

Sustainable Zoning: A New Imperative

The Sustainable Community Development Code

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I. Executive Summary

The Rocky Mountain Land Use Institute finds that community development code frameworks in operation in the United States today are deficient with respect to sustainability. The creation of a model sustainable community development code is needed and it should broadly incorporate the following features:

- 1) It must be comprehensive;
- 2) It must artfully and intelligently integrate natural and man-made systems;
- 3) It must be progressive, drawing upon useful features of other code types already proven and in use –e.g. in the areas of design, procedures, performance standards, incentives;
- 4) It must be based on a sustainable comprehensive policy plan and long term civic engagement; and
- 5) It must be tailored to local and regional climate, ecology, and culture.

II. On Sustainability

Thomas Jefferson in 1789 described sustainability in a quotable voice: when I say the earth belongs to each generation during its course, fully and in its own right, [but] no generation can contract debts greater than can be paid during the course of its own existence.

More recently, in a critique of our growing natural debt, Lester Brown, formerly director of the World Watch Institute stated that “we have not inherited the earth from our fathers; we are borrowing it from our children.”¹

The United Nations, Brundtland Commission in 1987 developed the guiding principles for sustainable development as it is generally understood today. The report stated that critical global environmental problems were primarily the result of the enormous poverty of the South and the non-sustainable patterns of consumption and production in the North. It called for a strategy that united development and the environment – described by the now-common term «sustainable development». Sustainable development is defined as development that meets the needs of the present without compromising the ability of future

¹ Lester R. Brown, *Building a Sustainable Society*, (New York, USA; London, UK: W.W. Norton & Company), 1981.

generations to meet their own needs. Doing so must integrate and balance economic, environmental, and social goals.²

Our collective ecological footprint—a metaphor to depict the amount of land and water a population hypothetically needs to support itself and to absorb its waste—has reached a critical point beyond which some in the environmental community believe irreparable harm is inevitable. The devastating consequences of climate change, the many risks inherent in over-reliance on fossil fuels, a wasteful global food system, an increasingly inactive and obese population, and the ongoing destruction of natural habitat are emerging crises to which single, uncoordinated, and incremental solutions will be woefully inadequate. Community development codes must be part of a comprehensive solution.

III. Community Development Codes in the United States

The major land use development code types in the United States have developed and evolved for different reasons and have varying levels of success in promoting sustainability. A brief history of development codes:

1. *Euclidian*

In 1916 New York City adopted the first comprehensive zoning ordinance. In 1926 the U.S. Supreme Court in “village of Euclid vs. Ambler Realty Company” upheld the validity of an ordinance to separate land uses into zone districts, specifying permitted and excluded uses, prescribing minimum lot, area, and bulk requirement for all permitted uses. Land uses are separated and sorted into groups based upon their perceived compatibility in order to promote public “health, safety, and welfare.” Today, with rare exception, “Euclidian” or “conventional” zoning exists in all cities, towns, and counties. Euclidian zoning, however, has been ineffective in dealing with the myriad environmental issues such as floodplains, riparian complexes, agricultural land preservation, and habitat protection.

2. *Planned Unit Development (PUD) Zoning*

Planned Unit Development is a means of land regulation which promotes large scale, unified land development. The first formal use of the term appeared in the San Francisco zoning ordinance in 1962. Generally it promotes a mixture of both land uses and dwelling types, the clustering of residential land uses providing public and common open space, increased administrative discretion to a local professional planning staff, and the enhancement of the bargaining process between the developer and government municipalities which in turn strengthens the municipality’s site plan review and control over development. In short, a much greater degree of flexibility is granted relative to the more rigid Euclidian zoning scheme. PUDs are often highly negotiated regulatory schemes that result in a custom-designed response to the market, community interests, and environmental context. They are particularly popular in fast growing areas, with some communities relying exclusively on

² Report of the World Commission on Environment and Development, *Our Common Future*, (United Nations), 1987.

developer initiated PUD proposals. Although they can address sustainability issues, their highly negotiated and custom-designed character means that critical sustainability matters are often inadequate or left unaddressed.

