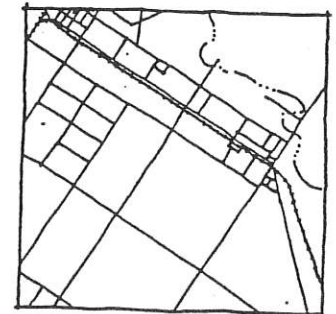
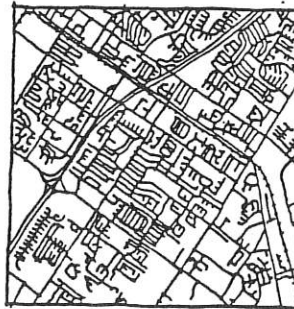
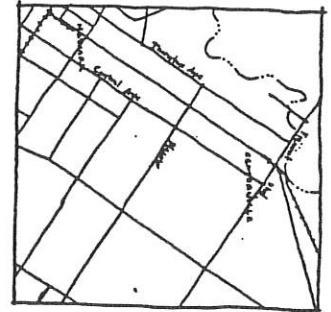


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Working Paper 579 Item No. 13

From: Dwayne Dewitt



The Evolving Metropolis: Studies of Community, Neighborhood and Street Form at the Urban Edge

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1. INTRODUCTION

This paper seeks to explore the expanding metropolitan fringe in terms of urban design. Using a case study sampling of development forms and patterns at the urban edge, it will attempt to identify some of the organizing principles and spatial typologies within an area of the urban environment that has been largely overlooked in terms of design. By examining certain cases over time, some observations will also be made about emerging patterns, trends and the ability of these places to change. Finally, implications of the findings on the quality and viability of future urban fringe communities will be discussed and future directions for urban design research will be outlined.

The field of urban design, from the City Beautiful movement in the early 1900s through the more recent periods of urban renewal and urban revitalization, has been preoccupied with the urban core of established cities. The topic of urban design at the fringe has been largely confined to a small number of "new town" developments, with vast areas of new growth at the edge virtually ignored in design terms. Any more general discussion by designers of the metropolitan edge seems limited to a general critique of its sprawling character, rather than any serious attempt to address the challenge of developing meaningful and vital urban environments in these areas.

As the twentieth century draws to a close, this preoccupation seems increasingly misplaced. Burgeoning population growth and economic investment at the fringe has been accompanied by

parallel declines in both the central city and the rural countryside. Driven by increasing mobility, steady economic expansion, an ample supply of relatively inexpensive land, and strong anti-urban policies and ideology, suburban communities have grown from a few pockets of wealthy aristocrats to the dominant form of American urbanism in less than 100 years. By 1990 suburbs had a clear majority of both population and jobs in relation to core cities and rural areas combined.

The growth of the urban fringe did not, however, occur without rules or guidance. Large real estate interests together with the emerging field of city planning successfully pushed for the adoption of subdivision, zoning, and engineering standards for streets and infrastructure. These factors, combined with an apparent market preference for lower density detached housing, worked to create a blueprint for development of the urban fringe. This blueprint was largely based on the abstractions of planning and subdivision regulations with little consideration given to the overall design quality of the communities and neighborhoods it dictated. As local communities became increasingly active in the planning process beginning in the 1960s, these standards became increasingly focused on restricting the pace and extent of growth. This led to further expansion of the urban edge into the surrounding countryside as developers searched for increasingly scarce land for development and a more hospitable regulatory environment.

The influence of these forces is clearly evident in the evolving form and character of the urban fringe. The bulk of this paper will study the existing conditions of the urban fringe through detailed case studies in an effort to more clearly outline its particular qualities and problems.

2. METHODOLOGY

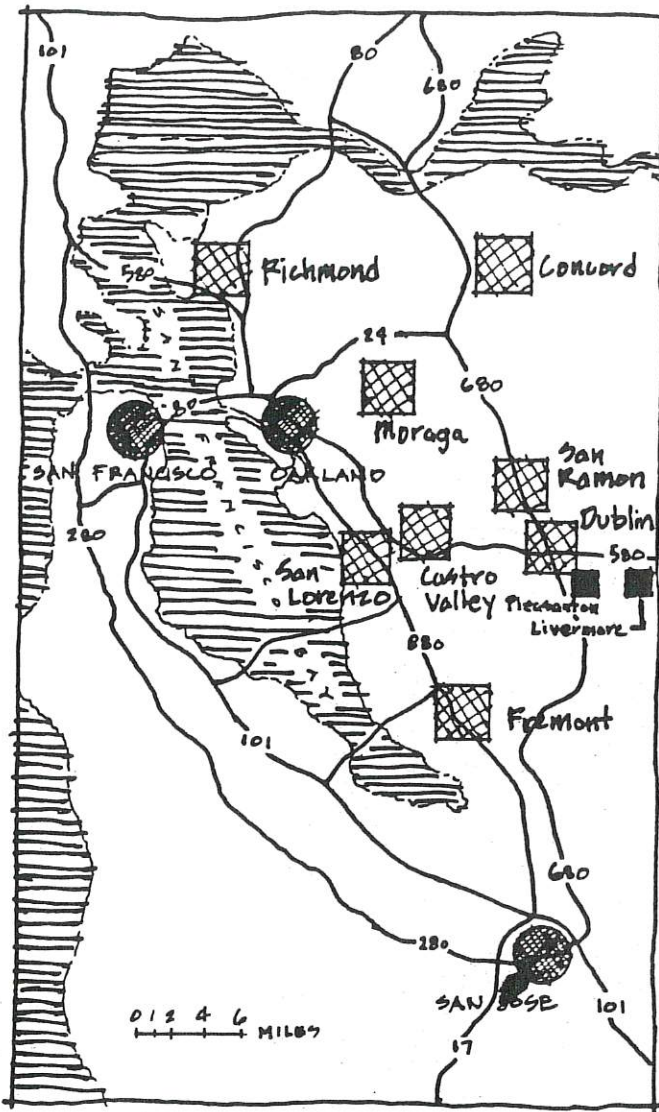
A case study approach was utilized to generate typologies for several different dimensions of the urban edge. The bounds of this study are the counties of Alameda and Contra Costa comprising the eastern part of the San Francisco Bay Region, an area that has been the focus of steady and continuous urban expansion throughout the twentieth century.

After an initial review of USGS topographic maps and aerial photographs from several time periods, as well as windshield surveys, eight study areas were selected that represented a variety of urban edge growth characteristics with regard to pattern, age, physiography and growth process. They include long urbanized areas that grew primarily in the first third of the twentieth century such as Richmond; areas that grew primarily in the middle of the century such as San Lorenzo and Castro Valley; and areas that have grown up primarily after 1960 such as Fremont, Moraga, Dublin and San Ramon. Concord is included as an example of an outlying community that has experienced growth throughout the twentieth century.

Because the problems of design and development at the urban edge are apparent at all scales, from individual house lot to entire subdivision or community, we felt it essential to consider these issues at several scales. Thus typologies were constructed at three scales: Community, Neighborhood, and Street/Lot/House. The community scale considered large patterns of streets, growth, and land use.

Each study area measures about nine square miles or 6000 acres. The neighborhood scale looked at intermediate patterns of blocks, streets and intersections. The study areas here measure about 100 acres and encompass an area that would take less than 10 minutes to walk across (2000'). Due to the limited scope of this project, this section focuses primarily on the single family neighborhood—the predominant neighborhood type of the urban fringe. Finally the small-scale patterns of street cross-sections, lot configurations, and building types were examined. Here the observations are largely preliminary and diagrammatic; they are intended to help flush out potentially significant areas for future research. For each scale the typological examples are described, analyzed and evaluated in terms of their urban design implications.

The limitations of this research should be noted at the outset. The sample of case studies was necessarily small and the geographical scope of the work was limited to Northern California. The research was by design exploratory in nature and was intended to help develop a sense of the key issues in an important but little studied area of urban design. Clearly, more in-depth work is needed on many of the issues outlined in this report.



LOCATIONS OF STUDY AREAS

3. COMMUNITY: STREETS

Street patterns are one of the primary design elements at the community scale. They invariably constitute the first marks of settlement upon the undeveloped landscape at the fringe. They provide the basic skeletal structure to communities—both dividing and connecting urban space. They affect environmental interaction by dictating the means of access between home and other places. To a large degree, they control where residents can go and what they observe and interact with along the way, providing, in a sense, public windows to a shared world. Thus, they probably play a significant role in shaping a community's self-image and sense of place.

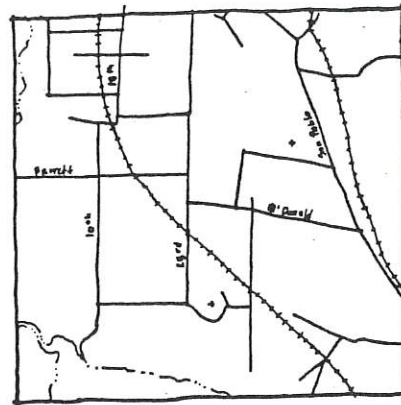
Observing the manner and extent of street pattern growth over time provides significant insight into the process by which a community has grown. As will be shown, however, street building has not always been synonymous with full urban land conversion as is generally the case today. The following examples trace the development of eight distinct patterns of urban edge growth. The patterns were taken from USGS and US Army topographic surveys dating from approximately 1895, 1915, 1940, 1960 and 1980. Information was updated using local planning maps for those areas showing significant growth since 1980. The particular patterns represent growth influenced by different historical periods, occurring over various lengths of time, and responding to different physical characteristics such as topography, hydrology and soils.

A. Speculative Gridiron (Richmond)

This pattern represents the most ubiquitous method of urban edge expansion prior to World War II. It simply builds on the long American tradition of the gridiron both in town and agrarian land planning. Using existing rural roads as starting points, the urban edge expanded in chunks by large gridded subdivisions in a fully interconnected fashion. Only elements difficult to cross such as railroads, rivers, and steep slopes caused a break in its continuous pattern.

The gridiron generally did not appear to follow any formal overall plan. Different grids begun in different parts of town eventually were forced to reconcile themselves—usually by converging at oblique angles along an intervening thoroughfare streets. The grid pattern, as will be shown in later diagrams, maximized street frontage to be sold, maximized access to other parts of the community and was infinitely expandable—important attributes for a country pre-occupied with growth and expansion.

The simple expansion of streets, however, did not mean an associated expansion of the urban fabric. Prior to the adoption of subdivision regulations (the spread of which generally coincided with the development of the FHA's Minimum Property Standards in the 1930s) subdividing land into streets and lots was a very simple and inexpensive process. Streets were easily surveyed, staked out, and adjoining lots put up for sale. As supply of lots typically outpaced demand, the neighborhood around the streets filled in gradually over a period of years or even decades. Community street systems, such as Richmond, that were laid out in the first decade of the twentieth century were not filled in until the 1940s. Uses of land were generally not controlled except in more exclusive developments. The net result was the development of a rather fine-grained and diverse urban fabric.



