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(As of December 31, 1964)

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Foreword

The reports contained in this Record provide an overview of the current activity in this country in the development of planned communities. Dr. Robert C. Weaver, Administrator of the Housing and Home Finance Agency, succinctly defines the role of the Federal government in assisting the development of sound urban growth patterns through various techniques, one of which is the "planned community" concept. The advantages of planned communities are fully delineated by Dr. Weaver, as well as the critical relationships between transportation and land use that must be considered in shaping new urban growth patterns. He also discusses the need for effective decision making at the state and metropolitan governmental levels if planning is to be a vital tool in solving our urban problems.

Two examples of current planned community developments are also presented in this Record: Columbia, Maryland—A New Town for America; and the Bluffs—A Planned Community on the Irvine Ranch, Newport Beach, California.

William E. Finley of James W. Rouse and Co., Inc., developers of Columbia, presents various criteria used in the selection of the Columbia site for a new town. Finley further discusses the detailed survey and analysis phase of the planning process that served as a prelude to the development of a plan for Columbia.

Kenneth Albright, in his discussion of "The Bluffs," emphasizes the various factors that were vital to the successful development of Irvine Ranch in California.

Wolf Von Eckardt, architectural critic of the Washington Post, in his discussion "Lessons to Be Learned from Europe," makes specific references to various planning efforts under way in such cities as Stockholm, Harlow, Cumbernauld, Tapiola, Rotterdam and Warsaw. Mr. Von Eckardt's thesis is that Western Europe's new architecture is far advanced of that in this country with regard to applying urban design principles to make our cities livable. He contends that although we have built vast housing accommodations and highways in this country, we have not built communities. Von Eckardt urges the building of three-dimensional models of our cities as a means to visualize and plan the growth and development of our urban areas.

Henry K. Evans in his paper, "Transportation Planning Criteria for New Towns," emphasizes the need for thorough traffic estimation and synthesis of future travel patterns for new towns. One of the most important criteria affecting plans for new towns, according to Evans, is the economic-base study, which when considered along with the initial investigations of controlling physical, legal and financial features of new town development, will determine the character and extent of development possible. As Evans points out, these factors are important inputs to planning the transportation system of new towns.

The papers presented in this Record should be of special interest to transportation planners, traffic engineers, city planners, and other professional groups who are concerned with the current trends in the growth and planning of our metropolitan and urban areas.

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Planned Communities

ROBERT C. WEAVER, Administrator, Housing and Home Finance Agency

•WRITING IN the New York Times, Columnist James Reston recently noted that, "In a fit of exuberance or absentmindedness we have increased the population of the United States by over 50 million since 1945."

As we all know, the exuberance and absentmindedness of which Reston spoke is continuing, and at such a pace that by the time the children of the past 15 years are grandparents, there will be another 125 million or so Americans. Moreover, at least 85 percent of the 300 million people in the nation will be living in urban places by the year 2000.

This growth is the most portentous single fact of our time—always excepting the thermonuclear threat. It means that in the next 40 years we will have to build as much housing, industry, highways and related development as we have built in our previous history. And it means, moreover, that the amount of land consumed by urbanization will be at least double the acreage now urbanized.

This tremendous population surge will be accommodated largely in what we today consider the metropolitan fringe, and, in many cases, in undeveloped or agricultural lands even farther out. By 2000, Megalopolis will be a fact, certainly the fast-growing East Coast "super-city" stretching from Boston to Richmond and the West Coast area between San Francisco and San Diego will appear, in another 40 years, as continuous urbanized places.

The previous 40 years of metropolitan growth has produced a phenomenon variously known as "Spread City," "urban sprawl" and "slurbs." In other words, much of our suburban development heretofore has been a mess. Not only has it resulted in ugliness and botched land uses, but it has also been tremendously wasteful. Community facilities, such as sewer systems and water supply, have been built on a piecemeal, too-little too-late basis. Roads and highways have been developed with little thought to repercussions on future land-use patterns, and commercial and industrial buildings have gone up, willy-nilly, wherever a local zoning ordinance could be obligingly bent.

This haphazard development has left us with a considerable deficit in terms of the physical condition of many of our suburban communities, and particularly in terms of their capacity to accommodate future growth. Ironically, however, in the midst of this physical chaos we often find a social uniformity which has provided much ammunition for pundits and philosophers alike.

Historian Oscar Handlin has perhaps put it best:

What is new in the long-term movement to the suburbs is the insistence upon constructing small, uniform, coherent communities and the surrender of the adventure of life in the larger units with all the hazards and opportunities of unpredictable contacts.

It is the stifling of opportunities and the minimization of choice that has most particularly brought much scorn on our suburbia of today. The one-class, one-color, uniform bedroom community so often satirized in modern fiction is, like most butts for satire, too sadly a fact.

Finally, the suburbs have, for a variety of reasons, grown intellectually and politically apart from the central cities. There is too little willingness to see that the problems of city and suburb alike are really the problems of a single metropolitan region.

Neither the problems of growth in the metropolitan fringes nor of decay in the older areas of the central city can be conveniently sorted out, as all transportation experts have long ago discovered. In fact, the rational development of transportation systems, with an optimum balance of mass transit and highways, offers a key opportunity for developing a truly metropolitan matrix in which the problems of the city and suburbs can be focused and delineated.

President Johnson, in his housing message a year ago, said, "If the taxpayer's dollar is to be wisely used and our communities are to be desirable places in which to live, we must assure ourselves that future growth takes place in a more orderly fashion."

In that message, the President proposed a new program to help meet the challenge of metropolitan growth. The program comprised aids to states or local governments for acquiring land and developing needed public facilities ahead of full-scale development, and also proposed mortgage loan insurance for private builders who would develop well-planned subdivisions or communities.

This program constituted a direct response to the threats of continued wasteful suburban development. It would have provided the Federal Government with the means to generate much greater interest in a trend already developing throughout the nation, the trend toward the building of carefully planned and, sometimes, fully serviced communities. Moreover, the program was designed to spur further the development of land in accordance with metropolitan area plans. For not only would the communities themselves have to be planned in a rational, orderly fashion, but they would also have to contribute to the broader scheme for total development of the metropolitan region.

The Federal program to assist planned communities was not aimed at merely creating a special variety of living mode. Fundamentally, it represented a bold approach to a higher order of comprehensive land use, with the emphasis squarely where it must be to meet the challenge of growth—on planning in a metropolitan context.

There are, of course, other objectives behind the Federal proposals for assistance to planned subdivisions and communities. Insuring the construction of public facilities, often in advance of actual need, was one. This is to guard against continued waste and inefficiency in such development, particularly in the building of sewer and water facilities. In too many suburbs today, citizens find themselves faced with the prospect of heavy costs for these facilities, which should have been provided before total development. New York State recently proposed a multi-billion dollar program to build sewer facilities and clean up lakes and streams, now polluted by wasteful development. Wolf Von Eckardt, writing in the Washington Post lately reported President Johnson's affirmed and reaffirmed concern for these matters, saying, "He seems determined to reverse the tide of land, water and air pollution resulting from industrialization, urban sprawl, highway needs, builders' greed and mounting technological waste."

Another objective of the Federal proposals affecting urban land use was to guard against unwarranted kiting of the price of land. More rational use of land will minimize the rise in land prices which would be expected to occur with the provision of public facilities. Better land utilization, assuming a high order of consumer acceptance, should, in fact, provide developed sites at lower cost. This can be done through judicious use of the cluster principle, whereby higher densities can be achieved while still providing maximum open spaces for all families. This cluster principle has, in fact, been followed in an increasing number of new suburban developments and in most of the 170 planned communities currently being built by private enterprise throughout the nation. It provides for a higher order of open space and preservation of existing greenery than most of the subdivisions we have seen in the postwar years.

It should be noted that not everything called a "planned community" is necessarily the ultimate in living styles. Many of these will be little more than glorified subdivisions, and maybe not even so glorified. And where any development of over 30,000 or so population is planned and built without regard for the development of the larger region of which it is part, there are serious questions about the value of this sort of "planned community."

But where the job is done properly, as it is in many of the newer communities, there are some obvious advantages:

1. Land costs are lower because of the ability to utilize land farther out on the metropolitan fringe and because of the advantages of carefully planned land uses designed to reduce unit costs.

2. There is maximum choice of housing for a full range of incomes, low as well as high and medium, with many different housing types. Some new communities, although they are quite far from urban centers, are attempting to develop an urban feel, with some high-rise apartments clustered closely around intimate plazas and pedestrian shopping malls.

3. Development of open spaces and recreation areas is optimum.

4. A comprehensive transportation system for internal circulation, travel to the larger urban center and to other outlying communities is included. Almost every planned community under construction is oriented closely to a major highway or highway interchange. And even though some of the planned communities stress high levels of employment within the community itself, all recognize the continuing need for convenient and reliable central city travel. Internal systems of travel increasingly involve clear-cut pedestrian-auto separation and some use of special vehicles. At the new town of Columbia, to be built between Washington and Baltimore, small buses, somewhat similar to Washington's minibuses, are being considered for internal public transportation. They would travel over exclusive rights-of-way with frequent scheduling.

5. A high level of employment potential is forecast for some larger planned communities. This will mean that workers should be housed in the community and, therefore, enforces the need, and provides the market, for lower and middle-income housing. As these communities develop, it is also anticipated that, even as in the central city, service jobs will grow faster than any other category and, therefore, will generate still further demand for lower and middle-income housing.

6. A much wider range of cultural opportunities will be present in the better planned communities than we have seen in most of our suburban developments. The notion of suburbia as a cultural desert hopefully will be less true in the new communities now planned or to be built in the future.

7. Finally, the new community concept offers an opportunity for a completely planned environment, with the most efficient, least wasteful hierarchy of land uses and the optimum provision of public facilities. This will not necessarily mean that overzealous urban designers will wrap communities in a rigid pattern of development geared solely to their particular esthetic. Rather, there should be plenty of room not only for the pedestrian to ramble, but for the free spirit to ramble as well; some of the more advanced planned communities recognize the need for tranquility and solitude, as well as for gregariousness and congregate activity. Our land-use proposals would encourage such results in new communities and facilitate the maximum number of these advantages in the larger suburbs. They will not be uniformly effective, but they are consistent with our institutions and values, and they do represent a first, but important, step toward a new and rational approach to a long-neglected problem.

It might appear that the Federal interest in promoting more planned suburban development indicates a lessening of concern with center city problems. Certainly some of our old city friends seemed to feel this was so last year when they opposed our New Communities proposal. I have to say, with some sadness, that they were never more wrong. In fact, we are prosecuting our urban renewal and public housing programs with greater vigor than ever, and we intend to continue to do so. Moreover, those programs which most directly benefit the central cities will be continually improved and expanded to do the job which still needs to be done, the revitalization of our great cities to make them better places in which to live and work.

This is not to say that we are ignoring the very real conflicts that will continue to exist between central city interests and suburban interests. But we certainly do not intend to aggravate them. Rather, we intend to help upgrade the quality of the total metropolitan environment and to expand the fullest range of choices—in jobs, housing and leisure activities—for all persons throughout our great urban regions. Some activities are better and more economically performed in one part of the metropolitan area than another, and those choices will have to be made in the typical American fashion

of private market accommodation to public purposes. In any case, these choices must be weighed in a truly metropolitan context.

This is a perspective which is increasingly recognized as the most effective way to handle the broad range of growth problems, and it is a perspective which we in the Federal Government intend to continue to foster.

As the late Catherine Bauer Wurster has said:

In order to predict the effect of potential changes in specific environmental factors, we are trying to understand the inner dynamics of the urban development process. And to this end we are borrowing the most refined theoretical and mathematical methods from technology and social science. In the analysis of urban form and structure, and even in the esthetic and cultural aspects of urban design, systematic approaches are increasingly being employed.

Catherine Bauer Wurster was one of our great pioneers in advanced thinking about metropolitan problems. We miss her wisdom and probing mind. She understood, perhaps better than anyone, that the challenge of growth could not possibly be dealt with in any but a metropolitan context.

Transportation planners have been, in major respects, the trailblazers in applying modern scientific methods to the problems of interrelationships between metropolitan sectors, such as various land uses and their ties to transportation. Such studies as the Tri-State Transportation Committee and the Penn-Jersey experts have been carrying out point the way to a more rational metropolitan development pattern throughout vast areas. If much of the work seems to generate as much scepticism as fact and fails to generate sufficient political backing, it nevertheless is drawing us relentlessly closer to meaningful solutions. I might add that the scepticism is a valuable byproduct, and the political backing will come.

The Federal Government has been busily boosting the cause of metropolitan planning through a variety of programs. Our Section 701 program of urban planning assistance has been most valuable. It has already made more than 325 grants to metropolitan and regional planning agencies and another 1,200 or so to states for urban planning in smaller localities and for statewide planning. Under the New Communities proposal, this assistance would have been extended and expanded.

Planning is also a major objective in our open space and mass transportation programs. Both require that grant funds be used in accordance with approved urban area plans, and thereby they tend to generate such plans. There have been some complaints that this requirement tends to slow up the mass transportation program. But this vital program is not a catch-as-catch-can vehicle for shoring up failing transit facilities without any considerations of broader needs or taking into account future growth. Not surprisingly, those areas which have done the most planning and thinking about the future have the least difficulty putting together a sensible proposal.

Finally, as you all undoubtedly know by now, Federally assisted highways to be built in larger urban areas after July 1, 1965, will have to be based on a continuing comprehensive transportation planning process. Moreover, this planning process must take into account needs for all forms of transportation and the potential effects of the evolution of such systems on future land development.

What we are saying in these programs is that the critical relationships between transportation systems and land uses must be carefully thought out before it is too late. We have made too many mistakes in the past to be able to afford more. There are alternatives to sprawl and unguided metropolitan growth, and we are asking you to look for them. We are not attempting to dictate forms, nor methods. Alternatives take many shapes: corridor patterns, satellite cities, clusters of semi-urbs surrounding a highly specialized core city, and others. The interest is obviously high. For instance, both California and New York, our two biggest states, have recently come out with reports urging comprehensive community development throughout broad metropolitan regions. New York has conceived a statewide system of development, following very generalized patterns of land use, within which specific situations can best be accommodated.

In all of this fast-growing interest in metropolitan area planning, the role of transportation experts will be pivotal. Soundly designed systems can be instrumental in shaping desired land-use patterns. This is quite different from most of our previous experience, of course, where land uses, like Topsy, just "grewed" as a consequence of highway routes, which in turn were usually designed strictly to get people and goods from here to there without much regard for what happened along the way.

The development of planned communities within the framework of a broader metropolitan scheme is perhaps our most creative means of evolving rational uses for optimum living and working conditions. In themselves, planned communities are certainly not the whole answer to the problems of growth without sprawl. In fact, most of our growth will not occur in so-called planned communities such as Reston or Columbia, but rather will continue to be accommodated through the efforts of builders developing smaller subdivisions. But we can continue to press for suburban developments of various sizes to occur within the framework of a metropolitan plan, and to see that there is adequate provision of facilities such as sewer, water and open spaces. And we can encourage and facilitate better land uses which preserve trees and contours while utilizing cluster development.

We make no pretense whatever that the Federal Government can, single-handedly, defeat the forces which turn growth into sprawl and waste. We can provide some means geared to national objectives, such as aids for planned communities and better suburban developments or better mass transportation, and then hope that local ingenuity can tailor them to fit individual situations. But one of the most perplexing problems involved in the disorganized sprawl of metropolitan development is the disorganization of government able to deal with the problem. So far we have had precious little luck in effecting meaningful political machinery for handling problems on a metropolitan basis. Advisory councils seem never to be more than that—and their advice is too seldom heeded—and congeries of local governments, on a voluntary basis, are subject to defections which usually destroy the chances for finding any consensus on which to proceed.

Metropolitan government has been discussed, advocated and attempted over the past three decades, but so far there are only two large areas so governed: Miami-Dade County in Florida and Nashville-Davidson County in Tennessee. There are still severe obstacles to metropolitan government as such, but there remains the desperate need for better means of putting decision-making power to work on a metropolitan basis.

The easy way out of the governmental bind in the past has been to establish special function districts, often to operate throughout a metropolitan area or at least across jurisdictional boundaries. The Port of New York Authority is a pioneer example. In fact, the State of New York today has over 4,100 special improvement districts (not counting 1,115 school districts) as part of its 6,846 different units of government involved in capital construction or outlays related to future development.

The special purpose district, then, has the virtue of being able to get going with its own particular job. But it too often has the drawback of operating in such a narrow context that there is little attention paid to the potential repercussions of its work on other programs.

One answer to the problem of achieving areawide consensus for rational metropolitan development is to get state governments more deeply involved. State governments are, after all, the ultimate source of political power for localities, the latter function through the delegation of powers granted under state charters and incorporations. The states themselves, of course, often establish special purpose organizations to deal with problems on a statewide basis, but these are not able to adapt very easily to special metropolitan problems, and are particularly handicapped in terms of planning objectives relating all the needed development activities for metropolitan areas. For instance, the lack of cooperation between state highway departments and state park departments in some places has approached distressing proportions.

Hopefully this situation is not such a handicap as it once was, and not in small measure because of our Federal planning requirements. This is the sort of conflict in which the Federal Government can play a valuable role, albeit a somewhat limited one.

I have no doubts that we shall find more effective political means for decision-making on a metropolitan basis. Many of our states are moving rapidly in that direction already, and I am confident there will be much more action soon. But I must stress the urgency of the situation as strongly as possible, for the growth of which I spoke earlier is upon us now. Land is already being consumed at the rate of nearly one million acres per year and urbanization will, if anything, increase that pace. Decisions put off today might find that there is no tomorrow.

If much of what I have said is unduly distressing, I can offer, by way of putting it all in perspective, a note from history. Very recently, a group of archaeologists discovered, in Turkey, the remains of a city believed to be over 8,000 years old. Moreover, they discovered evidence of a city plan, with houses and markets carefully laid out in ordered pattern. This is believed to be the oldest city plan in existence. I must add, though, that the residents of this ancient city were found to be preoccupied with fertility and death.

I am not saying that these preoccupations might be supposed, therefore, to provide the basis for city planning, although we are certainly much occupied with fertility, and unless we plan more carefully we are in danger of killing our chances for living decently.

What I am saying is that fertility—our great growth—should not be viewed as a death sentence for our great cities or their metropolitan fringes. Rather, in my view, this growth offers an unparalleled opportunity to achieve a standard and scale of living no society has yet been able to devise, to achieve a society which, in the democratic tradition, fosters the development of opportunity and choice for all—a society in which the human spirit, as well as the body—can grow and prosper, in a phrase, a truly Great Society.

