life of existing buildings, reduce use of new construction materials and generation of construction waste, and provide additional employment or housing opportunities within the community.

To encourage new uses or occupancies of existing structures as opposed to new construction, the city has allowed eligible properties to be relieved of certain parking standards, setbacks, and zoning height limitations. Projects that meet the applicable definition and standards laid out in the Title 21 Zoning provisions are permitted to use the alternative building standards established in Chapter 18 of the code.

Code Provisions:

[Long Beach, California – Municipal Code](#)

[CHAPTER 21.45 - SPECIAL DEVELOPMENT STANDARDS](#)

[21.45.010 - Purpose.](#)

“The City recognizes that certain types of land use, due to the nature of the use, require additional development standards beyond those specified for the applicable zone district. The additional standards are required to ensure that the use does not adversely impact adjacent uses. This Chapter establishes special development standards for permitted principal uses”

[CHAPTER 18.63 - ALTERNATIVE BUILDING STANDARDS FOR ADAPTIVE REUSE PROJECTS](#)

[18.63.010 - Purpose.](#)

“The Adaptive Reuse Ordinance in Title 21 Zoning Regulations expanded the scope of eligible and under-utilized buildings or structures that have great potential to be converted into new uses or occupancy that can benefit from relief of parking standards, setbacks and zoning height limitations. However, key to the success of the Adaptive Reuse Ordinance relies on the ability of the Building Official and Fire Code Official to effectively use their authority to grant code modification or alternative materials, design and methods of construction and equipment to address practical difficulties involved in complying with the strict provisions of the code or consider alternative design or methods not specifically prescribed in the code. Other statutory regulations such as the California Historic Building Code adopted in Chapter 18.50 and the California Existing Building Code adopted in Chapter 18.49, including Sections 17958.11 and 19957 of the California Health and Safety Code, provides the Building Official and Fire Code Official with the ability to consider other alternative building standards. Therefore, the purpose of this Chapter is to amend, expand, establish and clarify alternative building standards for the conversion of existing buildings or structures to accommodate new uses or occupancy for other purposes than what it was originally designed for and still provide reasonable use and safety to the building occupants.”

CHAPTER 21.15 - DEFINITIONS

21.15.064.5 - Adaptive reuse.

"Adaptive reuse" means a construction or remodeling project that reconfigures existing spaces, structures or buildings to accommodate a new use or to accommodate another purpose than what it was originally designed for.

CHAPTER 21.45 - SPECIAL DEVELOPMENT STANDARDS

21.45.500 - Adaptive reuse projects.

- A. **Land Use.** The intent of the adaptive reuse is to allow conversion of existing structures into new land uses that maintain or enhance the character of a neighborhood or district, extend the life of the building, reduce use of new construction materials and reduce construction waste generated, and provide additional employment or housing opportunities in appropriate and compatible locations.
- 1) An adaptive reuse project may change an existing building to any Neighborhood Commercial and Residential (CNR) District permitted use with the following exceptions:
 - a. Adaptive reuse projects are not allowed in single-family or duplex residential zoning.
 - b. Non-residential uses introduced into any multiple-family residential zones through adaptive reuse shall be compatible with the surrounding neighborhood as determined by the Site Plan Review Committee.
 - c. No new residential uses shall be introduced through adaptive reuse into any industrial zone.
 - 2) Any discretionary review, including an Administrative Use Permit or Conditional Use Permit required within the CNR zone for a particular use, is required for an adaptive reuse project.
 - 3) Any request for a land use not explicitly allowed within the CNR zone as part of an adaptive reuse project shall require an Administrative Use Permit.
- B. **Setbacks.** Existing principal structures with non-conforming setbacks may remain. Any additions or facade changes involving greater than twenty-five (25) continuous linear feet of exterior wall facing a public right-of-way shall comply with zoning setbacks, unless waived by the Site Plan Review Committee.
- C. **Height.** Heights of existing buildings shall be exempt from established height limits. The addition of parapets or roof structures, equipment or other enclosures or non-habitable space is allowed. Any new or additional habitable space or floors shall comply with height limits of the underlying zoning district, unless waived by the Site Plan Review Committee.
- D. **Residential Unit Size.** A minimum dwelling unit size of four hundred fifty (450) square feet and project average of no less than seven hundred (700) square feet shall be provided, unless waived by the Site Plan Review Committee.

- E. **Existing Parking.** The overall number of existing parking spaces on-site shall be maintained. An exception for a reduction in existing parking for purposes of providing required ADA parking and access may be allowed by the Site Plan Review Committee.
- F. **Required Parking in Designated Parking Impacted Areas.** Parking for adaptive reuse projects in designated parking impacted areas shall be provided as follows:
- 1) Residential parking shall be a minimum of one (1) space per dwelling unit plus one (1) guest space for every four (4) dwelling units.
 - 2) Parking for all non-residential uses shall be a minimum of two (2) spaces per every one thousand (1,000) square feet of usable internal space.
 - 3) In mixed use adaptive reuse projects, the first three thousand (3,000) square feet of non-residential space shall be exempt from parking requirements.
 - 4) Seventy-five percent (75%) of the minimum required parking shall be provided for assembly, office or retail conversions in mixed use or stand-alone buildings.
 - 5) Tandem parking is allowed up to seventy-five percent (75%) of provided spaces.
 - 6) Shared parking arrangements shall conform to LBMC Section 21.41.222 - Offsite parking or Section 21.41.223.A - Parking-Joint Use of Parking Facility.
 - 7) Any reduction in provided parking beyond the minimums above shall be approved by the Site Plan Review Committee.
- G. **Required Parking in General.** Parking for adaptive reuse projects outside of designated parking impacted areas shall be provided as follows:
- 1) No additional on-site parking shall be required for conversion to residential uses.
 - 2) Parking for all non-residential uses shall be a minimum of one (1) space per every one thousand (1,000) square feet of usable internal space.
 - 3) In mixed use adaptive reuse projects, the first six thousand (6,000) square feet of non-residential space shall be exempt from parking requirements.
 - 4) Fifty percent (50%) of the minimum required parking shall be provided for assembly, office or retail conversions in mixed use or stand-alone buildings.
 - 5) Tandem parking is allowed up to fifty percent (50%) of provided spaces.
 - 6) Shared parking arrangements shall conform to LBMC Section 21.41.222 - Offsite parking or Section 21.41.223.A - Parking-Joint Use of Parking Facility.
 - 7) Any reduction in provided parking beyond the minimums above shall be approved by the Site Plan Review Committee.

- H. **TDMs required.** An Adaptive Reuse project, whether residential or non-residential or mixed-use, that does not meet the parking requirements of this Section, or which is exempt from change of use parking requirements or minimum parking requirements, shall provide the Transportation Demand Management (TDM) measures set forth in Subsection 21.41.223.D, but shall not be required to obtain the Administrative Use Permit (AUP) required by that Section, nor to provide any parking spaces if otherwise exempt. This Subsection 21.45.500.H shall not be construed to create or maintain any minimum parking requirement for an adaptive reuse project.
- I. **Other provisions.** Floor Area Ratio (FAR), Landscaping, Lot Coverage, Open Space, and any other applicable development standards of the underlying zone would have to be complied with, unless waived by the Site Plan Review Committee.

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Disaster Mitigation

Narrative

Local disaster management is the practice of reducing the impact of natural hazards through proactive planning, land use regulations, and resilient development strategies. It involves integrating policies that anticipate and respond to risks such as flooding, hurricanes, wildfires, and extreme weather events. Disaster management may also go by the names 'disaster mitigation,' 'hazard management,' etc. By incorporating disaster management into local governance, communities enhance their capacity to protect people, property, and infrastructure from future disasters, ultimately reducing long-term recovery costs and disruption.

The costs of natural disasters are staggering. Between 2015–2024, the United States experienced 190 separate billion-dollar disasters, causing over 6,300 fatalities and around \$1.4 trillion in damages. Climate change has intensified the frequency and severity of these events, making local disaster management a critical component of climate resilient development (CRD).

A key strength of local disaster management is adaptability. Different communities face different climate risks based on geography, infrastructure, and economic capacity. Coastal cities may prioritize flood-resistant development and hurricane preparedness, while rural in-land areas might emphasize infrastructure improvements to maintain access to essential services during extreme weather like tornadoes or landslides. Recognizing these differences, our framework law is designed to provide local governments with a menu of regulatory tools that can be customized to meet the unique needs of each community while maintaining the common goal of increased resilience.

Disaster management planning requires local governments to systematically assess risks and develop structured responses to both pre-disaster mitigation and post-disaster recovery. Our research has identified several core strategies that can be implemented through local regulations. Overlay zoning, for instance, allows municipalities to impose additional regulations in high-risk areas, ensuring that development decisions address potential hazards. Resilient building codes establish stricter construction standards to ensure that structures can withstand natural disasters, reducing long-term vulnerability. Lot merger ordinances prevent excessive density in high-risk areas by consolidating undersized parcels - limiting the potential for development that exacerbates risk exposure.

At a broader level, a framework law on climate resilient development serves as an essential enabling condition for local governments to regulate private development effectively in alignment with CRD principles. Without a clear legal structure, municipalities may struggle to implement and enforce necessary regulations, leaving communities more vulnerable to the effects of climate change. The framework law is designed to bridge this gap by providing a structured yet flexible legal foundation for local disaster management efforts, ensuring that communities have the tools they need to safeguard their future in an era of escalating climate risks. By aligning development with disaster resilience, local governments can create safer, more sustainable communities that are better prepared for the challenges ahead.

Twenty-four cases studies were completed on a range of disaster management efforts in each region of the United States. Some notable case studies include Dare County, North

Carolina, which imposed strict development requirements and bars on property within their 'Coastal High Hazard Area', an overlay zone; Honolulu, Hawai'i which strengthened their building codes for developments to be able withstand lateral force from tsunami waves; Long Beach, California's Building Standards Code establishes mandatory and voluntary earthquake hazard mitigation regulations aimed at reducing the seismic risk associated with older and vulnerable structures; and Islamorada, Florida's building permit allocation system establishes a framework for regulating development to align with the village's comprehensive plan.

This report includes twelve representative case studies highlighting geographic and regulatory diversity. These case studies demonstrate the various avenues through which municipalities can strengthen disaster management in their jurisdictions. The goal is for case studies to show municipalities ways to prepare for the impacts of climate change through CRD.

Case Studies

Topic Title: Disaster Mitigation and Hazard Management

Resource Title: Georgetown, TX - Title 17 of the Georgetown Code of Ordinances and Hazard Mitigation Plan

Resource Type: Special Plan & Supplemental Zoning Provisions

Municipality: Georgetown

State: Texas

Date of Adoption: 2024

Abstract: Georgetown, TX - Title 17 of the Georgetown Code of Ordinances and Hazard Mitigation Plan

Georgetown has acknowledged that increased global temperatures may impact the extent of severe storm events globally and has recognized that this may impact the city of Georgetown. Georgetown is in Wind Zone III, meaning tornado winds can be as high as 200 mph. A 2016 publication by the Environmental Protection Agency titled [What Climate Change Means for Texas](#), identified climate trends that will impact the City of Georgetown. In the [2021 City of Georgetown Hazard Mitigation Plan](#), the city wrote that wind shear increases with rising concentrations of greenhouse gases-resulting in atmospheric instability which can yield a higher frequency of tornadoes. Georgetown also acknowledged that an increase in the number of tornadoes and their intensity could impact travel conditions, thus impacting economic industries reliant on transportation of goods.

Chapter 6, Section 6.02 of Georgetown's Unified Development Code requires that anchorage for each manufactured/mobile home be provided by the Manufactured Housing District to insure against tornadoes, high winds, and electrical storms. This is in accordance with the 2021 International Building Code, which Georgetown has adopted. Their code requires individuals to ensure that the exterior walls and roofs of their buildings/residences can withstand increased wind loads (Chapter 14, Section 1403 and [Chapter 15, Section 1503 of the 2021 International Building Code](#)).

Code Provisions:

Unified Development Code of the City of Georgetown, Texas

Chapter 6 - RESIDENTIAL DEVELOPMENT STANDARDS

[SECTION 6.02. - DEVELOPMENT STANDARDS](#)

[Sec. 6.02.100. - MH—Manufactured Housing District.](#)

C. Design Standards for Manufactured Housing Park.

10. "Anchorage. To insure against natural hazards such as tornadoes, high winds, and electrical storms, anchorage at each manufactured/mobile home shall be provided at the time of installation, according to the building code."

CHAPTER 15.04. - BUILDING CODE

Sec. 15.04.010. - Building code adopted.

A. The provisions of the "International Building Code," 2021 Edition, including Appendixes C, E, F, I, J and K, with the specific local amendments set forth in this Chapter, are hereby adopted. In this Chapter, the 2021 International Building Code shall be referred to as the "Building Code" and the Building Code shall establish regulations affecting or relating to structures, processes, premises and safeguards.

2021 International Building Code

Chapter 14

Exterior Walls

- § 1404.2: "Exterior walls shall provide weather protection for the building. The materials of the minimum nominal thickness specified in Table 1404.2 shall be acceptable as approved weather coverings."
- § 1404.14: "Vinyl siding conforming to the requirements of this section and complying with ASTM D3678 shall be permitted on *exterior walls* where the design wind pressure determined in accordance with Section 1609 does not exceed 30 pounds per square foot (1.44 kN/m²). Where the design wind pressure exceeds 30 pounds per square foot (1.44 kN/m²), tests or calculations indicating compliance with Chapter 16 shall be submitted..."
 - Similar code for different types of walls found at §1404.16 and 1404.18

2021 International Building Code

Chapter 15

Roof Assemblies and Rooftop Structures

- § 1504.1: "Roof decks and roof coverings shall be designed for wind loads in accordance with Chapter 16 and Sections 1504.2, 1504.3, 1504.4 and 1504.5."
 - Each section provides different wind loads for each type of roof.

2021 International Building Code

Chapter 16

Structural Design

- § 1609.1.1: “ Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic design wind speed, V , and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.”

TABLE 1404.2 MINIMUM THICKNESS OF WEATHER COVERINGS

COVERING TYPE	MINIMUM THICKNESS (inches)
Adhered masonry veneer	0.25
Aluminum siding	0.019
Anchored masonry veneer	
Stone (natural)	2.0
Architectural cast stone	2.5
Other	2.0
Asbestos-cement boards	0.125
Asbestos shingles	0.156
Cold-rolled copper ^d	0.0216 nominal
Copper shingles ^d	0.0162 nominal
Exterior plywood (with sheathing)	0.313
Exterior plywood (without sheathing)	See Section 2304.6
Fiber cement lap siding	0.25 ^c
Fiber cement panel siding	0.25 ^c
Fiberboard siding	0.5
Glass-fiber reinforced concrete panels	0.375
Hardboard siding ^c	0.25
High-yield copper ^d	0.0162 nominal
Lead-coated copper ^d	0.0216 nominal
Lead-coated high-yield copper	0.0162 nominal
Marble slabs	1
Particleboard (with sheathing)	See Section 2304.6
Particleboard (without sheathing)	See Section 2304.6
Porcelain tile	0.125 nominal
Steel (approved corrosion resistant)	0.0149
Structural glass	0.344
Stucco or exterior cement plaster	
Three-coat work over:	
Metal plaster base	0.875 ^b
Unit masonry	0.625 ^b
Cast-in-place or precast concrete	0.625 ^b
Two-coat work over:	
Unit masonry	0.5 ^b
Cast-in-place or precast concrete	0.375 ^b
Terra cotta (anchored)	1
Terra cotta (adhered)	0.25
Vinyl siding	0.035
Wood shingles	0.375
Wood siding (without sheathing) ^a	0.5

City of Georgetown Hazard Mitigation Plan

- Pg 4-101: “Wind shear generally increases when there is a rising concentration of greenhouse gasses, causing an increase in humidity and resulting atmospheric

instability. Such conditions generally foster tornado development, but the EPA suggests that wind shear may decrease, thus discouraging tornadoes. The agency is still researching whether tornadoes will be more or less frequent in the future.”

- Pg 4-102: “Increased global temperatures may impact the development and extent of severe storm events. Thunderstorms, high winds, lightning, and hail events may be more severe. An increase in the number of storms or their intensity may affect travel conditions, thus impact economic industries for which the transport of goods is essential, as well as the general safety of motorists otherwise.”

Topic Title: Disaster Mitigation and Hazard Management

Resource Title: Outer Banks Regional Hazard Mitigation Plan & Dare County Code of Ordinances

Resource Type: Special Plan and Supplemental Zoning Provisions

Municipality: Outer Banks Region & Dare County

State: North Carolina

Date of Adoption: 2020 (Plan) & 2024 (Code)

Abstract: Outer Banks Regional Hazard Mitigation Plan & Dare County Code of Ordinances

The Outer Banks Regional Hazard Mitigation Plan addresses multiple aspects of disaster planning, including social vulnerability, housing, and coastal erosion in their plan. The region acknowledges that they are highly susceptible to extreme weather conditions such as tropical storms, flooding, and high winds because of its proximity to the ocean and saltwater marshes and the shape of its above-ground land. Dare County, part of the Outer Banks, regulates private entities by restricting development in sand dunes, preventing movement of sand dunes, implementing retaining wall requirements in some areas, and imposing additional restrictions on Coastal High Hazard Areas through an overlay zone. A few requirements of the overlay zone include, restricted locations of development, prohibited use of fill for the structural support of buildings, location of development must be “landward of the reach of mean high tide, and decks must be above a certain height.

Code Provisions:

Outer Banks Regional Hazard Mitigation Plan

[3.4 Housing](#)

- “According to the 2013-2017 ACS 5-Year Estimates, there are 60,659 housing units in the Outer Banks Region, of which 50.5 percent are occupied. Approximately 25.5% of occupied units are renter-occupied. **A high percentage of renters is an indicator of higher pre- and post-disaster vulnerability** because, according to Cutter, et al. (2003), renters often do not have the financial resources of homeowners, are more transient, are less likely to have information about or access to recovery aid following a disaster and are more likely to require temporary shelter following a disaster. Higher rates of home ownership in some jurisdictions, including Duck, Kitty Hawk, Nags Head, and Southern Shores may indicate that more residents in these areas are able to implement certain types of mitigation in their homes. [. . .] Approximately 8.3 percent of [housing] units are mobile homes, which can be more

vulnerable to certain hazards, such as tornadoes and wind storms, especially if they aren't secured with tie downs." (pg 51) [emphasis added]

Outer Banks Regional Hazard Mitigation Plan

4.5.5 Coastal Hazards

- "[Coastal] erosion can be caused by large storms, flooding, strong wave action, sea level rise, and human activities—such as land uses that over-develop the shoreline, alterations to the shoreline or dunes, and hard shoreline stabilization structures like breakwaters and seawalls—that wear away the beaches and estuarine shorelines along the coast. Erosion undermines and often destroys homes, businesses, and public infrastructure and can have long-term economic and social consequences. According to NOAA, coastal erosion is responsible for approximately \$500 million per year in coastal property loss in the United States, including damage to structures and loss of land. [. . .] Erosion rates and potential impacts are highly localized. Severe storms can remove wide beaches, along with substantial dunes, in a single event. In undeveloped areas, high recession rates are not likely to cause significant concern, but in some heavily populated locations, one or two feet of erosion may be considered catastrophic." (pg 73)
- "[C]limate change is expected to make heavy rain events and tropical storms and hurricanes more frequent and intense. As a result, the erosion typically caused by these storms can be expected to occur more frequently. Coastal erosion is also expected to increase as a result of rising seas. A 2018 study found that globally, between 1984 and 2015 erosion outweighed accretion (Mentaschi et al., 2018). However, the study could not conclude the degree to which erosion during this period is attributed to climate changes or increased coastal development. Nonetheless, increases in erosion have been observed and are expected to continue." (pg 79)
- "Property damage due to erosion typically only results in conjunction with large storm events which also bring wind and water damages. These events can cause scour and weaken foundations, which may undermine affected buildings' structural integrity." (pg 95)

Outer Banks Regional Hazard Mitigation Plan

4.5.1 Drought

- "The Fourth National Climate Assessment reports that average and extreme temperatures are increasing across the country and average annual precipitation is decreasing in the Southeast. Heavy precipitation events are becoming more frequent, meaning that there will likely be an increase in the average number of

consecutive dry days. As temperature is projected to continue rising, evaporation rates are expected to increase, resulting in decreased surface soil moisture levels. Together, these factors suggest that drought will increase in intensity and duration in the Southeast.” (pg 101)

- “Drought is unlikely to cause damages to the built environment. However, in areas with shrinking and expansive soils, drought may lead to structural damages. Drought may cause severe property loss for the agricultural industry in terms of crop and livestock losses. The USDA’s Risk Management Agency (RMA) maintains a database of all paid crop insurance claims. Between 2007-2017, the sum of claims paid for crop damage as a result of drought in Currituck County was \$616,664, or an average of \$56,060 in losses every year.” (pg 102)

Outer Banks Regional Hazard Mitigation Plan

4.5.6 Hurricane and Tropical Storm

- “North Carolina’s coastal location makes it a prime target for hurricane landfalls, and changing climate and weather conditions may increase the number and frequency of future hurricane events. Hurricanes and other coastal storms may result in increased flooding, injuries, deaths, and extreme property loss. According to the US Government Accountability Office, national storm losses from changing frequency and intensity of storms is projected to increase anywhere from \$4-6 billion in the near future. According to NOAA, weather extremes will likely cause more frequent, stronger storms in the future due to rising surface temperatures. NOAA models predict that while there may be less frequent, low-category storm events (Tropical Storms, Category 1 Hurricanes), there will be more, high-category storm events (Category 4 and 5 Hurricanes) in the future. This means that there may be fewer hurricanes overall in any given year, but when hurricanes do form, it is more likely that they will become large storms that can create massive damage.” (pg 170)
- “General damages to property are both direct (what the winds associated with hurricanes physically destroy) and indirect, which focuses on additional costs, damages and losses attributed to secondary hazards spawned by the hurricane, or due to the damages caused by the storm. Depending on the size and strength of the hurricane, associated winds are capable of damaging and eventually destroying almost anything. **Construction practices and building codes can help maximize structures’ resistance to damage.**” (pg. 171) [emphasis added]

Dare County Code of Ordinances

§22-58.1: Sand Dune Provisions

- “These regulations shall apply to any property featuring natural topography that requires grading and/or modification in order to utilize the property. Before any grading, shaping, or modification of existing natural topography occurs, an on-site meeting with the Dare County Planning Department and/or Building Inspector is required to assess the topography, discuss proposed activities, and proposed stabilization methods that will be required to address remnant slopes on the property.
 - (a) **Sand dunes and their existing contours shall not be damaged, destroyed, removed, or changed except as specifically exempted below:**
 - (1) The area required for the construction and installation of septic or wastewater improvements as authorized by the Dare County Health Department or North Carolina Department of Environmental Health.
 - (2) Activities in conjunction with a Dare County building permit as authorized by the Dare County Building Inspector.
 - (3) Other land disturbing activities in conjunction with subdivision development or other residential or commercial development as authorized by the Dare County Planning Department, the Dare County Planning Board or the Dare County Board of Commissioners.
 - (b) For activities exempted under Section 1 a, b and/or c, the following standards shall apply:
 - (1) A site plan prepared by a NC licensed engineer or NC licensed surveyor shall be submitted depicting the existing grades and proposed grades and areas where retaining walls are needed to stabilize remnant slopes.
 - (2) A horizontal – vertical slope not to exceed 4’ to 1’ shall be maintained unless the dune-disturbing activity is intended to provide elevations that are consistent with abutting properties. Before any disturbing activities commence, silt fencing shall be placed at the bottom of slopes to prevent erosion of sediment onto adjoining properties and right of ways. Silt fencing shall remain in place until the final inspection of the property by the Dare County Planning Department. Depending on the vertical slope, temporary vegetative matting may be required to stabilize slopes until permanent stabilization measures are completed. Graded slopes shall be stabilized with retaining walls or other permanent stabilization improvements prior to issuance of the Certificate of Occupancy/Certificate of Completion by the Planning Department.
 - (c) All components of retaining walls shall be located on the subject property and shall not encroach onto adjoining lots or right-of-ways, either aboveground or subsurface.
 - (d) Sand shall not be removed from the site unless authorized by the Dare County Planning Department as part of the development activities.
 - (e) Other proposals for sand dune disturbing activities not specifically exempted in subsection (a) may be submitted for review as **special uses** subject to Planning Board review and Board of Commissioners approval.

- (f) Unauthorized dune-disturbing activities shall be considered a violation of this chapter and shall be subject to a fine of \$200 for each and every day the violation continues. Mitigation plans prepared by a NC licensed engineer or NC licensed surveyor shall be required for any unauthorized dune-disturbing activity.”

§ 151.55 Coastal High Hazard Area (Zone VE) (Overlay Zone)

- Coastal high hazard areas are special flood hazard areas established in § 151.07 and designated as Zones VE. These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, all new construction and substantial improvements shall meet the following provisions in addition to the provisions of §§ 151.50 and 151.51:
 - (A) All new construction and substantial improvements shall be located landward of the reach of mean high tide.
 - (B) All new construction and substantial improvements shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) is no lower than the regulatory flood protection elevation. Flood proofing shall not be utilized on any structures in coastal high hazard areas to satisfy the regulatory flood protection elevation requirements.
 - (C) All new construction and substantial improvements shall have the space below the bottom of the lowest horizontal structural member of the lowest floor free of obstruction so as not to impede the flow of flood waters, with the following exceptions:
 - (1) Open wood or plastic latticework or insect screening may be permitted below the lowest floor for aesthetic purposes only and must be designed to wash away in the event of wave impact and in accordance with the provisions of § 151.51(D)(5). Design plans shall be submitted in accordance with the provisions of § 151.32(A)(4)(c)1.; or
 - (2) Breakaway walls may be permitted provided they meet the criteria set forth in § 151.51(D)(5). Design plans shall be submitted in accordance with the provisions of § 151.32(A)(4)(c)1.
 - (D) All new construction and substantial improvements shall be securely anchored to pile or column foundations. All pilings and columns and the structure attached thereto shall be anchored to resist flotation, collapse, and lateral movement due to the effect of wind and water loads acting simultaneously on all building components.
 - (1) Water loading values used shall be those associated with the base flood.
 - (2) Wind loading values used shall be those required by the current edition of the North Carolina State Building Code.
 - (E) For concrete pads, including patios, decks, parking pads, walkways, driveways, pool decks, etc., the following is required:

- (1) Shall be structurally independent of the primary structural foundation system of the structure and shall not adversely affect structures through redirection of floodwaters or debris;
- (2) Shall be constructed to break away cleanly during design flood conditions, shall be frangible, and shall not produce debris capable of causing damage to any structure (Note: The installation of concrete in small segments (approximately 4 feet by 4 feet) that will easily break up during the base flood event, or score concrete in 4 feet by 4 feet maximum segments is acceptable to meet this standard);
- (3) Reinforcing, including welded wire fabric, shall not be used in order to minimize the potential for concreted pads being a source of debris; and
- (4) Pad thickness:
 - (a) Shall not exceed 4 inches; or
 - (b) Be certified by a design professional that the design and method of construction to be used shall be compliant with the applicable criteria of this section.
- (5) The provisions above shall not apply to non-residential or multi-family construction that is designed by a professional engineer and constructed with self-supporting structural slabs capable of remaining intact and functional under base flood conditions, included expected erosion. [. . .]
- (I) *Fill/grading.* **Fill material shall not be used for structural support of building.** Minor grading and the placement of minor quantities of non-structural fill may be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways. Fill material shall not prevent free passage of floodwaters and waves beneath elevated buildings. Fill must not divert floodwaters or deflect waves such that increased damage is sustained by adjacent or nearby buildings. FEMA Technical Bulletins may be consulted for appropriate evaluation criteria on the placement of non-structural fill in VE Zones.
- (J) **There shall be no alteration of sand dunes or mangrove stands which would increase potential flood damage.**
- (K) No manufactured homes shall be permitted except in an existing manufactured home park or subdivision. A replacement manufactured home may be placed on a lot in an existing manufactured home park or subdivision provided the anchoring and elevation standards of this Section have been satisfied.
- (L) Recreational vehicles may be permitted in coastal high hazard areas provided that they meet the recreational vehicle criteria of § 151.51(F).
- (M) A deck that is structurally attached to a building or structure shall have the bottom of the lowest horizontal structural member at or above the regulatory flood protection elevation and any supporting members that extend below the regulatory flood protection elevation shall comply with the foundation requirements that apply to the building or structure, which shall

be designed to accommodate any increased loads resulting from the attached deck. The increased loads must be considered in the design of the primary structure and included in the V-Zone certification required under § 151.32(C)(6).

- (N) A deck or patio that is located below the regulatory flood protection elevation shall be structurally independent from buildings or structures and their foundation systems, and shall be designed and constructed either to remain intact and in place during design flood conditions or to break apart into small pieces to minimize debris during flooding that is capable of causing structural damage to the building or structure or to adjacent buildings and structures.
- (O) **In coastal high hazard areas, development activities other than buildings and structures shall be permitted only if also authorized by the appropriate state or local authority;** if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave run-up and wave reflection that would increase damage to adjacent buildings and structures. Such other development activities include, but are not limited to:
 - (1) Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures;
 - (2) Solid fences and privacy walls, and fences prone to trapping debris, unless designed and constructed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters.
- (P) **Accessory structures, regardless of size or cost, shall not be permitted below elevated structures in VE Zones.** [emphasis added]

[§156: Wind Zone Restrictions for Manufactured/Mobile Homes](#)

- § 156.03 WIND ZONE RESTRICTIONS..
 - (A) Existing manufactured/mobile homes in unincorporated Dare County that do not meet the wind zone II or wind zone III requirements may be allowed to exist in their current location.
 - (B) Existing manufactured/mobile homes in Dare County that do not meet the wind zone II or wind zone III requirements may be moved from location to location within the unincorporated limits except into those areas zoned SED-1 on Hatteras Island.
 - (C) However, if such a manufactured/mobile home is moved outside of the unincorporated jurisdiction or outside of Dare County's boundaries, then the manufactured/mobile home will not be allowed to re-enter Dare County's jurisdiction."

Topic Title: Disaster Mitigation and Hazard Management

Resource Title: Lyon County Regional Hazard Mitigation Plan, Lyon County, Nevada Code of Ordinances & Fernley, NV Code of Ordinances

Resource Type: Special Plan and Supplemental Zoning Provision

Municipality: Fernley & Lyon County

State: Nevada

Date of Adoption: 2023 (Plan) & 2024 (Code)

Abstract: Lyon County Regional Hazard Mitigation Plan, Lyon County, Nevada Code of Ordinances & Fernley, NV Code of Ordinances

Lyon County, Nevada will encounter new issues and exacerbated existing issues because of climate change like drought, increased criminal activity, higher temperatures and floods. The county has a very progressive hazard mitigation plan which calls on the county and the cities within the county to properly plan to handle the impacts of climate change and prepare its citizens. While the county has not adopted their own building code, the county requires drought-resistant plants to be used throughout the county in every zoning district and allows temporary housing to be built in districts for nonconforming uses following a natural disaster.

Fernley, a city in Lyon County, has adopted the 2018 International Building Code. Many municipalities across the U.S. have adopted the 2018 International Building Code in replacement of their own building code. [The International Building Code \(IBC\) was last updated in 2024.](#)

The State of Nevada has also adopted a Disaster Debris Management Plan which addresses debris left behind after natural disasters. While this plan was adopted by the state, it includes guidelines for local governments as well. This plan makes private property owners responsible for debris on their property, unless they post a present, imminent, clear danger to public health. If the debris meets this standard, then the state will be responsible for cleaning up the debris.

Code Provisions:

[Lyon County Regional Hazard Mitigation Plan](#)

Criminal Acts and Terrorism

- § 4.2.1.3 Extent and Probability
 - “It is difficult to estimate the extent or probability of criminal activity or a terrorist incident. Nonetheless, it can be deduced that these threats could affect all populated areas in Lyon County and participating jurisdictions; government facilities and schools may be most likely targeted. The magnitude and potential severity of impacts of criminal activity or a terrorist

incident is considered High due to a Criminal Activity/Terrorism incidents ability to result in 2-25 injuries/deaths and/or severe damage to public infrastructure.

- The National Terrorism Advisory System Bulletin provides an updated “Summary of Terrorism Threat to the U.S. Homeland” approximately four times per year. At this time, a means of measuring the extent of acts of terrorism has not been identified. The potential extent of these acts are suggested by the previous occurrences discussed in the previous section.
- § 4.2.1.4 Potential Impacts from Future Climate Conditions
 - The following excerpt from the National Institute for Health’s National Center for Biotechnology Information (NCBI) reached the following conclusion in a study completed in St. Louis, MO.
 - “The current study examines the relation between climate change and levels of violence in different groups of neighborhoods. Using data from St. Louis, MO, USA, the findings indicate that **climate change is likely having a greater impact on levels of violence in disadvantaged communities than levels of violence in more affluent communities.** After controlling for confounding factors, the most disadvantaged group of communities in St. Louis typically experience an average 1% monthly increase in violent crimes for each degree increase in anomalous temperatures. In fact, results show that the 20% of most disadvantaged neighborhoods are predicted to absorb over 50% of climate change related increases in violence. On the other hand, the least disadvantaged neighborhoods in the study display no significant correlation between violence and temperature anomalies. Combined, these results suggest that those already at higher risk for a plethora of health issues connected to climate change are also likely to experience higher levels of violent victimization.” (emphasis added)

Severe Storm and Extreme Snowfall

- § 4.2.3.1 Hazard Description
 - “Severe weather can include hazardous conditions produced by thunderstorms, damaging winds, tornadoes, large hail, flooding and flash flooding, and winter storms associated with freezing rain, sleet, snow and strong winds.
 - Extreme Snowfall and Winter Weather –A winter storm is a combination of heavy snow, blowing snow and/or dangerous wind chills. A winter storm is life-threatening. Most precipitation that forms in wintertime clouds starts out as snow because the top layer of the storm is usually cold enough to create snowflakes. Snowflakes are just collections of ice crystals that cling to each other as they fall toward the ground. Precipitation continues to fall as snow when the temperature remains at or below 0 degrees Celsius from the cloud base to the ground. Strong Winds – consists of damaging winds, which are

classified as exceeding 58 miles per hour (mph). Extreme Heat – In most of the United States, extreme heat is a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. Severe Thunderstorms – a thunderstorm, winds greater or equal to 40 mph and/or hail at least 0.5 inch in diameter. Structural wind damage may imply the occurrence of a severe thunderstorm. A thunderstorm wind equal to or greater than 40 mph (35 knots) and/or hail of at least 0.5 inches is defined as approaching severe. Hail is a form of solid precipitation which consists of balls or irregular lumps of ice, that are individually called hail stones. Hail stones consist mainly of water ice and measure between 0.20 and 1.00 inches in diameter, with the larger stones coming from severe and dangerous thunderstorms. Hail is possible with most thunderstorms as strong rising air currents in the thundercloud transport moisture laden air well above the freezing level converting super-cooled water vapor into hail stones. The stronger the updraft into the thunderstorm, the longer these initially small hail stones stay suspended in the storm, allowing them to grow to in size to the point where they eventually become too heavy for the updraft to keep them aloft, and they fall to the surface.”

- § 4.2.3.4 Potential Impacts from Future Climate Conditions
 - “According to the 2023 State of Nevada Enhanced Hazard Mitigation Plan, the State climate assessment projects that in the relatively near future – the middle of the century – Northern Nevada will experience, on average, 7-35 more extremely hot days. In the near-term, the number of warm nights is also expected to increase, with larger increases in the southern part of the state. Representatives from the NWS-Reno office presented to the MPT in August 2023 that extreme weather events are more common and, in order to build climate resilience, jurisdictions should be prepared for not only for events experienced in the past, but for events the region has yet to experience. There are also models that suggest there may be more rain and less snow and larger drought/flood variability. “

[Lyon County Regional Hazard Mitigation Plan](#)

Drought

- § 4.2.11.4 Potential Impacts from Future Climate Conditions
 - “Long-term models are trending toward warmer temperatures; however, there is significant variability in levels of precipitation. Northern Nevada is recorded to have experienced several years of drought conditions followed by years of high precipitation. Lyon County and participating jurisdictions will plan for significant drought pattern during drier patterns in upcoming years.”

Title 32 - Development Code

- [§ 15.348.08: LANDSCAPING, FENCES AND WALLS:](#) LANDSCAPING, FENCES AND WALLS:
 - “Multi-family residential developments shall provide landscaping as specified in chapter 402 of this title and the following standards (see section 15.348.07, figure 15.348-6 of this chapter):
 - [. . .] E. **The use of native and/or low water-consumptive drought-tolerant landscaping is encouraged.** All landscaping shall be irrigated with a permanent irrigation system unless a licensed landscape architect submits written verification that the proposed plant materials do not require permanent irrigation. If the proposed plant materials do not require permanent irrigation, then temporary irrigation shall be installed to allow the living plant materials to become established. Once the living plant materials are deemed to be established by the Director, then the temporary irrigation shall be removed. The property owner shall maintain all landscaping. (Ord. 603, 11-1-2018)”
- [§ 15.360.05: ADDITIONAL STANDARDS; PROPERTIES WITH HIGHWAY 50 OR HIGHWAY 95A FRONTAGE:](#) ADDITIONAL STANDARDS; PROPERTIES WITH HIGHWAY 50 OR HIGHWAY 95A FRONTAGE:
 - “A. Applicability: Development of any site or structure that will contain a commercial use, or a mix of commercial and other uses adjacent to the rights-of-way of Highway 50 or Highway 95A, with the exception of those properties located within a Historic Character District, shall comply with the general site layout and building design standards of section 15.360.04 of this chapter, plus the standards of this section.
 - B. Setbacks:
 - 1. Highway Landscape Buffer: All development shall be buffered from Highway 50 or Highway 95A by a landscaped area. Commercial development within Regional Commercial Districts the minimum buffer shall be ten feet (10') **deep with drought tolerant trees, shrubbery and rock mulch.** Commercial development within Community Commercial, Highway Mixed-Use, Commercial Mixed-Use and Neighborhood Commercial Districts the buffer shall be ten feet (10') measured from the property line. Buildings and parking areas shall not be located in this buffer area. On sites with severe topographic/physical constraints, this landscaped buffer may be reduced at the discretion of the Director.”
- [§ 15.402.03: DESIGN STANDARDS::](#) DESIGN STANDARDS:
 - “A. General: Developments shall incorporate a variety of landscape elements to enhance the building or site, add privacy or shade, screen obtrusive or objectionable features, and take advantage of special site conditions. Landscape elements may include, but not be limited to:
 - 1. Living plant material;
 - 2. Decorative pavement;

- 3. Screening walls;
 - 4. Planters; or
 - 5. Site furniture or similar details to enhance the project.
 - All unimproved earth areas shall be planted, restored, or otherwise protected from erosion. The use of low impact development techniques such as use of native plants, on-site stormwater retention, drip-irrigation, and use of pervious paving material is strongly encouraged to meet the requirements of this title.
 - B. Protection Of Existing Vegetation: The appeal and character of the site shall be preserved and enhanced by retaining and protecting existing vegetation and trees whenever possible.
 - 1. Designation, Protection, And Replacement: The owner must indicate on the landscaping plan trees and vegetation intended to be preserved. Designated trees and vegetation must be protected during construction through use of fencing and other protective measures.
 - C. Maintenance: Landscaping shall be watered and maintained by the property owner/leaseholder as necessary to preserve the intent of any approved landscape plan. Ongoing maintenance shall include the replacement of dead or unhealthy plants. Violations of this section shall be subject to penalties pursuant to chapter 15 of this title.
 - **D. Plant Materials: Plant materials shall be adaptable to local conditions. Naturalized planting schemes using native or low water-consumptive drought-tolerant plant materials with a high desert character theme are strongly encouraged. Lawn areas shall be kept to a minimum.**
 - E. Street Trees: Street trees shall be organized in a formal architectural fashion to reinforce, define, and connect the spaces and corridors created by buildings and other features along a street.
 - 1. Location: Street trees shall be planted in the area between the curb and sidewalk or a location most appropriate for street tree planting.
 - 2. Spacing: Spacing of street trees shall not exceed two (2) times the tree's mature crown diameter.
 - **3. Type: Street trees shall consist of a mixture of canopy shade trees.**
 - 4. Additional Landscaping: Additional landscaping within the area between the curb and sidewalk may consist of shrubs, annuals, perennials, ground cover and turf, and shall be planted and maintained by the adjacent property owners at the approval of the appropriate jurisdiction (homeowners' association, landscape maintenance association, improvement district, GID, etc.)."
- § 15.314.01: LIGHT INDUSTRIAL - RURAL (LI-R) AND LIGHT INDUSTRIAL - SUBURBAN (LI-S): LIGHT INDUSTRIAL - RURAL (LI-R) AND LIGHT INDUSTRIAL - SUBURBAN (LI-S):

- “3. Open Space: A minimum ten foot (10') landscape strip shall be provided along the street frontage consisting of **drought tolerant, low water consumptive plantings.**”
- § [15.314.02: HEAVY INDUSTRIAL - RURAL \(HI-R\) AND HEAVY INDUSTRIAL - SUBURBAN \(HI-S\)](#):: HEAVY INDUSTRIAL - RURAL (HI-R) AND HEAVY INDUSTRIAL - SUBURBAN (HI-S):
 - “3. Open Space: A minimum ten foot (10') landscape strip shall be provided along the street frontage, consisting of **drought tolerant, low water consumptive plantings.**”
- § [15.314.03: SERVICE INDUSTRIAL \(SI\)](#):: SERVICE INDUSTRIAL (SI):
 - “3. Open Space: A minimum ten foot (10') landscape strip shall be provided along the street frontage, consisting of **drought tolerant, low water consumptive plantings.**”
- § [15.314.04: EMPLOYMENT MIXED-USE \(EMU\)](#):: EMPLOYMENT MIXED-USE (EMU):
 - “3. Open Space: A minimum ten foot (10') landscape strip shall be provided along the street frontage, consisting of **drought tolerant, low water consumptive plantings.**”
- § [15.800.13: SPECIFIC STANDARDS FOR FLOOD HAZARD REDUCTION](#):: SPECIFIC STANDARDS FOR FLOOD HAZARD REDUCTION:
 - “In all areas of special flood hazards where base flood elevation data has been provided as set forth in subsection [15.800.07A](#) or C of this chapter, the following provisions are required:
 - **I. Landscaping And Landscaping Berms: The planting of landscaping in special flood hazard areas shall consider the least resistance to stormwater flow. The construction of landscaping berms within the special flood hazard area shall be designed in consideration of the direction of stormwater flow and will not be allowed to divert the direction of flow.** Grading plans for any new construction where landscaping or landscape berms are proposed must show no adverse impact to the floodplain and must be included in the building permit submittal.”
- § [15.335.04: TEMPORARY USES PERMITTED BASED ON STANDARDS](#):: TEMPORARY USES PERMITTED BASED ON STANDARDS:

- “The temporary use permit is a mechanism to allow a use on a short-term basis and certain seasonal or transient uses not otherwise allowed. Prior to conducting or establishing a temporary use or structure, approval of a temporary use permit is required pursuant to chapter 233 of this title.
 - [. . .] 5. FEMA Trailers, Natural Disaster Or Significant Weather Event: FEMA trailers may be used as temporary housing in any Residential Zoning District following a natural disaster or significant weather event. **Should a non-conforming residential use exist at the time of a natural disaster or significant weather event in a district other than Residential, a FEMA trailer may be used as temporary housing in that zoning district.** FEMA trailers shall be removed within ninety (90) days of completion of new construction.”

Fernley, Nevada Code of Ordinances

[Title 8 - Buildings and Building Regulations](#)

- Sec. 8.02.01. - Codes adopted; amended.
 - “(a) Codes adopted. City of Fernley does hereby adopt, pursuant to NRS 268.012, in whole the following construction codes and specialized codes which will be collectively known as the City of Fernley Building Codes:
 - (1) International Building Code, 2018 edition, including appendices C, E, H, and I. [. . .]”

Topic Title: Disaster Mitigation and Hazard Management
Resource Title: Coastal Resiliency Overlay District
Resource Type: Zoning Use and Dimensional Requirements
Municipality: South Kingstown
State: Rhode Island
Date of Adoption: 2024

Abstract: Coastal Resiliency Overlay District

The South Kingstown Coastal Resiliency Overlay District is a forward-looking land use regulation aimed at mitigating the impacts of sea level rise, storm surge, and coastal erosion on vulnerable properties. By incorporating data from the Coastal Resources Management Council's (CRMC) design elevation maps, the ordinance encourages property owners to account for future flooding risks and adopt resilient construction practices. The regulation applies to areas identified as susceptible to a 100-year storm event with five feet of sea level rise, excluding FEMA-designated Special Flood Hazard Areas.

A key component of the ordinance is its emphasis on informed decision-making, requiring new development applicants to receive and acknowledge resiliency information prior to obtaining building permits. While it is an option to elevate structures to recommended flood elevation designs, the ordinance establishes height restrictions based on elevation levels to balance flood protection with aesthetic and community character considerations. Exemptions are provided for certain nonresidential and pre-approved development projects.

Code Provisions:

[CODE OF ORDINANCES TOWN OF SOUTH KINGSTOWN, RHODE ISLAND](#)
[PART III - CODE OF ORDINANCES](#)
[APPENDIX A - ZONING ORDINANCE](#)
[ARTICLE 6. - OVERLAY ZONES, SPECIAL ZONES AND SPECIAL MANAGEMENT DISTRICTS](#)

[§ 609 Coastal Resiliency Overlay District](#)

§ 609.1. Establishment of district.

There is hereby established a Coastal Resiliency (CR) Overlay District, the boundaries of which are shown on the official zoning map. The CR Overlay District contains the land area depicted on the Coastal Resources Management Council (CRMC) Design Elevation Maps as being vulnerable to storm surge during a one-hundred-year storm event with the presence

of five-feet of sea level rise (SLR) that lies outside of the Federal Emergency Management Agency's (FEMA) Special Flood Hazard Areas (SFHA).

§ 609.2. Purpose.

The purpose of the CR Overlay District is to protect the public health, safety, and general welfare by promoting awareness of future projections of sea level rise and the associated impacts from flooding and storm surge to current and future property owners. CRMC's design elevation maps allow municipalities and property owners to plan for the effects of storm surge, coastal erosion and wave conditions given future projected amounts of sea level rise. Each CRMC design elevation map depicts a specific level of anticipated sea level rise and provides recommended design flood elevations for structures, or in other words, the elevation at which a building should be constructed to withstand a once in hundred-year storm event given the amount of sea level rise depicted on the specific map. Utilization of CRMC's design elevation maps is intended to increase the ability of the structure to withstand future storm surge conditions, therefore increasing coastal resiliency and further protecting public health and safety.

§ 609.3. Recording of resiliency information prior to building permit application.

For all new construction, prior to application for a building permit, the applicant shall request information from the planning department relative to future projected sea level rise scenarios. The information to be furnished by the planning department shall be determined by the director of planning. Upon provision of the information to the applicant, the planning department shall record the information in the town's land evidence records, so that future property owners may benefit from the knowledge. The town intends this informational exercise to ensure that current and future property owners are aware of the risks from future sea level rise, flooding and storm surge. Elevating structures to a design elevation depicted on a CRMC design elevation map, however, is optional.

§ 609.4. Development standards and dimensional requirements.

When considered as part of a development project (as defined in section 601.3.C), the following height standards shall apply to the Coastal Resiliency Overlay District, except as provided in B below.

A. Maximum Building Height.

1. No structure shall exceed the following height measurements:

- (a) Structures that are elevated to a distance above grade of less than or equal to five (5) feet shall be limited to thirty-five (35) feet of building height;

(b) Structures that are elevated to a distance above grade of greater than five (5) feet but less than or equal to ten (10) feet shall be limited to thirty (30) feet of building height;

(c) Structures that are elevated to a distance above grade of greater than ten (10) feet but less than or equal to fifteen (15) feet shall be limited to twenty-five (25) feet of building height.

(d) Structures that are elevated to a distance above grade of greater than fifteen (15) feet shall be limited to twenty (20) feet of building height.

2. No part of any structure shall exceed the maximum height listed above except for those exclusions listed in the definition of "building height" in [article 12](#).

B. Inapplicability to Certain Development Projects. Notwithstanding A above, the standards in this section shall not apply:

1. Inapplicability to Development Projects within Nonresidential Zoning Districts. The standards established in this section shall not be applied to development projects wholly within a Commercial (CD, CW), Industrial (I-1, I-2, I-3), Government and Institutional (GI, and Public Marina Special Management District (PMSMD) zoning districts.

2. Inapplicability to Development Projects within Coastal Community Overlay District. The standards established in this section shall not apply to development projects located wholly within a Coastal Community Overlay District ([section 608](#)).

3. For the purposes of this section, development projects that have received a completed CRMC Preliminary Determination and/or an approval of an Onsite Wastewater Treatment System application from the Rhode Island Department of Environmental Management (RIDEM) on or before February 28, 2019 shall be exempt from the development standards outlined in A above.

C. Other than described in A above, nothing in this section shall be construed as to modify any dimensional requirements established elsewhere in this ordinance.

Topic Title: Disaster Mitigation and Hazard Management

Resource Title: Thurston County Code, Washington - Code of Ordinances (Critical Areas)

Resource Type: Supplemental Zoning Provision

Municipality: Thurston County

State: Washington

Date of Adoption: 2024

Abstract: Thurston County Code, Washington - Code of Ordinances (Critical Areas)

Thurston County, Washington, home of the state capital, Olympia, is susceptible to volcanoes and seismic activity due to their proximity to Mount Rainier. Mount Rainier is an active volcano and not only is it predicted to erupt in the near future, its heat has the potential to melt the more than 25 major glaciers on the mountain, putting the area at risk of [lahars](#). Accordingly, Thurston County has implemented 'critical areas' within their land use planning which are intended to "[m]inimize loss of life, injury, and property damage due to natural hazards such as flooding, landslides, seismic events, and volcanic eruptions, minimize the need for emergency rescue, and avoid the cost of replacing public facilities[.]" Two of these critical areas include 'Seismic Hazard Areas' and 'Volcanic Hazard Areas' and the zoning of each area has heightened development regulations and building codes, meant to strengthen the development already there, and prevent future development in these hazard areas. These critical areas are zoned through an overlay zone.

Code Provisions:

THURSTON COUNTY CODE, WASHINGTON

Title 24 - CRITICAL AREAS

Chapter 24.16 - SEISMIC HAZARD AREA

- § 24.16.010 - General purposes.
 - The purposes of this section are to:
 - A. Protect public health and safety;
 - B. Establish minimum requirements to address seismic hazards; and
 - C. Identify seismic hazard areas in Thurston County.
- § 24.16.020 - Applicability.
 - This chapter applies to all properties in Thurston County. Seismic activity can be unpredictable and may exceed the scope of this title and other requirements of the Thurston County Code. Such events may cause serious personal or bodily injury, including death, and damage to or loss of property. Too many uncertainties exist about the source, size and mobility of future events. This chapter is not a guarantee against damage or injury due to seismic activity.
- § 24.16.030 - Development standards and review.

- A. Buildings shall be subject to the design requirements and review process in Title 14 TCC, Buildings and Construction.
- B. Subdivision of property in an area that has a liquefaction susceptibility rating of high may occur provided that a geological report is provided that identifies sufficient buildable area outside of the area that has a liquefaction susceptibility rating of high. The boundary of the area that has a liquefaction susceptibility rating of high shall be clearly shown on the map.
- C. New roads, bridges, and utilities shall only be allowed in an area that has a liquefaction susceptibility rating of high when there is no feasible alternative location. Geotechnical analysis and design shall be provided to ensure the roadway, bridge and utility structures and facilities will not be susceptible to damage from seismic-induced ground deformation. Proposals shall be designed consistent with other requirements in the Thurston County Code, including Title 13 TCC, Roads and Bridges, Title 14 TCC, Buildings and Construction, and other applicable regulations.

Chapter 24.17 - VOLCANIC HAZARD AREA

- § 24.17.010 - General purposes.
 - The purposes of this section are to:
 - A. Protect public health and safety given current information on volcanic hazards;
 - B. Minimize damage to property due to volcanic events; and
 - C. Identify approximate locations of volcanic hazard areas.
- § 24.17.020 - Applicability.
 - "This chapter applies to all properties in Thurston County meeting the definition for volcanic hazard area in [Chapter 24.03](#) TCC. However, because volcanic activity can be unpredictable and may exceed the scope of this title, other areas of the county may be affected. Such low-probability, high-consequence events and other events documented by the United States Geological Survey, the State of Washington, or Thurston County may cause serious personal or bodily injury, including death, and damage to or loss of property. Too many uncertainties exist about the source, size and mobility of future events to locate hazard-free zones with absolute confidence. This chapter is not a guarantee against damage or injury due to volcanic activity."
- (24.03 Definitions)
 - "Volcanic hazard areas" means those areas subject to pyroclastic flows, lava flows and inundation by debris flows, mud flows or related flooding resulting from geologic or volcanic events of Mount Rainier, as mapped by United States Geological Survey Open File Report 98-428. The boundaries on these

maps are approximately located, and areas outside of the boundaries should not be regarded as hazard-free.

- § 24.17.030 - Development standards and review.
 - A. No new critical facilities as defined in Chapter 24.03 TCC and listed in Table 24.15-2 TCC shall be constructed or located in Case 1 lahar volcanic hazard areas; and
 - B. Existing critical facilities may be expanded so long as the existing evacuation plan is amended to demonstrate that any additional people can be evacuated in an amount of time less than the anticipated time that it takes a lahar to reach the facility. The time that it takes a lahar to reach a given point is calculated from the source of the event to the given point; and
 - C. An evacuation plan shall be provided for all multi-family, subdivisions with more than four lots, lodging, and public assembly uses with posting of the plan in all occupied rooms; and
 - D. For all new permitted uses and structures approved under this title, recordation on the title with the Thurston County Auditor that:
 - 1. Acknowledges that the development is within a Case 1 lahar volcanic hazard area for Mount Rainier, and is subject to debris flows and other hazards that potentially endangers property and life; and
 - 2. The owner and all future owners take complete responsibility for development and occupation of the residence or structure and hold Thurston County and its employees harmless for any damage suffered because of volcanic hazards; and
 - 3. Acknowledges that evacuation is the sole responsibility of the owner or occupant and that information on potential evacuation routes and holding areas is available from local emergency management agencies.
- § 24.17.040 - Additional reasonable use exception criteria.
 - In addition to the decision criteria in Chapter 24.45 TCC for granting reasonable use exceptions, reasonable use exceptions for the critical facilities listed in Table 24.15-2 proposed to be located in volcanic hazard areas shall also comply with the following conditions:
 - A. The applicant shall show through submittal of travel time data the amount of time that is anticipated for a Case 1 lahar to reach the proposed project and evacuation route.
 - B. The applicant has demonstrated that through submittal of a volcanic hazard emergency evacuation plan that:
 - 1. The proposed project is located near a safety zone (area completely located outside the limits of a Case 1 lahar) that is within walking distance in an amount of time less than the anticipated time that it takes a lahar and/or flood waters from the release of water from the Tacoma Power Structures (dams) to reach a given point, whichever is less. The time that it takes a lahar and/or flood waters to reach a given point is calculated from the source of the event to the

given point. The time of walking distance will be calculated based upon the amount of time necessary for physically or mentally challenged individuals to get from the proposed project to the safety zone any lahars off of Mt. Rainier may be mitigated or enhanced by the Tacoma Power Structures (dams); and

- 2. The evacuation route is at a slope and surface to be considered handicapped accessible; and
 - 3. The evacuation route has been determined not to contain any other potential natural hazards, such as landslide or flood hazards, to cause a blockage or destruction of the evacuation route during an event (i.e. seismic event causes the evacuation route to become impassible because of a landslide or soil liquefaction, or a release of water from the Tacoma Power Structures upstream that are likely to flood evacuation routes); and
 - 4. The evacuation route is not located adjacent to any highways or arterial road networks that may cause a life safety threat to evacuating pedestrians; and
 - 5. The safety zone is an area with adequate ingress/egress following an event, and that individuals have the ability to exit without going out of a safety zone.
- C. Proposed critical facilities shall have an adequate contingency plan that identifies where occupants and emergency response equipment and vehicles will be relocated in the event that a lahar damages the facility to an uninhabitable condition.
- CRITICAL BUILDINGS REFERENCED INCLUDE (Table 24.15-2):
 - Essential:
 - Hospitals and other medical facilities having surgery and emergency treatment areas
 - Fire, rescue and police stations and other emergency vehicle garages
 - Water treatment facilities required to maintain water pressure for fire suppression
 - Designated earthquake, hurricane or other emergency shelters
 - Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response
 - Power-generating stations and other public utility facilities required as emergency backup facilities for essential facilities
 - Aviation control towers, air traffic control centers, and emergency aircraft hangars
 - Structures containing sufficient quantities of toxic materials or explosive substances to be dangerous to the safety of the general public if released
 - Buildings and other structures having critical national defense functions
 - Hazardous:

- Buildings and other structures where more than 300 people congregate in one area
- Buildings and other structures with elementary school, secondary school, or day care facilities with an occupant load > 250
- Buildings and others structures with an occupant load greater > 500 for colleges or adult education facilities
- Health care facilities with an occupant load of 50 or more resident patients but not having surgery or emergency treatment facilities
- Jails and detention facilities
- All structures with occupancy load > 5,000
- Power-generating stations, water treatment for potable water, waste water treatment facilities and other public utility facilities not included as an essential facility, above
- Buildings and other structures not included as an Essential Facility, above, containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released

Topic Title: Disaster Mitigation and Hazard Management

Resource Title: Ocean Isle Beach, North Carolina - Coastal High Hazard Zones

Resource Type: Supplemental Zoning Provision

Municipality: Ocean Isle Beach

State: North Carolina

Date of Adoption: 2023

Abstract: Ocean Isle Beach, North Carolina - Coastal High Hazard Zones

Ocean Isle Beach, NC has adopted the North Carolina Building Code as well as set evacuation procedures, curfew, and regulated private actors through their Code of Ordinances. They have restricted construction in “coastal high hazard zones” through their code and bar removal by private actors of sand from the beach and seawalls.

The Code regulates residential and general construction by requiring flood prevention measures such as flood openings, coastal ecosystems to remain intact, and the use of drought-tolerant infrastructure.

Code Provisions:

[Code of Ordinances Town of Ocean Isle Beach, North Carolina](#)

[Chapter 10 - BUILDINGS AND BUILDING REGULATIONS](#)

[Sec. 10-31. - Building code adopted.](#)

The current edition of the North Carolina State Building Code, as adopted by the North Carolina Building Code Council, which code refers to commercial, residential and general construction, together with and along with all appendices for each of these categories and as same be amended from time to time, is adopted by reference herein as if set out in full.

[Chapter 18 - CIVIL EMERGENCIES](#)

[Sec. 18-33. - Evacuation.](#)

The mayor or his designee may direct and compel the evacuation of all or part of the population of the town to prescribed routes, modes of transportation and destination in connection with evacuations, and to control ingress and egress of a disaster area, the movement of persons within the area and the occupancy of premises in the area. Details of the evacuation may be set forth or amended in a subsequent proclamation, which shall be well publicized.

[Sec. 18-34. - Curfew.](#)

The proclamation of an emergency may impose a curfew prohibiting, in certain areas and during certain periods, the appearance, in public, of anyone who is not a member of an exempted class. The proclamation shall specify the geographical area and the period during each 24-hour day to which the curfew applies. The mayor or his designee may exempt certain

classes of people whose exemption is necessary for the preservation of public health, safety and welfare. The proclamation shall state the exempted classes and restrictions from which each is exempted.

Chapter 30 - FLOOD DAMAGE PREVENTION COASTAL REGULAR PHASE

ARTICLE V. - PROVISIONS FOR FLOOD HAZARD REDUCTION

§30-91(e)(ii): Breakaway walls shall have flood openings that allow for the automatic entry and exit of floodwaters to minimize damage caused by hydrostatic loads, per subsection 30-91(4)(d)(i)—(vi);

§30-96: These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, all new construction and substantial improvements shall meet the following provisions in addition to the provisions of sections 30-90 and 30-91:

(1) All new construction and substantial improvements shall:

- (a) Be located landward of the reach of mean high tide;
- (b) Comply with all applicable CAMA setback requirements.

(2) All new construction and substantial improvements shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) is no lower than the regulatory flood protection elevation. Floodproofing shall not be utilized on any structures in coastal high hazard areas to satisfy the regulatory flood protection elevation requirements.

(3) All new construction and substantial improvements shall have the space below the bottom of the lowest horizontal structural member of the lowest floor free of obstruction so as not to impede the flow of flood waters, with the following exceptions:

(a) Open wood or plastic latticework or insect screening may be permitted below the lowest floor for aesthetic purposes only and must be designed to wash away in the event of wave impact and in accordance with the provisions of subsection 30-91(4)(e)(i). Design plans shall be submitted in accordance with the provisions of subsection 30-61(1)(d)(iii)2; or

(b) Breakaway walls may be permitted provided they meet the criteria set forth in subsections 30-91(4)(a), (b), (c), and (e)(ii). Design plans shall be submitted in accordance with the provisions of subsection 30-61(1)(d)(iii)1.

(4) All new construction and substantial improvements shall be securely anchored to pile or column foundations. All pilings and columns and the structure attached thereto shall be anchored to resist flotation, collapse, and lateral movement due to the effect of wind and water loads acting simultaneously on all building components.

(a) Water loading values used shall be those associated with the base flood.

(b) Wind loading values used shall be those required by the current edition of the North Carolina State Building Code.

(5) For concrete pads, including patios, decks, parking pads, walkways, driveways, pool decks, etc. the following is required:

(a) Shall be structurally independent of the primary structural foundation system of the structure and shall not adversely affect structures through redirection of floodwaters or debris; and

(b) Shall be constructed to breakaway cleanly during design flood conditions, shall be frangible, and shall not produce debris capable of causing damage to any structure. (The installation of concrete in small segments (approximately four feet by four feet) that will easily break up during the base flood event, or score concrete in four feet by four feet maximum segments is acceptable to meet this standard); and

(c) Reinforcing, including welded wire fabric, shall not be used in order to minimize the potential for concreted pads being a source of debris; and

(d) Pad thickness shall not exceed four inches; or

(e) Provide a design professional's certification stating the design and method of construction to be used meet the applicable criteria of this section.

(f) The provisions above shall not apply to nonresidential or multifamily construction that is designed by a professional engineer and constructed with self-supporting structural slabs capable of remaining intact and functional under base flood conditions, including expected erosion.

(15) In coastal high hazard areas, development activities other than buildings and structures shall be permitted only if also authorized by the appropriate state or local authority; if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent buildings and structures. Such other development activities include, but are not limited to:

(a) Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures;

(b) Solid fences and privacy walls, and fences prone to trapping debris, unless designed and constructed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters.”

Chapter 38 - OFFENSES AND MISCELLANEOUS PROVISIONS

§38-33: “No person shall remove or cause to be removed any beach sand from its natural state, except necessary excavation in preparation for building, remodeling or repairing the premises[.]”

§15.314.01: LIGHT INDUSTRIAL - RURAL (LI-R) AND LIGHT INDUSTRIAL - SUBURBAN (LI-S):: LIGHT INDUSTRIAL - RURAL (LI-R) AND LIGHT INDUSTRIAL - SUBURBAN (LI-S):

F. Miscellaneous Requirements:

3. Open Space: A minimum ten foot (10') landscape strip shall be provided along the street frontage consisting of **drought tolerant, low water consumptive plantings.**”

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§ 15.314.02: HEAVY INDUSTRIAL - RURAL (HI-R) AND HEAVY INDUSTRIAL - SUBURBAN (HI-S):: HEAVY INDUSTRIAL - RURAL (HI-R) AND HEAVY INDUSTRIAL - SUBURBAN (HI-S):

F. Miscellaneous Requirements:

3. Open Space: A minimum ten foot (10') landscape strip shall be provided along the street frontage, consisting of **drought tolerant, low water consumptive plantings.**

§ 15.314.03: SERVICE INDUSTRIAL (SI):: SERVICE INDUSTRIAL (SI):

F. Miscellaneous Requirements:

3. Open Space: A minimum ten foot (10') landscape strip shall be provided along the street frontage, consisting of **drought tolerant, low water consumptive plantings.**

§ 15.314.04: EMPLOYMENT MIXED-USE (EMU):: EMPLOYMENT MIXED-USE (EMU):

F. Miscellaneous Requirements:

3. Open Space: A minimum ten foot (10') landscape strip shall be provided along the street frontage, consisting of **drought tolerant, low water consumptive plantings.**

§ 15.800.13: SPECIFIC STANDARDS FOR FLOOD HAZARD REDUCTION:: SPECIFIC

STANDARDS FOR FLOOD HAZARD REDUCTION: In all areas of special flood hazards where base flood elevation data has been provided as set forth in subsection 15.800.07A or C of this chapter, the following provisions are required:

I. Landscaping And Landscaping Berms: The planting of landscaping in special flood hazard areas shall consider the least resistance to stormwater flow. The construction of landscaping berms within the special flood hazard area shall be designed in consideration of the direction of stormwater flow and will not be allowed to divert the direction of flow. Grading plans for any new construction where landscaping or landscape berms are proposed must show no adverse impact to the floodplain and must be included in the building permit submittal."

§ 15.335.04: TEMPORARY USES PERMITTED BASED ON STANDARDS:: TEMPORARY USES PERMITTED BASED ON STANDARDS:

The temporary use permit is a mechanism to allow a use on a short-term basis and certain seasonal or transient uses not otherwise allowed. Prior to conducting or establishing a temporary use or structure, approval of a temporary use permit is required pursuant to chapter 233 of this title.

- [. . .] 5. FEMA Trailers, Natural Disaster Or Significant Weather Event: FEMA trailers may be used as temporary housing in any Residential Zoning District following a natural disaster or significant weather event. **Should a non-conforming residential use exist at the time of a natural disaster or significant weather event in a district other than Residential, a FEMA trailer may be used as**

temporary housing in that zoning district. FEMA trailers shall be removed within ninety (90) days of completion of new construction.”

Topic Title: Disaster Mitigation and Hazard Management
Resource Title: Development Review and Approval for Large Projects
Resource Type: Principal Land Use Boards and Officers
Municipality: Boston
State: Massachusetts
Date of Adoption: 2024

Abstract: Development Review and Approval for Large Projects

Boston's Large Project Review process, as established in Section 80B of the city's zoning code, creates a unified framework for evaluating major developments to ensure they align with public health, safety, environmental sustainability, and urban design goals. The ordinance requires large-scale projects to undergo a comprehensive review process that assesses their impact on transportation, historic resources, infrastructure, and environmental factors. A core component of this review is the Environmental Protection Component, which mandates detailed studies on potential harm related to wind, shadow, air and water quality, flood risk, and other ecological concerns. Developers must propose mitigation measures to address identified risks, ensuring that new projects contribute positively to Boston's built environment while minimizing adverse effects.

The ordinance plays a critical role in strengthening Boston's resilience to natural disasters, particularly flooding and extreme weather events, which pose significant risks to the city due to its coastal location and aging infrastructure. By requiring environmental assessments and mitigation strategies, the law integrates climate adaptation into urban planning, helping to prevent damage to buildings, infrastructure, and natural resources. Additionally, its emphasis on green building standards and sustainable development aligns with broader climate resilient development principles, ensuring that new construction enhances the city's long-term sustainability and disaster preparedness.

Code Provisions:

ARTICLE 80 - DEVELOPMENT REVIEW AND APPROVAL

§ 80-1- Purpose of this Article.

The purpose of this Article is to provide clear, predictable, and unified requirements for the review of development projects throughout the City. These review requirements also provide important opportunities for community involvement in development review activities that affect the quality of life in the City.

The development review requirements set forth in this Article are established to protect and enhance the public realm, to mitigate the impacts of development projects on their surroundings and on City resources, to ensure compliance with the intent and purpose of this Code and promote efficiency in its administration, and to promote the

public health, safety, convenience, and welfare. To that end, the goals of these development review requirements include the following for the purposes of Affirmatively Furthering Fair Housing, as defined in Article 2: to protect and enhance urban design quality; to encourage the most appropriate use of land; to improve the overall quality of development; to mitigate the impact of new development on the City's transportation network and on adjacent residential neighborhoods; to encourage the use of mass transit and alternate modes of transportation; to improve pedestrian and vehicular circulation and access; to encourage new buildings and public spaces that are designed to enhance and preserve Boston's system of parks, squares, walkways, and active shopping streets; to ensure that physically disabled persons have full access to buildings open to the public, to afford such persons the educational, employment, and recreational opportunities necessary to all citizens, and to preserve and increase the supply of living space accessible to physically disabled persons; to prevent overcrowding and deterioration of existing housing and to preserve and increase the City's housing amenities; to maintain a healthy and safe environment; to provide ample access to light and air; to protect and improve air and water quality; to assess the demand for infrastructure services; to encourage development that is in harmony with its surroundings; to ensure that new development is compatible with the existing traditional scale and character of Boston; and to maintain and improve a healthy economy by augmenting the City's attractiveness as a place to live, to conduct business and to visit.

§ 80B-3. - Scope of Large Project Review; Content of Reports.

All Proposed Projects that are subject to Large Project Review, pursuant to Section 80B-2, shall satisfy requirements relating to the Large Project Review components specified in this Section 80B-3, or such of these components as are required by the Boston Redevelopment Authority in its Scoping Determination issued pursuant to Section 80B-5. The components of Large Project Review are:

- (1) transportation;
- (2) environmental protection;
- (3) urban design;
- (4) historic resources;
- (5) infrastructure systems;
- (6) site plan;
- (7) tidelands;
- (8) Development Impact Project, as set forth in this Section 80B-3;
- (9) AFFH Assessment Component, as set forth in this Section 80B-3;

- (10) Accessibility Component, as set forth in this Section 80B-3;
- (11) Smart Utilities Component, as set forth in this Section 80B-3; and
- (12) Resilience.

2. Environmental Protection Component. In its Scoping Determination, the Boston Redevelopment Authority shall require the Applicant to conduct studies that are necessary to determine the direct or indirect damage to the environment reasonably attributable to the Proposed Project. In conjunction with such studies, the Boston Redevelopment Authority shall require the Applicant to propose mitigation and design measures that are intended to mitigate, limit, or minimize, to the extent economically feasible, any direct or indirect damage to the environment reasonably attributable to the Proposed Project. Elements for which environmental studies and mitigation measures may be required include the following:

- (a) Wind. Information may be required that indicates the pedestrian-level wind impact of the Proposed Project. Wind tunnel or other appropriate means of testing may be required for any Proposed Project over one hundred fifty feet (150') in height, or any Proposed Project at least twice as tall as any adjacent building.
- (b) Shadow. Information may be required that indicates the shadow impact of the Proposed Project, with particular emphasis on sidewalks, plazas, and other public open spaces. Shadow analyses may be required for build and no-build scenarios.
- (c) Daylight. Information may be required that indicates the percentage of skydome obstructed for build and no-build scenarios.
- (d) Solar Glare. An analysis of the solar glare impact and solar heat gain may be required.
- (e) Air Quality. An evaluation of the impact on local air quality from any significant stationary or mobile sources may be required. For residential projects, an evaluation of ambient air quality may be required to determine conformance with the National Ambient Air Quality Standards established by the United States Environmental Protection Agency.
- (f) Water Quality. An evaluation of the impact of the Proposed Project on the water quality of Boston Harbor or other affected water bodies may be required.
- (g) Flood Hazard Districts/Wetlands. A graphic or narrative description of the Proposed Project's location with respect to flood hazard districts or wetlands may be required.
- (h) Groundwater. An analysis of the impact of construction on groundwater levels and resulting effects on surrounding structures, wooden piles, and foundations may be required.

(i) Geotechnical Impact. An analysis of sub-soil conditions, the potential for ground movement and settlement during construction, and the impact on adjacent buildings and utility lines may be required, as well as a description of foundation construction methodology.

(j) Solid and Hazardous Wastes. A description of any known toxic or hazardous wastes on or buried in the Proposed Project's site may be required, pursuant to the requirements of M.G.L. Chapter 21E. A description of waste generation by the Proposed Project, including hazardous wastes, may be required.

(k) Noise. A noise impact analysis to determine compliance with applicable city, state, and federal regulations may be required. For residential projects, an evaluation of ambient noise levels may be required to determine conformance with the Design Noise Levels established by the United States Department of Housing and Urban Development.

(l) Construction Impact. A description of the Proposed Project's construction impact on public safety from noise, dust, pollutant emissions, waste generation and disposal, and staging areas, may be required.

(m) Rodent Control. An analysis of the Proposed Project's construction impact on any city or state rodent control programs, and a description of how construction activities comply with any city or state regulatory requirements controlling the rodent population, may be required.

(n) Wildlife Habitat. A description of significant flora and fauna that are present on the site.

(o) Green Building and Net Zero Carbon. An analysis to determine how well the proposed project complies with LEED and to assess the level of environmental performance that will be achieved by the Proposed Project under the most appropriate LEED building rating system; An analysis to determine how well the Proposed Project complies with the requirements detailed in Section 37-6.

Topic Title: Disaster Mitigation and Hazard Management

Resource Title: Building Permit Allocation System

Resource Type: Principal Land Use Boards and Officers

Municipality: Islamorada

State: Florida

Date of Adoption: 2002

Abstract: Building Permit Allocation System

The building permit allocation system establishes a framework for regulating development to align with the village's comprehensive plan. The system aims to control growth by preventing the deterioration of public facility service levels, mitigating environmental degradation, and reducing potential land use conflicts. Additionally, it encourages the redevelopment of both residential and nonresidential properties while promoting affordable housing. By applying a structured evaluation process, the system ensures that new developments adhere to the village's long-term planning and sustainability goals.

The ordinance operates through a point-based evaluation system that ranks building permit applications based on various criteria, including infrastructure availability, environmental impact, and community benefits. Applications receive positive points for factors such as infill development within existing subdivisions, energy-efficient construction, and affordable housing contributions. Conversely, points are deducted for proposals that would clear significant habitat, impact endangered species, or develop within high-risk coastal areas. This structured approach incentivizes sustainable growth while discouraging projects that could negatively affect the environment or strain public resources. By integrating development priorities with conservation and resilience measures, the permit allocation system serves as a tool for balancing growth with ecological and infrastructural sustainability.

Code Provisions:

DIVISION 30-IV-11 BUILDING PERMIT ALLOCATION SYSTEM

Sec 30-471 Intent and Purpose

It is the intent and purpose of this division to:

1. Facilitate implementation of goals, objectives and policies set forth in the village comprehensive plan;
2. Regulate the rate of growth in order to further deter deterioration of public facility service levels, environmental degradation and potential land use conflicts; and
3. Encourage redevelopment of residential and nonresidential development and to encourage affordable housing.

Sec 30-473 Applicability

1. *Type of development affected.* The building permit allocation system shall apply to the development of all residential dwelling units and all nonresidential floor area for which a building permit is required by this chapter, and which building permit has not been issued prior to the effective date of this division, except as otherwise provided herein.

Sec 30-476 Building Permit Allocation Evaluation Criteria and Award

1. *Residential building permit allocation evaluation criteria.* Applications shall be evaluated and ranked according to the following point values, which are to be applied cumulatively.

1. *Platted subdivision infill.* The following points are intended to encourage the infill of legally platted subdivisions served by existing infrastructure.

Point assignment:	+10.

Criteria: An application which proposes a dwelling unit within a legally platted, recorded subdivision on lots served by existing infrastructure, including, at a minimum, potable water, electricity, and roadways which the operations director determines are paved. In order to be considered served, the necessary infrastructure must be both located along the same street as the lot or parcel proposed for development and in place since December 31, 1997.

2. *Infrastructure availability.* The following points are intended to encourage the infill of lots or parcels served by existing infrastructure.

Point assignment:	+5.

Criteria: An application which proposes a dwelling unit outside of a legally platted, recorded subdivision, but the lot or parcel proposed for development is served by existing infrastructure, including, at a minimum, potable water, electricity, and roadways which the operations director determines are paved. In order to be considered served, the necessary infrastructure must be both located along the same street as the lot or parcel proposed for development and in place since December 31, 1997.

3. *Lot aggregation.* The following points are intended to encourage the voluntary reduction of density through aggregation of contiguous, vacant,

legally platted, buildable lots with density allocation by lot.

Point assignment:	+3 per contiguous, vacant, legally platted, buildable lot.

Criteria: An application which proposes aggregation of a contiguous vacant, legally platted, buildable R1, R1M, RMH, R2, R3, R4 or SR lot together with the parcel proposed for development. The application shall include but shall not be limited to an affidavit of ownership of all affected parcels, acreage or land and a legally binding restrictive covenant limiting the number of dwelling units on the aggregated lot, running in favor of the village and enforceable by the village, subject to the approval of the village council prior to filing in the office of the clerk of the county, and such covenant must be approved by the village council before any development approval may be issued pursuant to an award.

4. *Land dedication.* The following points are intended to encourage the voluntary reduction of vacant, buildable land in the village within those areas proposed for acquisition by governmental agencies for the purposes of conservation, resource protection or for affordable housing within the village.

Point assignment:	+10 per vacant, legally platted buildable lot or entire acre of unplatted buildable land.
	+10 additional per vacant, legally platted buildable lot or entire acre of unplatted buildable land within those areas proposed for acquisition by governmental agencies.

Criteria: An application which proposes the dedication to the village of one or more vacant, legally platted buildable lots or at least one acre of unplatted buildable land, including those located within areas proposed for acquisition by governmental agencies for the purposes of conservation, resource protection or for affordable housing within the village. Buildable means construction of a dwelling unit could be permitted pursuant to this chapter, as determined by the director of planning and development services. The application shall include but not be limited to an affidavit of ownership of all affected lots, parcels, acreage or land and a statutory warranty deed, subject to the approval of the village council prior to filing in the office of the clerk of the county, which conveys the dedicated property to the village. Such deed must be approved by the village council before any development approval

may be issued pursuant to an award. Applications including land dedication shall be evaluated in a category separate from applications without land dedication. A survey shall accompany all dedications of unplatted buildable lands or partial platted lots.

5. *Habitat protection.* The following points are intended to discourage the clearing of significant habitat and are based on the type and quality of the existing vegetation located within an area approved for clearing or development as shown on the approved site plan.

Point assignment and criteria:	-10 per application which proposes to clear an area of habitat type and quality from Group 4, which includes high quality tropical hardwood hammock, unscarified beach/berm, and saltmarsh and buttonwood wetlands.
	-7 per application which proposes to clear an area of habitat type and quality from Group 3, which includes moderate quality tropical hardwood hammock.
	-2 per application which proposes to clear an area of habitat type and quality from Group 2, which includes low quality tropical hardwood hammock, disturbed land with saltmarsh and buttonwood, disturbed land with tropical hardwood hammock and disturbed land with beach/berm.
	+1 per application which proposes to develop in an area of habitat type and quality from Group 1, which includes disturbed, disturbed with exotics, and scarified.

Additional criteria: If the approved clearing area includes more than one habitat type/habitat quality group, points shall be assigned to the application for development on the basis of the following formula: (area of clearing in Group 1/area in parcel of land to be cleared) × (+1) + (area of clearing in Group 2/area in parcel of land to be cleared) × (-2) + (area of clearing in Group 3/area in parcel of land to be cleared) × (-7) + (area of clearing in Group 4/area in a parcel of land to be cleared) × (-10). The determination of the quality of a tropical hardwood hammock shall be made through the utilization of the habitat analysis applied pursuant to article VII, division 4 of this chapter (Miscellaneous Environmental Standards).

6. *Threatened or endangered animal species.* The following points are based on probable impacts of a proposed development on the successful protection and recovery of a threatened or endangered animal species in its natural habitat.

Point assignment and criteria:	-10 per application which proposes a dwelling unit within a known habitat of a documented threatened/endangered animal species.
	-10 per application which proposes a dwelling unit within 100 feet of any known sea turtle nesting area, as described in article VII, division 3 of this chapter (Sea Turtle Nesting Protection).
	-10 per application which proposes a dwelling unit within 500 feet of any known nesting or resting area of the piping plover.
	-5 per application which proposes a dwelling unit within a probable or potential habitat of a threatened/endangered animal species.
	-2 per application which proposes a dwelling unit within the habitat of a wide-ranging threatened/endangered animal species or an animal species of special concern.

7. *Critical habitat areas.* The following points are intended to discourage development in critical habitat areas.

Point assignment and criteria:	-10 per application which proposes a dwelling unit within a Florida Forever acquisition area.

8. *Perseverance points.* The following points are intended to reward an application based upon the number of years spent in the building permit allocation system without receiving an allocation award.

Point assignment and criteria:	+1 A point shall be awarded on the anniversary date of the submittal date for each year that the application remains in the building permit allocation system up to four years.

	+2 points shall be awarded on the anniversary of the submittal date for each year over four that the application remains in the building permit allocation system.

Additional criteria: If, after gaining a perseverance point or points, an application is withdrawn for any reason, the perseverance point or points gained shall be retained; however, a new submittal date and time shall be established.

9. *Coastal high-hazard area*. The following points are intended to discourage development in a coastal high-hazard area.

Point assignment and criteria:	-2 per application which proposes development within an AE zone as shown on the most recent Federal Emergency Management Agency (FEMA) flood insurance rate map.
	-7 per application which proposes development within a VE zone as shown on the most recent FEMA flood insurance rate map.

10. *Coastal barrier resources system (CBRS)*. The following points are intended to discourage development of the CBRS.

Point assignment and criteria:	-10 per application which proposes development within units of the CBRS as shown on the most recent FEMA flood insurance rate map.

11. *Energy conservation*. The following points are intended to encourage the use of energy conservation measures.

Point assignment and criteria:	+1 per application which includes a dwelling unit with any installed air conditioning units must have an energy efficient rating of 12 or better.
	+1 per application which proposes a dwelling unit with a heat recovery unit or a solar hot

	water panel which provides supplemental heating of domestic hot water.

12. *Structural integrity of construction.* The following points are intended to encourage high standards of structural integrity.

Point assignment and criteria:	+1 per application which proposes a dwelling unit designed to meet a minimum peak wind speed of 160 miles per hour as certified by a qualified engineer or architect.
	+1 additional point per application which proposes a dwelling unit designed to meet a minimum peak wind speed of 175 miles per hour as certified by a qualified engineer or architect.
	+1 per application which proposes a dwelling unit with a concrete cistern with a capacity of no less than 2,500 gallons, gutters along the entire roof channeling into the cistern, and a pump-out system for recovery of the water.

13. *Affordable housing.* The following points are intended to encourage the development of multifamily affordable housing units.

Point assignment and criteria:	+3 per application which proposes affordable housing development with four or more new units within the same structure.

14. *Central sewer.* The following points are intended to encourage the development of parcels in areas served by or that would be served by a central sewer system by December 2015, that has committed funding or planned funding sources. Committed or planned funding is funding that is financially feasible and reflected in a capital improvements element of the comprehensive plan approved by the department of community affairs. These points shall be awarded to parcels served by a collection line within a central wastewater facility service area where a central wastewater treatment facility has been constructed that meets the treatment standards of F.S. §§ 381.0065(4)(1) and 403.086(10), and where treatment capacity is available. The points shall only be awarded if a construction permit has been issued for the collection system and the parcel lies within the service area of the wastewater treatment facility.

Point assignment and criteria:	+2 per application which proposes development within a central wastewater facility service area where a central wastewater treatment facility has been constructed that meets the treatment standards of F.S. §§ 381.0065(4)(1) and 403.086(10), and where treatment capacity is available. The points shall only be awarded if a construction permit has been issued for the collection system and the parcel lies within the service area of the wastewater treatment facility.

Topic Title: Disaster Mitigation and Hazard Management
Resource Title: Development Limited on the Waterfront
Resource Type: Environmental Chapter of Municipal Code
Municipality: Berkeley
State: California
Date of Adoption: 1986

Abstract: Development Limited on the Waterfront

Berkeley passed a comprehensive land use regulation designed to protect and preserve the city's ecologically sensitive and scenic shoreline. Enacted to prevent the unchecked urbanization of the waterfront, the ordinance establishes stringent development limitations while promoting conservation, public access, and responsible environmental stewardship. It designates specific areas—including wetlands, meadows, seasonal ponds, and beaches—as protected open space, restricting development to ensure the long-term health of the San Francisco Bay ecosystem. The ordinance also outlines strict mitigation requirements for any permitted construction, ensuring that adverse environmental impacts, such as habitat destruction, increased pollution, and geological hazards, are adequately addressed.

As a form of disaster mitigation planning, the ordinance mitigates risks associated with flooding, seismic activity, and ecological degradation. By limiting high-density development in vulnerable areas, it reduces exposure to climate-related threats while preserving natural flood barriers and wildlife habitats. Additionally, the ordinance advances climate resilient development by safeguarding critical ecological systems, promoting sustainable land use, and maintaining public access to natural resources. By balancing environmental conservation with limited, regulated development, the ordinance serves as a model for proactive, resilience-focused urban planning.

Code Provisions:

BERKELEY MUNICIPAL CODE

Chapter 11.56 DEVELOPMENT LIMITED ON THE WATERFRONT

§ 11.56.010 Findings.

The people of the City of Berkeley find that it is in the public interest to preserve and protect the open space, views, wetlands, tidal mudflats, seasonal ponds, wetlands-type environment, creeks, meadows, beaches and the low density character of the unique and irreplaceable waterfront area of the City, being all that land in the City of Berkeley generally adjacent to San Francisco Bay and lying west of Interstate Highway 80 and east of Marina Boulevard.

The people of Berkeley further find, based on numerous scientific studies and data, including those developed during the Waterfront Planning Process of 1984-86, and in the draft Environmental Impact Report of June 1986, that the portion of the waterfront area south of the northern edge of Virginia Street (as extended westward), and including School House Creek, constitutes environmentally sensitive, irreplaceable, and unique wetlands, marshes, seasonal ponds, meadows, wildlife habitat, and other features of the natural ecology; and that it is in the public interest to preserve, protect, reclaim, and restore all said portion of the waterfront in a natural, open, and undeveloped form.

These actions are necessary to protect the public health, safety, and welfare and to avoid unnecessary conversion of open space land to high density urban uses, thereby protecting against the resultant adverse impacts, such as: disturbance of wetlands and wetlands-type environment; destruction of wildlife habitat, including that of endangered and protected species; diminishing the ecological health of San Francisco Bay; hazards relating to geology, landfill, flooding, and earthquakes; destruction of scenic beauty; air, noise, and water pollution; increases in traffic on freeway, City streets, and intersections to unacceptable levels; rise in housing costs and subsequent displacement of low-income people from contiguous neighborhoods in West Berkeley; and other demonstrated consequences of overly dense urban development. (Ord. 5788-NS § 1, 1986)

§ 11.56.020 Purpose.

The purpose of this chapter is to establish policies and uses which:

- A. Provide special protection to the unique and irreplaceable San Francisco Bay shoreline ecology, including, but not limited to, seasonal ponds, wetlands, mudflats, meadows, beaches, marshes, creeks, and tidelands;
- B. Protect the open space and enhance the recreational uses and low density character of the entire waterfront area;
- C. Protect and preserve views from the waterfront to the rest of the City, and from the rest of the City to the waterfront;
- D. Guarantee and maximize access to the shoreline area by citizens of Berkeley and the state of California and guarantee that a continuous shoreline corridor or esplanade at least one hundred feet wide shall be dedicated to the public for access by pedestrians, the disabled, and bicyclists; provided, however, that such access shall not damage the delicate ecology of the area; and

E. Ensure that any development in the waterfront area occurs in a prudent manner, while protecting the City's residents from overly dense urban development in areas which are ecologically fragile and/or irreplaceable. (Ord. 5788-NS § 2, 1986)

§ 11.56.030 Policies.

A. Meadow. That area of the Berkeley Waterfront bounded by the freeway on the east, by the south sailing basin on the south, by Marina Boulevard on the west, and by the north sailing basin and by the northern edge of Virginia Street (as extended West to the Bay) on the north, commonly known as the Meadow, shall be retained as open space, except as provided in subsection C, 4 below. Open space uses which do not require the construction of structures on the Meadow may be allowed on the Meadow, provided that such uses are consistent with the findings, purposes, and policies stated above, and provided further that any adverse environmental impacts be satisfactorily mitigated on site.

B. Brickyard and Beach. That peninsular portion of the Berkeley Waterfront south of the Meadow to Emeryville, commonly known as the Brickyard, and that the water's-edge portion of the waterfront south of University Avenue, commonly known as the Berkeley Beach, shall be retained as open space, except that a nature interpretive center of no more than one story, with a height of no more than twenty feet above current ground level, and with an area of no more than five thousand square feet of floor space may be constructed on the Brickyard. Open space uses which do not require the construction of structures on the Brickyard and Beach may be allowed on the Brickyard and Beach, provided that such uses are consistent with the findings, purposes, and policies stated above, and provided further that any adverse environmental impacts be satisfactorily mitigated on site.

C. North Basin Strip and Horse Barns.

1. That portion of the Berkeley Waterfront north of the Meadow, east of the Bay and south of Gilman Street, commonly known as the North Basin Strip; and that portion of the Berkeley Waterfront north of Gilman Street, east of the Bay, and south of the Albany city line, commonly known as the Horse Barns area, shall be designated for development.

2. The total amount of development allowed in this area may not exceed five hundred sixty-five thousand square feet. No building may be constructed which exceeds two stories, or which exceeds twenty-five feet above the current (1986) ground level, except that up to fifty thousand square feet of this amount of development may be placed in a third story, in a building or buildings not to exceed thirty-five feet in height above the current (1986) ground level, if the appropriate City Design Review Board determines that a plan which includes such increase in

height is desirable both for aesthetic reasons and to carry out the policies set forth above. Permitted uses in this area are limited to the categories of uses for this area set forth in the draft Waterfront Specific Plan of May 9, 1986, (which categories include lodgings, conference center, restaurants, retail shops, recreational uses, and open space uses) plus buildings appurtenant to any open space use of the Meadow or Brickyard.

3. The above-described development may be allowed only if the landowner or developer establishes that any adverse environmental impacts, including, but not limited to, those described in the June 1986 draft Environmental Impact Report, including, but not limited to, traffic, geology, wetlands, and endangered-species problems, will be satisfactorily solved or mitigated. Any adverse impacts as to wetlands shall be mitigated on property within the Berkeley Waterfront, as defined above.

4. If the landowner or developer demonstrates to the City's satisfaction that it is economically and legally infeasible to place all the development described in subsection C, 2, above, in a location north of Virginia Street (as extended westward), then the City may permit some of that development to be situated south of Virginia Street (as extended westward) provided: (1) that the amount of development (including structures and parking) located south of Virginia Street shall be kept to a minimum; (2) that any such development south of Virginia Street may occupy a site of no more than twelve acres of land; (3) that this development shall be located as far north and as far east on the Meadow as possible, and shall not encroach on that portion of the Meadow which is west of the North Basin Strip shoreline, if that line were extended due south to University Avenue; and (4) that the above-described development may be allowed only if the landowner or developer establishes that any adverse environmental impacts, including, but not limited to, those described in the June 1986 draft Environmental Impact Report, including, but not limited to, traffic, geology, wetlands, and endangered-species problems, will be satisfactorily solved or mitigated. Any adverse impacts as to wetlands shall be mitigated on property within the Berkeley Waterfront, as defined above.

"Economically and legally infeasible" is defined as follows: the landowner or developer must establish that there was a lease between it and the Pacific Racing Association which existed as of January 1, 1986; that said lease did and does render it legally and financially infeasible to construct the approved development on the North Basin Strip north of Virginia Street, that the lease represents the sole reason for any inability to develop prior to the lease's expiration date, and that said lease cannot reasonably be modified at a reasonable cost. "Reasonable cost" means that the cost or fair market value of modifying the lease, as determined by the City, is

such that it would not make the contemplated construction north of Virginia Street financially infeasible.

"To the City's satisfaction", as used in this subsection, is defined as follows: the City Council must find, by a vote of more than two-thirds of the councilmembers, based on a preponderance of the evidence, that such development in this location is necessary to carry out the purposes and polices of this Chapter. (Ord. 5788-NS § 3, 1986)

§ 11.56.040 Programs and time limits.

Within six months of the effective date of this chapter the City of Berkeley's Master Plan, Zoning Ordinance, and Waterfront Specific Plan shall be amended to incorporate and conform to the policies contained in this chapter. However, the policies contained in this chapter shall be in force as soon as the chapter takes effect. These policies shall be implemented in a manner which advances the findings and purposes listed above. (Ord. 5788-NS § 4, 1986)

§ 11.56.050 Constitutionality.

