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Abstract

This article advocates for a new, fundamentally different plan for how cities should be coded, the Smart Code. It links urbanism and environmentalism and is strongly aligned with smart growth and sustainability. The Smart Code is offered as an alternative to the current anti-urban, conventional codes which are rigid and focus on single-use zones that separate human living space from the natural environment, as illustrated by the sprawl.

KEYWORDS: Property, Land Use, Zoning

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MAKING THE GOOD EASY: THE SMART CODE ALTERNATIVE

Andres Duany and Emily Talen***

It is legally difficult to build good urban places in the United States. The vast majority of conventional zoning codes prohibit the replication of our best examples of urbanism—places like Nantucket, Williamsburg, or even "Main Street U.S.A." in Disneyland. This situation has been profoundly damaging. Our current codes are based on a theory of urbanism that is decidedly anti-urban. They separate land uses, decrease densities, and increase the amount of land devoted to car travel, prohibiting the kind of urbanism that typifies our most beloved urban places.

Ironically, by being anti-urban, conventional codes are also anti-environment. Through separation, districting, and rigid statistical procedure, zoning has forced us to think in terms of separating the human habitat from the natural one when they are really co-dependent. The natural environment is better protected when cities are viable places for humans to live. Conventional zoning, however fails to recognize this reality by prohibiting true urbanism and substituting it with the "anti-city"[1]—a landscape composed of monofunctional, single-use zones. True urbanism is diverse, compact, pedestrian, and celebratory of the public realm. Conventional zoning gives us only a disaggregated version of urbanism, commonly known as sprawl, which does not constitute a viable human habitat.

What is needed is a fundamentally different vision of how cities should be coded. This article lays out an example of a completely new genre of urban planning code—the Smart Code.[2] The Smart Code exemplifies how the principles of urbanism and environmentalism can be mutually protected and enhanced. It is strongly aligned with the notion of "smart growth," a planning and environ-

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1. *See generally* LÉON KRIER, ARCHITECTURE: CHOICE OR FATE (1997).

2. DUANY, PLATER-ZYBERK & CO., SMART CODE (2001) [hereinafter SMART CODE].

mentalist movement based on the goals of environmental protection and sustainable development.[3]

The Smart Code is based on an explicit, normative theory, known as the Transect, that links human and natural environments in one conceptually continuous system.[4] The Transect concept promotes an urban pattern that is sustainable, coherent in design, and composed of an array of livable, humane environments.[5] Its principles are aligned with those of ecological and regional planners and urban theorists who have called for the need for a more enlightened approach to our current methods of urban expansion and regulation.[6]

I. SMART GROWTH CONCEPTS

Principles of smart growth, sustainable development, and New Urbanism have dominated discussions about urban form and sprawl in the last decade.[7] In its call for compact development, mixed use, and public transit, smart growth has naturally allied with a number of movements: historic preservation, downtown redevelopment, environmentalism, visual quality, public transit, bicycling, and pedestrianism.[8]

The need for smart growth extends beyond the bounds of urban planning practice. The problem of urban deconcentration has been expounded by environmentalists,[9] as well as economists.[10] Both groups are now intimately involved in exposing the liabilities of current urban growth patterns. Environmentalists speak of the need to reduce the ecological footprint of cities, whereas econo-

3. Norman B. Rice, *Smart Growth: A Catalyst for Public-Interest Investment*, 26 FORDHAM URB. L.J. 1417, 1417-18 (1999).

4. SMART CODE, *supra* note 2, at para. A.2.

5. *Id.* at para. A.4.

6. *See generally* DUANY PLATER-ZYBERK & CO., THE LEXICON OF THE NEW URBANISM (2000) (outlining the principles of Transect theory).

7. Todd W. Bressi, *Planning the American Dream*, *in* THE NEW URBANISM: TOWARD AN ARCHITECTURE OF COMMUNITY 9 (Peter Katz ed., 1994) ("[New Urbanism] addresses many of the ills of our current sprawl development pattern while returning to a cherished American icon: that of a compact, close-knit community.").

8. The Spring 1999 Charles & Shirley Weiss Urban Livability Symposium, Traditional Urbanism Reconsidered: Traditional Urbanism, New Urbanism, and Urban Livability at the Fin De Siecle (1999) (on file with the Fordham Urban Law Journal), *available at* http://www.unc.edu/depts/dcrpweb/events/weiss.htm.

9. TIMOTHY BEATLEY & KRISTY MANNING, THE ECOLOGY OF PLACE: PLANNING FOR ENVIRONMENT, ECONOMY AND COMMUNITY 17-22 (1997).

10. *See generally* JOSEPH PERSKY & WIM WIEWEL, WHEN CORPORATIONS LEAVE TOWN: THE COSTS AND BENEFITS OF METROPOLITAN JOB SPRAWL (2000).

mists speak in terms of rectifying externalities and social costs. In either case, the objectives are fundamentally the same.

Many authors have focused on designing specific solutions to these consolidated views. They have addressed the need for compact, walkable urban areas with mixed uses that re-invigorate the public realm; lessen reliance on auto use; enable public transit; and socially, culturally, and economically integrate regions.[11]

Smart growth principles address two related problems: spatial separation of land use and lack of mobility. Remedies for the problem of spatial separation include mixing land uses and creating diverse environments similar to traditional, older cities. Possible solutions for the lack of mobility include compact development and the promotion of public transit. Implementing these solutions requires concentrating, rather than dispersing employment and services. It involves increasing pedestrian access, clustering housing, and mixing land use types, rather than segregating them in Euclidean fashion. Remedying the problems of special separation and lack of mobility would combat sprawl by supporting a balanced urban development pattern that creates inclusive housing, supports home-based business, defines the public realm, facilitates pedestrian accessibility, and minimizes the use of the car while supporting public transit.

Since World War II, conventional urban growth has proceeded without the development of diverse neighborhood units. These "traditional neighborhood developments" should ideally form the basis of the settlement unit. If urban areas were oriented around the mobility pattern of the pedestrian, the neighborhood unit would be generally organized within a quarter mile radius and would contain a mix of housing types, as well as structures that meet the essential daily needs of residents, such as parks, schools, and stores.

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11. *See generally* PETER CALTHORPE, THE NEXT AMERICAN METROPOLIS: ECOLOGY, COMMUNITY, AND THE AMERICAN DREAM (1993); PETER CALTHORPE & WILLIAM FULTON, THE REGIONAL CITY: PLANNING FOR THE END OF SPRAWL (2001); CONG. FOR THE NEW URBANISM, CHARTER OF THE NEW URBANISM (Michael Leccese & Kathleen McCormick eds., 2000); ANDRES DUANY ET AL., SUBURBAN NATION: THE RISE OF SPRAWL AND THE DECLINE OF THE AMERICAN DREAM (1st ed. 2000); ANDRES DUANY ET AL., TOWNS AND TOWN-MAKING PRINCIPLES (2d ed. 1992); JAMES HOWARD KUNSTLER, HOME FROM NOWHERE: REMAKING OUR EVERYDAY WORLD FOR THE TWENTY-FIRST CENTURY (First Touchstone ed. 1998); Douglas Kelbaugh, *Three Paradigms: New Urbanism, Everyday Urbanism, Post Urbanism—An Excerpt From The Essential Common Place*, 20 BULL. SCI., TECH. & SOC'Y 285-89 (2000).