3. *Performance Systems*

Developed in the 1970s in response to the overly rigid and often environmentally damaging Euclidian zoning system, performance based zoning is based on an environmental carrying capacity model whereby the type and level of development must fit the unique characteristics of individual property. Lane Kendig's extensive work on this system has made his name virtually synonymous with it.³ Essentially, almost anything can be built anywhere, provided appropriate mitigation measures are taken into consideration. The approach placed an emphasis on environmental protection was hitherto not present in any Euclidian scheme.

4. *Form-Based Districts*

Form based development codes, popularly represented by the SmartCode,⁴ focus primarily on the public realm and the type of urban form necessary to create welcoming public spaces and walkable neighborhoods. The SmartCode is based on the urban-to-rural transect urban planning model created by Andrés Duany. The transect defines a series of zones that transition from sparse rural lands to the dense urban core. Each zone is fractal in that it contains a similar transition from the edge to the center of the neighborhood. The design laden code is heavily influenced by architects and requires their participation in its implementation. The transect is an important part of the New Urbanism and smart growth movements. The code is highly prescriptive regarding urban form. It has very little explicit focus on the environment and natural resources. Truly sustainable development must heavily emphasize a combination of high density and transit service. To the extent that many new urbanist developments rely on automobile transport and serve the detached single family housing market, they fall short of being truly sustainable. Furthermore, form based codes and the SmartCode in particular is incomplete and no community can adopt it as a stand alone regulatory ordinance.

5. *Hybrids*

Over time and in response to a growing list of social, economic, and environmental needs communities have resorted to cobbling together an imperfect and incomplete hybrid development code approach. Some call it incrementalism and perhaps it works well enough if the evaluation bar isn't raised to high. The City of Denver, for example, is undertaking the Herculean task of consolidating and updating its complex jumble of zoning codes and amendments so that the type of development the community wants to see happen—higher density, mixed use buildings of quality design along main thoroughfares—is actually easy to process and permit.

³ See Lane Kendig, *Performance Zoning*, (Washington, D.C.; Chicago, IL: Planners Press), 1980.

⁴ The SmartCode is a unified development ordinance developed by Duany Later-Zyberk & Company and is available by license through the Municipal Code Corporation.

The Next Evolutionary Step

Will the new consolidated development code of Denver and others like it be successful in comprehensively addressing the range of sustainability issues? Perhaps, to some extent. It is our view, however, that zoning must take a dramatic evolutionary leap to an entirely new model, if it is to remain relevant in addressing the array of global, regional, and local environmental and social issues we face today.

IV. Framework for the Sustainable Community Development Code

Sustainable development concepts are often subjective, incomplete and “fuzzy.” It is our intent to be objective, comprehensive and clear. Accordingly, a holistic and integrated framework is necessary to provide a foundation and maintain focus.

In crafting a framework on which to hang the elements we have turned to the work of Peter Brandon (University of Salford, UK) and Patrizia Lombardi (University of Turin, Italy) as expressed in “Evaluating Sustainable Development in the Built Environment.”⁵ They point out that much of the early work on sustainable development in the built environment was focused on the ecological dimension of the problem. On the other hand, the softer and more “fuzzy” dimensions of sustainable urban development (e.g. political, social, cultural, aesthetic, and so forth) are still poorly addressed in decision-making, while contemporary analytical tools (e.g., G.I.S.) do not handle them adequately.⁶

In approaching the challenge from an interdisciplinary perspective, a further problem is that experts use a specialized and codified vocabulary that is not common to all the disciplines and stakeholders involved in the planning process. Brandon and Lombardi observe that each discipline brings its own agenda, its own classification system and its own techniques to the problem.⁷

Devising strategies for the sustainable development of cities is difficult, not just because the nature of cities and regions is complex, but also because the concept is ambiguous, multi-dimensional and generally not easy to understand outside the single issue of environmental protection. No agreed upon structure for organizing all this information is currently in use. Most communities in the United States, for example, use a hybrid of land use code types to deal with sustainability. The result is a patchwork of regulations that incompletely and inconsistently hits the mark on sustainability matters---and furthermore, few know what to measure or how to measure progress.

