INVESTIGATIONS OF CITY TYPOLOGY & MORPHOLOGY

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PROJECT STATEMENT

- **Aim:**
- To explore and analyse city forms, their morphology and social fabric as a way of understanding the relationship between street layout, urban function and life of the people

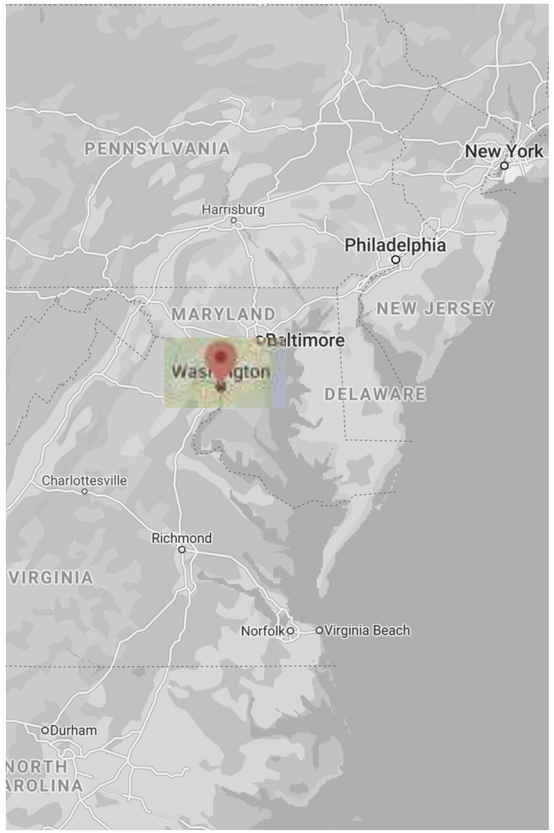
- **Methodology:**
- 1. Studying the general profile of the city through location analysis, geographic conditions, demographic study, density pattern and evolution over time
- 2. Research and analysis of historic maps and proposals for city planning
- 3. Understanding urban renewal and regeneration through study of current conditions
- 4. Using google maps, GIS data and satellite imaging to understand the different street patterns, textures and road network
- 5. Unlearning the DNA of the city through detailed mapping, morphology study and pattern identification
- 6. Photo documentation of imageable city elements using the google street view.
- 7. Visualisation of streets from the perspective of people- through sketches, photos and figure ground maps
- 8. Evaluation of good city form
- 9. Critical analysis of future proposals for the city

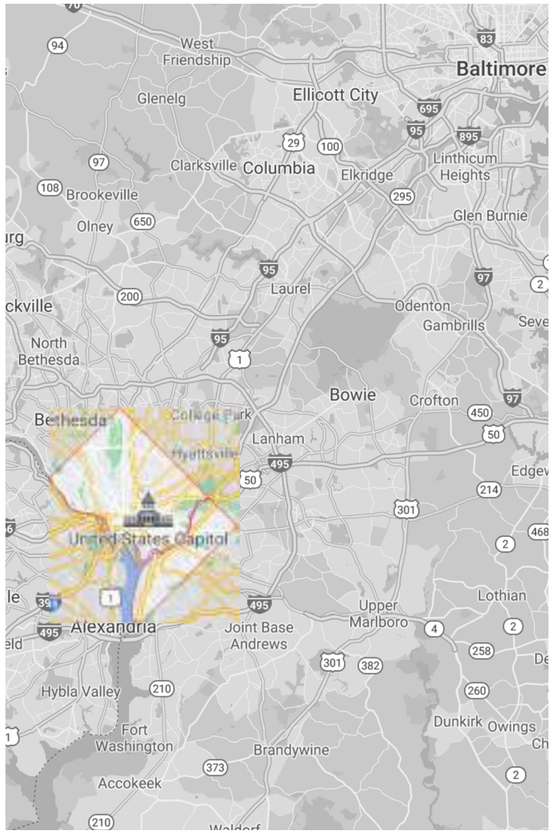
WASHINGTON DC

URBAN MORPHOLOGY

INTRODUCTION ABOUT WASHINGTON DC

LOCATION & INTRODUCTION

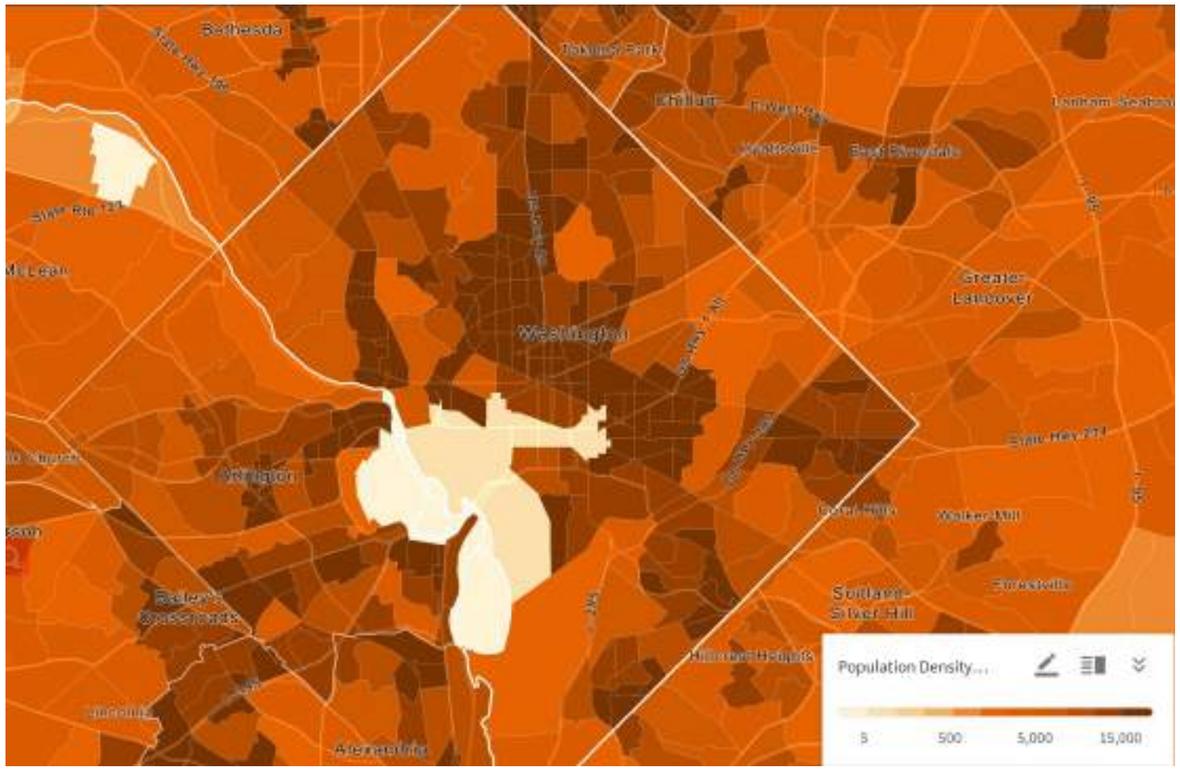




COUNTRY STATE CITY

Washington, District of Columbia was established in **1790**. It is the **capital city** of the United States. Its geographic location was discussed by **James Madison** and **Alexander Hamilton** at a dinner invited by Thomas Jefferson. However, its actual location was by President **George Washington** confirmed. Washington, D.C. was planned by French-American architect **Pierre Charles L'Enfant** in **1791**. He designed Washington’s roads into a chessboard shape, interspersed with several oblique streets, and at the intersections where the streets meet. Plan several circles and rectangular squares. At the beginning of its establishment in **1800**, the population of Washington, D.C. was approximately **8100**. As of **2019**, Washington's permanent population has exceeded **700,000**, with an average population density of approximately **11,506/sq mi**.

POPULATION DENSITY

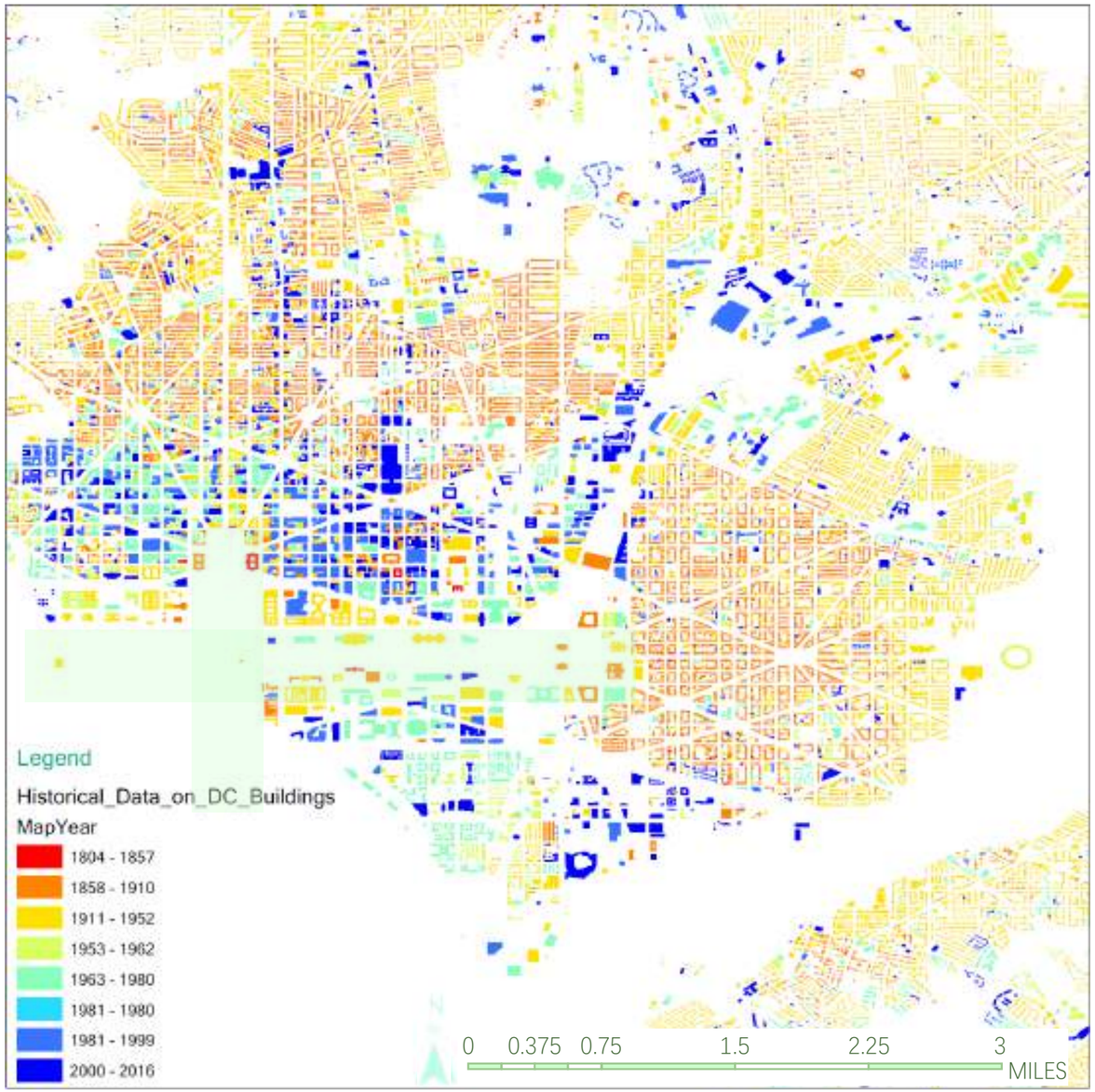


Within the District of Columbia, the Population Density is 11,330 per square mile. This equates to the entire population of D.C being 692,683.

This population density stays pretty consistent due to the consistency of jobs within Washington D.C.

These types of housing options like the row houses are what allow for such a dense urban area.

