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Urban Forms : An Introduction to the Concept and a Review of Some Factors which Influence the Shape of the Community

Multnomah County Planning Commission

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URBAN FORMS
... AN INTRODUCTION

Multnomah County Planning Commission
1967
URBAN FORMS

AN INTRODUCTION TO THE CONCEPT AND A REVIEW OF SOME FACTORS WHICH INFLUENCE THE SHAPE OF THE COMMUNITY
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Study Objectives
STUDY OBJECTIVES

The growth of the Portland metropolitan area can continue as it has in the past or it can be guided into one of a number of regional development patterns. This study will attempt to assess the values of several possible forms of development and some policies needed for their implementation.

Prior to an analysis of the various forms of development toward which the urban area might be guided, it is instructive to review those "natural" forces which cause the urban area to develop as it does. Some of the consequences of this undirected growth can then be outlined in terms of public cost and aesthetic considerations.

The more important controls of urban growth and land use patterns will be briefly reviewed. Their strengths and deficiencies will be examined and some attempt will be made to assess their impact on the urban form. In addition, some governmental policies will be identified which are not directly concerned with planning, but which do have an influence on the urban pattern.

Finally, some possible alternative development forms will be suggested which might be accomplished with existing guides, with modifications of existing controls and with new types of regulations and governmental policies.

The tenor of this study is general in character and the alternative development forms reviewed are largely theoretical.
In this way an overview of the process of suburbanization may be gained and the county-wide ramifications of alternative development patterns be identified in the absence of specific county characteristics which at this stage of study would be highly complex and confusing.

The question is not whether the Portland area will grow, but where it will grow and how that growth can be guided to achieve a more satisfactory land use configuration. Hopefully, this study will impart a sense of urgency in making appropriate decisions regarding the future shape of the community.
The Growth and Spatial Configuration of the Urban Area
THE GROWTH AND SPATIAL CONFIGURATION OF THE URBAN AREA

General Function of the Urban Area

The urban area exists and has developed, in large part, to serve as a means for minimizing distances between people and the activities in which they engage. These activities may be social, political, religious, or economic and the distances between the individuals and the places where the activities take place might be measured in terms of time or cost. The clustering of people and activities allows a high degree of efficiency, increased employment opportunities, and a wide range of specialization in the provision of those goods and services desired.

Cities have been grouped into three major functional categories: (1) central places (2) break-of-bulk and (3) specialized function. Actually, most cities represent a mixture of these types, with each factor assuming varying relative importance for each city. Central place cities serve as trade centers and social focii for a surrounding tributary area whose shape has been demonstrated to approach that of a hexagon, under ideal conditions. Central places approach a uniform distribution in hexagonal patterns and an hierarchy of size and functions performed when such factors as the physical base, climate, transportation network, and socio-political considerations are constant. Break-of-bulk cities develop at transportation junctions or where goods in transit must be transferred from one means of

1This and all following direct references are listed numerically in the bibliography following the conclusion of the text.
conveyance to another. Specialized function cities locate near sites of natural resources or amenities and/or they develop specialized commercial or industrial functions which serve extremely large tributary areas.

**Historical Growth Factors**

Once the site has been established, the city grows through its attraction of local rural population and the in-migration of rural and urban workers from other parts of the country. In its early stages, the topography of the site is typically the most influential force in determining the direction in which the city will expand, avoiding water barriers and hills. This topographically-determined land use form often persists throughout the entire history of the urban area and the effects of the pattern may be observed today to a greater or lesser degree in nearly all cities, even the most intensively developed.

Transportation systems also seek level ground and it is along these corridors that expansion from the city center occurs first. As the city matures, the areas between the "fingers" of expansion are gradually filled in and as technological advances allow less desirable land to be incorporated into the urban structure, the periphery of the urbanizing area assumes a more regular configuration.

**Economic Factors**

Accessibility and the distance between interacting activities (whether measured in terms of geographical distance, time distance, or psychologically perceived distance) are the most fundamental factors influencing the growth and pattern of the
urban area. Proximity to other activities is maximized at the
city center and it is here that the competition for land, and
consequently the cost of land, is the greatest. Only the most
intensive and productive activities are able to locate near the
city center while those less intense activities with a lower
profit for each product per unit of land must find sites at
increasing distances from the center of the urban area. Hence,
the central area is invariably dominated by commercial land uses
requiring a high degree of accessibility and by business-financial
operations for which proximity to related activities is important.
Residences and related activities are developed in peripheral
areas where access is poorer and land costs are lower.

In a static situation, a balance is achieved with a continual
decline of land use intensity in all directions outward from the
central city. The decline slope is flatter when the activities
are located on sites adjacent to a transportation corridor from
which the time-distance to the central city is reduced. Over time,
with improving transportation technology and a growing economy,
more areas are made available for the location of these activities
and competition for land takes place at increasing distances from
the central city. As development becomes more dense in the periph-
eral areas, regional sub-centers tend to be formed where access is
superior and where the peripheral population density reaches such
a size that it is able to support them. For this reason, the major
employment, shopping, and service areas are not decentralizing as
fast or as far as new residential development.
THE SHAPE OF THE URBANIZED AREA (HAVING MORE THAN 2.5 SINGLE FAMILY DWELLING UNITS PER ACRE) RESULTS FROM THE ELIMINATION OF THE INFLUENCE OF CBD-ORIENTED ACCESSIBILITY. DEVIATIONS FROM A PERFECTLY CIRCULAR, CONTINUOUS SHAPE MUST BE EXPLAINED BY SUCH FACTORS AS TOPOGRAPHY, HISTORICAL DEVELOPMENT, AND THE INFLUENCE OF MINOR URBAN CENTERS.
Analysis of population density patterns has indicated that there is a systematic decline in gross residential density as the distance from the central city increases. The establishment of this density gradient is determined by the interaction of the numerous requirements and desires of the residential family. The requirement to minimize the distance to one's place of employment, generally near the central area, and to the social, cultural, and economic advantages of the central city must be balanced against the desire for low density suburban living with open space and natural amenities. Higher income families that can afford the increased cost of commuting tend to locate further from the central area while lower income families are generally found closer to the city's center where densities must necessarily be high to compete for the higher priced land. This generalized pattern of family income is strongly influenced, however, by topography, historical development, and the degree of accessibility.

Commercial and industrial land uses also respond to a series of locational requirements in selecting sites for operations. Commercial uses generally attempt to minimize the distance (cost of transportation) to the greatest number of potential customers by locating near centers of high density where access is good. Non-competitive retail activities often find it to be mutually profitable to locate in close proximity to benefit from each other's customer attraction. Shopping centers and strip commercial developments are the most obvious examples of this clustering tendency. Industrial activities, in general, attempt to locate near the source of inputs and close to their market areas. Therefore, the existence of transportation facilities is of major
importance in site selection. Specialized industries might emphasize the importance of locating near their labor forces, near large water supplies, or near inexpensive sources of power, depending on the relative cost of these factors in the total cost of production of the output of the firm.

The land use pattern which results from the interplay of these economic factors is, of course, significantly modified by physiography, sociological factors, and the influence of the policies of the various public agencies whose actions affect land use. The value in overlooking these modifying factors initially is that once the basic growth and pattern-producing forces within the urban area are identified, it becomes possible to examine their effect as well as the effect of planning policies, both current and future, upon the form of the urban area.