1895 RICHMOND



1915

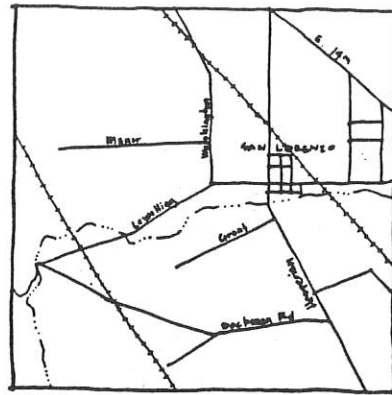


1940

B. Interrupted Parallel (San Lorenzo)

Here again the original rural roads provide a haphazard initial organization for fringe expansion. However, rather than street expansion serving to establish a strong pattern of interconnection between individual developments, subdivisions became increasingly internally focused and therefore disconnected at the community scale. Blocks were typically stretched into long rectangles. Streets began to loop and curve rather than to connect through to adjacent developments.

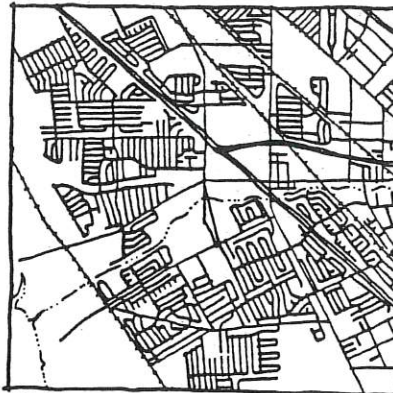
Subdivisions began to include the construction of repetitive tract homes built by a single builder rather than simply a division of lots that were built on by a variety of individual builders over a number of years. This resulted in a much more continuous, regular, and instantaneous urbanization. San Lorenzo developed primarily in a single decade—the 1950s. This resulted in a community that is homogenous in physical form and character with only limited opportunity for later infill or introduction of housing types other than the single family ranch house.



1915 SAN LORENZO



1940



1960

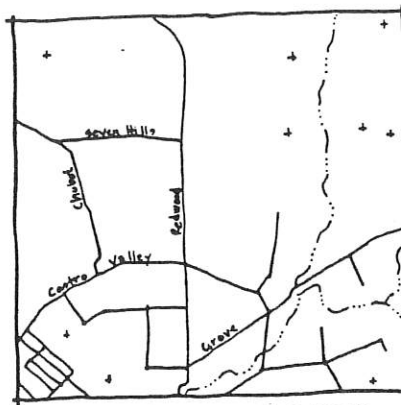


1980

C. Incremental Infill (Castro Valley)

This case study reveals a more gradual development of an urbanized street system than either A or B. Again the original organization was set by the existing roads in the undeveloped Bay Area fringe of 1900. However, rather than the immediate conversion of large ranch tracts into urban streets and house lots, an intermediate stage appears to have influenced this development pattern. Evidence on old maps suggests the subdividing of these tracts into relatively large parcels (5-40 acres) for orchards, truck gardens, and part-time farms (ranchettes) between the two World Wars.

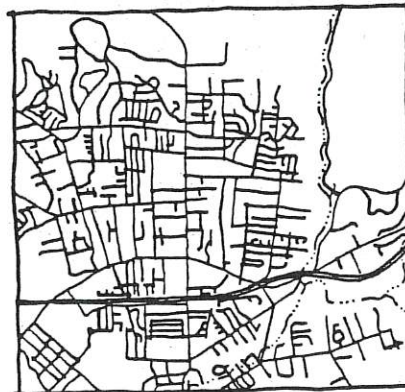
After WWII increasing ownership of automobiles and new highways made these areas more suitable for higher density housing. However, it appears the fragmented pattern of streets and land ownership prevented the development of the large-scale planned subdivisions typical of many suburban communities. The street pattern thus expanded in a much more incremental and haphazard manner as "backyard" subdivisions gradually filled in the open spaces in these communities. Maps suggest much of this infill occurred by 1960 although incidents of infill are recorded through 1980. This explanation is largely speculative and more research into the specific process is needed.



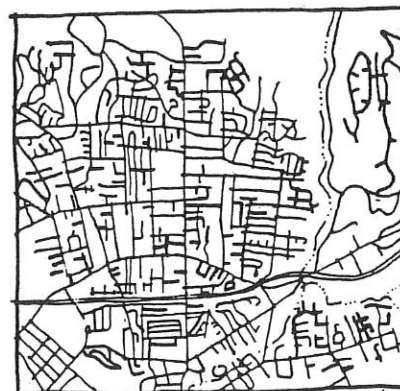
1915 CASTRO VALLEY



1940



1960

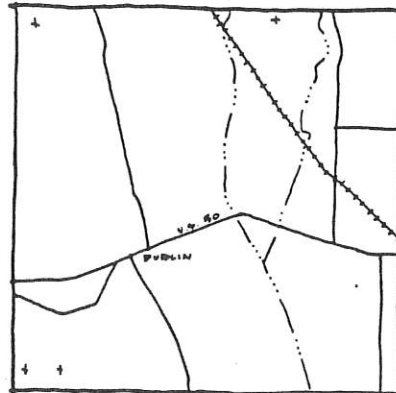


1980

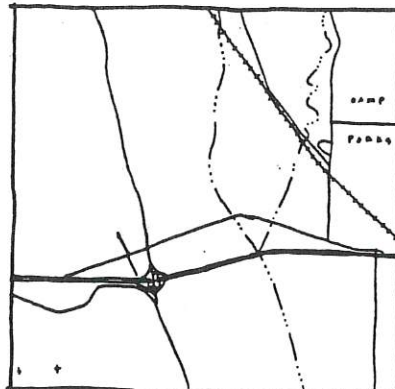
D1. Rigid Loops & Lollipops (Dublin)

This case represents the quintessential bedroom community of the 1960s and 1970s. Dublin was so far from the region's center that there were only a few existing roads to inform its growth. Still completely undeveloped by 1960, the growth of these communities was in large part due to the construction of modern freeways linking them to the rest of the region. Here we see the changes first evident in B taken to the next level. The movement away from the gridiron pattern of urban growth has been completed. The strong directional street grain adopted in A and still residual in B, has become twisted and non-directional. The subdivisions are almost all curving loops or cul-de-sac streets that have little or no connection to adjacent subdivisions.

This pattern was also developed in large chunks of repetitious tract housing designed to emphasize conformity rather than richness or variety. It was almost entirely built out during the 1960s and 1970s. Their curving forms were efficiently engineered to optimize the number of building lots (streets are never farther than 200 feet apart). The only connection between different parts of the community is along multi-laned arterial roads.



1940 DUBLIN



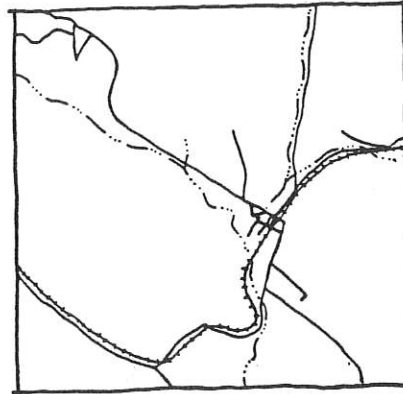
1960



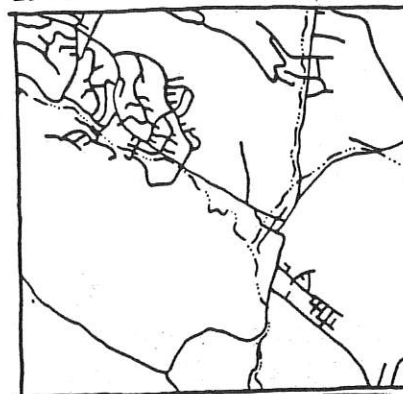
1980

D2. Lazy Loops & Lollipops (Moraga)

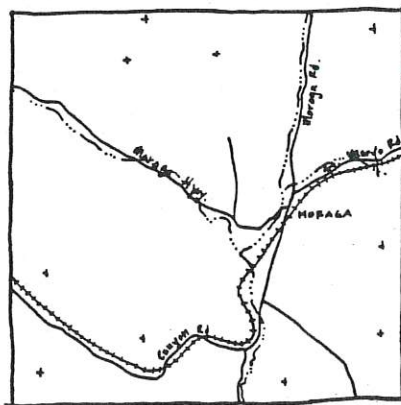
A variation of D, this pattern is characteristic of communities developed in hilly areas of the fringe. While the general pattern of curving streets and disconnected subdivisions is the same, the topography forces the street pattern into a much looser, more free-form pattern to allow for the differences in grade. The larger resulting lots may also appeal to a higher income market. Large areas of the community are also undevelopable due to steep slopes and protection by open space regulations (see land use analysis).



1940



1960



1915 MORAGA

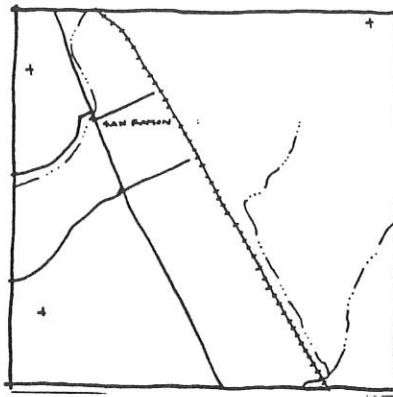


1980

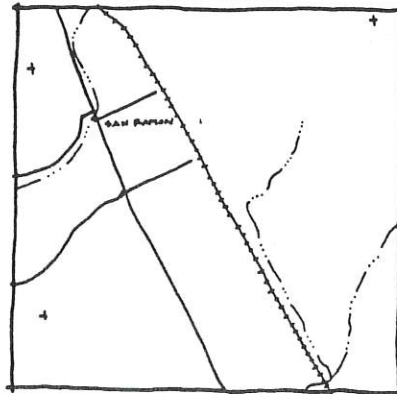
D3. Clustered Loops & Lollipops (San Ramon)

Yet another variation on D, this pattern has emerged in response to changing conditions in the 1980s. The combination of rising land costs and widespread adoption of open space protections has caused the pattern to become more intensely developed in a cluster pattern surrounded by open space. In some cases this open space is essentially the "left-over" space between separated subdivisions. In other cases it is planned as recreation amenities such as golf courses or lakes.

This pattern is generally comprised of large chunks of master-planned subdivisions. The notion of "community" in a civic sense has all but been eclipsed by these elaborately planned, self-contained enclaves. These developments are often walled, entered through a manned gate house and governed by a sophisticated local government (homeowner's associations) who oversee everything from maintenance operations to private security forces to planning of social events.