URBAN DEVELOPMENT& RENEW



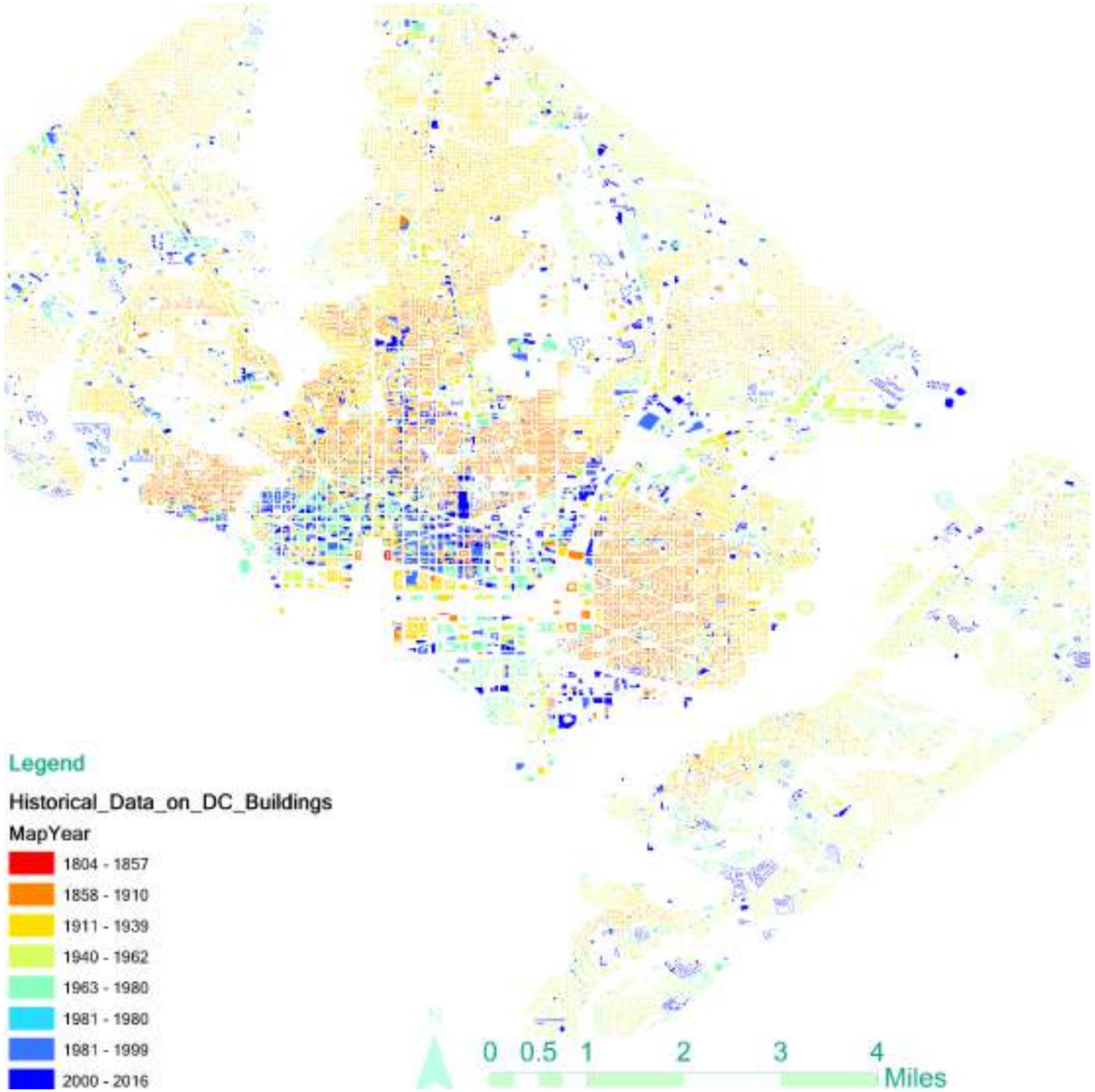
1814 The Burning of Washington: In August 1814, the British burned various government facilities, including the White House and U.S. Capitol, as part of a brief occupation of Washington, DC during the war of 1812. James Hoban, the original architect of the White House, oversaw its rebuilding, while Benjamin Latrobe oversaw major repairs to the damaged U.S. Capitol.

1945 District of Columbia Redevelopment Act: This act began the process of urban renewal in the city. Renewal plans ultimately cleared 400 acres in the city's southwest quadrant that resulted in the development of new apartment buildings and federal offices, but at the cost of the forced removal of 23,500 people and the destruction of numerous historic buildings.

1953 Urban Renewal: The Redevelopment Land Agency's invitation to developers to submit plans for Southwest Washington began the process of land assembly, building demolition, site preparation, and land disposal that resulted in the displacement of thousands of Washingtonians and the destruction of numerous historic structures.

1970 Modernist Federal Architecture: The late 1960s/early 1970s saw construction of several major federal offices downtown, including buildings for the U.S. Department of Housing and Urban Development (1968), Federal Aviation Administration (1963), FBI (1974), Hirshhorn Museum (1974), U.S. Department of Labor (1975), and the Consumer Financial Protection Bureau (1976).

URBAN DEVELOPMENT& RENEW

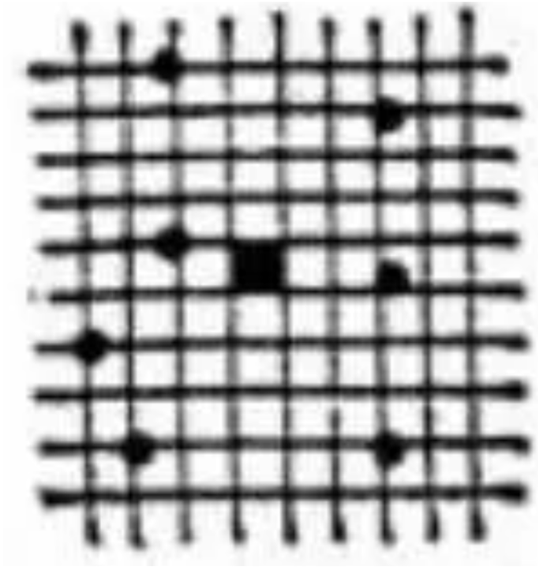


1950 Population Peak: Washington's population peaked at just over 800,000. Government jobs and the Great Migration from the South attracted African-Americans. Washington became a majority black city from the 1950's through 2011.

The city needs a variety of old buildings to cultivate the first mixed-use of diversity and the second use. In particular, they need old buildings to incubate new primary uses. That is to say, old buildings can provide shelter for many middle-to-lower or low-output enterprises. **To achieve a mixture of multiple types of enterprises, enhance diversity, and provide people with different levels of needs to meet.**

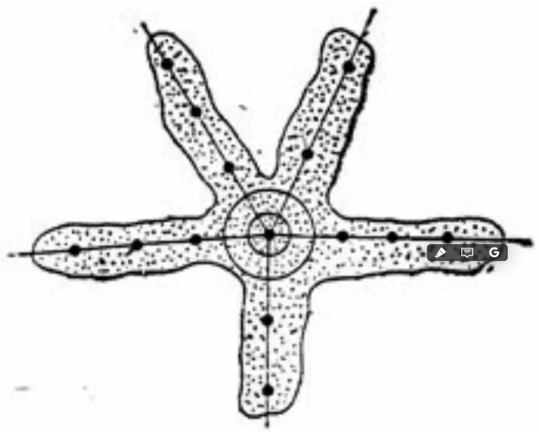
URBAN ROAD FORM ABOUT WASHINGTON DC

ROAD NETWORK SYSTEM



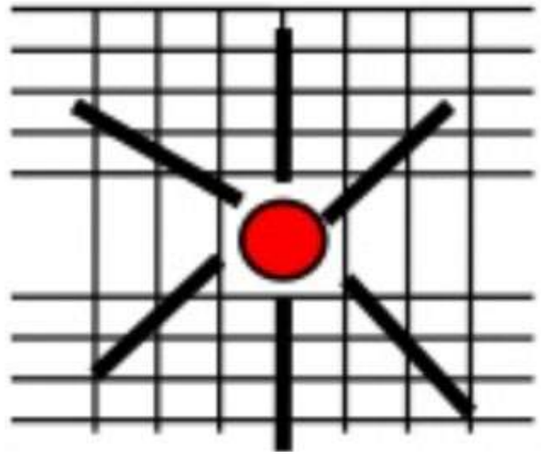
GRID STYLE

Advantages: It is convenient to arrange various buildings, can adapt to the expansion of the city in all directions, and is conducive to the development of automobile traffic
Disadvantages: The layout is easy to be monotonous, and it is not easy to form a significant and concentrated central city



STAR STYLE

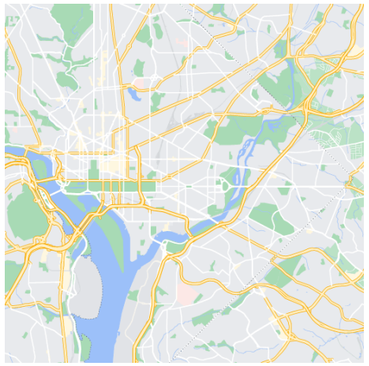
Advantages: to ensure the quick connection between the main attraction points and easy to form urban landscape nodes at road intersections.
Disadvantages: The road junction is not convenient for traffic organization and management.

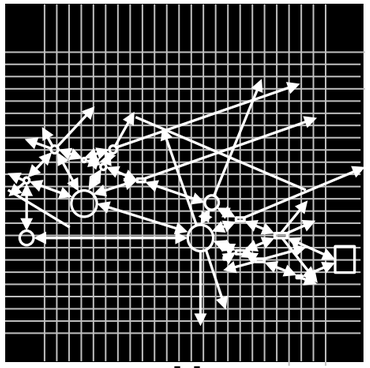


BAROQUE STYLE

It has a unique commemorative significance, is convenient to arrange various buildings, can adapt to the city's all-around expansion, is conducive to the development of automobile traffic, ensures the rapid connection between the main attractions, and is easy to form urban landscape nodes at road intersections.

ROAD NETWORK SYSTEM COMPARISON





WASHINGTON
DC

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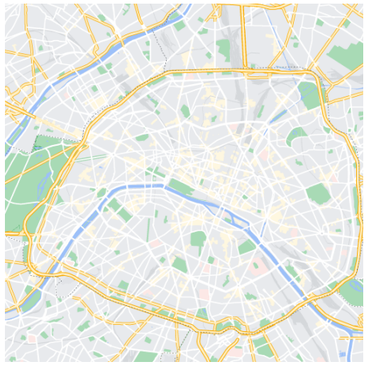
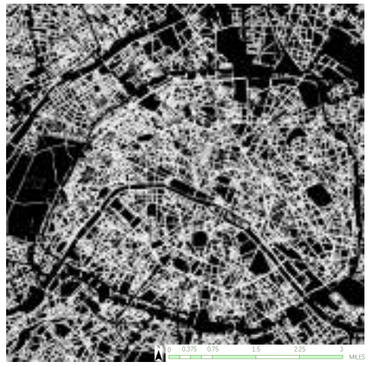
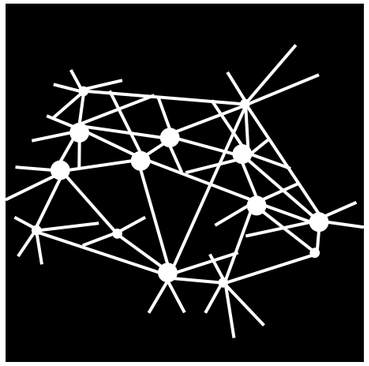
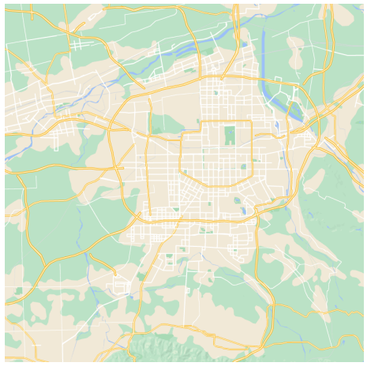






PARIS



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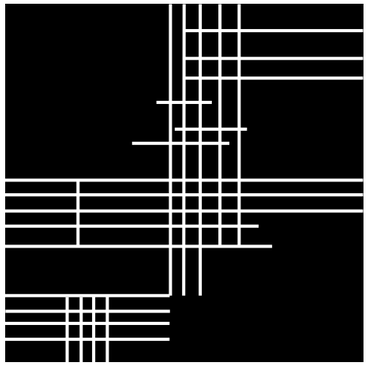

