THE MYSTERIOUS POWER OF LAND USE LAW: CONSTRUCTING A FRAMEWORK LAW FOR CLIMATE RESILIENT DEVELOPMENT

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ABSTRACT

This Article introduces and explains Climate Resilient Development (CRD), which is relied upon by the Intergovernmental Panel on Climate Change (IPCC) as a primary method of managing climate change. CRD "integrates adaptation measures and their enabling conditions with mitigation to advance sustainable development for all."[1] CRD illuminates 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. The Article unveils a legal structure that is followed in most states to organize local laws that affect land development; as such, it facilitates the implementation of IPCC policies: a responsive as opposed to prescriptive approach. Case studies of effective CRD strategies are organized by relevant topics into this well-established legal framework for the consideration of municipal leaders and advocates. The conclusion considers the feasibility of the framework law, highlighting the importance of enabling conditions and marking a trail for climate management policy makers and stakeholders to follow.

I. INTRODUCTION: THE IMPERATIVE OF CLIMATE RESILIENT DEVELOPMENT

Working Group II (WG II) of the Intergovernmental Panel on Climate Change stated that its principal strategy for managing climate change is Climate Resilient Development (CRD).[2] CRD, it states, "integrates adaptation measures and

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[1] *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Summary for Policymakers*, *in* CLIMATE CHANGE 2022: MITIGATION OF CLIMATE CHANGE, WORKING GROUP III CONTRIBUTION TO THE SIXTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 39 (Priyadarshi R. Shukla et al. eds., 2022) [hereinafter WG III SPM 2022]; *see also* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Summary for Policymakers*, *in* CLIMATE CHANGE 2022: MITIGATION OF CLIMATE CHANGE, WORKING GROUP II CONTRIBUTION TO THE SIXTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 39 (Priyadarshi R. Shukla et al. eds., 2022) [hereinafter WG II SPM 2022].

[2] The IPCC releases Assessment Reports (ARs) every five or six years, detailing the challenges of, and potential solutions for responding to, climate change. While WG II focuses on the impacts of climate change, adaptation, and vulnerability, WG III focuses on mitigation strategies to reduce

their enabling conditions with mitigation to advance sustainable development for all."[3] In other words, CRD proposes the holistic consideration of a community's history, topography, resources, shortcomings, and more to implement tailored, effective policies. A careful reading of its recent report to policymakers, and that of its companion Working Group III policymakers report, reveals that local governments, wielding their land use regulatory authority, have a major role in managing climate change. WG II identified local land use strategies as effective tools for implementing CRD. The effects of climate change are intrinsically local. Planning and action are needed at the ground level where essential development choices are made and the risks of climate hazards are felt.[4] The reports note that "embedding effective and equitable adaptation and mitigation in development planning can reduce vulnerability, conserve and restore ecosystems, and enable climate resilient development" and "…the global trend toward urbanization also offers a critical opportunity, in the near-term, to advance climate resilient development."[5]

In its most recent Summary for Policy Makers, the IPCC included five key elements to CRD: adaptation, mitigation, enabling conditions, resilience, and equity.[6] Adaptation is defined as the process of adjusting to actual or expected climate and its effects to moderate harm or take advantage of beneficial opportunities.[7] Mitigation is an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gasses.[8] Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.[6] Achieving sustainable development for all requires that CRD provisions are equitable. Equity is concerned with fairness in the way people are treated and is based on societal values.[9]

Resilience is defined by the IPCC as the capacity of social groups, economic structures, and ecosystems to cope with a hazardous event, trend, or disturbance. Resilience is tantamount to responding or reorganizing in ways that maintain the system's essential function, identity, and structure as well as biodiversity in cases of ecosystems while also maintaining the capacity for adaptation, learning, and transformation.[10]

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greenhouse gas emissions and combat climate change. WG II examines the effects of climate change while WG III finds ways to address these effects. WG II's Sixth Assessment. *See* WG III SPM 2022, *supra* note 1, at 39; *see generally* WG II SPM 2022, *supra* note 1.

[3] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Summary for Policymakers*, *in* CLIMATE CHANGE 2022: IMPACTS, ADAPTATION, AND VULNERABILITY, CONTRIBUTION OF WORKING GROUP II TO THE SIXTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 28 (H.-O. Pörtner et al. eds., Cambridge Univ. Press 2022) [hereinafter WG II AR6].

[4] *See id.* at 2658; WG II SPM 2022, *supra* note 1, at B.2 & D.1 (noting that "current unsustainable development patterns are increasing exposure of ecosystems and people to climate hazards" and "pursuing climate resilient development focuses on … where people and ecosystems are co-located….").

[5] WG II SPM 2022, *supra* note 1, at D.1.3. & D.3.

[6] *Id.*, at D.1–D.5.3.

[7] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2023: SYNTHESIS REPORT 120 (Hoesung Lee & Jim Skea eds., 2023) [hereinafter 2023 SYNTHESIS REPORT].

[8] *Id.* at 126.

[9] *Id.* at 124.

[10] *See id.* at 128.

The successful implementation of CRD strategies depends on whether the necessary enabling conditions are present. Enabling conditions are "conditions that are key for implementing, accelerating, and sustaining adaptation in human systems and ecosystems."[11] These include political commitment and follow-through, institutional frameworks, policies and instruments with clear goals and priorities, enhanced transparency by government and corresponding knowledge of constituents, mobilization of and access to adequate financial resources, monitoring, evaluation, and inclusive governance processes.[12] Enabling conditions often determine whether a particular adaptation option may be implemented. Feasibility considers the potential for an adaptive measure to be implemented and maintained successfully.[13]

II. THE ESSENTIAL MEANING OF DEVELOPMENT

Development, as used in this Article, refers to land development and preserved open space by private landowners that define how communities grow. This is development that provides housing, retail goods, offices, social services, manufacturing, and other types of building with an eye toward the protection of ecosystems. WG II refers to this as urbanization, which it states, "offers a critical opportunity in the near term to advance climate resilient development."[14]

Local governments have at their disposal the tools necessary to foster the shift from car-dependent, single-family neighborhoods to transit-oriented urban living, to increase energy efficiency in buildings and to reduce development pressures on carbon-sequestering open space.[15] And when the impacts of municipalities' regulations, policies, and education programs are aggregated, they collectively represent a significant, if not dominant, impact on domestic greenhouse gas (GHG) reductions.[16]

In addition to their extensive reports, each IPCC Working Group produces a corresponding Summary for Policymakers (SPM). SPMs are condensed documents that provide policy information and directives for adapting to and mitigating climate change. The WG II SPM highlights that CRD is more effective when "it is responsive to regional and local land use development and adaptation gaps, and addresses the underlying drivers of vulnerability."[17] As a means to implement CRD, WG II discusses the role of land use controls: "[p]lanning for CRD can support both adaptation and decarbonization via effective land-use, promoting

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[11] *See* WG II SPM 2022, *supra* note 1, at 27.
[12] *Id.*
[13] *See* WG II AR6, at 2909.; *see also* 2023 SYNTHESIS REPORT, *supra* note 6, at C.2.
[14] It refers the ability of actors involved in urban planning to shape human settlements: "[I]ntegrated inclusive planning and investment in everyday decision-making about urban infrastructure, including social, ecological and grey/physical infrastructures, can significantly increase the adaptive capacity of urban and rural settlements." *See* WG II SPM 2022, *supra* note 1, at D.3.
[15] *See infra* Part III.
[16] *Id.*
[17] WG II SPM 2022, *supra* note 1, at D.3.2.

resilient and low-carbon infrastructure; protecting biodiversity and integrating ecosystem services, assuming advancing just and equitable development processes."[18]

The SPM of WG III, in turn, highlights the importance of land use development in mitigating emissions as follows:

> The potential and sequencing of mitigation strategies to reduce GHG emissions will vary depending on a city's land use, spatial form, development level, and state of urbanization. Strategies for established cities to achieve large GHG emissions savings include efficiently improving, repurposing, or retrofitting the building stock, targeted infilling, and supporting non-motorized (e.g., walking or bicycling) and public transport. Rapidly growing cities can avoid future emissions by co-locating jobs and housing to achieve compact urban form and by leapfrogging or transitioning to low-emissions technologies. [19]

WG III also refers to "enhancing carbon uptake and storage in the urban environment, for example through bio-based building materials, permeable surfaces, green roofs, trees, green spaces, rivers, ponds, and lakes."[20]

WG III outlined several strategies for saving local GHGs including (1) improving, repurposing, or retrofitting the building stock; (2) supporting walking, biking, and public transit; (3) targeting infilling and compact urban form; (4) using bio-based building materials; (5) increasing permeable surfaces; (6) adding green roofs; (7) planting trees; (8) building green spaces; and (9) improving rivers, ponds, and lakes, among others. Land use law can achieve all these strategies and more.[21] Local governments can adopt, enforce, and incentivize CRD strategies to control and shape land use through regulation, capital spending, and policy.