1940 SAN RAMON



1960



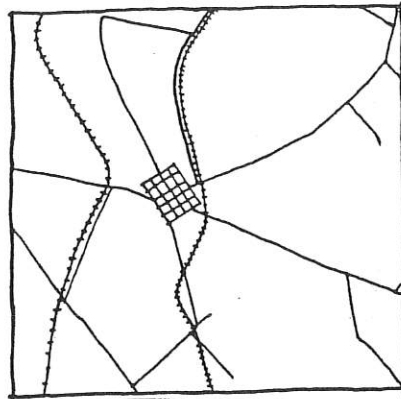
1980



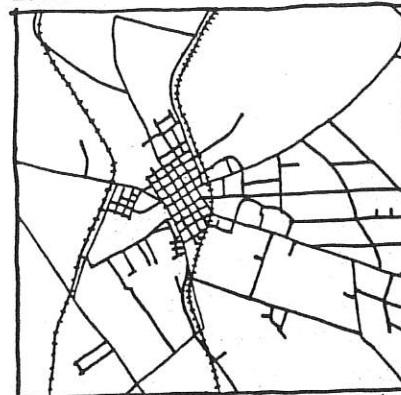
1990

E1. A/B/C/D Hybrid (Concord)

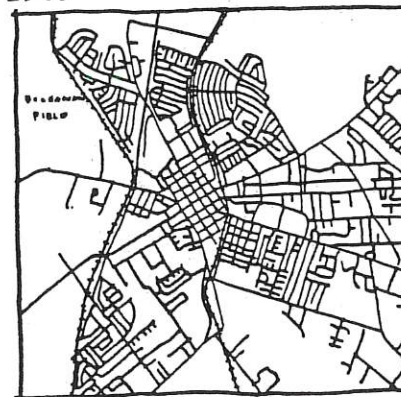
This is essentially a composite pattern associated with a small town outside of the region that was gradually enveloped by the outward moving forces of urban expansion. Its street pattern reads like a history book of urban expansion. It is centered around an original 20 block grid (A) laid out in the late 19th century that guided growth through the 1930s. Patterns B (to the north) and C (to the east) can be clearly seen developing during the 1940s and 1950s. Fragments of pattern D are evident in the infilling of development after 1960.



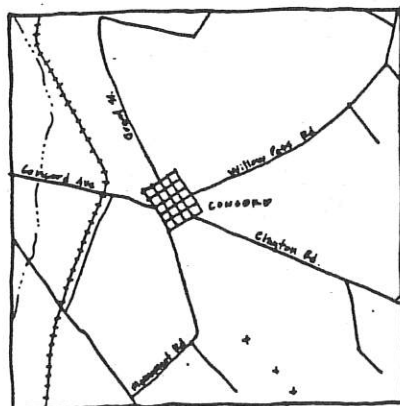
1915



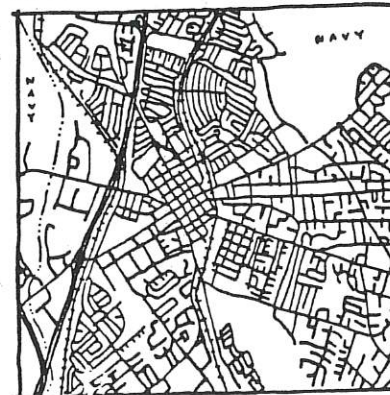
1940



1960



1895 CONCORD



1980

E2. B/D Hybrid (Fremont)

The two dominant forms of urban edge expansion since WWII are exhibited in this pattern. Fremont, situated midway between Oakland and San Jose, did not develop outward from a dominant center, but rather was assembled from four small unincorporated centers. This may account for its rather scattered sequence of subdivision. This pattern represents the increasingly complex nature of the urban edge as individual urban centers blur into multi-centered sprawling metropolitan regions.

Urban Design Implications

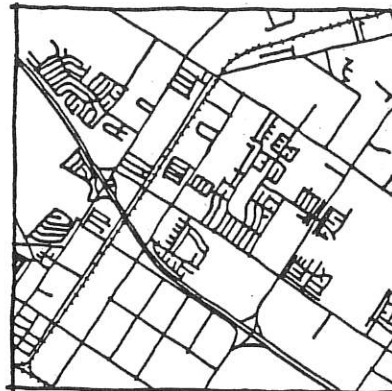
The evolution of street patterns has implications for the quality and character of new urban environments. The above analysis shows that an increasing focus on self-contained subdivision planning has eroded the integrity of the public street framework and severed connections between neighborhoods. The challenge of urban design is to find ways to reintroduce a strong sense of integration between developments without giving up the positive attributes of more recent street patterns. These include quiet, safe streets for children, a high degree of privacy, and the potential to lay out a street pattern that is more sensitive to the natural landscape. Street systems designed to serve many functions can have a big impact on the quality of a community's environment. The challenge for designers and planners is to show how a street pattern can be a critical urban design element rather than simply utility corridors for moving motor vehicles.



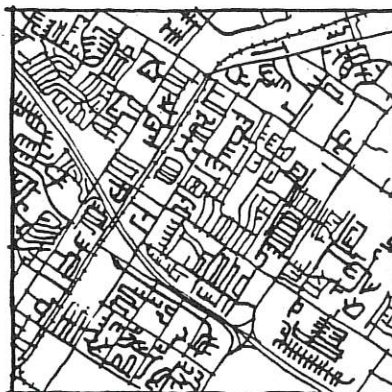
1915 FREMONT



1940



1960



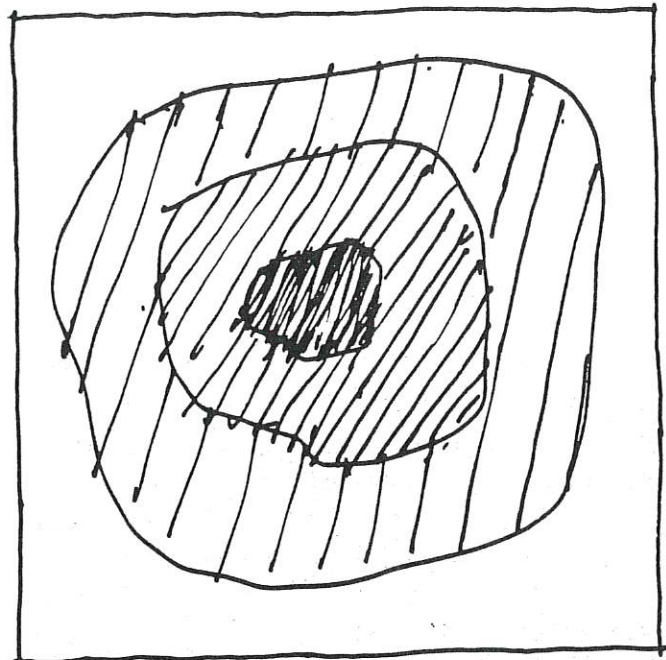
1980

4. COMMUNITY: GROWTH

Preliminary analysis of these evolving street patterns suggests at least three distinct growth patterns at the urban fringe: concentric, "instant," and scattered. Within these generic patterns there was also considerable variety with regard to the scale of the basic unit of growth.

Concentric Growth

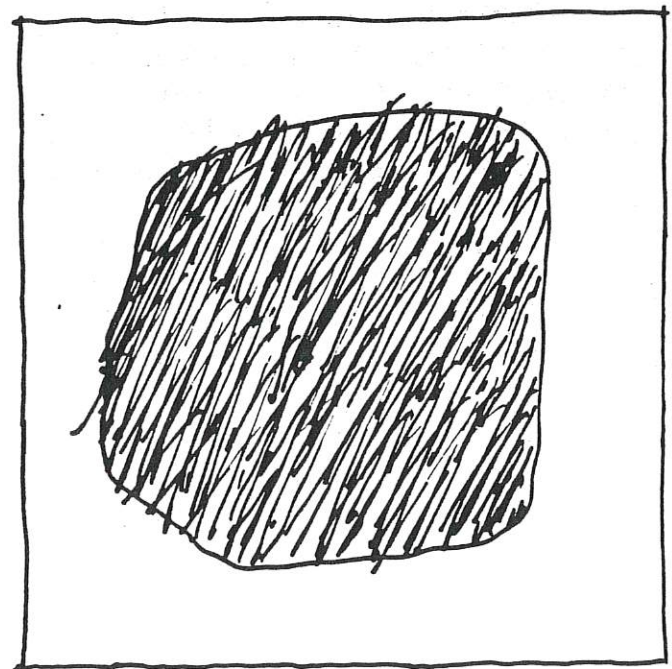
This is the classic pattern of monocentric growth. Beginning at an identifiable center, growth expands in concentric rings outward from the center, always pushing towards the outer edge. Concord is the only case study that approximates this pattern largely because it grew as an independent town for the first half of the century before it was swallowed by the expanding edge of the regional metropolis. Within its original grid, the increment of growth was the individual lot and building. By mid-century it was expanding by the increment of the subdivision which produced a coarser grain of urban fabric.



CONCENTRIC GROWTH

"Instant" Growth

In this process a rapid pace of development has created the sense of a single or all-at-once transformation. Early urban expansion in places such as Richmond was characterized by the sweeping subdivision of large areas into a grid of lots and streets over a short period of time. Yet, as was earlier noted, this seemingly instant expansion was misleading. The city these grids suggested on old maps was largely conceptual. The actual filling in of these street skeletons with buildings actually occurred incrementally over many years.



INSTANT GROWTH

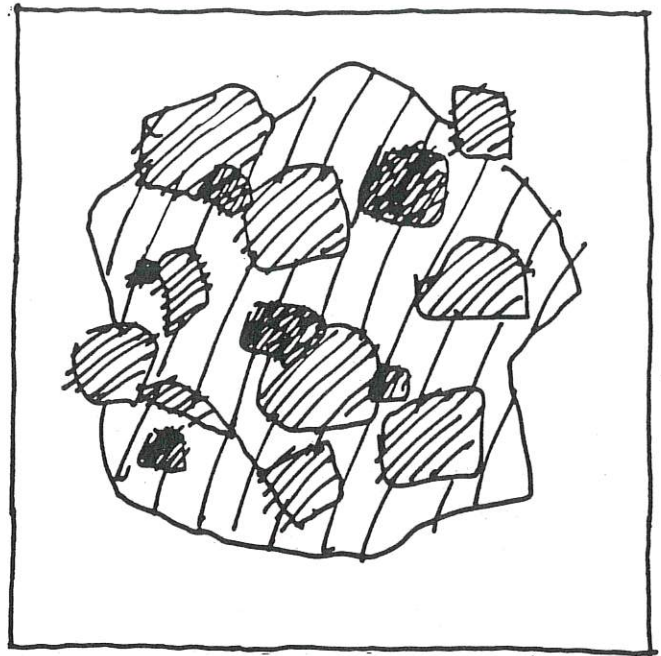
In areas of post WWII growth the transformation was more complete. Places like San Lorenzo, Dublin, and San Ramon experienced rapid development at the scale of large subdivisions that covered an extensive area within a decade or two. This effectively created an "instant" urban fabric with a homogeneous and repetitive character.

Scattered Growth

This pattern of growth became increasingly possible as travel mobility increased. It removed the overwhelming locational mandate to locate as close to the center as possible, keeping city form compact and growth patterns concentric throughout the nineteenth century. The case studies reveal a scattered pattern at several different increments of growth. As was noted above, within the sweeping framework of Richmond's early grid, growth by the small scale increment of the individual building lot was quite scattered. Buildings were developed in a seemingly random or shotgun pattern. The vacant lots around them often took years to fill in.