In addition to emphasizing diversity in neighborhood settlement, the smart growth concept views pedestrian flow as the central means of transportation.[12] A fine-tuned network of roadways would disperse traffic, increase accessibility for the pedestrian, and keep major arterials from cutting through neighborhoods. The concept that automobile-oriented development should be minimized is a recurrent theme in much of the scholarship devoted to improving urban development.[13] Environmentalism and sustainable development practices figure prominently in reducing automobile dependency and increasing pedestrian mobility. It is argued that compact urban form reduces vehicle miles traveled[14] and decreases energy consumption and air pollution.[15] While these findings are continually debated in a war of numbers, it is not contested that public transit-oriented compact development patterns consume much less land than sprawl.[16] Fundamentally, smart growth is about the reciprocal goals of environmental protection and urban quality of life. Traditional urbanism, which is compact and pedestrian oriented, provides significant protection to the environment by reducing land consumption and emphasizing the importance of infill development. It is the necessary corollary of protecting ecologically valuable resources.

II. THE IMPLEMENTATION OF SMART GROWTH

A. Conventional Codes

Most critics agree that the main problem with our current method of urban growth is sprawl. There is widespread agreement

12. Robert W. Burchell & Naveed A. Shad, *The Evolution of the Sprawl Debate in the United States*, 5 HASTINGS W.-N. J. ENV. L. & POL'Y 137, 153 (1999).

13. ANTHONY DOWNS, NEW VISIONS FOR METROPOLITAN AMERICA 7-8 (1994).

14. *See generally* JOHN HOLTZCLAW, USING RESIDENTIAL PATTERNS AND TRANSIT TO DECREASE AUTO DEPENDENCE AND COSTS (1994) (evaluating the effects of neighborhood characteristics on automobile usage and personal transportation costs to provide a formula for quantifying the value of location efficiency that can be used in the context of energy efficient mortgages); Robert T. Dunphy & Kimberly Fisher, *Transportation, Congestion, and Density: New Insights*, TRANSP. RES. REC., Nov. 1996, at 89-96.

15. *See generally* PETER NEWMAN & JEFFREY R. KENWORTHY, CITIES AND AUTOMOBILE DEPENDENCE: A SOURCEBOOK (1991); Valerie A. Haines & Jon Van Til, *Energy and Urban Form: A Human Ecological Critique*. URB. AFF. Q., Mar. 1986, at 337-53.

16. REID H. EWING & MARYBETH DEANNA, AM. PLAN. ASS'N, BEST DEVELOPMENT PRACTICES—DOING THE RIGHT THING AND MAKING MONEY AT THE SAME TIME (1996); CTR. FOR URBAN RESEARCH, RUTGERS UNIV., IMPACT ASSESSMENT OF THE NEW JERSEY INTERIM STATE DEVELOPMENT PLAN (1992); REAL ESTATE RESEARCH CORP., THE COSTS OF SPRAWL; DETAILED COST ANALYSIS (1974).

on how the current pattern should be remedied. Eco-villages, sustainable communities, smart growth plans, and New Urbanist developments are all based on an overlapping set of objectives. Despite this convergence of opinion and a large amount of publicity, widespread redirection of urban growth in the United States is proceeding at a painfully slow rate.[17]

A number of reasons have been identified for the continued use of unsound urban patterns: a traditional preference for low-density housing,[18] racism and white flight,[19] lending practices and federal subsidies,[20] construction practices,[21] and systems of governance.[22] However, the worst of them comes from the field of planning itself: the rigid manner in which planning regulates urbanist ideals in its implementation devices—the separation and spatial scattering of urban land uses that is endemic to the vast majority of zoning ordinances and subdivision regulations imposed in the United States.

Empirical studies have verified this. A recent survey of land use regulation in the State of Illinois verified the extent to which planning is the victim of its own devices. An analysis of the regulations of 168 cities and counties found mixed use zoning to be limited; smart growth tools almost non-existent; and proscriptive requirements for lot sizes, setbacks, road widths and parking decidedly in favor of low-density sprawl and urban fragmentation.[23] Pendall's study of land use regulation decisively linked land use controls to sprawl,[24] and a study of smart growth plans found a blatant lack of

17. Joint Ctr. for Hous. Studies, Harvard Univ., The State of the Nation's Housing 2000 (2001), *at* http://www.gsd.harvard.edu/jcenter (last visited Apr. 18, 2002).

18. Ivonne Audirac, *Stated Preference for Pedestrian Proximity: An Assessment of New Urbanist Sense of Community*, 19 J. PLAN. EDUC. & RES. 53-66 (1999).

19. KENNETH T. JACKSON, CRABGRASS FRONTIER: THE SUBURBANIZATION OF THE UNITED STATES (1987); JUNE MANNING THOMAS & MARSHA RITZDORF, URBAN PLANNING AND THE AFRICAN AMERICAN COMMUNITY: IN THE SHADOWS (1997).

20. GEN. ACCOUNTING OFFICE, GAO/RCED-99-87, COMMUNITY DEVELOPMENT: EXTENT OF FEDERAL INFLUENCE ON "URBAN SPRAWL" IS UNCLEAR 7 (1999) (discussing federal policies' and programs' influence on sprawling patterns of development).

21. *See generally* DOUGLAS KELBAUGH, COMMON PLACE: TOWARD NEIGHBORHOOD AND REGIONAL DESIGN (1999).

22. *See generally* MYRON ORFIELD, METROPOLITICS: A REGIONAL AGENDA FOR COMMUNITY AND STABILITY (rev. ed. 1998).

23. Emily Talen & Gerrit Knaap, The Implementation of Smart Growth Principles: An Empirical Study of Land Use Regulation in Illinois (Nov. 1, 2000).

24. Rolf Pendall, *Do Land Use Controls Cause Sprawl?*, 26 ENV'T & PLAN. B: PLAN. & DESIGN 555-71 (1999).

connection between smart growth rhetoric and corresponding implementation devices.[25]

There has been some movement among states to codify smart growth concepts.[26] A study by the American Planning Association's Growing Smart Project produced a comprehensive analysis of the degree to which state legislatures have adopted planning reforms consistent with smart growth.[27] Salkin found that approximately 1000 land-use reform bills had been introduced in state legislatures in 1999 alone.[28]

These developments "level the playing field" and allow the possibility of smart growth models to compete in the marketplace. However, local land regulation is defiantly unchanged.[29] Clearly a reworking of the tools of planning implementation has not kept pace with the rigorous denouncement of current patterns of urban growth at the local level.[30] This should be cause for concern. Why have the regulatory devices that implement planning objectives failed to change? More specifically, why do conventional zoning regulations and subdivision ordinances persist in their proscription of suburban sprawl?

One reason for this stagnation is that planning is mired in a culture of separation that makes it difficult to effectuate systemic change. For example, planning is stymied by a self-imposed system of specialization: planning professionals include economic development planners, transportation planners, and environmental planners—all competing to make their own issue the dominant force in development politics. This kind of specialization also characterizes the development industry where, largely as a result of our current system of zoning, developers and lenders specialize in building or financing only certain types of developments.

Another reason for planning's stagnation is its antiquated notions about the need to separate plans and outcomes. While the

25. Philip R Berke & Maria Manta Conroy, *Are We Planning for Sustainable Development?* 66 J. AM. PLAN. ASS'N 21-33 (1999).

26. *See, e.g.*, Parris N. Glendening, *Maryland's Smart Growth Initiative: The Next Steps*, 29 FORDHAM URB. L. J. (2002) (discussing the evolution of a Smart Growth program in Maryland).

27. Stuart Meck, *Executive Summary, Status of State Planning Reform, in* AM. PLANNING ASS'N, PLANNING COMMUNITIES FOR THE 21ST CENTURY 1-4 (1999).