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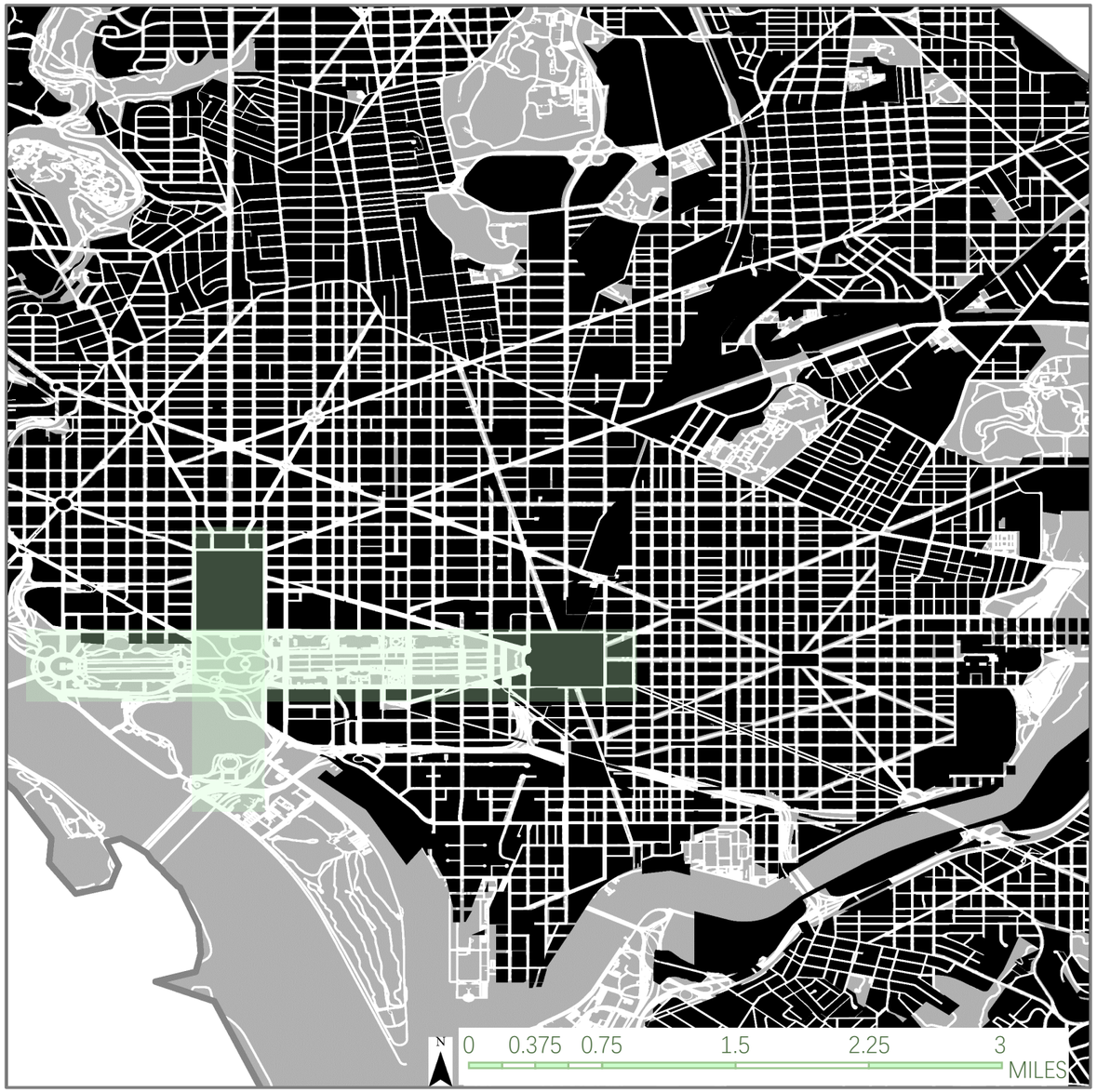
ROAD DESIGN CONCEPT



Washington's axis consists of a longer east-west axis and a shorter north-south axis, which is a typical "Latin Cross" structure.

L'Enfant's plan was modelled in the Baroque style and incorporated avenues radiating out from rectangles, providing room for open space and landscaping. His design also envisioned a garden-lined "grand avenue"

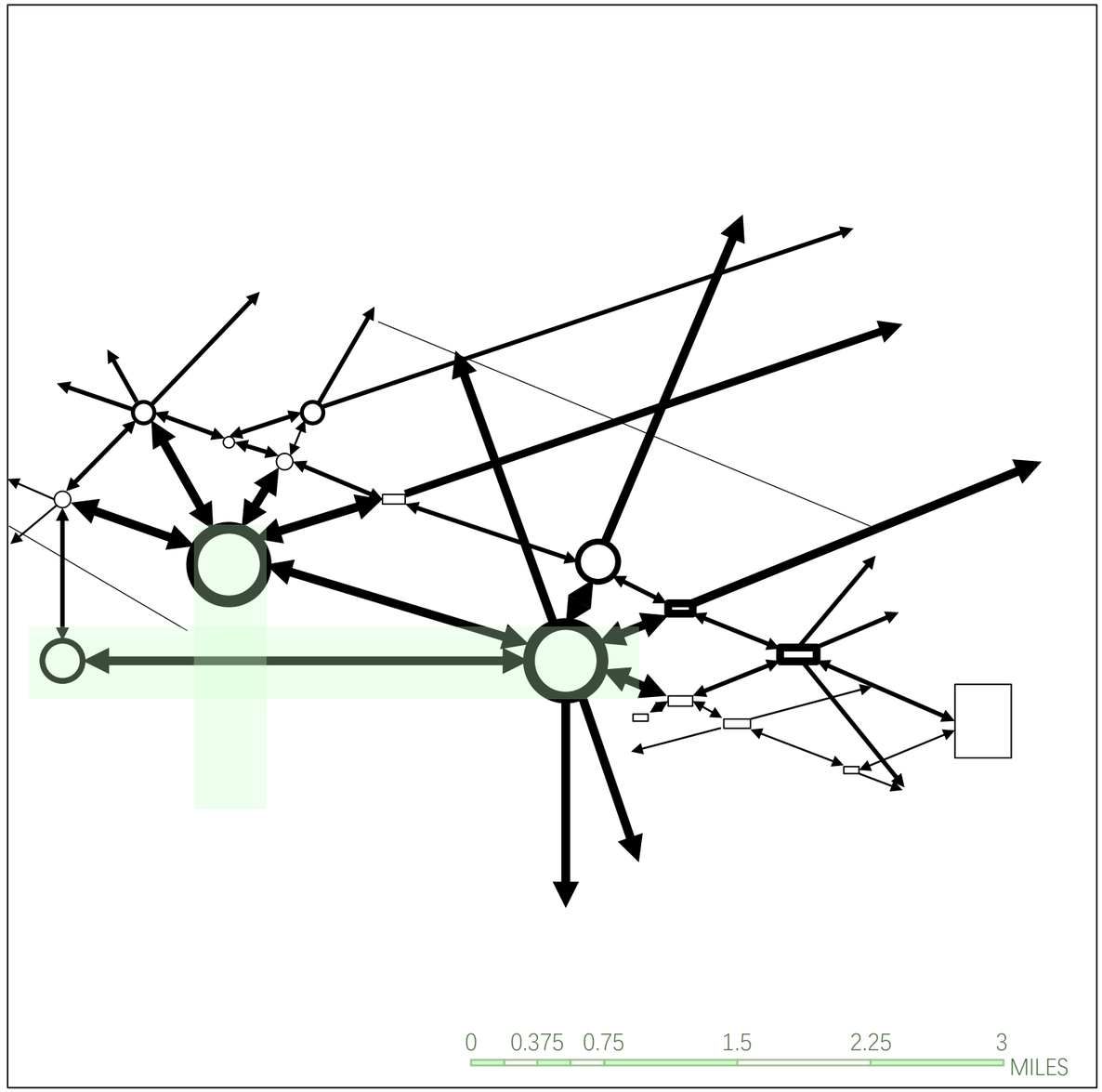
Baroque road network: The Baroque road network (or simply the axis diagonal road network) differs from the graphic road network in that the axis system and diagonal lines are very prominent (the rest of the road network is the ordinary grid) rather than the overall pattern of the graphic road network; For example, although Canberra also emphasizes the axis, but its overall pattern sense is more striking.

The Baroque road network was first developed in cities such as the capital as a way to show momentum. Only Washington has a purely baroque road network for the entire city, and in other cities, baroque elements appear only in parts or segments of the city.

Washington is full of traffic, and there are occasional traffic jams, but generally the traffic flow is relatively smooth, and the roads are not blocked.

1, Flexible bus right of way
2. Developed subway system
3. Reasonable road design
4. Adequate parking space
5. Good "Luther" of drivers

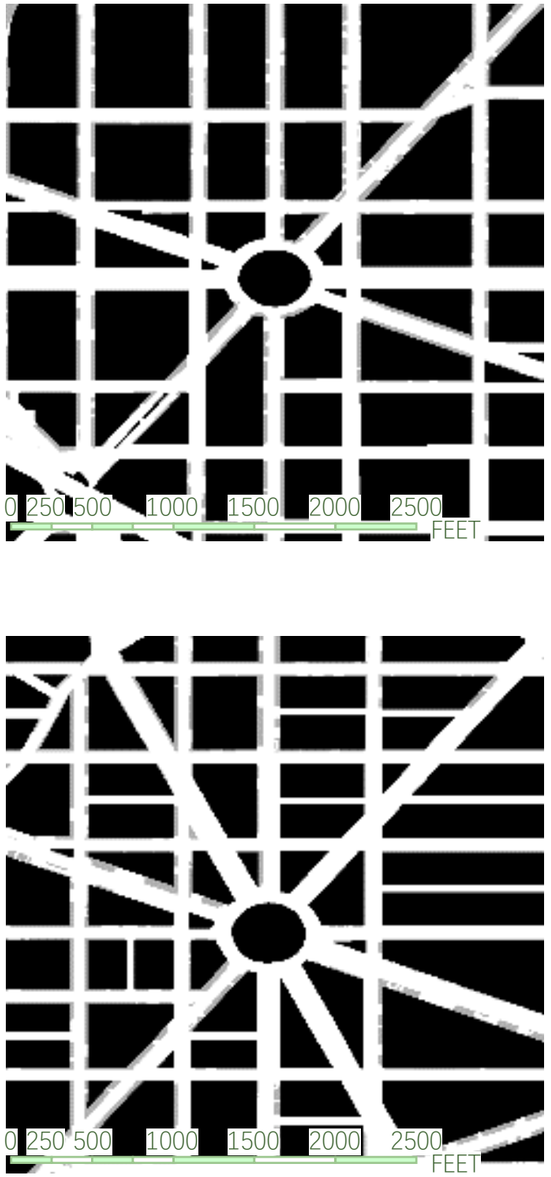
ROAD NETWORK SYSTEM ANALYSIS



The star road radiates outward from the White House and Congress, and each node has a unique commemorative significance. Ensure the rapid connection between major scenic spots, and easily form urban landscape nodes at road intersections.

Roads are the dominant elements of a city. The intersection of roads forms nodes, whose influence radiates to form regions, which are defined by boundaries, while markers are scattered in the city to deepen people's impression of a specific place.