A second scale of scattered development was by the small subdivision. In places like the Castro Valley growth did not occur in an outward direction, but rather inward through an infilling of existing community fabric. Here the subdividing of small farm and orchard lots into small residential developments occurred in a rather haphazard pattern until the area was "built-out".

Finally at the scale of the larger subdivision Fremont and Moraga record a scattered development pattern comprised of large chunks of urbanization occurring haphazardly across their respective areas. As the locational influence of a strong center did not exist, the pattern seemed to be driven more by the willingness of individual landowners to sell their holdings for subdivision more than anything else.



SCATTERED GROWTH

Urban Design Implications

The nature of urban growth is one of the key factors affecting the quality of the urban fringe environment. The above analysis reveals an increasing trend toward large scale instant growth rather than the smaller scale incremental pattern of older towns and cities. This has led to the development of an increasingly controlled and monotonous urban fabric. These areas not only lack the richness and character inherent to places that develop incrementally over time, they also lack a structure that allows future evolution and adaptation in response to changing community needs. The challenge for urban designers is to develop planning methods and design standards that meet basic environmental and economic standards while still allowing for an organic and incremental growth process.

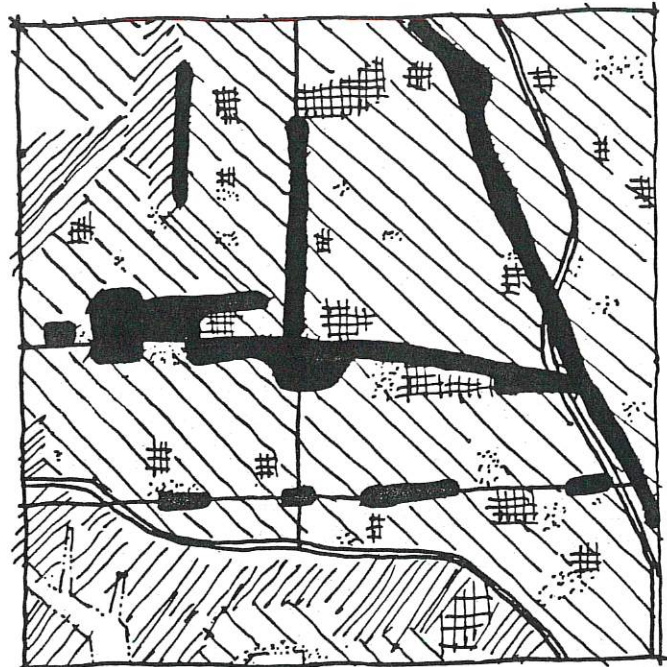
5. COMMUNITY: LAND USE

Preliminary investigations of land use patterns in certain study areas were also made. In general, an increasing separation of uses at the urban edge has been spurred in part by improvements in transportation and communication that have effectively increased the supply of land over which to distribute uses. Some variation in land use pattern appears to be related to time of development. They are also significant in what they do not reveal about the character and quality of the places they represent. This is particularly significant given that land use maps have been the fundamental tool of community planners since WWII—especially in the burgeoning zone of the urban edge. These observations are, however, based on a limited sampling and any generalization from them is necessarily tentative in nature. Future study should include both broader cases and a finer distinction between types of land-use.

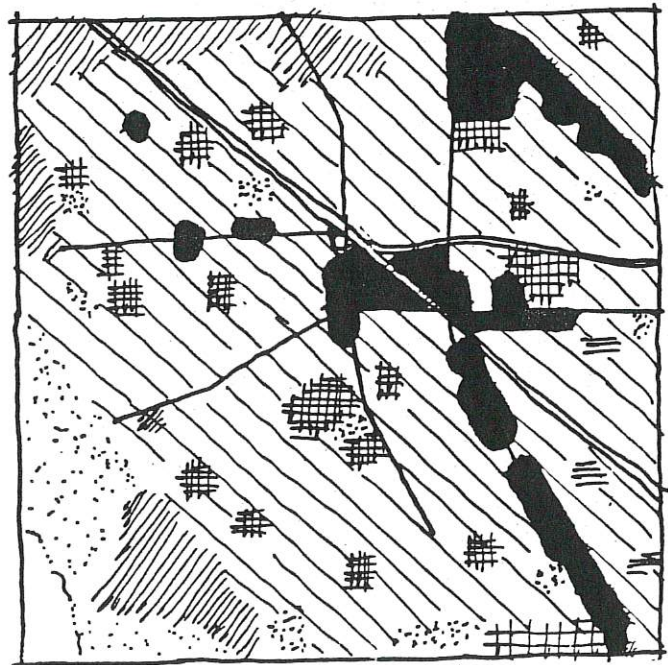
Strip Commercial/Continuous Residential (Richmond, San Lorenzo)

These older suburbs reveal a similar pattern of land use. Continuous neighborhoods of residential streets in-fill between lineal bands of commercial streets. In Richmond, the older of the two, the neighborhoods are divided by a somewhat finer network of commercial streets and a more coherent community center is evident. Its older neighborhoods also seem to be sprinkled with a higher frequency of smaller parks and schools. Schools and parks are fewer and larger in the postwar neighborhoods of San Lorenzo. This probably reflects the larger scale of subdivisions and the perception of a reduced need for pedestrian accessibility in these automobile suburbs.

This same pattern is reflected in the tendency of commercial activity to begin to concentrate in shopping centers rather than stretching out along neighborhood shopping streets. The older community retains a clear town center that mixes park, civic, and commercial activities within contained area. Both communities are ringed by industrial uses and have little open space.



RICHMOND

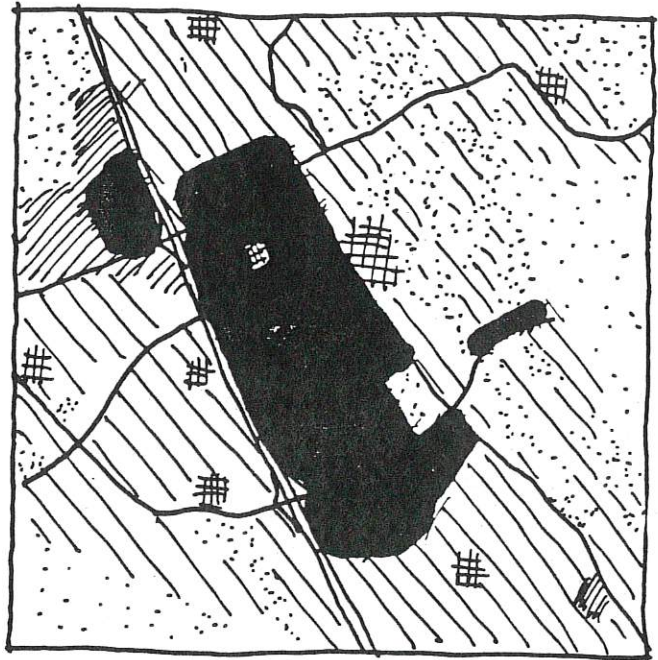
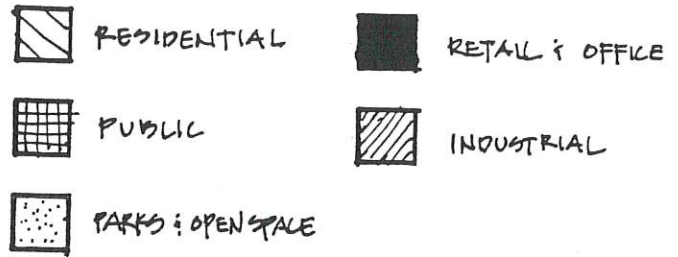


SAN LORENZO

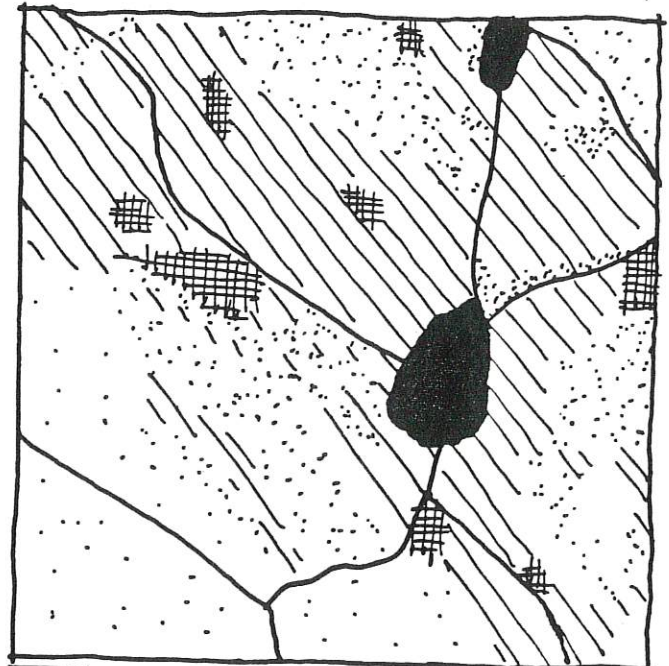
Contained Commercial/Broken Residential (San Ramon, Moraga)

These two newer communities show extreme variations of what appears to be a related pattern. The commercial areas in both cases are consolidated into a single main zone and a couple of minor zones. They tend to be self-contained islands that are weakly connected to surrounding neighborhoods. The obvious difference is the relative size of the commercial area. San Ramon's dominating size reflects its function as a regional job center employing residents of surrounding bedroom communities. The minimal size of the other community center reflects its limited function as a local retail and service center with most people commuting elsewhere to work. Park and civic uses do not play an important role in either community center. While this pattern suggests some success in overcoming the problem of "strip development", it does so in a way that further erodes pedestrian accessibility of neighborhoods to jobs and shopping.

The residential areas that are scattered about the commercial centers tend to be fragmented and bounded by extensive areas of open space. If the open space is not developed with interconnecting pedestrian and bicycle paths, this land use pattern can also increase the separation between different parts of the community. The interweaving of open space areas is especially notable in the residential areas developed over the past decade reflecting an emphasis on cluster site planning and incorporation of private open space amenities such as golf courses. The more pronounced topography at the periphery of both communities probably served to limit residential development further. There is an almost complete lack of the neighborhood parks typically found in older suburbs. Local school sites seem to be fewer and larger—reflecting some combination of lower neighborhood densities and increasing size standards for school sites. All of these changes make these environments increasingly pro-automobile and anti-pedestrian.



SAN RAMON



MORAGA

Urban Design Implications

One of the biggest challenges at the urban fringe is to reintroduce a rich mixture of uses in these communities. As the above analysis shows, development at the urban edge has tended increasingly to separate and divide uses as it filled in neat magic marker zones of colored land use maps. The increasing congestion created by people constantly driving back and forth between zones is grounds for a major rethinking of planning principles. Creating a finer grained separation of uses within buildings, neighborhoods, and communities can make more efficient use of energy and time resources as well as create more vital and diverse places to live. Likewise, open space reserves, if designed as an integrated community system can help optimize use of finite land resources. As uses become increasingly intermingled, a greater emphasis on urban design will be required to devise creative ways to transform potentially conflicting uses into opportunities for creating better places to live and work.

