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Authors

McNally, Michael G.
Ryan, Sherry

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Michael G. McNally
Sherry Ryan

Department of Civil Engineering and
Institute of Transportation Studies
University of California, Irvine, mmcnally@uci.edu

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Institute of Transportation Studies
University of California, Irvine
Irvine, CA 92697-3600, U.S.A.
<http://www.its.uci.edu>

**Accessibility of Neotraditional Neighborhoods:
A Review of Design Concepts, Policies, and Recent Literature**

S. Ryan and M.G. McNally

Department of Civil Engineering and
Institute of Transportation Studies
University of California, Irvine
Irvine, CA 92717

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ABSTRACT

Neotraditional Neighborhood Design (NTND) has gained increasing attention from professional, academic, and popular circles during the past ten years. This review establishes a baseline evaluation of NTND, with the goal of providing the background for more specific research in the future. The first section of the paper orients NTND in a historical context, reviewing the main subdivision design trends of the past century and how NTND has either diverged or borrowed from them. The second section of the paper focuses on a review of current issues and policies related to this planning trend, with special attention directed toward transportation and land use research and the effect of neotraditional design on accessibility of the transportation system. The paper concludes by offering an assessment of the potential of NTND to address growth-related problems in suburban areas and by identifying key unmet research needs.

INTRODUCTION

The neotraditional design movement was largely originated by two urban designers, Peter Calthorpe and Andres Duany. Although their approaches are often described with different language, "Transit-Oriented Development" and "Neotraditional Neighborhood Design" respectively, the content of the underlying concepts is very similar. This concept can be generalized as an attempt to reorient subdivision development toward patterns reminiscent of the United States' pre-World War II traditional communities. These patterns are based on mixed land uses, a highly interconnected street network (often in the form of a gridiron), and street design that accommodates the pedestrian and bicyclist as equally well as the automobile. Neotraditionalists are generally concerned with issues like the degraded quality of life in the suburbs, a lack of conveniently assembled land uses and the domination of automobile travel.

The following literature review is divided into three parts. Part One places Neotraditional Neighborhood Design into an historical context. This type of approach provides the reader with an understanding of past subdivision design trends, thereby establishing some basis for dealing with current neotraditional design theories. Part One will attempt to accomplish three goals: firstly, identify the predominate trends in subdivision design over the past century; secondly, identify the social, political, or technical concerns these concepts were attempting to address; and thirdly, discuss how each design trend relates to Neotraditional Neighborhood Design. This background should describe where neotraditional design concepts sit within a broad historical context, and ideally enhance our ability to evaluate and criticize. It is important to note that exploring the evolution of land use practices and design in this manner is a crucial and often overlooked preparation for the thorough assessment of transportation

related issues. In some cases, transportation planners in the past have already tried to deal with many of the problems we still face today. It is useful to study past approaches and build off of these experiences. After the historical background is provided in Part One, the second section will present a review of the current literature and research pertaining to the neotraditional trend. In Part Three, the paper concludes by offering an assessment of the potential of NTND to address growth-related problems in suburban areas, and by identifying future directions for research.

PART 1 HISTORICAL REVIEW

1. INTRODUCTION: PRINCIPLE DESIGN TRENDS OF THE PAST CENTURY

This historical review deals specifically with subdivision design in the United States. Although American design was most definitely influenced by trends from abroad, these European influences will not be discussed in depth, rather only in the context of providing background.

The review identifies five principal trends in subdivision design and regulation. For the sake of clarity, design trends have been forced into defined periods of time. This is a somewhat artificial representation, but was necessary to evoke a sense of continuity. In actuality, many of the trends overlapped and were being practiced simultaneously. The periods identified, therefore, will refer to the time in which the trend in question first appeared or became manifest in an actual land development. Table 1 lists the dates and design trend corresponding to each period. Exemplar subdivisions will be illustrated and used as tools to expand upon the key issues of a particular concept.

TABLE 1. Trends in Suburban Subdivision Design

	Period	Design Trend
1.	Pre 1928	Traditional Gridiron
2.	1928-1945	"Garden City"
3.	1945-1960	Build-out
4.	1960-1980	Planned-Unit-Development, Cluster development
5.	1980-present	Neotraditional Neighborhood Design

As mentioned in the introduction, each design trend has unique implications for the state

of the transportation system. This discussion of the evolution of land use design is intended to reveal a broad spectrum of important transportation issues which is often missing from the transportation professional's general understanding and approach to problem solving.

2. TRADITIONAL GRIDIRON (Pre-1928)

2.1 Political and Social Background

The 1900-1928 period in subdivision history is most notorious for the absence of regulations and the expansion of land speculation. It was during the early years of this century that land came to be viewed as simply a commodity to be bought and sold for profit (Gallion, 1986). The lack of subdivision regulation combined with this new understanding of profits to be made from land sales resulted in an unfortunate disregard for the social, political and environmental implications of widespread development. Almost all of the "suburban" development occurring during this period was motivated by an individual land owner's desire to turn a profit. The urban realities at this time fed into these capitalist aspirations in the sense that many urban dwellers were anxious to escape the overcrowding cities of this period. Land speculators were serving the urban population's increasingly vigorous demand for fresh air, light, and space.

What many urban dwellers sought by moving out of the city and what they found once they got into the outskirts did not always fall in sync. There are many horror stories about how poorly serviced the new subdivisions were. No regulations existed to insure there would be proper road access, street lighting, plumbing, schools or any other municipal services. Gallion (1986) sums up this predicament in the following passage:

Most of [early 20th century subdivision development] was not planned; it simply oozed over the edges of the growing metropolis. A minimum of improvements in streets, walks, sewers, water, electricity and gas distribution was installed. The unaware purchaser was left to foot the bill individually at some later date or the burden was shifted to the urban tax payer. (p.181)

Massive over-subdividing was also a common and unhealthy occurrence during this time.

In the early part of the century in Chicago, for example, enough land was subdivided to accommodate fifteen million people, or triple the population of the city at that time. Similarly, in Florida, enough land was subdivided to house the entire current United States population (Listokin, 1989, p.140). This kind of "premature" subdivision inevitably became a fiscal burden for banks and local and state governments, which explains why "busts" often occurred after periods of booming speculation.

2.2 Design Aspects and Implications for Neotraditionalists

The design of most early subdivisions was based on the gridiron street pattern. The gridiron was the dominant design pattern during this period primarily because it was convenient for surveying and recording deeds (Gallion, 1986), and also enabled the land owner to squeeze out as many lots as possible from his tract. The immediate impetus therefore for employing this design concept was not extremely noble, and needless to say, the gridiron street pattern came to be dreaded by most planners and urban critics. The gridiron acquired a reputation as an almost cruel form of development which forced suburban dwellers to succumb to a monotonous, lifeless environment. For decades after this period in subdivision design, planners and others responsible for the urban environment took up battle against the gridiron.

Why then have the neotraditionalists returned to the gridiron concept or a modified

version thereof, considering our experiences with it during this century? An important point to observe about subdivision design in the late 1800's and early 1900's is that it was perhaps not the inherent characteristics of the gridiron that created deplorable suburban conditions during this period. The most likely reason for the unfortunate subdivisions of this period was, as already mentioned, a total lack of amenities, including infrastructure, public spaces, schools, and civic buildings. Support for this argument can be seen in the use of the gridiron occurring prior to the late 1800's and early 1900's, when planners chose this pattern based upon thoughtful considerations of town planning and community goals. The gridiron did not appear in history as the obvious pattern for towns, rather, it was "invented" and its use spread throughout the world most likely because of its inherent advantages. The gridiron was believed to provide a coherent pattern which could grow indefinitely without losing shape or threatening the "organic unity" of the city (Stanislowski, 1946). It was thought to offer a sense of order and clarity, and provide for efficient usage of land. Neotraditionalists are attempting to re-examine these positive aspects of the gridiron because they believe it responds to certain shortcomings currently experienced in subdivision design.

Figure 1 shows two "successful" examples of cities based on a gridiron street pattern: (a) is an example from fifth century Greece, the town of Miletus (Ward-Perkins, 1974) and (b) is James Oglethorpe's plan of Savannah, Georgia (Gallion, 1986). Both plans, although not necessarily subdivisions, illustrate a coherent and humane setting. Public spaces, civic buildings and other amenities are plentiful. The plans demonstrate a commitment to the comfort, health and welfare of their inhabitants. Figure 2, on the other hand, is an example of a poorly conceived subdivision from the 1920's. This plan does in fact illustrate an undesirable place to

reside, but the important point is that this undesirability is not necessarily due to the shape of the gridiron. The plan is very bare and offers no public amenities whatsoever. There are no places and no structures provided to engender a sense of community and well-being, let alone the adequate provision of public services. These are the major shortcomings of this period.