The Bluffs

A Planned Community on the Irvine Ranch, Newport Beach, California

KENNETH C. ALBRIGHT, Costa Mesa, California

•THE HISTORIC 88,000-acre Irvine Ranch was purchased by James Irvine in the 1860's. It was acquired in substantially its present form from portions of three contiguous Spanish land grants. The Irvine Ranch holds a unique position because of its size; it is five times the area of Manhattan Island, and includes 20 percent of Orange County, extending 22 miles from the Pacific Ocean to the Riverside County line.

The need for housing in the postwar period generated great pressure on the Irvine Company for they owned the most desirable land. Developers clamored to buy and develop without delay. However, a policy of leasing was selected in lieu of selling, for this plan would retain control over the developer and encourage better land planning and buildings of a higher quality. Land planning as well as the houses must be approved in writing by the Irvine Company before commencing work.

The outstanding exception to the leasing plan was made when the Irvine Company donated 1,000 acres as a site for the University of California at Irvine (U.C.I.). The Regents of the University were enthusiastic over the offer to plan and develop a campus community of 10,000 acres surrounding the University site.

On June 20, 1964, Lyndon B. Johnson, President of the United States, dedicated the site of this sixth university in the California system of universities. U.C.I. will open in September 1965 to 1,000 students and 104 faculty members. The student enrollment will reach 27,500 by 1990, and the town surrounding the University will have a population of 100,000. The site for the University and its integrated town is located in gently rolling hills above the north end of Newport Bay, previously used for grazing land.

My remarks will be related to the research and development of The Bluffs, a planned community on the Irvine Ranch, Newport Beach, Calif. However, before proceeding with that story, I believe that you will be interested in knowing what we learned through research about the advantages to be derived from creative planning.

We were determined to create a community which would offer better houses and environment. But examples for inspiration could be found only by surveying the existing developments. A period of 3 months was spent in analyzing condominiums and cooperative schemes, not only in Orange County, but from San Diego to Marin County north of San Francisco. I found that the majority of developments were planned for maximum density. Emphasis was in recreation areas with two, and occasionally three, swimming pools, hobby shops, card room, etc.

The few successful planned developments which I visited were built around a theme. New Horizons at Torrance, Calif., is planned around a 9-hole golf course. The living units were placed above the course so that the tenants of each building have the long view of this green planting. The same developer created a low-income community with one large open area, called Central Park. In this open space he grouped tennis courts, swimming pools, a Little League baseball diamond, a Pop Warner football field for grade school players, and hand ball courts. A two-story clubhouse was built for the adults, where there are card rooms, pool rooms, hobby shops, and a large social hall

with a completely equipped kitchen. Here again the attraction was pointed towards amusement and recreation. These ideas were acceptable but where was the environment? All the buildings were like big two-story apartments, placed on a grid pattern.

Obviously, the developments I studied were not the results of creative planning. But the money and time devoted to this research was well spent. The inspiration and theme for The Bluffs would be realized through the determination to create something of value.

The Bluffs is located on 345 acres leased from the Irvine Ranch. The site is high above the Back Bay, providing views towards the sea and the mountains. It would have been simple to design and develop a good residential subdivision on the land, but this temptation was discarded.

The developers of The Bluffs, the Holsteins, had previous experience in the development and management of a successful cooperative, The Sandpiper, located at Palm Desert, Calif. They were enthusiastic over the possibilities of a similar lane-use concept in Orange County. However, since The Sandpiper is a resort or vacation area, many changes would be required in planning permanent homes.

After a series of staff meetings the decision was made to create a winding park of 32 acres for the first phase of 160 acres. Obviously if we were to proceed in an intelligent manner, we had to form a team composed of a land planning expert, an architect with skill and imagination, and a landscape architect with experience in park design. The latter was needed because the park, being our theme, was to be most important.

Our challenge was to create better housing and environment by combining the peace and quiet of the private home with the benefits afforded through the condominium plan.

We needed affirmative answers to the following important questions before launching into a full-scale program:

1. Would the Irvine Company be agreeable to our request to remove the land from the market for a period of one year, the time needed for complete research and planning?
2. Would George M. Holstein and Sons agree to provide the funds necessary for this study?
3. Could a creative land-use plan be developed, which would be economically sound for the Irvine Company and also produce a return to Holstein commensurate with the risks created in pioneering an idealistic concept of land use.

While awaiting the replies to these vitally important questions, conferences were held with the Newport Beach Planning Commission. Variances for private roads, easements for utilities, lot sizes, and an acceptable formula covering percentage of open areas to those occupied by buildings were required. The officials in all departments of the city were enthusiastic over our concept of land use and worked with us in a most cooperative way.

After several conferences, affirmative replies to the three questions were received from the Irvine Company. Holstein then proceeded with interviews relative to the formation of the team of experts. The selection of the landscape architect presented the only real problem, since the firm had to understand and agree with our objective. Linesch and Reynolds were finally selected as they had designed the landscaping for Disneyland and had maintained the plantings since the original scheme was completed.

I will not bore you with the conflicts and problems which developed during the following 12 months. This was a trying period, with everyone crusading for his ideas. In the middle was the coordinator, which was my position.

From time to time I have mentioned the word theme. It is my sincere belief that creative land planning must have a theme. Ours is the park and greenbelts. There are five greenbelts, one blending with the 15 acres of public park, adjoining the site for a grade school. Occasionally the greenbelts intersect, creating a most dramatic view in four directions (Figs. 1-3).

The concept of these green areas is one of informal design, offering a wide variety of trees, rocks, fountains and, occasionally, a putting green. Every skill has been

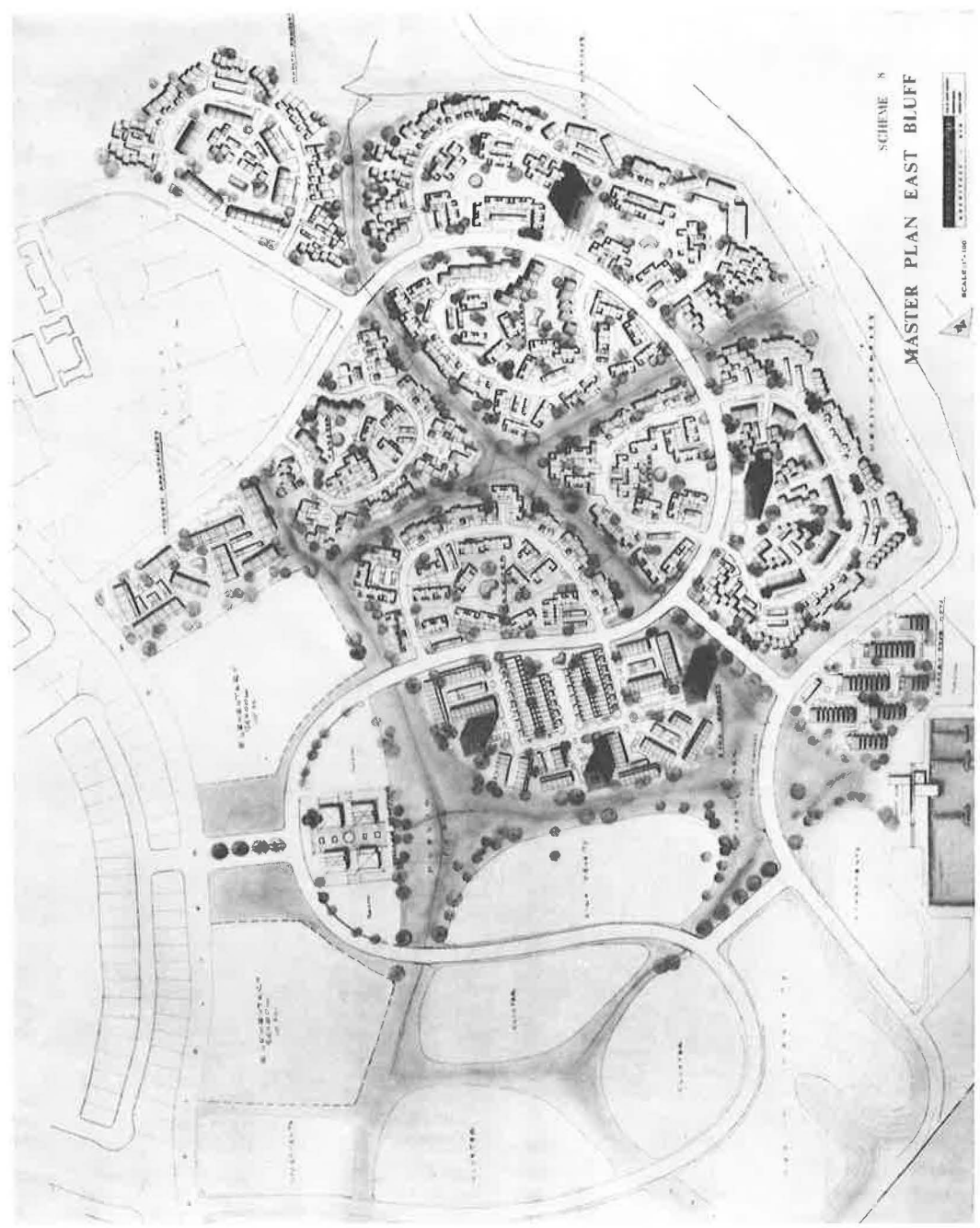


Figure 1. Original land plan.



Figure 2. Original land plan superimposed over area map (by plane).

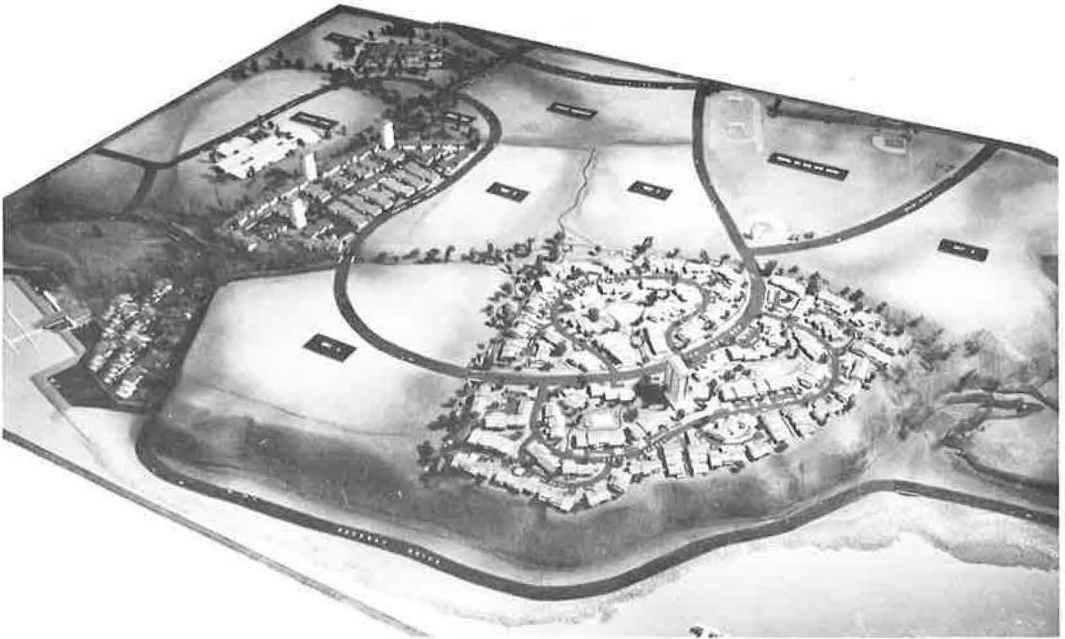


Figure 3. Model showing land-use concept.



Figure 4. Aerial photo showing development of land plan.



Figure 5. Later aerial photo showing development of land plan.

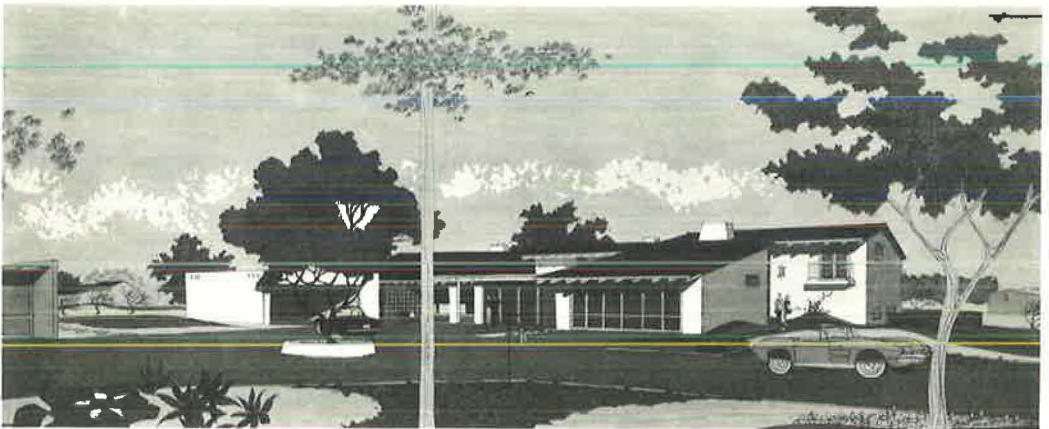


Figure 6. Home design.

used to introduce the ever-changing scene, rather than a formal plan. One and one-half million cubic yards of earth were excavated, moved, compacted and molded into a pattern of undulating form (Figs. 4 and 5).

The architect was faced with a challenge because of the winding greenbelts and their ever-changing contours. Many variations in buildings were designed (Figs. 6-8). Some

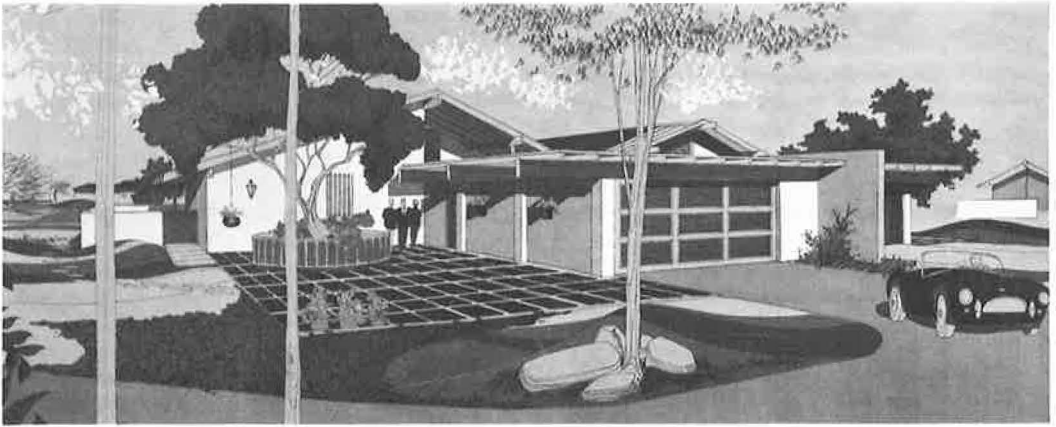


Figure 7. Home design.

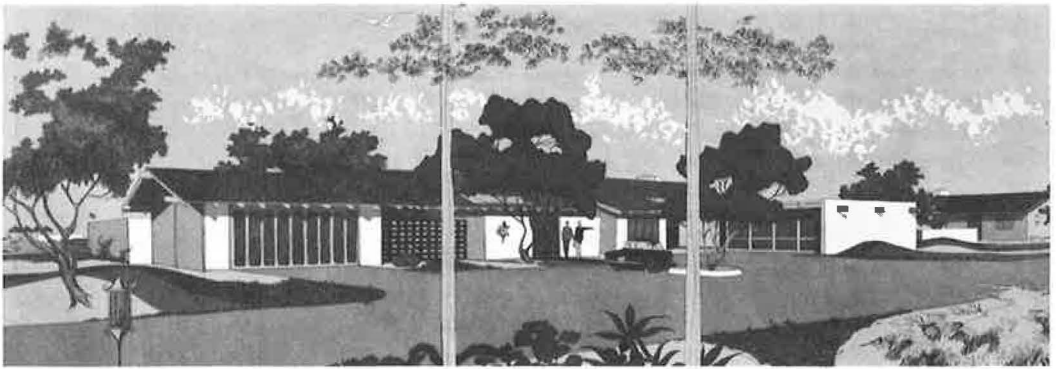


Figure 8. Home designs.



Figure 9.

were one-story types, fronting on winding streets, with living rooms oriented towards exceptionally large green gardens, having a swimming pool and a Ramada nestling into a high bank where other units of different types were sited (Fig. 9).

Where the private roads were below the greenbelts, the garages were placed at street level. Interesting and dramatic stairways were designed to provide access to the upper living area. Here again the living rooms were oriented to a greenbelt. In other cases the living rooms were placed over the garages when exceptional views were to be captured.

The architect was confronted with the most difficult problem in designing the buildings which would be built below the private streets. The combination of a two-story unit with the living room, dining room, kitchen, and the master suite on the street level, with three bedrooms and two baths on the lower level, together with two types of split-level schemes developed gracious and pleasing structures (Fig. 10).

There are ten different house plans. These house plans are combined in a most skillful manner to produce nineteen different buildings, all adjacent to a greenbelt where



Figure 10. View toward greenbelt from lower floor of a split-level plan.



Figure 11. View from greenbelt illustrating open spaces and types of building.



Figure 12. View of entry through garden atrium.

children can walk to grade or high school, the 15-acre park, and the neighborhood shopping center, without crossing a main street.

The architectural style selected for The Bluffs is Mediterranean in feeling. The use of shake or tile roofs, iron grills, and balconies reminiscent of Monterey, Calif., has created charm and interest (Figs. 11 and 12).

When our basic land-use pattern was completed, the architecture approved, and the buildings under way, we were faced with the question of whether the public would accept our ideas. On March 1st of this year the first nail was driven for the first house in The Bluffs. Since that date, 250 sales have been made. As of this date over 70 families have moved in and sales are still maintaining an average of two per day.

The first 100 buyers were interviewed regarding their decision to select a home in multiple units rather than in another private house. The replies indicated that 70 percent of the buyers were attracted by the greenbelt concept, where the units are staggered in each building, sited to provide the maximum view towards the Bay. The minimum distance between the buildings is 150 feet across the greenbelt. Twenty percent were enthusiastic over the paths in the greenbelts where their children could walk to grade or high school without crossing a main street. Also, these same paths lead to the neighborhood shopping area. Ten percent felt that the houses, the land use, and the overall feeling of peace and quiet attracted them to The Bluffs.

The Bluffs is not a new town. It is a new concept of land use which will provide three kinds of living for the people of Southern California. The first phase includes 571 units of cluster-type occupancy, having an average density factor of $4\frac{1}{2}$ living units per acre. These homes are sold with terms of 10 percent down, 30-year trust deeds, and a 75-year lease between the buyer and the Irvine Company. Two hundred rental

units are being constructed in one, two, and three-story buildings, surrounding garden areas with swimming pools. Here the density is 10 living units to the acre.