6. NEIGHBORHOOD: STREETS

The second scale of the urban edge that was examined was the neighborhood. As previously noted, the scope of the research is restricted to the single family neighborhood—a dominant settlement pattern at the urban edge. Although these particular examples were all taken from the Pleasanton/Livermore area of Alameda County, observations throughout the East Bay area show them to be representative of progressive stages of a dramatic change in residential design over the past 50 years.

As was the case for the larger community scale, there has been a widespread tendency for street patterns to become increasingly disconnected (more cul-de-sacs and loops, fewer “thru streets”), curvilinear, and organized in self-contained units with few points of access. A description of these changes is presented in the analysis of the following five typologies. Future research should be expanded to include street patterns of other types of specialized neighborhoods that have developed such as office parks, multi-family developments, and shopping malls.

A. The Gridiron (Livermore)

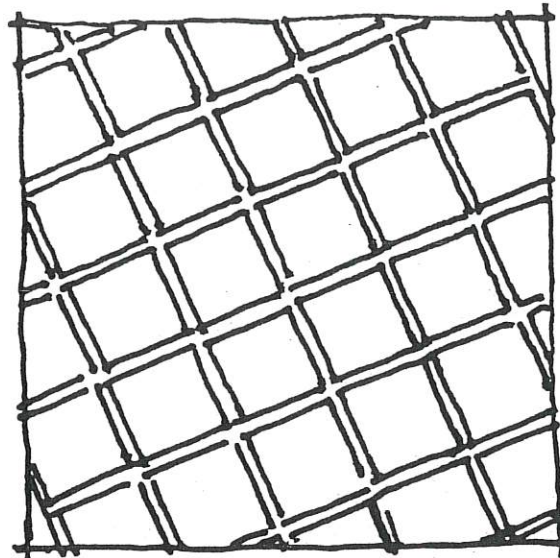
This pattern is the quintessential open grid that forms the structural core of hundreds of American towns and cities. It is characterized by a simple system of two series of parallel streets crossing at right angles to form a pattern of equal sized square blocks. In its purest form this type is non-hierarchical (democratic), strongly interconnected, readily expandable, and offers a wide variety of possible routes of movement through it and access points in and out.

The figures below show that this pattern has more streets, blocks, intersections, and points of access than the other four patterns. While adding to the cost of this pattern it has the benefit of providing the shortest trip lengths and most route choices of any of the patterns. This creates the most pro-pedestrian neighborhood. It is not surprising that this pattern was popular before WW II when pedestrian travel was high, auto ownership was low, and street construction standards were less stringent than today.

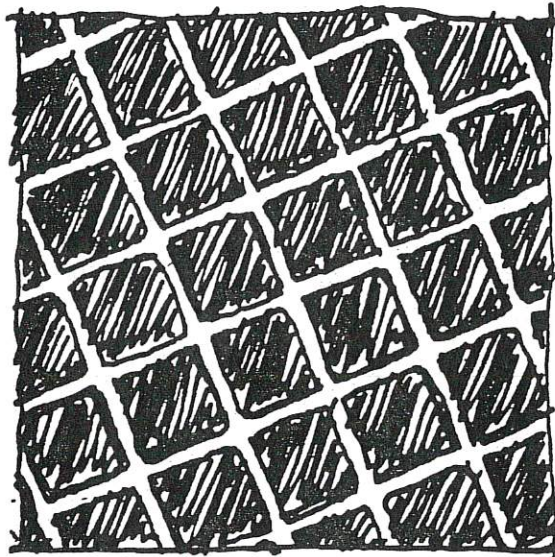
street length (lineal feet)	20,800
# of blocks	28
# of intersections	26
# of access points	19

Note: *These tables refer to the 100 acre unit of analysis illustrated in adjacent diagrams.*

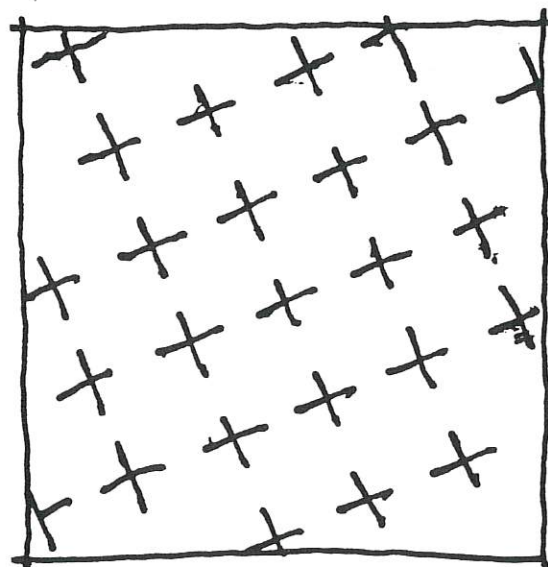
Intersections are defined as junctions of two or more through-routes. Junctions with cul-de-sacs are not treated as intersections because cul-de-sacs do not lead anywhere outside the immediate area.



A. STREETS



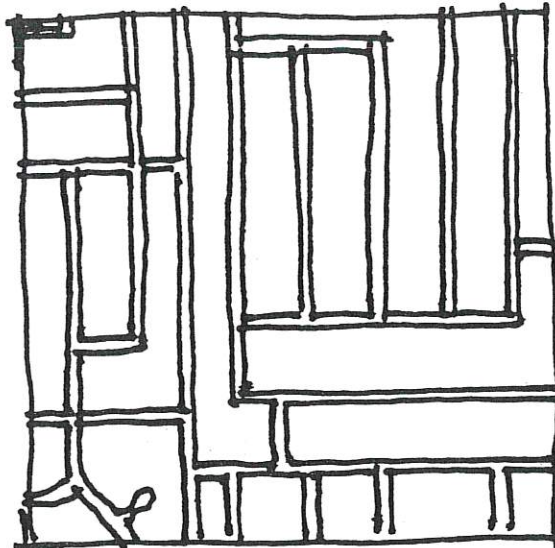
A. BLOCKS



A. INTERSECTIONS

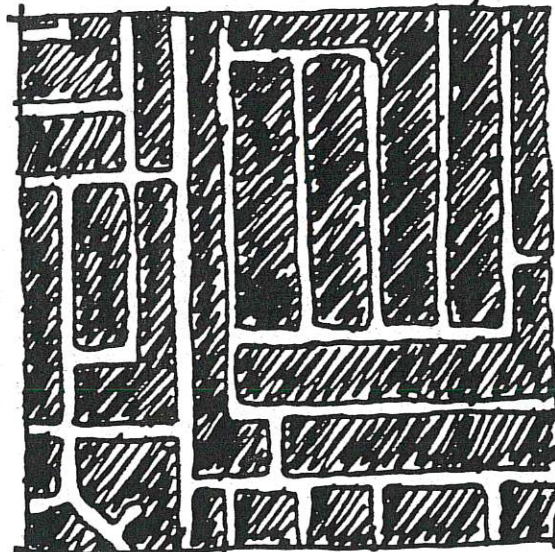
B1. Fragmented Parallel (Livermore)

This pattern, though still orthogonal in character, diverges from the regular grid in several respects. The blocks are reconfigured into long, narrow rectangles and "L" shapes. The streets, rather than being carried through, tend to be truncated at "T" intersections and sometimes make "L" corners. This begins to limit the degree of interconnection, the choices of routes through a neighborhood, and the number of access points in and out of it. The long narrow blocks provide optimal frontage for residential building lots.



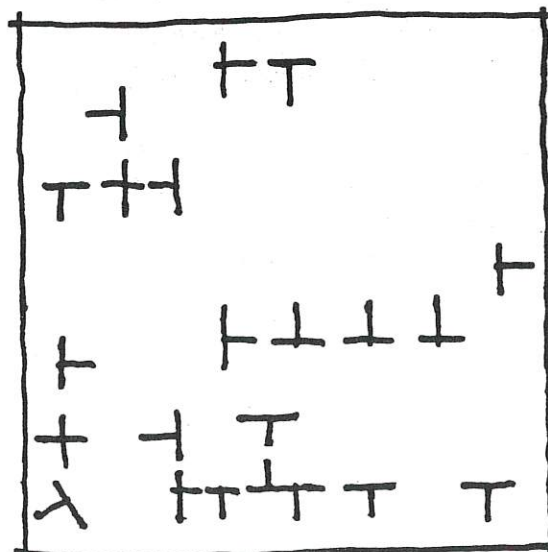
B1. STREETS

This pattern, while having almost as much street length as A, shows a significant reduction in the number of blocks and access points. It perhaps reveals a growing interest in longer blocks to provide more frontage for house lots and decreasing value on pedestrian access as these were among the first neighborhoods to be designed for the motor car. Fewer access points suggest an emerging trend toward emphasis on the self-contained private subdivision vs. the connectedness of the public town.



B1. BLOCKS

street length (lineal feet)	19,000
# of blocks	19
# of intersections	22
# of access points	10
# of cul-de-sacs and loops	1



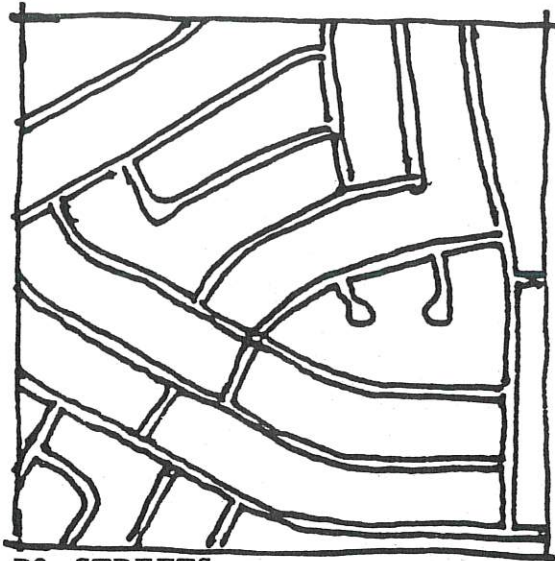
B1. INTERSECTIONS

B2. Warped Parallel (Livermore)

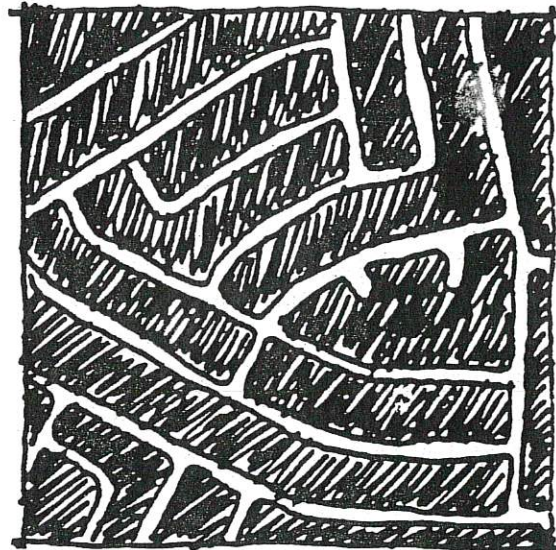
This pattern maintains the long, narrow blocks, "T" intersections and "L" corners of B1 while warping it into a parallel curvilinear pattern in an apparent effort to create a more rural character and to shorten the visual length of the street. Left-over spaces are filled in by occasional cul-de-sacs. Degree of connection, route choices, and access points are similar to B1. The curving streets make user orientation more confusing in these neighborhoods.