Cities depend primarily on the strength of their economic base for growth and stability. The entire array of economic operations performed within the urban structure are often categorized as either "basic" or "nonbasic" activities. Basic activities are those economic functions performed in the city which result in goods or services for export outside of the urban area. The basic category includes those activities which bring money into the city from the market region. Within the nonbasic category are those activities producing goods and services to support the population of the city itself. When all of the economic activities of the urban area are thus categorized and the magnitude of the operations established in terms of employment or value of output, a basic-nonbasic ratio may be calculated. This ratio, in the majority of case studies which have been conducted, tends to increase as
the size of the city increases. The very smallest hamlets have nearly 100% of their gainfully employed population in basic employment, supplying goods and services to consumers outside of the hamlet. The largest cities, by the very virtue of their size, are able to perform a great number of services and produce a wide range of goods for the local inhabitants and have correspondingly high basic-nonbasic ratios. Although there are numerous difficulties inherent in the application of the basic-nonbasic theory, it has none the less, provided important insights into the economic strength and growth potential of the urban area.

Total Land Use Patterns

Although the particular set of circumstances which determine the internal spatial structure of an individual city is unique, it is possible to generalize about the arrangement of activities which would result from the actions of these economic forces previously mentioned. Three basic theories of urban pattern have been suggested: concentric zones, sectors, and multiple nuclei. These theories assume that the arrangement of the use of the land within the urban area is fashioned largely by market forces and, as all theories must, minimize or ignore the influences of other factors which are considered to be of less significance.

The concentric zone theory was developed to explain ecological processes within the city, but has been used by urban economists to explain the effect of market forces on the land. The theory states that a city might be conceived as a series of five concentric zones. The center is the central business district composed of those intensive land uses for which centrality is of paramount
importance. Wholesaling, warehousing, and some light manufacturing and port functions are found in the second zone while the third zone consists largely of workingmen's homes. The fourth zone is the middle class and white-collar workers' residences and the fifth zone contains the suburban residences of the upper income commuters. This concept finds its greatest appeal in its simplicity, although the other two theories attempt to include some factors that cause irregularities in the circular patterns.

The sector theory incorporates the effect of a radial street pattern into the system. Here it was felt that similar types of land uses tend to locate in certain wedge-shaped sectors which radiate from the central business district. The various activities move progressively outwards along access corridors as urban growth takes place. The sector theory represents an improvement over the concentric zone theory in that it provides a more satisfactory explanation of the influence of improved access and residential growth dynamics, but it has been criticized on the grounds of its ambiguity and oversimplification.

The multiple nuclei concept recognizes the fact that many land uses locate and expand around several nuclei in the city. The primary focus is the central business district, but other economic activities often tend to locate in nucleated patterns as a result of mutual profitability of agglomeration, of the attracting or repelling force of land rents, or of mutual disaffinity whereby activities attempt to locate away from other activities whose actions are detrimental to their own. As a descriptive device the multiple nuclei concept illustrates the effect of the manifold locational factors on the urban area
and how these factors acting independently and together cause the particular pattern of land uses which may be observed in and around all cities within the country.
TOTAL LAND USE PATTERNS

**concentric zone**
(general form for all cities)

**sector**
(one form of an infinite number of possible variations)

**multiple nuclei**
(one form of an infinite number of possible variations)

Unregulated Growth Tendencies
UNREGULATED GROWTH TENDENCIES

Shortcomings of the Economic System

The unregulated growth of the urban complex, resulting exclusively from the influences of the market mechanism, has rarely resulted in a completely satisfactory intermixture of competing land uses. The conflicts occurring at the boundaries between industrial and residential land uses, the socially undesirable overcrowding in many residential areas, and the high public cost associated with haphazard urban sprawl (see case study - page 22) are a few examples of costs and generally undesirable and inefficient land use patterns resulting from growth under purely economic or market forces. Individual economic units (i.e., families, farms, businesses, industrial plants, etc.) acting and locating solely under the stimulus of such market features as land values, rents, and construction costs generally produce patterns of land use with incompatible intermingling of uses.

Two major shortcomings of the economic mechanism which most people feel should be provided for by public controls are (1) the regulation of individual activities where they interfere with other individuals and (2) the provision of goods and services that either cannot be provided by individuals or which are considered of sufficient importance to the community in general that a group decision is made for the individuals. The first of these two shortcomings of the pure economic system is termed an external cost where, in addition to the producer's cost of providing a commodity, an additional cost is imposed on other individuals or on the community without reimbursement. The total cost of the
commodity, facility, or service is therefore greater than its price, with the differential being borne by the community. Examples of external costs are industrial noise and smoke near residences, upstream waste disposal, and the construction of excessively large buildings immediately adjacent to smaller structures. Examples of community decisions to provide goods and services are public education and recreation facilities, welfare programs, and low-cost housing. An additional function of public controls is to provide information to consumers when, through ignorance or lack of information, individual cost estimates are not realistic reflections of social costs.

Urban Sprawl

The tendency for residential developments to disperse away from the central urban area is, in large part, a direct result of the general decrease of land values as the distance from the major urban area increases. In addition, builders and subdivision developers are able to assemble individual parcels of land into larger tracts at a lower total price than would be possible if they had to deal with a great number of property owners in the more intensely developed areas. Well planned, coherent residential neighborhoods with sufficient open space, low through-traffic volumes, variety of design, and in general, a more desirable environment are practical only when the scale of the development is of sufficient magnitude to warrant these added considerations.

The dispersal tendency is also encouraged by the wider range of level, well-drained building sites available in the "pioneer" fringe region. When lots must be developed on wooded, rolling, or poorly drained land, the improvement costs per lot rise sharply.
The lack of a comprehensive plan allows residential decentralization in some areas. Although the effect of this single factor is difficult to isolate, decentralization is less significant in those areas covered by a well-conceived and strongly-enforced general land use plan.

Residential Construction - Builders, Lenders, and Consumers

A study by the Twin Cities Metropolitan Planning Commission has isolated three key decision-making groups whose actions and policies play a significant role in determining where, when and why residential construction occurs as it does. The major groups are the builders, the lenders, and the consumers, all acting within the constraints set by a governmental framework.

The general residential locational pattern is determined primarily, but not solely, by the builders. The decision to develop a residential subdivision in a particular area is limited by the policy constraints of the local government, by the availability of public utilities, by the degree of risk as perceived by the lenders, and to a lesser extent, by the desires of the consumer.

The tract builder is highly sensitive to land costs and bases his operations largely in the pioneer fringe where it is possible to assemble large tracts. As a result of the magnitude of his operation and the resulting economies-of-scale he is able to realize, the tract builder is able to offer the best quality house for the lowest initial price to the consumer.

Those builders producing a small number of houses per year generally require smaller tracts of land and are able to develop
on higher priced land nearer the urban center. The most expensive houses are generally built by these smaller volume builders on a custom basis and the higher price of land is of less importance in the total cost of the house and lot package when the house cost is high.

The lender and the lending field exist to make a profit in those business ventures requiring a relatively large capital investment. In an effort to minimize the risk and maximize their profits, the lenders are primarily concerned with the marketability of the house produced by the builder. This marketability is based on house design, quality, and location. The builder's proposed house type and subdivision configuration are considered by the lender to be important factors in overall housing desirability and those types and configurations which have sold in the past are likely to be similar to those which are most readily financed. Consumers in the housing market are generally limited in their selections of new houses to what is available at a given time and priced within the buyer's ability to assume the financial burden. Thus, housing types and their locations tend to be perpetuated both by the conservative builder and the skeptical lender with little influence from the largely inarticulate consumer.

In most cases, it is probable that the consumer in the suburban residential market, particularly a young couple purchasing their first new home, underestimates the cost involved in purchasing, maintaining, and commuting from a residence which has been developed well out into the fringe area. The new housing available to lower income first-time purchasers is usually limited to those tract developments located a considerable distance from the
metropolitan center. An important, although usually fallacious, selling point for houses in these suburban tracts to the lower income consumer is the low rate of taxation. As a predominantly rural land use area develops into a predominantly residential land use pattern with a correspondingly greater demand for urban-type services, taxes must rise rapidly and will initially be spread over a low-density tax base, resulting in relatively high individual taxes.