28. Patricia E. Salkin, *Reform Proposals by the Thousand, in* AM. PLANNING ASS'N, PLANNING COMMUNITIES FOR THE 21ST CENTURY 85-100 (1999).

29. James Poradek, *Putting the Use Back in Metropolitan Land-Use Planning: Private Enforcement of Urban Sprawl Control Laws*, 81 MINN. L. REV. 1343, 1348-50 (1997).

30. *Id.*

need for design-policy-management integration is recognized,[31] the conventional approach of separating plan from implementation[32] is still the dominant model. Under the current system of "good plans, bad zoning,"[33] implementation regulations continue to defy the most well-intentioned plans. While it is estimated that comprehensive plan-making affects only five to ten percent of municipal development,[34] no such claims are made about implementation devices. Euclidean systems of separation—conventional zoning—have been implemented ubiquitously.[35]

Finally, a pervasive system of separation characterizes the regulatory mechanism itself. Conventional zoning schemes, despite their academic disfavor, continue to govern planning practice. Conventional zoning is becoming increasingly recognized for its counterintuitive methods of planning and regulating urban development. It encourages development through separation and dispersion, by disassembling the elements of daily life. Traditional neighborhood development or even mixed use is permitted in very few areas and only under negotiated agreements.

Each of these separations create problems for planning implementation by splintering efforts, pitting specializations against each other, and thwarting attempts to implement a consolidated approach. This is where the Transect and its implementation via the Smart Code can be of use. It is an integrative system that seeks to unify the separations endemic to current planning practice by interconnecting the goals of planning within a larger theoretical framework.

B. Smart Growth Codes

There is widespread agreement that the current pattern of growth in American cities is not only regrettable but also preventa-

31. Michael Teitz, *Implications for Planners of Race, Inequality, and a Persistent "Color Line"*, *in* LLOYD RODWIN & BISHWAPRIYA SANYAL, THE PROFESSION OF CITY PLANNING: CHANGES, IMAGES AND CHALLENGES, 1950-2000, AT 26 (2000).

32. *See generally* T. J. KENT, JR. & HOLWAY R. JONES, THE URBAN GENERAL PLAN (1990).

33. Joel Russell, *The Secret Life of a Land-Planning Professional*, 20 BULL. SCI. TECH. & SOC'Y 318, 319 (2000).

34. *See generally* MELVILLE CAMPBELL BRANCH, CONTINUOUS CITY PLANNING: INTEGRATING MUNICIPAL MANAGEMENT AND CITY PLANNING (1981).

35. J. B. CULLINGWORTH, PLANNING IN THE U.S.A.: POLICIES, ISSUES, AND PROCESSES (1997).

ble.[36] Since these patterns are caused by a failed regulatory code,[37] it is necessary to give maximum focus to the coding of a new system.

Most zoning codes are proscriptive.[38] Rather than pro-actively guiding the urban pattern, they restrict the kinds of development that can take place. They specify minimum sizes of lots; the types of developments allowed in particular zones; the amount of parking required; and the width of standard streets.[39]

An alternative code may be enacted through prescriptive means. This type of regulation forms the basis of a new genre of codes that are beginning to emerge, though only a few have been implemented. Prescriptive codes are designed to encourage a certain type and quality of development as opposed to simply restricting what can be built.[40]

Conventional, proscriptive codes usually deter smart growth through regulations concerning density, use, parking, and street design.[41] Smart growth codes, on the other hand, permit reductions in lot size, setbacks, and block length, and allow reductions in parking requirements as well as narrower street widths and rights-of-way. In terms of land use, smart growth codes permit accessory buildings to be used as dwellings, dwelling unit types to be mixed, home occupations and live or work units, and housing in commercial zones.

Prescriptive smart growth codes can take a variety of forms. Some areas have adopted cluster zoning to preserve open space while increasing density by reducing minimum lot size requirements.[42] Design-oriented New Urbanist codes have been developed to encourage compact, mixed-use neighborhoods, usually in selected urban zones.[43] For example, Stuart's Urban Code permits high-density and mixed-use development in all sections of the

36. *See generally* William W. Buzbee, *Urban Sprawl, Federalism, and the Problem of Institutional Complexity*, 68 FORDHAM L. REV. 57 (1999) (discussing the causes and the potential solutions to the problem of urban sprawl).

37. *Id.* at 79-84

38. Oliver A. Pollard, III, *Smart Growth: The Promise, Politics, and Potential Pitfalls of Emerging Growth Management Strategies*, 19 VA. ENVTL. L.J. 247, 257 (2000).

39. *Id.*

40. *Id.*

41. *Id.*

42. *Id.* at 255.

43. Burchell & Shad, *supra* note 12, at 152-54.

city.[44] Smart growth codes often emphasize bicycle lanes, street connectivity, and sidewalks to facilitate walking and cycling.[45]

The Smart Code developed by Duany Plater-Zyberk & Co. is one example of smart growth code. It has been implemented in several places in the United States, such as Belmont, North Carolina and Hillsborough County, Florida.[46]

The Smart Code differs from other approaches to smart growth implementation in that it is explicitly based on the concept of the Transect. As a Transect-based code, the Smart Code offers an alternative to Euclidean-based zoning by proposing a system of classification that arranges the elements of urbanism according to the principles of a Transect-based distribution. Understanding the Smart Code requires an examination of the Transect concept.

III. TRANSECT PRINCIPLES

Transect is a geographic cross-section of a region used to reveal a sequence of environments. For human environments, this cross-section can be used to identify a set of habitats that vary by their level and intensity of urban character—a continuum that ranges from rural to urban. This range of environments is the basis for organizing the components of the built world: building, lot, land use, street, and all of the other physical elements of the human habitat. In each human habitat along the rural to urban Transect, "immersive" environments are created—places that have an integrity and coherence about them because of their particular combinations of elements.

The Transect works by allocating elements that make up the human habitat to appropriate geographic locations. For example, human habitats that are rural might consist of wide streets and open swales. Human habitats that are more urban will likely consist of multi-story buildings and public squares. Accordingly, wide streets and open swales should be allocated to more rural zones, whereas multi-story buildings and public squares should be allocated to more urban zones. This proper geographic "appropriation" serves to better integrate natural and urban systems because

44. STUART, FLA. STUART URBAN CODE ch. 3 (2000), *at* http://www.flmainstreet.com/Stuart/stuarturbancode.html.

45. Robert Cervero, *Growing Smart by Linking Transportation and Urban Development*, 19 VA. ENVTL. L.J. 357, 365, 374 (2000).

46. BELMONT, NC, ORDINANCES § 4.11.1-10 (2000), *available at* http://www.ci.belmont.nc.us/tnd.htm; Logan D. Mabe, *New Urbanism Makes Old Designs New Again*, ST. PETERSBURG TIMES, Mar. 25, 2001, at 1 (discussing the implementation of the Smart Code in Hillsborough County, Florida).

one is defined in tandem with the other. Conventional zones ignore this interrelationship.

The Transect seeks to rectify the inappropriate intermixing of rural and urban elements known as sprawl. No desire for a particular type of development is categorically "wrong"; it is just in the wrong Transect location. The Transect eliminates the "urbanizing of the rural"—office towers in otherwise pristine environments—or, equally damaging, the "ruralizing of the urban"—undefined, vacant open space in the urban core. The prescribed urban pattern is therefore based on, theoretically, finding the proper balance between natural and human-made environments along the rural to urban Transect.

