An aerial, black and white photograph of a suburban residential development. The image shows a dense grid of streets and houses, with several winding roads cutting through the pattern. The overall appearance is that of a planned, organized neighborhood.

Redefining Suburbia

Laura E Albert

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Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Master of Architecture in Architecture

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Abstract

Suburban housing is a building type and form of development that has been neglected by many architects. Architects are responsible for designing only two percent of suburban residences. This means that the profession has largely ceded the best opportunity to be relevant and useful to ordinary people. The name itself, sub-urban, implies that the suburbs are less than or secondary to the urban typology. Suburban can also be used as an adjective to describe something which is dull and ordinary. And yet, more and more people continue to move to the suburbs each year. Since 1970, a greater percentage of the population has lived in the suburbs than in central cities or rural areas.

This thesis examines why people want to live in the suburbs and the impact of suburban development on the economy, the environment and social institutions. The conclusions of this investigation are then used to redefine the current concept of suburbia as it relates to nature, community and diversity. These concepts are in turn incorporated into a prototype for a suburban housing development. The prototype is a 38 unit residential housing development on a 2-acre wooded site in a suburb 16 miles west of Washington, DC.

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General Abstract

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This thesis examines why people want to live in the suburbs and the impact of suburban development on the economy, the environment and social institutions. The conclusions of this investigation are then used to redefine the current concept of suburbia as it relates to nature, community and diversity. These concepts are in turn incorporated into a prototype for a suburban housing development. The prototype is a 38 unit residential housing development on a 2-acre wooded site in a suburb 16 miles west of Washington, DC.

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To my children, Evan and Aaron

Thank you for inspiring me to finish this book.

To my husband, Dan

Thank you for your support during my studies, my career and our life together. You are my true north.

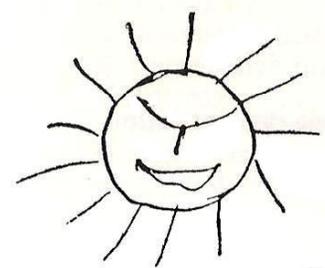


This book is dedicated to the memory
of my grandmother, Jeanne G. Rich

*The cities will be part of the country;
I shall live 30 miles from my office in one direction,
under a pine tree;
my secretary will live 30 miles away from it too,
in the other direction,
under another pine tree.
We shall both have our own car.
We shall use up tires,
wear out road surfaces and gears,
consume oil and gasoline.
All of which will necessitate a great deal of work ...*

Le Corbusier, The Radiant City (1967)

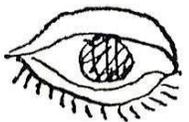
plages d'hélio et hydrothérapie



Culture physique

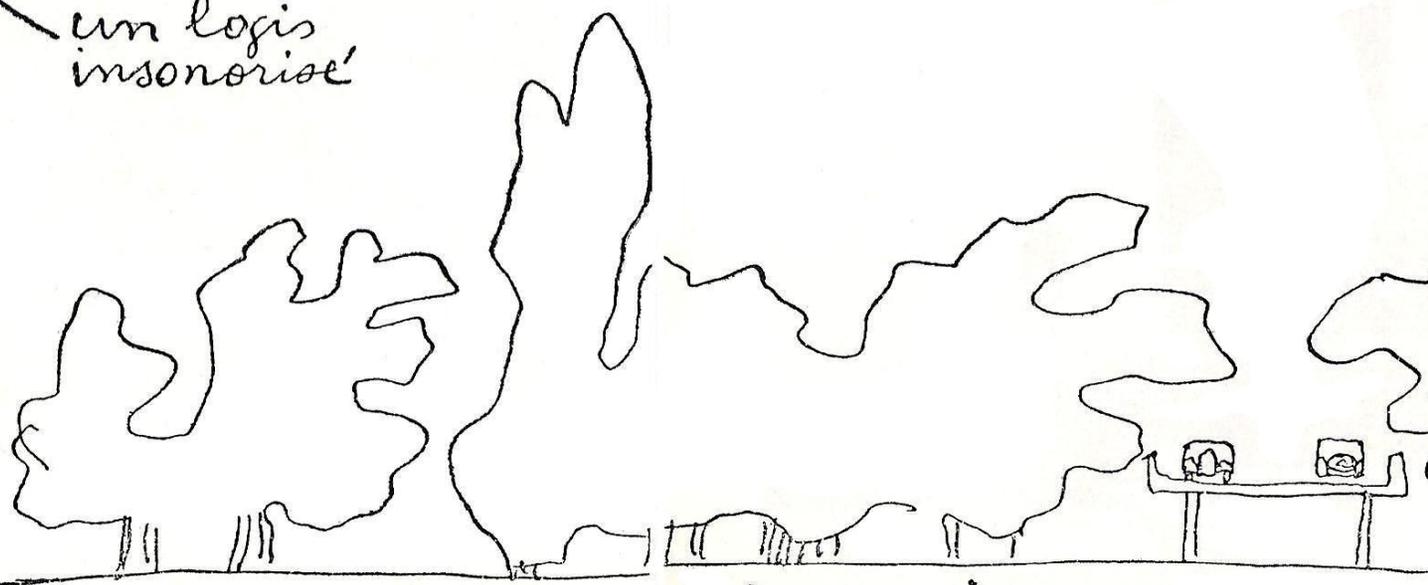
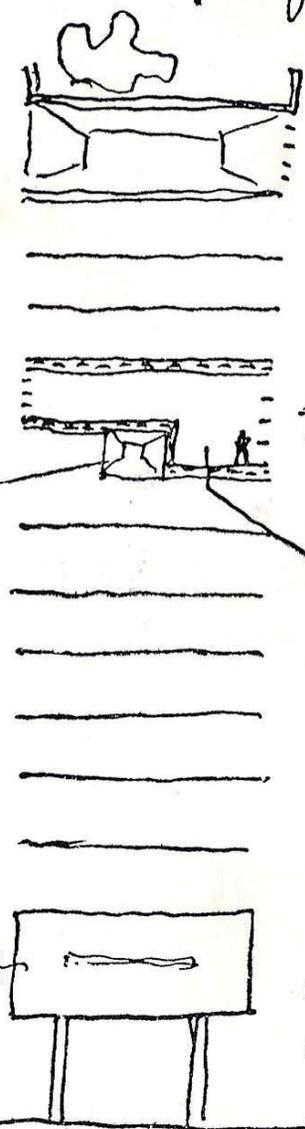


la rue intérieure



un logis insonorisé

le ravitaillement



le sport au pied des maisons

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1. Definitions

suburbia *noun*

1. the suburbs of a city
2. people who live in the suburbs
3. suburban life

suburb *noun*

an area outside a city but near it and consisting mainly of homes, sometimes also having stores and small businesses

suburban *adjective*

1. of or characteristic of a suburb.
2. contemptibly dull and ordinary.

sub- *prefix*

1. situated under or beneath, subterranean; secondary in rank; subordinate
2. falling short of; forming a subdivision or subordinate part of a whole subcommittee

urban *adj*

1. of, pertaining to, or comprising a city or town.
2. living in a city.
3. characteristic of or accustomed to cities; citified.

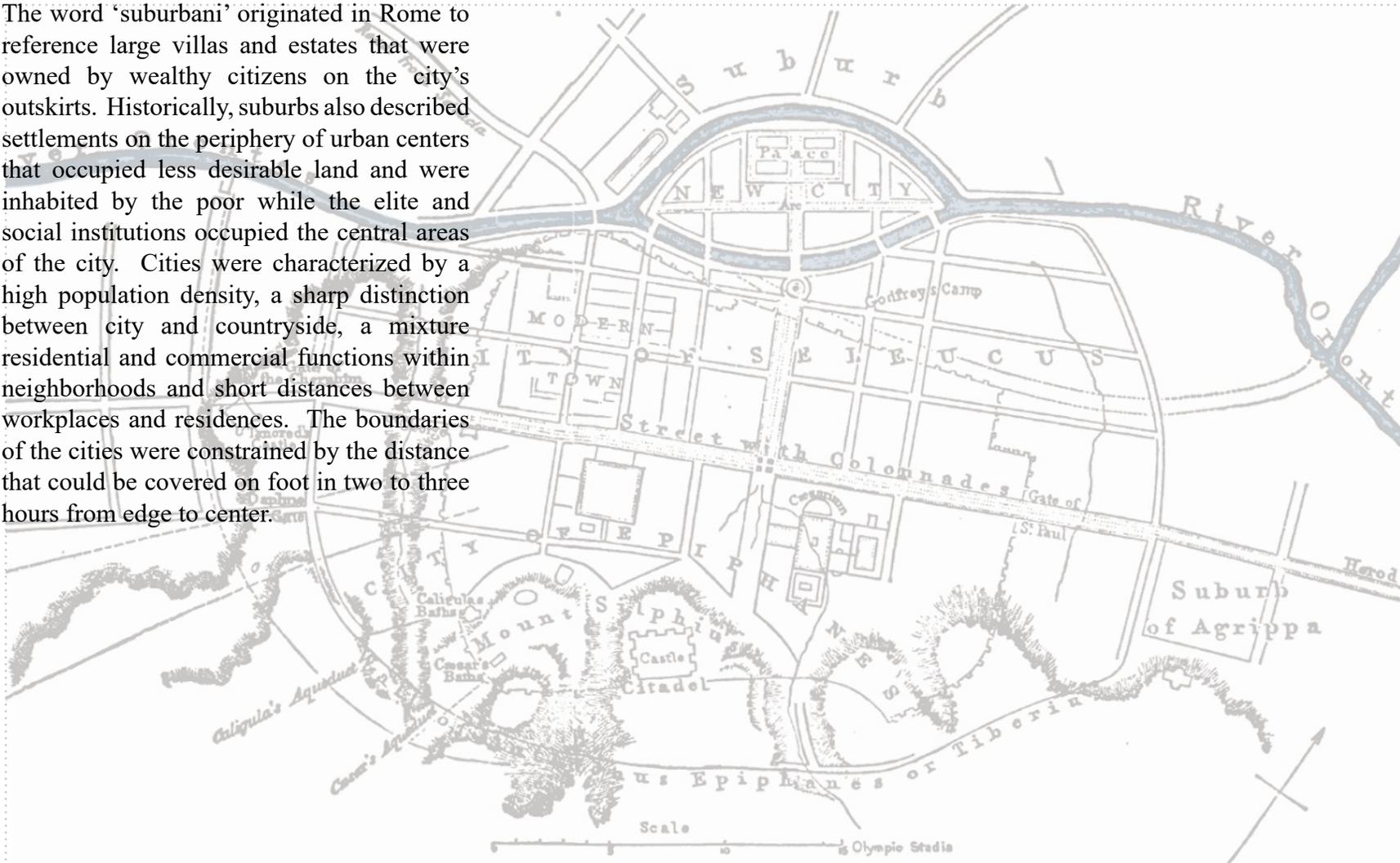
Suburbs are small, controlled communities where for the most part everyone has the same living standards, the same weeds, the same number of garbage cans, the same house plans, the same level in the septic tanks.

Erma Bombeck

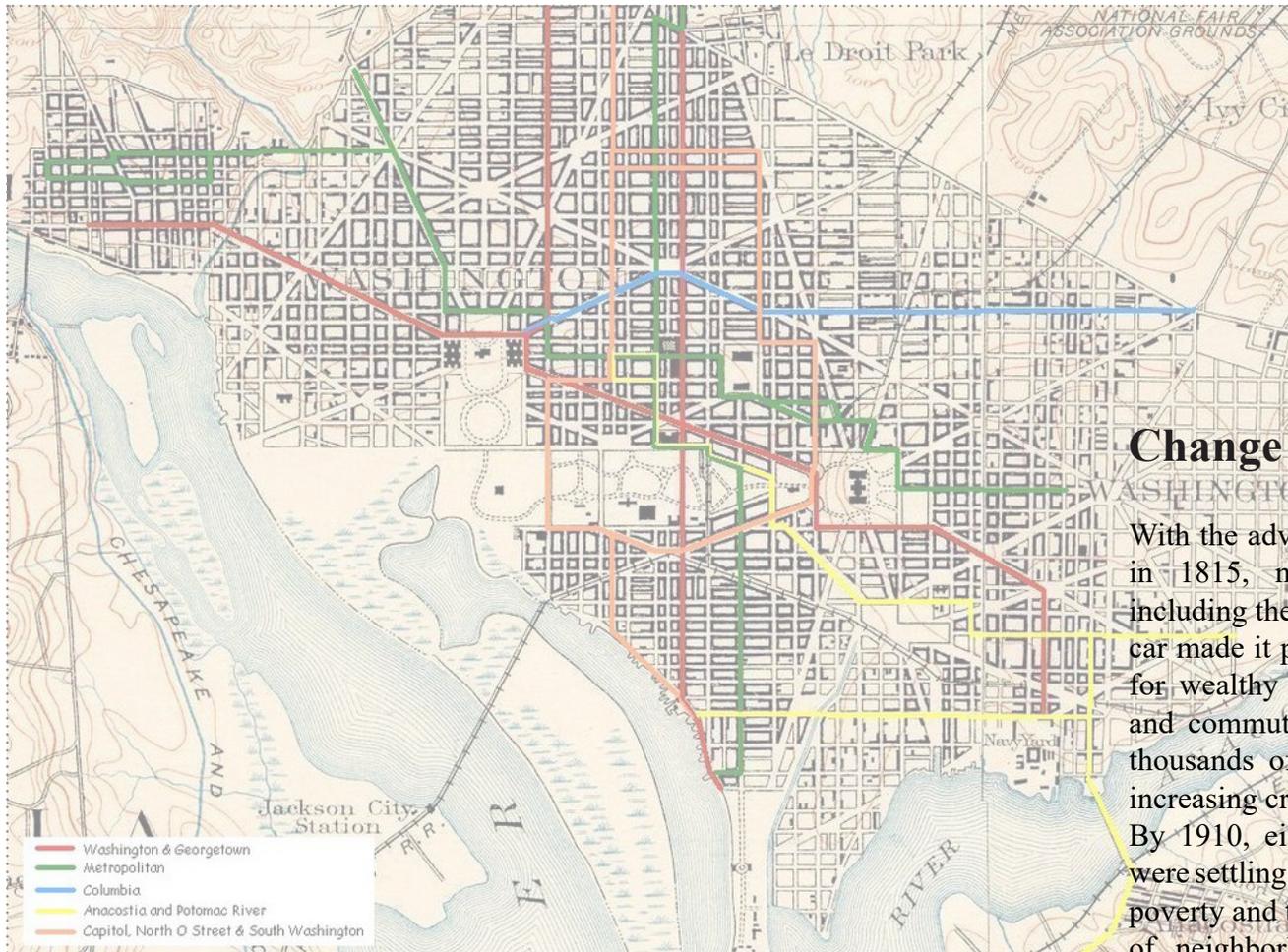
2. Evolution of the American Suburbs

Origins

The word ‘suburbani’ originated in Rome to reference large villas and estates that were owned by wealthy citizens on the city’s outskirts. Historically, suburbs also described settlements on the periphery of urban centers that occupied less desirable land and were inhabited by the poor while the elite and social institutions occupied the central areas of the city. Cities were characterized by a high population density, a sharp distinction between city and countryside, a mixture residential and commercial functions within neighborhoods and short distances between workplaces and residences. The boundaries of the cities were constrained by the distance that could be covered on foot in two to three hours from edge to center.