In the absence of restrictive local governmental regulations, the forces exerted by consumers, builders, and lenders and sustained by the permissiveness of the FHA and VA mortgage insurance policies regarding location have also tended to maintain and perpetuate suburban residential sprawl.

In general, suburban sprawl is undesirable both aesthetically and economically. Subdivisions and commercial uses developed on scattered parcels of land leave intervening properties vacant and raise costs of public utilities and services. Open spaces for recreation become prohibitively expensive within these developments while much of the best agricultural land in the country is being converted to residential use. The uncontrolled growth of the urban suburbs invariably leads to these conditions, appropriately termed "leapfrog" growth.

The Nature and Cost of Leapfrog Development

The checkerboard pattern of leapfrog developments results from the subdivision of the choicest parcels by the profit maximizing builder, leaving vacant those areas with a lower potential return of investment thereby decreasing the range of possible alternative uses of the intervening land. Those areas that have
been by-passed subsequently increase in value as a result of their proximity to new residential subdivisions, rendering their future development even more remote and costly. Consumers in the residential housing market have not generally been opposed to increased commuting distances, and remoteness of development seems to play a minor role in the overall desirability of a particular house, particularly during periods of great demand for single family residential housing. So long as inexpensive undeveloped areas remain within the maximum acceptable commuting distance to the central city, the builder will continue to develop the best building sites at increased distances from the major urban area. This leapfrogging is further reinforced by the development of more efficient commuting vehicles and improved street and freeway systems, which effectively extend the maximum commuting time-distance around the central city.

Although the initial cost to the builder and the consumer is decreased in the leapfrogging process, the public cost of providing utilities and services to widely scattered subdivisions with a subsequently low overall population and housing density is greatly increased.

An economic case study conducted in the Lexington, Kentucky suburbs demonstrates this point. Here it was indicated that a total annual cost differential of $590,577 existed for the construction, operation, and maintenance of utilities and services for a new subdivision as opposed to its hypothetical location in the area which it actually vaulted. The new subdivision contained approximately 400 homes and was located two miles from the Lexington urbanized area. The hypothetical subdivision could have occurred
immediately adjacent to the edge of continuous development of residences, located between the actual subdivision and the City of Lexington. The vaulted property is vacant, has superior topographical considerations, and is particularly suitable for residential development.

Of the total annual cost differential of $590,577, slightly more than 57 percent was attributable to increased commuting costs which were borne entirely by the residents of the new subdivision. The incidence of the remaining cost differential, however, was distributed to residents in the City of Lexington (13 percent of the total for sewerage, refuse collection, and fire and police protection), in the Lexington area (28 percent for gas, water, and commercial deliveries), in the county (0.1 percent for road and street maintenance and school bus service), in the state (2 percent for telephone and electricity), and, at the national level, 0.1 percent of the total for the incremental cost of mail service. Of the total cost differential, approximately 43 percent of the annual differential costs were borne at the various political levels, particularly at the local level of which the subdivision residents represented only a minor percentage.

The total public cost of this single leapfrog subdivision is quite significant, especially when the differential cost continues for a number of years until the intervening property is developed. The impact of this inefficient form of development on the economies of the national and local governments becomes apparent when it is realized that leapfrog subdivisions occur by the thousands each year throughout the country. The significance
of this particular study lies in its objective determination of the social cost of leapfrogging in quantitative forms.

Although the Lexington study is of a specific area with specific utility and service costs and methods of financing those costs, the relative cost distribution probably approximates those found in other parts of the country. In an effort to make the study as applicable to other areas as possible, certain aspects that appeared to be unique to the Lexington area were omitted from the analysis to "approximate the normal situation".6

In addition to those factors previously cited, some local governmental policies also serve to encourage leapfrog development. These policies are often the primary determinants in establishing which properties are profitable to develop and which will be withheld from the market for purposes of speculation. Inordinately low land evaluations and subsequent low rates of taxation result in a small cost to speculators to hold their land idle and prevent its development. Assuming that the speculator acts rationally and has good knowledge of the market conditions, he will withhold his land from the market as long as his annual taxes and property costs plus the normal return on his investment are lower than his estimate of the annual incremental appreciation of his land. As indicated previously, the property holder's expectation of future return may be considerably strengthened if he is aware that, by withholding his property from sale and forcing residential development to take place further out, his intervening land will increase in value due to its proximity to new
residential subdivisions. The withholding of properties from the open market for reasons other than profit-motivation are largely based on personal idiosyncrasies about which generalizations are extremely difficult.
Local Governmental Policies

and Existing Forms of Planning Controls
LOCAL GOVERNMENTAL POLICIES AND EXISTING FORMS OF PLANNING CONTROLS

Taxation

The valuations placed on vacant lands and the rates at which they are taxed are important causal factors in the creation and perpetuation of the urban pattern. Excessively low tax rates foster land speculation and leapfrog development while an abnormally high tax on idle property forces the land into immediate use. As the land is developed, there is an accompanying demand for public services which, in turn, require higher taxes. As stated by W.H. Whyte, "The assessor has become de facto a master planner, and the fact that it is by inadvertency only makes the problem worse". It should be noted however, that the assessor is often severely limited in his actions by the state regulations under which he operates.

High taxes on vacant land have the effect of forcing on the property owner a high cost for leaving his land as open space and consequently there is a strong pressure on him to put the land into some profitable use. This use may or may not conform to that which is the most desirable from a community standpoint. If taxes were based on a comprehensive land use plan rather than simply on the adjoining land uses, the effect would be to guide the use of the land into its "highest and best" use for the community. If the property is developed for a less intense use than that planned for the area, the owner will continue to pay taxes based on the more intense planned use and he will absorb an economic loss. A more intense use than that planned for the area hopefully would be prevented by land use controls. Thus, the coordinated use of planning controls and taxation policies can be effective
tools for encouraging land uses to become patterned in such a manner that the owners and users of the individual parcels can maximize their profits at a minimum of cost to the public.

Zoning

Zoning is perhaps the single most potent legal land use control available to local agencies. Zoning, as defined by most states' enabling legislation, generally provides for the regulation of the height and bulk of structures, the amount of lot coverage, yard and setback dimensions, and uses for individual parcels of land. These regulations generally work to assure the proper situation of activities in relation to each other, adequate space for each development, suitable land use densities accordant with public services, and a pattern of development which provides sufficient light, air, and privacy for all residents.

Zoning, during the forty years of its use, has demonstrated a great deal of flexibility in withstanding innumerable contests in the courts throughout the country. Many people feel however, that the restrictive aspects of zoning regulations do little to promote an active, constructive influence in the development of a well-designed community. Also, zoning is used for other purposes, such as the preservation of open spaces, where other methods of control would probably prove more effective. Some advantages of a more flexible use of zoning will be discussed in a later section of this study.

The preponderance of desirable open land remaining around most metropolitan areas is used for agricultural purposes, this fertile
farm land, together with vacant rural land, is being consumed for residential use at the rate of 3,000 acres per day throughout the country.

Farmers have viewed with alarm the unrelenting spread of residential neighborhoods around their properties. With suburbanization comes higher taxes to support the additional schools, water and sewer systems, and better police and fire protection demanded by the new suburbanites. Additional conflicts often arise when the suburbanites object to the use of insecticide sprays, smudge pots, and noisy farm machinery while farmers have become concerned with falling water tables, traffic congestion, the removal of the natural ground cover, and declining local farm services. Further, farmlands increase in value when a suburban community is developed nearby and the rates of property taxation increase as the assessed value of the land increases.