In nature, the sequence of habitats is continuous, but in human environments the rural-to-urban continuum must be segmented into discrete categories. This is dictated by the requirement that human habitats fit within the language of our current approach to land regulation—zoning. In other words, codes of perfectly familiar formats can be written based on Transect Zones. To explain this more exactly, a diagram of the nomenclature of the Transect is presented in Figure 1.

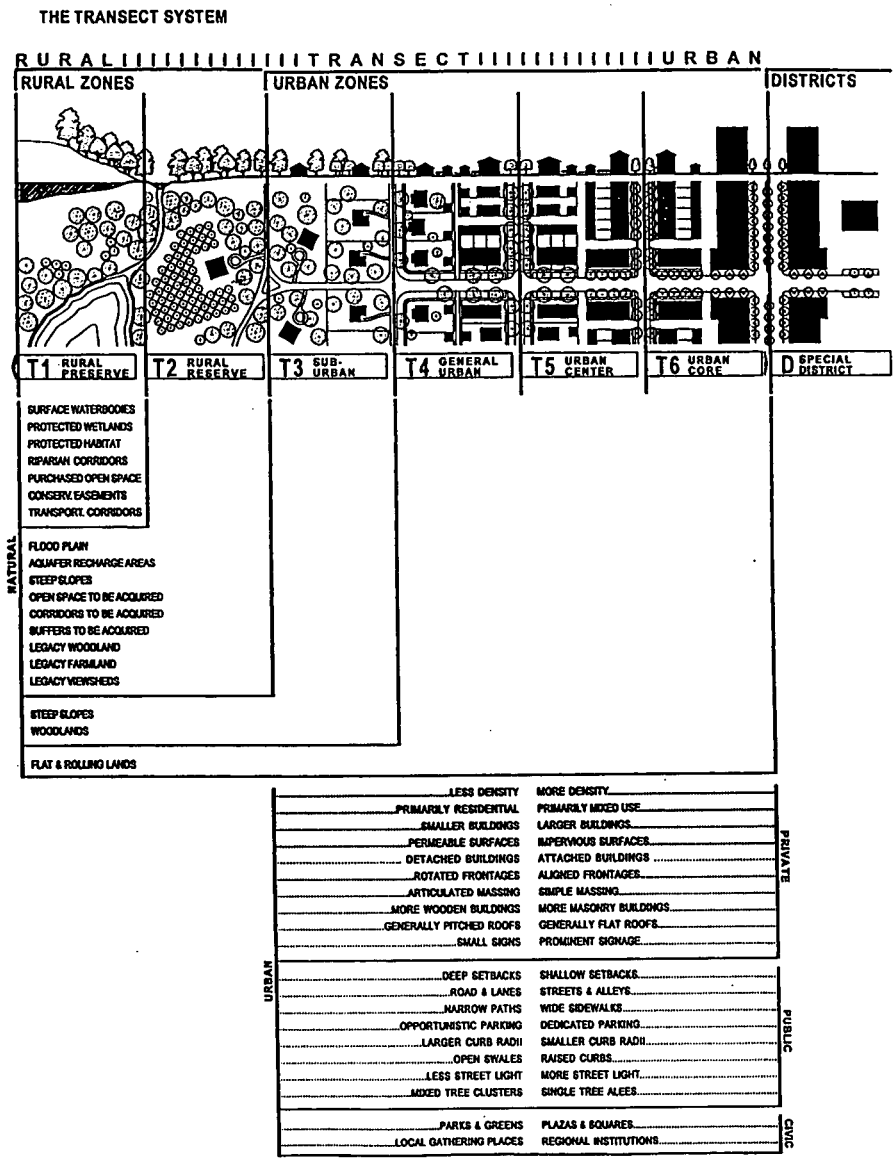
The segmentation of the Transect continuum is accomplished by dividing it into six different Transect Zones: Rural Preserve, Rural Reserve, Sub-Urban, General Urban, Urban Center, and Urban Core. While these categories work well, it is important to note that other immersive categories have been proposed that somewhat resemble the zones discussed here. Brower's typology of neighborhoods is one example.[47]

The Transect approach is essentially a matter of finding an appropriate spatial allocation of the elements that make up the human habitat. Rural elements should be located in rural locations, while urban elements should be located in more urban locations—not unlike natural ecological systems where plant and animal species coexist within habitats that best support them. In the Transect system, urban development is distributed so that it strengthens rather than stresses the integrity of each immersive environment. The Transect approach also controls the geographic extent of zones, disallowing the creation of large, monocultures of any one particular type of Transect Zone.

The Transect should also be viewed as a way of applying good urban principles to a range of human habitats. The idea that

47. SIDNEY N. BROWER, GOOD NEIGHBORHOODS: A STUDY OF IN-TOWN AND SUBURBAN RESIDENTIAL ENVIRONMENTS (2000).

FIGURE 1



Source: Smart Code. Duany, Plater-Zyberk and Co., 2001

human environments should be pedestrian-oriented, diverse, and public is intrinsic to each type of environment along the Transect. The Transect approach also factors in the element of time, as a Transect Zone can change to another type of immersive environment (usually one of higher urban intensity).

IV. THE SMART CODE

The Smart Code is a Transect-based code that implements smart growth principles. The remainder of this paper describes the basic components of the Smart Code in three sections: "Requirements," "Organization," and "Procedures."

A. Requirements

A Transect-based code must spatially locate a discrete number of Transect environments, ranging from urban to rural. The code must apply standards within each environment so that development within them is intrinsically complex, while not detracting from the integrity of each place. It must also be flexible enough to allow one Transect zone to evolve into another, thereby incorporating a dynamic, rather than static, approach to guiding urban development.

To be successful, a Transect-based code must be comprehensive, simple, and technically worded. The first condition is intuitive, particularly for planners. Being comprehensive conventionally means that planning is required to simultaneously consider the interrelationships between social, economic, and geographic factors.[48] It also implies that planning should be able to integrate and define its implementation devices at varying scales, that is, at the level of building, lot, block, neighborhood, city, and region. This means that, in order to be effective, a new system must be applicable to the whole cacophony of development standards such as traffic engineering standards, fire codes, brownfield redevelopment laws, school site location standards, and storm water management requirements.

At the same time, the implementation of a new system must be kept simple. Various innovative approaches that have been devised, such as rating schemes for new proposals or measures of environmental performance, suffer from being too complex and therefore too difficult to administer. As a practical matter, a new regulatory approach must not only be comprehensive but it must

48. KENT, JR. & JONES, *supra* note 32.

be as simple as the one it is seeking to replace. Standard zoning and subdivision regulations have strong appeal in this regard. This appeal undoubtedly attests to their persistence. The Transect code can attain an equal standard of clarity by making use of simple diagrams, tables, and other visual devices.

Finally, a new coding system must be able to speak the language of technocracy to be politically feasible and legally defensible. Despite the tendency for planners to question technicist approaches,[49] the American system of planning is heavily reliant on technical measurement. Lucid examples are the regulatory codes that act as a kind of DNA of the planning system, articulated as densities, setbacks, parking ratios, and other forms of statistical expression. Any new system must absorb this technical language, a realization that has not been lost on environmental groups who successfully pursue an agenda that rests on a foundation of scientific, quantified "fact."

The challenge is to apply a new system of land regulation that is comprehensive, simple, and technically worded, while still able to create diverse human environments that are integrated with natural ecological systems. This is the promise of the Smart Code. It is comprehensive because it can be applied at a variety of scales, from building to region. It is simple in its system of regulating urban form according to distinct spatial categories. Finally, it is amenable to technical presentation through its use of coding language. By providing a context for different types of development standards—from traffic engineering to environmental concerns—it provides a common language that links specialists together and provides a more coherent environment.