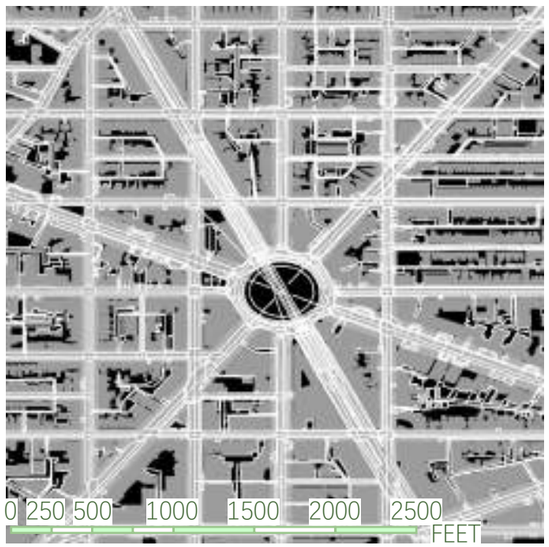
SYSTEM CRITICAL JOINT



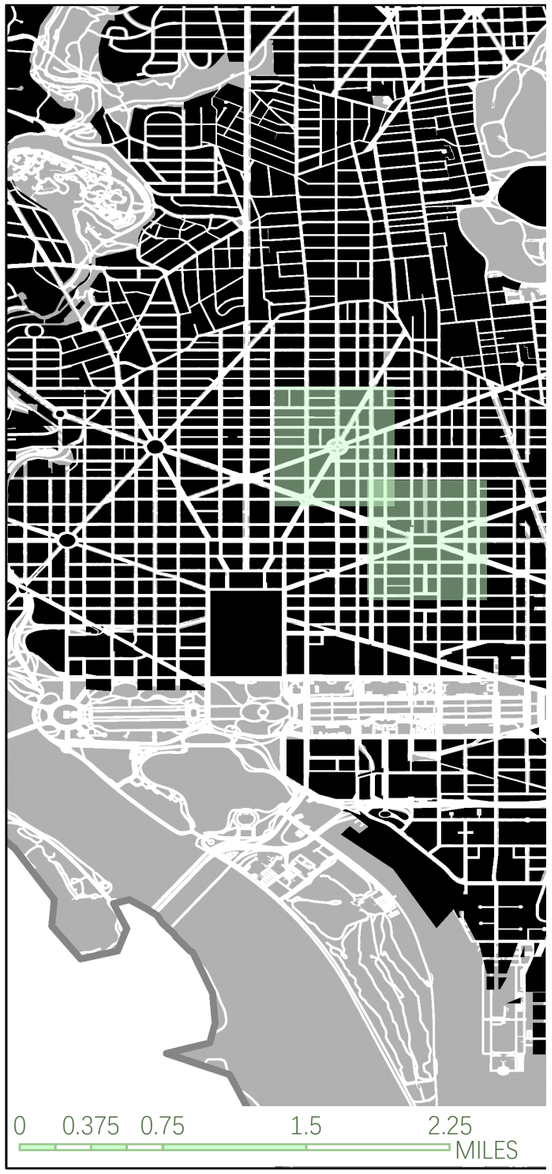
SYSTEM CRITICAL JOINT

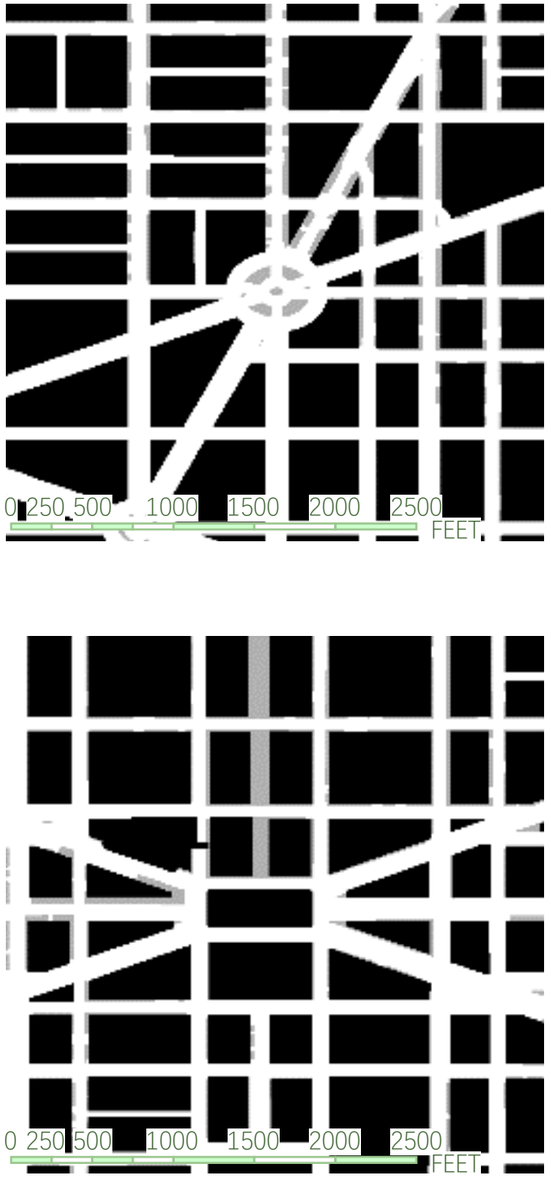
Washington Cir, NW

Dupont Circle



SYSTEM CRITICAL JOINT

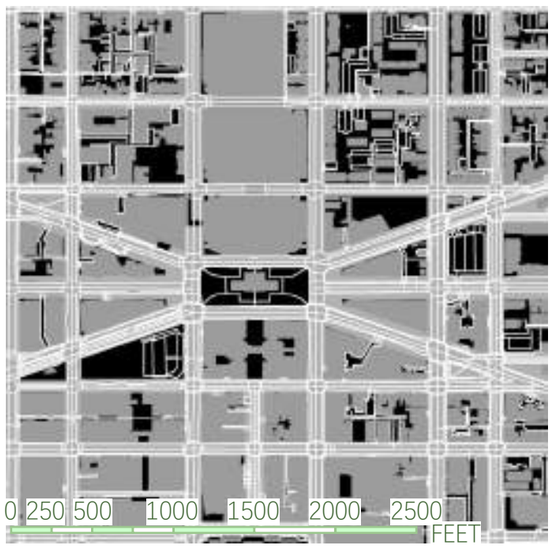




SYSTEM CRITICAL JOINT

Logan Circle

Apple Carnegie Library



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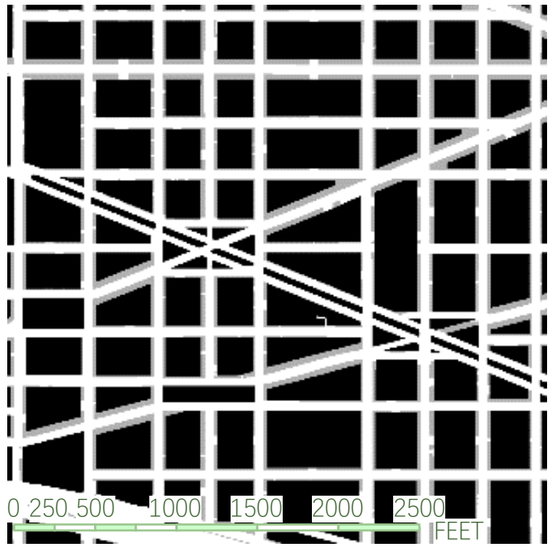
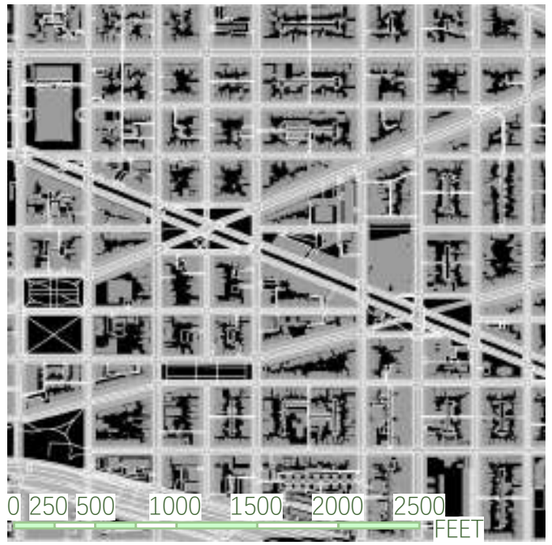
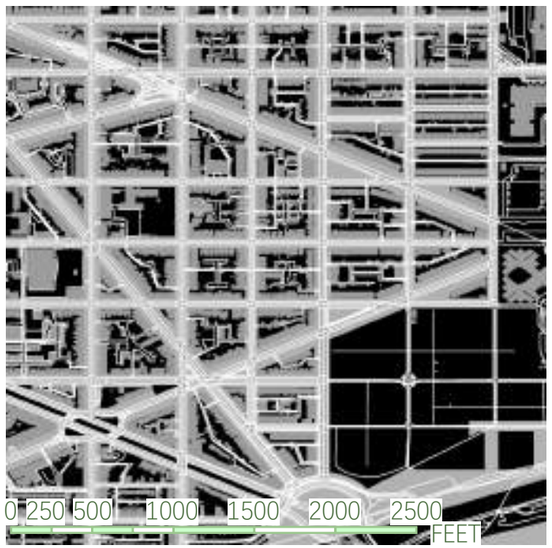


SYSTEM CRITICAL JOINT

Capitol Hill



DC Central Detention Facility



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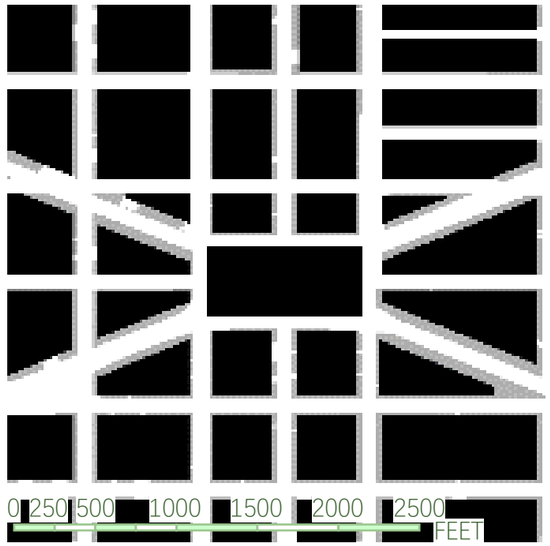
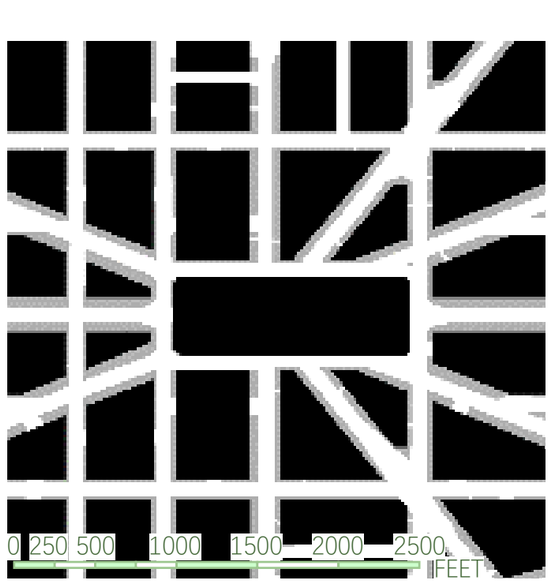
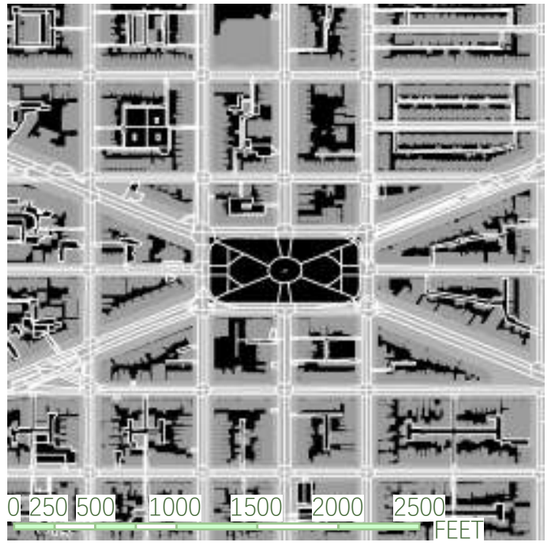