As an economic unit of production, the farm, with its low per acre land use intensity, simply cannot compete with an intensely developed residential subdivision in the value of its productivity per acre. In an effort to preserve their farmlands, the farmers have been primarily responsible for the passage of various agricultural zoning and taxation measures in a number of states. Section 308.370 of the Oregon Revised Statutes provides for the assessment of agriculturally zoned farmlands "at its true cash value for farm use and not at the true cash value it would have if applied to other than farm use". This provision also applies to land not zoned for agriculture, but that is presently used for agriculture and has been used for agricultural purposes for the past two years.
Agricultural zoning and the taxation of farmlands as agricultural units of production rather than as potential subdivisions relieves the immediate pressure on the farmer to sell or to subdivide. This zoning, however, is only a short-run stopgap form of protection. Although the farmer might be taxed at a rate considerably lower than neighboring subdivision residents, his property continues to gain in value. This increasing value is due not to increased farm productivity or other agricultural considerations, but mainly as a result of the subdivision potential of the farmland. Eventually, many farmers succumb to the high prices offered and, with their strong vote in most governments, are often able to have their properties rezoned for single family residences. In order to minimize the effect of this eventuality and to prevent subsidized speculation, it is desirable that the law which initially provides for the reduced taxes also provide for, at the time the land is subdivided, the collection of the retroactive tax differential between the actual taxes paid and those that would have been paid. In Oregon, this legal procedure is provided for in Section 308.395, Oregon Revised Statutes.

The preceding statements suggest the question: Should farm-land be, in effect, partially subsidized by low rates of taxation to remain as farmland, thereby restricting the more economically intensive expansion of suburban residences? In either the short or the long-run, the justification for holding lands in agricultural use when subdividers are willing to pay high prices for the land must be based largely on non-economic considerations to which economic values cannot be readily assigned. In part, however, the
decision to use land for farms or for subdivisions might be viewed as a long-run versus a short-run social cost. In the short-run, subdividers are able to pay more for land and realize a better profit per acre than farmers, even on the most fertile lands. However, with the exceptions of slope, drainage, and natural vegetation, the development of a subdivision is not greatly influenced by the physical characteristics of the site, whereas site characteristics are all-important to the farmer. In other words, subdividers have a wider range of alternative sites available to them than do farmers. The use of a poorer site by the subdivider represents an additional cost of site preparation which is reflected in an increased cost to the consumer. If this increased cost to the subdivider is less than the long-run cost to the public resulting from irretrievably destroying relatively productive farmlands, then there is justification for restricting residential growth in selected areas.

An additional advantage in retaining land in agricultural use is to establish and hold open spaces within the urban fabric. These open spaces, while not directly accessible to the public, none the less provide a breathing space and a general relief from the monotony of continuous urban development. If, as is often the case, farmland is earmarked for future parks or for commercial or industrial use, the land is withheld from immediate development and is able to produce some agricultural output and pay taxes during that period until the planned use preempts the land from agricultural use.
While the monetary addition to the metropolitan area from local farm production might be significant, there appear to be sufficient alternatives available to the farmer and to food processors so that residential displacement of farmlands has not become economically critical. This statement is supported by the simple fact that farmlands cannot compete economically with residential subdivisions. If the loss of local agricultural output was economically significant, food prices would increase to the point where farms would become more competitive with subdivisions. This has, in fact, become the case in the nursery-stock business where value per acre is sufficiently high to compete for land with residential expansion.

There is, apparently, an inherent flexibility in the agricultural industry so that as farms are displaced by suburban development, one or more of the following tend to occur: (1) farmers move out further and transport their produce over longer distances, often benefiting from the improved access of the urbanizing area, (2) farmers intensify the use of their land, thereby increasing the farm's value per acre, or (3) many of the local farms simply disappear and their output is replaced in the local markets by products which have been imported from other regions.

The Effects of Large Lot Zoning on Residential Development

The use of large lot size zoning as a means of population density control has been used in many areas in an attempt to lessen the incidence of suburban sprawl. The primary objective in the use of minimum size regulations is to control the density of an
area sufficiently to postpone the ultimate obligation of providing urban-level services, with an accompanying high per capita tax burden. The economical provision of these services requires a relatively high housing and population density to achieve any sort of economy-of-scale. Until development pressures on an area zoned in this manner reach a point where the area might be rezoned as a unit to smaller lot sizes, small-scale socially uneconomical subdivisions are prevented. Substantial economies are realized by the developer and the lot owner if less essential improvements required for areas of more intense residential development are waived or adjusted commensurately to the lower density use - provided, of course, that acceptable standards of community health and welfare are maintained.

Although the primary objectives of large lot zoning are to limit population density and to retard urban sprawl, one possible undesirable result of this type of zoning is to accelerate residential development beyond the low-density belt encompassing the central area and to encourage concentrations in new outlying centers. To function most effectively, the zones should be considered to be holding zones, specifying lots of a reasonable size and allowing sufficient flexibility to restrain growth until services can be provided without completely preventing normal residential expansion. The administration and regulation of area-wide zoning and the associated problems are best resolved through a regional, rather than local, plan which is a basis to evaluate the full implications of large lot zoning on the entire metropolitan area.
The Urban Land Institute has published a study in which empirical evidence was collected in an attempt to determine (1) the effect of lot size on lot development costs, (2) the effect of lot size on community costs and income, and (3) the effect of large lot zoning on suburban development.

The conclusions reached indicated that lot size is not an important factor in determining overall improvement costs. Of more significance in determining costs are lot frontage and the level and number of improvements to be installed. One-site improvement costs remain relatively constant as the size of the lot increases while off-site improvement costs, usually being based on the amount of frontage, may often be reduced when it is possible to utilize a lower level and smaller number of utilities and improvements than would be required in a higher density neighborhood.

Lot size and the corresponding density of population did not appear to have any effect on municipal costs when the level of services remains constant. The savings to the municipality in providing a lower level and a smaller quantity of public services seemed to be largely cancelled out by increased maintenance and operating costs of those or other utilities or services. In fact, it was found that capital outlay costs for the four major municipal services most affected by density (schools, streets, sewage, and fire and police protection) showed a slight rise with an increase in lot size. The average taxable valuation of land and buildings did show a slight positive correlation with lot size, although the wide range of variations precludes the statement of any general rule about this relationship.
The establishment of minimum lot size requirements seems to have little influence on retarding the spread of urban development. In some cases, the large lot zoning actually seems to promote development by establishing high quality, prestigious, restricted neighborhoods. Also, developers are able to purchase large tracts of land zoned for large minimum lot sizes at remote distances from the central city for prices not significantly higher than they would have to pay for smaller tracts closer to the city and zoned for smaller lot sizes. In either case they are able to develop approximately the same number of lots per tract and the additional cost of land in the more remote areas is only a small part of the total development cost.

Subdivision Regulations

Subdivision regulations have been devised to promote the creation of sound neighborhood patterns, the continuity of the transportation network, the integration of residential developments with other land uses, and to maintain property values and the general community character. Within the subdivision itself, the regulations control street grades, intersections, and the provision of utilities. The purpose of these controls is to ensure that the primary profit-oriented goals of the subdivider are not in conflict with the long-run interests of the community.