Map of Ancient Antioch



1888 Washington DC Streetcar Map

Change

With the advent of the Industrial Revolution in 1815, new means of transportation, including the ferry, the railroad and the cable car made it possible for cities to expand and for wealthy people to live outside the city and commute to work. Factories attracted thousands of people to cities, dramatically increasing crowded conditions and pollution. By 1910, eighty percent of all immigrants were settling in cities. Fear of rising crime and poverty and the changing ethnic composition of neighborhoods encouraged the middle class to leave the cities for the suburbs. New neighborhoods expanded radially from the cities along streetcar and railroad lines. However, the high costs of housing and transportation limited development.

Growth

Following World War II, suburban development exploded in the United States. Societal, economic and political forces contributed to rapid growth. With this phenomenal growth, a unique form of the suburbs also took shape in America. Four characteristics have made suburbs in the United States unique compared to suburbs in other countries. Suburbs in the United States have a lower population density, a higher percentage of home ownership, a greater distance from cities, and a greater disparity in income levels between the suburbs and the core city.

The invention of the car combined with the assembly line manufacturing process, inexpensive fuel and increased prosperity made automobile transportation accessible to a greater number of people than before the war. At the same time, the government began a 41,000-mile interstate highway program, coupled with federal and local subsidies for road improvements. Cars reshaped suburban settlement patterns. By necessity, streetcar suburbs were concentrated within walking distance of streetcar lines. Automobile transportation and the expansion of roads made it possible for suburbs to grow anywhere. Thus, suburban settlement began to fill in the spaces between streetcar lines, altering the spoke-and-wheel settlement pattern. Because land was cheaper in the areas between streetcar lines, the inhabitants could afford larger pieces of property, which gave rise to the uniquely American pattern of a single-family home sitting in the middle of a large yard. It further deepened the disparity in population density between the cities and suburbs.

Throughout history, the treatment and arrangement of shelter have revealed more about a particular people than have any other products of the creative arts. Housing is an outward expression of the inner human nature; no society can be fully understood apart from the residences of its members.

Kenneth T. Jackson, Crabgrass Frontier: The Suburbanization of the United States



Henry Ford, James Couzens, Elwood Rice and Gaston Plantiff in Ford Model K Car, 1907.

The American Dream

A man is not a whole and complete man unless he owns a house and the ground it stands on.

Walt Whitman

The rise of economic prosperity which followed the lean years of the World War II encouraged increased spending and consumption. People who had delayed marriage and children during the war started families. Growing families and returning veterans with money to spend in turn created a demand for housing which was already in short supply following the halt in construction during the war. The government also funded the Federal Housing Administration and Veterans Administration loan programs which provided mortgages for over eleven million new homes. These mortgages, which typically cost less per month than paying rent, were directed at new single-family suburban construction. Intentionally or not, the programs discouraged the renovation of existing housing stock and the construction of row houses, mixed-use buildings, and other urban housing types. Additionally, a new method of construction, the balloon frame, replaced timber framing as a means of residential construction and allowed homes to be built more quickly and cheaply. Owning a home became a reality for more people than ever before and an important part of the American dream.



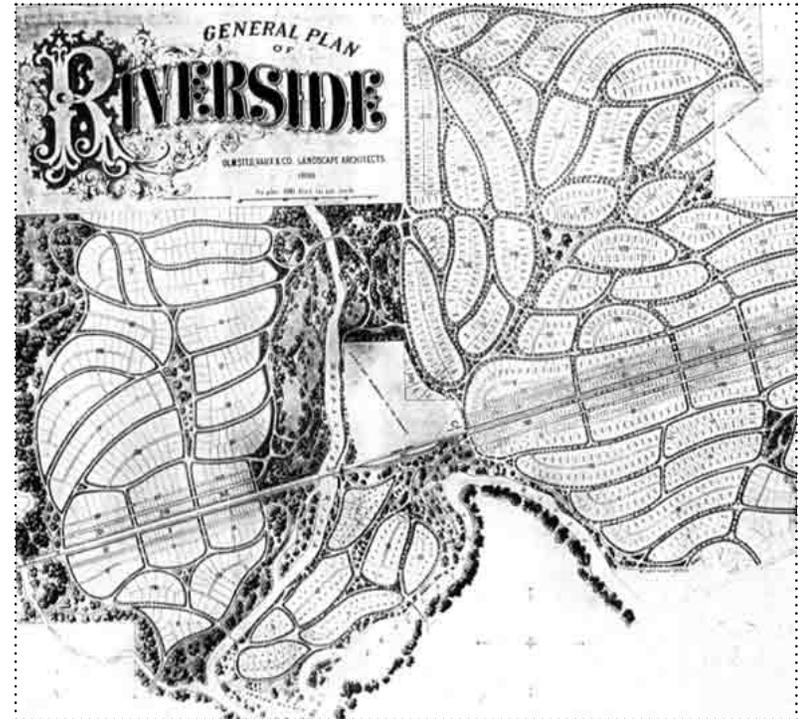
Levittown, Pennsylvania

Increased prosperity also fueled a desire for more private space. Crowded conditions in cities combined with inexpensive land in rural areas encouraged the growth of the suburbs. As more people crowded together in cities and factories, families sought to carve out a private space for home life. In America, the family unit was glorified and used as an example of a safeguard against the moral decay of society. Popular culture emphasized the virtues of domestic life and the idea of the family home as a refuge. This concept of the home as a retreat led to an emphasis on the lawn and garden. A well manicured lawn became a symbol of respectability and the house was the physical manifestation of having arrived and of moral fortitude.

The Civil Rights Movement accelerated the white flight from cities that had begun during the Industrial Revolution. Cities were increasingly viewed as crime-ridden and unhealthy places to raise a family. Americans were inspired by the Garden Movement in England which promoted the ideal of a prosperous and idyllic life in the country. In the suburbs, wide, curving streets meant to evoke meandering paths replaced the street grid of the city and zoning favored residences that were separate from commercial development. Zoning laws also prevented minorities from settling in the suburbs creating homogeneous enclaves. FHA loans were only available to developers who agreed not to sell to blacks, furthering the economic divide between whites in the suburbs and people of color in the cities. An emphasis on conformity also led to a lessening of diversity. Home Owners Associations restricted modifications to homes and builders abandoned regional building archetypes in favor of new popular styles such as the cape cod and the ranch home regardless of geographic location.



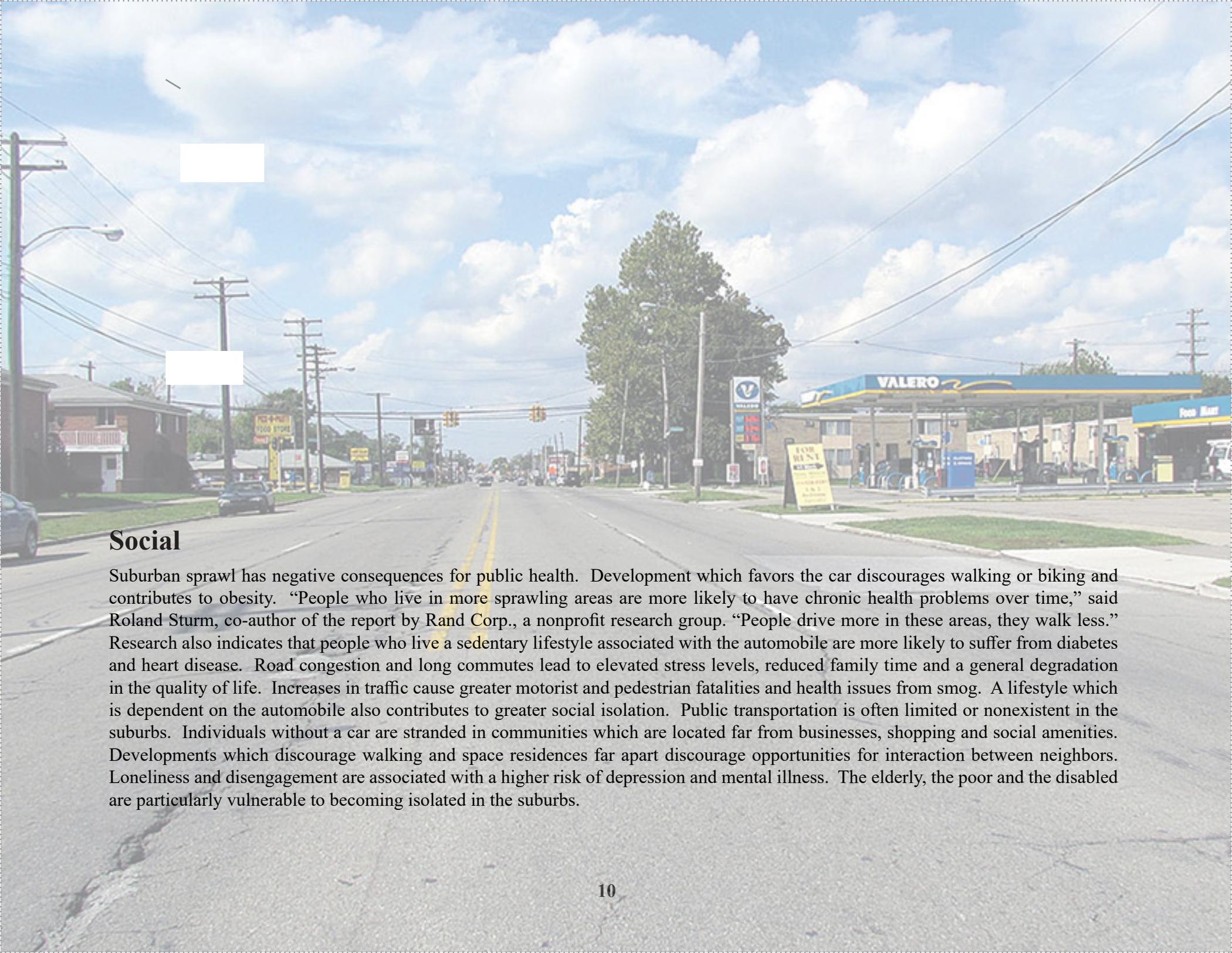
Railway poster promoting suburban life, 1930's



General Plan of Riverside, Olmsted, Vaux & Co. Landscape Architects, 1869.

Probably the advantages of civilization can be found illustrated and demonstrated under no other circumstances so completely as in some suburban neighborhoods where each family abode stands fifty or a hundred feet or more apart from all others, and at some distance from the public road.
Frederick Law Olmsted

3. The Costs of Suburban Sprawl

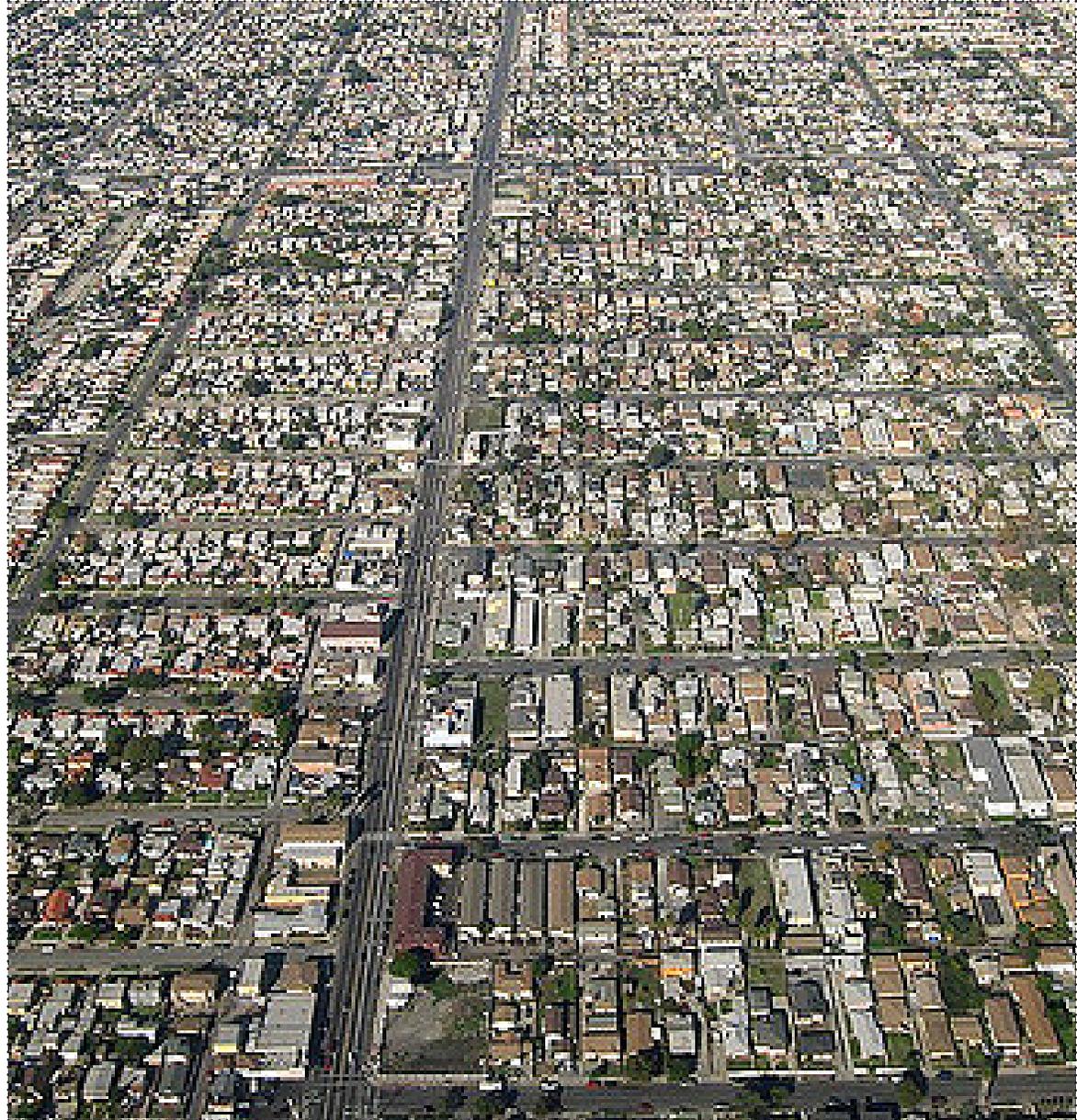


Social

Suburban sprawl has negative consequences for public health. Development which favors the car discourages walking or biking and contributes to obesity. “People who live in more sprawling areas are more likely to have chronic health problems over time,” said Roland Sturm, co-author of the report by Rand Corp., a nonprofit research group. “People drive more in these areas, they walk less.” Research also indicates that people who live a sedentary lifestyle associated with the automobile are more likely to suffer from diabetes and heart disease. Road congestion and long commutes lead to elevated stress levels, reduced family time and a general degradation in the quality of life. Increases in traffic cause greater motorist and pedestrian fatalities and health issues from smog. A lifestyle which is dependent on the automobile also contributes to greater social isolation. Public transportation is often limited or nonexistent in the suburbs. Individuals without a car are stranded in communities which are located far from businesses, shopping and social amenities. Developments which discourage walking and space residences far apart discourage opportunities for interaction between neighbors. Loneliness and disengagement are associated with a higher risk of depression and mental illness. The elderly, the poor and the disabled are particularly vulnerable to becoming isolated in the suburbs.