3. "GARDEN CITY" (1928-1945)

3.1 Political and Social Background

The next period in the history of subdivision design can be viewed as a direct reaction to the former period of uncontrolled speculation and land consumption. Upon becoming aware of the ruinous effects of uncontrolled land development, the planning profession began lobbying for planning laws that would, among other things, harness suburban development. A landmark federal law, the Standard City Planning Enabling Act, was passed in 1928. This law was written to grant states the right to establish their own subdivision regulations. The Standard City Planning Enabling Act provided states with the power to regulate subdivision design, but did not actually dictate the specifics of "good" design. The Enabling Act marked the beginning of the states involvement in directing the shape of their communities. An emphasis was placed on insuring that basic improvements to the land were provided, so that at least the general public welfare would be protected. The Enabling Act included provisions "for the arrangement of streets in relation to other existing or planned streets and to the master plan, for adequate and convenient open spaces of traffic, utilities, access of fire fighting apparatus, recreation, light, air, and for avoidance of congestion of population, including minimum width and area of lots," (Freilich, 1975).

3.2 Design Aspects

Along with the planning profession's legislative breakthroughs, this period in subdivision design was also influenced by the ideas of the utopian planners. The utopian planners were less grounded in politics and tended to express their views through design and architecture. They provided the thought and theory behind "good design" and community well-being, rather than the legislative thrust toward accomplishing change. The principle planners behind the Garden City movement in the United States were Henry Wright and Clarence Stein.

The Garden City or New Town movement originated in England with the work of Ebenezer Howard. He was neither planner nor architect, but possessed a heightened sensitivity to the social forces of his time. The idea for a decentralized living pattern stemmed from his discontent with the quality of life offered by the large metropolitan areas of that era. Howard presented his concept in a book titled *Tomorrow: A Peaceful Path to Real Reform*. Clarence Stein was directly influenced by the ideas of Ebenezer Howard. He described himself as a disciple of E. Howard upon returning from a trip to England where he had gone "in search of constructive action" for building a better world (Stein, 1957). In order to explain the garden city concept and the issues it sought to address, a discussion of the "first" American Garden City, Radburn, will be used rather than simple generalizations. The design characteristics of Radburn reflect the designers' efforts to respond to the severe shortcomings in land development practices of the late 1800's and early 1900's. Stein and Wright sought to deal with what they saw as the evils of their time: overcrowding, monotony, ugliness, unsafe conditions due to increased automobile usage, and unsanitary conditions. The Radburn plan marked the beginning of two major trends that are still prevalent in subdivision design today: decentralization of land

development and the "rearranging" of the transportation system to accommodate both the automobile and the pedestrian in residential areas.

The planners of this period believed that urban decentralization was the only humane living pattern for the future. This makes sense when one considers the urban living conditions resulting from rapid industrialization that existed during this time. Decentralization meant bringing light, air, health and safety back to the working man's living environment. The original ideas of Howard were based on the design of self-contained communities protected from unorganized expansion or the encroachment of the city by a greenbelt, but connected to the urban core by rail or highway. Not only was decentralization accomplished by a distinct separation from dense urban areas, but the design of the community itself promoted a sense of open space and peacefulness associated with rural living. In Sunnyside (a pseudo-Garden City development in Long Island, preceding Radburn), for example, instead of building in the typical gridiron fashion with houses fronting along streets, the designers arranged houses in such a way that they now fronted on interior courtyards and open spaces (see Figure 3). In Radburn, the houses were arranged in cul-de-sacs clusters within large superblocks. This allowed the interior of the superblock to be used as a continuous park (see Figure 4).

In terms of the transportation system, several important techniques were employed to alleviate the hazards and displeasure of living with the automobile, including:

- (1) superblocks,
- (2) distinction between road types,
- (3) separation of pedestrian and automobile traffic, and
- (4) extensive use of cul-de-sacs.

Although examples of these design elements can be found throughout history, Radburn was a landmark community in American suburban history because of the way it integrated these

design elements as a response to industrialization and the emerging automobile society. The superblock was used as a way to eliminate through traffic from residential areas and in turn enhance the desirability of the living spaces. A distinction between road types occurred with the use of superblocks. Instead of the gridiron's homogenous street system, the superblock created a need for different classes of streets. Radburn used local access streets to service ten or less dwelling units within a superblock, collectors for moving around within the community and highways to connect with cities beyond. This scenario is very similar to the hierarchical street pattern seen today in most subdivision developments.

Another element of the design was to provide completely separate right-of-ways for the pedestrian and the automobile. Wright and Stein were adamant about the need to separate different modes of transportation and believed that the traditional gridiron street pattern did not function safely or effectively under the rising pressures of the automobile. They sought to turn houses away from the street and the automobile by actually turning all of the houses around so that the kitchen and living rooms were facing the interior of the superblock. Stein (1957) summarizes problems the Radburn design sought to address:

American cities were certainly not places of security in the twenties. The automobile was a disrupting menace to city life in the U.S.A.--long before it was in Europe. In 1928 there were 21,308,159 automobiles registered (as compared with 5 in 1895). The flood of motor cars had already made the gridiron street pattern, which had formed the framework for urban real estate for over a century, as obsolete as a fortified town. Pedestrians risked a dangerous motor street crossing twenty times a mile. The roadbed was the children's main play space....The checkerboard pattern made all the streets equally inviting to through traffic. Quiet and peaceful repose disappeared along with safety. Porches faced bedlams of motor thoroughways with blocked traffic, honking horns, noxious gases. Parked cars, hard grey roads and garages replaced gardens. It was the answer to such questions that the Radburn plan evolved...." (p.41)

3.3 Implications for Neotraditionalists

All of contemporary subdivision design finds its roots in the "Garden City" period: decentralization, attention to public amenities, and designing integrated community units. One of the major design aspects which the neotraditional period has rediscovered from the garden city period is the distinct emphasis on designing a coherent neighborhood unit. Although the two design concepts are responding to different political, social, and technical conditions, both movements fervently announce American society's need for a sense of place, a sense of community. Likewise, both set out to attack this problem largely through the provision of readily accessible public spaces such as civic buildings and public parks. A key aspect of the "American" problem these two design concepts attempted to address is the automobile. Both design concepts were very motivated to ameliorate the ravages wrought by the automobile on the human environment. The major difference, however, is in their respective approaches to this problem. The garden city designers wanted to separate the automobile from the human environment by providing distinct right-of-ways for vehicular and non-vehicular travel and by reorienting houses away from streets. Neotraditionalists advocate the exact opposite approach. They would like to return the automobile to the common area, but change the street design so that it functions for the lowest common denominator, namely the pedestrian. The neotraditionalists seek to include the automobile, but to de-emphasize and discourage its use.

4. BUILD-OUT (1945-1960)

4.1 Political and Social Background

This period in subdivision history is not characterized by the emergence of a new design

concept; it is characterized rather by a quantitative shift in land development. Construction occurring in this period was completed primarily in the same vein as previous development. A major transition occurred, however, in the speed and magnitude of development and the subsequent effects on this country's regional landscape. Suburban sprawl became a fully visible and recognized phenomena. This post-WWII transition in land development practices resulted primarily from the influence of four newly funded federal programs: (1) public housing, (2) urban renewal, (3) home mortgage insurance, and (4) highway construction (Krueckeberg, 1983). The combined effect of these programs created a situation where widespread suburban development was fiscally, politically and technologically possible. Public housing and urban renewal were set in motion in the late 1930's and 1940's and marked the beginning of the federal government's role in funding urban development. Public housing involved contracting with private developers to increase the supply of adequate housing, while urban renewal allowed states to apply for federal funds for assistance in redeveloping blighted areas or actually razing neighborhoods to construct entirely new developments. Both of the programs represented an increase in housing, though mainly in urban areas. Home mortgage insurance, administered by the Federal Housing Administration, had a much greater impact on suburban development than the previous two influential programs. Mortgage insurance enabled widespread borrowing for the purchase of homes, intensifying the demand for housing and making building less of a risk. The average-income worker now had access to loans for the purchase of housing, and this availability of money stimulated massive construction. Simultaneously, the supply of land suitable for development increased dramatically as the federal government embarked on the construction of the Interstate Highway System after the passage of the Federal Highway Act of

1956. The national highway system drastically changed the face of suburban development as builders were able to reach farther away from urban centers in search of cheaper land.

The suburban picture resulting from these federal programs was very different than that seen before WWII. Urban core areas increasingly lost their importance, as shopping and employment decentralized along with housing. Contiguous land development was no longer important because the automobile provided instant connection with a very broad range of locations. Thus, the decentralization which began during the previous period as a search for a better living environment continued with increased force during the post WWII period. The possibility of owning a detached house in the suburbs lost its novelty during this period and became very much the norm of the American lifestyle.

4.2 Implications for Neotraditionalists

Neotraditional Neighborhood Design is very much the product of this era in the sense that many of the concerns neotraditionalists address are directly related to the shape that suburban communities took on during this period. In many ways, the neotraditional movement is a reaction against the formless, placeless development that occurred after WWII. The dominance of the automobile and its effect on urban form are key issues that neotraditional planning attempts to deal with. Duany and Plater-Zyberk (1992) offer a synthesized picture of the contemporary suburban woes they are attempting to address through neotraditional design. The role of the automobile and a waning "sense of community" are key issues they discuss.