The minimum standards demanded by subdivision regulations also act to eliminate innovations in design that do not meet these specific standards but yet comply with the general spirit of the law. The simple gridiron residential pattern is extremely efficient from a surveying and administrative viewpoint - from an
aesthetic outlook and monotonous uniformity is most undesirable. The straight, wide streets of the design encourage large volumes of high-speed through traffic, contributing to numerous intersection accidents and endangering pedestrians. Construction costs are greatly increased when the gridiron is superimposed on irregular terrain. Few subdivision designs devote as much land to street use as does the square or rectangular grid system. When the grid system contains an irregular natural feature, such as a stream or ravine, or when the system is diagonally bisected by a transportation right-of-way, undesirable lot shapes result which are difficult to develop. Yet, with proper design, these very lots can be the most valuable in the subdivision.

Excessively stringent subdivision standards regarding required development can impose undue hardships on the developer. The increased cost of lot development must be reflected in the total cost of the house-lot package to the buyer and this higher price eliminates a segment of the potential house-buying population from the market. In the past twenty years, the site cost has increased from approximately ten percent of the total house-lot package to nearly twenty percent. The practice of allowing less than a standard level of improvements for large lot subdivisions probably does little to encourage sprawl, provided of course, that these reduced requirements are based on the density of the subdivision rather than on its location.

Once established, a residential neighborhood with paved streets, erected buildings, and installed utilities becomes a permanent feature of the urban pattern. Changes or revisions can only be effected at great expense and it therefore becomes of vital
concern to the entire community that the initial layout of the subdivision be done in the most economical and aesthetically pleasing manner possible, both for present-day consumers and for future residents.

Utilities and Services and The Urban Pattern

The problem of providing to the community the facilities needed for growth and stability becomes increasingly aggravated as development takes place at greater distances from established neighborhoods. These community facilities—water supply, sewage and garbage disposal, paved and maintained roads, schools and playgrounds, etc.—will represent a considerable investment, particularly in remote rural areas which either completely lack these improvements or to which the extension of existing facilities is difficult. The degree to which these utilities and services are provided by public agencies can have an all-important affect on the suburban residential growth pattern.

The three primary utilities—sewers, water, and roads—are the principal facilities whose presence or absence determines the economic feasibility of particular locations for residential and also commercial and industrial developments. Secondary facilities—garbage disposal, sidewalks, schools, parks, etc.—do not play such an important part in determining the locational aspects of residential subdivisions, but generally become more important after the location for the subdivision has been established.

Improvement costs per lot are considerably lower in areas where geological and soil conditions allow the use of individual sewage disposal systems as opposed to centralized service and
and these areas are generally the first to be developed, all other things being equal. The per lot cost differential between the two methods of disposal increases rapidly when terrain with steep grades is being improved.

The provision of water is usually of less importance as a locational determinant than is the provision of sewers. On-site wells are generally found only on the largest lots, while the typical residential lot receives its water from public distribution systems, using either reservoir, river, or well water. Subdivisions which are developed a considerable distance from existing neighborhoods must either be of sufficient size to be able to prorate the cost of transmitting the water or must locate within the boundaries of an established water district.

Access roads to new subdivisions are a limiting locational factor only where the distance to an existing public arterial is excessive. Perhaps as important as the higher construction cost of developing a long access road is the increased commuting time of the subdivision resident. Roads within the subdivision are so essential that they cannot be considered to be determinants of residential development. At best, the subdivider can only minimize their lengths through the judicious arrangement of lots and minimize their construction cost through close attention to topographical considerations.

Locational patterns are greatly affected by the share of these utility expenses which are assumed by the local public agencies. The standard practice of urban counties throughout the U.S. is to require, through subdivision regulations or otherwise, that the developer install the three primary utilities in the subdivision.
and connect them to existing facilities at his own expense. Completion of some or all of these improvements is generally guaranteed by some legal means, usually through the posting of a performance bond. Where the developer is required to install utilities which are larger in size than those required for his subdivision, the usual and most equitable practice is to reimburse him partially or entirely for the cost differential.

Fixed Service Radius Concept

The urban pattern is often determined through the extension of facilities into areas in which residential development is appropriate and economical from a community standpoint. The establishment of the limit to which the municipality will extend services may be based on the topography of the area or it may be established arbitrarily at the city or service district limits or within a specified radius from the city. In addition to these service limits, the boundary of permitted utility extension might be defined as the periphery of the urban form which the community desires to achieve. This concept, combined with an effectively enforced zoning ordinance, has a strong influence in directing urban growth and in preventing haphazard sprawl. Areas outside of the public service boundary are generally zoned for large lots on which individual utility systems must be used. In this way the community is able to identify the new sectors in which development may proceed most efficiently and economically. It is also able to encourage the filling in of vacant land and to withhold virgin land from intense development.
until a dense network of utilities with excess capacity has been established in immediately adjacent areas from which extension is most economical from the community's standpoint.

Preinstallation of utilities in an area prior to its intense development can be an important tool for guiding urban growth into a predetermined spatial configuration and density distribution. At present, the extension of utilities invariably follows or accompanies residential expansion and essentially amounts to public condonation of that expansion, regardless of its long-run community desirability. When oversized utilities are installed in anticipation of future growth in an area, that growth is generally projected from past and current uncontrolled trends and rarely bears any relationship to the overall integrated growth plan, if any, for the entire urban area. Utility preinstallation as a control policy is permissive rather than restrictive - that is, growth in particular sectors is encouraged rather than enforced. Other control policies, such as zoning and subdivision regulations, must accompany preinstallation to eliminate undesirable alternative areas from consideration by the developer. The policy of sewerage preinstallation will become increasingly effective as good cesspool and septic tank sites are developed and eliminated from the land market.

So long as alternative developable sites are available, and in the absence of completely restrictive expansion controls, (e.g., the requirement that all new construction be required to connect to a sewerage system) utility preinstallation cannot realize its full potential as a planning tool. With the extension of sewer lines into relatively undeveloped areas,
abutting property values must automatically increase by at least the cost per lot of the extended system. Rather than pay this increased cost for land, many developers prefer to locate away from the sewer line and to install individual septic tanks or cesspools to keep the price of the house low. Again assuming that alternative sites are available, residential development in selected sectors can be effectively encouraged only when local governmental agencies are able to furnish utilities at a lower per lot cost than can the developer. This should, in fact, be the case, since the public agencies would be able to realize significant economies in the construction of large-scale systems.

The definition of the service area boundaries must be based on a consistent, well-conceived area development plan with full knowledge of the impact on the community in allowing development to occur in particular areas. The decision to restrict selected suburban areas from development should also be supported by those local governmental agencies whose responsibilities, both current and future, are based on a pre-defined level and location of population. These agencies include, but are not limited to, schools, police and fire protection and utility districts. In order to withstand the inevitable pressure to subdivide in restricted areas, factual economic data must support the planning policy indicating that growth in these areas is not in the best interests of the community.
Consolidation of Utility Districts

In general, the existence of a large number of small independent utility districts within an urbanizing area contributes to an uneconomical overall operation. In the case of sanitary sewerage and water service, administrative and other overhead costs result in a rapid increase in the cost per connection with a decrease in the size of the district served. In nearly all cases, it is possible to reduce connection charges to the consumer and to provide a higher overall level of service through district consolidation. Area-wide planning for the accomplishment of an optimum development plan can be greatly facilitated when one or a small number of jurisdictions are responsible for the provision of public utilities.

Small districts do satisfy a local need in providing immediate service to newly developed low-density areas which cannot economically be connected to existing central utility systems. Whether or not these developments should have been allowed to happen in the first place, the inefficiency and lack of scale economies of these small districts may be a cost that users are willing to accept initially for prompt service, but there seems little reason to continue this inefficiency after residential expansion reaches the point where the density allows the extension of the major utility systems. In addition, restrictive controls on the formation of new districts may have an important effect on controlling haphazard suburban growth.
Preservation of Open Space

Changing public tastes and a revised scale of values have placed a new importance on the value of open space within the urban fabric. A visual pattern of openness has become as essential as the traditional public facilities and services in making the urban environment a more satisfying place in which to live. While open areas provide a pleasant interlude in the continuous urban land use pattern, they also act as effective barriers to uncontrolled expansion and the establishment of open spaces can be an important tool to meet the objectives of timing the rate and controlling the location of urban growth.