Environmental

Current patterns of suburban development are environmentally unsustainable. Fields of single family homes replace the verdant and open landscape which draws people to leave crowded cities. Longer commutes from work to home require the construction of more roads that are often congested with traffic. The construction of roads and buildings destroys farmland and wildlife habitat. This means that food needs to be transported from farther away. The loss of wildlife habitat is more than an aesthetic loss. These areas also often serve as critical watersheds that filter stormwater runoff and supply drinking water. Suburban developments contribute significantly more greenhouse gas emissions per person to the environment than urban or rural areas and transportation is now the leading source of heat-trapping carbon dioxide emissions nationwide. More materials and energy are used for commuting, the construction of larger homes and the utilities needed to supply these homes which must be extended over long distances and sacrifice the efficiencies of multi-family residences.



Arial view of the suburbs outside Los Angeles

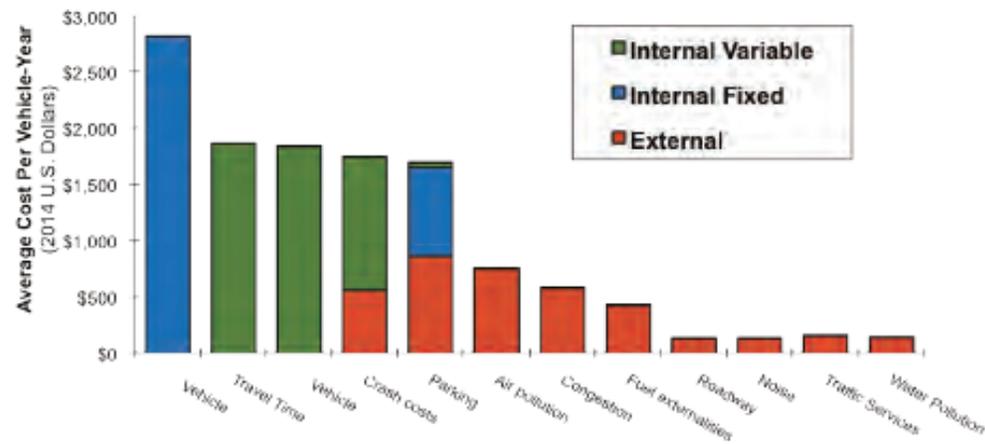
Economic

Suburban sprawl costs the American economy more than \$1 trillion annually, according to a new study by the New Climate Economy. These costs include increased expenditures for transportation and infrastructure. New roads to reach and serve communities must be built and maintained. Longer commutes necessitate higher fuel consumption and more automobile repairs. New developments also require utilities, schools and other services. In addition to infrastructure investments, cities, states and communities across America spend billions of dollars to attract corporations to their areas. Many of these costs are funded by tax payers since municipalities lack the resources to finance the infrastructure that is required to create new suburban developments. Businesses and residents in urban areas subsidize the costs of construction for new suburban communities. This transfer of income leads to less investment in cities and existing resources, increases the marginalization of the urban poor and creates greater income disparity between the cities and the suburbs.



Traffic on I-95 near Dale City, Va.

Figure 15
Estimated Urban Automobile Costs



Source: based on Litman 2009

This figure illustrates the estimated costs of motor vehicle ownership and use.

4. Redefining Suburbia

Community

We must grasp every opportunity of avoiding too rigid a separation between dwellings, and of stimulating what is left of the feeling of belonging together.

Herman Hertzberger

Lessons for Students in Architecture

Humans are social creatures and depend upon one another in order to survive. We need places that foster interaction and community.

Suburban developments should provide a balance between private and public spaces.

Increasing the densities of housing developments, building walkable neighborhoods and making connections to retail, public transportation and amenities create opportunities for social interaction.

Minimizing the primacy of the car reduces the area devoted to roads and allows for greater housing densities.

Removing cars from public spaces allows them to be claimed for communal activities.



Spanish Steps, Rome

Surely it is far better to go back to the optimistic and utopian concept of the 'reconquered street'...the street is again conceived as what it must have been originally, namely as the place where social contact between local residents can be established: as a communal living room..."

Herman Hertzberger

Lessons for Students in Architecture



Dorset, Enland



Nazos, Greece

Nature

I seek to instill the presence of nature within an architecture austere constructed by means of transparent logic. The elements of nature - water, wind, light and sky - bring architecture derived from ideological thought down to the ground level of reality and awaken manmade life within it.

Tadao Ando

Beyond Horizons in Architecture

People need access to light, air and water in order to survive.

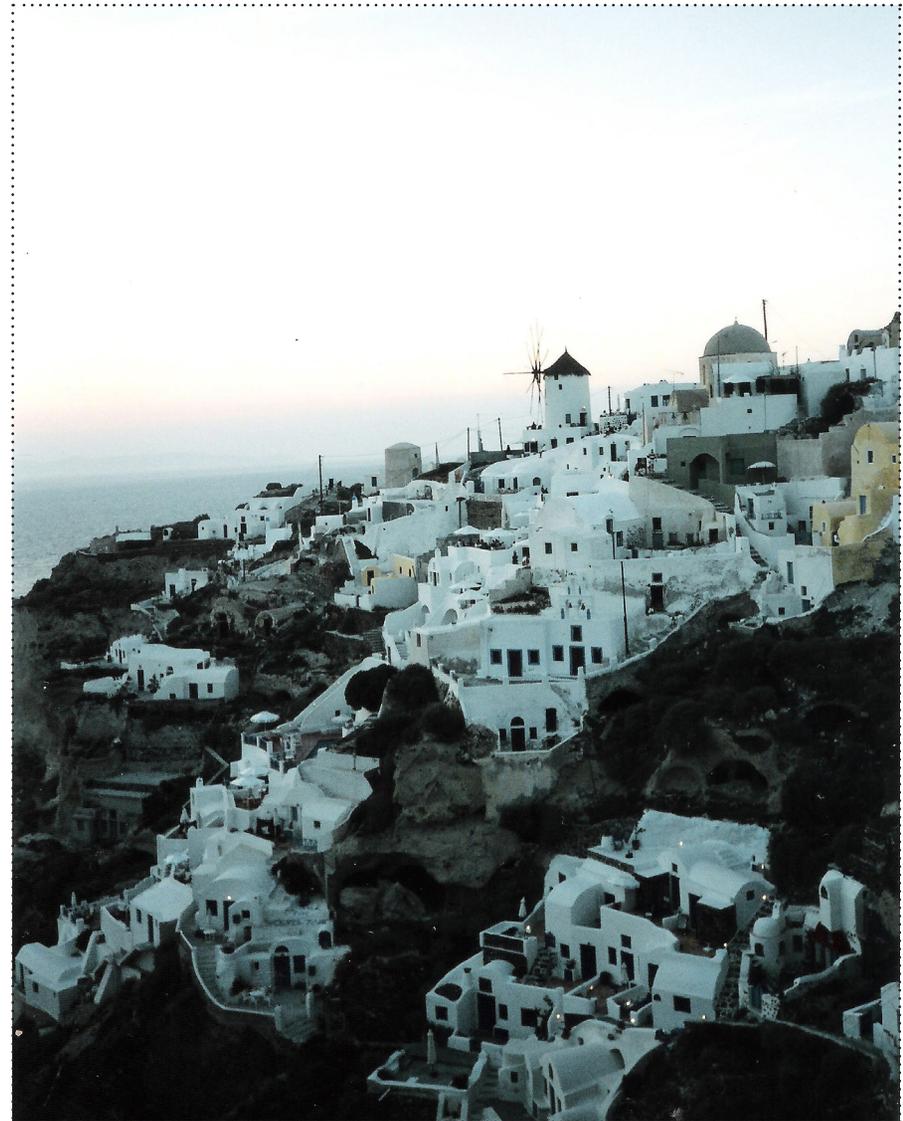
We yearn for a connection to nature.

Suburban developments should provide opportunities for interaction with the natural environment.

Working with the topography and the natural characteristics of a site creates a sense of place and a relationship with the surrounding landscape.

Views to the outside and outdoor spaces connect people to nature.

Increasing the density of developments preserves open space.



Santorini, Greece

Diversity

...the warp establishes the basic ordering of the fabric, and in doing so creates the opportunity to achieve the greatest possible variety and colourfulness with the weft.

Herman Hertzberger

Lessons for Students in Architecture

Human beings are creative and want to express their individuality. Society is made up of many different people with different needs.

Suburban communities need to serve and accommodate diverse populations.

Housing should be flexible enough to provide for a range of ages, family sizes, living arrangements and economic circumstances.

Building types should respond to site and climate conditions.

Suburban developments should provide a mix of residential, commercial and institutional uses.

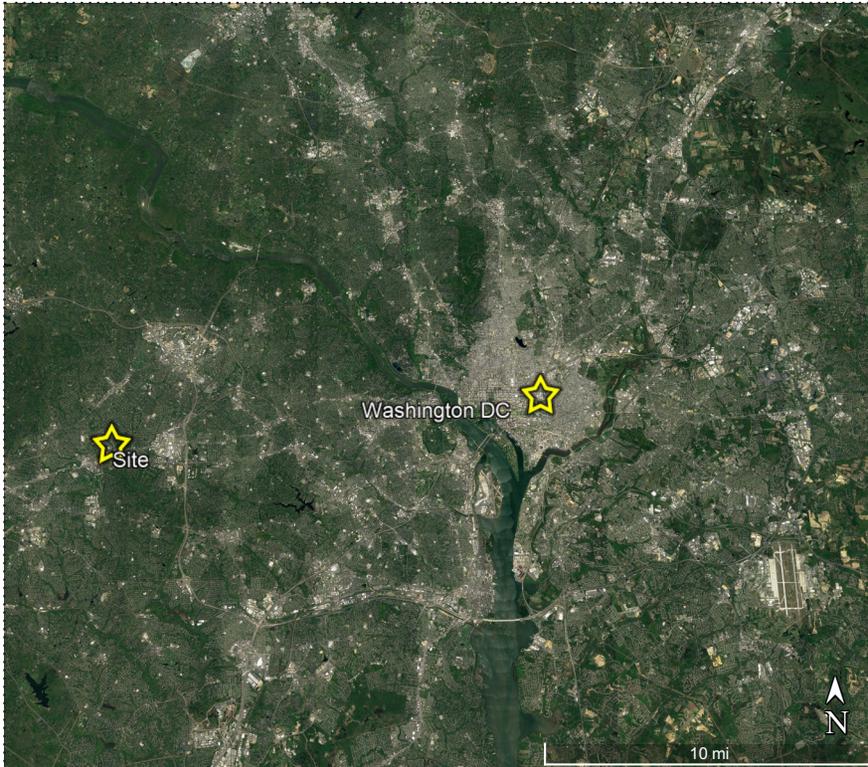


Venice, Italy

5. A Suburban Housing Prototype

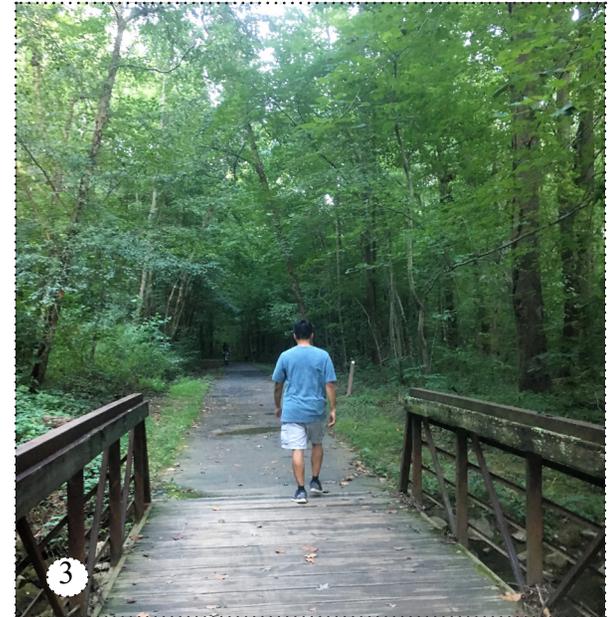
Site Characteristics

In selecting a site, I felt it was important to find a site that was accessible to the metro to decrease the dependence on the car. The site I selected is 16 miles west of Washington, DC in the suburb of Fairfax, Virginia. The Vienna metro station is one mile to the north and offices and retail are within walking distance. An adjacent townhouse development and the Accotink Stream trail and park are located to the south. The site is heavily wooded and slopes gently from east to west down to a stream.