Their work is heavily influenced by the Dutch philosopher Herman Dooyeweerd, who’s once obscure writings have gained currency recently in legal and planning literature.

⁵ Peter S. Brandon and Patrizia Lombardi, *Evaluating Sustainable Development in the Built Environment*, (Oxford, UK; Malden, MA: Blackwell Pub., 2005), see Chapter 4 in particular.

⁶ *Ibid*, p. 75.

⁷ *Ibid*, p. 76.

Dooyeweerd developed the concept of modalities, an integrated and holistic philosophy that can be used to explain the interdependence between aspects of the urban environment and which can be linked to the wider sustainable development agenda. Its holism allows an integrated view of the issue and also assists in explaining what is meant by, and what contributes to, sustainable development.⁸

The theory is complex, but broadly, it proposes a list of dimensions of reality, named modalities, which can be useful for understanding the functioning of a complex system or entity such as the built environment, a local community or an environmental system. The modalities, in a very specific dependent and relational order are:

1. Numeric
2. Spatial
3. Kinematic
4. Physical
5. Biological
6. Sensitive
7. Analytical
8. Formative/Historical
9. Communicative
10. Social
11. Economic
12. Aesthetic
13. Judicial
14. Ethical
15. Creedal

The order is not arbitrary. The economic modality is dependent on the social, the social on the communicative, the communicative on the historical, and so on. In other words, the fifteen modalities are nested inside one another and each modality affects and informs those above. To illustrate why this might be important in a community development code scheme,

⁸ The theory on modalities is articulated in *The Philosophy of the Cosmonomic Idea (1935-1936)* [De Wijsbegeerte der Wetsidee (Amsterdam: 1935-36)]. Herman Dooyeweerd was a professor of law at the Free University of Amsterdam. This writing is available in English in the *Encyclopedia of the Science of Law Volume 1 Mellen, Series A, vol. 8*, General Editor: D.F.M. Strauss, Translated by Robert D. Knudsen, Edited by Alan M. Cameron (New York: The Edwin Mellen Press, 2002).

consider the case of raw density figures. It is not uncommon for a planning commission to spend hours in a debate on whether a proposed development should be 7 dwelling units per acre or 10. The numbers (numeric mode, #1) are necessary but not sufficient to understanding and resolving more complex issues that involve spatial elements of size and scale (spatial mode, #2) and the complexity of compatibility, a combination of spatial (#2), sensitive (#6), and social modes (#10).

At a minimum, the modalities can be used as a check list, ensuring that all relevant issues related to sustainability are addressed.

We have further adapted relevant elements of Dooyeweerd's modalities to encompass American land use code topics. These are shown in the fourth column of Table 1-- "Built Environment and Planning Aspects." A more detailed draft of how the elements of the Sustainable Community Development Code might fit and evolve within this modal framework is provided in the following section.

Framework for Sustainable Community Development Code

Based upon Dooyeweerd's Multi-Modal Framework and Brandon and Lombardi's "Evaluating Sustainable Development in the Built Environment"

First level	Second level aspects	Multi-modal aspects	Built environment and planning aspects
Physical	Urban and	Numeric	Numeric accounting
		Spatial	Spaces, shape and extension (e.g. urban density)
		Kinematic	Transport and mobility/e.g. infrastructure level)
Human cultural	Environmental and	Physical	Physical environment, mass and energy (e.g. environmental quality level)
		Biological	Health and ecological protection or biodiversity (e.g. greenery)
		Sensitive	Perceptions of people towards the environment
Human cultural	Education and scientific	Analytical	Analysis and formal knowledge (e.g. university reputation)
		Formative/Historical	Creativity and cultural development
		Communicative	Communication and the media (e.g. ICT level)
Financial	Social and economical	Social	Social climate, social relationships and social cohesion
		Economic	Efficiency and economic opportunity (e.g. GNP)
		Aesthetic	Visual appeal and architectural style (e.g. cultural heritage)
	Governance	Judicial	Rights and responsibilities (e.g. legal framework)
		Ethical	Ethical issues (equity)
	Creedal	Commitment, interest and vision	