This chapter is not intended to authorize, and shall not be construed as authorizing, the City of Berkeley to exercise its power in a manner which will take or damage private property for public use. This chapter is not intended to increase or decrease the rights of any owner of property under the Constitution of the State of California or the United States. (Ord. 5788-NS § 5, 1986)

Topic Title: Disaster Mitigation and Hazard Management

Resource Title: Earthquake Hazard Building Regulation

Resource Type: Public Health Chapter

Municipality: Long Beach

State: California

Date of Adoption: Updated 2022

Abstract: Earthquake Hazard Building Regulation

The Long Beach, CA Building Standards Code (Chapters 18.68 and 18.70) establishes mandatory and voluntary earthquake hazard mitigation regulations aimed at reducing the seismic risk associated with older and vulnerable structures. [Chapter 18.68](#) mandates a systematic evaluation and retrofitting process for certain existing buildings, requiring owners to assess structural conditions and, where necessary, implement hazard reduction measures to bring the building's risk level to a "tolerable" standard. The law outlines specific technical requirements for retrofitting plans, including material conditions, anchorage, wall structure, and past repair history. If an owner fails to comply or is found to be acting in bad faith, the city has the authority to order immediate demolition of the building—highlighting a strong regulatory intervention for public safety.

[Chapter 18.70](#), by contrast, establishes *voluntary* minimum seismic safety standards for soft-story, wood-frame residential buildings, especially those with open ground floors (typically for parking) and multiple stories above. This part of the ordinance responds to the demonstrated dangers posed by such structures during earthquakes, as evidenced by the 1994 Northridge quake. Although it does not mandate retrofits, it sets design and construction guidelines that, if implemented, can significantly reduce the risk of injury or death. Together, these ordinances showcase the proactive role of local government in regulating private property to mitigate disaster risk and foster climate-resilient development. They also demonstrate a tiered regulatory approach—mandatory in high-risk cases and voluntary where appropriate—that encourages private-sector cooperation in achieving public safety goals.

Code Provisions:

[Long Beach, California – Municipal Code](#)

[Title 18 - LONG BEACH BUILDING STANDARDS CODE](#)

[Ch. 18.68 Earthquake Hazard Regulations](#)

§ 18.68.010 - Purpose.

The purpose of this chapter is to define a systematic procedure for identifying and assessing earthquake generated hazards associated with certain existing structures within the City and to develop a flexible, yet uniform and practical procedure for correcting or

reducing those hazards to tolerable hazard levels. It is not the purpose of this chapter to preclude or affect the assessment and abatement, pursuant to existing laws, of other hazards which may involve fire, exit, plumbing, electrical, and other such problems with existing buildings.

§ 18.68.023 - General requirements..

A. General. All buildings shall have a seismic resisting system conforming with UBC Section 2303(b), except as modified by this chapter.

B. Alterations and repairs. Alterations and repairs required to meet the provisions of this chapter shall comply with all other applicable requirements of this title unless specifically provided for in this chapter.

C. Requirements for plans. The following construction information shall be included in the plans required by this chapter:

1. Dimensioned floor and roof plans showing existing walls and the size and spacing of floor and roof framing members and sheathing materials. The plans shall indicate all existing and new crosswalls and their materials of construction. The location of the crosswalls and their openings shall be fully dimensioned or drawn to scale on the plans.
2. Dimensioned wall elevations showing openings, piers, wall classes as defined in Subsection 18.68.024.C.3(f), thicknesses, heights, wall shear test locations, and cracks or damaged portions requiring repairs. The general condition of the mortar joints shall be noted and if and where the joints require pointing. Where the exterior face is veneer, the type of veneer, its thickness and its bonding and/or ties to the structural wall masonry shall also be reported.
3. The type of interior wall and ceiling surfaces.
4. The extent and type of existing wall anchorage to floors and roof when utilized in the design.
5. The extent and type of parapet corrections which were previously performed, if any.
6. Repair details, if any, of cracked or damaged unreinforced masonry walls required to resist forces specified in this chapter.
7. All other plans, sections, and details necessary to delineate required retrofit construction including those items in Section 18.68.028.

§ 18.68.024 - Material requirements.

A. General. All materials permitted by this chapter, including their appropriate allowable design values and those existing configurations of materials specified herein, may be utilized to meet the requirements of this chapter.

B. Existing materials. All existing materials utilized as part of the required force resisting system shall be in sound condition or shall be removed and replaced with new material.

§ 18.68.150 - Owner responsibility to accomplish hazard reduction measures.

In the event the Board or the City Council certifies to the validity of any or all of any measures the owner has proposed as a means of reducing the earthquake hazard, and finds that the accomplishment of such measures will reduce the earthquake hazard associated with the structure to or below the applicable tolerable level, it shall order the owner to immediately initiate the accomplishment of such measures and to complete the same within a reasonable time. The Board or the City Council shall designate in its order, based on evidence presented to it during the hearing, that date certain which represents a reasonable time in its opinion for the accomplishment of the proposed measures.

§ 18.68.170 - Hearing—Failure of owner to proceed in good faith.

In the event the Building Official or any interested person presents written affidavits to the Board or the City Council indicating the owner is not proceeding in good faith to timely accomplish any measures approved by the Board or the City Council in its original decision and order, the Board or City Council shall, on ten (10) days' written notice mailed via certified United States mail to the owner of the structure, schedule and conduct a hearing on the matter. At such hearing, evidence, oral and written, may be presented as in the original hearing, and if the Board or the City Council is convinced that the owner is not proceeding in good faith to timely carry out its original order, then it shall revoke the order and order instead the immediate vacation and demolition of the structure. Written affidavits shall not, however, be received by the Board or the City Council under this section until at least fifty percent (50%) of the time allowed in their original order has expired.

Chapter 18.70 [Voluntary Earthquake Hazard Reduction in Existing Wood Frame Residential Buildings with Soft, Weak or Open Front Walls](#)

§ 18.70.010 - Purpose.

The purpose of this chapter is to promote the public welfare and safety by reducing the risk of death or injury that may result from the effects of earthquakes on existing wood-frame multi-unit residential buildings. The ground motion of the Northridge earthquake caused the loss of human life, personal injury, and property damage in these types of buildings. This chapter creates minimum standards to strengthen the more vulnerable portions of these structures. When fully followed, these minimum standards will substantially improve the performance of these buildings, but they will not necessarily prevent all earthquake-related damage.

§ 18.70.020 - Scope.

The provisions of this chapter shall apply to all existing wood frame buildings or portions thereof, designed using the Building Code in effect before January 1, 1995, which are used as hotels, lodging houses, congregate residences or apartment houses where:

- A. The ground floor portion of the wood frame structure contains parking or other similar open floor space that causes soft, weak or open front wall lines as defined in this chapter and there exists one or more levels above; or
- B. The walls of any story or basement of wood construction are laterally braced with nonconforming structural materials as defined in this chapter, and there are two or more levels above.

Topic Title: Disaster Mitigation and Hazard Management

Resource Title: The Revised Ordinances of Honolulu and the Local Hazard Mitigation Plan

Resource Type: Code of Ordinances and Local Hazard Mitigation Plan

Municipality: Honolulu

State: Hawai'i

Date of Adoption: 2025

Abstract: The Revised Ordinances of Honolulu and the Local Hazard Mitigation Plan

Honolulu, Hawaii is particularly vulnerable to tsunamis originating in the Pacific Ocean. Tsunamis are induced by earthquakes, landslides, or submarine volcanic explosions. The Hawaiian Islands have a history of suffering from tsunami destruction as they can cause catastrophic damage to property and public infrastructure. The county of Honolulu has an assessment of tsunami evacuation zones to display the coastal areas that could be flooded by tsunami waves. The county has constructed signs indicating the locations of evacuation areas, warning sirens, and developed emergency evacuation plans. Furthermore, Honolulu County has plans to mitigate tsunami destruction and regulate private property owners, both residential and commercial, using the county code. The structural design of buildings and structures subject to tsunamis must be in accordance with coastal flood water design. This structural design is meant to withstand extreme flooding caused by tsunamis, and it is designed to resist seismic fluctuations. Notably, the local municipality *shall* also remit “due or paid [tax] for real property damaged or destroyed as a result of natural disaster, where the mayor has declared a natural disaster for purposes of real property tax relief”. This would directly benefit private property owners in the event of a natural disaster.

Code Provisions:

[Long Term Disaster Recovery Plan for the City and County of Honolulu](#)

- The City and County of Honolulu’s *Long Term Disaster Recovery Plan* not only encourages public comment, but also notes case studies of disaster management in the U.S. which they used to form their zoning decisions.
- “Public role in decision-making.”
 - The public process will aid in determining decisions around zoning code, land use, and building code updates related to recovery and resilience. This includes decisions concerning changes in allowable density, replacement and repair of nonconforming uses and structures after disaster, floodplain regulations, expedited permitting in rebuilding, emergency demolition policies, Coastal Zone Management including Special Management Area (SMA) and shoreline setback regulations, and site design requirements. Updates should align with the goals of the plans noted above.

- While growth management decisions are managed by state and City departments, community members can inform discussions around connections to place, protecting sacred places, and relationships with natural resources that support communities. **Decisions include relocation out of hazardous and environmentally sensitive areas, open space acquisition and preservation/conservation, transfer of development rights, and buyouts, for example.** [emphasis added]
- “Priority groups to include in the public process.
 - Residents, renters, and homeowners in hazardous zones
 - Business owners in hazardous zones
 - Low-income residents and other groups at increased risk of displacement pressure
 - Community Associations
 - Coastal Communities
 - Hawai‘i Alliance for Community-Based Economic Development
 - Hawai‘i Community Foundation
 - Climate Change Commission
 - Business improvement associations
 - Farmers
 - Natural resource experts
- “Case Studies.
 - New York City conducted robust public engagement to address zoning and land use issues in flood prone areas after Hurricane Sandy. The 2019 Zoning for Coastal Flood Resiliency: Planning for Resilient Neighborhoods report was created to improve upon and make permanent existing temporary zoning rules that were adopted on an emergency-basis after the hurricane.
 - Santa Rosa, California created a Resilient City Permit Center to provide technical assistance and expedited processing for zoning code and building code applications while also waiving permitting fees after the 2017 wildfires.
 - The Association of Bay Area Governments and the San Francisco Bay Conservation and Development Commission requested assistance from the U.S. Environmental Protection Agency to ensure that housing built in the region’s high-growth areas are safe from hazard risks. They conducted a Housing and Community Risk Assessment Project to outline housing growth strategies balanced with seismic and flood risks.
 - A case study from the Lincoln Institute of Land Policy discusses Home Buyouts in New York State after Superstorm Sandy, including obstacles to participation and how to efficiently relocate residents out of hazardous areas.”

Honolulu, HI Code of Ordinances

[Chapter 8: Remissions](#)

- § 8-4.2 Remission of taxes in cases of natural disasters.
 - “(a) The director shall remit taxes due or paid [tax] for real property damaged or destroyed as a result of natural disaster, where the mayor has declared a natural disaster for purposes of real property tax relief, under this section. Remissions shall be granted:
 - (1) Of taxes on the damaged or destroyed real property for the tax year in which the natural disaster occurred; and
 - (2) To the extent and in the manner set forth in this section.
 - (b) The director shall determine whether the real property was wholly destroyed or was partially destroyed or damaged from the natural disaster. If the real property was partially destroyed or damaged, the director shall determine what percentage of the value of the whole property was destroyed or otherwise lost by reason of the natural disaster.
 - (c) If the real property was wholly destroyed, the amount remitted shall be the lower of the following, but subject to subsection (e):
 - (1) The total tax on the property for the tax year in which the natural disaster occurred; or
 - (2) \$25,000.
 - (d) If the real property was partially destroyed or damaged, the amount remitted shall be the lower of the following, but subject to subsection (e):
 - (1) The amount derived by multiplying the total tax on the property for the tax year by the percentage of the value destroyed or otherwise lost, determined as provided in subsection (b); or
 - (2) \$25,000.
 - (e) The minimum tax of § 8-11.1(g) shall apply to real property, the tax on which is remitted under this section. In no case shall the amount remitted for a parcel of real property under this section cause the tax on that parcel to be less than the minimum.
 - (f) Application for a remission of taxes pursuant to this section shall be filed with the director on or before June 30 of the tax year involved, or within 60 days after the declaration by the mayor of the natural disaster, whichever is the later. Any amount of taxes authorized to be remitted by this section, which has been paid, shall be refunded upon proper application therefore out of appropriated general funds.
 - (g) For purposes of this section, the term “natural disaster” means any disaster caused by seismic or tidal wave, tsunami, hurricane, volcanic eruption, typhoon, earthquake, or flood waters.”

Honolulu, HI Code of Ordinances

[Chapter 16: Building Code](#)

- § 1615.1 General.

- “The design and construction of Risk Category III and IV buildings and structures, where located in the Tsunami Design Zones defined in the ASCE 7 Tsunami Design Geodatabase (version 2022-1.0), shall be in accordance with Chapter 6 of ASCE 7-22, except as modified by this code.”
- § 1615.3 Definitions.
 - “a. Tsunami Design Geodatabase. The ASCE database (version 2022-1.0) of Tsunami Design Zone maps and associated design data for the states of Alaska, California, Hawaii, Oregon, and Washington.”
 - “b. Tsunami Design Zone. An area identified on the Tsunami Design Zone map between the shoreline and the inundation limit, within which certain structures designated in Chapter 6 are designed for or protected from inundation.” [This provision describes an overlay zone.]
- § 1615.4 Lateral-Force Resisting Systems.
 - “Lateral-Force-Resisting System Acceptance Criteria for structures designed to the requirements. For Seismic Design Category A and B, the lateral-force-resisting system shall be designed to resist the **Maximum Considered Tsunami**. For structures designed to the requirements for Seismic Design Category C, D, E, or F, the lateral-force-resisting system shall be deemed adequate if $0.75 O_{Eh}$ exceeds the required tsunami force F_{TSU} , where E_h is the required seismic resistance and O is the system overstrength as defined in Chapter 12 of the ASCE 7 standard. When the inundated portions of Seismic Design Category C structures are detailed per Seismic Design Category D, it shall be permitted to use the O system overstrength corresponding to SDC D for the acceptance of the lateral- force-resisting system for the overall tsunami force on the structure.” [emphasis added]
- § 1615.5 Deep Foundations.
 - “Buildings and structures on deep foundation systems complying with Section 1810 shall be permitted to be deemed to satisfy ASCE 7 Section 6.12.2.4 Scour.”
- §16-11.3 Floodproofing requirements in certain areas.
 - “(a) *General*. Building permit applications for structures that require floodproofing under Chapter 21A and this article shall be accompanied by a statement of a registered professional engineer or architect that to the best of such person’s knowledge, information, and belief, **the floodproofing methods are adequate to resist the flood depths, pressures, velocities, impact, and uplift forces, and other factors associated with the flood, including flood waters due to tsunamis in coastal high hazard areas.**
 - (b) *Floodproofing of buildings above base flood elevation*. All buildings and structures that are required to be elevated above the base flood elevation shall be floodproofed by building on natural terrain above the base flood elevation on natural undisturbed ground or by building on stilts or by building on fill (unless fill is specifically prohibited by Chapter 21A, in the particular flood hazard area) or by other approved methods.
 - (c) *Waterproofing of buildings below base flood elevation*. Any building or portion thereof, not used for human habitation, and that is permitted to be below the base flood elevation shall either have the space below the base

flood elevation free of obstructions or shall be designed and constructed so that below the base flood elevation, the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy due to the base flood. Compliance with the requirements of ASCE 24 shall be in compliance with this section. Within coastal high hazard areas, however, any usable enclosed space below the base flood elevation shall be constructed with breakaway walls intended to collapse under stress without jeopardizing the structural support of the building. Areas enclosed by such breakaway walls shall not be used for human habitation.” [emphasis added]

- § 16-11.5 Structural Requirements

- “Coastal flood water design. **Buildings or structures shall be designed to resist the effects of coastal floodwaters due to tsunamis.** The base flood elevation due to tsunamis is considered to result from a nonbore condition, except where a bore condition is shown on the flood insurance maps or in the flood study adopted for the county.
- Habitable space in building structures must be elevated above the base flood elevation by such means as posts, piles, piers, or shear walls parallel to the expected direction of flow of the tsunami wave. The forces and effects of floodwaters on the structure shall be fully considered in the design.
- Allowable stresses (or load factors in the case of ultimate strength or limit design) for the building materials used shall be the same as the building code provides for wind or earthquake loads combined with gravity loads, i.e., treat loads and stresses due to tsunamis in the same fashion as for earthquake loadings.
- **The main building structure shall be adequately anchored and connected to the elevating substructure system to resist all lateral, uplift, and downward forces. In wood construction, toenailing is not allowed.**
- Scour of soil from around individual piles and piers shall be provided for in the design in the coastal flood hazard area. Shallow foundation types are not permitted, unless the natural supporting soils are protected on all sides against scour by a shore protection structure, preferably a bulkhead. Shallow foundations may be permitted beyond 300 feet from the shoreline; provided that they are founded on natural soil and at least 2 feet below the anticipated depth of scour, and provided that not more than 3 feet of scour is expected at the structure. The table below gives estimated minimum depths of soil scour below existing grade as a percentage of the depth (h) of water at the location.” [emphasis added]

Wildfires

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Wildfires

Narrative

In selecting case studies, we focused on geographical diversity. We compiled studies from a wide array of locations throughout the country, including Pacific states like California, Oregon, and Hawaii; Mountain states such as Colorado and Arizona; Southern states like Texas and Florida; and Eastern states such as New Jersey.

We also sought a variety of resource types for our case studies. The primary types were supplemental substantive zoning provisions and either environmental or public health chapters of municipal codes regulating land use. Zoning provisions took the form of subdivision regulations, fire-resistant construction mandates, and vegetation management provisions around the built environment. We selected comprehensive and Community Wildfire Protection Plans as demonstrations of the anticipatory planning process. We also selected zoning use and dimensional requirements that directed urban growth into lower-risk areas, assessed site risks, and allowed emergency housing measures for recovery. Together, these resources cover planning, development, zoning, permitting, and post-disaster actions.

This project examines wildfire mitigation codes and land use ordinances as essential tools for reducing wildfire risks in communities located in the expanding Wildland-Urban Interface (WUI). Wildfire mitigation codes refer to local regulatory frameworks that require property owners and developers to implement building, land management, and fire protection practices designed to prevent the ignition and spread of wildfires. The relevance of these codes has increased dramatically as climate change intensifies wildfire frequency, severity, and unpredictability across the United States and beyond. Climate change directly exacerbates wildfire risks by creating hotter, drier, and longer fire seasons, resulting in more extreme and difficult-to-control wildfire events. In response, local governments have expanded the scope of land use regulation to improve community resilience. Municipal codes now frequently integrate wildfire mitigation standards for new developments, site improvements, and even anticipatory actions like open burning. These codes represent a proactive climate adaptation strategy, reducing the vulnerability of communities to wildfire hazards and protecting critical infrastructure, public health, and natural resources.

Land use law's role in wildfire mitigation is critical, controlling how communities develop and interact with the built environment. Land use law enables legislation to promote public health, safety, and welfare. Land use law allows municipalities to control the location, use, construction standards, and surroundings of the built environment, particularly in wildfire overlay districts. By regulating the construction and adjacent area of a lot, land use law encourages mitigation and resilience measures. The permit approvals process can ensure subdivisions are provided with sufficient safety features. It can also be used to deny site plans in areas that are deemed too high a risk. Lastly, these permitting powers can be

suspended, allowing faster recovery by encouraging emergency shelter and allowing the rebuilding of nonconforming structures.

Our wildfire case studies can be grouped into four categories. First is “Defensible Space & Vegetation Management”, which protects structures by clearing the area around them of flammable debris, such as overhanging trees. Defensible space mandates are found in [Beachwood](#), NJ, and [Mono County](#), CA. Vegetation management is pursued through creative strategies like animal grazing in [Marin](#), CA to diminish fuel buildup. The second category is “Construction Standards”, which impose building requirements like flame-resistant materials, window protection, and metal coverings over openings. These are found in locations such as [Austin](#), TX, and [Boulder](#), CO. The third category is “Planning & Development”. This includes risk assessments, which help landowners quantify the danger to their property by looking at criteria such as proximity to fuel, vegetation type, topography, and the presence of emergency egress roads. Examples of risk assessments are found in [Austin](#) and [Lone Tree](#), CO. Planning, either comprehensive or specific, spells out the challenges a community has identified and explains the strategies the community intends to pursue, such as in [Kaua'i County](#), HI’s Multi-Hazard Mitigation and Resilience Plan. [Pima County](#), AZ’s TDR provisions manage development by channeling it into lower-risk regions. The final category is “Disaster Recovery Measures”. These help a community following a disaster by permitting temporary shelter and accelerating rebuilding, as exemplified by [Sonoma](#), CA’s disaster recovery ordinances.

Wildfires are addressed through measures implementing adaptation, mitigation, resilience, and enabling conditions. Municipalities use defensible space and construction provisions to lower the impact that wildfires will have, both in property damage and loss of life. Municipalities further adopt defensible space and construction standards to lower the chances of structures igniting, which decreases rapid wildfire spread and reduces GHG emissions. Fuel treatment measures such as prescribed burning and vegetation management diminish wildfire intensity. Resilience is pursued through recovery measures, which promote temporary housing and allow a community to bounce back more quickly. Enabling conditions include risk assessments that score a site based on factors such as fuel load and topography. They help make homeowners aware of their individualized risk and encourage adoption of the above techniques.

Potential partners include government organizations such as the [Wildland Fire Leadership Council](#). This group promotes a cohesive strategy between federal, state, and local officials to manage wildfires, including using controlled burns to decrease the accumulation of wildfire fuel. Other organizations, such as [Community Planning Assistance for Wildfires](#), promote land use actions municipalities can take. These include recommending local adoption of WUI interface codes, area plans, and evacuation guides for residents. More broadly, key partners for wildfire mitigation include local governments, fire agencies, utility

providers, developers, insurance companies, community organizations, and state, tribal, and federal land management agencies.

Case Studies

Defensible Space and Vegetation Management

Topic Title: Wildfires

Resource Title: Grazing to Reduce Wildfire Fuels

Resource Type: Comprehensive Plan and Special Topic/Area Plans

Municipality: Marin County

State: CA

Date of Adoption: CWPP 2020, Countywide updated 2023

Abstract: Grazing to Reduce Wildfire Fuels

Marin County, California, has adopted a comprehensive plan that acknowledges the region's wildfire risk and pursues several measures to address it. One goal seeks to reduce wildfire fuel to prevent larger and more dangerous fires and lists numerous methods to achieve this reduction. A particularly interesting idea mentioned in the Countywide General Plan and further expanded in the Community Wildfire Protection Plan is controlled grazing. This involves encouraging animals to graze or browse, which provides an ecologically sound way to reduce vegetation buildup that may otherwise promote destructive fires.

Controlled grazing can be accomplished by fencing off areas of overgrowth and stocking them with grazing animals. This can reduce wildfire fuels without the use of heavy equipment and without controlled burns, which may face community opposition. Benefits of this vegetation management method can include more thorough clearing, less noise and pollution, and enrichment of local soils. This low-impact method can be utilized in a variety of areas to help reduce the risk of wildfires. This helps Marin County achieve adaptation to future wildfire risk and mitigate the amount of CO₂ released during wildfires, as well as promote resiliency by relying on and strengthening natural systems. However, this policy must be adopted with caution to prevent harm to native plants and the spread of invasive species.

Countywide Plan Provisions:

[Marin Countywide Plan](#)

Adopted November 6, 2007 (Revised on January 24, 2023)

Natural Systems and Agriculture Element: Environmental Hazards

GOAL EH-4 Safety from Wildfire. Protect people and property from hazards associated with wildland and structural fires.

EH-4.i Implement Ecologically Sound Methods of Vegetation Management. Collaborate with the Marin Wildfire Prevention Authority Ecologically Sound Practices Partnership, which focuses on developing best management practices for fuel reduction projects in wildlands, provides subject matter expertise for project development, and environmental regulatory compliance. Use the best fuel reduction methods (depending on the time of year, fuel types, reduction prescriptions, presence of sensitive biological resources, and cost) to implement the Marin County Community Wildfire Protection Plan and Marin Wildfire Prevention authority projects. This may include using [. . .] animal grazing, or fuel reduction contractors.

Marin County, California Community Wildfire Protection Plan

2020 CWPP

Section 8.5.3: Open Space and Common Vegetation Management

Grazing to Reduce Fuels:

Since 2016, herds of goats and sheep have been used to graze in open space areas as part of a largescale fire hazard reduction project spearheaded by local landowners. The goat grazing program has been a collaborative effort to address key locations for fuel reduction to reduce the impact of wildfires in Marin communities. Over the past three years, this multi-agency project has successfully reduced hazardous fuels on hundreds of acres of high-hazard grassy woodlands throughout central Marin. Some grazing practices are known to import and/or expand non-native plant species. Therefore, grazing practices should be monitored and managed to avoid potentially negative impacts to native plant diversity and other ecological attributes.

[. . .]

4. Continue to improve vegetation management practices to reduce fire hazard and threat in and around non-residential areas.

4.4 Continue to encourage and support grazing to reduce fuels in appropriate areas.

Topic Title: Wildfires

Resource Title: Transfer of Development Rights Program

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Pima County

State: AZ

Date of Adoption: 2007

Abstract: Transfer of Development Rights Program

Pima County, AZ, has implemented a Transfer of Development Rights (TDR) program that seeks to shift development pressures to regions of the county that can better accommodate them. This system allows landowners to sever the right to develop in certain 'sending' districts and sell those rights to 'receiving' districts that can support higher intensity use than they currently do. This involves the sale of a right to develop, or develop past the current intensity, coupled with a restrictive covenant for enforcement. This program helps direct development away from areas in the Wildland-Urban Interface (WUI), such as Coronado National Forest in the east of the county. It promotes lower development in areas marked for conservation.

By moving development out of the WUI, Pima County reduces the vulnerability of this area to wildfires. Because the sending districts are more remote and rural, they present a challenge for firefighting; thus, leaving them in an undeveloped state makes practical sense. This provision helps Pima County encourage the protection of sensitive areas while still preserving the value of landowners' property. It represents an anticipatory adaptation to the future threat of wildfires and contains an equitable component by providing compensation for the voluntary restrictions on the development rights of landowners.

Code Provisions:

Pima County, Arizona Municipal Code

[Title 18, Ch. 18.92: Transfer of Development Rights](#)

18.92.050 Conditions for severance and use of development rights.

1. Partial transfers of development rights

a. The owner of a sending property may sever some of the development rights from that sending property, provided that the owner identifies the portion of the sending property from which all development rights have been severed, and upon which no future development shall be permitted. In the case of a partial transfer of development rights:

The ratio of A/B must be greater than or equal to the ratio of C/D where:

A = the acreage of the sending property protected from development by restrictive covenant;

B = the total acreage of the sending property;

C = the total number of development rights severed; and

D = the total number of development rights that would have been available on the sending property if no part of it had been developed.

For example, if the owner of a sending property has 10 development rights, and no development has occurred on the sending property, and the owner chooses to sever only four of those 10 development rights, the owner shall identify at least 40% of the sending property as the area from which all development rights have been severed. The restrictive covenant (or notice of anticipated restrictive covenant) required by section [18.92.060\(C\)](#) shall be applied to the area identified, and no further development of that area shall be permitted.

b. Where the Pima County Code provides that more development rights are available for severance and transfer than for development on the sending property, the ratio of land from which all development rights are removed shall be [calculated] as set forth in subsection a above. The amount of development rights available for development on the remainder of the property shall be calculated without regard to any additional development rights that may have been available for transfer.

For example, if a property has 24 development rights available for development, but 30 available for transfer, and the owner chooses to transfer half of the available development rights, the owner may transfer 15 development rights, provided that 50% of the sending property is restricted from further development. On the remaining 50% of the land, the owner may use one half of the development rights that would have been available for development, or 12 development rights.

c. In the case of each transfer of development rights from a sending property that does not include all of the development rights available for severance and transfer, the lands protected from future development through the restrictive covenant shall be located contiguous to either (i) any lands on the same sending property previously protected from development or (ii) any lands on adjacent parcels previously protected from development, if possible. If these contiguity requirements would be required with more than one adjacent area, the owner shall only be required to comply with one of the contiguity requirements, and the owner shall determine which of the contiguity requirements shall apply. In order to ensure that contiguity requirements are met, the County may require the applicant for

transferable development rights certificate(s) to provide a title insurance report regarding surrounding parcels of land. If the owner believes that it is not possible to comply with any of the contiguity requirements, the owner may appeal the applicability of the contiguity requirements to the sending property pursuant to section [18.92.100](#).

d. Land subject to a restrictive covenant must be maintained as undisturbed open space unless the land, at the time of development right severance, is in use as grazing or agricultural land, in which case these uses, and all related ancillary structures, may continue.

C. Conditions on use in receiving areas: All development applications incorporating the use of transferred development rights shall comply with all development standards and dedication requirements applicable to the most restrictive zone that (1) allows the proposed uses as permitted or conditional uses, and (2) has a maximum development density or intensity equal to or greater than the development density or intensity shown in the application. At the owner's option, if there is another less restrictive zone that would allow the same gross density as the proposed development (including development rights) but would allow smaller individual lots the proposed development may instead comply with the development standards provided that the development is reviewed, based on guidelines in the Pima County Transferable development rights Manual, and approved by the design review committee.

18.92.060 Severance and transfer of development rights.

A. Severance. The owner of any sending property may choose to sever one or more development rights from the sending property, and may sell such development right(s) to any person, at any price agreed upon between the buyer and seller, in accordance with the provisions of this chapter. Development rights may only be sold in increments of one (1) development right; fractional development rights may not be sold.

B. Transfer. The owner of a receiving property may choose to purchase one or more development rights from any person in order to increase the amount of development permitted upon the receiving property, at any price agreed upon between the buyer and seller, in accordance with the provisions of this chapter. Development rights may only be purchased in increments of one (1) development right; fractional development rights may not be purchased.

C. Restrictive covenant required

1. No transfer, sale or purchase of any development right shall create any rights to additional development on a receiving property unless and until a restrictive covenant meeting the requirements of this chapter has been recorded with the Pima County Recorder identifying the portion of the sending property restricted from future development and the number of development rights transferred.

2. Each of the owner(s) of the sending property shall execute either (1) the restrictive covenant meeting the requirements of this section, or (2) a notice that the owner(s) are attempting to sell development rights from the sending property, identifying the portion of the sending property from which all development rights will be severed, and that the seller(s) intend to execute a restrictive covenant meeting the requirements of this section no later than the date on which a transaction for the sale of development rights is completed. Each of the owners of the sending property shall execute the restrictive covenant or notice and the restrictive covenant or notice shall be recorded with the Pima County Recorder. No transfer of development rights shall be registered pursuant to section [18.92.070](#)(C)(1) below until the recording of the restrictive covenant has been completed and evidence of such recording submitted to the County.

3. Written consent of lienholders. If all or part of the sending property is subject to one or more recorded liens, each lienholder must sign the instrument of transfer and the restrictive covenant or notice confirming its consent to the transfer of the development right(s) and the restriction of future development on the sending property.

4. The restrictive covenant shall be on a form provided by Pima County, shall be adequate to confirm that the portions of the sending property restricted from future development meet all applicable requirements of this chapter, and shall confirm that the potential development on the sending property has been reduced by an amount equal to the development rights sold.

The restrictive covenant form shall, at a minimum, include all of the following clauses: (1) that the restrictions on development are for the benefit of the citizens of Pima County; (2) that the restrictions shall apply in perpetuity; (3) that the restrictions shall be non-revocable without the written consent of the board of supervisors and that consent requires approval by at least four members of the board of supervisors; (4) that the restrictions shall remain in effect notwithstanding any future annexation of any portion of the land by any municipality; and (5) that Pima County approves the restrictive covenant. The form shall be signed by the Director of the Department or his designee, the owner(s) of record for the sending property, and any lien holder(s).

Topic Title: Wildfires

Resource Title: Defensible Space and Fire Hazards Reduction

Resource Type: Public Health/Environmental Chapters in Municipal Code

Municipality: Mono County

State: California

Date of Adoption: 2008

Abstract: Defensible Space and Fire Hazards Reduction

The Mono County, California, Code of Ordinances establishes defensible space and fire hazard reduction measures to mitigate wildfire risks in a region characterized by mountainous and high desert terrain. Chapter 7.22 mandates property maintenance in compliance with state defensible space requirements, including removing flammable vegetation within specific distances from structures and ensuring firebreaks and reduced fuel zones. Local enforcement authorities, such as fire rescue personnel and code compliance officers, are empowered to inspect properties, educate residents, and issue correction notices. The ordinance applies to new development applications and allows for site-specific modifications based on environmental considerations. These regulations aim to enhance public safety, protect structures from wildfires, and support firefighting efforts.

Code Provisions:

Mono County, CA – Code of Ordinances

Title 7 – Health and Welfare

Chapter 7.22 – Defensible Space and Fire Hazards Reduction

7.22.010 – Purpose.

Mono County is rural in nature, primarily consists of mountainous and high desert terrain, and the communities and inhabited portions of the unincorporated area of Mono County are generally located within, or in close proximity to, mountainous areas, forest-covered lands, brush-covered lands, grass-covered lands, and similar lands that are subject to wildfires. In order to minimize the threat of wildfire spreading to occupied structures, and to supplement the educational and enforcement activities of the California Department of Forestry and Fire Protection ("CAL FIRE"), local educational efforts, and enforcement of defensible space requirements, are reasonable and necessary to protect structures from damage from

fire, reduce the spreading of fire, provide firefighting personnel improved conditions when fighting fire, and will benefit the public health and safety.

7.22.020 – Requirements.

- A. Property shall be maintained in accordance with the defensible space requirements contained in Government Code Section 51182 (unless exempted by Government Code Section 51183 or 51184) and Public Recourses Code Section 4291, as applicable.
- B. The existence or maintenance of any of the following conditions is prohibited:
 - 1. Tree branches within ten feet of a chimney outlet or stovepipe outlet;
 - 2. Dead or dying tree branches adjacent to or overhanging a building;
 - 3. Leaves, needles, or other dead vegetative growth on the roof of any structure;
 - 4. Flammable vegetation or other combustible growth within thirty feet of an occupied dwelling or structure which prevents the creation of a firebreak;
 - 5. Brush, flammable vegetation, or combustible vegetation located between thirty and one hundred feet of an occupied dwelling or structure which prevents the creation of a reduced fuel zone; or
 - 6. Brush or other flammable material within ten feet of a propane tank.
- C. For the purposes of this section, the following definitions shall apply:
 - 1. "Firebreak" means an area of land within thirty feet of an occupied dwelling or structure in which all flammable vegetation or other combustible growth has been removed and cleared away. The creation of a firebreak shall not require the removal of single specimens of trees or other vegetation that is well pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to any dwelling or structure.
 - 2. "Reduced fuel zone" means an area between thirty and one hundred feet of an occupied dwelling, whichever is closer, in which all brush, flammable vegetation or combustible growth has been removed. The creation of a reduced fuel zone shall not require the removal of single specimens of trees or other vegetation that is well pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a dwelling or structure. Grass and other vegetation located more than thirty feet from the dwelling or structure and less than eighteen inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.
- D. No person shall be required to maintain any clearing on any land if that person does not have the legal right to maintain the clearing, nor is any person required to enter upon or damage property that is owned by another person without the consent of that person.

- E. The prohibitions contained in subsection C of this section shall not apply to land or water area located outside of a state responsibility area that are acquired or managed for one or more of the following purposes or uses:
1. Habitat for endangered or threatened species, or any species that is a candidate for listing as an endangered or threatened species by the state or federal government;
 2. Lands kept in a predominantly natural state as habitat for wildlife, plant, or animal communities;
 3. Open space lands that are environmentally sensitive parklands;
 4. Other lands having scenic values, as declared by the local agency or by state or federal law.

7.22.030 – Local Enforcement.

- A. Any county personnel performing health and safety functions, including, but not limited to, fire rescue paramedics, building inspectors, and code enforcement officers, may be trained and assigned to conduct general property inspections to determine compliance with the provisions of this chapter, provide educational materials and instruction concerning defensible space requirements to owners and occupiers of structures, and to issue correction notices to owners and occupiers of structures to gain compliance with the provisions of this chapter. Any duly designated person assigned by a local fire protection district may be trained and assigned to conduct general property inspections to determine compliance with the provisions of this chapter, provide educational materials and instruction concerning defensible space requirements to property owners and occupiers, and to issue correction notices in order to gain compliance with the provisions of this chapter.
- B. In the event that any person or entity fails to comply with a correction notice issued to them, the person or entity that issued the correction notice may follow up the correction notice with a second correction notice that shall include a warning that the failure to make the necessary corrections may result in enforcement action pursuant to [Chapter 1.12](#) of the Mono County Code or any other enforcement action or remedy allowed by law.
- C. Mono County Code compliance specialists may take any necessary enforcement action upon receipt of a copy of a second correction notice issued pursuant to this section. The proposed enforcement action shall take into consideration the degree of the danger or fire hazard posed by the lack of compliance with the defensible space requirements.
- D. Forms may be created for use by county personnel and fire protection district personnel in implementing this section.

7.22.040 – Applicability.

- A. Defensible space requirements shall apply to protect existing structures and shall be required for the following applications for which approval has not been granted as of the effective date of the ordinance codified in this chapter:
1. Applications for building permits as provided in Mono County Code [Chapter 15.04](#);

2. Applications for tentative subdivision final and parcel maps;
3. Applications for use permits, items requiring director review, or any other items subject to discretionary land use approval when appropriate and/or applicable.

7.22.050 – Exceptions and Modifications.

- A. An exception to, or modification of, the regulations set forth herein may be authorized whenever a finding is made by the community development director that the exception or modification provides an overall practical effect of creating defensible space and/or where site-specific conditions, including previously required development mitigation conditions to preserve wildlife or botanical habitat preservation, have been required. When considering such site-specific exemptions or modifications, the community development director may consult with experts in the fields of wildfire protection and wildlife and botanical habitat preservation in reaching an appropriate level of modification. When an exception is requested for a site that is located within an established community, the community development director may consult with the designated representative of the local fire protection district in determining whether to approve or deny the requested exception or modification.

Topic Title: Wildfires

Resource Title: Open Burning Provisions

Resource Type: Public Health Chapters in Municipal Code

Municipality: Broward County

State: Florida

Date of Adoption: 2007

Abstract: Open Burning Provisions

Broward County, FL, has included open burning regulations within the pollution control chapter of its County Code. This provision comprehensively regulates open burning to minimize detrimental effects on air quality. The code restricts burning to specific circumstances and procedures. It provides for burning to deal with, among other things, storm debris in agricultural and silvicultural contexts. The county also encourages the use of air curtain burners, which mechanically increase combustion temperatures to minimize air quality harm. All fires are subject to safety regulations to ensure they remain under control.

By permitting regulated burns, Broward County helps reduce the risk of uncontrolled fires arising from an excess of accumulated fuel. This practice also reduces the intensity of fires that do occur. This is an example of an anticipatory strategy, focused on addressing risk before wildfires occur.

Code Provisions:

Broward County, FL Municipal Code

[Volume I, Chapter 27, Article IX](#)

Open Burning

Sec. 27-281. - Declaration of intent.

(b) It is the intent of the board to require that open burning be conducted in a manner, under conditions, and within certain periods that will reduce or eliminate the adverse effects of air pollution caused by open burning.

Sec. 27-284. - Prohibitions.

(a) *General prohibitions:* Any open burning not specifically allowed by this article, by Section 62-256, F.A.C., and by Rule 5I-2, F.A.C., is prohibited. No person shall ignite, cause to be ignited, or permit to be ignited any material which will result in any prohibited open burning as defined in this section; nor shall any person suffer, allow, burn, conduct, or maintain any prohibited open burning.

(h) Pile burning is prohibited except for agricultural burning associated with normal onsite agricultural operations.

Sec. 27-285. - Open burning allowed.

The following open burning activities are allowed:

(a) Municipal, industrial, commercial, and research open burning.

(2) Opening burning in connection with an emergency which requires immediate action to protect human health and safety.

(3) Open burning in connection with county or municipal operations to burn hurricane, tornado, fire, or other disaster-generated vegetative debris using an air curtain incinerator. The operation of air curtain incinerators to burn vegetative debris generated by a natural disaster shall be subject to the same limitations for air curtain incinerators in subsection 27-286(b).

(4) Open burning which is essential to a research project is allowed provided prior notification is provided to the RED [Resilient Environmental Department] and measures are taken to protect ambient air quality from pollutants and contaminants to the greatest extent feasible.

(d) Agricultural and silvicultural fires. Open burning will be allowed for agricultural and silvicultural fires when approved by the Florida Division of Forestry.

Sec. 27-286. - Open burning requirements.

(a) *General Requirements.* The following requirements and limitations apply to all open burning activities that are allowed under this section:

(1) Any open burning that is allowed by this article is restricted to the site where the material to be burned was generated and may not be transported to another property to be open burned, with the exception of vegetative debris generated by a natural disaster and recreational campfires or bonfires.

(2) Distance From Occupied Buildings: Except as otherwise restricted in this article, no open burning will be allowed unless it is a minimum of three hundred (300) feet distant from any occupied building. This requirement may be waived if permission is obtained in writing, using the form provided by the RED, from the occupant(s) of said building. This setback requirement does not apply to open burning for the training of firefighters.

(3) Distance From Public Highway: No open burning will be allowed unless it is a minimum of one hundred fifty (150) feet distant from any public highway, measured from

the material to be burned to the center line of the highway. This setback requirement does not apply to open burning for the training of firefighters.

(4) Time Period: Except in the case of a ceremonial or recreational bonfire, open burning will be allowed only between 9:00 a.m. and not later than one (1) hour before sunset.

(b) *Operation of air curtain incinerators.* The following rules apply to the operation of air curtain incinerators for open burning of hurricane, tornado, fire, or other disaster-generated vegetative debris as provided in subsection 27-285(a)(3):

(6) The owner or operator shall implement the following measures to prevent accidental fires in the vegetative debris piles and to suppress accidental fires that may occur:

a. Vegetative debris piles shall not exceed the following dimensions:

Width: Fifty (50) feet

Area: 10,000 square feet

Height: Eighteen (18) feet

There shall be a space of at least fifty (50) feet between debris piles, on all sides, to allow vehicle and equipment access and to prevent the spread of accidental fires. Unobstructed access for emergency vehicles shall be maintained at all times.

(7) The moisture content and composition of the material to be burned shall be favorable to good burning which will minimize air pollution. Wet or green vegetative materials shall not be burned.

Sec. 27-287. - Notification required.

(a) Any person engaging in the following open burning activities authorized under this article must notify the RED at least five (5) working days prior to the initiation of open burning activities using the form provided by the RED:

Topic Title: Wildfires

Resource Title: Pinelands Fire Regulations

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Borough of Beachwood

State: New Jersey

Date of adoption: 1982

Abstract: Pinelands Fire Regulations

The Borough of Beachwood, NJ, has adopted a number of regulations within its land use code that relate to the 'pinelands' area. These include provisions requiring firebreaks around development, road access, and fire-resistant home construction. These provisions also take into account the unique vegetation of the pinelands, with higher risk ratings for locations that contain more flammable tree species.

By requiring both firebreaks and construction standards, Beachwood helps ensure development in the pinelands is adapted to the high fire frequency of the region. Additionally, road access allows emergency services to respond faster, mitigating wildfires that do occur and helping to prevent further damage.

[Beachwood Code Ch. 17-27.14 Pinelands Fire Regulations](#)

- a. All proposed developments or units or sections thereof of twenty-five (25) dwelling units or more shall have two (2) access ways of a width and surface composition sufficient to accommodate and support fire-fighting equipment;
- b. All dead-end roads will terminate in a manner which provides safe and efficient entry and exits for fire equipment.
- c. The rights-of-way of all roads will be maintained so that they provide an effective fire break;
- d. A fire hazard fuel break shall be provided around structures proposed for human use by the selective removal or thinning of trees, bushes, shrubs and ground cover including the use of prescribed burning as follows:
 - 1. In moderate fire hazard areas a fuel break of thirty (30') feet measured outward from the structure in which:
 - (a) Shrubs, understory trees and bushes and ground cover are to be selectively removed, mowed, or pruned on an annual basis; and
 - (b) All dead plant material is removed.

2. In high fire hazard areas a fuel break of seventy-five (75') feet measured outward from the structure in which:

(a) Shrubs, understory trees and bushes and ground cover are to be selectively removed, mowed or pruned and maintained on an annual basis;

(b) All dead plant material is removed.

3. In extreme high hazard areas a fuel break of one hundred (100') feet measured outward from the structure in which:

(a) Shrubs, understory trees and bushes and ground cover are to be selectively removed, mowed or pruned and maintained on an annual basis;

(b) No pine tree (Pinus spp.) is closer than twenty-five (25') feet to another pine tree; and

(c) All dead plant material is removed.

4. All residential development of one hundred (100) dwelling units or more in high or extreme high hazard areas will have a two hundred (200') foot perimeter fuel break between all structures and the forest in which:

(a) Shrubs, understory trees and bushes and ground cover are selectively removed, mowed or pruned and maintained on an annual basis;

(b) All dead plant material is removed;

(c) Roads, rights-of-way, wetlands and waste disposal sites shall be used as fire breaks to the maximum extent practical; and

(d) There is a specific program for maintenance.

e. Subsection 17-27.5; Wildfire Hazard Classifications.

FIRE HAZARD

Shall mean the classification of a parcel of land in accordance with the following:

HAZARD	VEGETATION TYPE
Low	Atlantic White Cedar Hardwood Swamps
Moderate	Non-pine barrens forest Prescribed burned areas
High	Pine barrens forest including mature forms of pine, pine-oak, or oak-pine
Extreme	Immature or dwarf forms of pine-oak or oak-pine; all classes of pine-scrub oak, and pine-lowland.

f. All structures shall meet the following specifications:

- 1.** Roofs and exteriors will be constructed of fire resistant materials such as asphalt rag felt roofing, tile, slate, asbestos cement shingles, sheet iron, aluminum or brick. Fire retardant-treated wood shingles or shake type roofs are prohibited in high or extreme fire hazard areas.
- 2.** All projections such as balconies, decks, and roof gables shall be constructed of fire resistant materials or materials treated with fire-retardant chemicals.
- 3.** Any openings in the roof, attic, and the floor shall be screened.
- 4.** Chimneys and stovepipes which are designed to burn solid or liquid fuels shall be equipped with screens over the outlets.
- 5.** Flat roofs are prohibited in areas where vegetation is higher than the roof.

Construction Standards

Topic Title: Wildfires

Resource Title: Wildland-Urban Interface Code: Ignition-Resistant Construction

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: City of Austin

State: Texas

Date of Adoption: 2017

Abstract: Wildland-Urban Interface Code: Ignition-Resistant Construction

Austin, Texas has included a wildland-urban interface code to control development at the boundary between urban and rural areas of the city, which face heightened wildfire risk. The development code, along with extensive site protection and analysis provisions, includes many construction requirements. It mandates that ignition-resistant construction materials be used in the vulnerable locations of a building, such as eaves, windows, and vents. It also mandates standards that can prevent wildfire embers from lodging in structures and leading to destructive fires. Combined, these provisions ensure that houses in higher-risk wildfire zones are less vulnerable, helping protect both the property and the lives of Austin's inhabitants. These provisions are a prime example of adaptation, as they respond to the threat of wildfires by adjusting building practices to promote safety.

Code Provisions:

Austin, Texas Municipal Code

[Title 25, Ch. 12, Art. 8: Wildland-Urban Interface Code](#)

SECTION 504 IGNITION-RESISTANT CONSTRUCTION.

504.1 General. When ignition-resistant construction is required, it must comply with Sections 504.2 through 504.11.

504.3 Protection of eaves, soffits, fascia, and rafter tails.

504.3.1 A building or structure within 50 feet (15,240 mm) of a 40 acre (4.05 ha) or greater contiguous area that consists of light, medium, or heavy fuel.

504.3.1.1 For an eave or soffit, the exposed underside must be protected using ignition-resistant materials or by materials approved for at least one-hour fire-resistance-rated construction, two-inch (51 mm) nominal dimension lumber, one-inch (25 mm) nominal fire-retardant treated lumber, or ¾-inch (19.1 mm) nominal fire-retardant treated plywood

that is identified for exterior use and meets the requirements of Building Code, Section 2303.2.

504.3.1.2 For a fascia, the backside must be protected on the backside by ignition-resistant materials or materials approved for at least one-hour fire-resistance-rated construction or two-inch (51 mm) nominal dimension lumber.

504.3.2 A building or structure more than 50 feet (15,240 mm) from a 40 acre (4.05 ha) or greater contiguous area that consists of light, medium, or heavy fuel.

504.3.2.1 A combustible eave, fascia, or soffit must be enclosed with solid materials that are at least ¾-inch (19 mm) thick.

504.3.2.2 An exposed rafter tail must be constructed of heavy timber materials.

504.5 Exterior Walls. For a building or structure within 50 feet (15,240 mm) of a 40 acre (4.05 ha) or greater contiguous area that consists of light, medium, or heavy fuel, the exterior walls must be constructed using one or more of the following:

1. materials approved for exterior use and at least one-hour fire- resistance-rated construction;
2. approved non-combustible materials;
3. heavy timber or log wall construction;
4. fire-retardant-treated wood approved for exterior use that complies with Building Code Section 2303.2; or
5. ignition-resistant materials approved for exterior use.

The material must extend from the top of the foundation to the underside of the roof sheathing.

504.7 Appendages and structures. An unenclosed accessory structure that is attached to or located within 10 feet (3,048 mm) of a building with habitable spaces and projections, such as a deck, must be constructed using at least one-hour fire-resistance-rated materials, heavy timber, or one of the following:

1. approved non-combustible materials;
2. fire-retardant-treated wood approved for exterior use that complies with Building Code Section 2303.2; or
3. ignition-resistant building materials that comply with Section 503.2.

504.8 Exterior Glazing. An exterior window, window wall and glazed door, window within an exterior door, or a skylight within 50 feet (15,240 mm) of a 40 acre (4.05 ha) or greater contiguous area that consists of light, medium, or heavy fuel must have a fire protection rating of 20 or more minutes. Tempered glass, multilayered glazed panels, and glass block comply with this provision.

504.9 Exterior Doors. An exterior door within 50 feet (15,240 mm) of a 40 acre (4.05 ha) or greater contiguous area that consists of light, medium, or heavy fuel must have a fire protection rating of 20 or more minutes. Approved noncombustible construction materials and solid core wood that is 1¾-inches (44 mm) thick comply with this provision. A window within a door or a glazed door must comply with Section 504.8.

504.10 Vents. Each attic ventilation opening, foundation or underfloor vent, or other ventilation opening in a vertical exterior wall and each vent through a roof may not exceed 144 square inches (0.0929 m²). These vents must be covered with non-combustible corrosion-resistant mesh with openings that are ⅛-inch (3.3 mm) or less or must be designed and approved to prevent flame or ember penetration into the structure.

Topic Title: Wildfires

Resource Title: Restrictions in Wildfire Zone No. 2. (Ignition-Resistant Construction)

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Boulder County

State: Colorado

Date of Adoption: 1994 (Updated 2024)

Abstract: Ignition-Resistant Construction

Boulder has included in its Land Use Code Section 19-500, which establishes wildfire mitigation requirements for buildings in Wildfire Zone 2 (plains/grassland of Boulder County), prioritizing fire-resistant materials and designs to minimize ignition risks and fire spread. Roofs must use Class A materials, include fire-stopping at eaves, and feature noncombustible valley flashings. Gutters and downspouts must be noncombustible and debris-resistant, while chimneys require spark arrestors to block embers. Exterior walls, eaves, decks, and fences must utilize noncombustible, ignition-resistant, or fire-rated materials, with specific standards for framing and underfloor enclosures. Vent openings must be small, fire-blocking, and strategically placed to prevent ember intrusion. Detached structures must adhere to similar standards, particularly for underfloor areas on slopes. To create defensible space, a fire-resistant buffer of gravel, crushed rock, or similar materials must extend around buildings and beneath decks. These provisions aim to improve the fire resilience of structures in wildfire-prone areas.

Code Provisions:

Boulder County Land Use Code

[Boulder County Land Use Code: Article 19 Procedures Following Disasters](#)

19-500 - Appendix A

R327.4 Restrictions in Wildfire Zone No. 2.

Buildings constructed in Wildfire Zone 2 shall comply with this section.

R327.4.1 Roof covering.

Roof covering materials installed in Wildfire Zone 2 shall be listed Class A roof covering materials or be constructed as a Class A roof assembly. For roof coverings where the pro- file allows a space between the roof covering and roof decking, the space at the eave ends shall be fire stopped to preclude entry of flames or embers, or

have one layer of 72-pound (32.4 kfg) mineral- surfaced, non-perforated cap sheet complying with ASTM D 3909 installed over the combustible decking.

R327.4.1.1 Roof valleys.

When provided, valley flashings shall be not less than 0.019 inch (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of 72-pound mineral-surfaced, non-perforated cap sheet complying with ASTM D 3909 running the full length of the valley.

R327.4.2 Gutters and downspouts.

Gutters, downspouts, and gutter covering devices shall be constructed of noncombustible material. Gutters shall be provided with an approved means to prevent the accumulation of leaves, pine needles and debris in the gutter.

Exception: Buildings meeting one of the exceptions to Section R401.3 of this code may be constructed without gutters and downspouts.

R327.4.3 Spark arrestors.

Chimneys serving fire-places, barbecues, incinerators or decorative heating appliances in which solid or liquid fuel is used shall be protected with a spark arrester. Spark arresters shall be constructed of woven or welded wire screening of 12 USA standard gauge wire (0.1046 inch)(2.66 mm) having openings not exceeding ½ inch (12.7 mm). The net free area of the spark arrester shall not be less than four times the net free area of the outlet of the chimney.

R327.4.4 Fences, retaining walls and similar appurtenances.

Fences, retaining walls or other appurtenances that connect to buildings must be constructed of noncombustible materials or ignition-resistant materials for a distance of 3 feet beyond the exterior walls.

R327.4.5 Protection of eaves.

The leading edge of the roof at the fascia must be finished with a metal drip edge so that no wood sheathing is exposed.

Eaves, fascia, and soffits, covered decks or covered porch ceilings shall be protected on the enclosed underside by one of the following materials or methods:

1. Noncombustible materials.
2. Ignition-resistant materials.

3. Materials approved for a minimum of 1-hour fire-resistance-rated construction.
4. 2-inch-thick nominal dimension lumber.
5. 1-inch-thick nominal fire-retardant-treated wood.
6. $\frac{3}{4}$ -inch-thick nominal fire retardant-treated plywood labeled for exterior use.
7. Any materials permitted by this code.

Exceptions:

1. Vinyl or plastic soffits, fascia or trim are not permitted.
2. Rafter tails or roof beam ends may be exposed if they are heavy timber having minimum dimensions not less than 6-inch nominal in width and not less than 8 inches nominal in depth.

R327.4.6 Exterior walls.

Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Noncombustible materials approved for a minimum of 1-hour fire-resistance-rated construction on the exterior side.
2. Approved noncombustible materials.
3. Heavy timber or log wall construction.
4. Fire-retardant-treated wood labeled for exterior use on the exterior side.
5. Ignition-resistant materials on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

Exception: Trim is not required to meet the materials requirements for exterior walls.

R327.4.7 Unenclosed under floor protection.

Buildings or structures shall have all underfloor areas enclosed to the ground with exterior walls in accordance with Section R327.4.6. For decks, see Section R327.4.8.

Exception: Complete enclosure may be omitted where the underside of all exposed floors and all exposed structural columns, beams, and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy timber construction or fire-retardant-treated wood labeled for exterior use.

R327.4.8 Decks, appendages, and projections.

Decks and other unenclosed accessory structures attached to buildings shall be constructed of the following materials:

R327.4.8.1 Deck surface:

Non-combustible material, approved wood thermoplastic composite lumber with an ASTM E84 flame- spread index no greater than 200, ignition- resistant building materials or any approved Class A roof assembly.

R327.4.8.2 Deck framing:

Deck framing shall be constructed of one of the following:

1. 1-hour fire resistance-rated construction
2. Heavy timber construction.
3. Approved noncombustible materials.
4. Fire-retardant-treated wood labeled for exterior use.
5. Ignition-resistant building materials.
6. Wood with a minimum nominal thickness of at least 2 inches for joists and 4 inches for beams and columns or posts.

R327.4.11 Vents.

Attic ventilation openings, foundation or under-floor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inches or shall be designed and approved to prevent flame or ember penetration into the structure. Gable end and dormer vents shall be located at least 15 feet from property lines and shall be designed and approved to prevent flame or ember penetration into the structure. Underfloor ventilation openings shall be located as close to grade as practical.

R327.4.12 Detached accessory structures.

Detached accessory structures shall have exterior walls constructed in accordance with Section R327.4.6.

R327.4.12.1 Underfloor areas.

Where the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas enclosed to within 6 inches of the ground with exterior wall construction in accordance with Section R327.4.6 or underfloor protection in accordance with Section R327.4.7.

Exception: The enclosure shall not be required where the underside of all exposed floors and all exposed structural columns, beams, and supporting walls are protected as required for exterior 1-hour fire-resistance-rated

construction or heavy timber construction or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use.

R327.4.13.1 Weed barrier and gravel or crushed rock.

A weed barrier and gravel or crushed rock not less than $\frac{3}{4}$ -inch in diameter applied at least 2 inches thick must be installed beneath decks, unenclosed floors, and around the perimeter of the building to extend at least 3 feet beyond the exterior walls and at least 2 feet beyond the driplines of decks, bay windows and other eaves and overhangs.

Exception: Noncombustible surfaces, such as poured concrete or asphalt, or other approved noncombustible materials, such as a weed barrier and brick, concrete or stone pavers, may satisfy this requirement.

Planning and Development

Topic Title: Wildfires

Resource Title: Wildfire Hazard Overlay Zone

Resource Type: Comprehensive Plan

Municipality: Wallowa County

State: Oregon

Date of Adoption: 2021

Abstract: Wildfire Hazard Overlay Zone (WHO)

This case study examines Wallowa County, Oregon's comprehensive approach to wildfire risk management through the implementation of a Wildfire Hazard Overlay (WHO) Zone as outlined in the county's 2021 Comprehensive Plan. Recognizing the growing threat posed by wildfires, the county developed a set of land use policies aimed at reducing wildfire hazards to life, property, and natural resources, particularly in unincorporated areas identified as Communities at Risk (CARs) and within the Wildland Urban Interface (WUI). The WHO Zone applies additional regulatory layers to the Timber Commercial and Timber Grazing zones and mandates specific development standards based on fire hazard levels identified in the 2017 Community Wildfire Protection Plan. These include stringent fuel break requirements, fire-resistant building materials, fire suppression infrastructure, and access provisions for emergency vehicles. The policy also provides flexibility for compliance through easements, natural firebreaks, and alternative building standards when site conditions limit full implementation. This overlay district exemplifies a proactive and adaptive land use planning strategy that integrates hazard mitigation with development regulation to enhance community resilience in wildfire-prone areas.

Plan Provisions:

Article 25

FLOOD, WILDFIRE, and NATURAL HAZARDS (FHA)

SECTION 25.010, PURPOSE: It is the finding of Wallowa County that some areas of unincorporated Wallowa County are subject to periodic inundation, wildfire and other natural hazards which adversely affect the public health, safety, and general welfare. The purpose of the Flood, Wildfire and Natural Hazards Article is to provide additional restrictions upon uses permitted outright or conditionally in the underlying zones in order to minimize public and private losses due to flood conditions, potential wildfire and other

natural hazards and to promote the public health, safety, and general welfare. This article shall apply to all special flood hazard areas, areas at risk for wildfires and areas prone to other natural hazards within the jurisdiction of Wallowa County.

[...]

SECTION 25.080, NATURAL HAZARDS: The purpose of this section is the identification of, and placement of additional restrictions on uses permitted outright and conditionally within areas subject to natural hazards other than flooding or wildfire which adversely affect the public health, safety, and general welfare.

A. Permit Evaluation

1. **Initial Evaluation:** Each development permit shall be initially evaluated on forms provided by the Planning Department to ascertain if the development is within a potential Natural Hazard area. This initial evaluation will be done by the Planning Department or its designee and shall be based on inventories, maps, area history and current status, photographs and other information. A Site Investigation is required if the area in question has experienced a mass earth movement or has a slope greater than 25%. The Planning Department or its designee may ask the Wallowa County Natural Resources Technical Advisory Committee to participate in the initial evaluation.
2. **Site Investigation:** If the Planning Department or its designee finds the development to be within a Natural Hazard area, then a Site Evaluation must be done by the applicant including an evaluation of the risk to people and property from developing in a permit specific Natural Hazard area. This evaluation shall include an assessment of:
 - A. The type of Natural Hazard.
 - B. The effects of new development in identified hazard areas on existing development, adjoining properties, and public rights of way; and
 - C. The evaluation of the risk to people and property from natural hazards and shall include provisions to:
 1. Evaluate the risk to people and property from natural hazards. The evaluation shall include, but not be limited to:
 - a. The frequency and severity of the hazard, and
 - b. The limitations of identified hazard areas to sustain different types and intensities of land use. Open space, recreation and low density uses should be preferred in hazard areas; and the beneficial impact on natural

resources and the environment from the occurrence of natural disasters.

2. Avoid development in areas of high risk; and
 3. Prohibit, where appropriate, development of essential facilities (defined in ORS 455.447(1)(a)) in identified hazard areas.
- D. The effects of development in a Natural Hazard area on the management of natural resources.
- E. Expert analysis by a Registered Professional Engineer or Certified Engineering Geologist, at the expense of the applicant, in areas of extreme hazard or when requested by the Planning Director or Commission.
- F. The Planning Department or Commission may request an independent expert analysis. This analysis may be in addition to the applicant's analysis and, the permit fee shall be raised to cover the expense of the independent analysis.

B. Protection Standards

1. **Earthquake** [...]
2. **Wildfire** - When a proposed development is determined to be in an area of Wildfire Hazard as determined in the 2017 Wallowa County Community Wildfire Protection Plan (CWPP), the proposal must meet the standards set forth in Section 25.090 Wildfire Hazard Overlay Zone.

[...]

SECTION 25.090 WILDFIRE HAZARD OVERLAY ZONE

Purpose: The purpose of the WHO zone is to minimize wildfire risk to life and property and to implement the wildfire policies in Chapter VII Areas Subject to Natural Disasters and Hazards the Wallowa County Comprehensive Plan based on information provided in the 2017 Wallowa County Community Wildfire Protection Plan, which has been adopted as a supporting document to the Wallowa County Comprehensive Plan.

01.Applicability: The WHO zone shall apply to Timber Commercial (TC) and the Timber Grazing (TG) Zones, to Communities at Risk (CARs) and to the Wildland Urban Interface (WUI) Zone, in unincorporated areas, as mapped in the 2017 Wallowa County Community Wildfire Protection Plan (CWPP) and as generally shown below. The Planning Department shall maintain GIS maps showing the precise location of CARs and WUI Zones to determine whether a property is located within these fire management areas. Figure 1 shows the general location of CARs and WUI Zones in Wallowa County.

03.Definitions [...]

05. Levels of Protection: The degree of wildfire hazard protection depends on the degree of wildfire hazard as determined in the 2017 CWPP.

- A. The Planning Director shall maintain maps, overlain with tax lots, showing the probability of wildfire occurrence for public review, and shall make the final administrative determination regarding the level of protection appropriate for specific properties within WUI Zones and CARs.
- B. The following standards apply in addition to any siting or related standards that apply in the base zone. In cases of conflict, the more restrictive standard shall apply.

06. Where Level 1 and Level 2 Design Standards Apply.

[...]

07. Level 1 Fire Safety Design Standards. The following standards shall apply to (a) all new structures associated with private businesses and additions to structures associated with private businesses, and all new dwellings and additions to dwellings, (b) accessory structures greater than 1000 square feet, and additions to structures greater than 1000 square feet, and (c) public and private infrastructure projects.

- A. **Access:** Roads and driveways must be wide enough for fire equipment passage, and dead end roads and cul-de-sacs must be large enough for fire equipment to turn around. (See 18.035.03 and Article 32, Road Design, for standards). There shall be more than one functioning entrance/exit to a dwelling, business or public building.
- B. **Fuel Break Areas:** Fuel-free break areas shall be provided surrounding new primary structures of any size and accessory structures of 100 square feet or greater, as follows:

1. **Primary Fuel Break Area.** A primary fuel-free break area shall be maintained for a distance of 30 feet surrounding any new structure as defined in Subsection 07 above. The primary safety area is a fire fuel break extending a minimum distance around structures. The goal within the primary safety area is to remove fuels that will produce flame lengths in excess of one foot. Vegetation within the primary safety zone may include green lawns and shrubs less than 24 inches in height. Trees shall be spaced with greater than 15 feet between the crowns and pruned to remove dead and low (less than eight feet) branches. Accumulated leaves, needles, limbs and other dead vegetation shall be removed from beneath trees. Nonflammable materials (e.g., rock) instead of flammable materials (e.g., bark mulch) shall be placed next to the structure. As slope increases, the primary safety area shall increase away from the structure and down the slope at a 45-degree angle from the structure, as shown in Table 1.
2. **Secondary Fuel Break Area.** A secondary fuel-free break area shall be cleared and maintained on land surrounding the structure, provided that the land is owned or controlled by the applicant. The secondary fuel-free break extends around the primary safety area.

The goal of the secondary fuel-free break shall be to reduce fuels so that the overall intensity of any wildfire would be lessened and the likelihood of crown fires and crowning is reduced. Vegetation within the secondary fuel-free break shall be pruned and spaced so that fire will not spread between crowns of trees. Small trees and brush growing underneath larger trees shall be removed to prevent spread of fire up into the crowns of the larger trees. Dead fuels shall be removed. The minimum width of the secondary fuel-free break is 100 feet around the primary fuel break area.

3. The fuel-free break standards shall be completed and approved by the Planning Director prior to issuance of any septic, building, or manufactured dwelling permits. Maintenance of the fuel-free breaks shall be the continuing responsibility of the property owner.
4. Structures shall not be sited on slopes of 40 percent or greater under any circumstances.

C. Building Requirements:

1. Roofs of new or expanded structures shall be made of non-flammable fire-resistive [updated 09/23/2021 to match Building Code] material.
2. All building vents and other openings shall be screened.
3. All chimneys shall have a spark arrestor.

D. Water for Fire Suppression. The dwelling shall be located on a parcel within a fire protection district or shall be provided with fire protection by contract.

If the above criteria cannot be met, then:

1. The applicant shall provide evidence that he/she has asked to be included within the nearest such district. If the Planning Director determines that inclusion within a fire protection district or contracting for residential fire protection is impracticable, the Planning Director may consider an alternative means for protecting the dwelling from fire hazards. The means selected may include a fire sprinkling system, on-site equipment, and water storage, or given the site conditions, other methods that are reasonable.
2. If a water supply is required for fire protection, it shall be a swimming pool, pond, lake, or similar body of water that contains at all times at least 4,000 gallons, or a stream that has a continuous year around flow of at least one cubic foot per second. The water source for fire protection shall be an independent system. Water stand pipes shall be located at least 50 feet from the dwelling. The applicant shall provide verification from the Water Resources Department that any permits or registrations required for water diversion or

storage have been obtained or that permits or registrations are not required for the use.

3. Road accesses shall be provided to within 15 feet of the water's edge for firefighting pumping units. The road access shall accommodate the turn-around of fire-fighting equipment during the fire season. Permanent signs shall be posted along the access route to indicate the location of the emergency water source.

08. Level 2 Fire Safety Design Standards. The following standards shall apply to (a) all new structures associated with private businesses and additions to structures associated with private businesses, and all new dwellings and additions to dwellings, (b) accessory structures greater than 1000 square feet, and additions to structures greater than 1000 square feet, and (c) public and private infrastructure projects.

A. Level 2 standards are the same as Level 1 standards with the following exceptions:

1. **Primary Fuel Break Area.** The primary fuel break areas shall extend a minimum of 20 feet around structures. Additional primary fuel breaks based on slope percentage will increase at half the rate specified in the Level 1 standard, as follows:
2. **Secondary Fuel Break Area.** The secondary fuel-free break area shall extend 80 feet around the primary fuel break area, provided that the land is owned or controlled by the applicant.

09. Adjustment to Fuel Break Area Standards. Where Level 1 or 2 fuel-free break standards can't reasonably be met they must be.

A. **Adjustment Standards.** However, if a structure cannot reasonably satisfy fuel-free breaks on the subject property due to the size, shape, topography, or other physical characteristics of the property, the standards may be modified by one or more of the following alternatives:

1. Irrevocable easements for fuel-free break safety zones may be obtained from adjacent property owners so that the fuel-free break safety zone can be maintained. The easement(s) shall be recorded with the County Clerk.
2. The area of an existing road right-of-way or access easement in use and adjacent to the subject property may be utilized to satisfy the fuel free break safety zone requirement.
3. Rivers, streams or lakes maybe used as firebreaks where appropriate, provided that riparian vegetation standards are met. Structures shall be sited so that a primary safety zone can be completed around the structure outside of the river or stream corridor setback/buffer area. The area within the river or stream setback/buffer area shall be exempt from the secondary fuel-free break area requirements.

Alternative to Fully Meeting Applicable Secondary Fuel Break Standard. If the secondary fuel break standard cannot reasonably be met based on the standards set forth in Subsection 09.A above, then the standard shall be met to the extent possible given the physical characteristics of the site, and the Planning Director shall require that the structure be constructed in accordance with the International Fire Code Institute Urban Wildland Interface Code: (1) Section 505 Class 2 Ignition Resistant Construction if the secondary fuel break is at least 50 feet wide, or (2) Section 504 Class 1 Ignition Resistant Construction if the secondary fuel break width is less than 50 feet.

Topic Title: Wildfires

Resource Title: Wildfire Chapter of County of Kaua'i Multi-Hazard Mitigation and Resilience Plan

Resource Type: Special Topic or Area Plans

Municipality: County of Kaua'i

State: Hawaii

Date of Adoption: 2021

Abstract: Wildfire Section of Multi-Hazard Mitigation and Resilience Plan

Wildfires pose a growing threat to the County of Kaua'i due to climate change, land use patterns, and vegetation overgrowth. This chapter assesses the wildfire risk across the island, identifying vulnerable communities, critical infrastructure, and high-risk zones. It examines historical wildfire occurrences, contributing factors such as prolonged drought and invasive species, and the potential impacts on public safety, environmental health, and economic stability. The plan outlines mitigation strategies, including fuel reduction programs, defensible space requirements, enhanced fire detection and response capabilities, and community education initiatives. Additionally, it integrates wildfire resilience efforts with broader land management and emergency response planning to reduce future wildfire hazards. By implementing these strategies, Kaua'i aims to minimize wildfire risks, protect residents and ecosystems, and build long-term resilience against increasing wildfire threats.

Provisions:

County of Kaua'i Multi-Hazard Mitigation and Resilience Plan

Chapter 5. Wildfire

A wildfire is any uncontrolled fire on undeveloped land that requires fire suppression. Wildfires can be ignited by lightning or by human activity such as smoking, campfires, equipment use, and arson. The potential for significant damage to life and property exists in areas designated as "wildland urban interface (WUI) areas," where development is adjacent to densely vegetated areas. Fires in WUI areas tend to be more damaging than urban structural fires, are often more difficult to control, and behave differently from structural fires. When these fires erupt, people and structures must take priority, often at a devastating expense to natural resources. Homes and other structures are often built and maintained in a manner that leaves them and their occupants vulnerable. Thus, fire becomes a significant threat to both humans and natural resources. The Kaua'i Fire Department responds to wildland fires, brush fires, and wildfires almost exclusively.

Structure fires are rare on the island of Kaua'i. Additional general information on the wildfire hazard is provided in Appendix L.

5.1 HAZARD PROFILE

[...]

5.2 RISK ASSESSMENT

5.2.1 Scenario

A major conflagration in the planning area might begin in the wet season, contributing to extensive growth of grasses and similar flash fuels. A dry season could follow, exacerbated by dry hot winds. Carelessness with combustible materials, a tossed lit cigarette, or a sudden lightning storm could trigger multiple small isolated fires.

The embers from these smaller fires could be carried by hot, dry winds into forests and WUI zones. New small fires there would eventually merge. Fires that start in flat areas move slower, but wind still pushes them. It is not unusual for a wildfire pushed by wind to burn the ground fuel and later climb into the crown and reverse its track. This is one of many ways that fires can escape containment, typically during periods when response capabilities are overwhelmed. Suppression resources would be redirected from protecting the natural resources to saving more remote subdivisions. The response to a major wildfire on the island would be exclusively local and state resources. The County does not have real-time access to federal firefighting resources.

To further complicate this scenario, heavy rains could follow, causing flooding and landslides and releasing tons of sediment into rivers, permanently changing floodplains and damaging sensitive habitat and riparian areas. Such a fire followed by rain could release millions of cubic yards of sediment into streams for years, creating new floodplains and changing existing ones. With forests removed from the watershed, stream flows could easily double. Floods that could be expected every 50 years may occur every couple of years. With the streambeds unable to carry the increased discharge because of increased sediment, the floodplains and floodplain elevations would increase.

5.2.2 Exposure

The Hawai'i Wildfire Management Organization has developed mapping of Communities at Risk from Wildfire (CARW), which was used for the wildfire risk assessment. CARW maps delineate communities that share similar environmental conditions, land use characteristics, fuel types, hazards, and general wildfire issues. They provide ratings to characterize generalized hazards in each area.

[...]

5.2.3 Vulnerability

Population

All people exposed to the wildfire hazard are potentially vulnerable to wildfire impacts. Persons with access and functional needs, the elderly and very young may be especially vulnerable to a wildfire if there is not adequate warning time for them to evacuate if needed. In addition, people outside the mapped risk areas are susceptible to health hazards associated with smoke and air pollution from wildfires, especially sensitive populations including children, the elderly, and those with respiratory and cardiovascular diseases. In addition, wildfires threaten the health and safety of those fighting the fires.

Property

All property exposed to the wildfire hazard is vulnerable. Structures that were not constructed to standards designed to protect a building from a wildfire may be especially vulnerable. Loss estimations for the wildfire hazard are not based on damage functions, because no such damage functions have been generated. Instead, estimates of potential loss were developed representing 1 percent, 10 percent, 30 percent and 50 percent of the replacement value of exposed structures. This allows emergency managers to select a range of economic impact based on an estimate of the percent of damage to the general building stock. Damage in excess of 50 percent is considered to be substantial by most building codes and typically requires total reconstruction of the structure. Table 5-3 shows the general building stock loss potential estimates in the high and medium CARW wildfire risk areas.

Critical Facilities

Critical facilities of wood frame construction are especially vulnerable during wildfire events. In the event of wildfire, there would likely be

little damage to most infrastructure. Most roads would be without damage except in the worst scenarios. Power lines are the most at risk from wildfire because most poles are made of wood and susceptible to burning. Fires can create conditions that block or prevent access and can isolate residents and emergency service providers. Wildfire typically does not have a major direct impact on bridges, but it can create conditions in which bridges are obstructed. Many bridges in areas of high to moderate fire risk are important because they provide the only ingress and egress to large areas and in some cases to isolated neighborhoods. Hazardous materials sites located in proximity to wildfires are at particular risk for compounding issues.

Hazardous materials facilities often contain large quantities of flammable materials. Should a wildfire reach one of these facilities, the result could be catastrophic.

Environment

Fire is a natural and critical ecosystem process in most terrestrial ecosystems, affecting the types, structure, and spatial extent of native vegetation. However, under a specific set of circumstances, it can also cause severe environmental impacts, such as the following:

- **Damaged Fisheries**—Critical fisheries can suffer from increased water temperatures, sedimentation, and changes in water quality.
- **Soil Erosion**—The protective covering provided by foliage and dead organic matter is removed, leaving the soil fully exposed to wind and water erosion. Accelerated soil erosion occurs, causing landslides and threatening aquatic habitats.
- **Spread of Invasive Plant Species**—Non-native woody plant species frequently invade burned areas. When weeds become established, they can dominate the plant cover over broad landscapes, and become difficult and costly to control.
- **Disease and Insect Infestations**—Unless diseased or insect-infested trees are swiftly removed, infestations and disease can spread to healthy forests and private lands. Timely active management actions are needed to remove diseased or infested trees.
- **Destroyed Endangered Species Habitat**—Wildfire can have negative consequences for endangered species by degrading their habitat.

- **Soil Sterilization**—Some wildfires burn so hot that they can sterilize the soil. Topsoil exposed to extreme heat can become water repellant, and soil nutrients may be lost.
- **Reduced Agricultural Resources**—Wildfire can have disastrous consequences on agricultural resources, removing them from production and necessitating lengthy restoration programs.
- **Damaged Cultural and Historical Resources**—The destruction of cultural and historic resources may occur, scenic vistas can be damaged, and access to recreational areas can be reduced.

5.3 ISSUES

5.3.1 Development in High-Hazard Areas

The highly urbanized portions of the planning area have little or no wildfire risk exposure. Urbanization tends to alter the natural fire regime and can create the potential for the expansion of urbanized areas into wildland areas. The expansion of WUI areas can be managed with strong land use and building codes. The planning area is well equipped with these tools. Land use is determined by the County's zoning code and zoning map, also known as the Comprehensive Zoning Ordinance. Zoning controls the density and intensity of development, and well as its form and character. Changes to the zoning code are guided by the General Plan, which is adopted by the Kaua'i County Council. The General Plan includes community plans for West Kaua'i, South Kaua'i, Lihu'e, East Kaua'i, and North Shore. The General Plan and community plans establish policies to protect communities from hazards. Development in the planning area is also regulated by building standards and performance measures.

Figure 5-2 shows the land use distribution by area in high and medium CARW severity zones. Agricultural and natural uses make up about 34 percent of these zones. Most homes and facilities are in areas designated urban center, neighborhood center, neighborhood general, or residential community. Approximately 30 percent of the hazard area is highly developed.

5.3.2 Other Issues

The following issues have been identified related to the wildfire hazard in the planning area:

- **WUI Public Information**—Public education and outreach to people living in or near the fire hazard zones should include information

about and assistance with mitigation activities such as defensible space, and advance identification of evacuation routes and safe zones.

- **Management of Development**—Future growth into WUI areas should continue to be managed with special development considerations.
- **Continued Responder Training** —Area fire districts need to continue to train on WUI events.
- **Vegetation Management Activities**—Such activities would include enhancement through expansion of the target areas as well as additional resources. Controlled burns of former sugar cane fields would continue to be monitored to mitigate against potential major uncontrolled conflagrations

Responder Qualifications—Expand certifications and qualifications for fire department personnel. Ensure that all firefighters are trained in basic wildfire behavior, basic fire weather, and that all company officers and chief level officers are trained in the wildland command and strike team leader level.

Topic Title: Wildfires

Resource Title: Wildland-Urban Interface Code Permitting Requirements

Resource Type: Zoning Use / Supplemental Substantive Zoning Provisions

Municipality: City of Austin

State: Texas

Date of Adoption: 2017

Abstract: WUI Code Permitting Requirements

Austin, Texas, adopted a wildland-urban code to control development at the boundary between urban and rural areas of the city. It requires site plans for parcels being developed and vicinity plans for the area surrounding each site. These provisions promote strategic placement of development in the fire-prone landscape. The code also prohibits issuance of construction permits for sites in very high-hazard areas, and for sites that lack defensible measures.

These code provisions ensure that the city of Austin does not develop all available land but rather weighs the benefits of potential development against the risks of wildfire exposure. The Fire Hazard Severity table quantifies these risks by fuel type, proximity, and slope to identify the most dangerous building sites and restrict their development. By doing so, it ensures development does not outrun the ability to protect against wildfire. The code, in turn, allows expansion into safer locations. This is an important anticipatory adaptation strategy, forecasting where wildfires may be likely to occur in the future. The code also promotes mitigation by seeking to prevent the destruction of buildings.

Code Provisions:

Austin, Texas Municipal Code

[Title 25, Ch. 12, Art. 8: Wildland-Urban Interface Code](#)

107.2 Permits Required. Except as otherwise provided in the Land Development Code, a building or structure may not be constructed, erected, altered, repaired, moved, removed, converted, demolished, or changed in its use of occupancy without the applicable city permit.

107.2.1 A permit may not be issued to construct a structure with (a) an extreme hazard severity as set forth in Table 502.1[see below]; (b) nonconforming access; (c) nonconforming water supply; and (d) nonconforming defensible space.

107.3 Work Exempt from Permit. Except as required by the Building Code, Fire Code, or Residential Code, a permit is not required for:

1. a one-story detached accessory structure used as a tool and storage shed, playhouse, or similar use, provided the floor area is not greater than 120 square feet (11 m²) and the structure is located more than 50 feet (15,420 mm) from the nearest adjacent structure; and

2. a fence that does not exceed 6 feet (1,829 mm) in height.

A structure or fence constructed without a permit, as allowed by this provision, must comply with this code.

108.1 General. A plan, engineering calculation, diagram, or other data described in this code must be submitted when required by the Fire Code or this code.

108.3 Site Plans and Residential and Commercial Building Permit Applications. A site plan or an application for a residential or commercial building permit must include (a) landscape and vegetation details when this code requires defensible space; (b) the proposed ignition-resistant construction for each building, structure, and associated appendage; and (c) the proposed roof classification for each building.

108.7 Vicinity Plan. A site plan or an application for a residential or commercial building permit must include the lot lines, other structures, slope, vegetation, fuel breaks, water supply systems, and access roads that are located within 300 feet (91,440 mm) of the proposed building(s) and structure(s).

TABLE 502.1 FIRE HAZARD SEVERITY.

E= Extreme Hazard; H= High Hazard; M= Moderate Hazard.

Fuel Model	Proximity to Contiguous (40 Acres) Wildland Fuels					
	150' to 1.5 miles			<150'		
	Slope (%)					
	<10	10 to 25	>25	<10	10 to 25	>25
Light: herbaceous plants and round wood less than ¼ inch diameter	M	M	M	M	M	H
Medium: round wood ¼ to 3 in.	M	M	H	E	E	E
Heavy: round wood 3 to 8 in. diameter	H	H	H	E	E	E

Topic Title: Wildfires

Resource Title: Site Improvement Plans Containing Wildfire Risk Assessments and Wildfire Mitigation Plans.

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Lone Tree

State: Colorado

Date of Adoption: 2023

Abstract: Site Improvement Plans Containing Wildfire Risk Assessments and Wildfire Mitigation Plans

The wildfire mitigation provisions in the Lone Tree, CO Municipal Code establish requirements for development sites adjacent to open space or undeveloped land to submit a wildfire risk assessment and a wildfire mitigation plan. These assessments, conducted by a Wildfire Mitigation Specialist, evaluate burn probability, wildfire intensity distribution, and potential consequences for human life, property, and the environment. The mitigation plans outline strategies to minimize wildfire damage, including site design considerations, building material requirements, landscaping treatments, and maintenance of the Wildland Urban Interface (WUI). These regulations aim to enhance fire resilience and safety in urban and suburban developments within Lone Tree, Colorado.

Code Provisions:

Lone Tree, CO – Municipal Code

Chapter 16: Zoning

ARTICLE XXVII – Site Improvement Plan (SIP)

Sec. 16-27-80 – General submittal requirements

(20) All development sites adjacent to open space and/or undeveloped land shall submit a wildfire risk assessment and wildfire mitigation plan. Wildfire risk assessments and wildfire mitigation plans shall be prepared by a Wildfire Mitigation Specialist.

- a. Wildfire risk assessments shall provide an appraisal of the site (to include the land and any existing structures or improvements) which assesses the likelihood of burning (burn probability) and the distribution of wildfire intensity in the event a burn occurs. Such an appraisal shall include an assessment of the impacts of fuel (to include vegetation and existing structures/development), historic weather conditions and climactic patterns, and topography on burn probability and wildfire distribution. The assessment shall also analyze the consequences to human life, health, property and the environment in the event a burn occurs on the site.
- b. Wildfire mitigation plans shall identify measures designed to minimize the destructive effects of a wildfire to a development site and the surrounding area. The

plan shall address site design and function, use restrictions, building and furnishing/amenity materials to improve fire resistance, building and furnishing/amenity locations to reduce ignition risk, landscaping treatments, access and circulation, modifications to and maintenance of the Wildland Urban Interface (WUI) surrounding the site, and any additional design and use components deemed necessary by a Wildfire Mitigation Specialist, or that may be requested by the City.

Topic Title: Wildfires

Resource Title: Development Code: Fire Safety Overlay Zone

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: San Bernardino County

State: California

Date of Adoption: Adopted 2007, Amended 2017

Abstract: Development Code: Fire Safety Overlay Zone

San Bernardino County includes a Fire Safety Overlay Zone in its development code. The overlay zone is designed to reduce wildfire risk in mountains, valley foothills, and desert regions. It requires planning and building permit applicants to notify the Fire Authority. It also requires fuel modification plans and restricts residential density based on the topography of particular parcels. These provisions represent anticipatory adaptation strategies that prevent severe wildfires and mitigate the fires that do occur. They help to ensure that life and property are protected from the threat of wildfire.

Code Provisions:

San Bernardino, California Development Code

[Title 8, Div. 2, Ch. 82.13: Fire Safety Overlay](#)

§ 82.13.050 (General Development Standards).

The FS Overlay includes areas within the mountains, valley foothills, and desert region designated by the applicable Fire Authority as wildfire risk areas. It includes all the land generally characterized by areas varying from relatively flat to steep sloping terrain and with moderate to heavy fuel loading contributing to high fire hazard conditions. Present and future development within the FS Overlay is exposed to the impacts of wildland fires and other natural hazards primarily due to native fuel types, topography, and prevailing weather conditions such as Santa Ana winds. These factors contribute to the potential of extreme wildland fire behavior conditions.

§ 82.13.040 Application Requirements.

(a) *Notice of Planning Application or Building Permit.* A notice of each planning application and/or building and safety building permit, that would lead to the construction of one or more structures or the subdivision of land within the FS Overlay shall be sent to the responsible Fire Authority for comment.

(b) *Review Authorities.* Each proposed land use application that would lead to the construction or expansion of a structure or the subdivision of land shall be submitted to the responsible Fire Authority and the appropriate Natural Resources Conservation Service

Office of the United States Department of Agriculture for review and recommendation. Any recommendations received shall be indicated in any staff report and/or presentation for the proposed development and shall be incorporated into project conditions of approval where possible.

(c) *Fuel Modification Plan.* Each project application shall include a fuel modification plan describing the fuel modification area required in § [82.13.050\(l\)](#) below. The plan may be submitted as a preliminary and final plan. A preliminary and/or final plan shall be submitted concurrently with the development application to the Department of Land Use Services for review in conjunction with the project design review. Final plans shall be reviewed and approved by the responsible Fire Authority. The fuel modification plan shall address the standards in § [82.13.050\(l\)](#) below, and the following factors:

(1) The natural ungraded slope of the land within the project and in the areas adjacent to the project;

(2) Fuel loading;

(3) Access to the project and access directly to the fuel-modified area;

(4) The on-site availability of water that can be used for fire-fighting purposes;

(5) The continual maintenance of the fuel-modified areas;

(6) The soil erosion and sediment control measures to alleviate permanent scarring and accelerated erosion; and

(7) A list of recommended landscape plant materials that are fire resistant.

(d) *Subdivisions.* When 25 percent or more of a subdivision project site involving five or more lots is located on natural slopes greater than 30 percent, the subdivision application shall be submitted concurrently with a planned development application to evaluate appropriate project design in consideration of topographic limitations of the site. This provision shall not apply if all of the areas on the site with natural ungraded slopes over 30 percent are permanently restricted from structural development. Each subdivision application shall include the following slope analysis information:

(1) A topographic map of the proposed project area and all adjoining properties within 150 feet at a scale of not less than one-inch to 200 feet. The contour interval shall not be more than two feet except that the contour interval may be five feet if the general natural ungraded slope is more than 10 percent. Contour lines shall be obtained by aerial or field survey, done under the supervision of a licensed land surveyor or registered engineer.

(2) The natural, ungraded, slope categories to be computed are: zero percent to less than 15 percent; 15 percent to less than 30 percent; 30 percent to less than 40 percent; and

40 percent and greater. The minimum area (polygon) used for slope calculation shall be 5,000 square feet.

(3) The area, in acres, shall be tabulated for each category.

§ 82.13.050 General Development Standards.

Each proposed development shall comply with all applicable requirements of this Chapter, as follows.

(a) *All Phases.* The requirements of this Chapter shall apply to all phases of a development project.

(b) *Fire Authority Standards.* All proposed development shall comply with applicable standards required by the responsible Fire Authority. This shall include the standards and provisions of the California Building Code (CBC) Chapter 7A (Materials and Construction Methods for Exterior Wildfire Exposure) and California Residential Code (CRC) Chapter 327, which are included in this Code by reference.

(c) *Applicability of Land Use Zoning District Standards and Overlay Standards.* The development standards established by a land use zoning district and any applicable overlay shall apply, except as modified by this chapter.

(d) *Additions, Alterations, Enlargements, or Reconstructions.* Any addition, alteration, enlargement or reconstruction of a structure shall comply with the provisions of this Chapter. When an addition, alteration, enlargement, or reconstruction of a structure equals or exceeds 50 percent of the existing structure, or 25 percent of the roof for roofing requirements only, the provisions of § [82.13.050\(h\)](#) (Perimeter access to fuel-modified and fire hazard areas), and § [82.13.050\(p\)](#) (Building construction requirements), shall apply to the entire structure and/or the whole roof as applicable. The structures and/or roofs shall be entirely retrofitted to comply with the requirements of this Chapter.

(e) *Residential Slope Density.* In order to reduce fire hazards, prevent erosion, and to preserve the existing vegetation and visual quality, the density of development for any tentative parcel map or tentative tract map in hillside areas shall be in compliance with the following criteria:

- (1) One to four dwelling units per gross acre on slopes of zero to less than 15 percent;
- (2) Two dwelling units per gross acre on slopes of 15 to less than 30 percent;
- (3) One dwelling unit per three gross acres on slopes of greater than 30 to less than 40 percent gradient;
- (4) One dwelling unit per ten gross acres on slopes of 40 percent or greater gradient;

(5) In the Rancho Cucamonga Sphere of Influence, zero density is allowed for any portion of a proposed tentative parcel map or tentative tract map on slopes of greater than 30 percent gradient.

(f) *Site and Emergency Access.* Each development project and each development project phase, except for a development project located exclusively on a cul-de-sac, shall have a minimum of two points of vehicular ingress and egress, designed to County road standards, with a minimum width of 26 feet of all-weather surface as defined in the California Fire Code, from existing and surrounding streets. The Land Use Services Department may authorize one point of vehicular access to be an emergency access route with an all-weather surface if the Land Use Services Department first makes each of the following findings:

- (1) Two points of nonemergency access are physically infeasible;
- (2) Provisions have been made to reasonably ensure that the emergency access will be maintained; and
- (3) Based on the review and consideration of the responsible Fire Authority's recommendation, the emergency access route will provide adequate vehicular ingress and egress during emergencies.

(g) *Private Driveways or Access Roadways.* Private driveways or access roadways for residential units shall not exceed 150 feet in length, unless approved by the responsible Fire Authority in compliance with the California Fire Code.

(h) *Perimeter Access to Fuel-modified and Fire Hazard Areas.* Fire fighting vehicles shall have adequate access into areas between fire hazardous areas or fuel-modified areas and the development perimeter, so that a wildland fire can be contained at the development perimeter and prevented from spreading to structures. Each development project shall provide adequate vehicular access for fire fighting vehicles to the development perimeter of the project along the portion of the development perimeter that is adjacent to either an existing or proposed fuel-modified area, or a fire hazard area. Provisions shall be made and shall be required, where necessary, through conditions of approval for the development project for the continual maintenance of the areas intended to provide the access. Perimeter access shall be provided, through either of the following measures or through alternate measures in compliance with § [82.13.090](#) (Alternate Hazard Protection Measures).

- (1) The provision of an existing or proposed road along the development perimeter, or portion thereof that is exposed to a fire hazard or fuel-modified area, and which is accessible to fire-fighting equipment. The road shall be capable of supporting fire-fighting equipment, shall be at least 20 feet in width, and shall not exceed a grade of 14 percent. The

conditions of approval for the development project shall require provisions to ensure that the roadway will be maintained, if it is not within the publicly maintained road system.