Washington, DC Metrorail Map





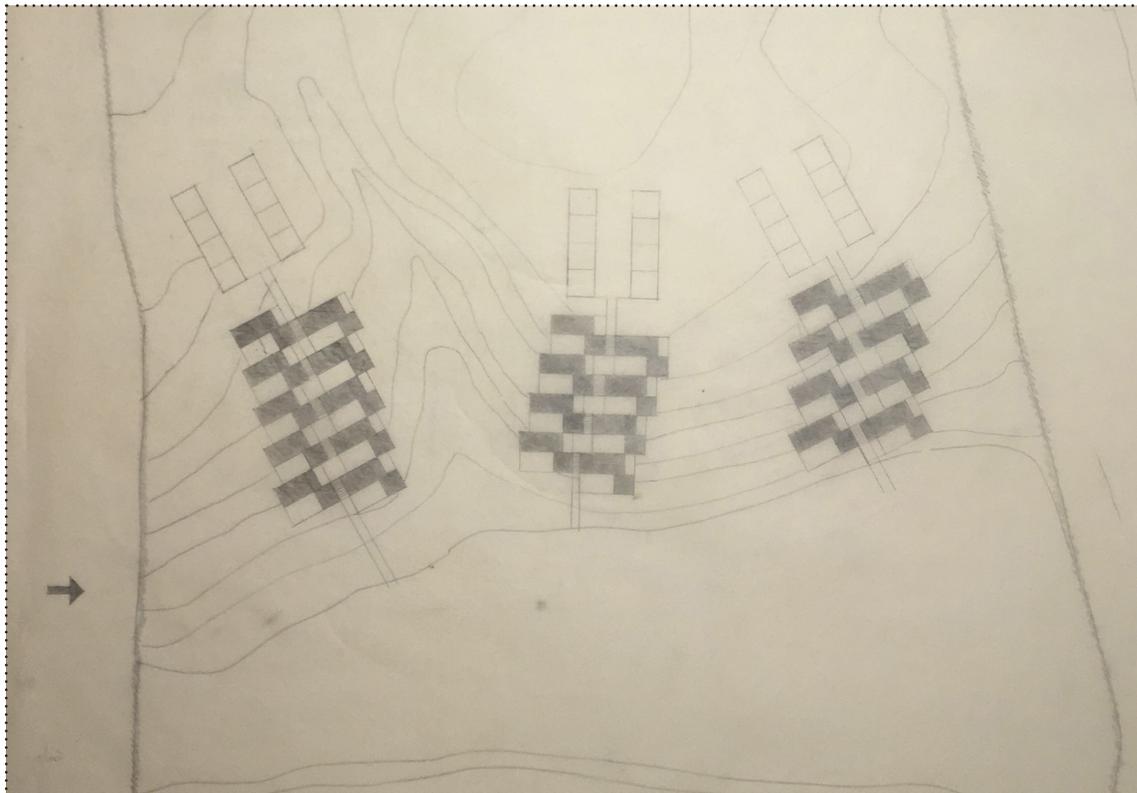
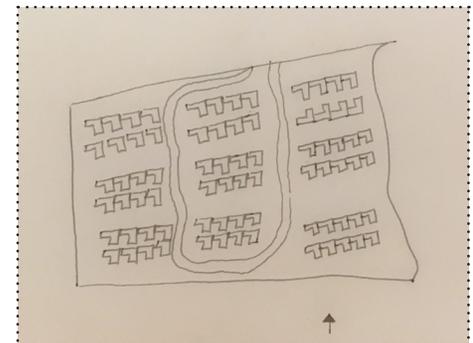
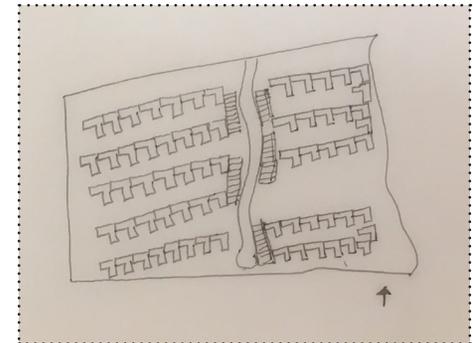
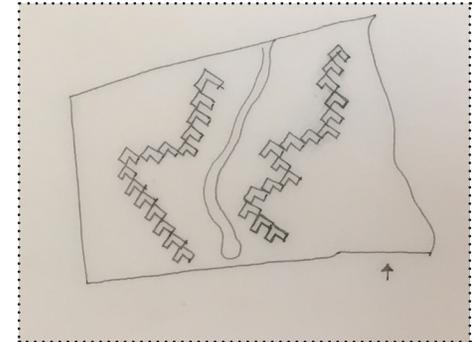
Connections

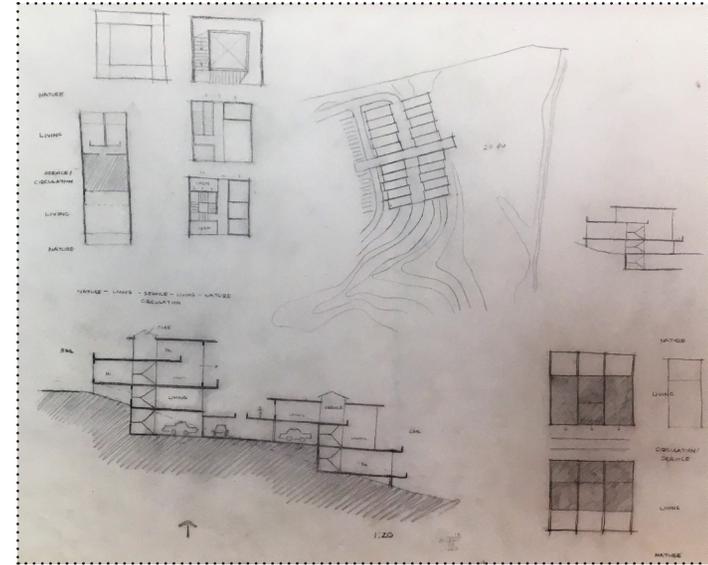
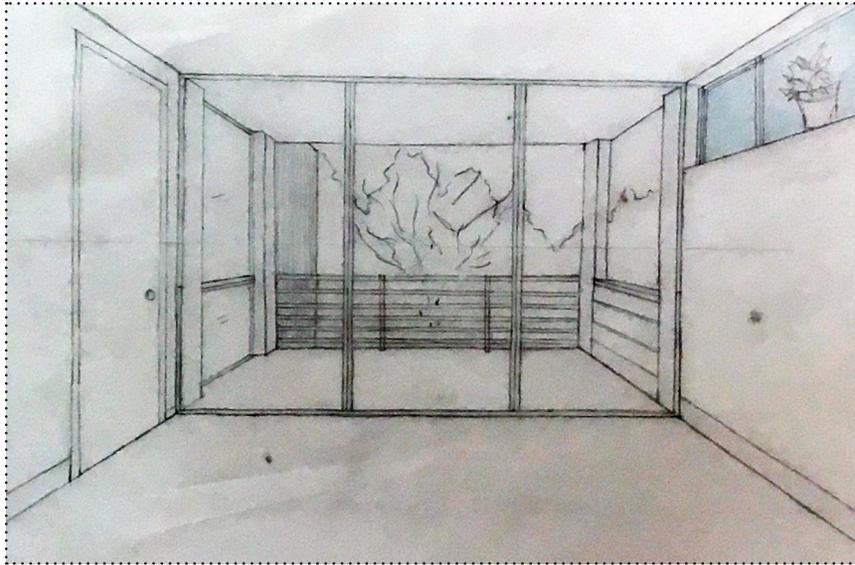
Suburban communities are typically laid out for the convenience of the car. Many lack sidewalks and pedestrian access to public transportation, parks and shopping areas. In developing the site plan, I minimized the area devoted to the car by clustering the parking to reduce roads and driveways. A communal stair from the parking area provides access to the residences and down to the creek that runs along the eastern edge of the site. A trail joins the clusters of residences and connects with the Lake Accotink trail to the south and a path to the Metro to the north. A bridge across the creek creates another connection to a shopping center across the street.



Density

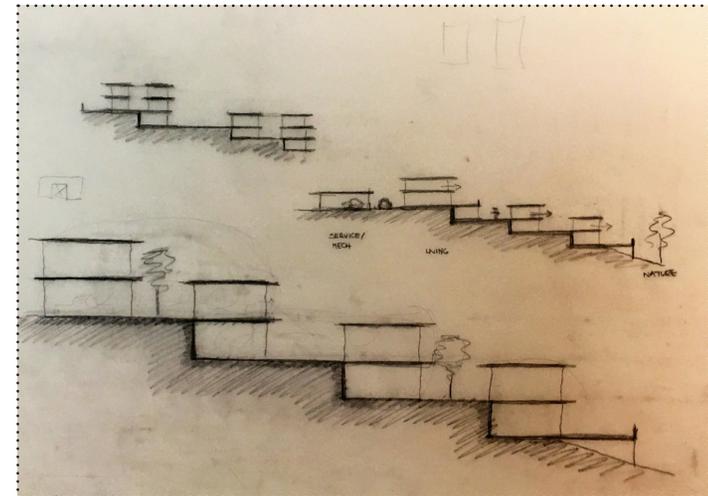
The median density for suburban neighborhoods in metropolitan areas is 2.9 units per acre. In developing a suburban prototype, I examined different options to increase the density while still preserving the feeling of openness and privacy that attract people to the suburbs. Clustering the units achieved the greatest amount of common open space while also creating communities of dwellings that promote interaction among the residents. The final site plan has 3 clusters of units and a density of 19 units per acre.





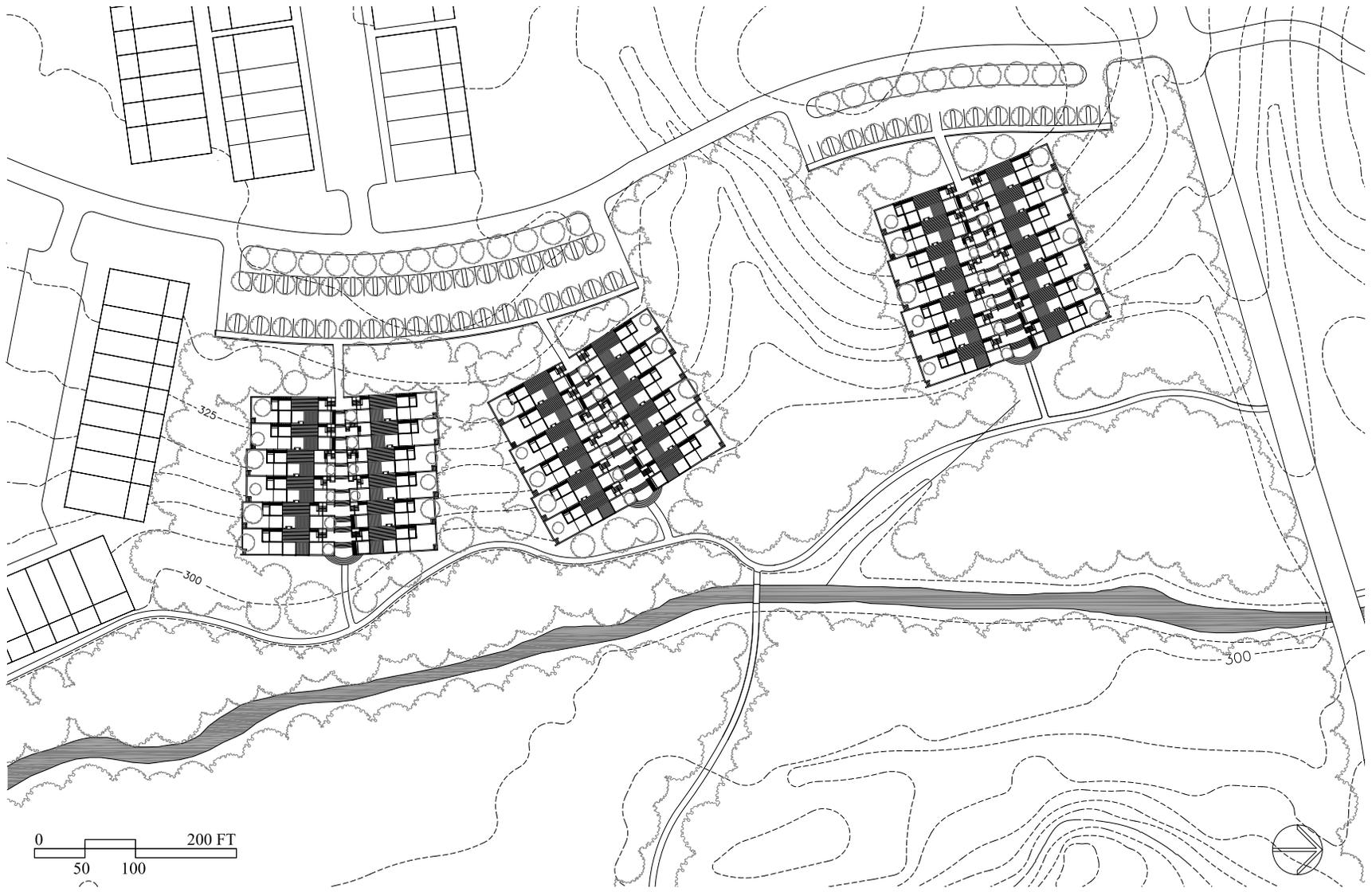
Orientation

In many suburban developments, the land is raised and leveled, destroying the natural topography and landscape of the site. Houses are oriented with garages to face the street instead of taking advantage of scenic views. I tried to preserve the unique characteristics of the site by stepping the dwellings to follow the sloping terrain. A communal stair provides access from the parking area to the individual units and directs the view as you approach the units to the trees and the creek at the bottom of the hill.