V. Elements of the Sustainable Community Development Code

I Physical environmental capital (Environment)

A) Urban and infrastructural development

1) *Numeric*

- (1) Census data
- (2) Human population
- (3) Amount of land and water resources available

Note: While this modal component is not an integral component of a development code per se, this is fundamental to determining the extent of our collective ecological footprint and the carrying capacity of urban and natural system. This must be part of a comprehensive background planning study.

2) *Spatial: spaces, shape and extension*

How we shape our public spaces and the intensity of urban development plays a significant and essential role in maximizing positive social interaction, reducing energy and time needed for travel, reducing infrastructure costs for roads and utilities, and maximizing passive solar energy gain.

The essential components

- (1) Solar access
 - (a) Guarantee adequate solar access for all property and buildings through site design standards and the use of easements
- (2) Urban density (intensity)
 - (a) Establish moderate to high urban densities (intensity) at the site, neighborhood, and regional level
 - (i) Residential units
 - (ii) Commercial units
 - (iii) Employment units
- (3) Urban Extension and Growth
 - (a) Promote proximity and connectedness of new to existing development by prioritizing infill development--brownfields, greenfields, underutilized, and vacant land—over greenfield development.

- (b) Locate greenfield development within urban growth boundaries with priority given to adjacency to existing development and services
- (4) Spatial Dimensions
 - (a) Shaping public space:
 - (i) Establish building setbacks and ***build-to lines*** to shape public space in a manner that promotes a safe and inviting place for pedestrians and a high level of positive social interaction
 - (ii) Establish maximum and ***minimum*** building heights
 - (iii) Adopt open space standards
 - (b) Distributed energy facilities
 - (i) Establish by right height and performance standards for utilities and distributed energy production facilities (biofuels, solar, and wind facilities)
 - (c) Privacy
 - (i) Establish height limits and setbacks to permit sufficient light and privacy for private property
 - (d) Automobile parking
 - (i) Minimize the negative impact of automobile parking through the use of maximum (including zero) permitted spaces, shared facilities, and design mitigation
 - (e) Site Planning
 - (i) Adopt standards that maximize solar orientation and enhance positive social interaction

3) *Kinematic: transport and mobility*

A wide range of energy efficient, safe and easily accessible transportation options must be available to all citizens in a manner that maximizes choice, fosters pedestrian activity, and is fiscally responsible over the long term.

The essential components:

- (1) Mode choice and availability
 - (a) Adopt minimum public transportation standards for proximity and frequency of service (e.g. all departure and destination points within 15 minute walk of 15 minute service frequency)
 - (b) Pedestrian orientation
 - (i) Establish standards to maximize pedestrian orientation with sidewalks, trails, street furniture, and connectivity
 - (c) Establish comprehensive bicycle facility standards (lanes, parking, signage, traffic signals, etc.)

- (d) With few exceptions, all streets must be “complete streets” with full facilities for all modes: automobile, bus, bicycle, and pedestrian
- (2) Accessibility
 - (a) Adopt and enforce universal street and walkway design standards to safely accommodate the elderly, handicapped persons and children
 - (b) Safe routes to schools and other public facilities
- (3) Freight movement
 - (a) Adopt standards for rail, highway, and shipping facilities and terminals
- (4) Wildlife movement
 - (a) Adopt standards to facilitate wildlife movement in critical movement corridors

B) Environmental and physical quality

Energy and physical mass

Energy

The built environment holds much promise for further energy conservation and as a producer of renewable non-carbon emitting energy.