The third type of living unit (also rental) is to be in five 6-story tower apartments. Underground garages providing space for two cars per occupant will be included. A swimming pool and garden areas are to be built on the deck over the garages. Shops which are normally to be found on the ground floor of high-rise apartments will be omitted. Here, again, we are maintaining a residential character. These apartment buildings are to be placed on 1½ acres of ground, thereby providing ample space between the tower and the nearest cluster building. The high-rise structures are scattered throughout the project, rather than as a concentration in one area. By so doing, we avoid a mass complex which would interfere with our exceptional views.

The concept of greenbelts is very acceptable to the public in our area, since the natural terrain is barren for 10 months of the year. The charm of our greenbelt is to be found in the ever-changing views afforded through the winding concept. Thousands of trees and shrubs have been planted, with many of the cedars and palms as high as 40 feet. The environment which we have created overcomes the sterile look of the subdivision, with its paved streets and its pattern of look-a-likes, even to the parkway trees.

Scattered throughout planted areas are putting greens for the golfer who may be strolling through the park during the warm summer evenings. In the planning of the cluster groups, we have avoided the use of a swimming pool and a "Ramada" for barbecuing in even cluster unit. This a community of homeowners, not a resort development.

Quiet areas of green lawn, 150 feet wide and 400 feet long, have been provided with shade trees, benches and occasionally a small fountain.

The promotion and advertising to announce the opening of our development was handled in a sophisticated way in keeping with the environment which we were creating. Our approach was made through the mails with heavy concentration on the residents of Orange County. There were 3,000 names on our list. Each week, for a period of five weeks, the prospects received a "teaser."

The first item was a 5-inch brass nail inserted through a 6-inch square piece of heavy cardboard, notifying the prospect that the first nail for the construction of The Bluffs had been driven on March 1, 1964. The second item was one glove. The message here was clear: when you live at The Bluffs there never will be a need for the matching glove, or any gloves. All exterior maintenance will be done for the owners, including exterior painting. The final message was a large colored poster, showing the location of The Bluffs. This poster included a large sea horse, our trademark to be used in all advertising.

Inquiries flooded our offices. When would information be available? What were the houses to include—how many bedrooms? What were the prices and terms?

No definite information was given. The caller was told that his name was to be added to the list of interested people. When answers were available he would be notified. After receiving over 400 inquires, the planned newspaper advertising program was canceled.

Following the completion of seven model units, completely surrounded by fully landscaped areas, we decided that the time was right for people to inspect our product. Two cocktail-buffet parties were held in the gardens. Over 1,100 guests attended, including executives from the city and county offices.

Ten days after parties, we received our first sales report. There were 101 reservations. Our question was answered most emphatically! The public appreciated our attempt to create a better home and environment.

Our plans for the future include a series of membership clubs, including one for swimming and tennis and another for those who have interests in sailing. We will build a small boat harbor and a small yacht club.

A permanent office, management, and sales building is being constructed near the main entrance to The Bluffs. Management will operate the staff of gardeners, oversee the maintenance of private streets and attend to the needs or complaints of the buyers. Maid service and handymen will be available to all buyers on a hourly basis. Each buyer will pay the management \$62.50 per month to maintain all greenbelts, gardens,

and swimming pools, as well as to paint the exterior of all buildings when needed. Taxes on the open areas are also included in this monthly payment.

The firm of George M. Holstein and Sons deserves an accolade for its faith in creative planning and its ability to interest the Irvine Company in the value of research, as well as being able to provide good financing on leased land. The same interest will govern the planning and development of the remaining phases to provide 1,300 additional living units.

Through the devoted interest shown by all parties responsible for The Bluffs, we now can offer an opportunity for the homeowner to live in a better way, by investing in homes priced from \$22,500 to \$43,000, with adequate living areas varying from 1,500 to 2,100 square feet.

It is our sincere hope that other developers will examine our concept and become encouraged to research their land, and produce something a little better for people who wish to live according to their ideals.

Shamefully, I must admit that all of the owners living in The Bluffs will be moving by car. If we can be successful in convincing the people to walk to the shopping center, we will have helped in a small way toward removing a few cars from the streets. All transportation in Orange County is by car or bus, and probably always will be.

Columbia, Maryland—A New Town for America

WILLIAM E. FINLEY, James W. Rouse and Company, Baltimore, Maryland

•THE FIRST QUESTION which must be answered is "Why a Columbia? Why a new town?" I don't have to tell you about urban sprawl or the ugliness of the American countryside. The Baltimore-Washington area with its current population of four million will be called on to house six million people by 1980. The corridor between Baltimore and Washington, where the Beltways are only 21 miles apart, will house a half million people alone. So Columbia, with a population of 110,000 or 125,000, is really a drop in the bucket.

The question also arises: "Why haven't we had more new towns?" There has been no leadership in the United States concerned with the creation of new communities. Not a single state has made any serious efforts to propose or to plan them. There has been no leadership in the large cities which have feared the possibility of new towns drawing off their middle-income white-collar people, their better industries and their leadership. In general, it is unlikely, I think, that we are going to find much leadership from local government. Such important and inspirational documents of regional leadership as the great Year 2000 Plan for the National Capital area of the Metro-Towns Plan for Baltimore or the Year 2000 Plan for the Denver metropolitan area are rare exceptions. The lack of leadership is an upsetting thing for planners and the people concerned with the future form and quality of urban development, but it is a fact. However, I do think that there are signs of improvement. We are now accomplishing things in urban renewal and in the poverty program that planners and other social scientists have been talking about for a quarter of a century. The present recognition of this cultural lag will certainly result in positive public leadership in the field of new communities in the next decade or so.

The other reason why we have had so few major new communities is the fact that no one in the private sector of the economy really has had the money to build them. There are no General Motors or General Electrics in the home building industry. The largest home builders in the United States are sadly undercapitalized. There are very few people who have the money necessary to get a project like this off the ground.

One of the things we've been asked is why we located our new town in Howard County, which is between Montgomery and Baltimore Counties. Our staff did considerable study up and down the Megalopolis looking for land to meet a handful of relatively simple criteria.

First, the site had to be located in the "magnetic field" of a growing metropolitan area. It could not be in an isolated area because it is impossible to sell houses where there are no job opportunities. It had to be a location where it was actually possible for homeowners to commute to work and vice versa.

Secondly, it had to be in a location where there was either an existing or a planned major transportation system. By this I mean not railroads or airlines but highways. Our studies led us to conclude that Howard County was on the verge, with the powerful and extensive Maryland state highway program, of being crisscrossed with some of the really great highways planned in the area, including I-95.

The third criterion was that the development had to be in a location where the choice was not whether to develop or not to develop, that is, an area which would develop with us or without us. One of the points of our proposed strategy in starting a new town from scratch was that we had to be able to buy the land and not take the chance of being turned down on the application for zoning. The real issue before the local community had to be what kind of development they were going to be faced with: sprawl or planned

community. Although Howard County had only 45,000 people, it was located between two fantastically growing metropolitan areas. Washington had recently achieved the distinction of being the fastest growing metropolitan area in the United States, and Baltimore ranked ninth.

It also had to be in an area where land could be acquired without the power of eminent domain. We had to be able to buy sufficient acreage in a more or less contiguous area with only "a suitcase full of money." It had to be an area where we could buy land without pressure, without any fast tactics, and with secrecy. Most important and the greatest discipline of all in new town development, the land had to be acquired at a price which would allow parts of it to be held throughout the 18-year development period.

One of the things that stops major new developments is the cost of borrowing money. Every invested dollar in America must pay interest in one form or another. If land is acquired at too high a price in 1965, by 1975 when the project is only two-thirds finished, the carrying charges will make the land uneconomical and unsatisfactory as an investment. I'm not sure that Federal financial assistance will change that picture very much, although I think that the potential use of eminent domain for a new town development may help a little.

Behind our motivation to try to build, as our company calls it, a better mousetrap was the basic philosophy of our organization that if you build something to high standards with a high quality of design, construction, maintenance, management, and promotion, it will retain its competitive value. This also requires better management, more planning skill, and more overhead, but in the long run, it will be well worth it.

One of the things we had to do after locating the site was to find a source of funds. I mentioned before that no company or no individual who is interested in new town development has the kind of money required. Mr. Rouse, our president, was able to interest a major American life insurance company and as a result of their seeing the responsibility that a major pool of investments funds has in urbanizing America as well as the financial opportunity, they put up approximately \$23,500,000.00 to finance the project. We acquired 15,650 acres (larger than Manhattan Island) in 9 months for \$23,500,000.00.

The question was then what to do next. Not that we hadn't been thinking about it, but we were not really free to proceed publicly at all because the land had to be acquired under a cloak of secrecy.

One of the first decisions made was to hire our own planning staff. We felt that the planning, design, construction, and coordination of a community as large as this, as extensive in terms of time and complexity, could not be done by outside consultants in the usual fashion. This is not to say that we did not use consultants. As a matter of fact, we have over 30 in various fields. For example, we had to have aerial maps made of approximately 25,000 acres at fairly large-scale contours to know what we really had. We soon found out that we were the owners of 4,000 acres of woods; our land had three major stream valleys, obviously in need of protection from damage; and we had about 99 percent productive land which was enormously impressive in its beauty, its rolling topography and its general quality. We went through the normal motions of any responsible planners in looking at all the physical attributes and problems of the area. We found that Howard County is occupied mostly by farmers, former farmers, and exurbanites, meaning that most of the people who have moved to Howard County in the last 15 years moved there to get away from the city. However, the most important thing we did was to take the time and spend the money to find out how to plan a new city.

If a roomful of people were given a map with 15,000 acres on it and a general set of requirements, each person would come up with a different design for the town. Each would have different ideas about what kinds of facilities there should be, how the road system ought to work, how the school system ought to work, how the communities ought to be organized, what the city needed, what it ought to look like, and so forth. Most of the plans would probably be pretty good. We decided that this is not how to go about planning a city. We felt that a new city needed to be planned from the people up. We were convinced that most cities are largely unresponsive to people's needs. American society is plagued with serious problems of crime, delinquency, loneliness, despair, economic difficulties, fears about child-rearing, anxious and neurotic housewives,

commuting fathers, and children unfulfilled because of the lack of opportunity. And this is not necessarily confined to the inner city; it includes the suburbs. Typical sprawling suburbs in the United States only become really liveable after they've been developed for 10 or 15 years. A house on a quarter-acre lot and a school at the end of the street do not result in a full life. We believed there is a far better alternative and set out to find out what it was.

Our first thought was to bring in behavioral scientists. However, we soon found that we could read most of what they had to say, and we were very anxious for the planning of this town to come from unfrozen minds. So we assembled a rather distinguished group of relatively unknown names in a wide variety of fields, such as health, education, and the growing field of leisure. We even had an expert on women, one of the technical secretaries of the President's Commission on Women, to discuss the many problems of women, a major consideration in the planning of our town. Also included were a professor from Michigan specializing in problems of human communication and an expert in suburban sociology. The team was guided by a social psychologist from Harvard. In addition, we had a lot of good hardware people, experts in local government, some outstanding transportation people, urban economists, and some real wonders in consumer trends.

This group was called together with the assignment to plan the most perfect town possible. We asked them to give us their best thinking on how we could do it. Although retaining the responsibility for planning the town, we said to them: "How do we attack the problems we have to face? How do we go about it? What kinds of guidelines can you give us? Tell us what insights you can give us into the opportunities that are before us." We set a half dozen goals for this town which are not earthshaking, but which we feel are absolutely essential, and we expect to achieve them.

One of the things we were met with in the county was the real fear that Columbia as a rapidly urbanizing area would create a disaster in county finances. We have established as a goal and made the promise that we will come forward with a system to protect the remainder of the county from additional tax burdens as a result of Columbia. The proposed solution is a public district which would carry on those functions which an urban society needs but which rural people neither want nor will pay for.

Our plan had to preserve major areas of permanent open space. One of the most critical issues facing suburbia today is the almost total inability to set aside large areas of open space before they are overrun and developed. We promised to preserve lakes, parks, stream valleys, tree masses, and all the natural amenities that are there on the land.

One of our development principles is that Columbia must be a truly balanced community. It is one of our mottoes that "everyone who lives there will be able to work there and everyone who works there will be able to live there." This, of necessity, requires a very broad range of housing prices, types, and styles; this is not going to be just an upper-middle-income community but a true city of variety. At the same time, we are satisfied that we will attract a wide range of employment. Of course, we do not expect to attract extremely heavy industry because there is no immediately convenient rail access or deep water. We have promised to set the highest possible standards of beauty, safety and convenience. We expect to have strict architectural and aesthetic control over commercial areas, residential areas and roadsides. One of the reasons Howard County has not developed residentially and industrially is that there are almost no water or sewer lines. We are bringing major utilities into the area for the first time at extremely high cost, but we are pledged to public water and sewerage rather than a continuation of the well and septic tank system.

The plan for Columbia calls for some 30,000 dwelling units to be constructed over 15 years. This requires reaching a building rate of 2,500 to 3,000 units a year during the peak years, nearly twice the number of dwelling units built in the Baltimore-Washington area by any one developer in the same period of time. We have set aside more than 3,500 acres of permanent open space in the form of stream valleys, parks, playing fields, playgrounds, riding trails, hiking trails, golf courses, small parks, and so forth. Sixteen hundred acres are scheduled for employment centers, resulting in 2 to 3 million square feet of industry which will, of course, help to create and maintain

that important economic balance the community demands. There will be 1½ million square feet of commercial space, 70 schools, 50 churches, a completely separated pathway system with underpasses and overpasses, a community college, a hospital, a wide variety of institutions, and some Federal employment.

There are important social links between the stores and the community center, and between the high school auditorium and the library. One of our pioneer attempts in the field of libraries is a common library system for school and community with its double benefits. The planned school system departs considerably from the present county system and is naturally meeting some resistance. We are urging much smaller schools, and many more of them, on the principle that if there are ten school newspapers instead of three in a community, there will be ten editors and more people participating. The exchange of a few advanced facilities for a higher level of participation in the school system and in the community is well worthwhile.

At the neighborhood level, the same principles apply. There is considerable correlation among all the elements planned for the neighborhood center. The elementary school, adjacent nursery school, tot lot, child-care center, a swimming pool, an outdoor eating terrace which becomes a teenage hangout part of the year, a little neighborhood store where a loaf of bread can be bought without having to drive 5 miles—all will become the vital heart of the smaller scale neighborhood community.

In the town center will be the major one-of-a-kind activities; the real downtown includes major retail and recreation facilities, gardens (like the Tivoli in Copenhagen), theatre, the main library, a hotel, restaurant, community college, a hospital, offices and, we hope, the U. S. Patent Office. We are putting a great deal of effort into having Route 29, which cuts our property in half, upgraded to a limited-access six-lane landscaped parkway. We have recently purchased three sites zoned for shopping centers for up to \$15,000 an acre just to take them off the map. We are satisfied that this is an important step and that the values in the community will be maintained and improved by wiping out roadside commercialism. We feel that once this is done (though of course we cannot buy everything), we will have eliminated the major eyesores and there will be real incentive in the local community and at the state highway level to make Route 29 a beautiful parkway.

On the basis of the major land uses, population densities, and employment figures for the town, Wilbur Smith and Associates reported the impact of this new town (in an area formerly assumed undeveloped) on the state highway system of Maryland. Their figures were combined with state calculations and I think we are going to have some very much improved highways as a result of this effort. Alan Voorhees and Associates were our transportation consultants throughout this effort and worked on the internal transportation system as well.

We presented our general plan to the County in November 1964, together with a new form of zoning which will make possible the development of a new town. As those familiar with typical zoning know, we cannot lay out every lot and block on 15,000 acres today. Yet we must have the overall development zoning approval, that is, the right to develop the 30,000 dwelling units, before we can put the first major sewer in the ground. This calls for an unusual obligation on the part of the local county government, especially for this county which has never really had to consider development on this scale. However, we are committing thousands of acres of developable land to an open space program, guaranteeing its preservation, and bringing in, through the sheer power and size of the community, a wide range of cultural, recreational, and commercial activities which the county would never be able to attract under normal circumstances.

We have fond hopes of acquiring the approval of the local government this spring, starting construction late in 1965, and having people move in early in 1966. The community is scheduled to be finished in 1980.

Today Columbia is just a plan on paper. Its soundness and its feasibility have been checked and tested for more than a year. Columbia is possible. Tomorrow it can become the finest community in America. It offers an opportunity for a strong and solidly financed corporation to begin a business undertaking within the discipline of good economics. If Columbia is completed as planned, it will make a profit. Thus, the incentive to succeed financially is a solid assurance that Columbia can and will be built as

planned. Columbia is an opportunity for the growth of America, a changed course from needless waste of the land, sprawl, disorder, congestion and mounting taxes to a direction of order, beauty, financial stability and a sincere concern for the growth of people.

Lessons to Be Learned from Europe

WOLF VON-ECKARDT, Architectural Critic, The Washington Post

•IT was a surprise to meet the bearded minstrels again, lustily strumming their guitars in the shadow of the glass and steel skyscrapers of Sergelgatan, downtown Stockholm's new business center. But West Europe's new architecture has many such surprises. It is far ahead of us in applying the ancient art of urban design to make modern life livable.

I had first encountered the three wandering troubadours—students from England singing their way across the Continent—on Copenhagen's Strøget, a mile-long, meandering shopping street barred to automobiles and returned to people on foot. One almost expects street singers here. The stores are modern, but their design is tastefully blended into a setting which, with its lovingly restored old houses and churches along the narrow street and its open vistas around every bend, is essentially medieval.

But you scarcely expect folk singers in a redeveloped downtown business center atop multi-level underground garages and a gleaming, new subway station. Like the new downtown centers in Coventry, Rotterdam, Warsaw, Kassel and other European cities, Sergelgatan is designed to rescue the soul of the inner city from traffic congestion. Its architecture is perhaps the most exciting—as imposing as Rockefeller Center, the granddaddy of them all, but more bustling and varied.

Five large office towers, identical in bulk but different in their facade treatment, are rhythmically spaced along the car-free mall lined with shops. It's the scale, the intimacy and movement on that mall, as much, I would think, as the cafes, flower beds, potted trees, benches and fountains, that attract the festive crowd even when the stores are closed. It seems to invite the artists who display their paintings or chalk pictures on the pavement. It spontaneously lured our minstrels and, surrounded by an appreciative crowd, they cheerfully seemed to belong. Only this time the girl friends who collected for them were Swedish, of course, not Danish. But they were just as blond and as pretty.

The next day on Sergelgatan the shoppers were serenaded by young Spaniards in black velvet Goya costumes, no less. They passed their berets themselves. In Spain chivalry is not dead.