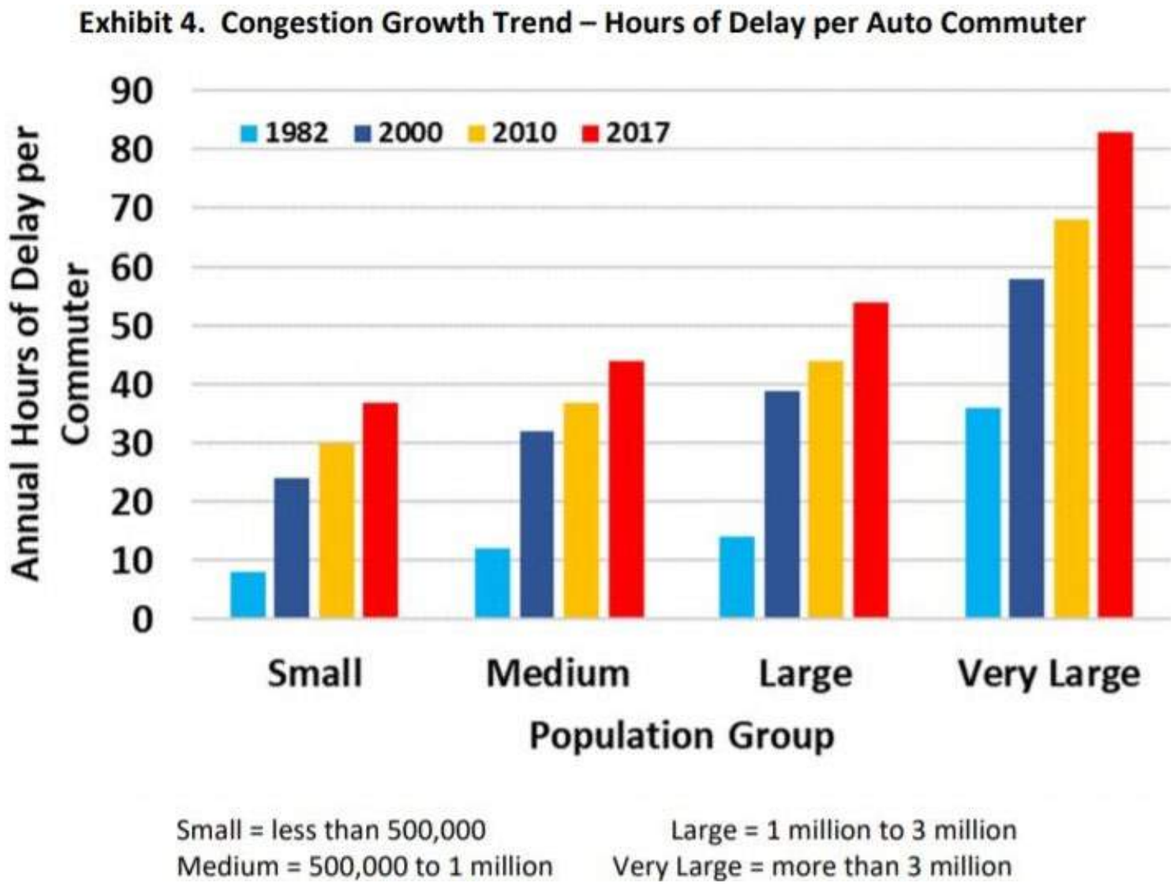
SYSTEM CRITICAL JOINT

Stanton Park



Lincoln Park

SYSTEM CONGESTION ISSUES

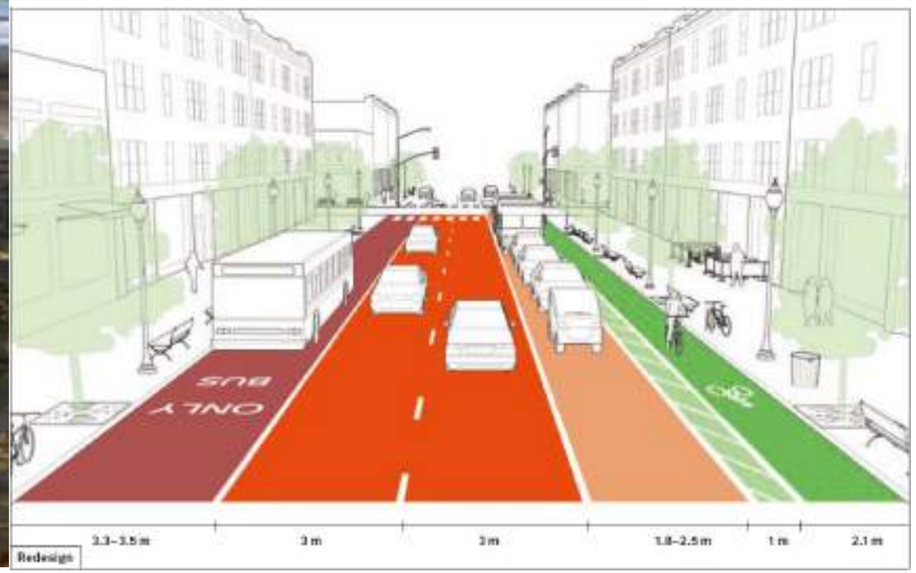


Washington today is viewed as 3rd most traffic and according to the Washington Post “In the Washington area, commuters experienced about 248 million hours of delays.”

All of this congestion also can cause environmental effects because it states that “Road congestion means the area uses about 90 million gallons of extra fuel.”

Also while looking at the 2019 Urban Mobility Report you could see that over the past years the price that congestion cost per auto commuter is steadily rising along with the amount of wasted fossil fuels that are burned every year.

PROBLEM SOLVING METHOD



In terms of physics, build many bicycle lanes and sidewalks, advocate green travel, and use public transportation or bicycle travel. Improve the time of each traffic light at intersections to increase the passing rate, improve the traffic rules of equal lights to avoid traffic jams in four directions at the same time, improve the continuity of straight roads to reduce lane changes, and improve the setting of loop lines and high-speed entrances and exits to reduce local congestion.

In terms of policies, lower public transportation taxes, lower taxi prices, increase in-city parking fees and adopt a leveraged and high-cost parking fee system on urban streets. The road congestion fee is collected, and the high road tolls are adopted. Every motor vehicle that enters the urban area must pay the fee (except public transportation).

ARCHITECTURE DEVELOPMENT ABOUT WASHINGTON DC

1910 CAPITAL HEIGHT LIMIT ACT

Passed by Congress, the act was key in establishing the national capital's horizontal character by setting maximum building heights generally controlled by street widths. The height limit on residential streets is 90 feet. Height limits on commercial streets is the width of the adjacent street plus 20 feet, with a general maximum height limit of 130 feet (except for 160 feet along portions of Pennsylvania Avenue).

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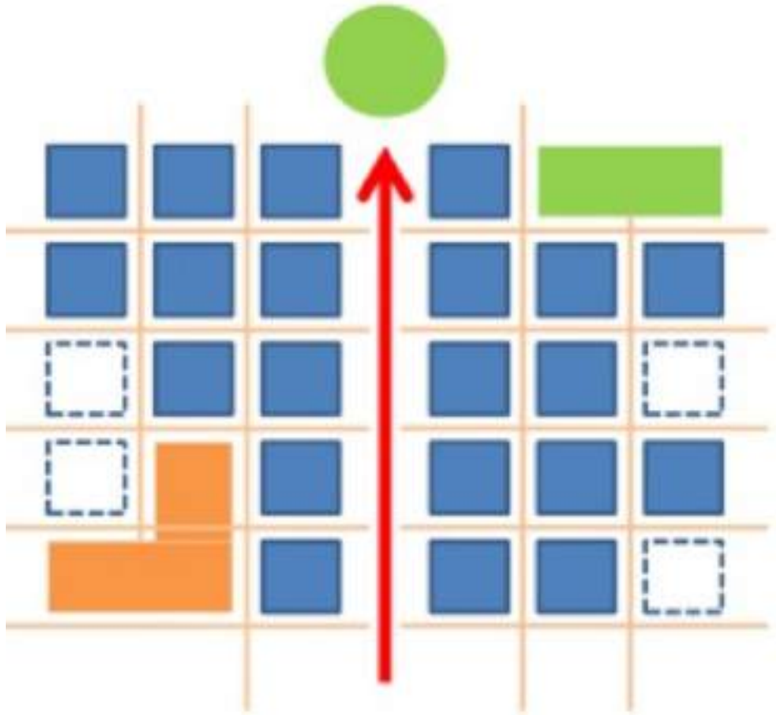
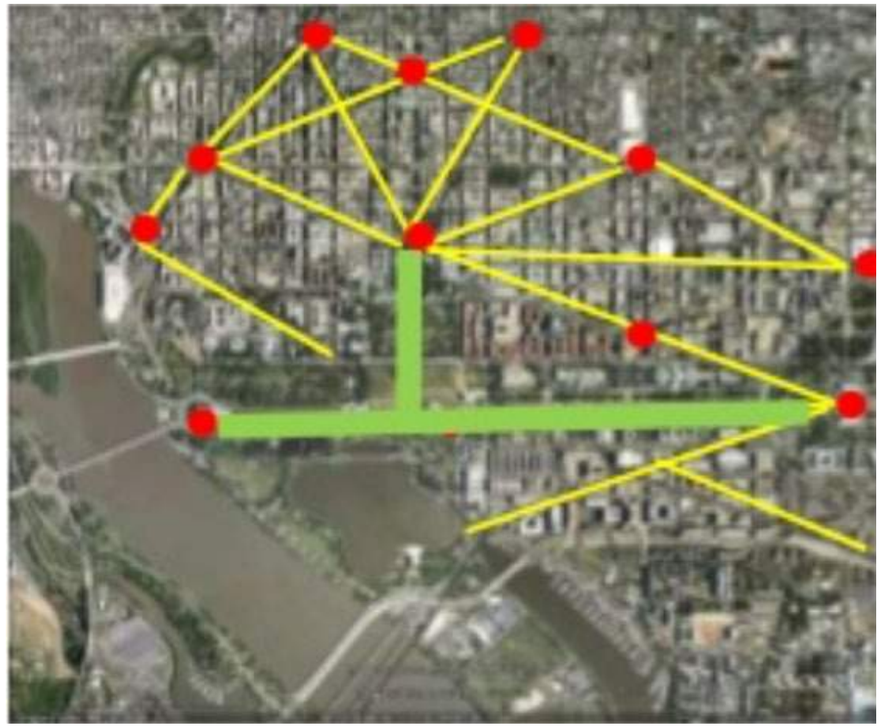
CITY FORM – DESIGN FOR POWER

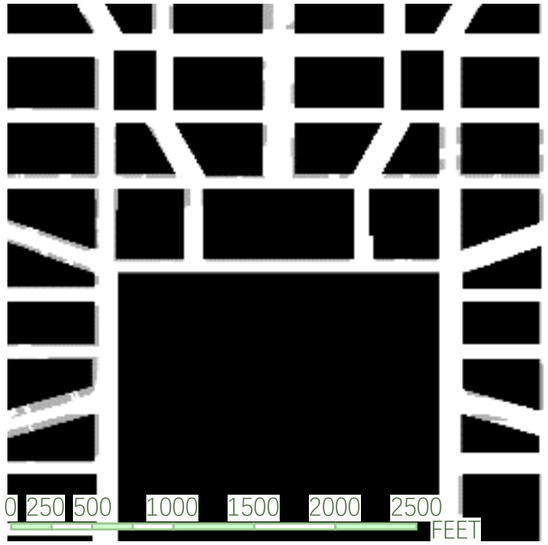


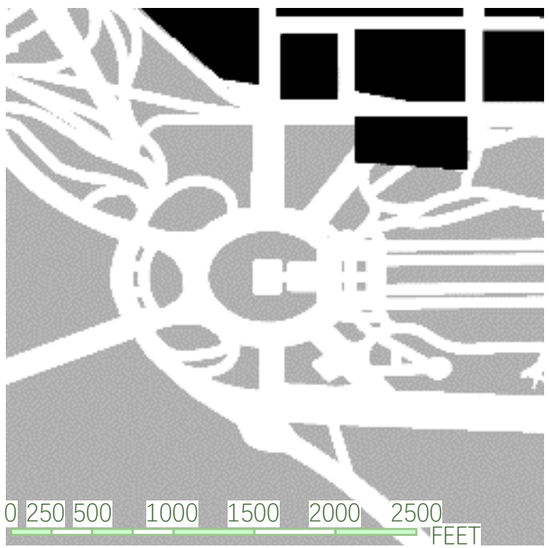
Grid is imposed on the existing format. In nature, we do not find the right angles and straight roads. It is enforced to show the power.