III. THE MYSTERIOUS POWER OF LOCAL LAND USE LAW

The authority to adopt land use plans and zoning regulations is delegated to local governments in most states through planning and zoning enabling acts adopted by state legislatures.[22] Many states have supplemental acts delegating other types of land use controls to local governments to protect, for example, environmental functions or public health.

Land use enabling laws generally are broadly construed to empower localities to adopt innovative and flexible land use regulations.[23] One of the purposes of local

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[18] *See id.*

[19] WG III SPM 2022, *supra* note 1, at C.6.2. Retrofitting building stock refers to the process of upgrading existing buildings by incorporating new technologies and materials to improve performance and, in some cases, climate resilience. Targeted infilling, discussed in greater detail later in this Article, refers to the strategic development of vacant or underutilize land within existing urban areas to build "up" rather than "out."

[20] *See id.*

[21] WG III SPM 2022, *supra* note 1, at C.6.2.

[22] JOHN R. NOLON, CHOOSING TO SUCCEED: LAND USE LAW & CLIMATE CHANGE, 23–26 (2021).

[23] *See generally* John R. Nolon, *Death of Dillon's Rule: Local Autonomy to Control Land Use*, 36 J. LAND USE & ENV'T L. 7 (2020).

zoning laws is to provide for "the most appropriate use of land," a broad objective indeed.[24] This phrase was contained in the original model zoning enabling act and is found in the law of most states.[25] In upholding the constitutionality of land use restrictions, the Supreme Court said "…while the meaning of constitutional guaranties never varies, the scope of their application must expand or contract to meet the new and different conditions which are constantly coming within the field of their operation. In a changing world, it is impossible that it should be otherwise."[26]

State statutes may require all land use regulations, including zoning, subdivision and site plan regulations, and all other regulations affecting the use of private land, to conform to a comprehensive plan.[27] When a locality's comprehensive plan calls for innovative strategies to meet emerging conditions such as climate change, conformance of land use regulations to plan objectives helps to meet due process, ultra vires, equal protection, takings, and other landowner challenges.[28] The interplay among these facets of local land use laws has enabled it to evolve as new challenges have arisen. Over the last fifty years, localities have created regimes such as urban redevelopment, local environmental law, smart growth, and sustainable development.[29]

Many municipalities have turned their attention to facilitating development that is mitigative, adaptive, and resilient. Such development fosters climate resilient development. Among their CRD achievements are biophilic design, environmental housing, high albedo roofs, low carbon construction, climate resilient retrofits, heat island mitigation, carbon neutral building assessments, climate justice plans, living shorelines, shoreline protection, and anti-displacement, just to name a few achievements. Part V of this article discusses these accomplishments in greater detail, providing illustrative case studies.

IV. THE STRUCTURE OF LAND USE LAW – THE FRAMEWORK EMERGES

Municipalities regulate private sector behavior and establish administrative boards and procedures governing land use by the formal adoption of laws and

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[24] *See id.* at 13.
[25] *See id.* at 10.
[26] Village of Euclid v. Ambler Realty Co., 272 U.S. 365, 387 (1926).
[27] **New York**: Under Town Law § 272-a, all town land use regulations must be in accordance with a comprehensive plan adopted pursuant to this section. **Washington**: The Growth Management Act mandates that counties and cities adopt comprehensive plans, and all development regulations must be consistent with these plans. **Oregon**: The Land Conservation and Development Act requires cities and counties to prepare comprehensive plans, with all land use regulations and decisions needing to comply with these plans. *See* N.Y. Town Law § 272-a (McKinney 2024**);** *see also* Wash. Rev. Code § 36.70A.020 (2024); *see also* Or. Rev. Stat. §§ 197.005–197.860 (2024).
[28] NOLON, *supra* note 21, at 215-217.
[29] *See* Jonathan D. Weiss, *Preface Smart Growth and Affordable Housing,* 12 SMART GROWTH & AFFORDABLE HOUSING 165-173 (Winter 2003) ; *see generally* CENTER FOR GLOBAL METROPOLITAN STUDIES ET AL., THE FUTURE OF SHRINKING CITIES: PROBLEMS, PATTERNS AND STRATEGIES OF URBAN TRANSFORMATION IN A GLOBAL CONTEXT (Karina Pallagst et al. eds., 2009).

regulations. Local laws are codified into municipal codes that are organized, in most cases, alphabetically, with Animal Control, for example, found in the beginning of the municipal code and Zoning toward the end. Often the code is organized by chapters with Animal Control being found in Chapter 3, for instance, and Zoning in Chapter 125.[30]

Municipalities are diverse, have unique land use concerns and opportunities, and enjoy significant discretion in organizing their codes as to form and substance based on their concerns. There is, however, a common structure.[31] For the purpose of this Article, this structure, or framework, includes the following nine elements relevant to furthering CRD:

1. The comprehensive plan
2. Special topic or area plans
3. Zoning use and dimensional requirements
4. Supplemental substantive zoning provisions
5. Principal land use boards and officers – powers and duties
6. Special interest land use boards – powers and duties
7. Environmental chapters in municipal code
8. Public health chapters in municipal code
9. Other municipal code chapters regulating land use [32]

Altogether, the municipal code and advisory plan provisions related to land use can exceed two hundred and fifty pages in many communities and even double that amount in others[33]. State legislatures seldom require localities to follow a certain order, to be consistent in the location of certain types of provisions, or to require regulations of land use to be clustered consistently in discrete municipal code

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[30] There are other methods used to describe the formal parts of the municipal code such as dividing its substantive parts into Titles, Articles, etc. For the CRD Framework Law, we have chosen the chapter format since it is the most prevalent nomenclature.

[31] One advantage of the framework law is that it is responsive to local practices since it fits new regulations into a legal structure with which local stakeholders are familiar. Other efforts over the decades have been more prescriptive requiring full-on changes in the local land use regulatory structure. This approach can be seen as paternalistic and not responsive, thus disrespectful and less likely to be adopted.

[32] Pamella Vegna, *Achieving Climate-Resilient Development at the Local Level: Does a Nationally Consistent Legal Framework Exist to Facilitate Adoption of CRD Best Practices?,* PACE ENV'T L. REV. BLOG (Jan. 15, 2025), https://pelr.blogs.pace.edu/2025/01/15/achieving-climate-resilient-development-at-the-local-level-does-a-nationally-consistent-legal-framework-exist-to-facilitate-adoption-of-crd-best-practices/ [https://perma.cc/JNU2-BEWS].

[33]Julie Lovelace, *Is it Time for a Legal Review of your Code of Ordinances?*, MUNICODE, https://www.municode.com/code/page/it-time-legal-review-your-code-ordinances [https://perma.cc/R24E-CZBY]; *see Zoning Text*, NYC PLANNING, https://www.nyc.gov/site/planning/zoning/access-text.page#:~:text=The%20text%20of%20the%20Zoning,the%20enhanced%20online%20Zoning%20Resolution [https://perma.cc/K5HP-HXU3]; Tara Astbury, *City Ordinance vs. City Code: What's the Difference?*, ESCRIBE (Mar. 27, 2024), https://www.escribemeetings.com/blog/city-ordinance-vs-city-code/#:~:text=An%20ordinance%20is%20a%20specific,organized%20systematically%20by%20subject%20matter [https://perma.cc/2BF4-N934].

locations.[34] Subdivision regulation, for example, may be found in the supplemental section of the zoning chapter or in a separate chapter of its own. Site plan regulations and special use provisions tend to be in the zoning chapter itself and are seen as supplemental substantive zoning provisions.

From year to year, over the decades that the community has been adopting land use regulations, the circumstances can change drastically, political situations evolve, dozens of elected legislators and volunteer land use board members come and go along with municipal attorneys with ideas of their own about how land use regulations should be structured. Nonetheless, the nine structural components listed above will be found somewhere in the municipal code or departmental websites. They will be used in this Article to build out the Framework Law for locating exemplary CRD language included in Part V.