Neither, in many of the new city centers and new towns of West Europe, is the old market. They are holding their own against the big chain stores with their American check-out counters and the city planners encourage them despite American-size traffic jams and housing problems. In Stockholm the new shopping mall spills right into the colorful old flower and produce market in front of the Concert Hall. Rotterdam has a market. In the brand new town of Wolfsburg, Germany, where the Volkswagen is made, the city planners designed handsome, modern stalls and umbrellas for the market on their new city square. On market day it has much of the delight of the Piazza delle Erbe in Verona. Alvar Aalro's enchanting new cultural center makes as fitting a foil as a 13th century Veronese palace.

In Harlow, one of Britain's eighteen new towns, the vendors use their own stalls and trucks for a traveling market. It's a bit messy. But its very messiness helps this rather drab, machine-made space with its curtain wall structures. The market turns the town center into a real community center. You experience humanity and it is this experience for which, for millennia, people have come together in cities.

The troubadours and the markets are only a part of it. They are delightful results of the design, the creative intention, to build an environment for the enjoyment and community of people rather than merely to let buildings squat where they seem most profitable.

Paper sponsored by Department of Urban Transportation Planning.

We say that we plan our cities. In fact we have as many planning boards and commissions and committees as we have bitter and drawn-out public hassles about every new highway, every bridge and every urban renewal plan. We quarrel because we can't resolve our urban conflicts: we set up one agency to control air pollution and another, more powerful one, to bring more cars and carbon monoxide into our settlements. And we still keep tearing down or relocating our markets and turn them into parking lots.

We say that only firm regional planning can save us, but jealous local governments are still proliferating. The Federal Government wants to help save the inner city but spends most of its money helping to push the suburbs even further out. Some Congressmen and local officials wage war against poverty and public housing for the poor at the same time.

These conflicts lead to planning paralysis. Meanwhile, driven by the explosive dynamics of growing economic affluence and population growth, chaotic squatting continues. Our city planners only join the fracas and are powerless anyway. Ask them how they intend to bring order into the city and they will show you computer projections of how the disorder will spread. They draw their pretty colored zoning maps and fill their "green spaces" with no idea how to keep them green or what to do with them.

The specialized planning agencies, wrote Lewis Mumford recently, have done "nothing to counteract the cataclysmic economic forces that are now producing something close to total urban chaos, in which purposeless violence and barefaced criminality and meaningless 'happenings' contradict all the professed boasts of an advancing civilization."

We knew once that you can design cities where young people can sing and where we can experience our humanity when Faneuil Hall in Boston or Jackson Square in New Orleans were built. But then we built an elevated freeway over old Boston and threaten to build one over the French Quarter in New Orleans. We might have rediscovered the joys of good urban design on any sunny afternoon during the past 34 years in Rockefeller Center. And, ironically, the new towns in Britain, Sweden, Finland and elsewhere in Europe would be unthinkable without Radburn, New Jersey.

Designed back in 1928 by Clarence Stein and Henry Wright, with people like Lewis Mumford cheering them on, Radburn pioneered the idea of neighborhood clusters and of keeping automobiles in their place. Franklin D. Roosevelt's greenbelt towns of the late thirties echoed this idea. But then we forgot all about it in our postwar rush to suburbia. Now the frightful economic and social penalty of raping the countryside and letting our cities decay has forced us to remember.

Europe never forgot. West Europe has two-thirds more people than the United States who live in an area about one-third as large. It now has the same frightening proliferation of cars and people. The rush hour traffic jams in most of its cities are every bit as bad as ours and the housing shortage is worse. Yet, as you drive around, you always know where one city ends and another begins and there is unspoiled open country in between. European countries, regardless of political system, are effectively planning their expanding communities, transportation systems and the adjustment of their cities to the motor age.

The tradition of urban planning goes back to antiquity and the walled cities of the middle ages. Regional planning began as the Dutch, in the 15th century, started to reconquer their land from the sea. But the simple idea of building new communities instead of letting old ones sprawl out unmanageably and anonymously, started with Ebenezer Howard's "Garden Cities of Tomorrow," published in 1898 in London. It inspired Radburn, and our own new towns—notably Reston, now under construction 18 miles from Washington, D. C., and Columbia, soon to be built between Washington and Baltimore—are based on it. But not every builder development that assumes this suddenly fashionable term is really a new town.

Ebenezer Howard was an English court stenographer and inventor. He proposed to abolish London's slums by moving their inhabitants into completely planned, new communities of limited size surrounded by permanent greenbelts where they would live, work and play in pleasant surroundings. The city slums were to be turned into parks

and the endless growth of London was to be arrested. The idea at once launched a world-wide movement and five years after Howard's book appeared, Letchworth, the first such Garden City, 35 miles from London was underway. Nearby Welwyn followed in 1920. Right after World War II the British passed their New Towns Act and over one million of them now live in planned communities. The government finances the development corporations but private enterprise does most of the building.

The idea, though still valid, has neither entirely abolished the London slums nor has it entirely prevented some urbanization of its surrounding greenbelt. But it has helped. Compared to us, though not the stern Dutch, the British are ahead in the race for a livable environment. And it has focused the skill of their planners and architects on comprehensive community planning. It is fascinating to see how each British new town has learned from the mistakes of the one before it.

Letchworth and Welwyn now appear little different from our own well-established and well-to-do suburban communities like Shaker Heights near Cleveland or Winnetka, near Chicago, although they are much better planned than most of our more recent subdivisions and they provide employment in their own neatly tucked away industries.

Harlow, 23 miles from London, which was staked out in 1947 and now has a working class population of over 60,000, most of which is employed in the town, has mainly the market to recommend it. Again, by American standards, the town is attractive. The row houses form pleasant streets and the clusters allow intimate courts. There are handsome sculptures everywhere. The overhead wiring and ugly poles that ruin the appearance of even our most attractive subdivisions are buried.

But no troubadours would venture there. "Jolly nice," just about sums up the local pride. "You can get just as lonely here as anywhere else," a red-headed young dental assistant told me. "Why just the other day an old lady was found dead in her flat. She'd been dead for three days, they say. And the milk kept standing outside her door but no one took notice. Now that's not neighborly like, is it?"

Old ladies die lonely in crowded London, too, of course, but Harlow, I'm afraid, suffers from an overdose of Ebenezer Howard's Thoreauvian passion for Mother Nature which most of our planners still share. The posters, promising £5 rewards for information leading to the arrest of vandals, may have something to do with the enormous, vacant and rather unkempt green spaces that spread the town apart. All the jolly nice clubs and activities, particularly for the Beatle topped youngsters, can't quite overcome these unneighborly distances. They certainly lead to more and more motor traffic and larger and larger parking lots, now that everyone is beginning to own cars. Few residents can walk to the town center.

Basildon, built a few years later, is already more compact, more urbane—no £5 rewards here. Its town center, with a towering apartment building on stilts and a gushing fountain with a sensuous statue, is downright dramatic. The kids are all over the statue.

And in Cumbernauld, not far from Glasgow, Britain's latest new town, the whole thing is, or rather will be, sheer, wonderful drama. Cumbernauld was conceived in 1958 by Hugh Wilson and others and will be completed in 1980. Here the Garden City has yielded to an urban community. Three-quarters of the ultimately 70,000 residents will live within one-third of a mile of the center. There'll be apartments near the heart of town, but most people will live in two and three story townhouses, ingeniously stacked, like ancient Mediterranean towns, on fairly steep hills. Everyone will have both privacy and sunlight, yet no one looks into the other fellow's garden.

There is a complete separation of cars and people. You amble undisturbed on a network of turning and twisting walkways with schools and neighborhood stores along the way. They double as "linear playgrounds," as the planners call them. There are fences to rattle sticks on as the children run along them. There are low walls to walk, sit and climb on. There are courts and protected gullies—paved with cobblestone since lawns turn muddy in Scotland's wet climate—equipped with marvelous play sculptures. Open space is put to work. It becomes meaningful.

Yet the automobile is far from neglected. It can go nearly everywhere on separate roads and there is parking for one car per family either below its house or in nearby garages. You will drive right under the town center, a single citadel with the library,

community center, medical services, offices, stores, a hotel, bank and penthouse apartment atop the towers. You get up by elevators, escalator ramps and stairs to the landscaped plazas and terraces. Leonardo da Vinci, nearly five hundred years ago, sketched visions of such a city where all transportation moves in underground tunnels, leaving man free to enjoy the sun. Built on a hill, Cumbernauld's town center will be surrounded by a meadow. There'll be sheep grazing on it, the planners promise.

The promise of Cumbernauld has already had a profound influence on urban design everywhere. Finland's no less influential new town, Tapiola, however, is already an enchanting accomplishment. "What are we to do with our prosperity?" is how its initiator, Heikki von Hertzen, a slim, quick, no-nonsense man, began explaining it to me. "We can't eat more. There's a limit to the automobiles and gadgets we really need. That's why I am persuading my countrymen that we should build a more beautiful, healthier environment for everyone to live in. We must do away with the stresses and strains of polluted cities and monotonous suburbs."

We talked in his office on the eleventh floor of Tapiola's central office tower. Six miles away, beyond gently rolling forests and the cold blue of the Gulf, where the sky is dimmer, you see the steeples of Helsinki. Immediately below, shooting out like mushrooms among the trees and rocks and richly varied in their crisp, modern architecture, are Tapiola's townhouses and apartment buildings. They casually group themselves around the water, clustered in three villages or neighborhoods. "Tapio" is the name of a Finnish forest sprite. You sense his presence.

Von Hertzen, formerly director of a welfare agency, brought welfare organizations, women's clubs and labor unions together to build Tapiola as a non-profit venture. Interest rates are higher than in the United States. Yet despite the outstanding architecture, the result of an architectural competition, well lighted sidewalks, beautiful landscaping and other amenities American suburbs don't even dream of, rents are below those in Helsinki. "It's all a matter of good design and good management," says von Hertzen.

In contrast to Cumbernauld's tight, Italian hilltown cluster, Tapiola may come closer to what American real estate agents tout as "gracious living." But there are differences, deeper and more important than the absence of carriage lamps on the doors. Like most new towns, Tapiola's neighborhoods each have their school, small cafe, and store for essentials. But you can also walk to the town with its rather sophisticated stores and services of all kinds. The office tower beckons from all directions. Mothers can take baby along. "Our town is planned in perambulator distances," said von Hertzen.

People of various income groups live together on the same streets and you can never tell on the outside which of the houses and apartment buildings received the forty percent government subsidy for low income housing. The ultimate population is 17,000 and half of them will work there. All share the convenience of a central plant that supplies heat and hot water along with the abundant libraries, playgrounds, sports and other things. There are even soft drink bars for the teenagers and workshops where they build model airplanes or tinker with hotrods. There are special studios for artists.

Yet there is as much privacy as there is community. It is, on the contrary, the unplanned agglomerations of dwellings in most American suburbs that regiment us. Our gracious living, according to a recent real estate page news story, means "smartly improved ranch homes packed with new appliances and fixtures . . . step-saving kitchens with hand-rubbed, wood cabinets and glass-fronted wall oven" and whatnot. The miles of ranch homes are as alike as the people in them. No one saves us steps to the distant shopping centers or the children's music lessons. We can look at the roast, but what do we see outside the window?

Von Hertzen was too polite to ask what it is we do with our prosperity.

We have built our affluent, new homes better and more comfortable than the Europeans. But the quality of our civilization, as President Johnson said in his State of the Union message, "cannot realize its full promise in isolation In our urban areas the central problem today is to protect and restore man's satisfaction in belonging to a community where he can find security and significance."

"A community must offer added dimensions to the possibilities of daily life," Mr. Johnson elaborated in his message to Congress on cities. "It must meet the indi-

vidual's most pressing need and provide places for recreation and for meeting with neighbors." He advocated Federal inducements for effective metropolitan planning, and financial assistance for the advance acquisition of land to plan and build new towns.

Private enterprise already has two under way. Reston, largely financed by the Gulf Oil Company, and Columbia, financed by the Metropolitan Life Insurance Company, promise much of the architectural charm and perhaps even more of the amenities of Cumbernauld and Tapiola. But Federal help will be needed to assure America's new towns of the necessary employment centers so people can stay put instead of cluttering the highways. And only Federal help can assure that they include homes for people of modest income to break down the walls of our downtown racial ghettos and our class conscious, social arteriosclerosis.

Nor can we neglect urban renewal to reinvigorate the heart of the city. We've done better here. The new Southwest in Washington is on the way of becoming an attractive community. Constitution Plaza in Hartford, Connecticut, is a beautifully designed breath of fresh air in the city. But lacking shops and movement, it is more of a garden for the surrounding office buildings than an urban plaza that might attract wandering troubadours. There is more hope for them in Boston's new Government Center or Baltimore's Charles Center when they are finished, provided the police don't arrest them for loitering. Only in Fresno, California, where six downtown blocks have been closed off to automobiles and furnished with benches, greenery, sculpture and fountains, have we so far allowed the fun of street life to return on an appreciable scale.

But it can't be done by just keeping cars off some streets. European city planners saw the tide coming twenty years ago. Stockholm's Sergelgatan is possible because the city, immediately after the war, made a superb, modern subway system the backbone of its masterplan. It is a joy to ride. Each of the new, cheerful stations is designed by a different artist in different colors and materials and serves as something of a neighborhood center. At the end of each line, you arrive not in amorphous suburbia, but in the charming and bustling center of a compact satellite town. You can quarrel with some of the architecture of Vallingby and Farsta and the others. The design of the pavements, the enchanting playgrounds everywhere, the landscaping, the advertising display cases, the orientation maps and signs, the trash baskets, the lettering on the stores, the benches and all the other details American city builders keep neglecting, make these towns works of art, a harmonious manifestation of a modern visual culture.

Stockholm's subways carry three-quarters of the rush-hour traffic. Like the subways in twelve European cities they are still being expanded. But our highway lobby needn't worry. With one out of four Swedes now owning private cars, the highways are being expanded too, and there are still traffic jams.

Stockholm could properly plan its growth without the pains of sprawl, billboards and ugliness because back at the beginning of the century its city fathers had the wisdom to buy up miles of surrounding land. Oddly enough, even the socialist countries in Europe, with the exception of France, are reluctant to condemn existing buildings, except hopeless slums, for urban renewal and large-scale development as we do. We, on the other hand, are reluctant even to purchase, let alone use the power of "eminent domain," for undeveloped, outlying land to assure orderly expansion.

But the main difference between community building on the two continents is not in the method but in the general approach. We could always move further west and therefore never took planning very seriously and still don't, except for property values and highway interests. The Europeans have long been forced to make their limited space livable.

The heart of Rotterdam was still smoldering after the Luftwaffe's savage, senseless bombing in May 1940 and the air was reeking with smoke and burned corpses. The Municipal Library was one of the few buildings spared. And there, bent over maps and drawing paper was the city architect, W. G. Witteveen, planning a new Rotterdam, efficient, fair and proud. Other notable architects, particularly J. H. van den Broek and Jacob Bakema, joined the clandestine effort at the constant peril of being discovered by the Gestapo. As soon as Holland was free, the Dutch government in exile in England appropriated the rubble so that all rebuilding would conform to the masterplan. The

owners were compensated only after the new buildings were completed. They received the added satisfaction of living and working in surroundings where modern is also human and delightful.

The planning for the reconstruction of Warsaw, in fact of all of Poland, also began in secret while Nazi war and destruction were still going on. Chief city architect, Stanislaw Jankowski, managed to escape German captivity to England. He was trained at the Liverpool planning school and parachuted back into Poland where he organized an underground group of planners and architects. "We even issued degrees," he told me. And currently Polish urban designers are winning international competitions all over Europe. Communist architects, for instance, won the competition for the new opera house in Fascist Madrid.

Though construction is shoddy, the overall plan of the new Warsaw, its housing projects and particularly the new downtown center show this design excellence. The new downtown skyscrapers, similar to Sergelgatan, contrast oddly with Stalin's horrible wedding cake Palace of Culture across the street that everyone, including Jankowski, openly jokes about. The city is ready for the automobile invasion, bound to come when the economy improves, as will the already planned subway. Most of Warsaw's homes already get their heat and hot water piped in from two electric power plants along the Vistula. Along with the convenience this, of course, also reduces air pollution.

"We have over a million city planners here," said Jankowski. "Everybody but the babies helped rebuild the city so everyone argues what should be built and how." Jankowski appears on television once a week to help the city planning discussions along. Once a year there is a city-wide contest for the most popular new building from a slate proposed by architects.

Comprehensive city and regional planning may be easier in a Communist country, where the state simply won't produce more cars, for instance, until the roads and parking garages are ready. But the democratic countries in West Europe, too, give their planners authority to make their planning effective. Here we don't trust planning and allow the planners only to advise the city fathers who seldom listen. And we have separate agencies for public housing, urban renewal, highways, schools, sanitation and the like who rarely speak to each other except to quarrel. In Europe all this is under one administrative roof in city hall and a part of politics, a word derived from the art of managing the affairs of the city or polis. If you don't like what the planners do, you can vote the rascals out.

Their work, to be sure, is somewhat easier than here. People, on the Continent at least, like cities and their concentrated variety of people and activities. No one finds it scandalous if public funds are spent on enhancing public buildings or if a city like Hannover, for instance, spends six percent of its budget on enhancing its streets and squares with well maintained flower beds and trees.

West Europe, although its agriculture is also becoming increasingly more efficient, keeps more people on the farm. One of our great urban problems is that, while we spend little on our cities where nearly three-quarters of our people live, we spend a great deal on our farmers. The farm subsidies speed mechanization which forces farm workers to seek jobs in the cities that often aren't there. In the past 25 years 18 million farm laborers have swelled our downtown ghettos. And despite what Mumford calls "the insensate dynamism of our affluent society" with all its bulldozing and constructing, we have done precious little to make them at home in the city. We have built housing and highways but not communities.

Before you can build you must plan. And before you can plan you must have a concept of what you want and what the community is to be. This cannot be done with abstractions like zoning maps and engineering charts and electronic computations, as our planners attempt it. In Europe it is easy to visualize what is to come of all the digging and building and how the city is to grow. You go to city hall and almost inevitably you will find a scale model of the entire city. On the model and the supporting three-dimensional exhibits you see the whole organism—the arteries and veins of transportation, the industrial muscle, the breathing lungs of parks, plazas and playgrounds and all the other things which make the cells of human habitation throb with life. You see

how high buildings and the low, the important and the humble ones and the waters and hills of the city all relate to each other. You see the city as a unit and how it will grow. Made to the same scale, proposed new buildings and projects can simply be put into the city model and everyone can visualize how it will work out.

Philadelphia is one of the few American cities that has such a scale model at least for its center. As in Europe, people study and discuss it and they bring the school children to show them what's happening to their community. It is no coincidence, I believe, that the renewal of Philadelphia is considered among the best urban designs this side of the Atlantic.