(2) Development projects shall provide access ways, at least 12 feet in width, with a grade not to exceed 14 percent, and capable of supporting fire fighting vehicles, between the development perimeter and proposed or existing streets. Access ways shall be spaced at intervals of no more than an average of 350 feet along each street. The conditions of approval for the development project shall require specific provisions to ensure that access ways will remain unobstructed and will be maintained. Where feasible, access ways may not be paved and shall be designed so as not to detract from the visual quality of the project.

(i) *Length of Cul-de-sacs.* Cul-de-sacs shall not exceed 350 feet in length, except that they may be extended as allowed by this Subdivision.

(1) *Exception for Parcels of Less than Five Acres.* A cul-de-sac may exceed 350 feet in length but shall not exceed 600 feet in length, if parcels that take access from the cul-de-sac are less than five acres, and:

(A) Alternate measures are utilized in compliance with § [82.13.090](#) (Alternate Hazard Protection Measures); or

(B) Based upon consideration of the recommendation of the responsible Fire Authority, the Land Use Services Department determines that the cul-de-sac is situated and designed so that each parcel taking access from it is not contiguous to or exposed to either undeveloped fuel modified areas along the development perimeter of the project or to fire hazard areas, and that the extension of the cul-de-sac will not increase the exposure of buildings to wildland fires.

(2) *Exception for Parcels Larger than Five Acres.* A cul-de-sac may exceed 600 feet in length if all parcels that take access from the cul-de-sac are five acres or greater in area and:

(A) The proposed cul-de-sac is not within or adjacent to areas that are zoned for or subdivided to parcels of five acres or less.

(B) Alternate measures are utilized in compliance with § [82.13.090](#) (Alternate Hazard Protection Measures).

(3) *Alternate Measures.* In compliance with § [82.13.090](#) (Alternate Hazard Protection Measures) and dependent upon site-specific conditions, one of the following measures or combination of measures may be used to mitigate the effect of creating cul-de-sacs up to 600 feet in length with parcels less than five acres in area:

(A) Limitation of the total number of dwelling units with access to the cul-de-sac to no more than 15, and restriction of further subdivision of parcels and construction of additional independent residential units which have access to the cul-de-sac. These restrictions shall be imposed through conditions of approval of the development project.

(B) A continuous perimeter access road at least 20 feet in width is provided along the portion of the cul-de-sac exposed to fire hazard or fuel-modified areas such that it is drivable under normal conditions by fire fighting vehicles, provides adequate maneuvering space for the vehicles, and is designed so that at least one point of access to the perimeter access road is taken from roads other than the subject cul-de-sac.

(C) The cul-de-sac road will have a paved width of at least 40 feet with posted no parking for its entire length, and there is at least one area approximately at the midpoint of the cul-de-sac that serves the same function of a cul-de-sac bulb in allowing fire fighting vehicles adequate room to turn around. This measure may only be utilized if the expansion of the road width will not contribute to slope stability hazards either on-site or off-site.

(D) Other alternate measures approved by the department in compliance with § [82.13.090](#) (Alternate Hazard Protection Measures).

[...]

(3) *Sloping Site Setbacks or Fuel Modification.* Each structure proposed upslope, in an area with slopes exceeding 30 percent before grading and greater than 30 feet in height, shall comply with the following requirements:

(A) For existing parcels, the vegetation on the slopes shall be treated in a manner so that it becomes a fuel-modified area. The fuel-modified area shall be maintained for either the entire slope, or 100 feet from the structure, or to the property line, whichever distance is less. For newly created parcels, the vegetation shall be maintained as outlined above, or prescribed by a fuel modification plan.

(B) Where grading is utilized or proposed, that does not conform to the natural slope and the graded area is adjacent to natural ungraded slopes that are greater than 30 percent in gradient and greater than 30 feet in height, each structure proposed upslope from the toe of the slope, shall be set back at least 30 feet from the edge of the slope.

Topic Title: Wildfires

Resource Title: Chapter 40 – Sonoma Complex Fire Disaster Recovery

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Sonoma County

State: California

Date of Adoption: 2024

Abstract: Sonoma Complex Fire Disaster Recovery

This case study examines Sonoma County's legislative and regulatory response to the devastating Sonoma Complex Fire, which displaced thousands of residents and destroyed significant portions of the housing stock. In the aftermath, the county adopted Chapter 40 of its Code of Ordinances to facilitate expedited recovery and transitional housing efforts. This temporary legislation, in effect through December 31, 2026, suspends or modifies various housing, permitting, and health and safety codes to accommodate displaced residents in interim shelters such as recreational vehicles, manufactured homes, guest houses, and other nontraditional structures. The chapter establishes administrative standards and permits a wide range of alternative housing arrangements, including the temporary use of farmworker housing, promotional accommodations, and accessory structures. It also provides for fee waivers on accessory dwelling units (ADUs), modifies restrictions on nonconforming uses and structures, and streamlines design review processes. By balancing urgent housing needs with public health and safety standards, Sonoma County's approach illustrates a flexible, place-based model for disaster recovery governance at the municipal level.

Code Provisions:

Sonoma County, California – Code of Ordinances

[Chapter 40 – Sonoma Complex Fire Disaster Recovery](#)

Article I – General

[...]

Sec. 40-2. – Purpose

This chapter is enacted for the purpose of modifying and/or temporarily suspending various county housing, permitting and health and safety codes and policies to allow the fastest possible transition of residents made homeless or displaced by the Sonoma Complex Fire to interim and long-term shelter and to house people in safe, secure, habitable housing on a temporary basis.

[...]

Sec. 40-3.5. – Administrative standards

The director may establish administrative standards for use in implementing this chapter. Any administrative standards established pursuant to this chapter shall be made available to the public on the permit and resource management department's website and upon request at the department.

Sec. 40-4. – Effective Period

- A. This chapter and all its provisions shall expire and be of no further force or effect on December 31, 2026, subject to extension or modification by the board of supervisors.
- B. Unless otherwise provided herein, no residential recreational vehicle use or other interim housing authorized pursuant to this chapter shall be used for housing after the expiration of this chapter.

Secs. 40-5—40-19. – Reserved.

Article II. – Glossary.

Sec. 40-20. – Purpose.

This article provides definitions of terms and phrases used in this chapter that are technical or specialized, or that may not reflect common usage. If any of the definitions in this article conflict with definitions in other provisions of this code, these definitions shall control for the purposes of this chapter. If a word is not defined in this article, or in other provisions of this code, the director shall determine the correct definition.

Sec. 40-21. – Definitions

[...]

Secs. 40-22—40-29. – Reserved.

Article III. – Residential Use of Recreational Vehicles and Manufactured Homes

Sec. 40-30. – Residential use of recreational vehicles.

- A. Recreational vehicles for reconstruction or repair of damaged dwellings. The use of recreational vehicles in any residential zoning district outside of the coastal zone during the term of this chapter shall be allowed, subject to county approval or permit as applicable, for use by persons displaced by the Sonoma Complex Fire, subject to the requirements in [Sections 40-30](#) B and C.
- B. Standards. Other than as provided in [Section 40-30](#) A, all residential use of recreational vehicles authorized pursuant to this section shall meet the following standards.
1. The property owner or the property owner's authorized agent shall obtain a county temporary use approval or permit and all other required permits. Permits will be issued for a period up to two (2) years, but in no case will the permit expiration date extend past the effective period of this chapter. Written consent of the property owner is required in all cases. Not more than one (1) recreational vehicle may be placed on any residential lot under this subsection.
 2. Residential use of recreational vehicles is limited to vehicles not on a permanent foundation and used to house displaced persons during the effective period set forth in [Section 40-4](#).
 3. Residential use of recreational vehicles shall be located outside the boundaries of any recorded easements but may be located within [Chapter 26](#) (zoning ordinance) setback areas, other than riparian setbacks, if such placement of the recreational vehicle is necessary to allow for unobstructed reconstruction on the site.
 4. The recreational vehicle shall be connected to an approved source of water meeting one (1) of the following criteria:
 - a. Public water supply;
 - b. Existing well, provided that it has been approved by the director as safe for domestic consumption; or
 - c. Other water source approved by the director.
 5. The recreational vehicle shall be connected to an approved sewage disposal system meeting one (1) of the following criteria:
 - a. Public sewer system;
 - b. Existing on-site sewage disposal system that has been approved by the director to be intact, adequately sized, and functioning following the disaster; or
 - c. Other method of sewage disposal approved by the director.
 6. The recreational vehicle shall be connected to an approved source of electricity meeting one(1) of the following criteria:
 - a. Permitted electrical service hook-up; or
 - b. Other power source approved by the director.
 7. Residential use of recreational vehicles under this chapter shall not be allowed in an area with health and safety hazards as determined by the director.
 8. Except as provided herein, no county approval or permit for residential use of a recreational vehicle shall be issued until the site is approved for reconstruction by the county, CalOES or FEMA.

- C. Removal and disconnection. Every recreational vehicle and manufactured home placed on any site for residential use pursuant to this chapter shall be disconnected from sewer, septic, water and/or power connections and removed from the site on which it is located upon expiration of the permit required by [Section 40-30](#) B.1 herein or the expiration date of this chapter provided in [Section 40-4](#), whichever occurs first.

Secs. 40-31—40-39. – Reserved.

Article IV. – Additional Housing and Recovery Provisions.

Sec. 40-40. – Suspension of occupancy limits on seasonal farmwork housing.

This code currently allows seasonal farmworker housing and extended seasonal farmworker housing in certain agricultural districts, to be occupied for not more than one hundred eighty (180) days in any calendar year and subject to regulation pursuant to Title 25 of the California Code of Regulations. Notwithstanding any contrary provision in this code, seasonal farmworker housing and extended seasonal farmworker housing may be occupied for up to three hundred sixty-five (365) days in any calendar year, provided that such seasonal farmworker housing or extended seasonal farmworker housing shall remain subject to all other existing regulations and limitations, standards, except that the park and traffic mitigation fees described in county code [Section 26-88-010\(l\)\(13\)](#) shall not become due or payable as the result of interim housing use.

Sec. 40-41. – Rental of existing guest houses, pool houses and residential accessory structures.

Notwithstanding any contrary provision in this code, during the effective date of this chapter, existing legally permitted guest houses, pool houses, and residential accessory structures may be rented as interim housing for persons displaced by the Sonoma Complex Fire, but shall remain subject to all other existing regulations and limitations. Residential occupancy of such structures shall no longer be a legal use under the county code after the expiration date of this chapter provided in [Section 40-4](#) A. In all such cases, the property owner shall be responsible for notifying tenants of the temporary nature of the housing.

Sec. 40-42. – Rental of existing promotional or marketing accommodations, farmstays, bed and breakfast inns, resorts, retreats, camps or other similar uses.

Notwithstanding any contrary provision in this code or use permit conditions, existing rental or residential occupancy of promotional or marketing accommodations, farmstays, bed and breakfast inns, resorts, retreats, camps or other similar visitor serving uses shall be allowed as interim housing for persons displaced by the Sonoma Complex Fire.

Sec. 40-42.5. – Use and rental of existing dwellings and recreational vehicles on agricultural parcels.

- A. Existing dwellings. Notwithstanding any contrary provision in this code, existing legally permitted main or primary dwellings and farm family dwellings on agricultural parcels may be used by or rented to persons displaced by the Sonoma Complex Fire, provided that such use or rental does not displace agricultural employees or farm workers. The temporary rental of farm family or agricultural employee dwelling to persons not involved in the agricultural enterprise shall no longer be permitted as of the expiration of this chapter.
- B. Recreational vehicles. Notwithstanding any contrary provision in this code, one (1) or two (2) recreational vehicles as defined herein may be placed on LIA, LEA and/or DA parcels within the burn area for use or rental by persons displaced by the Sonoma Complex Fire, subject to county permit or approval, and subject to the permitting requirements, term limits, and standards set forth in Section 4-30 above.
- C. State regulations. Nothing in this chapter removes or suspends regulatory requirements or authority of the State Department of Housing and Community Development to regulate residential use of recreational vehicles as special occupancy parks or otherwise, other than as such provisions are suspended or modified by State law and/or an Executive Order or emergency proclamation by the Governor.

Sec. 40-43. – Fee waivers for accessory dwelling units.

- A. Purpose. The code currently requires payment of permit processing fees and development fees in connection with applications for new accessory dwelling units (ADUs). Notwithstanding any contrary provision in this code, for fire-damaged lots where the primary dwelling is reconstructed, new ADU applications shall be eligible for fee waivers in accordance with this section.
- B. Internal conversions. When a reconstructed single-family dwelling that was previously connected to public sewer service is built to the originally permitted dimensions without changing the footprint or square footage of the original dwelling, building permit processing fees shall be waived for an accessory

dwelling unit (ADU) that is incorporated into the interior of the dwelling. No development fees are applicable. The ADU shall conform with all other applicable codes and standards, including [Section 26-88-060](#), and shall be identified in the application submittal.

Sec. 40-44. – Safe Parking.

[...]

Sec. 40-45. – Reserved.

Sec. 40-46. – Legal nonconforming uses and structures.

- A. Structures that exceed allowable density. Notwithstanding any contrary provision of this code, a legal nonconforming residential structure substantially damaged or destroyed by the Sonoma Complex Fire that exceeds allowable density may be rebuilt and reconstructed and expanded in floor area by ten percent (10%) of the original floor area.
- B. Structures damaged or destroyed by the Sonoma Complex Fire. Notwithstanding any contrary provision of this code, legal nonconforming residential structures damaged or destroyed by the Sonoma Complex Fire need not be rebuilt on the original foundation footprint. Structures that conform to allowable density may be rebuilt and expanded subject to lot coverage and setback requirements and to all other applicable requirements of the code, provided that the improvements do not increase the existing nonconforming portion of the structure.

Secs. 40-47—40.49. – Reserved.

Sec. 40-50. – Design review.

- A. Scenic landscape units.
 - 1. Design standards. The director shall establish ministerial design standards for review of applications for reconstruction and repair of residential structures on fire-damaged lots.
 - 2. Reconstruction and repair of residential structures. Notwithstanding any contrary provisions of this code, applications for reconstruction and repair of residential structures on fire-damaged lots located in an SR combining district and also within a scenic landscape unit as shown in the general plan open space element shall be subject to review and approval by the director. Applications that conform to the design standards established under [Section 40-50](#) A shall be approved. The director's decision shall be final and the provisions of Section[s] [26-92-040](#)(a), (b) of this code shall not apply.

Applications that do not comply with the design standards established under [Section 40-50](#) A shall be subject to administrative design review under [Chapter 26](#) of this code.

- B. Commercial and industrial structures. Notwithstanding any contrary provisions of this code, applications for reconstruction and repair of commercial and industrial structures on fire-damaged lots may, in the discretion of the director, be subject to administrative design review pursuant to [Chapter 26](#) of this code. If the director determines that administrative design review is not appropriate or otherwise not applicable, the application for reconstruction or repair shall be subject to design review under [Chapter 26](#) of this code.

Sec. 40-51. – Residential use of manufactured homes.

Manufactured homes may be used for temporary residential use on fire-damaged lots by displaced persons where an application and site plan for reconstruction of the primary residential structure has been submitted to PRMD and the use complies with the standards set forth in [Sections 40-30](#) B, except that the manufactured home may be placed on a pad or foundation. Upon completion of the permanent residential structure, and as a condition of receiving final inspection and approval for occupancy of the permanent residential structure, the manufactured home and any installed pad or foundation shall be removed. For purposes of this section only, the definition of manufactured home in [Section 26-04-020](#) of this code shall apply. Nothing in this section shall preclude use of a manufactured home on a permanent foundation as the primary dwelling or accessory dwelling unit, provided that the manufactured home complies with all applicable requirements of this code.

Sec. 40-52. – Groundwater availability

Notwithstanding any contrary provision in this code, compliance with [Section 7-12](#) of this code shall not be required in connection with an application for reconstruction or repair of a residential dwelling unit on a fire-damaged lot, as defined in this chapter.

Secs. 40-53-40.59. – Reserved.

Inland Flooding

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[Dallas, TX -- Floodplain Overlay District](#)

[City of Green Bay, WI -- Stormwater Management](#)

[Boone, NC -- Flood Damage Prevention](#)

Inland Flooding

Narrative

Inland flooding is flooding that occurs away from coastal areas, typically because of excessive precipitation or runoff. As the severity and frequency of storm events continues to increase with climate change, and the development of urban and suburban areas continues, flooding events increasingly result in loss of life and property. Inland flooding is thus a growing concern for communities nationwide. Research of municipal codes from around the United States was conducted by members of the Inland Flooding subgroup and presented in case studies. This research was largely completed through online searches of municipal codes and analysis of relevant portions of those codes. Most codes were found within Floodplain Management and Permitting chapters or sections, as well as Stormwater Management ordinances.

The case studies contained in this body of research represent codes from eight states, ranging from coast to coast and throughout multiple types of ecosystems. The vast majority of codes rely on permitting requirements for developers seeking to build new infrastructure in or near floodplains or flood-prone areas. However, large portions of most codes also incorporate the Federal Emergency Management Agency's Model Code. The FEMA Model Code, in part, is included to ensure communities are eligible for disaster relief via various programs, most notably the National Flood Insurance Program, in the case of major incidents. The FEMA Model Code also serves as a means by which communities can implement and tier to the FEMA Flood Insurance Rate maps, which are developed through, inter alia, FEMA Flood Insurance Studies that are typically conducted for counties nationwide. These maps are utilized for insuring development and assessing risks throughout the country and provide bases for communities to designate areas based on various levels of flood risk. By considering FEMA research data and implementing elements of FEMA Model Code based on the risk factors pertinent to their community, local officials can reduce the risk of flood damage to private and public housing and infrastructure.

Floodplain management ordinances also help communities develop logical growth plans and avoid development that could exacerbate flood events and risks in key areas. These ordinances have been implemented by state-delegated land use authority that has been granted to local communities. They help promote climate resilient development by limiting development in key areas (such as wetlands) that serve as buffers during flooding, and promote development that avoids waste of human and natural resources. Moreover, optimal land use strategies through these ordinances are critical, as they also implement building standards that require flood proofing and various structural elements that mitigate the effects of flooding. It is highly recommended that planners and policymakers seeking to develop or refine floodplain management ordinances pay close attention to the FEMA Model Code, permitting processes used in most states, and additional resources, like the No Adverse Impact Toolkit from the Association of State Floodplain Managers.

Other considerations to address inland flooding may revolve around stormwater management strategies and various state and federal laws. For planners and policymakers in areas closer to coastlines, Inland Flooding case studies should be reviewed in conjunction with Sea Level Rise case studies. Overall, these case studies may help planners address the vast array of factors that must be considered to further adaptation and mitigation measures aimed at addressing risks associated with inland flooding.

Case Studies

Topic Title: Inland Flooding

Resource Title: Floodplain Overlay District

Resource Type: Special Topic or Area Plans

Municipality: Springfield

State: Oregon

Date of Adoption: 2024

Abstract: Floodplain Overlay District

Springfield, Oregon updated its zoning provisions for floodplains and the special overlay district used by the city to administer development in these areas. Springfield's [changes](#) to its code are partially driven by recent [litigation](#) surrounding the Endangered Species Act and the Upper Willamette River Chinook (a threatened species of salmon). As a result of the litigation, the Federal Emergency Management Agency (FEMA) required the city to update its code to protect habitat and achieve "no net loss" requirements of the Endangered Species Act (ESA). Springfield chose to adopt and implement FEMA's Model Code as its Pre-Implementation Compliance Measure to comply with the ESA. This overview focuses on major changes regarding permits under Springfield code to achieve ESA compliance.

Code Provisions:

[Springfield Development Code – Chapter DC3, art. 3: Floodplain Overlay District](#)

§ 3.3.405 – Statutory Authority and Interpretation

[This sections was added and described authority and liberal construction of the code. This is largely based off the FEMA Model Code.]

§ 3.3.410 – Purpose

[This section was updated with language from the FEMA Model Code and clarifies permitting requirements.]

§ 3.3.415 – Definitions

[Added based on FEMA Model Code.]

§ 3.3.420 – Applicability

[Updated for clarification and to include required language from FEMA Model Code.]

§ 3.3.425 – Administration

[Updated to meet requirements in FEMA Model Code.]

§ 3.3.430 – Development Standards

- A. General Standards. In all special flood hazard areas within the [Urban Growth Boundary], the following shall be adhered to:

1. Alteration of Watercourse. Require that the flood carrying capacity within the altered or relocated portion of said watercourse is maintained. Require that maintenance is provided within the altered or relocated portion of said watercourse to ensure that the flood carrying capacity is not diminished. Require compliance with SDC 3.3.425(C)(3)(b) and SDC 3.3.425(C)(3)(c). [Parts 2 through 8 address anchoring, construction materials and methods, utilities and equipment, tanks, streets, subdivision proposals, and the use of other base flood data.]

9. Structures Located in Multiple or Partial Flood Zones. In coordination with the State of Oregon Specialty Codes:

- a. When a structure is located in multiple flood zones on the community's Flood Insurance Rate Maps (FIRM) the provisions for the more restrictive flood zone shall apply.
- b. When a structure is partially located in a special flood hazard area, the entire structure shall meet the requirements for new construction and substantial improvements.

- B. Specific Standards.

[This section largely adopts the FEMA Model Code.]

§ 3.3.435 – Floodplain Development Permits

- A. Floodplain Development Permit Required. A Floodplain Development Permit shall be obtained before construction or development begins within any area horizontally within the special flood hazard area established in SDC 3.3.420(B). The permit shall be required for all structures, including manufactured dwellings, and for all other development, as defined in SDC 3.3.415, including fill and other development activities.
- B. Application for Floodplain Development Permit. Application for a permit may be made on forms furnished by the Floodplain Administrator and includes plans drawn to scale showing the nature, location, dimensions, and elevations of the development area; existing or proposed structures; fill; storage of materials; drainage facilities; and the location of the foregoing. Specifically, the following information is required:
1. In flood zones, the proposed elevation (in relation to mean sea level), of the lowest floor (including basement) and all attendant utilities of all new and substantially improved structures; in accordance with the requirements of SDC 3.3.425(C)(2).
 2. Proposed elevation in relation to mean sea level to which any non-residential structure will be floodproofed.
 3. Certification by a registered professional engineer or architect licensed in the State of Oregon that the floodproofing methods proposed for any non-residential structure meet the floodproofing criteria for nonresidential structures in SDC 3.3.430(B)(3)(c).

4. Description of the extent to which any watercourse will be altered or relocated.
5. Base Flood Elevation data for subdivision proposals or other development when required per SDC 3.3.425(C)(1) and SDC 3.3.430(A)(7).
6. Substantial improvement calculation for any improvement, addition, reconstruction, renovation, or rehabilitation of an existing structure.
7. The amount and location of any fill or excavation activities proposed.

§ 3.3.440 – Variances

- A. The issuance of a variance is for floodplain management purposes only. Flood insurance premium rates are determined by Federal statute according to actuarial risk and will not be modified by the granting of a variance.
- B. A variance from the provisions of this section, with respect to the provisions for special flood hazard reduction, will be reviewed under Type 3 procedure as specified in SDC 5.1.405 to 5.1.455.
- C. Conditions for Variance
 1. Generally, variances may be issued for new construction and substantial improvements to be erected on a lot of 0.5 acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood elevation, in conformance with the provisions of SDC 3.3.440(C)(3) and SDC 3.3.440(C)(5), and SDC 3.3.440(D). As the lot size increases beyond 0.5 acre, the technical justification required for issuing a variance increases.
 2. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
 3. Variances shall not be issued within any floodway if any increase in flood levels during the base flood discharge would result.
 4. Variances shall only be issued upon:
 - a. A showing of good and sufficient cause.
 - b. A determination that failure to grant the variance would result in exceptional hardship to the applicant; and
 - c. A determination that the granting of a variance will not result in:
 - i. Increased flood heights
 - ii. Additional threats to public safety (such as potential danger that materials may be swept onto other lands to the injury of others; potential danger to life and property due to flooding, debris, or erosion damage; inability for emergency vehicles to safely access the property in times of flood),
 - iii. Extraordinary public expense (such as the costs of providing government services during flood conditions including the maintenance and repair of public utilities and facilities including but not limited to sewer, gas, electrical, and water systems, and streets and bridges),
 - iv. Create nuisances (based on expected heights, velocity, rate of rise, sediment, debris transported by the floodwaters and the

effects of hydrodynamic forces, if applicable, expected at the site),

v. Cause fraud on or victimization of the public, or

vi. Conflict with existing laws or ordinances.

5. Variances may be issued by the City for new construction and substantial improvements, and for other development necessary for the conduct of a functionally dependent use provided that the criteria of SDC 3.3.440(C)(2)—(4) are met, and the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

- D. Variance Notification. Any applicant to whom a variance is granted shall be given written notice that the issuance of a variance to construct a structure below the Base Flood Elevation will result in increased premium rates for flood insurance and that such construction below the base flood elevation increases risks to life and property. Such notification and a record of all variance actions, including justification for their issuance shall be maintained in accordance with SDC 3.3.425(C)(2).
- E. Reasonable conditions may be established in connection with a variance if necessary to comply with the purpose and standards of this section. If approved, the applicant must record a notice of variance with Lane County Deeds and Records.

Topic Title: Inland Flooding

Resource Title: Flood Damage Prevention Code

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Atkins

State: Arkansas

Date of Adoption: 2012

Abstract: Flood Damage Prevention Code

Arkansas has seen the large costs and human impacts associated with flooding. In conjunction with the [Association of Floodplain Managers](#) (AFPM), the state attempted to develop “how-to” guides and [toolkits](#) for floodplain management that would lead to “no adverse impact” ordinances. Without specifically using the term “no adverse impacts” or “NAI,” the town of Atkins, Arkansas integrated NAI concepts into its zoning ordinances. In part, the Atkins code aligns with Special Flood Hazard Areas identified by the Federal Emergency Management Agency. It adds specific regulations to those areas that are tailored to reduce or eliminate adverse impacts in alignment with the toolkits and recommendations of the AFPM. The Atkins code also provides a good example of tiering and incorporation of other ordinances through reference. This overview highlights some of the major components in the Atkins ordinances that integrate NAI concepts.

Code Provisions: Flood Damage Prevention Code

[Atkins Municipal Code – Title 14](#)

§ 14.08.02 – Findings of fact

- A. The Federal Emergency Management Agency (FEMA) has identified Special Flood Hazard Areas of Pope County in the current scientific and engineering report entitled “The Flood Insurance Study (FIS) for Pope County, Arkansas, and incorporated areas, dated April 17, 2012 with an effective Flood Insurance Rate Map (FIRM) dated April 17, 2012.
- B. These Special Flood Hazard Areas are subject to periodic flooding events that result in loss of life and property, pose health and safety hazards, disrupt commerce and governmental services, and cause extraordinary public expenditures for flood protection and relief, all of which adversely affect the public health, safety and general welfare.
- C. These periodic flooding events are exacerbated by the cumulative effect of floodplain developments which cause an increase in flood heights and velocities, and by the placement of inadequately elevated, inadequately floodproofed or otherwise unprotected structures or uses vulnerable to floods into Special Flood Hazard Areas. Such structures or uses are inherently hazardous to other lands because of their adverse impact on flooding events.

§ 14.08.03 – Statement of purpose. It is the purpose of this ordinance is to promote the public health, safety and general welfare, to prevent adverse impacts from any floodplain development activities, and to minimize public and private losses due to

flood conditions in identified Special Flood Hazard Areas. This ordinance advances the stated purpose through provisions designed to:

- A. Protect human life and health;
- B. Protect natural floodplains against unwise development;
- C. Eliminate adverse impacts of necessary floodplain development;
- D. Minimize expenditure of public monies on flood control projects;
- E. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- F. Minimize prolonged business interruptions due to flooding events;
- G. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines; streets and bridges located in Special Flood Hazard Areas;
- H. Minimize future flood blight areas to help maintain a stable tax base; and I. Provide for notice to potential buyers when property is in a Special Flood Hazard Area.

§ 14.08.05 – Methods of reducing flood losses

- A. This ordinance restricts or prohibits structures or uses in Special Flood Hazard Areas that adversely impact health, safety or property during flooding events;
- B. This ordinance requires protection against flood damage for structures or uses vulnerable to floods at the time of initial construction, or after substantial improvement of the structure, or after substantial damage has occurred;
- C. This ordinance controls the alteration of natural floodplains, stream channels and natural protective barriers which are involved in the accommodation and transport of flood waters;
- D. This ordinance controls floodplain development (structural development, placement of manufactured structures, clearing, grading, mining, drilling, dredging, placement of fill, excavating, watercourse alteration, drainage improvements, roadway or bridge construction, individual water or sewer installations and other activities) which may increase flood damage by increasing flood elevations, flood water velocities, or flood discharge patterns;
- E. This ordinance regulates the construction of flood barriers which unnaturally divert floodwaters or which may adversely impact other lands.

§ 14.08.06 – Food Damage Prevention Code adopted by reference. There is hereby adopted by reference a Flood Damage Prevention Code for the city of Atkins, Pope County, Arkansas, dated February, 2010. The code shall include:

- Article 1 Definitions
- Article 2 Administration
- Article 3 Provisions for Flood Hazard Reduction

A copy of the referenced code shall be filed in the office of the Floodplain Administrator and shall be available for inspection and copying by any person during normal office hours.

Chapter 14.12 (sic) – Hazard Mitigation Plan

§ 14.12.01 – Adoption. The city of Atkins, Arkansas, hereby adopts those portions of the Plan relating to and protecting its jurisdictional area against all hazards, 2015-2019; and appoints the Emergency Management Director to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the Hazard Mitigation Plan be developed and presented to the governing board for consideration; and agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Topic Title: Inland Flooding

Resource Title: Overlay Districts

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Omaha

State: Nebraska

Date of Adoption: 2023

Abstract: Overlay Districts

Omaha, Nebraska divides floodplains into two types of districts: floodway overlay districts (FW) and flood fringe overlay districts (FF). The distinction between these types is based on Federal Insurance Rate Maps, which overlay other districts and require additional regulation. The legal distinction between these overlay districts, accompanied by differentiated land use restrictions, helps to ensure human safety in flood-prone areas. The distinction also helps to protect the interests of buyers and owners of floodplain land.

FF districts have less stringent building standards, allowing structures that are permitted in the underlying district. FF districts require that any new, improved, or repaired residential buildings have their lowest floors elevated at least one foot above the highest base flood elevation available. Any fully enclosed areas below the base flood elevation must be used for parking or limited storage. Manufactured homes must be anchored to prevent floating away during heavy flooding. FW districts are more restrictive, only allowing uses with low flood-damage risk that do not obstruct flood flows. The permitted uses include agriculture, parks and recreation, utilities, and campgrounds. Structures not in compliance cannot be altered in any way that increases their noncompliance. If a nonconforming structure is destroyed in a flood event, it cannot be rebuilt unless the repairs bring it into compliance with the law. Noncompliance is a misdemeanor under state and local law.

Code Provisions:

Omaha, Nebraska – Code of Ordinances

[Chapter 55 – Zoning, Article XI](#)

Overlay Districts

A. Statutory authorization, findings of fact, and purposes.

[§55-652](#): “...It is the purpose of this section to promote the public health, safety, and general welfare and to minimize those losses described in subsection [55-652\(b\)\(1\)](#) by applying the provisions of this section to:

- (1) Restrict or prohibit uses which are dangerous to health, safety, or property in times of flooding or cause undue increases in flood heights or velocities;
- (2) Require that uses vulnerable to floods, including public facilities, which serve such uses, be provided with flood protection at the time of initial construction;
- (3) Protect individuals from buying lands, which are unsuited for intended purposes because of flood hazard; and
- (4) Assure that eligibility is maintained for property owners in the community to purchase flood insurance in the National Flood Insurance Program...”

B. Establishment of zoning districts

§55-656: "Along watercourses where a floodway has been established, the mapped floodplain areas are hereby divided into the two following districts: A floodway overlay district (FW) and a flood fringe overlay district (FF) as identified in the flood insurance study, FIRM, or best available data. The zoning districts created by this section overlay other zoning districts and place additional restrictions upon the manner in which lands in such underlying district may be used. Within these districts, all uses not meeting the standards of this section and those standards of the underlying zoning district shall be prohibited."

C. Flood fringe overlay district (including AO and AH zones) and the future base flood area of zone X

§55-658:

(a) *"Permitted uses.* Any use permitted in the underlying base zoning district shall be permitted in the flood fringe overlay district. No use shall be permitted in the district unless the standards of section 55-657 are met.

(b) *Standards for flood fringe overlay district*

(1) New construction, substantially damaged, or substantially improved residential structures shall have the lowest floor, including basement, elevated to or above one foot above the highest base *flood* elevation available.

(2) New construction, substantially damaged, or substantially improved nonresidential structures shall have the lowest floor, including basement, elevated to or above one foot above the highest base flood elevation available, or, together with attendant utility and sanitary facilities, be floodproofed so that below that level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the floodplain management coordinator of the planning department as set forth in subsection 55-655(b)(2)g.

(3) Fully enclosed areas below the lowest floor (excluding basements) and below the base flood elevation shall be used solely for the parking of vehicles, building access, or limited storage of readily removable items. The area below lowest floor subject to flooding shall be a maximum of four feet in height measured from the bottom of the floor joists, unless used for parking of vehicles. When the area below the lowest floor is used for the parking of vehicles, the city shall require the owner to sign a nonconversion agreement and file it with the Douglas County register of deeds. A nonconversion agreement may only be used for attached garages or parking areas below elevated buildings at the discretion of the city. Fully enclosed areas below the lowest floor (excluding basements) and below the base flood elevation shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one

square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall not be higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

- (4) Within AH and AO zones, adequate drainage paths around structures on slopes shall be required in order to guide floodwaters around and away from proposed structures.

(5) Manufactured homes

- a. All manufactured homes placed or substantially improved within A1-30, AH, and AE zones, which meet one of the following criteria, shall be elevated on a permanent foundation such that the lowest floor is a minimum of one foot above the base *flood* elevation and securely anchored pursuant to subsection 55-658(b)(5)c., and mechanical, electrical, and HVAC equipment shall be elevated to provide at least one foot of freeboard above the base *flood* elevation.
 - i. Outside a manufactured home park or subdivision;
 - ii. In a new manufactured home park or subdivision;
 - iii. In an expansion of an existing manufactured home park or subdivision;
 - iv. On a site in an existing park in which a manufactured home has incurred substantial damage as a result of a *flood*.
- b. Manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within special *flood* hazard areas that are not subject to the provisions of subsection [55-658\(b\)\(5\)a.](#) be elevated either on a permanent foundation such that the lowest floor of the manufactured home is at or above one foot above the base *flood* elevation; or the chassis shall be supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade; and be securely anchored to an adequately anchored foundation system in accordance with the provisions of subsection [55-658\(b\)\(5\)c.](#); and mechanical, electrical and HVAC equipment shall be elevated to provide at least one foot of freeboard above the base *flood* elevation.
- c. All manufactured homes shall be anchored to resist flotation, collapse, or lateral movement. Manufactured homes must be anchored in accordance with local building codes or FEMA guidelines. In the event that over-the-top frame ties to ground anchors are used, the following specific requirements (or their equivalent) shall be met:
 - i. Over-the-top ties shall be provided at each of the four corners of the manufactured home with two additional ties per side at intermediate locations with manufactured homes less than 50 feet long requiring one additional tie per side;
 - ii. Frame ties shall be provided at each corner of the home with five additional ties per side at intermediate points with manufactured

- homes less than 50 feet long requiring four additional ties per side;
- iii. All components of the anchoring system shall be capable of carrying a force of 4,800 pounds; and
- iv. Any additions to the manufactured home shall be similarly anchored..."

D. Floodway overlay district
§55-659:

- (a) *"Permitted uses.* Only uses having a low *flood*-damage potential and not obstructing *flood* flows shall be permitted within the floodway district, but only to the extent that they are not prohibited by any other ordinance; accordingly, the following are the only permitted uses within the floodway district:
 - (1) *Agricultural uses.* Animal production. Crop production. Horticulture.
 - (2) *Civic uses.* Local utility services. Parks and recreation services.
 - (3) *Commercial uses.* Campground.
- (b) *Standards for the floodway overlay district.* New structures for human habitation are prohibited. All encroachments, including fill, new construction, substantially damaged or substantially improved structures, and other development are prohibited unless certification by a registered professional engineer or architect is provided demonstrating that the development shall not result in any increase in water surface elevations along the floodway profile during occurrence of the base *flood* discharge. These uses are subject to the standards of sections 55-656, 55-657 and 55-658."

E. Nonconforming use or nonconforming structure.
§55-661:

- (a) "A structure or the use of a structure or premises which was lawful before the passage or relevant amendment of this section, but which is not in conformity with the provisions of this section may be continued, subject to the following conditions:
 - (1) No such structure or use shall be expanded, changed, enlarged or altered in a way which increases its nonconformity.
 - (2) If such use is discontinued for six consecutive months, any future use of the building premises shall conform to this section. The public utility providers shall notify the floodplain management coordinator in writing of instances of nonconforming uses where utility services have been discontinued for a period of six months.
 - (3) Uses or adjuncts thereof that are or become nuisances shall not be entitled to continue as nonconforming uses.
- (b) If any nonconforming use or structure is destroyed by any means, including flood, it shall not be reconstructed if the cost of damages is more than 50 percent of the market value of the structure before the damage occurred, unless it is reconstructed in conformity with the provisions of this section. This limitation does not include the cost of any alteration to comply with existing state or local health, sanitary, building, or safety codes or regulations or the cost of any

alteration of a structure listed on the National Register of Historic Places or a state inventory of historic places, provided that the alteration shall not preclude its continued designation.”

F. Penalties for violation

§55-662: “Violation of the provisions of this section or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with grants of variances or special exceptions) shall constitute a misdemeanor, and be punishable by state or local law. Each day such violation continues shall be considered a separate offense. Nothing herein contained shall prevent the city or other appropriate authority from taking such other lawful action as is as necessary to prevent or remedy any violation.

Topic Title: Inland Flooding

Resource Title: Floodplain Management Regulations

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Linden

State: New Jersey

Date of Adoption: 2023

Abstract: Floodplain Management Regulations

The Municipal Code of Linden, NJ has included an article in its Flood Damage Prevention Chapter that contains floodplain management regulations. Article 1, *Floodplain Management Regulations*, utilizes various land use strategies to mitigate flooding while also designating a Floodplain Administrator to oversee the implementation of these regulations. [See Section 26-103.2.](#)

Methods utilizing local land use authority include the establishment of the Local Design Flood Elevation (LDFE) in flood hazard areas, [see Section 26-102.3](#), and a prohibition of development in riparian zones without prior approval. [See Section 26-103.13](#). Through state and federal data, Linden has established flood hazard areas. [See Section 102.2](#). Linden's floodplain management regulations, in conjunction with the flood provisions of New Jersey's Uniform Construction Code and the New Jersey Flood Hazard Area Control Act (collectively known as "these regulations") apply to all proposed development in designated flood hazard areas. [See Section 26-101.1](#).

Code Provisions:

Linden, New Jersey Municipal Code
[Chapter 26 Flood Damage Prevention Article 1](#)
Floodplain Management Regulations

A. Purpose and Objectives

§ 26-101.3: "The purposes and objectives of these regulations are to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific flood hazard areas through the establishment of comprehensive regulations for management of flood hazard areas, designed to:

1. Protect human life and health.
2. Prevent unnecessary disruption of commerce, access, and public service during times of flooding.
3. Manage the alteration of natural floodplains, stream channels and shorelines;
4. Manage filling, grading, dredging and other development which may increase flood damage or erosion potential.
5. Prevent or regulate the construction of flood barriers which will divert floodwater or increase flood hazards.
6. Contribute to improved construction techniques in the floodplain.

7. Minimize damage to public and private facilities and utilities.
8. Help maintain a stable tax base by providing for the sound use and development of flood hazard areas.
9. Minimize the need for rescue and relief efforts associated with flooding.
10. Ensure that property owners, occupants, and potential owners are aware of property located in flood hazard areas.
11. Minimize the need for future expenditure of public funds for flood control projects and response to and recovery from flood events.
12. Meet the requirements of the National Flood Insurance Program for community participation set forth in Title 44 Code of Federal Regulations, Section 59.22."

B. Establishment of Flood Hazard Areas

§ 26-102.2(a): "The City of Linden was accepted for participation in the National Flood Insurance Program on November 24, 1976.

The National Flood Insurance Program (NFIP) floodplain management regulations encourage that all Federal, State, and Local regulations that are more stringent than the minimum NFIP standards take precedence in permitting decisions. The FHACA requires that the effective Flood Insurance Rate Map, most recent preliminary FEMA mapping and flood studies, and Department delineations be compared to determine the most restrictive mapping. The FHACA also regulates unstudied flood hazard areas in watersheds measuring 50 acres or greater in size and most riparian zones in New Jersey. Because of these higher standards, the regulated flood hazard area in New Jersey may be more expansive and more restrictive than the FEMA Special Flood Hazard Area. Maps and studies that establish flood hazard areas are on file at the Division of Engineering, Linden City Hall, 301 North Wood Avenue, Linden, NJ 07036.

The following sources identify flood hazard areas in this jurisdiction and must be considered when determining the Best Available Flood Hazard Data Area:" [See Section 26-102.2\(a\)\(1\)-\(4\).](#)

C. Establishing the Local Design Flood Elevation (LDFE)

§ 26-102.3:

- a. "The Local Design Flood Elevation (LDFE) is established in the flood hazard areas determined in Section [26-102.2](#), above, using the best available flood hazard data sources, and the Flood Hazard Area Control Act minimum Statewide elevation requirements for lowest floors in A, Coastal A, and V zones, ASCE 24 requirements for

critical facilities as specified by the building code, plus additional freeboard as specified by this article.

At a minimum, the Local Design Flood Elevation shall be as follows:

1. For a delineated watercourse, the elevation associated with the Best Available Flood Hazard Data Area determined in Section 26-102.2, above plus one (1) foot or as described by N.J.A.C. 7:13 of freeboard; or
 - (a) For any un-delineated watercourse (where mapping or studies described in Section 26-102.2a1 and a2 above are not available) that has a contributory drainage area of fifty (50) acres or more, the applicants must provide one of the following to determine the Local Design Flood Elevation: A copy of an unexpired NJDEP Flood Hazard Area Verification plus one (1) foot of freeboard and any additional freeboard as required by ASCE 24; or
 - (b) A determination of the Flood Hazard Area Design Flood Elevation using Method 5 or Method 6 (as described in N.J.A.C. 7:13) plus one (1) foot of freeboard and any additional freeboard as required by ASCE 24. Any determination using these methods must be sealed and submitted according to Section 26-105.2-3.
2. AO Zones - For Zone AO areas on the municipality's FIRM (or on preliminary flood elevation guidance from FEMA), the Local Design Flood Elevation is determined from the FIRM panel as the highest adjacent grade plus the depth number specified plus one (1) foot of freeboard. If no depth number is specified, the Local Design Flood Elevation is three (3) feet above the highest adjacent grade.
3. Class IV Critical Facilities - For any proposed development of new and substantially improved Flood Design Class IV Critical Facilities, the Local Design Flood Elevation must be the higher of the 0.2% annual chance (500 year) flood elevation or the Flood Hazard Area Design Flood Elevation with an additional two (2) feet of freeboard in accordance with ASCE 24.
4. Class III Critical Facilities - For proposed development of new and substantially improved Flood Design Class III Critical Facilities in coastal high hazard areas, the Local Design Flood Elevation must be the higher of the 0.2% annual chance (500 year) flood elevation or the Flood Hazard Area Design Flood Elevation with an additional one (1) foot of freeboard in accordance with ASCE 24.

D. Development in Riparian Zones

§ 26-103.13: "All development in Riparian Zones as described in N.J.A.C. 7:13 is prohibited by this article unless the applicant has received an individual or general permit or has

complied with the requirements of a permit by rule or permit by certification from NJDEP Division of Land Resource Protection prior to application for a Floodplain Development Permit and the project is compliant with all other Floodplain Development provisions of this article. The width of the riparian zone can range between fifty (50) and three hundred (300) feet and is determined by the attributes of the waterbody and designated in the New Jersey Surface Water Quality Standards N.J.A.C. 7:9B. The portion of the riparian zone located outside of a regulated water is measured landward from the top of bank. Applicants can request a verification of the riparian zone limits or a permit applicability determination to determine State permit requirements under N.J.A.C. 7:13 from the NJDEP Division of Land Resource Protection.”

Topic Title: Inland Flooding

Resource Title: Floodplain Overlay District

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Harrisburg

State: Pennsylvania

Date of Adoption: 2014

Abstract: Floodplain Overlay District

Harrisburg, Pennsylvania's Floodplain Overlay District lays out extensive floodplain management regulations in its municipal code. Along with other initiatives, it bars the production, storage, or use of listed substances within a Floodway Area, [see § 7-315.25](#), sets specific design and construction standards, [see § 7-315.24](#), establishes four types of floodplain areas, [see §7-315.9](#), and establishes the procedures for modifying area designations. [see § 7-315.10](#).

The Floodplain Overlay District identifies floodplain areas for the application of these ordinances. In so doing, Harrisburg employs comprehensive floodplain regulations, adopting FEMA data and designations while also complying with the Pennsylvania Flood Management Act of 1978. Such regulation promotes human safety and mitigates flood damage in Harrisburg, a city located along the large and flood-prone Susquehanna River.

Code Provisions:

Harrisburg, PA Municipal Code
[Title 7: Planning and Zoning Code, Chapter 7-315](#)
Floodplain Overlay District

A. Purpose

§ 7-315.1: "The City of Harrisburg is subject to periodic flooding which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief. The Legislature of the Commonwealth of Pennsylvania has, by the passage of the Pennsylvania Flood Plain Management Act of 1978, delegated the responsibility to local governmental units to adopt floodplain management regulations to promote public health, safety, and the general welfare of its citizenry. The purpose of this chapter is to:

- A. Promote the general health, safety, and welfare of the community;
- B. Encourage the utilization of appropriate construction practices in order to prevent or minimize flood damage in the future;
- C. Minimize danger to public health by protecting water supply and natural drainage;
- D. Reduce financial burdens imposed on the community, its governmental units, and its residents, by preventing excessive development in areas subject to flooding; and
- E. Comply with federal and state floodplain management requirements.

B. Applicability

§ 7-315.2: "This chapter shall apply to all lands shown on the City of Harrisburg Floodplain Map which is adopted as part of the City of Harrisburg Zoning Code, as further described under Section 7-315.8, Identification of Floodplain Areas, referred to otherwise as the "Floodplain Overlay District." The Floodplain Overlay District overlays the underlying zoning districts, and this chapter supplements the regulations found elsewhere in the Zoning Code applicable to the underlying districts. It shall be unlawful for any persons, partnership, business, or corporation to undertake, or cause to be undertaken, any construction or development anywhere in the City of Harrisburg unless a zoning permit has been obtained from the Zoning Officer/Floodplain Administrator."

C. Identification of Floodplain Areas.

§ 7-315.8: "The identified floodplain areas shall be any areas of the City of Harrisburg, classified as special flood hazard areas (SFHAs) in the Flood Insurance Study (FIS) and the accompanying Flood Insurance Rate Maps (FIRMs) dated August 2, 2012, and issued by the Federal Emergency Management Agency (FEMA) or the most recent revision thereof, including all digital data developed as part of the Flood Insurance Study.

The above-referenced FIS and FIRMs, and any subsequent revisions and amendments are hereby adopted by the City of Harrisburg and declared to be part of this Zoning Code. Furthermore, any future regulations developed by FEMA and required for compliance with federal and/or state legislation are hereby adopted by the City of Harrisburg and declared to be part of this Zoning Code."

D. Description of Floodway Area

§ 7-315.9

A. "Floodway Area.

(1) Description. A. The Floodway Area is the area identified in the FIS which represents the channel of a watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation by more than one foot at any point. This term shall also include floodway areas which have been identified in other available studies or sources of information for those special floodplain areas where no floodway has been identified in the FIS.

(2) Special requirements. Any encroachment that would cause any increase in flood heights shall be prohibited. No new construction or development shall be allowed, unless a permit is obtained from the Department of Environmental Protection Regional Office.

B. Special Floodplain Area.

(1) Description. The Special Floodplain Area is the area identified as Zones AE and A1-30 in the FIS which is subject to inundation by the one-percent-

annual-chance flood event determined by detailed methods and where base flood elevations (BFEs) are shown.

(2) Special requirements. No new construction or development shall be located within the area measured 50 feet landward from the top-of-bank of any watercourse, unless a permit is obtained from the Department of Environmental Protection Regional Office.

(3) In Special Floodplain Areas without a designated floodway, no new development shall be permitted unless it can be demonstrated that the cumulative effect of all past and projected development will not increase the BFE by more than one foot.

C. Approximate Floodplain Area.

(1) Description. The Approximate Floodplain Area is the area identified as Zone A in the FIS which is subject to inundation by the one-percent-annual-chance flood event determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no BFEs or flood depths are shown.

(2) Special requirements. No new construction or development shall be located within the area measured 50 feet landward from the top-of-bank of any watercourse, unless a permit is obtained from the Department of Environmental Protection Regional Office.

When available, information from other federal, state, and other acceptable sources shall be used to determine the BFE, as well as a floodway area, if possible. When no other information is available, the BFE shall be determined by using a point on the boundary of the identified floodplain area which is nearest the construction site in question.

In lieu of the above, the City of Harrisburg may require the applicant to determine the elevation with hydrologic and hydraulic engineering techniques. Hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently accepted technical concepts. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough technical review by the City of Harrisburg.

D. Shallow Flooding Area.

(1) Description. The Shallow Flooding Area is identified as Zones AO and AH in the FIS. These areas are subject to inundation by one-percent-annual-chance shallow flooding where average depths are between one foot and three feet.

(2) Special requirements. Drainage paths must be established to guide floodwaters around and away from structures on slopes.”

E. Changes in Designation Areas

§ 7-315.10: “The identified floodplain area may be revised or modified by the City Council where studies or information provided by a qualified agency or person documents the need for such revision. However, prior to any such change, approval must be obtained from the FEMA. Additionally, as soon as practicable, but not later than six months after the date such information becomes available, a community shall notify FEMA of the changes by submitting technical or scientific data.”

F. Prohibited Uses

§ 7-315.27:

- A. “The following uses, including enlargement or expansion of existing uses, are prohibited in the Floodway Area, Special Floodplain Area, Approximate Floodplain Area, or Shallow Flooding Area:
 - (1) Recreational vehicles;
 - (2) Manufactured homes, or any improvements thereto, subdivisions and parks;
 - (3) Supportive housing facilities, including nursing homes; and
 - (4) Correctional or community correctional facilities, including jails and prisons.
- B. The commencement of construction, enlargement, or expansion of any hospital within the Floodway Area, Special Floodplain Area, Approximate Floodplain Area, or Shallow Flooding Area shall be prohibited unless a special exception is approved by the Harrisburg Planning Commission and the Zoning Hearing Board.”

Topic Title: Inland Flooding

Resource Title: Floodplain Overlay District

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Dallas

State: Texas

Date of Adoption: 2014

Abstract: Floodplain Overlay District

Dallas, Texas's Floodplain Regulations are incredibly comprehensive. While similar to many floodplain management ordinances in its use of FEMA mapping for floodplain designation and classification, the Dallas code is particularly far-reaching. [See Sec. 51A-5.102](#). Moreover, the floodplain regulations exceed the minimum standards required by the National Floodplain Insurance Program. [See Sec. 51A-5.101\(b\)](#)

The Dallas code also includes some considerations that are less common in floodplain management regulations. For example, it provides prohibitions on vegetation alteration, [see Sec. 51A-5.103.1](#), and outlines an extensive process for filling within the floodplain. [See Sec. 51A-5.105](#). It also provides additional requirements for development within the Trinity River Corridor, which is home to the Trinity River Corridor Project, a major economic development and public works initiative. [See Sec. 51A-5.107](#).

Code Provisions:

The Dallas City Code

[Article V. Floodplain and Escarpment Zone Regulations](#)

Division 51A-5.100. Floodplain Regulations

A. Interpretations

Sec. 51A-5.101(b): "The intent of this division is to equal or exceed the minimum federal criteria for participation in the National Flood Insurance Program, located in 44 Code of Federal Regulations, Chapter I, Part 60.3, as amended; and FEMA 480, as amended. All higher standards and FEMA minimum standards apply. The City of Dallas must also enforce any more restrictive state requirements. The City of Dallas has exceeded the minimum standards by adopting more comprehensive floodplain management regulations. In some instances, community officials may have access to information or knowledge of conditions that require, particularly for human safety, higher standards than the minimum NFIP criteria. Any floodplain management regulations adopted by a state or community that are more restrictive than the criteria set forth in the NFIP regulations take precedence. All FEMA minimum standards in the Code of Federal Regulations also apply. (Ord. Nos. 19455; 19786; 20360; 24085; 27318; 27572; 27697; 27893; 30994; 31314; 32039)"

B. Vegetation Alteration in Floodplain Prohibited.

Sec. 51A-5.103.1:

(a) “Except as provided in this section, the urban forest conservation requirements in Division 51A-10.130 apply. Protected trees removed in the floodplain are not subject to exceptions to Article X.

(b) A person commits an offense if he removes or injures any vegetation within a floodplain.

(c) It is a defense to prosecution under Subsection (b) if the act is:

- (1) authorized in advance in writing by the director of water utilities;
- (2) in conformance with a landscape plan approved by the director of water utilities;
- (3) routine maintenance of vegetation such as trimming or cutting designed to maintain the healthy or attractive growth of the vegetation; or
- (4) routine maintenance performed, required, or authorized by the city in order to maintain the floodwater conveyance capacity of the floodplain. (Ord. Nos. 19455; 19786; 24085; 27697; 30994; 32039)”

C. Filling in the Floodplain.

Sec. 51A-5.105: ***SUMMARY OF SECTION***: This section is immensely expansive. It requires a permit from the director of water utilities to deposit or store fill, place a structure, excavate, or engage in any other development activities in a floodplain area or, in the alternative, to obtain a floodplain alteration permit. The section then outlines the process to acquire either permit, which include a preapplication conference, and it also outlines the process for removing a floodplain designation.

D. Trinity River Corridor Development Certificate Process.

Sec. 51A-5.107:

(a) “Definitions. In this section:

(1) CORRIDOR DEVELOPMENT CERTIFICATE (CDC) MANUAL means the manual by that title dated January 31, 1992, or its latest revision.

(2) FLOODPLAIN ALTERATION means any construction of buildings or other structures, mining, dredging, filling, grading, or excavation in the floodplain.

(3) TRINITY RIVER CORRIDOR means the portion of the floodplain of the West Fork, Elm Fork, and mainstem segments of the Trinity River floodplain within the Dallas city limits, as delineated on the latest CDC Regulatory Map.

(b) Certificate required. A person commits an offense if he makes any floodplain alteration within the Trinity River Corridor without first obtaining a corridor development certificate (CDC) from the director of water utilities. It is a defense to prosecution that an exemption or variance has been obtained in accordance with CDC criteria.

(c) Application. An application for a corridor development certificate must be filed with the director of water utilities on a form furnished by the department of water utilities.

(d) Review. The director of water utilities shall deny an application for a certificate unless it complies with the standards contained in the CDC Manual or unless an exemption from or a variance to those standards is obtained in accordance with Subsection (e).

(e) Exemptions and variances.

(1) Exemptions.

(A) An exemption from the requirements of this section may be obtained if the floodplain alteration involves the following activities:

(i) Ordinary maintenance of and repair to flood control structures.

(ii) The construction of outfall structures and associated intake structures if the outfall has been permitted under state or federal law.

(iii) Discharge of material for backfill or bedding for utility lines, provided there is no significant change in pre-existing bottom contours and excess materials are removed to an upland disposal area.

(iv) Bank stabilization.

(v) Any project listed in the U.S. Army Corps of Engineers March 1990 Reconnaissance Report, which is attached as Appendix A to the CDC Manual, or any project approved under the provisions of this division, provided the approval, permit, or authorization has not expired and no significant changes have occurred since the approval, permit, or authorization was issued.

(B) Application for an exemption must be made to the director of water utilities on a form provided by the department of water utilities.

(C) If the director of water utilities determines that an application for an exemption falls within one of the categories listed in Paragraph (1), the director shall issue a written exemption from the requirements of this section.

(2) Variances. If the director of water utilities determines that the application for a corridor development certificate does not comply with all of the standards contained in the CDC Manual, the applicant may apply for a variance to any standard contained in the manual. An application for a variance must be made to the director of water utilities, who shall schedule

the application for consideration by the city council. (Ord. Nos. 21636; 24085; 27697; 30994; 32039)”

Topic Title: Inland Flooding

Resource Title: Stormwater Management

Resource Type: Environmental Chapters in Municipal Code

Municipality: City of Green Bay

State: Wisconsin

Date of Adoption: 2022

Abstract: Stormwater Management

Green Bay implemented a requirement that developers applying for a permit must submit a stormwater management plan with the application. The stormwater management plan must contain information such as contact information for responsible parties like landowners and architects, the Best Management Practices (BMPs) used by the developer, a topographic map of the site, and plans for using natural features and topography to minimize stormwater damage. Applications for a development permit must be brought to the Director of Public Works (Director) with a list of items for review, such as a stormwater management plan, a certificate from an engineer, a copy of the plans for stormwater management facilities, and payment for the application. Requiring developers to consider stormwater management strategies helps to ensure that new construction in Green Bay does not increase flood severity or community vulnerability.

Code Provisions:

Green Bay, Wisconsin Code of Ordinances

[Chapter 16 Article III](#)

Stormwater Management

A. Stormwater Management Performance Standards

Sec. 16-81:

- (a) *“Responsible party.* The landowner of the post-construction site, or any other person obligated by agreement with the landowner to implement and maintain post-construction stormwater management measures, is deemed the responsible party and shall comply with this article.
- (b) *Stormwater management plan.* The responsible party shall develop and implement a written post-construction stormwater management plan that incorporates the requirements of this section.
- (c) *Development districts.* All land development activities shall conform to stormwater management standards established for the development district within which the development occurs.
- (d) *Maintenance of effort.* For redevelopment sites where the redevelopment will be replacing older developments that was subject to post-construction performance standards of Wis. Admin. Code Ch. NR 151 in effect on or after October 1, 2004, the responsible party shall meet the total suspended solids reduction, peak flow control, infiltration, and protective areas standards applicable to the older development or

meet the redevelopment standards of Wis. Admin. Code §§ NR 151.122 through 151.125, or the City of Green Bay stormwater standards, whichever is more stringent.”

(e) *Stormwater discharge quantity.* Unless otherwise provided for in this article, all land development activities subject to this article shall establish on-site management practices to control the peak flow rates of stormwater discharged from the site as described in this article. The amount of peak discharge control previously required for the site shall not be reduced as a result of the proposed development or land disturbance. Infiltration of stormwater runoff shall be in accordance with Wis. Admin. Code Ch. NR 151 and WDNR Technical and Guidance Standards.

(1) On-site management practices shall be used to meet the minimum performance standards for each development district as described in the applicable subsection below.

- a. All developments smaller than five acres in size in the Urban Service District shall not increase peak flow rates of stormwater runoff from that which would have resulted from the same storm occurring over the site with the land in its existing land use conditions for design rainfall events with recurrence intervals of two, ten, and 100 years. The Director of Public Works may require more stringent or less stringent criteria if it has been determined that the downstream storm sewers can or cannot handle the runoff from the site.
- b. All developments five acres in size or larger in the Urban Service District shall be subject to the criteria described in subsection (e)(1)c. of this section. The Director may require more stringent or less stringent criteria if it has been determined that the downstream storm sewers can or cannot handle the runoff from the site.
- c. All proposed land developments in the Urban Reserve and Urban Expansion Districts shall not increase peak flow rates of stormwater runoff from that which would have resulted from the same storm occurring over the site with the land in its pre-development land use conditions for design rainfall events with recurrence intervals of two, ten, and 100 years. The Director may require more stringent or less stringent criteria if it has been determined that the downstream storm sewers can or cannot handle the runoff from the site.”

B. Permitting requirement and procedures and fees

Sec. 16-82:

- (a) *Permit required.* No landowner, land operator or responsible party may undertake a land disturbing or land development activity subject to this article without receiving a permit from the Director of Public Works prior to commencing the proposed activity.
- (b) *Permit application and fee.* Unless specifically excluded by this article, any landowner operator or responsible party desiring a permit shall submit to the Director of Public Works a permit application made on a form provided by the City of Green Bay for that purpose.
 - (1) Unless otherwise exempted or excluded by this article, a permit application must be accompanied by the following to be considered by the Director:
 - a. A stormwater management plan;
 - b. A maintenance plan and a maintenance agreement;
 - c. Any easements which may be required;
 - d. A copy of plans and specifications for all stormwater facilities;
 - e. Certification by a professional engineer;
 - f. Any payment of a fee-in-lieu, as provided for under [Section 16-81\(m\)](#);
 - g. A nonrefundable permit administration fee; and
 - h. Performance securities, if applicable by subsection (d) of this section.
 - (2) The stormwater management plan shall be prepared to meet the requirements of [Section 16-83](#) and the maintenance agreement shall be prepared to meet the requirements of [Section 16-84](#).
 - (3) Fees shall be as provided in the City Fee Schedule and shall be billed to the applicant for actual expenses charged by the City or its consultant to review the stormwater management plan.
- (c) Review and approval of permit application. The Director of Public Works shall review any permit application that is submitted with a stormwater management plan, maintenance agreement, and the required fee. The following approval procedure shall be used:
 - (1) Within 30 business days of the receipt of a complete permit application, including all documents as required by subsection (b)(1) of this section, the Director of Public Works shall inform the applicant whether the application, stormwater management plan, maintenance agreement and easements are approved or disapproved based on the requirements of this article. The Director of Public Works shall base the decision on requirements set forth in [Sections 16-81, 16-83, and 16-84](#).
 - (2) If the stormwater permit application, stormwater management plan, maintenance agreements and easements are approved, or if an agreed upon payment of fees in lieu of stormwater management practices is made, the Director of Public Works shall issue the permit.

- (3) If the stormwater permit application, stormwater management plan, maintenance agreements or easements are disapproved, the City of Green Bay shall detail in writing the reasons for disapproval. The applicant may revise the stormwater management plan or agreement, or may appeal the decision to the Improvement and Service Committee as provided for in [Section 16-86](#).
 - (4) If additional information is submitted, the Director of Public Works shall have 30 business days from the date the additional information is received to inform the applicant that the application, plan, maintenance agreement and easements are either approved or disapproved.
 - (5) Failure by the Director of Public Works to inform the permit applicant of a decision within 30 business days of a required submittal shall be deemed disapproval of the submittal.
- (d) *Practice installation and maintenance performance security.* The Director of Public Works may, at their discretion, require the submittal of a performance security prior to issuance of the permit in order to ensure that the stormwater practices are installed and maintained by the permit holder as required by the stormwater management plan. The Director of Public Works shall determine the amount of the performance security. The performance security shall not exceed the total estimated construction cost of the stormwater management practices approved under the permit, plus 15 percent. The amount of the maintenance performance security shall be determined by the Director of Public Works not to exceed the maintenance costs estimated in the stormwater plan for the period during which the permit holder has maintenance responsibility. The performance security shall contain forfeiture provisions for failure to complete work specified in the stormwater management plan. Conditions for the release of performance security are as follows:
- (1) The installation performance security shall be released in full only upon submission of as-built plans and written certification by a registered professional engineer in the State of Wisconsin that the stormwater practice has been installed in accordance with the approved plan and other applicable provisions of this article. The Director of Public Works may make provisions for a partial pro rata release of the performance security based on the completion of various development stages.
 - (2) The maintenance performance security, minus any costs incurred by the City of Green Bay to conduct required maintenance, shall be released at such time that the responsibility for practice maintenance is passed on to another private entity via an approved maintenance agreement or to the City of Green Bay.”
- (e) *Permit conditions.* All permits issued under this article shall be subject to the following conditions, and holders of permits issued under this article shall be deemed to have accepted these conditions. The Director of Public Works may suspend or revoke a permit for violation of a permit condition upon written notification to the permittee,

landowner or responsible party. An action by the Director of Public Works to suspend or revoke this permit may be appealed in accordance with [Section 16-86](#)."

C. Stormwater management plans

[Sec. 16-83](#): "(a) *Plan requirements*. Every applicant for a permit under Section 16-82 shall submit a stormwater management plan. The application shall contain sufficient information for the Director to evaluate the environmental characteristics of the area affected by land development activity, the potential impacts of the proposed development upon the quality and quantity of stormwater discharges, the potential impacts upon the area's water resources and drainage utilities, and the effectiveness and acceptability of proposed stormwater management measures in meeting the performance standards set forth in this article. Unless specified otherwise by this article, stormwater management plans shall contain, at a minimum, the information described below:

- (1) [contact information for responsible parties such as landowner, developer, project engineers, etc.]
- (2) A proper legal description of the property proposed to be developed, referenced to the U.S. Public Land Survey system or to block and lot numbers within a recorded land subdivision plat.
- (3) A narrative describing the existing site conditions (soils, topography, land use, protective areas, and environmentally sensitive areas.)
- (4) A narrative describing the proposed development, including what is going to be developed and the phasing (construction schedule) of the development from initial groundbreaking to final stabilization.
- (5) Explanation of the provisions to preserve and use natural topography and land cover features to minimize changes in peak flow runoff rates and volumes to surface waters and wetlands,
- (6) Results of investigations of soils and groundwater required for the placement and design of stormwater management measures.
- (7) A discussion as to the analysis performed to achieve water quantity and quality standards, including a summary of results, the method of conveyance, and assumptions made.
- (8) A discussion as to what short-term and long-term BMPs will be utilized during the course of construction and post-construction, including a complete construction/installation schedule.
- (9) A statement that the selected BMPs are designed in accordance with WDNR Technical and Guidance Standards. If they are not, a discussion as to how the design differs from the Technical and Guidance Standards and the reason for the variance.
- (10) A description of any special construction, installation, and short-term/long-term maintenance terms that need to be considered for the life of each stormwater

management practice proposed. Include a list of the items and the frequency at which they are to be addressed.

- (11) Calculations and data to support the final results. Hydrology and pollutant loading computations as needed to show compliance with performance standards. All major assumptions used in developing input parameters shall be clearly stated. The computations shall be made for each discharge point in the development, and the geographic areas used in making the calculations shall be clearly cross-referenced to the required map.
- (12) Pre-development site map with property lines, disturbed limits, and drainage patterns, summary of impervious areas (parking lots, roofs, sidewalks, etc.) and pervious areas (lawns, ponds, swales, landscaping, etc.).
- (13) One or more site maps at a scale of not less than one inch equals 40 feet. The site maps shall show the following site locations and legal property description; predominant soil types and hydrologic soil groups; existing cover type and condition; topographic contours of the site at scale not to exceed two feet; topography and drainage network including enough of the contiguous properties to show runoff patterns onto, through, and from the site; watercourses that may affect or be affected by runoff from the site; flow path and direction for all stormwater conveyance sections; watershed boundaries used in hydrology determinations to show compliance with performance standards; lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site; limits of the 100-year floodplain; location of wells and well head protection areas covering the project areas and delineated pursuant to Wis. Admin. Code. Ch. NR 811
- (14) Post-development site map with property lines, disturbed limits, and drainage patterns.
 - a. Total area of disturbed impervious surfaces within the site.
 - b. Total area of new impervious surfaces within the site.
 - c. Performance standards applicable to site.
 - d. Proposed best management practices.
 - e. Groundwater, bedrock, and soil limitations.
 - f. One or more site maps at a scale of not less than one inch equals 40 feet showing the following: post-construction pervious areas including vegetative cover type and condition; impervious surfaces including all buildings, structures, and pavements; post-construction topographic contours of the site at a scale not to exceed two feet; post-construction drainage network including enough of the contiguous properties to show runoff patterns onto, through, and from the site; locations and dimensions of drainage easements; locations of maintenance easements specified in the maintenance agreement; flow path and direction for all stormwater conveyance sections; location and type of all stormwater management conveyance and treatment practices, including the on-site and off-site tributary drainage area; location and type of conveyance system that will carry runoff from the drainage and treatment practices to the nearest adequate outlet such as curbed street, storm drain, or natural drainageway; watershed boundaries used in hydrology and pollutant loading calculations and any changes to lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site.

Topic Title: Inland Flooding

Resource Title: Flood Damage Prevention

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Boone

State: North Carolina

Date of Adoption: 2013

Abstract: Flood Damage Prevention

Boone is a community in western North Carolina that was impacted by Hurricane Helene in 2024 and is accustomed to flooding. Cities and towns generally attempt to align local zoning with the Federal Emergency Management Agency's (FEMA) Base Flood Elevation (BFE) data and maps to provide greater cohesion between federal and local governments in the event of flooding. Inconsistencies remain, however, and Boone has recognized the potential for conflict between FEMA data and local realities. To avoid this conflict, Boone has included standards for those areas without a BFE dataset.

Code Provisions:

[Boone Unified Development Ordinance](#)

Title VI, art. 30: Flood Damage Prevention

§ 30.03.03 – Standards for Floodplains Without Established Base Flood Elevations:

Within the Special Flood Hazard Areas designated as Approximate Zone A and established in Subsection 30.01.02, where no Base Flood Elevation (BFE) data has been provided by FEMA, the following provisions, in addition to the provisions of Section 30.03.01, shall apply:

- A. No encroachments, including fill, new construction, substantial improvements or new development shall be permitted within a distance of twenty feet (20') each side from top of bank or five (5) times the width of the stream, whichever is greater, unless certification with supporting technical data by a registered professional engineer is provided demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- B. The BFE used in determining the Regulatory Flood Protection Elevation shall be determined based on the following criteria:
 - 1. When Base Flood Elevation (BFE) data is available from other sources, all new construction and substantial improvements within such areas shall also comply with all applicable provisions of this Article and shall be elevated or floodproofed in accordance with standards in Subsections 30.03.01 and 30.03.02.
 - 2. When floodway or non-encroachment data is available from a Federal, State, or other source, all new construction and substantial improvements within floodway and non-encroachment areas shall also comply with the requirements of Subsections 30.03.02 and 30.03.05.
 - 3. All subdivision, manufactured home park and other development proposals shall provide Base Flood Elevation (BFE) data if development is greater than

five (5) acres or has more than fifty (50) lots/manufactured home sites. Such Base Flood Elevation (BFE) data shall be adopted by reference in accordance with Subsection 30.01.02 and utilized in implementing this Article.

4. When Base Flood Elevation (BFE) data is not available from a Federal, State, or other source as outlined above, the reference level shall be elevated or floodproofed (nonresidential) to or above the Regulatory Flood Protection Elevation. All other applicable provisions of Subsection 30.03.02 shall also apply.

§ 30.03.04 – Standards for Riverine Floodplains with Base Flood Elevations but

Without Established Floodways or Non-Encroachment Areas: Along rivers and streams where Base Flood Elevation (BFE) data is provided by FEMA or is available from another source but neither floodway nor non-encroachment areas are identified for a Special Flood Hazard Area on the FIRM or in the FIS report, the following requirements shall apply to all development within such areas:

- A. Standards of Subsections 30.03.01 and 30.03.02; and
- B. Until a regulatory floodway or non-encroachment area is designated, no encroachments, including fill, new construction, substantial improvements, or other development, shall be permitted unless certification with supporting technical data by a registered professional engineer is provided demonstrating that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one (1) foot at any point within the community.

§ 30.03.05 – Floodways and Non-Encroachment Areas: Areas designated as floodways or non-encroachment areas are located within the Special Flood Hazard Areas established in Subsection 30.01.02. The floodways and non-encroachment areas are extremely hazardous areas due to the velocity of floodwaters that have erosion potential and carry debris and potential projectiles. The following provisions, in addition to standards outlined in Subsections 30.03.01 and 30.03.02, shall apply to all development within such areas:

- A. No encroachments, including fill, new construction, substantial improvements and other developments shall be permitted unless:
 1. It is demonstrated that the proposed encroachment would not result in any increase in the flood levels during the occurrence of the base flood, based on hydrologic and hydraulic analyses performed in accordance with standard engineering practice and presented to the Floodplain Administrator prior to issuance of Floodplain Development Permit, or
 2. A Conditional Letter of Map Revision (CLOMR) has been approved by FEMA. A Letter of Map Revision (LOMR) must also be obtained upon completion of the proposed encroachment.
- B. If Subsection 30.03.05(A) is satisfied, all development shall comply with all applicable flood hazard reduction provisions of this Article.

- C. No manufactured homes shall be permitted, except replacement manufactured homes in an existing manufactured home park or subdivision, provided the following provisions are met:
 - 1. The anchoring and the elevation standards of Subsection 30.03.02(D).

Sea Level Rise

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Environmental Element](#)

[Mason County, WA -- Shoreline Stabilization Plan](#)

Special Topic or Area Plan

[Marshfield, MA -- Town of Marshfield Long-Term Coastal Resilience Plan](#)

Zoning Use and Dimensional Requirements

[Jekyll Island, GA -- Sea Level Rise Resistance](#)

Supplemental Zoning Provision

[South San Francisco, CA -- Flood Plain/Sea Level Rise \(SLR\) Overlay Zone](#)

[Lee County, FL -- Bonus Density and Transferable Development Units Program](#)

[South Kingstown, RI -- Coastal Resiliency Overlay District](#)

[South Kingstown, RI -- Coastal Community Overlay District](#)

Special Interest Land Use Boards

[Norfolk, VA -- Coastal Management and Review Board](#)

Environmental Chapters in Municipal Code

[St. Lucie, FL -- Environmentally Sensitive Lands](#)

Sea Level Rise

Narrative

Rising sea levels affect coastal communities globally, and it is estimated that half a billion people living in these communities will be displaced by flooding by the end of the century. Sea levels are rising due to thermal expansion and the melting of land-based ice, both exacerbated by climate change. Warmer temperatures cause ocean water to expand, contributing significantly to sea level rise. The ocean absorbs over [90% of excess atmospheric heat](#) generated by human emissions. Additionally, warmer temperatures accelerate the melting of glaciers and ice sheets, further contributing to rising sea levels. By 2100, sea levels are projected to rise between 2.3 to 4 feet. Concurrently, municipalities must also address other natural disasters, such as tropical cyclones, heavy precipitation, hurricanes, and flooding, which are worsened by rising sea levels.

This report synthesizes 11 case studies from geographically diverse coastal areas, including cities like South San Francisco, California, and smaller municipalities such as Marshfield, Massachusetts. Municipalities facing significant threats were identified using the [National Oceanic and Atmospheric Administration \(NOAA\) Sea Level Rise Viewer](#). Additionally, most municipalities have zoning districts that incorporate FEMA flood maps as informational and adaptation tools, requiring buildings to be elevated to FEMA-designated levels. However, our research revealed that FEMA maps might not offer the most accurate predictions of sea level rise, providing only baseline protections for property. Thus, we selected case studies from municipalities that exceeded FEMA standards and addressed their unique risks with tailored solutions.

Sea levels will rise at varying rates and impact communities differently, depending on their location, geography, and circumstances, necessitating localized responses and data-informed adjustments. Local geology, climate, and infrastructure significantly influence a municipality's capacity to adapt. Climate-resilient development (CRD) requires municipalities to adopt adaptation and mitigation measures, create enabling conditions, build resilience, and promote equity. CRD techniques addressing sea level rise include land use resources such as traditional zoning requirements, comprehensive planning, climate action planning, substantive supplemental zoning, and special interest land use boards.

Supplemental Zoning Provisions, such as those in South San Francisco, CA, implement targeted overlay, mandatory elevation standards, buffers, stormwater management systems, and impervious surface restrictions to protect vulnerable areas. Additionally, the zone incentivizes private developers through community benefit programs, offering density bonuses for environmentally beneficial projects, and zones such as Lee County, Florida utilize Transfer of Development Rights (TDR) programs to encourage growth in safer, upland areas. South Kingstown, Rhode Island, has two supplemental zoning provisions. The first, Coastal Resiliency Overlay District, is an information-based strategy requiring the planning department to supply information about sea level rise risks to development applicants. This information is recorded and publicly available for current and future residents. Secondly, South Kingstown developed the Coastal Community Overlay District, restricting modifications on existing nonconforming uses. This provision aims to equitably protect residents within the overlay district while discouraging future development.

Comprehensive Plans, exemplified by South San Francisco's 2040 General Plan and Bainbridge Island's Environmental Element, integrate long-term adaptation and mitigation goals across multiple sectors, including infrastructure, housing, and public health. These plans utilize detailed local data, going beyond FEMA flood maps to anticipate the impacts of sea level rise better and incorporate equity considerations into emergency communication and public health resilience initiatives.

Like Marshfield's Long-Term Coastal Resilience Plan, Special Area Plans provide targeted, science-based regulatory reforms, including updated elevation requirements and seawall setbacks. These plans rely heavily on localized data and robust community engagement to develop actionable strategies.

Special Interest Land Use Boards, such as the Norfolk, Virginia's Coastal Management and Review Board inform public plans and foster stakeholder collaboration by providing specific research, public input, and policy guidance.

We recommend overlay zones as a climate-resilient adaptive technique for future actions because they allow specific flood-prone areas to enforce stricter building codes without applying these standards citywide. Overlay zones provide flexibility, enabling cities to adapt to new climate data without revising entire land use codes. Additionally, we advocate for increased private development incentives encouraging sustainability-focused designs and projects to combat rising sea levels. Finally, we recommend municipalities review the most recent scientific data of sea level rise and update their provisions frequently, as assessments may alter the risks posed to their communities. This chapter allows readers to compare the provided case studies with their own municipalities, identify similarities and differences, and determine which approaches best suit their communities' needs. For further research on sea-level rise, you can utilize the US Climate Resilience Toolkit and Adaptation Clearinghouse resource to find case studies on coastal floodings and tools.

Case Studies

Topic Title: Sea Level Rise

Resource Title: 2040 General Plan City of South San Francisco

Resource Type: Comprehensive Plan

Municipality: South San Francisco

State: California

Date of Adoption: 2023

Abstract: 2040 General Plan City of South San Francisco

As California state law requires, South San Francisco updated its general plan in 2022 and outlined a strategy for future development and resilience. South San Francisco recognizes sea level rise as the most significant risk and sets a vision to adapt and mitigate the effects of sea level rise through policies, goals, and actions. The plan promotes innovation district expansion with stricter regulations while phasing out non-conforming uses like warehouses.

The overlay zone requires new development and substantially modified buildings to adopt floodproofing measures and adaptation strategies. The city encourages tracking sea level rise projections and projects, requires real estate disclosures regarding hazard risks, and explores adaptation financing options to encourage private sector adoption, such as community facilities districts and development impact fees. The plan highlights the need to strengthen emergency communication systems to ensure timely and accessible alerts for all residents and integrate climate resilience into public health initiatives, as climate change impacts communities unequally.

General Plan Provisions:

City of South San Francisco

[2040 General Plan](#)

Shape SSF

Chapter 2: Our Story

- **Community Profile and Trends:** The risks associated with climate change hazards [are increasing], with sea level rise posing the greatest risk to South San Francisco.
- **Climate Change:** [Gradual climate change and hazards threaten people, infrastructure, the economy, and ecosystems, with vulnerable populations at greatest risk. Sea levels may rise to 3 feet by century's end, requiring action.]

Chapter 5: Land Use and Community Design

- **General Plan Land Use:** [The General Plan aims to create a land use scheme and transform Colma Creek into a public amenity that manages flooding, restores ecology, and enhances access to the Bay and Bay Trail.]

Chapter 6: Sub-Areas

- **East of 101:** [The General Plan supports R&D, industry, and mixed-use growth, promoting life sciences north of East Grand Avenue through denser transit-oriented development while supporting the City's resilience efforts to sea level rise and flooding in the south.]
- **Policy Framework: East of 101**

- Goal SA-20: [...] Create collaborative solutions to complex district challenges, such as sea level rise and traffic congestion.
 - Intent: To create a safe, connected, and resilient district.
 - Policy SA-20.1: Explore funding mechanisms to finance East of 101 district improvements.
- Goal SA-21: Continue to promote the expansion of an innovation district with R&D uses in the northern portion of the East of 101 area.
 - Intent: [Foster innovation and growth R&D companies in East of 101.]
 - Policy SA-21.1: Promote urban campus-style life science uses. [...]
 - Policy SA-21.2: Restrict warehousing and distribution uses in Business Technology Park areas. [...]
 - Policy SA-21.3: Allow building heights in the East of 101 area to the maximum limits permitted under Federal Aviation regulations.

- **East of 101: Implementation Actions**

Policy	Implementation Action	Priority	Primary Responsibility
Goal SA-20: The creativity of the district is harnessed to create collaborative solutions to complex district challenges, such as sea level rise and traffic congestion.			
Policy SA-20.1	Action SA-20.1.1: [Create a Community Facilities District to fund infrastructure, parking management, and public amenities.]	Medium	City Manager
	Action SA-20.1.2: Identify funds for roadway maintenance and repairs. [...]	Medium	City Manager
	Action SA-20.1.3: Support building upkeep and maintenance. [...]	Medium	Planning Division
Goal SA-21: Continue to promote the expansion of an innovation district with R&D uses in the northern portion of the East of 101 area.			
Policy SA-21.2	Action SA-21.2.1: Update zoning to encourage non-conforming warehouses North of East Grand Avenue [...] transition to conforming uses.	Medium	Planning Division

Chapter 8: A Prosperous Economy for All

- **Addressing the Impacts of Climate Change:** [Sea level rise threatens areas South of East Grand Avenue, East of 101, and surrounding Colma Creek, creating business uncertainties. Mitigation requires significant funding, but local resources are limited, prompting regional agencies to plan and explore funding options.]
- **Policy Framework**
 - Goal PE-4: Infrastructure investments support job access, job growth, and address climate hazards impacting South San Francisco businesses.
 - Intent: [Ensure infrastructure investments support South San Francisco's workforce and job centers by improving accessibility and reducing the impacts of sea level rise and other hazards.]
 - Policy PE-4.4: [Explore funding options to mitigate sea level rise.]
 - **Policy PE-4.4 Implementation Actions:**

- Action PE-4.4.1: Partner with impacted property owners to explore potential mitigations and funding mechanisms for mitigating the risk of sea level rise; communicate property owner responsibilities to protect their own properties.
- Action PE-4.4.2: Monitor and join (as appropriate) regional/state efforts to fund and address mitigations for the impacts of climate change and sea level rise.

Chapter 12: Community Health and Environmental Justice

Policy	Implementation Action	Priority	Primary Responsibility
Goal CHEJ-4. [South San Francisco reduces waste, cleans hazardous sites, and ensures safe hazardous material management in Lindenville and East of 101.]			
Policy CHEJ-4.1	Action CHEJ-4.1.2: [Implement sea level rise adaptation plan for the Marina and landfill to prevent the release of toxins into the Bay.]	High	Capital Projects (CM)

Chapter 13 Community Resilience

- Where we want to be in the future: Community assets, infrastructure, and public facilities are prepared for future flood events and sea level rise.
- Performance Metric: [The amount of sea level rise and flooding projects completed.]
 - Target: [An increase in the number of sea level rise and flooding projects.]
- Key Issues and opportunities—hazard profile
 - Climate Change: [South San Francisco is experiencing climate change impacts like rising sea levels, which disproportionately affects vulnerable groups, including children, older adults, low-income residents, renters, immigrants, and BIPOC communities.]
 - Rising Sea Levels: [Bay Area sea levels have risen over 8 inches and are expected to increase—extremely high tides already cause flooding at Oyster Point Marina. Since future risk is uncertain, The California Sea Level Rise Guidance offers different scenario risk-based projections for planning infrastructure and development.]
 - Flooding: [Sea level rise will exacerbate coastal flooding, which includes risks from storms, tides, erosion, and permanent inundation. A San Mateo County assessment found that public facilities, infrastructure, and significant assets are vulnerable. The City, the Army Corps of Engineers, and San Mateo County are studying impacts and developing flood prevention adaption solutions.]
- Critical Planning Issues
 - Disadvantaged Communities: [Sensitive populations, including older adults, face heightened risks from climate hazards such as rising sea levels. Effective disaster response relies on strong communication infrastructure, ensuring alerts and warnings are accessible for community resilience.]
 - East of 101 and Lindenville: [South San Francisco’s areas that house key industries and critical infrastructure face risks from sea level rise, flooding,

liquefaction, and tsunamis. New construction meets modern standards, but future building codes must account for climate hazards like rising sea levels.]

- Policy Framework
 - Goal CR-1: The city proactively advances community resilience and is prepared for all hazards, including climate disruption.
 - Policy CR-1.5: [Require capital projects in high hazard areas and sea level rise inundation zones to adhere to risk assessment guidance and identify appropriate resilience strategies.]
 - Goal CR-2: A resilient community that protects existing and future development and people from sea level rise and flooding.
 - Intent: [Partner with federal, state, and regional agencies to develop solutions to sea level rise, including constructing levees/seawalls, expanding green infrastructure, and elevating new development.]
 - Policy CR-2.1: [Use the best available science per California's Sea Level Rise Guidance. Define development lifespans for structures and infrastructure. Identify site-specific sea level rise projections and assess impacts based on project type and risk tolerance.]
 - Policy CR-2.2: Pursue a comprehensive shoreline management plan that uses a variety of adaptation solutions to protect the shoreline and enhance ecosystem resilience.
 - Policy CR-2.3: Prioritize green infrastructure in the Colma Creek watershed to reduce flooding in developed areas through continually updated site-specific design guidelines, low impact development, and design standards for public infrastructure projects.
 - Policy CR-2.4: Site new municipal buildings, facilities, and critical infrastructure at higher elevations, consistent with the State of California Sea Level Rise Guidance
 - Policy CR-2.5: Require new development to account for sea level rise in all project applications. This includes:
 - Identifying areas of a parcel subject to flooding by type of flooding, including inundation, creek, and groundwater and by the potential depth of flooding.
 - Raising base floor elevation above the Federal Emergency Management Agency Base Flood Elevation to include sea level rise projections expected for the lifetime of the project.
 - Locating mechanical equipment, such as boilers, chillers, and air handlers for ventilation on the roof to ensure operation during flooding.
 - As needed, implement additional adaptation measures or pathways based on the sea level rise projections, project types, and risk tolerance.
 - Policy CR-2.6: [Require redevelopment in sea level rise zones to comply with city policies, mandating full compliance for projects exceeding 50% demolition, renovation, or replacement.]

- Policy CR-2.7: [Require flood-damaged properties to meet sea level rise policies for redevelopment and insurance claim eligibility.]
- Policy CR-2.8: Partner with regional agencies to evaluate and address sea level rise and flooding on critical infrastructure, including but not limited to:
 - [With PG&E and Peninsula Clean Energy to assess vulnerability of electricity and natural gas infrastructure.]
 - With Caltrans and neighboring jurisdictions on measures to protect US-101.
 - With Caltrain and BART on measures to protect the rail corridors.
 - [With the regional groundwater study to assess groundwater change impacts on future development and infrastructure.]
- Policy CR-2.10: Explore financial incentives and fee programs to implement nature-based and conventional physical adaptation, including a Development Impact Fee Program, Community Facilities District, and repeat flooding buyout program
- Goal CR-3: A transformed Colma Creek.
 - Intent: To improve Colma Creek through a comprehensive strategy that mitigates flooding and sea level rise, restores native ecologies, and increases access to and along the creek.
 - Policy CR-3.1: [Develop Colma Creek adaptation solutions with San Mateo County Flood and Sea Level Rise Resiliency District, restoring ecologies and creating resilient habitat zones.]

• Implementation Actions

Policy	Implementation Action	Priority	Primary Responsibility
Goal CR-1: The city proactively advances community resilience and is prepared for all hazards, including climate disruption.			
Policy CR-1.2	Action CR-1.2.1: Continue funding regional sea level rise and flood protection agency.	High	City Manager
	Action CR-1.2.2: Continue to work with regional water and energy agencies to ensure redundant water and energy supplies in case of an emergency.	Low	City Manager
Policy CR-1.3	Action CR-1.3.2: Conduct site specific vulnerability assessments of municipal buildings and facilities at risk to sea level rise and flooding[...].	High	Water Quality Control Plant Division (PW)
	Action CR-1.3.3: [Enact an ordinance to require real estate disclosures for hazards in the Hazard Mitigation Plan, including sea level rise for ownership and rental.]	Medium	Planning Division (ECD)
Goal CR-2: A resilient community that protects existing and future development and people from sea level rise and flooding.			
Policy CR-2.2	Action CR-2.2.1: [Continue ongoing collaboration with the US Army Corps of Engineers to protect	High	Engineering Division (PW)

	existing and future development by raising levees or seawalls. Implement future sea level rise adaptation plans for the Oyster Point Marina and landfill.]		

- Performance Metric: Sea level rise and flooding projects completed
 - Target: An increase in the number of sea level rise and flooding projects completed.

Chapter 15: Environmental and Cultural Stewardship

- Policy Framework
 - Goal ES-3: Colma Creek is an ecological corridor that supports community resilience and livability.
 - Intent: [Meet objectives to reduce flooding, combat sea level rise, enhance shoreline access, improve water quality, and restore biodiversity.]
 - Policy ES-3.1: [Restore Colma Creek as an ecological corridor with transitional habitats to enhance resilience and ecosystem services.]
 - Policy ES-3.2: [Co-locate parks and open spaces along Colma Creek for green infrastructure and habitat.]
 - Policy ES-3.3: [Maintain development standards within 80 feet of Colma Creek to support habitat, urban ecology, and resilience, with limited exemptions or offsets.] Standards include:
 - Requiring no net new impervious areas.
 - Maintaining (or increasing) building setbacks to support habitat areas.
 - Encouraging new construction to construct bioswales or similar features to treat runoff before it enters the creek.
 - Using a planting palette consisting of native species and species that provide valuable resources for native wildlife.
 - Policy ES-3.4: Continue to implement stormwater management practices across the Colma Creek watershed [...] to improve water quality and increase trash capture.
 - Policy ES-3.5: Continue to develop public and private partnerships with agencies, developers, and nonprofits [...].

Topic Title: Sea Level Rise

Resource Title: The Bainbridge Island Comprehensive Plan – Environmental Element

Resource Type: Comprehensive Plan

Municipality: Bainbridge Island

State: Washington

Date of Adoption: 2004; Revised in 2017

Abstract: The Bainbridge Island Comprehensive Plan – Environmental Element

The City of Bainbridge Island has explicitly addressed the potential for sea level rise in the Environmental Element of its Comprehensive Plan. Adopted in 2004 and revised in 2017, the plan recognizes that Bainbridge Island is subject to flooding, erosion, landslides, seismic events, and soil subsistence. The overall goal of the Environmental Element is to integrate climate change considerations into land use policies. Property owners must avoid adverse impacts where possible, minimize, reduce, or eliminate implications over time, and compensate for unavoidable impacts. The plan outlines protections for critical areas, such as floodplains, wetlands, and shorelines, where development is discouraged and outlines the transfer and purchase of development rights as an alternative for development.

The plan enforces compliance through city ordinances, zoning restrictions, and coordinated oversight with state and federal agencies. Implementation actions prioritize updating the City's Critical Areas Ordinance, incorporating climate resilience into capital projects, and engaging private stakeholders in climate mitigation efforts. The Frequently Flooded Areas component of the plan addresses actions to mitigate sea level rise, including limiting development and alteration in natural floodplain areas, preserving stream channels and natural protective barriers, updating flood maps, implementing nonstructural protective methods such as setbacks, using natural vegetation, and relocating public infrastructure outside of frequently flooded areas. The plan reduces carbon footprints and enhances ecosystem resilience by requiring developments to integrate low-impact design.

General Plan Provisions:

[The Bainbridge Island Comprehensive Plan – Environmental Element](#)

Environmental Vision 2036

[Monitoring and regulating human activities, along with fostering a proactive and adaptive response from citizens and businesses to climate change effects, such as sea level rise, is essential.]

Goals and Policies

Environment

Goal EN-1: Preserve and enhance Bainbridge Island's natural systems, natural beauty and environmental quality.

- Policy EN 1.1: A primary goal of the Comprehensive Plan is protecting the Island's natural environment; land use decisions implement this goal.
- Policy EN 1.2: Taking into account the present and future need to reduce the potential for personal injury, loss of life, or property damage due to flooding, erosion, landslides, seismic events, climate change or soil subsidence, properties

adjoining or adjacent to critical areas must be developed in observance of the following principles in descending order:

- Avoid the impact if possible.
- Minimize or limit the degree or magnitude of the action and its implementation by using appropriate technology to avoid or reduce impacts.
- Reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action.
- Rectify by repair, rehabilitation or restoration of the affected environment.
- Compensate for unavoidable impacts by replacing, enhancing or providing substitute resources or environments.