1. **The comprehensive plan:** The plan is advisory in nature, not regulatory. As such, it is not a local law. Generally, plans are not located in the municipal code, but rather found on the municipal website, often in the link to the appropriate city agency such as the building, planning, or economic development department. They typically have a notation that they were adopted on a certain date in compliance with state procedures, which in most cases require legislative approval following public notice and one or more public hearings. Once adopted, formally adopted plans guide the amendment and addition of land use laws and, as a result, constitute the policy foundation of the CRD Framework law.

2. **Special topic or area plans:** Communities that adopt truly comprehensive plans will tend to integrate more detailed planning specifications and procedures into their comprehensive plan for the sake of coordinating topics such as stormwater management or areas with special characteristics such as waterfronts, extensive wetlands, eco-system rich open space areas, vulnerable coastal areas, transit-oriented neighborhoods, and disaster-prone districts. Other communities will adopt stand-alone special plans to guide development in these targeted areas. However organized, special plans, too, are not regulatory and thus are located on departmental webpages rather than neatly organized in the municipal code. These special plans are part of the policy platform that supports the adoption of higher tiers of land use regulation.

3. **Zoning chapter of municipal code – use and dimensional requirements:** Zoning, historically, refers to the creation of a number of different districts or zones, the adoption of permitted land uses, and the dimensions required such as maximum building heights, lot coverage, setbacks, and other

[34] WORKING WITH STATE LEGISLATURES: A GUIDE FOR MILITARY INSTALLATIONS AND STATE LEGISLATURES, NAT'L CONF. OF STATE LEGS. 10, https://www.repi.mil/Portals/44/Documents/Primers/Primer_StateLegislatures.pdf [https://perma.cc/B9L2-UW6S].

dimensional characteristics that will differ from zone to zone.[35] Such regulations must be in conformance with the comprehensive plan.

4. **Supplemental substantive land use provisions:** Regulations that are supplemental to the traditional district use and dimensional provisions may be added to the zoning chapter of the municipal code or be added as separate code chapters. Subdivision regulations are often found in a separate chapter, while special use permit provisions, along with erosion and sedimentation controls, and restrictions limiting excavation, tree harvesting, or other standards limiting environmental harms may be in the zoning chapter itself.

5. **Principal land use boards – powers and duties:** The requirements for development contained in zoning and land use laws are enforced through an administrative review process conducted by a planning or zoning board. Such agencies can be empowered by their local legislatures to impose conditions on their approval of developer and landowner proposals, including conditions that further CRD. These boards may also be empowered to provide incentives for projects that further critical policies such as climate change mitigation or adaption. Incentives can include awarding greater density or speeding up the review process.

6. **Special interest land use boards - powers and duties:** Land use regulation can be expanded to govern details such as architectural design, wetlands, waterfronts, or historic districts. Some municipalities create special review boards to ensure that developments comply with these additional requirements. These boards can be given advisory or permitting authority over projects that are within their jurisdiction. This process can be used in some instances to further CRD objectives such as ensuring that developments are resilient by preserving or expanding wetlands or by enhancing vegetation that provides biological sequestration.[36]

7. **Environmental chapters in municipal code:** Using delegated authority to protect environmental functions, local governments can add a chapter to their municipal code concerning such matters, some of which can affect the use of land or the construction of buildings. Stormwater management provisions, in lieu of being added as a supplemental regulation in the zoning chapter, could be found in its own chapter entitled Stormwater Management, which regulates development projects.

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[35] *Zoning Text*, *supra* note 32; *see generally* Michael Chandler & Gregory Dale, *Zoning Basics*, 42 PLANNING COMM'RS J. 13 (2001); *see generally* Michael Allan Wolf, *A Common Law of Zoning*, 61 ARIZ. L. REV. 771 (2019).

[36] Biological sequestration is the process whereby plants and ecosystems absorb and store carbon dioxide. *See* U.S. Geological Survey, *Biological Carbon Sequestration*, U.S. Geological Survey (Apr. 24, 2025), https://www.usgs.gov/media/images/biological-carbon-sequestration#:~:text=Detailed%20Description,or%20in%20extensive%20root%20systems.

8. **Public health chapters in municipal code:** Similarly, using delegated authority to protect the physical or mental health of the public, local governments can add a chapter to their municipal code to affect the use of land or the construction of buildings. Noise abatement regulations might, for instance, be found as one section of the Public Health chapter of the code.

9. **Other municipal code chapters relevant to land use:** In addition, municipalities can use their broad land use authority or power to protect the public health, safety, and welfare to limit the location of junkyards, high emission facilities, or polluting facilities. When they do, they may add a separate chapter to their codes under a relevant title such as "Junkyards," which can be considered land use regulation and a method of furthering CRD such as equity or adaptation. Similarly, they might adopt water conservation standards in a separate "Water Conservation" chapter of their municipal code.

V. BUILDING OUT THE FRAMEWORK LAW: TOPICS AND CASE STUDIES[37]

Based on results of student research,[38] twelve substantive topics have been selected for this Article to fill in the CRD Framework Law. The topics are:

1. Local climate action plans,
2. Targeted infill and adaptive reuse,
3. Low-carbon buildings,
4. Wildfire mitigation,
5. Sea level rise,
6. Vegetated urbanism,
7. Parking and pavement,
8. Inland flooding,
9. Distributed energy,
10. Disaster mitigation and hazard management,
11. Public health, and
12. Water conservation.

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[38] Over three semesters, fifty land use scholars worked with the Land Use Law Center scanning the nation at the local level to find and record case studies of land use laws that embodied CRD components and furthered CRD objectives. The students found that these case studies fit into twelve substantive categories. "The legal academy has been turning to empirical work in recent years to get a better handle on what the world looks like and the impacts of legal change and legal reform," Bob Needham, *Empiricism on the Rise*, 67 LAW QUADRANGLE: NOTES FROM MICH. L. 26 (Winter 2024-2025) (quoting J.J. Prescott).

This Article describes and discusses some examples of CRD that have emerged within some of these topic areas and illustrates where they fit within the Framework structure. A brief description of each topic is provided below with references to recently adopted land use laws.

A. Local Climate Action Plans: New York City CAPs – *Special Topic Plan*

Local governments have sought to formulate long-term sustainability strategies through climate action plans (CAPs), which deal with land use as well as other local government policies.[39] Like state-level climate action plans, municipal CAPs generally include: a GHG emissions inventory; realistic emissions reduction targets based on this inventory and an analysis of energy savings opportunities; and strategies and policies to meet these emissions reductions goals.[40] CAPs are inherently special plans because they are documents dedicated to specific goals like GHG reductions.

In November 2021, New York City amended its administrative code in relation to the creation of its citywide Climate Adaptation Plan.[41] The law requires that the Office of Long-Term Planning and Sustainability (OLTPS) develop and post a CAP at least every ten years.[42] New York City established the OLTPS in 2008 by amending the New York City charter and the administrative code of the city of New York in relation to the office of operations, the office of environmental coordination, and an office of long-term planning and sustainability.[43] The city created OLTPS to develop and implement PlaNYC, the city's strategic plan through 2030.[44]

B. Targeted Infill and Adaptive Reuse: Surprise, Arizona – *Supplemental Substantive Zoning Provisions*

Preserving open land is part of an overall community development and conservation strategy.[45] Experience proves that when community leaders develop a balanced strategy for development and conservation—or Smart Growth—both

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[39] *See generally* Ellen Bassett & Vivek Shandas, *Innovation and Climate Action Planning,* 76 J. OF AM. PLANNING ASS'N 435 (2010).

[40] *See id.*

[41] *See AdaptNYC*, CITY OF N.Y. MAYOR'S OFF. OF CLIMATE & ENV'T JUST., https://climate.cityofnewyork.us/initiatives/adaptnyc/ [https://perma.cc/H3TD-FBBE]; *see also Off. of Long Term Planning and Sustainability Job Listing*, CITY OF N.Y. MAYOR'S OFF.,https://www.nyc.gov/html/oltps/downloads/pdf/senior_policy_advisor_notice_061614.pdf [https://perma.cc/2H4Z-5X4N].

[42] N.Y.C., N.Y., ADMIN. CODE § 24-808 (2025), *available* at https://codelibrary.amlegal.com/codes/newyorkcity/latest/NYCadmin/0-0-0-207400.

