Urban Economics of the Ideal City

A Thesis Presented for the
Master of Architecture
Degree
The University of Tennessee, Knoxville

William Taylor Brantley
August 2014

Copyright © 2014 by William Taylor Brantley

All rights reserved.

Acknowledgments

This thesis is a product of the advising, encouragement, and aid of many individuals. To not acknowledge their role in this document would be a gross oversight. First, I'd like to express the deepest appreciation to my family for their continued support and encouragement of my academic endeavors.

I would like to thank my committee chair, Mark Schimmenti, for his continued engagement throughout the design process. He pointed out the things that make great communities and made sure they were integrated into the project. I would also like to thank my committee members, T.K. Davis and Hansjörg Göritz, for their encouraging spirit, insightful critiques, and fresh ideas. Hansjörg removed the "blinders" helping me hone in on details without losing site of the big picture. T.K. provided me with a firm foundation in urban design. Always willing to roll out the trace paper, he brought expertise and enthusiasm to charrettes.

I would like to thank Avigal Sachs who offered direction and guidance in the preparatory stages of this thesis investigation. She always asked the right questions. I would like to recognize Tom Boehm who provided me with a foundation in real estate investment analysis and introduced me to urban economics. This thesis would certainly not be a comprehensive document if it wasn't for his class.

I would also like to thank Brian Spencer, Alan Gray, and everyone at SMP Architecture for providing me with resources and support. Brian has been a tremendous mentor offering direction and making sure that I had access to everything I needed to start the project.

Abstract

Infrastructure influences both depictions of the ideal city and economic models predicting urban growth. As the common variable, infrastructure investments could promote ideal city values within free market economies.

To preserve the countryside and natural lands infrastructure investments must encourage concentrated growth in cities. The city and countryside are codependent. An abstraction between the two zones will lead to the demise of both the city and the countryside. New urban infrastructure should relate to public spaces creating economic, cultural, and social value in dense development. This value is achieved by generating a multiplicity of connections, program, and places within the existing urban fabric.

Supporting and facilitating human activity, infrastructure has the ability to create place and suggest future growth. Infrastructure in American cities is often isolated and mono functioning. Constant widening of roadways along with investments in suburban infrastructure increases the supply of land available for development in the periphery of the city. The result is an uncontrolled, unplanned outward growth consuming valuable rural and natural lands. Expanding roadways to accommodate low-density sprawl is like telling a fat man to add another notch to his belt. This money should be used to invest in infrastructure that facilitates growth within the existing urban fabric. To ensure maximum value, this infrastructure should preform multiple uses and relate to public space.

A design study preformed in Pensacola, Florida tests the viability of this new infrastructure. As North America's first European settlement, Pensacola's

growth can be charted from the founding of the centralized historic city to the sprawling metropolitan area that surrounds it today. Implementation of water taxi and ferry systems will encourage dense development around existing harbors within the metropolitan area. A retrofit of Pensacola's post-industrial waterfront supports this system while simultaneously providing a recreational and cultural amenity for the city.

Table of Contents

1 | Introduction....1

2 | The Ideal City....3

Town and Country....3

Urban Transect....5

Charter of the New Urbanism....9

3 | Urban Economics....14

Classical Location Theory....14

Central Place Theory....17

Bid Rent Theory....24

4 | Infrastructure the Common Variable....30

5 | Pensacola as Study City....41

History and Development....41

Downtown Neighborhoods....57

Region....59

6 | Proposal....71

Principals....71

Program....72

7 | Design Implementation....81

Optimal Size and Structure of Local Government....81

Regional Infrastructure Plan....83

Retrofit of Post Industrial Waterfront....82

Museum to the Waterfront....88

8 | Conclusion....95

List of References....97

Vita....101

List of Figures

Figure 1 | Ideal City and Central Place Theory _ Léon Krier, O'Sullivan 1

Figure 2 | Urban Transect and Bid-Rent Model _ Author 2

Figure 3 | Congested System _ Léon Krier 4

Figure 4 | Cities within Cities _ Léon Krier 4

Figure 5 | Natural Transect _ James Wassel 6

Figure 6 | Ancient Chinese Transect _ Museum of Taipei, Duany Plater-Zyberk and Company 6