The transition to an auto subdivision becomes more pronounced in this pattern variation with significant drops in intersections and street length as well as blocks and access. The pattern as a whole seems more unified than B1 reflecting a clearer conceptual basis.

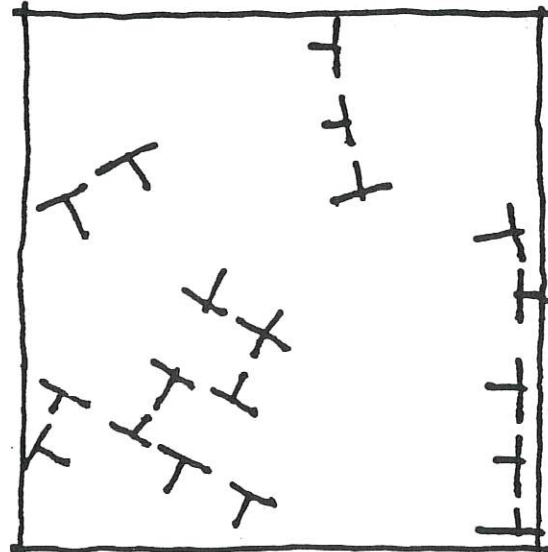
street length (lineal feet)	16,500
# of blocks	14
# of intersections	14
# of access points	7
# of cul-de-sacs and loops	2



B2. STREETS



B2. BLOCKS



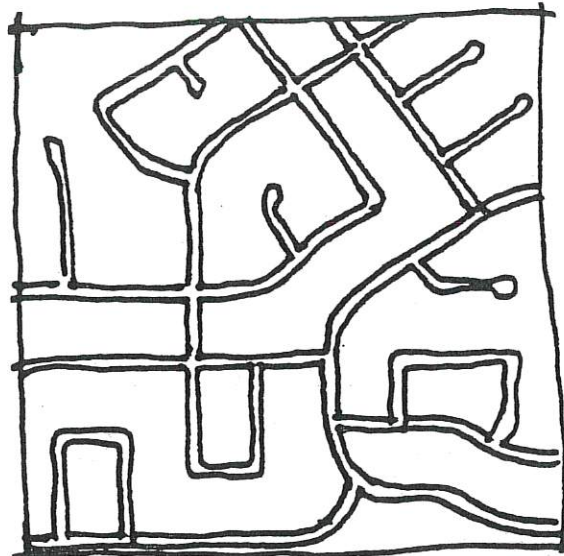
B2. INTERSECTIONS

C1. Loops and Lollipops (Pleasanton)

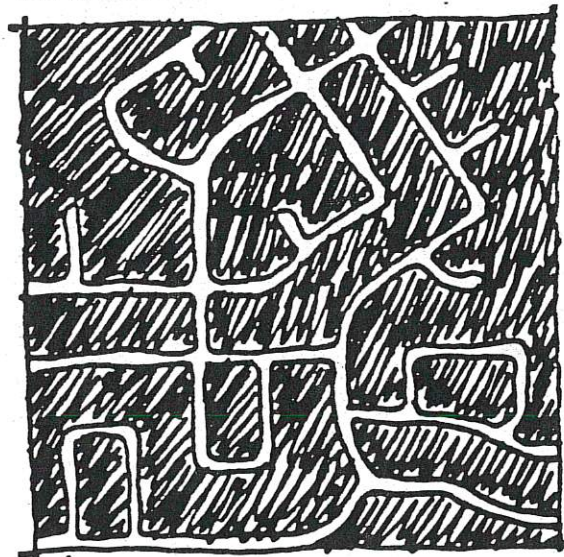
This pattern erodes away the parallel structure further by placing an emphasis on loops and cul-de-sacs. This creates an essentially non-directional pattern of streets that tend to loop back on themselves. Interconnection is limited to several thru streets that are not readily apparent in the plan. Blocks tend to be odd-shaped and are frequently penetrated by street stubs. Increased privacy is accompanied by limited route choices and few access points. Its maze-like pattern makes user orientation even more difficult than simply curving the streets.

Though the numbers continue to decline somewhat here, its real significance lies in the adoption of the loop street and the cul-de-sac as the dominant pattern element. Feasibility of pedestrian access to anywhere but a neighbor's house or a local school is all but gone. This pattern provides a much higher percentage of lots that are on short streets and thus increases the relative sense of privacy and protection from the automobile. These factors combine to increase auto trips while concentrating them on a few remaining arterials. This has resulted in unprecedented traffic congestion in many younger urban edge communities. Thus, at the community scale this pattern is proving undesirable for both the car and pedestrian.

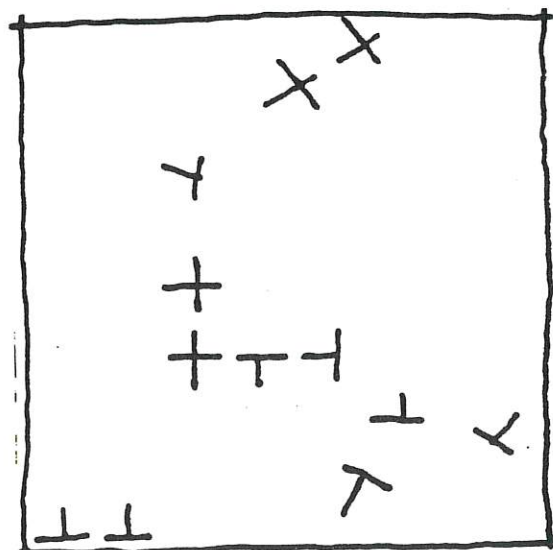
street length (lineal feet)	15,300
# of blocks	12
# of intersections	12
# of access points	6
# of cul-de-sacs and loops	8



C1. STREETS



C1. BLOCKS



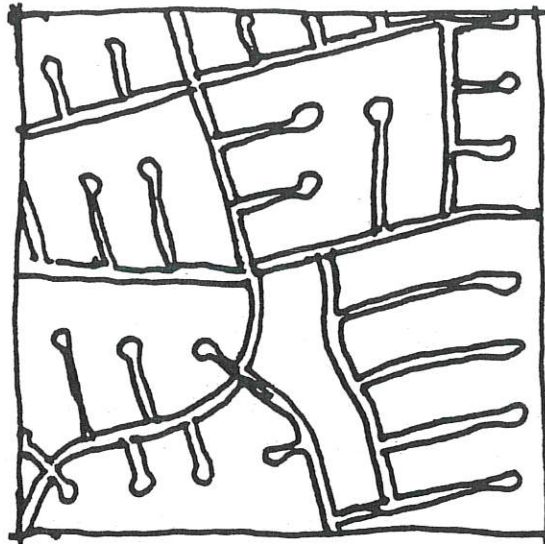
C1. INTERSECTIONS

C2. Lollipops on a Stick (Pleasanton)

This pattern represents the antithesis of the open grid of type A. It is almost completely comprised of dead-end cul-de-sacs branching off a few easily recognizable through streets. Privacy is maximized but interconnection is very limited. Blocks are few and large. A repeating parallel pattern of penetrating street stubs provides access to their interior. Intersections, route choices, and access points are all very limited.

This is another variation of the limited access maze pattern which focuses on maximizing the number of house lots on short dead-end streets. In this pattern it is even difficult to find a block to walk the dog around.

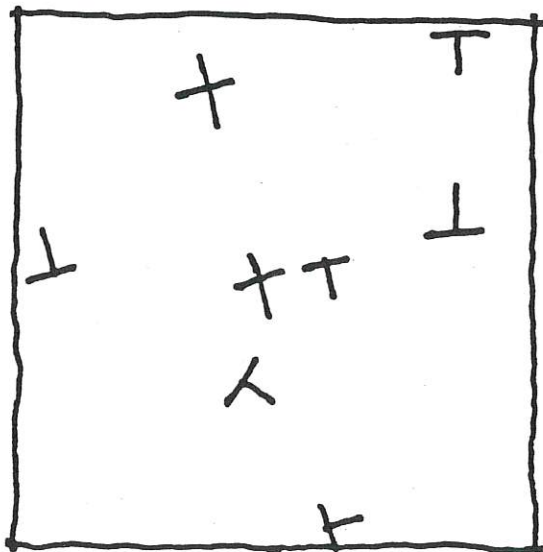
street length (lineal feet)	15,600
# of blocks	8
# of intersections	8
# of access points	4
# of cul-de-sacs and loops	24



C2. STREETS



C2. BLOCKS



C2. INTERSECTIONS

Observation of other places leads one to conclude that the transition from more open and interconnected street patterns to more closed and discontinuous ones is generally an historic one. A number of factors may contribute to these changing patterns:

- a. An increasing cultural concern for security and privacy has resulted in the development of physical environments that emphasize control and separation over openness and interaction.
- b. Curving streets were perceived as more "rural" or "natural" and thus less "city-like" by potential home-buyers.
- c. Communities have adopted public planning standards promoted by the planning profession as progressive and beneficial.
- d. Responsibility for street layout has shifted from the municipality (which may be more sensitive to connection) to the private land developer (who is more concerned with the internal site).
- e. It has been an economically more advantageous layout with more area for lots and lower street and infrastructure construction costs.

Urban Design Implications

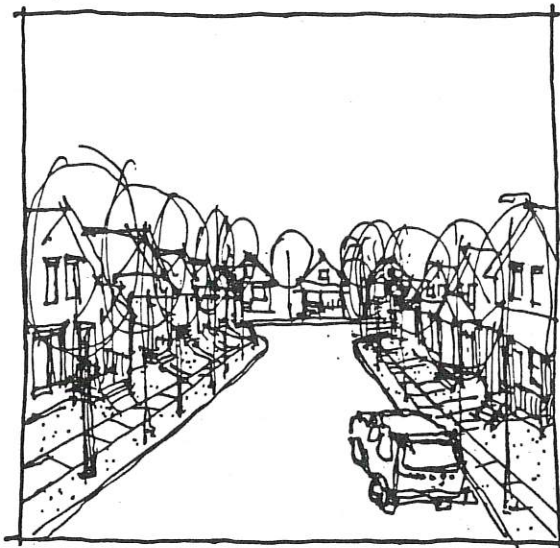
As was the case for the community scale, the pattern of neighborhood streets has strong implications for the quality of the urban environment. The above analysis shows a steady degradation of pedestrian accessibility and perceptual coherence of residential neighborhoods as a result of increasingly disconnected and closed street patterns. The challenge of urban design is to devise legible and pedestrian/bicycle/transit accessible street patterns without sacrificing privacy and safety. Such solutions will require an understanding of public streets as much more than a product of traffic engineering.