Critical areas are identified in order to flag concerns during the review process and to make applicants aware of potential hazards or areas where development may be constrained. Compatible development will be allowed which avoids designated critical areas, minimizes the impact or mitigates potential problems through engineering, siting or design. Proposals will be examined on a case-by-case basis to allow for creative solutions and to assure that the special combinations of factors in a particular case are addressed.

- Policy EN 1.3: Protect and enhance the natural systems and environmental quality of Bainbridge Island by continuing to build cooperative relationships between the city, citizens, landowners and other public, non-profit and private organizations.
- Policy En 1.5: Create and maintain overlay maps that show the location of agricultural lands, critical aquifer recharge areas, geologically hazardous areas, floodplains, streams, wetlands and fish and wildlife habitat. Integrate the maps from the Bainbridge Island Climate Impact Assessment (2016).
- Policy EN 1.6: Use the city's Shoreline Master Program to address and protect marine fish and marine shoreline habitat.
- Policy EN 1.8: Consider the potential impacts of climate change and its impacts in all decisions related to natural systems and environmental quality.

Goal EN-3: "Consider the impact on critical areas whenever land is subdivided."

- Policy EN 3.1: "Design lots to protect natural systems and avoid or minimize impact to critical areas. In order to protect critical areas, the full density permitted under the zoning ordinance might not be achieved."
- Policy EN 3.3: Include in any lot created by subdivision of land sufficient area to accommodate a building site outside of a critical area and its buffers.

Fish and Wildlife

Goal EN-5: "Protect and enhance wildlife, fish resources and ecosystems."

- Policy EN 5.1: "The protection and enhancement of fish and wildlife habitat, especially during offspring rearing season, and wildlife corridors, including Tribal Usual and Accustomed fishing areas, are integral components of the land use planning process."
- Policy EN 5.2: The identification of fish and wildlife habitat is based on a current evaluation of the species of wildlife on the Island and the habitat requirements of these species now and in the future.

- Policy EN 5.3: The protection and enhancement of mature trees, and fish and wildlife habitat are important criteria used when evaluating the preservation of open space as part of development techniques such as clustering, flexible lot design subdivisions and transfer of development rights (TDRs).
- Policy EN 5.4: Protect fish and wildlife habitat and limit fragmentation of habitat that physically and genetically isolates fish and wildlife populations by identifying an interconnected system of corridors that will provide continuous links east to west and north to south connecting larger tracts that are important habitat.
- Policy EN 5.7: Undertake appropriate, adequate and timely actions to protect and recover state priority species, species listed under the federal Endangered Species Act, local species of concern and their habitats located within the City to 1) avoid local extirpation of such species from the lands or fresh waters or nearshore of the City and 2) contribute to the protection and recovery of such species throughout the greater region in cooperation with federal, state and other local agencies.
- Policy EN 5.9: Develop in coordination with the Department of Fish and Wildlife, the Bainbridge Island Metropolitan Park and Recreation District and the Bainbridge Island Land Trust a program to educate the citizens of the Island, particularly those citizens who reside adjacent to priority wildlife habitat, on ways to utilize private property in a manner that will help protect and enhance wildlife habitat.
- Policy EN 5.10: Consider climate change and its impacts in all decisions related to wildlife, fish resources and natural systems.

Frequently Flooded Areas

Regulation of frequently flooded areas is important for property and habitat protection. Floodplains are valuable natural resource areas that play a major role in the function of ecosystems. Floods are a natural process where rising water inundates otherwise dry land. Floodplains provide storage for floodwaters which reduces downstream erosion and improves downstream water quality. Floodplains allow infiltration for aquifer recharge and provide important habitat necessary for the survival of many invertebrate, fish and wildlife species. Flood courses can change naturally over time. As impervious development covers more land surface and encroaches on floodplains, damage increases to both the built and natural environments. The Federal Emergency Management Agency (FEMA) has designated frequently flooded areas as areas that have a 1% or greater chance of flooding in any given year. Also known as the 100-year flood, this level was chosen to manage flooding as a compromise between an economic use of the land and an understanding of the natural benefits of flooding. Frequently flooded areas are critical areas.

Goal EN-6: Protect the natural functions of frequently flooded areas

- Policy EN 6.1: Minimize public and private losses due to flood conditions by limiting development in frequently flooded areas as shown on the Flood Insurance Rate Maps. Educate property owners and residents in proximity to frequently flooded areas about vulnerability over time.

Frequently flooded areas can and do migrate over time. Increased development may affect the level of occurrence and location of frequently flooded areas. The Flood

Insurance Rate Maps adopted by the City were originally produced in 1975 and updated in 1977 and need to be kept current.

- Policy EN 6.2: Limit the alteration of natural floodplains, stream channels and natural protective barriers that help accommodate, dissipate, or channel floodwaters.
- Policy EN 6.3: Emphasize nonstructural methods such as setbacks and vegetation, to prevent or minimize flood damage.
- Policy EN 6.4: Locate public facilities such as sewer and water lines outside of frequently flooded areas and with consideration of future sea level rise in order to minimize damage to both the public facility and the natural environment. Public facilities may be located within frequently flooded areas only if no environmentally preferable alternative exists to mitigate environmental concerns. Additional development is not encouraged in frequently flooded areas.

Sea Level Rise

Sea level rise may happen as the result of natural or human activity such as geologic subduction or climate change. Here in the Puget Sound, we experience the effects of both the geologic and climatological forces. Cumulative sea level rise has serious implications for the shorelines and lowland areas of the Island such as beach and bluff erosion and loss of intertidal zones. These areas serve such purposes as nursery habitat, feeding grounds for fish and fowl, stormwater collection and water filtration.

Goal EN-7: Anticipate and prepare for the consequences of sea level rise.

- Policy EN 7.1: Consider the implications of sea level rise in all relevant decision-making by using regional sea level rise projections and shoreline instability maps (as provided by the WA Department of Ecology and utilized and interpreted with the Bainbridge Island Climate Impact Assessment).
- Policy EN 7.2: Coordinate with Tribal, Federal, State and local agencies to address issues related to sea level rise.

Geologically Hazardous Zones

Goal EN-8: Protect landslide hazard areas and erosion hazard areas from the impacts of use and development for the protection of public safety, property, and the environment.

- Policy EN 8.1: Avoid land uses on landslide hazard and erosion hazard areas. If the hazard caused by development can be mitigated, then design land use to prevent damage to persons or property and environmental degradation and to preserve and enhance existing vegetation to the maximum extent possible.
- Policy EN 8.2: As the degree of slope increases, decrease development intensity, site coverage, and vegetation removal to mitigate problems of drainage, erosion, siltation and landslides.

Greenhouse Gases

Goal EN-12: Reduce greenhouse gas emissions through compliance with federal, state and regional policies while developing local strategies to reduce emissions further.

- Policy EN 12.1: Support and implement climate pledges and commitments undertaken by the City and other multi-jurisdictional efforts to reduce greenhouse

gas emissions, address climate change, sea-level rise, ocean acidification and other impacts of changing global conditions.

- Policy EN 12.3: Strive for reduced greenhouse gas emissions by, among other actions, integrating climate change into the city planning process, including land use and transportation planning and management, and making climate change considerations and meeting greenhouse gas emission reduction goals a component of city decision making.

Environmental Implementation

To implement the goals and policies in this Element, the City must take a number of actions, including adopting or amending regulations, creating outreach and educational programs, and staffing or other budgetary decisions. Listed following each action are several of the comprehensive plan's policies that support that action.

High Priority Actions

- EN Action #1: When updating the City's Critical Areas Ordinance, integrate the precautionary principle and mitigation sequencing to protect and preserve natural resources.
- EN Action #3: Consider climate change in all relevant City decisions, including capital projects, budgeting, staffing, and program creation.
- EN Action #5: Incorporate low impact development principles, goals, and approaches into all land use and development codes.
- EN Action #7: Evaluate the reasons why the City's PDR and TDR programs have not been successful and explore ways to make them functional to meet city objectives.

Medium Priority Actions

- EN Action #8: Improve City outreach programs to educate the public about how they can protect and enhance natural resources and respond to climate change.

Other Actions

- EN Action #10: Coordinate with organizations and governments at all levels to prepare for and respond to climate change.

Topic Title: Sea Level Rise

Resource Title: Shoreline Stabilization for Mason County

Resource Type: Environmental Chapters in Municipal Code

Municipality: Mason County

State: Washington

Date of Adoption: 2005

Abstract: Shoreline Stabilization for Mason County

Mason County implemented shoreline stabilization policies in which subdivisions should refrain from uses that will require additional stabilization. Rather than overlay district, this provision applies to all properties abutting shorelines and restricts future development. When stabilization is required, the code requires a geological assessment and measures to mitigate impacts on the local ecosystems. Mason County tries to encourage soft stabilization over hard stabilization and sets conditions for when hard methods are permitted. The code also incorporates actions by state agencies who manage natural resources and wildlife in order to protect the productivity of aquatic ecosystems. This Shoreline Plan aims to mitigate damage from sea level rise and push residents and developers to adapt their expectations of shoreline property.

Code Provision:

[Mason County Washington Shoreline Plan](#)

(b) Shoreline Stabilization, Regulations.

(1) New development shall be located and designed to avoid the need for future shoreline stabilization to the extent feasible. Subdivision of land must be regulated to assure that the lots created will not require shoreline stabilization in order for reasonable development to occur using geotechnical analysis of the site and shoreline characteristics.

(A) When a geotechnical report or geological assessment is required for primary structures and appurtenances per the landslide hazard, erosion hazard, or seismic hazard chapters of the resource ordinance, they shall consider sea level rise, if applicable, and include the following:

(i) A site plan, drawn to scale and stamped/signed by the author of the report or assessment, that shows the ordinary high water mark (OHWM), the crest of the bluff or shoreline bank (if applicable), the development envelope (including proposed or recent clearing and grading), and the proposed structures.

(ii) The geotechnical report shall assert that proposed development or uses are set back sufficiently to ensure that shoreline stabilization is unlikely to be necessary during the life of the structure. In addition, buffer widths for marine bluffs shall be equal to or greater than a distance from the OHWM landward at a slope of 2:1 (horizontal to vertical) that intersects with the existing topography of the site.

(B) New development that would require shoreline stabilization which causes significant impacts to adjacent or down-current properties and shoreline areas is not allowed.

(2) New structural stabilization measures shall not be allowed except as follows:

(A) To protect existing primary structures:

(i) New or enlarged structural shoreline stabilization measures for an existing primary structure, including residences, shall not be allowed unless there is conclusive evidence documented by a shoreline geotechnical assessment that the structure is in danger from shoreline erosion caused by tidal action, currents, waves, or sea level rise. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not demonstration of need. The geotechnical assessment shall evaluate on-site drainage issues and address drainage problems away from the shoreline edge before considering structural shoreline stabilization.

(ii) The erosion control structure will not result in a net loss of shoreline ecological functions. This shall be demonstrated in a habitat management plan.

(iii) Primary structure means the structure or the only access associated with the principal use of the property that cannot feasibly be relocated. It may also include single family residential appurtenant structures that cannot feasibly be relocated.

(B) In support of new non-water-dependent development, including single-family residences, when all of the conditions below apply:

(i) A shoreline geotechnical assessment demonstrates the following:

a. The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage on the subject lot.

b. Nonstructural measures, such as placing the development further from the shoreline, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.

c. A need to protect primary structures from damage due to erosion. The damage must be caused by natural processes, such as tidal action, currents, and waves.

(ii) The erosion control structure will not result in a net loss of shoreline ecological functions. This shall be demonstrated in a habitat management plan.

(C) In support of water-dependent development when all of the conditions below apply:

(i) A shoreline geotechnical assessment demonstrates the following:

a. The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage.

b. Nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.

c. A need to protect primary structures from damage due to erosion.

(ii) The erosion control structure will not result in a net loss of shoreline ecological functions. This shall be demonstrated in a habitat management plan.

(D) To protect the restoration of ecological functions, hazardous substance remediation, essential public facilities, public lands that facilitate shoreline access

for substantial numbers of people, public health safety and welfare, or unique natural and cultural resources when all of the conditions below apply:

- (i) Nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.
- (ii) The shoreline stabilization structure will not result in a net loss of shoreline ecological functions.

(3) When structural shoreline stabilization measures are demonstrated to be necessary, pursuant to above provisions, proposals for new shoreline stabilization shall:

- (A) Limit the size of stabilization measures to the minimum necessary.
- (B) Use measures designed to assure no net loss of shoreline ecological functions, as demonstrated in a habitat management plan as required.
- (C) Include a shoreline geotechnical assessment that, in addition to the requirements for assessments in subsection (2) above, addresses the following:

- (i) The need to prevent potential damage to a primary structure or to protect public health and welfare. The assessment shall address the necessity for shoreline stabilization by estimating time frames and rates of erosion and report on the urgency associated with the specific situation.
- (ii) If a hard armoring solution is proposed, the assessment shall also confirm that there is a significant possibility that a primary structure will be damaged within three years as a result of shoreline erosion in the absence of such hard armoring measures, or where waiting until the need is that immediate would foreclose the opportunity to use measures that avoid impacts on ecological functions or the opportunity to protect public health or welfare. Thus, where the geotechnical assessment confirms a need to prevent potential damage to a primary structure, but the need is not as immediate as the three years, the report may still be used to justify more immediate authorization to protect against erosion using soft measures.

Measures range from soft to hard.

SOFT: Vegetation enhancement; upland drainage control; biotechnical measures; beach enhancement; anchor trees and/or root wads; gravel placement.

HARD: Rock revetments; gabions (prohibited); concrete groins; retaining walls and bluff walls; bulkheads; and seawalls.

Note: For properties on or near designated landslide, seismic, or erosion hazard areas, a shoreline geotechnical assessment required by this program may be combined with the geological assessment, geotechnical report and/or a soil erosion and sediment control plan.

- (D) Locate structural stabilization measures at or above the OHWM unless a shoreline geotechnical assessment demonstrates a need based on safety, or where a habitat management plan demonstrates a net benefit to shoreline functions. If the shoreline geotechnical assessment or the habitat management plan demonstrates that the need to locate the proposed structure waterward of the OHWM, the department of natural resources should be consulted to assess the potential impacts to state owned aquatic lands (SOALs).

(E-I Omitted)

(4) The following pertains to all (new, replaced, or repaired) shoreline stabilization:

(A) The use of solid waste, junk, abandoned automobiles or asphalt or building demolition debris is prohibited in the construction or maintenance of shoreline stabilization structures.

(B) Gabions are prohibited as a means of stabilizing shorelines because of their limited durability and the potential hazard to shoreline users and the shoreline environment.

(C) Beach materials shall not be used for fill material behind bulkheads.

(D) Stairways shall be located "in line" or landward of bulkheads except where proven infeasible.

(5) Repair and Replacement.

(A) An existing shoreline stabilization structure may be replaced with a similar structure if there is a demonstrated need to protect principal uses or structures from erosion caused by currents, tidal action, or waves and not caused by normal sloughing, vegetation removal, or poor drainage.

(B) Replacement of a failed bulkhead shall be permitted in the same location and dimension as the original bulkhead, if such replacement is commenced within five years of failure. The burden of proof of location of the original bulkhead shall be on the applicant.

(C) The replacement structure should be designed, located, sized, and constructed to assure no net loss of ecological functions.

(D) Replacement walls or bulkheads shall not encroach waterward of the ordinary high-water mark or existing structure unless the residence was occupied prior to January 1, 1992, and there are overriding safety or environmental concerns. In such cases, the replacement structure shall abut the existing shoreline stabilization structure.

(E) When an existing bulkhead is being repaired or replaced, construction shall occur no further waterward of the existing bulkhead than is necessary for construction of the new footing.

(F) Where a net loss of ecological functions associated with critical saltwater habitats would occur by leaving the existing structure, remove it as part of the replacement measure.

(G) Soft shoreline stabilization measures that provide restoration of shoreline ecological functions may be permitted waterward of the ordinary high-water mark.
(H-J) Omitted.

(6) Shoreline stabilization projects may also require permits/approvals from the Washington Department of Fish and Wildlife (hydraulic project approval), Washington Department of Natural Resources (lease authorization on state owned aquatic lands), and the United States Army Corps of Engineers. As required by WDFW rules, projects shall incorporate mitigation measures as necessary to achieve no-net-loss of productive capacity of fish and shellfish habitat.

Topic Title: Sea Level Rise

Resource Title: Town of Marshfield Long-Term Coastal Resilience Plan

Resource Type: Special Topic or Area Plan

Municipality: Marshfield

State: Massachusetts

Date of Adoption: 2022

Abstract: Town of Marshfield Long-Term Coastal Resilience Plan

The Town of Marshfield Long-Term Coastal Resilience Plan presents multiple strategies to enhance coastal resilience against sea level rise and flooding risks. The plan resulted from broad public participation and emphasized building standard improvements, zoning rules, and wetlands protection measures to create future construction that can withstand changing coastal environments.

The plan advocates for more precise elevation standards which involve updating base flood elevation terminology to match the Massachusetts State Building Code. The plan advocates for enhanced Wetlands Protection Bylaw provisions that include coastal resilience as a protected value and zoning regulations that support floodproofing and new setback requirements near seawalls. The Town of Marshfield plans to develop building elevation case studies to help residents and contractors understand elevation project complexities.

Plan Provisions:

[Town of Marshfield Long-Term Coastal Resilience Plan](#)

6.0 Policy and Zoning Recommendations

6.2 Establish Higher Elevation Standards

Within the FEMA Special Flood Hazard Area (1% annual chance flood zone), new, substantially improved, and substantially damaged residential buildings, as well as buildings with new or substantially repaired foundations, are already required by the Massachusetts State Building Code to be elevated at least 1 ft above the FEMA Base Flood Elevation (BFE) in A Zones, or 2 ft above the BFE in the V Zones. The town cannot supersede the State Building Code, but it can use other local zoning and wetlands bylaws and regulations to require that new and substantially improved buildings are built to be resilient to future sea level rise and more intense coastal flooding conditions, to protect public health and safety and the general welfare, and to protect wetland resource values. The BCAs conducted for this project consistently indicate that such policies would be cost-effective.

The town should consider the following regulatory strategies:

1. Improve the clarity and consistency of language regarding tidal and flood elevations.

- [Change Base flood elevation to specify the minimum elevations required by the Massachusetts State Building Code 780 CMR, including the FEMA base flood elevation and any required freeboard. This ensures that structures and utilities are built 1-2 feet above the base flood elevation, as required by the code.]

- [Replace references to "mean sea level" or "NGVD29" with "NAVD88" for consistency with FEMA FIRMs and to avoid confusion and conversion errors, as FEMA uses NAVD88 for base flood elevations.]

2. Strengthen existing Wetlands Protection Bylaw and Regulations.

- Purpose. Add "Coastal resilience to sea level rise" to the list of interests protected in the purpose of the Wetlands Protection Bylaw.
- Regulations Part I (Purpose and Procedures), Article 2 (Purpose). Modify as follows: The town should consider the following bylaw modifications:
 - Add "Coastal resilience to sea level rise" to the list of wetland values.
- Regulations Part I (Purpose and Procedures), Article 3 (Jurisdiction). Modify as follows:
 - Move Land Subject to tidal action and Coastal Storm Flowage to above bullet F, so that these areas are included as having 100-foot Buffer Zones.
- Regulations Part I (Purpose and Procedures), Article 5 (Definitions). Modify as follows:
 - Add "Coastal Resilience means the ability to minimize the negative impacts of sea level rise; to build capability and ability of a resource area to minimize negative impacts of sea level rise."
 - Add "Sea Level Rise means the relative rise in elevation of the sea surface over time as interpreted by the best available science. Sea level rise may cause greater risk to human safety and development, increased risk to infrastructure, greater and more frequent coastal inundation, elevated storm surge flooding levels, saltwater intrusion to water wells and septic systems, loss of coastal recreational resources, increased coastal erosion, and loss of coastal habitats and resources."
- Regulations Part II (Performance Standards for Resource Areas), Article 4 (Land Subject to Coastal Storm Flowage), Section D (Performance Standards). Modify as follows:
 - Add "In order to protect coastal resilience to sea level rise wetland values provided by Land Subject to Coastal Storm Flowage resource areas, there shall be no habitable space in any structure and no utilities for any structure located below 13 feet in elevation, referenced to the North American Vertical Datum of 1988 (NAVD88)." [...]
- Regulations Part II (Performance Standards for Resource Areas), Article 6 (Buffer Zone). Modify as follows:
 - Section C (Definitions). Do not exclude Land Subject to tidal action or Coastal Storm Flowage.
 - Section D (Performance Standards). Add "In order to protect coastal resilience to sea level rise values provided by the Buffer Zone of Land Subject to Coastal Storm Flowage resource areas, within the Buffer Zone of Land Subject to Coastal Storm Flowage, there shall be no habitable space in any structure and no utilities for any structure located below 13 feet in elevation, referenced to NAVD88." The 100- foot buffer zone will include most areas subject to future coastal flood risk that are not presently in the FEMA Special Flood Hazard Area.

3. Strengthen Zoning Bylaw, Article XV (Floodplain Zoning).

- Section 15.01 (Purpose). Add “Increase coastal resilience to sea level rise and increased coastal flooding” or similar.
- Section 15.05 (Contents of applications). Modify to include the following:
 - Existing site contours and elevations of existing structures
 - Flood Design Class and associated freeboard height of all new construction, reconstruction, expansion of existing buildings, and new or expanded uses of existing buildings and structures
 - Base flood elevations of all special flood hazard areas delineated on the plan
 - Proposed uses below elevation 13 feet NAVD88 or the minimum elevation required by the State Building Code including the base flood elevation in the effective FEMA FIRM and any required freeboard
 - Minimum elevation of the lowest floor
 - Minimum elevation of the bottom of the lowest horizontal structural member, if in the Zone VE
 - Minimum elevation below which flood damage-resistant materials are used
 - Minimum elevation of utilities and equipment
 - Minimum elevation of dry floodproofing of non-residential structure and nonresidential portions of mixed-use buildings (not allowed in Zone VE
 - Minimum elevation of wet floodproofing (not allowed in Zone VE), if permitted by the State Building Code.
- Section 15.08 (Areas of special flood hazard standards).
 - Add “Consistent with the Wetlands Protection performance standards for Land Subject to Coastal Storm Flowage, use of areas below elevation 13 feet NAVD88 for any purpose other than access, storage, or parking is prohibited. Areas used for building electrical and mechanical systems are not considered storage.”
 - Add “New, substantially improved, and enlarged Flood Design Class 3 and 4 buildings and uses are prohibited.”
 - Section 15.19.B (Special permits) – add “Any permitted structure or use is consistent with the purposes and standards of the Overlay and include measures to mitigate or adapt areas subject to future coastal flooding due to relative sea level rise and increased storm surge.”

4. Create building elevation case studies. Create a set of building elevation case studies for typical and challenging conditions to help homeowners, contractors, and town officials (Planning Board, Conservation Commission) understand how to construct elevation projects in Marshfield’s coastal context. These could include addressing challenges associated with houses on small lot sizes very close to one another, older structures, and geologic conditions.

6.3 Increase Maximum Building Heights for Elevation Projects

The town can also make zoning dimensional requirements (e.g., building height, setbacks, lot size and dimensions, lot coverage) more flexible within flood risk areas to facilitate or incentivize building elevation projects. Zoning flexibility may be particularly helpful in the

planning area, where many existing homes do not conform with zoning requirements (requiring homeowners to go through approvals processes that add time, cost, and uncertainty) and lot sizes tend to be smaller (limiting opportunities for increased living area and return on investment). The town already allows for building height to be measured more flexibly for floodproofing projects and allows for encroachment into setbacks for utility elevation bump outs. However, currently, only the difference between older and newer FEMA BFEs can be added to building height for flood mitigation projects.

The Town should modify the definition of building height, as follows:

1. Article 2 (Definitions), Building Height. Modify the definition of “Building Height” to the effect of “... For all new construction, substantial improvements, or expansion of existing buildings and new or expanded uses within the Floodplain Zoning Overlay District (Zoning Bylaw, Article XV) and Land Subject to Coastal Storm Flowage and its Buffer Zone (General Bylaws, Chapter 294 and Chapter 505), the maximum building height listed in § 305-6.02, Table of Dimensional and Density Regulations, shall be measured from a) the minimum elevation for flood-resistant design and construction required by the State Building Code, including the base flood elevation in the effective FEMA FIRM and any required freeboard, or b) elevation 13 feet NAVD88, whichever is higher; only for the portions of the new or modified structures and uses that meet the flood-resistant design and construction requirements of the State Building Code and the Wetlands Protection restrictions on habitable space and utility uses below elevation 13 ft NAVD88 shall building height be measured in this way.

6.4 Pursue Federal Grants to Incentivize Mitigation

The Town should aggressively pursue federal grants to incentivize property owners to voluntarily elevate their homes or dry floodproof their businesses to higher levels or voluntarily sell their property to the Town. [...]

6.5 Create a 30-Foot No Build Setback from Seawalls

The vast majority of existing repetitive loss structures affected by coastal flooding in Marshfield are located on the first row of parcels along the oceanfront, just landward of existing seawalls. The damages and losses to these properties and safety risks to their occupants has historically been due to a combination of wave overtopping and storm damage and erosion induced seawall failures. Elevating structures within proximity to the town’s seawalls will reduce certain risks from wave overtopping (e.g., inundation of lower floors and foundation erosion), but, alone, it will not mitigate the prevalent damage and safety risks from water, stones, and debris that are launched over the seawalls during storm events or the risk of structural damage due to seawall failures. To reduce these prevalent damage and safety risks, buildings need to be set back further from the seawalls. In general,

FEMA's risk mapping procedures delineate the wave overtopping splash zone as approximately 30-50 feet inland of seawalls.

The town should consider the following bylaw modifications:

1. General Bylaws, Chapter 217 (Seawalls). Modify to prohibit structures "...on, over, or within 30 feet of seawalls and revetments..." The Town should consider rescinding the existing exemption of privately owned and maintained seawalls from these restrictions, since structures built in the splash zones of these private structures would be subject to continued risk.

2. Article 6 (Dimensional and Density Regulations), Section 6.08. (Other dimensional and density provisions). Add "The minimum front yard within R-3 districts for a parcel where the rear yard is limited by a 30-foot setback from an existing seawall or revetment, the minimum front yard setback shall be 5 feet, provided that no new or existing structure is located within the 30-foot setback from the existing seawall or revetment." This could also be clarified with an asterisk and note in the table of dimensional requirements.

Topic Title: Sea Level Rise

Resource Title: Jekyll Island, Georgia Sea Level Rise Resistance

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Jekyll Island

State: Georgia

Date of Adoption: 2022

Abstract: Jekyll Island, Georgia Sea Level Rise Resistance

Jekyll Island, Georgia is a self-governing island off the coast of Georgia. The local government recognizes its vulnerable position regarding sea level rise, ground water intrusion, and risks from tropical storms. As a result, it enacted an increased buffer; new developments must be at least 75 feet from the mean higher-high water mark. New development may request a variance, if the 75-foot buffer is too restrictive. Applicants for a buffer variance must fulfill the requirements set forth in this provision and refer to the Sea Level Rise Projections, as provided by NOAA. The data may inform future developers against applying for a variance, as long-term investments may be threatened if construction is not adequately placed.

Code Provisions:

[Article IX: Sea Level Resilience](#)

Sec. 10-284. – Using sea level rise projection data.

The sea level rise projections in Table 5A below shall be used for all policy, planning, design, and regulatory purposes that require the authority or its staff to consider tide levels. The appropriate sea level rise increment shall be added to the current Mean-Higher-High-Water level (MHHW), as defined by NOAA, which shall establish the relevant tide line for the relevant plan, permit, ordinance, or other purpose. Where appropriate, additional tidal data should also be considered, such as the height of spring tide events in the area. The appropriate increments shall be identified by determining the relevant planning horizon or the design life of the potentially affected project and selecting the relevant decade in which that end date occurs. These sea level rise increments shall follow the most recently updated GMSL [Global Mean Sea Level] Intermediate-High GMSL Scenario.

Sea Level Rise Projections Table

Intermediate-High GMSL Scenario	Meters	Feet
2030	0.19	0.62
2040	0.30	0.98
2050	0.44	1.44
2060	0.60	1.97
2070	0.79	2.59
2080	1.0	3.28

2090	1.2	3.94
2100	1.5	4.92

§ Sec. 10.283 Statement of purpose.

(a) To increase long-term community resilience, preserve public safety, and minimize public and private property losses due to flooding and storm damage, and to minimize other negative impacts associated with rising sea levels, this chapter shall require the use of future sea level rise projections in future plans, regulations, ordinances, policies, public infrastructure and facilities planning and construction, and other public decisions. Specific decisions may require the use of other projections or estimates, particularly for critical infrastructure and facilities that need a higher standard of protection or where the project's design life warrants the use of a different standard.

(b) In addition, this chapter creates a buffer around all tidally influenced waters to create a minimum level of safety for new buildings as well as public and private infrastructure that would be damaged by future inundation from future tides or flooding events.

§ Sec. 10.285 Enhanced buffer requirements.

(a) To limit the exposure of future buildings and infrastructure, including new roads and utilities, all new construction shall take place at least 75 feet landward of the mean higher-high water mark along all tidally influenced waters, or, where coastal marshlands exist as described in the State of Georgia's Coastal Marshland Protection Act, all new construction shall take place at least 75 feet from the edge of the marsh.

(b) If a proposed construction project is rendered infeasible by the establishment of this buffer, the authority may grant a variance from the requirements of this article if the applicant for the variance can establish the following:

- (1) That this requirement represents an unnecessary hardship.
- (2) That a practicable reduction in the scale of the project will not avoid the need for a variance.
- (3) The portions of the project to be built in the buffer areas will be designed and constructed to limit the potential impacts of future flooding.

(c) This buffer shall not apply to the following:

- (1) The maintenance, repair, or renovation of existing buildings, infrastructure, or historic resources, as approved by the authority.
- (2) The legally permitted construction of buildings or infrastructure approved by the authority but not yet constructed prior to this chapter taking effect.
- (3) Construction within the footprint of the developed land associated with the Jekyll Island Wastewater Treatment facility as identified in the most current version of the Jekyll Island Master Plan.
- (4) Land-management activities, maintenance of public green spaces and associated public facilities and services, and other activities not related to permanent construction.
- (5) The construction of parks, trails, boardwalks, and other structures related to outdoor recreation, environmental education, or similar public pursuit.
- (6) Temporary construction associated with events, film production, or other legally permitted purpose approved by the authority.

(d) Applications for a buffer variance shall be presented in writing to the authority to be reviewed by the design review group and considered for approval by the executive director or their designee. Applications must state the rationale for the variance request and demonstrate how failure to receive a variance will cause undue hardship on the applicant.

Topic Title: Sea Level Rise

Resource Title: Flood Plain/Sea Level Rise (SLR) Overlay Zone

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: South San Francisco

State: California

Date of Adoption: 2022

Abstract: Flood Plain/Sea Level Rise (SLR) Overlay Zone

The Flood Plain/Sea Level Rise (SLR) Overlay District, adopted in 2022, provides a comprehensive framework for mitigating sea level rise through identifying flood-prone and high-risk areas using FEMA and local data, requiring stricter regulations in this zone to adapt and reduce sea level rise. The zoning code is a mix of mandated rules and incentives to enable developers to adapt to rising sea levels.

The zoning code enforces compliance through a structured permitting process, requiring developers to submit detailed site plans, elevation surveys, and flood impact assessments. The City Engineer and Chief Planner oversee project approvals, ensuring alignment with FEMA, state, and local floodplain regulations. Development regulations include profited uses for emergency facilities in the overlay zone, base elevation, stormwater management systems, and shoreline protection measures. The community benefits program also incentivizes developers to adopt adaptation strategies to combat rising sea levels.

Code Provisions:

City of South San Francisco, CA Municipal Code

[Title 20 Zoning](#)

[Division IV Overlays and Plan Districts](#)

[Chapter 20.180 Flood Plain/Sea Level Rise \(SLR\) Overlay](#)

[Chapter 20.020 Zoning Districts, Zoning Map, and Boundaries](#)

[20.020.002 Official Maps and District Boundaries](#)

[C. Alterations of Floodplain/Sea Level Rise Overlay Boundaries.](#) The Floodplain/Sea Level Rise Overlay Map may be revised by the City Council based on updates to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), sea level rise science, monitoring results, and shoreline and creek conditions. All proposals for new construction shall be based on the Floodplain/Sea Level Rise Overlay Map currently in effect at the time a complete project application is submitted.

[Chapter 20.180 Flood Plain/Sea Level Rise \(SLR\) Overlay](#)

[20.180.001 Purpose The Flood Plain/Sea Level Rise \(SLR\)](#)

The Flood Plain/Sea Level Rise (SLR) Overlay District is intended to protect areas projected to be impacted by sea level rise, mitigate the impacts of sea level rise, and protect the health, safety, and welfare of residents of the City by establishing regulations for addressing flooding and other hazards associated with sea level rise. The specific purposes of the Flood Plain/Sea Level Rise Overlay District are to:

A. Limit the potential impact of coastal flooding and erosion patterns on coastal development so as to minimize damage to and destruction of life and property and to

reduce the necessity of public expenditure to protect future development from such hazards.

B. Adapt to a changing climate by requiring resilient design and upgrades in areas impacted by sea level rise.

C. Require adaptation strategies and best practices for long-term resilience.

D. Establish standards consistent with the objectives of the San Mateo County Flood and Sea Level Rise Resiliency District (Resiliency District), which include substantial sea level rise and flood protection, and environmental and recreational enhancements.

E. Introduce flood-proof construction techniques and shoreline protection measures.

F. Steward the San Francisco Bay, Colma Creek, San Bruno Creek, and the natural habitat they provide.

G. Enhance South San Francisco waterways as ecological corridors, restoring creek ecologies and creating transitional habitat zones to build resilience and ecosystem services.

20.180.002 Applicability

The provisions of this chapter shall apply to all areas of the City within the Flood Plain/Sea Level Rise Overlay district. This area includes:

A. The area within the Federal Emergency Management Agency (FEMA) flood zone map;

B. The area identified in the State of California Sea-Level Rise Guidance as the 100-year flood plus the 2100 mid-level scenario of 36 inches sea level rise; and

C. The San Francisco Bay Shoreline area, defined by California Code of Regulations Section 10121 as the jurisdiction of the Bay Conservation and Development Commission (BCDC) within a 100-foot "Shoreline Band."

In addition, the City Engineer or Chief Planner may require that standards of the Overlay apply to properties outside the Overlay District based on maps and other studies, which document the existence of potential flooding or sea level rise hazards that warrant evaluation.

20.180.003 Application Required

A. Site Clearance Required. [Prior to a Building Permit is issued, all new construction, repairs, or alterations must obtain Site Clearance per [Chapter 20.470 Site Clearance](#), ensuring compliance with this section. The Chief Planner may exempt normal maintenance or emergency projects for community health and safety.]

B. Site Clearance Review Application Submittal. Application for Site Clearance must be accompanied by the following for review by the Chief Planner:

1. For any rehabilitation, installation of new electrical or mechanical systems, or any structural repair with an estimated cost that is less than 50 percent of the market value of the structure, a current elevation certificate sealed by a licensed design professional is required.

2. For any addition, any conversion of any non-habitable space to habitable space, or the construction or installation of a new accessory structure that requires a building permit:

- a. A current elevation prepared by a licensed design professional; and

- b. A physical survey, performed after the effective date of the FIRM that:

- i. Accurately depicts current improvements on the property; and

- ii. Documents the type of flood (coastal, creek, and groundwater), and depth of flooding based on available resources (e.g. FEMA FIRM, Our Coast Our Future Hazard Map).

3. For new construction and any improvement to a principal structure where the cost of work is greater than 50 percent of the appraised value of the building:
 - a. A proposed site plan sealed by a design professional that provides:
 - i. Two topographic surveys of the property [..]
 - ii. The type of flood (costal, creek, and groundwater), and depth of flooding based on available resources (e.g. FEMA FIRM, Our Coast Our Future Hazard Map).
 - iii. Proposed grades, grading and stormwater management;
 - iv. All proposed structures and improvements.
 - v. Proposed finished floor elevations of all structures.
 - vi. The elevation of the bottom of the lowest horizontal structural member of the lowest floor of all structures.
 - vii. Landscape plan.
 - b. Elevations of the proposed development showing compliance with these floodplain regulations; and
 - c. For non-residential structures proposed to be flood-proofed, documentation of proposed flood-proofing showing compliance with the regulations of this chapter.
4. As a condition of project approval, the applicant shall execute an agreement with the City identifying the landowner's ongoing maintenance obligations for the shoreline infrastructure approved as part of a development.
5. Any additional information deemed by the Chief Planner to be necessary to perform the required review.

C. Determination of Compliance. Prior to issuance of a Building Permit, a registered professional engineer retained by the applicant shall certify that the design, specifications, and plans for the construction of Shoreline infrastructure are in accordance with the requirements of this Chapter, FEMA guidance, and the Code of Federal Regulations (CFR) related to the mapping of areas protected by levee systems in place as of the application date. An applicant's proposal that meets the requirements of this chapter and the CFR, but is not consistent with the planned infrastructure project of the City and District, shall be permitted if the proposal is demonstrated to be a less or equally environmentally impactful practical alternative (including environmentally-beneficial features such as listed species habitat, marsh, open space, etc.).

20.180.004 Uses

The following uses are prohibited within the Flood Plain/Sea Level Rise Overlay District:

A. Emergency command centers/communications facilities.

B. Emergency shelters.

C. Fire stations.

D. Hospitals.

E. Health care facilities.

F. Schools.

G. Telecommunication facilities.

20.180.005 Development Standards

Standards for the Flood Plain/Sea Level Rise Overlay District are intended to prevent flood damage to buildings by elevating occupiable space, flood proofing areas beneath flood

elevations, and promoting health and safety by preventing sensitive uses below the sea level rise elevation.

A. Construction Requirements. New construction or replacement of existing construction must be in conformance with Chapter 15.56 ("Flood Damage Prevention") except where this chapter establishes a different requirement.

B. Shoreline Infrastructure. For properties with frontage on San Francisco Bay, Colma Creek, and Navigable Slough, new and/or substantial construction must include shoreline infrastructure with an elevation sufficient to protect against the FEMA 100- year event with three feet of sea level rise. All required elevations shall be approved by the City and OneShoreline, and certified by a professional land surveyor. In-lieu of this requirement, the Applicant can meet an alternative set of requirements, which includes paying in-lieu fees and providing an easement to the City so that the City or OneShoreline is able to build this Shoreline Infrastructure.

C. Building Height. Building height within the Flood Plain/Sea Level Rise Overlay District will be measured from the Sea Level Rise Base Flood Elevation (SLR-BFE). The SLR-BFE is defined as or three feet above the project site's Base Flood Elevation on the FEMA FIRM in place at the time the Project application is deemed complete, or 77 inches above sea level.

D. Bay Access Buffer. A Bay Access Buffer extending 100 feet inland from the San Francisco Bay Shoreline is intended to provide an area to accommodate and maintain built and natural shoreline infrastructure for sea level rise protection, environmental enhancement, and public access trails. For the purposes of this Chapter, the San Francisco Bay Shoreline is defined by California Code of Regulations Section 10121, which describes the jurisdiction of the Bay Conservation and Development Commission (BCDC) within a 100-foot "Shoreline Band."

1. Building Encroachments. Building encroachments may be accommodated within the 100-foot Bay Access Buffer provided that the City determines that such encroachments do not inhibit a planned infrastructure project of the City and Resiliency District as of the application date.

2. Shoreline Access. Public access shall be maintained and developed within the Bay Access Buffer based on the City-adopted and BCDC-approved public access guidelines.

3. Trails Required. Where required by the San Francisco Bay Trail Project, the Bay Access Buffer must be improved with trails located an average of 75 feet from the Shoreline.

4. Trail Connectivity. Unless it is demonstrated to the satisfaction of City staff that no feasible alternative exists, any property with frontage on the Shoreline within the jurisdiction of the BCDC shall be required to provide, as a part of the on-site landscaping plan and Shoreline infrastructure, connectivity improvements by constructing a new or improved portion of the Bay Trail along the site, including improving access to the Bay Trail from and through the site. The trail shall be compliant with specifications of the City Public Works Department, BCDC, and San Francisco Bay Trail Project. Each trail segment shall connect directly to the trail segment of adjacent properties.

5. Maintenance. All areas improved for public access within the jurisdiction of BCDC shall be maintained by the property owner and shall be available to the public in perpetuity, as determined by the BCDC.

E. Creek Access Buffers. Creek Access Buffers are intended to provide an area to accommodate and maintain flood protection and public access trail infrastructure. For properties with frontage on Colma Creek or San Bruno Creek, a minimum buffer zone of 35 feet from the top of creek bank is required to accommodate and maintain future infrastructure and a public access trail.

1. Building Encroachments. Building encroachments may be accommodated within the buffer zones provided that the City determines that such encroachments do not inhibit planned infrastructure projects of the City and Resiliency District as of the Application Date.

2. Creek Access. Unless it is demonstrated to the satisfaction of City staff that no feasible alternative exists, any property with frontage on Colma Creek or San Bruno Creek shall be required to provide, as a part of the on-site landscaping plan, a paved public-access trail along the top of the bank for the portion of the creek bank on the site. The trail shall be compliant with specifications of the City Public Works Department and BCDC, if applicable. Each such trail segment shall connect directly to the creek bank on each adjacent property or a trail segment along the Shoreline (e.g., the Bay Trail).

F. Elevation of Lowest Floor. For structures not wholly within a levee or seawall system, the lowest building finished floor elevation shall be the SLR-BFE (defined in Subsection 20.180.005.B Shoreline Infrastructure). Spaces below the SLR-BFE are limited to access or vertical circulation structures; flood prevention measures; storage; and parking. Habitable spaces are prohibited below the SLR-BFE unless wholly protected by a levee or seawall system.

H. Site Grading.

1. Site grading shall include the importation of fill to raise the site adequate to allow positive drainage in a 10 year storm occurring at the 100 year flood elevation established by FEMA.

2. Finished slopes shall not exceed a maximum of 2:1.

I. Levees, and Floodwalls

1. Any new portion of a levee above existing grade shall be sloped at least ten to one (10:1).

2. Along canals and creeks, armoring shall be living vegetation where possible.

3. Along the shoreline, armoring is restricted to natural materials.

4. Floodwalls may be used to provide additional protection only when used in conjunction with and on top of a levee.

J. Stormwater Runoff and Drainage.

1. Stormwater conveyance infrastructure should be designed such that it can continue to function during a FEMA 100-year event with 3 feet of sea level rise.

K. Landscape Species. Planting palettes must:

1. Consist of a minimum 80 percent native species.

2. Reflect the composition of native habitat types.

M. Impervious Areas. No net new impervious areas are permitted in designated parks and open spaces within the Flood Plain/Sea Level Rise Overlay District.

N. Connectivity. All on-site open spaces are to be connected with open spaces on adjacent parcels or rights-of-way, shoreline protection, or watershed management projects.

O. Riparian Area Protection. To minimize disturbance to the creek and vegetation, on the edge of the creek setback the project applicant shall erect a minimum four foot high construction fence prior to the issuance of a grading permit. The fence shall stay in place until a certificate of occupancy is issued.

P. Real Estate Disclosure of Hazards. In any contract for the sale of real estate located in the Floodplain/Sea Level Rise Overlay District indicated on the Overlays map adopted on file with the City of South San Francisco, the seller shall include in the contract a real estate disclosure of all hazards associated with anticipated sea level rise, geologic hazards, groundwater inundation, or coastal and fluvial flooding. Any site-specific analyses related to sea level rise must also be disclosed in real estate transactions.

Chapter 20.395 Community Benefits Program

20.395.001 Purpose: This Chapter establishes the South San Francisco Community Benefits Program by which the City may increase the value of private property by granting additional development capacity (i.e. a floor area ratio (FAR) bonus) in exchange for community benefits. The Program is a way for the City to derive greater benefit for the broader community from the granting of planning entitlements than would be otherwise possible through base zoning district standards. Community benefits include enhanced open spaces, enhanced connectivity, green buildings, social service uses, expanded transportation demand management, on-site and off-site affordable housing, or sea level rise adaptation measures.

20.395.004 Community Benefit Priorities: This section establishes the City's community benefit priorities. Community benefit fees collected in accordance with Section 20.395.003 ("Review and Approval") may fund one or more of the benefits described below. Should an applicant provide a community benefit proposed as a part of a Development Agreement, the benefit must be consistent with the City's priorities as established in this Section.

7. District Sea Level Rise Mitigation Measures. Contributions to or construction of district-wide sea level rise mitigation measures may qualify as a community benefit. Measures may include construction of levees or sea walls; creek restoration and improvements; construction of detention basins; landscaping efforts aimed at supporting creating biodiversity and improving resilience in impacted areas.

Topic Title: Sea Level Rise

Resource Title: Bonus Density and Transferable Development Units Program

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Lee County

State: Florida

Date of Adoption: 2016; Updated 2024

Abstract: Bonus Density and Transferable Development Units Program

Lee County, Florida, uses a Transfer of Development Rights (TDR) program to encourage land conservation and protect vulnerable areas such as wetlands and Coastal High Hazard Areas (CHHAs). The program enables development to voluntarily forgo their right to development in these vulnerable areas for the exchange of allowing development density (TDUs) to high-ground areas that are less susceptible to flooding and sea level rise. The program targets Pine Island, which is severely exposed to sea level rise, to develop in denser urban areas of the county.

The TDR program steers development away from coastal zone areas and protects natural buffers that help mitigate sea level rise, such as wetlands, marshes, dunes, and vegetation. The provision awards developers if they sell their property in vulnerable areas to an upland receiving district by doubling their density allocation and utilizing TDUs to decrease minimum open space and native vegetation preservation requirements.

Code Provisions:

[Lee County, Florida Land Development Code](#)
[Chapter 2 - ADMINISTRATION](#)
[ARTICLE IV. - BONUS DENSITY](#)

[DIVISION 2. - BONUS DENSITY PROGRAM](#)

[Sec. 2-146. - Minimum requirements.](#)

(b) Minimum requirements:

(3) Storm shelters or other appropriate mitigation is provided if the development is located within the coastal high hazard area as defined in Section 2-483.

(d) The barrier and coastal islands, including, but not limited to, Gasparilla Island, Cayo Costa, North Captiva, Captiva Island, Buck Key, and Black Island are not eligible to receive bonus density, with the following exceptions:

(1) Only the portion of Greater Pine Island defined in the Lee Plan as Pine Island Center is eligible to receive Greater Pine Island TDUs subject to this article and the Lee Plan. Suburban designated lands within the Greater Pine Island Community Plan Area are not eligible receiving lands for any TDUs.

(2) Work force housing may be developed on barrier islands within the Mixed-Use Overlay if transit is available and bonus density is approved through the Affordable Housing Program.

(e) TDUs may not be utilized on property located within the coastal high hazard area as defined in [Section 2-483 Definitions](#) or located within the Bayshore, Buckingham, Caloosahatchee Shores, or Northeast Lee County Community Plan Areas. Within the Southeast Lee County Community Plan Area, TDUs may only be used as described in [Section 2-154 Density and intensity equivalents of Southeast Lee County TDUs.](#)

DIVISION 3. - CREATION OF TRANSFERABLE DEVELOPMENT UNITS

Sec. 2-148. - Establishment of Transfer of Development Rights Program.

(a) The Transfer of Development Rights Program provides that a TDU may be established from property that:

- (1) Is a designated wetlands under the Comprehensive Plan;
- (2) Contains jurisdictional wetlands as defined through the use of the Unified State Delineation Methodology;
- (3) Is located within the Greater Pine Island Community Plan Area; or
- (4) Is designated as Density Reduction/Groundwater Resource (DR/GR) by the Lee Plan and is within the Southeast Lee County Community Plan Area.

(b) TDUs may not be established from:

- (1) Land that is owned by a public agency;
- (2) Land that is subject to existing conservation easements;
- (3) Land that is subject to other legal restrictions that would (or that have) precluded the physical development of the land on or before September 1, 1986 (the effective date of Ordinance No. 86-18 from which this article is derived);
- (4) Land that is currently developed with uses not identified in Subsection (d) of this section;
- (5) Land that is defined as wetlands that are approved as part of any development order or planned development for open space or water management purposes;
- (6) Land that is zoned private recreational facilities planned development (PRFPD);
- (7) Mines zoned mining excavation planned development (MEPD) pursuant to Chapter 12; or
- (8) Land that is designated on Lee Plan Map 2-D as an existing acreage subdivision.

(c) The sending parcel may only be used consistent with its conservation easement or written governing instrument. The governing instrument must expressly identify the following:

- (1) The restriction of property use, including the maximum number of residential units and the nonresidential uses permitted under Subsection (d) of this section that can be developed on the subject property upon severance of the TDUs; and
- (2) The property maintenance and management activities, including removal and control of invasive exotic plants as identified in [Section 10-420 plant material standards](#), that will be conducted after the severance of the TDUs. (d) TDUs may be created from upland areas with assurances of continued agricultural uses through agricultural easements or another recorded instrument. The uses that may occur upon severance of the TDUs, if specifically listed in the governing instrument and proper approvals are obtained, are provided in Table 2-148(d).

[TABLE 2-148(d) omitted]

Notes:

(e) Wetland impacts on the sending parcel, including impacts associated with permitted nonresidential uses, property maintenance, and management activities, are prohibited in perpetuity.

Sec. 2-149. - Computation of Wetland TDUs.

(a) Units of measure of Wetland TDUs, which are generated from wetlands outside of the Greater Pine Island or Southeast Lee County Community Plan areas are hereby established at one TDU per five acres of wetlands. The County will not recognize TDUs smaller than one-tenth unit. The following table sets forth equivalent TDUs for various acreages or portions of an acre:

[TABLE 1. FRACTIONAL TRANSFER OF WETLAND TDUs omitted]

(b) A single-family lot or parcel designated as wetlands that holds an affirmative determination of the single-family residence provision pursuant to Chapter XIII of the Lee Plan, may be permitted to sever two TDUs in lieu of development.

(c) TDUs created pursuant to Subsection (a) or (b) of this section, may be doubled if the wetlands are within the Coastal High Hazard Area (CHHA) (Lee Plan Map 5-A).

(d) Under no circumstances will natural bodies of water be included in the calculation for TDUs.

Sec. 2-150. - Density and intensity equivalents of Wetland TDUs.

(a) The residential ratio for Wetland TDUs is one Wetland TDU will be equal to two dwelling units when transferred to upland areas within the Intensive Development, Central Urban, Urban Community, or General Interchange future land use categories.

(b) The nonresidential ratios for Wetland TDUs are as follows:

(1) One Wetland TDU equals 10,000 square feet of nonresidential intensity which may be used to administratively increase allowable nonresidential intensity on an existing planned development consistent with Section 34-380 Amendments to approved Master Concept Plan.

(2) The use of Wetland TDUs to increase commercial intensity is permitted within future urban areas as defined by the Lee Plan.

(c) Wetland TDUs may be utilized to reduce open space and on-site native preservation requirements set forth in Chapter 10 Development Standards in accordance with the following ratios. Applications for the use of TDUs to decrease open space must meet the applicable approval requirements identified in Administrative Code 13-5.

(1) One Wetland TDU equals a 5,000 square foot reduction to the minimum open space and on-site native preservation requirements for residential, commercial, industrial and mixed-use projects. TDUs may not be used to reduce required landscape buffers, building perimeter plantings, stormwater management, or any other design requirement set forth in Chapter 10 Development Standards.

a. A maximum reduction of 50 percent is permitted for development within the Mixed-Use Overlay.

b. A maximum reduction of 35 percent is permitted for development within future urban areas, as defined in the Lee Plan, and which are not located within the Mixed-Use Overlay.

c. A maximum reduction of 20 percent is permitted for development within future suburban and non-urban areas, as defined in the Lee Plan.

Sec. 2-151. - Computation of Greater Pine Island TDUs.

(a) One TDU is hereby established per five acres of wetlands.

(b) One TDU is hereby established per one acre of uplands located in non-urban future land use categories.

(c) Three TDUs are hereby established per one acre of uplands located in the Outlying Suburban future land use category.

(d) A single-family lot or parcel designated as wetlands that holds an affirmative determination of the single-family residence provision pursuant to Chapter XIII of the Lee Plan, may be permitted to sever two TDUs in lieu of development.

(e) Manmade water bodies, natural water bodies, and rights-of-way may not be included within the acreage calculation for the creation of TDUs.

(f) Greater Pine Island TDUs smaller than one-quarter unit will not be recognized.

Sec. 2-152. - Density and intensity equivalents of Greater Pine Island TDUs.

(a) The residential ratios for Greater Pine Island TDUs are as follows:

(1) One Greater Pine Island TDU will be equal to two dwelling units when transferred to receiving lands outside of the Greater Pine Island Community Plan Area;

(2) One Greater Pine Island TDU will be equal to one dwelling unit when transferred to receiving lands in Pine Island Center, in accordance with Section 2-146(d)(1).

(b) The nonresidential ratios for Greater Pine Island TDUs are as follows:

(1) One Greater Pine Island TDU equals 10,000 square feet of commercial retail and office space, which may be used to administratively increase allowable commercial intensity on an existing planned development consistent with Section 34-380 Amendments to approved Master Concept Plan.

(2) The use of Greater Pine Island TDUs to increase commercial intensity is permitted within the Intensive Development, Central Urban and Urban Community future land use categories that are not located within the Greater Pine Island Community Plan Area.

(c) Greater Pine Island TDUs may be utilized to reduce open space and on-site native preservation requirements set forth in [Chapter 10 Development Standards](#) in accordance with the following ratios. Applications for the use of TDUs to decrease open space must meet the applicable approval requirements identified in Administrative Code 13-5.

(1) One Greater Pine Island TDU equals a 5,000 square foot reduction to the minimum open space and on-site native preservation requirements for residential, commercial, industrial and mixed-use projects. TDUs may not be used to reduce required landscape buffers, building perimeter plantings, stormwater management, or any other design requirement set forth in [Chapter 10 Development Standards](#).

a. A maximum reduction of 50 percent is permitted for development within the Mixed-Use Overlay.

b. A maximum reduction of 35 percent is permitted for development within future urban areas, as defined in the Lee Plan, and which are not located within the Mixed-Use Overlay.

c. A maximum reduction of 20 percent is permitted for development within future suburban and non-urban areas, as defined in the Lee Plan.

Sec. 2-153. - Computation of Southeast Lee County TDUs.

(a) One TDU may be established per five acres of wetlands.

(b) TDU credits may be established from land designated in the Density Reduction/Groundwater Resource future land use category as follows:

(1) One TDU may be created for each ten upland acres encumbered by an agricultural easement that meets the requirements of [Section 2-148 Establishment of Transfer of Development Rights Program](#).

(2) In lieu of the credits in Subsection (b)(1) of this section, one TDU may be created for each five upland acres with indigenous native or restored native vegetation encumbered by a conservation easement that meets the requirements of Section 2-148. Indigenous native vegetation is defined in Section 10-1.

(3) For each TDU credit allowed by the base rates set forth in this section, two extra TDU credits may be created if the sending area land is designated as Tier 1, Tier 2, Tier 3, or the southerly two miles of Tiers 5, 6, and 7, in the priority restoration strategy (Lee Plan Map 1, Page 4).

(c) Land cleared of native vegetation after July 1, 2010, cannot create TDU credits by conservation easement for 25 years from time of clearing. However, such land is not disqualified from generating TDU credits when land is encumbered by an agricultural easement.

(d) Fractional TDU credits of no less than a 0.1 increment may be created in accordance with the formulas in this article. Fractional TDR credits may not be redeemed unless aggregated to form a whole TDR credit.

Topic Title: Sea Level Rise

Resource Title: South Kingstown, RI Coastal Resiliency Overlay District

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: South Kingstown

State: Rhode Island

Date of Adoption: 2019

Abstract: South Kingstown, RI Coastal Resiliency Overlay District

South Kingstown recognized the future risks of sea level rise and developed this overlay district as an information-based strategy for current and future residents and developers. While it also includes some substantive measures regulating the private sector, this overlay district is primarily focused on establishing an informational exercise. The code requires the planning department record that an applicant received information about risks associated with sea level rise on the desired property. This also achieves the purpose of informing subsequent owners and occupants of such risks. "Elevating structures to a design elevation depicted on a CRMC design elevation map", however, if the property is not elevated, it must adhere to height requirements. This code is an example of how climate resiliency can be implemented, even with the more hesitant communities and legislatures.

Code Provision:

[South Kingstown, RI - 609 Coastal Resiliency Overlay District](#)

609.1. Establishment of [Costal Resiliency Overlay] District

There is hereby established a Coastal Resiliency (CR) Overlay District, the boundaries of which are shown on the official zoning map. The CR Overlay District contains the land area depicted on the Coastal Resources Management Council (CRMC) Design Elevation Maps as being vulnerable to storm surge during a one hundred-year storm event with the presence of five-feet of sea level rise (SLR) that lies outside of the Federal Emergency Management Agency's (FEMA) Special Flood Hazard Areas (SFHA).

609.3. Recording of resiliency information prior to building permit application.

For all new construction, prior to application for a building permit, the applicant shall request information from the planning department relative to future projected sea level rise scenarios. The information to be furnished by the planning department shall be determined by the director of planning. Upon provision of the information to the applicant, the planning department shall record the information in the town's land evidence records, so that future property owners may benefit from the knowledge. The town intends this informational exercise to ensure that current and future property owners are aware of the risks from future sea level rise, flooding and storm surge. Elevating structures to a design elevation depicted on a CRMC design elevation map, however, is optional.

609.4. Development standards and dimensional requirements.

When considered as part of a development project (as defined in section 601.3.C), the following height standards shall apply to the Coastal Resiliency Overlay District, except as provided in B below.

A. Maximum Building Height.

1. No structure shall exceed the following height measurements:

(a) Structures that are elevated to a distance above grade of less than or equal to five (5) feet shall be limited to 35 feet of building height;

(b) Structures that are elevated to a distance above grade of greater than five (5) feet but less than or equal to ten (10) feet shall be limited to thirty (30) feet of building height;

(c) Structures that are elevated to a distance above grade of greater than ten (10) feet but less than or equal to fifteen (15) feet shall be limited to twenty-five (25) feet of building height.

(d) Structures that are elevated to a distance above grade of greater than fifteen (15) feet shall be limited to twenty (20) feet of building height.

2. No part of any structure shall exceed the maximum height listed above except for those exclusions listed in the definition of "building height".

B. Inapplicability to Certain Development Projects. Notwithstanding A above, the standards in this section shall not apply:

1. *Inapplicability to Development Projects within Nonresidential Zoning Districts.* The standards established in this section shall not be applied to development projects wholly within a Commercial (CD, CW), Industrial (I-1, I-2, I-3), Government and Institutional (GI, and Public Marina Special Management District (PMSMD) zoning districts.

2. *Inapplicability to Development Projects within Coastal Community Overlay District.* The standards established in this section shall not apply to development projects located wholly within a Coastal Community Overlay District [this overlay district is a case study itself]

3. For the purposes of this section, development projects that have received a completed CRMC Preliminary Determination and/or an approval of an Onsite Wastewater Treatment System application from the Rhode Island Department of Environmental Management (RIDEM) on or before February 28, 2019, shall be exempt from the development standards outlined in A above.

C. Other than described in A above, nothing in this section shall be construed as to modify any dimensional requirements established elsewhere in this ordinance.

Topic Title: Sea Level Rise

Resource Title: South Kingstown, RI Coastal Community Overlay District

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: South Kingstown

State: Rhode Island

Date of Adoption: 2019

Abstract: South Kingstown, RI Coastal Community Overlay District

This Coastal Community Overlay District (CCOD) applies to existing non-conforming structures in the “sensitive environmental setting”, but which is “a valuable component of the heritage of these communities and the town at large.” The district is very limited and applies only to particular parcels, primarily occupied by mobile homes. This CCOD “provides additional regulatory requirements for proposals to expand or change these developments and/or the individual units within the same. CCOD states modifications which are permitted as of right and prohibited changes. It also lays out approval processes for minor change by the Technical Review Committee and major modifications are required to obtain a special permit from the zoning board. This overlay district is unique for sea level rise codes because it addresses issues of equity. The area is lower-income and while it does not push residents out, it alerts them and future residents of likely future damage.

Code Provision:

[South Kingstown, RI - 608 Coastal Community Overlay District](#)

608.5. Permitted changes to coastal community structures.

The following changes to coastal leased land community structures are permitted as of right, subject to the issuance of a building permit from the building official (zoning enforcement officer):

A. Replacement in-kind structures, as defined above.

B. Handicapped ramps and stairs for access to cottages or trailer units.

608.6. Changes to coastal community structures allowed with approval of the technical review committee (TRC).

A. Upon referral by the zoning enforcement officer the [TRC] is authorized to permit minor changes or modifications to existing structures, trailers, and appurtenances.

B. Minor changes may allow for expansion of baseline footprint and/or GLFA square footage up to 25% or 150 square feet, whichever is less. For trailer or manufactured home replacements with "bump-out" extension features, the bump-out shall be counted toward the square footage of the replacement structure.

C. Small decks of up to 100 square feet may be allowed by the TRC under this section.

D. Such allowances shall be available one-time only for any structure, trailer or appurtenance under this section.

[E removed as community specific provision]

F. Where the ZEO declines to refer an application to the technical review committee as an administrative allowance, said expansion shall be considered a major change and the applicant must secure a special use permit from the zoning board of review to permit any proposed expansion.

G. If the TRC declines to approve an application as a minor change the application shall be considered a major change and require the issuance of a special use permit from the zoning board of review to proceed.

608.7. Changes to coastal community structures allowed by zoning board.

A. The following changes to coastal leased land community structures are permitted subject to the issuance of a special use permit from the zoning board of review:

1. Except as specifically permitted above, any applicant seeking an expansion, replacement unit or addition to an existing structure, trailer or manufactured home shall be required to apply for a special use permit. In consideration of such applications, the zoning board shall be guided by the requirements, allowances and limitations of... Nonconformance... Administration Enforcement and Relief...Special use permit.
2. The enclosure and conversion of open porches or decks to living area.
3. Detached accessory structures to cottages or trailers for storage or other purposes.
4. Any replacement or new construction projects utilizing a CRMC design elevation map to establish a base flood elevation (BFE). The zoning board of review shall only grant a special use permit for such project upon submittal of credible evidence by the applicant, to the satisfaction of the board, that the following standards have been met:

(a) The structure shall maintain land-based, adequate vehicular access to U.S. Route 1, with the projected amount of sea level rise inundation depicted on the design elevation map utilized to establish BFE. The applicant must use CRMC's sea level rise maps to demonstrate maintained vehicular access.

(b) The footprint of the proposed structure lies completely outside of any land area that is below the mean high-water mark with the projected amount of sea level rise depicted on the selected design elevation map utilized by the applicant to establish BFE. The applicant must use CRMC's maps to demonstrate that no portion of the building will lie above an area projected to be inundated by sea level rise.

(c) The structure will be serviced by an approved onsite wastewater treatment system (OWTS) that will function compliantly with the projected amount of sea level rise depicted on the design elevation map utilized to establish BFE. Submitted evidence must include a certification from a Rhode Island registered professional engineer and RIDEM licensed OWTS system designer that the OWTS is anticipated to remain compliant at the projected level of sea level rise.

(d) The structure will be adequately serviced by public potable water or a private potable water supply approved by RIDOH. All private wells shall be located completely outside of any land area that is below the mean high-water mark with the projected amount of sea level rise depicted on the selected design elevation map utilized by the applicant to establish BFE.

(e) The structure shall be constructed with the foundation type required by the state building code for the flood zone projected by CRMC to be in effect with the projected amount of sea level rise depicted on the design elevation map utilized to establish BFE. CRMC's design elevation maps provide the projected flood zone given the amount of sea level rise indicated; development projects shall utilize the

foundation type required by the State Building Code which conforms to the projected flood zone.

B. Decks allowed by special use permit (unenclosed and unroofed) shall not exceed 50% of the GLFA as defined herein or 200 square feet, whichever is less.

C. Any application involving two (2) or more structures, trailers or manufactured homes shall require a special use permit by the zoning board of review.

D. Where a special use permit application involves changes to more than five (5) units, the building official/zoning officer shall require the applicant to contact CRMC to ascertain if a "preliminary determination" process is appropriate as a pre-requisite to the zoning board of review's formal consideration.

608.8. Prohibited changes to coastal community structures.

The following changes to coastal leased land community structures are prohibited:

A. Enclosure of the area below the BFE with breakaway walls, lattice or similar treatments.

B. Detached decks at ground level.

C. Second stories.

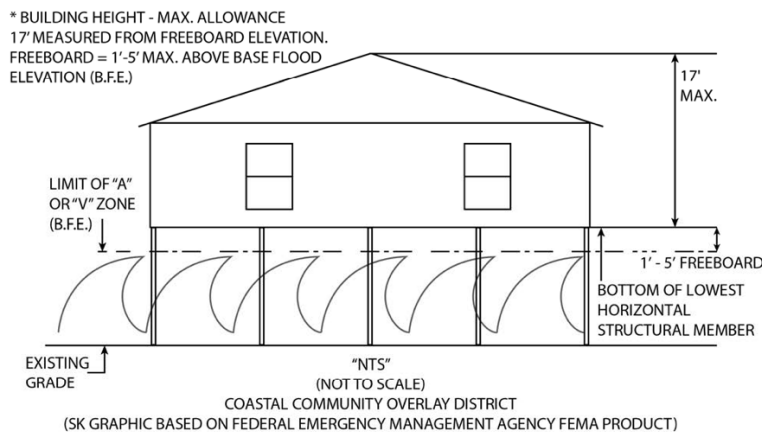
D. Sleeping lofts.

E. Roof decks.

608.9. General standards for changes to coastal community structures.

The following standards shall apply to all changes to coastal leased land community structures:

Expansion to existing structures or replacement structures that are currently less than fifteen (15) feet from other existing structures must maintain or increase the existing separation between structures.



Topic Title: Sea Level Rise

Resource Title: Coastal Management and Review Board

Resource Type: Special Interest Land Use Boards – Powers and Duties

Municipality: Norfolk

State: Virginia

Date of Adoption: 2016

Abstract: Coastal Management and Review Board

The Coastal Management and Review Board is a special-purpose advisory board whose sole focus is overseeing the beach and dune environment on the Chesapeake Bay. The board comprises an array of people, including city planners, council members, engineers, and scientists. The board oversees plan oversight, annual environmental monitoring, community engagement and education, regulation guidance, and project approval.

Specifically, the board must recommend sand management policies to the city planning commission or city council. Additionally, the board recommends, approves, or disapproves beach access construction and advises on dune management, vegetation projects, storm impacts, and educational programs like adopt-a-dune.

Code Provisions:

[Norfolk, VA Code of Ordinances](#)
[Chapter 49 - Wetlands and Coastal Primary Sand Dunes](#)
[Article V. - Coastal Management and Review Board](#)

[Sec. 49-38. - Creation and composition.](#)

The coastal management and review board (CMRB) is created to monitor changes in the beach and dune environment and to assess the progress of management projects that may be undertaken pursuant to any adopted sand management plan designed to comprehensively address the beaches and dunes along the Chesapeake Bay shore in order to evaluate and report on the efficacy of such projects. The board shall consist of the following twelve (12) members who shall serve without compensation:

(1) Two (2) members of the city council designated by the council from among the following persons:

- (a) The councilperson representing Ward 1,
- (b) The councilperson representing Ward 5,
- (c) The councilperson representing Superward 6, and
- (d) The mayor.

(2) The president of the East Ocean View Civic League or his designee.

(3) The president of the Cottage Line Civic League or his designee.

(4) The president of the Willoughby Civic League or his designee.

(5) A member of the staff of the department of public works, as designated by the director.

(6) A member of the staff of the department of city planning, as designated by the director.

(7) A member of the staff of the office of the city manager, as designated by the manager.

- (8) A representative from Department of the Ocean, Earth & Atmospheric Sciences of Old Dominion University, as designated by the department chair.
- (9) A staff member of the Virginia Marine Resources Commission, Habitat Management Division, designated by the Chief of Habitat Management.
- (10) A staff member of the Army Corp of Engineers, Norfolk District, designated by the District Engineer.
- (11) A staff member of the Virginia Institute of Marine Science, designated by the director.

Sec. 49-39. - Designations shall be biennial; vacancies.

The designation for each member of the CMRB shall be effective for two (2) years. Any vacancy in a seat shall be filled, by selection of the designor wherever a designation is required, for the remainder of the unexpired term

Sec. 49-40. - Meetings.

Meetings shall be held at least twice each year. Additional meetings may be held for the purpose of reviewing any information or project where review at the next regular meeting would result in a delay which would likely cause a significant increase in cost or would continue exposing persons or property to an existing threat of injury or damage for an extended period of time.

Sec. 49-41. - Duties and responsibilities.

The CMRB has the following duties and responsibilities:

- (1) Initiate and recommend amendments to any adopted sand management plan. No changes to such a plan should be made without a review and recommendation from the CMRB prior to consideration by the city planning commission or the city council.
- (2) Receive and review annual reports which provide the following information:
 - (a) Topographical or LIDAR surveys showing any changes to the beach and dune environment, including erosion and accretion.
 - (b) Dune planting success and mortality and progress of invasive vegetation eradication efforts.
 - (c) Beach nourishment projects.
 - (d) Dune blowout repairs and other alteration activity in a dune.
 - (e) Sand fence locations and effects.
 - (f) Breakwater modification and performance measures.
 - (g) Effects of seasonal storms impacts.
 - (h) Alterations to, construction of, and removal of any beach access.
 - (i) Alterations to the profile of the crest or front face of a dune.
 - (j) Other projects or activities that impact the health or use of the dune environment.
- (3) Make recommendations to the city manager regarding policies and procedures for:
 - (a) Adopt-a-Dune program to promote education and responsible stewardship of the shoreline environment.
 - (b) Instructional or written materials to assist citizens with appropriate dune vegetation plantings.

- (c) Instructional events or written materials to assist citizens with maintenance of noncommercial beach access walkways.
 - (d) Conducting training for citizens to assist city field operations for eradicating invasive vegetation by identifying and locating problem areas.
 - (e) Guidelines for appropriate methods of performing other activities that are exempt from regulation under the provisions of Title 28.2, Chapter 14 of the Code of Virginia related to Coastal Primary Sand Dunes and Beaches.
- (4) Review and recommend approval or denial of nonemergency construction of beach accesses.

Topic Title: Sea Level Rise

Resource Title: St. Lucie County, FL Environmentally Sensitive Lands

Resource Type: Environmental Chapters in Municipal Code

Municipality: St. Lucie County

State: Florida

Date of Adoption: 2013

Abstract: St. Lucie County, FL Environmentally Sensitive Lands

Local land use in Florida is vested in the counties. St. Lucie is able to regulate the development of unincorporated land in the coastal barrier islands of North and South Hutchinson Island, which are key nesting grounds for sea turtles. The development code also regulates development in areas FEMA considers to be Coastal High Hazard Areas. Development on sensitive land is prohibited, with limited exceptions and considerations for groundwater resources and federally and state-level protected species. Permitted development requires coordination with state and federal wildlife services, dune conservation practices, and landscape and density requirements. By regulating development on sensitive land, St. Lucie County protects future structures from sea level rise while mitigating its effects on the environment.

Code Provision:

[St. Lucie County, FL - Chapter VI Resource Protection Standards](#)

Sec. 6.02.01

B. Overall Review and Consistency.

1. The regulations shall apply to all development within the unincorporated limits of North Hutchinson Island and South Hutchinson Island and to land within the Coastal High Hazard Area in the unincorporated area of St. Lucie County, which shall be considered the "V" zone according to the best available information from the Federal Emergency Management Administration.

2. No development shall be approved unless consistent with the applicable policies set out in this Section. All development shall be reviewed by the Growth Management Director for consistency with the policies set out in this Section.

3. All development not required to file for site plan approval under Section 11.02.00 of this Code shall provide the information necessary to evaluate conformance to this Section on forms provided by the Growth Management Director.

C. Environmentally Sensitive Resources and Habitats. All development in the coastal area as defined in Section 6.02.01(B) is required to comply with the following criteria in order to protect environmentally sensitive resources and habitats:

1. *Alteration, Degradation or Destruction Criteria:* No development shall be allowed that results in the alteration, degradation or destruction of environmentally sensitive resources or habitats, except when any of the following apply:

a. The development is necessary to prevent or eliminate a public hazard. In order for this exception to apply, all of the following must be found applicable:

b. The development would provide direct public benefits which would exceed those lost to the public as a result of the resource or habitat alteration,

degradation or destruction. In order for this exception to apply, all of the following must be found applicable:

c. The development is proposed for environmentally sensitive habitats in which the functions and values currently provided are significantly less than those typically associated with such habitat types. In order for this exception to apply, all of the following must be found applicable:

(1) The functions and values provided by the habitat are significantly reduced below those typically associated with that habitat type;

(2) The benefits currently provided are minimal and of little ecological consequence;

(3) The reduction in value is irreversible and cannot practically be restored by the landowner, persons undertaking development, or governmental agencies; and

(4) The development would be carried out in a manner least damaging to the habitat.

d. The development is water dependent or, due to the unique configuration of the site, minimal impact is the unavoidable consequence of development for uses which are appropriate given general site characteristics; however, in no case shall such development be allowed for the purpose of obtaining fill.

2. *Groundwater and Surface Water:* All development shall comply with the following criteria in order to facilitate the recharging of groundwater and protect the quality of groundwater and surface water resources:

a. Impervious surfaces shall be held to a minimum and porous materials shall be substituted to the maximum extent feasible.

b. Site design shall maximize use of onsite water recharge capability.

c. Surface water management measures shall be designed to minimize changes in the pre-development quantity, quality, rate and temporary characteristics of stormwater discharge.

d. Surface water management measures shall result in no degradation of surface water draining into environmentally sensitive resources and habitats.

3. *Protected Species:* All development shall comply with the following criteria concerning federal and state protected species, as defined in Chapter II, and their habitats:

a. *Pre-development:* If it is determined that a federal or state protected species is resident on or otherwise is significantly dependent upon the subject parcel of land, the person undertaking development shall consult with the Florida Game and Fresh Water Fish Commission, U.S. Fish and Wildlife Service, and the County. Appropriate protection to the satisfaction of all parties shall be provided prior to approval of the development. When off-site mitigation or relocation of federal or state protected species is required, these activities shall be required to take place within St. Lucie County unless the appropriate federal or state regulatory agency finds that no suitable habitat located in the County is available to accept additional relocated species.

b. *Notification Requirement:* In the event that it is determined that any representative of a federal or state protected species is resident on or

otherwise is significantly dependent upon the subject parcel of land for which development is underway, the person undertaking development shall be required to cease all development work which might adversely affect that individual species or population and immediately notify the Florida Game and Fresh Water Fish Commission, U.S. Fish and Wildlife Service, and the County. Appropriate protection to the satisfaction of all parties shall be provided by the person undertaking development prior to resuming development.

4. *Permit required.* A permit from the Florida Department of Environmental Protection must be obtained for all construction seaward of the adopted Coastal Construction Control Line. This includes all buildings, garages, and accessory structures, including but not limited to, pools, sun decks, boardwalks, tennis courts, and paved areas for parking.

D. *Vegetation and Landscaping.* All development is required to comply with the following criteria concerning the preservation of existing native vegetation, the use of native and non-native vegetation in landscaping, and the removal of exotic vegetation:

1. *Selective Clearing and Micro-Siting:* All development requiring a County permit shall set aside through selective clearing and micro-siting of buildings, as a minimum, twenty-five percent (25%) of each native plant community which occurs onsite, such as, upland scrubland, upland mixed hammock, and duneland communities.
2. *Minimum Disturbance:* Existing native vegetation shall be disturbed to the least degree practical.
3. *Landscape Criteria for Native or Drought Tolerant Vegetation:* Landward of the frontal dune one hundred percent (100%) of all landscaped areas, required pursuant to Section 7.09.00, shall be composed of native or drought tolerant vegetation adapted to soil and climatic conditions occurring onsite. It is recommended that compliance with these requirements is achieved through preservation of existing native vegetation.

E. *Beach and Dune Protection.* All development shall comply with the following restrictions and criteria in order to protect against erosion, maintain habitat value and productivity, maintain natural scenic values, prevent damage to beach and dune vegetation, and promote natural rebuilding of the dune through wind forces.

1. *Dune Preservation Zone Restriction:* No development shall be approved within the Dune Preservation Zone other than for non-rigid or flexible structures, rigid structures, or other shoreline protection development; beach access; beach safety; approved **sea** turtle research; and other beach dependent or public uses approved by the Florida Department of Environmental Protection.
2. *Beach and Dune Criteria:* No development shall be approved that would threaten the stability of the frontal dune or beach in front of or adjacent to any parcel of land.
3. *Restrictions on the Use of Rigid, Fixed Above-Ground Structures and Materials:* The use of continuous, rigid, fixed above-ground structures and materials which provide limited or no beach access to sea turtles or eliminates portions of the beach-dune

system as a nesting habitat, such as seawalls or rip-rap, shall be prohibited except when:

- a. Used a part of a comprehensive plan for beach-dune restoration.
- b. Non-structural alternatives are unacceptable.
- c. Such structures and materials can be convincingly demonstrated to have no negative impact on water quality, the natural habitat, adjacent shore areas, or beach use.

4. *Design and/or Positioning of Structures:* Buried, emergent or above-ground structures shall be designed and/or positioned such that they do not act as traps to adult sea turtles or their hatchlings.

5. *Treatment of Impenetrable, Buried, Synthetic Materials:* Any impenetrable, buried, synthetic materials used for beach-dune preservation, stabilization, or restoration projects shall be sufficiently covered by beach sediments and maintained in such a state to allow for normal sea turtle nesting.

6. *Erosion Control:* All development shall comply with the following criteria in order to protect coastal area resources and natural processes within the Beach-Dune Shoreline Area:

- a. *Limitations:* Erosion control measures shall be limited to those that do not interfere with normal littoral processes, sea turtle nesting and hatching activities, or negatively impact coastal area resources.
- b. *Replacement of Damaged Structure:* Damaged erosion control structures may be replaced only with structures which are compatible with the intent of subsection 6.a and identified as necessary to protect existing, previously approved development.

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Vegetated Urbanism

Narrative

Vegetated Urbanism hinges on greening urban and suburban communities in alignment with the principles of Climate Resilient Development (CRD). As climate change intensifies, Vegetated Urbanism acknowledges that all communities exist on a sliding scale of urbanization. Vegetated Urbanism and Green Infrastructure strategies support this inevitable transition and offer a wide range of benefits. These include reducing the urban heat island effect, sequestering carbon and mitigating greenhouse gas (GHG) emissions, and improving stormwater infiltration while reducing soil erosion. Collectively, these benefits enhance the public health and welfare of municipalities by promoting outdoor activity, reducing noise and air pollution, and decreasing heat-related ailments.

Land use plays a crucial role in advancing CRD initiatives. Local governments are uniquely positioned to regulate land use through authority delegated by the state. Local leaders and their constituents possess firsthand knowledge of the specific climate-related challenges their communities face. Land use regulations, incentives, and planning tools can be leveraged to guide or incentivize the private sector to promote greener buildings and stormwater systems, as well as to protect tree cover. Additionally, local governments can mandate green infrastructure requirements within their own public service operations.

Case studies were originally selected based on municipalities implementing Vegetated Urbanism measures to improve public health and welfare. These studies were compiled and categorized by topic area: green buildings, green stormwater management, and tree canopy protection. They can also be organized by resource type, depending on their location within a municipal code or plan, often under titles such as “Green-Infrastructure Specific Plan” or “Green Building Code.”

Vegetated Urbanism intersects with other CRD focus areas, including inland flooding, water conservation, low-carbon buildings, infill and adaptive reuse, local climate action plans, distributed energy, and public health. Urbanized areas typically have less ground vegetation than undeveloped areas. A lack of vegetation in the built environment can exacerbate the negative effects of climate change, particularly those associated with the urban heat island effect. Expanding vegetated spaces, implementing green stormwater infrastructure, and preserving or enhancing the tree canopy all contribute to advancing CRD. These strategies mitigate climate change by reducing GHG emissions, support adaptation by acknowledging the ongoing trend towards urbanization, enhance resilience by protecting cities from urban heat and stormwater impacts, and rely on enabling conditions to ensure they remain equitable and serve all members of the community.

Numerous online tools are available to assist local planners in greening their municipalities. Specific sections within Georgetown Law’s [Green Infrastructure](#) and [Urban Heat Adaptation](#) toolkits provide local leaders with planning, zoning code, incentive-based, and other governmental strategies, all of which support the goals of Vegetated Urbanism. These toolkits offer specific examples of localities across the country that have implemented such strategies. Other tools help private developers comply with the specific requirements of their local green building codes. Additionally, the Center for Neighborhood Technology’s [Green Stormwater Management Calculator](#) estimates the cost of installing green infrastructure elements to help assess stormwater management needs for both residential and commercial properties.

Installing green infrastructure is made feasible by the enabling conditions available to municipalities through their land use authority. These enabling conditions vary by municipality and depend on factors such as existing tree canopy, public-private partnerships, and public awareness and financial support. These factors empower local leaders to develop green infrastructure provisions that reflect the current and future needs of their communities.

Recommendations for further action include expanding funding for private projects. As municipalities establish building or development requirements, these provisions often focus specifically on new private developments or large-scale building modifications. To advance these efforts, municipalities should promote the incorporation of Vegetated Urbanism features into existing private spaces, despite the common resistance from property owners. To address this pushback, municipalities should consider creating Green Infrastructure-Specific or Capital Planning Budgets that allocate funds to assist private developers in renovating their properties. This approach supports the community's Vegetated Urbanism goals and helps reduce opposition.

The case studies in this report highlight the most promising, creative, and replicable efforts by local governments to advance CRD within the context of Vegetated Urbanism.

The criteria used to evaluate and select these case studies include: the size and population of the locality (to ensure representation across different types of municipalities); the presence of enabling conditions (such as adequate funding mechanisms, public involvement, political will to implement change); the existence of local laws and policies that mandate or incentivize private action rather than merely offering suggestions; and, finally, representation across a diverse range of resource types, geographic areas, and political strategies.

Case Studies

Topic Title: Vegetated Urbanism

Resource Title: Hoboken Green Infrastructure Specific Plan

Resource Type: Special Topic or Area Plans

Municipality: Hoboken

State: New Jersey

Date of Adoption: 2013

Abstract: Hoboken Green Infrastructure Specific Plan

For years, Hoboken has studied the increasing intensity and frequency of severe weather impacting its city. Its infrastructure has proven inadequate, as the high amount of impervious cover in the city causes the stormwater infrastructure to become overwhelmed, leading to flooding and combined sewer overflows.

In 2013, after Hurricane Sandy devastated the city, officials launched an initiative to reduce reliance on these stressed stormwater management systems through the use of green infrastructure. Hoboken city officials, the North Hudson Sewage Authority, Hudson County, and other interested parties came together to develop the city's "Green Infrastructure Specific Plan." The plan identifies areas most at risk of flooding and flood damage, while recommending best management practices for each individual region within the city. The plan clearly divides the city into three main zones: Green, Blue, Grey, which allow for varied application of the recommended techniques based on permeability of the surrounding urban landscape. The plan specifically highlights locations that may be ideal for green infrastructure interventions, particularly to protect vulnerable populations, critical infrastructure such as firehouses, schools, and hospitals, and city utility sites.

Provisions of Plan:

[Part 1: Conceptual Framework](#)

A. Methodology Sewershed level Analysis

The City of Hoboken sought a strategic and place-based approach to green infrastructure, which maximizes the benefit of capital investment for stormwater management. The Plan employed a sewershed level analysis to achieve this objective, as described below. Based on its analysis of the carrying capacity of the underlying land forms, the Plan proposed a Conceptual Framework that organizes the City into three zones:

- *The Gray Zone*, which contains a shallow depth to bedrock and therefore cannot infiltrate stormwater efficiently, is most appropriate for above-ground BMPs such as rainwater harvesting and green roofs.
- *The Green Zone*, which has a greater depth to bedrock and soils that are capable of accepting and infiltrating stormwater and as such is most appropriate for vegetated BMPs like rain gardens, swales, and stormwater trees.

- *The Blue Zone*, which contains the lowest elevations in the City and therefore may be available for the detention of stormwater.

On the district level, the Plan identified sewersheds H1, H4, H5, and H7 (as identified by the North Hudson Sewerage Authority) as areas where green infrastructure would produce the most cost-effective results. The Team determined the most appropriate BMPs for each sewershed based on an analysis of Hoboken's existing stormwater management system, land use context for each sewershed, and siting considerations. To help identify which BMPs would have the most cost-effective impact, the Team conducted a literature review (which can be found in the appendix) of green infrastructure measures successfully employed in other cities.

Green Infrastructure has the potential to address many issues. For example, recurring flooding is one of the most significant barriers to accessing the City's two Hudson Bergen Light Rail stations. Addressing flooding through green infrastructure will be essential in making critical infrastructure assets more resilient and will improve accessibility to transit. Because the City's most vulnerable populations are concentrated in its most flood prone areas, implementation of green infrastructure in these areas will be an important element in improving the quality of life for those most in need of protection. The Plan puts forth a bold but pragmatic implementation strategy to implement these recommendations. This strategy is based on:

- Leveraging opportunities for the City to take early and significant action, including the relatively large concentration of land controlled by the public sector. Also, it is largely concentrated within the sewersheds H1, H3, H4, and H7; and designated Redevelopment Areas, which presents
- opportunities to implement green infrastructure in a more comprehensive manner potentially engaging public private partnerships. • Innovative regulatory measures such as performance-based zoning and establishment of a Stormwater Trust Fund to allow the City to address the issues.

B. Key Findings

Targeted Sewersheds For Green Infrastructure Implementation:

The Team's initial analysis of Hoboken's sewer system revealed that sewershed interconnections allow stormwater to flow from one sewershed to another. Stormwater captured in one sewershed may be exacerbating flooding in another sewershed. Key interconnections between Hoboken's sewersheds, particularly between H1 and H3/H4, may cause increased localized flooding in the lowest areas. Therefore, the Plan recommends focused implementation of Green Infrastructure BMPs within sewersheds H1, H3, H4, and H5. In addition, interconnections between sewersheds were recommended as an area for future study.

Subsequent analysis of the subsurface conditions revealed that while sewershed H3 plays a key role in Hoboken's interconnected sewer system, its subsurface geology and land use context are not conducive to installation of vegetated BMPs (e.g., rain gardens, infiltration planters). Conversely, sewershed H7 has ideal subsurface geology as well as the presence of the North End Rehabilitation Area, presenting the City's most significant opportunity for targeted green infrastructure installation throughout an entire sewershed. As such, the Plan recommends H1, H4, H5 and H7 for strategic green infrastructure implementation.

C. Demographics/Outreach Service Organizations

Demographics:

Public Housing

Hoboken is home to a disproportionate quantity of subsidized and low-income housing. The city has more than three times the number of HUD-subsidized Housing Units (46 per 1,000 population compared to 13 in the North Jersey NJTPA region), more than five times the number of Public Housing Units (27 compared to 5), and almost three times the number of Multi-Family Housing Units (16 compared to 6) compared to the region.

Poverty Rates

Hoboken has slightly higher rates of poverty (10.1%) than the North Jersey region (8.6%). This trend extends to families with children, which have higher rates of poverty (6.3%) compared with the region (5%) as a whole.

Access to Transportation

Transit is important to the mobility needs of residents in Hoboken, who have a higher percentage of carless households (15.7%) than Hudson County (13.7%) and the North Jersey region (12.5%). One of the Plan's most significant concerns is identifying the people and assets that are most in need of protection. With the presence of Hoboken Housing Authority's Andrew Jackson Gardens and the Columbian Arms Senior Living Community in sewershed H1 and the Hoboken Housing Authority in sewershed H4, the City's most vulnerable populations are concentrated in the City's most flood prone areas. As such, implementation of green infrastructure in these areas has the greatest potential to address the areas frequently impacted by flooding. This will also have the potential to significantly improve the quality of life for Hoboken's most vulnerable residents.

Outreach

Identification of Issues and Challenges

Service Organizations

These organizations participated as members of the project's Steering Committee and were integral to informing the community engagement process. **HOPES Community Action Partnership Incorporated** is a Hoboken-based organization which is part of a larger, nationwide network of community action agencies dedicated to fighting poverty through encouragement of self-sufficiency. Their mission is to provide community services

that respond to the social, educational and training needs of individuals in an effort to overcome barriers and fight the causes of poverty. They operate from five different Hoboken locations, including the Family Resource Center in the Jackson Gardens community of the Hoboken Housing Authority. **Hoboken Quality of Life Coalition (QLC)** is a community-based organization concerned about the air, earth and water of Hoboken, especially as it relates to issues such as T development, open space, parking and flooding in the city. Their continuing efforts revolve around preserving the streetscape and the city's old and historic buildings.

D. Flooding Concerns

Problem Locations and Impacts

Much of Hoboken's west side was built on filled wetlands, and a river was located on the City's western perimeter. The lowest areas of the City are located in the southwest, which is less than three feet above sea level. The high point in the City is located along the eastern cliff face at Castle Point. Surface stormwater flows generally follow the topography, leading to the west and southwest parts of the city with additional flows coming from the higher elevations of the surrounding communities such as Jersey City and Union City in the Palisades.

The City's flooding problems can be attributed to multiple sources: high tides, low topography, surface runoff, a prevalence of impervious surfaces, antiquated sewer infrastructure, interconnections between sewersheds, and insufficient pumping capability.

These factors combine to pose the highest flood risk in the southwest portion of the city. Specifically, flooding occurs most often at catch basin flood points and around certain intersections:

1. Paterson Avenue and First Street
2. Jackson Street and Fourth Street
3. Ninth Street between Monroe Street and Madison Street
4. Clinton Street between First and Second Streets
5. Thirteenth Street between Jefferson and Grand Streets.

E. Key Assets to be Protected

- Critical facilities are concentrated in H1, H3 and H4
- Transit infrastructure is concentrated at the borders of H1, H2, H4, H5, and H7

F. Best Management Practices (BMPs)

There are a wide range of actions that the City can take to reduce stormwater on a lot-by-lot basis through the implementation of best management practices (BMPs). Designs that utilize BMPs help to minimize impervious surfaces, absorb stormwater and mimic the natural water cycle through the processes of infiltration, evaporation and reuse. BMPs can help reduce the overall volume of stormwater generated on-site and recharge groundwater supply. BMPs that were considered for use in the City include:

- Constructed wetlands
- Permeable pavements
- Stormwater street trees
- Vegetated swales

- Rainwater harvest and reuse
- Basins or ponds
- Rain gardens
- Stormwater infiltration planters
- Subsurface storage
- Green roofs

G. Opportunities

The primary sewersheds where green infrastructure installations would appear to be most beneficial include the H1, H4, H5 and H7. Public sector entities control 29.1 acres in Hoboken, which is largely concentrated within the four key sewersheds (H1, H2, H4 and H5). Designated Redevelopment Areas offer larger-scale opportunities to implement green infrastructure, among which is the BASF site located in the Northwest Redevelopment area.

Existing open space and recreation areas, as well as schools, roadways and other public property provide significant opportunities for the integration of green infrastructure Best Management Practices (BMPs). Hoboken's three proposed parks (located within the BASF, Pino, and Block 12 sites, shown in the map on page 18) are also ideal locations for the implementation of BMPs.

New development and redevelopment can incorporate source controls (BMPs that absorb water before it can enter the stormwater system) such as green roofs, infiltration technologies and subsurface detention. The most effective BMPs include constructed wetlands, permeable pavements and stormwater tree pits. When factoring capital cost as well as operation and maintenance, swales and rainwater harvest/reuse tend to be highly effective over their useful lifetime.

Implementation of green infrastructure best management practices can help mitigate the significant costs involved in improving the gray infrastructure system to reduce the frequency of future CSO events.