The urban design uses the topography precisely, with the Capitol Heights as the symbol, designing the vertical and horizontal two verticals. The main axis is east-west, with Congress as the centre of the city and the presidential palace (the White House) as the focus on the north and south. Washington, especially Capitol Heights, is built at the two intersections. Because of the large green space and water surface, the entire space is open, stretched and lively, Reflects the nature and theme of the city.

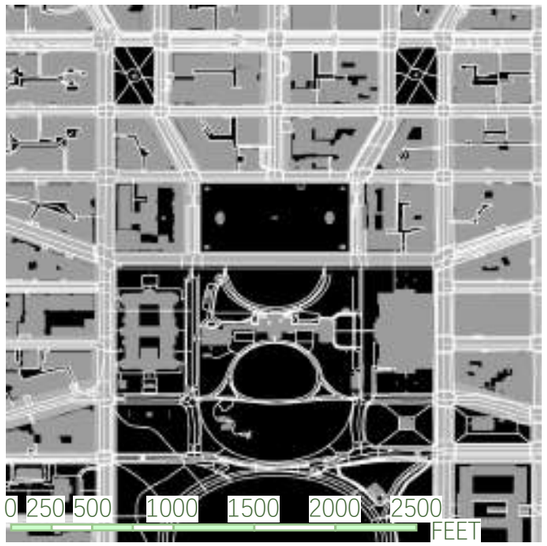
URBAN CRITICAL LANDMARK



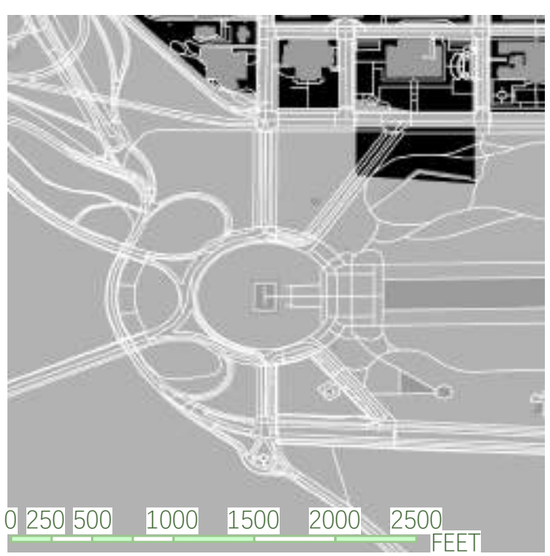


URBAN CRITICAL LANDMARK

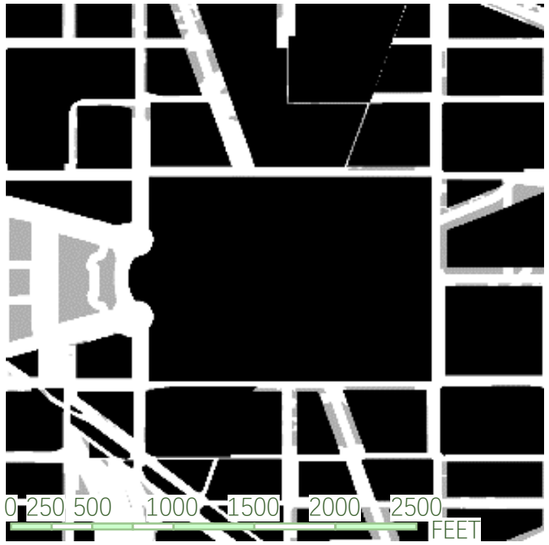
The White House



Lincoln Memorial

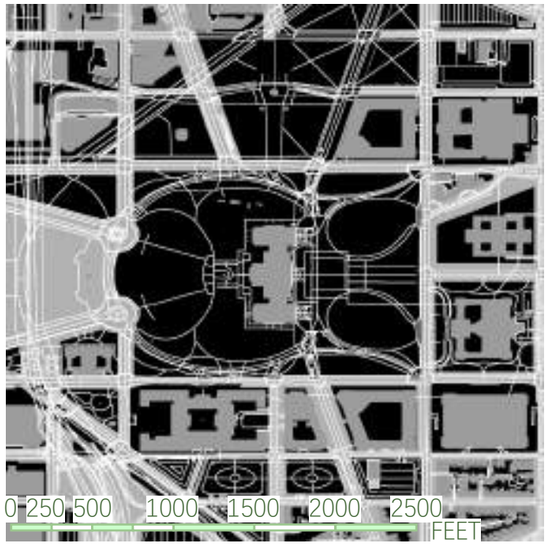


URBAN CRITICAL LANDMARK

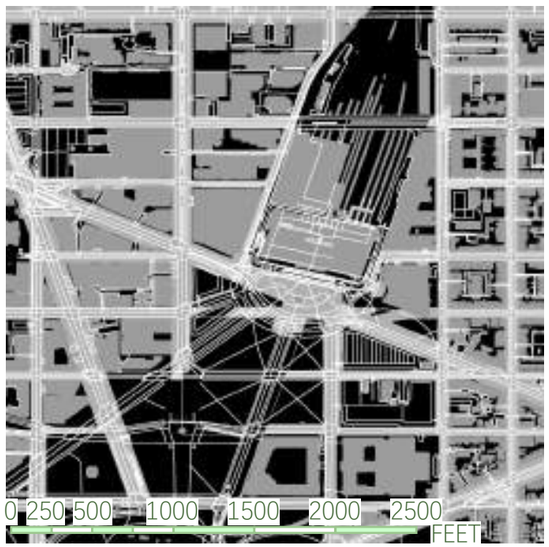


URBAN CRITICAL LANDMARK

United States Capitol



Washington Union Station



A GOOD CITY FORM

The form and content of Washington's urban layout in the United States have reached a high degree of unity. The entire spatial layout is open, stretched, and lively, reflecting the city's nature and theme. It is fully equipped with:

Vitality: Here, Kevin Lynch uses the literal meaning, that is, the protection and support of the city's residents' physiological functions, including health, safety, environmental diversity, etc.

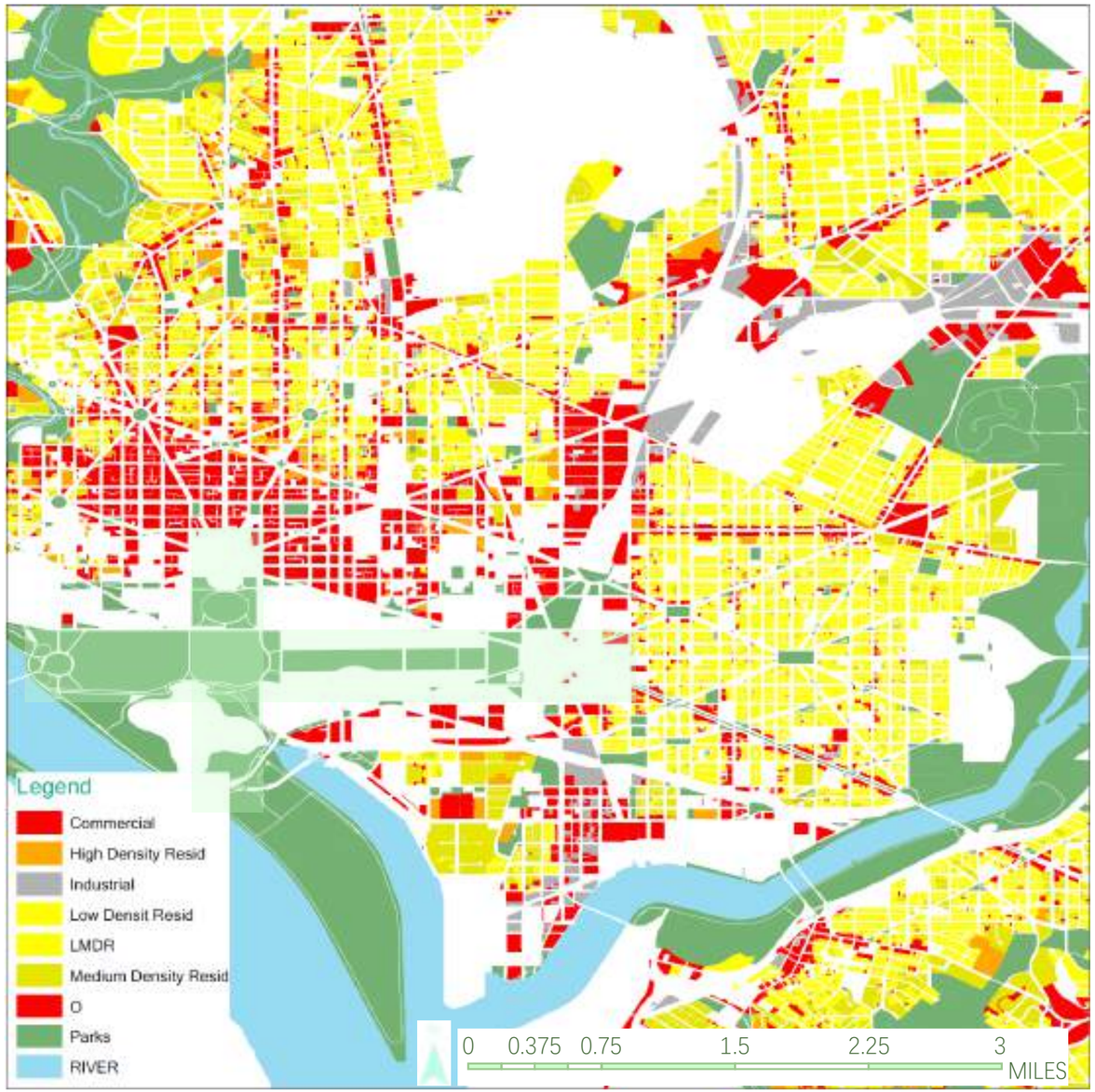
Sense: It can be clearly sensed, with recognition in time and space, in line with residents' values and cognitive habits, such as the sense of place and spatial recognition.

Fit: The city's time and space characteristics conform to its residents' behaviour patterns, which is functionally easy to use and efficient.

Access: The number and diversity of people, activities, resources, services, information, and locations that an individual can obtain.

Control: Users can control the creation, repair and management of spaces and activities.

URBAN TEXTURE – LAND USE



Washington's commerce is distributed from the city center along both sides of the radial road, and the industry is mainly distributed in the northeast corner of the city.

People can extract structure and personality from the surrounding environment.

The physical environment of cities is not the same. Still, some basic elements of urban imagery, such as roads, regions, etc. resident can compare the strength and effectiveness of these elements horizontally.