[43] *See id.*

[44] *PlaNYC*, CITY OF N.Y. MAYOR'S OFF. OF CLIMATE & ENV'T JUST., https://climate.cityofnewyork.us/initiatives/planyc-getting-sustainability-done/ [https://perma.cc/PCG3-9UPG] (explaining that PlaNYC is the city's comprehensive plan). While PlaNYC is a comprehensive sustainability plan, it is not a traditional comprehensive plan that covers all aspects of city development but rather focuses on sustainability and climate action. *Id.*

[45] *See generally* JOHN R. NOLON, PROTECTING THE ENVIRONMENT THROUGH LAND USE LAW: STANDING GROUND Ch. 5 (2014).

objectives are more easily achieved.[46] Simply acquiring and regulating land cannot prevent sprawl and its negative side effects; an effective approach to concentrating market pressures for development in appropriate places is required.[47] Local comprehensive plans routinely call for balanced land use patterns with development and conservation occurring in appropriate places. Proper environmental planning requires this balance.[48]

Surprise, Arizona's Surprise Heritage District (SHD) is a zoning district that seeks to encourage redevelopment while preserving historical character in the city's Original Town Site. The city's Infill Incentive District Plan provides financial incentives to promote both residential and commercial development.[49] Sec. 109-48 states: **"**[a]ny new residential development on parcels zoned either as SHD/RO or as SHD/CO shall receive a 100-percent waiver of City of Surprise development impact fees."[50] Incentivizing developers with fee waivers frees up their funds for construction in denser areas that may be more expensive due to higher land costs, infrastructure challenges, or increased competition for resources that might not exist in undeveloped areas. Thus, this project combats urban sprawl by encouraging development in areas that have existing commercial markets and existing infrastructure, including sewers, roads, and public transit services.

C. Low-carbon Buildings: Boulder, Colorado – *Other Municipal Code Chapters Regulating Land Use*

Buildings that accomplish multiple sustainability objectives have become known as low-carbon buildings or green buildings.[51] Low-carbon buildings employ construction techniques, building designs, and operational systems that save water, reduce lighting needs, use recycled and low-carbon building materials, or create a more healthful indoor environment, for example.[52] They may also incorporate renewable energy sources such as individual building solar systems and wind turbines.[53]

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[46] *See id*. Smart growth is an overall approach to development that encourages a mix of building types and uses, diverse housing and transportation options, development within existing neighborhoods, and robust community engagement. *See also What Is Smart Growth?,* SMART GROWTH AM., https://smartgrowthamerica.org/what-is-smart-growth/ [https://perma.cc/C3R2-QP7D].

[47] NOLON, *supra* note 44, at Ch. 5.

[48] *See id.*

[49] *See Surprise Heritage District,* CITY OF SURPRISE, https://surpriseaz.gov/263/Surprise-Heritage-District [https://perma.cc/R7YY-UNLW] (noting the Infill Incentive District Plan was adopted under Ordinance 2016-14).

[50] SURPRISE, ARIZ., MUNICIPAL CODE § 111-1.3 (2024), *available* at https://library.municode.com/az/surprise/codes/municipal_code?nodeId=PTIILADEOR_CH111ININDI.

[51] *See generally* Ye Li, et al., *A Review on the Policy, Technology and Evaluation Method of Low-Carbon Buildings and Communities,* 16 ENERGIES 4 (2023).

[52] *See id.*

[53] *See id.*

Boulder, Colorado's building code now requires that construction projects meet a threshold level of embodied carbon credits in addition to other electric and building credit requirements.[54] Embodied carbon credits consider building materials and their relative benefit or burden to the overall embodied carbon inventory within the city.[55] The code lays out considerations for materials such as lumber, steel, and concrete.[56] To achieve credits for reduction of embodied carbon, the code states:

> "…all materials or products of the type chosen to meet this credit option used in the construction of the building shall meet the requirements of this section. The construction documents shall identify the products proposed for the construction of the building and demonstrate compliance of the proposed products with the requirements of this section."[57]

The code goes on to state that a minimum of three materials or products selected from the options outlined must be chosen to achieve the credits.[58] These materials include products like embodied carbon in insulation, interior finishes, floor covering, and roofing, among others.

The final section of the code requires a "whole building life-cycle assessment."[59] The code states that the assessment must demonstrate a minimum ten percent reduction for at least three of six impact categories. The six categories for reductions include: (1) global warming potential (greenhouse gases); (2) depletion of the stratospheric ozone layer; (3) acidification of land and water sources; (4) eutrophication; (5) formation of tropospheric ozone; and (6) depletion of nonrenewable energy resources.[60] By providing varying reductions options, the code gives developers some flexibility to meet the regulation.

D. Wildfire Mitigation: Maui, Hawaii – *Other Municipal Code Chapters Regulating Land Use*

Wildfires are increasingly destroying homes in the wildland-urban interface.[61] With projections of climate change and housing growth potentially

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[54] BOULDER, COLO., ENERGY CONSERVATION CODE CH. 4, COM. ENERGY EFFICIENCY (2024), *available at* https://codes.iccsafe.org/content/COBECC2024P1/chapter-4-ce-commercial-energy-efficiency. Embodied carbon refers to the GHG emissions associated with the lifecycle of a product, encompassing, in some cases, the extraction, manufacturing, transportation, installation, maintenance, and disposal. In the context of building construction, embodied carbon considers how to incorporate low-carbon processes from start to finish.

[55] *See id.*

[56] *See id.*

[57] *Id.* § C406.3.8.

[58] *Id.* §§ C406.3.8.1–C406.3.8.11 (noting alternatively, one selection from the options in §§ C406.3.8.1 through C406.3.8.11 and compliance with § C406.3.9.12 will also achieve the credit).

[59] *See id.* § C406.3.8.12.

[60] *Id.* § C406.3.8.12.

[61] *See* Alexandra D. Syphard, Avi Bar Massada, Van Butsic, & Jon E. Keeley, *Land Use Planning and Wildfire: Development Policies Influence Future Probability of Housing Loss,* PLOS (Aug. 14, 2013). *See also What Is the Wildland Urban Interface (WUI)?,* U.S. FIRE ADMIN., https://www.usfa.fema.gov/wui/what-is-the-wui [https://perma.cc/FHU7-KY2X]

exacerbating the threat of wildfire to homes and property, effective fire-risk reduction alternatives are needed as part of a comprehensive fire management plan.[62] Land use planning can yield policies that avoid exposure to wildfires altogether through the informed placement of new residential structures.

Maui County's Fire Code requires clearing vegetation that may pose a risk of causing or spreading wildfires.[63] This code gives control to Maui's Fire Prevention Bureau to determine which vegetation should be removed. Section 10.13.10, Exterior Vegetation, reads:

> "Cut or uncut weeds, grass, vines, and other vegetation shall be removed when determined by the AHJ [Authority Having Jurisdiction] to be a fire hazard. When the AHJ determines that total removal of growth is impractical due to size or environmental factors, approved fuel breaks shall be established."[64]

The code specifies that, to maintain an effective firebreak, it is necessary to remove flammable vegetation from areas that are within thirty feet of buildings and structures.[65] If conditions worsen, the scope can be expanded to within one hundred feet of buildings.[66] However, the code also includes some exceptions, such as leaving single trees that do not pose a risk of spreading fire.[67] Finally, Maui County is implementing educational campaigns to inform the public of this code and underscore its importance.[68]

[hereinafter U.S. FIRE ADMIN.] (noting that the WUI is the zone of transition between unoccupied land and human development. It is the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels).

[62] *See* U.S. FIRE ADMIN, *supra* note 60.

[63] *Maui County Fire Code*, MAUI COUNTY GOV'T § 16.04D.230 (2024), *available* at https://library.municode.com/hi/county_of_maui/codes/code_of_ordinances?nodeId=TIT16BUCO_CH16.04DFICO_16.04D.230SU10.13.10AM.

[64] *See id.* §§ 10.13.10.1 and 10.13.10.2.

[65] *See id*. § 10.13.10.2.1. The code creates clearance of brush provisions as follows: "Clearance of brush**.** Persons owning, leasing, controlling, operating or maintaining buildings or structures in, upon, or adjoining hazardous fire areas, and persons owning, leasing or controlling land adjacent to such buildings or structures, shall at all times: 1. Maintain an effective firebreak by removing and clearing away flammable vegetation and combustible growth from areas with 30 feet of such buildings or structures. 2. Maintain additional fire protection or firebreak by removing brush, flammable vegetation and combustible growth located within 30 feet from such buildings or structures, when required by the AHJ because of extra-hazardous conditions causing a firebreak of only 30 feet to be insufficient to provide reasonable fire safety the AHJ may require the removal for up to 100 feet."