Suburbanites sense what is wrong with the places they inhabit. Traffic, commuting time, and the great distances from shopping, work, and entertainment all rank high among their complaints. But all such inconveniences might be more bearable were suburbs not so largely devoid of most signs of "community". The classic suburb is less a community

than an agglomeration of houses, shops, and offices connected to one another by cars, not by the fabric of human life. The only public space is the shopping mall, which in reality is only quasi-public, given over almost entirely to commercial ends. The structure of the suburb tends to confine people to their houses and cars; it discourages strolling, walking, mingling with neighbors. The suburb is the last word in privatization, perhaps even its lethal consummation, and it spells the end of authentic civic life. (p.21)

Much of the suburban discontent the authors address in this citation is a result of the land development practices of the post WWII "Build Out" period. It is interesting to note that Duany and Plater-Zyberk attack the problems they have observed with a fervor very similar to that illustrated by Stein's quotation (see Section 3.2). And interestingly enough, some of the same issues addressed by Stein seem to have resurfaced in Duany and Plater-Zyberk's passage, namely the pressing need for an improved human environment and sense of community, and the ever recurring question of how to deal with the automobile.

One of the major questions raised about the neotraditional movement is whether de-emphasizing the automobile through subdivision design is a reasonable or possible goal. Some maintain that the forces set in motion by the construction of the interstate highway system and the pursuant suburban lifestyle are perhaps too deeply ingrained in American society.

5. PLANNED-UNIT AND CLUSTER DEVELOPMENTS (1960-1980)

5.1 Political and Social Background

The post WWII housing boom occurred within a planning framework that was probably not quite up to the task. Subdivision regulation had not been perfected by any means and local planners were still attempting to insure that at least basic public services were provided to the residents of expansive new developments. This build-out resulted in planners becoming

extremely aware of the deficiencies in subdivision regulation and land use controls: the next phase of subdivision history is characterized by efforts to deal with these shortcomings.

The period from 1960 to 1980 shows a dramatic increase in the number of municipalities that had subdivision regulations. A survey conducted in 1968 showed that over half of the government agencies contacted had subdivision regulations (Listokin, 1989). Regulations were becoming an acceptable form of control over the deleterious side effects of land development; moreover, the regulations being adopted were increasingly demanding of the developer. By 1970, land developers were almost universally required to provide on-site improvements such as streets, sewerage, and water lines (Listokin, 1989). Other considerations were also beginning to take root, such as environmental protection and timing controls to avoid premature development.

5.2 Design Aspects

The predominant subdivision designs produced during this period can be referred to as the planned-unit-development (PUD) and the cluster development. Both design models depict a higher level of regulation and planning than had ever been seen before. Instead of subdividing and selling parcels of land to be built upon by individual land owners, a single owner or corporation developed an entire community and sold not only the lot but also a built house. In other words, "an integrated community instead of the individual lot [became] a unit for planning. This community concept [included] homes, apartments and shopping centers as a unified development, together with the needed school and recreational facilities for completeness,..." (Harman, O'Donnell & Henniger, 1961).

Figure 5 (Harman, O'Donnell & Henniger, 1961) provides an example of an early planned-unit-development design for a one square mile site in Tucson, Arizona. Many of the design elements that planners of this period sought to achieve are evident in this plan. Within the single development, all of the amenities for comfortable residential living are provided, including churches, schools, shopping, and public parks. The residential land uses are well segregated from other land uses. Two main roads bisect the development, and cul-de-sacs are used extensively in an effort to discourage cut through traffic and provide quiet, protected residential streets. The curvilinear design of the street network reflects a complete break from the use of the gridiron. Also, a mild form of the hierarchical street network is apparent.

The cluster development follows most of the same themes and patterns of the planned-unit-development, although it also seeks to address the specific issue of environmental damage and wasteful land consumption. Through clustering development, planners hoped to rearrange land uses so that the most efficient use of space would result, thereby reducing land consumption and building costs. The arguments for cluster development are made very clear in Figure 6 (Whyte, 1968) by a comparison of the site characteristics outlined below the drawings. Acres used for streets and building sites are twenty-five and fifty-one percent less in the cluster development. At the same time, the number of dwelling units in the cluster development is approximately three percent greater. The design of the cluster development is based on curvilinear streets, which are used to provide variety and changing street vistas, and cul-de-sacs to discourage speeding and promote quiet and safety.

5.3 Implications for Neotraditionalists

The planned-unit-development and the cluster development represent two important points of concern for the neotraditionalist. The first point involves the complete sophistication of designing communities to accommodate traffic and the automobile. The use of the hierarchical street network becomes essentially codified by this period. The street network of the typical planned-unit-development and cluster development is entirely designed for the efficient and safe movement of vehicles, and for the reduction of cut through traffic in residential neighborhoods. Although these design approaches arguably have many positive aspects associated with them, the neotraditionalists have reacted against them. Neotraditionalists maintain that the irregular and disconnected street patterns of the planned-unit and cluster developments have unnecessarily forced Americans to rely on their automobiles for trip making. They claim that the dominance of the automobile is destroying the community well-being that planned-unit-developments initially sought to provide.

The neotraditionalist's approach to the automobile and the community is to design new growth that provides greater transportation options, particularly walking and mass transit. This shifted transportation emphasis entirely changes the scale at which development occurs and the arrangement of land uses. The neotraditionalist seeks to integrate all of the elements of planned-unit-developments into "towns" rather than isolated pieces of sprawl. In other words, neotraditionalists want to take all of the components currently found in the suburbs and rearrange them into real towns, places that have "centers, edges, integrated diversity, and clear public spaces," (Calthorpe, 1991). The principal integrating factor in these new towns and in most traditional American towns is the pedestrian, and often mass transit. In most planned-unit

developments, the pedestrian has been left out of the planning process. Neotraditionalists view pedestrians as having no place in the planned-unit-development: streets lead nowhere of use to someone on foot, intersections require pedestrians to cross up to eight lanes of traffic, and sidewalks are bare landscapes lined by garage doors. In order to re-orient development toward the pedestrian, neotraditionalists seek to create communities that function at a human scale, rather than being entirely dictated by the automobile and its ever growing need for speed and space. As Calthorpe (1991) concludes, "[w]ithout pedestrians a city's common ground-- its parks, plazas and sidewalks -- become useless obstructions to the car. When this happens, an area's focus can easily be disaggregated...".

The second point of concern for the neotraditionalists is what they describe as the over-preoccupation with the natural habitat and not with the human habitat. This is particularly applicable to the cluster development concept which arose almost entirely out of concern for the natural environment and inefficient land consumption. Although neotraditionalists recognize the importance of this issue, they feel that the quality of the human environment is also crucial and has been unfortunately disregarded by the planned unit and cluster development concepts.

6. NEOTRADITIONAL NEIGHBORHOOD DESIGN (1980-Present)

6.1 Social Concerns

As with each historical period reviewed thus far, the period of subdivision design beginning in 1980 can in large part be explained as a reaction to the previous period, in this case, to the concepts dictated by the planned-unit-development and cluster development. The planned-unit-development represents the climax of the success of the automobile-oriented suburb.

This pattern offered a very satisfying and important way of life for American society. The problem facing suburban designers for the past fifteen years, however, has been an ever deepening uncertainty as to whether it will be possible to continue the pattern typically offered by the planned unit development. In a recent report Rabinowitz (1991a) points to the impending failure of the American automobile-oriented suburb:

The success of this type of suburb [the automobile-oriented suburb], however, is a part of its own undoing. Many metropolitan areas, particularly in the sunbelt, have grown enormously, and most of that growth has been in the suburbs, and almost all of the suburban growth has been low-density, detached housing. Commuting has become untenable as metropolitan populations have substantially increased, commuting distances have grown, and families contain two working spouses, owning two or more cars... Not only has there been a loss of convenience, but a by-product of this lifestyle, air pollution, has increased to the crisis stage in some areas... (p. 8)

6.2 Design Aspects

The design characteristics of this "new suburb" have primarily risen out of the planner's recognition that extensive auto-dependence should no longer be promoted. The new suburb has taken on several different names, depending on the specific master planner. "Traditional Neighborhood Development", "Neotraditional Neighborhood Design", "Pedestrian Pockets", and "Transit-Oriented Developments" are all used to refer to the same general concept.

This movement draws on several elements from earlier design periods including mixed land uses, distinct neighborhood centers, and an interconnected street network such as that provided by the gridiron. Although many of the neotraditional design elements are revisited, today's economic, social and technological situation is entirely different than that faced by the original planners of traditional American towns. The challenge for the neotraditionalist is to design communities held together by the human element, like the traditional American town, but

also not to ignore the automobile or the suburbanite's tremendous demand for convenient travel.

Figure 7 and Figure 8 are two examples of the neotraditional concept. Figure 7, the Laguna West project (designed by Calthorpe Associates) is generally typified as a Transit-Oriented Development. The plan shows a heavy reliance on cul-de-sacs, although the street network remains very interconnected. There are purposefully placed public greens which define distinct neighborhoods. The subdivision provides a centralized location for retail and office space. There are also several important characteristics not visible from the plan. Mass transit has been planned for in the form of feeder bus lines, which can be replaced by the extension of the Sacramento's light rail system. A separate network of pedestrian and bicycle paths have been provided for easy movement throughout the development. Cul-de-sacs are open for through pedestrian access. Residential streets have been narrowed in an attempt to slow travel speeds and discourage cut-through traffic in residential areas.