There are a great many things we must do before street singers will again entertain us on the streets of our cities, before, as President Johnson put it, the American city is again "a place where each individual's self-respect is strengthened by the respect and affection of his neighbors."

But first of all, as in Philadelphia, we should build and display comprehensive scale models of our cities so we all are able to see what we are doing. Building livable communities in the existing city and in the suburbs should become our national hobby.

Transportation Planning Criteria for New Towns

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Effective transportation planning is needed in connection with the many new towns springing up in the fast growing areas of the United States. Sponsors of such new developments need this work to attract high-type tenants and developers, and to obtain approvals from various governmental agencies as to road plans, particularly the connections with adjacent road networks.

The transportation plan springs from both the land-use plan and economic base study. These criteria determine the volume and pattern of traffic, and the interchange between the new town and adjacent communities. There must be feedback between the preliminary findings of the transportation planners and the economic-base land-use planning team, whereby the latter's projections and recommendations may be modified to produce more acceptable transportation conditions. Examples are the proposed Universal City and Irvine Ranch developments in California, where impossible traffic densities were predicted on the basis of preliminary plans, requiring changes in proposed land-use densities and dispositions.

Steps in transportation planning may be summarized under the following headings: (a) formulation of trial road networks, based on preliminary land-use plan, (b) trip-generation estimation, (c) estimate of interchange between new town and outside communities and through traffic, (d) trip distribution (O and D), (e) trip assignment to alternate routes, evaluation and feedback as necessary, and (f) selection and staging of transportation plan.

•RAPID POPULATION GROWTH and overcrowding of urban areas have stimulated an increasing amount of new town planning and construction. These new towns are often set apart from existing urbanization and contain all the land uses normally associated with a city, including residential areas, a central business district, industrial areas, and schools. Two such cases will be described here in some detail—Mountain Park and Irvine Ranch, both in California. Another more frequently observed type of new city development is a complex of high-rise commercial and residential buildings introduced into an existing urban area via a redevelopment project, or perhaps on a vacant land site. Century City and Universal City, in Los Angeles, are typical of this type of development. Here movie studios have decided to turn their back lots into high-rise building complexes and transfer much of their outdoor movie making to less valuable land.

The need for thorough traffic estimation and synthesis of future travel patterns for new towns has been emphasized by the affected governmental jurisdictions. City, county and state agencies are increasing their insistence that the developer demonstrate that adequate planning has been undertaken to obviate future traffic access and

circulation problems, among other things. The zoning mechanism is often employed to enforce compliance with the government's wishes in this regard. In addition, new town developers are aware of the fact that prospective tenants are becoming increasingly aware of possible future traffic problems. The traffic engineer's access plans and projections are becoming more useful as a promotional and selling aid for the developer.

ECONOMIC-BASE STUDY

One of the most important criteria affecting plans for a new town is the economic-base study. This, together with other initial investigations, including those of controlling physical, legal and financial factors associated with the new town site, will determine in large part the character and extent of development possible. The economic study should establish such major determinants as marketability of land for various types of development, amount of employment that can be supported, and retail sales potential which give the land-use, traffic and architectural planners the necessary input for the plan of development.

Self-Containment

The economic-base study should disclose the probable extent of self-containment of the proposed community. It is essential that the traffic planner have reliable estimates of the degree of self-sufficiency of the prospective new town, since the relative proportions of external and internal traffic will hinge on this matter. Specifically, he must know to what extent the local residents will work, shop and carry on other daily activities outside the new town's boundaries, and the extent to which outsiders will come into this area for such purposes.

If it is possible and practical for the traffic planner to consider the new town as one zone within a much larger zoned study area, extending perhaps as much as 10 to 20 mi in all directions from the town, and to synthesize a trip origin-destination (O-D) pattern for the entire area, the degree of self-sufficiency in the new town could be determined. In fact, this general process is implicit in the economic-base study, whether it is done mathematically or intuitively. It should be pointed out that such an approach requires soundly based estimates of employment, population, industrial activity, retail sales, etc. for the entire study area as well as for the new town.

FEEDBACK

There must be coordination of planning effort and feedback of information between the economist, the land-user planner-architect, and the traffic planner. In a sense, there is a natural sequence of planning, from the initial economic-base studies to the land-use development plan to the traffic estimation phase. However, one member of the team cannot simply hand his output to the next member, to serve as input for the next stage of planning, and consider such a parameter to remain unchanged throughout the entire planning process. The output of the next planning stage is likely to indicate some problems and impacts which will require modification of the input (i. e., the output of the first stage). The traffic planner is likely to find, for example, that certain initial projections relative to densities or patterns of land use result in unusual traffic access or circulation problems. Average daily traffic loads projected to the future may indicate overloading of planned arterials or impractical peak hour volumes on freeway ramps and weaving sections. For example, a simple rearrangement of land uses may be indicated to spread peak hour traffic in one particular direction over two access points instead of being concentrated at one. Or a reduction in planned number of dwelling units or extent of office development may be indicated.

TRAFFIC PLANNING PROCESS

Figure 1 summarizes the major elements of the traffic planning process for new towns. The estimation of traffic demand stems directly from the land-use plan, which in turn is dependent to a large degree on the economic potentials, physical capabilities, and financial, legal or other parameters governing the development. Frequently

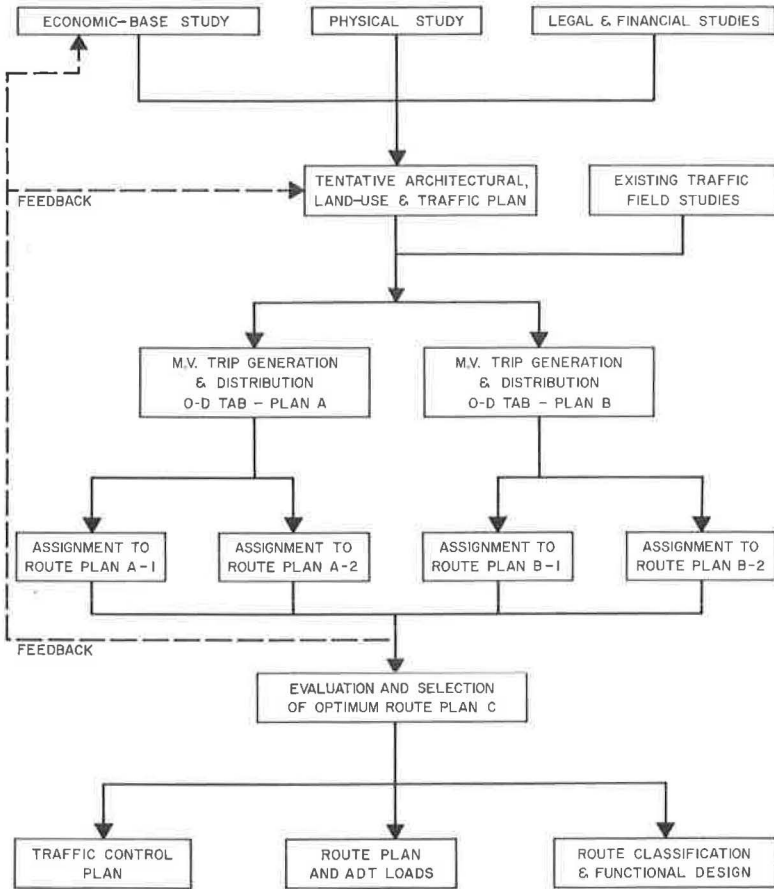


Figure 1. Flow of traffic-planning criteria for new towns.

two or more possible land-use plans are postulated for study, representing alternate concepts of density, pattern, or type of land use. In Figure 1, two plans have been assumed to exist, designated as A and B.

The trip-estimation techniques used in the studies cited in this paper involve three classes of data: (a) trip generation at home and purpose ends (of trips); (b) distribution of trips between zones and/or stations of origin and destination; and (c) assignment of trips to route networks. Criteria employed in this regard are discussed in the following paragraphs.

Trip Generation

Daily trip production associated with a land-use plan can be estimated by applying anticipated trip-generation ratios to basic planning units. Trip ends generated by residential units are usually estimated on a per capita or per dwelling unit basis. Table 1 indicates per capita ratios employed in several studies conducted by Wilbur Smith and Associates. Home-based trips, approximating two per resident, relate to only those motor vehicle trips originated or terminated by the resident at his home. It does not include the trips he may make between other points, such as a trip from his work place to a store. The latter would be included in the nonhome-based category of resident trip production. Trips originating at other points and destined to the resident's home but not made by him (such as visits by friends or delivery trucks) are not included in the home-based generation figure shown here. Thus, the total trip ends at

TABLE 1

DAILY RESIDENTIAL MOTOR VEHICLE TRIP-GENERATION INDICES FOR
NEW TOWN PLANNING, CALIFORNIA^a

Town	Trips per Resident		% of Home-Based Trips for		
	Home-based	Nonhome-based	Work	Shopping	Other
Mountain Park	2.00	0.35	35	25	40
Irvine Ranch	2.05	- ^b	30	20	50
Universal City	1.90	- ^b	40	30 ^c	30
San Ramon Village	2.00	0.24	30	20	50

^aExcluding nonresident trips made within town site.

^bNot estimated.

^cIncluding business trips.

residences will have a per capita ratio greater than the home-based ratio shown here and can be ascertained after the complete O-D tabulation has been synthesized by dividing the total residential trip ends by total residents. Some recent studies in the Los Angeles area have indicated current ratios of about 2.5 motor vehicle interzonal trips per capita in both single family and multi-family dwelling units, taking both home-based and nonhome-based residential trip ends into consideration (1). Including intrazonal trips, the overall ratio would exceed 2.5 by a small amount.

Three common categories of trip purposes utilized in traffic-estimation procedures are "work," "shopping" and "other." The home-based trip-generation totals in each traffic study zone are classified by these groups in the studies referred to in Table 1, and percentages estimated in each group are also given.

For the usual procedures employed in home-based trip-distribution procedures, it is necessary to make use of relative attractive forces at destination zones. Table 2 lists such trip-end generation indices applied in the Irvine Ranch planning study. Per-acre ratios are useful where land-use plans have not progressed to the point where planned building floor areas are available and, of course, must be used for parks or other areas where buildings are not the principal traffic generators.

Table 3 lists motor vehicle trip-generation and parking-space indices which may be used in business and commercial districts where planned building floor area data are available. These indices are based on studies by Wilbur Smith and Associates and the ranges reflect actual observed conditions in a number of buildings in different cities. (The figures represent the

TABLE 2
ESTIMATES OF DAILY MOTOR VEHICLE TRIP
ENDS PER ACRE USED IN NEW
TOWN PLANNING

Lane Use	Land-Use Density Range		
	Low	Medium	High
Industrial	25	50	75
Retail commercial	200	400	600
Other commercial	100	250	400
Schools and parks	10	20	30
Hotel and motel	100	200	300
Open space	0.1	1	3
Residential low density	10	15	20
Residential medium density	25	35	45
Residential high density	100	125	150
Airport	-	10	-
University	-	20	-
Health center	-	10	-
Cemetery	-	0.5	-
Bay front	-	10	-

TABLE 3
COMMERCIAL AREA TRAFFIC- AND PARKING-GENERATION
INDICES FOR NEW TOWN PLANNING^a

Building Type	Daily Motor Vehicle Trip Ends	Parking Spaces Required
Banks	20-90	3-7
Misc. private offices	3-8	1-2
State offices	30-90	N. A.
City and county offices	10-30	2-5
Post offices	10-60	3-4
Utility offices	10-30	2-3
Clothing stores	20-40	2-3
Dept. stores	10-40	2-4
Avg.	30	3.6

^aper 1,000 sq ft building floor area.

extremes of the middle 50 percent range of building ratios.) Extent of public transit played very little part in the variations. The ranges are attributed to varying character of activity or popularity of services in the different concerns. Parking-space requirements summarized in Table 3, derived from the same source as the trip-generation indices, are useful in planning terminal facilities in business districts (2).

Trip Distribution

The distribution of home-based trips between home ends and purpose ends is accomplished by a trip-distribution formula which is simply the total zonal trip production for the home zone multiplied by a travel time factor representing travel time between the two zones and by an attraction factor for the purpose zone; the resultant value is divided by the sum of all travel factor-attraction factor products for all interzonal trip interchanges associated with the home zone and all other zones. This mathematical form is the same as that now widely used in the gravity model applied to synthesizing O-D data.

Internal vs External.—The distribution of trips from home to work, etc., involves an important decision as to what proportion of trips will remain in the planning area and what proportion will be distributed to external points. The degree of self-containment will determine this split. Estimates of the extent to which residents will travel to points outside the area to shop, work, etc., are important considerations coming out of the economic-base study, as pointed out previously.

Table 4 gives some self-containment criteria utilized in connection with several new town planning projects by Wilbur Smith and Associates. In the case of Mountain Park, two possible conditions were investigated, as indicated by the two sets of figures. The makeup of a community, its size, and its relation, both geographic and economic, to other urban areas influence the percentages, as shown in this table. For instance, Irvine Ranch, being a very large development with large pools of employment, was considered to be relatively self-sufficient, and 63 percent of resident workers were estimated to work on the ranch. On the other hand, San Ramon Village, on the line dividing Alameda and Contra Costa Counties in northern California, about 10 mi east of Hayward, is relatively close to major employment concentrations to the west and north and is more of a bedroom community, generally speaking, than the Irvine Ranch. Only 40 percent of resident labor force are estimated to find employment within the village.

Table 4 indicates the degree of self-containment viewed from the purpose ends as well as the home ends of the trips. For example, of all Irvine Ranch jobs, 90 percent are expected to be held by local residents. Universal City, on the other hand, although expected to absorb over half the resident labor force, will have many more jobs than residents; hence, these resident workers will fill only 12 percent of the jobs on the site. Universal City will be more of a commercial complex than a typical community. Today it is principally devoted to the motion picture industry, but will come into the new town category if the apartment houses, office buildings, hotel, and retail shopping center are completed as planned.

Distribution Process.—The trip-distribution formula previously described makes use of trip attraction factors in each zone, as well as travel factors. In the planning

TABLE 4
SELF-CONTAINMENT CRITERIA ESTIMATES FOR NEW TOWNS

Town	Planned Population	At Home Ends of Trips			Planned Employment	At Purpose Ends of Trips		
		% Res. Trips to Town Jobs	% Res. Shopping Trips to Town Stores	% Res. Other Trips to Town		% Res. Town Work Trips	% Res. Town Shopping Trips	% Res. Town Other Trips
Mountain Park (self-cont.)	63,100	45	80	80	15,235	90	100	77
Mountain Park (nonself-cont.)	63,100	5	65	60	15,235	10	100	71
Irvine Ranch	285,000	83	81	82	125,000	90	73	76
Universal City ^a	12,000 ^b	54	33	50	12,300	12	30	11
San Ramon Village	40-50,000	40	90	80	9,500	39	67	80

^aDevelopment plans indicated not official, alternate plans under study.

^bAt assumed 2.5 resident per apartment unit.

work for the communities cited here (Table 4); estimated work trips were distributed from residential zones to employment zones, using the projected numbers of jobs and travel times from home to work as parameters. Nonhome-based trips were distributed between pairs of nonresidential zones, using trip ends (from the home-based distribution process) as a parameter. Shopping trips were distributed to destinations in relation to gross retail sales estimates or commercial building floor area, and travel time. Other trips were distributed on the basis of travel times and appropriate categories of trip-end generation in destination zones.

Typical trip-distribution travel time factors used in new town studies are depicted by the curves in Figure 2. There is little information available on calibrated trip-

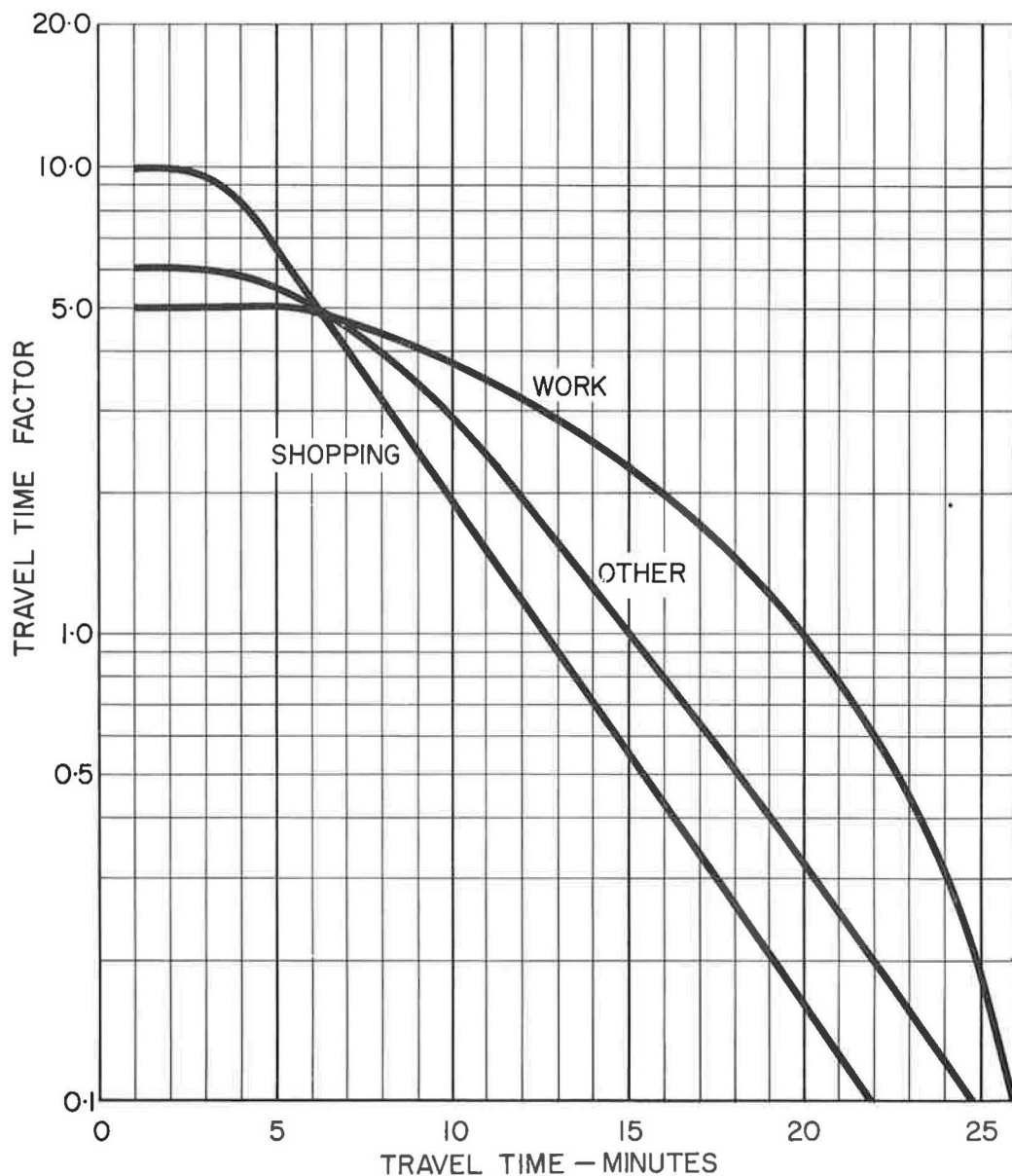


Figure 2. Typical travel time factors for home-based trips used in new town planning.

distribution curves for communities of 50,000 to 100,000, the general range of most new towns. The illustration is a generalization of data from various large and small communities. Much remains to be learned about these curves and how they vary in relation to trip purposes and environmental factors. However, the curves shown here are useful tools, reasonably accurate for the general planning work intended. Perhaps more important than the shapes of these curves are the other parameters of trip generation and distribution of attraction factors which determine quantity and direction of traffic flow. It is very likely that errors in these will influence assigned traffic volumes to a greater extent than variations in the shape of the travel factor curves.