B. Organization

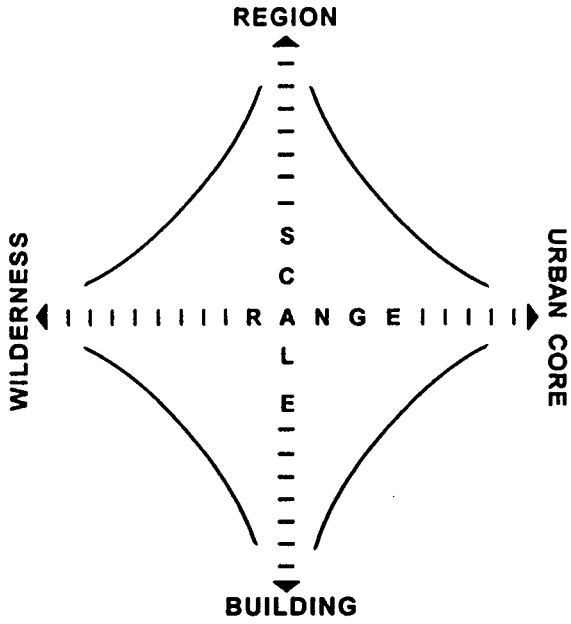
The Smart Code regulates and organizes the elements of urbanism according to Transect principles.[50] These principles are implemented at several different scales. The code is concerned with both the range of urban development and its scale. The integration of these two dimensions is conceptually portrayed in Figure 2.

The structure of the Code is based on this system of organization—Transect-based environments coded at different scales. This system of organization is unique in current regulatory practice. Zoning ordinances are usually organized as a series of rules for

49. Judith E. Innes, *Challenge and Creativity in Postmodern Planning*, 69 TOWN PLAN. REV. 5-9 (1998).

50. SMART CODE, *supra* note 2, at para. 3.

FIGURE 2



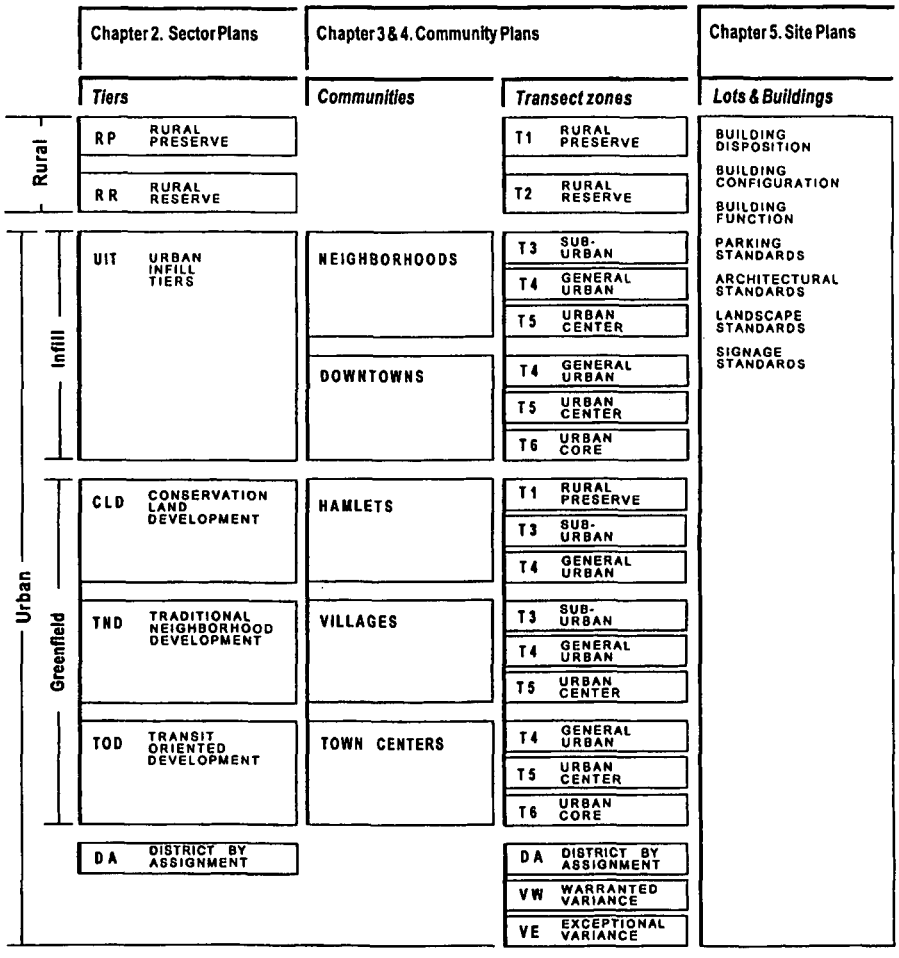
Source: Smart Code. Duany, Plater-Zyberk and Co., 2001

discrete zoning categories that do not interrelate. In the Smart Code, rules are proscribed for different types of "Communities," relevant to different scales. These Communities, regulated by the Community Plan, provide a structure for the Transect Zones.

Figure 3 gives a visual presentation of the basic structure. Three different scales shown along the top horizontal axis are used: Sector Plans, which are regional in nature; Community Plans, which represent an intermediate scale and are used as a framework for the Transect Zones; and Site Plans, which focus on specific standards for the smallest scale of urbanism. The entire system is organized according to Transect principles, varying in urban intensity from the rural to the urban along the vertical axis.

Another fundamental difference with conventional coding is that in conventional land regulation, plans are kept separate from codes. The Smart Code integrates procedures for the preparation of plans directly into the code and uses these procedures as the main organizing structure of the code. These are not plans in the sense of long-range, comprehensive plans, which are often vaguely defined and difficult to translate into code. The plans that make up

FIGURE 3



Source: Smart Code. Duany, Plater-Zyberk and Co., 2001

the Smart Code are specific guiding principles of good urban form used to provide a framework for the Transect Zones.

1. *Sector Plans*

The first type of plan described in the code is the Sector Plan. This type of plan operates at the largest geographic scale—the region. The main focus of a Sector Plan is to achieve an ecologically sound framework composed of environmentally protected resources, throughout which smart growth communities are interspersed.

There are four categories in the Sector Plan. Rural Preserve and Rural Reserve are used to designate land that either is or should be conserved. Land in the Rural Preserve category is legally protected from development in perpetuity. This includes land already legally protected, and land that has been planned for acquisition through purchase, by easement, or through the transfer of development rights. The Rural Preserve Tiers are composed of open waters, protected wetlands and habitats, riparian corridors and littorals, purchased open space, conservation easements, and transportation corridors.

The Rural Reserve Tier is open space that is not currently protected by legal means, but that should be protected—that is, added to the Rural Preserve Tier—in the future. The Rural Reserve is the sending area for the Transfer of Development Rights ("TDRs"). Specific examples of land in this tier include flood plains, aquifer recharge areas, and steep slopes.

In addition to the Rural Tier, there are two categories of Urban Sector Plans: the Urban Tier, intended for greenfield development and the Urban Infill Tier, intended for redevelopment in existing urban areas.

The Urban Tier for greenfield development is divided into three categories. The Conservation Land Development ("CLD") Tier applies to Greenfield areas that may have value as open space, but that are nevertheless subject to development. This is due to the fact that their status has already been determined by previously granted zoning rights, or because there is no legally defensible reason to deny development. The type of development encouraged in the CLD Tier is the Hamlet.