Topic Title: Vegetated Urbanism

Resource Title: Protection of Trees on Private Property

Resource Type: Environmental Chapter in Municipal Code; Derived from Comprehensive Plan

Municipality: Evanston

State: Illinois

Date of Adoption: 2023

Abstract: Protection of Trees on Private Property

In 2023, Evanston's City Council passed a new [tree ordinance](#), Ordinance 50-0-23, to protect the tree canopy on private properties, effective June 1, 2024. The Ordinance amends the Trees and Shrubs chapter within the Public Ways title of Evanston's Code of Ordinances, to preserve the tree canopy on private land. Evanston seeks to protect its trees for both environmental and communal benefits aligning with the goals of its [Climate Resilience Action Plan](#) (CARP), inspiring the tree ordinance's inception.

Under the ordinance, any construction or activity within 25 feet of a tree requires a Tree Canopy Preservation permit. Tree removal on private property is permitted only for construction purposes, if the tree is dead, dying, or diseased. Applications for removal must include a diagram showing the location and size of affected trees relative to the work. Emergency removals may proceed but require additional documentation. Evanston's Human Services Committee reviews requests from property owners who wish to remove trees for other reasons; removal may be granted with committee approval. All replacement trees must be provided by the applicant, selected from an approved species list, be at least 2.5 inches in diameter, and sourced within 200 miles from Evanston. The applicant is also responsible for caring and maintaining the replacement trees for at least two years after planting.

Code Provisions:

15-0-23 AN ORDINANCE Amending Title 7, Chapter 8 of the City Code Concerning The Protection of Trees on Private Property

7-8-8.1 Purpose and Intent

A. Purpose and intent. This Chapter governs the maintenance, protection, removal and replacement of existing public and private trees, within the City of Evanston, in order to protect and preserve the urban forest and all of the benefits it provides to the community. Active management of Evanston's tree canopy fulfills the objectives identified in the Evanston Comprehensive Plan and the Climate Resilience Plan (CARP).

B. Objectives. The protection of trees as a valuable community resource also accomplishes the following objectives: 1. Stabilize valuable topsoil by preventing or minimizing unnecessary soil erosion and sedimentation; 2. Assist in proper stormwater runoff in order to decrease the costs associated with flooding; 3. Protect the important link in the hydrologic cycle that trees provide through the transpiring of water and the neutralization of wastes that pass through to the groundwater table and other aquifers; 4. Aid in the reduction of air pollution through the removal of harmful carbon dioxide and the generation of oxygen; 5. Provide a buffer and screen against noise pollution; 6. Provide a haven and nesting areas for birds, insects, and other forms of wildlife that are essential to

the maintenance of the food chain and that help control and eliminate disease-carrying mosquitoes; 7. Reduce energy consumption through the windbreak and shade effects of trees; 8. Protect and increase property values in a manner that maintains each property owner's enjoyment of his or her property; 9. Conserve and enhance the City's physical and aesthetic environment; 10. Eliminate trees that constitute a threat, danger, or nuisance to the public or to property in the City, or that may be dangerous to the health of other trees and vegetation in the City; 11. Protect and enhance the quality of life and the general welfare of the City and its residents; and 12. Restore, to the greatest extent possible, denuded soil that results from construction and grading work accompanying development.

7-8-8-4 Protected Trees

- A. Identification of trees by group. Trees species within the City are defined into four (4) groups: A, B, C, and D, based on ratings for species characteristics including ecosystem and habitat contributions, climate adaptability, management requirements, and physiological traits. Group A trees are the highest rated trees and most valuable trees and group D trees are the lowest rated and provide the fewest desirable ecosystem and community benefits. A description of each group and the list of species in each group is in the City's Tree Canopy Preservation Policy, as set forth in Subsection 7-8-8-13 of this Section.
- B. Protected Trees designated.
 - 1. Protected Trees are those trees in groups A,B,C, and D (as defined in the City's Tree Canopy Preservation Policy) with a minimum DBH as listed below:

Protected Trees	Minimum DBH
All public trees	2 inches
Group A	6 inches
Group B	6 inches
Group C	6 inches
Group D	6 inches

7-8-8-5. - REGULATED ACTIVITIES.

- A. Regulated activities designated. The following activities are regulated activities and are subject to the provisions of this Section:
 - 1. Any activity on public or private property within twenty five (25) feet of the trunk of any Protected Tree as defined in this Section, including:
 - a. Any activity on public or private property requiring the issuance of any construction permit pursuant to any City ordinance, including, without limitation, excavating, digging, compacting, boring, or other construction or building activity within 25 feet of the trunk of any tree as outlined in the City's Tree Canopy Preservation Policy.
 - b. Any activity involving construction, earthmoving, demolition, or vehicular traffic, or any similar activity, occurring within a critical root zone of a

Protected Tree, with the exception of regularly scheduled maintenance activities performed by City of Evanston employees.

2. The removal of exotic and invasive species with a DBH of two (2) inches or greater on public property and six (6) inches or greater on private property.

B. Exceptions...

- C. Limitation on damage or removal of trees. This Section applies to the damage or removal of any tree in the course of the regulated activities described in this Section. All regulated activities must be planned and performed in a manner, to a degree, and with sufficient equipment and personnel so as to: 1) Reasonably involve the least amount of damage or removal of trees; and 2) Not defeat or be inconsistent with the purposes and intent of this Section.

7-8-8-7. - TREE REPLACEMENT.

- A. General requirements. Any Protected Tree damaged or removed in the course of a regulated activity must be replaced by the applicant pursuant to this Section and as depicted in a tree replacement plan pursuant to Subsection 7-8-8-7(I) of this Section, regardless of whether the Protected Tree is located on the same lot on which the regulated activity takes place; except, that the City Manager or designee may, pursuant to Subsection G of this Section, consider a request to submit a mitigation fee in lieu of the replacement of trees, and except for the exemptions in Subsection B of this Section or as outlined in the City's Tree Canopy Preservation Policy. Any replacement tree shall have a caliper between one (1) and two (2) inches.
- B. Exceptions ...
- C. Replacement formula....When a tree removal permit is issued, Protected Trees on private property shall be replaced with Group A or B trees, or other high-ecosystem value native trees as approved by the City Manager or designee. The tree replacement rate is determined by the group designation...The mitigation formula for the number of required replacement trees shall be: $(\text{DBH of removed tree} \times \text{coefficient}) / (\text{caliper size of replacement trees}) = \text{required number of replacement trees}$.
- D. Specifications. All replacement trees must be:
 1. Provided by the applicant at the replacement rate specified in Subsection C of this Section;
 2. Of a species listed in Group A for public tree replacement or Groups A or B or other high-ecosystem value native trees for private property tree replacement as set forth in the City's Tree Canopy Preservation Policy Appendix A, Subsection 7-8-8-13 of this Section;
 3. Between one (1) and two (2) caliper inches At least two and one-half (2½) caliper inches;
 4. Grown in within the northeastern Illinois region or within a two-hundred mile radius of Evanston;

7-8-8-8. – TREE PROTECTION PLAN.

- A. Plan required.

If a regulated activity includes construction activity within twenty-five (25) feet of any public or private tree, a tree preservation permit will include a protection plan for any impacted public or private trees. Guidelines for these protections will be included in the Tree Canopy Preservation Policy.

- B. Construction activity area. The construction activity area is the area of the subject property that is the smallest area reasonably needed to undertake the proposed construction activity as determined by the City Manager or designee. The construction activity area must include the entire area impacted by the proposed construction activity and must also include any access route across the public right-of-way and the private tree preservation area. Construction activity must not be conducted or staged in any area of the subject property located outside the construction activity area. No excess soil, additional fill, liquids, or any construction materials or debris may be placed or located outside the construction activity area. Any temporary buildings, structures, and driveways constructed for or associated with the construction activity must be located so as to reasonably involve the least amount of damage or removal of trees, but must nevertheless be consistent with minimum building setback requirements of this Code.
- C. Contents required for of plan. A tree protection plan must consist of a site plan of the subject property upon which the information described in this Subsection must be graphically and accurately marked.
 - 1. Location of the subject property, including street address and legal description.
 - 2. Existing and proposed buildings or structures on the lot.
 - 3. Proposed building elevations, if applicable.
 - 4. Proposed work access areas and routes.
 - 5. The name and contact information of the general contractor or project representative, if any, responsible for the proposed construction activity.
 - 6. A demonstration of the ways in which the applicant will ensure that the tree protection required by this Section will be achieved.
 - 7. A diagram of the trees on and around the subject property, consisting of the following: a) all the Protected Trees on the subject property; b) all Protected Trees on adjacent properties that are within twenty-five (25) feet of the construction activity or that have a critical root zone extending into the subject property; c) all public trees adjacent to the subject property or that may be impacted by any regulated activity; d) all Protected Trees likely or proposed to be removed or damaged during construction must be labeled; e) trees must be labeled with distances to all existing and proposed infrastructure; f) all other requirements as required by the Tree Canopy Preservation Policy.
 - 8. Detailed specifications for maintenance and protection of Protected Trees and for the maintenance and protection of trees other than Protected Trees that are reasonably likely to be damaged or removed during implementation of the proposed construction activity, including, without limitation, proposed measures such as construction pruning, root pruning, critical root zone protection, installation of a retaining wall or high visibility fencing, and auguring of utility

lines when auguring is determined by the City Manager or designee to be necessary to improve the chances of tree survival.

9. Detailed specifications for tree protection fencing on the subject property, to be placed at a minimum: a) along the property frontage from property line to property line to completely separate the construction activity area; and b) around the critical root zone of each protected tree. These specifications must also include the identification and clear delineation on the site plan of the construction activity area and the tree protection area and their respective perimeters.

D. Protection area. The tree protection area is the area of the subject property not included in the construction activity area. No construction activity may be conducted in the tree protection area. All reasonable measures and protective materials must be employed to preserve and safeguard trees located within the tree protection area. Protective materials must include, without limitation, the temporary installation of high visibility fencing or other similar materials in the sizes and at the locations specifically approved by the City Manager or designee.

E. Stop work order.

1. If the protective measures and materials required by this Section, or any other related measures or materials otherwise required by this Section, are not fully implemented and completely constructed prior to commencement of construction activity, the City Manager or designee may issue a stop work order until the applicant fully complies with the requirements of this Section.

2. If protective measures and materials constructed and employed on the subject property are not adequately maintained in a manner that protects Protected Trees and the tree protection area, the City Manager or his/her designee may issue a stop work order until the measures and materials are repaired, restored, and constructed to the satisfaction of the City Manager or designee.

Topic Title: Vegetated Urbanism

Resource Title: City of Dover Central Business District Regulations

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Dover

State: New Hampshire

Date of Adoption: 2019

Abstract: City of Dover Central Business District Regulations

Dover, New Hampshire, revised its zoning code in 2019 to include green development strategies consistent with the concept of climate-resilient development. Dover's zoning code created various use districts, including a mixed-use Central Business District (CBD). Building and street standards are designed to accommodate pedestrians and multi-modal transportation.

Dover's code includes adaptive measures in response to climate change effects. Green roofs are strictly required for commercial and mixed-use structures greater than 25,000 square feet, an adaptive measure to the increase of urban heat through the incorporation of cooling vegetation into the existing built environment. The code provides techniques that mitigate GHG emissions by both reducing emissions and increasing the capacity of biological sequestration. The revised code requires that all new buildings in the CBD be solar-ready, and any new commercial development greater than 25,000 square feet must include solar panels. The CBD encourages pedestrian-friendly neighborhoods, a place-making strategy that exemplifies social resilience. Additionally, Dover's *Streetscape Standards* require each green street to plant and maintain specific species of canopy trees, spaced appropriately. The code includes provisions for maintenance, financing, and species selection, all of which are enabling conditions that contribute to the plan's feasibility.

Code Provisions:

City of Dover, NH

Code of Ordinances

[Division 3, Zoning Ordinance](#)

Ch. 170 Zoning

[§ 170-20 Central Business District regulations.](#)

E. Streetscape.

(1) Sites within the CBD shall be developed so that buildings are placed at or near the right-of-way, along the outer edge of their sites and so as to ensure the unity of those rights-of-way. Furthermore, these standards establish an environment that encourages and facilitates pedestrian activity. The sub-district sheets, design guidelines, and Dover Streetscape Standards will serve as a reference document for many of the elements below.

(3) Minimum standards.

In addition to any regulations set forth in the CBD sub-district tables and the Dover Streetscape Standards, development shall follow the regulations outlined below. Subsection E(3)(a), (b), and (c) shall only apply to new construction and/or renovations that will result in a 50% or more increase in

the value of the property, as determined by a licensed New Hampshire appraiser.

a) Street trees/landscaping.

[1] Each street shall have canopy shade trees (street trees). Street trees shall be planted at an average spacing not greater than 25 to 30 feet on center (measured per block face). The planting area's minimum dimension shall be not less than five feet. At planting, trees shall be 2.5 to three inches in diameter (four feet above grade) and shall meet the American Nursery Standards for height. The tree species used shall be selected from the City of Dover's approved list of street trees.

[2] Unpaved ground area along the frontage shall be planted with appropriate ground cover or shrubs, no bare ground or mulch-only areas permitted. Low-impact development techniques such as rain gardens, bioretention areas, tree boxes and other green infrastructure techniques shall be incorporated into these landscaped areas and maintained to ensure a five-foot-wide walkway.

[Amended 9-11-2019 by Ord. No. 2019.08.28-012]

F. Architectural standards. The following standards, including those noted on sub-district sheets, may be utilized by the applicant.

(3) Roofs and parapets.

(a) Roofs and parapets should demonstrate a common-sense recognition of the climate by utilizing appropriate pitch, drainage, and materials.

(e) Green roof technologies are encouraged in all districts. Use of this technology to cover 30% of the roof is required on commercial and mixed-use structures over 25,000 square feet in the CBD. Vegetative cover should be considered for flat-roofed structures. Roofs that contain gardens or plants must be maintained per the approved maintenance agreement.

Topic Title: Vegetated Urbanism

Resource Title: Charleston, SC Zoning Code, Land Use Regulations

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Charleston

State: South Carolina

Date of Adoption: 2015

Abstract: Charleston, SC Zoning Code, Land Use Regulations

Within Charleston, South Carolina's Zoning Code, Article 2, "Land Use Regulations," is partially dedicated to a specific area known as [the Upper Peninsula District](#). The purpose of this section is to guide the responsible redevelopment and growth of the Upper Peninsula District, a strategically located part of the city characterized by its connectivity, modern infrastructure, and unique natural views of two rivers. In recognition of the district's potential for higher population density, the [Charleston City Council](#) adopted zoning provisions that encourage responsible redevelopment while balancing urban growth with environmental preservation, in furtherance of the public's best interests.

Charleston's zoning code incentivizes green roofs in its Upper Peninsula District by offering density and development bonuses to private developers who integrate them into new buildings. Developers are rewarded through a point system, earning either one or two incentive points depending on the percentage of the total roof area covered by a green roof. Points may be combined with other incentive options, such as stormwater management, renewable energy, and outdoor public space. To qualify, green roofs must meet specific design and maintenance standards. A minimum of 70% vegetation coverage is required after one year, and only climate-appropriate plant species may be used. Mandatory irrigation systems prevent water waste. Developers must also provide data on stormwater retention capacity and install signage on or around the roof to promote public awareness. This green roof incentive is a key climate resilience strategy in the broader context of Charleston's urban development, and one that other municipalities can likely replicate with minimal barriers.

Code Provisions:

Zoning Ordinance of Charleston, South Carolina
Article 2, Land Use Regulations
Part 17, Upper Peninsula District

[Sec. 54-299.32. - Incentive options.](#)

Height and density bonuses are available to owners who achieve a predetermined sum of incentive option points. The options for achieving points are identified in Table 1: Incentive Options. The number of points required to achieve a bonus for one (1) building is set out in Table 2: Building Height and Density Bonuses.

Table 1: Incentive Options (abbreviated)

Incentive Options	Description	Point Value	Maximum Allowable Points
Vegetated Green Roof	Vegetated Green Roof (greater of, 700 ft ² or 30%)	1	-
	Vegetated Green Roof (greater of, 1,500 ft ² or 60%)	2	2

General requirements for incentive options

2) Vegetated Green Roof. Urban greening in the form of vegetated green roofs reduces stormwater runoff and flooding, mitigates the urban heat island effect, creates a sanctuary for wildlife, adds aesthetic beautification, can extend the life of the roof and can improve energy efficiency of the building by acting as an insulator. Vegetated green roofs can be installed on a wide range of buildings and are an ideal best management practice for urban sites, especially those which may be contaminated.

Requirements: Vegetated Green Roof

Install and maintain a vegetated green roof. The vegetated green roof surface area need not be contiguous to allow flexibility for mechanical equipment and other necessary or desired roof infrastructure.

For one (1) point, incorporate and maintain a vegetated green roof onsite that is the greater of: (1) seven hundred (700) square feet; or (2) thirty (30%) percent of total roof area of the building utilizing bonuses.

OR For two (2) points, incorporate and maintain a vegetated green roof onsite that is the greater of: (1) one thousand five hundred (1,500) square feet; or (2) sixty (60%) percent of total roof area of the building utilizing bonuses.

OR For two (2) points, incorporate and maintain a vegetated green roof onsite that is the greater of: (1) one thousand five hundred (1,500) square feet; or (2) sixty (60%) percent of total roof area of the building utilizing bonuses.

General requirements

(a) Root barrier slip sheets. A minimum forty (40) mil thick slip sheet of EPDM, TPO or PVC or another material as recommended by the roof membrane manufacturer shall be installed as a root barrier layer. Root barriers which have been impregnated with pesticides, metals or other chemicals that could leach into stormwater runoff shall not be

allowed in systems where the root barrier layer will come into contact with water or allow water to pass through the barrier.

(b) Growing media. Growing media shall be lightweight, absorbent and engineered specifically for vegetated green roofs. Growing media shall contain organic matter of approximately ten (10%) percent to thirty (30%) percent of the soil composition by volume.

(c) Depth. Growing media shall be four (4) inches or more deep. A standard four (4) inch modular unit is acceptable so long as it is filled with growing media as close to the top as possible.

(d) Planting plan. A planting plan shall be completed by a landscape architect, horticulturalist or other professional experienced with vegetated green roofs and Charleston's unique climate.

(e) Vegetation. Tolerant plant selections shall be used and should be suitable to Charleston's climate and able to withstand rooftop sensitivities such as strong winds, extreme heat and drought conditions.

i. A variety of at least five (5) different plant species representing at least two (2) different genera shall be used to maintain diversity. One genus shall not contain more than seventy-five (75%) percent of the total vegetation.

ii. Guidelines for plant selection are listed in the Guide. It is imperative plant selection considerations are made specifically for Charleston's unique climate as a plant that does well in another climate may not work as well in Charleston.

iii. Pre-planted vegetation mats or already established mature plants shall be installed. Small plugs and seeds are difficult to establish on rooftops and shall be used sparingly only as appropriate for a species. Seeds cannot exceed a maximum of fifty (50%) percent of the total vegetated green roof surface area.

iv. Living vegetation shall cover at least fifty (50%) percent of the surface area of the vegetated green roof after the first three (3) months and throughout the remainder of the first year.

v. After the first year, living vegetation shall cover at least seventy (70%) percent of the surface area of the vegetated green roof and shall be maintained at that level for the life of the building(s) utilizing bonuses.

vi. Vegetation shall be replaced as needed to maintain the minimum vegetative surface coverage at all times to prevent roots from drying out and ensuring its success and effectiveness.

(f) Irrigation. A permanent programmable irrigation system and water access on roof shall be installed and shall include a rain sensor to ensure proper irrigation and avoid overwatering. The frequency of irrigation shall adhere to the recommendations in "Appendix A: Charleston Vegetated Green Roof Maintenance Manual" (hereafter the "Manual"), a copy of which is on file in the Department.

(g) Roof pitch. Flat or low sloping roofs are required to optimize stormwater collection and ease maintenance access. The slope of the vegetated green roof shall not exceed a rise:run ratio of 3:12 or a twenty-five (25%) percent pitch.

(h) Separation of active and inactive zones. Vegetated green roofs which also offer pedestrian active areas (walkways and/or gathering areas) shall clearly delineate and demarcate pedestrian activity zones from inactive vegetated green roof zones to deter everyday foot traffic out of the vegetated green roof area.

(i) Drain collars. Drain collars and protective flashing shall be installed to ensure free flow of excess stormwater.

(j) Maintenance access. The vegetated green roof shall be setback a minimum of two (2) feet from all serviceable rooftop equipment allowing ample room for maintenance personnel to access rooftop mechanical equipment without disturbing the vegetation on the roof. A clear, vegetation free, maintenance route to all serviceable equipment shall be available and maintained.

(k) Maintenance. A maintenance plan that complies with the Manual shall be followed. At a minimum, for the first two (2) years, all maintenance shall be performed by experienced green roof personnel to help the vegetated green roof get established during its most sensitive growing period. Documentation of this contract shall be furnished to the Department.

(l) Inspection. Owners of property availing themselves of this incentive shall be required to sign a Maintenance and Operation Agreement which, among other things, will require continued maintenance of the green roof system and a yearly inspection and report on the condition and functionality of the green roof system by a third party experienced vegetated green roof professional, the cost of which, if any, shall be borne by the property owner. Any deficiencies revealed by the inspection shall be corrected in the timeframe established by the City. The Agreement shall be in recordable form, and at the option of the City, may be recorded in the RMC Office for Charleston County. The City may choose to perform additional inspections at its discretion at no cost to the property owner.

(m) Installation. An experienced installer shall construct the vegetated green roof.

(n) Signage. All vegetated green roofs shall have appropriate educational signage, approved by the Department, on the roof to inform users of the design and prevent accidental trampling of the vegetation. If the roof is not open for user access, the sign shall be placed

in a more visible and highly used location to inform users of the system in place and its function.

(o) Data. The City shall be provided the approximate stormwater retention capacity of the designed system in gallons per square foot and the size of the system in square feet.

(p) Best practices and tips. For vegetated green roof design considerations and best practices, referencing the Guide is encouraged.

(q) Longevity. This incentive option shall exist and be maintained by the owner for the life of the corresponding building(s) utilizing bonuses.

(r) Implementation. This incentive option is not limited to being located in, on or around a specific building, but does need to be located onsite. However, the size requirement of a vegetated green roof specifically corresponds to the building utilizing bonuses.

(s) Point redemption. Points earned from this incentive option may be applied to any building on the site, in any full point increment

Topic Title: Vegetated Urbanism
Resource Title: Norwalk City-Wide Zoning Standards
Resource Type: Supplemental Substantive Zoning Provisions
Municipality: Norwalk
State: Connecticut
Date of Adoption: 2024

Abstract: Norwalk City-Wide Zoning Standards

In 2021, the State of Connecticut passed legislation [calling for the advancement in climate resiliency strategies in zoning regulations](#). In response, the City of Norwalk updated its zoning regulations and map in accordance with the state’s directive; the newest version has taken effect as of February 2024.

Norwalk promotes city-wide sustainable development to protect public health, safety, and welfare for current and future generations in Article 6 of its new zoning regulations, titled “City-Wide Standards”. Across all zoning districts, any new construction and major renovations across that exceed 5,000 square feet must incorporate sustainable roofing, such as solar panels (minimum 4kW), green roofs, cool roofs, or a combination. Additionally, Norwalk requires that stormwater management strategies for these buildings follow Low-Impact Development (LID) guidelines, incorporating bioretention areas, permeable surfaces, rain gardens, bioswales, and green infrastructure. More detailed provisions outline criteria for certain strategies, including runoff infiltration, vegetative and porous surface solutions, green roofs, planter boxes, and cisterns. ensuring effective water management and environmental sustainability. The Planning and Zoning Commission may also consider alternative sustainable technologies that align with the city’s sustainability and green infrastructure goals.

Code Provisions:

[City of Norwalk](#)
[Zoning Regulations](#)
(amended Feb. 2024, effective Dec. 15, 2024)

Art. 6: City-Wide Standards

[6.11.1 Statement of Purpose \(at p.31\)](#)

It is declared that a desire is present in Norwalk for sustainable Development to protect the public health, safety and welfare for current and future generations. Solar Panels, shading of Facade Glazing, and/or natural drainage to be used on a Lot or Building Site shall comply with these provisions. Other sustainable technologies and systems may be considered by the Planning and Zoning Commission. For all Developments that exceed a Footprint a 5,000 square feet or a Floor Area of 20,000 square feet, see Section(s) 8.4.5.N.2.g. and 8.4.8.G.f. for additional requirements.

[6.11.2 Solar Energy and Natural Drainage \(at p.31\)](#)

A. Requirements.

Unless demonstrated by the Applicant that the proposed Use(s) or Building Construction makes it unfeasible, all new Construction, including Parking Structures, and Parking Lots, as well as alterations of existing buildings where the entire existing roof deck or roof assembly is being replaced, with an area of five thousand (5,000) square feet or greater, shall at a minimum, provide a sustainable roofing zone covering the usable roof area. The sustainable roof must include a solar photovoltaic system generating at least 4kW, a green roof system, a cool roof system, or a combination thereof.

B. Solar Energy.

1. Roof mounted Solar Panels shall comply with the following standards:
 - a. The total square footage shall not exceed the total area of roof surface of the Building to which the Solar Panel system is attached.
 - b. To the extent possible Solar Panels shall be parallel to the roof surface.
 - c. In Historic Districts, roof mounted Solar Panel location shall be referred to the Historic District Commission for Review.
 - d. Signage or writing of any kind is not permitted on any portion of the system, other than required manufacturer plates and safety labeling.
2. Freestanding Solar Panels shall comply with the following standards:
 - a. Unless located on a Parking Structure or Parking Lot, Freestanding Solar Panels shall be located in the Rear Yard and meet Accessory Building Setbacks.
 - b. Maximum Height shall not exceed the allowable Height of an Accessory Building, in the District.
 - c. All panels must be constructed of nonreflective materials, or treated with an antireflective material.
 - d. Freestanding Solar Panels must be encircled by a security Fence or Wall a minimum of six feet (6') tall, with a vegetative Screen provided outside the security fence meeting the Screening standards of these Regulations.

C. Natural Drainage

As required in A, stormwater management strategies identified in the LID Site Planning and Design Strategies in the City of Norwalk Drainage Manual and Low-Impact Development Appendix of the latest Connecticut Stormwater Quality Manual shall be incorporated. Acceptable design solutions include the Use of bio-retention areas and basins, green roofs, infiltration planters, permeable surfaces, rain barrels, rain gardens, and bioswales and the minimization of impervious surfaces, minimization of curbing and collection, with the following considerations:

1. Rain Gardens and Bioswales should be installed to infiltrate runoff from parking lots, Streets, Plazas and other impervious surfaces.
2. Where vegetative solutions are not feasible, porous concrete or porous asphalt should be specified for Sidewalks, Parking Lots, and Plazas to infiltrate stormwater. These surfaces shall be maintained.

3. Buildings with green roofs should be equipped with roofs of shallow 4-inch soils and drought tolerant plants. Buildings approved for intensive green roofs may hold soils deeper than four inches (4") and larger plants and trees.
4. Balconies should be equipped with planter boxes designed to capture runoff from the balcony.
5. Green walls, if provided, shall be restricted to non-invasive species.
6. Cisterns may be used to capture and recirculate stormwater from Buildings.
Cisterns shall comply with all other regulations and be reviewed by the Planning and Zoning Director.
7. Planter boxes should be bottomless, flowthrough boxes with native plants, placed next to Buildings and designed to capture Building runoff. They may be placed in courtyards or Adjacent Sidewalks with runoff sent to them via French drains or hidden pipes.

Topic Title: Vegetated Urbanism
Resource Title: Healthy Outdoor Public Spaces
Resource Type: Public Health Chapters in Municipal Code
Municipality: Philadelphia
State: Pennsylvania
Date of Adoption: 2020

Abstract: Healthy Outdoor Public Spaces

In 2020, the Philadelphia City Council enacted Bill No. 200425-A, amending Title 6 of the Philadelphia Code, entitled "Health Code," by creating a new Chapter 6-1300 titled "Healthy Outdoor Public Spaces." This legislation prohibits the use of toxic herbicides on all city-owned or city-used public grounds, including parks, trails, recreation centers, and playgrounds. The intent is to promote a healthy environment that protects the public from the risks associated with toxic herbicides. Philadelphia has adopted a unique approach to preserving public health and outdoor green space through a single code provision. Preserving greenery and access to public green space through health code offers a new angle on achieving Climate Resilient Development (CRD) through vegetated urbanism.

Code Provisions:

The Philadelphia Code

Title 6. Health Code

CHAPTER 6-1300. HEALTHY OUTDOOR PUBLIC SPACES

§ 6-1301. Definitions.

In this Chapter, the following definitions shall apply:

- 1.) "*Grounds*" means property or land owned by the City of Philadelphia, including any and all parks, open space, trails, lawns, playgrounds, recreation centers, sports fields, land, and real property. "*Grounds*" does not include the interior spaces of buildings, parking lots, nor any land or other real estate that is not open for use by the general public.
- 2.) "*Organic Land Management*" means a problem-solving strategy that prioritizes a natural, organic approach to turfgrass and landscape management, and care of trees and shrubs without the use of pesticides. It mandates the use of natural, organic practices that promote healthy soil and plant life as a preventative measure against the onset of turf and landscape pest problems.
- 3.) "*Pesticide*" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any plant, insect, or fungal pest. This includes any herbicide, insecticide, or fungicide.

- 4.) "*Synthetic*" means a substance that is formulated or manufactured by a chemical process or by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources, except that such term shall not apply to substances created by naturally occurring biological processes.
- 5.) "*Synthetic herbicide*" means any herbicide containing a Synthetic substance, including any material or agent containing a Synthetic substance that harms, adversely affects, or kills any plant, except synthetic herbicides that are allowed on the National List of Allowed Substances under the Organic Foods Production Act (OFPA), as published by the National Organic Standards Board (7 C.F.R. § 205.601 (2020 edition)).

§ 6-1302. Prohibited Use of Synthetic Herbicides.

- 1.) Except as provided in subsection (2), no person shall use or apply synthetic herbicides on any City Grounds. This prohibition shall be effective thirty-six (36) months after the ordinance adding this Section 6-1302 to the Code becomes law for golf courses and athletic fields and effective eighteen (18) months after the ordinance adding this Section 6-1302 to the Code becomes law with respect to all other City Grounds.
- 2.) Upon constitution of the advisory committee authorized under subsection (3), and upon request for a waiver by an applicant, the Department of Public Health may authorize the use or application of a synthetic herbicide on any City Grounds after receiving a recommendation from the advisory committee, if the Department determines the following criteria are met with respect to such use or application:
- a. Such use or application is appropriate to address an emergency that threatens the public health, safety, or welfare of persons; or involves an invasive species that threatens the overall health of the ecosystem and is necessary after organic methods prove insufficient;
 - b. The applicant has carefully evaluated all alternative methods and materials, including but not limited to, non-herbicide management tactics and non-synthetic herbicides, and is requesting to use the minimum amount of the least toxic, most effective herbicide necessary;
 - c. The person or entity using or applying the synthetic herbicide will, to the greatest extent practical, minimize the impact of the application on abutting properties; and
 - d. The authorized use or application of the synthetic herbicide will not be detrimental to the public's health, safety, or welfare.
- 3.) The City is authorized to create an advisory committee to evaluate and make recommendations to the Department of Public Health concerning waivers requested under subsection (2)

§ 6-1303. Advance Posting of Notice of Anticipated Pesticide Use.

City Council recognizes that the Department of Parks and Recreation has committed to post signs prominently providing notice in advance of applying pesticides including (a) the date application will be occurring; and (b) a contact number for questions. The signage will be posted 48 hours prior to pesticide application and remain for 72 hours after pesticide application.

§ 6-1304. Organic Land Management.

City Council recognizes that the Department of Parks and Recreation will develop an organic land management plan. Organic land management practices shall be the method of choice to understand, prevent, and control actual and potential plants considered to be noxious weeds. The essential practices of organic pest land management include, but are not limited to:

- 1.) Regular soil testing;
- 2.) Addition of approved soil amendments as necessitated by soil test results, following, but not limited to, the recommendations of the Northeast Organic Farming Association;
- 3.) Selection of plantings using criteria of hardiness, suitability to native conditions; drought, disease and pest-resistance; and ease of maintenance;
- 4.) Modification of outdoor management practices to comply with organic horticultural science, including scouting, monitoring, watering, mowing, pruning, proper spacing, and mulching;
- 5.) The use of physical controls, including hand-weeding and over-seeding;
- 6.) The use of biological controls, including the introduction of natural predators, and enhancement of the environment of a pest's natural enemies;
- 7.) Through observation, determining the most effective treatment time, based on pest biology and other variables, such as weather and local conditions; and
- 8.) Eliminating pest habitats and conditions supportive of pest population increases.

§ 6-1305. Reporting and Record Keeping on Pesticide Usage.

- 1) Effective July 1, 2021, usage of any kind of pesticide shall be reported at least annually to the City Council and to the general public on the City's website.
- 2) The required report under this subsection must include the following information:
(a) the common name of the pesticide; (b) the trade name of the pesticide; (c) the

registration number designated by the United States Environmental Protection Agency; (d) the amount of pesticide applied; (e) the method of application; (f) the location where the pesticide was applied; (g) the square footage of area where the pesticide was applied; (h) the name of the person applying the pesticide; (i) the name of the entity employing or directing the person applying the pesticide; and (j) whether the person applying the pesticide posted any notices informing the public that the pesticide was applied.

- 3) The Departments of Parks and Recreation, Streets, and all other departments that apply pesticides on City Grounds are required to make this report based on applications by their staff, contractors, and sub-contractors. Such reports shall be maintained centrally by the Department of Records as well as by individual departments.
- 4) The Department of Records shall preserve and maintain the records reported to Council pursuant to this Section on Council's behalf for no less than three years after the last date of application of the pesticide identified in any such report.

Topic Title: Vegetated Urbanism

Resource Title: Chapter 7.07 Portland Clean Energy Community Benefits

Resource Type: Environmental Chapter in Municipal Code

Municipality: Portland

State: Oregon

Date of Adoption: 2022

Abstract: Chapter 7.07 Portland Clean Energy Community Benefits

The *Portland Clean Energy Community Benefits* chapter in Portland's municipal code establishes a long-term funding mechanism to advance climate action and environmental justice. Acknowledging the disproportionate impact of climate change on low-income communities and communities of color in Portland, the city's policy imposes a 1% surcharge on large retail businesses to support greenhouse gas (GHG) reduction initiatives. Revenue from this surcharge provides funding to the *Community Benefits Fund*, which prioritizes renewable energy, energy efficiency, workforce development, and green infrastructure. Notably, regenerative agriculture and green infrastructure projects, including urban tree planting, stormwater management, and carbon sequestration initiatives, are categorized as high-priority investments.

Grants and contracts from the fund emphasize equity, requiring that at least 20% to go to nonprofits serving economically disadvantaged communities. Projects are evaluated based on co-benefits, geographic diversity, and potential for additional funding leverage. To ensure transparency, the fund undergoes annual financial audits and biennial performance reviews. By investing in community-driven climate solutions, workforce training, and environmental resilience, Portland aims to transition away from fossil fuels while fostering economic and social equity.

Code Provisions:

Portland, OR

City Code

Title 7, Ch. 7.07 'Portland Clean Energy Community Benefits'

7.07.10 Findings.

- A. The City of Portland has adopted numerous climate action goals. These goals affirm the importance of environmental justice; community-based efforts to decrease greenhouse gas emissions; and maximizing the social, economic, and environmental benefits of transitioning away from fossil fuels.
- B. To meet the City's goals there is an urgent need to fund and accelerate greenhouse gas emissions reductions and sequestration, especially within low-income communities and communities of color.
- C. Climate change has a disproportionate impact on the health and financial well-being of low-income communities and communities of color.
- D. To implement the City's climate action goals and this Chapter, there is a critical need for more skilled workers. Members of historically disadvantaged groups, including people with disabilities, people experiencing gender or sex-based discrimination in the workplace, women, and people of color are under-represented in the skilled

work force, and therefore offer an enormous untapped resource to meet the City's climate action goals.

- E. Large retail businesses are a significant contributor to greenhouse gas emissions. They encourage consumption of heavily packaged and non-recyclable products, have carbon intensive shipping, manufacturing, and supply chain practices, and share responsibility for generating a substantial portion of the City's overall greenhouse gas emissions when customer traffic and facility operations are considered. These businesses have an inherent responsibility and the financial capacity to support the goals of this Chapter, and an incentive to remain in the City to engage in retail activities here.

7.07.020 Policy and Purpose.

A. Based on the findings set forth above, the purpose of this Chapter is to provide a consistent long-term funding source and oversight structure to invest in climate action projects that support environmental justice and social, economic, and environmental benefits for all Portlanders, including the development of a diverse and well-trained workforce and contractor pool to perform work that reduces or sequesters greenhouse gases.

B. This Chapter requires large retailers (those with gross revenues nationally exceeding \$1 billion, and \$500,000 in Portland) to pay a surcharge of one percent on gross revenues from retail sales in Portland, excluding basic groceries, medicines, and health care services, in accordance with Subsection 7.02.500 F.

7.07.040 Portland Clean Energy Community Benefits Fund.

- A. Proceeds from the Clean Energy Surcharge will be placed in a special fund to be designated as the Portland Clean Energy Community Benefits Fund (Fund).
- B. Fund proceeds will be distributed through grants and contracts.
- C. Qualified organizations are eligible to receive grants, solely or in partnership with other non-profit entities, government entities, or for-profit businesses.
- D. Qualified organizations and qualified businesses are eligible to receive contracts, solely or in partnership with other non-profit entities, government entities, or for-profit businesses.

7.07.060 Funding Categories.

A. Funding priorities and funding levels in the Climate Investment Plan and funded projects must further the purpose of this Chapter and fall within the following categories:

1. Renewable energy and energy efficiency projects.

- a. This category includes residential, commercial, industrial, and school-based projects that reduce greenhouse gases within the City.
- b. Projects that broaden access to energy efficiency and renewable energy, such as community-initiated energy strategies and decentralized renewable energy, are a high priority.
- c. At least one half of the projects should benefit priority populations.

2. Climate jobs training, apprenticeships, and contractor development projects.

- a. This category includes projects serving populations within the Portland metropolitan statistical area that directly facilitate and promote job training, pre-apprenticeship programs, apprenticeship programs, and contractor development in businesses that produce goods or services that reduce or sequester greenhouse gases.
- b. Projects supporting workforce priority populations are a high priority.
- c. Projects supporting entry into union-registered apprentice trades are a high priority.

3. Regenerative agriculture and green infrastructure projects.

- a. This category includes projects that reduce or sequester greenhouse gases within the City.
- b. Projects must demonstrate or promote the adoption of regenerative agriculture or green infrastructure practices, with a focus on priority populations.
- c. Projects that provide benefits to priority populations are a high priority.

B. Funding decisions must consider:

- 1. Co-benefits. Whether a project prioritizes greenhouse gas reduction or sequestration in a manner that promotes environmental justice and social, economic, and environmental benefits.
- 2. Geographical diversity. Whether projects operate at the neighborhood level (including east of 82nd Avenue) as well as citywide.
- 3. Organizational representation. To ensure that the Program is inclusive as well as effective, at least 20 percent of the Funds will be awarded to non-profit organizations with a stated mission and track-record of benefitting economically disadvantaged community members, including workforce priority populations.
- 4. Leverage. Projects that leverage additional government or private funding and therefore increase the Program's effectiveness should be prioritized, but leverage is not required.

Topic Title: Vegetated Urbanism

Resource Title: Vegetation Tree Commission

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Wilmington

State: Delaware

Date of Adoption: 2011

Abstract: Vegetation Tree Commission

Wilmington, Delaware has included in its Tree Ordinance the creation of a “Tree Commission.” This five-member body, along with the urban forest administrator from the Department of Public Works, is responsible for recommending, reviewing, and permitting the preservation or removal of trees within the urban forest, which the city considers vital to its infrastructure. The commission is also charged with reviewing and advising on the “Community Tree Plan,” as prepared by the urban forest administrator. This code further recognizes trees as green infrastructure.

Code Provisions:

Wilmington, Delaware Municipal Code
[Code of Ordinances Chapter 46: Vegetation](#)
Tree Commission

ARTICLE I. - IN GENERAL

Secs. 46-1—46-25. - Reserved.

ARTICLE II. - TREES

[Sec. 46-26. - Purpose.](#)

This article comprises Wilmington's tree ordinance and is designed to protect the urban forest, which is recognized as a necessary and vital part of the city's infrastructure. The urban forest is green infrastructure that provides crucial benefits to the community including: environmental (carbon storage, reduction of air pollution, climate control, energy savings, storm water management and increased biodiversity); social (improved human health and increased quality of life); and economic (increased property values, increased visitation of businesses and decreased energy use). This article provides for the planning, policy, management and enforcement necessary for a healthy urban forest. It states trees and greenspace should be considered on par with other city infrastructure and services as important components of the health, safety and welfare of residents and visitors. As the city improves the health and coverage of the urban forest, consequently human health, quality of life and the community as a whole are also improved. Thus, the purposes of this article are:

To protect public health, safety and welfare by providing for efficient and effective administration of urban forest maintenance, management and expansion;

To optimize costs and benefits of the urban forest by achieving American Forests' recommended urban forest canopy coverage and goals of the city's community tree plan;

To protect and sustain existing and future urban forest canopy coverage;

To dispose of, or recycle, wood waste in an environmentally sound manner;

To protect and enhance the city's plant, air, soil, water and other ecosystem components;
and

To promote use of the appropriate tree in the appropriate space with the goal of creating a healthy and diverse urban forest.

Sec. 46-28. - Authorized activities of city.

This article specifically authorizes, but does not limit, the city to perform activities in regard to public trees including: Adopt policies, rules and regulations for tree management and maintenance; select and plant trees in public areas; order the removal of dangerous trees on private and public property; oversee tree maintenance operations; oversee tree planting and maintenance operations undertaken by contractors; review land development plans including zoning and building permit applications; complete and update inventories of public trees; complete and update management plans; complete annual work plans and budgets; implement a community tree plan and develop and implement programs of public participation and education.

(1) *Department of public works.* The provisions of this article shall be administered and enforced by the department of public works, unless another department is specifically noted, and except as the department of licenses and inspections is specifically authorized to administer and enforce certain provisions of this article, particularly those trees that are located on private property but are subject to certain provisions hereof. The department of public works shall be responsible for enforcing the provisions of the chapter that address right-of-way trees, shall advise on all other subsections, and is authorized to manage trees in the right-of-way. Other responsibilities may include, but are not limited to, developing and implementing the community tree plan, providing technical arboriculture consultations on behalf of the city, reviewing construction plans, reviewing and issuing tree permits, maintaining the street tree database and handling resident concerns regarding street trees.

(2) *Department of parks and recreation.* The department of parks and recreation shall be responsible for the management of trees in parks and in rights-of-way adjacent to parks and for enforcing the provisions of this chapter that address said trees. The department of

parks and recreation will provide support for post storm clean up, for emergency clean up that blocks rights-of-way, and for administering the firewood program. The department of parks and recreation will be available to respond to emergencies during normal business hours and on nights and weekends, if necessary.

(3) *Department of licenses and inspections.* The department of licenses and inspections shall work with the department of public works to enforce the provisions of this article, specifically trees on private property.

(4) *Department of planning.* The department of planning shall review private development plans, consulting with the urban forest administrator as necessary to make appropriate tree recommendations.

Sec. 46-29. - Tree commission.

(a) *Creation and membership.* A City of Wilmington tree commission is hereby created which shall consist of five members, three of whom shall be appointed by the mayor and two of whom shall be appointed by the president of city council and shall serve at the pleasure of the appointing authority. Members shall serve for two-year terms, which may be renewable no more than five consecutive times. Commissioners shall be selected on the basis of education, experience or demonstrated interest in the fields of arboriculture, forestry, horticulture, landscape architecture or urban design. Pursuant to Wilmington City code section 3-304(b) and Wilmington City Charter 3-100(g), the commissioners do not need to be city residents.

The tree commission shall meet at least quarterly and shall adopt appropriate by-laws to conduct meetings and business. The commissioner of public works shall coordinate staff support for the tree commission and solicit help as needed from the director of the department of parks and recreation, the director of planning, and the commissioner of licenses and inspections. The tree commission's role is primarily advisory.

The tree commission is considered a public body and must comply with the relevant provisions of the Freedom of Information Act including public notice of meetings.

Commissioners may be terminated at will by the authority that appointed the commissioner. Such termination must be in writing and is effective immediately. Replacements for terminated commissioners will be selected by the appointing authority and effective immediately.

(b) *Organization, records, and meetings.*

(1) The mayor shall appoint a chairperson from among the commissioners. The commissioners shall elect such other officers as they may determine necessary.

(2) The tree commission shall keep a written record of its meetings. For the purpose of taking action, a quorum of three members must be present.

(c) Responsibilities. The tree commission shall have the following responsibilities:

(1) Advise on matters relating to trees. The tree commission shall advise the urban forest administrator, commissioner of public works, and other city departments involved in the planting, design, maintenance, management and removal of public trees. Such advice may include:

- a. Recommendations of tree species for planting public areas;
- b. Recommendations for controlling diseases and pests damaging trees;
- c. Recommendations for tree maintenance standards;
- d. Recommendations for public education/information programs concerning the importance and care of trees;
- e. Recommendations on departmental standards and city ordinances regarding tree planting, maintenance and removals;
- f. The preparation and review of a community tree plan;
- g. The preparation of an annual report of urban forestry activities;
- h. The preparation of an annual urban forestry work plan and budget; and
- i. The preparation and acceptance of grants and contributions.

(2) Appeals.

- a. Permit appeals: The tree commission shall hear appeals of tree permits approved or denied by the department of public works. Public notice for permit appeals will follow FOIA guidelines. Appeals to the tree commission shall be recorded and decisions shall be written and shall include findings of fact. The tree commission shall provide information to the relevant city departments regarding the determination within 60 days of the receipt of the appeal. Any further appeal shall be properly heard in Justice of the Peace Court #20.
- b. Citation appeals: In accord with sections 46-30 of this City Code, the department of licenses and inspections shall hear appeals by property owners as described in City Code section 5-706, board of license and inspection review, whereby any person aggrieved by the issuance, transfer renewal, refusal, suspension, revocation or cancellation of a tree related notice or order shall be afforded a hearing. The urban forest administrator in the department of public works shall provide relevant tree related information and professional assessments to the board of licenses and inspection review and may seek

advice from the tree commission. Any further appeal shall be properly heard in the Justice of the Peace Court #20.

- (3) *Community tree plan.* The tree commission shall provide review and advice on the preparation and/or amendment of a community tree plan developed by the urban forest administrator and the department of public works for street, park and other public trees in the city. Other applicable city departments shall have the opportunity to provide written comments on the community tree plan. The community tree plan shall be available for public comment before adoption by the tree commission.

The community tree plan should recognize the benefits and ecosystem services provided by a public tree program and include a list or inventory of existing public trees (including species, condition and location). The community tree plan should also include suggested policies, strategies, and standards for: 1) the planting of trees (including suitable species for various environments, tree planting standards, and spacing of trees); 2) the management of tree risk; 3) programs of public participation and education; 4) tree management and maintenance; 5) landscape design; 6) funding and fund raising; and 7) other elements of a public tree program. 8) The community tree plan may also identify specific locations for new plantings and suggest desirable species for urban landscapes.

The tree commission shall review the community tree plan every five years and at other times at the request of the commissioner of public works, director of parks and recreation, or director of planning.

- (4) The tree commission may, with the approval of the mayor and resolution of city council pursuant to City Code section 2-363, solicit and accept grants and contributions on behalf of the city.
- (5) The tree commission, at the request of the urban forest administrator or commissioner of public works, shall review private and public land development plans including zoning and building permit applications to determine the impact of such plans on public trees and to make recommendations on steps needed to mitigate said impacts. The commission may review proposed plans of public improvements to city parks, plazas, streetscapes and other public places, and shall have the authority to propose changes.
- (6) The tree commission shall educate the public about the environmental, aesthetic, human health and economic benefits to the city and its citizens, including both publicly and privately owned trees and green spaces.
- (7) The tree commission shall encourage partnerships with corporations, local business and neighborhood associations in the city to improve the health, and condition of the urban forest.

Sec. 46-30. - Duty of property owner to maintain, prune, treat or remove trees.

(a) *Public right-of-way.* Any person owning property shall be responsible for the maintenance, pruning, and treatment of any tree which is on, or adjoining or abutting their property and in the public right-of-way for a street, highway, lane or alley, etc, as may be necessary to alleviate any risk to the property owner or the public in the event that the tree or any part thereof is in a dangerous condition. If removal of the tree is necessary to alleviate the risk, the property owner is responsible for removal of the tree, specifically including grinding and removal of the stump and removal of the wood, and replacement of the tree. The department of public works urban forest administrator and the department of licenses and inspections, under the advice of the urban forest administrator, shall be authorized to enforce the provisions of this subsection and may issue an order to the property owner directing them to take specific action if the property owner is not in compliance with this provision. The penalties for violations for this section are provided in section 46-36.

(b) *Private property.* The owner of any property shall be responsible for the maintenance, pruning and treatment of any tree and shall not permit and shall be solely responsible for any damage that may result to any person or property from any dangerous tree condition. If any dangerous tree condition exists, the property owner shall cause the same to be entirely removed, pruned, or treated as may be necessary to alleviate any risk to the public. The department of licenses and inspections shall administer this provision with the advice of the urban forest administrator in the department of public works, and shall be authorized to enforce the provisions of this subsection and may issue an order to the property owner directing them to take specific action if the property owner is not in compliance with this provision. The penalties for violations of which shall be those provided in section 46-36.

Topic Title: Vegetated Urbanism
Resource Title: Seattle Green Factor Measurement
Resource Type: Supplemental Substantive Zoning Provisions
Municipality: Seattle
State: Washington
Date of Adoption: 2006

Abstract: Seattle Green Factor Measurement

Seattle Green Factor is a score-based requirement in the Seattle Land Use Code, implemented to improve the quantity and quality of landscaping in new developments throughout the city. Well-thought-out landscaping practices can improve neighborhood aesthetics and public health, reduce the urban heat island effect, promote natural ecosystems and filter stormwater runoff.

Code Provisions:

Seattle, Washington Municipal Code
Title 23 Land Use Code

Subtitle IV – Administration

[Chapter 23.86 - MEASUREMENTS](#)

23.86.019 - Green Factor measurement

- A. Development standards for certain areas require landscaping that meets a minimum Green Factor score. All required landscaping shall meet standards promulgated by the Director to provide for the long-term health, viability, and coverage of plantings. These standards may include, but are not limited to, the type and size of plants, spacing of plants, depth, and quality of soil, use of drought-tolerant plants, and access to light and air for plants. The Green Factor score shall be calculated as follows:
 - 1. Identify all proposed landscape elements, sorted into the categories presented in Table A for 23.86.019.
 - 2. Multiply the square feet, or equivalent square footage where applicable, of each landscape element by the multiplier provided for that element in Table A for 23.86.019, according to the following provisions:
 - a. If multiple elements listed on Table A for 23.86.019 occupy the same area (for example, groundcover under a tree), count the full square footage or equivalent square footage of each element.
 - b. Landscaping elements in the right-of-way between the lot line and the roadway may be counted, provided that they are approved by the Director of the Department of Transportation.
 - c. Elements listed in Table A for 23.86.019 that are provided to satisfy any other requirements of this Title 23 may be counted.
 - d. For trees, large shrubs, and large perennials, use the equivalent square footage of each tree or shrub according to Table B for 23.86.019.

- e. For vegetated walls, use the square footage of the portion of the wall covered by vegetation. All vegetated wall structures, including fences counted as vegetated walls, shall be constructed of durable materials, provide adequate planting area for plant health, and provide appropriate surfaces or structures that enable plant coverage.
 - f. For all elements other than trees, large shrubs, large perennials, and vegetated walls, square footage is determined by the area of the portion of a horizontal plane that lies over or under the element.
 - g. All permeable paving and structural soil credits together may not count for more than one third of the lot's Green Factor score.
3. Add together all the products calculated under subsection 23.86.019.A.2 to determine the Green Factor numerator.
4. Divide the Green Factor numerator by the lot area to determine the Green Factor score.

Table A for 23.86.019 Green Factor landscape elements		
Green Factor landscape elements		Multiplier
A. Planted areas (choose one of the following for each planting area)		
	1. Planted areas with a soil depth of 24 inches or more:	0.6
	2. Bioretention facilities meeting standards of the Stormwater Code, <u>Title 22</u> , Subtitle VIII	1.0
B. Plants		
	1. Mulch, ground covers, or other plants normally expected to be less than 2 feet tall at maturity	0.1
	2. Medium shrubs or other perennials at least 2 feet tall, but less than 4 feet tall, at maturity	0.3
	3. Large shrubs or other perennials at least 4 feet tall at maturity	0.3
	4. Small trees	0.3
	5. Small/medium trees	0.5
	6. Medium/large trees	0.7
	7. Large trees	0.9
	8. Preservation of existing trees at least 6 inches in diameter at breast height	1.0
C. Green roofs		

Table B for 23.86.019 Equivalent square footage of trees and large shrubs	
Landscape elements	Equivalent square feet
Medium shrubs or other perennials at least 2 feet tall, but less than 4 feet tall, at maturity	9 per plant
Large shrubs or other perennials at least 4 feet tall at maturity	36 per plant
Small trees	75 per tree
Small/medium trees	150 per tree
Medium/large trees	250 per tree
Large trees	350 per tree
Existing trees	20 per inch of trunk diameter 4.5 feet above grade

Detailed Requirements for affected zones are as follows:

- Commercial and Neighborhood Commercial (NC1,NC2,NC3,C1,C2):
 - Minimum Score of .30: 23.47A.016 - Landscaping and screening standards
- Industrial Commercial (IC) within urban village or urban center boundaries:
 - Minimum Score of .30
- Development in South Downtown (variety of zones with the South Downtown planning area):
 - Minimum score of .30 for development with 20,00 gross square feet or more: 23.49.031 - Green Factor Landscaping in South Downtown
- Midrise and Highrise Multifamily Residential (MR, HR):
 - Minimum score 0.50: 23.45.524 - Landscaping standards
- Low-Rise Multifamily Residential (LR):
 - Minimum Score of 0.60: 23.45.524 - Landscaping standards
- Yesler Terrace (MPC-YT):
 - Minimum score of .30: 23.75.160 - Landscaping, street trees, and tree protection
- Seattle Mixed (SM):
 - Minimum score of .30 : 23.48.055 - Landscaping and screening standards

Public Health

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Public Health

Narrative

The [Intergovernmental Panel on Climate Change \(IPCC\)](#) highlights Climate Resilient Development (CRD) as a “solutions framework” to address climate change. Land Use Scholars of the Land Use Law Center at the Elisabeth Haub School of Law at Pace University, led by Distinguished Professor of Law Emeritus John R. Nolon, have taken on the challenge of developing a CRD Framework Law in order to provide a blueprint for CRD implementation. To achieve this goal, land use scholars have created and compiled case studies based on municipalities that have successfully implemented CRD objectives through the local governmental power of land use law. Land use law, such as comprehensive plans, zoning provisions, and municipal ordinances, is related to climate change by providing a mechanism through which local governments, the private sector, and members of the community can work together to identify and address environmental and health concerns created or worsened by the effects of climate change. Land Use Scholars have identified 13 CRD topics, including Public Health.

“Public health” is defined by the Oxford English Dictionary as [“the health of the population as a whole, especially as monitored, regulated, and promoted by the state.”](#) In recent years, public health officials have become more aware of the direct impacts of climate change on public health. [According to the New York Department of Health](#), “...changes in climate affect health in many ways. For example, droughts and severe floods can affect drinking water quality, food safety, and air quality which can increase risks of illness and injury.” There is further increased recognition that the effects of climate change on public health have a disproportionate impact on historically marginalized communities as well as on those who “Live, work, or go to school in geographic areas more exposed to climate-related environmental exposures and hazards (e.g., coastal areas and sea level rise / flooding; urbanized areas that experience greater urban heat island effect; homes in areas at greater risk of wildfires).”

The twelve public health case studies can be divided into three categories: open spaces, housing, and food. The five case studies included under the open spaces category aim to improve health equity by encouraging or requiring the creation of open spaces such as parks. The three case studies included under the housing category aim to promote public health by increasing affordable housing options or decreasing pollution-related health risks in residential areas. The four case studies included in the food category aim to increase access to healthy food. Through these case studies, the private sector is being incentivized and regulated to improve health equity through land use law. Of the twelve case studies, four are incentive-based resources and eight are regulation-based resources. Four resource types are exhibited through these twelve case studies including one case study based on a comprehensive plan, seven based on supplemental substantive zoning provisions, two based on public health chapters in municipal codes, and two based on other municipal code chapters regulating land use.

The CRD components achieved through these case studies are mitigation and equity as the selected case studies are focused on mitigating the negative public health impacts of climate change or addressing health inequity worsened or caused by climate

change. Partners and resources relating to the topic of public health include the [Healthy Food Policy Project](#) and the [City Parks Alliance](#). As more states become aware of the impacts of climate change on public health, there may be a growing trend in state enabling legislation passed to allow local governments more power to improve health equity. This is exemplified by the two Long Beach, California case studies.

Case studies were selected based on geographic diversity, resource type diversity, and relevance to the advancement of public health objectives. The following case studies highlight the advancement of public health through three categories: open spaces, housing, and food.

***Open Spaces** – The following case studies seek to improve public health through the creation of open spaces such as parks and other pedestrian centered green space to increase recreational opportunities and foster socialization.*

Topic Title: Public Health

Resource Title: Minneapolis 2040

Resource Type: The Comprehensive Plan

Municipality: Minneapolis

State: Minnesota

Date of Adoption: 2020

Abstract: Minneapolis 2040

Minneapolis, Minnesota recognizes that there are social and economic disparities in its city and that “these gaps need to close if equity in health outcomes is to advance”. As a result, Minneapolis has centered 25 of 100 policies included in its comprehensive plan, [Minneapolis 2040](#), on the topic of public health. Among the policies for public health is Policy 81: Social Connectedness, which in part seeks to ensure public open spaces and encourage development of multi-family housing. According to the “[Implementation – Land Use Regulations](#)” page on the Minneapolis 2040 website, Minneapolis 2040 was created “with a focus on guiding public and private investment in the built, natural, and economic environment”. The city has been working to adopt the policies of Minneapolis 2040 and has made progress through creating new zoning districts. This is exemplified in [Chapter 530 Zoning Districts](#) of the Minneapolis Municipal Code, through which the city has adopted “fifteen new primary zoning districts” that “align with the future land use categories outlined in Minneapolis 2040” as explained on the “[Adopted Zoning Ordinance Chapters – Chapter 530 Zoning Districts](#)” page of the Minneapolis 2040 website. These “primary zoning districts” include Urban Neighborhood Districts, Residential Mixed-Use Districts, Commercial Mixed-Use Districts, Downtown Districts, Production Districts, and Transportation Districts.

Code Provisions:

[Minneapolis 2040 – Comprehensive Plan](#)

[Topic: Public Health](#)

Policy 81: Social Connectedness

A. Topic: Public Health

“To remain a world-class city of healthy people and thriving communities, the City of Minneapolis must provide all residents with equitable opportunities for healthy development and lifestyles. Healthy development is impacted by a myriad of social determinants and has considerable long-term ramifications. Inequities related to opportunities, conditions, policies and practices don’t impact just individuals in isolation. Instead, entire generations are impacted by these inequities – especially those rooted in race, place and income – in healthy development and lifestyle. Inequities in social and economic factors are key contributors to health disparities; ultimately, these gaps need to

close if equity in health outcomes is to advance. Social and economic disparities underpin health disparities from premature death rates to access to healthy food and from healthy youth development to housing stability.”

B. Policy 81: Social Connectedness

“Social connectivity is incredibly important in creating and maintaining the relationships that make our communities stronger and more resilient. Through programs and the design of community spaces, including parks, community and youth centers, new buildings and city streets, Minneapolis can foster environments to increase social connectedness, helping to improve individual health and resilience and leading to stronger, more engaged communities and greater involvement in City decision-making.”

C. Policy 81 Action Steps

“The City will seek to accomplish the following action steps to expand and promote opportunities for all residents to connect socially and participate fully in the vitality of their community.

- a. Actively build the community’s capacity to strengthen authentic engagement through neighborhood associations and City advisory committees and to facilitate meaningful resident, business owner and property owner input into City policies, programs and procedures.
- b. Create new avenues to facilitate meaningful engagement with underrepresented and vulnerable communities that are culturally accessible.
- c. Expand activity and participatory arts programs for older adults, extracurricular activities for youth social engagement, youth peer mentoring and intergenerational mentoring.
- d. Ensure safe and welcoming community spaces for all, including parks, community and youth centers, and city streets and rights of way, located in all areas of the city.
- e. Ensure integrated community centers that provide space for recreational and educational programming, counseling and support services, and socialization.
- f. Support and encourage the expansion of public events that bring communities together in public and private spaces.
- g. Expand the use of social media to share information and encourage collaboration and civic engagement.
- h. Encourage development of intergenerational single-family homes and multi-family housing.
- i. Encourage the development and implementation of transportation and wayfinding programs that further enhance the connectedness of Minneapolis tourism assets, including hospitality, local businesses, event centers and other destinations.

- j. Evaluate community engagement strategies on an ongoing basis to ensure all communities are reached.”

Progress on implementation of Minneapolis 2040 into the city’s municipal code:

Implementation Chapter of Minneapolis 2040

Topic Title: Public Health

Resource Title: Open Space Districts

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Town of Apple Valley

State: California

Date of Adoption: 2025

Abstract: Open Space Districts

The Town of Apple Valley, CA, has included Open Space Districts as part of its [Development Code](#) in accordance with the town's [General Plan](#). The Open Space Districts are divided into two categories: the Conservation Open Space District (OS-C) and the Recreation Open Space District (OS-R). The OS-C district seeks to preserve the natural resources and aesthetic beauty of the town. The OS-R district "is primarily intended for privately owned lands" and seeks to "serve the recreational and social interaction needs of the Town residents of all ages, economic situations, and physical conditions." Among the objectives of these Open Space Districts are to preserve "the integrity, function, productivity, and long-term viability of environmentally sensitive habitats and significant geological features within the Town"; to provide "recreational facilities to meet the needs of all segments of the community for recreational activities, relaxation, and social interaction"; to provide "pedestrian, jogging, equestrian, and bicycle trails as linkages between open space and recreational facilities within the Town"; and to support "regional efforts to control air pollution in order to minimize public health hazards."

Code Provisions:

Town of Apple Valley, California Municipal Code

[Title 9 – Development Code](#)

[Chapter 9.55 - Open Space Districts](#)

A. Purpose and General Plan Consistency

"The purpose of this Chapter is to implement the Open Space/Conservation Element of the General Plan, to protect areas designated for public and private uses related to open space and recreation, to preserve and protect these areas as a limited valuable natural resource, and to identify, classify and protect lands the unrestricted use of which, might constitute a hazard to the public health, safety and welfare and the aesthetic value of the community. Open space areas include Bell Mountain, Fairview Mountain, the Apple Valley Country Club, the Mojave River, the knolls, any significant rock outcroppings, and any slopes of fifteen (15) percent or greater. Also included are flood control channels, groundwater percolation basins, and recreational facilities such as parks and recreation trails."

B. Objectives

“The following are objectives of the Open Space Districts:

1. The conservation and protection of natural resources within the Town;
2. The preservation of significant mature native trees, native vegetation, significant natural landforms, and wildlife habitat within the Town;
3. The preservation of the integrity, function, productivity and long term viability of environmentally sensitive habitats and significant geological features within the Town;
4. The promotion and encouragement of energy efficiency and the use of renewable energy resources;
5. The encouragement and support for the preservation of historic, cultural and archaeological resources within the Town;
6. The emphasis of the importance of the maintenance of, and access to, open space and recreational resources within the Town;
7. The provision of recreational facilities to meet the needs of all segments of the community for recreational activities, relaxation and social interaction;
8. The provision of pedestrian, jogging, equestrian and bicycle trails as linkages between open space and recreational facilities within the Town;
9. The minimization of the generation of air pollutants from projected growth and the support of regional efforts to control air pollution in order to minimize public health hazards;
10. The promotion of land use decisions which ensure, to the greatest extent possible, compatibility between mineral resource extraction and adjacent land uses.”

C. Conservation Open Space District (OS-C)

“The purpose of the OS-C district is to protect and conserve significant natural and visual resources within the Town, and to protect the public health, safety and welfare by establishing regulations for those areas set aside for open spaces. In general, lands in the OS-C district contains environmental conditions that have significant constraints on development, or are scenic assets to the community, or are essential in establishing and maintaining Town's image when left undisturbed. The OS-C district is intended to:

1. Conserve significant natural features and open spaces such as major rock outcroppings and boulder fields, major ridges and peaks, fifteen (15) percent and greater slopes of mountains and knolls, prime wash habitats and native vegetation;
2. Conserve the character of the natural desert landscape and provide opportunities for passive recreational uses such as hiking, horseback riding, bicycling, and enjoyment of the natural desert setting;
3. Assure the continued existence of adequate wildlife habitat and foster the free movement of wildlife within the desert;

4. Promote a continued economic benefit to the community by protecting natural open space areas for the visual and recreational enjoyment of residents and visitors alike;
5. Provide a mechanism for recognizing and protecting private and public lands that have been designated for conservation in the Town General Plan."

D. Recreation Open Space District (OS-R)

"The OS-R district is primarily intended for privately owned lands that provide a range of active recreational opportunities within the community. These active recreational opportunities are meant to serve the recreational and social interaction needs of the Town residents of all ages, economic situations, and physical conditions. A limited number of publicly owned lands may also be included, subject to the approval of the Town Council. The OS-R district is intended to:

1. Preserve open space for the conservation of natural resources;
2. Maintain the natural desert character of the land while providing for compatible on-site recreational uses;
3. Provide public or private commercial active recreational uses and activities on either publicly or privately owned land within the community;
4. Promote land use compatibility with existing or planned residential, commercial, manufacturing and open space uses;
5. Encourage in-fill active recreational land uses which provide a range of opportunities within the community that serve the recreational and social interaction needs of the Town residents of all ages, economic situations and physical conditions;
6. Provide for the conservation and preservation of environmentally significant physical and cultural resources;
7. Provide for recreational opportunities within planned communities and planned residential developments;
8. Provide for associated building construction and development that is sensitive to existing and planned land uses on the same parcel and on surrounding properties."

Topic Title: Public Health

Resource Title: Park Design Requirements: Neighborhood and Linear Parks and Connections to Park

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Town of Prosper

State: Texas

Date of Adoption: 2025

Abstract: Park Design Requirements: Neighborhood and Linear Parks and Connections to Park

The “vision” of the Town of Prosper, Texas’ [Parks, Recreation, and Open Space Master Plan](#) is “...to create a happy, vibrant, active, healthy, and engaged community where residents of all ages can live, learn, work, and play.” In accordance with this plan, the Town of Prosper has included [park design requirements](#) as part of its [Subdivision Design Standards](#). These park design requirements apply to “all new residential development within the town for which a final plat or preliminary plat is required to be submitted to the town for approval.” Under these requirements, parks “must be easy to access and open to public view to benefit area development, enhance the visual character of the town, protect public safety, and minimize conflict with adjacent land uses.” Standards for “designing parks and adjacent development” in these areas include “[w]here physically feasible,” bordering parks by “streets, or other public uses (e.g.. a school, library, recreation center”); not allowing designs for proposed subdivisions adjacent to a park to “restrict reasonable access to the park from other area subdivision”; and for a hike and bike trail/park, “[t]he developer shall install a hike and bike trail connection from the street to the hike and bike trail/park prior to final acceptance of the subdivision. This trail must be blocked from motor vehicle traffic.” Requiring easy and safe public access to parks enhances health equity by ensuring that all members of the community have the opportunity to take part in recreational activities.

Code Provisions:

[Ch 10 Art 03 Div 6 Subdivision Design Standards](#)

[§10.03.150 Park land designs, dedications, and fees.](#)

[§10.03.150\(d\) Park design requirements: neighborhood and linear parks and connections to park.](#)

A. Purpose

This section is intended to meet the goals and objectives of the Parks, Recreation, and Open Space Master Plan to meet the additional needs created by new residential development.

B. Scope

The provisions of this section shall apply to all new residential development within the town for which a final plat or preliminary plat is required to be submitted to the town for approval.”

C. Exemptions

The provisions of this section shall not apply to the following:

- (1) Senior living facilities and senior care facilities, including assisted living facilities, senior congregate care facilities, memory care facilities and nursing homes. However, independent living and retirement communities or age-restricted housing developments shall be subject to the provisions of this section.

D. Park design requirements: neighborhood and linear parks and connections to park

- (1) This § 10.03.150(d) shall not apply to major creeks as set forth in § 10.03.145 unless otherwise noted.
- (2) Parks must be easy to access and open to public view to benefit area development, enhance the visual character of the town, protect public safety and minimize conflict with adjacent land uses.
- (3) The following standards shall be used in designing parks and adjacent development:
 - a. Where physically feasible, parks shall be bounded by streets, or by other public uses (e.g. a school, library, recreation center).
 - b. Where residential lots directly abut a park, lots must be oriented to side and not back to the park. In this instance, cul-de-sac and looped streets must be used to access the lots and park.

Figure 6: Park Design

- c. "Residential lots may back to a park only when the site's physical character (e.g., shape, topography, drainage) does not reasonably permit an alternative design or the layout of the subdivision complements the use of the park (e.g., lots backing to a golf course). Lots backing to a park shall only be allowed upon a recommendation from the Director of Parks and Recreation and approval by the Commission.
- d. A proposed subdivision adjacent to a park may not be designed to restrict reasonable access to the park from other area subdivisions.
- e. Street connections to existing or future adjoining subdivisions may be required to provide reasonable access to parks.
- f. Alleys shall not abut a park.
- g. Public access to a park shall not be less than 50 feet at the curb and in width to the base floodplain and/or maintenance and/or access dedication and shall not be part of a residential lot. The developer shall install a hike and bike trail connection from the street to the hike and bike trail/park prior to final acceptance of the subdivision. This trail must be blocked from motor vehicle traffic. However, the developer may request to escrow funds for the contracted amount prior to final acceptance of the subdivision with town approval. The escrow amount will remain in place until the trail has been completed and accepted by the town.
- h. A 20 foot level surface shall be provided for all public hike and bike trails. The 20 foot wide level surface can be provided within and/or outside of

the base floodplain and/or access dedication. The parkway for the public street may count towards the 20 foot wide level surface.

- i. All proposed hike and bike trails shall be shown on the preliminary plat. The Parks and Recreation Department shall make the final determination of the placement of the public hike and bike trail at the time of the final plat.
- j. No development shall interrupt future trail routes or otherwise hinder efficient public access to or from an existing or future planned trail. Gated and other limited access developments shall be designed such that they facilitate, and do not impede, through public access, emergency ingress and egress, usage and enjoyment of public trails.
- k. Streets abutting a park shall be built in accordance with the Thoroughfare Plan, the standards of this ordinance and all other applicable construction standards and/or ordinances, as they exist or may be amended; however, the town may require any residential street built adjacent to a park to be constructed to collector street width to ensure access and prevent traffic congestion.
 - i. When park land is acquired, the town shall reserve sufficient land to provide the additional right-of-way required for an abutting collector size street, 60 feet of right-of-way, unless otherwise approved by the town.
 - ii. The proposed street alignment fronting on town parks is subject to town approval. Land owners shall also provide street access to all major creeks and/or access dedications."

Topic Title: Public Health

Resource Title: Alameda Point District

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: City of Alameda

State: California

Date of Adoption: 2022

Abstract: Alameda Point District

Alameda Municipal Code Section 30-4.24 establishes guidelines for the redevelopment of subdistricts within the former Naval Air Station. These new zoning requirements aim to promote public health by creating walkable, sustainable, and community-centered districts. By fostering walkable neighborhoods, reducing greenhouse gas emissions, and encouraging alternative transportation, the district supports public health through increased physical activity and improved environmental quality. Additionally, the economic revitalization goals enhance the social determinants of health by creating new job opportunities and fostering community engagement. Overall, the zoning code reflects a comprehensive effort to create a resilient, sustainable, and health-conscious community.

Code Provisions:

Alameda, California Municipal Code
[Chapter XXX – Development Regulations](#)
[Article I. – Zoning Districts and Regulations](#)
[Section 30-4.24- Alameda Point District](#)

A. Purpose

“This section provides regulations to facilitate and guide future development at Alameda Point consistent with the goals and objectives of the 1996 Naval Air Station (NAS) Alameda Community Reuse Plan, the City of Alameda General Plan, and:

- Create mixed-use transit oriented walkable districts that deemphasize the automobile and support alternative modes of transportation.
- Create sustainable districts that minimize greenhouse gas emissions, energy and water use, and maximize protection of the natural environment.”

B. Applicability

- “The regulations in this section are applicable to all properties within the Alameda Point Zoning District. In addition to these regulations, all new construction, alterations, and land use within the Alameda Point Zoning District must comply with...permit requirements.”

- “All new development and uses shall be reviewed for consistency with the 2014 Alameda Point Environmental Impact Report adopted Mitigation Monitoring and Reporting Program.”

C. Alameda Point Sub-district Purpose Descriptions

1. Waterfront Town Center:

This subdistrict’s “development standards are intended to create a pedestrian, bicycle, and transit supportive urban environment designed to de-emphasize the automobile and create a mixed-use environment that supports the emergence of a transit and pedestrian-friendly mixed-use waterfront neighborhood.”

2. Main Street Neighborhood:

“This sub-district provides lands for a variety of housing types with complementary small-scale neighborhood-serving retail, urban agriculture and parks uses, and a mix of residential densities. Development standards support development of a walkable, transit-friendly neighborhood with safe streets, adequate common open space areas, and site planning that complements the NAS Alameda Historic District Residential Subarea character-defining features. Use standards should support a diversity of household types, including supportive housing, assisted living, and a mix of neighborhood compatible uses, such as community gardens, childcare centers, urban farms, and other neighborhood supporting uses. Development in this district shall be consistent with the Main Street Neighborhood Specific Plan.”

3. Enterprise 1:

“Development standards are intended to create a pedestrian, bicycle, and transit supportive urban environment and ensure high quality, well designed buildings within walking distance of services, restaurants, public waterfront open spaces, and residential areas.”

4. Open Space:

Standards in this subdistrict “are intended to allow for a variety of public open space and compatible uses, such as museums, concessions and parking areas necessary for public use of these lands, in a manner that ensures the protection of

the natural environment. Residential, office, and non-visitor serving or non-maritime oriented commercial uses are not permitted in this sub-district.”

5. Nature Reserve/Government:

“Use of this area should preserve and protect the natural habitat in this area to the fullest extent possible, compatible with the protection of endangered species and other wildlife and plant life that may inhabit, make use of, or be permanently established within this area. Uses include seasonal public access, on-going management and monitoring and activities related to education and research consistent with federal requirements.”

D. Site Planning and Building Design Requirements

1. Building Orientation: “All new buildings shall be oriented toward the main adjacent public right-of-way (i.e., public street or public park) and shall provide a main public entrance with direct access to the public right-of-way.”
2. Pedestrian Orientation: Drive through lanes are prohibited, site improvements shall include bicycle racks, pedestrian pathways through parking areas, pedestrian lighting, and sidewalks and street trees on all streets adjacent to the property. Moreover, “ground floor windows adjacent to the public pedestrian right-of-way shall provide an unobstructed view into the building for a distance of at least five feet to animate the pedestrian experience.”
3. Setback Landscaping: “In cases where a front or side yard setback that faces a public street or public open space is provided, that setback area shall be landscaped or improved for public use. In the adaptive reuse sub-district, the landscape plan shall be consistent with the Cultural Landscape Guidelines. To protect the endangered species, no landscape materials may be planted in the open space sub-district lands located west of Saratoga Street that are capable of growing over twenty (20’) feet in height.”

Topic Title: Public Health

Resource Title: Gating and Greening Alleys Ordinance

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Baltimore City

State: Maryland

Date of Adoption: 2025

Abstract: Gating and Greening Alleys Ordinance

The City of Baltimore has incorporated [Subtitle 8A: Gating and Greening Alleys](#) into [Article 26: Surveys, Streets, and Highways](#) of its City Code, providing residents with the legal means to enhance these spaces for community engagement. The municipality explains the process in greater detail in the [Alley Gating and Alley Greening Process](#), found on the Baltimore City Department of Transportation's (DOT) [website](#). This ordinance allows for, and outlines, the process by which the DOT to receive, evaluate, and process applications for alley gating and greening. Alley gating involves restricting access with locked gates, helping to reduce traffic, noise, littering, and loitering, thereby fostering a more peaceful urban environment. Alley greening allows residents to convert alleys into green spaces, rendering them inaccessible to vehicles. According to the Baltimore Department of Transportation, the city has [approximately 600 miles of alleys](#). This ordinance empowers residents to revitalize these often-overlooked areas, promoting community connection and sustainability, and enhancing public health, safety, and welfare.

Code Provisions:

Baltimore City Code
[Article 26: Surveys, Streets, and Highways](#)
[Subtitle 8A: Gating and Greening Alleys](#)

A. § 8A-1. Definitions.

“(a) *In general.*

In this subtitle, the following terms have the meanings indicated.

(b) *Abandoned property.*

"Abandoned property" means:

(1) an unoccupied structure or vacant lot on which taxes are in arrears for at least 2 years; or

(2) a building that:

(i) is unoccupied by an owner or tenant;

(ii) is unfit for habitation;

(iii) has deteriorated to the point at which:

A. it is structurally unsound; or

B. the cost of rehabilitating the building would significantly exceed the building's post-rehabilitation market value; and

(iv) has been the subject of a violation notice or order from the City that requires the owner to:

- A. rehabilitate the building to conform to minimum code habitability requirements; or
- B. demolish the building for health and safety reasons.

(c) *Department.*

"Department" means the Department of Transportation.

(d) *Director.*

"Director" or "Director of Transportation" means the Director of the Department of Transportation or the Director's designee.

(e) *Greening.*

(1) "Greening" means any alteration to an alley, beyond mere gating, that newly restricts vehicular access to or in the alley.

(2) "Greening" includes, but is not limited to, the installation of a fixed object, plant, or tree that newly restricts vehicular access to or in the alley."

B. § 8A-4. Scope; General standards.

"(a) Scope of subtitle.

This subtitle governs the procedures for gating, greening, and leasing alleys under the authority of City Charter Article II, § 35(e) and (f).

(b) Standards for authorizing gating and greening.

The Director of Transportation may authorize the gating and, if applicable, the greening of an alley if, on petition, public notice, and hearing as provided in this subtitle, the Director determines that:

(1) the alley is no longer needed for through pedestrian or vehicular traffic;

(2) **the gating and, if applicable, the greening will promote the public health, safety, or welfare;** and

(3) the majority of the structures abutting the alley:

(i) are residential; or

(ii) contain, above a non-residential ground floor, 1 or more upper stories that, **as allowed by the applicable Use Table of the Baltimore City Zoning Code**, are being used or are designed and intended to be used as residential dwellings."

C. § 8A-5. Rules and regulations; Fees.

"(a) Rules and regulations.

Subject to Title 4 {"Administrative Procedure Act – Regulations"} of the City General Provisions Article, the Director of Transportation must adopt rules and regulations to carryout this subtitle.

(b) Fees.

The rules and regulations adopted under this subtitle may set reasonable fees to cover the costs incurred by the Department in processing a petition."

D. § 8A-7. Record of abutting owners.

“At the request of any person interested in the gating or greening of an alley, the Department of Transportation must provide that person with a list of the names and addresses, as then shown on the Department's records, of the owners of all properties abutting that alley.”

E. § 8A-8. Petition required.

“(a) *In general.*

To initiate a proceeding under this subtitle, a petition by abutting owners must be submitted to the Director of Transportation.

(b) *Scope of petition.*

The petition must specify whether it is for:

- (1) gating, but not greening, an alley;
- (2) gating and greening an alley; or (3) greening an alley for which gating already has been approved.

(c) *Accompanying statement and consents.*

The petition must be accompanied by:

- (1) a statement that specifies how the proposed gating and, if applicable, the proposed greening would promote the public health, safety, or welfare; and
- (2) the signed consents of abutting owners, as required by § 8A-9 {"Consents – Gating only"} or § 8A-10 {"Consents – Greening"} of this subtitle, as the case may be.

(d) *Forms and contents.*

Each petition and its accompanying statement and consents must be in the form and contain the information that the Director requires by rule or regulation.”

F. § 8A-9. Consents of abutting owners – Gating only.

“(a) *Required consents.*

A petition to gate, but not to green an alley must be accompanied by the signed consents of at least 75% of the owners of all abutting properties, not including abandoned properties.

(b) *Statement of diligent attempts.*

If 1 or more abutting owners has not consented in writing to the proposed gating, the petition must be accompanied by an affidavit, made under the penalties of perjury, that describes and substantiates diligent attempts made by the petitioners to obtain the consents of all of the owners of all abutting properties.”

G. § 8A-10. Consents of abutting owners – Greening.

“(a) *In general.*

Except as provided in subsection (b) of this section, a petition to gate and green an alley or a petition to green an alley for which gating already has been approved must be accompanied by the signed consents of 100% of the owners of all abutting properties.

(b) *Excepted properties.*

If 1 or more abutting properties are unoccupied or abandoned and, notwithstanding due diligence, their owners have not been found, the petition may still be filed and considered if:

- (1) the petition is accompanied by the signed consents of 100% of the owners of all occupied properties abutting the alley;
- (2) the properties for which signed consents have been obtained constitute at least 80% of all of the properties, not including any abandoned properties, abutting the alley; and
- (3) the petition is accompanied by an affidavit, made under the penalties of perjury, that:
 - (i) describes and substantiates diligent attempts made by the petitioners to obtain the consents of 100% of the owners of all unoccupied properties and abandoned properties abutting the alley; and
 - (ii) affirms that no owner of any abutting property has refused to sign a consent or otherwise is known to object to the petition."

H. § 8A-11. Reviews by Police and Fire Departments.

"(a) Referral by Director.

On receipt of a completed petition, the Director of Transportation must refer the petition to both the Police Commissioner and the Fire Marshall for their respective reviews and, within 30 days of the referral, submission of reports.

(b) Effect of failure to report.

If the Police Commissioner or the Fire Marshall fails to submit a report to the Director of Transportation within the 30-day submission period, that official is deemed to have no objections to the petition."

I. § 8A-12. Public hearing.

"(a) Director to schedule.

During the 30-day period for submission of reports under § 8A-11 {"Reviews by Police and Fire Departments"}, the Director of Transportation must:

- (1) determine whether the petition satisfies all legal requirements for a petition; and
- (2) if it does, schedule a public hearing to be held as soon as practicable after the determination and, in any event, within 30 days of that determination.

(b) Posting notice.

- (1) At least 10 days before the hearing, the petitioners must post notice of the hearing at each end of the alley.
- (2) The posted notice must be of the size and contain the information that the Director requires by rule or regulation.

(c) Mailed notice.

- (1) At least 10 days before the hearing, the petitioners must also mail notice of the hearing to the owners of all properties abutting the alley, as then shown on the Department's records.
- (2) The mailed notice must contain the information that the Director requires by rule or regulation."

J. § 8A-13. Decision.

“Within 30 days of the hearing, the Director of Transportation must:

- (1) issue a written decision on the petition; and
- (2) send a copy of the decision to the person designated for this purpose by the petitioners.”

K. § 8A-15. Required lease.

“(a) *In general.*

The approval of any petition to gate or green an alley is subject to the entry into a lease, in the form and on the terms approved by the Board of Estimates, between the City, as lessor, and a neighborhood association or other non-profit entity that consists of property owners whose properties abut the alley or otherwise represents the area in which the alley and its abutting properties are located, as lessee.

(b) *Terms and conditions.*

The lease must include, at a minimum, provisions to the following effect:

- (1) All plans for the design and construction of gates, for any sodding, seeding, pavement removal, or other landscaping of the alley, and, if within the scope of the approved petition, for any greening of the alley must be reviewed and approved by the Department of Public Works, by the Department of Transportation, and, if the alley is located within a historical and Architectural Preservation District or is on or adjacent to property included on the City's Landmark List or Special List, by the Commission for Historical and Architectural Preservation.
- (2) All costs related to the preparation of these plans, to the purchase, installation, and maintenance of gates, to sodding, seeding, pavement removal, or other landscaping of the alley, or, if within the scope of the approved petition, to any greening of the alley, and all costs related to general maintenance of the alley, including all fees for building, fire, or related permits, are at the lessee's expense.
- (3) If the approved petition is for gating, but not greening, the alley, the lessee may not cause or permit any greening of the alley or otherwise cause or permit any alteration to the alley, beyond mere gating, that would newly restrict vehicular access to or in the alley.
- (4) If the approved petition is for gating and greening the alley or for greening an alley for which gating already has been approved, no greening activities may be undertaken until the lessee has first entered into a developer's agreement with the Department.
- (5) Access to the alley must be available to the City's Police, Fire, Public Works, and Transportation Departments, to all other appropriate agencies of the City, and to all companies that have utilities lawfully located in the alley.
- (6) A Knox box must be placed on each gate for access by authorized vehicles and pedestrians.
- (7) No utilities in the alley may be disturbed or built upon, and all easements for utilities must be preserved.
- (8) If the Public Works Department, the Transportation Department, or their employees, agents, or contractors enter the alley for maintenance, repair, or replacement of City utilities, the Department:

(I) is responsible, on completion of its work, for restoring the alley to grade;
but

(ii) is not responsible for any other work in the alley or for any other costs incurred in restoring the alley.

(9) Nothing in the lease may affect or be construed to affect any person's private rights in the alley.

(10) The Director of Transportation may terminate the lease and may order or cause, at the lessee's expense, the removal of all gates and other obstructions and the alley's restoration if:

(I) at any time, the owners of two-thirds of the abutting properties, not including any abandoned properties, so request in writing;

(ii) at any time, the lessee is in default of any term of the lease and has failed to cure that default in accordance with the terms of the lease; or

(iii) after a public hearing, with prior notice as provided in the lease, the Director determines that:

A. the alley is needed for through pedestrian or vehicular traffic; or

B. the gating and, if applicable, the greening no longer promotes the public health, safety, or welfare."

Housing – The following case studies seek to improve public health through land use law that increases access to affordable housing and decreases pollution-related health risks in residential areas.

Topic Title: Public Health

Resource Title: Incentives for Affordable Housing Development

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Long Beach

State: California

Date of Adoption: 2025

Abstract: Incentives for Affordable Housing Development

Within the [Housing Element](#) of the City of Long Beach’s [General Plan](#), Long Beach recognizes that “[h]ousing is essential to people’s health, quality of life, and the economy,” and that “[s]upply and access to adequate and affordable housing continue to be one of the biggest challenges faced by communities across the state, including Long Beach, where we are currently experiencing record-high housing costs.” Long Beach further recognizes that “government regulations can have a significant impact on the development, improvement and affordability of housing” and explains that “Long Beach is committed to addressing governmental constraints through innovative and proactive land use planning and regulations.” Therefore, as part of the Housing Element of the General Plan, Long Beach has created Housing Element (HE) Policy 23, which seeks to “[o]ffer financial and/or regulatory incentives, such as density bonuses and fee reductions or waivers, where feasible, to reduce the costs and/or to remove impediments to developing affordable housing, particularly near transit.” As a result, through the enabling legislation of [Section 65915 of the California Government Code](#) which allows for incentives for affordable housing through density bonuses, Long Beach has included a chapter on incentives for affordable housing as part of its zoning regulations. This chapter “establishes a system of incentives to encourage developers to provide housing for very low-, low-, moderate-income, and senior households, pursuant to Section 65915 et seq. of the California Government Code. The incentive consists of a density bonus.”

Code Provisions:

Long Beach, California Municipal Code
Title 21 - Zoning
[Chapter 21.63 – Incentives for Affordable Housing](#)

A. Purposes

“This Chapter establishes a system of incentives to encourage developers to provide housing for very low, low income, moderate income, and senior households, pursuant to Section 65915 et seq. of the California Government Code. The incentive consists of a density bonus. (ORD-06-0045 § 1 (part), 2006: Ord. C-6822 § 20 (part), 1990: Ord. C-6533 § 1 (part), 1988)”

B. Qualification

“In order to qualify for a density bonus, a project must be a very low income, low income, moderate income condominium project as defined by the State of California, or a senior citizen housing project (as defined in Sections 51.2 and 51.3 of the California Civil Code). (ORD-06-0045 § 1 (part), 2006: Ord. C-6822 § 20 (part), 1990: Ord. C-6533 § 1 (part), 1988)”

C. Limitation

“Density bonuses shall not exceed the percentage as permitted by the State of California of maximum density allowed in the applicable zoning district. (ORD-06-0045 § 1 (part), 2006: Ord. C-6822 § 20 (part), 1990: Ord. C-6533 § 1 (part), 1988)”

D. Procedures

“The following procedural requirements shall be observed in reviewing and acting upon applications for density bonuses made pursuant to this Chapter:

- A. Application. An application for a density bonus shall be made in conjunction with other required applications for residential developments and shall be subject to the same procedures required by this Title and other applicable Sections of the Municipal Code.

(ORD-06-0045 § 1 (part), 2006: Ord. C-6822 § 20 (part), 1990: Ord. C-6533 § 1 (part), 1988)”

E. Development standards

“All residential projects granted a density bonus shall conform to the development standards of the applicable zoning district, except those standards regulating density or as waived according to Section 21.63.080 of this Chapter. (ORD-06-0045 § 1 (part), 2006: Ord. C-6822 § 20 (part), 1990: Ord. C-6533 § 1 (part), 1988)”

F. Maintenance of units

“In exchange for the density bonus, the developer shall guarantee the units will be maintained for very low income, low income, moderate income condominiums, and senior households for thirty (30) years. The guarantee shall be in the form of a deed restriction or other legally binding and enforceable document acceptable to the City Attorney. The document shall be recorded with the Los Angeles County Recorder prior to the issuance of a building permit. The applicant shall comply with the provisions of Chapter 21.60 of this Code for the maintenance of the units according to Housing Authority procedures. (ORD-06-0045 § 1 (part), 2006: Ord. C-6822 § 20 (part), 1990: Ord. C-6533 § 1 (part), 1988)”

G. Additional incentives

“In addition to the density bonus, the very low income, low income, moderate income condominiums, and senior units shall be exempt from the parks and recreation and transportation developer fees, if the developer is in compliance with the applicable exemption provisions of Sections 18.17.130, 18.18.120 and 18.18.140 of the Long Beach Municipal Code as they now exist or may later be amended. (ORD-06-0045 § 1 (part), 2006: Ord. C-7247 § 28, 1994: Ord. C-6822 § 20 (part), 1990)”

Topic Title: Public Health

Resource Title: Los Angeles, California Clean Up Green Up Initiative

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: City of Los Angeles

State: California

Date of Adoption: 2016

Abstract: Los Angeles, California Clean Up Green Up Initiative

The "Clean Up Green Up" (CUGU) ordinance establishes a Supplemental Use District in Boyle Heights, Pacoima/Sun Valley, and Wilmington to reduce health impacts from industrial land use, vehicle emissions, and freight corridors near sensitive area, such as homes and schools. It prioritizes stricter zoning regulations for pollution-heavy industries and requires compliance with enhanced development standards, including setbacks, landscaping, noise reduction, and the enclosure of emissions-producing activities. The ordinance also mandates administrative clearance for new projects, sets conditions for petroleum refineries, and increases public notification for certain developments. Overall, CUGU aims to create healthier communities by mitigating environmental risks from industrial and transportation-related activities. Through these measures, the CUGU District seeks to balance economic activity with environmental justice, prioritizing the health and well-being of communities historically burdened by industrial pollution.

Code Provisions:

Los Angeles, California Municipal Code

[Article 3 Specific Plan – Zoning Supplemental Use Districts](#)

[Section 13.18: “CUGU” Clean Up Green Up District](#)

A. [Purpose](#)

“This section sets forth procedures and standards for the establishment of the CUGU District. The purpose of the CUGU District is to reduce cumulative health impacts resulting from land uses including, but not limited to, concentrated industrial land use, on-road vehicle travel, and heavily freight-dominated transportation corridors, which are incompatible with the sensitive uses to which they are in close proximity, such as homes, schools and other sensitive uses.”

B. [Relationship to other Zoning Regulations](#)

“Wherever the provisions of the CUGU District conflict with any provisions of other Supplemental Use Districts, the underlying zone, or any other regulation, the more restrictive provision shall prevail.”

C. District Identification

“The provisions of this ordinance shall apply to all properties identified on the zoning map with a “CUGU” suffix on the zone classification. The CUGU District shall include all public and private land uses.”