Figure 7 | Wedge Transect _ Duany Plater-Zyberk and Company 6

Figure 8 | Rural to Urban Transects _ Center for Applied Transect Studies, James Wassel 7

Figure 9 | Urban to Rural Transect _ Duany Plater-Zyberk and Company 8

Figure 10 | Delivered Price Curve _ O'Sullivan 18

Figure 11 | Market Extent _ O'Sullivan 19

Figure 12 | Market Areas _ O'Sullivan 19

Figure 13 | New Market Entrants _ O'Sullivan 20

Figure 14 | Impact of Technology on Market Area _ O'Sullivan 21

Figure 15 | Central Place Theory, Rise of System of Cities _ O'Sullivan 23

Figure 16 | Transportation Cost and Distance from CBD _ O'Sullivan 25

Figure 17 | Residential Bid-Rent Curve _ O'Sullivan 25

Figure 18 | Bid-Rent Model _ Author 27

Figure 19 | Ideal City and Central Place Theory _ Léon Krier, O'Sullivan 31

Figure 20 | Regional Greenprint of Pensacola _ Author 31

Figure 21 | Ideal Urban and Agricultural Bid-Rent Model _ Author 32

Figure 22 | Ideal Pensacola Rural to Urban Transect _ Author 32

Figure 23 | Sprawled Urban and Agricultural Bid-Rent Model _ Author 33

Figure 24 | Sprawled Pensacola Rural to Urban Transect _ Author 33

Figure 25 | Formation of the Anti-City _ Léon Krier 34

Figure 26 | Motorized Traffic _ Léon Krier 34

Figure 27 | Auto Centric City Decomposed into Zones _ Léon Krier 35

Figure 28 | City of the Pedestrian vs. City of the Motorcar _ Léon Krier 35

Figure 29 | Pensacola Residential Settlement Patterns - Urban Design Associates 37

Figure 30 | Downtown Pensacola Parking X-Ray _ Urban Design Associates 37

Figure 31 | 1907 Figure Ground of Pensacola CBD _ Author 38

Figure 32 | 2013 Figure Ground of Pensacola CBD _ Author 39

Figure 33 | Proposed Figure Ground of Pensacola CBD _ Author 40

Figure 34 | “City of Five Flags” _ City of Pensacola 41

Figure 35 | 1700 Spanish West Florida Coast Map _ Pensacola Historical Society 42

Figure 36 | 1764 British Map of Pensacola Bay _ Pensacola Historical Society 43

Figure 37 | 1764 Plan of British Fort George _ Pensacola Historical Society 44

Figure 38 | 1764 Plan of the Harbor of Pensacola _ Pensacola Historical Society 45