Figure 8 is a plan of the Belmont Forest project in Loudon County, Virginia (designed by the offices of Duany Plater-Zyberk). This subdivision has many of the same characteristics and intents as the Laguna West subdivision. Belmont was designed with a traditional town center within a ten minute walk of all residences (approximately one quarter of a mile). Various green spaces identify neighborhoods as well as civic and commercial areas. Streets are tree-lined and amenable to pedestrian travel. The street network is interconnected and based more closely on a gridiron pattern than the Laguna West development, which has radial streets and a curvilinear pattern. There are no cul-de sacs or dead ends in Belmont Forest, which again emphasizes the goal of providing better accessibility for pedestrians and drivers alike.

Through design such as that seen in Figures 7 and 8, neotraditionalists hope to transform

the shape of new growth. The basic pattern for this growth, as espoused by Calthorpe (1991), is a town concept which provides "housing for a diverse population, a full mix of uses, walkable streets, positive public space, integrated civic and commercial centers, transit orientation, and accessible open spaces." Although some of these design aspects have been seen previously, neotraditionalists are faced with an environment that is unprecedented. They are attempting therefore to adapt these "older" principals to new settings in a way that is functional for our society.

7. SUMMARY OF HISTORICAL REVIEW

In studying the evolution of subdivision design and in trying to understand its current evolution, it is important to emphasize the fact that contemporary suburbia exists in an economic, social and technical scenario that is drastically different from any seen previously. One of the major changes today's planners are facing is that suburbia, the location of most subdivision development, is no longer inextricably connected to the urban core. The original subdivisions of the "Traditional Gridiron" period were more or less residential spillovers from highly centralized urban areas. The "Garden City" planners, although they envisioned suburban communities with a certain degree of amenities and self-sufficiency, still articulated their design concepts as having very close ties with urban core areas. During the "Build Out" period, a crucial change begins to occur in relation to the suburb's dependency on urban areas: decentralization is seen at all levels of society. This decentralization has reached a level today where suburbanites are entirely detached from downtown areas. They are no longer dependant on downtown areas for employment or shopping because these establishments have relocated to the suburbs. In fact, virtually all of the amenities of centralized urban cores can now be seen in the suburbs, although they have been obscured through decentralized.

Fishman (1987) calls this new metropolitan structure a "technoburb". He makes the interesting point that today's suburbs are not suburbs in the true sense, rather they are in effect new cities. The traditional suburb was more a residential area based on workers commuting to a central business district, which supported urban areas and ensured its viability. Fishman (1987) concludes that today's suburbs undermine the central business area and have left it abandoned and decaying.

Neotraditionalist are responding to this phenomenon by taking all of the urban amenities that have dispersed to outer areas and recompiling them into integrated towns or cities. Since all of the components of actual cities now exist in the suburbs, as the neotraditionalist's logic follows, why not arrange them in coherent patterns that resemble towns or cities. This is the driving premise of the neotraditionalist planner, and represents a novel idea in the sense that it offers the first direct planning response to the total transformation of American metropolitan structure.

The Planned-Unit-Development and Cluster Developments did not purposefully respond to this transformation of the American economy and social structure, rather their design illustrated a hesitation or inability to reconcile the urban elements pouring into the suburbs. Suburban development during the 50's, 60's and 70's seems to have been characterized by dual goals: to accommodate those urban elements arriving in the suburbs while still providing a semi-rural environment that suburbanites had grown to expect. The conflicting nature of these goals resulted in dreaded sprawl, in the "hopeless jumble of housing, industry, commerce and even agriculture" (Fishman, 1987).

Through their design, neotraditionalists offer a pattern of growth that perhaps seems regressive, but in fact is very progressive in that it finally addresses the duality of our current suburbs. Neotraditionalists recognize and are prepared to deal with the fact that all of the components of true cities exist in the suburbs. Their approach to this phenomenon is to take these urban elements and arrange them with the force and meaning found in cultural and economic centers: that is, to arrange these newly relocated pieces of the urban core into towns or small cities that offer their residents a sense of community and a sense of civic awareness.

In other words, neotraditionalists want to give suburbanites a culture, a place, rather than throwing their world together without thought or meaning.

Whether the neotraditionalists can accomplish their intents within the framework of our economy and society remains to be seen. It can be said with certainty however that this most recent trend in subdivision design illustrates yet a higher level of understanding of current American suburbs, and a continuation of the belief held by each generation of planners that our built environment can be better in the future.

PART 2

REVIEW OF THE LITERATURE

1. SUMMARY OF CURRENT THOUGHT AND APPROACHES

The current literature on Neotraditional Neighborhood Design can be divided into two general subject areas. The first area is comprised of work related to the introduction and discussion of this new planning concept. The second area is comprised of work produced mainly by the transportation profession in which transportation benefits and problems are addressed. The following discussion provides a review of these subject areas and the major pieces of work that mark the beginning of this new literature. It should be emphasized here that there is also a relevant body of European literature that addresses the broader issues of integrating public transit into new developments, traffic calming and urban decentralization. Although this literature contains information pertinent to the discussion of contemporary suburban form, it will not be addressed here. Our focus again is limited to the experiences of the United States.

2. URBAN PLANNING LITERATURE

This work is mainly written by the founding planners and architects and is characterized by broad, sociological discussion of the rationale for reorienting suburban development toward neotraditional design.

Peter Calthorpe, who is usually attributed with developing the Transit-Oriented Development concept, discusses his basic approach in the Pedestrian Pocket Book (1988). The book accomplishes two significant goals: (1) explaining the social and environmental impetuses behind the pedestrian pocket concept, and (2) defining the components of a pedestrian pocket. When neotraditionalists attempt to address the social reasons behind their suburban design

practices, their speech is usually colored by exasperation stemming from a sense that the pattern of our suburbs today is no longer effective and should be altered. Calthorpe writes:

The current round of suburban growth is generating a crisis of many dimensions: mounting traffic congestion, increasingly unaffordable housing, receding open spaces, and stressful social patterns. The truth is, we are using planning strategies that are forty years old and no longer relevant to today's culture. Our household makeup has changed dramatically, the work place and work force have been transformed, real wealth has shrunk, and serious environmental concerns have surfaced. But we are still building World War II suburbs as if families were large and had only one bread winner, as if jobs were all downtown, as if land and energy were endless, and as if another lane on the freeway would end congestion. (p.3)

This quotation encapsulates the social and environmental conditions which neotraditionalists so urgently want to address through alternative suburban design practices.

The other useful aspect proposed by Calthorpe (1988) is a formal definition of the pedestrian pocket concept which, simply put, is a "balanced, mixed-use area within a quarter mile walking radius of a transit station." For a more detailed definition of the pedestrian pocket concept, Calthorpe (1990) offers a thorough discussion of pedestrian pocket features in a set of guidelines prepared for Sacramento County. The guidelines include how to identify possible locations for new and infill Transit-Oriented sites, optimal site characteristics and relationship to surrounding land uses, proportions and types of mixed land uses, ideal residential and commercial densities, building design and orientation, street and circulation systems, and parking requirements.

Duany and Plater-Zyberk (1992) discuss neotraditional neighborhood design and the motivations behind this planning movement in a work which begins by commenting on the failure of current suburbia. The authors cite the anti-growth movement as an indication that Americans are dissatisfied with suburban development. An interesting point is made about the

sad irony of the anti-growth movement: while growth has historically represented economic, social and cultural vitality, today it is viewed by suburbanites as an unwanted evil. The authors ominously deduce that a society which no longer wants to grow, and is actually taking political steps to reduce growth, will soon be a dead society.

Where does this discontent originate? Duany and Plater-Zyberk acknowledge that the modern planned community offers everything the average American desires: "convenient workplaces, well-managed shopping centers, and spacious, air-conditioned houses full of the latest appliances". The authors maintain that although "[suburbanites] are happy about the private realm they have won for themselves, [they are] desperately anxious about the public realm around them." It is this sterile, dehumanizing public realm that Americans are reacting against through the anti-growth movement.

Duany and Plater-Zyberk's solution to this problem is to seek an alternative suburban pattern, a pattern which is based on the traditional American town. Many of the components of their concept are similar to Calthorpe's approach. In a very loose definition, the authors describe the principle attributes of a neotraditional development as containing "neighborhoods of finite size and definite character which people can easily traverse on foot. Residential areas are seamlessly connected to the rest of the town, and they are not even exclusively residential. They boast corner stores, attorney's offices, coffee shops, and other small establishments."

3. TRANSPORTATION LITERATURE

The transportation profession has perhaps had the most vocal response to neotraditional neighborhood design. The following section reviews three areas of transportation which have

been addressed in the literature thus far. These areas are traffic engineering, transportation planning, and public transit.

3.1 Traffic Engineering

The first traffic engineering publication to address neotraditional neighborhood design was authored by Spielberg (1989) and defines the major conflicts existing between current traffic engineering practice and the demands being made by neotraditional subdivision design. The major points of conflict identified are street width, on-street parking, curb radii, street layout, and intersection spacing.