[66] *See id.*

[67] *See id.*

[68] The Fire Education section is responsible for developing and implementing programs that will increase the public's awareness of fire safety. This includes an annual fire safety program for Maui

E. Sea Level Rise: *South San Francisco, California – Supplemental Substantive Zoning Provision*

Rising sea levels in the United States will greatly affect existing communities built along coasts and estuaries that are at, or close to, sea level.[69] These communities have existing buildings, rail lines, roads, and other infrastructure at risk, not only from the rising water level, but also from the storm surges and other natural disasters associated with climate change.[70] Sea level rise will erode beaches; drown marshes and wetlands; damage barrier islands, habitat, and ecological processes; cause saline intrusion into freshwater ecosystems and groundwater; flooding or inundation of low-lying areas; and damage to private and public property and infrastructure.[71]

The South San Francisco Zoning Code Update, adopted in 2022, provides a comprehensive framework for managing land use and development within the city.[72] The Floodplain/Sea Level Rise (SLR) Overlay District Map helps protect against sea level rise by enforcing regulations such as site clearance requirements, prohibited uses, and specific development standards.[73] The SLR map identifies current flood zones and areas at risk of rising sea levels.[74] The zoning code also offers floor area ratio (FAR) incentives to encourage developers to adopt community benefit programs, including sea level rise adaptation initiatives.[75]

Section 20.395.001 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 FAR bonus) in exchange for community benefits.[76] The program enables 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.[77]

Benefit fees collected in accordance with Section 20.395.003 ("Review and Approval") may fund one or more of the benefits.[78] The code provides that contributions to or construction of district-wide sea level rise mitigation measures constitute community benefits. Such contributions may include levees, sea walls and

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County schools. See *Fire Education*, MAUI COUNTY GOV'T, https://www.mauicounty.gov/1806/Fire-Education [https://perma.cc/AX3B-RCJU]; *see also Fire Prevention Bureau*, MAUI COUNTY GOV'T, https://www.mauicounty.gov/1465/Fire-Prevention-Bureau [https://perma.cc/5BD4-BCVL].

[69] *See generally* Anny Cazenave & Goneri Le Cozannet, *Sea Level Rise and Its Coastal Impacts,* 2 EARTH'S FUTURE (2014).

[70] *See id.* (explaining the danger of sea level rise to coastal communities and their infrastructure).

[71] *See id.*

[72] *See* SOUTH S.F., CAL., ZONING CODE (2022), *available at* https://ecode360.com/43450037.

[73] *See id.* § 20.180.

[74] *See id.*

[75] *Id.* § 20.395.001.

[76] *Id*.

[77] *See id.*

[78] *Id.* § 20.395.004.

detention basins, creek restoration and improvements, and landscaping efforts aimed at "supporting biodiversity and improving resilience in impacted areas."[79]

F. Vegetated Urbanism: Tallahassee, Florida – *Environmental Chapter*

City planners concerned with green infrastructure calculate the current green space coverage so that an adequate percentage of the land is sheltered and shaded, with its soils held intact and its ability to absorb and retain water preserved, if not enhanced.[80] Under the urban tree canopy and between intense zones of green, small stretches of vegetated spaces work to connect streams and channels, provide paths for people and species, direct and control the flow of water, and provide places along the way for rest and play.[81] The elements of green infrastructure can include green roofs, planters, rainwater harvesting devices, street trees, preserved open space on building sites, natural vegetated corridors and swales, permeable paved areas accented with green features, detention basins, green building facades, and greened medians and edges along streets, paths, and rail lines.[82]

Chapter 5 of Tallahassee's Land Development Code requires certain protections for tree canopy and other removal standards. Section 5-83 (f), *Reforestation Requirements*, states:

> "[a]ll sites, except for individual lots being developed with one single-family, duplex, or triplex, and residential subdivisions that do not exceed four dwelling units per acre shall provide, upon completion of development activities, a minimum number of trees equivalent to a ratio of 40 tree credits for each acre proposed for development."[83]

The code also provides that, if the total number of trees to be replanted is not feasible on the development site, then

> "…the applicant may enter into an agreement with the city, as approved by the director, to plant the excess trees on an approved public site or to provide the monetary equivalent to the city for use in public landscaping projects."[84]

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[79] *Id.*
[80] *See generally* JOHN R. NOLON, PROTECTING THE ENVIRONMENT THROUGH LAND USE LAW: STANDING GROUND 262 (2014).
[81] *See id.*
[82] *See id.*
[83] i.e., total tree preservation credits plus tree replanting credits shall be equal to or greater than 40 credits per acre proposed for development.
[84] TALLAHASSEE, FLA., LAND DEVELOPMENT CODE, § 5-83 (f) (2020), *available at* https://library.municode.com/fl/tallahassee/codes/land_development_code?nodeId=LADECO_CH5ENMA.

The code additionally creates a "critical protection zone," (CPZ) defined as "that area surrounding a tree within a circle described by a radius of one foot for each inch of the tree's diameter at breast height."[85] The code seeks to protect the root systems of individual trees that are contained within the CPZ from impacts associated with development activity. Pursuant to this mission, the code states:

> "The critical protection zone of every protected tree not permitted for removal shall be protected from activities that may injure the tree, including, but not limited to, cut and fill activities, building pad placements, roadbed construction, construction of material storage, driving or parking heavy equipment, or trenching.[86]

By drawing on restrictive zoning and comprehensive environmental provisions, Tallahassee makes clear that tree canopy and its incidental benefits are priorities for the city.

G. Parking and Pavement: Paterson, NJ – *Zoning Use and Dimensional Requirements*

About 90% of parking lots are paved with asphalt due to its cost-effectiveness and durability; however, such dark colored materials absorb heat, thus exacerbating what is known as the urban heat island (UHI) effect.[87] UHIs occur when natural surfaces are replaced with manmade infrastructure, such as parking lots, in a concentrated area. An abundance of surfaces that retain heat leads to hotter temperatures in urban neighborhoods.[88] People living in lightly vegetated urban spaces are far more likely to experience heat-related deaths than people in shadier areas.[89] Studies have revealed this risk can be as high as thirty percent more likely in

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[85] *See id.*

[86] *See id.* Section (j) requires compensation for removal of protection trees, determined using tree debits and tree credits. Tree debits and tree credits are terms used to represent the taking or the preservation of a two-inch diameter at breast height tree or larger.

[87] Hannah Dauray, *Climate Resiliency & Parking Structures,* PACE ENV'T L. REV. BLOG (Oct. 18, 2023), https://pelr.blogs.pace.edu/2023/10/18/climate-resiliency-parking-structures/ [https://perma.cc/8G7A-GLZX]; Bill Palmer, *Concrete Parking Lots*, CONCRETENETWORK.COM https://www.concretenetwork.com/concrete-parking-lots/#:~:text=Today%2C%20about%2090%25%20of%20parking,says%2C%20a%20no%2Dbrainer [https://perma.cc/JP8D-HLCR].

[88] To demonstrate just how drastic this effect can be, a group of researchers reported in *Urban Forestry and Urban Greening* that the temperature of the surface of one parking lot at noon on a summer day was fifty-nine degrees Fahrenheit hotter than that of a nearby grassy field. The same researchers also found the air temperature immediately above the lot was thirty-five degrees Fahrenheit higher than the field. These "islands" of heat lead to greater energy use for things like air conditioning and increased risk of heat related illnesses. *See id.; see also* Akio Onishi, Xin Cao, Takanori Ito, Feng Shi, Hidefumi Imura, *Evaluating the Potential for Urban Heat-Island Mitigation by Greening Parking Lots,* 9 URBAN FORESTRY & URBAN GREENING 4 (2010).