Traffic Assignment

Traffic diversion curves, such as those shown in Figure 3, are used to assign motor vehicle trips to route networks. The division is shown for interzonal trip volumes between a freeway (5) and alternate major street connecting a pair of zones. The dashed line shows the division between two alternate major streets (where no freeway route exists). The latter curve is intended to be used for splitting traffic between two arterials substantially the same in traffic service standards, not between a new arterial and alternate existing street offering poorer service which is a situation not often encountered in new town planning.

These curves recognize only the travel time differentials between alternate routes. The California Division of Highways has developed a more detailed method relating the relative split of trips between a freeway and the best alternate arterial to both travel time and distance between the zones of origin and destination. The California formula is as follows:

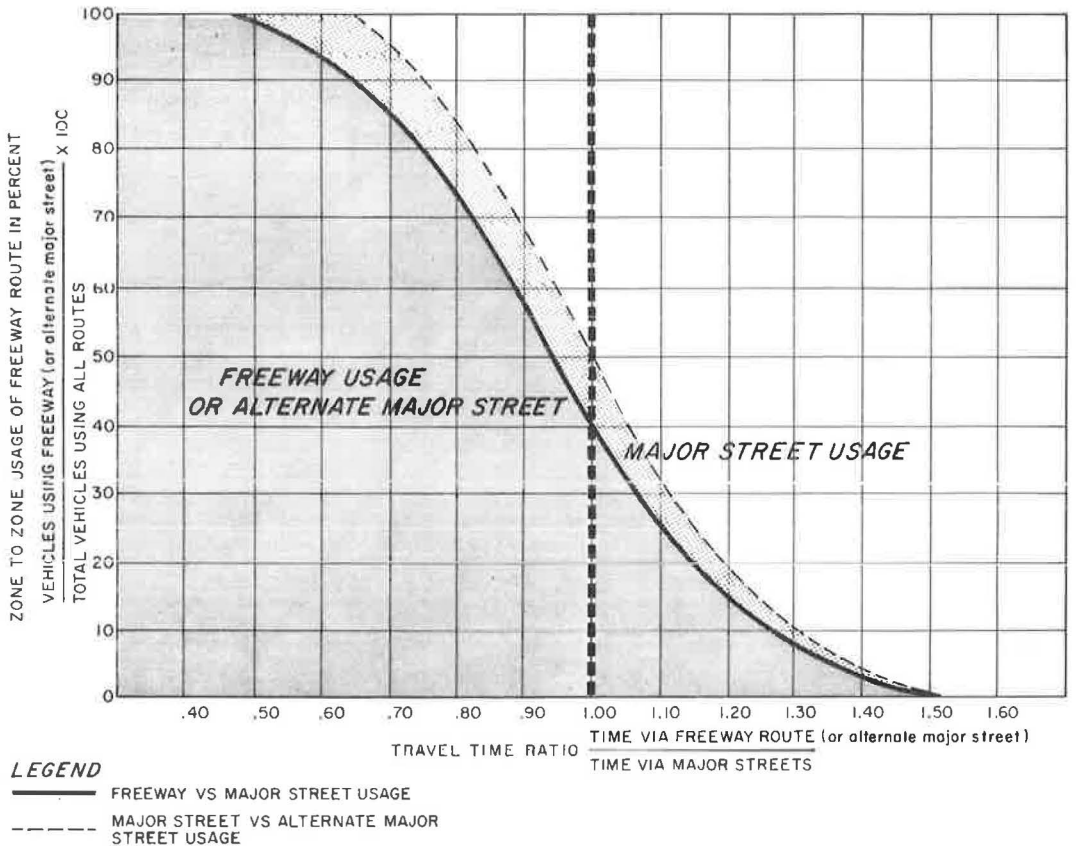


Figure 3. Traffic diversion curves.

$$p = 50 + \frac{50(d + 0.5t)}{\sqrt{(d - 0.5t)^2 + 4.5}} \quad (1)$$

where

$$0 \leq p \leq 100,$$

p = percentage of trips via freeway,

d = distance saved via freeway (mi), and

t = time saved via freeway (min).

A modification of this formula applies where p is less than 50 and the length of freeway travel on freeway route minus length of freeway travel on alternate route is under 2.0 mi.

There are also other recognized assignment methods, including the U.S. Bureau of Public Road's minimum path or "all-or-nothing" system which has been programmed for EDP methods and is widely used.

The differences in final answers that can result from choice of assignment method alone can be seen from a study Wilbur Smith and Associates is carrying on in Laguna Beach, Calif., at the present time. Table 5 indicates the comparative results of making

TABLE 5
COMPARISON OF FREEWAY ASSIGNMENTS BY CALIFORNIA VS
BPR DIVERSION CURVE METHODS, LAGUNA BEACH

Zones	Route	Time (min)	Distance (mi)	Diversion (%)		Diff. on Freeway
				Calif.	BPR	
7- 1	Freeway	2.57	1.80	58	87	+29
	Alternate	3.75	1.54	42	13	
11- 6	Freeway	9.39	5.48	40	57	+17
	Alternate	10.39	4.56	60	43	
16- 8	Freeway	13.12	9.42	0	18	+18
	Alternate	11.22	5.12	100	82	
4- 2	Freeway	2.25	1.07	52	70	+18
	Alternate	2.75	1.00	48	30	
9- 5	Freeway	4.48	3.27	72	88	+16
	Alternate	6.63	3.22	28	12	
9- 2	Freeway	6.19	4.04	70	85	+15
	Alternate	8.73	3.82	30	15	
4- 3	Freeway	4.20	2.05	62	76	+14
	Alternate	5.40	1.95	38	24	
9- 3	Freeway	7.31	4.50	60	73	+13
	Alternate	9.13	4.13	40	27	
18-13	Freeway	18.69	9.69	53	63	+10
	Alternate	21.31	8.57	47	37	
7- 6	Freeway	7.67	5.00	76	83	+ 7
	Alternate	10.65	4.67	24	17	
9- 7	Freeway	4.24	2.40	57	65	+ 8
	Alternate	5.00	2.36	43	35	
10- 5	Freeway	10.76	8.95	88	89	+ 1
	Alternate	16.52	8.78	12	11	
10- 9	Freeway	14.04	11.76	96	91	- 5
	Alternate	22.39	11.80	4	9	
10- 4	Freeway	8.54	7.09	98	90	- 8
	Alternate	13.49	7.43	2	10	
12-11	Freeway	7.43	3.44	99	84	-15
	Alternate	10.44	4.11	1	16	

assignments by the two methods to a freeway routing under study: (a) using the differences in travel times and distances between trip origin and destination, and employing the California curves which take both into account; and (b) using only the ratio of travel times from the BPR traffic diversion curve. The zonal interchanges were selected at random, and the resulting data were arranged in order of magnitude of difference in freeway percentage assignment. It is evident that the largest differences occur where the trip distances are short, the ratios of travel times are substantial, and distances are in a contrary relationship. For example, trips between Zones 7 and 1 would be 1.2 min faster on the freeway, but 0.26 mi longer in travel distance. Looking at travel time ratios only, the diversion curve would assign 87 percent of trips to the freeway. But using the California curves which take the adverse travel distance into account as well, the freeway would receive only 58 percent of interzonal trips. This is an extreme case, and it is pertinent to note that the diversion curve sometimes assigns less trips to the freeway than the California method.

The purpose in pointing out these differences is not to claim weaknesses for traffic study methods, but rather to illustrate the degree of variability and unpredictability present in all traffic projections. The land-use data for future years is always subject to question and revision. The traffic models used to predict trip generation and distribution are subject to statistical errors of the order of ± 20 -25 percent. And the assignments to route networks are subject to similar errors.

The traffic planner is working with traffic flow predictions that may be subject to 25 percent error (perhaps as much as 50 to 100 percent for some low volume ratios), and he is only fooling himself if greater accuracies are implied. However, when considered in terms of the ultimate use of such data, the determination of capacity requirements, the situation is not as bad as it might first appear to engineers used to working with tolerances of a few percentage points. For traffic planning purposes, the analyst is primarily interested in ranges, such as 0-5,000 ADT; 5,000-10,000 ADT; or 10,000-15,000 ADT. Such predictions are entirely adequate for traffic planning purposes, although they may involve errors up to 100 percent (under 10,000 ADT, for instance). It may be expected that errors of assignment will diminish as larger volumes are involved (e.g., for values of 50,000 ADT and above) since compensating errors tend to bring corridor volumes into closer check with actual volumes; thus, errors due to assignment methods will decrease as larger numbers of zonal trip interchanges are added together.

The assignment of future traffic may be made to several alternate networks for purpose of assisting in selection of the best one. And effects of alternate land-use plans may be tested in terms of the resulting street network loads to be carried. For example, in Figure 1, two land-use plans, A and B, and two networks for each plan have been assumed, resulting in four networks.

The selection of the optimum plan will be based on many considerations, mostly subjective, but similar to those applying to traffic planning in general. New town planning permits a flexibility not possible, of course, in conventional work with existing cities. One of the chief factors in this respect is the ability to change the land-use input to obtain desired changes in traffic loading or other new town characteristics. Thus, the study of route assignments may indicate the desirability of altering the distribution and density of population, employment, or other aspects of the planned community. In Figure 1, the feedback indicates this process.

Once the optimum plan and assigned traffic loads are ascertained, the functional design details and traffic control system can be developed. Numbers of lanes, use of dividing strips, locations of median left-turn lanes, provision or prohibition of curb parking, traffic signal systems, and speed limits are the major elements referred to in this instance.

MOUNTAIN PARK

The planned community of Mountain Park in the Santa Monica Mountains of Los Angeles, Calif., provides a good example of planning for a new town, with particular reference to the matter of self-containment and the impact of different assumptions concerning this factor. Due to the filling up of available flatland, builders in the Los

Angeles area are now turning increasing attention to the undeveloped mountainous areas which offer fine views and are reasonably close to primary regional employment centers. Ridge and ravine topography preclude the usual mass construction techniques. There has been much land scalping and stilt hillside construction.

A new technique of constructing homes on stilts on the hillsides was developed. The original residential developments took place in the bottoms of canyons and along

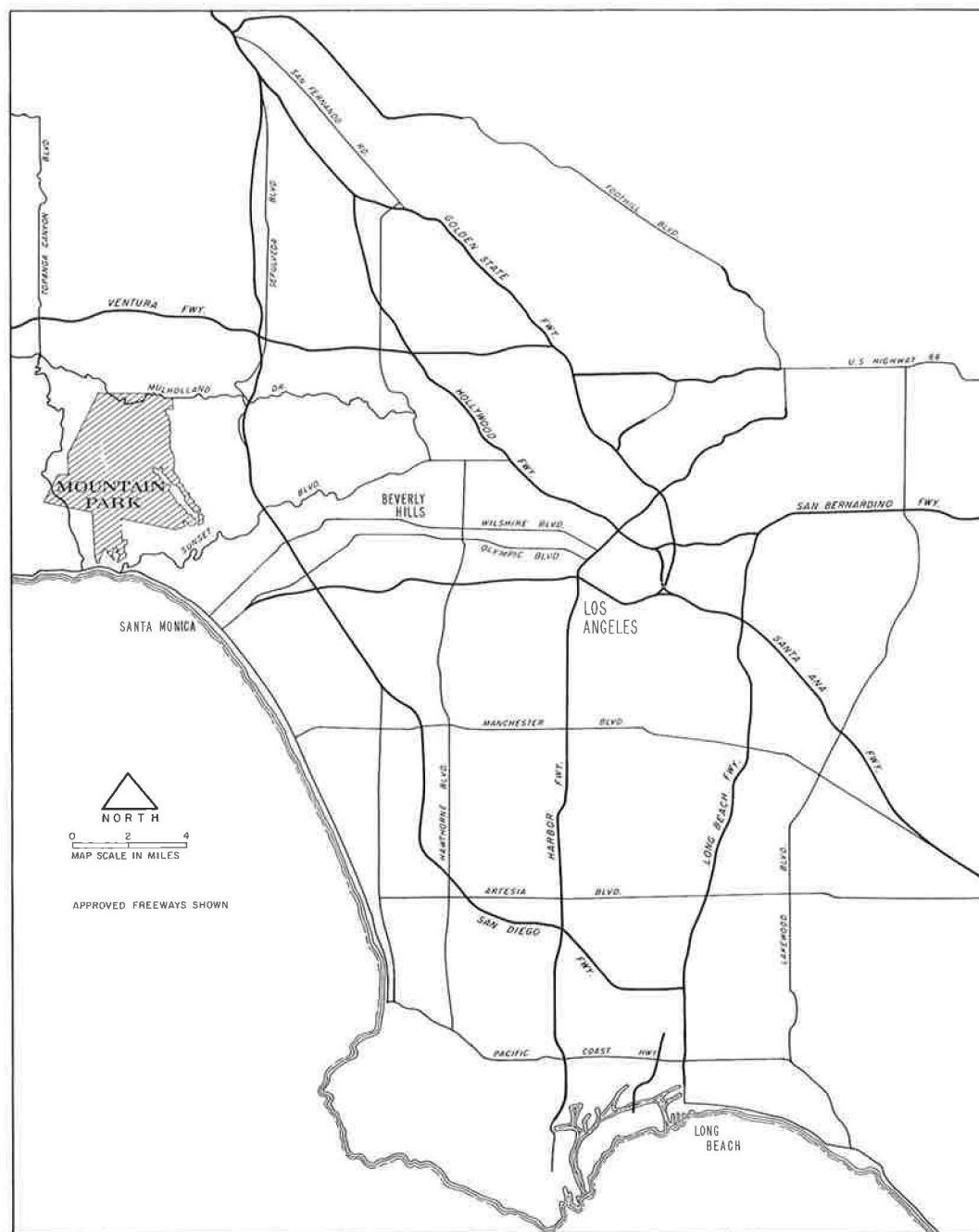


Figure 4. Map showing relation of Mountain Park to Los Angeles metropolitan area.

tops of ridges, leaving only the steep hillsides vacant, which are now being utilized by such unusual construction techniques. Extensive hillside cuts are being made in the Los Angeles area for buildings. Many homes on such hillside developments are priced in the \$100,000 range.

Mountain Park is being planned to avoid carving up the landscape and to preserve the mountains and their scenic beauty. Greenbelts will be created to separate the clusters of buildings, concentrated in relatively self-contained mountain villages. Over 50 percent of the land will be committed permanently to open spaces in the form of parks, golf courses, recreational areas and greenbelts.

Figure 4 shows the location of this proposed community (3). It is presently an undeveloped area of 10,700 acres or 16 sq mi, with hillsides, canyons and rolling land ranging in elevation from 100 to over 2,100 ft above sea level. Primary highway access will be via Sunset Blvd. on the south, Mulholland Drive on the north, Topanga Canyon Blvd. on the west, and a planned new Reseda freeway bordering the development on the east.

The University of California is planning to develop a graduate-level scientific research center on a 350-acre site on highest portion of Mountain Park, looking northeasterly toward the San Fernando Valley. The center will create specialized employment opportunities. Incidentally, this is at the highest elevation of the planned community.

The planned single family clusters will consist of a concentration of residential buildings in certain portions of the land with adequate compensating open spaces in other areas so that development will meet acceptable overall density standards. Incidentally, this adds variety to new subdivisions, avoiding the repetitious monotony often seen in the typical gridiron layouts of urban land use.

Figure 5 shows the ten planning areas of Mountain Park and the extent of employment and population anticipated in each. Total population will approximate 63,000 people; employment will reach 15,235 jobs. Land-use and site plans have been developed which envision ten villages separated by large greenbelts. The villages are planned as "balanced communities," that is, containing a mixture of land uses including single family and multi-unit residences, neighborhood shopping areas, schools, parks, churches, and offices.

Self-Sufficiency

One important factor in the plan is the design of each village as relatively self-sufficient to reduce the need for long commuting between home and work, relieve traffic loads on access routes, and help create a distinctive character for each of the ten villages. The extent to which this can be achieved will affect the number of lanes required for principal access highways leading into and out of Mountain Park. However, the actual degree of self-containment to be experienced at ultimate development is obviously open to question. This question was raised by the City of Los Angeles, and there was the feeling on the part of some persons that Mountain Park might in actuality become a bedroom community, and that approvals for access roads should be based on this possibility. Therefore, to evaluate the relative impact of the two extremes of self-containment vs nonself-containment, two sets of traffic estimates, one for each condition, were developed. In the first case, 90 percent of the jobs were assumed to be filled by local residents; the second case assumed a figure of 10 percent.

It was assumed that no outsiders would come into Mountain Park to shop. Local residents would do 80 percent of their shopping in town under the self-contained concept or 65 percent under the nonself-contained concept. For other trips, the percentages of resident trips to Mountain Park destinations were 80 and 60 percent, respectively, for the two concepts. Table 4 shows the various percentages estimated in this study.

Figures 6 and 7 show the resulting traffic desire line projections, in which the expected differences in travel patterns are apparent. The topography of Mountain Park limits the number of external origins and destinations to three major corridors. With the self-contained concept, there will be an estimated daily traffic volume to and from external points through the northern corridor of 22,000 vehicles. As a nonself-contained



Figure 5. Population and employment distribution at ultimate development.

community, this external trip volume will be 37,000. The two extremes for the eastern corridor were found to be 24,000 vs 40,000, and for the southern corridor, 17,000 vs 29,000. These are substantial differences, the bedroom community concept producing about 70 percent more external trips than for the self-contained community.