The acquisition of land for open space should precede or accompany residential development if meaningful quantities of land, optimally located with respect to the existing and potential population, are to be added to the urban pattern at a minimum of public expense. Numerous acquisition methods have been suggested and tried for the temporary reservation and permanent preservation of open space. Outright purchase is obviously the most effective means of acquiring desirable land for specific open purposes and for guaranteeing the integrity of that open space in the future. Agricultural, watershed, and flood-plain zoning are useful temporary protective devices, although their application cannot be entirely depended upon for permanent protection. Land may be acquired and preserved in a relatively undeveloped state through the establishment of scenic easements.
along freeways and around other public facilities. The pur-
chase of these easements ensures the continuing control over
the future land uses to maintain their scenic value. In those
areas where the scenic easement is widely used along highways,
it has been discovered that significant savings are realized
in right-of-way maintenance. Instead of maintaining the grass-
land within the right-of-way at public expense, the area is used
for crops or for cattle grazing. Also, encouragement is often
given to farmers to retain their properties in open agricultural
uses by allowing tax deferments as mentioned previously.

Philanthropic donations of land can be an important source
of preserving open space. When it has been demonstrated that
there is a need for open space in particular areas and that
there is a sound plan for its use, significant quantities of
land or the development rights to that land have been donated
to the community. This practice could be encouraged through
the granting of certain concessions to the landowner, especially
through reduced taxes on that land without intense development
potential.

When funds for the outright purchase of open land are limit-
ed or public ownership is not otherwise necessary, perhaps the
most effective and just means of establishing and holding open
spaces is through the acquisition of less-than-fee interests
(i.e., easements) in private properties. This method involves
the purchase by the appropriate local public agency of a land-
owner's right to develop his land for a more intense use. In
this way, key portions of the country-side are conserved and subdivision development is channeled into other areas, while the open land may well remain in productive use. These rights may be acquired either through direct purchase or through the purchase of the land in fee simple with subsequent leaseback or resale to a private party with certain restrictions. The former of these appears to have a number of advantages over the latter, not the least of which is the lower initial capital outlay required. The sale or leaseback technique, however, is often preferable for properties having a high current market value and subject to strong pressure to develop. The public purchase of easements has an added value through restricting development in a particular area until some character has been established in neighboring areas and the best use can be more accurately determined.

An interesting approach to the problem of conserving open space, albeit yet to be tested in the courts, is based on the concept of compensable regulations. 9 According to this approach, land that has been ear-marked for open space would be limited to selected uses and the owner would be guaranteed compensation upon the sale of his property based on the value established at the time of the imposition of the compensable regulations. The established value would be adjusted regularly to compensate for property appreciation and the declining value of the dollar. Compensation would be paid only at the time of sale, thus eliminating the need for the local government to provide a large initial capital outlay for the purchase of the property owner's right to develop. Sale of all property would necessarily be
public in order to curtail buyer-seller collusion. It is conceivable that in some instances no compensation would ever have to be paid since some property owners would welcome a guarantee that surrounding properties would not be developed at any time in the future and hence there would be little if any decrease in property valuation resulting from the imposition of the regulations. In the main, this proposal appears to represent a sound compromise between the strict application of police power controls and the outright acquisition of desirable open space lands. The full impact of its value for maintaining open spaces and/or shaping our urban areas can best be assessed through its use in a number of places and situations.

Implicit in the review of the majority of these methods of acquisition is the principle of eminent domain versus the use of the police power. Police power is used to prevent the landowner from engaging in actions which are detrimental to the public welfare and no compensation to the landowner is required. Under eminent domain the public receives a benefit from the landowner and is morally and legally required to reimburse the landowner for his loss. The amount that must be paid depends on how much the property owner loses in keeping his property open; the amount can vary from nothing to full value of the lot.

The body of law related to funding the acquisition of fee interests or less-than-fee interests is being rapidly expanded and the availability of federal funds for assisting in open space acquisition has greatly increased the amount of open land which can be incorporated into the urban pattern on a permanent basis. The use of money from the general state or community
funds is the most direct method of local financing, but demands from other public bodies often limit the amount that can be appropriated from this source. The difficulty in defining the incidence of benefits limits the widespread use of local assessment districts. A large bond issue would establish a sizeable capital base which could be used for immediate open space acquisition, possibly on a revolving fund basis, and would be particularly useful when the entire fee interests are to be purchased with the consequent resale or leaseback with restrictions. A small increment in the rate of property taxation could be specifically allocated for the continuing acquisition and development of parks and open spaces. In addition to these direct methods of acquisition, open spaces may be financed and obtained indirectly through other public improvement programs. The acquisition of these open spaces would be incidental to the main purpose of these programs and the open spaces would generally be more functional than purely aesthetic.

Open space is only one element in the total urban pattern, but its presence or absence can have important effects on the direction a community grows, the rate at which it grows, and the environment which is established as a result of that growth. A total community plan and program should assure that suitable land is set aside for open space uses, both active and passive, and the amount, location, and timing of acquisition of such land should proceed before open uses are preempted by intensive development.
Alternative Forms of Urban Development
Alternative Control Policies

Desirability of Flexible Zoning Controls

Existing zoning, subdivision, and building regulations have had an important influence on existing urban patterns and on the direction and magnitude of suburban growth. Zoning, in particular, directly affects the value of parcels of land by increasing or decreasing their value depending upon the permitted intensity of use. Even though legally permissible under most zoning regulations, it is not generally economical to use a property for any less intense use than that specified by the regulations. Similarly if an area is zoned for 7,000 square-foot minimum residential lots, the developer automatically uses this figure as his maximum lot area to allow the most intense use of the land.

Contemporary zoning regulations, based on single lots, do not lend themselves well to the regulation of the development of large-scale, multiple purpose subdivisions. The single lot concept is appropriate when the typical builder develops a few individual lots within an area and it is necessary to have regulations to assure some orderliness, uniformity of quality, and maintenance of some open space to preserve light and air. The permissible building "envelope" on a lot is defined by the setback requirements, the side and rear yard specifications, height limitations and lot coverage percentages. These constraints
limit the creativity of site planners and architects, and work to perpetuate the uniformity of design and the paucity of open spaces within new residential subdivision developments. Large, comprehensively planned subdivisions with variable setbacks and with smaller lot sizes than allowed under existing zoning regulations, together with common useable open spaces, dramatize the desirable types of development that can take place when regulations are made less rigid. This flexibility allows the use of alternative methods of satisfying those requirements which zoning ordinances were designed to provide.