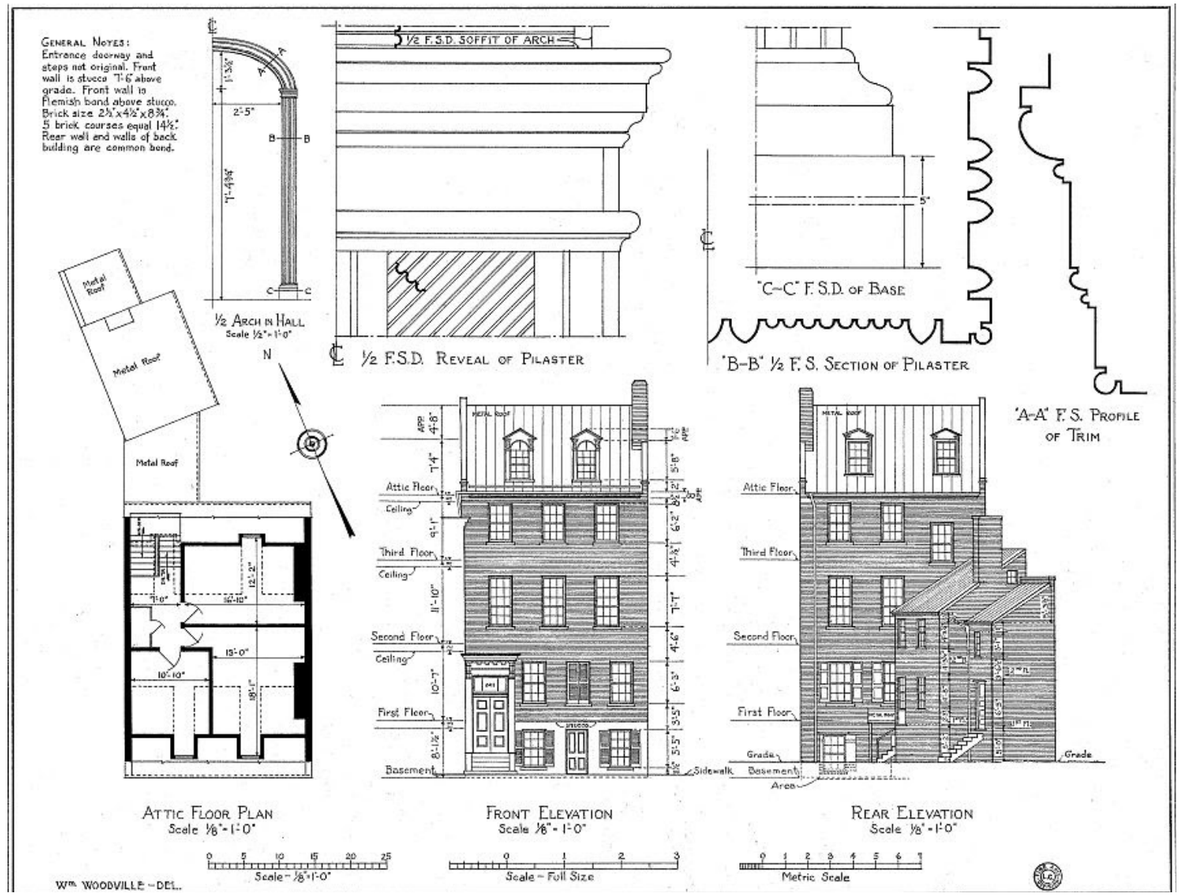
Spatial breadth is significant because it enables the observer to be able to clearly perceive the city's elements and the relationship between himself and the city.

The landscape features of the city are pleasant (water surface, vegetation, etc.).

The social and economic status can also affect people's perception of the city and even divide it into areas such as "upper-class residential areas" and "lower-class shopping areas".

Continuous and clear urban imagery can help us organize complex urban activities.

ROWHOUSE HOUSING BUILDING TYPOLOGY

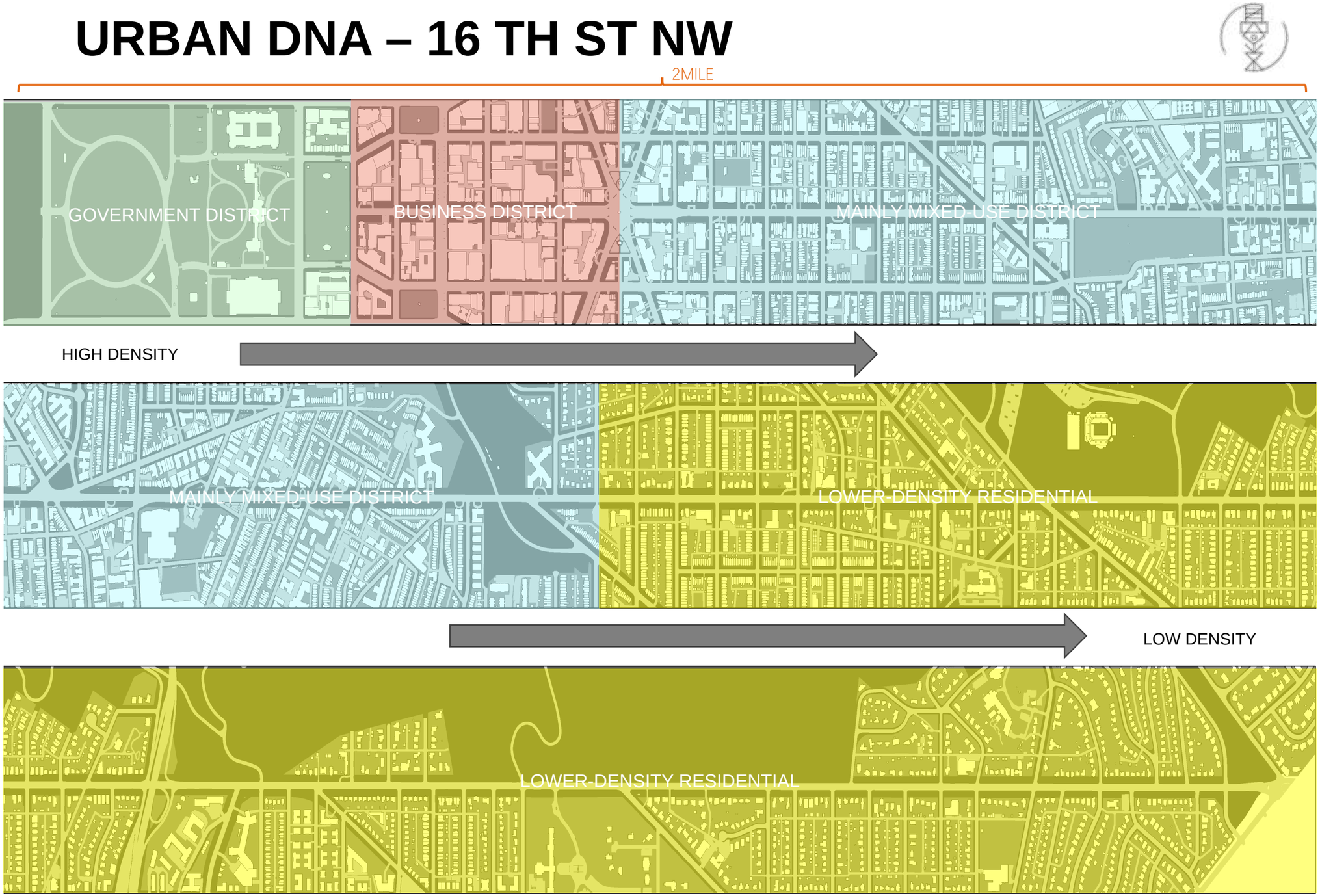


Rowhouse play a large effect in the Urban Fabric of Washington D.C, lining streets in response to City Constraints.

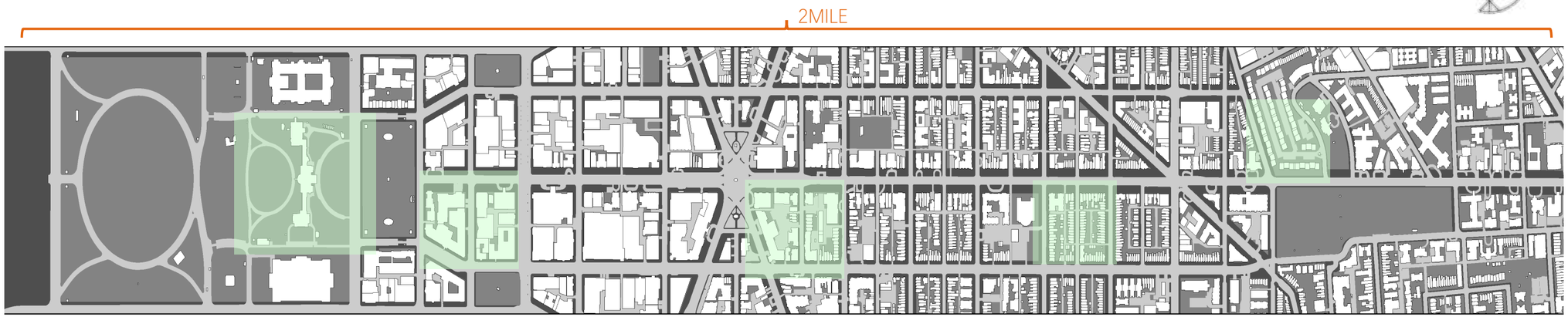
Limits to this type of housing include the fact that they only have street parking, but on the positive side it has great access to the nearby amenities.

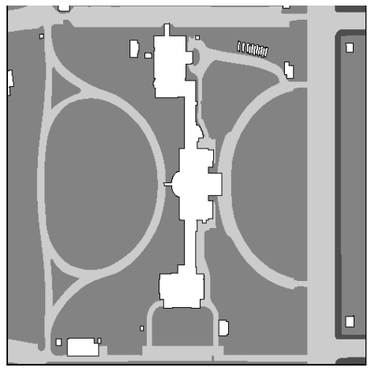
Main of the positives for this type of typology come from their proximity to shops, amenities, public transit, and the gridded system mixed with alleyways.

URBAN DNA – 16 TH ST NW



URBAN DNA – 16 TH ST NW

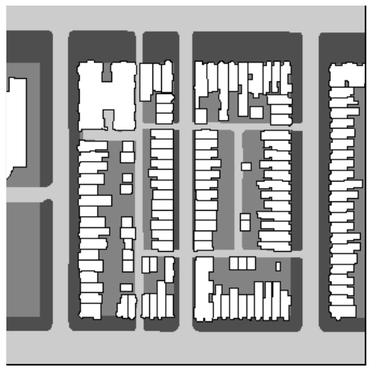




White House

Comprehensive building

Comprehensive Building + Center Parking Lot

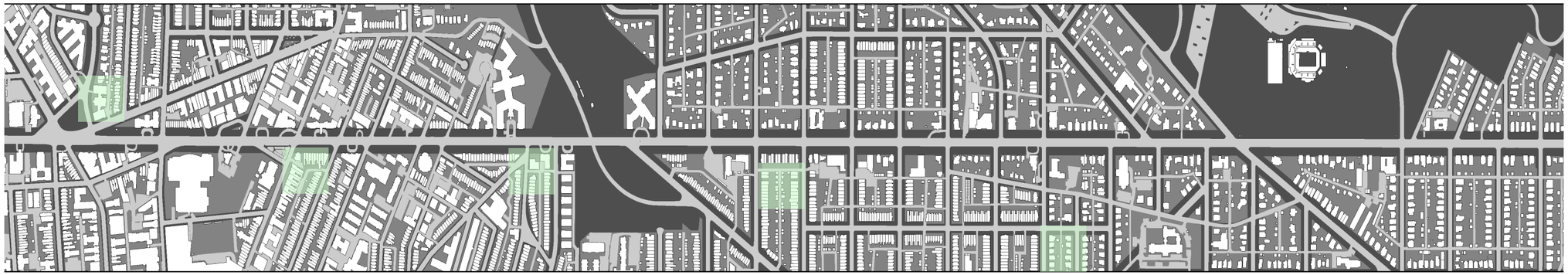


Townhouse

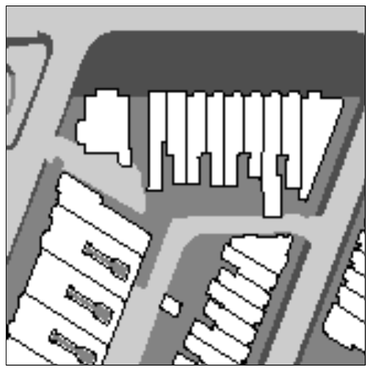
Apartment

URBAN DNA – 16 TH ST NW

2MILE



Townhouse



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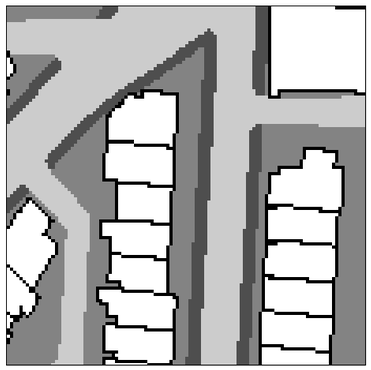
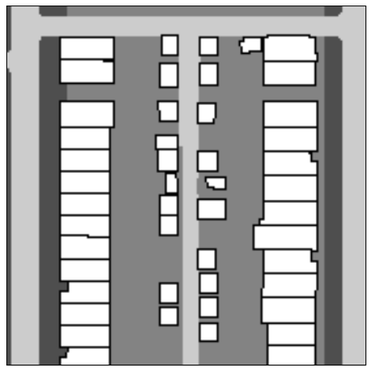
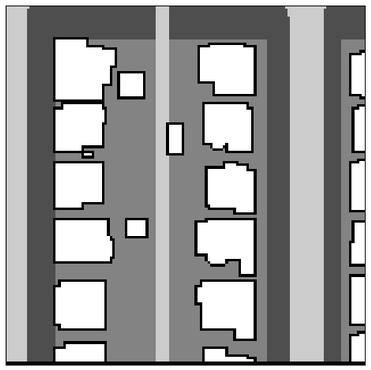