7. STREET / LOT / HOUSE

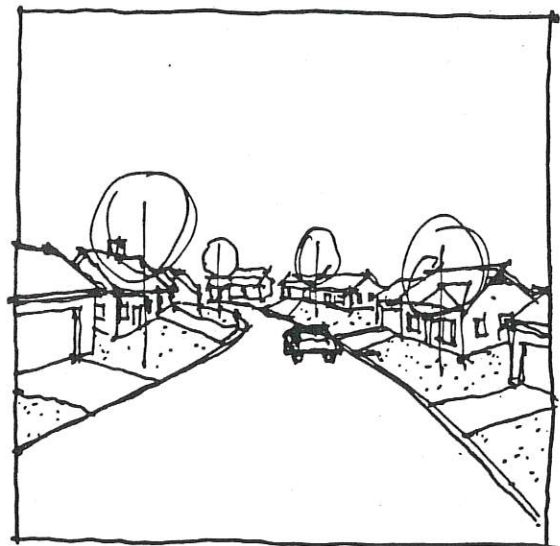
The following observations are based on the analysis of typical streets in several of the study areas. The limited scope of this study did not allow for detailed case studies of individual streets. Findings concerning the issues of Street Scale, Lot Size, and Building Patterns have been synthesized from a number of observations.

Street Scale

There appears to be a general tendency of road widths, both in right-of-way and pavement, to increase over time. Within the areas studied, the older (pre-WW II) gridiron streets tend to have a 50'-60' ROW, pavement widths of 32'-36', and adjacent greenswards and sidewalks on both sides. In newer suburbs, ROW widths seem to be a minimum 60', and more significantly, pavement width typically ranged 40'-50' with sidewalks often on only one side. In lower density areas, such as Moraga, sidewalks disappeared altogether. This seems to reinforce the observation that the urban fringe has evolved as a place designed for the automobile and against the pedestrian. In addition there was often a noticeable lack of street trees on newer streets—a critical factor affecting the scale and comfort of residential streets. Only in the most recent developments was any noticeable decrease in street width observed. This may suggest that increasing land costs are beginning to cause excessive standards to be reassessed.



RESIDENTIAL STREET c. 1925



RESIDENTIAL STREET c. 1965

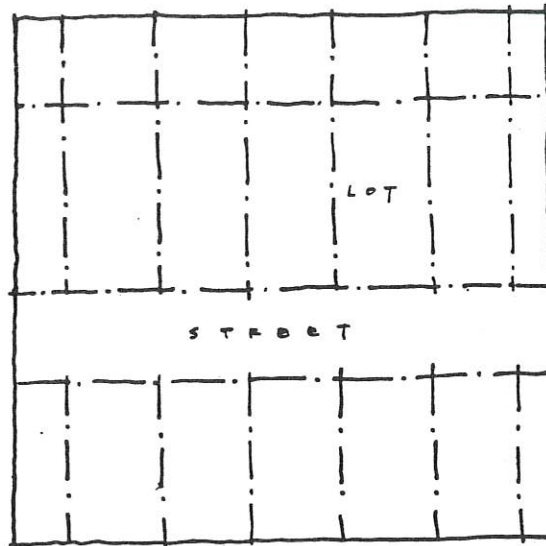
Lot Size and Shape

There has been an even stronger pattern of changing lot size. In general lot widths were observed to have grown from a range of 30'-45' in the pre-WWII period to 60'-70' in the postwar period. Wider lots effectively diluted the sense of "enclosure" of the street contributing to a less inviting pedestrian environment. Pedestrian scale is further diminished by less on-street parking, which can help create a more intimate scale and slow down traffic. Lot sizes also have become more uniformly sized on a given street, presumably due to a more controlled subdivision process. As a result, the sense of spatial variety and interest is weakened. With rapidly rising land costs, lot sizes have again been shrinking, but the persistent lack of sidewalks and several important trends in building patterns (see below) have minimized the restoration of the pedestrian-scaled neighborhood street.

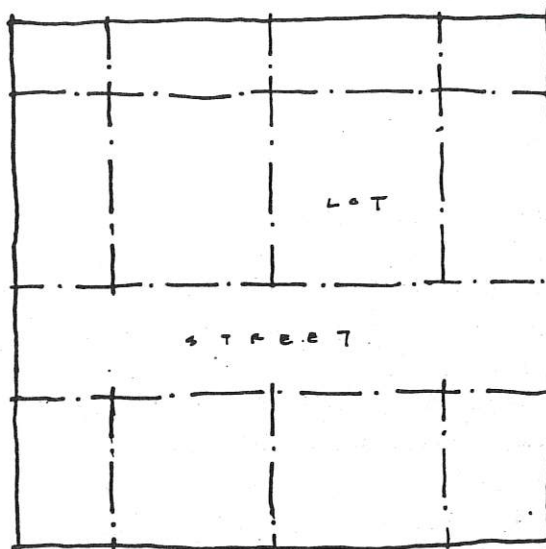
Building Pattern

Several key changes in building patterns have had a dramatic impact on the scale of a typical neighborhood street. First, as lots got wider, houses tended to rotate from the perpendicular orientation of bungalows and other gable-fronted styles to the parallel orientation of the ranch house and colonial revivals. Houses also were set back farther from the street in many cases. By weakening the spatial edge of the street, these changes dissolve the sense of enclosure that is so critical to the creation of inviting, human-scaled streets.

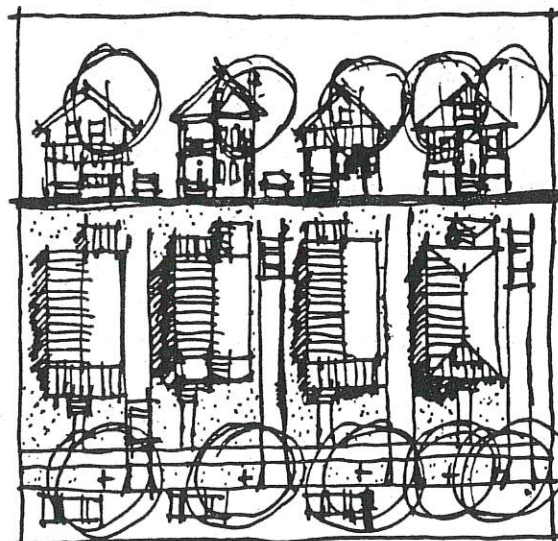
While there is considerable evidence that these patterns are also reversing themselves in the face of tighter land supplies, two related building patterns are limiting the impact of these changes on the scale of the street. In conjunction with the expanding importance of the automobile at the urban edge, the garage has slowly grown in size and stature. The garage, originally a small structure confined to



LOT PATTERN c. 1925



LOT PATTERN c. 1965



BUILDING PATTERN c. 1925

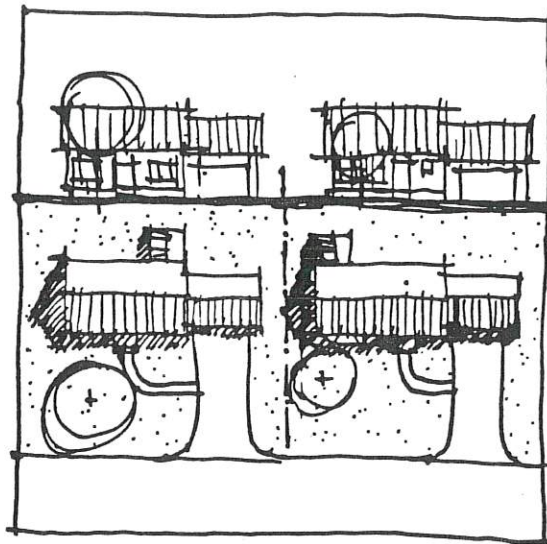
the back corner of a lot and accessed by a long narrow driveway or an alley, has slowly expanded and migrated forward to a position of prominence next to the house and from one to two or three bays. More recently, as lots got narrower, it has moved out to the street and in front of the house.

Conversely the front porch has evolved from the dominant element of the residential street into obsolescence. In older urban edge neighborhoods it contributed to a human street scale both formally and functionally. It provided an intimate transition space from the public to private world and a safe place for social interaction among neighbors. As the garage moved forward it became the primary place of entry and exit and the front porch was reduced to a residual symbolic form reserved for strangers and formal occasions often not even retaining direct sidewalk connection to the street. Finally, as lots again narrowed over the past decade, the front entry and porch have completely disappeared. Pedestrian entry to the house is commonly made by a narrow alley down the side of the garage to a side entry.

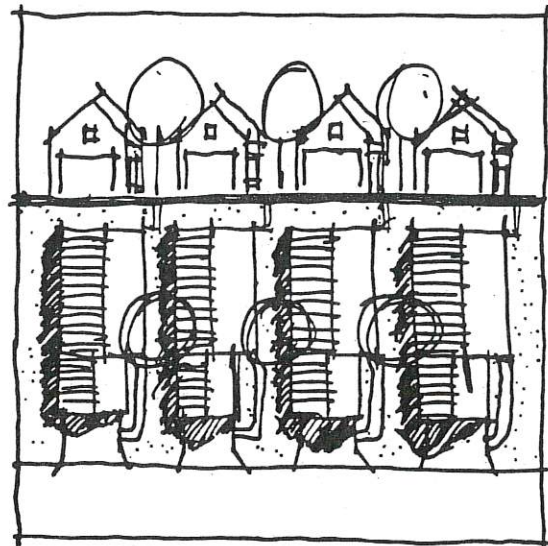
Thus, despite narrowing streets, decreasing setbacks and a more continuous street edge, the reestablishment of inviting and life-filled neighborhood streets remains elusive. The dominance of lifeless and vacant garage doors creates more a sense of alienating entrapment than one of intimate human space.

Urban Design Implications

These failures suggest a stronger role for urban design at the scale of the street. It is here where the sense of neighborhood and street identity is made or lost. The first level of response lies with a serious reexamination of the wasteful and overengineered street standards that still mandate the construction of costly and badly scaled streets in most communities. Recent evidence of changes in street standards are in planned unit develop-



BUILDING PATTERN c. 1965



BUILDING PATTERN c. 1990

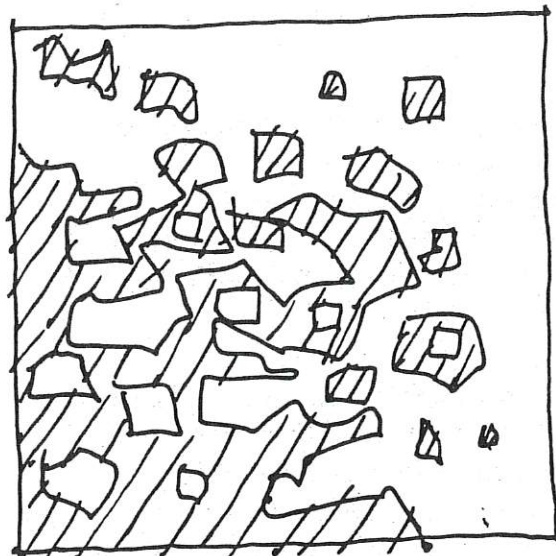
ments (PUDs) where the developer exercises more site planning flexibility. Secondly, even as increasing densities begin to reduce street dimensions, design strategies need to be developed that create inviting and pedestrian scaled streets while successfully accommodating the automobile in less space.