The essential components:

- (1) Distributed energy
 - (a) Permit by right and establish incentives for on site distributed energy production for solar, wind, and biofuels.
- (2) Regional centralized energy facilities
 - (a) adopt standards and incentives for development of regional facilities for renewable, clean fossil, and nuclear sources
- (3) Conservation
 - (a) Conserve energy through site planning, solar orientation, use of local building materials, and green roofs and walls
- (4) Distribution
 - (i) Pipelines and electrical grid
 - 1. Rights of ways
 - 2. Adopt separation standards to sensitive uses

Natural Hazards

Increase safety and protect natural ecological functions through restrictive zoning and safe building practices.

The essential components:

- (1) Structure of ground for building
 - (a) Minimize steep slope disturbance
 - (b) Mitigate or avoid construction on unsafe soils
- (2) Wild land interface
 - (a) Restrict and mitigate development in the wild land interface to avoid harm from wildfires to humans while permitting forest fires to burn naturally
- (3) Flood zones
 - (a) Restrict development within flood zones such that there is no adverse impact to the flood plain and its ability to carry floods safely
- (4) Landslide and rock fall zones
 - (a) Restrict and mitigate development within landslide and rock fall zones

Building materials (limited to external surfaces)

- (b) Establish material efficiency standards
- (c) Adopt standards to support use of durable, local materials
- (d) Adopt minimum green “eco” roofs and walls standards (vegetative material)

5) Biological: food, shelter, health, biodiversity and eco-protection***Food Systems***

The production, distribution, and marketing of food make up a food system, which is an often overlooked element of sustainability. Locally or regionally grown foods are more energy efficient and healthy, supporting local agricultural economies.

The essential components:

- (1) Urban
 - (a) Establish standards for organic, edible landscapes with fruit trees, herbs, vegetable gardens, and green eco-roofs
 - (b) Permit and require urban gardens within urban green spaces and parks
 - (c) Provide standards and incentives for local markets and farmers markets
 - (d) Promote and set standards for urban organic truck farming
 - (i) Machinery use and noise standards

- (e) Promote urban animal husbandry
- (2) Rural
 - (a) Protect local productive agricultural land and the distribution and marketing system, including farmers markets
 - (b) Adopt realistic and economic rural agricultural production standards for a wide range of uses such as wineries, greenhouses, on site retail, and agri-tourism
 - (c) Adopt standards for large animal production units
 - (d) Guarantee the right to farming

Shelter/Housing

Shelter, as a basic biological need, must be accessible and affordable to all citizens and household types.

- (1) Affordability
 - (a) Ensure reasonable levels of affordability through inclusive zoning, density bonuses, accessory units by right, and other tools
- (2) Access
 - (a) Adopt universal access standards for people of all races, all incomes, handicapped persons, the elderly, and families with children
- (3) Lifestyles
 - (a) Adopt sufficiently inclusive standards of what constitutes a “household” to include extended families, group homes, and non-traditional families

The Healthy City (public health)

The human built environment should encourage healthy living and protect and enhance biological systems essential to human health.

- (1) Environmental health
 - (b) Air and air quality
 - (c) Water and water quality

Sharing water resources with the broader ecological system requires conservation and low impact storm water management.

- (i) Use and manage water only in an ecologically healthy manner that does not deplete nonrenewable sources (ancient aquifers) or harm streams, fish, habitat, and riparian complexes
- (ii) Conserve and harvest water through the use of xeric landscaping, cisterns, green roofs