The Traditional Neighborhood Development ("TND") Tier is assigned to Greenfield areas where development in the form of Villages is encouraged. Areas assigned to the TND Tier are appropriate for commercial development based on their proximity to medium-capacity thoroughfares.

Areas designated as the Transit Oriented Development ("TOD") Tier are served by high-capacity transportation systems and/or transit access. For this reason, development in the TOD tier can support a substantial commercial center, forming the basis of a Town Center type of Community.

The second type of Urban Sector Plan, the Urban Infill Tier, regulates areas that have already been developed, including conventional suburban development. These areas, such as suburban malls,

shopping centers, and office parks, could be retrofitted to either Neighborhoods or Downtowns.

The final category of Sector Plan is the District. These plans regulate development that is inconsistent with smart growth, but that is, nevertheless, necessary to fulfill various urban functions. Districts accommodate uses that intrinsically do not belong in one of the Communities of the Urban Tiers. Examples include hospitals, large scale transportation facilities such as airports, college campuses, and manufacturing areas such as refineries. Because Districts cannot be viewed as part of smart growth per se, their regulation is determined by original, existing codes, not by the Smart Code. They are therefore exempt from the Smart Code.

2. *Community Plans*

At the Community Plan scale, the Smart Code demonstrates its ability to implement more than one development type using a single set of Transect zones. Different types of development are appropriate to the Urban Tiers identified at the higher geographic scale of the Sector Plan. Within the two types of Urban Tiers—Greenfield and Infill—different types of Communities, covering a full range of smart growth development types, are accommodated. For Greenfield Tiers, such communities consist of Hamlets, Villages, and Town Centers. For Infill Tiers, appropriate communities are composed of Neighborhoods and Downtowns. There are similarities between the Communities of Greenfield and those of Infill Tiers. Villages in Greenfield Tiers are the equivalent of Neighborhoods in Infill Tiers, and Town Centers in Greenfield Tiers are the equivalent of Downtowns in Infill Tiers. However, there is no equivalent of a Greenfield Hamlet for an Infill Tier.

It is important to identify where the different Community types originate. "Hamlets" have been proposed as an appropriate development type in rural areas, recently articulated by Arendt's notion of cluster development;[51] "Villages" are identical to Quarters, a form of urbanism put forth by Leon Krier;[52] and Transit Oriented Developments, or TODs, form the heart of Calthorpe's proposal for the regional city.[53] Importantly, the Smart Code can accommodate each of these. What this means is that although the Transect

51. Randall Arendt, *Basing Cluster Techniques on Development Densities Appropriate to the Area*, 63 J. AM. PLAN ASS'N 137, 139 (1997)

52. LÉON KRIER & DEMETRI PORPHYRIOS, HOUSES, PALACES, CITIES (1984).

53. John King, *Sprawl Fighters: The Bay Area Should Be a Center for New Urbanism, So Why Is It Still Lacking a Built Presence Here?* S.F. CHRON., Feb. 3, 2002, at 10.

zones are spatially distinct, there are different ways they can be fit together, and these combinations produce different types of communities. Most importantly, all of these modules and spatial schemes can be assembled using a single set of Transect zones.

The Transect zones are thus used to create a modular and hierarchical pattern, yielding different combinations of immersive urban environments. The combinations of Transect zones and the types of communities these combinations produce can be delineated. Urban Infill Tiers accommodate either Neighborhoods or Downtowns. Neighborhoods, in turn, consist of T3 through T5 zones—Sub-Urban, General Urban, or Urban Center. Downtowns consist of T-4 through T-6 zones—General Urban, Urban Center, and Urban Core. Thus the Transect Zones that comprise Downtown Communities consist of a higher intensity of urbanism than Neighborhood Communities. In all cases of Urban Infill Community types, the Community Plan is intended to reinforce the existing historic pattern.

Other characteristics of the two types of Community Plans that make up the Urban Infill Tier can be described as follows: Neighborhood Communities are urban places that are primarily residential. Generally, they have a defined center located at an important traffic intersection and civic or commercial facility. Neighborhood edges, which are beneficial as a way of giving identity to the neighborhood, may simply feather into an adjacent Neighborhood or Downtown.

A Downtown Community has a greater urban intensity, and thus is more fully mixed-use than a Neighborhood. Downtowns are usually the preferred location of larger retail uses, as well as government or civic facilities with regional importance.

The Sector Plan will designate the potential location of three types of Greenfield Communities: Hamlets, Villages, and Town Centers. While the Urban Infill Tier accommodated two types of Communities (Neighborhoods and Downtowns), the Greenfield Tier has a different Sector Plan for each of the three Communities: Hamlets are regulated by the Conservation Land Development ("CLD") Tier; Villages by the Traditional Neighborhood Development ("TND") Tier; and Town Centers by the Transit Oriented Development ("TOD") Tier. Within each Greenfield tier, the corresponding community types are vested.

Like the Urban Infill Tiers, the combinations of Transect Zones and the types of communities these combinations produce can be delineated. The Transect Zones that comprise Hamlet Communi-

ties consist of a higher intensity of urbanism than Town Center Communities. Thus Hamlets consist of T1, T3, and T4 zones—Rural Preserve, Sub-Urban, and General Urban. Villages consist of T-3, T-4, and T-5 zones—Sub-Urban, General Urban, and Urban Center. Town Centers consist of T-4, T-5, and T-6 zones—General Urban, Urban Center, and Urban Core. Other characteristics of the three types of Community Plans that make up the Greenfield Tier can be described as follows.

Hamlets are small rural developments, standing free in the countryside. Each developable parcel is a minimum of forty acres, half of which consist of Rural Reserve.

Villages are complete neighborhoods standing in the countryside, where the minimum area of a developable parcel is eighty acres gross, and consisting of one or more "pedestrian sheds"—the distance covered by a five-minute walk that most people are willing to walk if the pedestrian environment is appropriate.

Town Centers assemble several neighborhoods and have strong centers that can support regional transit. They have a minimum area of 160 acres gross.

3. *The Transect Zones*

This section describes six types of Transect Zones. The first two Zones, the Rural Preserve and the Rural Reserve, are areas not meant to be developed and thus do not correspond with any type of Community Plan. The remaining four types of Zones accommodate development in progressive degrees of urban intensity. Figure 3 shows how these four Transect Zones are combined to form different types of Communities. The T-3 through T-6 Transect Zones form the essential building blocks of the Smart Code system of development.

The Sub-Urban (T-3) zone is the most residential habitat. Buildings in this zone consist of single-family, detached houses. Office and retail are permitted on a restricted basis. Buildings are a maximum of two stories and open space is rural in character.

The General Urban (T-4) zone is a generalized, but primarily residential habitat of a community. Buildings in this zone consist of single-family detached houses and rowhouses on small and medium-sized lots. Limited office and lodging are permitted, and retail is confined to designated lots, typically at corners. Buildings are a maximum of three stories, and open space consists of greens and squares.

The Urban Center (T-5) zone is the denser, fully mixed-use habitat of a community. Buildings here include row houses, flex houses, apartment houses, and offices above shops. Offices, retail, and lodging are permitted. Buildings are a maximum of five stories. Open space consists of squares and plazas.

Finally, the Urban Core (T-6) zone is the densest residential, business, cultural and entertainment concentration of a region. Buildings here include row houses, apartment houses, office buildings and department stores. Buildings in this zone are disposed on a wide range of lot sizes. Surface parking lots are not permitted on frontages, and open space consists of squares and plazas.