8. GENERAL NOTES ON FORM AND PATTERN

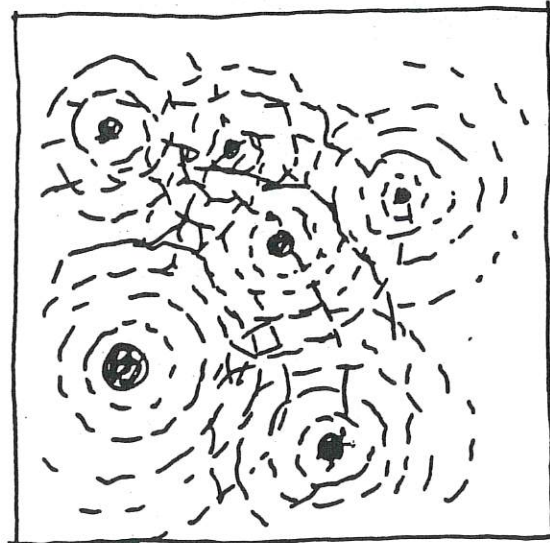
Several general observations about the form of the urban edge may be made based upon the preceding analysis.

FRAGMENTATION. At the metropolitan scale the urban edge is no longer a simple concentric line expanding from the regional center. As economic functions disperse a sprawling and polycentric pattern of urbanization has emerged much like intersecting ripples of many pebbles cast into a puddle. The interaction between increasing growth limits and increasing accessibility to outlying lands has caused growth to skip or hopscotch as it follows the path of least resistance.

DIFFUSION. A parallel trend has been the steady outward diffusion of low-density development patterns. The adoption of restrictive zoning by anti-growth fringe communities combined with the increased area required by the automobile and the reach it provides to land at the fringe have resulted in the consumption of land resources per unit of activity at a rate many times higher than older towns and cities. This is true for all types of land use designations. The result has been an increasingly fuzzy and indeterminate quality to the metropolitan fringe.

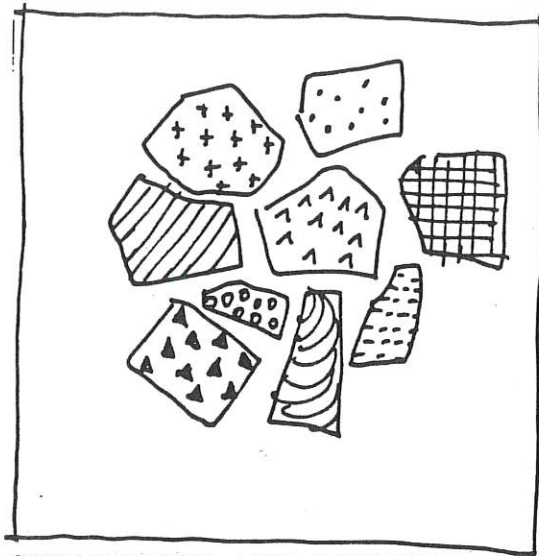


FRAGMENTATION



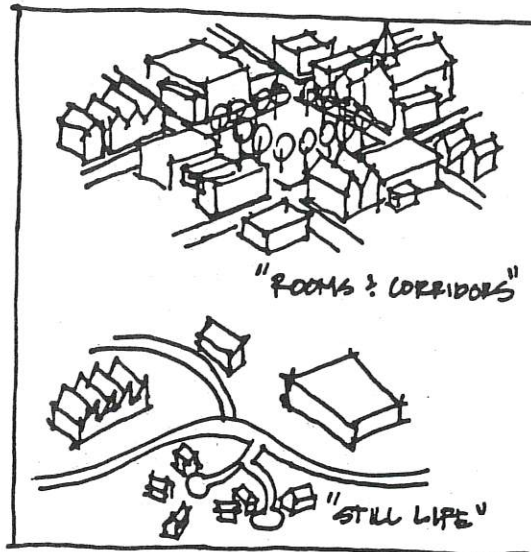
DIFFUSION

SEPARATION. Within the communities themselves, land use functions have become increasingly separated and distinct under the powerful influence of single-use zoning. The mixed and overlapping patterns of older, fine-grained cities have given way to a disconnected pattern of specialized zones graded by use and socio-economic class and separated spatially by wide arterial roadways. Patterns of cul-de-sacs and looped streets reinforce the separation and make life increasingly inconvenient. Long and circuitous circulation routes between zones wastes time and energy and precludes the possibility of a pedestrian-oriented environment.



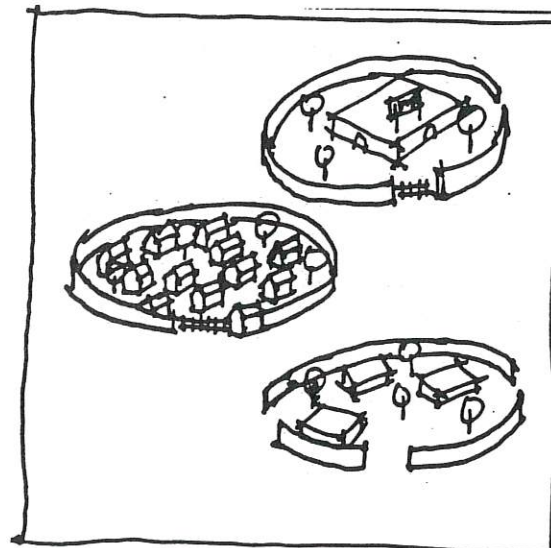
SEPARATION AND CONTROL

LACK OF PUBLIC STRUCTURE. There has been a steady erosion of public space, particularly streets and parks, as the primary organizing element of urban form. Isolated, inwardly focused development prevents the interaction of diverse urban functions within a common framework of public space. Public buildings such as libraries, churches, and schools no longer anchor and orient community space. The city as a still-life of autonomous floating objects has replaced the city of rooms and corridors where the buildings acted to enclose pedestrian-scaled streets and squares. The result has been a diminished sense of public life and identity in the urban fringe.



LACK OF STRUCTURE

INCREASING PRIVATIZATION. An increase in more sophisticated and elaborate private community amenities within individual development has accompanied the decline of the public domain. Subdivisions have evolved into "residential communities" complete with their own recreational facilities, private clubs and are often gated for social control. Downtown commercial blocks have evolved into "shopping centers" and "office parks" complete with their own internal street systems, security forces, and assessed fees for maintenance of common open space and landscaping.



PRIVATIZATION

LARGE SCALE CONTROLLED FORM.

Within these single-use zones, planning standards, planned unit developments, and changes in real estate marketing and finance, have encouraged larger units of development with a more consistent and repetitive design character. The result is coarser, more "splotchy" and internally controlled grain of development. Strict public and private controls often institutionalize this condition and limit the possibility for change. Little opportunity exists for individual self-expression or adaptation over time. These trends work to sanitize places and diminish the diversity and experience of their inhabitants.

INDIFFERENCE TO LANDSCAPE. As the technology of land development becomes more sophisticated, urbanization is increasingly independent of the existing natural, cultural and historic landscapes. Streams have been channelized, topography regraded, and wildlife habitats destroyed. Historic cultural patterns have quickly disappeared under a continuous haze of sprawling development in which distinctions between town and countryside are blurred. While urbanization has transformed landscapes for centuries, the explosion of metropolitan areas has raised the destruction of the native landscapes to a new level.

In general, these trends suggest a strong need to rethink the operating assumptions that have driven the growth of the urban fringe through the twentieth century. They describe a pattern of urbanization lacking human scale and richness, stripped of a sense of public life, stratified by social and economic class, destructive of land, energy and natural resources, inconvenient and time-wasteful, poorly organized and disorienting, and ill-suited to adaptation and change over time. In their search for an idyllic environment, these places also tend to adopt a narrow and carefully edited concept of "community". Essential functions such as cemeteries, waste disposal sites, and other utilitarian uses considered unsightly or

undesirable are conspicuously absent from these communities.

Escalating housing costs, unprecedented traffic congestion, and environmental degradation in the urban fringe are transforming the American dream into a nightmare. The ability of more highways to ever expand access to new land for affordable urban expansion appears to have reached its elastic limit in the 1980s. After a century of decreasing suburban densities, recent patterns suggest a new trend toward higher densities in response to escalating land costs. This increase while making more efficient use of land has ignored the opportunity to rethink the suburbs as more humane and engaging places. The qualities of alienation, disorientation and monotony persist.

9. RESEARCH NEEDS

Several general areas of research could prove useful in design and planning of the urban edge environment.

First of all, considerable attention needs to be addressed to the question of user perceptions and satisfaction in the urban fringe. How are these places perceived? What are their assets and weaknesses in the eyes of their users? Do they really offer the kind of diminished human experience that our initial observation and analysis suggest? If so, what accounts for their tremendous spread and adoption as status quo for new American communities? What kind of social patterns and behaviors are associated with these places? Whose interests are represented in the development of these places and whose are ignored?

Second, a much more rigorous evaluation of the functional qualities and resource demands of these places needs to be considered. By what patterns do people actually move around and interact? How does distribution and scale of land use and transportation patterns affect these patterns? What can be done to make these environments more adaptable to transit, pedestrians, and bicyclists? How do these places use energy and natural resources? Can the urban fringe be designed to be a more ecologically sustainable place?

Third, further work on the physical and social structure of the urban fringe is needed. How can a stronger sense of community identity and sense of place be developed? What are the key issues in creating more culturally diverse communities? How can a more adaptable and evolutionary form be encouraged? Can older, economically declining suburbs be retro-fitted as more efficient and workable communities? How can planning and engineering standards be improved? What are the options and implications for the development of an environment that encourages and supports public life of a community?

Finally, the urban fringe is a place that by nature is in a constant state of creation and development. It is also an area that faces severe problems as currently conceived and with continued pressures to expand. Thus, it presents a unique opportunity to test and adapt innovative urban design solutions for urban environments. There is a real need to develop, present and critique alternative models of the urban fringe.

The challenge of urban design seems clear. These abstract environments of "magic marker" planning are in need of both functional and aesthetic reconception. The challenge is not simply to reconstitute some romanticized version of an earlier era of towns and cities in the manner of many "neo-traditionalists". These changes must be considered within the context of the late twentieth century. The new fringe must seek to incorporate the best of the suburban era—privacy, mobility, the prospect of home ownership and a private garden. The challenge of urban design is to achieve this without destroying the prospects for developing liveable, sustainable, and vibrant human places.

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