This discussion was expanded upon by Lerner-Lam et al. (1992) where a comprehensive list of potential traffic engineering problems was identified. These issues are:

Table 2. Potentially Problematic Traffic Engineering Issues

1. Basic street layout	9. Traffic Signals
2. Alleys	10. Parking
3. Street design speed	11. Sidewalk width and location
4. Centerline location	12. Trees and landscaping
5. Superelevation	13. Building setbacks
6. Street width	14. Lighting
7. Curb radii	15. Trip Generation
8. Intersection geometry	

Lerner-Lam et al. attempt to alert the traffic engineering profession that neotraditional neighborhood design is inevitable due to its popularity among planning boards and other policy makers, and that the profession's concern should not be whether this concept is implemented but how it will be implemented safely and responsibly.

Perhaps the most comprehensive discussion yet of neotraditional neighborhood design and

its implications for the traffic engineer can be found in the Synthesis Report prepared by the Institute of Transportation Engineers (1992). This report acts as a precursor to the preparation of new guidelines for recommended traffic engineering practice in neotraditional neighborhoods. The primary intention of this synthesis report is to educate the traffic engineering profession about the specific elements of neotraditional design, and to enhance their preparedness for dealing with new land use designs.

3.2 Transportation Planning

The literature covering transportation planning is devoted to discussion about the effects of this design on the transportation system. All of the major works dealing with the transportation planning aspects of neotraditional neighborhood design argue that positive transportation impacts will result in the form of reduced automobile dependence, increased public transit accessibility, and reduced travel distances and travel times.

In an important preliminary paper, Kulash (1990) offers an extensive discussion of the possible transportation impacts of neotraditional design, focusing on network capacity, travel distances, and travel speeds. In terms of capacity, he maintains that neotraditional neighborhoods can handle higher volumes of traffic than the conventional network because (1) the large streets of a sparse network are operating under deficiency of scale, (2) turning movements are more efficient on small streets, (3) the increased route choices offered by a dense network make real time route decisions possible, and (4) uninterrupted flow is more likely to occur in a dense network of small streets because there are fewer signalized intersections. In terms of travel speeds, times, and distances, Kulash claims that the neotraditional network results

in lower travel speed with travel times comparable to conventional networks due to the shorter distances between origins and destinations found in a dense network.

Gordon and Peers (1991) draw similar conclusions from their preliminary studies of the transportation benefits of neotraditional design. They suggest that neotraditional design could be very instrumental in the area of Transportation Demand Management. Their analysis shows that the design of the Laguna West project in Sacramento County resulted in a twenty to twenty-five percent reduction in vehicle-miles-traveled. The authors attribute this reduced traffic to: (1) trips being internalized within the community, (2) a reduction in the percent of trips made by car, and (3) to residents working closer to home.

Stone and Johnson (1992) offer solid evidence that many of the transportation benefits attributed to neotraditional design may in fact be plausible. Using site impact assessment techniques, the authors compare two hypothetical subdivisions and find that the neotraditional neighborhood has twenty-five percent less vehicle delay, twenty percent fewer trips generated, and thirty percent more entry points (used to define accessibility). McNally and Ryan (1992) found similar results using standard demand forecasting techniques to model hypothetical networks depicting conventional and neotraditional design. Their results indicated that vehicle-miles-traveled in a neotraditional network decreased by approximately ten percent as compared to the vehicle-miles-traveled resulting from an identical number of trips assigned in a conventional network. Total vehicle-hours-traveled in the neotraditional network were approximately twenty-seven percent less than in the conventional network, and average trip lengths were found to be approximately fifteen percent shorter in the neotraditional network.

Friedman, Gordon and Peers (1992) have completed important work in the area of

determining how neotraditional design could potentially effect trip generation and mode choice splits. Their approach was to use existing data from a regional travel survey of the San Francisco Bay Area to compare existing mode splits and trip generation for "Traditional-design" and "Standard Suburban" neighborhoods. Although they state that the results of this approach can not necessarily be directly applied to neotraditional developments, their work provides some basis for planners to begin to measure the impacts of different land use patterns on trip generation and mode choice. The findings indicate that for a "Traditional" community, there are 18 percent fewer total daily trips generated than for a "Suburban" community, and 38 percent fewer auto trips. Similarly, in a "Traditional" community, they found that 54 percent of total daily trips are auto trips, versus 68 percent are auto trips in the "Suburban" community, representing a 21 percent reduction in auto-driver mode share.

The transportation planning literature represents the beginnings of an attempt to understand how assembling land uses in a different manner could possibly effect the transportation system. More work is needed to quantify the impacts of land use patterns on the transportation system, and specifically, more work will be necessary when actual neotraditional sites are completed and functioning as communities. The research is limited at this point since there is only one very young neotraditional subdivision that has been completed (Seaside, Florida). Directions for future research are offered in Part Three of this review.

3.3 Public Transit

Neotraditional neighborhood design has attracted the attention of transit professionals because it offers a significantly higher transit-oriented land use pattern than the typical suburban

developments of recent decades. The key components to this increased transit accessibility are more concentrated activity centers, interconnected street systems that avoid circuitous paths and cul-de-sacs, and increased pedestrian accessibility.

Rabinowitz et al. (1991a) offers an objective review of the planning principles involved in neotraditional neighborhood design. The main focus of this report is to determine how seriously transit issues are currently being addressed by land developers. Two sets of subdivisions are examined for their transit potential: the first set consists of ten "exemplar" subdivisions representing the neotraditional trend, and the second set examined consists of two hundred and fifty entries to the suburban portion of the International City Design Competition (ICDC). This sampling is used as an indication of where suburban design is headed in the future. Based on a review of how extensively transit service is accommodated in the community design, the researchers draw conclusions about the probable condition of transit in the future.

Three major areas were analyzed in an attempt to judge how well the suburban designs accommodate transit: (1) land use, (2) accessibility to transit, and (3) compatibility with transit operations. In the evaluation of the exemplar suburban designs, the researchers found that all ranked highly in their potential ability to accommodate public transit, however only four out of ten actually included public transit in their design. In the evaluation of the ICDC design proposals, the researchers found that only twelve percent of the plans either included mass transit or provided what could be considered land use patterns suitable to effective transit service.

In a companion study, Rabinowitz (1991b) specifically addresses the problem that successful public transit systems can not be attempted without attention to the land use patterns of an area. Proposed guidelines are divided into three major categories: (1) Administration and

Policy, (2) Systems Planning, and (3) guidelines related to the design of Transit Corridor District design. Efforts are made to explore the elements of successful transit from a systems level rather than at the level of individual sites. Within the System Planning and District Level categories, there are three subcategories dealing with land use, access systems, and transit services. These subcategories offer discussion of specific aspects of land use design that promote the success of public transit. The authors attribute suburban land use patterns such as those of neotraditional developments as being highly beneficial to the success of transit systems.

4. CONCLUSIONS

A review of neotraditional literature reflects the fact that this field is in its infancy. Neotraditionalist ideas have definitely commanded space within the professional, intellectual, and popular arenas of American thought. However, the literature shows that the major topics of importance have only just been delineated. Significant thinking and research remains to be accomplished.

The area which seems to be gaining the most attention is that related to the transportation impacts of neotraditional design. This is a positive sign in that interesting questions related to how land use decision-making and design effect the transportation system are surfacing at the discussion table with new force. These questions include:

- (a) How is trip generation effected by different land use patterns?
- (b) How do different street network types effect travel behavior?
- (c) How can transit be integrated into land development practices?

Since transportation issues are of pressing concern today, it is likely that the effects of neotraditional design will continue to be explored for its possible benefits.

PART THREE RESEARCH DIRECTIONS

1. TRANSPORTATION ISSUES

The transportation system proposed through neotraditional design raises many questions, primarily in the areas of traffic engineering and transportation planning. Traffic engineers have made significant strides in beginning to evaluate the potential problems with neotraditional design. These problems have been documented in work carried out by the Institute of Transportation Engineers, and in several articles referred to in Part Two of this paper.

In the area of transportation planning, more comprehensive modeling evaluations would be helpful to determine the impacts of neotraditional design, especially as it compares to other design approaches. Studies of isolated developments, real and hypothetical, need to be conducted to assess the transportation system performance. It will also be important to conduct regional studies of neotraditional neighborhood design. A major limitation of the research thus far is its restriction to isolated developments. Since the transportation impacts of neotraditional design will most probably accrue on a regional basis, a comparative assessment of design benefits which reflects a truly regional mix of neotraditional and conventional developments is necessary. Such an assessment will also allow for the introduction of regional transit systems and a more accurate depiction of regional travel patterns.

2. PROSPECTS FOR CONTINUED DEPLOYMENT

Because the neotraditional neighborhood design concept is relatively new and has not been sufficiently tested in the real world, questions remain as to the viability of this trend. Significant evaluation remains to be completed as to whether this design concept makes

economic sense. For example, will developers be discouraged from planning denser street networks called for in a neotraditional neighborhood due to high infrastructure costs. The same question applies for the provision of alleys. Another aspect of the viability of neotraditional design is simply whether the American public truly wants to live in the type of neighborhoods being proposed. Are mixed land uses, integrated housing types, and increased street life characteristics that the American public values and will seek out in a competitive real estate market. These questions will be answered primarily through the passage of time, but specific research documenting cost-benefit analysis and marketing trends will serve as useful tools for predicting whether neotraditional design is a passing or permanent phenomenon.