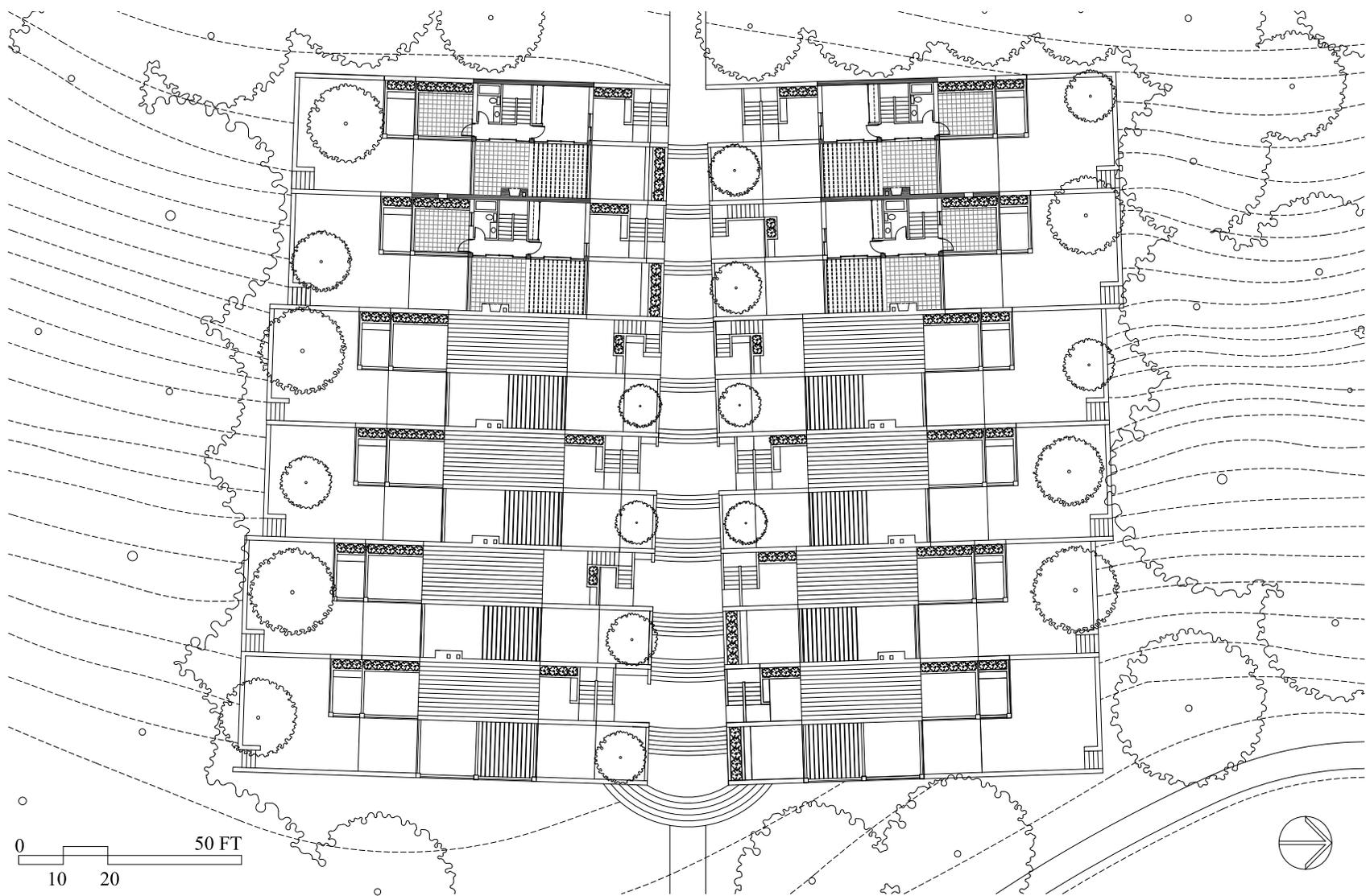
Site Plan

The site plan is comprised of three clusters of 12-14 dwelling units. Clustering the units creates small communities and preserves larger areas of the surrounding landscape. The units are individually owned with small private yards that overlook forested areas collectively owned by the community. The parking area, road, stairs and bike path are also communally owned and maintained. Efficiencies in the cost of utilities and construction are achieved by reducing the footprint of the dwellings and placing them close together.



Floor Plans

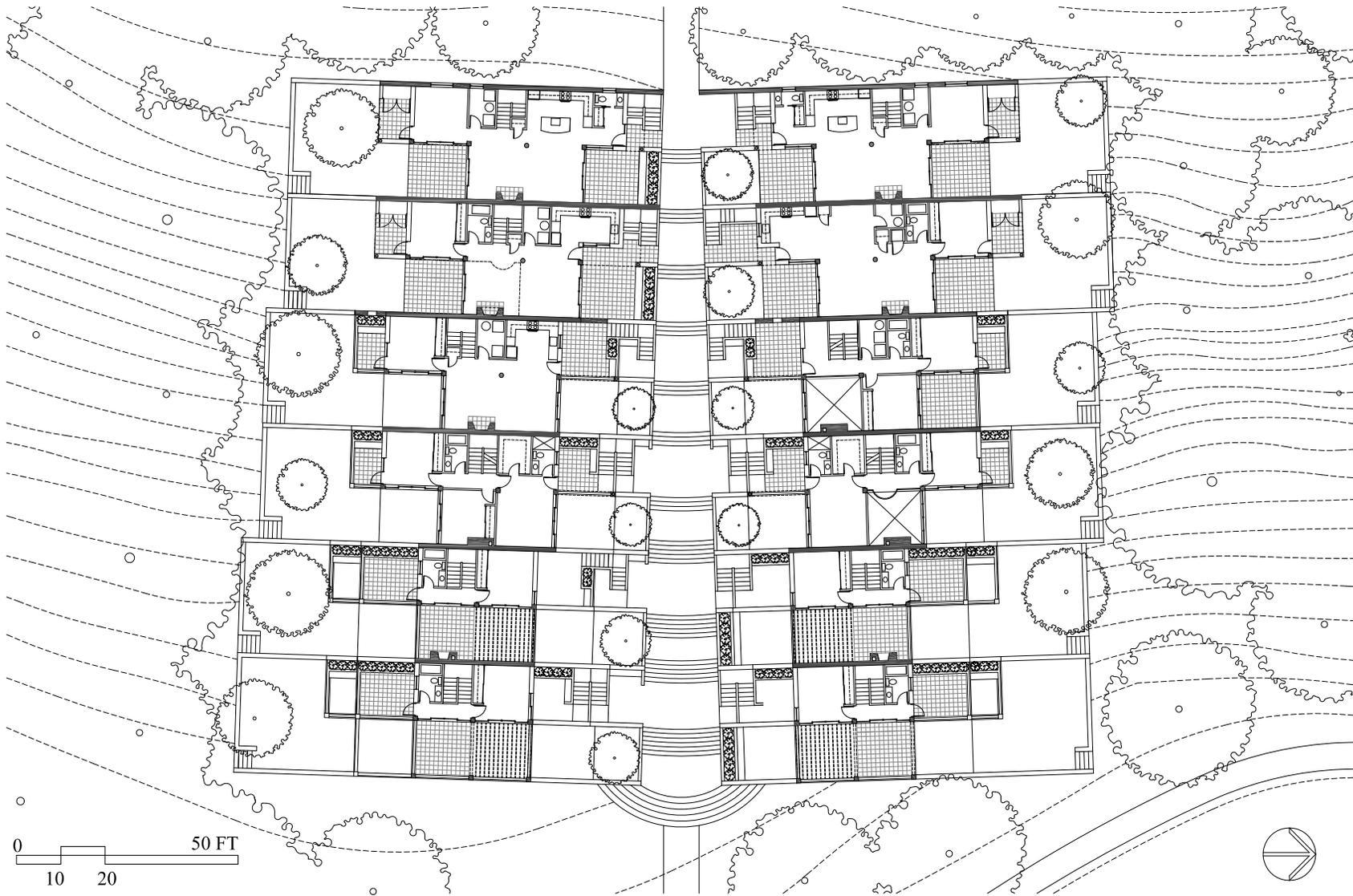
The units in each community are connected by a stair that provides access from the parking lot and to the bike trail and the stream located at the bottom of the hill. The stair serves as a communal street and is wide enough to accommodate both pedestrian traffic and space to gather. Built in benches and wide landings located at the entry to the units allow for the meetings that occur during coming and leaving. Each unit has a courtyard facing the stair that creates a semi-public transition space, much like a front porch, between the collective realm of the stair and the individual dwelling units. A private stair off of the courtyard leads to a balcony and an entrance to the second level. The courtyards and balconies enliven the public stair, creating a place for alfresco meals, a safe play area for children or a cup of coffee with a friend. Benches and planters encourage the residents to use the outdoor space as extensions of their homes. The semi-public courtyards access the public areas of the dwellings, which include the entry, kitchen, dining area, and office. On the opposite side of the units, the bedroom and the living area open onto a courtyard which overlooks the woods and offers a quieter, more private realm. Balconies at the second and third levels and a roof terrace create a variety of outdoor spaces that extend the living area of the dwellings to the outside.



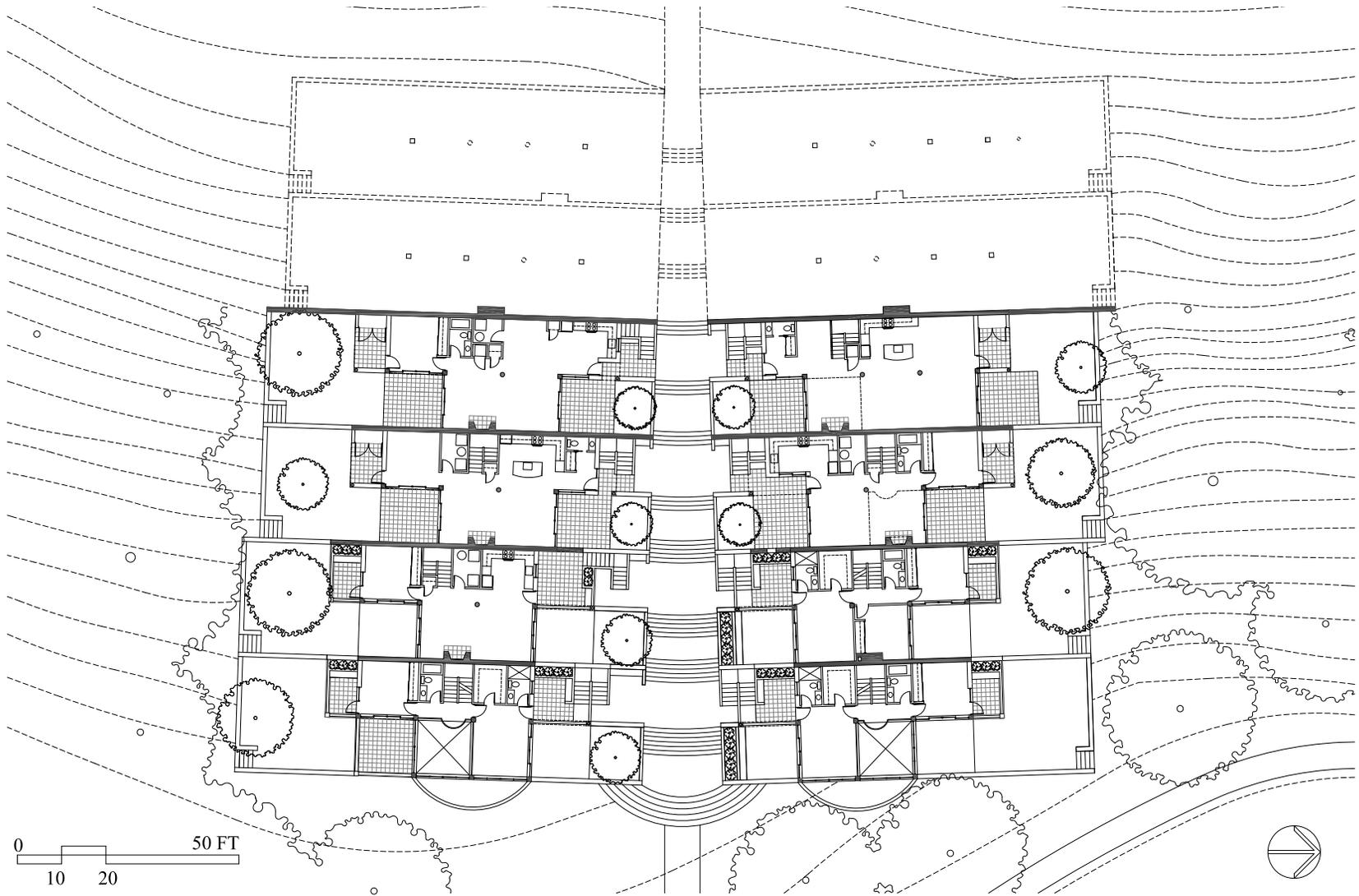
Plan at 346.00'



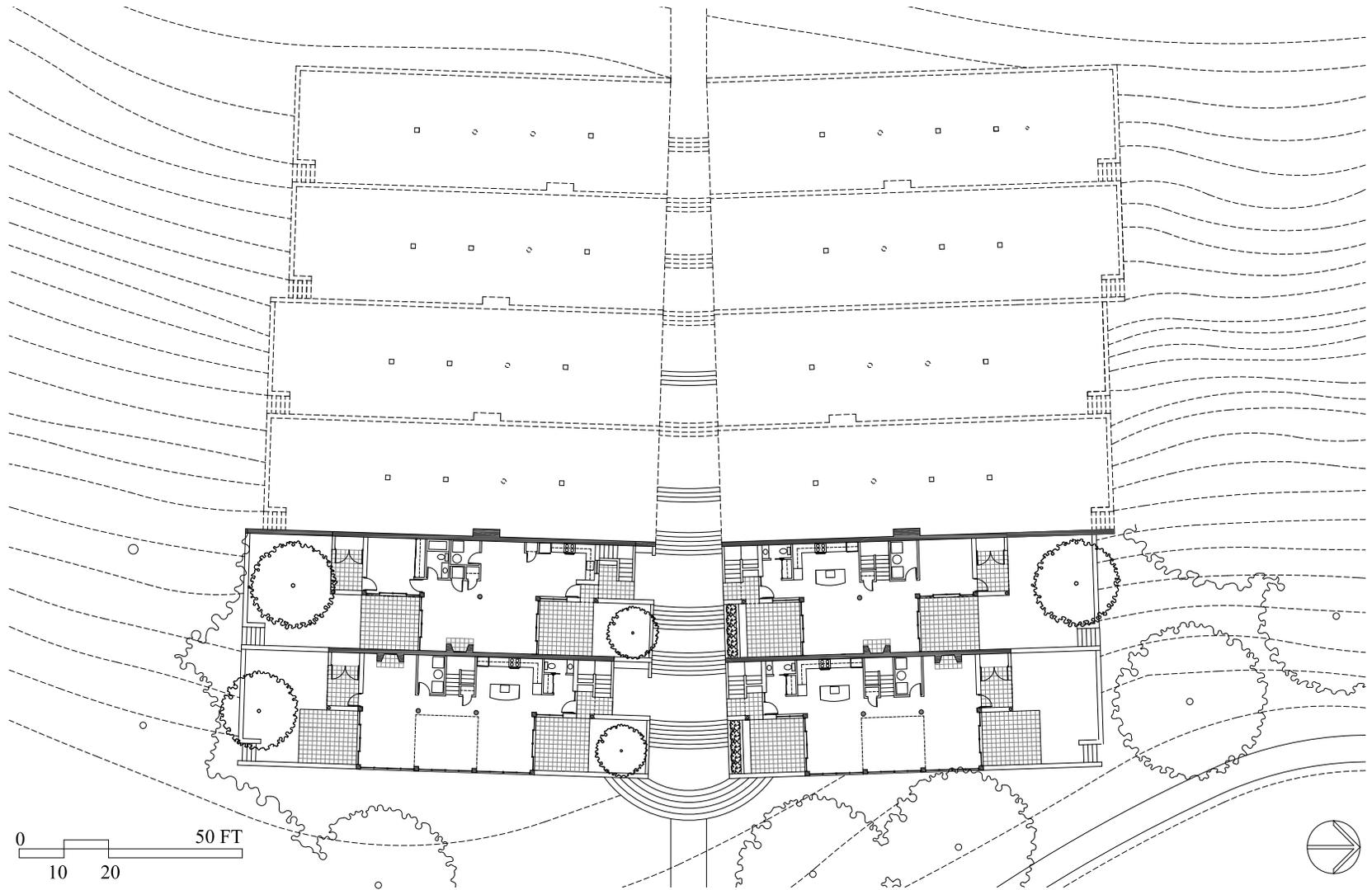
Plan at 338.00'