D. Definitions

Provides **key terms** relevant to the ordinance, including:

- “Adjacent Property: A property next to, across the street or alley from, or having a common corner with the subject property.”
- “Abutting Property: A property sharing a parcel or lot line.”
- “Publicly Habitable Spaces: Any use containing one or more dwelling unit or guest room, as well as a school, park, recreation center, day care center, hospital, medical building and nursing home.”

E. Qualifying Criteria

Projects must meet **at least one** criterion from **both** of the following lists:

1. **Project Type:**

- **New Construction** – A **standalone** new building.
- **Major Improvement** – Renovations costing **over 50% of the building’s replacement value**.
- **Addition** – Expanding a building where work costs **over 50% of the site's replacement value**.
- **Change of Use** – Changing to a **pollution-heavy use** listed under "Subject Uses."

2. **Project Context:**

- Located **within 1,000 feet of a freeway or major state route**.
- A **publicly habitable space** next to a **Subject Use**.
- A **Subject Use** next to a **publicly habitable space**.
- Primary use of site is a Subject Use (Includes a list of what constitutes a Subject Use).

F. Development Regulations

Projects must follow **specific environmental and zoning standards**, such as:

1. **Subject Use Regulations:**

- **Site Planning:** Trash bins must be **gated and covered**.
- **Lighting:** “All outdoor lighting systems shall be directed away from the window of any residential uses and shall comply with the non-residential Light Pollution Reduction standards in the Green Building Code of this Code”

- Enclosure: “A use, material or equipment that emits or generates dust, smoke, gas, fumes, cinder or refuse matter shall be completely enclosed with mechanical ventilation to prevent fugitive emissions unless another regulatory agency requires natural ventilation. A stack, vent or flare is exempt from this enclosure requirement.”

2. **Subject Use Adjacent to Publicly Habitable Spaces:**

- **Signage:** “Any use adjacent to Publicly Habitable Spaces with commercial vehicles...shall post “No Idling” signage onsite at the back of the curb and adjacent to the entrance of at least one driveway where truck loading, staging or parking occurs.”
- **Distancing Requirements:** “Any new automobile dismantling yard, exhaust test station, automobile laundries (car wash), automotive repair, used auto retail sales, assembly of auto parts and accessories, tire shop, tire repair, and wholesale auto parts and accessory facilities are prohibited within 500 feet of a residential zone.”
- **Landscaping:** A landscaper shall select “trees or hedges low in water use, low in biogenic emissions, high in carbon and particulate matter filtration qualities, and retain foliage for most months of the year.... Non-drought tolerant trees and Palms shall be prohibited.”
- **Surface Parking Lot Designs:** “One tree for every 4 new parking spaces shall be planted within the surface parking lot...Parking spaces covered by solar carports functioning as shade structures are exempt from the calculation... The surface lot shall be graded to allow for ground water recharge into an unpaved planting area... that shall be in a concave design to receive runoff.”
- **Noise:** “An applicant shall submit to the Department of City Planning an acoustic evaluation report issued by a licensed noise consulting professional which identifies compliance options for noise mitigation. An applicant shall comply with the stated performance-based mitigation measures.”

3. **Publicly Habitable Spaces Adjacent to Subject Uses:**

- **Open Space Buffers:** New public spaces **must have physical barriers** separating them from polluting sites.
 - **Landscaping:** “Except for front yards, all required yards abutting a Subject Use shall be landscaped with...trees or hedges low in water use, low in biogenic emissions, high in carbon and particulate matter filtration qualities, and retain foliage for most months of the year.... Non-drought tolerant trees and Palms shall be prohibited.”

4. **Municipal Projects Adjacent to Freeway and State Route 47**

- **Signage:** “NOTICE: Air pollution studies show a strong link between the chronic exposure of populations to vehicle exhaust and particulate matter from major roads and freeways and elevated risk of adverse health impacts, particularly in sensitive populations such as young children and older adults. Areas located within 500 feet of the freeway are known to

experience the greatest concentration of ultrafine particulate matter and other pollutants implicated in asthma and other health conditions.”

G. [Issuance of Building Permits](#)

“For any Project within a CUGU District, the Department of Building and Safety shall not issue any permits, including, but not limited to, grading, shoring or building unless an Administrative Review, CUGU Adjustment, or CUGU Exception has been obtained pursuant to the applicable procedures in Section 13.18 G. of this Code.”

H. [Review Procedures for Projects within CUGU District](#)

1. **Application Process:**

- “An applicant who complies with the CUGU District regulations shall submit plans to the Director for an Administrative Review.”

2. **Administrative Clearance:**

- If a project meets **all** CUGU regulations, it **can be approved without further review**.

3. **Adjustments (Minor Deviations):**

- The **Director of Planning** can approve **small modifications (up to 20% changes)** if they do not undermine environmental protections.

4. **Exceptions (Major Deviations):**

- The **Area Planning Commission** can approve **larger exceptions** (e.g., not following a key regulation), but only if:
 - Strict enforcement would cause **hardship**.
 - The change **does not harm the environment or public health**.
 - The project remains **consistent with the intent of CUGU**.

[Clean Up Green Up Boundary Maps:](#)

[Green Zones Implementation Guide:](#)

Topic Title: Public Health

Resource Title: Enhanced Ventilation Required for Urban Infill Sensitive Use Developments

Resource Type: Public Health Chapters in Municipal Code

Municipality: San Francisco

State: California

Date of Adoption: 2008

Abstract: Enhanced Ventilation Required for Urban Infill Sensitive Use Developments

San Francisco has established an [Air Pollutant Exposure Zone and Map](#) and implemented an [Enhanced Ventilation Requirement](#) for all urban infill sensitive-use development within that zone. The goal of [Article 38](#) is to increase the availability of infill housing and other sensitive use developments in the city such as residences, daycares, and schools, while also minimizing the risk of air pollution-related health issues for facilities located within the [Air Pollutant Exposure Zone](#). Existing building ventilation and engineering technologies offer solutions to safeguard indoor environments from the intrusion of outdoor air pollutants. The Enhanced Ventilation Requirement obligates entities to proactively outline and work with a licensed mechanical engineer (or individual authorized by the Professional Engineers Act) to determine how the project will meet the standards of [Article 38](#). They must then submit the Enhanced Ventilation Proposal to the Director of the San Francisco Department of Public Health for review. For buildings that fall within the [Air Pollutant Exposure Zone](#), the required performance standards for the Enhanced Ventilation Proposals include placement of HVAC intake and the use of filtration systems that provide protection against particulate matter, equivalent to MERV 13 filtration. Furthermore, the code stipulates that buyers, lessees, and renters must be informed that the property is located in an area with significant air pollutant concentrations and that the building is equipped with an enhanced ventilation system.

Code Provisions:

San Francisco Health Code
[Article 38: Enhanced Ventilation Required for
Urban Infill Sensitive Use Developments](#)

A. Sec. 3803. Findings.

“(a) Scientific studies show that exposure to particulate matter from air pollution leads to significant human health problems, including: aggravated asthma; chronic bronchitis; reduced lung function; irregular heartbeat; heart attack; and premature death in people with heart or lung disease. Exposure to air pollutants that are carcinogens can also have significant human health consequences. For example, exposure to diesel exhaust is an established cause of lung cancer.

(b) Heart disease and stroke are the first and fourth leading causes of death in the U.S. respectively. Air pollution affects heart health and can trigger or contribute to heart attacks and strokes. One in three Americans has heart or blood vessel disease and is at higher risk from air pollution. Impacts on the lungs may take several forms. Short-term effects include deficits in lung function that can limit breathing, especially during exercise. Irritants from

air pollution may cause airway constriction or chest tightening that is uncomfortable or limiting to normal activity. These changes in lung function are sometimes accompanied by underlying lung tissue inflammation which over the long term may lead to chronic lung disease. Exposure to air pollutants may be a contributing factor to leading causes of death recorded for San Francisco's population (ischemic heart disease; lung, bronchus and tracheal cancers; cerebrovascular disease; chronic obstructive pulmonary disease; hypertensive heart disease and lower respiratory infection).

(c) Persons living in close proximity to air pollution sources, such as freeways or busy roadways, have poorer lung functions and are more susceptible to developing asthma and other respiratory problems, compared with persons living at a greater distance from such sources. The California Air Resources Board's 2005 Land Use Guidance document, "Air Quality and Land Use Handbook: A Community Health Perspective," reviewed traffic-related air pollution studies and found that particulate matter pollution levels decrease by about 70 percent at 500 feet from freeways and high-traffic roadways, defined as urban roads with 100,000 vehicles/day or rural roads with 50,000 vehicles/day.

(d) Proximity to sources of air pollution increases exposure, and proximity to sources is established to be more common for the poor and for certain ethnic minorities.

(e) Consequently, health vulnerability varies among neighborhoods and populations within San Francisco, as measured by population health records of air pollution-associated hospital discharges and emergency room visits, and non-accident mortality. Health vulnerable populations are likely to have more significant health consequences from air pollutant exposure compared to populations that are less vulnerable.

(f) Existing regulatory control measures, often focused on new stationary sources of emissions and average regional air pollution concentrations, are not sufficient to address all local sources of exposure or disparities in exposure.

(g) "Sensitive Use" buildings have the highest proportion of individuals who are most vulnerable to air pollutant exposures.

(h) Available technologies exist to protect sensitive uses from air pollution health effects. Available and accepted air pollution modeling technology allows for the estimation of certain air pollutant concentrations for individual land parcels. Furthermore, available building ventilation and engineering technologies provide mechanisms to protect indoor environments from the infiltration of ambient air pollutants."

B. Sec. 3803. Purposes and Goals.

"(a) The purpose of this Article 38 is to protect the public health and welfare by establishing an Air Pollutant Exposure Zone and imposing an enhanced ventilation requirement for all urban infill sensitive use development within the Air Pollutant Exposure Zone.

(b) The goals of this Article 38 are to maintain and increase the stock of infill housing and other sensitive use development in the City while reducing the risk to human health from air pollutants among occupants of, and visitors to, buildings in the Air Pollutant Exposure Zone."

C. Sec. 3805. Applicability of Article.

"This [Article 38](#) shall apply to Sensitive Use buildings located on a site identified as within the Air Pollutant Exposure Zone that are either:

- (a) Newly constructed; or
- (b) Undergoing a "Major Alteration to Existing Building" as defined by the San Francisco [Green Building Code](#); or
- (c) The subject of an application for a Planning Department-permitted Change of Use."

D. Sec. 3806. Air Pollutant Exposure Zone and Air Pollutant Exposure Zone Map:

"(a) The Director shall create an Air Pollutant Exposure Zone Map according to Rules and Regulations as authorized by Section [3809](#). The Air Pollutant Exposure Zone Map shall depict all locations in the City where the estimated cumulative PM_{2.5} concentration is greater than 10 µg/m³ or where the estimated cumulative excess risk of cancer from air pollutants resulting from lifetime (70 year) exposure is greater than 100 in a million. Additionally, the Air Pollutant Exposure Zone Map shall include all locations within 500 feet of any Freeway, if those locations were not otherwise captured by modeling estimates. Within Health Vulnerable Locations, the Air Pollutant Exposure Zone Map shall depict all locations where the estimated cumulative PM_{2.5} concentration is greater than 9 µg/m³ or where the estimated cumulative excess risk of cancer from air pollutants resulting from lifetime (70 year) exposure is greater than 90 in a million. The Director shall update the Air Pollutant Exposure Zone Map to identify new sources, updated pollutant standards, additional pollutants and standards for those pollutants, and updated methodologies in accordance with Section 3809 and the accompanying Rules and Regulations for this [Article 38](#).

(b) The Director shall, at least once every five years, update the Rules and Regulations governing creation of the Air Pollutant Exposure Zone Map to account for changes in information including, but not limited, to:

- (1) Information available to estimate air pollutants of health concern;
- (2) Information available to determine Health Vulnerable Locations; and
- (3) Information that may affect delineation of the Air Pollutant Exposure Zone, including, but not limited to:
 - (A) Construction, expansion or modification of major roadways;
 - (B) Changes in traffic patterns in the City's roadway system;
 - (C) Changes in area sources or siting of industrial or commercial sources of air pollution; and
 - (D) Climatic factors for which there is evidence of changes to air quality.

(c) The Director shall post the Air Pollutant Exposure Zone Map on the Department's website, and make paper copies of the map available to the public upon request.

(d) In creating and updating the Air Pollutant Exposure Zone Map, the Director shall follow the procedures specified in Section [3809](#).

(e) The Air Pollutant Exposure Zone Map that is operative as of the effective date of Ordinance No. [224-14](#) amending this [Article 38](#), is on file with the Clerk of the Board of Supervisors in File No. 140806."

E. Sec. 3807. Enhanced Ventilation Requirement.

"(a) Any person or entity to whom this [Article 38](#) applies, as defined in Section 3805, shall submit to the Director an Enhanced Ventilation Proposal, prepared by, or under the supervision of, a licensed mechanical engineer or other individual authorized by the California Business and Professions Code Sections 6700-6799 (Professional Engineers Act) to design mechanical ventilation systems that meet the requirements of this [Article 38](#) and San Francisco [Building Code](#) Section 1203.5. An Enhanced Ventilation Proposal shall include the name, title and license number of the person submitting such proposal.

(b) The Enhanced Ventilation Proposal shall explain how the project will achieve the standards mandated by this [Article 38](#) and accompanying the Rules and Regulations as described and updated according to Section 3809, San Francisco [Building Code](#) Section 1203.5, and any relevant amendments or revisions thereto. The Enhanced Ventilation Proposal shall include a statement signed by the person who prepared it, in accordance with the requirements of Section 3807(a), certifying that in his or her judgment the ventilation system proposed will be capable of achieving the protection from particulate matter (PM_{2.5}) equivalent to that associated with MERV 13 filtration (as defined by ASHRAE standard 52.2). In updates to the Rules and Regulations, the Director may specify additional or alternative protective equivalents as technology and research dictate.

(c) The Director shall review the Enhanced Ventilation Proposal and may require additional modification or justification prior to the Director's approval. The Director shall issue a letter to the Department of Building Inspection Permit Services Energy/Mechanical Plan Review Section identifying and attaching the letter describing the approved Enhanced Ventilation Proposal.

(d) Building permit documents submitted to the Department of Building Inspection shall incorporate all designs and details necessary for the construction of the approved Enhanced Ventilation system. The Department of Building Inspection shall review submitted plans to assure compliance with the Director-approved Enhanced Ventilation proposal and shall not issue permits for the construction, installation, or modification of the Enhanced Ventilation systems unless it is in compliance with the approved proposal."

F. Sec. 3809. Rules and Regulations.

"(d) Rules and Regulations shall, at a minimum, meet the following standards and criteria:

(1) The criteria used for the definition of "Health Vulnerable Locations" shall be at least as health-protective as that of the Bay Area Air Quality Management District (BAAQMD) methodology. BAAQMD methodology defines those zip codes in San Francisco in the worst quintile of Bay Area health vulnerability scores based on two years of statewide

hospitalization and emergency room visit records, and estimated costs, for the following air pollution related conditions per zip code: Chronic Obstructive Pulmonary Disease (COPD) Hospital Admissions, Pneumonia Hospital Admissions, Myocardial Infarction (MI, Heart Attack) Hospital Admissions and Emergency Room Visits, Cardiovascular Hospital Admissions (less MI), Asthma Emergency Hospital Admissions and Emergency Room Visits, Asthma Hospital Admissions, Hospital Admissions for Respiratory Diseases, combined with the non-accident mortality rate per zip code. For San Francisco, based on 2009-2011 health records, the zip codes in the worst quintile of Bay Area health vulnerability scores are 94102, 94103, 94105, 94124, and 94130. In updates to the Rules and Regulations, the Director may modify the methodology to identify Health Vulnerable Locations as required to ensure the Air Pollutant Exposure Zone Map is consistent with current scientific evidence.

(2) The criteria for creating and updating the Air Pollutant Exposure Zone Map and the models underlying this map shall include, but not be limited to:

(A) Identification of parcels with lifetime excess cancer risk due to air pollution greater than 100 cases per million population.

(B) Identification of parcels in Health Vulnerable Locations with lifetime excess cancer risk due to air pollution greater than 90 cases per million population.

(C) Identification of parcels where $PM_{2.5}$ concentrations are greater than $10 \mu\text{g}/\text{m}^3$ (including ambient levels).

(D) Identification of parcels in Health Vulnerable Locations where $PM_{2.5}$ concentrations are greater than $9 \mu\text{g}/\text{m}^3$ (including ambient levels).

(E) Identification of parcels within 500 feet of any Freeway, if those locations were not otherwise captured by modeling estimates.

(F) New research findings, particularly quantification of risk, that change the Director's knowledge of how particulate matter and any other air pollutants affect public health.

(3) Required performance standards for Enhanced Ventilation Proposals must include the following minimum criteria:

(A) Location of air intake for HVAC (Heating, Ventilation and Air Conditioning systems) away from air pollution sources;

(B) Specification of filtration certified by the ASHRAE capable of achieving protection from particulate matter ($PM_{2.5}$) equivalent to that associated with a MERV 13 filtration (as defined by ASHRAE standard 52.2).

(4) Additional criteria for Enhanced Ventilation Proposals may include the following project design information:

(A) Number of air exchanges per hour of outside filtered air;

(B) Building materials and/or design that limit unfiltered infiltration of outside air, such as air sealing or maintenance of positive pressure within the building interior;

(C) Location of operable windows oriented away from air pollutant sources, to the extent feasible;

(D) Other building design criteria that may reduce air pollution exposure to residents;

(E) Other combinations of technologies and designs to achieve the goals of this Article.

(5) Certification and/or licensing requirements for the persons who prepare the Enhanced Ventilation Proposals pursuant to Section 3807. The Enhanced Ventilation Proposal must be prepared by, or under the responsible charge of a person who is authorized by California Business and Professions Code Sections 6700-6799 (Professional Engineers Act), or any successor provisions, to design mechanical ventilation systems that meet the requirements of this [Article 38](#) and San Francisco [Building Code](#) Section 1203.5 and either:

(A) a licensed mechanical engineer, or

(B) an individual authorized by California Business and Professions Code Sections 6700-6799 to design mechanical ventilation systems that meet the requirements of this [Article 38](#) and San Francisco [Building Code](#) Section 1203.5.

(6) Minimum criteria for maintenance and disclosure, including but not limited to:

(A) Minimum standards for proper maintenance, and

(B) Disclosure to buyers, lessees and renters that the building is located in an area with substantial concentrations of air pollutants, and that the building includes an enhanced ventilation system information about the proper use of the installed enhanced ventilation system.

(e) The Director may specify additional or alternative equivalents as justified by accepted research including:

(1) addition or substitution of risk factor criteria;

(2) inclusion of other pollutants such as Nitrogen Dioxide.

(f) Within Health Vulnerable Locations, the Director shall specify more protective requirements in the Air Pollutant Exposure Zones.

(g) The Director may grant variances to this [Article 38](#), on a case-by-case”

[Link to Air Pollutant Exposure Zone Map](#)

***Food** – The following case studies exhibit land use law that seeks to improve public health through increasing equitable access to healthy foods.*

Topic Title: Public Health

Resource Title: Athens-Clarke County, GA – A Community Garden and the Keeping of Chickens Permissible in All Zoning Districts

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Athens-Clarke County

State: Georgia

Date of Adoption: 2024

Abstract: Athens-Clarke County, GA – A Community Garden and the Keeping of Chickens Permissible in All Zoning Districts

Athens-Clarke County, GA recognizes in its [2023 Comprehensive Plan](#) that [v]arious areas” in the county “have been identified as ‘food deserts,’ where there is a lack of healthy, fresh food within reasonable distance to residences.” As a result, one of the plan’s goals is that “[a]griculture remains a viable and productive component of the local economy by encouraging innovative community agricultural programs and leveraging use of land for agricultural production, alternative agricultural enterprises, and ecotourism”. As part of its strategy to implement this goal, Athens-Clarke County seeks to “[a]ctively encourage and identify ways to advance local agriculture and food initiatives, including Eastside Farmer’s Market, innovative community gardens, and efforts to increase access to food and eliminate food deserts.”

In compliance with the comprehensive plan, Athens-Clarke County has adopted community garden and urban agriculture regulations as part of its [Title 9 – Zoning and Development Standards](#). These regulations permit a community garden and the keeping of chickens in all zoning districts, thereby increasing access to healthy food regardless of socioeconomic status. In order to establish community gardens, a permit must first be obtained. Additionally, allowing up to three sales events at the community garden per year, a “temporary use permit for the sale of flowers, vegetables or other crops grown on the property is required for such sales events.” While the keeping of chickens is allowed in all zoning districts, private neighborhood covenants prohibiting or restricting chickens still apply.

Code Provisions:

[Title 9 – Zoning and Development Standards](#)

[Article I. Zoning](#)

[Chapter 9.15. – General Regulations](#)

[Sec. 9-15-23. – Community garden](#)

[Sec. 9-15-25. - Urban agriculture](#)

A. Sec. 9-15-23. - Community garden.

“The following provisions apply to a community garden:

- A. *Permitted zoning districts.* A community garden is a permitted use in all zoning districts.
- B. *Size limitation.* A community garden may not be greater than one acre in size, measured as the area enclosing the garden and all ancillary uses.
- C. *Front setback.* Crops shall be set back a minimum of ten feet from the front property line, or comply with the minimum front yard setback of the applicable zoning district, whichever is greater.
- D. *Structures.*
 - 1. Buildings and structures shall not be located closer than 50 feet to any property line.
 - 2. In RS, RM and C-D districts, no more than three buildings and/or structures are permitted, which may not exceed a combined 250 square feet in floor area. In all other districts, the combined square footage of all structures shall not exceed ten percent of the minimum lot area per the applicable zoning district.
- E. *Fences.* Fences shall comply with the standards of section 9-15-1 of this title.
- F. *Livestock.* Livestock is subject to the standards and restrictions of an agriculture use in the applicable zoning district.
- G. *On-site sales.* A maximum of three sales events may be held on property on which a community garden is located each calendar year. A temporary use permit for the sale of flowers, vegetables or other crops grown on the property is required for such sales events. Each event may not exceed two days in duration. A single temporary use permit may be issued to cover multiple events scheduled in the same calendar year.
- H. *Signs.* A community garden in a residential zone shall be restricted to one identification sign not exceeding eight square feet and four feet in height, and set back a minimum of five feet from the front and side property lines. In all other zoning districts, signs shall comply with the restrictive standards for a permanent sign in the applicable zoning district per Chapter 7-4 of the Code of Athens-Clarke County, Georgia.
- I. *Parking.* Any provided on-site parking shall comply with the standards of Chapter 9-30 of this Title.
- J. *Storage and screening.* Trash storage areas, mechanical equipment, compost and mulch piles, and similar areas shall be screened so that they are not visible from the street or from adjacent properties.
- K. *Maintenance.* A community garden shall be maintained in a manner that provides regular maintenance of all plants, groundcovers and turf; removal of the exposed parts of dead plant material from the property on which a community garden is located, or to on-site compost areas after the harvesting of edible, ornamental,

plantable, or otherwise useful materials; and proper maintenance of all structures and parking areas.

- L. *Initial permit application fee and annual permit renewal fees.* It shall be unlawful for a community garden to be established without first obtaining a permit for such use. The initial application fee for such permit shall be \$50.00. For each year thereafter that a community garden is in active operation, an annual renewal fee of \$10.00 shall be paid no later than January 31st of that year.

(Ord. of 2-4-2014, § 8)”

B. Sec. 9-15-25. - Urban agriculture.

“A. *Keeping Chickens.* The following provisions apply to the keeping of chickens:

1. Permitted zoning districts.

a. The keeping of chickens is permitted in all zoning districts. Nothing herein shall abrogate any prohibitions or restrictions contained in private neighborhood covenants, such covenants not being subject to investigation or enforcement by Athens-Clarke County.

2. Number and type of chickens allowed.

- a. No more than six chickens are allowed per parcel.
b. Roosters and any other crowing chickens are prohibited.

3. Noncommercial use only.

a. Chickens, chicken products and/or by-products shall not be sold on the property.

4. Enclosures.

- a. A covered enclosure must be provided for roosting and protection. Chicken coops, chicken houses, and/or roosting structures shall be situated in the rear yard. Chickens must at all times be kept within a fenced or enclosed area and no person shall fail to prevent his or her chickens from straying from the property of the owner or keeper, or going upon the property of any other person, or upon any public rights-of-way.
- b. All chicken houses and enclosures must be maintained in a clean and sanitary condition at all times, must be positioned at least 10 feet from the property line in all RM zones and RS-5 zones, 16 feet from the property line in RS-8 zones, 30 feet from the property line in RS-15 zones, and 50 feet from the property line in RS-25 and RS-40 zones, and in all cases such structures must be positioned at least 20 feet from residential structures on neighboring parcels. In no case shall a resident be provided with less than a 10 foot by 10 foot opportunity for a structure at the center of the back yard.
- c. Structures greater than 25 square feet will be considered an accessory structure and shall comply with the standards of section 9-15-12 of this title.

d. Fences shall comply with the standards of section 9-15-1 of this title.

5. Predators, rodents, insects and parasites.

a. Feed must be stored in a fully enclosed, rodent-proof container. (Ord. of 5-2015(2), § 1)"

Topic Title: Public Health

Resource Title: Watsonville Healthy Eating Options

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: City of Watsonville

State: California

Date of Adoption: 2024

Abstract: Watsonville Healthy Eating Options

The [Healthy Eating Options Ordinance](#), enacted by the City of Watsonville, aims to improve community health by promoting nutritious food choices in restaurants. It establishes a point-based program that encourages existing restaurants to voluntarily adopt healthy menu practices and requires new restaurants to meet a minimum threshold of healthy food options to obtain building permits. Restaurants can earn recognition through awards such as the Award Certificate and the Golden Carrot Award based on their compliance with criteria like offering fruits and vegetables, using low-fat preparations, practicing portion control, and providing calorie information. While participation is optional for existing establishments, new restaurants and major remodels must achieve at least six points from a 19-point checklist to proceed with development. The ordinance exempts minor modifications, historic structures, and existing restaurants that choose not to participate. Compliance is overseen by the Community Development Department, reinforcing the City's commitment to fostering healthier eating habits and reducing diet-related health issues through local policy.

Code Provisions:

[Watsonville, California Municipal Code](#)

[Title 14 Zoning](#)

[Chapter 14-29 Healthy Eating Options](#)

A. 14-29.020 Purpose and Findings:

- “The City finds that promoting healthy eating options at new and existing restaurants is an effective way to reduce health issues related to unhealthy eating habits, such as diabetes, heart disease, and being overweight...This chapter is also intended to reward existing businesses that embrace the concept by establishing an award system in Table 1 of this chapter that recognizes restaurants with menus that emphasize healthy eating options.”
- “The second purpose is to require new restaurants to include a minimum of healthy eating options from Table 2 of this chapter in order to obtain enough points in Table 1 of this chapter to obtain a building permit.”
- “The City also finds that healthy eating decisions made by businesses in the City can result in significant cost savings to the residents of the City over the life of the restaurant by helping to reduce unhealthy eating habits in the City. The City also recognizes that it must lead by example in order to have the general populace follow

suit and therefore commits itself to the practice of healthy eating by offering healthy eating options in City-sponsored programs and events.”

B. 14-29.030 Definitions:

- “Award certificate: The City Council will prepare a resolution indicating that the restaurant has met the City’s healthy eating option criteria. As part of the award the business will be featured on the City’s Channel 70 programming for a month.”
- “Building permit: New and existing restaurants that are requesting City approval to authorize construction of a new restaurant or remodel of an existing restaurant must meet the minimum points listed in Table 1 of this chapter.”
- “Golden Carrot Award: The Go for Health! collaborative has an existing award program for restaurants that meet the point total listed in Table 2 of this chapter. This award will be prepared by the County and presented at the City Council. As part of the award the business will be featured on the City’s Channel 70 programming for two (2) months and will be featured in the high school’s newsletters to students.”

C. 14-29.050 Standards for Compliance

- “Existing restaurants are encouraged to participate in the Healthy Eating Options Program listed in Table 2 of this section by submitting an application and their menus to the Community Development Department to determine if they qualify for awards recognition listed in the program in Table 1 of this section.
- Applicants for a new restaurant in the City shall participate in the Healthy Eating Options Program. In order to obtain a building permit for any new restaurant, addition or substantial remodel in excess of those exempted in Section 14-29.060, each project must include elements in program from the healthy food plan option checklist (Table 2 of this section) equal to or exceeding the following points on Table 1.

14-29.060 Exceptions:

- Existing restaurants that do not want to participate.
- Additions and remodels to existing restaurants that are less than one hundred (100) square feet.
- Equipment and non-structural modifications of any restaurant.
- Modification to historical restaurant structures.”

D. 14-29.080 Method of Compliance:

“The Building Official and/or the principal planner shall maintain the following documents for the public:

- City of Watsonville Application for Healthy Eating Options Awards;
- Healthy eating checklist for new and existing restaurants.

These documents shall aid in certification of new restaurants and significant remodels and additions thereto. Every applicant for a building permit not exempted by Section 14-29.060, Exceptions, shall complete and submit the appropriate checklist for their project along with the standard application documents. All compliance measures shall be clearly delineated on the proposed menu for the restaurant.”

Included Documents:

[Table 1:](#)

[Table 2:](#)

Topic Title: Public Health

Resource Title: Urban Agriculture Incentive (UAIZ) Program

Resource Type: Public Health Chapters in Municipal Code

Municipality: Long Beach

State: California

Date of Adoption: 2017

Abstract: Urban Agriculture Incentive (UAIZ) Program

Within the [Land Use Element](#) of the City of Long Beach's [General Plan](#), Long Beach recognizes that "[i]ncreasing access to healthy, locally grown foods by invigorating the community's interest in farmers' markets, community and school gardens, and home-grown foods also contributes to a healthier population." According to this [General Plan](#), "[t]here is a growing movement in Long Beach that promotes healthy and environmentally sustainable urban agriculture and small-scale farming" with the goal "to build an urban farming network that will increase local food production, assist underserved neighborhoods, and establish greater community and social connections." This is exemplified by the City incorporating the "City of Long Beach Urban Agriculture Incentive Zone (UAIZ) Program" into its [Municipal Code](#) under [Title 8 – Health and Safety](#). This program, created through the enabling legislation of [California Government Code Section 51040](#), "promotes urban agriculture and increases access to healthy food" by allowing property owners to "voluntarily enter into an agreement with the City to use vacant or unimproved property for small-scale agricultural purposes (UAIZ Contract)," and thereby be "subject to a reduced property tax assessment."

Code Provisions:

Long Beach, California Municipal Code

[Title 8 – Health and Safety](#)

[Chapter 8.77 – Urban Agriculture Incentive Zone \(UAIZ\) Act](#)

A. Purpose

"The purpose of this Chapter is to implement the "City of Long Beach Urban Agriculture Incentive Zone (UAIZ) Program", which promotes urban agriculture and increases access to healthy food in accordance with California Government Code Sections 51040 et seq. and County of Los Angeles Planning and Zoning Code (County Planning Code) Sections 22.52.3400 et seq. Under the UAIZ Program a property owner may voluntarily enter into an agreement with the City to use vacant or unimproved property for small-scale agricultural purposes (UAIZ Contract), and be subject to a reduced property tax assessment under California Revenue and Taxation Code Section 422.7 during the term of the agreement. (ORD-17-0024 § 6, 2017)"

Topic Title: Public Health

Resource Title: Baltimore City Code

Resource Type: Other Municipal Code Chapters Regulating Land Use

Municipality: Baltimore City

State: Maryland

Date of Adoption: 2016

Abstract: Personal Property Tax Credits - Food Desert Incentive Areas

Baltimore City has designated certain areas as Food Desert Incentive Areas, where eligible supermarkets can receive a tax credit against the City's personal property tax. [One in four Baltimore residents](#) and almost one in three Baltimore children live in food deserts, where it is challenging to access fresh foods, including vegetables and fruit. The Baltimore City Department of Planning has developed its [Healthy Food Environment Strategy](#) to work towards its goal of ensuring that all residents have equitable access to healthy, affordable food. The Personal Property Tax Credit is just one component of their overall goal to retrain and attract supermarkets and grocery stores, especially in underserved areas, to promote the accessibility of healthy foods to Baltimore residents.

To qualify for this credit, the supermarket must be located within a Food Desert Incentive Area, with at least 500 square feet of floor space dedicated to the sale of fruits and vegetables, an additional 500 square feet for the sale of other perishable goods like meat, seafood, and dairy products, and must have made certain expenditures on new personal property (as specified in the code). A Food Desert is defined as an area where the distance to a supermarket exceeds ¼ mile, the median household income is at or below 185% of the Federal Poverty Level, over 30% of households lack access to a vehicle, and the average Healthy Food Availability Index score for all food stores is low. The credit, up to 80% against the personal property tax, is available for 10 tax years and is implemented by the Baltimore Development Corporation.

Code Provisions:

Baltimore City Code

[Article 28: Taxes; Subtitle 10: Credits](#)

[§ 10-30 Food Desert Incentive Areas \(Personal Property Tax Credit\)](#)

A. Definitions.

“(1)In general.

In this section, the following terms have the meanings indicated.

(2)Finance Director.

"Finance Director" means the Director of the City Department of Finance or that Director's designee.

(3)Food desert.

"Food desert" means an area in which:

(i)the distance to a supermarket is more than ¼ mile;

(ii)the median household income is at or below 185% of the Federal Poverty Level, as measured by the most recent 5-year estimate of the U.S. Census Bureau's American Community Survey;

(iii)over 30% of households have no vehicle available, as measured by the most recent 5-year estimate of the U.S. Census Bureau's American Community Survey; and

(iv)the Healthy Food Availability Index average score of all food stores is low, as measured by the Johns Hopkins Center for a Liveable Future.

(4)Food Desert Incentive Area.

"Food Desert Incentive Area" means any area:

- (i)that is a food desert;
- (ii)that is within ¼ mile of a food desert; or
- (iii)that would be a food desert but for the presence of a qualified supermarket.

(5)Personal property.

"Personal property" means any personal property that is subject to the City's tax on personal property.

(6)Qualified supermarket.

"Qualified supermarket" means a supermarket that has been newly constructed or newly substantially renovated to meet the qualifications imposed by this subtitle.

(7)Supermarket.

"Supermarket" means a grocery store that has:

- (i)all major food departments, including produce, meat, seafood, dairy, and canned and packaged goods;

(ii)more than 50% of total sales derived from food sales; and

(iii)more than 50% of total floor space dedicated to food sales."

B. Credit granted.

"In accordance with State Tax-Property Article § 9-304(h), a tax credit is granted against the City personal property tax imposed on qualified supermarkets"

C. Qualifications for credit.

"To qualify for the credit granted by this section, a qualified supermarket must:

- (1)be located in a Food Desert Incentive Area;

(2)have at least 500 square feet of total floor space dedicated to the sale of fruits and vegetables;

(3)have at least 500 square feet of total floor space dedicated to the sale of other perishable goods, including meat, seafood, and dairy products; and

(4)have expended on new personal property:

(i)for a newly constructed supermarket, an amount equal to the greater of:

(i)\$150,000; or

(ii)\$25 per square foot of total floor space; or

(ii)for a newly substantially renovated supermarket, an amount based on the supermarket's total floor space, as follows:

Total Floor Space	Expenditure Required
20,000 sq. ft. or less	\$5 per square foot
More than 20,000 sq. ft. up to 45,000 sq. ft.	\$8 per square foot
More than 45,000 sq. ft.	\$10 per square foot

”

D. Amount of credit.

“The amount of the credit granted under this section is equal to:

(1)the amount of personal property tax that would otherwise be due in the current tax year on the supermarket's personal property, less

(2)the amount of any other credit applicable in the current tax year to the personal property, multiplied by

(3)80%.”

E. *Application.*

“The owner of the personal property for which a credit under this section is being sought must file an application with the Finance Director at least 90 days before the 1st tax year for which the credit is sought.”

F. *Term of credit.*

“The term of the credit is 10 tax years.”

G. *Continuing eligibility.*

“The owner of the personal property for which a credit has been granted under this section shall ensure that, throughout the credit period, the supermarket:

(1) continues to operate as a supermarket; and

(2) is maintained in full compliance with:

(i)the City Health Article; and

(ii)the [City Building, Fire, and Related Codes Article](#).”

H. *Administration.*

“The Finance Director, after consultation with the Baltimore Development Corporation:

(1) shall, subject to Title 4 {"Administrative Procedure Act – Regulations"} of the [City General Provisions Article](#), adopt rules and regulations to carry out this section, including procedures, forms, and documentation required to apply for the credit authorized by this section and to periodically evidence continuing eligibility for the credit;

(2)in those rules and regulations, may define or further define any terms used in connection with the qualifications for or computation of the credit authorized by this section;

(3)may settle disputed claims arising in connection with the credit authorized by this section; and

(4)may delegate to any other City agency or to the Baltimore Development Corporation any of her or his ministerial powers, duties, or functions in connection with the administration of the credit authorized by this section.”

Water Conservation

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Water Conservation

Narrative

As society races to confront, mitigate, and adapt to climate change, each level of government plays a vital role. In the United States, local governments – villages, towns, cities, and counties – have vast discretion over land use and zoning decisions that impact the rate and nature of development within their jurisdiction. If they use this discretion to require or incentivize development that mitigates or adapts to climate impacts, they are pursuing “climate-resilient development,” a concept first endorsed by the UN Intergovernmental Panel on Climate Change several years ago. The Land Use Law Center’s Climate Resilient Development (CRD) project has identified hundreds of innovative land-use strategies implemented by municipalities around the United States to fortify their communities in the face of a changing climate. Through our workshop series and framework law, we seek to share these strategies with the larger land use community and ensure that any local government – no matter its size, geographic location, or demographic makeup – can proactively respond to climate impacts while still encouraging the sustainable growth of private development.

This chapter focuses on Water Conservation: the efficient consumption of water resources and protection of water supplies from threats of overuse and pollution. The case studies featured within this chapter are divided into three categories: drought mitigation, wetlands protection, and surface/groundwater conservation. The first category highlights five municipalities from primarily Western states that have acted to protect their water resources from overconsumption during drought periods. The second category showcases four local governments from coastal states that have passed innovative ordinances to protect wetland ecosystems, which are essential to the preservation of potable water supplies. The final category features five case studies from primarily Northern states that conserve surface water or groundwater resources through innovative regulations.

The fourteen case studies in this chapter represent a diverse mix of land use controls municipalities can pursue. They were selected from a larger collection of case studies for their creativity, adaptability, and impact on water conservation. In keeping with the themes of the CRD project, all case studies incorporate elements of climate mitigation, adaptation, resilience, equity, enabling conditions, or a mix of multiple elements. The strategies included therein are sourced from a diverse mix of geographies, with only one state repeated across case studies (Washington). Because of this, it is our hope that municipalities of any size and from any state will be able to identify land use controls that might work for their community. Professional organizations such as the Association of State Drinking Water Administrators, the American Planning Association, ICLEI - Local Governments for Sustainability, WaterNow Alliance, and others should also be involved. Climate resilient development and water conservation go hand-in-hand; both can be achieved if diverse coalitions of local leaders step up and take decisive action swiftly.

Case Studies

Category I: Drought Mitigation

Topic Title: Water Conservation

Resource Title: Water Supply Conservation Program

Resource Type: Special Topic or Area Plan

Municipality: Hays

State: Kansas

Date of Adoption: 2024 (updated)

Abstract: Water Supply Conservation Program

Since the 1990s, the City of Hays has made water conservation a priority through setting water conservation goals and implementing corresponding ordinances. The city's first water conservation plan was developed in 1992, and its implementation led to the city becoming a leader in the region for water conservation. According to a 2011 state report, Hays' "gallons per person per day" or "GPCD" was 34% below the regional average in the state of Kansas. Building on that momentum, Hays set itself a goal to bring its GPCD down from 99 to 95 and created its 2014 Water Conservation and Drought Response Plan to meet their goal. Included in the plan are updated water conservation goals and practices, public education plans, a water service fee structure for residential, business, and irrigation users that increases automatically when city officials declare "water warning" or "water emergency" periods, and a multi-stage drought response plan that triggers management, regulatory, and educational actions for the city. This 2014 plan was adopted and codified in the city's code of ordinances on March 27, 2014. The code provisions below cover how the city classifies different types of water usage, the three stages of water alerts that city officials can declare, what voluntary and/or mandatory water conservation measures are required at each stage of water alert, when emergency water rates will apply, and what happens when water supply recipients violate the provisions of the ordinance.

Code Provisions:

City of Hays, KS

Chapter 65 – Utilities

Article III – Water Service System

Sec. 65-73. - Water supply conservation program

(a) *Purpose.* The purpose of this section is to provide for a progressive water supply conservation program, including the declaration of a water watch, water warning or water emergency and the implementation of voluntary and mandatory water conservation

measures throughout the city in the event such a watch, warning or emergency is declared by the governing body.

(b) *Definitions.*

- (1) *Water*, as used in this section, shall mean water available to the City of Hays for treatment by virtue of the city's water rights, water supply, water supply contracts or any treated water introduced by the city into its water distribution system, including water offered for sale at any bulk water sales site.
- (2) *Customer*, as used in this section, shall have the meaning described in Section 65-56 of this chapter.
- (3) *Waste of water*, as used in this section, shall mean acts constituting violations of Section 65-69 of this chapter.
- (4) *Domestic uses* means the use of water by a person or by a family unit or household for household purposes, or for the watering of livestock, poultry, farm and domestic animals used in operating a farm, and for the irrigation of lands not exceeding a total of two acres in area for the growing of gardens, orchards and lawns.
- (5) The following classes of water usage are established for the purposes of this section:
Class 1: Water used for outdoor watering, either public or private, for gardens, lawns, trees, shrubs, plants, parks, golf courses, playing fields, swimming pools or other recreational areas or the washing of motor vehicles, boats, trailers, or the exterior of any building or structure.

Class 2: Water used for any commercial, agricultural or industrial purpose, except water actually necessary to maintain the health and personal hygiene of bona fide employees of such businesses while such employees are engaged in the performance of their duties at their place of employment.

Class 3: Domestic usage, other than that which would be included in either class 1 or 2.

Class 4: Water used to sustain human life and the lives of domestic pets and maintain standards of hygiene and sanitation.

(c) *Declaration of Governing Body.* In the event the governing body determines that there is a need for conservation of the city's water resources due to drought, drought forecast, infrastructure problems, or for any other reason, the governing body may declare the existence of any stage in this subsection.

- (1) *Stage 1: Declaration of water watch.* Whenever the governing body finds that conditions of a drought or some other trigger is causing a water supply shortage, it shall be empowered to declare, by resolution, (1) that a stage 1 water watch exists and (2) that it shall take steps to inform the public and ask for voluntary water conservation. Such resolution shall be deemed effective until it is declared by resolution by the governing body to have ended.

(2) *Stage 2: Declaration of water warning.* Whenever the governing body finds that conditions of a drought or some other trigger is causing a water supply shortage, it shall be empowered to declare, by resolution, (1) that a stage 2 water warning exists and (2) that it shall take steps to inform the public that it may impose mandatory restrictions on water use during the period of the warning. Such resolution shall be deemed effective until it is declared by resolution of the governing body to have ended. Pursuant to the approval of the Chief Engineer, Division of Water Resources, Kansas Department of Agriculture, the mandatory restrictions on nonessential uses may be extended to private wells within the city limits, pursuant to K.S.A. 82a-733.

(3) *Stage 3: Declaration of water emergency.* Whenever the governing body finds that conditions of a drought or some other trigger is causing a water supply shortage, and an emergency exists by reason of a shortage of water supply needed for essential uses, it shall be empowered to declare, by resolution, (1) that a stage 3 water emergency exists and (2) that it shall take steps to inform the public that it will impose mandatory restrictions on water use during the period of the emergency. Such resolution shall be deemed effective until it is declared by resolution of the governing body to have ended. Pursuant to the approval of the Chief Engineer, Division of Water Resources, Kansas Department of Agriculture, the mandatory restrictions on nonessential uses may be extended to private wells within the city limits, pursuant to K.S.A. 82a-733.

(d) *Voluntary Conservation Measures.* Upon the declaration of a water watch or water warning as provided in subsections (c)(1) or (c)(2), the city manager is authorized to call on all water consumers to employ voluntary water conservation measures to limit or eliminate nonessential water uses including, but not limited to:

(1) Class 1 uses of water.

(2) Waste of water.

(e) *Mandatory Conservation Measures.* Upon the declaration of water warning or emergency as provided in subsection (c)(2) or (c)(3), the city manager is also authorized to implement certain mandatory water conservation measures, including, but not limited to, the following conservation measures:

(1) Suspension of new connections to the city's water distribution system, except connections of fire hydrants, and those made pursuant to agreements entered into by the city prior to the effective date of the declaration of the emergency;

(2) Restrictions on the time of day or time of week of water uses in one or more classes of water use as described in subsection (b)(4), wholly or in part;

(3) Restrictions on the sales of water at bulk water sales sites;

(4) The imposition of water rationing based on any reasonable formula including, but not limited to, the percentage of normal use and per capita or per consumer restrictions;

(5) Complete or partial bans on the waste of water;

(6) Other reasonable best management practices for conservation; and

(7) Any combination of the measures in subsections (e)(1)—(6) as the governing body may deem necessary.

(f) *Emergency Water Rates.* Upon the declaration of water warning or emergency as provided in subsection (c)(2) or (c)(3), the conservation tier 2 water rates for residential customers described in Section 65-224 of this chapter shall increase to the levels described therein.

(g) *Regulations.* After the governing body declares a water warning or water emergency as provided for in subsection (c)(2) or (c)(3), the city manager is empowered to put into practice the provisions of the city's drought response plan as may be necessary to carry out the provisions of this section.

(h) *Violations, Disconnections and Penalties.*

(1) Any person accused of violating the provisions of this section shall be notified in writing that such accusation has been made and the accused party may request a hearing before the city clerk, or any representative appointed by the city clerk, and may present evidence in defense of such accusation. If a request for a hearing is not served on the city clerk within three days following the service of the written accusation on the accused party or if the city clerk finds that the allegations of such accusation are true, the following penalties shall be imposed:

- a. Upon a first violation, the accused party shall be issued a formal written warning.
- b. Upon a second violation, water service shall be terminated on the property involved and a resumption of services fee in the sum of \$50.00 shall be paid before water service shall be resumed.
- c. Upon a third violation, water service shall be terminated on the property involved and a resumption of services fee in the sum of \$200.00 shall be paid before water service is resumed.
- d. Upon a fourth violation and any subsequent violations, water service shall be terminated on the property involved and a resumption of services fee in the sum of \$250.00 shall be paid before water service is resumed.

These provisions are cumulative, and for purposes of determining the number of violations committed, the previous 24 months shall be considered. Any violations previous to the preceding 24 months shall not be considered as violations for the purpose of assessing penalties in this section.

(i) *Emergency Termination.* Nothing in this section shall limit the ability of the city manager or his designee to terminate the supply of water to any or all customers upon the determination that emergency termination of water service is required to protect the health and safety of the public or for any other emergency as required or authorized by ordinance or as deemed necessary by the city manager or the governing body.

Topic Title: Water Conservation

Resource Title: Artificial Turf Requirements

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Thornton

State: Colorado

Date of Adoption: 2023

Abstract: Artificial Turf Requirements

In 2023, Thornton, CO updated its city code by repealing and reenacting the [Artificial Turf](#) section of their landscaping division. The provision includes regulations regarding installation of artificial turf to conserve water in the community and maintain appearances of a natural-looking yard. The ordinance details where and how much artificial turf can be installed, and the metrics for required buffers around the man-made turf. Artificial turf, under this provision, may primarily be installed in single-family rear yards, but with approval from City Council, turf may be installed in designated public spaces for sports recreation, which would cut down on the City's water usage and reduce gas emissions from lawn equipment. Overall, PFAS-free artificial turf with permeable buffers requires less water for landscaping, and required living plant material ensures there is still organic material consuming carbon dioxide, thus mitigating climate change.

Code Provisions:

[Sec. 18-616 Artificial Turf Standards](#)

(a) Locations permitted.

- (1) Artificial turf is allowed on lots developed with a Dwelling, 1 Unit Detached; Duplex; or Dwelling, 2 Units Attached uses.
- (2) Artificial turf is prohibited on all other lots or tracts unless the requirements of both (2)a and (2)b, below, are met.
 - a. The artificial turf has been allowed through the Development Plan process for:
 1. Designated sports fields on city-owned or city-operated parks and recreational facilities; or
 2. Designated activity areas where the artificial turf serves a functional purpose and is not intended as landscaping, such as putting greens, playground surfacing, and similar spaces that facilitate play, sport, or other specific recreational opportunities; and
 - b. The artificial turf complies with the design, materials, and installation requirements of this section.
- (3) A Development Plan is required prior to the installation of artificial turf as landscaping.

(b) Maximum area. Artificial turf is permitted as follows:

(1) In the rear landscape area, with no area limitations. For purposes of this provision, the rear landscape area means:

- a. The area between the rear plane of the dwelling and the rear lot line, extending the width of the lot, as shown on Figure 18-616.1 as the shaded area designated as 'a', and;
- b. Areas of the lot located behind the front plane of the dwelling which are visually shielded or obscured from public places by solid fencing, densely planted vegetation, structures, or combination thereof, as shown on Figure 18-616.1 as the shaded area designated as 'b'.

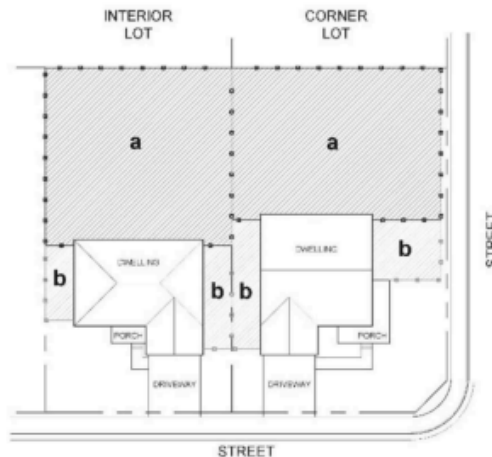


Figure 18-616.1

(2) In all other areas of the lot that are not the rear landscape area, as defined by subsection (b)(1), artificial turf shall not exceed 25 percent of the area that is not occupied by driveways, sidewalks, patios, decks, buildings, or other structures.

(c) Design requirements.

(1) The design and installation of all artificial turf areas shall comply with the front, side, and rear yard landscaping requirements of the landscape code.

(2) Artificial turf shall be installed and maintained to effectively simulate the appearance of a well-maintained lawn. The department shall maintain and make available for public inspection a sample of various artificial turf products that meet this standard of appearance.

a. Artificial turf must be a green color, similar to natural grass.

b. Artificial turf products shall have a minimum eight-year warranty against fading.

(3) Buffers.

a. The following minimum buffer areas are required between the edge of the artificial turf and the specified location:

- 1. Three feet from all property lines. Artificial turf may extend to the front property line if a minimum three-foot buffer is installed between the artificial turf and the sidewalk along a street.

2. Eight feet from the front wall of any building, and three feet from all other building walls or impervious surfaces when located outside of rear landscape area, as defined in subsection 18-616(b)(1); and
3. Three feet from the trunk of any deciduous tree, and no closer than the dripline of any evergreen tree.

b. Buffers shall be permeable, consisting of wood mulch, gravel, or rock a maximum of two inches in diameter, or other approved permeable materials.

(4) Living plant materials are required when artificial turf is installed on the lot outside of the rear landscape area, as defined in subsection 18-616(b)(1).

a. For the first 750 square feet of artificial turf, or fraction thereof, one tree equivalent is required.

b. For each additional 250 square feet of artificial turf, or fraction thereof, one-half tree equivalent is required.

c. Required living plant materials shall be located on the lot outside of the rear landscape area, as defined in subsection 18-616(b)(1).

d. Required living plant materials may consist of:

1. Existing plant materials meeting the requirements of section 18-613(c) and (d);
2. New plant materials installed in accordance with section 18-613(c) and (d); or
3. A combination of existing and new materials.

(d) Materials requirements.

(1) Artificial turf products.

a. Artificial turf shall be of a type known as cut pile infill and shall be manufactured from polypropylene, biobased products, nylon, polyester, polyethylene, or a blend of polypropylene, biobased products, nylon, polyester, or polyethylene fibers stitched onto a meshed or hole-punched backing made of similar materials. Biobased products are derived from plants and other agricultural, marine, and forestry materials, and may be certified as a USDA Bio Preferred product.

b. Hole-punched backings shall have holes spaced in a uniform grid pattern with spacing not to exceed four inches by six inches on center.

c. Backings shall be designed to drain at a minimum rate of two inches per hour.

d. The use of indoor or outdoor carpeting in lieu of artificial turf, mulch or other plant materials is not permitted.

(2) PFAS-free requirements. All artificial turf, infill, and other manufactured products used in the installation of artificial turf shall be free of per- and poly-fluoroalkyl substances (PFAS).

a. PFAS-free means that at least one of the following requirements have been met:

1. The manufacturer or distributor has publicly stated that the product is made without the intentional use of PFAS in a statement referring to all members of the class of PFAS using language such as "PFAS-free," "fluorocarbon-free," "per- and poly-fluorinated

compounds-free," and similar. "PFC-free" shall not be sufficient to satisfy this requirement. The statement must explicitly address which product or products it applies to, and ambiguous statements will not be accepted.

2. The product has been tested and shown to be PFAS-free. Testing sufficient to satisfy this requirement may have been carried out at the manufacturer's request or as a part of an independent investigation by a nongovernmental organization, research laboratory, or other entity not affiliated with the company. Testing completed by the manufacturer does not satisfy this requirement. Testing results must be published online and must indicate the test method used and the specific product tested. Third-party certifications are not valid as "PFAS-free" unless the testing evaluates total organic fluorine and results are publicly available.

b. Documentation evidencing that the proposed product is PFAS-free shall be submitted at the time of permit application and approval of such documentation is at the sole discretion of the director or designee.

c. Additional restrictions or standards may be adopted in writing by the director due to the rapidly evolving science around the presence of PFAS.

d. If a product is installed that is later determined to contain PFAS, that product may remain in place so long as the applicant complied with the PFAS-free documentation requirements in this section.

(e) Installation and maintenance.

(1) Artificial turf shall be installed in accordance with the manufacturer's specifications, including the following:

a. Sod or existing groundcover shall be removed prior to installation of any artificial turf.

b. Artificial turf shall be installed over a compacted aggregate material that is a minimum of three inches deep, which may be a combination of coarse and fine material layers separated by a geotextile per the manufacturer's specifications.

c. The specified base material(s) system must be able to contain a minimum of one-half inch of precipitation prior to generating sheet flow runoff.

d. Artificial turf shall be anchored at all edges and seams.

e. All artificial turf seams shall be glued and not sewn.

f. An infill medium consisting of clean washed sand and/or ground shells, or other approved mixture may be brushed into the fibers to ensure that the fibers remain in an upright position and to provide ballast that will help hold the turf in place and provide a cushioning effect. Infill is not required if the artificial turf manufacturer does not recommend or require its use.

(2) Artificial turf shall be maintained in a manner to mimic healthy living turf. General maintenance requirements are specified in Section 18-619. In addition, the following maintenance activities are required for artificial turf:

a. Cleaning, sanitizing, brushing, and removal of debris. Cleaning shall be done with biodegradable products.

b. Hand raking of worn turf areas on an as needed basis.

- c. Repairing of depressions to maintain an even visual surface.
- d. Brushing back any loose infill that has been washed or moved off the turf.
- e. Regular maintenance to eliminate any odors, flat or matted areas, weeds, looseness at edges, seams, or elsewhere.
- f. Replacement of the artificial turf when maintenance or repair is unable to simulate a healthy living turf.

(f) **Interpretations.** The director shall interpret this section and all other applicable provisions of this chapter as the need for interpretation arises pertaining to artificial turf, including but not limited to issues such as site configurations, buffer requirements, and area limitations. No interpretation shall permit artificial turf to be installed in locations prohibited in subsection 18-616(a).

Topic Title: Water Conservation

Resource Title: Water Rights Acquisition Policy

Resource Type: Environmental Chapters in Municipal Code

Municipality: Doña Ana County

State: New Mexico

Date of Adoption: 2004

Abstract: Water Rights Acquisition Policy

Two decades ago, Doña Ana County, NM adopted an ordinance adding a Water Systems chapter to its municipal code. This chapter includes their Water Rights Acquisition Policy, which allows the County Water Utility to provide water service to new developments only after developers have transferred their water rights to the County. Transfers can only occur after developers, through the approval of the New Mexico Office of State Engineer, can ensure the availability of a water right that would provide a 40-year supply of water for their proposed developments. In the face of a changing climate, the deprivatization of water rights can provide a municipality with additional levers to enact and enforce policy decisions that protect a crucial public resource.

Code Provisions:

§ 324-46 Rule 26: Water Rights Acquisition Policy.

- A. It is the County's policy to acquire water rights in sufficient quantity to properly and legally provide water service to existing and new development within the unincorporated areas of the County as served by the County Utility.
- B. Water rights may be acquired by requiring developers to provide a sufficient quantity and quality of water rights necessary to supply their subdivisions and developments with water over a forty-year period. This acquisition of water rights may occur in phases as the development is approved and built out.
- C. In the case of a subdivision or other land division, as defined in Chapter 250, Land Use and Zoning, Chapter 300, Subdivision of Land, or the building permit process, the County Water Utility will provide water service under the following terms and conditions:
 - 1. Prior to the approvals required in Subsection C above, the developer will meet with the County Utilities Department to determine if and under what terms and conditions water service can be provided. The Utilities Director will make a recommendation to the Board for consideration and approval if service should be provided and under what terms and conditions. These terms and conditions will include the County's line extension policy, water rights acquisition policy, infrastructure transfer policy, rate schedules, standards for construction, and any other issues determined to be applicable at the time, including related water service issues.

2. If the County determines that it can provide the water service to the development within a reasonable time frame, and under terms and conditions acceptable to the developer and the County, the developer will quantify the proposed development's water requirements according to Chapter 300, Subdivision of Land, § 300-48, Water supply guidelines. The quantifications required in § 300-48 will be used as the basis for determining infrastructure size and configuration, supply requirements, operating pressure requirements, and water rights acquisition requirements.
3. Prior to final approval by the County, the developer and County Utilities Director will provide evidence of agreement on all of the issues outlined in Subsection C (1) and (2) above. The agreement will be on a form provided by County Utilities Department.
4. Upon final approval by the County and prior to commencement of construction, the developer will provide the following items:
 - a. Evidence that all easements identified have been provided to the County.
 - b. Electronic versions of all engineering drawings.
 - c. Evidence of water rights acquisition, transfer and approval by the Office of the State Engineer, for bona fide consumptive use water rights for the forty-year period described in Chapter 300, Subdivision of Land, and legal transfer of said water rights to Doña Ana County. All water rights offered to the County must be acceptable to the County and completed in accordance with the Office of the State Engineer requirements.
5. At the County's sole discretion, the developer may provide payment in lieu of water rights at the rate of the current market value.
6. Where extraordinary circumstances exist and at the sole discretion of the County, the developer may provide financial instruments in lieu of the requirements set forth in Subsection C (5) above, including cash, bond, or other form of instrument acceptable to the County, such that no adverse effects will be imposed on the County.

Topic Title: Water Conservation

Resource Title: Water Consumption Limits and In-Lieu Fees for New Development

Resource Type: Other Municipal Chapter Regulating Land Use

Municipality: Santa Monica

State: California

Date of Adoption: 1992, Amended 2008, 2015, 2017 & 2019

Abstract: Water Consumption Limits and In-Lieu Fees for New Development

Situated along the mid-California coast, Santa Monica faces several water conservation challenges. Not only does the locality suffer from frequent droughts, but strain on groundwater supplies is also exacerbated by saltwater intrusion due to rising sea levels. To balance this, the City enacted a water offset program. Under this program, permits for new developments may not be approved unless the developer pledges to offset all new water consumption, either through on-site water efficiency upgrades (e.g. low-water appliances) or through payment of an in-lieu water offset fee. Fees collected under the program will fund public works projects to reduce water demand elsewhere within Santa Monica. By establishing their offset program, the City is taking a proactive measure to promote water conservation, while allowing private developers to choose the means of compliance that best suits their project– a true land use win-win.

Code Provisions:

§ 7.16.050 - Water consumption limits and in-lieu fees for new development.

- a. **Applicability.** Except as provided in subsection (b), below, this Section applies to:
 - 1. Approval of a building permit for new development, occurring on or after November 27, 2018.
- b. **Exemptions.** This Section does not apply to:
 - 1. New development that does not require a permit under Section 8.08.050;
 - 2. Repair, alteration, modification, addition to, or rehabilitation of an existing structure that results in the net increase in the number of any plumbing fixture(s) in an existing single-family residence, or any repair, alteration, modification, new construction or rehabilitation of an ADU, where the projected water demand is less than the water conservation threshold in effect at the time of issuance of the building permit.
 - 3. Any new development application for a building permit filed on or before November 27, 2018, that only results in a change of use of six thousand square feet or less and/or an addition of one thousand five hundred square feet or less. Instead, such new development projects shall be required to pay the water demand mitigation fee in effect as of November 27, 2018.
- c. **Definitions.** The following definitions apply for purposes of administering this Section:

1. One hundred percent affordable housing project. One hundred percent affordable Housing Project is defined in Section 9.52.020.0050.
2. Baseline water demand. Baseline water demand means the average potable water use over the previous five years from the time the first application for new development is filed. The most recent five-year average of potable water use according to City records at the proposed development site will be used; where no records exist only for new development of a one hundred percent affordable housing project, the five-year average potable water use of water customers in the same water customer class (single-family, multi-family, mixed-use, commercial, industrial, landscape, etc.) with the same meter size will be used.
3. Director. Director means the Director of the City's Public Works Department or his or her designee
4. New development. For the purposes of implementing this Section, new development means any of the following:
 - A. A new, enlarged, or relocated pool, spa, pond, or water feature;
 - B. A new, enlarged, or relocated irrigation system;
 - C. A new structure with any plumbing fixture(s);
 - D. A change in use that results in the addition of any number of plumbing fixture(s);
 - E. Repair, alteration, modification, addition to, or rehabilitation of an existing structure that results in the net increase in the number of any plumbing fixture(s);
 - F. Repair, alteration, modification, addition to, or rehabilitation of an existing structure with any plumbing fixture(s), where a demolition will occur in accordance with Section 9.25.030 or any successor thereto.
5. New water demand. New water demand means projected water demand (defined below) for a proposed new development less baseline water demand (defined above) at the proposed site. New water demand shall be determined at the time of the City Building Official's acceptance of plan check submission.
6. Plumbing fixture. A receptacle or device that is connected to a water supply system or discharges to a drainage system or both.
7. Projected water demand. The total amount of projected potable water demand for a proposed new development. The projected water demand shall serve as the water use allowance for the proposed new development.
8. Water use allowance. The Water Use Allowance (WUA) established by the Water Supply Shortage Response Plan adopted in accordance with Section 7.16.030.
9. Water conservation threshold. The lowest level that the Water Use Allowance can be set for a residential water customer as calculated in

the Water Shortage Response Plan adopted in accordance with Section 7.16.030.

d. Water Offset Requirements.

1. No person shall be issued a temporary or final certificate of occupancy, or a required permit, for any new development that is not exempt under subsection (b) of this Section unless the new development offsets all increases in new water demand as follows:
 - A. New water demand for any new development that constitutes either: (i) a one hundred percent Affordable Housing Project, including individual units and common spaces that support those units; or (ii) an accessory-dwelling unit regulated under Section 9.31.300, shall be offset at a ratio of 0.5:1.
 - B. New water demand for all other new development shall be offset at a ratio of 1:1.
2. The water offsets required by this Section shall be achieved with on-site water efficiency measures unless the Director determines that such efficiency measures cannot be reasonably achieved on-site. In the event that the Director determines that such efficiency measures cannot be reasonably achieved on-site, the applicant for a permit may satisfy the offset requirement by implementing such on-site water efficiency measures as the Director determines can reasonably be achieved on-site to accomplish the maximum possible portion of the water offsets required by this Section and:
 - A. Payment of an in-lieu water offset fee in accordance with subsection (j), below; and/or
 - B. Performing or undertaking to perform the offset requirements, in whole or in part, at an off-site location within the City of Santa Monica. The criteria for equivalent performance of the offset requirements at an off-site location shall be approved in writing by the Director prior to commencement of such work. All work performed or undertaken to be performed by the applicant shall be subject to all laws and regulations generally applicable to such work and shall be performed at the applicant's sole risk and cost.
3. The owner or permit applicant shall submit sufficient documentation as determined by the Director to demonstrate that the water offset requirements in this Section have been or shall be achieved.

- e. **New Buyer or Tenant Notification.** The owner or selling agent of any new development that is subject to this Section shall provide any buyer or tenant of the new development with the building record informing the buyer or tenant that the new development is subject to the Water Use Allowance established by this Section.
- f. **Verification of Water Offset Requirements.** Neither a temporary or final certificate of occupancy for a new development nor a final approval for any permit required to comply with this Section shall be issued until:

1. The on-site or off-site water offset provisions approved by the Director have been installed and demonstrated to be operational; and/or
 2. The owner or permit applicant has paid the in-lieu water offset fee in accordance with subsection (j).
- g. **Implementing Regulations.** The Director shall adopt written administrative regulations or guidelines that are consistent with and that further the terms and requirements set forth in this Section.
- h. **Penalties for Unauthorized Water Use.** Failure to meet the utility account's Water Use Allowance during a billing period may result in a penalty established through the Water Supply Shortage Response Plan adopted in accordance with Section 7.16.030.
- i. **Administrative Fee.** An administrative fee shall be assessed and paid to the City by the permit applicant at the time of issuance of the building permit. The administrative fee shall be imposed to cover the cost of administering and implementing the water offset requirements of this Section and shall be set by City Council resolution.
- j. **In-Lieu Water Offset Fee.**
1. The water offset requirements in this Section may be satisfied, in whole or in part, by payment of a one time in-lieu water offset fee. The fee shall be paid by the owner or permit applicant, as follows: fifty percent shall be paid at the time of issuance of the building permit and the remaining fifty percent shall be paid at the time of the issuance of the temporary certificate of occupancy or certificate of occupancy, whichever occurs first. For all other permits where an issuance of the temporary certificate of occupancy or certificate of occupancy is not required, one hundred percent of the fee shall be paid by the owner or permit applicant before receiving final approval from the City of Santa Monica.
 2. Funds collected by the in-lieu water offset fee shall be deposited into a dedicated fund used by the City to reduce new water demand citywide.
 3. Payment of the in-lieu offset fee, in combination with any implemented water offsets, shall constitute full satisfaction of the water offset requirements in this Section.
 4. The in-lieu water offset fee shall be non-refundable.
 5. The City's acceptance of the in-lieu water offset fee does not represent or establish an obligation of the City to reduce new water demand by any particular means.
 6. The criteria for establishing the in-lieu water offset fee shall be set by City Council resolution for implementation through the regulations to be adopted by the Director pursuant to this Section.
- k. **Hardship.**
1. The Director may exempt an owner or a building permit applicant from the requirements of this Section, upon showing by the owner that the requirements of this Section would cause undue hardship.
 2. For purposes herein, an "undue hardship" shall be found where imposition of the water offset requirements would deprive the owner

of a development site of all economically beneficial use of that site or otherwise be prohibited by applicable State or Federal law.

3. An undue hardship application shall include all information necessary for the Director to make a finding of undue hardship, including, but not limited to, documentation showing the factual support for the claimed undue hardship.
4. The Director may approve the undue hardship exemption application, in whole or in part, with or without conditions.
5. Any exemption granted by the Director is effective immediately.

Topic Title: Water Conservation

Resource Title: Water Conservation Standards and Regulations

Resource Type: Other Municipal Chapter Regulating Land Use

Municipality: Chapel Hill

State: North Carolina

Date of Adoption: 2025

Abstract: Water Conservation Standards and Regulations

In response to drought conditions across much of North Carolina beginning in 1998 and peaking in the summer of 2002, the town of Chapel Hill has taken important steps to protect and conserve water resources. Chapter 23 of the town's code of ordinances—entitled Water, Sewers and Drainage—includes sections on stormwater management, storm drains, water conservation, and illicit discharge detection and elimination. Article IV of Chapter 23—entitled Water Conservation Standards—was enacted in 2009 to improve year-round conservation practices and increase the town's drought resilience. The town partnered with the Orange Water and Sewer Authority (OWASA) to create and implement Article IV, which provides requirements for outdoor and indoor use of all OWASA-supplied potable water, procedures for addressing water leaks, exemption from the outdoor and indoor use requirements, conservation methodology education, and promotion of voluntary conservation methods.

Chapel Hill's voluntary conservation methods of using harvested rainwater and reclaimed water (Sec. 23-66(a)(4)) have proven particularly impactful within the community. In 2009, OWASA partnered with the University of North Carolina at Chapel Hill (UNC) to build a reclaimed water system that has provided over 3.6 billion gallons of reclaimed wastewater to the UNC campus, UNC Hospitals, the North Carolina Botanical Gardens, and St. Thomas More Catholic School. UNC reports that campus potable water consumption decreased by 31% between 2007 and 2021, and the school has plans to increase non-potable water use for the UNC and UNC Hospital cooling towers, athletic field irrigation, toilet flushing, and landscape irrigation. OWASA also makes reclaimed water directly available to residents through their Bulk Fill Program, free of charge. Article IV's required and voluntary conservation methods, and the partnerships that have been built as a result of the water conservation efforts, provide Chapel Hill with adaptation, resilience, equity, and enabling conditions that will help ensure that all residents have access to potable water as the challenges of climate change continue to impact water quality and quantity in the future.

Code Provisions:

Town of Chapel Hill, NC

Chapter 23 – Water, Sewers, and Drainage

Article IV. Water Conservation Standards

Division 2 – Year-Round Requirements, Policy and Practice.

Sec. 23-64. - Exterior use.

- (a) The following outdoor or exterior use requirements shall apply to all customers using OWASA-supplied potable water:
 - (1) Spray irrigation shall not occur more than three (3) days per week. Even-numbered properties may be irrigated with spray systems only on Sundays, Wednesdays, and/or Fridays. Odd-numbered properties may be irrigated with spray systems only on Tuesdays, Thursdays, and/or Saturdays. All spray irrigation shall occur only between the hours of 6:00 p.m. and 10:00 a.m., and shall apply no more than one (1) inch of water in any given week. These restrictions shall not apply to properties using underground, drip irrigation, micro spray, low precipitation bubblers, soaker hoses, hand watering, tree or shrub watering bags, or where watering of containerized plants and commercial plant stock in trade is maintained for resale.
 - (2) All irrigation systems shall be equipped with automatic controllers that activate the system according to a desired frequency and duration, and shall also be equipped with rain or soil moisture sensors that will prevent irrigation during periods of rainfall or when there is sufficient moisture in the ground for plant health and survival.
 - (3) All hoses used for hand watering, vehicle washing, or other allowable outdoor uses shall be equipped with shutoff nozzles.
 - (4) No exterior use of OWASA-supplied potable water shall result in the flow of water onto adjacent property or public right-of-way, and all irrigation systems shall be designed and maintained to prevent to the extent practicable water from flowing onto paved or other impervious surfaces.
 - (5) Outdoor water leaks on property or facilities of OWASA customers shall be repaired within ten (10) days of discovery by the customer and/or notification by OWASA.
- (b) Owners of public purpose athletic fields, recreational fields, and/or public purpose botanical sites shall not be subject to the year-round limitations of subsections (a)(1)—(5) if those facilities are operated in compliance with an OWASA-approved water conservation plan that specifies the conservation measures and irrigation operating modes to be employed at that facility year-round and during successive stages of a declared water shortage.
- (c) Unless superseded by the declaration of a water supply shortage or emergency, the year-round requirements of subsection (a)(1) and subsection (a)(2) shall not apply to the following:

- (1) Outdoor irrigation necessary for the establishment of newly sodded or seeded lawns and for the establishment of new non-turf plant materials within the first forty-five (45) days of planting, provided that such irrigation occurs only between the hours of 6:00 p.m. and 10:00 a.m.
- (2) Irrigation necessary for one (1) day only where treatment with an application of chemicals requires immediate watering to preserve an existing landscape or to establish a new landscape, provided that such irrigation occurs only between the hours of 6:00 p.m. and 10:00 a.m.
- (3) Water used to control dust or to compact soil when alternate methods are not available.
- (4) Visually supervised operation of watering systems for short periods of time to check system condition and effectiveness.
- (5) Water used for construction or maintenance activities where the application of water is the appropriate methodology and where no other practical alternative exists.
- (6) Water used for firefighting, firefighter training, fire hose testing, fire pumper testing, and other emergency situation mitigation purposes.
- (7) For situations in which there is no practical alternative, OWASA-supplied potable water may be used for other special purposes, such as washing out garbage trucks, cleaning up hazardous or unsanitary materials, etc., or for other purposes necessary to protect public health, safety, and welfare - provided that such water is used in the least quantity needed to accomplish the task.

(Ord. No. 2009-06-08/O-2, § 2)

Sec. 23-65. - Interior use.

- (a) The following indoor or interior use requirements shall apply to all customers using OWASA-supplied potable water:
 - (1) Restaurants and dining facilities shall serve water only upon request of the customer.
 - (2) Hotels, motels, and other facilities providing sleeping accommodations shall change bed linens only upon request of the customer, or upon customer changeover, or every five (5) days for long-term customers.
 - (3) Indoor water leaks on property or facilities of OWASA customers shall be repaired within ten (10) days of discovery by the customer and/or notification by OWASA.
- (b) Unless superseded by the declaration of a water supply shortage or emergency, the year-round requirements of subsection (a) shall not apply to the following:
 - (1) Visually supervised operation and flushing of plumbing systems for short periods of time to check system condition and effectiveness.
 - (2) Water used for construction or maintenance activities where the use of water is the appropriate methodology and where no other practical alternative exists.

(Ord. No. 2009-06-08/O-2, § 2)

Sec. 23-66. - Year-round policy and practice.

(a) It shall be OWASA's policy and practice to publicize periodically water conservation methods, including but not limited to, methods of conserving water both indoors and outdoors; methods of collecting and storing harvested water in appropriate devices, such as rain barrels and cisterns; as well as information about the availability, feasibility and allowable uses of reclaimed water from OWASA. It shall be OWASA's policy to strongly encourage and promote the following voluntary conservation measures year-round, regardless of water supply conditions:

- (1) Operate dishwashers and clothes washers only when loaded to their maximum capacity or at water level settings appropriate for the size of the load.
- (2) Where not otherwise required, install ultra-low flow toilets, tank dams, flow restrictors (aerators) and low-flow showerheads.
- (3) Repair and maintain plumbing systems to prevent water leaks.
- (4) Use harvested rainwater and/or reclaimed water for indoor and outdoor purposes where allowable and practical.

(Ord. No. 2009-06-08/O-2, § 2)

Category II: Wetlands Protections

Topic Title: Water Conservation

Resource Title: Wetlands Management Plan

Resource Type: Special Topic Plan or Area Plan

Municipality: Anchorage

State: Alaska

Date of Adoption: 2014

Abstract: Wetlands Management Plan

Anchorage was one of the first communities in the country to adopt a local wetlands management plan back in 1982. In 2014, the municipality updated the management plan and provides strategies for freshwater wetlands in the area. The benefits listed include supporting productive ecosystems; regulating surface water flows through retention of excess runoff and release of water over extended dry periods; protection from erosion; purifying water through uptake of nutrients; and preventing carbon dioxide from being released due to wetlands draining and clearing. The Plan designates wetlands as class “A,” “B,” or “C,” with “A” being the most protected class and “C” being the least. If developers want to construct in areas near designated wetlands, they must submit a permit application dependent on the class of wetlands in the area. The permit application process may require commercial developers to submit a drainage impact analysis, site drainage plan, water quality control plan, site restoration and stabilization plan, and/or minimization and habitat avoidance measures.

Plan Provisions:

[Anchorage, Alaska, Municipal Wetlands Management Plan](#)

Commercial Rainwater Harvest

B. Best Management Practices:

In order to evaluate and minimize individual and cumulative impacts of wetland permit authorizations, Drainage Impact Analyses, Project Site Drainage Plans, Water Quality Control Plans, Site Restoration and Stabilization Plans, and Wetland Minimization and Habitat Avoidance Plans shall be required, as necessary, for Permit reviews. For a General Permit, site-specific Best Management Practices shall be applied as conditions of the permit. (See the General Permit for further information.)

1. DRAINAGE IMPACT ANALYSIS.

When required as a specific permit condition or as deemed necessary for municipal reviews, a Drainage Impact Analysis (i.e., hydrogeologic analysis) shall be supplied by the applicant to the Municipality of Anchorage's Community Development Department with consultation by MOA-Watershed Management Section. Information for this analysis includes, but is not limited to:

- a. Estimates of surface and subsurface water movement within and into the subject property;
- b. Delineation of estimated on-site and off-site drainage impacts of the fill;
- c. Outline of mitigating factors to offset adverse impacts;
- d. Soil types, depth to groundwater, and seasonal water table information;
- e. Existing topographic delineation and general surface drainage patterns;
- f. Location of permanent and ephemeral watercourses and water bodies greater than 100 sq ft;
- g. How development within and adjacent to the subject wetland may be affected by groundwater intrusion as a result of the proposal.

Note: The Drainage Impact Analysis provided by the applicant should include information, which conforms, at a minimum, to municipal policies in the most current municipal Design Criteria Manual.

2. SITE DRAINAGE PLAN.

To evaluate and reduce the potential for groundwater intrusion and impacts to existing local hydrology, the following information shall be required when indicated in Table 4 or otherwise as a condition of a General Permit. This information may be applicable concerning both construction and full build-out of the project:

- a. Identification of final surface drainage directions for a finished development;
- b. Location and types of existing and proposed constructed and natural drainage facilities/features, including sub-drains, culvert size and catch basins, and location of connections and elevations where new drainage features tie into existing storm drains. Also, location and measurements of retained natural drainage features;
- c. Identification and location of water quality treatment measures and facilities and levels/standards of water quality intended to be achieved with treatment;

- d. Location and types of necessary dewatering controls (ditches, ditch blocks, etc.) to be used in construction and as part of finished design, to ensure maintenance of remaining wetland hydrology;

3. WATER QUALITY CONTROL PLAN.

A water quality control plan shall be submitted for all wetland construction projects and shall indicate, as necessary:

a. Measures that will be taken during construction for water quality maintenance. These measures must include, but are not limited to:

- 1) Placement of perimeter silt fence or other sediment control devices at the toe of any exposed fills;
- 2) Identification of the location, size, and depth, of stormwater and construction site runoff treatment settling ponds;
- 3) Identification of the location and type(s) of outlet features of water treatment for settling ponds, e.g., filtering swales; and
- 4) Identification of temporary construction and fill slope stabilization measures.

b. Measures that will be taken (by the applicant) for long-term site stabilization, including:

- 1) Minimum 2.5:1 slopes of fill which face or abut unfilled wetlands;
- 2) Slope blankets; and
- 3) Revegetation plans for exposed fills and slopes, including maintenance.

4. SITE RESTORATION AND STABILIZATION.

The following measures shall be included in any restoration plan submitted by an applicant, where the original wetland is being restored or enhanced:

- a. Final grading plan of disturbed and restored wetlands shall match remaining natural grades, or original grades as closely as practicable;
- b. Include revegetation plan for disturbed fills and wetlands. Shall utilize native species per original condition to maximum extent practicable, and/or match guidelines of the Municipality of Anchorage Standard Specifications (M.A.S.S.).

- c. Shall include topsoil placement, as necessary, on poorer soil areas, e.g., peat or silt, to insure revegetation.
- d. Proposed coverage of revegetation plans: recommend 90% coverage after one season, plus appropriate maintenance and replacement scenarios. Consult with the current M.A.S.S. for the latest applicable guidelines. Site-specific guidelines may be required.

5. MINIMIZATION AND HABITAT AVOIDANCE.

The following measures shall be included in design plans for General and Individual Section 404 Permits in order to minimize or avoid disturbance to wetlands and to wildlife use of an area:

- a. Cluster housing design [or Conservation Subdivision per “New” Code (January, 2014) 21.08.070] and transition buffer standards, following the Anchorage Municipal Code (Section 21.45), shall be used wherever feasible and prudent to modify residential densities in order to avoid fills in key wetland areas.
- b. Whenever practicable, commercial or residential subdivision design shall incorporate key wetland areas in separate tracts as open space or under other non-development designations.
- c. In larger wetlands, subdivision development and fills shall be phased, where possible, to minimize impacts. Phasing shall begin at the portion of a wetland furthest from known sections of higher value wetlands.
- d. General Permit and Individual Permit authorizations shall contain timing restrictions for fills, during the period from May 1 to July 15 in an effort to minimize impacts on nesting and migrant waterbirds.
- e. Equipment shall not be serviced nor stored in wetlands or near watercourses/ water bodies, nor shall equipment encroach beyond the project area, in accordance with AMC 15.40 or “New” Code (January, 2014) AMC 21.07.040F.2. and 21.07.040F.3.

Topic Title: Water Conservation

Resource Title: Wetlands Mitigation Requirements

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Bellingham

State: Washington

Date of Adoption: 2005, Amended 2016

Abstract: Wetlands Mitigation Requirements

Typically, in Bellingham, WA, development in or near wetlands is either prohibited or subject to strict buffer requirements. However, when development is deemed essential, this section of the Bellingham Municipal Code (BMC) outlines specific mitigation measures to offset its impact on wetlands. The code establishes a clear hierarchy of preferred actions, starting with wetland restoration as the top priority. If restoration isn't feasible, creating new wetlands, enhancing degraded wetlands, and, finally, preserving high-quality wetlands are considered in that order. As the mitigation measures become less protective, the burden of proof required by the municipality increases. This prioritization ensures that any development negatively affecting wetlands is effectively mitigated to protect these critical ecosystems. Critical areas, such as wetlands, provide many valuable functions in the face of climate change, like maintaining biodiversity of flora and fauna, protecting property from damage due to flooding, and conserving ground and surface waters.

Code Provisions:

[16.55.350 Mitigation requirements specific to wetlands](#) (see BMC 16.55.240, 16.55.250, and 16.55.260 for other mitigation requirements).

Compensatory mitigation for alterations to wetlands shall be used only for impacts that cannot be avoided or minimized and shall achieve equivalent or greater wetland functions. Mitigation plans shall be consistent with Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Ecology Publication No. 06-06-011b, Olympia, WA, March 2006 or as revised), and

Selecting Wetland Mitigation Sites Using a Watershed Approach (Western Washington), (Ecology Publication No. 09-06-32, Olympia, WA, December 2009).

A. *Preference of Mitigation Actions.* Mitigation actions shall occur in the following order of preference after mitigation sequencing has been applied (see BMC [16.55.510](#) for full definitions of creation, enhancement, preservation, rehabilitation, reestablishment, and restoration):

1. Restoration (reestablishment and rehabilitation) of wetlands. Reestablishing wetlands is returning natural or historic functions to a former wetland. Rehabilitation of wetlands is repairing natural or historic functions of a degraded wetland
2. Creation (establishment) of wetlands.
3. Enhancement of significantly degraded wetlands in combination with restoration or creation. Such enhancement should be part of a mitigation package that includes replacing the impacted area to meet appropriate ratio requirements.
4. Preservation of high quality, at-risk wetlands when done in combination with restoration, creation, or enhancement.

B. Specific Types of Mitigation. The following types of mitigation are fully defined in BMC 16.55.510, Definitions. In the interest of consistency, they are the definitions provided by the Army Corps of Engineers in its “Regulatory Guidance Letter 02-02.” They have also been adopted by the Washington State Department of Ecology. Each is considered a type of “restoration” as defined in BMC 16.55.510: reestablishment, rehabilitation, creation (establishment), enhancement, preservation (protection/maintenance).

For the purposes of this chapter, the mitigation categories are:

1. *Restoration.* This includes reestablishment or rehabilitation.
2. *Creation (establishment).* Wetlands on disturbed upland sites such as those with vegetative cover consisting primarily of nonnative introduced species. This should only be attempted when there is a consistent source of hydrology and it can be shown that the surface and subsurface hydrologic regime is conducive for the wetland community that is being created.
3. *Enhancement.* Unlike restoration activities, enhancement results in a change of wetland functions, not a net gain of function or wetland acres.
4. *Preservation.* Preservation in combination with other forms of mitigation is allowed. Preservation as the sole means of mitigation for wetland impacts may be allowed if the wetland area to be preserved meets all of the following criteria:
 - a. The preserved wetland and buffer are protected in perpetuity through a conservation easement, deed restriction, or dedication as a separate tract;
 - b. The area proposed for preservation is of high quality (scores between 20 and 27 points in the wetland rating system), is located in the same

watershed, and is critical to the health of the watershed or sub-basin. Some of the other high quality features include:

- i. Rare wetland types such as bogs, mature forested wetlands, estuaries, or vital wildlife habitat;
 - ii. High regional or watershed importance;
 - iii. Large size with high species diversity (plants and/or animals) and a high abundance;
- c. Preservation is used as a form of compensation only after the standard sequencing of mitigation (BMC 16.55.250) has been applied;
- d. Creation, restoration, and enhancement opportunities have also been considered and preservation is the best mitigation option;
- e. Preservation sites include buffer areas adequate to protect the habitat and its functions from encroachment and degradation;
- f. The impacts are to a Category II, III, or IV wetland;
- g. The preservation site is determined to be under imminent threat, specifically sites with the potential to experience a high rate of undesirable ecological change due to on- and/or off-site activities;
- h. Replacement ratios are listed in Table 16.55.350. Replacement ratios for preservation used in combination with other forms of mitigation are to be determined by the director.

C. Location of Compensatory Mitigation. Site selection for compensatory mitigation shall be based on a location that will provide the greatest ecological benefit and have the greatest likelihood of success. Where feasible, mitigation shall occur in the same sub-basin as the permitted wetland alteration. However, if it can be demonstrated that a mitigation site in an alternative sub-basin or watershed would provide a greater ecological benefit and offer a more successful replacement of wetland functions and values, compensatory mitigation may take place in an alternative sub-basin or watershed. If a mitigation bank or in-lieu fee program is proposed for the required mitigation, documentation shall be provided that demonstrates there is an ecological benefit. The documentation shall also include how locating the mitigation out of the sub-basin or watershed will not impact other nearby critical areas.

D. *Mitigation Banking.* Mitigation banking is allowed for compensatory mitigation when all of the following are met:

1. The bank is certified under state rules;
2. The proposal to use the mitigation bank meets the certified banking instrument criteria; 3. Documentation is provided with the proposal that an alternatives analysis pursuant to BMC 16.55.210(C)(7) has been completed;
4. Documentation that mitigation sequencing pursuant to BMC 16.55.250 has been adhered to;
5. Documentation is provided that the bank is ecologically preferable and will provide a more successful replacement of wetland functions and values; and
6. The director determines that the wetland bank provides appropriate compensation for impacts.

E. *In-Lieu Fee Mitigation.* Development or use of an in-lieu fee program is allowed if the program is established consistent with federal and state regulations and policies. Using credits from an approved in-lieu-fee program shall be consistent with mitigation sequencing pursuant to BMC 16.55.250 and with state criteria.

F. *Mitigation Ratios.* The ratios in Table 16.55.350 and consideration of factors described in this section shall be used to determine the relative amount of created, reestablished, restored, or enhanced wetlands that will be required to replace impacted wetlands. The first number refers to the amount of wetland area providing mitigation and the second refers to the amount of wetland area impacted or altered. If a mitigation bank or in-lieu program is used for

mitigation requirements, wetland replacement ratios are not applied. The mitigation bank credit system, or in-lieu fee program credit system, whichever applies, is used to determine the number and cost of the credits to be purchased to fulfill mitigation requirements.

1. *Provisions for Increasing or Decreasing Ratios.* The director may increase or decrease the ratios based on one or more of the following:

- a. Replacement ratios may be increased under the following circumstances:
 - i. Uncertainty exists as to the probable success of the proposed restoration or creation;

- ii. A significant period of time will elapse between impact and establishment of wetland functions at the mitigation site;
- iii. Proposed compensation will result in a lower category wetland or reduced functions relative to the wetland being impacted; or
- iv. The impact was an unauthorized impact.

b. Replacement ratios may be decreased under the following circumstances:

- i. The proposed mitigation actions are conducted in advance of the impact and are shown to be successful;
- ii. Documentation by the applicant demonstrates that the proposed compensation actions will provide functions and values that are significantly greater than the wetland being impacted; or
- iii. Documentation by the applicant provides more certainty that the proposed compensation action will be successful. Documentation could include extensive hydrologic data to support the proposed water regime.

2. *Credit/Debit Method.* As an alternative to using mitigation ratios for calculating mitigation requirements, the director may allow mitigation based on the “credit/debit” method as described in Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Western Washington: Final Report (Ecology Publication No. 10-06-011, Olympia, WA, March 2012, or as revised).

G. *Mitigation Report Requirements.*

1. *Prepared by a Qualified Professional.* A wetland mitigation report shall be prepared by a qualified professional in accordance with BMC 16.55.510.

2. *Report Requirements.*

- a. Detailed summary of the project, including the wetland and buffer impacts and the proposed mitigation, to appear in the beginning of the report;
- b. Complete site characterization to include parcel size, soils, vegetation, hydrology, wildlife, and topography;
- c. Complete site characterization of the proposed mitigation site to include parcel size, soils, vegetation, hydrology, topography and wildlife;
- d. Goals, objectives, and performance standards of the mitigation proposal;

- e. A mitigation implementation schedule that includes the sequence and timelines of tasks to fully implement the mitigation plan;
- f. Monitoring and maintenance for a minimum of five consecutive years, and a contingency plan;
- g. Function assessment of wetland to be impacted;
- h. Delineation report, with maps, of site to be impacted;
- i. Map of development, with scale, overlaid on wetland delineation map; and
- j. A detailed, line-item estimate of the total costs to complete the approved mitigation plan including, but not limited to, a minimum of five years of monitoring and maintenance, shall be submitted for approval for the required financial surety for the project. The total estimate shall be multiplied by 150 percent. [Ord. 2016-02-005 § 26; Ord. 2005-11-092].

Topic Title: Water Conservation

Resource Title: Wetlands Transfer of Development Rights

Resource Type: Supplemental Substantive Zoning Provisions

Municipality: Key West

State: Florida

Date of Adoption: 1986

Abstract: Wetlands Transfer of Development Rights

Given its proximity to the water and its vulnerability to a changing climate, the City of Key West has long recognized the value of protecting ecosystems such as coastal wetlands and mangrove forests. In 1986, the City established a transfer of development rights (TDR) program specifically for environmentally sensitive areas vital to water conservation and wetlands protection. Like many conventional TDR programs, property owners in “receiving districts” make payments to property owners in “sending districts,” whose right to development is limited due to the nature of their property. The idea is to direct future growth away from critical ecosystems and toward suitable areas in the city while adhering to the city’s comprehensive plan and adopted land use regulations. The City’s TDR program is a win-win-win situation; development is still allowed to proceed in the aggregate, impacted property owners are duly compensated, and lands crucial to water conservation are protected for decades to come.

Code Provisions:

ARTICLE XI. - TRANSFER OF DEVELOPMENT RIGHTS

Sec. 108-1126. - Definitions

[This section defines several key terms. A conservation area includes environmentally sensitive lands like wetlands and mangroves. A density bonus allows more development than typically permitted. Development rights may be severed from a sending area and transferred to a receiving area. A parcel refers to any defined tract of land, and wetlands are areas with water-saturated soils that support specific vegetation.]

Sec. 108-1127. - Findings

The city commission makes the following findings:

1. The city, pursuant to F.S. ch. 163, part II, and F.A.C. ch. 9J-5, adopted a comprehensive plan as required by state law;

2. The city, pursuant to F.S. § 163.3202(1), is required to adopt land development regulations that are consistent with and implement the adopted comprehensive plan;
3. In addition to the mandates and authority under F.S. ch. 163, part II, and F.A.C. ch. 9J-5, the department of community affairs, the state land planning agency (referred to as the "DCA"), brought an action against the city in the state division of administrative hearings (DOAH), Case No. 92-0515GM, pursuant to F.S. § 163.3184(10);
4. Pursuant to F.S. § 163.3184(16), the department of community affairs and the city entered into a stipulated settlement agreement which provides remedial action to bring the city comprehensive plan into compliance with F.S. ch. 163, part II; and
5. The comprehensive plan has identified the protection of environmentally sensitive areas as a primary goal and has adopted policies to achieve this goal (policies 1-2.1.1 and 1-2.4.1 of the future land use element of the comprehensive plan pertaining to goals, objectives, and policies). These policies provide for the establishment and implementation of a system for transferring development rights as a method of preserving environmentally sensitive areas.