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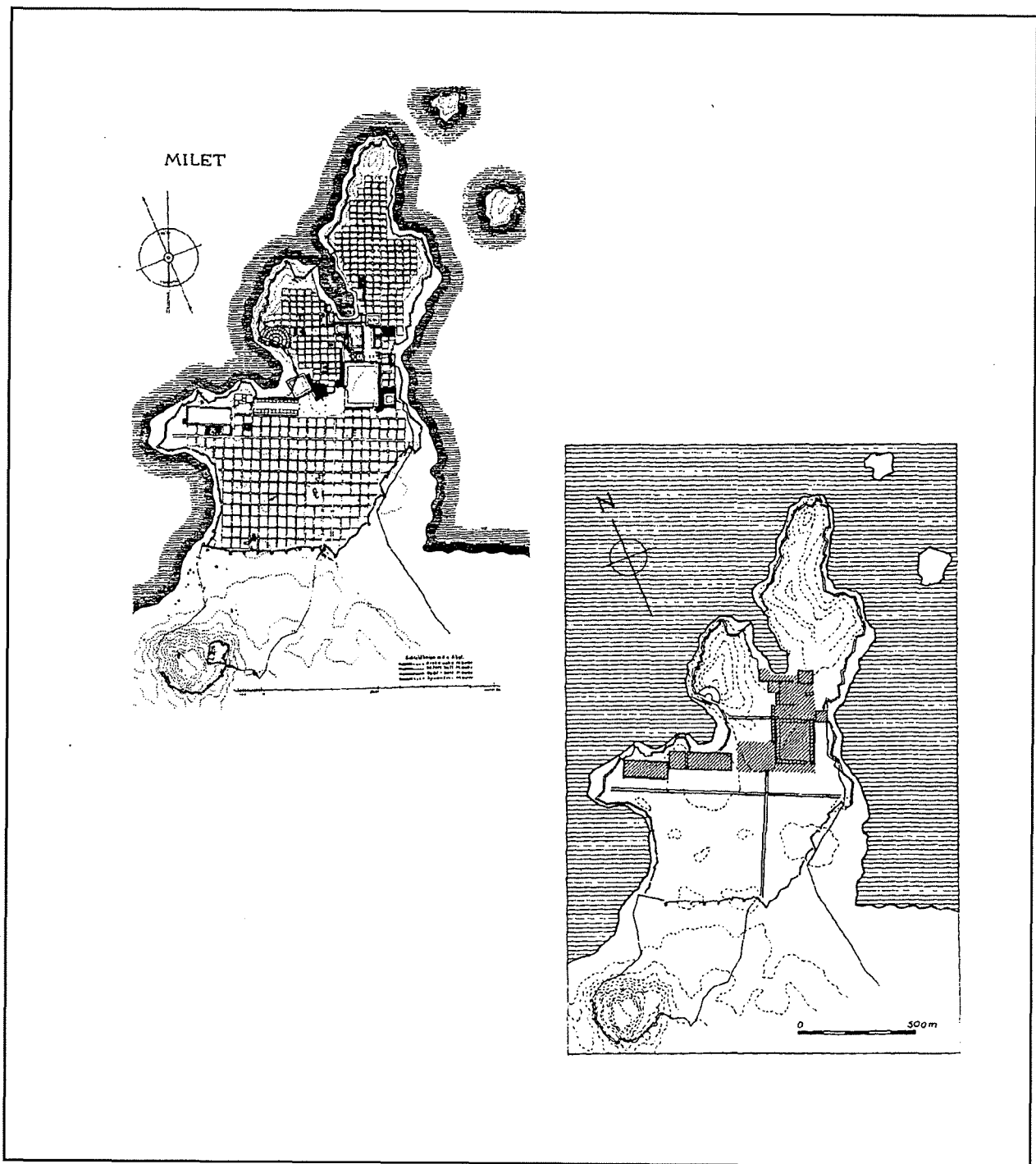


Figure 1a. Gridiron Street Pattern: Town of Miletus, Greece (5th Century BC)
 [Source: Ward-Perkins (1974). Reprinted by permission of George Braziller, Inc.]

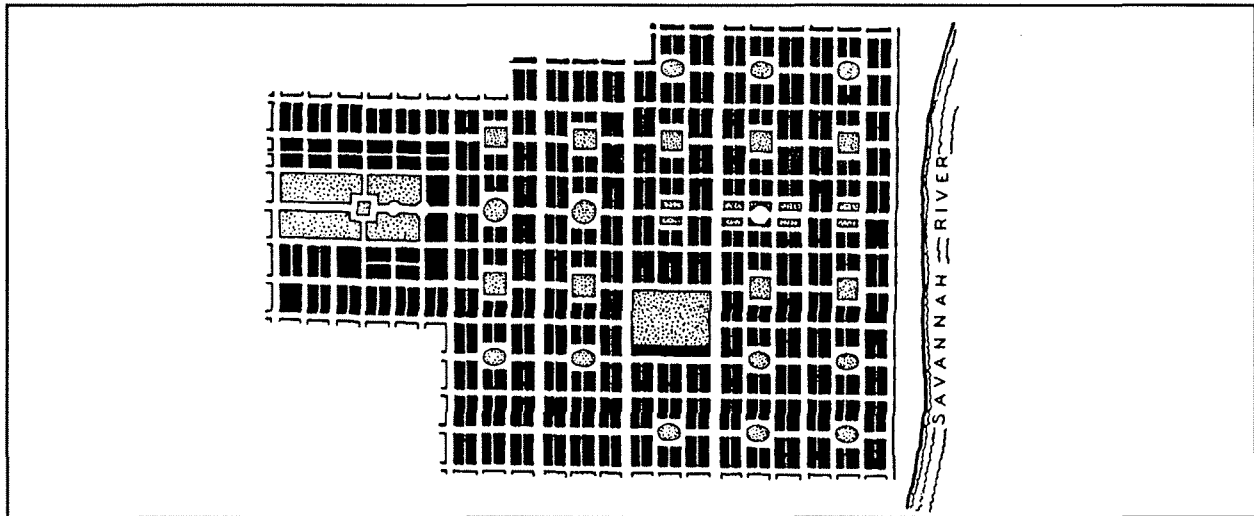


Figure 1b. J.Oglethorpe's Plan of Savannah, Georgia (1773)
 [Source: Gallion and Eisner (1975). Reprinted by permission of Van Nostrand.]

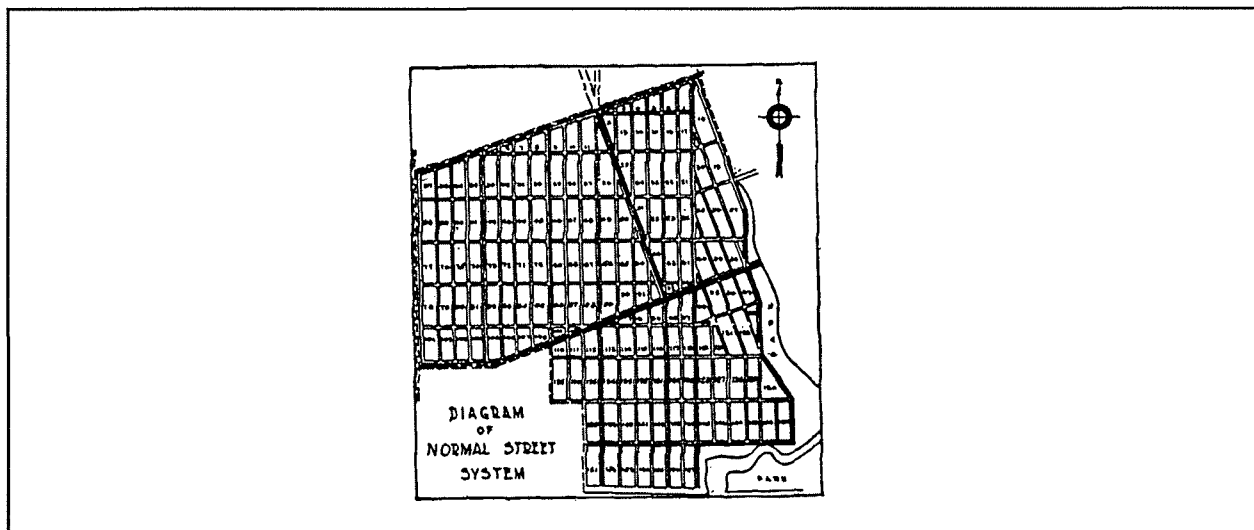


Figure 2. An 'Unsuccessful' Gridiron [Source: Stein (1971). Reprinted by permission of The MIT Press.]