Plan at 330.00'



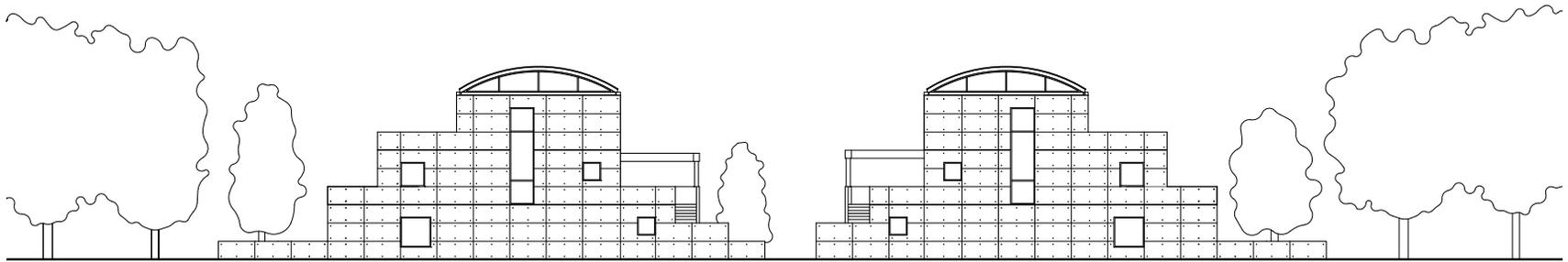
Plan at 322.00'



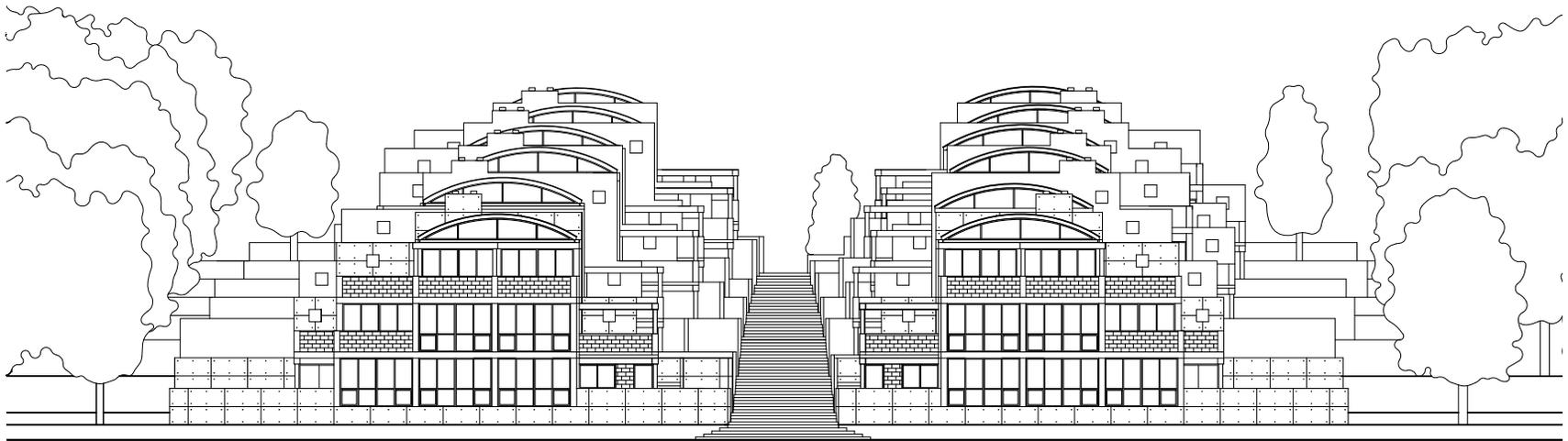
Plan at 314.00'

Elevations

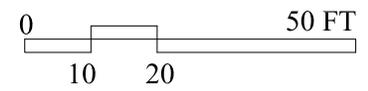
The elevations express both the structural building elements and the natural landscape. Concrete walls define the individual dwellings and also retain the earth to form terraces that respond to the sloping site. The walls step up from the central communal stair to form the dwellings and then step back down and disappear into the ground as they approach the natural, wooded area on the opposite side. The walls also form exterior courtyards, balconies and roof terraces that extend the boundaries of the units to the outdoors. Large areas of glass on the sides of the units which face the woods dissolve the boundary between inside and outside and reinforce the connection to nature. Openings in the concrete walls frame views and create shadows that instill an awareness of light, shadows and the time of day.



West Elevation



East Elevation

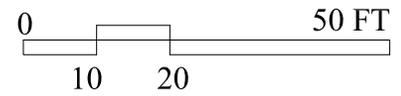




North Elevation

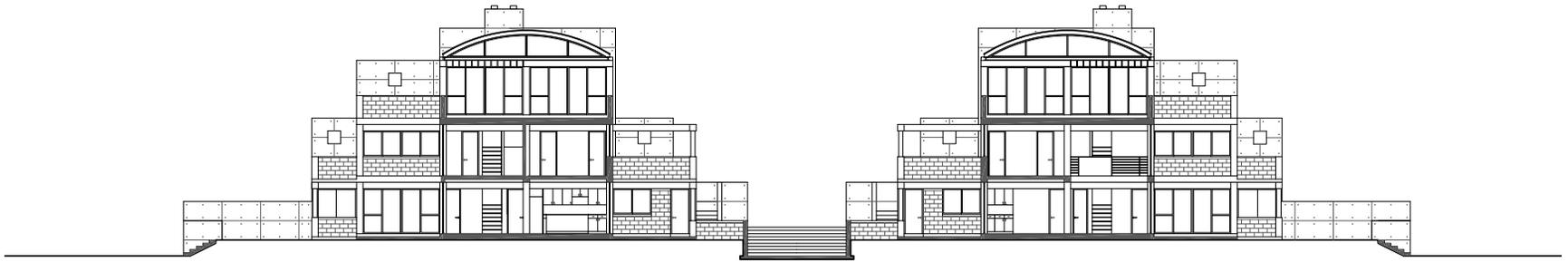


South Elevation



Sections

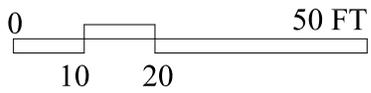
The dwellings within each community are separated and supported by a series of concrete walls that are spaced 26 feet apart. The concrete walls also serve as structural retaining walls and service walls to support the utility spaces within the units, which include the stairs, bathrooms, mechanical room and kitchen. Concrete slabs span between the walls, supporting the floor structure and a radiant heating system. Cooling is provided by a forced air system via ductwork that is located along a central circulation hallway. Concrete beams and columns define the hallway and other spaces and add another means of structural support. The concrete columns change form to express different conditions. Square columns are used at intersections with other elements while round columns are used where the columns are freestanding. The concrete walls, columns, beams and slabs are expressed at both the exterior and interior of the building. Concrete block and glass serve as infill materials and differentiate between the structural and non-structural elements.

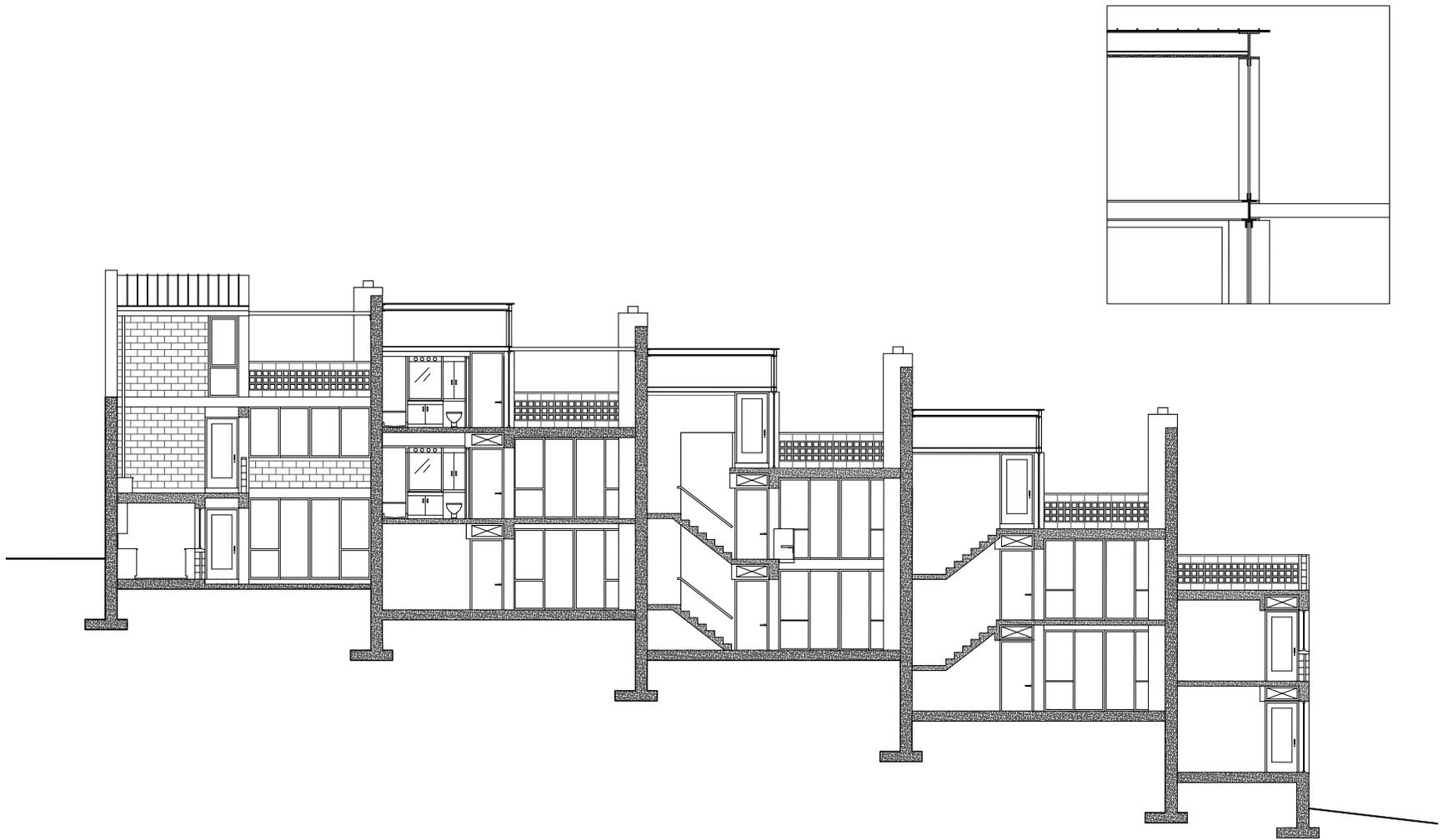


North-South Section

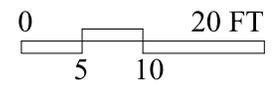


East-West Section





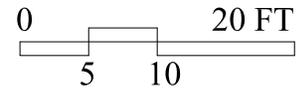
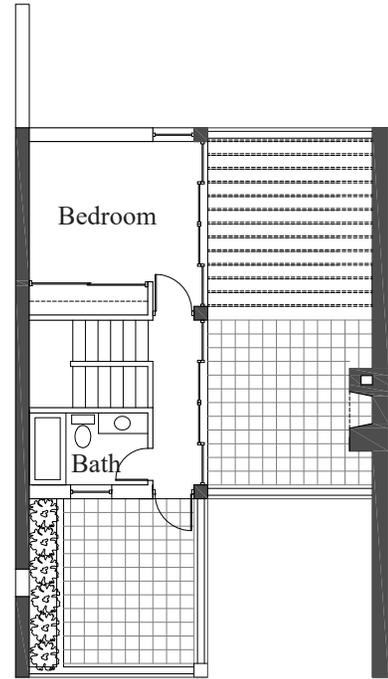
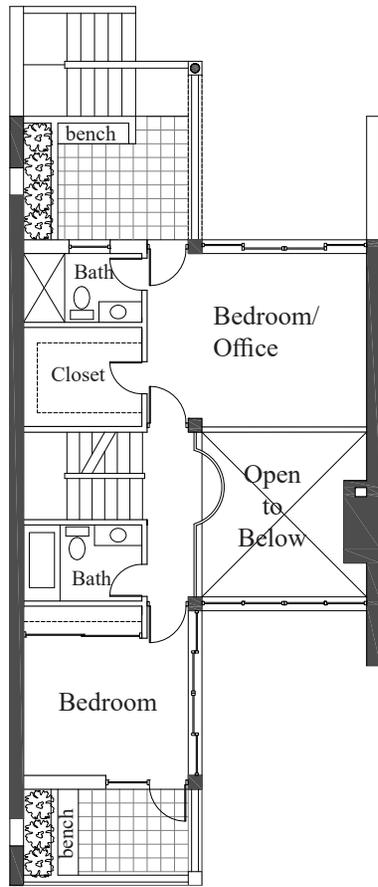
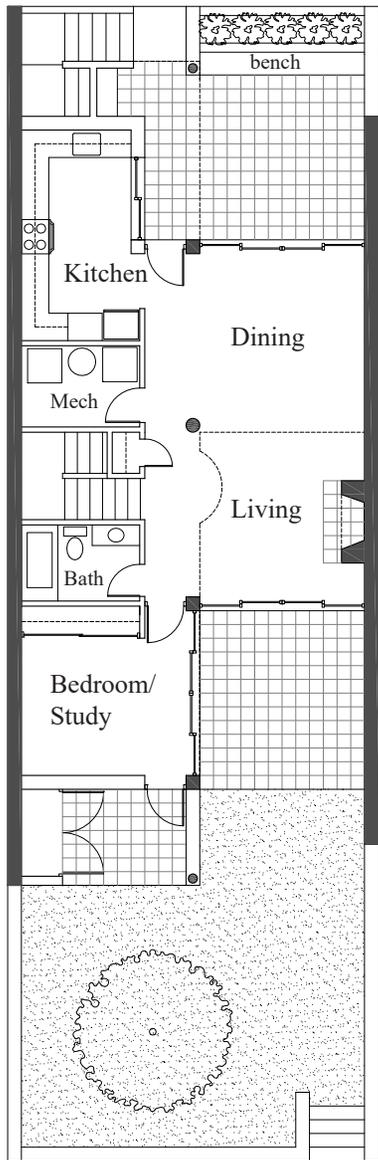
Enlarged Section