[89] *See* Jude Coleman, *Heat waves cause more illness and death in U.S. cities with fewer trees*, SCIENCENEWS (Apr. 8, 2024, 5:00 AM), https://www.sciencenews.org/article/heat-waves-illness-death-cities-fewer-trees [https://perma.cc/KN3E-BUNT].

some urban environments.[90] That figure results in around 1,500 deaths per year, surpassing the number of fatalities resulting from any other severe weather events.[91] Mortality is the most tragic effect of UHI, but there are other negative health effects, too, including "heat strokes, dehydration, loss of labor productivity, and decreased learning."[92]

The city of Paterson, New Jersey, has adopted a zoning ordinance as part of its Zoning Code for off-street parking that provides opportunities to reduce the amount of required parking through shared parking and land-banking for future parking.[93] This flexibility is consistent with Paterson's 2014 Master Plan land use goal of "address[ing] excessive parking standards."[94] Paterson's 2017 Center City Expansion Redevelopment Plan integrated aspects of the ordinance, including the goal of encouraging shared parking.[95] Paterson also eliminated minimum parking requirements in its Center City Mall-Entertainment and Mixed-Use Downtown districts.[96]

The Zoning Code's Shared Parking provision designates allowable reduction percentages for the following seven specific uses: retail sales, offices, service establishments, restaurants, ballrooms, banquet halls, and meeting rooms.[97] This could potentially fast-track Planning Board approvals for parking shared by those listed uses.[98] Developers may satisfy the parking requirements in a joint parking program, provided that (1) the Planning Board approves the joint program; (2) the area for the parking facilities shall be adequate to provide the sum total of

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[90] *See* Mat Santamouris, *Recent Progress on Urban Overheating and Heat Island Research. Integrated Assessment of the Energy, Environmental, Vulnerability and Health Impact. Synergies with the Global Climate Change*, 207 ENERGY & BUILDINGS (2020).

[91] Katie Good, *The Disproportionate Impact of Climate Change on People Experiencing Homelessness*, TEXAS HOMELESS NETWORK, https://www.thn.org/2024/04/03/the-disproportionate-impact-of-climate-change-on-people-experiencing-homelessness/#:~:text=Around%20the%20country%2C%20heat%20contributes,related%20causes%20than%20sheltered%20individuals [https://perma.cc/A5TK-PUCX].

[92] *See* Angel Hsu, Glenn Sheriff, Tirthankar Chakaborty, & Diego Manya, *Disproportionate Exposure to Urban Heat Island Intensity Across Major U.S. Cities,* 12 NATURE COMMN'CS (2021).

[93] CITY OF PATERSON, ZONING AND LAND DEV. CH. 483, §500-7 (2016), https://www.patersonnj.gov/egov/documents/1463422578_02635.pdf [hereinafter PATERSON ZONING AND LAND DEV.].

[94] City of Paterson, *Master Plan* (Mar. 2014), https://www.patersonnj.gov/egov/documents/1395155623_756225.pdf [https://perma.cc/V898-G2D4].

[95] City of Paterson, *Center City Expansion Redevelopment Plan* 17 (Feb. 2017), https://www.patersonnj.gov/egov/documents/1525282984_07106.pdf [https://perma.cc/P6JK-6ZCL].

[96] *Id.* at 22.

[97] PATERSON ZONING AND LAND DEV., *supra* note 92.

[98] A planning board is the government entity responsible for reviewing and approving or denying development proposals. In many cities, the planning board is comprised of volunteers.

off-street parking space requirements; and (3) parking requirements for a use in a non-residential district shall not be satisfied within a residential district [99]

The ordinance also creates a "land-banking" program whereby the Board may determine that fewer than the required number of parking spaces is sufficient, the Board may "waive" or "landbank" the improvement of up to 1/3 of the total number of spaces. This flexibility demonstrates that Paterson and other municipalities like it are moving away from arbitrary parking standards and, instead, turning toward tailored solutions.

H. Floodplain Management: Jacksonville, Florida – *Environmental Chapter*

Floodplains play an essential role in the exchange of water masses and matter between river and terrestrial ecosystems, thus influencing water quality.[100] Scholars have observed that "[c]limate change and the increasing frequency and intensity of extreme weather events, such as floods, tornadoes, droughts and the drying of streams and rivers as well as the major environmental degradation observed in many catchments and floodplains, have led to a reduction in the carrying capacity of the global system."[101]

The Jacksonville Code of Ordinances includes a chapter containing floodplain management regulations. Chapter 652 of the Code of Ordinances, *Floodplain Management Ordinance*, implements numerous land use strategies aimed at mitigating the effects of flooding.[102] In coordination with the Florida Building Code, the City of Jacksonville utilizes its land use authority to protect lives and property from floodwaters.[103] For example, the ordinance includes a ban on variances that will increase base flood elevation in specific areas.[104] It reads:

> "[a] variance shall not be issued for any proposed development in a floodway if any increase in base flood elevations would result, as evidenced by the applicable analyses and certifications."

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[99] City, *supra* note 96, §500-7.1 ("General Provisions for Off-Street Parking: C. Joint Parking Facilities. Required parking may be satisfied through participation in a joint parking program involving 2 or more uses; provided that").

[100] *See* Wolfgang J. Junk, Philip B. Bayley & Richard E. Sparks, *The Flood Pulse Concept in River-Floodplain Systems*, 106 CAN. SPEC. PUBL'N FISHERIES & AQUATIC SCIS. 110, 110–127 (1989); Klement Tockner, François Malard & J.V. Ward, *An Extension of the Flood Pulse Concept*, 14 HYDROLOGICAL PROCESSES 2861, 2861–2883 (1999); Elżbieta Kiedrzyńska, Mariusz Kiedrzyński & Marek Urbaniak, *Point Sources of Nutrient Pollution in the Lowland River Catchment in the Context of the Baltic Sea Eutrophication*, 70 ECOLOGICAL ENG'G 337, 337–348 (2014); William J. Mitsch, Blanca Bernal & María E. Hernandez, *Ecosystem Services of Wetlands*, 4 INT'L J. BIODIVERSITY SCI. & MGMT. 1, 1–5 (2015).

[101] Edyta Kiedrzynska, Marcin Kiedrzyński, Maciej Calewski, *Sustainable Floodplain management for flood prevention and water quality improvement,* 75 NAT. HAZARDS 955, 956 (2015).

[102] *See* JACKSONVILLE, FLA., CODE OF ORDINANCES § 652.102 (2024), *available at* https://library.municode.com/fl/jacksonville/codes/code_of_ordinances?nodeId=TITXVIILAUS_CH652FLMA_PT1GE_S652.102SC [https://perma.cc/QBQ3-4HBX].

[103] *See id.* § 652.103.

[104] *See id.* § 652.704.

The code features various types of ordinances that consider resiliency to flooding, such as regulations for decks and patios, and requirements for concrete slabs used for parking pads, among other things, in certain areas.[105] Section 652.1605 reads:

> "In coastal high hazard areas and Adjusted SFHAs [Special Flood Hazard Areas], concrete slabs used as parking pads, enclosure floors, landings, decks, walkways, patios and similar nonstructural uses are permitted beneath or adjacent to buildings and structures provided the concrete slabs are designed and constructed to be:
>
> (a) Structurally independent of the foundation system of the building or structure;
> (b) Frangible and not reinforced, so as to minimize debris during flooding that is capable of causing significant damage to any structure; and
> (c) Have a maximum slab thickness of not more than four inches."[106]

Beyond the ordinance, both Chapter 754, the Stormwater Utility Code, and Chapter 654, the Code of Subdivision Regulations, contain regulations that promote floodplain management.[107] Namely, the Stormwater Utility Code encourages the retention and detention of stormwater runoff to reduce the need for storm sewers and the Code of Subdivision Regulations requires builders to secure permits from the Building Inspection Division before undertaking development in special floodplain hazard areas.[108] Overall, Jacksonville comprehensively protects existing structures from floods and promotes conscientious development with flood risks in mind.