Townhouse



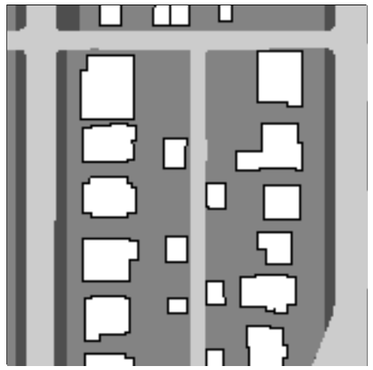
Townhouse + Back Yard



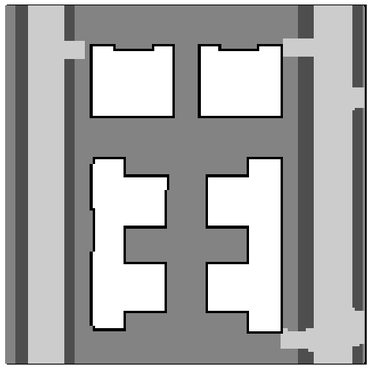
Detached Single Family Residence + Back Yard

URBAN DNA – 16 TH ST NW

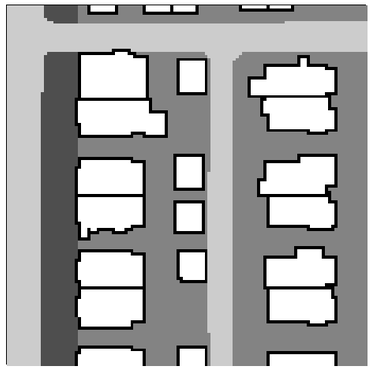
2MILE



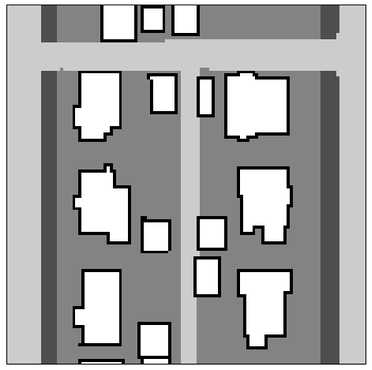
Detached Single Family Residence + Back Yard



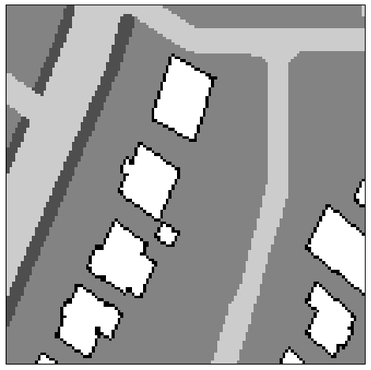
Apartment



Attached Single Family Residence + Back Yard

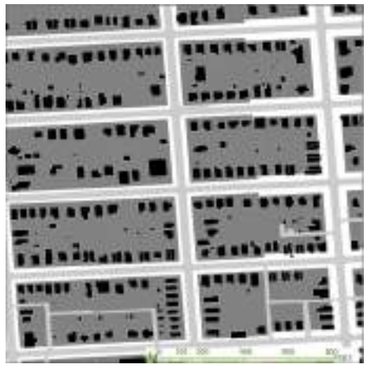


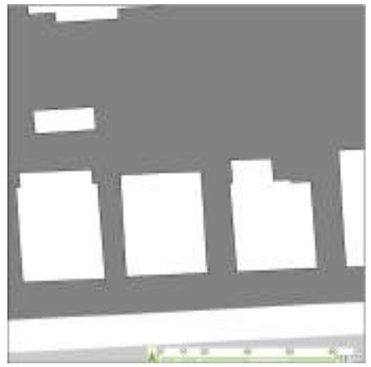
Single Family Residence + Back Yard + Front Yard

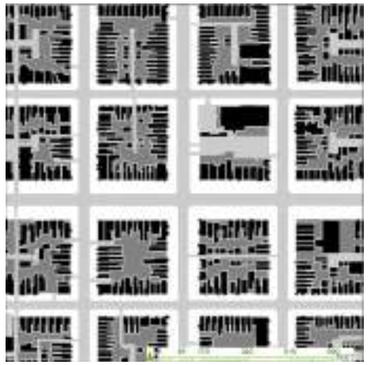


Multi- Family House + Back Yard +Front Yard

CITY RANDOM SELECTION FORM







URBAN FORM

CONCLUSION ABOUT WASHINGTON DC

SUGGESTED CHANGES FOR CITY TYPOLOGY

Exhibit 5. Percent of Delay for Each Day

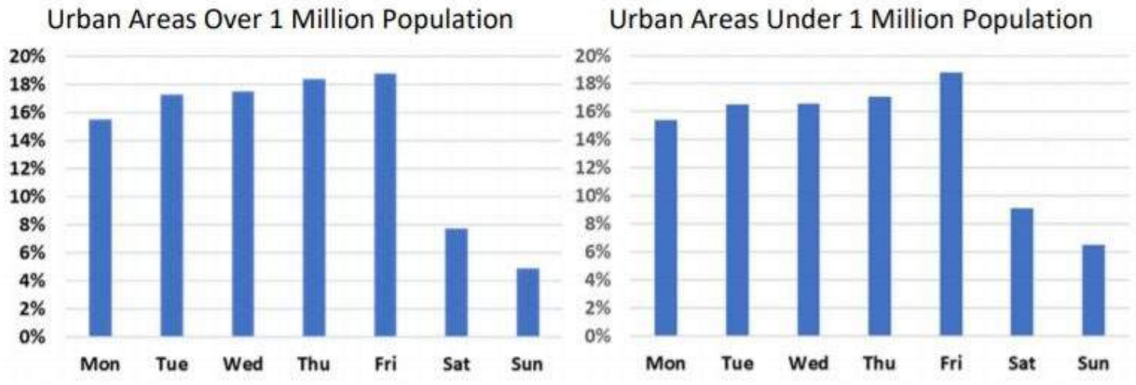
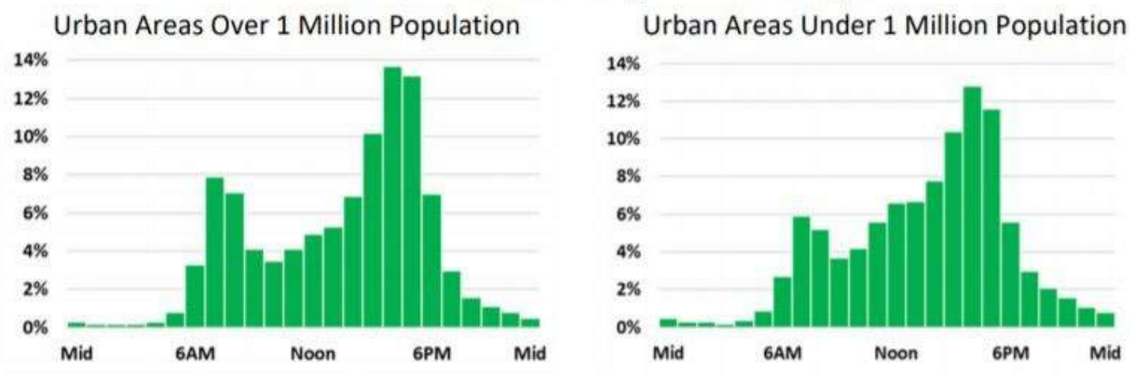


Exhibit 6. Percent of Delay for Hours of Day



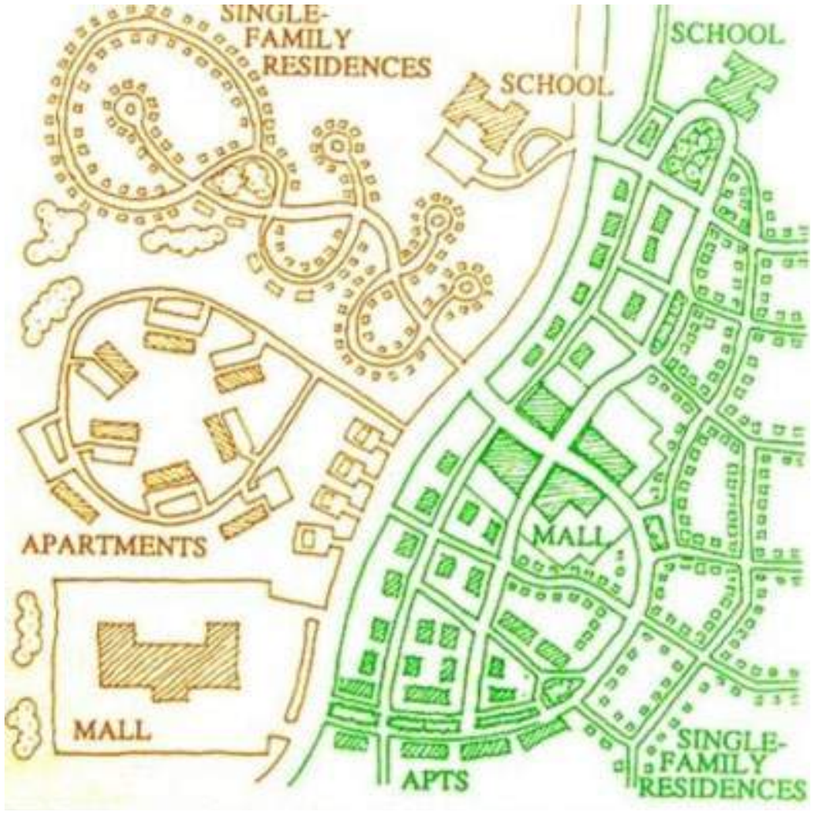
In the 2019 Urban Mobility Report they specify different solutions that may help alleviate some of the congestion:

One idea is to do a lot of low-cost improvements that are able to be rapidly deployed such as rapidly removing crashes, better green light system, and improved intersection designs.

Adding capacity in critical corridors is another goal they would like to accomplish.

Diversifying the development patterns seems like it will play a huge role in how to fix this issue of congestion along with helping the economic development within regions.

CONCLUSION



Through the above analysis, we find that Washington is a vibrant city. We believe that the main reason why the city is vibrant is because of its excellent physical structure. Jane Jacobs believes that four conditions are indispensable if there is to be a rich diversity in the streets and areas of the city:

First, a region's main function and as **many internal regions as possible must be more than one**, preferably more than two. These functions must ensure the existence of the flow of people. Whether it is people who go out according to different schedules or people who come here for different purposes, they should use many common facilities. There are a large number of mixed-use buildings or mixed-use blocks in downtown Washington DC. These mixed-use buildings or blocks have brought vitality to the city.

Second, most of the **street segments must be short**. That is, people can easily turn them on the street. The road network in Washington, DC, is very dense. This dense and interconnected road network has greatly increased the number of commercial points. The convenience they provide will also greatly increase, which will produce good economic effects and public life.

Third, **buildings in a region should be of various colors, with different ages and conditions,** and should include an appropriate proportion of old buildings because old buildings can provide shelter for many middle-to-lower or low-output enterprises. To achieve a mixture of multiple types of enterprises, enhance diversity, and provide people with different levels of needs to meet. The building renewal speed of the Washington DC business district is breakneck. Still, there are many historical buildings scattered outside the business district, especially in the place where it is connected with the business district. A large number of historical buildings and modern buildings are mixed to make Washington DC unique. These historic buildings can provide more choices for young people who choose to develop their careers in Washington.

Fourth, the **density of people's flow must be high enough**, regardless of the purpose of these people coming here. This also includes the flow of residents to an equal density. As of 2019, the population density of Washington is about 11,506/sq mi. This high density is one of the reasons why Washington DC is full of vitality.