Figures 8 and 9 show the relative impact of the two concepts on one of the major access routes, Santa Ynez Canyon Road. The two assignments are 8,600 and 11,000 veh/day along the lower part of this route, and 15,700 vs 15,000 at the heaviest traveled point. The study concluded that a four-lane cross-section for this road would accommodate traffic demands in both self-contained or nonself-contained cases.

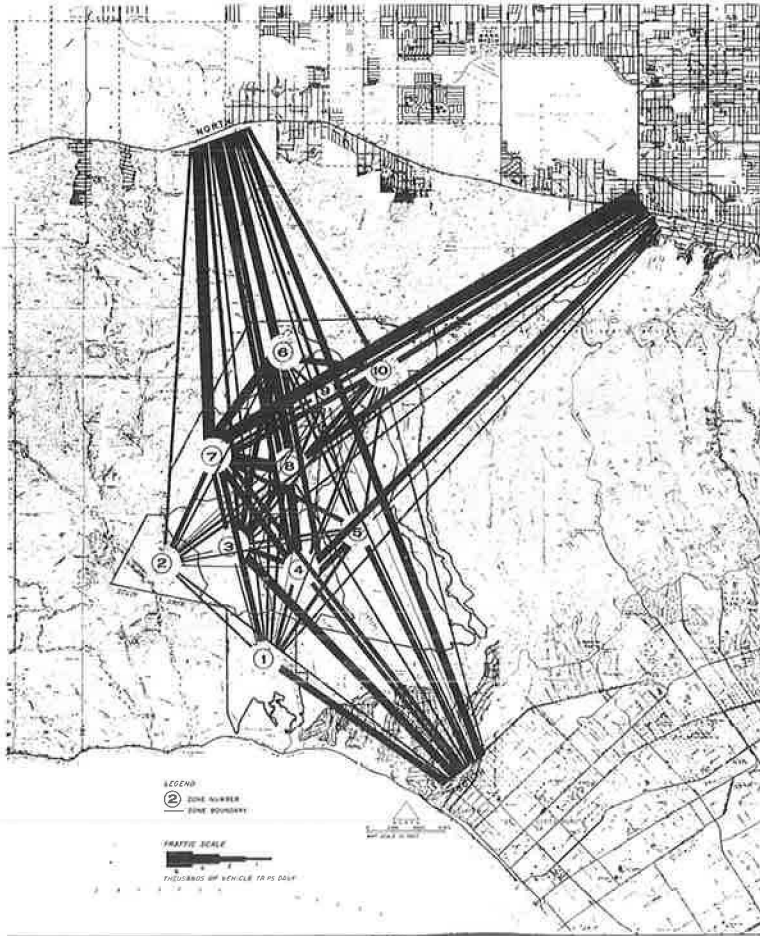


Figure 6. Traffic desire lines, 1980, self-contained community.

Mulholland Drive

This important access route for Mountain Park was accorded special study for the approximate 8-mi section between Topanga Canyon Blvd. on the west and the San Diego Freeway on the east. A somewhat unusual phase of this investigation was the estimation of the future sight-seeing through traffic that will probably use this route after it is improved and completed.

The location of Mulholland Drive at the crest of the Santa Monica Mountains makes it attractive for motorists who want to get a birds-eye view of Los Angeles. Tourist, recreation and sight-seeing traffic is difficult to predict. In the absence of any recognized indices of trip generation of this class of traffic, it was decided to approach the matter on the basis of analogy.

The first basis of analogy was the observed difference in daily traffic loads between the seasonal peak during tourist season and the annual average volume on major Los Angeles routes known to carry substantial tourist and sight-seeing traffic. This difference averaged 5,700 for the twelve routes investigated (Table 6). The second approach was a consideration of the peak seasonal traffic generated by some of California's scenic tourist attractions (Table 7), which averaged 3,700 ADT. Based on these data, it was reasoned that about 5,000 ADT would be a suitable estimate of the seasonal sight-seeing traffic component of the total usage of Mulholland Drive (a high estimate to be on the safe side).

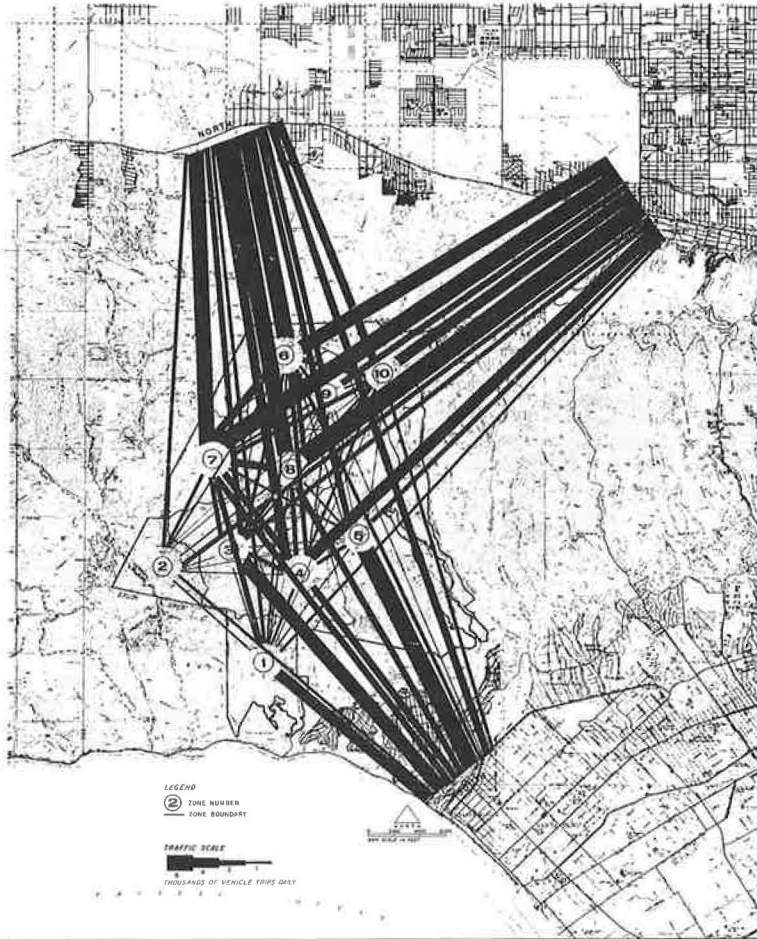


Figure 7. Traffic desire lines, 1980, nonsell-contained community.

IRVINE RANCH

Another example of new town planning is Irvine Ranch in southern California. The way in which feedback information was used in developing the plan for this community is discussed in the following paragraphs.

Figure 10 shows the location of this 93,000-acre planned community, one of the largest single land planning projects ever undertaken (4). It occupies 147 sq mi, or about seven times the area of Manhattan Island. The property has been held virtually intact and utilized almost exclusively for agriculture and ranching purposes since the time of the Spanish land grant to the original owners of the properties. The Irvine Ranch is located within Orange County, now close to a million in population and one of the fastest growing counties in the United States. Population of the county is predicted to reach 2.5 million persons by 1980.

The ultimate development of the ranch will include housing and employment for a population of 280,000 by 1980. The balanced complex of residential, industrial, commercial, agricultural, educational, and recreational facilities will include a new 1,000-acre University of California campus (now partially completed and in operation), complete with its own town center and residential community for students, faculty and university staff. The population on the ranch was approximately 25,000 in 1961, when the traffic planning studies cited here were begun, concentrated along the Pacific Coast

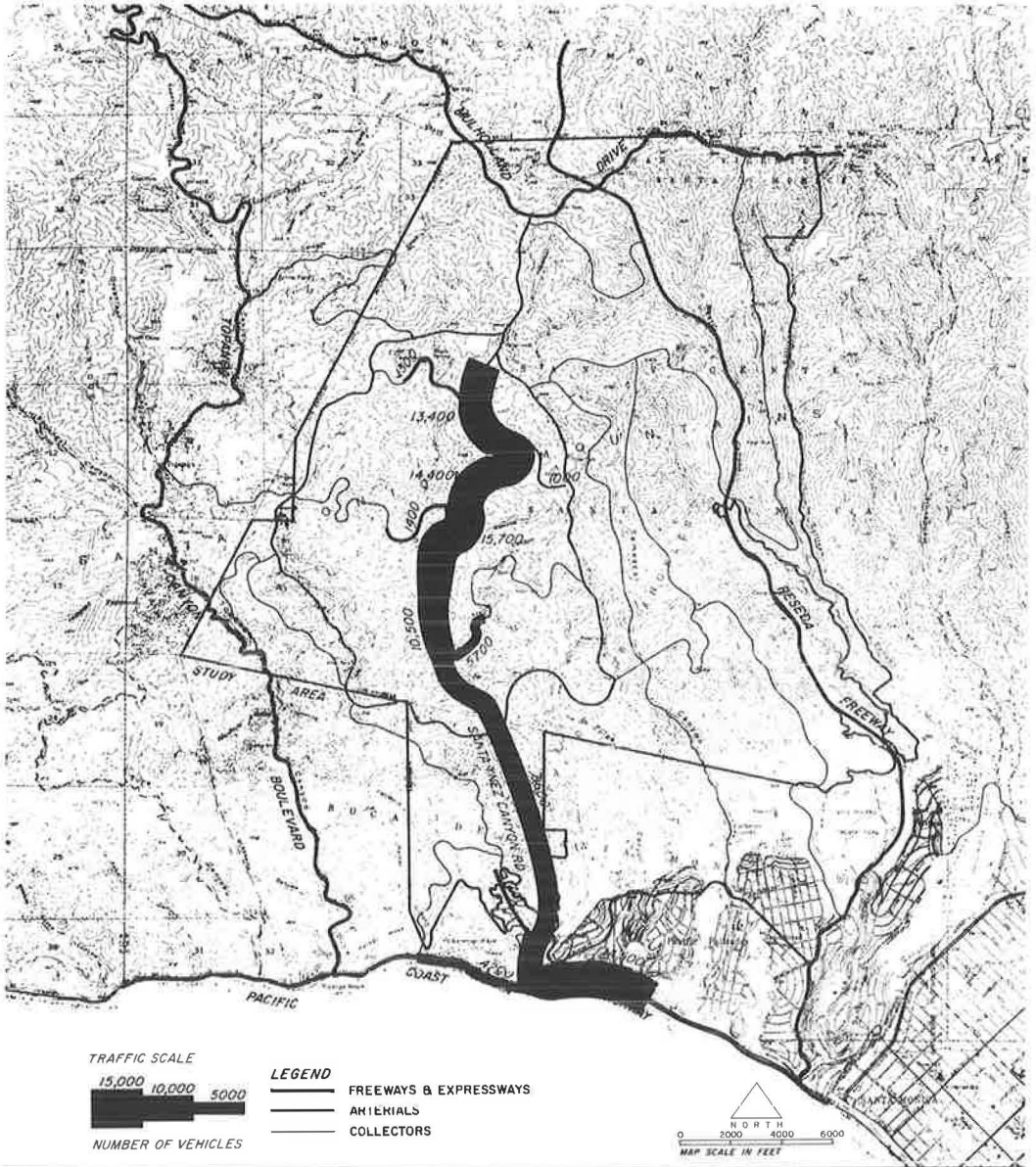


Figure 8. Average daily traffic volumes on Santa Ynez Canyon Road, Network A-ultimate development, self-contained community.

within the communities of Laguna Beach, Newport Beach and Costa Mesa. Several major industrial concerns are also located within the ranch.

Figure 11 shows the estimates of the total daily generation of vehicle trips, classified by purpose, and the extent of traffic interchange between Irvine Ranch and external areas. (The overall area shown is Orange County.) It was estimated that 63 percent (111,000) of resident-generated work trips will be associated with jobs within the ranch. Outside resident trips to and from the ranch for work purposes will number 20,000, making a total 131,000 motor vehicle trips per day associated with the predicted 125,000 jobs on the ranch.

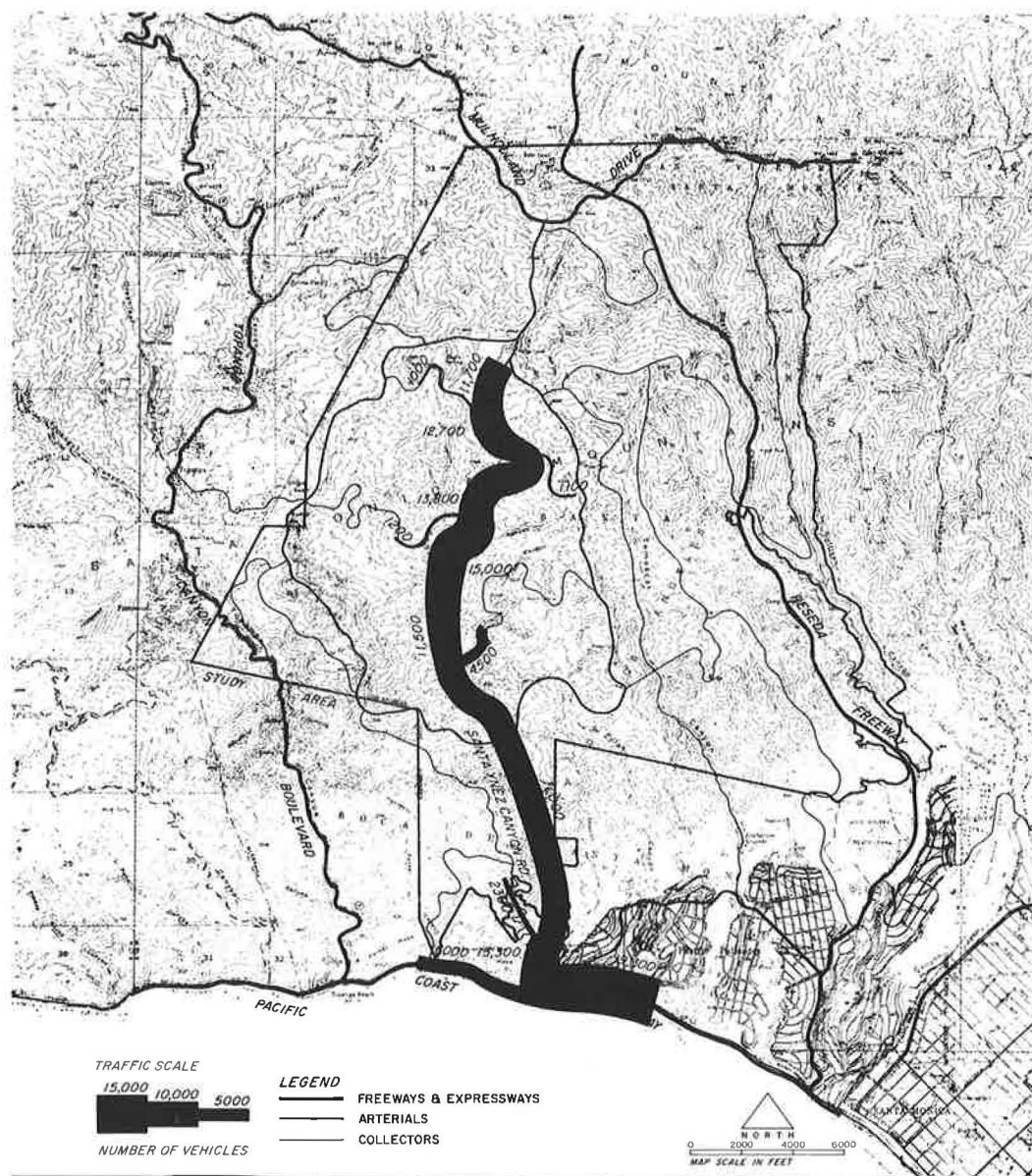


Figure 9. Average daily traffic volumes on Santa Ynez Canyon Road, Network A—ultimate development nonsel-contained community.

The map shows major commercial centers and their retail sales volumes for the year between October 1959 and October 1960. These indices were used (with consideration given to future change), in conjunction with anticipated distribution of retail activities on the ranch, as a basis for distribution of the daily shopping trips of ranch residents. The residual numbers of shopping trips, starting with total shopper trip ends in Irvine Ranch retail centers and subtracting ranch resident trips, were allocated to residents outside the ranch. Other trips were allocated in similar fashion, the projected distributions of total vehicular trip ends being used as a guide in the trip-distribution model utilized in this instance.

TABLE 6
SEASONAL PEAK ADT VS ANNUAL ADT,
LOS ANGELES ROUTES

Route	ADT		
	Seasonal Peak	Annual Avg.	Diff.
San Bernardino Freeway:			
West Covina	69,000	61,000	8,000
Pomona	60,000	53,000	7,000
County line	57,000	51,000	6,000
Ontario	42,200	38,300	3,900
Colton	38,600	35,000	3,600
Redlands	26,700	24,000	2,700
Coast Highway:			
Orange County line	29,100	20,700	8,400
Sunset Blvd.	23,300	18,200	5,100
Ventura County line	6,900	5,400	1,500
Santa Barbara County line	24,000	17,000	7,000
US 101, Ventura County line	36,000	26,300	9,700
US 99, Kern County line	18,200	13,200	5,000

TABLE 7
SEASONAL PEAK TRAFFIC VOLUMES ON CALIFORNIA
RECREATIONAL AREA ACCESS ROUTES

Attraction	Seasonal Peak ADT
Yosemite Nat. Park	7,100
Sequoia Nat. Park	4,400
Big Bear Lake area	6,200
San Francisco:	
Santa Cruz Coast Highway	3,000
Stinson Beach Coast Highway	1,000
Carmel - Morro Bay - south of Big Sur	2,400
Skyline Blvd. - South Half-Moon Bay Road	2,000

Figure 12 shows the synthesized 1980 trip desire data for interzonal movements. Heavy travel is projected between Zones 18, 23 and 30. Zone 18 will be mainly residential in character, with 50,000 population in 1980. Zone 23 contains the University of California at Irvine campus, with a projected population of 52,000 and employment of 20,000. Zone 30, besides residential and employment concentrations, will contain Newport Town Center, a regional shopping center. External trips are not shown.



Figure 10. Map showing relationship of Irvine Ranch to Orange County and Los Angeles metropolitan area.