Sec. 108-1128. - Purpose and intent

The purpose and intent of this article is to recognize that there are environmentally sensitive lands designated as conservation areas pursuant to the city comprehensive plan which warrant protection in their undeveloped, natural state. Further, it is the purpose and intent of this article to provide an alternative to development of these environmentally sensitive lands by providing a mechanism for owners having legal and/or equitable interest in such lands to seek economic relief from the limitations of development on their lands by encouraging the use of the transfer of development rights concept. The transfer of development rights concept is designed to direct future growth toward specific areas of the city which can accommodate new development in a manner consistent with the city's comprehensive plan and land development regulations.

Sec. 108-1129. - Applicability

This article shall apply to the city and shall regulate development rights within a specific sending area and receiving area, as defined in this article and as delineated on the city's future land use map.

Sec. 108-1130. - Penalty

Any person who violates any section of this article shall upon conviction be punished as provided in section 1-15 pursuant to F.S. § 162.21. Such person also shall pay all costs and

expenses involved in the case. Each day such violation continues shall be considered a separate offense.

Sec. 108-1131. - Description of sending and receiving areas

1. *Description of sending area.* For the purposes of this article, the sending area is any environmentally sensitive parcel in the Salt Pond area, which is designated as a "conservation area" on the future land use map (FLUM) and in policy 1-2.4.1 of the comprehensive plan pertaining to goals, objectives, and policies. The future land use map designations that identify parcels in the sending area are as follows:
 1. C-OW outstanding waters of the state;
 2. C-FW freshwater wetlands;
 3. C-TW tidal wetlands of the state; and
 4. CM mangrove.
2. *Description of receiving area.* The receiving area is any parcel located within the Key West Bight (Caroline Street Corridor) Redevelopment Area, which is designated as "HRCC-2" on the future land use map.

Sec. 108-1132. - Concepts

1. *Legal concept.* Transfers of development rights (TDRs) are based upon the property law concept that the right to develop real estate is one of the bundle of rights included in fee simple ownership of land. Fee simple ownership of land allows the owner to sell, lease, or trade any one or all of the bundle of rights associated with that property. A bundle of rights includes the right to use, lease, sell, or abandon the property or any of its components of ownership not retained by a previous owner such as mineral, oil, gas, air, and/or development rights. These rights or ownership are subject to the limitation and legislative powers of the local government.
2. *Development rights.* A development right is a simple extension of the rights normally associated with land ownership. When legally established a development right has value separate from the land itself. It can be subject to reasonable regulation by the local government under the police power. The development rights of one property can be transferred, sold or given by the owner to another property. The landowner may sell the development rights and still retain the title to the land; however, the right to use the surface of the land, even on a limited basis, is strictly prohibited.
3. *Computation of units.* The computation of the transfer of development rights units shall be as follows:
 1. *Density in sending areas.* Transferred development rights within sending areas are established at a ratio of one dwelling unit per acre.
 2. *Density in receiving areas.* The base density in receiving areas shall be eight units per gross acre. The density can increase to 12 units per gross acre using the transfer of development rights process and provided that the owner/developer certifies that a minimum of 40 percent of the residential units shall be constructed and maintained in

perpetuity as affordable housing units. Affordable housing shall be occupied only by households meeting the criteria established in F.S. § 420.9071(3). Similarly, affordable housing units shall maintain rents and mortgage structures consistent with the provisions of F.S. § 420.9071(3). Under the transfer of development rights process, the density can be increased to 20 units per gross acre, provided that the owner/developer certifies that 100 percent of the residential units constructed shall be maintained in perpetuity as affordable housing units.

3. *Rounding off fractions.* If there is a fractional transferred development right, it shall be converted upward to the next whole number if one-half or more, and converted downward to the nearest whole number if less than one-half.

Sec. 108-1133. - Application

1. Any owner of land in the sending area may apply for a transfer of development rights either separately or concurrently with a site plan for their use within the receiving area as provided for in this article.
2. The applicant for a transfer of development rights shall submit to the planning department the following information and data on an application, the form to be established by the planning department:
 1. A transfer of development rights application which includes the name and address of the owner of the property in the sending area and the name and address of the owner of the property in the receiving area.
 2. Legal description and survey of the parcel in the sending area from which the transfer of development rights will be severed.
 3. Legal description and survey of the parcel in the receiving area which will acquire the transferred development rights.
 4. Data supporting the computation of available development rights connected with the proposed sending area.
 5. Data supporting the ability of the proposed receiving area to accommodate the proposed transfer of development rights.
 6. A conservation easement, in a format acceptable to the city attorney, stating that the parcel in the sending area will be forever retained in its natural condition and will never be developed in any manner whatsoever by anyone. Natural conditions include minor nature-related improvements such as nature paths, elevated boardwalks and outdoor educational learning areas. The easement shall be dedicated to the city or to a trustee approved by the city. The easement shall be approved by the city commission along with the application. The easement shall be recorded with the clerk of the circuit court of the county as a recorded restriction on the use of the subject parcel and shall be binding to all present and subsequent owners, heirs, or assigns of such parcel. Such restrictions may not be amended, deleted

or otherwise altered except by an affirmative vote of all members of the city commission.

Sec. 108-1134. - Review of application.

1. *Review by administrative official.* The city planner or other city administrative official designated by the city manager shall review the application for transfer of development rights and supporting documentation for completeness and compliance with this article. The city planner's review shall include but is not limited to the following:
 1. Verify the legal description of all parcels cited within the application, including confirmation of their location within the respective sending or receiving area as defined in the comprehensive plan.
 2. Verify the total number of development rights which can be transferred, and verify that the sending parcel has not previously transferred available development rights.
 3. Verify that the ratio of affordable housing units proposed to be constructed is consistent with the comprehensive plan.
 4. Verify the accuracy of the existing and proposed density on the specified receiving area to determine its ability to accommodate the proposed transferred development rights within the maximum density cap and to determine that it is consistent with the comprehensive plan.
 5. Review the application for compliance with the comprehensive plan and the land development regulations.
 6. Ensure appropriate legal instruments have been submitted to identify and preserve the required conservation easement.
2. *Review by city commission.* If the application is found to be complete and in compliance with the comprehensive plan and this article, the city planner or other designated administrative official shall forward the application with a staff evaluation to the city commission which shall have final authority to approve, approve with conditions or deny the transfer of development rights. If the application is incomplete and/or not in compliance with this article or the comprehensive plan, the city planner shall notify the applicant in writing of the deficiencies. The applicant may then correct the deficiencies and resubmit the application.
3. *Recording.* The applicant, upon receiving approval from the city commission, shall record the deed of transfer and the conservation easement with the clerk of circuit court of the county. The deed of transfer shall convey the transferred development rights from the property in the sending area to the property in the receiving area. No sale of any parcel that has been the object of a transfer of development rights shall be deemed legal until such transfer of development rights has been approved by the city and a deed of transfer together with the conservation easement have been recorded with the county. The applicant shall be responsible for providing the city with two recorded deeds of transfer as well as the conservation easement. The city

clerk and the planning department shall each receive one of the deeds of transfer and the conservation easement, respectively.

4. *Site plans.* No development of the specified receiving area shall be approved until a site plan has been submitted by the applicant and approved by the city pursuant to the applicable land development regulations. When a site plan for a property which has received transferred development rights is submitted for review, the applicant shall include a recorded deed of transfer for each of the development rights which have been secured to the property. The planning department shall verify that the sending parcel has not transferred development rights to another parcel on a previous occasion.

Sec. 108-1135. - Monitoring.

1. *Method for tracking transfer of development rights.* The city shall maintain a tracking system to record and monitor the transfer of development rights, which shall be maintained by the planning department.
2. *Records.* Each parcel included within a deed transferring development rights shall have an individual record. Each record shall at a minimum include the following information:
 1. Name and address of the property owner;
 2. Address and legal description;
 3. Zoning classification and land use designation on the future land use map;
 4. Number of development rights transferred to or from the subject parcel;
 5. Area of the parcel;
 6. Density allowed on the property prior to the transfer of development rights and after approval of the transfer of development rights;
 7. Number of affordable housing units linked to the property;
 8. Date of city commission approval;
 9. Date the deed of transfer and conservation easement were recorded;
 10. Date of site plan approval and date of building permit issuance; and
 11. Each entry shall include a description of the corresponding property which received or transferred development rights to the subject parcel.
3. *Map.* The planning department shall maintain a map indicating the parcels within the sending area that have transferred development rights as well as the parcels within the receiving area that acquired development rights.

Topic Title: Water Conservation

Resource Title: Wetland Board of Appeals

Resource Type: Special Interest Land Use Boards - Powers and Duties

Municipality: Middleton

State: Wisconsin

Date of Adoption: 2012

Abstract: Wetland Board of Appeals

In 2012, the city of Middleton, WI passed an ordinance adopting zoning requirements for wetland areas. One of the more innovative sections within the wetland zoning code is the establishment of the Wetland Board of Appeals. This special interest land use board has 5 members, all of which need to be confirmed by the City Council. The WBA is tasked with hearing and rendering decisions on appeals, conditional use permits, variances, and enforcement actions in relation to the wetland zoning code. They are additionally required to hold public hearings. Wetlands are important for mitigating climate change because of their ability to store nutrients that could cause harmful algal blooms or hypoxia in rivers, their capacity to hold rainwater and runoff that would otherwise cause flooding, and their capability to sequester carbon. By creating the WBA, Middleton is ensuring that land use decisions impacting these critical ecosystems are made by professionals, with appropriate oversight and accountability.

Code Provisions:

29.05 ADMINISTRATIVE PROVISIONS - (8) Wetland Board of Appeals

(a) For the purposes of this ordinance the Mayor shall appoint a Wetland Board of Appeals consisting of five members subject to confirmation by the Common Council. The structure of this Board shall be: one member each from the Plan Commission, Public Works Committee, Water Resources Management Commission, and Park, Recreation and Forestry Commission, and one citizen member. The terms of their appointment shall be as set forth in Wis. Stat. s. 62.23(7)(e)3. The Wetland Board of Appeals shall adopt rules for the conduct of its business as required by Wis. Stat. s. 62.23(7)(e)3.

(b) Powers and Duties. The Wetland Board of Appeals:

1. Shall hear and decide appeals where it is alleged there is error in any order, requirement, decision or determination made by an administrative official in the enforcement or administration of this ordinance.

2. Shall hear and decide applications for conditional use permits.
3. May authorize upon appeal a variance from the dimensional standards of this ordinance where an applicant convincingly demonstrates:
 - (i) That literal enforcement of the terms of the ordinance will result in unnecessary hardship for the applicant.
 - (ii) That the hardship is due to special conditions unique to the property; and is not self-created or based solely on economic gain or loss;
 - (iii) That such variance is not contrary to the public interest as expressed by the purpose of this ordinance; and
 - (iv) That such variance will not grant or increase any use of property which is prohibited in the zoning district.

(c) Appeals to the Board

Appeals to the Wetland Board of Appeals may be taken by any person aggrieved by an officer, department or committee/commission of the City affected by any order, requirement, decision or determination of the zoning administrator or other administrative official. Such appeals shall be taken within a reasonable time, as provided by the rules of the Board by filing with the official whose decision is in question shall transmit to the Board all the papers constituting the record on the matter appealed.

(d) Public Hearings

1. Before making a decision on an appeal or application, the Wetland Board of Appeals or the Plan Commission shall, within a reasonable period of time, hold a public hearing. The Board shall give public notice of the hearing by publishing a Class 2 notice under Wis. Stat. Chapter 985, specifying the date, time and place of the hearing and the matters to come before the Board. At the public hearing, any party may present testimony in person, by agent or by attorney.
2. A copy of such notice shall be mailed to the parties in interest at least 10 days prior to all public hearings on issues involving wetland zoning. A copy shall also be sent to the Southern District Headquarters of the Department at

least 10 days prior to all public hearings on issues involving shoreland-wetland zoning.

(e) Decisions

1. The final disposition of an appeal or application for a conditional use permit before the Wetland Board of Appeals or the Plan Commission shall be in the form of a written decision, made within 15 days after the public hearing and signed by the Board Chairperson. Such decision shall state the specific facts which are the basis of the Board's determination and shall either affirm, reverse, or modify the order, requirement, decision or determination appealed, in whole or in part, dismiss the appeal for lack of jurisdiction or prosecution, or grant the application for a conditional use.
2. A copy of such decision shall be mailed to the parties in interest and the South District Headquarters of the Department within 10 days after the decision is issued if the decision involves a shoreland-wetland area.

Category III: Surface/Groundwater Conservation

Topic Title: Water Conservation

Resource Title: Creek Watershed and River Sub-Basin Stormwater Management

Resource Type: Special Topic Plan or Area Plan

Municipality: Northampton

State: Pennsylvania

Date of Adoption: 2020

Abstract: Creek Watershed and River Sub-Basin Stormwater Management

This highly detailed and technical ordinance serves to protect both quality and quantity of surface waters and groundwater in the Hokendauqua Creek Watershed in the borough of Northampton, Pennsylvania by providing very specific requirements for proactively managing stormwater runoff. Under the authority of Northampton's Borough Code, Stormwater Management Act, and Act of October, the ordinance is designed to "[m]anage stormwater runoff impacts at their source by regulating activities which cause such problems" and "[e]ncourage infiltration of stormwater, where appropriate, to maintain groundwater recharge, to prevent degradation of surface and groundwater quality and to otherwise protect water resources" and applies to both residential and non-residential properties after construction has completed. This ordinance considers the topography, soils, and geology in Northampton, and provides customized stormwater runoff infiltration requirements for carbonate, non-carbonate, and combination carbonate/non-carbonate land. Subsection O of the ordinance provides a selection of twelve Best Management Practices (BMPs) for safe infiltration of stormwater as well as a collection of nineteen reports, studies, and design guides to help individuals research, design, and implement the most appropriate BMPs for their property.

Code Provisions:

Borough of Northampton, PA

Chapter 203 - Stormwater Management

Article II - Hokendauqua Creek Watershed and Lehigh River Sub-Basin 3

§ 203-39 Postconstruction water quality criteria. No regulated earth disturbance activities within the municipality shall commence until approval by the municipality of a drainage plan which demonstrates compliance with this article. This article provides standards to meet NPDES permit requirements associated with construction activities and MS4 permit requirements.

- A. The Water Quality Volume (WQv) shall be captured and treated... *[explaining how the WQv should be calculated two different ways, and requiring that the larger of these two calculated volumes be used as the WQv to be captured and treated, clarifying that no volume above 1.25 inches of runoff over the site area is permitted]*
- B. The WQv shall be calculated for each post-development drainage direction on a site for sizing BMPs *[Best Management Practices]*. Site areas having no impervious cover and no proposed disturbance during development may be excluded from the WQv calculations and do not require treatment.
- C. If an applicant is proposing to use a [...] BMP that ponds water on the land surface and may receive direct sunlight, the discharge from that BMP must be treated by *[another]* BMP that provides a thermal benefit to protect the high quality waters of the Hokendauqua Creek and Lehigh River Sub-basins from thermal impacts.
- D. The WQv for a site as a result of the regulated activities must either be treated with infiltration or two acceptable BMPs such as those listed in Subsection O, except for minor areas on the periphery of the site that cannot reasonably be drained to an infiltration facility or other BMP.
- E. Infiltration BMPs shall not be constructed on fill unless the applicant demonstrates that the fill is stable and otherwise meets the infiltration BMP standards of this article.
- F. The applicant shall document the bedrock type(s) present on the site from published sources. Any apparent boundaries between carbonate and noncarbonate bedrock shall be verified through more detailed site evaluations by a qualified geotechnical professional.
- G. For each proposed regulated activity in the watershed where an applicant intends to use infiltration BMPs, the applicant shall conduct a preliminary site investigation, including gathering data from published sources, a field inspection of the site, a minimum of one test pit and a minimum of two percolation tests, as outlined in Appendix G. This investigation will determine depth to bedrock, depth to the seasonal high water table, soil permeability and location of special geologic features, if applicable. This investigation may be done by a certified Sewage Enforcement Officer (SEO), except that the location(s) of special geologic features shall be verified by a qualified geotechnical professional. [...]
- H. Sites where applicants intend to use infiltration BMPs must meet the following criteria:
 - (1) Depth to bedrock below the invert of the BMP *[at least 2 feet]*.
 - (2) Depth to seasonal high water table below the invert of the BMP *[at least 3 feet]*
[exceptions for residential roof runoff where seasonal high water table is below invert of BMP, and for where depth to bedrock is 2-3 feet and seasonal high water table unclear from soil analysis]
 - (3) Soil permeability [...] greater than or equal to 0.5 inch/hour and less than or equal to 12 inches per hour. [...]
 - (4) Setback distances or buffers as follows... *[(a) 100 feet from water supply wells; (b) 15 feet downgradient or 100 feet upgradient from non-residential building foundations, 15 feet downgradient or 40 feet upgradient from residential building foundations; (c) 50 feet from non-residential septic system drainfields, 25 feet from residential septic system drainfields; (d) 50 feet from carbonate bedrock unless site*

investigation shows absence of special geologic features within 50 feet of proposed infiltration area (e) 100 feet from property line for non-residential and residential 3+ family homes unless documentation shows existing or future wells, foundations, and drainfields of neighboring properties meets criteria (a)-(c), 40 feet from property line for 1- and 2-family homes unless documentation shows existing or future wells, foundations, and drainfields of neighboring properties meets criteria (a)-(c)]

- I. For entirely noncarbonate sites, the Recharge Volume (REv) shall be infiltrated unless the applicant demonstrates that it is infeasible to infiltrate the REv for reasons of seasonal high water table, permeability rate, soil depth or setback distances; or except as provided in Subsection U.
 - (1) The REv shall be calculated as follows: $REv = (0.25) * (I) / 12$; where REv = Recharge Volume in acre-feet and I = Impervious area in acres
 - (2) The preliminary site investigation described in Subsection H is required and shall continue on different areas of the site until a potentially suitable infiltration location is found or the entire site is determined to be infeasible for infiltration. For infiltration areas that appear to be feasible based on the preliminary site investigation, the additional site investigation and testing as outlined in Appendix G[3] shall be completed. [...]
 - (3) If an applicant proposes infiltration, the municipality may determine infiltration to be infeasible if there are known existing conditions or problems that may be worsened by the use of infiltration.
 - (4) The site must meet the conditions listed in Subsection I.
 - (5) If it is not feasible to infiltrate the full REv, the applicant shall infiltrate that portion of the REv that is feasible based on the site characteristics. If none of the REv can be infiltrated, REv shall be considered as part of the WQv and shall be captured and treated as described in Subsection O.
 - (6) If REv is infiltrated, it may be subtracted from the WQv required to be captured and treated.
- J. In entirely carbonate areas, where the applicant intends to use infiltration BMPs, the preliminary site investigation described in Subsection H shall be conducted. For infiltration areas that appear feasible based on the preliminary site investigation, the applicant shall conduct the additional site investigation and testing as outlined in Appendix G.[4] The soil depth, percolation rate and proposed loading rate, each weighted as described in § 203-42, along with the buffer from special geologic features, shall be compared to the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix D[5] to determine if the site is recommended for infiltration. In addition to the recommendation from Appendix D, the conditions listed in Subsection I are required for infiltration in carbonate areas. Applicants are encouraged to infiltrate the REv, as calculated in Subsection J, but are not required to use infiltration BMPs on a carbonate site even if the site falls in the "Recommended" range on the chart in Appendix D. Any amount of volume infiltrated can be subtracted from the WQv to be treated by noninfiltration BMPs. If infiltration is not proposed, the full WQv shall be treated by two acceptable BMPs, as specified in Subsection O. [...]

- K. If a site has both carbonate and noncarbonate areas, the applicant shall investigate the ability of the noncarbonate portion of the site to fully meet this article to meet the requirements for REv for the whole site through infiltration. If that proves infeasible, infiltration in the carbonate area as described in Subsection K or two other noninfiltration BMPs as described in Subsection O must be used. No infiltration structure in the noncarbonate area shall be located within 50 feet of a boundary with carbonate bedrock, except when a preliminary site investigation has been done showing the absence of special geologic features within 50 feet of the proposed infiltration area.
- L. If infiltration BMPs are proposed in carbonate areas, the postdevelopment two-year runoff volume leaving the site shall be 80% or more of the predevelopment runoff volume for the carbonate portion of the site to prevent infiltration of volumes far in excess of the predevelopment infiltration volume.
- M. Site areas proposed for infiltration shall be protected from disturbance and compaction except as necessary for construction of infiltration BMPs.
- N. If infiltration of the entire WQv is not proposed, the remainder of the WQv shall be treated by two acceptable BMPs in series for each discharge location. Sheet flow draining across a pervious area can be considered as one BMP. Sheet flow across impervious areas and concentrated flow shall flow through two BMPs. If sheet flow from an impervious area is to be drained across a pervious area as one BMP, the length of the pervious area must be equal to or greater than the length of impervious area. In no case may the same BMP be employed consecutively to meet the requirement of this section. Acceptable BMPs are listed below along with the recommended reference for design.

Best Management Practice	Design Reference Numbers
Bioretention ^A	4, 5, 11, 16
Capture/reuse ^B	4, 14
Constructed wetlands	4, 5, 8, 10, 16
Dry extended detention ponds	4, 5, 8, 12, 18
Minimum disturbance/minimum maintenance practices	1, 9
Significant reduction of existing impervious cover	N/A
Stormwater filters ^A (sand, peat, compost, etc.)	4, 5, 10, 16
Vegetated buffers/filter strips	2, 3, 5, 11, 16, 17
Vegetated roofs	4, 13
Vegetated swales ^A	2, 3, 5, 11, 16, 17
Water quality inlets ^D	4, 7, 15, 16, 19
Wet detention ponds	4, 5, 6, 8

NOTES:

- A. This BMP could be designed with or without an infiltration component. If infiltration is proposed, the site and BMP will be subject to the testing and other infiltration requirements in this article.

- B. If this BMP is used to treat the entire WQv, then it is the only BMP required because of this BMP's superior water quality performance.
- C. See table below.
- D. Water quality inlets include such BMPs as oil/water separators, sediment traps/catch basin sumps, and trash/debris collectors in catch basins.

Number	Design Reference Title
1	"Conservation Design For Stormwater Management — A Design Approach to Reduce Stormwater Impacts From Land Development and Achieve Multiple Objectives Related to Land Use," Delaware Department of Natural Resources and Environmental Control, The Environmental Management Center of the Brandywine Conservancy, September 1997.
2	"A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in the Coastal Zone," Schueler, T. R., Kumble, P. and Heraty, M., Metropolitan Washington Council of Governments, 1992.
3	"Design of Roadside Channels with Flexible Linings," Federal Highway Administration, Chen, Y.H. and Cotton, G.K., Hydraulic Engineering Circular 15, FHWA-IP-87-7, McLean Virginia, 1988.
4	"Draft Stormwater Best Management Practices Manual," Pennsylvania Department of Environmental Protection, January 2005.
5	"Evaluation and Management of Highway Runoff Water Quality," Federal Highway Administration, FHWA-PD-96-032, Washington, D.C., 1996.
6	"Evaporation Maps of the United States," U.S. Weather Bureau (now NOAA/National Weather Service) Technical Paper 37, Published by Department of Commerce, Washington D.C., 1959.
7	"Georgia Stormwater Manual," AMEC Earth and Environmental, Center for Watershed Protection, Debo and Associates, Jordan Jones and Goulding, Atlanta Regional Commission, Atlanta, Georgia, 2001.
8	"Hydraulic Design of Highway Culverts," Federal Highway Administration, FHWA HDS 5, Washington, D.C., 1985 (revised May 2005).
9	"Low Impact Development Design Strategies An Integrated Design Approach, Prince Georges County, Maryland Department of Environmental Resources, June 1999.
10	Maryland Stormwater Design Manual," Maryland Department of the Environment, Baltimore, Maryland, 2000.
11	"Pennsylvania Handbook of Best Management Practices for Developing Areas," Pennsylvania Department of Environmental Protection, 1998.
12	"Recommended Procedures for Act 167 Drainage Plan Design," LVPC, Revised 1997.
13	"Roof Gardens History, Design, and Construction," Osmundson, Theodore. New York: W.W. Norton & Company, 1999.
14	"The Texas Manual on Rainwater Harvesting," Texas Water Development Board, Austin, Texas, Third Edition, 2005.
15	"VDOT Manual of Practice for Stormwater Management," Virginia Transportation Research Council, Charlottesville, Virginia, 2004.

16	"Virginia Stormwater Management Handbook," Virginia Department of Conservation and Recreation, Richmond, Virginia, 1999.
17	"Water Resources Engineering," Mays, L.W., John Wiley & Sons, Inc., 2005.
18	"Urban Hydrology for Small Watersheds," Technical Report 55, US Department of Agriculture, Natural Resources Conservation Service, 1986.
19	U.S. EPA, Region 1 New England website (as of August 2005) http://www.epa.gov/NE/assistance/ceitts/stormwater/techs/html

- O. *[explaining that any hotspot land uses (such as garages, gas stations, commercial nurseries, salvage yards, recycling facilities, etc.) must pretreat stormwater and then meet the requirements of Subsection O, then providing a list of appropriate pretreatment methods based on the category of hotspot land use]*
- P. The use of infiltration BMPs is prohibited on hotspot land use areas.
- Q. Stormwater infiltration BMPs shall not be placed in or on a special geologic feature(s). Additionally, stormwater runoff shall not be discharged into existing on-site sinkholes.
- R. Applicants shall request, in writing, public water suppliers to provide the Zone 1 Wellhead Protection radius, as calculated by the method outlined in the Pennsylvania Department of Environmental Protection Wellhead Protection regulations, for any public water supply well within 400 feet of the site. In addition to the setback distances specified in Subsection I, infiltration is prohibited in the Zone I radius as defined and substantiated by the public water supplier in writing. If the applicant does not receive a response from the public water supplier, the Zone I radius is assumed to be 100 feet.
- S. The volume and rate of the net increase in stormwater runoff from the regulated activities must be managed to prevent the physical degradation of receiving waters from such effects as scour and streambank destabilization, to satisfy state water quality requirements, by controlling the two-year post-development runoff to a 30% release rate.
- T. The municipality may, after consultation with DEP, approve alternative methods for meeting the state water quality requirements other than those in this section, provided that they meet the minimum requirements of and do not conflict with state law including but not limited to the Clean Streams Law.

Topic Title: Water Conservation

Resource Title: Local Surface Water Management Plan

Resource Type: Special Topic Plan or Area Plan

Municipality: Woodbury

State: Minnesota

Date of Adoption: 2019

Abstract: Local Surface Water Management Plan

The city of Woodbury, Minnesota created its Surface Water Management Plan (SWMP) in connection with the city's comprehensive plan, and to meet the requirements of Minnesota Statute 103B and Minnesota Rule 8410. The SWMP is a forward-looking document that provides an assessment of the current state of surface and groundwater in Woodbury, identifies existing and potential future water management issues, and then proffers a series of solutions. Both the problems and solutions offered in the SWMP are organized into four categories – resilience, quantity, quality, and planning for the future. The entire plan is built around the city's "One Water" vision, which recognizes and intentionally incorporates the connection among surface water, groundwater, and drinking water into all facets of the SWMP.

The first five chapters of the SWMP meticulously lay out the physical setting, the regulatory setting, enabling conditions including other agencies and city plans that relate to the SWMP, and currently operational water management agreements. Chapter 6 details existing and potential future water management issues, Chapter 7 identifies goals and policies to address those issues, and Chapter 8 outlines implementation priorities for those goals and policies. Chapter 9 describes how the SWMP is reviewed, adopted, and amended. The excerpt below is a set of resilience goals and policies from Chapter 7 that highlight the city's commitment to the "One Water" vision, to shifting perspective on stormwater from nuisance to resource, and to preparing for climate-change induced intense storm events.

Code Provisions:

City of Woodbury, MN

[2040 Local Surface Water Management Plan](#)

Chapter 7

7.1 Resilience

Goal: *Design the surface water system to mimic nature by integrating stormwater into development and utilizing it as a resource, not a nuisance.*

Goal: *Design the surface water system to withstand greater than design events through the creative use of transient storage, freeboard, multi-stage outlets, defined overflow routes and emergency response.*

In addition to meeting permit requirements, stormwater features can provide all or part of a solution to other issues. For instance, including a green roof reduces the total volume of runoff and reduces building heating and cooling costs. Creating green space that provides stormwater management adds an aesthetic amenity that the community values, can increase public support for sustainable stormwater management, and increases property values.

Increasing rainfall the last few decades, means Woodbury's flood control design has evolved to an even greater capacity. Resilient design anticipates that rainfall intensity and frequency may continue increasing and a well-designed system has redundant capacity.

Policies:

1. Design and maintain the surface water system to accomplish multiple goals; including the management of water quality and quantity, and utilizing storm water as an amenity.
2. Manage stormwater in ways that promote groundwater recharge and protect drinking water and wells.
3. Inform and educate the public on surface water protection and the impacts of urban stormwater on water resources.
4. Build new stormwater systems to Atlas 14 standards, retrofit existing systems as opportunities arise, and cost-benefit supports.
5. Provide specific management strategies for landlocked basins through its Stormwater Design Guide.
Pursue a neighborhood-focused implementation program that identifies water quality and quantity projects, in conjunction with street reconstruction projects.

Topic Title: Water Conservation

Resource Title: Riparian Buffer Development Standards

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Greenville

State: Illinois

Date of Adoption: 2013

Abstract: Riparian Buffer Development Standards

Greenville is located in Bond County, Illinois, forty-five miles east of St. Louis, Missouri. It is situated along Shoal Creek, which flows into the Kaskaskia River, a tributary of the Mississippi River. Riparian buffers are areas that run along a stream or river, and they increase resilience to climate change by preventing erosion, capturing agricultural runoff, and aiding in flood control. Greenville adopted the Development Standards in Riparian Buffers Ordinance, which sets guidelines for managing land use within riparian buffer zones to protect water quality, mitigate flooding, and support wildlife habitats. The standards regulate stormwater discharge, the location of streets, driveways, and utility lines, as well as the installation of water and sewage systems. Additionally, the ordinance promotes rainwater capture and other green infrastructure techniques within riparian buffer zones.

Code Provisions:

Greenville, Illinois Code of Ordinances,

Greenville, IL, Ordinance 3085, Ch. 153: Unified Development Code, Division 13:
Environmental Protection Of Critical Areas - Riparian Buffers

§153.1239 Development Standards In Riparian Buffers.

§ 153.1239 Development Standards In Riparian Buffers. (repealed)

The following standards and criteria shall apply to any portion of a development or, as appropriate, to any land disturbance, within the riparian buffers.

(A) No storm water discharge is permitted directly off an impervious surface into a stream channel.

(B) Streets and driveways shall be located, as much as practicable, parallel to the flow of waters. Where a street, driveway or utility line necessarily must cross a watercourse, such crossing shall be located and designed to allow convenient access by wildlife through and beyond such crossing, and shall be designed to safely convey flood waters to the same extent as before construction of said crossings.

(C) Streets and bridges shall be spaced at an average interval of at least 400 feet within the proposed development, and not closer than 200 feet from streets on contiguous property. This distance shall be measured from the edge of the paved surface.

(D) Water supply, sanitary sewer and on-site waste disposal systems shall be designed to:

(1) Prevent the infiltration of flood waters into the system;

(2) Prevent discharges from the system or systems into flood waters; and

(3) Avoid impairment during flooding to minimize flood damage. Finished floor elevations to be served by sanitary sewer shall be at or above the rim elevation of the nearest upstream manhole cover. Sanitary sewer manholes must be provided with locking, water-tight manhole covers, or be elevated to a height sufficient to prevent submersion or infiltration by flood waters. All sewer and sewer outfall lines shall use gravity flow to a point outside the riparian buffers.

(4) Promote rain water capture, treatment and storage to promote recycling and reuse of water, including use of vegetated swales, rain gardens, rain barrels and cisterns, and permeable paving techniques.

(E) Electrical, heating, ventilation, plumbing, gas, air conditioning and other service/utility facilities shall be designed and/or located in order to prevent water from entering or accumulating within the components during conditions of flooding during the base flood discharge.

Table 153.1239(A): Permitted Uses Within Riparian Buffer Corridor Zones

(A) Use	(B) Stream Side Zone	(C) Managed Use Zone	(D) Upland Zone
Accessory land-disturbing activities ordinarily associated with a single- or two-family dwelling,	N	P	P

such as utility service lines, gardens and similar uses			
Archery ranges, picnic structures, playground equipment and other similar public and private recreational uses that do not require the use of fertilizers, pesticides or extensive use of fences or <u>walls</u>	N	P	P
Detention/retention basin and associated infrastructure		P	P
Gardens, play areas and other similar uses that do not require the use of pesticides for routine maintenance.	N	P	P

Lakes, ponds and associated infrastructure, such as dams, spillways, riser pipes and stilling basins, which are located outside of the regulatory floodplain	C	C	C
Lawns, golf course fairways, play fields and other areas that may require the use of fertilizers or pesticides	N	N	P
Outdoor horticulture, forestry, wildlife sanctuary and other similar agricultural and related uses not enumerated elsewhere in this table that do not require land-disturbing activities, or use of pesticides or extensive use of fences or walls	P	P	P
Pastures or plant nurseries that do not require land-disturbing activities or use of pesticides, or extensive use of fences or walls	N	P	P

Public maintenance of streets, bridges, other similar transportation facilities and/or public utility and storm drainage facilities	P	P	P
Public utility and storm drainage facilities where there is a practical necessity to their location within the Resource Conservation District (RCD)	P	P	P
Sidewalks	P	P	P
Stream and riparian area restoration and maintenance P		P	P
Streets, bridges and other similar transportation facilities where there is a practical necessity to their location within the RCD	C	C	C
Trails, greenways, open space, parks and other similar public recreational uses and private recreational uses that do not require the use of fertilizers, pesticides or extensive use of fences or walls	P	P	P
<u>NOTES TO TABLE:</u> P = the activity is permitted as of right; N = the activity is prohibited; and C = the activity is permitted only upon approval of a conditional use permit or a subdivision application.			

Table 153.1239(B): Dimensional Regulations in Riparian Buffer Zones

(A) <i>Dimensional Requirement</i>	(B) <i>Stream Side Zone</i>	(C) <i>Managed Use Zone</i>	(D) <i>Upland Zone</i>
Disturbed area ratio	0.20	0.40	0.40
Floor area ratio	0.01	0.019	Same as underlying zoning district
Impervious surface ratio (sewered areas)	0.10	0.20	0.20
Impervious surface ratio (unsewered areas)	0.06	0.12	0.12

(Ord. 3020, passed 9-10-2013, § 5.40.5)

Topic Title: Water Conservation

Resource Title: Water Resource Protection District

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Westfield

State: Massachusetts

Date of Adoption: 2015

Abstract: Water Resource Protection District

In 2015, the city of Westfield, MA passed an ordinance creating a Water Resource Protection District. The WRPD is an overlay district established to preserve and maintain the city's public water supply. By adding additional development restrictions on certain parcels, the city sought to protect the sensitive lands that contribute to the public water supply through groundwater recharge. As climate change progresses, increased temperatures will cause wetter winters and drier summers leading to more droughts and floods that will affect groundwater recharge. As such, a litany of uses is prohibited within the WRPD, including many commercial and industrial uses that are prone to the discharge of chemicals and waste. The code lists a smaller number of permitted uses, as well as special uses that could be approved after the landowner receives a permit from the Westfield Planning Board. Mitigation measures are additionally listed for special uses to ensure total compliance with the purpose of the WRPD.

Code Provisions:

Section 3-170: WATER RESOURCE PROTECTION DISTRICT

3-170.2 - Delineation of the District.

1. The Water Resource Protection District is hereby established as overlaying and superimposed upon other existing zoning districts. Such district shall be inclusive of those areas approved by the Massachusetts Department of Environmental Protection (hereinafter MassDEP) and defined under the Massachusetts Drinking Water regulations 310 CMR 22.00 as Zones I & II aquifer recharge areas for the Barnes, Southampton, Great Brooks and Northwest Road aquifers, duly adopted and shown on the zoning map.
2. Any petition to amend the location of the district boundary established above shall include evidence of a scientific and professional investigation, and/or the City may, at the petitioner's expense, engage a qualified professional engineer, hydrologist, geologist, or soil scientist to verify or more accurately determine the boundaries of this district with respect to the subject property.

3-170.3 - Applicability.

1. Except where the Water Resource Protection District imposes greater restrictions or requirements, all other provisions of the zoning ordinance are applicable and remain in effect. Nothing in Section 3-170 shall allow for any use or condition not allowed in the underlying district.
2. In the case of a lot or parcel partially within the Water Resource Protection District, and to achieve the purposes and intent of this ordinance, the use regulations, review thresholds and performance standards of Section 3-170 shall apply to the entirety of the property when any alteration or development is to occur within the limits of this district. However, a Special Permit issued by the Planning Board or applicable permit granting authority may allow for exemption of any portion of the property not within the delineated Water Resource Protection District from any provision of Section 3-170.
3. Lawfully pre-existing uses or conditions which do not conform to the current requirements of this district may be continued. Such uses may also be extended or altered in accordance with the applicable provisions of 3-170.7(1) and/or 4-10.

3-170.5 - Prohibited Uses.

The following uses, activities or conditions are prohibited within the Water Resource Protection District:

[Within the Water Resource Protection District, a wide range of activities are prohibited to safeguard water resources. These include most business and industrial operations involving hazardous waste, solid waste disposal, underground petroleum storage, and outdoor storage of certain chemicals. Specific bans apply to auto-related services, self-storage businesses, cemeteries, commercial earth removal, and on-site wastewater disposal. Exceptions exist for small hazardous waste generators, approved remediation treatment works, and facilities connected to municipal sewer systems. The district also prohibits activities in Zone I areas and bans multifamily residential developments not served by municipal sewer. The overall goal is to prevent contamination of water supplies.]

3-170.6 - Permitted Uses.

The following uses and activities are permitted within the Water Resource Protection District, provided that the use is also permitted in the underlying district, and pursuant to all other requirements of this district, including 3-170.8. A permitted use may also require a Special Permit for a condition or activity regulated under 3-170.7.

1. Agriculture, horticulture, floriculture, forestry and nursery uses provided that the storage of associated chemicals, in quantities greater than normal household use, including but not limited to: fertilizers, herbicides, pesticides, manure or other leachable materials in compliance with the requirements found in 310 CMR 22.21(2)(b) 3 and 4.

2. Single family dwellings (2-acre minimum lot area).
3. Day Care Center, Family Day Care Homes and school age child care programs.
4. Municipal recreation buildings, playgrounds, outdoor recreation and parks, but excluding dog parks.
5. Uses for educational or religious purposes.
6. Accessory uses on the same lot with, and customarily incidental to, the foregoing principal uses, subject to any further requirements of this ordinance.

3-170.7 - Special Permit Uses.

In addition to those allowed in the underlying districts (but not listed in 3-170.6), the following uses, activities or conditions shall require a Special Permit, provided they are not prohibited per Section 3-170.5. For any use exempted under MGL c.40A s.3, Site Plan Approval (Section 6-10) shall be required in lieu of this Special Permit. For uses that are permitted by-right in the underlying district, the Special Permit required by this section shall be issued by the Planning Board. For uses requiring a Special Permit in the underlying district, the Special Permit required by this section shall be issued by the Special Permit Granting Authority for the underlying district and shall be included as a part of that Special Permit Application. Any approval, findings and conditions required under this district shall be in addition to, and incorporated with, the findings and conditions concerning the Special Permit for the underlying district.

1. Changes in existing uses or their developed sites, whether or not conforming to the requirements of this district, as follows:
 - a. Business, commercial, industrial, or multifamily residential uses:
 - i. change of or new use (including new accessory uses which may have direct or indirect impact upon water resources);
 - ii. any modification resulting in an increase in impervious surfaces, provided it adds more than either 2,500 square feet of impervious surface to the lot or causes more than 15% of the total lot area to be impervious surface, and in accordance with 3-170.9(2);
 - iii. new construction, reconstruction or enlargement of the building footprint to greater than 25% of the existing;
 - iv. an increase of 10 or more parking spaces;
 - v. expansion to greater than 10% of the existing for any material, condition or use described in 3-170.5;
 - vi. any increase in generation of hazardous wastes above existing quantities permitted; or
 - vii. any increase in impervious surfaces on the lot of a pre-existing use (as of November 17, 2014) which causes or intensifies non-conformance with 3-170.8(2).

Notwithstanding the foregoing, a separate Special Permit per Article IV, Section 4-10.3 concerning the underlying district may also be required from the Board of

Appeals. Unless a joint public hearing on the Special Permit applications is held, the applicant shall seek Board of Appeals approval first. Each Board shall make its own separate findings and decision pursuant to their respective responsibilities under the separate articles. If a Special Permit is issued pursuant to Section 3-170.7(1a) for a pre-existing use non-conforming to the requirements of this district only, it shall be deemed a finding of not substantially more detrimental than the existing condition, and no finding per Section 4-10.3 shall be required, except as may concern a non-conformity with the underlying district.

- b. Single and two-family residential uses: Changes in any impervious surfaces resulting in a net increase, provided the lot is not in conformance with, or the change will result in non-conformance with, 3-170.7(4). If a separate finding per Article IV, Section 4-10.3 is also required, the Board of Appeals may concurrently issue the Special Permit required under this paragraph (1b) only.
- 2. Any new business, commercial, industrial or other non-residential use (except those described in 3-170.6).
- 3. Any new residential use or development, excluding single-family dwellings.
- 4. The addition of impervious surface equivalent to more than either 15% of the lot/parcel or 2,500 square feet per lot, and in accordance with 3-170.9(2); except that no special permit shall be required for residential uses, municipal facilities or any use permitted by-right if impervious surfaces do not exceed the greater of the above thresholds.
- 5. The alteration or disturbance of more than 40,000 square feet of land, excluding milling or resurfacing (but not reconstruction) of existing pavements, agriculture and logging activities, and developments separately approved under the Subdivision Control Law.
- 6. The above ground storage of hazardous materials or petroleum products, except that a Special Permit shall not be required for storage of products which are: in 5 gallon or less approved portable containers and used for customary residential or commercial maintenance activities; or liquid petroleum used for the heating of single family or two-family residence provided such storage meets the performance standards described herein and is otherwise in compliance with the Fire Safety Code (527 CMR).
- 7. Excavation for removal of earth, loam, sand, gravel and other soils or mineral substances. Such excavation shall not extend closer than 5 feet above the historical high groundwater table (as determined from on-site investigations, monitoring wells and historical water table fluctuation data compiled by the United States Geological

Survey, whichever is higher). A monitoring well shall be installed by the property owner to verify groundwater elevations. A Special Permit shall not be required for excavations incidental to permitted uses, including but not limited to providing for the installation or maintenance of structural foundations, utility conduits or on-site sewage disposal.

3-170.8 - Dimensional and Coverage Requirements.

1. Minimum lot size shall be 2 acres (87,120 square feet), regardless of whether it is serviced by public water and/or public sewer. For non-residential uses, this requirement shall not apply to any lot in existence as of November 17, 2014, notwithstanding any such lot may be altered or expanded thereafter, but not reduced in its area.
2. Maximum impervious surface coverage of any lot or common development project shall be 70%.
3. All other dimensional and density provisions of the underlying district shall apply.

3-170.9 - Special Permit Additional Requirements.

[Applicants seeking a Special Permit must submit detailed plans addressing soil erosion control, stormwater management, and groundwater recharge, using methods consistent with the MassDEP Stormwater Handbook. Commercial, industrial, and multifamily projects require formal stormwater management plans, while residential projects should incorporate natural drainage and infiltration techniques. Applicants must also provide a list of hazardous materials, a hazardous materials management plan with spill prevention and containment measures, and evidence of compliance with state hazardous waste regulations. For Open Space Subdivisions, a conventional plan based on 2-acre minimum lot sizes must be included to determine development capacity.]

Topic Title: Water Conservation

Resource Title: Surface Water Management Program

Resource Type: Special Interest Land Use Boards - Powers and Duties

Municipality: King County

State: Washington

Date of Adoption: 2025 (updated)

Abstract: Surface Water Management Program

King County, Washington has included in its Surface Water, Stormwater and Groundwater Management section a chapter creating a Surface Water Management Program (SWMP). A key feature of this program is the service charges system. This system is designed to encourage sustainable development with limited impervious surfaces to enhance groundwater recharge and reduce stormwater runoff that can lead to pollution of water resources, property damage, and threaten public health and safety. The annual surface water management charges are tiered based on the percentage of impervious surfaces on the property, providing an incentive for developers to limit the use of impervious surfaces in development to receive lower annual per-acre charges. The service charges system also contains an equity component, by charging a flat per-parcel fee to all residential properties. This carve-out helps to address the county's growing need for housing, since King County is the twelfth most densely populated county in the country.

The SWMP also includes extensive findings that help clarify the need for, and benefits of, managing the county's surface waters. The service charges system's rate structure is supplemented by information about pursuing rate adjustments and appeals, requesting additional services, the billing procedures, and what happens in cases of delinquency and foreclosure. The SWMP concludes with a section on administrative standards and procedures, which includes a provision for the SWMP director to develop procedures for providing residents with grants to help them improve their surface water management through reduction of impervious surfaces on their properties.

Code Provisions:

King County Code

[Title 9 Surface Water, Stormwater and Groundwater Management](#)

Chapter 9.08 Surface Water Management Program

(9.08.020 Authority.)

(9.08.030 Surface water management citizens committee.)

9.08.040 Purpose.

It is the finding of the county that the Surface Water Management Program is necessary in order to promote public health, safety and welfare by establishing and operating a comprehensive approach to surface and storm water problems which would reduce flooding, erosion and sedimentation, prevent and mitigate habitat loss, enhance groundwater recharge and prevent water quality degradation. This comprehensive approach includes the following elements: basin planning, land use regulation, construction of facilities, maintenance, public education, and provision of surface and storm water management services. It is the finding of the county that the most cost effective and beneficial approach to surface and storm water management is through preventative actions and protection of the natural drainage system. In approaching surface and storm water problems the Surface Water Management Program shall give priority to methods which provide protection or enhancement of the natural surface water drainage system over means which primarily involve construction of new drainage facilities or systems. The purpose of the rates and charges established herein is to provide a method for payment of all or any part of the cost and expense of surface and storm water management services or to pay or secure the payment of all or any portion of any issue of general obligation or revenue bonds issued for such services. These rates and charges are necessary in order to promote the public health, safety and welfare by minimizing uncontrolled surface and storm water, erosion, and water pollution; to preserve and utilize the many values of the county's natural drainage system including water quality, open space, fish and wildlife habitat, recreation, education, urban separation and drainage facilities; and to provide for the comprehensive management and administration of surface and storm water. (Ord. 11615 § 6, 1994: Ord. 10187 § 4, 1991: Ord. 7817 § 2, 1986: Ord. 7590 § 5, 1986).

9.08.050 Applicability.

A. Developed parcels within the service area shall be billed each year for surface and storm water management services pursuant to RCW 36.89.080. Surface and storm water management services or service charges, or both shall be imposed on developed parcels lying within cities and towns when the services or charges, or both, have been provided for by interlocal agreements between the county and the cities or towns. That portion of the rates or charges allocated to payment of debt service on revenue or general obligation bonds issued to finance storm water control facilities in areas annexed or incorporated subsequent to the issuance of the bonds shall be imposed as set forth in K.C.C. 9.08.020. In addition, the county and cities or towns may enter into interlocal agreements allowing the

city or town to provide surface and storm water management services or charges, or both, for specified developed parcels lying within unincorporated King County.

B. The service area may be modified in accordance with policy contained in K.C.C. 9.08.060. Modifications to the service area shall be by ordinance. (Ord. 13695 § 3, 1999: Ord. 11015 § 3, 1993: Ord. 10187 § 5, 1991: Ord. 8626 § 2, 1988: Ord. 7817 § 2, 1986: Ord. 7590 § 6, 1986).

(9.08.060 Findings – policy.)

9.08.070 Rate structure.

A. The service charges shall be based on the relative contribution of increased surface and storm water runoff from a given parcel to the surface and storm water management system. The percentage of impervious surfaces on the parcel, the total parcel acreage and any mitigating factors as provided in K.C.C. 9.08.080 shall be used to indicate the relative contribution of increased surface and storm water runoff from the parcel to the surface and storm water management system. The relative contribution of increased surface and storm water runoff from each parcel determines that parcel's share of the service charge revenue needs. The service charge revenue needs of the program are based upon all or any part, as determined by the council, of the cost of meeting stormwater permit obligations of state and federal law and the cost of surface and storm water management services and to pay or secure the payment of all or any portion of any issue of general obligation or revenue bonds issued for that purpose.

B. The division shall determine the service charge for each parcel within the service area by the following methodology: Residential and very lightly developed nonresidential parcels shall receive a flat rate service charge for the reasons in K.C.C. 9.08.060. Light to very heavily developed parcels shall be classified into the appropriate rate category by their percentage of impervious surface coverage. Land use codes or data collected from parcel investigations, or both shall be used to determine each parcel's percentage of impervious surface coverage. After a parcel has been assigned to the appropriate rate category, the service charge for the parcel shall be calculated by multiplying the total acreage of the parcel times the rate for that category.

C. There is hereby imposed upon all developed properties in the service area annual service charges as follows:

SURFACE WATER MANAGEMENT SERVICE CHARGES

Class	Impervious Surface %	Rate
Residential	NA	\$361.00/parcel/year
Very Light	0 to less than or equal to 10%	\$361.00/parcel/year
Light	greater than 10% to less than or equal to 20%	\$1,003.69/acre/year
Moderate	greater than 20% to less than or equal to 45%	\$1,878.75/acre/year
Moderately Heavy	greater than 45% to less than or equal to 65%	\$3,206.03/acre/year
Heavy	greater than 65% to less than or equal to 85%	\$4,466.12/acre/year
Very Heavy	greater than 85% to less than or equal to 100%	\$5,495.07/acre/year
County Roads	NA	Set in accordance with RCW 90.03.525
State Highways	NA	Set in accordance with RCW 90.03.525

The minimum service charge in any class shall be three hundred sixty-one dollars per parcel per year. Mobile home parks' maximum annual service charges in any class shall be three hundred sixty-one dollars times the number of mobile home spaces.

D. The county council shall review the surface water management service charges biennially to ensure the long-term fiscal viability of the program and to guarantee that debt covenants are met. The program shall use equitable and efficient methods to determine service charges.

E. When a parcel with impervious surface is divided by the boundary of the service area and a portion of the parcel's impervious surface drains into the service area, the parcel shall be charged as otherwise provided herein on the basis of the lands and impervious surfaces that drain into the service area. When the director has determined that the impervious surface of a parcel, divided by the boundary of the service area, completely drains outside of the service area, the parcel is exempt from the rates and charges of this chapter.

F. The King County council by ordinance may supplement or alter charges within specific basins and subbasins of the service area so as to charge properties or parcels of one basin or subbasin for improvements, studies or maintenance that the council deems to provide service or benefit the property owners of one or more basins or subbasins. (Ord. 19847 § 1, 2024: Ord. 19543 § 1, 2022: Ord. 18836 § 1, 2018: Ord. 18401 § 1, 2016: Ord. 17451 § 4, 2012: Ord. 17451 § 2, 2012: Ord. 16958 § 2, 2010: Ord. 15638 § 2, 2006: Ord. 14261 § 4, 2001: Ord. 13695 § 5, 1999: Ord. 11015 § 5, 1993: Ord. 10187 § 7, 1991: Ord. 8626 § 3, 1988: Ord. 8373 § 2, 1988: Ord. 7817 § 2, 1986: Ord. 7590 § 8, 1986).

(9.08.080 Rate adjustments and appeals.)

(9.08.085 Petition for additional services.)

(9.08.090 Billing procedure.)

(9.08.100 Delinquencies and foreclosures.)

9.08.120 Administrative standards and procedures. Pursuant to K.C.C. chapter 2.98 the director shall develop administrative standards and procedures relating to the implementation of this chapter. This includes but is not limited to:

A. Procedures for the imposition and collection of service charges and/or for filing of liens and initiation of foreclosure on delinquent accounts and the collection of the debt service portion of the service charge in areas that annex or incorporate;

B. Lake management plans for: *[3 lakes in the county – Beaver, Desire, and Cottage]*

C. Standards and procedures for granting discounts to the surface water management fee;

D. Procedures for a grant program to help citizens in reducing the impact of excess storm and surface water runoff by removing impervious surface from their property. (Ord. 14261 § 6, 2001: Ord. 12513 § 1, 1996: Ord. 12101 § 1, 1996: Ord. 11522 § 2, 1994: Ord. 11015 § 8, 1993: Ord. 10187 § 11, 1991: Ord. 7817 § 2, 1986: Ord. 7590 § 15, 1986).

Local Climate Action Plans

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Case Studies

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Local Climate Action Plans (CAPs)

Narrative

A **climate action plan (CAP)** is a framework document for measuring, tracking, and reducing greenhouse gas emissions (mitigation) and adopting climate adaptation measures. These documents are used as a framework to guide administrative bodies in addressing the impact of climate change in their communities. CAPs play a central role in Climate Resilient Development (CRD) by integrating adaptation, mitigation, and equity into policy and planning. Land use law enables CAP implementation by providing the legal authority to regulate zoning, development, and building standards, translating climate goals into enforceable actions that shape sustainable, climate-ready communities.

The case studies highlight how cities across the United States are advancing climate goals through a combination of legal integration, green infrastructure, and equity-centered planning. Kansas City ties energy efficiency to development incentives using the Zero Code—which requires renewable energy for new residential and commercial projects--while Rockville and Dobbs Ferry embed climate goals into comprehensive plans and zoning ordinances, giving them enforceable legal power. Rochester and Cincinnati are emphasizing green infrastructure and climate adaptation, with clear, measurable targets. Denver and Richfield use permitting and building reforms to promote sustainability, and West Hollywood introduces progressive transportation and parking strategies to reduce emissions.

These strategies align with the framework for **CRD**—integrating adaptation, mitigation, resilience and equity. **Land use law** is central to these strategies, enabling municipalities to regulate zoning, development patterns, and construction standards. This legal foundation allows cities to implement CAPs with enforceable mechanisms, promote sustainable growth, and support long-term resilience.

The case studies can be categorized as follows:

1. Legal and Policy Integration:

- *Rockville, MD*: CAP embedded in the Comprehensive Plan.
- *Dobbs Ferry, NY*: Tree preservation codified; Tree Commission established.
- *Kansas City, MO*: Energy incentives tied to code compliance.
- *Southeast Florida Regional Climate Change Compact, FL*: Created a regional CAP to align the region's climate goals.

2. Green Infrastructure and Resilience:

- *Rochester, NY*: Stormwater infrastructure and green retrofits.
- *Cincinnati, OH*: Brownfield redevelopment and flood resilience targets.
- *Richfield, MN*: Sustainable design features, native landscaping.

3. Building Codes and Sustainable Design:

- *Denver, CO*: Green building codes for large structures.

- *Houston, TX*: Adoption of the 2021 International Energy Conservation Code.
 - *Richfield, MN*: Streamlined permitting for sustainable projects.
4. **Mobility, Land Use, and Equity:**
- *West Hollywood, CA*: Parking reforms and multimodal mobility upgrades.
 - *Rockville, MD*: Transit-oriented development to reduce emissions.
 - *Kansas City, MO*: Targeted equity initiatives for disadvantaged communities.
 - *Dallas, TX*: Transit oriented development to reduce car dependency and increase mixed-use zoning.

What can CAPs do differently? While Climate Action Plans are spreading to many different municipalities and governments across the United States, a plan is just words if not given appropriate meaning and measuring strategies. A successful CAP must create sufficient monitoring systems to ensure effective change is achieved. This can include annual/semi-annual updates informing the community of what work has been done to achieve the CAP goals. Along with tracking mechanisms like updates, the plan should also include ways to measure goals to allow the community to hold the municipality accountable if little progress is made. Lastly, it is important to always ensure that CAPs are engaging with all communities within their area to guarantee that all voices are being heard. By ensuring that equity and inclusivity are present within a CAP, it protects communities that may be left behind in the advancement of a more green and sustainable community.

Partners and Resources:

- [C40 Knowledge Hub Climate Action Planning Framework](#)
- [Municipal Resources and Services Center \(MRSC\)](#)
- [ICLEI: Local Governments for Sustainability](#)

Final report

A Climate Action Plan (CAP) is a strategic framework used by municipalities to measure, track, and reduce greenhouse gas emissions while adopting climate adaptation measures. The City of Rockville, Maryland is a prime example of how climate action planning should be done. In the City's plan, Rockville plans to tailor its Comprehensive Plan to steering the densest development/redevelopment to mixed-use, transit-served locations. To track its progress, Rockville also has a dashboard where members of the public can stay up to take on objectives and goals of the CAP. Local governments are ahead of the game when it comes to understanding how they want to address climate change—they are gathering information and using it to benefit their communities. For more information, refer to the C40 Knowledge

Hub Climate Action Planning Framework, MRSC, and ICLEI: Local Governments for Sustainability.

Topic Title: Local Climate Action Plan

Resource Title: [Houston Climate Action Plan](#); [2021 Energy Code](#)

Resource Type: Special Plan

Municipality: Houston

State: Texas

Date of Adoption: 2020

Abstract: Houston Climate Action Plan

Three 500-year floods in as many years culminating with the largest rain event in North American history, has exposed climate change as an unprecedented challenge for Houston. Houston's Climate Action Plan allowed the City to develop strategies that can help minimize the City's carbon footprint and improve the quality of life of residents. One of the CAP's Focus Area's concerns building optimization. To optimize buildings, Goal 1 aims to "reduce energy use and maximize savings." To meet Goal 1, Houston has outlined three strategies. Of note is strategy B1.1: "update energy code and increase compliance." In 2021, one year after the publication of its CAP, Houston adopted the International Energy Conservation Code. The code applies to commercial buildings and the buildings' sites and associated systems and equipment.

Code Provisions:

[Houston CAP](#)

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DESCRIPTION OF STRATEGIES		GHG IMPACT	CITY LEADS	KEY STAKEHOLDERS
BUILDING OPTIMIZATION				
GOAL 1: REDUCE BUILDING ENERGY USE AND MAXIMIZE SAVINGS.				
B1.1	Update energy code and increase compliance.	High	HPW, ARA, MYR	Private sector, non-profit & advocacy groups
B1.2	Develop programs that improve building energy efficiency.	High	ARA, GSD	BOMA, private sector, non-profit & advocacy groups
B1.3	Reduce water and wastewater energy consumption by 10% through optimization of facility operations and water conservation.	Medium	HPW	Regional water providers, municipal utility districts, private sector, HOAs, non-profit & advocacy groups

[C101.3 Intent](#)

This code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.

Topic Title: Local Climate Action Plans

Resource Title: Denver, Colorado [Climate Action Plan](#); [Municipal Code of the City and County of Denver, Colorado](#)

Resource Type: Special Plan

Municipality: Denver

State: Colorado

Date of Adoption: CAP 2018, Code Adopted 2019

Abstract: Denver, Colorado Climate Action Plan

Denver, Colorado's 2018 Climate Action Plan takes a macro approach to local climate action planning aiming to decrease its greenhouse gas emissions by 80% by 2050. Following a [McKinsey & Company study](#) which emphasized that cities should focus on a few top priorities to maximize impact, Denver's CAP had four objectives: optimizing energy efficiency in buildings, decarbonizing the electricity grid, enabling next-generation mobility, and improving waste management (p. 4). Following publication of their CAP, one element Denver has sought to carry out, is the optimization of energy efficiency in buildings, pursuant to their outlined goal. In 2019, Denver enumerated [Green Building Requirements for Existing Buildings in its Building Regulations](#).

Code Provisions:

[Sec. 10-302. – Green building requirements for existing buildings](#)

- (a) *In general.* Except as provided in subsection 10-302(d) below, any owner of a building that has received a certificate of occupancy prior to November 2, 2018 and whose building contains twenty-five thousand (25,000) square feet or greater of gross floor area, must provide the following green building requirements upon a roof replacement for more than five (5) percent of either the total roof area or individual roof section(s), as applicable, in any calendar year:
- (1) A cool roof; and
 - (2) One (1) of the following options:
 - a. Green space covering an area in one (1) of the following amounts, whichever is least:
 1. For total roof area replacement: two (2) percent of the gross floor area of the building; for individual roof section replacement: two (2) percent of the gross floor area of the building, multiplied by the area of individual roof section(s) being replaced, divided by the total roof area of the building; or
 2. For total roof area replacement: eighteen (18) percent of the total roof area on the building; for individual roof section replacement: eighteen (18) percent of the individual roof section(s) being replaced.
 - b. On-site solar panels located anywhere on the building or zone lot and covering an area in the least of the following:

1. For total roof area replacement: five (5) percent of the gross floor area of the building; for individual roof section replacement: five (5) percent of the gross floor area of the building, multiplied by the area of roof section(s) being replaced, divided by the total roof area of the building;
 2. For total roof area replacement: forty-two (42) percent of the total roof area on the building; for individual roof section replacement: forty-two (42) percent of the individual roof section(s) being replaced; or
 3. An area equal to an amount required to provide one hundred (100) percent of estimated annual average electricity used at the building.
- c. Building certification of LEED Silver, Enterprise Green Communities, the National Green Building Standard ICC/ASHRAE 700 Silver, Green Globes Three Green Globes rating, International Living Future Institute Living Building Challenge certification, International Living Future Institute Core Green Building certification, International Living Future Institute Zero Energy certification, International Living Future Institute Zero Carbon certification, Denver Green Code Enhanced Use Program compliance verification, or an equivalent certification approved by the building official.
 - d. Enrollment in the energy program described in section 10-304 below.

Topic Title: Local Climate Action Plans

Resource Title: [2019 Climate Change Resilience Plan](#) & [2017 Climate Action Plan](#)

Resource Type: Special Plan

Municipality: Rochester

State: New York

Date of Adoption: 2019 & 2017

Abstract: 2019 Climate Change Resilience Plan & 2017 Climate Action Plan

The City of Rochester has implemented a unique system to track progress while continuing to plan for climate change. The Climate Change Resilience Plan builds on a series of ongoing climate change planning efforts, including the community-wide Climate Action Plan (2017), and the [Green Infrastructure Retrofit Manual](#) 2017. The Manual is intended for a wide audience, including design professionals, private developers, and municipal staff. Additionally, in the Climate Change Resilience Plan, 2019, Rochester demonstrated an interest in codifying practices found in the Manual.

Code Provisions:

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[2017 CAP](#): “In 2016, the City of Rochester, Monroe County, New York Sea Grant and the National Oceanic and Atmospheric Administration (NOAA) partnered to develop a Green Infrastructure Retrofit Manual, which focuses on green infrastructure design in our region that addresses water quality, flood prevention, air quality, habitat and wildlife, health and wellness, as well as climate resiliency. The manual will include guidance for design, construction, operation and maintenance of green infrastructure retrofit techniques.”

IB-1.E (pg. 31 of the 2019 [Climate Change Resilience Plan](#)): **Codify, enforce and implement stormwater and green infrastructure best management practices in public and private development.** Adopt, as part of the City Code, and enforce, through the **City’s Site Plan Review process**, stormwater and green infrastructure best management practices on public and private development projects. Green infrastructure utilizes vegetation, soils, and landscaping to allow for pervious surfaces that help absorb and filter pollutants, and therefore improve quality of stormwater runoff. Green infrastructure techniques including porous pavement, rain gardens, vegetated swales, green roofs, rainwater harvesting and recycling, and other methods will help increase pervious surface area. The City has developed and can encourage increased awareness and implementation of its Green Infrastructure Retrofit Manual to promote use of green infrastructure techniques in development projects. Going forward, the City should also ensure public rights of way and/or other strategically protected lands can be utilized for green infrastructure development.

Topic Title: Local Climate Action Plans

Resource Title: [Village of Dobbs Ferry Climate Action Plan 2017](#) & [Dobbs Ferry Municipal Code](#)

Resource Type: Special Plan & Zoning Code

Municipality: Village of Dobbs Ferry

State: New York

Date of Adoption: 2017, 2022

Abstract: Village of Dobbs Ferry Climate Action Plan 2017 & Dobbs Ferry Municipal Code

The Village of Dobbs Ferry, in their Climate Action Plan of 2017 outlined five focus areas which they came to through input from community stakeholders and using a GHG baseline analysis: Transportation; Built Environment (including Energy); Waste and Recycling; Gardens, Trees, & Local Food; and Water. The Gardens, Trees & Local Food focus area was made up of actions of generally high implementation capacity such as a leaf mulching initiative and gardening classes. Additionally, the CAP called for a prioritization of the preservation of trees utilizing local land use methods. In 2022 Dobbs Ferry adopted an article in their municipal code outlining the creation of a Tree Commission to ensure the protection of trees, and to consult on the removal and replacement of trees. The Village of Dobbs Ferry demonstrates how climate action planning can change from words on paper to actual enforceable laws to make environmental change.

Code Provisions:

[Article VI Tree Commission § 300-21](#)

Tree Commission

§ 300-21

A. Intent and purpose, establishment, power and duties. Trees in a community provide many unique services and values. Trees recycle air and water, absorb pollution, buffer noise, and provide shade, air cooling, and windbreak protection. They also help control flooding and erosion of topsoil. Trees enhance property values and the beauty of the community as well as provide critical habitat for birds and other wildlife species. There is hereby established in the Village of Dobbs Ferry a Tree Commission to protect the character of Dobbs Ferry as a well-treed village, consistent with its being a "Tree City."

B. Establishment and organization.

(1) In accordance with the findings set forth above, there is hereby established in the Village of Dobbs Ferry a Tree Commission to consist of at least three members appointed by the mayor, subject to the approval of the Board of Trustees.

- (2) One member shall be a Village officer or employee. The other members shall be from the public at large.
- (3) Tree Commission members shall serve three-year terms.

C. Powers and duties.

- (1) To adopt rules and regulations for its operation and to follow said rules and regulations in the conduct of its official business.
- (2) To advise the Village Board of Trustees and other boards on matters affecting the preservation and protection of trees throughout the Village.
- (3) To develop and conduct a program of public information in the community to foster increased understanding of proper tree husbandry to protect the health of trees in the Village.
- (4) To conduct studies, surveys and inventories of significant trees within the Village of Dobbs Ferry as may be necessary to carry out the general purposes of this chapter.
- (6) To prepare, print and distribute books, maps, charts and informational pamphlets in accord with the purposes of this chapter.
- (7) To review each application for a tree removal permit referred in accordance with the provisions of this chapter and to make recommendations concerning the removal and/or the replacement of trees to the Board of Trustees, the Planning Board and/or the Land Use Officer.
- (8) To request the opinion of qualified consultants, including a qualified arborist, to help meet obligations under this chapter.
- (9) To prepare a list of appropriate trees to be planted within the Village, with preference given to indigenous tree types, as well as a list of invasive species that should not be planted within the Village.
- (10) To advise on the replacement of trees lost by age or damage to assure that the new trees planted will be of a species, type and size that will thrive and be appropriate in the specific location, as well as not interfere with view vistas, disturb paved areas and curbs, block visibility at street intersections, or interfere with utility wires.
- (11) To advise on tree trimming in an effort to maintain healthy trees with attractive canopies, while also maintaining safety, particularly with utility wires, and valued vistas and views.
- (12) The Tree Commission, on its own or upon recommendation or receipt of a nomination from the public, shall prepare a proposed list of trees with historic or unique value and provide such list to the Board of Trustees for consideration and adoption by resolution. Upon adoption a copy of such list shall be provided to the Village Clerk who shall maintain such list as a Village record. Said list should not be

deemed all-inclusive or complete and may be periodically reviewed and updated as set forth herein.

§ 300-51 Tree preservation.

A. Tree preservation; legislative intent.

(1) The Village of Dobbs Ferry finds that the existence of trees within the Village makes a fundamental contribution to the health, safety and general welfare of Dobbs Ferry citizens and the community at large. Trees, in addition to their aesthetic benefits, are essential to riparian habitat, wildlife, energy conservation, temperature moderation and the healthy ecology of the area; trees help improve air quality and reduce global warming. These benefits to the community and environment increase as trees mature. Maturation of trees protects surface water quality, provides shade, offers windbreaks, controls water pollution by reducing soil erosion and flooding, offers a natural barrier to noise, yields advantageous microclimates and fundamental ecological systems. Trees, together with shrubs, contribute to property values of residential and commercial establishments, and preserve and enhance the natural beauty and appearance of the Village and its historic, non-urban character.

(3) The Village hereby establishes policies, regulation and standards necessary to ensure that the community will continue to realize the benefits provided by our trees. The provisions of this section are enacted to:

(a) Control and regulate the indiscriminate cutting and destructive or excessive pruning of trees.

(b) Increase species and age diversity of our tree population to provide long-term stability of the aggregate canopy and ecosystem by requiring replanting when trees are removed.

(c) Preserve our trees and the non-urban appearance of our Village by encouraging owners of existing homes, vacant lands and commercial parcels to save or replace mature tree species when developing their parcels.

(d) Protect public trees in municipal parks and easements.

(e) Facilitate Village stewardship of air, water, land and living resources, to sustainably protect the environment for the use of this and future generations.

Topic Title: Local Climate Action Plans

Resource Title: [Climate Action Plan for Municipal Operations, Village of Bronxville, NY 2023-2030](#)

Resource Type: Special Plan

Municipality: Village of Bronxville

State: New York

Date of Adoption: 2023

Abstract: Climate Action Plan for Municipal Operations, Village of Bronxville, NY 2023-2030

Citing reasons respecting national and international climate change, the Village of Bronxville adopted a Climate Action Plan for Municipal Operations in November 2023, having already been awarded the [Bronze Certification for Climate Smart Communities Program](#). Climate Smart Communities is a local government point based pledge system where points are awarded for certain priority actions aligning with NYS's climate adaptation goals and greenhouse gas (GHG) reduction limits. The Village of Bronxville has designed their CAP to help them reach Climate Smart Communities Silver status on their way to reducing municipal GHG emissions by 40%. To achieve this goal, they have 4 major planning sectors that will be targeted: Transportation; Buildings and Facilities; Natural Resources, Water and Land Use; and Waste and Recycling.

Main Goals of the CAP:

A. Water Conservation in Municipal Operations

Assessment of irrigation controls and the implementation of water conservation methods; this includes a review of current water pipelines that have burst in the past and an analysis of various maintenance issues.

To improve the water efficiency in government and municipal buildings, the Village plans to upgrade water fixtures, install water consumption meters, promote water smart landscaping, and install water-sense irrigation controllers. Since most buildings already have meters, the main initiative is to retrofit these meters with water saving fixtures.

B. Infrastructure

The Village would like to create infrastructure for bicycling and walking to promote safer streets. This would include safer routes to school that could be accessed by walking or bicycling. Overall, the CAP looks to promote safe sidewalks, greening of sidewalk areas, bike lanes, crosswalks that encourage biking and walking instead of cars in the Village.

C. Electrify the Village

The CAP aims to electrify lawn equipment and gradually convert leaf blowers, mowers, trimmers, and other equipment to battery tech by 2030, which would reduce gasoline use, noise and air pollution, and protect Village workers who sustain auditory and respiratory damage due to gas run equipment. This plan would allow the Village to enroll in the NYS Green Purchasing Program and aligns with the Village's implementation of an Environmentally Preferred Purchasing Policy.

D. Reduce Emissions

The CAP looks at limiting mowing to reduce emissions and promote bird health and pollinators and promote native species, which are more climate resilient, to take root. Additionally, restricting pesticide use can protect pollinators and birds and create adapted lawns that require less water usage.

E. Storm Water Flooding

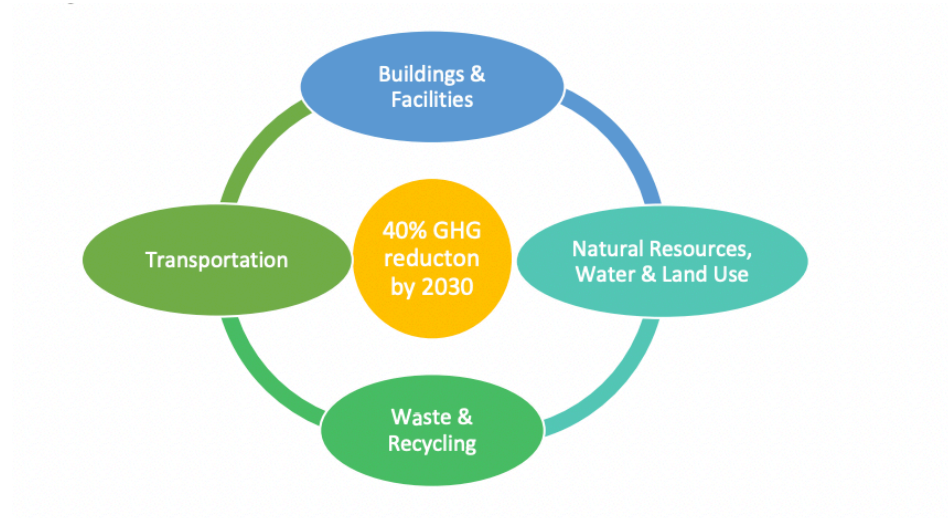
One of the Village's largest concerns is storm water flooding. To mitigate this problem, the CAP attempts to promote regional planning around the Bronx River watershed, rather than allowing large volumes of water to move across hardscapes. This includes switching to parking lots with permeable pavement. These projects would require maintenance, but it would overall improve drainage and prevent pooling. This aspect of the CAP is inspired by SUNY Ulster campus's implementation of permeable pavement as part of their Hurley Climate Smart Task Force. Another method of flood mitigation includes the implementation of bioswales and tree pits. These are areas that are excavated and filled with permeable materials and plantings to absorb excess stormwater and runoff to keep it from overwhelming the storm water systems. This would also help with the Village's resiliency for future rain event.

F. Tree Ordinance

Another mitigation effort under the CAP is the implementation of a Village tree ordinance and renewed membership in Tree City USA, which would help expand and protect the tree canopy to promote CO2 sequestration, absorption of storm water, flood reduction, provide habitat for birds and pollinators, and reduce ambient temperatures via shading. The CAP also wishes to focus on native species, such as oaks which are the best carbon sinks, and London Plan and maples, and increase the tree population from 20 to 30% in the central part of the village, based on the results of a development and population density geo-mapping survey.

G. Improve Land Management

To improve land management, the Village aims to make municipal parking lots more climate friendly by using permeable paving, LED lighting, shrubs and trees, space for bicycles and scooters, EV charging stations, and adding locations for solar panels.



Timeline:

Page 32.

Completion year	2024	2025	2026	2027	2028	2029	2030
NATURAL RESOURCES, WATER & LAND USE							
Park & open space maintenance							
Irrigation controls/water conservation- to reduce 30% by 2030	X	X	X	X	X	X	X
Limit mowing, use mulching mowers; eliminate pesticides	X	X	X	X	X	X	X
Inventory /retire older equipment; purchase electric/battery operated maintenance equipment-15% each year to replace all feasible by 2030	X	X	X	X	X	X	X
Use permeable paving surfaces for storm control in park areas/parking lots			X	X	X	X	X
Preservation & planting							
Conduct public tree inventory, promote preservation; increase tree planting of diverse species		X	X	X	X	X	X
Enact tree ordinance	X						
Plant native species in all park and municipal landscape plans	X	X	X	X	X	X	X
Plan bioswales, tree pits where feasible		X	X	X	X	X	X

Topic Title: Local Climate Action Plans

Resource Title: [Green Cincinnati Plan](#)

Resource Type: Special Plan

Municipality: Cincinnati

State: Ohio

Date of Adoption: 2023

Abstract: Green Cincinnati Plan

The City of Cincinnati, Ohio has been recognized as a [leader in combatting climate change](#), having begun its climate action planning efforts in 2008. In 2023, the City updated the Green Cincinnati Plan (GCP). The plan highlights its resident-input methodology and roots in intentional inclusivity and equity. The 2023 Green Cincinnati Plan (GCP) outlines 40 high-impact strategies to reduce the City's carbon emissions 50% by 2030 and achieve 100% carbon neutrality by 2050. In addition, the Plan identifies 30 measurable goals that will be used to report progress towards a more resilient City. Two Focus Areas within the GCP are of note. First, the Resilience and Climate Adaptation Focus Area, which outlines the goal of completing 25 green infrastructure projects by 2028 in extreme heat and overland flood vulnerable communities. Second, the Pollution Reduction & Adaptive Land Use Focus area outlines the goal of revitalizing 25 contaminated industrial properties through brownfield redevelopment.

Plan Provisions:

[Page 140.](#)

Focus Area: Resilience & Climate Adaptation

"To be resilient against extreme heat, overland flooding, sewer backups/overflows, landslides, and water pollution, the City must increase green infrastructure"

Goal: Complete 25 green infrastructure projects by 2028 in extreme heat and overland flood vulnerable communities.

Strategy: Reduce extreme heat, overland flooding, landslides, and water-pollution vulnerabilities by incentivizing, improving, and increasing green infrastructure and other mitigating methods.

Priority Actions	GCP PILLARS			ADDITIONAL PRIORITIES			
	Sustainability	Equity	Resilience	Jobs	Investment	Health	Feasibility
Incentivize green infrastructure projects in communities with extreme heat and flood vulnerabilities	●	●	●	●	●	●	●
Equitably restructure sewer rates based on permeable land surface and other contributing factors	●	●	●	●	●	●	●
Create a “sponge city” with more and diverse green infrastructure in public and residential places including green roofs, bioswales, green medians, wetlands, parks, permeable pavements, and landscape gardens	●	●	●	●	●	●	●
Continue to decrease sewer backups, sewer overflows, and overland flooding (flash flooding) by supporting sewer infrastructure improvements in priority communities	●	●	●	●	●	●	●
Partner with communities to identify opportunities to address property damage caused by overland flooding and hillside instability	●	●	●	●	●	●	●
Ensure all rental housing has at least one room with adequate air conditioning	●	●	●	●	●	●	●
Use heat reflective materials when appropriate (roads, parking surfaces, roofs, etc.)	●	●	●	●	●	●	●

● strong alignment ● moderate alignment ● weak alignment
 See Natural Environment Focus Areas for more green infrastructure actions

Focus Area: Resilience & Climate Adaptation (pg. 146)

“Brownfield revitalization outcomes aligned with priority community needs and city planning can include stable, secure, and affordable living environments; energy-efficient, sustainable buildings that use renewable energy sources; economic investment; and job creation.” (pg. 147)

Goal: Revitalize 25 contaminated industrial properties in neighborhoods of the Lower Mill Creek Valley by 2028.

Strategy: Mitigate pollution and cleanup additional legacy brownfield sites to revitalize neighborhoods and result in healthier communities.

Priority Actions

Conduct inventories, assessments, and clean-ups of contaminated industrial sites, referred to as brownfields, in alignment with both community revitalization priorities and city-planned reuse

Address emerging pollutants, including pharmaceuticals and personal care products, that are endocrine-disrupting chemicals and microplastics

● strong alignment ● moderate alignment ● weak alignment

GCP PILLARS			ADDITIONAL PRIORITIES			
Sustainability	Equity	Resilience	Jobs	Investment	Health	Feasibility
●	●	●	●	●	●	●
●	●	●	●	●	●	●

Topic Title: Local Climate Action Plans

Resource Title: [Climate Protection & Resiliency Plan, 2022](#)

Resource Type: Special Plan

Municipality: Kansas City

State: Missouri

Date of Adoption: 2022

Abstract: Climate Protection & Resiliency Plan, 2022

In 2006, Kansas City passed a [resolution](#) that would set it on track to develop its first Climate Protection Plan. In 2019, energy use in homes and buildings accounted for almost two-thirds of the GHG emissions in Kansas City. These emissions were attributed to electricity and natural gas use in the buildings. The City's 2022 Climate Protection Plan has a focus area titled *Homes & Buildings: Creating Healthy Indoor Spaces for Living, Working, and Enjoying*. To create climate resilient and affordable living spaces, the city has several intriguing strategies, including increasing building efficiency and health for commercial and public buildings. Pursuant to this strategy, the City is looking to implement energy efficiency requirements for private entities seeking City incentives for development by developing energy efficiency minimums. For example, the Zero Code is a renewable energy procurement framework that could require developers in the City to use renewable energy for new commercial and residential buildings. The Zero Code is part of the 2021 International Energy Conservation Code, adopted by Kansas City in 2022.

Plan Provisions:

Focus Area - Homes & Buildings: Creating Healthy Indoor Spaces for Living, Working, and Enjoying

Strategy B-1: Increase Building Efficiency and Health for Commercial and Public Buildings
Page 66-67.

B-1.5: Implement energy requirements to private entities seeking City incentives. Develop energy efficiency minimums, such as the Zero Code, that private entities must meet to obtain City incentives for development.

Equitable Future Highlights: "To move toward our equitable future, we will prioritize support for local businesses in areas with lower incomes and multiculturally owned businesses to help bring the cost savings benefits to historically marginalized communities."

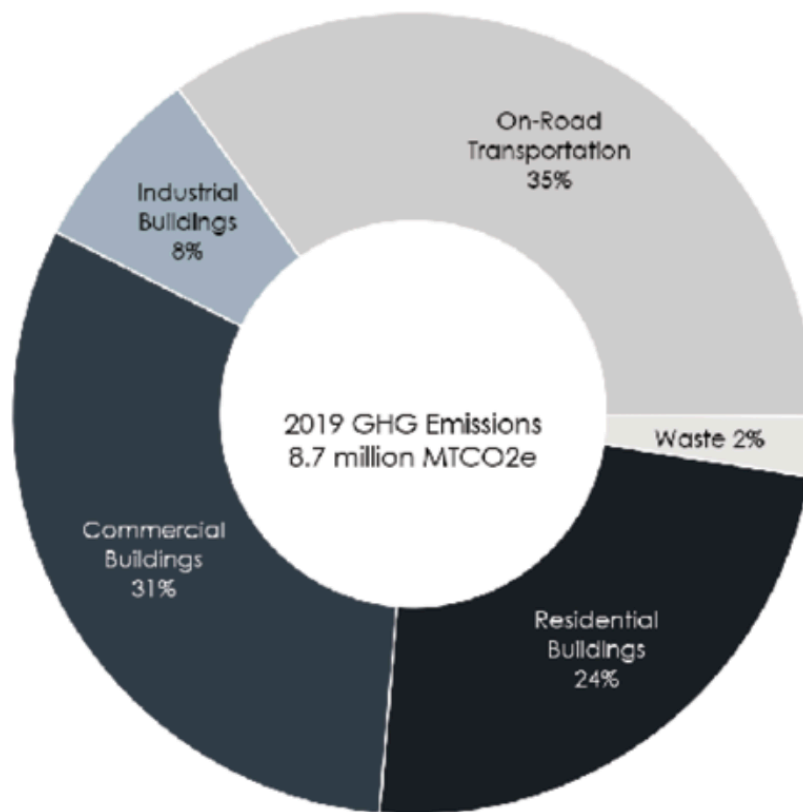


FIGURE 17: Industrial, Commercial, and Residential Building Emissions as a Portion of 2019 Total Emissions

Topic Title: Local Climate Action Plans

Resource Title: [City of Rockville Climate Action Plan](#)

Resource Type: Special Plan

Municipality: Rockville

State: Maryland

Date of Adoption: 2022

Abstract: City of Rockville Climate Action Plan

The City of Rockville, Maryland's Climate Action Plan is detailed, comprehensive, and accessible for all interested groups. This CAP has seven "Climate Actions" that is aims to implement, including Energy Efficiency, Transportation, Land Management, and Resiliency. This case study focuses on Land Management, highlighting action C-16: Implement the Comprehensive Plan to steer the densest development/redevelopment to mixed-use, transit-served locations, reduce vehicle miles travelled and emissions, and conserve/restore environmental areas. Rockville has conducted surveys and identified areas that are not only best for mixed-use transit oriented developed TOD, but also more resilient, and likely to reduce sprawl. Also of note is their intention to make sure this language makes its way into Rockville's Comprehensive Plan, giving the CAP more teeth when it comes to justifying amendments to the zoning code.

Plan Provisions:

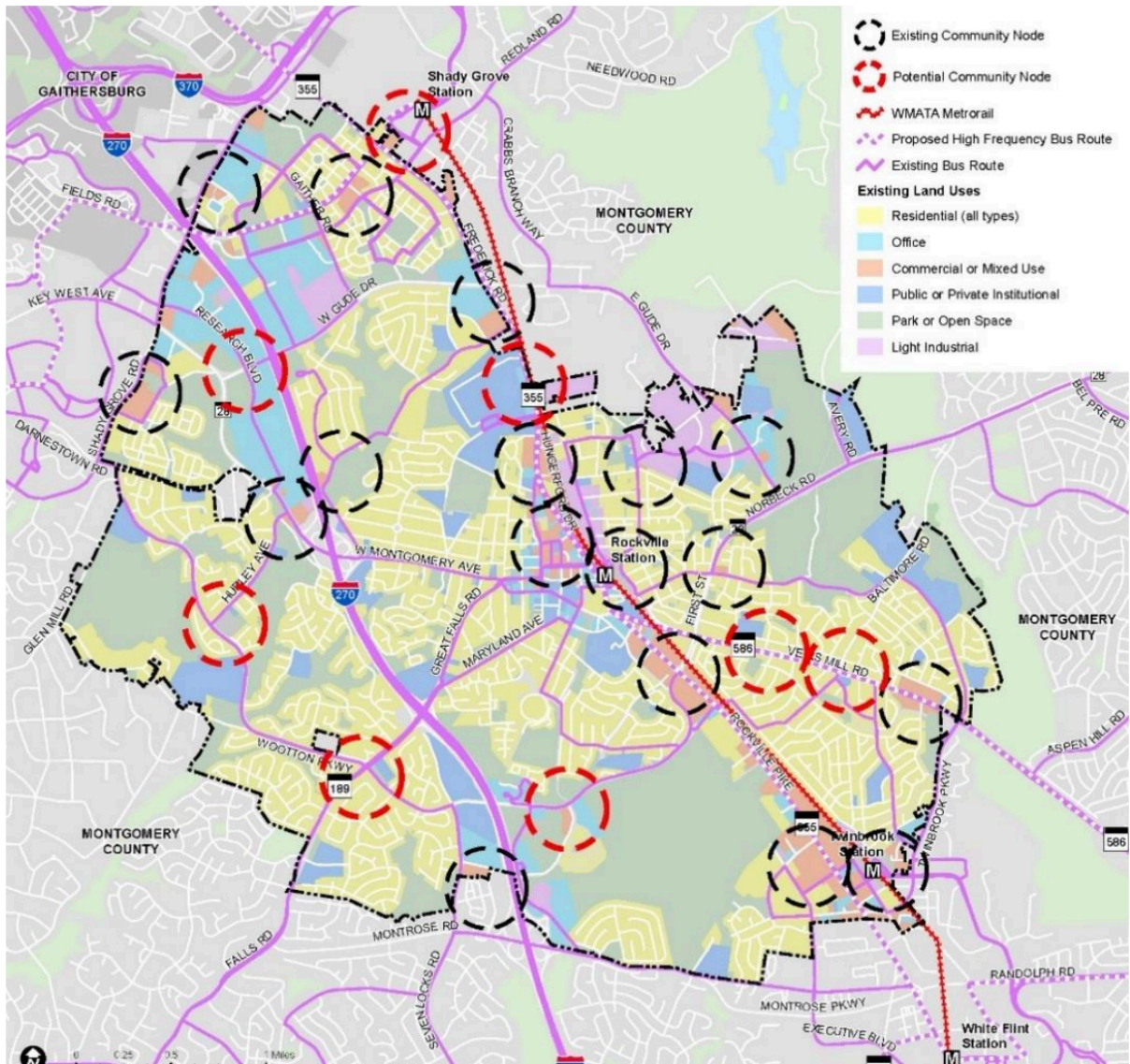
Page 89.

	Implement the Comprehensive Plan to steer the densest development/redevelopment to mixed-use, transit-served locations, reduce vehicle miles traveled (VMT) and emissions, and conserve/restore environmental areas				
Action C-16					
Objective	Reduce vehicle miles traveled and GHG emissions by increasing allowable density and types and number of desirable destinations within a short distance of transit hubs and activity centers and conserve/restore environmental areas				
Metrics	Milestone/Status update				
Target	Community transportation emissions	Development Stage		Ongoing	
Lead	Planning and Development Services	City Upfront Cost			
Partners	Planning Commission, Public Works, Housing and Community Development, Rockville Economic Development Inc. (REDI), Rockville Chamber of Commerce	City Operating Cost		Capital and implementation costs determined in a separate process. Cost share with many other CAP measures.	
GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
++	++	+	++	+	Mobility, Economic, Environment

“Rockville’s Comprehensive Plan contains several climate mitigation and resiliency policies that support Climate Action Plan goals, including sustainable design and green buildings, energy efficiency, renewable energy, waste reduction, equity, resilience, sustainable transportation, and the conservation and restoration of environmental areas.” [. . .]

“Several policies and actions will be implemented and tracked through the Comprehensive Plan process; including land use policies to foster redevelopment, transit-oriented development and walkable neighborhoods, transportation policies to reduce vehicle congestion and improve transportation alternatives, and environmental policies to protect green space and trees” [. . .]

“Land Use and Urban Design: Rockville’s Comprehensive Plan envisions mixed-use, vibrant activity nodes and identifies 17 existing and 8 potential future activity nodes to help guide land use and development policies (Figure 31). Key area of the city planned for land use changes include Rockville Town Center, Rockville neighborhood, North Stonestreet Avenue, Shady Grove Road/Piccard Drive corridor, and Veirs Mill Road corridor. Directing new residential development and employment to these locations will help reduce sprawl and associated vehicle emissions and greenhouse gases.”



Topic Title: Local Climate Action Plans

Resource Title: [Climate Action Plan](#)

Resource Type: Special Plan

Municipality: Richfield

State: Minnesota

Date of Adoption: 2020

Abstract: Climate Action Plan

In [Richfield's 2040 Comprehensive Plan](#), one of the overarching goals was “emphasizing sustainability as a measure to ensure the future economic, environmental and social health of the community.” The City of Richfield has identified the following goals as overarching objectives that encompass numerous possible actions: (1) Develop and Promote Energy Efficiency Efforts (2) Promote Renewable Energy Installation and Purchasing (3) Encourage Sustainable Design and Building Practices (4) Strengthen and Expand Natural Resource Management (5) Reduce Waste Generated & Promote Responsible Disposal (6) Improve Access to Local and Healthy Food. Here, the focus is on Goal 3: Encouraging Sustainable Design and Building Practices. To accomplish Goal 3, Richfield aims to streamline the permitting process to better accommodate projects with sustainable opportunities.

Plan Provisions:

Page 9

Goal 3: Encourage Sustainable Design and Building Practices. In 2019, Minnesota generated an estimated 10.2 million tons of construction and demolition waste. . . . With limited space for new construction in Richfield, sustainable design, which looks at the lifespan of a building and plans for emerging technologies is essential. . . . Richfield residents are implementing sustainable design features into their own home improvement or construction projects. Many residents have installed solar panels, natural landscaping, passive solar design, additional dwelling units, and more.

- **Objective 1: Develop and streamline municipal permit process**

1.1 Evaluate projects for sustainable opportunities during Administrative Review Committee (ARC) meetings. For projects with city financial support or regulatory approval, develop and amenity point evaluation system.



Richfield's partnership with Habitat for Humanity constructs affordable housing units in the city. All of their houses are built to meet Energy Star 3.1 standards.

Topic Title: Local Climate Action Plans

Resource Title: [Climate Action and Adaptation Plan](#)

Resource Type: Special Plan

Municipality: West Hollywood

State: California

Date of Adoption: 2021

Abstract: Climate Action and Adaptation Plan

West Hollywood's (WeHo's) Climate Action and Adaptation Plan outlines the City's intended path to achieve carbon neutrality by 2035 and adapt to the impacts of a changing climate while centering equity and quality of life. The implementation progress of the Plan can be tracked by utilizing the [WeHo Climate Action Public Dashboard](#). The CAP has five focus areas: (1) City Leadership & Governance (2) Energy (3) Transportation, Mobility, and the Public Realm (4) Zero Waste (5) Natural Environment. This case study will focus on focus area 3, Transportation, Mobility, and the Public Realm. According to WeHo, "Parking policy is one of the City's most important assets for behavior change and street management, and can be leveraged to encourage sustainable modes, the adoption of electric vehicles, and even car-free and car-lite lifestyles that are supported by a wide array of mobility options other than private vehicles." WeHo aims to rethink curb space and parking assets by exploring a few options and evaluating minimum parking requirements.