Site-Value Taxation

Advocates of the politically controversial land value taxation theory as conceived by Henry George claim that this method could improve the existing spatial pattern of the urban area without distorting the market mechanism. The theory proposes that the complete tax load be placed on the land or site value while any improvements on the site would be untaxed. It is claimed that the effect of this method of taxation would be to depress the demand for land and, consequently, its price. Widespread land speculation would be eliminated and it is felt that a more continuous built-up area would result. Although these views have been largely substantiated through the actual use of site value taxation in Australia, Canada, and New Zealand, opponents of the practice fear unpredicted distortions of the urban pattern and tax base. In addition, vacant land would be virtually eliminated unless some provision would be made for reducing the tax burden on land left in a relatively undeveloped state.
Alternative Local Patterns of Development

Neighborhood Concept

The neighborhood unit concept was developed by Clarence A. Perry in a report published in 1929 by the Committee on the Regional Plan of New York and Its Environ's.\textsuperscript{10} Basically, the theory attempts to create a healthy and satisfying residential neighborhood environment which fulfills the needs of the family and is based primarily on the principle of walking distance rather than on mechanical means of conveyance. The elementary school is the nucleus of the neighborhood unit and the size and shape of the school's tributary area is largely determined by the number of families located within a half-mile radius. Approximately ten percent of the neighborhood area is devoted to parks and playgrounds, located strategically with respect to the population. The internal street system is arranged to discourage through traffic and the major traffic ways act as neighborhood boundaries. Commercial land uses and shopping facilities are located at the major street intersections and are separated from the residential neighborhood by apartments.

In order to retain the walking distance principle, neighborhood units are most appropriately located in the zone around the central city where population densities of the neighborhood approximate the expected density based on the natural decline away from the urban center. Being relatively isolated from other neighborhoods by physical features, either natural or man-made, each neighborhood essentially becomes a self-contained operational
administrative unit with its own civic conciousness.

Numerous comprehensive development plans group a series of neighborhoods around a high school and district park. These groups are then focused on community civic centers which in turn focus on the central city, which is dominated by commercial retail centers.

The neighborhood concept has become widely accepted since its inception and is incorporated into a large number of development plans throughout the country. The concept has been criticized, however. Major critics, such as planner Reginald Issacs and architect Henry Churchill, feel that the neighborhood tends to encourage the segregation of racial, economic, and religious groups. In addition, the neighborhood unit, as defined by Perry, with its uniform population density and lot sizes, does little to allow for the decreases in population and land use intensity which may be expected to occur as the distance from the urban center increases. Many communities use the neighborhood concept only as a device for ordering the arrangement of land uses in appropriate relationships.

The application of the neighborhood concept has changed over the years, partly to meet the deficiencies noted in the above criticisms. For example, a variety of housing types and densities may be encouraged within each neighborhood.

Cluster Subdivisions and Planned-Unit Developments

Beginning with garden cities in England, attempts have been made to discover alternative designs for subdivision developments to replace the traditional gridiron system. The use of curvilinear streets represents an improvement in design, but their repetitious
use has created a new monotony in the suburban residential land pattern. The need for a design that severely limits through traffic, provides for and encourages variety in house design and lot development, and contains open spaces for recreationally and leisure use has been partially satisfied by the concept of cluster subdivisions and planned-unit developments.

The cluster subdivision consists of several lots grouped together within a relatively small area and surrounded by undeveloped land which provides a visual and physical definition between similar clusters. The undeveloped land is often held in joint ownership by the subdivision residents and is used commonly by all of the property owners. This land may be left in its natural state or it may contain such features as a local swimming pool, golf course, landscaped park, lawns, and buffer plantings which contribute to a more enjoyable and satisfying living environment.

The advantages of cluster subdivisions are many - an important consideration is the maintenance of the same levels of housing density as with lot-size zoning. But, the clustering of houses greatly reduces the cost of installing and maintaining utilities. When it is possible to provide a high level of urban-type services, the lot sizes may be reduced while population and housing densities remain similar to that accomplished by lot-size zoning. Street, sewer, and water main lengths are significantly less than those in typical subdivisions, resulting in reduced costs to the developer and to the prospective home buyer. If drainage conditions warrant, individual sewerage systems might be employed with the possibility of using all or
a portion of the open space as a community drainage field. In unusual cases, it may prove desirable to construct a sewage lagoon within the open space and well-isolated from the residences, although the desirable sites required for this disposal method are rather limited.

Another advantage of cluster subdivisions is their ability to utilize by-passed land which cannot economically be used in the conventional manner. Parcels of land with "flaws" (ravines, hills, streams, etc.) may be developed, turning traditional land defects into aesthetic and visually pleasing assets. Extensive site engineering costs may be held to a minimum by intensively developing only the levellest and best drained portions of the parcel and leaving the remainder as open space. Also, clusters could be situated so that the connecting streets may be optimally located, avoiding and preserving natural obstacles and thereby maintaining the natural character of the land.

In all cluster subdivisions, some guarantee must be established to insure against future use of the open space which would be contrary to the originally planned use. While it may be possible that, in some instances, the open space should be available to the public and hence controlled by a local government agency, the customary method is the local joint-ownership of the property. In this way, the open space and the uses of that space may be planned as an integral part of the entire subdivision, with only the subdivision residents having access to the open space.

In the original plat design, the lots and open spaces may be
oriented in such a manner that future subdivision is impossible. In addition to plat design, legal restrictions in the form of deed restrictions or open space easements might be used to assure integrity of the open space.

Planned-unit developments are similar to cluster subdivisions in that they are intended to provide opportunities to create more desirable environments through the application of flexible and diversified land development standards. They differ from cluster subdivisions in that they permit an intermixture of housing types - single family residences, duplexes, row houses, townhouses, or apartments, as well as cluster units - and related commercial uses which are designed exclusively to serve the development of which they are a part.

Planned-unit developments have particular applicability in the utilization of by-passed lands of any reasonable size which are otherwise difficult to develop because of poor configuration, unique character, or problems related to topography or access.

Cluster subdivisions and planned-unit developments have, in the vast majority of cases, proven successful to all parties concerned - builders and developers, purchasers, lenders, and abutting neighbors. Heightened property values have been maintained in all cases and the stability of the neighborhood in terms of resident turnover has been demonstrated in numerous instances. Builders and developers are able to provide highly desirable and saleable products to consumers. Consumers are able to obtain reasonably priced homes with small private
lots which minimize the burden of yard maintenance and yet the consumers have access to community recreational facilities they ordinarily would not be able to enjoy. Lenders, although often initially skeptical, are realizing that cluster and planned-unit developments represent sound investments in their stability and general desirability.

**Alternative Regional Patterns in Development**

The optimum urban form for any area of population concentration must be based on a set of goals which that community wishes to achieve. Of paramount importance, in most cases, is the desire to minimize the distances (or, conversely, to maximize accessibility) separating individuals and the activities in which they wish to participate. These activities include employment, convenience shopping, purchase of goods and services in the central city, recreation, and social and cultural pursuits. Accessibility should also be increased for the activities in which commercial and industrial uses engage. Implicit in improved accessibility is reduced traffic congestion.

The optimum design should also encourage the urban area to assume such a pattern and density that public transportation, utilities and services can be provided most economically. The design should provide sufficient open spaces, easily accessible to the majority of the residents. If the optimum plan includes peripheral urban centers, they should be designed in such a manner that their integrity and identity are maintained. Since growth will occur in any design, some provision must be made in
the plan to accommodate this growth. The optimum urban configuration should retain valuable agricultural lands and natural resources within its structure. Finally, the plan should be capable of being developed from the existing forms at a minimum of expense and with the least amount of governmental and policy change. Four basic patterns will be examined and assessed for their ability to satisfy these goals.

Centralization

By severely restricting suburban expansion at the periphery of the central city, future growth must then take place on previously skipped vacant land and population densities will increase throughout the urbanized area. Large belts of open space would surround the city and would provide a definition between major cities. The higher density of population and housing would allow more economical installation of public utilities throughout the urban area and would facilitate the greater use of mass transportation to decrease congestion in the central district. Public services such as police and fire protection and schools would be more efficient and economical with a dense and continuous pattern of development. The clearly defined periphery of the urban area would eliminate all farmland within the boundary and would preserve most agricultural uses within the open space belt.