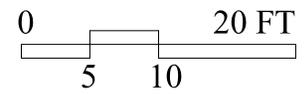
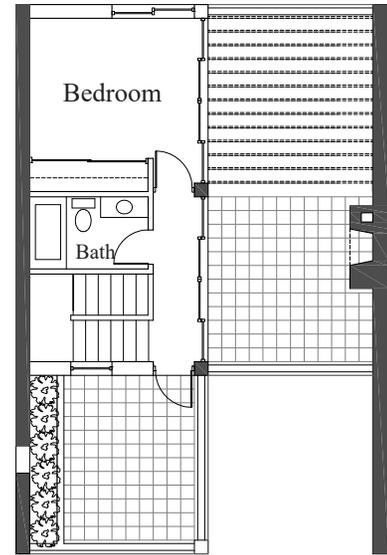
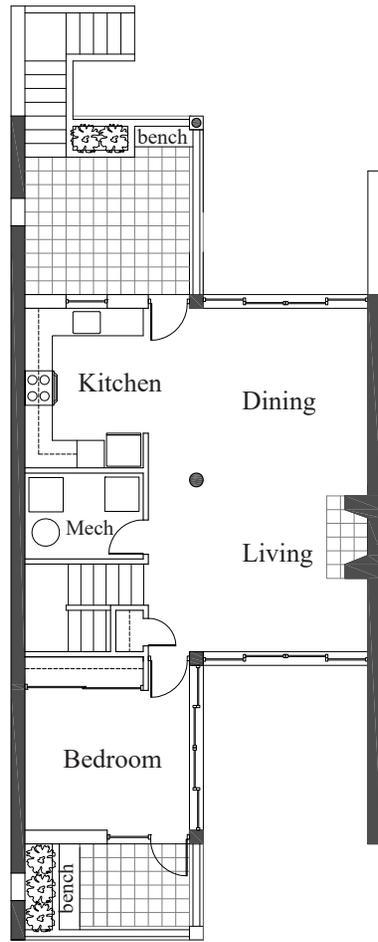
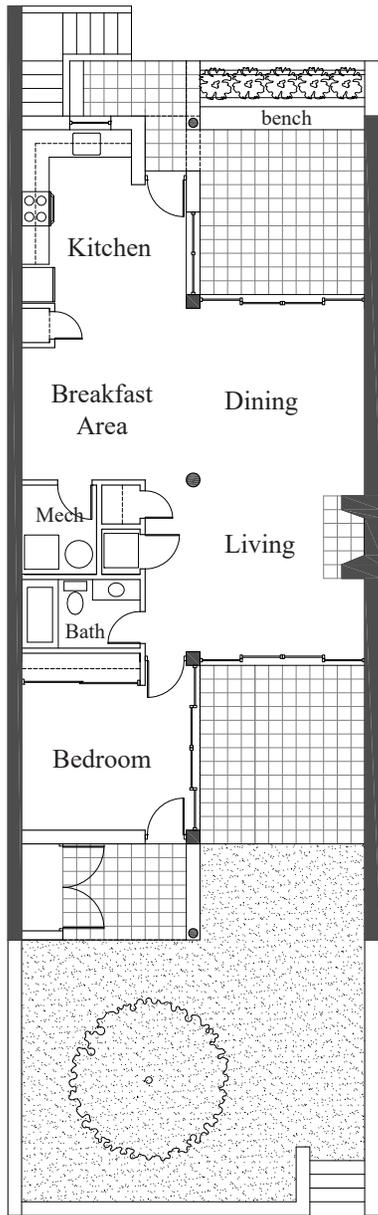
Unit Plans

The basic building organization of parallel concrete walls and an intermediary system of beams and columns allows for a variety of unit plans. The different unit plans can satisfy a range of income levels and living arrangements. Unit Type A is a four bedroom residence with a bedroom at the second level which has a separate entrance and can be converted into an office or a rental unit. Unit Type B is subdivided into two separate dwellings. The dwellings can be owned separately like a duplex or by a single owner who could rent one half of the unit or use it as an in-law apartment. The first level of the unit is a single bedroom residence and the second and third level of the unit comprise a two bedroom residence. Unit Type C is a large four bedroom unit with a study that can be used as a guest room and a second level bedroom with a separate entrance that could also be used as an office or rental space.

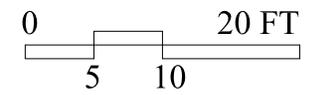
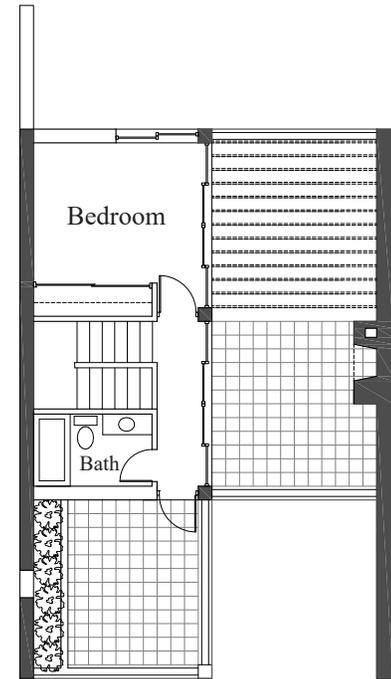
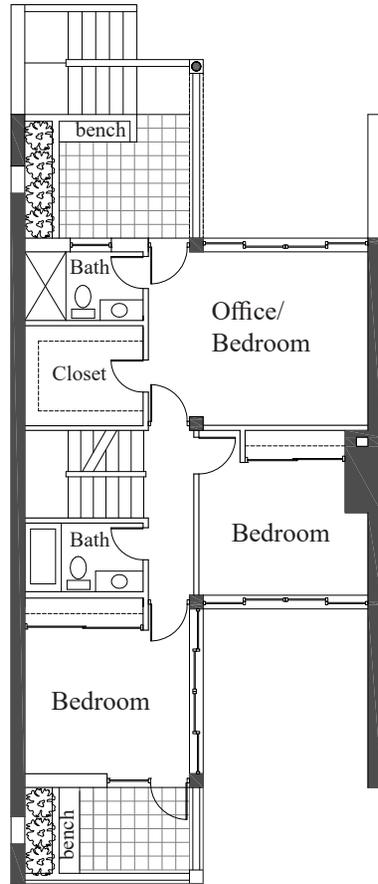
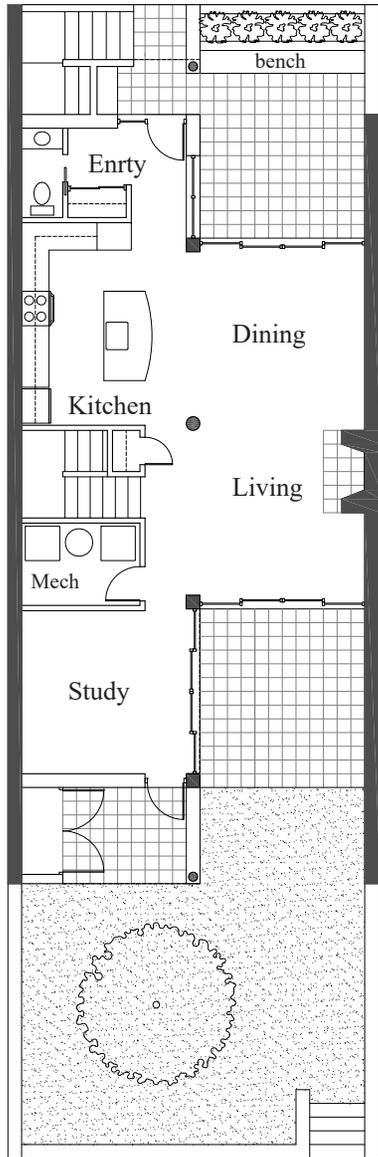
All of the residences have two courtyards; a public courtyard at the entry side of the unit and a private courtyard on the side that faces the wooded common area. The courtyards enable light and views from the outside to reach all of the living areas. While the interior of the units are a modest 1,955 sf, the exterior living areas add another 1,130 sf and significantly increase the spaciousness of the units.