- (iii) Set standards for low impact storm water management (e.g. use of pervious parking, bio swales, and rain garden standards)
- (d) Waste: recycling, reuse
- (e) Hazardous and toxic materials
 - 1. Exclude or mitigate hazardous and toxic materials land uses, particularly in low income neighborhoods
- (2) Community Health
 - (a) Hazardous and toxic materials land uses
 - (i) environmental justice topics
 - (b) Hospitals, health clinics
 - (i) Siting standards
 - (c) Safety and injury prevention (protection for pedestrians and cyclists on streets)
 - (d) Green areas standards--open space—parks
- (3) Healthy lifestyles
 - (i) Walkable neighborhood design standards to promote physical activity, enhance pedestrian safety, and reduce injuries
 - (ii) Standards for formal and informal park land and recreation facilities
- (4) Wildlife habitat protection
- (5) Landscaping
 - (a) Shade trees: public and private
 - (b) Choice of plant materials to fit local climate and promote biodiversity

II Human cultural capital (Equity)

B) Environmental and physical quality (cont.)

6. Sensitive: people's perceptions towards the environment

The built environment can have a positive or negative impact on how safe, comfortable, and enjoyable people feel: a critical element in perceived livability.

The essential components:

- (1) Safety and security
 - (a) Enhance safety and prevent crime through environmental design standards
- (2) Privacy

- (a) Building and site design standards
- (3) Peacefulness
 - (a) Establish minimum noise standards to create peaceful urban environments
- (4) Materials
 - (a) Promote materials with high tactile qualities: e.g.--cobblestones, brick
- (5) Light quality
 - (a) Enhance light quality by enhancing texture (e.g. dappled shade) and preserving the dark night sky with lighting standards
- (6) Fitness
 - (a) Promote sense of appropriate scale and sensitivity to local and regional vernacular—e.g. architecture, fencing, cultural practices
- (7) Visual impacts
 - (a) Minimize negative visual impacts in scenic corridors and areas of significant monumental or historical significance

C. Education and scientific development

7. Analytical: scientific analysis and formal knowledge

- (1) Quality of analysis for planning and evaluation

Note: Establish minimum scientific analytical standards and require as needed for complex and sensitive development applications.

8. Formative/Historical: creativity and cultural development

- (1) Built heritage-historical preservation

9. Communicative: communications and media

- (1) Orientation to monumental focal points that encourage interaction and express meaning
- (2) Participation facilitation standards--ongoing input
- (3) Access to information—web based, interactive, comprehensive

D. Social and economical development

9) Social cohesion

Promote social cohesion by ensuring inclusivity and maximizing opportunities for public gathering.

The essential components:

- (1) Promote social cohesion and housing affordability through inclusive zoning, density bonuses, accessory units, and other tools
- (2) Outdoor gathering places standards--: streets, plazas
- (3) Standards to promote indoor gathering places such as coffee shops, cafes, and pubs (also known as “third places”)
- (4) Establish minimum standards for proximity of public amenities

III Financial and institutional capital (Economic)

D. Social and economical development (cont.)

11. Economic: efficiency and economic appraisal

Land use type and location is influenced heavily by the economic market, which is often constrained in inefficient and ineffective ways through poorly construed land use codes that separate uses in ways that do not efficiently match the way people live their lives.

The essential components:

- (1) Use of restricted single use zones should be exceedingly limited
- (2) Mixed use zones should be the norm and strategies adopted to promote efficient mixing
- (3) Development exactions, fees, and charges should be used to manage growth, properly allocate costs, and promote the overall public health, safety, and welfare

12. Aesthetic: visual appeal and architectural style

- (1) Architecture and design
- (2) Site design
- (3) Landscape design and materials

E. Governance

13. Juridical: equity, rights and responsibilities

- (1) National and state land local legal framework
- (2) Due process and public participation
- (3) Development review process and standards

14. Ethical: goodwill, neighborliness, ethical issues

- (1) Standards that foster a citizenship of neighborliness rather than “Nimbyism”
(not in my backyard)
- (2) Engender a respect for the needs of future generations
- (3) Equity issues--who is impacted--public benefit
- (4) Environmental and social justice

15. Creedal: commitment, interest and vision

- (1) Continuous public participation clarifying vision and establishing
commitment

*Note: The built environment is ultimately a reflection of our vision as individuals and
community*

- (2) Consistency with local, regional and national planning