The most undesirable aspect of this pattern of development is the difficulty in devising policies for its implementation.
Centralization is in direct opposition to the current trend toward decentralization and extremely strong and unpopular expansion controls would be required. Land for residential development would become increasingly scarce and expensive as growth takes place, and it would be expected that a large segment of the population would be forced, for financial reasons, into multiple-family dwelling units. Any policy for the guidance of urban growth and expansion is more likely to succeed if it reinforces, rather than opposes, natural social and economic forces.

Radial and Linear Corridor Development

Radial corridor development takes advantage of the improved access offered by radial arterials which converge on the central city. Intense development would take place at a decreasing rate away from the central city, allowing the extremely efficient provision of public utilities and services, particularly those of a linear nature (i.e., sewers, water lines, transportation, etc.). Open space would be provided between the fingers of the radial corridors, readily accessible to the population and establishing a limit to undesirable expansion. Minor subcenters of economic activity could be expected to develop at spaced intervals along the corridors, containing decentralized industrial plants, community centers, local shopping districts, multiple family structures, regional parks and schools.

The principal radial arteries are often developed through
good farmland and in these instances the agricultural uses would be preempted by more intense developments. However, large areas of land would be available for the more intensive types of agricultural uses within the open spaces between the radial corridors.

Since development along the corridors would be continuous, there would be little differentiation between individual nodal communities. In this respect, public functions which are based on areas for districts, such as police and fire protection and school districts, might not be as efficient as in more compact designs.

Linear corridor development would also be oriented along major arterials or along natural features and would have design characteristics similar to the radial pattern. Greenbelts would separate the corridors, and land uses along the corridor would be planned to provide for a decline in land use intensity as the distance from the major concentrations increases. The linear system, however, lacks a central focus and much of the transportation efficiency of continuity realized in the radial plan is lost in the linear plan.

New Towns

The British new town program, enacted in 1946, had established 15 new urban centers by 1961 with a total combined population of nearly 476,000. Initially, the new towns were designed and located for the primary purpose of receiving the London suburban population overspill and have since proven to be successes in both social and economic terms as well as from an administrative viewpoint. The average town size is approximately 32,000
(large enough to support the preplanned central shopping plaza and a number of industries) but small enough to be socially and economically dependent upon the major metropolitan area.

It is felt, both in Britain and the U.S., that a population size of about 100,000 to 300,000 is required to achieve relative independence and self-sufficiency. It is at this level, for instance, that the Baltimore regional development plan of metrotowns is based. 13

Under the Baltimore proposal each metrotown would be approximately 30 to 50 square miles in area and would have a large-scale commercial central district with public buildings and cultural facilities near the town's center. The towns would be largely self-sufficient, but would be connected to the major central city and to other metrotowns by a well-developed transportation system. The towns would be located on existing commercial clusters or at sites where current and projected development pressures would indicate the desirability of a large, cohesive urban center. Each town would be surrounded by a greenbelt of agricultural and recreational land.

New towns and metrotowns benefit from the wide range of planning techniques and economies which have been developed in recent years. Land use distribution and vehicular circulation networks may be designed with a high degree of efficiency, especially when the new town is not superimposed on an existing urban site.

The metrotown concept finds its greatest advantage over alternative forms in its potential for relieving traffic congestion in the central city. Metrotowns provide major employment
opportunities and offer a wide range of specialized goods and services.

Growth of the metrotowns would be strictly controlled to achieve a smooth progression of density decline outwards from each center. Internal accessibility would be relatively good as a result of the compact shape. Expansion at the periphery would be restricted by the surrounding open space, which would be devoted to recreation, agriculture, resource conservation, or would be left as vacant land.

Central Place System

Central place theory, as stated previously, attempts to explain the size, number, and distribution of urban centers. In brief, the major features of the theory are (1) that each central place is located at the center of its tributary area where accessibility is maximized, (2) the "order" of the central place depends on the quantity and diversity of goods and services offered, and (3) the lower order goods generally require frequent purchase trips by the consumer and are consequently found in all low-order central places, which are most accessible to the population; consumers are willing to travel further to purchase higher order goods and services, although less frequently, and there are fewer establishments to provide them than lower order goods; the higher order places command large tributary areas and also supply all of the lower order goods, (4) central places "nest" in a hierarchical pattern of distribution, with the tributary areas of higher centers dominating a number of lower order central places and their tributary areas. Each tributary area is assumed to be
hexagonally shaped under ideal conditions, although in actuality the pattern of central places and the shape of their tributary areas become greatly distorted when influenced by such factors as physical features, the existing transportation network, and the distribution of resources.

Traces of the hierarchy are visible in most areas of the country. While the strict hexagonal pattern may be lacking and even undesirable in light of existing development and environmental conditions, the theory none the less illustrates some features of urban function and distribution which tend to aid the efficiency of interaction and are worthy of consideration when assessing alternative forms of urban development.

The central place system would focus on the central city to a greater degree than would the metrotown configuration. While each urban place would contain some employment generating activities, much of the specialized employment would remain in the central city. Local shopping centers within the smallest central places would satisfy most of the needs of the population within their tributary areas, with higher order goods and services available at the next higher and more distant central place and the highest order and most specialized functions would be satisfied in the central city.

The maximum size to which any center could grow would be determined by a surrounding greenbelt. This open space would give definite legibility to the central places and would be easily accessible to the entire population of the urban region. As in previous alternative forms the belt of open space could
be left in its natural state or could be devoted to low intensity uses.

The design provides for towns of various sizes, giving a range of environmental choices to the population of the region. The density of each central place would be high and the population distribution would be continuous, allowing the efficient provision of public utilities and services. Since the configuration is generated largely by natural forces, there would be a minimum of governmental control policies required to effectuate the plan. With the current trend toward industrial decentralization, each central place could be provided with a relatively wide industrial employment base, minimizing intra-center commuting. The major functions of planning and governmental policies would be to assure the controlled growth of each central place and to provide the pattern with an efficient transportation and services network.
ALTERNATIVE FORMS

central place

centralization

linear corridor

radial corridor

new towns
CONCLUSION

Suburbanization is proceeding at a faster rate than is our means to provide the suburban areas with a minimum level of utilities and transportation facilities. An unfortunate tendency has been to view all underdeveloped property within a maximum commuting distance from the central city as potential residential, commercial, or industrial land. Hopefully, this study has indicated the general undesirability and shortsightedness of such an outlook. The "highest and best" use of the land is not necessarily that use yielding the greatest return in the short-run. Active or passive open uses, while they may yield little or no immediate financial return, generally prove to be extremely valuable in later years in terms of individual personal satisfaction and general community welfare.

The type of growth now being experienced in our suburban areas is not self-correcting - the trends now underway can only be expected to continue at an accelerating rate in the foreseeable future. Superior forms of development are feasible and policies and controls are possible to bring them about. Promptness is essential in making the required decisions to define the future growth sectors of the metropolis. It is imperative that this time element be recognized and that all practical alternatives be examined which will preserve at least some of the open character of the remaining countryside, will guide population growth into an economically efficient and socially satisfying pattern, and will establish an overall framework to guide smaller
scale, day by day decision making.

The growth of the urban area and the spatial pattern of land uses which result can take many forms, depending on the degree to which conscious policies and controls are applied to guide growth in order to achieve the "best" urban form. Some consequences which can be expected in allowing urban development to continue in a largely unplanned manner, primarily in response to market influences, have been identified in this study. Any one of the alternative development patterns discussed, however, or most combinations of them, are feasible goals toward which the metropolitan area might strive. The ultimate pattern which is the most desirable form for the area is one that minimizes public sacrifices and maximizes public benefits during its implementation and results in the optimum configuration best satisfying the goals of the community.
SELECTIVE REFERENCES


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