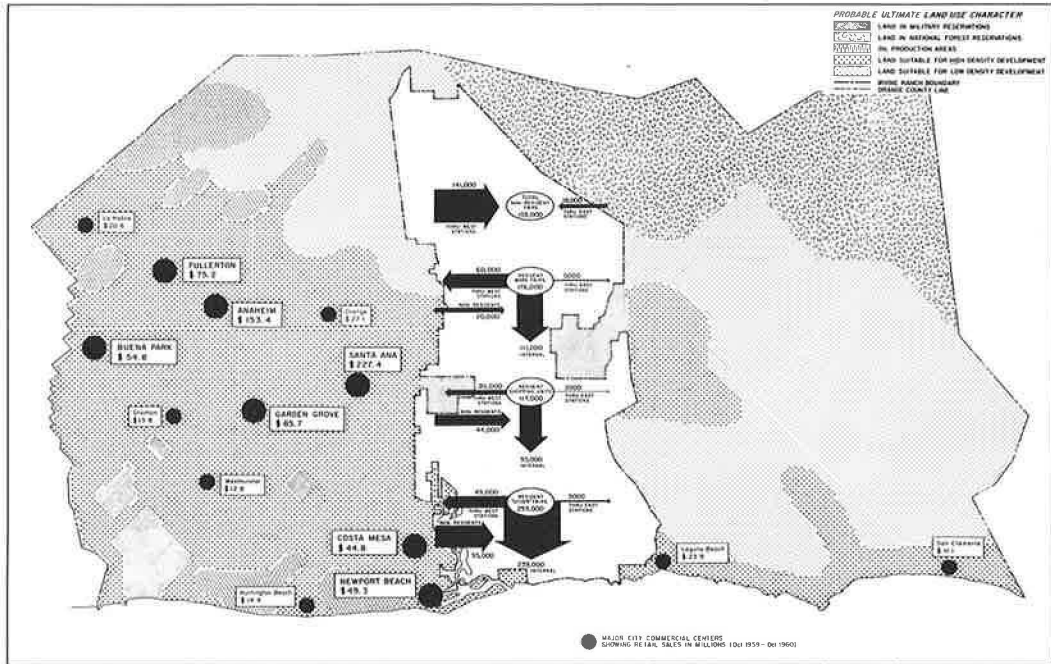


Figure 11. Distribution of 1980 trips by major trip purpose.

Figure 13 illustrates the assignment of 1980 travel desires to the recommended major route system. Through traffic, not associated with Irvine Ranch activities, is shown apart from traffic generated on the ranch. Through trips were projected separately from the others and were based on a study of traffic growth trends and projected population growth in southern California. Only one freeway, the Santa Ana Freeway, existed at the time of the study illustrated here. The major route plan includes six freeways (including the Pacific Coast Highway).

Table 8 gives the criteria used in this instance for recommending numbers of roadway lanes and other functional design requirements.

Newport Town Center

An example of feedback is provided in the case of Newport Town Center, a vast building complex planned for development at the intersection of the future Corona Del Mar Freeway and Pacific Coast Highway (also a future freeway) on the Irvine Ranch. The plan includes retail stores, hotels and motels, offices, a hospital and medical offices, residential units, automobile agencies, an auditorium, a theater, a library and a music center, and miscellaneous other service and recreational facilities. Initial plans called for 13 million sq ft of building floor area. Figure 14 summarizes the projected traffic loads assigned to access routes, aggregating 181,000 daily motor vehicle trips to and from the center.

Three of the most critical points would be the easterly at-grade intersection on Ridge Road (immediately west of Corona Del Mar Freeway), the most southerly intersection on Jamboree Road, and the Jamboree Road-Ridge Road intersection. All would have intersection approach volumes of 70,000 to 80,000 per day, and heavy turning movements. For example, at the most southerly Jamboree Road at-grade intersection immediately north of the Pacific Coast Highway (assumed to be a freeway in the future), the assignment shows a total daily turning movement of 37,000 into and out of the center to and from the south. (The diamond intersection diagrams show directional desires, not ramp assignments.) Analysis was made of possible at-grade operating conditions

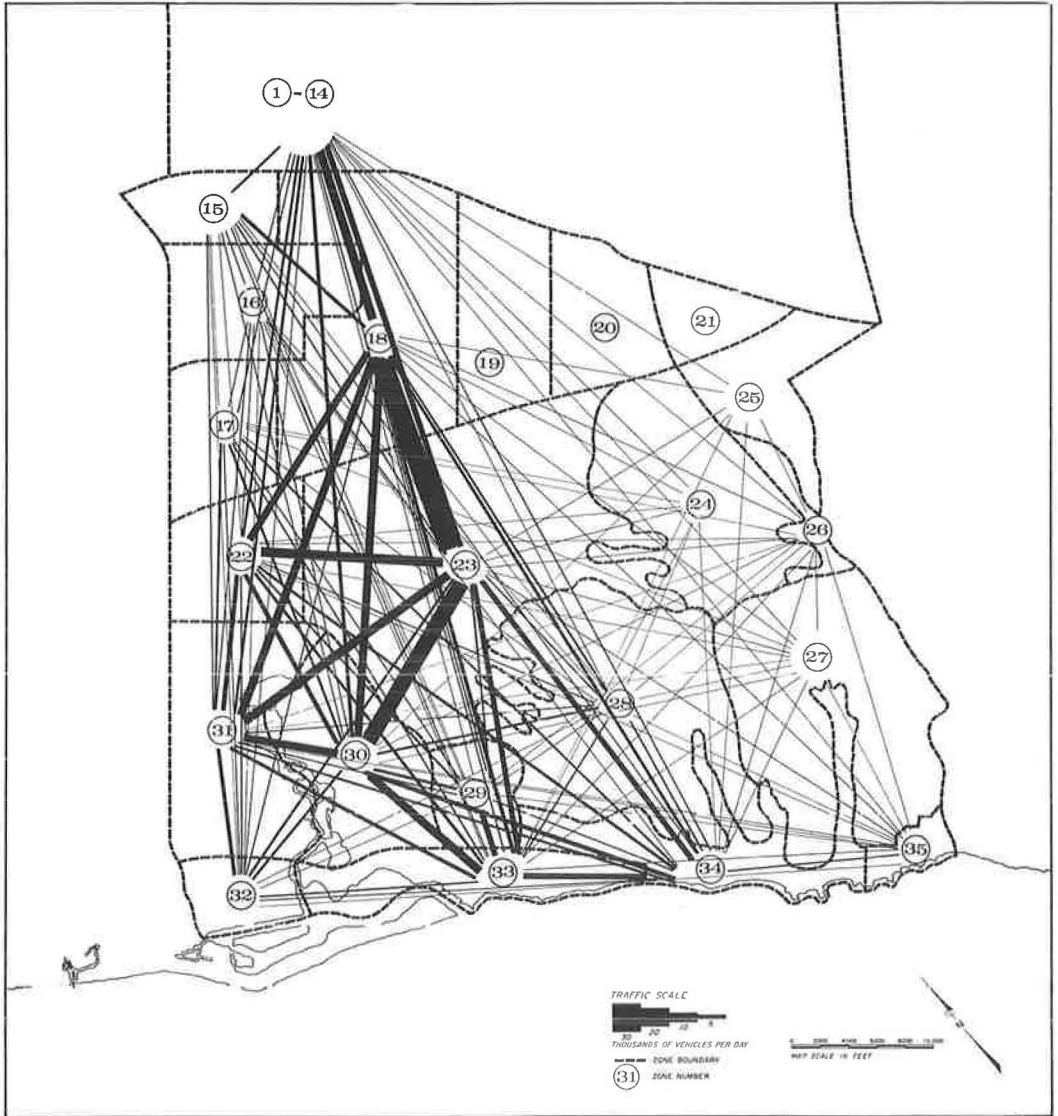


Figure 12. 1980 traffic desires, interzonal motor vehicle trips.

during peak hours, in which some peak hour diversion to adjacent intersections was made, and provision of a third intersection on Jamboree was assumed, bringing the 37,000 turning movements down to 20,000. Any further addition of intersections would reduce spacing below that desirable for good traffic control. On the basis of this analysis, it was concluded that these intersections could provide capacity for about 65 percent of traffic demand generated by a 13 million-sq ft Newport Town Center.

Similarly, a study was made of peak hour operating conditions on the freeways. The 62,000 veh interchanging between the Pacific Coast Highway and the Corona Del Mar Freeway was considered to be above practical capacity for a reasonable design providing a high-type directional interchange, which would have a capacity for about 52,000 to 56,000 veh/day. A reduction to between 55 and 75 percent of the center's traffic generation (comprising only a portion of the 62,000 turning movements) would be necessary to bring the assignment down to the indicated capacity range.

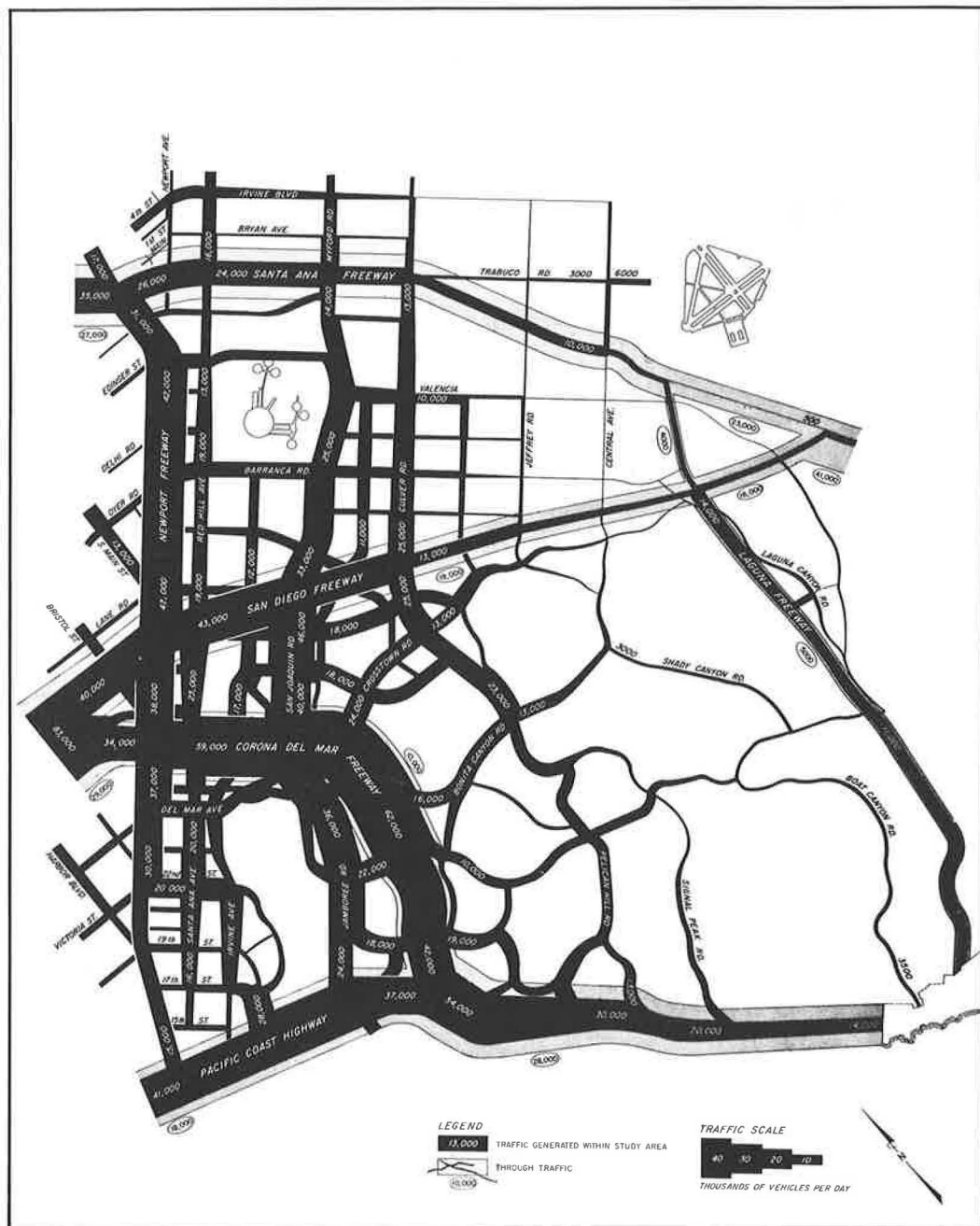


Figure 13. 1980 traffic flow.

Similarly, an analysis at the junction of Ridge Road and Corona Del Mar Freeway indicates the 40,000-veh daily traffic interchange from Ridge Road to and from the north would overload a diamond ramp interchange by 100 percent; a directional interchange by 10 to 25 percent. The most critical intersection, at Pacific Coast Highway and Jamboree Road, shows a 54,000 total desire between west and north. A reduction of the center traffic by 50 to 55 percent would be necessary to bring the peak hour

TABLE 8
TYPICAL ROADWAY CAPACITY CRITERIA FOR PLANNING NEW TOWNS^a

Type	2-Dir. Vol.	
	Peak Hr	24-Hr
8-lane freeway	8,000-10,000	80,000-100,000
6-lane freeway	6,000- 7,500	60,000- 75,000
6-lane divided arterial (72-ft plus left-turn lanes, no parking)	3,200- 3,700	32,000- 37,000
6-lane undivided arterial (72-ft, no parking)	2,800- 3,300	28,000- 33,000
4-lane divided arterial (84-ft, including parking)	2,000- 2,500	20,000- 25,000
4-lane undivided arterial (64-ft, including parking)	1,700- 2,200	17,000- 22,000
4-lane divided major business street (84-ft, including parking)	1,600- 2,000	16,000- 20,000
4-lane undivided major business street (64-ft, including parking)	1,300- 1,700	13,000- 17,000
4-lane divided collector (84-ft, including parking)	1,500- 1,800	15,000- 18,000
4-lane undivided collector (64-ft, including parking)	1,200- 1,500	12,000- 15,000
2-lane arterial (44-ft, including parking)	900- 1,300	9,000- 13,000
2-lane collector (44-ft, including parking)	700- 900	7,000- 9,000
2-lane collector (40-ft, including parking)	600- 800	6,000- 8,000
4-lane rural road	1,100- 1,600	11,000- 16,000
2-lane rural road	500- 700	5,000- 7,000

^aMotor vehicle traffic capacities based on Highway Research Board Capacity Manual, with upward adjustments based on subsequent research. Freeway and expressway capacities based on A Policy on Arterial Highways in Urban Area, American Association of State Highway Officials. Calculations based on 60 percent signal go period, 10 percent trucks, 20 percent combined left- and right-hand turns, one direction volume two-thirds of other in peak hour, and 9 percent to 10 percent peak hour relation to 24-hr volume.

traffic loads down to the capacity of 32,000 to 35,000 vehicles estimated for the west-north directional desire.

It was concluded on the basis of this study that access roadway capacity limitations would permit a center development of only about 50 to 65 percent of the proposed 13 million-sq ft building floor area, in terms of traffic generation. The feedback of this information to the land-use planners on the Irvine Ranch planning team resulted in appropriate revision of Newport Town Center plans.

IN RETROSPECT

The development of new towns offers an exciting prospect for planners, who are afforded the unique opportunity of complete planning without the hindrances and restrictions of established land uses. Team work is essential between the various specialists—the economist, the architect, the land planner, the traffic engineer, the civil engineer, the lawyer, the geologist, and the other disciplines involved in such planning. There must be the maximum of coordination and cooperation among these individuals if a balanced and successful plan is to emerge. In the specific area of traffic planning, no set group of criteria will be available for estimating future traffic loads in the new town. The planner must give careful consideration to the type of people who will live there, how they will be employed, the degree of self-containment to be expected, and other characteristics of the community and its environs before he can select the appropriate indices and parameters for traffic estimation purposes. The new "leisure towns" for example, may not conform at all to the trip-generation and attraction characteristics cited in this paper. And finally, the planner must be generous in supplying capacity for estimated needs, remembering the human frailty of not "thinking big" enough, and also the ever-present possibilities for future downgrading of standards in the name of economy.

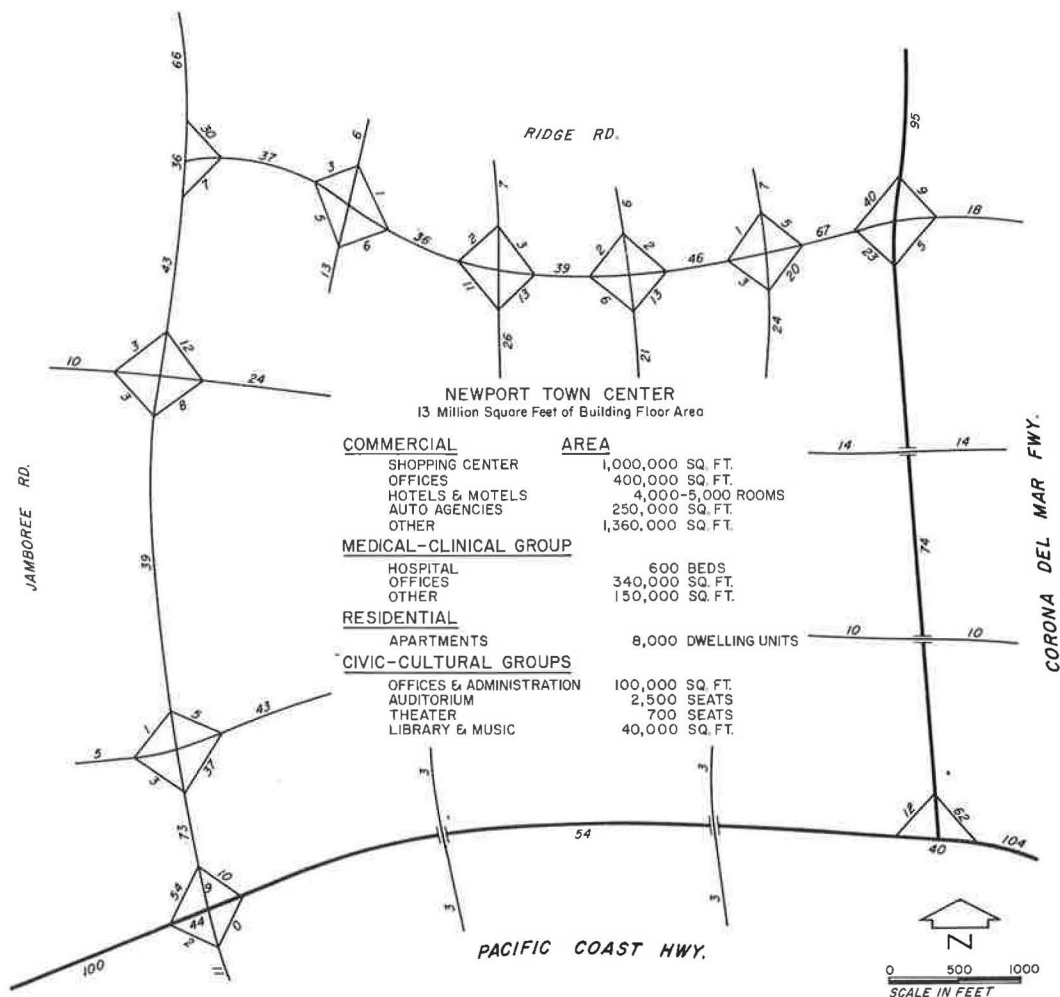


Figure 14. Average daily traffic, 1980, Newport Town Center (numbers indicate thousands of vehicles).

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