I. Distributed Energy: San Francisco Case Study – *Environmental Chapter*

Distributed generation refers to "a variety of technologies that generate electricity at or near where it will be used, such as solar panels and combined heat and power."[109] Distributed generation may serve a single structure, such as a home or business, or it may be part of a microgrid (a smaller grid that is also tied into a larger electricity delivery system), such as at a major industrial facility, a military

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[105] *See id.* § 652.1605-6.
[106] *Id*. § 652.1605.
[107] JACKSONVILLE, FLA., CODE OF ORDINANCES, *Ch. 754, available at* https://www.jacksonville.gov/departments/public-works/about-stormwater/chapter-754-stormwater-management-utility-code.
[108] *See id*.
[109] *Distributed Generation of Electricity and Its Environmental Impacts*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts [https://perma.cc/ZLS5-RS6K].

base, or a large college campus.[110] When connected to the electric utility's lower voltage distribution lines, distributed generation can help "support delivery of clean, reliable power to additional customers and reduce electricity losses along transmission and distribution lines."[111]

San Francisco's goal is to achieve zero GHG emissions from large buildings by 2035.[112] Nine percent of commercial buildings in San Francisco are larger than 50,000 square feet, and they account for seventy-three percent of commercial building electricity use.[113] To meet this goal, San Francisco has adopted the 100% Renewable Electricity for Commercial Buildings Ordinance so that certain nonresidential buildings must use on-site energy systems or pay for one hundred percent renewable energy.[114] San Francisco provides commercial and residential property owners a range of financing options and incentives for energy efficiency projects through the Energy Watch and BayREN programs.[115]

Under Chapter 30 of the San Francisco Environment Code, Renewable Energy for Commercial Buildings, each nonresidential building shall "ensure that all on-site electricity demands are met through any combination of: on-site generation from 100% [GHG]-free or renewable energy resources, and/or purchase from 100% [GHG]-free or renewable energy resources."[116] In providing a menu of options, San Francisco makes the clean energy transition more feasible for developers.

J. Disaster and Hazard Management: Long Beach, California – *Other Municipal Code Chapters Regulating Land Use*

The combination of sea level rise and more intense storm events can lead to a host of problems, including reduced freshwater supplies and severe damage to infrastructure of all types, such as energy generation plants, and coastal and flood plain ecosystems.[117] The threat of extreme precipitation is of particular concern in

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[110] *See id.*

[111] *See id.* (In the residential sector, common distributed generation systems include solar photovoltaic panels**,** small wind turbines**,** natural-gas-fired fuel cells**,** and emergency backup generators, usually fueled by gasoline or diesel fuel. In the commercial and industrial sectors, distributed generation can include resources such as: combined heat and power systems**,** solar photovoltaic panels**,** wind**,** hydropower**,** biomass combustion or cofiring**,** municipal solid waste incineration**,** fuel cells fired by natural gas or biomass**,** and reciprocating combustion engines, including backup generators.).

[112] *Energy Efficiency in Existing Commercial* Buildings, S.F. ENV'T DEP'T, https://www.sfenvironment.org/energy-efficiency-existing-commercial-buildings [https://perma.cc/JBL9-E6JK].

[113] *See 100% Renewable Electricity Commercial Buildings Ordinance*, S.F. ENV'T DEP'T, https://www.sfenvironment.org/100-renewable-electricity-commercial-buildings-ordinance [https://perma.cc/9HEJ-FY5G].

[114] *See id.*

[115] *See Bay Area Regional Energy Network (BayREN)*, BAYREN, https://www.bayren.org [https://perma.cc/X7US-EC64].

[116] S.F., CAL., ENV'T CODE § 3003(b) (2019), *available at* https://codelibrary.amlegal.com/codes/san_francisco/latest/sf_environment/0-0-0-48595.

[117] *See Climate Change Impacts on Freshwater Resources*, EPA, https://www.epa.gov/climateimpacts/climate-change-impacts-freshwater-resources [https://perma.cc/PQT2-V3D5]; *see also Climate Impacts on Water Utilities*, EPA, https://www.epa.gov/arc-x/climate-impacts-water-utilities [https://perma.cc/P4N9-KEZ9].

the Northeast and Midwest regions where the intensity and number of extreme rainfall events have increased substantially over the past thirty years, with flooding drastically affecting communities in the Northeast.[118] Climate change brings with it warmer air which contains more water vapor and affects weather patterns, particularly in storm fronts in mid-latitude regions.[119] Both rising sea levels and more frequent storms can yield more earthquakes because these events increase hydrostatic pressure underground.[120] Our next case study explores how an earthquake-prone region deals with these new challenges.

Long Beach is susceptible to earthquakes due to the city's proximity to several faults, which are zones of weakness in the earth's crust.[121] Long Beach adopted "Earthquake Hazard Regulations," 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.[122] Under Chapter 18.68 of the Long Beach municipal code, all buildings must have a seismic resisting system conforming with the UBC Section 2303(b).[123] Section C of the Earthquake Hazard Regulations requires that the following construction information be included in the seismic resisting systems:[124]

> "1. Dimensioned floor and roof plans showing existing walls and the size and spacing of floor and roof framing members and sheathing materials.
> 2. Dimensioned wall elevations showing openings, piers, wall classes, thicknesses, heights, wall shear test locations, and cracks or damaged portions requiring repairs.[125]

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[118] *See id.*
[119] *See id.*
[120] *See Mehr Erdbeben durch menschengemachten Klimawandel [More Earthquakes Due to Global Warming]***,** HELMHOLTZ CENTRE POTSDAM - GFZ GERMAN RESEARCH CENTRE FOR GEOSCIENCES (May 29, 2024), https://www.gfz.de/en/press/news/details/mehr-erdbeben-durch-menschengemachten-klimawandel [https://perma.cc/456Q-6MCY].
[121] *See generally* Robert Clayton, Yan Yang, Eric Campbell & Dan Hollis, *Long Beach and Seal Beach Seismic Hazard*, CALTECH (Dec. 9, 2020) https://web.gps.caltech.edu/~clay/SealBeachHazard/SealBeachHazard.html [https://perma.cc/AYJ4-5VRD].
[122] *See* LONG BEACH, CAL., CH. 18.68.010 (2025) *available at* https://library.municode.com/ca/long_beach/codes/municipal_code?nodeId=TIT18LOBEBUSTCO_CH18.68EAHARE.
[123] *See id.* CH. 18.68.023. UBC is the 1988 Edition of the Uniform Building Code as published by the International Conference of Building Officials. *See generally* UNIFORM BUILDING CODE**,** INT'L CONF. OF BLDG. OFFS., (1988).
[124] *See* LONG BEACH, CAL*, supra* note 121. 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.
[125] *See id*. 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."[126]

By requiring the construction information, Long Beach can hold its developers accountable to create earthquake resilient buildings.

K. Public Health: Newark, New Jersey – *Principal Land Use Boards*

Climate change threatens to undermine the last half-century of gains in development and global health.[127] Climate scientists have indicated that the direct effects of climate change include "increased heat stress, floods, drought, and increased frequency of intense storms, with the indirect threatening population health through adverse changes in air pollution, the spread of disease vectors, food insecurity and undernutrition, displacement and mental illness."[128] In response to—and in anticipation of—these increased threats to public health, municipalities like Newark, New Jersey have pursued regulations that protect the public throughout the development process.

Newark has included in its Zoning Regulations an Environmental Review Checklist to assess the impact of development projects on the health of the people and environment in the surrounding community.[129] Newark has created two Environmental Justice and Cumulative Impact Checklists for development, depending on its intended use: one for Commercial or Light Manufacturing Use, and the other for Industrial Use.[130] Developers must submit their completed checklist for "site plan approval from the Newark Central Planning Board or approval of a

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[126] *See id*.
[127] *See* Nick Watts, W. Neil Adger, Paolo Agnolucci, Jason Blackstock, Peter Byass, Wenjia Cai, Sarah Chaytor, Tim Colbourn, Mat Collins, Adam Cooper, Peter M Cox, Joanna Depledge, Paul Drummond, Paul Ekins, Victor Galaz, Delia Grace, Hilary Graham, Michael Grubb, Andy Haines, Ian Hamilton, Alasdair Hunter, Xujia Jiang, Moxuan Li, Melissa Lott, Robert Lowe, Yong Luo, Georgina Mace, Mark Maslin, Maria Nilsson, Tadj Oreszczyn, Steve Pye, Tara Quinn, My Svensdotter, Sergey Venevsky, Koko Warner, Bing Xu, Jun Yang, Yongyuan Yin, Chaoqing Yu, Qiang Zhang, Peng Gong, Hugh Montgomery & Anthony Costello, *Health and Climate Change: Policy Responses to Protect Public Health*, 386 LANCET 1861, 1861 (2015).
[128] *See id.*
[129] *Newark EJ Ordinance: Environmental Review Checklist*, N.J. ENV'T JUST. ALL. (Aug. 2, 2021), *https://njeja.org/newark-ej-ordinance-environmental-review-checklist* [https://perma.cc/9SDA-WQL2].
[130] *See id.; see also* NEWARK, N.J., NEWARK CODE ENV'T REV. CHECKLIST CH. 41:20A, available at https://njeja.org/wp-content/uploads/2021/08/NewarkEnvironmentalJusticeOrdinance.pdf.

variance from the Zoning Board of Adjustment" before proceeding with development."[131]

The Newark Environmental Commission, in consultation with City of Newark departmental staff, is directed to research, draft, and present to the Central Planning Board and Zoning Board of Adjustment a Natural Resources Index (NRI).[132] The NRI will include data on "built, natural, environmental, health and demographic features that occur within Newark's boundaries."[133] The NRI will also seek to make visible to the public geospatial information about environmental features, both positive and negative, as juxtaposed to demographic and health data, to develop a better understanding of the relationships among environment, land use, public health, and neighborhood quality of life.[134]

The code also requires applicants to prepare and submit an Environmental Review Checklist to the Central Planning Board or Zoning Board, as appropriate, as a required component of any application for major site plan approval or for a variance.[135] By baking these environmental justice considerations into the approval process, Newark provides greater protection for its vulnerable populations.