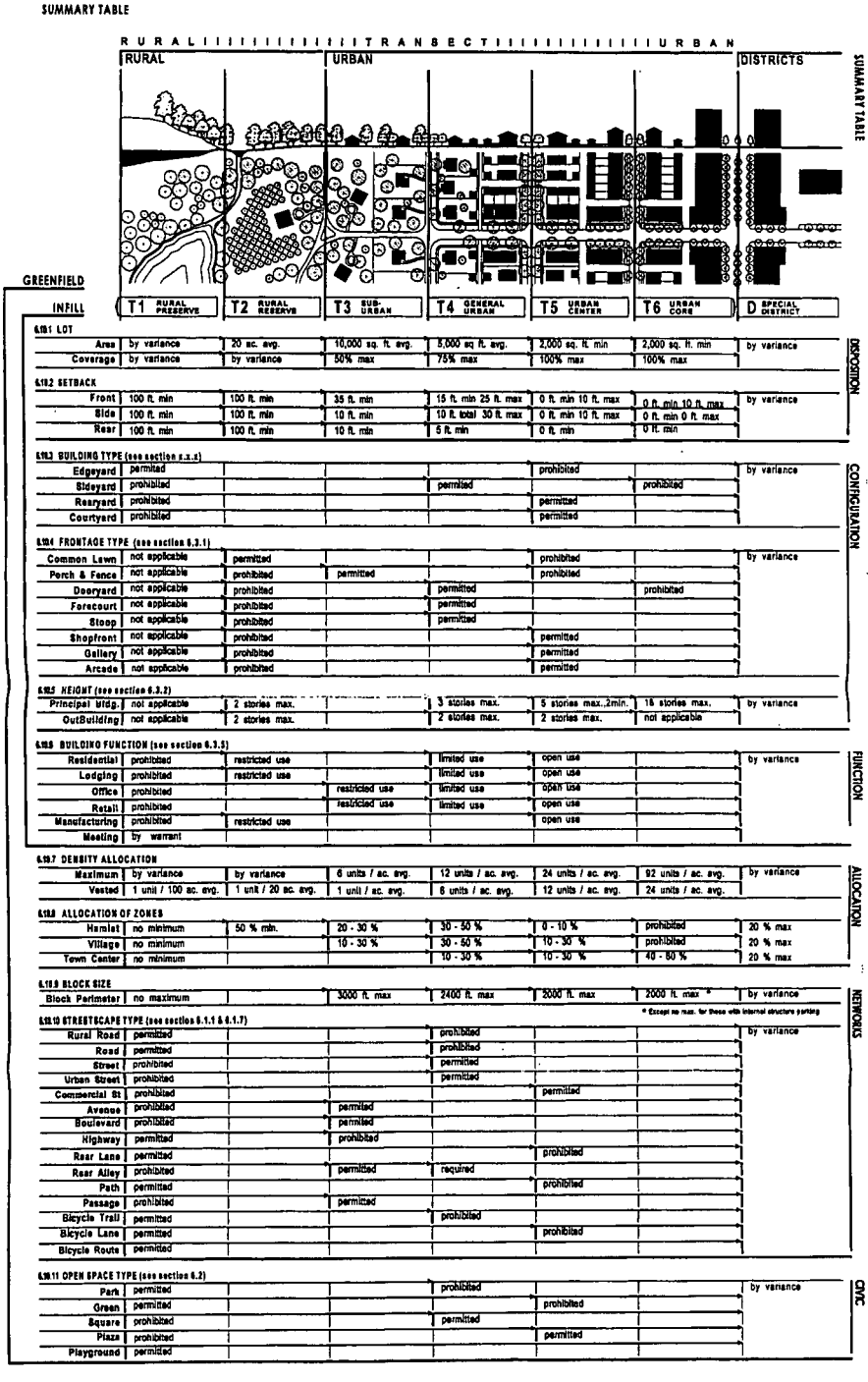
4. *Site Plans*

The third type of plan in the Smart Code is the Site Plan, which operates on the smallest geographic scale. The Site Plan prescribes lot and building requirements, which vary for each type of Transect Zone.

In conventional zoning, zones like "Single-Family Residential," "Multiple-Family Residential," or "Commercial" are specified and the associated requirements for use, height and bulk, setback, lot size, and parking are listed for each in segregated fashion. The Smart Code is made up not only of a different set of zones—zones that vary by level of urban intensity, not by use—but by a different set of standards for each type of zone. Figure 4 presents a summary table of these standards and how they vary for each zone. The set of standards that make up a Site Plan are as follows: Building Disposition—lot area, coverage, and setback requirements; Building Configuration—building type, frontage type, height, and building function (residential, lodging, office, retail, manufacturing, or meeting); Density Allocation—units per acre (on average), or the allocation of zones according to different types of Communities (applicable to Greenfield development); Networks—block size and streetscape type; and Civic Realm—regulation of open space types (parks, greens, squares, plazas and playgrounds).

Many of the conventional requirements of zoning are included in these standards, but how they are applied is fundamentally different. Again, the level of urban intensity is the controlling variable, not use. In fact, each zone is made up of different uses, so each could be viewed as a different type of "mixed-use zone" by conventional zoning standards.