Plan Provisions:

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TM-3A: Explore Opportunities for:

- Increasing EV only parking (on-street)
- Piloting dynamic parking pricing
- Providing lockers or shares storage spaces for delivery services

Increasing loading zones for delivery vehicles

TM-3B: Evaluate minimum parking requirements across all land uses and provide alternatives that meet current and future parking needs.

- According to WeHo's Public Dashboard, this objective has been completed! The latest update states, "AB2097 was adopted and went into effect January 2023, which applies to a vast majority of parcels in the City. Staff evaluated the application of AB2097 and determined that at this time, this state law satisfies the intention and purpose for this subaction."
 - o Assembly Bill 2097 (AB 2097) is a California law that prohibits public agencies or cities from imposing a minimum automobile parking

requirement on most development projects located within a half-mile radius of a major transit stop.

Topic Title: Local Climate Action Plans

Resource Title: [Comprehensive Environmental and Climate Action Plan](#)

Resource Type: Special Plan

Municipality: Dallas

State: Texas

Date of Adoption: 2020

Abstract: Comprehensive Environmental and Climate Action Plan

Dallas has taken significant steps to intertwine land use planning with climate action. The City of Dallas's Comprehensive Environmental and Climate Action Plan (CECAP), adopted in 2020, outlines several land use strategies aimed at reducing greenhouse gas emissions and enhancing climate resilience. These strategies are designed to integrate with broader city planning efforts, such as the [ForwardDallas Comprehensive Land Use Plan Update](#), to ensure cohesive and sustainable urban development. Dallas's Comprehensive Environmental and Climate Action Plan (CECAP) incorporates land use strategies that promote sustainability, equity, and emissions reduction. Of note is aligning land use planning with the city's [Strategic Mobility Plan](#) to encourage transit-oriented development (TOD), reduce car dependency, and increase mixed-use zoning along commercial corridors. The plan also proposes revising parking ordinances to reduce minimums and pilot parking districts near transit hubs. To address environmental justice, CECAP calls for correcting historical zoning inequities and fostering healthier, more inclusive neighborhoods. As transportation relates to land use, Dallas aims to "Synergize land use and housing with transportation infrastructure to increase access to walking and biking options, and public transit." This objective is to be accomplished by the two strategies excerpted below.

Plan Provisions:

Pages 90–100

T11: DEVELOP A NEW COMPREHENSIVE LAND USE STRATEGY IN THE UPCOMING COMPREHENSIVE PLAN UPDATE TO PAIR WITH THE SMP + CECAP GOALS, ADOPT POLICY TO REDUCE TRANSPORTATION RELATED GHG EMISSIONS.

"The City will develop a public facing land use strategy in a holistic and comprehensive manner that aligns mixed-income housing and jobs around transit and is coordinated with DART's long-range transit plan and the TOD plan in Action T12. While the TOD plan is specifically related to development directly adjacent to existing and future DART stations, the land use strategy will exist within the Comprehensive Plan and should address the City's broader land use strategy and its relationship with the bus system, regional job

growth, and density. The strategy should support better job-housing balance throughout the city and shorter trips and alternative modes even in areas that do not have great transit access. It should also address other mobility related issues such as access to schools, daycare, healthcare and groceries etc. The land use strategy has direct linkages to other relevant plans, such as the 'Transportation Strategic Mobility Plan (ongoing)' , 'Strategic Economic Development Plan (2019)' and 'Comprehensive Housing Policy (2018)'. As site plans and development cases come through the development review process, conformity with the land use strategy will be required for staff approval before Planning and Zoning Commission. Non-conformity approval must demonstrate how the City or developer intends to mitigate any negative impacts of the project."

T14: ADOPT A REVISED PARKING ORDINANCE STRATEGY THAT SUPPORTS NEW MODE SPLIT GOALS AND LAND USE STRATEGY THAT MINIMIZES AVAILABLE PARKING IN TRANSIT-ORIENTED DISTRICTS.

"As part of a comprehensive effort to revisit land use and urban design standards based on the Strategic Mobility Plan and through the Comprehensive Plan Update, parking maximums will be introduced in areas with mature transit infrastructure to "level the playing field" between SOV and transit convenience. Where appropriate, parking management districts will be introduced (rather than parking standards) per development to begin shifting to a shared parking model for major nodes of activity. Parking management districts are often deployed by a local entity, such as a Public Improvement District (PID), to regulate supply and demand for parking through a combination of strategies aimed at reducing the number of parking spots for each parcel. Strategies can include shared parking, dynamic pricing, establishing maximum parking ratios, allowing offsite parking, or modifications to parking minimums. The parking management district will help balance the needs of developers who want to minimize expensive parking spots for walkability reasons and those who require more parking in short bursts for their businesses. A parking district standard can be piloted in one of Dallas' Public Improvement Districts such as Deep Ellum PID or Downtown Improvement District. Parking management districts should also adopt design guidance to retrofit surface lots with green infrastructure best practices, such as permeable surfaces or bioswales for water conveyance."

Topic Title: Local Climate Action Plans

Resource Title: [Regional Climate Action Plan 3.0](#)

Resource Type: Special Plan

Municipality: Miami-Dade, Broward, Palm Beach, and Monroe Counties

State: Florida

Date of Adoption: 2021

Abstract: Regional Climate Action Plan 3.0

In December 2022, the Southeast Florida Regional Climate Change Compact—a collaboration among Miami-Dade, Broward, Palm Beach, and Monroe counties—adopted the third iteration of its Regional Climate Action Plan (RCAP 3.0). This comprehensive plan serves as a voluntary framework guiding local governments in implementing climate mitigation and adaptation strategies. A significant focus of RCAP 3.0 is the integration of land use and zoning policies to enhance climate resilience across the region. The key strategies of this plan include **Promoting Transit-Oriented Development (TOD), Implementing Resilient Zoning Codes, Preserving Agricultural Lands, and Enhancing Green Infrastructure**. RCAP 3.0 outlines a collaborative approach involving multiple stakeholders, including local governments, regional planning councils, and community organizations. The plan identifies specific implementers for each strategy, ensuring accountability and coordinated action. For instance, local governments are tasked with updating comprehensive plans and zoning ordinances, while regional entities provide technical support and facilitate knowledge sharing. This case study illustrates how Southeast Florida is proactively addressing climate challenges through strategic land use and zoning reforms, as well as collaborating on issues that will ultimately impact the entire region. Of note is the “Sustainable Communities and Transportation” Portion of the RCAP, with the ultimate goal being to “Adapt to the impacts of climate change and reduce greenhouse gas emissions by reshaping where and how to build and move from place to place.”

Plan Provisions:

Pages 88–91

Recommendation ST-1: Incorporate resilience and sustainability objectives, inclusive of the Southeast Florida Regionally Unified Sea Level Rise Projections in city, county and regional agency comprehensive plans, transportation and other infrastructure plans, and capital improvement plans.

- ST-1.1 Review local government comprehensive plans and transportation, infrastructure and capital improvement plans to determine gaps in planning for projected sea level rise in Southeast Florida and ensure resilience objectives are incorporated. Identify opportunities to maximize intergovernmental and

interagency coordination on utilization of the Southeast Florida Regionally Unified Sea Level Rise Projections.

- ST-1.2 Update local government and regional plans as needed to incorporate periodic updates to the Southeast Florida Regionally Unified Sea Level Rise Projections and account for ongoing advances in scientific knowledge and modeling.

Recommendation ST-2: Ensure locally produced maps for planning and project documents include the latest storm surge and sea level rise projections.

- ST-2.1 Develop sea level rise scenario maps and updated storm surge maps, based on the Compact's Regionally Unified Sea Level Rise Projections and the National Oceanic and Atmospheric Administration's (NOAA) Sea, Lake and Overland Surges from Hurricanes (SLOSH) model, to be included in appropriate local and regional planning documents.
- ST-2.2 Use locally produced maps to guide municipal and county government climate adaptation planning efforts related to:
 - The built environment
 - Transportation infrastructure and services
 - Historic and archaeological resources
 - Water management systems and public infrastructure
 - Natural resources
- ST-2.3 Continue to update maps in local and regional plans as more data becomes available and scientific projections are refined. Local governments, agencies and organizations should use best available data and tools for land use and other planning.

Recommendation ST-3: Use vulnerability and risk assessment analyses and tools to designate Adaptation Action Areas (AAAs) or similar designation, and identify priorities for resilience investments.

- ST-3.1 Conduct vulnerability and risk assessments in accordance with Section 380.093, Florida Statutes to identify areas requiring adaptation strategy development.
- ST-3.2 Use local government authority to designate or otherwise recognize AAAs or similar designation to identify areas deemed most vulnerable to sea level rise and other climate change impacts (including, but not limited to, extreme high tides, heavy local rain events, and storm surge), and prioritize funding and adaptation planning. Such areas may include:
 - Areas below, at, or near mean higher high water
 - Areas with a hydrological connection to coastal waters
 - Areas designated as evacuation zones for storm surge.
 - Other areas impacted by climate-related drainage and/or flood control issues.

- ST-3.3 Document, inventory and share data sources, thresholds, criteria and models to encourage the use of common approaches to vulnerability and risk assessments and, ultimately, the development and implementation of adaptation strategies that will be complementary across jurisdictions and infrastructure types and result in a cohesive, resilient built and natural environment.

Parking and Pavement

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Parking & Pavement

Narrative

Parking, Pavement & CRD

American municipalities devote considerable landmass to motor vehicle parking. The affiliated abundance of paved surfaces has contributed to rising temperatures and worsening water quality. Most parking spaces are built with impervious materials like asphalt or concrete which prevent water from infiltrating below grade and contribute to [destructive flooding and pollutant transport](#). Furthermore, parking surfaces are often darkly pigmented which means they absorb heat during the day and release it back to the atmosphere at night creating a “[heat island effect](#).” Impermeable paved surfaces are exacerbating environmental problems and climate change.

The number of existing parking spots exceeds demand both nationally and locally. CNBC estimated that there are “[between 2.5 to 7 spots for every registered vehicle](#).” However, even with this oversupply, many drivers elect to double park or “[cruise](#)” the curb looking for a better spot, thus contributing to idling and road congestion. Furthermore, plentiful free or cheap parking disincentivizes using fee-based mass transit and encourages driving. Taken together, these factors lead to increased automotive emissions and more atmospheric greenhouse gases and surface level VOCs and particulates. Consequently, excess parking may harm human health.

The private sector bears substantial costs in building out the parking required by local law. First, there is an opportunity cost to building required onsite parking – every square foot devoted to parking leaves less space for revenue-producing uses. Next, there is the cost of building the space itself – the New York Times estimated that construction costs “[run from \\$10,000 per parking space in a surface lot to \\$70,000 per space in an underground garage](#).” Costs and constraints have serious consequences, [including housing shortages and affordability crises](#). Having excess parking doesn’t make social or economic sense.

Using the CRD framework elements, the parking and pavement team were able to find 14 case studies from across the country that utilize land use controls to enact climate resilient building strategies and requirements. These case studies were pulled directly from comprehensive plans, zoning codes, special topic plans, and municipal codes to allow readers to see exactly how municipalities are achieving parking and pavement reform and climate resilient development.

The Role of Land Use in CRD

Land use boards have tools at their disposal to help overhaul their zoning codes to address parking and pavement issues within their municipalities. As a first step towards parking reform, land use boards may adopt comprehensive plans that set forth their

municipality's goals and priorities when it comes to parking in pavement reform. The comprehensive plans featured in this framework outline various strategies to achieve parking reform. These strategies include finding secondary uses for underutilized streets, abolishing or decreasing parking minimums to reduce the amount of parking lots, using pervious pavements to assist with groundwater recharge and using reflective pavement materials to mitigate the urban heat island effect. Land use boards can use their comprehensive plans to identify both long-term and short-term parking and pavement goals that will encourage CRD.

Land use boards can also implement the strategies set out in their comprehensive plans in their zoning codes. Most municipality's zoning code already contains a parking and/or pavement chapter that dictate things like minimum parking requirements, what pavement material should be used in a project, and requirements for vegetation and tree cover in parking lots. Municipalities across the country have implemented new zoning provisions that accomplish CRD by requiring new projects to limit the amount of parking spaces, use climate change resilient materials in paving, and increase the amount of vegetation used in parking lots.

Researching Alternatives to Traditional Parking Policies

This Framework examples local laws encouraging or directing climate resilient private development involving parking, with geographic and resource type diversity.

The case studies are sorted into three categories:

- 1) parking requirements from minimums to innovations,
- 2) plans and planning for alternatives to vehicle parking, and
- 3) processes for mitigating the negative climate-related effects of pavement.

1) Minimums & Beyond

The overabundance of parking has stemmed in part from municipal policies and requirements designed to accommodate the proliferation of motor vehicles beginning in the mid-20th century. Most municipalities adopted "parking minimums," also known as minimum parking requirements (MPRs), to address these concerns. The first MPR was introduced in Columbus, Ohio in 1923.

MPRs contained in zoning codes establish parking space quotas for each land use category. The quota determination can be based on a variety of metrics--*e.g.*, square feet of gross-leasable area in a shopping mall, number of seats in a movie theater, or number of dwelling units in a multi-family residential building. When applied to the proposed size or

capacity of a development, these metrics are used to calculate the minimum number of parking spaces that should be required for that proposed use.

Municipalities without staff transportation planners that needed guidance or advice on what metric to use turned to other municipalities that had already adopted MPRs or purported experts, such as the Institute of Transportation Engineers or Urban Land Institute. However, over time it became apparent that one-size fits all approaches like formulaic MPRs result in inaccurate predictions of parking demand, and consequently over- and under-supply of parking.

This framework focuses on the next generation of parking requirements that have begun to take the place of MPRs or at least supplement them. Illustrative examples include municipalities that had eliminated minimums (Buffalo, NY), imposed maximums (St. Paul, MN), allowed reduction of parking minimums through shared parking and land banking for future use (Paterson, NJ), permitted exemptions (Ketchum, ID), and provided “reduced parking areas” (Tacoma, WA). Furthermore, some municipal policies have gone beyond creating parking for cars by implementing mandatory minimum parking for transportation alternatives like bicycles (Omaha, NE) and the repurposing of unused parking lots to provide Safe Outdoor Spaces for the unhoused and their vehicles (Albuquerque, NM).

2) Plans & Planning

Not all land use control is derived from codes and ordinances--planners and boards have a significant role to play as well. One comprehensive plan addressed the heat island effect of parking lots by recommending increased permeable surfaces and expanded planting areas (Newark, NJ). Another--a climate action and adaptation plan-- provided for cooler parking surfaces (Davis, CA).

Principal and special interest land use boards and officers may merge parking with climate resiliency. One provision requires “the permit-issuing authority,” a principal land use board, to flexibly interpret MPRs and request MPR amendments when it finds use classifications erroneous (New Bern, NC). In another, a special interest Pedestrian and Bicycle Commission (Fort Worth, TX) called for bicycle parking minimums to encourage active alternative transportation that could replace automobiles and their parking needs.

3) Mitigating Negative Effects of Impervious Pavement.

Impervious paved surfaces have adverse environmental and health impacts including urban heat island effect, increased flooding, and pollutant transport. This framework examples innovations that could reduce or eliminate the detrimental effects of paved surfaces. In one example a municipality included pervious surface recommendations in its stormwater management chapter and required that any parking above use-based minimums be constructed from pervious concrete or other permeable materials (Noblesville, IN). In another, a zoning provision granted parking reduction incentives for nonresidential

properties that retained or constructed perimeter planting beds, retained or constructed interior landscape islands, or preserved or planted trees (Tuscaloosa, AL). Finally, an example is given of a zoning provision that required impervious surface reductions by incorporating reflective, pervious, or recycled material into pavement (Hartford, CT).

Case Studies

Topic Title: Parking and Pavement

Resource Title: Off-Street Parking and Loading, § 500-7

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Paterson

State: New Jersey

Date of Adoption: 2016

Abstract: Off-Street Parking and Loading

Paterson is New Jersey's third largest city, with a population of over 156,000. The city is located along the Passaic River which has benefited the city's manufacturing and industrial interests but has also contributed to inland flooding during extreme weather events. In recognition of the impact that impervious paved surfaces have on flooding, Paterson has adopted an off-street parking ordinance in its [zoning code](#) that provides private developers with opportunities to reduce required parking space construction through shared parking and land-banking for future parking (§ 500-7.1). This flexibility is consistent with Paterson's [2014 Master Plan](#) land use goal of "addressing excessive parking standards."

Of note in the Zoning Code's Shared Parking provision is the designation of allowable reduction percentages for seven specific uses (retail sales, offices, service establishments, restaurants, ballrooms, banquet halls, and meeting rooms). This could potentially fast-track Planning Board approvals for parking shared by those listed uses. Also of interest is the Zoning Code's Land-Banked Parking provision that permits the Planning Board to delay some "improvement" of an applicant's lot by setting aside up to 33% of required parking spaces through land-banking for potential future use. Both the initially improved and land-banked portions of the lot must be adequately drained, lighted, and landscaped.

Paterson's [2017 Center City Expansion Redevelopment Plan](#) integrated aspects of § 500-7.1, including encouraging shared parking. Shared parking and land-banking for future use are two alternatives to minimum parking requirements that can limit the amount of parking to be built with private developments, thus slowing the growth of impervious surfaces.

Code Provision:

Municipal Code of the City of Paterson

[Chapter 483; Article V Zoning](#)

Section 500-7. OFF-STREET PARKING AND LOADING

§500-7.1 General Provisions for Off-Street Parking.

- A. Responsibility. The duty to provide and maintain off-street parking spaces shall be the joint and separate responsibility of the operator and owner of the use or land for which off-street parking spaces are required to be provided and maintained. In the B-4 District, parking for public, semipublic, and commercial uses may be provided by the Parking Authority of the City of Paterson or other privately owned centralized facilities. Each developer shall be required to coordinate his plans with those of the Planning Board and other applicable agency of the City of Paterson.
- B. Location.
1. All parking spaces required herein shall be located on the same lot with the building or use served. However, parking spaces required for non-residential uses may be located on a separate lot in a non-residential district within 300 feet of the principal building subject to the requirement of §500-7.1.C.4, below.
 2. No land in a residential zone shall be used to fulfill the off-street parking or loading requirements for a use in a nonresidential district.
- C. Joint Parking Facilities. Required parking may be satisfied through participation in a joint parking program involving 2 or more uses; provided that
1. Plans for such a joint program shall have been approved by the Planning Board.
 2. The area for the parking facilities shall be adequate to provide the sum total of off-street parking space requirements of all such joint uses, unless modified in accordance with §500-7.1.D, below
 3. Parking requirements for a use in a non-residential district shall not be satisfied within a residential district.
 4. In any case, where the required parking spaces are not located on the same lot with the building or use served, or where such spaces are collectively or jointly provided and used, such parking spaces shall be established by a recorded covenant or agreement as parking spaces to be used in conjunction with the principal use and shall be reserved as such through an encumbrance on the title of the property to be designated as required parking space, such encumbrance to be valid for the total period the use or uses for which the parking is needed are in existence. Such agreement or covenant shall be duly recorded in the Office of the county Registrar of Deeds.
- D. Mixed Uses and Allowable Reduction in Parking Requirements for Shared Parking. In the case of mixed uses, uses with different parking requirements occupying the building or premises, or in the case of the joint use of a building or premises by more than one use having the same parking requirements, the parking spaces required shall equal the

sum of the requirements of the various uses computed separately, except that parking requirements for permitted accessory retail and service uses and apartment buildings with 100 or more dwelling units or hotels, may be reduced by the following percentages where it is found shared parking is likely to occur as a result of patrons utilizing several of the uses comprising the development in a single visit or where variations in peak demand for parking spaces would occur between different uses:

1. Retail sales, offices, service establishments: 50%
2. Restaurants and dining rooms: 60%
3. Ballroom, banquet hall, meeting rooms: 70%

E. "Land-Banking" of Parking Spaces. Where the Board reviewing a plan for development determines, in connection with its review of such plan, that less than the required number of parking or loading spaces will satisfy the intent of this chapter because of the unique nature of the proposed use, variations in the probable time of maximum use by joint users or for any other reason, the Board may waive or "landbank" the improvement of up to 1/3 of the total number of spaces as required by this Chapter, subject to the following regulations:

1. Since this section does not reduce the number of required spaces (instead it allows the reviewing board to allow less than the required number of spaces to be constructed), it shall be demonstrated on the plan that sufficient area remains for the future provision of the total number of spaces required. The site plan shall clearly indicate both that portion of the parking area to be initially improved and that portion of the required spaces proposed to be "land-banked."
2. The site plan shall provide for adequate drainage, lighting and landscaping of both the initial and "land-banked" future parking areas.
3. The "land-banked" parking area shall be landscaped in accordance with this ordinance. Such unimproved or "landbanked" spaces shall be maintained as additional landscaped area until and unless required for parking or loading use.
4. Written guarantees, satisfactory to the Attorney to the Board having jurisdiction, shall be submitted by the applicant, insuring the improvement of such spaces within six months of the date of written notice to the property owner by the Board having jurisdiction stating that all or a portion of such spaces have been determined to be necessary and shall be constructed.
5. An application for site plan approval shall be required in the event there is a proposed change of use that requires more total parking spaces than was required on the plan involving the "landbanking" of parking spaces.

Topic Title: Parking and Pavement

Resource Title: Bicycle Parking Requirements, § 55-745

Resource Type: Zoning Use & Dimensional Requirements

Municipality: Omaha

State: Nebraska

Date of Adoption: 2020

Abstract: Bicycle Parking Requirements

Omaha, the largest city in Nebraska with a population of over 486,000, is sited on the Missouri river in the heartland of the U.S. During its rich history of planning for nonmotorized travel, Omaha has embraced bicycling as an alternative to fossil-fuel- guzzling and paved-parking-requiring car ridership. In keeping with the city's [Active Mobility Plan](#), Omaha has created a robust network of bicycling routes, and they have not forgotten that bike parking is needed once cyclists reach their destinations.

Omaha's Active Mobility Plan recognizes the importance of private developers providing bicycle parking, particularly near higher ridership bus stops and commercial/mixed use areas. Fortuitously, Omaha's Zoning Chapter outlines bicycle parking requirements for both long- and short-term needs in its Mixed Use and Transit Oriented Development districts. Per § 55-745(a)(1), short-term bicycle parking spaces may take the form of "securely anchored bicycle racks" located within 75 feet of a building entrance. § 55-745(a)(2) requires that long-term bicycle parking be provided via "bicycle storage room, bicycle lockers, or any other secure, indoor or covered outdoor area specifically intended for bicycle parking." § 55-745(a)(5) allows the city engineer to grant permission to locate bicycle parking in a public right-of-way under certain conditions. Omaha has adopted minimum requirements for bicycle parking based on use types, with the number of bicycle parking spaces calculated based on either gross floor area or another metric such as number of dwelling units. Omaha's extraordinary use of "parking minimums" for bicycles enhances the city's strong "active mobility" culture and limits the need for additional paved car parking spaces and lots.

Code Provision:

City of Omaha, Nebraska Code of Ordinances

Chapter 55 - Zoning

Article XIV – Off-Street Parking and Loading Regulations

[§ 55-745. Bicycle Parking Requirements.](#)

- (a) *Standards.* Bicycle parking may be short-term or long-term bicycle parking in accordance with the following standards.
- (1) Short-term bicycle parking is intended to serve the needs of people, such as customers, clients, and students, parking their bicycles for short time periods and shall:
 - a. Be provided in the form of securely anchored bicycle racks of any of the following standard designs: U-racks, staple racks, circle racks, post-and-ring racks, or any other bicycle rack design approved by the planning director, which provides two points of contact with the bicycle frame and allows for both the bicycle frame and one wheel to be locked to the rack using a standard U-lock;
 - b. Be located within 75 feet of the building entrance it serves or in a location approved by the planning director; and
 - c. Be of solid construction, resistant to rust, corrosion, hammers, and saws.
 - (2) Long-term bicycle parking is intended to meet the needs of people, such as residents and employees, parking bicycles for longer time periods, and shall:
 - a. Be a bicycle storage room, bicycle lockers, or any other secure, indoor or covered outdoor area specifically intended for bicycle parking;
 - b. Be in an area that can be accessed without requiring users to carry bicycles up or down stairs; and
 - c. Contain bike racks, bike lockers, or other bicycle parking and storage solutions that do not require the user to lift the entire bicycle, including both wheels, completely off the ground.
 - (3) Both short-term and long-term bicycle parking shall be accessible to intended users without requiring the user to move another bicycle and without obstructing a required walkway.
 - (4) Both short-term and long-term bicycle parking shall be installed according to the manufacturer's specifications, including minimum recommended distance from other structures and minimum spacing between adjacent bicycle racks.
 - (5) With the permission of the city engineer, required short-term bicycle parking may be located in the public right-of-way. Public bicycle parking spaces may contribute to compliance with required bicycle parking when located on the same block face and within 75 feet of a principal building entrance for the use in question.
- (b) *Schedule of bicycle parking requirements.* Bicycle parking for each use shall be provided in accordance with the minimum requirements set forth in Table 55-745.
- (1) One U-rack, staple rack, circle rack, post-and-ring rack, or other bicycle rack that can accommodate one bicycle on each side of the rack counts as two bicycle parking spaces.
 - (2) Uses not listed in Table 55-745 are not required to provide bicycle parking.
 - (3) Uses within all zoning districts are exempt from bicycle parking requirements provided in Table 55-745 except for within the following zoning districts: MU mixed use district, and all TOD transit oriented development districts.

- (4) Any non-residential uses having 1,000 square feet or less of gross floor area shall be exempt from minimum bicycle parking requirements.
- (5) When a computation of required parking results in a fraction of 0.5 or greater, the requirement should be rounded up to the next whole number.
- (6) Unless otherwise indicated, parking requirements are based on gross floor area. Gross floor areas for the purpose of this computation do not include enclosed areas devoted to off-street vehicle or bicycle parking or loading.
- (7) When parking requirements are computed on the basis of capacity, capacity shall be determined by the building code applicable in the city at the time the use is established.

TABLE 55-745. BICYCLE PARKING REQUIREMENTS

Use Types	Minimum Bicycle Parking Requirements
<i>Residential use types:</i>	
Multiple-family residential	1 space per 8 dwelling units that do not have an exterior ground floor entry or that are not served by a private garage; a minimum of 80 percent of the required bicycle parking shall meet the standards for long-term bicycle parking
Large group living	1 space per 25 residents; a minimum of 80 percent of the required bicycle parking shall meet the standards for long-term bicycle parking
<i>Assisted living:</i>	
Independent housing	1 space per 15 dwelling units; a minimum of 80 percent of the required bicycle parking shall meet the standards for long-term bicycle parking
Semi-independent living	1 space per 30 dwelling units
Dependent living	1 space per 50 employees on largest shift
<i>Civic use types:</i>	
Administrative services	1 space per 15,000 square feet
College and university facilities	2 spaces per classroom
Cultural services	1 space per 50,000 square feet
Social or recreational clubs	2 spaces
Hospital services (general or limited)	1 space per 50 employees on the largest shift
Park and recreation services	2 spaces
Primary educational facilities	1 space per classroom
Public assembly	1 space per 200 persons capacity
Religious assembly	1 space per 400 persons capacity of largest place of public assembly
Secondary educational facilities	1 space per classroom
<i>Office use types:</i>	
All office use types	1 space per 15,000 square feet
<i>Commercial use types:</i>	
Business or trade school	1 space per classroom

Cocktail lounge	2 spaces
Indoor and outdoor sports and recreation	2 spaces
Indoor and outdoor entertainment	1 space per 200 persons capacity
Food sales (limited)	2 spaces
Food sales (general)	The greater of 1 space per 10,000 square feet or 2 spaces
Food sales (convenience)	2 spaces
General retail sales	The greater of 1 space per 10,000 square feet or 2 spaces
Hotel and motel	The greater of 1 space per 50 rooms or 2 spaces; a minimum of 50 percent of the required bicycle parking shall meet the standards for long-term bicycle parking.
Liquor sales	2 spaces
Personal improvement services	2 spaces
Personal services	2 spaces
Pet services	2 spaces
Research services	The greater of 1 space per 25,000 square feet or 2 spaces
Restaurants	2 spaces

Topic Title: Parking and Pavement

Resource Title: Safe Outdoor Space, § 4-3(G)(9)

Resource Type: Zoning Use and Dimensional Requirements

Municipality: Albuquerque

State: New Mexico

Date of Adoption: 2023

Abstract: Safe Outdoor Space

The City of Albuquerque is New Mexico's largest municipality with a population of more than 560,000. The city's dry climate and unique geography (adjacent to pueblos, mountains and desert while also having the Rio Grande flowing through its downtown core) have made it an attractive place to live. Like many other cities, [Albuquerque has experienced urban sprawl that has resulted in an over-abundance of parking which some estimate covers one-third of the downtown landmass.](#) At the same time, [the city has a sizable unhoused population,](#) also concentrated in the downtown area. To meet these dual challenges, Albuquerque has recently adopted a local law that permits the private sector to create "[Safe Outdoor Spaces](#)" ("SOS") for the unhoused in parking lots and elsewhere as a temporary use. [Part 14-16-7-1 of the city's Integrated Development Code](#) defines SOS as "a lot, or a portion of a lot, developed to provide designated spaces for occupancy by tents, recreational vehicles, and/or light vehicles. Designated spaces are provided to occupants at no charge." The city's code contains use-specific standards for SOSs including duration of the temporary use permit, maximum numbers of spaces and occupants, and permissible locations within a lot. An SOS is required to have an "operations and management plan" or security agreement and may also provide social services and support facilities for occupants. The city's [Safe Outdoor Spaces website](#) includes a link to a [map showing SOS applications by location and status.](#) Albuquerque's innovation allows landowners to make good use of excess paved parking for a compassionate purpose.

Code Provision:

City of Albuquerque, New Mexico Code of Ordinances

Integrated Development Code

Part 14-16 Use Regulations

4.3 Use-Specific Standards

[§ 4-3\(G\)\(9\). Safe Outdoor Space](#)

- (a) This use is limited to 2 years, and the Permit - Temporary Use may be extended for an additional 2 years. A new Permit - Temporary Use pursuant to Subsection 14-16-6-5(D) shall not be approved within 6 months of the last date that the use was allowed in a previous Permit - Temporary Use.
- (b) The maximum number of designated spaces shall be 40 per safe outdoor space development. One (1) tent, recreational vehicle, or light vehicle is allowed per designated space. The maximum number of occupants per safe outdoor space development is 50 people.
- (c) Safe outdoor spaces with more than 10 designated spaces and 15 or more occupants are prohibited within 660 feet in any direction of a lot containing any other safe outdoor space with more than 10 designated spaces and 15 or more occupants.
- (d) Any portion of a lot in use as a safe outdoor space shall be at least 330 feet in any direction from any property zoned R-A, R-1, R-MC, or R-T that contains low-density residential development.
- (e) Toilets, hand washing stations, and showers shall be provided as follows.
 - 1. Plumbed hand washing stations and water-flush or composting toilets shall be provided within 2 years of the City approval of the safe outdoor space.
 - a. One (1) water-flush or composting toilet shall be provided for every 8 designated spaces.
 - b. One (1) hand washing station shall be provided for every 10 designated spaces.
 - 2. Prior to the installation of plumbed handwashing stations and water-flush or composting toilets, portable toilets and hand washing stations may be provided to meet this requirement.
 - a. Portable toilets and hand washing stations shall be provided at a ratio of 1 each per 8 designated spaces.
 - b. Portable toilets and hand washing stations shall be serviced at regular intervals.
 - 3. Toilets and hand washing stations shall not be located more than 300 feet in any direction of any designated space.
 - 4. One (1) shower shall be provided for every 10 designated spaces.
 - a. Portable showers may be provided to meet this requirement.
 - b. Showers are not required to be plumbed within 2 years of the City approval of the safe outdoor space.
- (f) Designated spaces, toilets, hand washing stations, and lavatories (i.e. facilities with toilets, showers, and sinks) shall be set back a minimum of 20 feet from each property line that abuts R-ML, R-MH, or any Mixed-Use zone district and a minimum of 5 feet from any other property line.
- (g) The area containing designated spaces for tents shall be secured and screened on all sides by an opaque wall or fence or vegetative screen at least 6 feet high. Other requirements in Section 14-16-5-6 Landscaping, Buffering, and Screening do not apply.
- (h) Each safe outdoor space development shall include an operations and management plan or security agreement to ensure the safety of individuals occupying the designated spaces.

1. Proof of the plan or agreement shall be required with the application for a safe outdoor space and shall be reviewed by the City's Department of Family and Community Services.
 2. The plan or agreement shall specify on-site support on a 24 hours a day, 7 days a week basis.
 3. The management plan shall, at a minimum, include the following statement: "No person who is a registered sex offender shall be allowed to stay in a Safe Outdoor Space."
- (i) Each safe outdoor space shall offer social services and support facilities to its occupants, including but not limited to showers, education and job training, storage space for residents' belongings, recreational services, and activities for use by occupants to provide comprehensive livability options.
 - (j) This use is prohibited adjacent to Major Public Open Space.
 - (k) The total number of safe outdoor spaces shall not exceed 2 in each City Council District.

Topic Title: Parking and Pavement
Resource Title: Minimum Parking Requirements
Resource Type: Supplemental Substantive Zoning Regulations
Municipality: Buffalo
State: New York
Date of Adoption: 2016

Abstract: Minimum Parking Requirements

Buffalo is located on the eastern end of Lake Erie in western New York. Buffalo is the second most populous city in New York with a population of about 280,000 people. While Buffalo does have a large population, the amount of parking lots in the city exceeds the demand. Parking lots cover almost 30% of Buffalo's downtown. To slow the development of more parking lots, in 2017, Buffalo became the first city in the U.S. to eliminate parking minimums. To promote alternative methods of transportation, Buffalo's Green Code requires new developments and expansions to provide bicycle parking. Additionally, the green code requires parking surfaces to be rated with a [Solar Reflectance Index \(SRI\)](#) of at least 29, which may be effective to mitigate urban heat island effect.

Code Provisions:

Buffalo, New York

Chapter 496 Unified Development Ordinance

[8.2 BICYCLE ACCESS AND PARKING:](#)

8.2.1 General

- A. Any development which involves new construction of a principal building, expansion of an existing principal building by 2,500 square feet or more, or substantial renovation of an existing principal building, must provide bicycle parking in accordance with this section.
- B. Table 8A: Bicycle Parking identifies the minimum number of bicycle parking spaces required per principal use, plus the percentage of these spaces that must be designed for long-term parking, versus short-term. If the principal use is not listed, no bicycle parking is required. The required minimum number of spaces is calculated as follows:
 - 1. The number of bicycle parking spaces, not the number of bicycle parking fixtures, is calculated to determine compliance; i.e., a single bicycle rack that is designed for parking two bicycles is counted as two bicycle parking spaces.
 - 2. A minimum of two bicycle parking spaces must be provided for each principal use where bicycle parking is required.

3. After the first 20 bicycle parking spaces, no additional bicycle parking is required for a principal use.
 4. When there is more than one principal use on a site, the required bicycle parking for the site is the sum of the required parking for the individual principal uses.
- C. Short-Term and Long-Term Parking. Short-term bicycle parking and long-term bicycle parking are described as follows:
1. Short-term bicycle parking accommodates visitors, customers, messengers, and other persons who intend to depart within two hours or less. Fixtures include bicycle racks, which may be unsheltered. Standards for the design of short-term bicycle parking are found in Section 8.2.2.
 2. Long-term bicycle parking accommodates employees, students, residents, commuters, and other persons who intend to leave their bicycle parked for more than two hours. Fixtures include lockers and bicycle racks in secured areas, and are always sheltered or enclosed. Standards for the design of long-term bicycle parking are found in Section 8.2.3.

8.3 VEHICLE ACCESS AND PARKING:

8.3.1 General

- A. Off-Street Parking. There are no provisions that establish a minimum number of off-street parking spaces for development. However, certain development proposals are required to complete a transportation demand management plan, per Section 8.4, which can result in the provision of off-street parking. Where provided, off-street vehicle parking must comply with the standards of this section.

...

- G. Parking Surfaces. All driveways, parking stalls, drive aisles, and loading areas:

1. Must be surfaced with fixed, firm, and non-slip material. Gravel may be used as a surface material only with the written consent of the Commissioner of Permit and Inspection Services. The portion of a driveway within a public right-of-way must be constructed in accordance with the specifications of the Commissioner of Public Works, Parks, and Streets.
2. Must be capable of withstanding the weight of vehicles and their loads.
3. Should be rated with a Solar Reflectance Index (SRI) of at least 29.

Topic Title: Parking and Pavement
Resource Title: Parking Requirements
Resource Type: Supplemental Substantive Zoning Regulations
Municipality: St. Paul
State: Minnesota
Date of Adoption: 2016

Abstract: Parking Requirements

St. Paul, the capital city of Minnesota, is a mid-sized city with a population of about 310,000 people. Under Article II of St. Paul's zoning code parking maximums—rather than minimums—are imposed on new developments to limit the paved surface and the ensuing rising of temperature and water quality deterioration. Additionally, by limiting the amount of parking spaces allowed for developments, St. Paul can prevent the construction of excess parking lots, saving private entities costs.

St. Paul's zoning code also provides a number of ways to mitigate the urban heat island effect and increase the absorption and retention of stormwater. Parking surfaces must include landscaping that reduces the glare from the parking surface and pavement must be pervious to allow for stormwater retention. Additionally, the code requires that for off street parking facilities with greater than one-quarter of an acre of total disturbed area, stormwater drainage into public sewers to be controlled in accordance with best management practices.

Code Provisions:

Saint Paul, Minnesota

Code of Ordinances

Sec. 63.201. - Off-street parking.

Accessory off-street parking spaces are permitted subject to the requirements and limitations of this article. There are no requirements for a minimum number of parking spaces. A parking fee may be assessed to users of off-street parking spaces, and accessory parking may be made available to the public as short-term event parking.

Sec. 63.207. - Parking requirements by use.

Off-street surface parking maximum. Off-street surface parking maximums shall apply to surface parking facilities with more than fifteen (15) spaces. The maximum number of off-street parking spaces by type of use shall be determined in accordance with table 63.207, maximum off-street surface parking by use. Surface parking facilities that exceed the maximum shall not be created unless a conditional use permit is approved based on demonstration of need.

Sec. 63.314. - Landscaping.

For any parking facility, other than structured parking, landscaping shall be provided to buffer the facility from adjacent properties and from the public right-of-way; reduce the visual glare and heat effects of large expanses of pavement; and provide areas for the retention and absorption of stormwater runoff. All required yards and any underdeveloped space shall be landscaped using materials such as trees, shrubs, sod, groundcover plants, or stormwater landscaping as required in [section 63.319](#), stormwater runoff, and defined in [section 60.213](#).

Sec. 63.316. - Paving.

All parking spaces, driveways and off-street parking facilities must be paved with standard or pervious asphalt or concrete, or with brick, concrete or stone pavers, or material comparable to the adjacent street surfacing, in accordance with specifications of the zoning administrator, within one (1) year of the date of the permit except as provided in [section 61.402\(e\)](#).

Sec. 63.319. - Stormwater runoff.

- a. For off street parking facilities with greater than one-quarter ($\frac{1}{4}$) of an acre of total disturbed area, the following provisions for stormwater management shall apply:
 1. Stormwater drainage into public sewers shall be controlled in accordance with best management practices to comply with required local and regional water quality, volume, and rate control standards. These standards include but are not limited to chapter 52, stormwater runoff. Parking lots shall also abide by operation and maintenance regulation as specified by local and regional authorities.
 2. Stormwater landscaping shall be designed to include an under drain system if stormwater landscaping is located in areas with hydrologic soil type C (Sandy clay loam).
 3. Stormwater landscaping shall not be required if located in areas with hydrologic soil type D (Clay); groundwater or bedrock within three (3) feet of the bottom of the infiltration area; nearby wells or utilities; or potential contamination.
- b. For parking facilities with greater than one (1) acre of total disturbed area, other local, state, and regional regulations also apply.

Topic Title: Parking and Pavement

Resource Title: Parking Requirements Exemptions in Community Core and Tourist Districts

Resource Type: Supplemental Substantive Zoning Regulations

Municipality: Ketchum

State: Idaho

Date of Adoption: 2024

Abstract: Parking Requirements Exemptions in Community Core and Tourist Districts

Ketchum is a small mountain resort located in central Idaho with a population of about 3,500 permanent residents. Ketchum's proximity to mountains, rivers, and creeks draws many tourists who visit Ketchum to ski, fish, and hike. To protect its small-town community character, as well keep the tourism heavy areas walkable, Ketchum's zoning regulation provides an exemption from parking requirements for a number of developments located in its "Community Core" and "Tourism" districts. Community housing, food service, retail spaces of less than 5,500 square feet, office spaces of less than 5,500 square feet, and places of assembly that are located within a Community Core or Tourism district are not required to provide any off-street parking. Additionally, other uses may be exempted from parking requirements upon completion of a parking demand analysis that demonstrates that the actual demands of the project are less than the minimum requirements of the code.

Code Provisions:

Ketchum, Idaho

Code of Ordinances

16.02.040. Mixed-Use Districts

A. T: Tourist District

1. *Purpose.* The purpose of the T Tourist District is to provide the opportunity for high density residential and tourist use, land ownership and development including certain restricted business and personal service establishments in conjunction with such use, which can be justified on the basis of the primary use within the district. Tourist district classifications are intended to be carefully placed in the neighborhood structure to assure the closest possible compatibility with the surrounding uses and development. Dimensional requirements in this zone are designed to complement and enhance the neighborhoods in this zone, and to encourage articulation and quality design in new buildings. The tourist zone contains several distinct areas, including the Entrance Corridor, Second Avenue, River Run, Warm Springs Base Area and Saddle Road.

D. CC: Community Core District

1. *Purpose.* The purpose of the CC community core district is to promote a compact and cohesive center of commerce and culture, to promote an attractive and safe pedestrian environment which includes sidewalks, gathering spaces, streetscape amenities and landscaping, to retain the unique small-town scale and character and to encourage buildings which respect Ketchum's historical and geographic context while providing diversity. Compatible mixed uses including retail, office, residential and cultural uses are encouraged. Commercial uses are concentrated in the CC District which is consistent with the City's comprehensive plan and the downtown master plan.

16.04.050. Off-Street Parking and Loading

A. Purpose

Standards for off street parking and loading spaces are necessary to facilitate access to specific land uses and to ensure the efficient use of land. The standards are intended to support the goals of the comprehensive plan and in recognition of Ketchum as a geographically compact and historic mountain resort community sustained by both the full-time resident population and the influx of seasonal residents, visitors, and workforce who travel within the community. The regulations of this chapter have been established to:

- A. Ensure the public health, safety, and welfare;
- B. Facilitate development and redevelopment by providing clearly defined minimum standards;
- C. Encourage a range of transportation alternatives designed for residents, visitors, and the workforce to travel safely and easily to their destinations;
- D. Promote travel demand management techniques to improve the efficiency of the transportation system;
- E. Maximize the efficient use of existing surface parking lots by permitting shared parking;
- F. Provide safe, secure, and conveniently located bicycle parking facilities;
- G. Enhance pedestrian connectivity and comfort by limiting surface parking;
- H. Incentivize development and redevelopment, which will create vibrant and activated commercial environments;
- I. Facilitate community design supported by multi-modal transportation in order to lessen dependence on vehicular transportation alone.

D. Off-Street Parking and Loading Calculations

2. Applicability

1. In the Community Core (CC) and Tourist (T) Zoning Districts the following uses meeting the definitions found in § 16.08.020 of this title are exempt from providing off street parking:
 - a. Community housing.
 - b. Food Service
 - c. Individual retail spaces of 5,500 square feet or less.
 - d. *Place of assembly*. Places of assembly uses in existence on April 17, 2017 and any expansion of existing place of assemble uses in existence on April 17, 2017 that occur on the same lot or parcel. This exemption shall also apply to any expansion of a place of assembly that includes adjacent lots or parcels but shall be limited to not more than 5,500 square feet above the existing square footage of the assembly use in existence on April 17, 2017.
 - e. The first 5,500 gross square feet for new assembly uses. The first 5,500 gross square feet of an assembly use established or constructed after November 20, 2017.
 - f. The first 5,500 square feet of office and personal service uses.
2. Other uses may be exempted by the administrator upon completion of a parking demand analysis demonstrating the actual demands of the project are less than the minimum requirements of this Code. A parking demand analysis shall be prepared by a registered professional engineer licensed in the State of Idaho.”

Topic Title: Parking and Pavement
Resource Title: Reduced Parking Areas
Resource Type: Supplemental Substantive Zoning Regulations
Municipality: Tacoma
State: Washington
Date of Adoption: 2020

Abstract: Reduced Parking Areas

Tacoma, Washington is located on the banks of the Puget Sound. It is a mid-sized city with a population of about 220,000 people. Tacoma's land use code attempts to limit excess parking spaces by designating some areas in Tacoma as "Reduced Parking Areas." Reduced parking areas are designated in Tacoma's downtown and other districts near significant transit corridors. There are no minimum parking requirements for commercial or residential projects located within the reduced parking areas.

Tacoma's land use code also makes an effort to decrease the parking requirements within mixed-use center districts. Mixed-use, multi-unit, group housing, commercial, institutional and industrial developments within the mixed-use center districts parking requirements may be reduced by transit plans, trip reduction plans, car sharing stalls, shared parking credits, bicycle parking credits, motorcycle/scooter credits, and on-street parking credits.

Code Provisions:

[j. Reduced Parking Areas.](#)

(1) Applicability. The following standards apply within the Reduced Parking Areas (RPA), as defined both in Downtown and in Urban Residential Districts, Neighborhood Commercial Nodes and High-Density Multifamily areas.

(2) Purpose. The following off-street parking standards are intended to achieve Comprehensive Plan policies that strive to minimize and effectively manage the amount of land both within Downtown Tacoma and in other districts near significant transit corridors that is dedicated to parking, as large parking areas are often unattractive, inefficient uses of land which disrupt cohesive urban form and pedestrian environment.

(4) Quantity requirements in the Reduced Parking Areas (RPAs).

(a) Downtown Tacoma RPA. There are no minimum off-street parking stall quantity requirements within the Reduced Parking Area (RPA), as delineated above, unless accessible parking is required per TMC 13.06.090.C.5.

(b) Urban Residential RPA. There are no minimum off-street parking stall quantity requirements for residential projects or residential units within mixed-use projects that are

located within the Urban Residential RPA, as delineated above, unless accessible parking is required per TMC 13.06.090.C.5.

The parking requirements for mixed-use, multi-unit, group housing, commercial, institutional and industrial developments within Mixed-use Center Districts as established in TMC 13.06.040 and Downtown Districts as established in 13.06.050 may be reduced as follows:

(1) Transit Access	Parking requirement shall be reduced by 25% for sites located within 500 feet accessible walking distance of a transit stop and 50% for sites located within 500 feet accessible walking distance of a transit stop at which a minimum of 20-minute peak hour service is provided (routes which serve stops at least every 20 minutes during peak hours). Applicants requesting this reduction must provide a map identifying the site and transit service schedules for all transit routes within 500 feet of the site.
(2) Trip Reduction Plan	Parking requirement shall be reduced by 25% for developments that create and implement a site-specific Trip Reduction plan and program that includes features such as employer-provided transit passes, telecommuting, ridesharing, carpooling, car-sharing, bicycling, flexible work schedules, etc. The trip reduction plan shall be reviewed and approved by the City's CTR Coordinator and yearly reports shall be provided to evaluate the effectiveness of the program and ensure its continued maintenance and operation.
(3) Car-Sharing Stalls	Parking requirements shall be reduced by one stall for each stall that is dedicated and designated for use by a locally-operating car sharing program, such as "Zipcar."
(4) Mixed-Use/Shared Parking Credit	No parking shall be required for the residential units in a mixed-use project where at least 50 percent of the floor area is designed for commercial or institutional use.
(5) On-Street Parking Credit	Parking requirements shall be reduced ½ stall per each new public, on-street parking stall provided as part of the project (through the installation of angled or perpendicular spaces with bulb-outs and curbs or other methods). Any modifications to the right-of-way are subject to the acceptance and approval of the Public Works Department. This one-time credit applies at the time of the development and shall not be affected by any future changes to the right-of-way configuration, design or alignment.
(6) Bicycle Parking Credit	For every five non-required bicycle parking spaces provided on the site (beyond the standard requirements, as found in Section 13.06.090.F), the automobile parking requirement shall be reduced by one space. This credit is limited to a maximum of 5 automobile spaces, or 15% of the standard parking requirement for the development, whichever is less. Vehicle parking for residential uses shall be replaced by long-term bicycle parking. For all other uses, a combination of long- and short-term bicycle parking shall be used for each vehicle space replaced.
(7) Motorcycle/Scooter Parking Credit	For every 4 motorcycle/scooter parking spaces provided, the automobile parking requirement shall be reduced by one space. Each motorcycle/scooter parking space must be at least 4 feet wide and 8 feet deep and may be located in areas that are otherwise unusable for automobile parking (such as in corners, at aisle ends and near pillars). This credit is limited to a maximum of 5 automobile spaces, or 5% of the standard automobile parking requirement for the development, whichever is less.
The Director or designee shall have the authority to require any and all necessary agreements or documentation, as they deem appropriate, to ensure that projects utilizing this parking quantity reduction program maintain all required features for the life of the project. Any such agreements or documentation shall be in a format acceptable to the City Attorney and shall be recorded on the title of the property.	

Topic Title: Parking and Pavement
Resource Title: Master Plan – Land Use Element
Resource Type: Comprehensive Plan
Municipality: Newark
State: New Jersey
Date of Adoption: 2021

Abstract: Master Plan – Land Use Element

Newark, New Jersey's land use element of their master plan contains a number of suggestions to modify parking and pavement policy. Under the neighborhood section of the master plan, Newark highlights how streets can serve a larger purpose than being used exclusively for transportation. The master plan suggests that streets and empty curbs can be used as gathering areas to effectively make use of underutilized curb and street space. The master plan also suggest that neighborhoods increase the amount of pervious surfaces used for paving and increase the amount of planted areas to mitigate the urban heat island effect.

The master plan also recognizes that minimum parking requirements drive up the cost of development and often results in a greater number of parking spaces than a city demands. To limit the amount of new parking created, the master plan suggests Newark eliminate all parking minimum requirements. Furthermore, the plan acknowledges that some areas in Newark would benefit from the imposition of parking maximums. Additionally, the master plan highlights that the requirements for bicycle and micro-mobility parking should be increased.

Code Provisions:

Newark, New Jersey

[Newark360 Master Plan – Appendix I: Land Use Element](#)

- 3.2.4 - Bring Park Qualities to Street Environment
 - As an adaptation measure to respond to the Covid-19 pandemic, Newark permitted street eateries and other outdoor gathering places within the public realm. The lessons learned from those necessary interventions can inform a longer-term response to how valuable street and curbside space is used. From a land use perspective, the city should define temporary uses in public spaces and establish a clear approval process that is efficient and cost-effective.
- 3.6.2 – Increase permeable surfaces and expand planted areas to combat urban heat island effect and improve stormwater management.
 - The impervious coverage standards in the NZLUR and redevelopment plans should be reviewed and updated where needed.
 - Surface parking lots should continue to be prohibited city-wide as standalone uses and phased out of new development proposals at all scales.
 - Green or blue roofs should be mandated for all but the smallest developments in the city

- Tree planting standards in the ordinance should be strictly enforced and variance relief for plantings held to a higher standard to ensure that on-site and on-tract tree planting takes place throughout the city.
- Future Land Use Plan
 - The Future Land Use Plan seeks to:
 - ...5. Eliminate minimum parking requirements throughout the city and institute parking maximums within proximity to transit to focus new land development on creating space for people to lead healthy, productive, and active lives rather than focusing on dedicating excessive, costly space for vehicle storage.
- Parking
 - To advance the Newark360 objectives related to health, equity, resilience and to promote housing affordability, the Future Land Use Plan recommends eliminating minimum parking requirements throughout the city.
 - Parking is an expensive component of land development and a major use of space in urban areas. During the Master Plan process, members of the development community explained that there are significant costs associated with building and providing parking spaces, and that they are often observed to be underutilized after developments are built and occupied. The raw cost of a single structured parking space in an urban area tends to exceed \$50,000, while providing one parking space per unit can increase moderate-priced housing costs by about 12%.
 - The Newark Zoning and Land Use Regulations should be updated to eliminate minimum parking requirements throughout the city. In addition, the redevelopment plans should be individually amended to reflect the citywide policy so there is not a patchwork approach to parking requirements.
 - Further study should be undertaken to establish appropriate maximum parking requirements in areas that are well-served by transit. The current residential minimum requirements may be an effective baseline for future maximum parking standards. In addition, there is precedent for parking maximums in the Broad Street Station Redevelopment Plan, which could provide additional guidance. As with the parking minimums, the NZLUR and redevelopment plans should be updated to reflect maximum parking standards.
 - Bicycle and Micro-Mobility Parking
 - As a complement to the elimination of vehicle parking minimums, new requirements for bicycle and micro-mobility parking should be implemented. The current bicycle parking standards should be increased to at least 0.5 spaces per residential unit. The bicycle parking should be provided in secure and dedicated areas. Parking and charging infrastructure for scooters, electric bikes, and other similar emerging micro-mobility options should also be considered as a requirement for all new and substantially rehabilitated buildings.
 - Statements of Strategy

- Smart Growth: The entire city of Newark is located in the State Development and Redevelopment Plan Metropolitan Planning Area (PA1). The city is also designated as one of the state's urban centers. The city is well served by transit and has walkable, mixed-use neighborhoods. The Future Land Use strategy envisions increased residential density in mixed-use neighborhoods along important corridors and around transit stops. In addition, parking minimums will be reduced or eliminated to promote more efficient use of land, housing affordability, and an increase in transportation options. Each of these strategy elements promotes smart growth through urban redevelopment and infill, reduces vehicle miles traveled, and creates more affordable housing.

Topic Title: Parking and Pavement

Resource Title: 2020 Climate Action and Adaptation Plan

Resource Type: Special Topic and Area Plans

Municipality: Davis

State: California

Date of Adoption: 2023

Abstract: 2020 Climate Action and Adaptation Plan

Davis is located in the Sacramento Valley in Northern California. It is a mid-sized city, with a population of about 68,000, and is best known as the home of University of California-Davis. In 2010, the Davis City Council first adopted the Climate Action and Adaptation Plan (CAAP). The CAAP shares how Davis will address climate change and collaborate with residents and businesses. The plan and the proposed actions are regularly reviewed through community engagement, progress monitoring and an online dashboard, and exploration of emerging opportunities. CAAP updates are planned for 2025 and every five years thereafter (2030, 2035, 2040) and greenhouse gas (GHG) inventories will be conducted biannually.

Davis's Climate Action Plan recognizes the need to strengthen the city's regional transit. The plan's goal is to reduce single occupant vehicle use by implementing parking pricing, considering a Transportation Demand Management (TDM) program, creating a low emissions vehicle program, encouraging carpooling, and adjusting parking space availability for residential buildings. The Climate Action Plan also considers how cool surfaces, such as reflective pavement and coating, can mitigate the urban heat island effect.

Code Provisions:

Davis, California

[Climate Action and Adaption Plan \(CAAP\)](#)

[Climate Action and Adaption Plan Overview](#)

- The City of Davis 2020-2040 Climate Action and Adaptation Plan (CAAP) supports recent City Council actions to assess greenhouse gas (GHG) reduction progress made since the 2010 CAAP adoption, identify physical and social vulnerabilities, establish and prioritize climate action and carbon reduction policies toward carbon neutrality, and bring the City into compliance with current state legislation.
- This CAAP is the result of the City's and community's vision to attain 2040 carbon neutrality by building transformative networks and policies. The CAAP showcases characteristics Davis is known for—insight, drive and capacity, a proactive, engaged community, regional collaboration, and a commitment to leading with environmental justice.

- A “living document,” the CAAP shares how the City will address climate change and collaborate with residents and businesses. The plan and the proposed actions will be regularly reviewed through community engagement, progress monitoring and an online dashboard, and exploration of emerging opportunities. CAAP updates are planned in 2025 and every five years thereafter (2030, 2035, 2040) and greenhouse gas (GHG) inventories will be conducted biannually.
- The entire Davis community will be essential partners in implementing CAAP actions to reach carbon neutrality and address climate risk. We all have a role to play, whether it seems small and incremental or large and significant. For example, every electric replacement for a natural gas appliance sends a strong signal. Every time a Davis resident chooses to walk, bike, carpool or take public transit reduces emissions and local pollution. Many climate-friendly actions are available to everyone in the community, including eating local, plant-based foods, using less water, creating less waste, meeting with neighbors to create a resilient community, or planting trees and beneficial, native and drought-tolerant landscapes.”

Action TR.7. Strengthen Regional Transit:

- **GOAL: REDUCE SINGLE OCCUPANT VEHICLE USE**
 - Actions in this goal area aim to reduce single occupant vehicle use by implementing parking pricing, considering a Transportation Demand Management (TDM) program, creating a low emissions vehicle program, encouraging carpooling, and adjusting parking space availability for residential buildings.
 - Transportation actions have equity benefits by improving air quality, addressing public health, and providing other co-benefits. Further analysis of equity considerations will be part of action development, but some considerations for transportation actions are provided here:
 - Equity Issues:
 - Paid parking poses a greater cost burden for low-income communities.
 - Parking meters that only accept credit card or app payments exclude those who only have access to cash.
 - Low-income people may not have the at-home resources to telecommute.
 - Low-income neighborhoods may have a greater share of residents whose jobs cannot be performed remotely.
 - Financial disincentive programs place a higher cost burden on low-income and vulnerable communities.

- Paid parking risks being ineffective at changing the behavior of wealthy drivers, while posing a disproportionate burden on lower-income drivers, especially if alternative modes of transportation are not equally accessible and convenient
- Some community members may face additional challenges in understanding and responding to this action due to language barriers or lack of access to technology and resources.
- Equity Solutions:
 - Program and pilot project design, implementation and evaluation should consider the needs of Environmental Justice communities as defined in the Vulnerability Assessment.
 - Pilot project implementation should consider the need for meters that accept multiple payment methods, including cash.
 - Increase access to high-quality internet connectivity for low-income households and areas of the City where broadband internet is not easily accessible.
 - Program design and implementation should consider the needs of Environmental Justice communities as defined in the Vulnerability Assessment.
 - Communications regarding this action should accommodate community members' language and access needs."

Action TR.9. Transportation Demand Management (TMD) Program

- Transportation Demand Management is a strategy by which driving can be disincentivized by promoting using alternative travel modes (public transit, active transport), increasing the number of passengers in vehicles (carpooling) and eliminating trips altogether (working remotely). As many employees have already shifted to working remotely, TDM strategies are becoming more popular and easier to implement.
- To implement this action, the City will develop, fund and staff a TDM program designed for "all people, all trips" with the goal of achieving broad participation in the TDM programs, including voluntary participation from residents. Requirements that might be developed as part of this program will focus on employer implementation of TDM strategies, such as providing remote work opportunities, community education and outreach, micromobility options, vanpool or rideshare incentives, subsidized transit passes and employee parking cash-out. In addition, the City will explore options to collaborate with large employers such as UC Davis and the City of Davis, which offers an up-to-50% remote work policy for those employees whose positions can be performed remotely."

Action AD.1. Cool Surfaces

- Cool surfaces (such as cool roofs and cool walls) are designed to absorb less heat than standard surfaces, resulting in cooler building interiors during the summer and reducing energy demand and associated GHG emissions from air conditioner use. In addition, by reducing heat transfer from buildings to the air, use of cool building technology can curtail the urban heat island effect. The City currently has a cool roof ordinance that states that, re-roof projects are required to comply with cool roof requirements when more than 50% of a roof is replaced, as per the provisions of the 2013 California Energy Code.
- To undertake this action, the City will start with pilot projects to understand local experience and develop data. Alternative materials and surfaces may have higher upfront costs. It is important to evaluate user experiences feedback based on pilot implementation. Long-term costs, wear, and glare are uncertain for ground application of cool surfaces (parking lots, roads, walk and bikeways) and thus should be piloted and deployed based on experience, lesson learned from other cities, and data since.
- Following analysis of pilot project data, the City will develop one or more ordinances that require the use of cool building and roadway technology such as cool surfaces, reflective materials, and coatings. Cool roofs and other cool building surface implementation can begin earlier as these materials are well known and supported by data and research for their reduction of building heat load. The ordinance(s) could require a percentage of total hardscape and roof area to have a minimum albedo rating.
- Note that shading, especially with trees or solar, should be considered as an alternative, including for smaller paved areas where cool surfaces may not be cost-effective.”

Topic Title: Parking and Pavement

Resource Title: Flexibility in Administration Required, § 15-343

Resource Type: Principal Land Use Boards and Officers

Municipality: New Bern

State: North Carolina

Date of Adoption: 2024

Abstract: Flexibility in Administration Required

The City of New Bern, North Carolina is a mid-sized southeast city renowned for a historic riverfront that is unfortunately susceptible to weather-induced inland flooding. The city's [2022 Resiliency and Hazard Mitigation Plan](#) denotes parking lots with impervious surfaces as “elements that may hinder flood hazard mitigation.” While the city has a parking standard that is found neatly laid out in a standard multi-page table of required parking spaces based on use, it notes that parking minimums “cannot and do[] not cover every possible situation that may arise” ([Number of parking spaces required § 15-342](#)). New Bern's code of ordinances states, in a unique twist, that administrative flexibility in interpreting those minimums is “required,” perhaps in an effort to find ways to reduce impervious surfaces.

The code goes on to state that the City's “permit-issuing authority” may “permit deviations from the presumptive requirements of subsection 15-342(g) and may require more parking or allow less parking whenever it finds that such deviations are more likely to satisfy the standard set forth in subsection 15-342(a)” (requiring all developments to provide a “sufficient number of parking spaces to accommodate the number of vehicles that ordinarily are likely to be attracted to the facility in question”). Section 15-343(b) identifies likely scenarios where deviations from parking requirement would be warranted, including those proposed developments that are “irrevocably oriented toward the elderly,” located near the central business district, or geared toward “walk-in trade.” Further, section 15-343(d) calls upon the permit-issuing authority to initiate a request to amend the table of parking requirements when it finds that the minimum parking requirement for a particular use classification is “erroneous.” New Bern recognizes both the usefulness and limitations of parking minimums, while providing for administrative flexibility in applying them to private development of land.

Code Provisions:

[New Bern, North Carolina Code of Ordinances](#)

Appendix A (Land Use), Article XVIII (Parking)

[§15-343 Flexibility in administration required](#)

- (a) The board of aldermen recognizes that, due to the particularities of any given development, the inflexible application of the parking standards set forth in subsection [15-342\(g\)](#) may result in a development either with inadequate parking space or parking space far in excess of its needs. The former situation may lead to traffic congestion or parking violations in adjacent streets as well as unauthorized parking in nearby private lots. The latter situation results in a waste of money as well as a waste of space that could more desirably be used for valuable development or environmentally useful open space. Therefore, as suggested in subsection 15-342(f), the permit-issuing authority may permit deviations from the presumptive requirements of subsection 15-342(g) and may require more parking or allow less parking whenever it finds that such deviations are more likely to satisfy the standard set forth in subsection 15-342(a).
- (b) Without limiting the generality of the foregoing, the permit-issuing authority may allow deviations from the parking requirements set forth in subsection 15-342(g) when it finds that:
- (1) A residential development is irrevocably oriented toward the elderly;
 - (2) A residential development is located in close proximity to the central business district and is committed to a policy of placing restrictions on the vehicle ownership of its tenants; or
 - (3) A business is primarily oriented to walk-in trade.
- (c) Whenever the permit-issuing authority allows or requires a deviation from the presumptive parking requirements set forth in subsection 15-342(g), it shall enter on the face of the permit the parking requirement that it imposes and the reasons for allowing or requiring the deviation.
- (d) If the permit-issuing authority concludes, based upon information it receives in the consideration of a specific development proposal, that the presumption established by subsection 15-342(g) for a particular use classification is erroneous, it shall initiate a request for an amendment to the table of parking requirements in accordance with the procedures set forth in article XX (Amendments).
- (e) Notwithstanding any other provision in this section, developments located in the central retail core shall be exempt from off-street parking requirements except those requirements set forth in subsection 15-163(h)(3), provided such development shall

not reduce the number of parking spaces in existence as of the date of the adoption of this section. For purposes of this section, "central retail core" shall be defined as the area encompassing those properties abutting the east side of Hancock street, the south side of South Front Street, the west side of East Front Street, the south side of Broad Street from the west side of East Front Street to the west side of Craven Street, and the north side of Broad Street from the east side of Craven Street to the east side of Street Hancock Street, including the west side of southern terminus of Middle Street 100 feet from the intersection with South Front Street and excluding the Riverfront Convention Center of Craven County.

Topic Title: Parking and Pavement

Resource Title: Pedestrian and Bicycle Advisory Commission, § 2-69

Resource Type: Special Interest Land Use Boards

Municipality: Fort Worth

State: Texas

Date of Adoption: 2023

Abstract: Pedestrian and Bicycle Advisory Commission

Fort Worth is a large city in the north central region of Texas with a [population of over 978,000](#) (the 12th largest in the U.S. by population and among the fastest growing). The city's southern latitude makes it susceptible to [severe heat risk](#) due to the [urban heat island effect](#), whereby "built up areas . . . with a lot of concrete and other impervious surfaces" hold heat, causing temperature increases of more than ten degrees. One strategy for limiting heat-absorbing pavement is to promote transportation alternatives that reduce motor vehicle dependence. Fort Worth's [Active Transportation Plan](#) does just that.

When the city finalized its [Bike Fort Worth Plan](#) in 2009, its recommendations included that the city 1) adopt a zoning ordinance to provide for bicycle parking and 2) establish a permanent advisory body on biking. The city has since achieved both goals. As Bike Fort Worth noted, the motivation for promoting biking over driving cars stemmed from, in part, the city's scarcity of developable land and the desire to "re-use expansive surface parking lots." Notably, "ten bicycles can park in the same amount of space required for one automobile," according to Bike Fort Worth.

Fort Worth's pedaling-promoting tools include a special interest land use board, known as the Pedestrian and Bicycle Advisory Commission. The first iteration of the Commission, with only nine members, was established by resolution in 2015. The current Commission, made up of eleven Fort Worth residents appointed for two-year terms by the City Council, was granted authority to act in § 2-69 of the Fort Worth Code of Ordinance. The Commission is tasked with making policy recommendations to the city's legislative and administrative bodies on bicycle safety as well as "the design, location, and type of pedestrian and bicycle facilities in significant on-street and off-street programs." [§ 2-69(b)(4)] Further, § 2-69(b)(5) requires the Commission to "[a]ssist in updating the Walk Fort Worth and Bike Fort Worth Plans every five years." Fort Worth's Pedestrian and Bicycle Advisory Commission is helping the city eliminate unneeded motor vehicle parking and encourage active transportation options.

Code Provision:

City of Fort Worth, Texas Code of Ordinances

Chapter 2 - Administration

Article III – Boards and Commissions

○ Sec. 2-69. Pedestrian and Bicycle Advisory Commission.

- (a) The pedestrian and bicycle advisory commission shall consist of 11 residents of the City of Fort Worth appointed by the city council.
- (b) The purpose of the commission shall be to provide recommendations to the city manager, city plan commission, and the city council on plans, policies, programs, and projects to improve the environment for non-motorized travelers, including, but not limited to, the following:
 - (1) Guide the preparation and updates of pedestrian, bicycle, and trail plans.
 - (2) Recommend policies and programs for the safe travel of all non-motorized traffic.
 - (3) Review and comment on the city's annual operating budget and capital improvement program for pedestrian and bicycle improvements.
 - (4) Guide the design, location, and type of pedestrian and bicycle facilities in significant on-street and off-street programs.
 - (5) Encourage resident participation in identifying problems, assessing existing facilities, and planning for future facilities.
 - (6) Assist in updating the Walk Fort Worth and Bike Fort Worth Plans every five years.
- (c) Commission members shall serve two-year terms. Members appointed in odd-numbered places will serve terms that expire October 1 of odd-numbered years. Members appointed to even-numbered places will serve terms that expire on October 1 of even-numbered years.
- (d) The commission shall meet at least quarterly in a calendar year.
- (e) A quorum of the commission shall consist of six members. The presence of a quorum of the commission shall be required prior to deliberation or action by the commission-approval of all items before the commission shall require a majority vote of those appointed.
- (f) The commission shall establish procedures, as necessary and appropriate, for the conduct of its business and for receiving of public comment on pedestrian and bicycle issues.
- (g) The commission shall report annually to the city council on the activities of the commission. The commission shall include in its annual report the status of projects, initiatives and goals established by the commission and by city council.

Topic Title: Parking and Pavement

Resource Title: Tree Preservation and Off-Street Parking Credits, §24-256.

Resource Type: Supplemental Substantive Zoning Provision

Municipality: City of Tuscaloosa

State: Alabama

Date of Adoption: 2014

Abstract: Tree Preservation and Off-Street Parking Credits

Tuscaloosa is a city in western Alabama with a population of over 111,000. Tuscaloosa is no stranger to extreme weather, having experienced tornados, hurricanes, and severe thunderstorms in its past. [Climate projections](#) foresee increased extreme precipitation, more extreme heat days, and potential for more severe droughts in the city's future. As a result, the city values strong stewardship of natural resources, as demonstrated by its [2021 Comprehensive Plan](#) goal of enhancing the urban tree canopy by preserving mature trees and planting new ones for shade. To that end, the city encourages tree planting and preservation in off-street parking areas.

The city has enacted legislation that allows qualified nonresidential properties to reduce required off-street parking by up to 25% if the property developer preserves or plants trees in or around a parking area. This law, enacted in 2014, is codified in Tuscaloosa's Zoning Chapter at Article XIX (Landscape and Buffer Requirements). Generally, submission of a landscape plan is required prior to the issuance of a land development permit or building permit. A landscape plan must show, among other things, "the required number of parking spaces and the proposed number of parking spaces of subject property/development" and "location and dimensions of all entrances and exits of the parking lot and the manner in which vehicles will be parked." In Tuscaloosa, parking areas have specific landscaping requirements for the parking perimeter, internal planters, and landscape buffers. For example, the code requires parking area perimeter planting strips to contain canopy trees, shrubbery, groundcover, and stormwater inlets (with bioswales, rain gardens and/or other stormwater mitigation measures). Tuscaloosa's tree incentive law allows preserved (existing) or new trees in the parking area perimeter to count as one parking space and in interior landscape islands to count as two parking spaces, both not to exceed certain parking reduction percentages.

Code Provision:

[Tuscaloosa Alabama Code](#)

Chapter 24 (Zoning), Article XIX (repealed and now reserved)

- Section 24-256. Tree Preservation and Off-Street Parking Credits

- This section provides incentives for the reduction of impermeable surface through the addition of landscaping. Nonresidential properties subject to this article may reduce off street parking requirements as outlined in subsection (1) and (2); however, in no case shall the combined reduction in parking exceed the following criteria: Ten (10) percent for parking lots containing one to seventy-four (74) spaces; fifteen (15) percent for parking lots containing seventy-five (75) to one hundred twenty-five (125) spaces and twenty-five (25) percent for parking lots containing one hundred twenty-six (126) or more spaces.

(1) *Perimeter planting.* Trees which meet the perimeter planting requirements, whether existing or new, may be counted as one parking space per tree and be used to fulfill the total parking requirement of the development not exceeding the following percentages:

- a. Minimum parking requirements of one to seventy-four (74) spaces: ten (10) percent;
- b. Minimum parking requirements of seventy-five (75) to one hundred twenty-five (125) spaces: fifteen (15) percent;
- c. Minimum parking requirements of one hundred twenty-six (126) or more: twenty-five (25) percent.

(2) *Interior landscape islands.* Interior landscape islands may be counted as two (2) parking spaces per island and may be used to fulfill a portion of the total parking requirement of the development not exceeding the following percentages:

- a. Minimum parking requirements of one to seventy-four (74) spaces: ten (10) percent;
- b. Minimum parking requirements of seventy-five (75) to one hundred twenty-five (125) spaces: fifteen (15) percent;
- c. Minimum parking requirements of one hundred twenty-six (126) or more: twenty-five (25) percent.

(3) *Tree preservation and credit.* Existing healthy trees may be included in the minimum planting requirements and credited toward trees required by this article in a landscape plan as per the following schedule:

DBH of Preserved Tree(s)	Number of Trees Credited
9—19 inches	2
20—25 inches	3
26—29 inches	4
30—35 inches	5
36 inches or greater	6

- a. A tree proposed for use as a credit to satisfy minimum planting requirements must be approved as part of the site plan review process.
 - b. The landscape area surrounding a preserved tree shall be located so that the trunk of the tree is as close to the center of the landscape area as practical, and specific preservation practices shall be followed to insure exchange of water and oxygen to the root zone.
- (4) *Protection of preserved trees during construction.* Existing tree(s) shall only be credited where the following management standards are met:
- a. During construction, the critical root zone of the tree(s) to be preserved shall be fenced and protected from compaction, trenching, harmful grade changes and/or other injury and be shown on an approved landscape plan.
 - b. Pavement, building foundations or other impervious surfaces shall not encroach into the critical root zone, unless specific preservation practices are followed to insure exchange of oxygen, water and nutrients to the root system.
 - c. Sidewalks or other forms of hard surfaces that do not require soil compaction and are not intended for vehicular use may be located within the critical root zone only if specific preservation practices are followed to insure exchange of oxygen, water and nutrients to the root system.

Topic Title: Parking and Pavement

Resource Title: Parking Requirements

Resource Type: Supplemental Substantive Zoning Regulations

Municipality: Hartford

State: Connecticut

Date of Adoption: 2016

Abstract: Parking Requirements

Hartford is the capital city of Connecticut. It is a small to mid-size city with a population of about 120,000 people.

Chapter 7 of Hartford's zoning regulations contains the city's parking regulations. The goals of this chapter are to ensure an appropriate level of parking, mitigate the impacts of parking lots on adjacent land uses and zoning districts, reduce the amount of impervious surfaces, protect against unnecessary reductions in landscaped green space, and encourage use of bicycles as a mode of transportation.

Chapter 7 allows for a reduction in required parking for some developments. The code requires the zoning commission to take into consideration several different factors when determining whether to grant an applicant a multiple use reduction. These factors include: the provision of bicycle parking; the proximity to transit stations or bus stops; the provision of on-site or nearby car share services; and transportation management plans promoting carpools, vanpools, subsidized transit passes, walking, biking, or regional ride sharing.

Chapter 7 requires that all parking and driveways are constructed using asphalt, concrete, pavers, or other semi-pervious surfaces approved by the zoning administrator. The code also requires the chosen pavement be either (1) Paving materials with a solar reflectance index (SRI) of at least 29, (2) Pervious pavement material, or (3) Recycled content of 15 percent or more.

Chapter 6 of Hartford's zoning regulations contains the regulations for sitework and landscaping. The goals of this chapter are to create a buffer between pedestrian and vehicular travel lanes, to promote the prudent use of water and energy resources, to reduce the urban heat island effect and stormwater runoff and mitigate the impacts of climate change through prudent management of natural resources and wildlife habitat.

Under chapter 6 structured soil must be used when the soil surface area of a tree will extend below pavement. This chapter also established a minimum number of trees that must be planted along streets to increase Hartford's tree canopy.

Code Provisions:

Hartford, Connecticut Zoning Regulations

Chapter 7 – Parking

- [7.1.1 – Intent:](#)

- The following provisions are established to accomplish these goals:
 - A. Ensure an appropriate level of vehicle parking, loading, and storage to support a variety of land uses.
 - B. Provide appropriate site design standards to mitigate the impacts of parking lots on adjacent land uses and zoning districts.
 - C. Provide specifications for vehicular site access.
 - D. Reduce the amount of impervious surface, including parking lot paving, in the city through tandem parking, multiple use reduction strategies, and bicycle parking, which will reduce the urban heat island effect and provide other environmental benefits.
 - E. Protect against unnecessary reductions in landscaped green space, negative impacts on historic resources, and impairment of the urban design objectives of the city.
 - F. Encourage bicycle use as a mode of transportation by ensuring quick, convenient, and safe access to secure bicycle parking.
- 7.2.3 – Multiple Use Reduction:
 - The commission must consider evidence presented regarding: the possibility of multiple use reductions; the provision of bicycle parking; the proximity to transit stations or bus stops; the provision of on-site or nearby car share services; and transportation management plans promoting carpools, vanpools, subsidized transit passes, walking, biking, or regional ride sharing.
- 7.3.1(H) – Parking Requirements:
 - Pavement Construction. All parking and driveways shall be constructed using asphalt, concrete, pavers, or other semi-pervious surfaces approved by the zoning administrator. One of the following shall be met:
 - 1) Paving materials with a solar reflectance index (SRI) of at least 29.
 - 2) Pervious pavement material, such as permeable asphalt, permeable concrete, or permeable pavers.
 - 3) Recycled content of 15 percent or more.

Chapter 6 – Sitework & Landscape

- 6.1.1 – Intent:
 - The landscape standards outlined in this chapter are designed to meet the following set of goals.
 - A. To provide for healthy, long-lived street trees within all public ways to improve the appearance of streets and create a buffer between pedestrian and vehicular travel lanes.
 - B. To increase the compatibility of adjacent uses and minimize the adverse impacts created by adjoining or neighboring uses.

- C. To promote the prudent use of water and energy resources by achieving and maintaining sustainable, functional landscapes.
 - D. To plant, protect and preserve trees and landscaping that clean the air, calm traffic, reduce the urban heat island effect, provide shade that reduces energy costs, increase property values, reduce stormwater runoff, and otherwise enhance quality of life.
 - E. To mitigate the impacts of climate change through prudent management of natural resources and wildlife habitat.
 - F. To meet the citywide tree canopy goal of 35% by 2070.
- 6.2.3 – Requirements:
 - The installation of landscaping shall adhere to the following standards.

... (F) Compost, Mulch, and Organic Matter. Compost, mulch, and organic matter may be utilized within the soil mix to reduce the need for fertilizers and increase water retention.

(H) Permeable Surface. For each tree preserved or planted, a minimum amount of permeable surface area is required unless otherwise stated in these regulations. Refer to Figure 6.2-B, Required Soil Volumes & Permeable Area per Tree. Review 6.2.3.H (1) and (2) for feasibility.

 - 1) At least 70 percent of the canopy limits of preserved trees should have a permeable surface.
 - 2) Permeable area for one tree cannot count toward that of another tree.

(I) Structural Soil.

 - 1) When the soil surface area of a tree will extend below any pavement, structural soil may be used underneath that pavement. Refer to Figure 6.2-B Recommended Soil Volumes & Permeable Area per Tree.
 - 2) Structural soil is a medium that can be compacted to pavement design and installation requirements while still permitting root growth. It is a mixture of gap-graded gravels (made of crushed stone), clay loam, and a hydrogel stabilizing agent to keep the mixture from separating. It provides an integrated, root penetrable, high strength pavement system that shifts design away from individual tree pits.
 - 6.7.3 – Minimum Street Tree Requirements:
 - The following standards apply to the installation of street trees.
 - A. Exception. Street Trees are not required on alleys.
 - B. Clear Branch Height. The clear branch height of a tree is the distance between the ground plane and the lowest branch of the tree at maturity. Minimum clear branch height is 8 feet for the portion of trees overhanging sidewalks and 15 feet for the portions of trees overhanging streets. At planting, minimum clear branch height of 5' is required with 6' preferred for all trees planted adjacent to a sidewalk or street.

C. Street Tree Type. Refer to Figure 6.4-D Permitted Tree Types.

D. Street Tree Spacing. Street trees shall be planted as follows:

1. Minimum per Street Frontage. Each lot is required to have one tree for every 40 feet of street frontage with a minimum of one street tree per street frontage.

2. Spacing. Street trees must be located a minimum of 2 feet and a maximum of 10 feet from the street, measured perpendicular to the curb.

3. Limited Space. Notwithstanding anything to the contrary in this section, the requirement to provide street trees shall be waived when there is less than 6 feet between the back of the curb and the front facade of the building.

4. Tree Wells. For trees installed within the public right of way, which are not within a continuous landscaped buffer strip, a tree well shall be used. Such tree wells shall be a minimum of 25 square feet. The opening of such tree well must include one of the following:

(a) The tree well opening shall be fenced with an ornamental iron fence 18 inches above grade, with a top row of rings topped with a horizontal bar, which meets or exceeds the following specifications, as revised: ASTM A-787, ASTM A-653, and ASTM A-607. Such fences must be welded and painted black, and must be 3-sided, with the open side facing the curb. Refer to Figure 6.7-A Example of Tree Well Fencing.

(b) Continuous granite curbing approximately 4 inches wide and 6 inches above the height of the sidewalk immediately adjacent to the well.

(c) Granite posts at corners and every 4 feet along the perimeter of the well, such posts being approximately 8 to 10 inches above the height of the sidewalk immediately adjacent to the well, 4 inches wide, and 4 inches deep, with steel bracing on 3 sides of the tree well between such posts, with the open side facing the curb.

(d) Other durable, long-lasting protective fencing or materials as the city forester deems appropriate given site conditions.

Topic Title: Parking and Pavement

Resource Title: Required Off-Street Parking Standards, §159.142

Resource Type: Zoning Use & Dimensional Requirements & Other Municipal Code Chapters
Regulating Land Use

Municipality: Noblesville

State: Indiana

Date of Adoption: 2005; 2008; 2013

Abstract: Required Off-Street Parking Standards

Noblesville, a suburb of Indianapolis, is the 10th largest city in Indiana with a population of nearly 70,000. The city is located on the banks of the White River and adjacent to two creeks, which has left the city vulnerable to the consequences of flooding: road closures, property damage, and emergency access limitations. The city's 2013 Flooding brochure noted that "[l]imiting development in areas designated as being part of the floodplain minimizes the potential for damage and personal property loss due to flooding and also enhances the beneficial aspects of flood plains."

One way to minimize flooding is to reduce impervious surfaces such as parking lots and spaces. To that end, Noblesville has adopted three code provisions that promote the use of pervious materials in constructing parking spaces. This first law, enacted in 2005, is codified in the Stormwater Management chapter at §52.35(A)(1), where it encourages the use of pervious areas to reduce stormwater runoff "from driveways, sidewalks, rooftops, parking lots, and landscaped areas." In 2008, Noblesville adopted Pervious Concrete Pavement Design Requirements, codified in [Appendix K](#) of the code, describing technical design and construction parameters for pervious concrete in parking lots that will ensure structural stability and adequate drainage. Further, in 2013 Noblesville amended its [Unified Development chapter at §159.142\(A\)\(6\)](#), requiring that any additional parking above the identified use-based minimums shall "be constructed using pervious concrete, permeable pavers, or other similar materials." These three code provisions, sprinkled as they are among the layers of local law, provide a pathway for incorporating permeable parking in Noblesville.

Code Provisions:

Noblesville, Indiana Code of Ordinances

Chapter 159 (Unified Development), Title XV (Land Usage), Off-Street Parking and Loading

○ [§159.142 Required Off-Street Parking Standards](#)

- (f) Computing Number of Required Spaces. In determining the minimum required number of off-street parking or loading spaces, the following instructions shall be applicable in such computations:

- (1) Determining Floor Area. Off-street parking requirements shall be calculated based on gross square footage of the use to which the parking is accessory, or as otherwise provided in Table 8.
- (2) Fractions. If the calculation of required parking spaces results in a fraction, said fraction shall be considered as being the next unit and shall be counted as requiring one space.

Title V (Public Works), Chapter 52 (Stormwater Management), Stormwater Runoff Associated with Construction and Post-construction Activities

○ [§ 52.35 Design Requirements](#)

(A) Erosion and sediment control measures shall be designed and installed in accordance with Rule 5, the Noblesville Standards Manual, and the Indiana Storm Water Quality Manual. Unless judged by the Noblesville Wastewater Utility to be exempt or granted a waiver, the following performance criteria shall be addressed for stormwater management at all sites:

- (1) All site designs shall establish stormwater management practices to control the peak flow rates of stormwater discharge associated with specified design storms and reduce the generation of stormwater. These practices should seek to utilize pervious areas for stormwater treatment and to infiltrate stormwater runoff from driveways, sidewalks, rooftops, parking lots, and landscaped areas to the maximum extent practical to provide treatment for both water quality and quantity.

Appendix K: Pervious Concrete Pavement Design Requirements

○ [1.0 Overview](#)

- Pervious or porous concrete pavements permit the percolation of water through voids in the pavement structure to the sub-grade which may reduce storm water runoff and pollutants carried during its transportation and dispersion.
- In an attempt to provide a cost-effective alternative to conventional storm water detention methods while reducing the impact caused by additional development, the City of Noblesville has developed minimum standard requirements for pervious concrete pavement. The premise of these standards is to:
 1. Establish minimum performance criteria for the pavement structure, in a manner consistent with other pavements that are currently permitted by City Standards
 2. Establish reasonable compliance with the City's Stormwater Ordinance, while observing traditional engineering practice, the City of Noblesville's Ordinances; and,
 3. To utilize design and quality control measures recommended by the concrete industry for pervious concrete

- The following requirements and standards shall be considered as a supplement to the City of Noblesville Stormwater Technical Standards Manual, which are incorporated by reference herein. These standards shall also reference and incorporate the subject matter in the City of Noblesville's Unified Development Code that involve projects which propose to utilize this design standard.
- These standards shall be observed, applied, and demonstrated to obtain final approval for an Improvement Location Permit and the use of pervious concrete pavement. The purpose of using pervious concrete pavements shall not be to circumvent the requirement of detention or the need to save design costs. The concrete industry recognizes that pervious pavements are sensitive to in-situ conditions and require unique design consideration and expertise in their use. These standards were developed from several resources and incorporate their findings and recommendations. The placement of pervious concrete pavement and its use in a manner similar to conventional paving materials is not acceptable as it does not perform in a similar manner.
- 2.0 Design
 - Design and approval of any pavements utilizing pervious concrete shall follow the requirements of these standards and be subject to the City of Noblesville's Stormwater Technical Standards Manual, the City of Noblesville's Construction Standards, and the Unified Development Code, latest editions.
 - Pervious concrete is NOT a traditional pavement structure and may not be readily and simply substituted for regularly used hot-mixed asphalt (HMA) or customary INDOT standard concrete mixture without addressing the City of Noblesville's stormwater detention requirements.
 - The structure of pervious concrete pavement is designed to function as both an outlet for stormwater runoff and a surface to transport and store vehicular traffic.
- 3.0 Subgrade
 - The subgrade for proposed pervious concrete pavement serves two purposes. It must be pervious to permit the percolation of water into the earth so it may dissipate an acceptable release rate without adversely affecting surrounding off-site areas, while addressing the City's design criteria for the storage of runoff. The subgrade must also be stable enough to adequately support the load from the pavement and applied traffic.
 - Percolation tests shall be procured by the developer through the designer to determine the suitability of the soil to percolate runoff from the pavement course. The number of tests for the site shall be determined by its overall size, with tests at two evenly-spaced location sites of 10,000 sf or less. Sites exceeding 10,000 sf in size shall submit a percolation plan and report for subsurface soils according to the following table:

Site Area (SF)	Number of Percolation Test Locations
10,000	2
10,000 to 15,000	3
Every 5,000 sf Increment Exceeding 15,000 SF	1 per 5,000 sf of additional area

- A sampling plan shall be provided to the City of Noblesville for approval prior to the completion of the test. In general, test locations shall be evenly spaced and near the middle half or third of the proposed pavement area. The City of Noblesville reserves the opportunity to request any modifications or additions to any proposed sampling plan based on the conditions, shape, size and use of the lot. This is not to infer that sampling plans will be expanded, it is conceivable that fewer test spots could be needed, depending on the case and situation.
- Using the results of the percolation test, the designer shall determine the average **Infiltration Rate** in inches per hour (in/hr) for the site. Calculations and the results of the field investigation for the determination of the average infiltration rate shall be submitted with the proposed site plan for review.
- 4.0 Mix Design
 - For each project, a mix design shall be submitted for approval with the project plans and specifications. The following section provides material specifications and requirements for the pervious concrete mix. The seven-day compressive strength of pervious concrete pavement mixtures shall range from 3,300 to 2,900 psi.
- 5.1 Aggregate Base
 - Aggregate base for pavement shall be evaluated by the designer for each individual site to determine whether the minimum required standard depth of aggregate base is suitable for the traffic loads proposed for the site. The standard minimum aggregate base for all pervious concrete pavements shall be 8 inches of INDOT Gradation No. 2 Course Aggregate. The volume of void space for the proposed aggregate base compacted in place should be obtained from the supplier for use in determining the storage capacity of pavement base. The void ratio by volume for the aggregate base layer shall be 35% ± 5%.
- 5.2 Pavement

- The minimum thickness of pervious concrete pavement used for commercial or institutional use shall be 8 inches. Locations subject to higher amounts of truck traffic shall be evaluated using traditional rigid pavement design techniques and increasing the depth of the rigid pavement by a factor of 1.25. The void ratio in the mixture shall be determined and range between 15% and 20% by volume.
- 6.0 Drainage and Detention Design
 - The completion of runoff and storage computations for analyzing the water storage available in pervious pavements is a "5-part process". The methodology for the selection of the site's hydrologic design criteria and storage and runoff computations shall be documented in the design calculations for the project and submitted for review with the site plan for TAC Review. The process to determine storage and runoff is as follows.
- 6.1 Section of Design Storm
 - The selection of the parameters for the design storm and the pre-developed runoff condition for all sites shall be determined in accordance with the City of Noblesville's Stormwater Technical Standards Manual.
 - The runoff coefficient used to determine the runoff from pervious concrete pavement for the required design storm shall be 0.95.
- 6.3 Determination of Storage Volume and Release Rate
 - The analysis and design of pervious concrete pavements shall follow the methodology of the **Hydraulic Design of Permeable Pavements**, July 14, 2000, North Carolina State University's Department of Biological and Agricultural Engineering College of Agriculture and Life Sciences. This publication provides a logical step-by-step method for determining the storage capability for pervious concrete pavements.
 - An additional acceptable method of analysis and design can be obtained from the Portland Cement Association, the National Concrete Pavement Technology Center, and the National Ready-Mixed Concrete Association. These groups have combined to create an interactive CD that contains an Excel-based design and analysis program.
 - No site plan utilizing pervious pavement shall be approved through The City of Noblesville's Technical Advisory Committee Review without drainage computations in a format compatible with or similar to the two aforementioned procedures certified by a Registered Professional Engineer in the State of Indiana.
- 7.0 Site Design
 - All other applicable City design standards and ordinances shall be observed during the design of parking lots utilizing pervious concrete.

- In areas where the proposed pavement is on grade or is adjacent to a concrete approach that exits onto City right-of-way, the designer and constructor shall use and install an impervious membrane, such as visquene, to separate the aggregate base courses to prevent subsurface drainage from flowing to areas other than the subgrade directly under the area of pervious concrete. This type of separation is discussed in the publications referenced in these standards.
- Curbs shall be provided as per the Unified Development Ordinance. The presence of curbs provides lateral support for the pavement structure and to control parking drainage and traffic patterns.
- All pervious pavements shall be constructed with a six-inch diameter underdrain that has a positive outlet to an existing public drainage facility. The underdrain for the proposed pavement shall be designed in a manner consistent with the City of Noblesville's typical details for street underdrains.
- Pervious concrete pavements shall be designed to store a maximum depth of six inches of ponded water on-site in the event of failure or frozen conditions. The depressed area may be designed to permit the discharge of water off-site when six inches of runoff is stored in the parking area. This provision shall be observed to provide the owner to maintain or rehabilitate pervious pavement detention systems that fail or do not operate as intended.
- The City of Noblesville may develop standard drawings to supplement or clarify the criteria outlined in these written standards.
- 8.0 Construction
 - Pervious pavements shall be constructed in compliance with the plans and specifications for the project. These standards have been approved and adopted by the City of Noblesville's Board of Public Works and Safety and shall hereby be incorporated into the City of Noblesville's Stormwater Standards Technical Manual. Authority is hereby given to the City of Noblesville's Wastewater Utility to develop and promulgate standards to address and mitigate stormwater quality issues associated with the installation, construction, and maintenance of pervious concrete pavements.