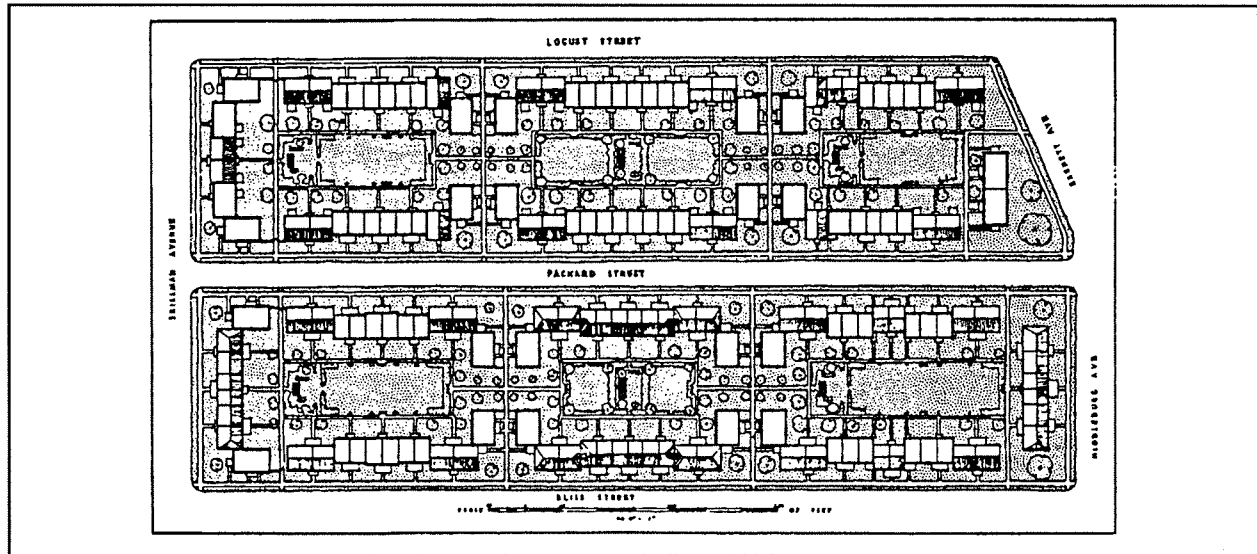


Figure 3. Interior Courtyards: Sunnyside, Long Island
 [Source: Stein (1971). Reprinted by permission of The MIT Press.]

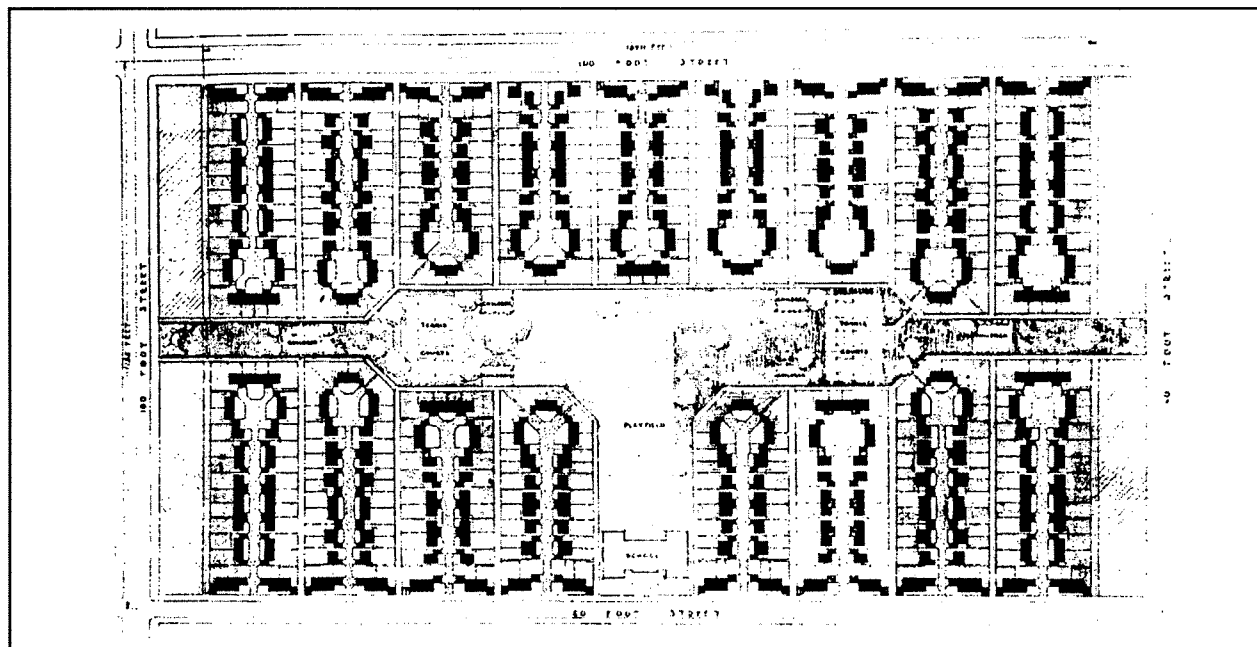


Figure 4. Cul-de-sac Clusters within Superblocks: Radburn
 [Source: Stein (1971). Reprinted by permission of The MIT Press.]

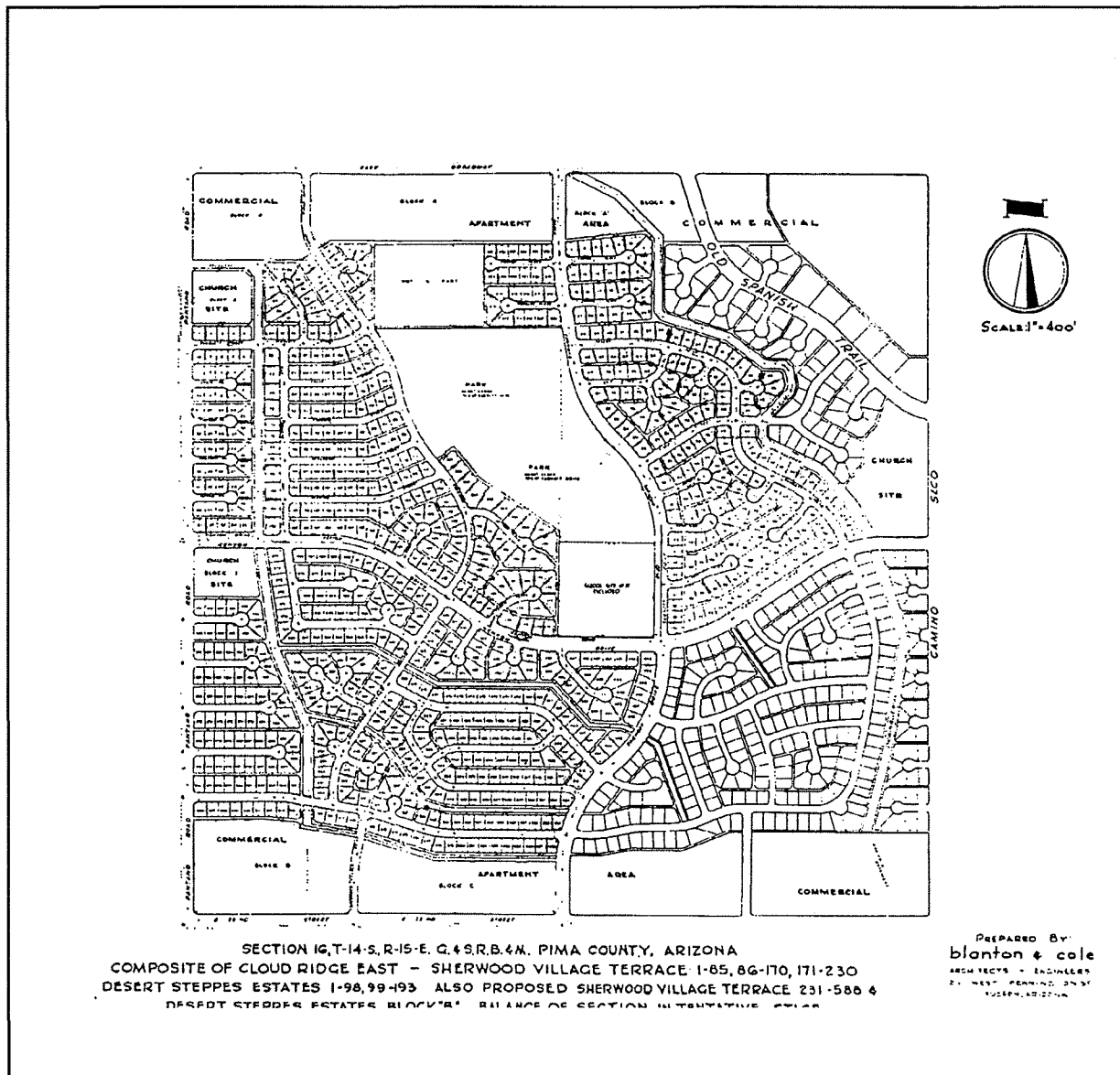


Figure 5. Early Planned-Unit-Development: Tucson, Arizona.
 [Source: Harman, O'Donnell, and Henniger, (1961). Reprinted by permission of the Urban Land Institute.]