FIGURE 4



SUMMARY TABLE

RURAL ..... TRANSECT ..... URBAN

RURAL | URBAN | DISTRICTS

GREENFIELD

INFILL

	T1 RURAL PRESERVE	T2 RURAL RESERVE	T3 SUB-URBAN	T4 GENERAL URBAN	T5 URBAN CENTER	T6 URBAN CORE	D SPECIAL DISTRICT	
6.10.1 LOT								DISPOSITION
Area	by variance	20 ac. avg.	10,000 sq. ft. avg.	5,000 sq ft. avg.	2,000 sq. ft. min	2,000 sq. ft. min	by variance	
Coverage	by variance	by variance	50% max	75% max	100% max	100% max		
6.10.2 SETBACK								
Front	100 ft. min	100 ft. min	35 ft. min	15 ft. min 25 ft. max	0 ft. min 10 ft. max	0 ft. min 10 ft. max	by variance	
Side	100 ft. min	100 ft. min	10 ft. min	10 ft. total 30 ft. max	0 ft. min 10 ft. max	0 ft. min 0 ft. max		
Rear	100 ft. min	100 ft. min	10 ft. min	5 ft. min	0 ft. min	0 ft. min		
6.10.3 BUILDING TYPE (see section 6.3.4)								CONFIGURATION
Edgeyard	permitted				prohibited		by variance	
Sideyard	prohibited			permited		prohibited		
Rearyard	prohibited				permitted			
Courtyard	prohibited				permitted			
6.10.4 FRONTAGE TYPE (see section 6.3.1)								
Common Lawn	not applicable	permitted			prohibited		by variance	
Porch & Fence	not applicable	prohibited	permitted		prohibited			
Dooryard	not applicable	prohibited		permitted		prohibited		
Forecourt	not applicable	prohibited		permitted				
Stoop	not applicable	prohibited		permitted				
Shopfront	not applicable	prohibited			permitted			
Gallery	not applicable	prohibited			permitted			
Arcade	not applicable	prohibited			permitted			
6.10.5 HEIGHT (see section 6.3.2)								
Principal bldg.	not applicable	2 stories max.		3 stories max.	5 stories max.,2min.	16 stories max.	by variance	
OutBuilding	not applicable	2 stories max.		2 stories max.	2 stories max.	not applicable		
6.10.6 BUILDING FUNCTION (see section 6.3.3)								FUNCTION
Residential	prohibited	restricted use		limited use	open use		by variance	
Lodging	prohibited	restricted use		limited use	open use			
Office	prohibited		restricted use	limited use	open use			
Retail	prohibited		restricted use	limited use	open use			
Manufacturing	prohibited	restricted use			open use			
Meeting	by warrant							
6.10.7 DENSITY ALLOCATION								ALLOCATION
Maximum	by variance	by variance	6 units / ac. avg.	12 units / ac. avg.	24 units / ac. avg.	92 units / ac. avg.	by variance	
Vested	1 unit / 100 ac. avg.	1 unit / 20 ac. avg.	1 unit / ac. avg.	6 units / ac. avg.	12 units / ac. avg.	24 units / ac. avg.		
6.10.8 ALLOCATION OF ZONES								
Hamlet	no minimum	50 % min.	20 - 30 %	30 - 50 %	0 - 10 %	prohibited	20 % max	
Village	no minimum		10 - 30 %	30 - 50 %	10 - 30 %	prohibited	20 % max	
Town Center	no minimum			10 - 30 %	10 - 30 %	40 - 80 %	20 % max	
6.10.9 BLOCK SIZE								NETWORKS
Block Perimeter	no maximum		3000 ft. max	2400 ft. max	2000 ft. max	2000 ft. max *	by variance	
						* Except no max. for those with internal structure parking		
6.10.10 STREETSCAPE TYPE (see section 6.1.1 & 6.1.7)								
Rural Road	permitted			prohibited			by variance	
Road	permitted			prohibited				
Street	prohibited			permitted				
Urban Street	prohibited			permitted				
Commercial St	prohibited				permitted			
Avenue	prohibited		permited					
Boulevard	prohibited		permited					
Highway	permitted		prohibited					
Rear Lane	permitted				prohibited			
Rear Alley	prohibited		permited	required				
Path	permitted				prohibited			
Passage	prohibited		permited					
Bicycle Trail	permitted			prohibited				
Bicycle Lane	permitted				prohibited			
Bicycle Route	permitted							
6.10.11 OPEN SPACE TYPE (see section 6.2)								CIVIC
Park	permitted			prohibited			by variance	
Green	permitted				prohibited			
Square	prohibited			permitted				
Plaza	prohibited				permitted			
Playground	permitted							

Source: Smart Code. Duany, Plater-Zyberk and Co., 2001

C. Procedures

The Smart Code specifies how each type of Plan is prepared and what provisions should be included. As in conventional codes, the Smart Code also spells out the procedures involved in its implementation. Planners and legal authorities used to conventional zoning codes will not recognize these unique procedural requirements. What is unique is the way in which the Smart Code integrates elements that under conventional practice are separated. For example, the following elements are combined: Plans and the Standards and Requirements that support them; three scales of development (Sectors, Communities, and Sites); Infill and Greenfield development; graphic examples of different types of plans; and methods of environmental protection.

One of the most important procedural aspects of the Smart Code is that the Code is not integrated with existing zoning regulations. Because it is philosophically different than conventional zoning, it cannot be integrated or "grafted on" to conventional codes. The Smart Code makes reference to the "Existing Code" as a separate set of regulations, and this ensures its integrity. As mentioned previously, if conventional development is to be permitted, it should be permitted by application of the existing code, not by watering down the Smart Code.

The Smart Code is specific about which entities are responsible for preparing the Plans that serve as the guiding framework for the Code. Sector Plans are prepared by the local government planning office. Infill Community Plans are also prepared by the local planning office , whereas Greenfield Community Plans will be prepared by a private developer. Finally, Site Plans are usually prepared by a private developer or property owner.

The Code also lists incentives that can be used by the local government planning office to encourage the Code's use. These include allowing an application to be processed administratively rather than through public hearing; giving priority to an application filed under the Smart Code, even if other applications were submitted earlier; waiving review fees; allowing increased density through subsidized development rights transfer; waiving traffic impact reports; and providing tax relief for first-time buyers of dwellings in certain Transect Zones (T4, T5, or T6).

CONCLUSION

Thomas Kuhn, writing about the nature of scientific revolutions, observed that paradigm shifts occur when one working model becomes more adept than another at solving problems.[54] Over the past seventy years, the primary working model for the implementation of urban planning ideals has been conventional, Euclidean-based, land use zoning. The problems that this has produced are well known. In response to regrettable state of current American urban development, this paper has argued that a Kuhnian-type change in land use regulatory practice is necessary.

The Smart Code is significantly different than a conventional zoning code. Over time, the Smart Code will produce an urbanism that is fundamentally unlike conventional sprawl, featuring urban areas that are compact, pedestrian-oriented, and containing mixed uses. It will produce viable urban settings that people will want to live in, thereby reducing pressure to consume natural habitats and convert more land to low-density sprawl.

Transect planning capitalizes on the most fundamental normative concepts of urbanism—the need for order, diversity, and a human habitat that can be integrated within an ecological system. This does not involve tinkering with physical layout, but embedding urban development within the larger ecosystem on which it depends. In order to do that effectively, the Transect must bring these ideals to the level of everyday planning practice and provide a foundation for a code that operates at the most basic regulatory level. Regardless of function, the American system of planning elevates the importance of numbers, codes, and other quantifiables. Such systems are technocratic and rigid, but the simplicity with which they are applied produces an administrative supremacy that cannot be denied. Despite their failings, they are defensible.

Where urban growth takes place on previously undeveloped sites, Transect-based codes should follow the historical precedent of our best urban patterns. These can be defined as human habitats that do not intermix urban elements inappropriately from different Transect Zones. Planners must also work with the existing urban fabric to strengthen the distinctions that the Transect embodies. In either case, planners must seek ways to rectify the problem of spatial misappropriation: density in rural landscapes without the compensation of street life; marsh grasses on main streets; and deep setbacks in urban centers. They must seek integrity in all

54. THOMAS KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS (3d ed. 1996).

types of natural and built environments along the rural to urban Transect.

What must be required from planners to encourage widespread adoption of smart growth codes? Obviously there must be political will from outside the planning profession, and there is strong evidence that this is already in place.[55] Even for areas that are not swayed by the need for smart growth, the Smart Code may thrive under public scrutiny since it offers a range of immersive environments. Human preferences for living environments vary in response to different stages in the life cycle[56] yet the ability of our current patterns of urban growth to accommodate these changes is sorely lacking. In contrast, the Smart Code's ability to accommodate a variety of preferences and lifestyles is intrinsic to the system.

Additionally, it will be critically important to enlist the support of environmental groups in gaining widespread adoption of the Smart Code. The Transect approach could boost the cooperation of urbanists and environmentalists by facilitating the assessment of urbanism from an environmental point of view. Rather than simply gauging whether urban development is taking place inside an urban growth boundary, a Transect approach could assist environmentalists in evaluating development patterns in terms of its relationship to a integrated ecological system. Urban ecologists are in fact working to build predictive models of urban expansion that incorporate the human dimension, taking into account cultural factors, institutional constraints, and socio-demographic variables. The goal of a Transect-based system such as the Smart Code is to ensure that the impact of the human dimension is based not only on these factors but on sound planning principles that emulate our best urban models. Hopefully, the Transect system, via the Smart Code, will produce a seamless, non-hostile integration between natural and human ecologies.

55. *E.g.*, Glendening, *supra* note 26.
56. *See* BROWER, *supra* note 47.