L. Water Conservation: Woodbury, Minnesota – Special Topic Plan

With the growing threat of water scarcity materializing in droughts on both coasts and the decision in *Sackett v. Environmental Protection Agency*, it is more important than ever that land use planners account for water-protective measures when implementing policies.[136] Across the country, localities have adopted numerous strategies to protect their natural resources such as open space protection, erosion and sedimentation control, grading, filling and excavations, ground water and aquifer resource protection, and stormwater management, among others. Interestingly, many of these ordinances deal with the prevention of nonpoint source

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[131] NEWARK, N.J., ZONING AND LAND USE REGUL. §§ 41:20–3 (2023), *available at* https://ecode360.com/36713865#36713899.

[132] *See id.* §§ 41:20-4.

[133] *City of Newark Environmental Resource Inventory,* CITY OF NEWARK 176 (2021), www.arcgis.com/home/item.html?id=b8d1365a87384131affeca57c8251ee9 [https://perma.cc/AML3-6BUD].

[134] *See id.*

[135] *See id.* at 207 ("Covered applicants shall prepare and submit an Environmental Review Checklist to the Central Planning Board or Zoning Board, as appropriate, as a required component of any application for major site plan approval or for a variance in the form attached to this Chapter 41:20 as Exhibit A. The checklist for projects which meet the criteria of Section 41:20-3, Covered Applicant, hereof shall be amended to include said Environmental Review Checklist and shall be provided to all covered applicants.").

[136] Sackett v. EPA, 598 U.S. 651, 684 (2023) (narrowing the scope of federal regulatory authority under the Clean Water Act by redefining what constitutes "waters of the United States.").

pollution, which is a critical environmental problem that is generally conceded to be beyond the effective reach of federal environmental law.[137]

Woodbury's surface water management plan (SWMP) describes the physical and regulatory setting, gives an assessment of existing and potential problems, and then offers implementation goals, policies, and priorities focused around four topics: resilience, quantity, quality, and planning.[138] Woodbury is home to three watersheds; therefore, the SWMP takes special care to address the unique features of each, working in conjunction with the three Watershed District Organizations.[139]

Under the principle of "one water vision," the city recognizes connection among surface water, groundwater, and drinking water and the importance of considering impacts to all water resources when making decisions. In chapter six, the impaired waters table identifies impaired waters within the city and those to which the city discharges as part of its watershed restoration and protection study (WRAPS) and identifies the total maximum daily load (TMDL).[140] Unlike a traditional TMDL study, though, the WRAPS expands its protections to areas not yet impaired but at risk, so it is forward-looking.[141] Additionally, chapter seven identifies resilience goals like "design surface water system to mimic natural hydrology and provide flood protection" and "reduce or maintain existing flows to lakes, wetlands, and streams through a rate control policy to control flooding and maintain natural communities of those surface waters."[142] This reflects the SWMP's broader mission to work with nature, rather than against it.

Finally, the SWMP designs the system to improve quality and quantity, and uses stormwater as an amenity; manages stormwater so it promotes groundwater recharge and protects drinking water and wells; and educates the public on surface water protection and impacts of urban stormwater on water resources.[143] All told, the plan and accompanying portions of code demonstrate that Woodbury is taking stock of its water resources and seeking to protect them holistically.

The dominant methods of enacting CRD are environmental chapters, zoning and dimensional requirements, supplemental substantive zoning provisions, and special topic and area plans. Though the research to date has yielded instances of CRD materializing in comprehensive plans, public health chapters, and the powers and duties of special interest land use boards, these instances are less

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[137] Nonpoint source pollution is pollution that does not originate from a single identifiable source. *Basic Information About Nonpoint Source Pollution*, EPA (Nov. 22, 2024), https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution [https://perma.cc/JC2A-44WL].

[138] CITY OF WOODBURY, 2040 LOCAL SURFACE WATER MANAGEMENT PLAN 1 (2019).

[139] A watershed is an area of land where water, like rain and snowmelt, flow into a common body of water.

[140] *See id.* at 58.

[141] *See id*. at 58.

[142] *Id.* at 65.

[143] Though the SWMP is not codified, there are several portions of the Woodbury code that facilitate it. For example, the Woodbury code of ordinances references the stormwater management standards and design criteria. Additionally, the Metropolitan Surface Water Management Act passed in 1982 created Minnesota statute 103B, which requires all local governments to address surface water management via participation in a watershed management organization. Section 235 dictates that after required watershed management plan approved, the local government must create local water management plans.

frequent. The project is ongoing; therefore, the recurrence of these framework elements may increase as the research progresses.

VI. CONCLUSION - FEASIBILITY OF THE FRAMEWORK LAW

IPCC defines 'feasibility' as "the potential for a mitigation or adaptation option to be implemented."[144] IPCC integrates the term 'enabling conditions' throughout its latest report, a term to describe "conditions that enhance the feasibility of adaptation and mitigation options." Enabling conditions include "political commitment and follow-through, institutional frameworks, policies and instruments with clear goals and priorities, enhanced knowledge on impacts and solutions…and inclusive governance processes."[145]

This Article describes a framework of strategies that is built on the existing structure of land use laws found in most municipalities nationally. It is familiar. The strategies are to be adopted voluntarily in response to local climate change impacts. It is responsive rather than prescriptive. It comprises actual laws that have been adopted by peer cities and towns; its strategies are credible to local stakeholders in similar circumstances. Those actors manage the legal system that determines patterns of development and conservation and the shape of human settlements. These patterns and settlements are the focus of Climate Resilient Development, which the IPCC states "integrates adaptation measures and their enabling conditions with mitigation to advance sustainable development for all." [146]

Enabling conditions abound in the operation of local land use decision-making. Most of the framework's strategies are local laws, which are adopted after public notice and public hearings. Comprehensive plans and special plans are often preceded by intensive participation of engaged stakeholders from the civic and private sectors as well as government officials, elected and appointed. Administrative boards hear proposals for development projects. These processes impart data and other information to local stakeholders.

The stakeholders who are interested in mitigating and adapting to climate change can be enablers if they engage in land use law reform at the local level. They can appear before local legislative bodies and propose the adoption of climate action components of comprehensive plans or the adoption of one or more of the legal

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[144] *IPCC AR6 Working Group III Summary for Policymakers: Headline Statements*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, https://www.ipcc.ch/report/ar6/wg3/resources/spm-headline-statements/ [https://perma.cc/3AFR-SU3U].

[145] WG II AR6, *supra* note 3, at 27 & 163.

[146] *Id*. This emphasis on implementation is new in the content and emphasis of Working Group reports. Academics have relied on the concept of enabling conditions since as early as 1960. *See* Heidi R. Huber-Stearns, Drew E. Bennett, Stephen Posner, Ryan C. Richards, Jenn Hoyle Fair, Stella J. M. Cousins & Chelsi L. Romulo, *Social-Ecological Enabling Conditions for Payments for Ecosystem Services,* 22 ECOLOGY & SOC'Y 1 (2017) (noting that multiple fields have addressed the concept of enabling conditions including economics, political science, and ecology). However, the IPCC first brought the term into its vocabulary in the 2022 IPCC Sixth Assessment Report (SAR). The term does not appear in the 2014 Fifth Assessment Report or the prior four reports.

strategies contained in the framework law. They can appear before local land use review boards and advocate for decisions congruent with those strategies. They can design robust citizen engagement processes as the framework is constructed locally. The IPCC, in calling for Climate Resistant Development, has captured the mysterious power of the land use authority delegated to most of the nation's municipal governments. In doing so, it has designed a local solution to the global problem of climate change, insufficient perhaps but with too much potential to be ignored.