Unit Type A

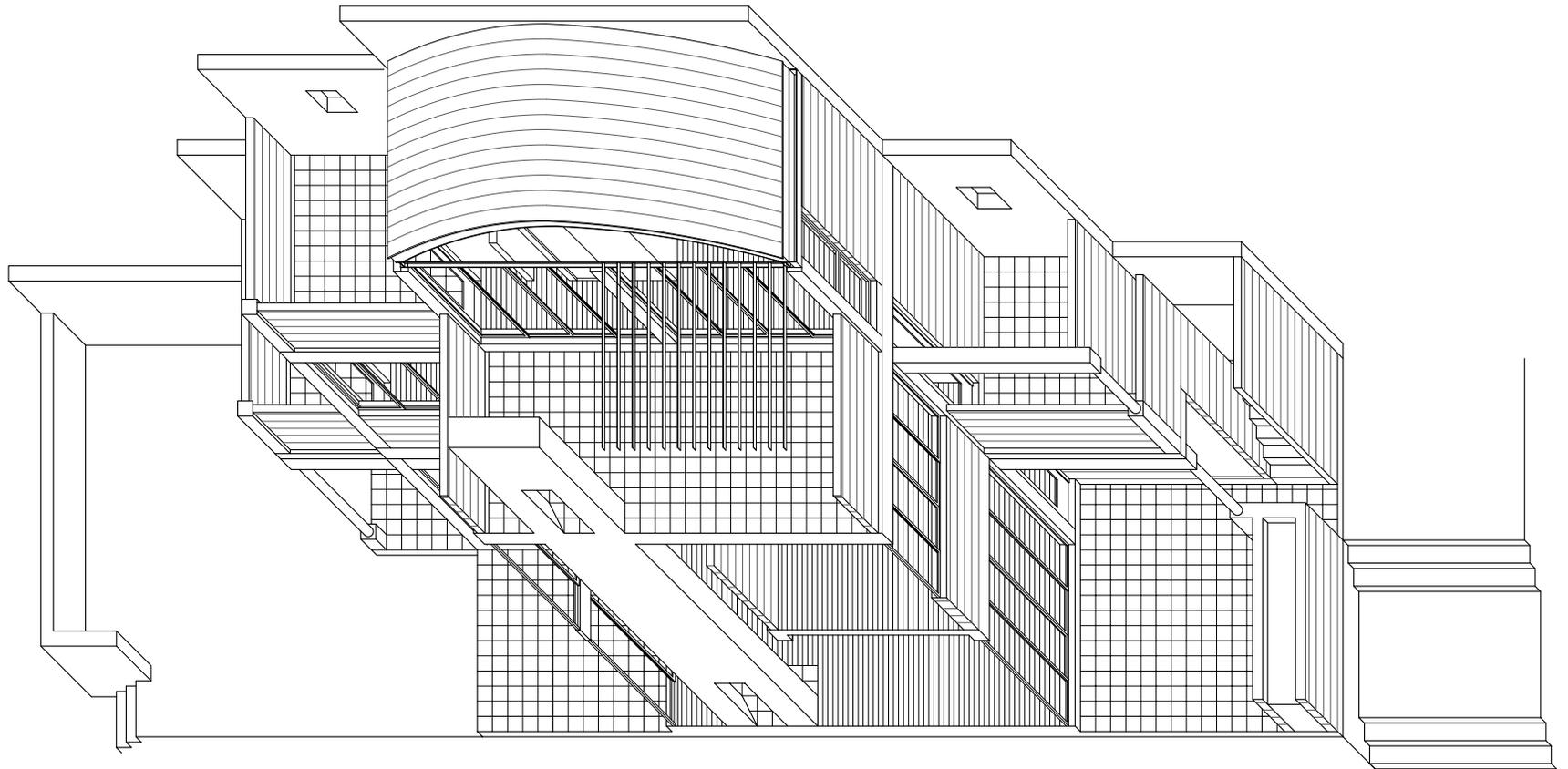


Unit Type B

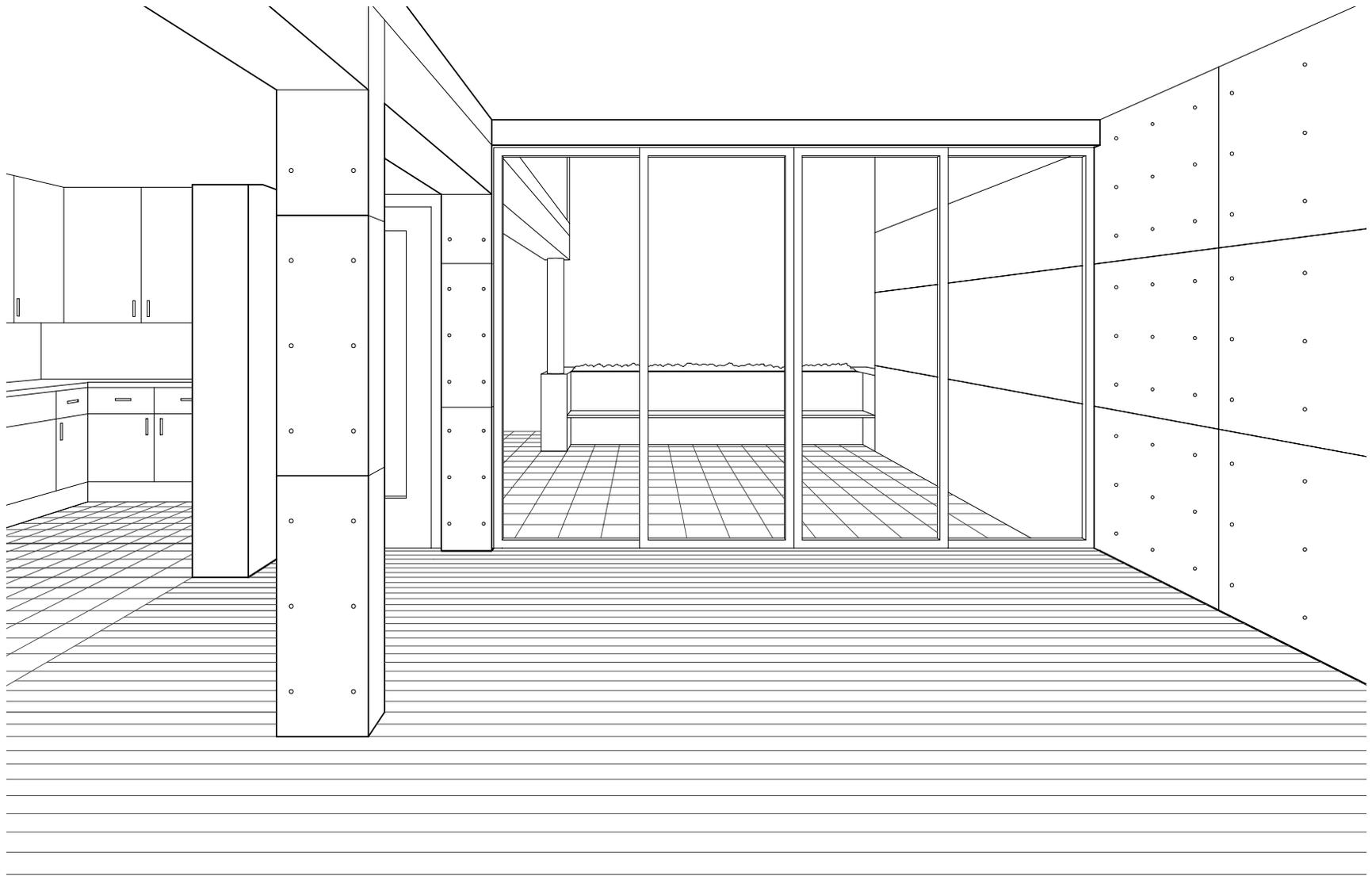


Unit Type C

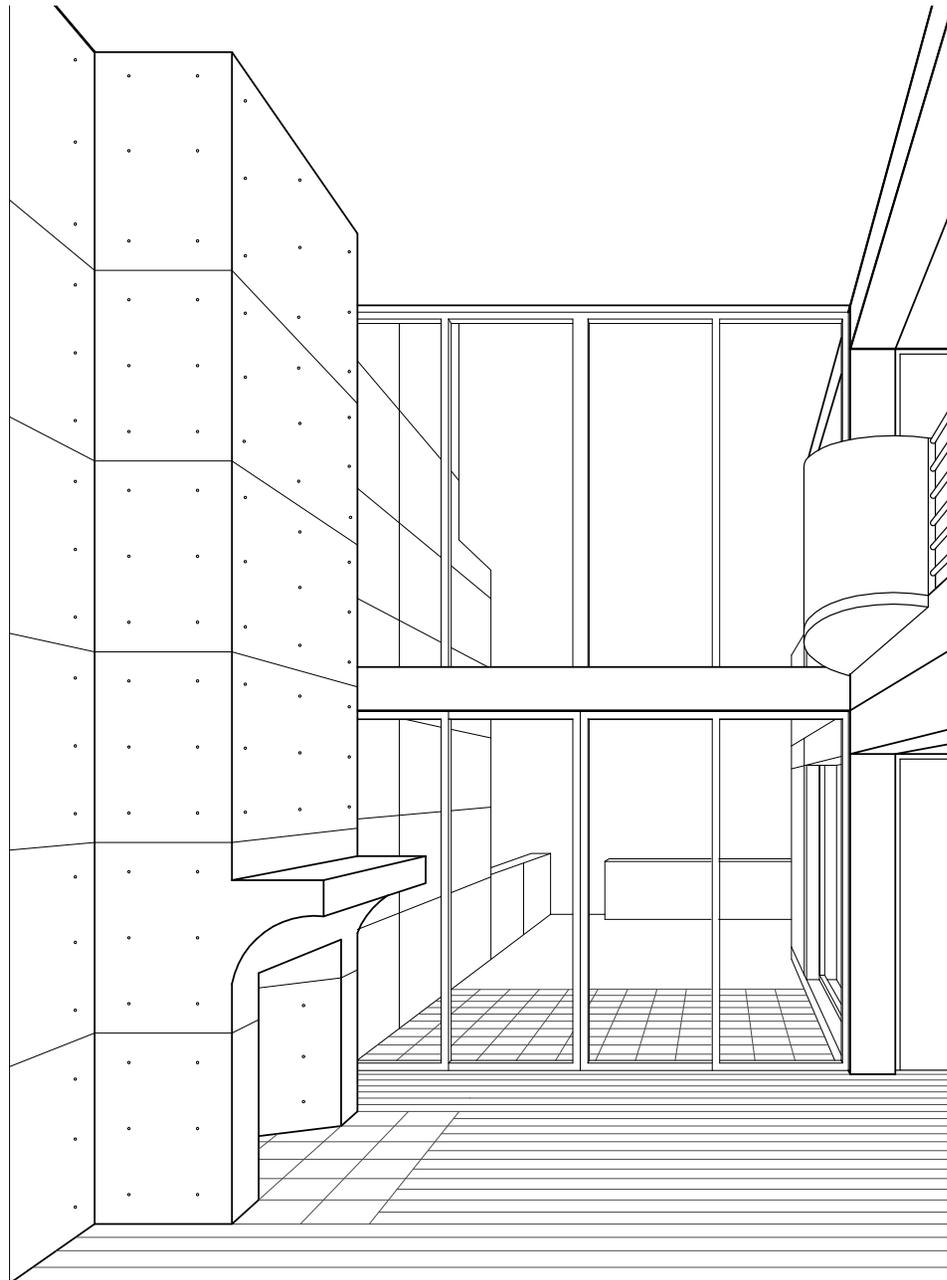
Axonometric



Perspectives



Interior View at Kitchen /Dining

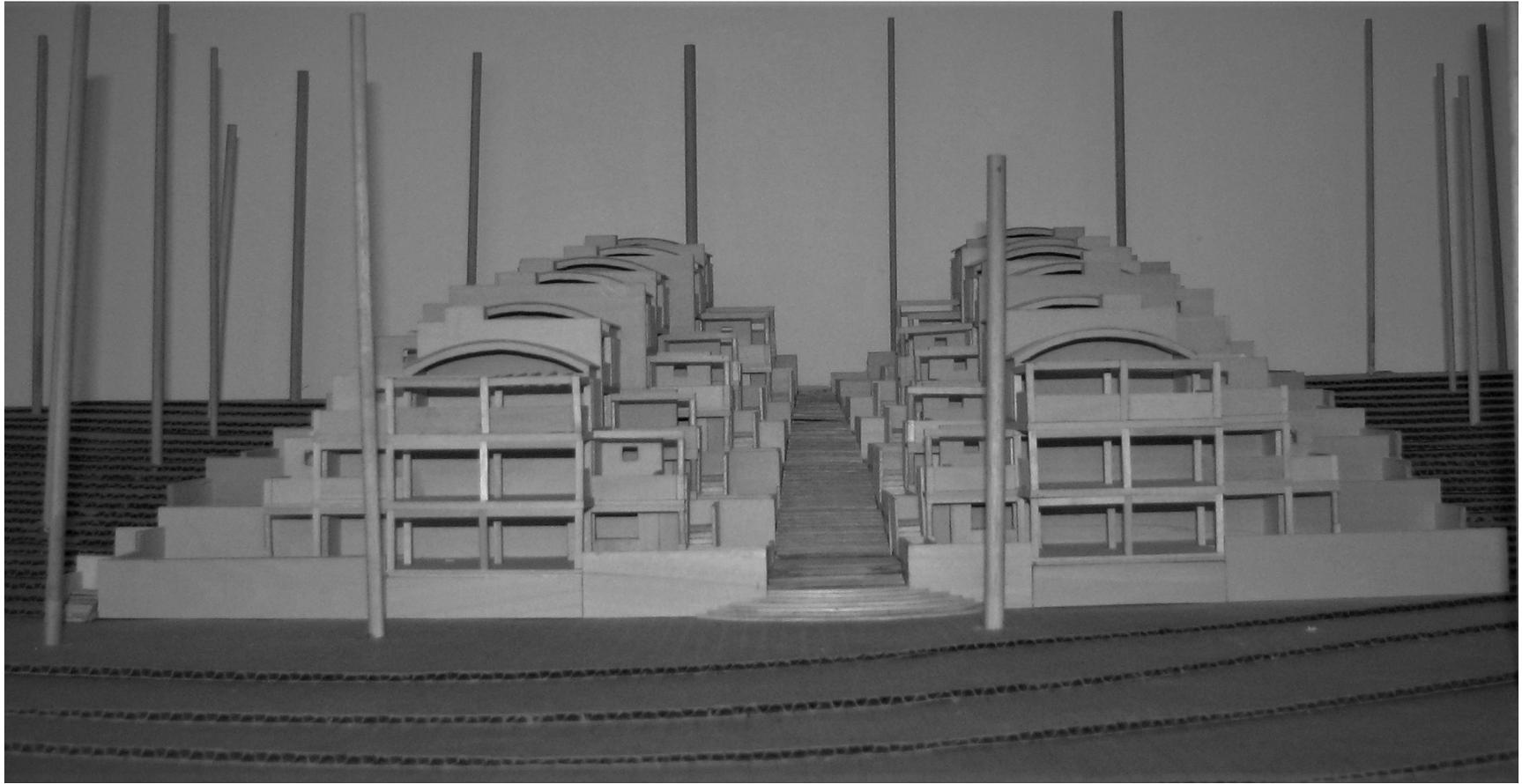


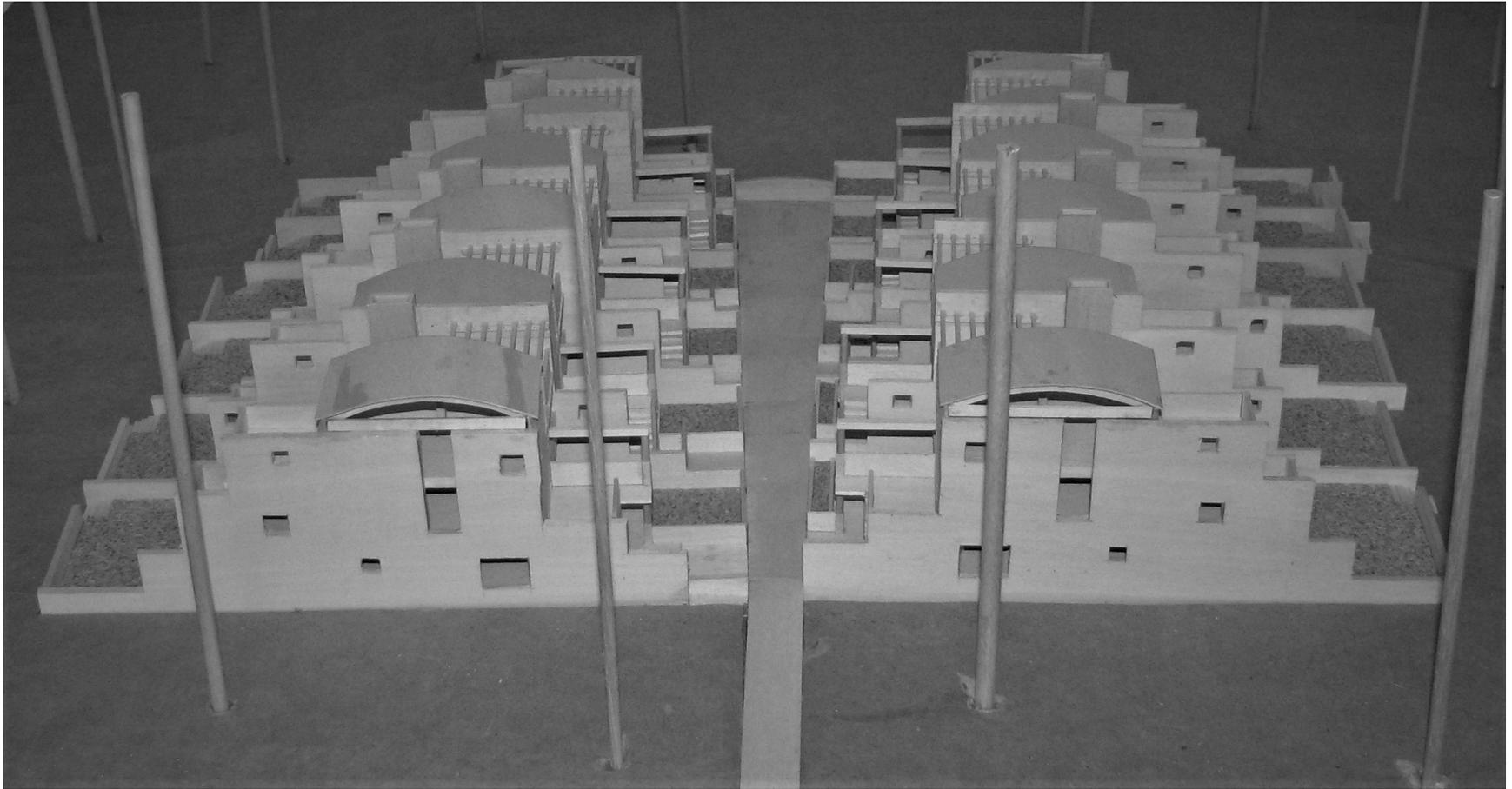
Interior View at Living Area

Model









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- Page 10 [Railways poster promoting suburban life, 1930s](#).
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<https://media.nbcwashington.com/images/652*396/I-95+Near+Dale+City+112112.jpg>
- Page 28 Site Map. Google Earth. 38°52'13.03"N 77°15'52.55"W
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