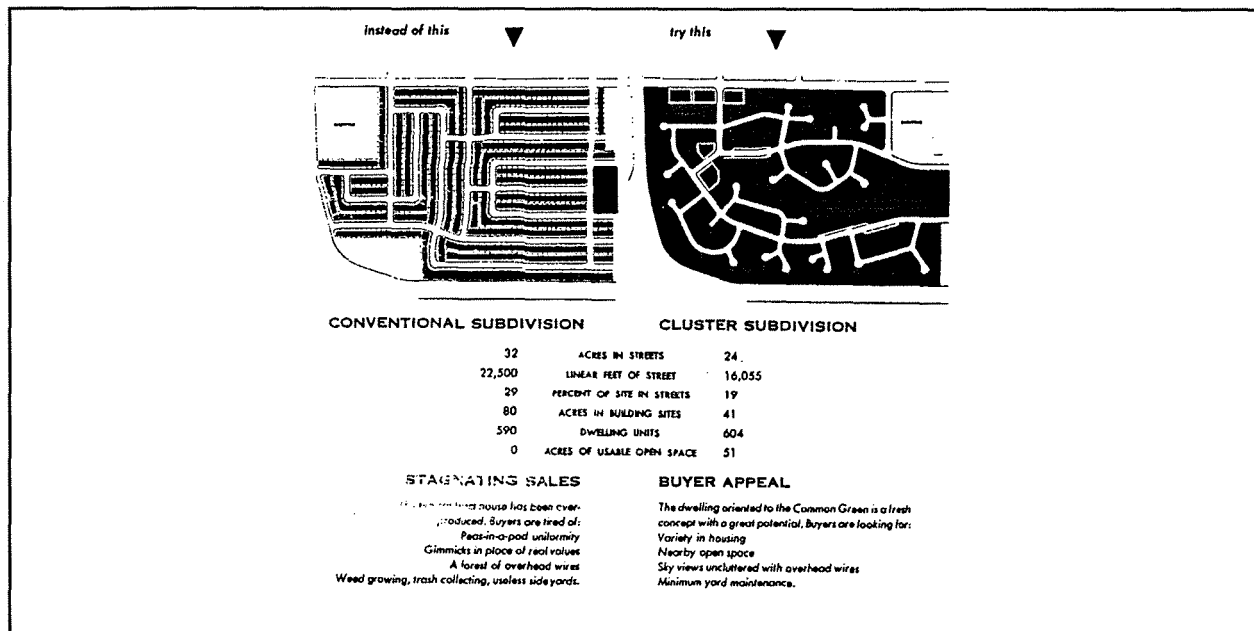


Figure 6. Argument for Cluster Development [Source: Whyte (1964). Reprinted by permission of the American Conservation Association.]

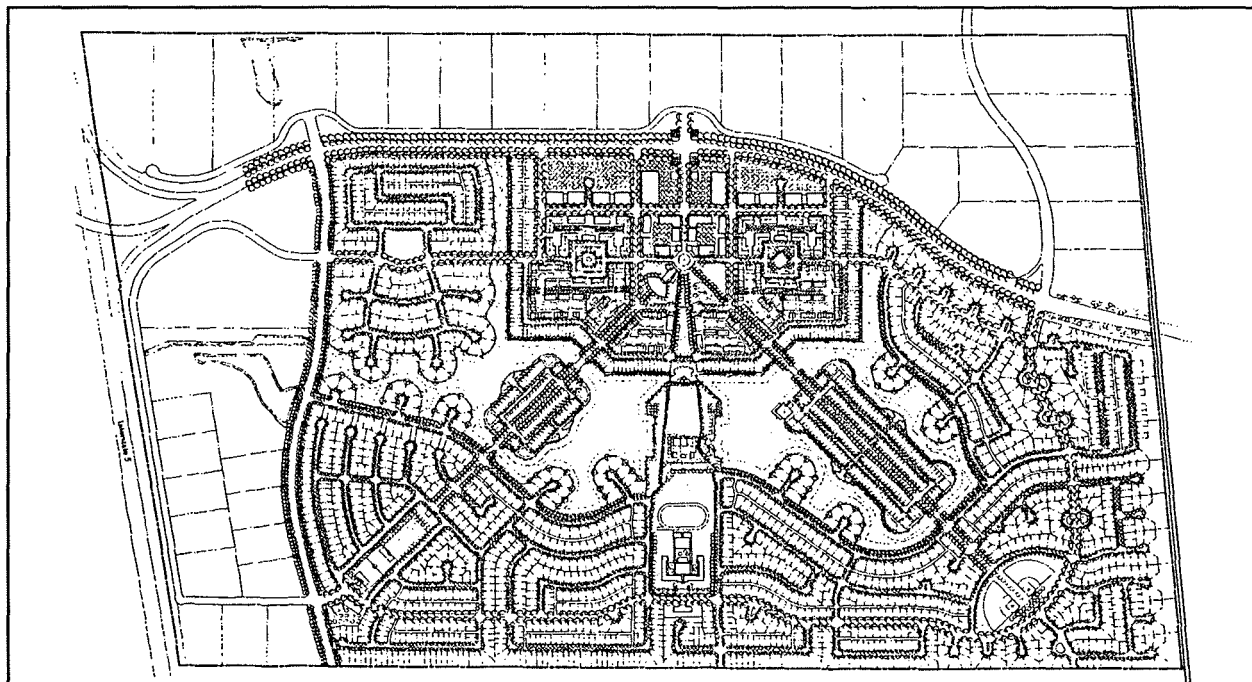


Figure 7. Laguna West Project: Sacramento, CA [Source: Calthorpe and Associates. Reprinted by permission of Calthorpe and Associates.]

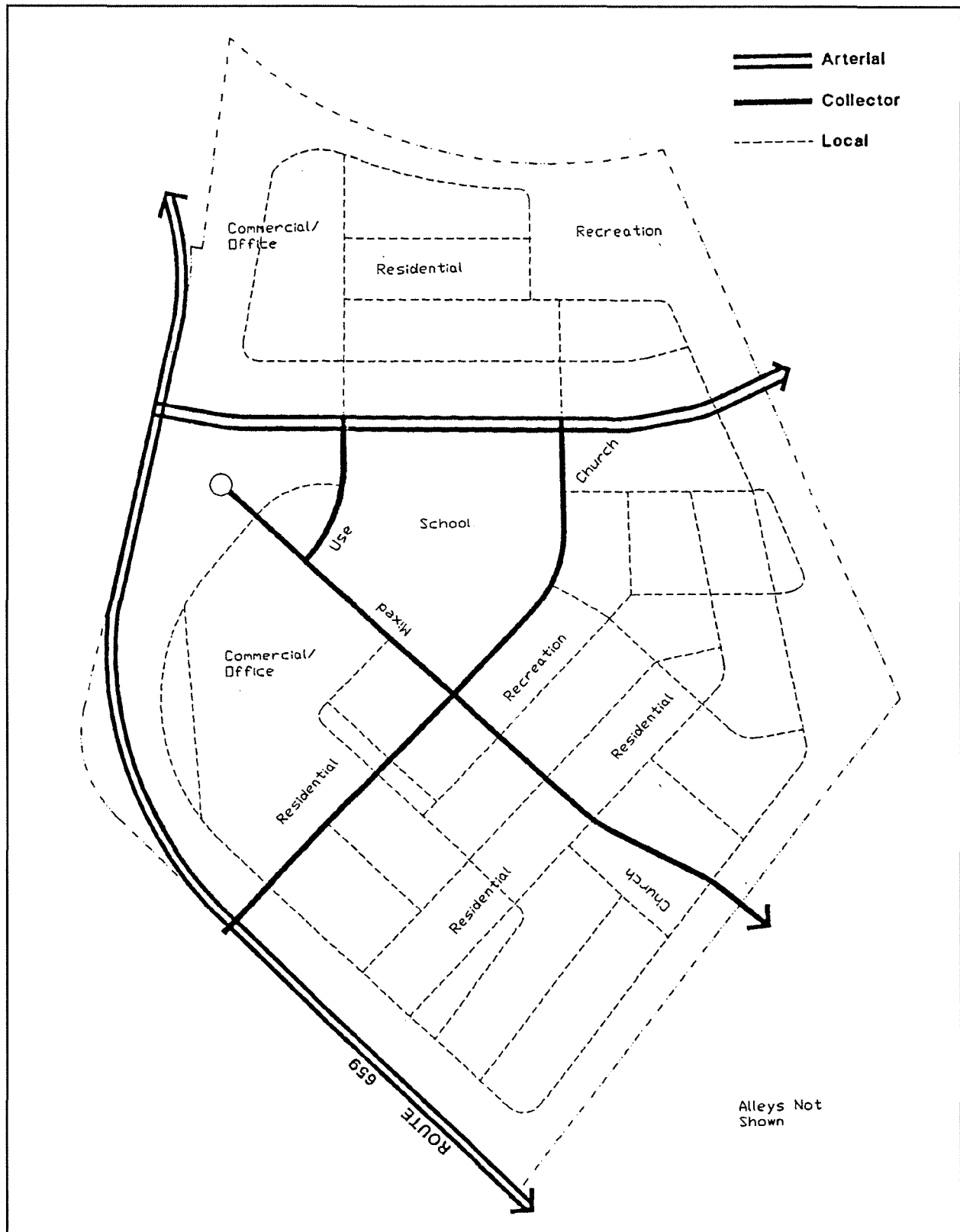


Figure 8. Belmont Forest Project: Loudon County, VA [Source: Wells (1992). Reprinted by permission of Wells and Associates.]