Figure 39 | 1764 Pensacola Harbor Plan Detail _ Pensacola Historical Society 45

Figure 40 | 1767 Plan of Pensacola _ Pensacola Historical Society 46

Figure 41 | 1778 Drawing of Pensacola _ Pensacola Historical Society 46

Figure 42 | 1836 New City Plat _ Pensacola Historical Society 47

Figure 43 | 1861 Civil War Map _ Pensacola Historical Society 48

Figure 44 | 1885 Drawing of Pensacola _ Pensacola Historical Society 50

Figure 45 | 1896 Drawing of Pensacola _ Pensacola Historical Society 50

Figure 46 | 1907 Compilation of Sanborn Maps _ Author 51

Figure 47 | Drawing of CBD and Bay _ Pensacola Historical Society 52

Figure 48 | 1940 Aerial of Downtown Pensacola _ Pensacola Historical Society 53

Figure 49 | 2013 Aerial of Downtown Pensacola _ Google Maps 53

Figure 50 | Post Card of Palafox Pier 1896 _ Pensacola Historical Society 54

Figure 51 | Palafox Pier 1896 _ Pensacola Historical Society 54

Figure 52 | Palafox Pier 2001 _ Frank Hardy 55

Figure 53 | Palafox Pier 2012 _ Birdwell Agency 55

Figure 54 | Palafox Street Early 1900s _ Pensacola Historical Society 56

Figure 55 | Palafox Street 2010 _ City of Pensacola 56

Figure 56 | Downtown Pensacola _ City of Pensacola 57

Figure 57 | Seville Square _ City of Pensacola 57

Figure 58 | Pensacola Regional Greenprint _ Author 58

Figure 59 | Pensacola Downtown Neighborhoods _ Author 58

Figure 60 | Pensacola Metropolitan Statistical Area _ Author 59

Figure 61 | County Delineation _ Author 60

Figure 62 | Blue Angles _ Museum of Naval Aviation 62

Figure 63 | Palafox Street during Gallery Night _ City of Pensacola 64

Figure 64 | 1964 Fiesta Parade _ Pensacola Historical Society 65

Figure 65 | Palafox Street during Gallery Night _ City of Pensacola 65

Figure 66 | Port of Pensacola _ Author 70

Figure 67 | Region Aerial _ City of Pensacola 70

Figure 68 | Girl on Tracks _ Author 73

Figure 69 | Reconnect Historic Street Grid _ Author 74

Figure 70 | Existing Bayfront Parkway 74

Figure 71 | Proposed Bayfront Parkway 71

Figure 72 | Downtown Esplanade, City Greenways, and Landmarks _ Author 75

Figure 73 | Greenway along Railroad Right-of-Way _ Greenway Precedents 75

Figure 74 | Port of Pensacola _ Author 77

Figure 75 | Downtown Waterfront _ Author 77

Figure 76 | Post Industrial Waterfront _ Author 78

Figure 77 | Pensacola Pass and Barrier Islands _ Author 78

Figure 78 | Railroad Trestle _ Author 79

Figure 79 | Robertson Island in Pensacola Pass _ Author 79

Figure 80 | Crumbling Downtown Seawall _ Author 80

Figure 81 | Port of Pensacola _ Author 80

Figure 82 | City Boundaries _ Author 81

Figure 83 | Regional Water Taxi Plan _ Author 83

Figure 84 | Downtown Esplanade Street Sections _ Author 84

Figure 85 | Existing Downtown Figure Ground _ Author 85

Figure 86 | Proposed Downtown Figure Ground _ Author 85

Figure 87 | Existing Downtown Aerial _ Google Maps 86

Figure 88 | Proposed Downtown Axon _ Author 86

Figure 89 | Proposed Downtown Waterfront _ Author 87

Figure 90 | Culmination of Palafox Axis _ Author 87

Figure 91 | Perspective from Approaching Water Taxi _ Author 88

Figure 92 | Longitudinal Section Perspective _ Author 88

Figure 93 | Palafox Street Perspective _ Author 89

Figure 94 | Cross Section Perspective _ Author 89

Figure 95 | Harbor Perspective _ Author 90

Figure 96 | Amphitheater Perspective _ Author 90

Figure 97 | Esplanade Perspective _ Author 91

Figure 98 | Pier Level Plan _ Author 92

Figure 99 | Second Level Plan _ Author 93

Figure 100 | Plaza Level Plan _ Author 94

1 | Introduction

Urban Designer: How is the ideal city organized?

Urban Economist: How do people organize themselves in the free market?

Urban designers depict the ideal city as a system of urban centers surrounded by rural and natural lands. Urban economic models support the social and economic benefits of dense development. However, in American cities urban growth patterns often do not follow the predictions by economists and depictions by urban designers. Infrastructure influences both depictions of the ideal city and economic models predicting urban growth. As the common variable, poor infrastructure investments can be attributed to the low density sprawl consuming the American countryside.

Infrastructure is a broad term, including everything from the Internet, to schools, public policy, transportation systems, power plants, etcetera. It forms the basic framework of society. Supporting and facilitating human activity, infrastructure has the ability to create place and suggest future growth.

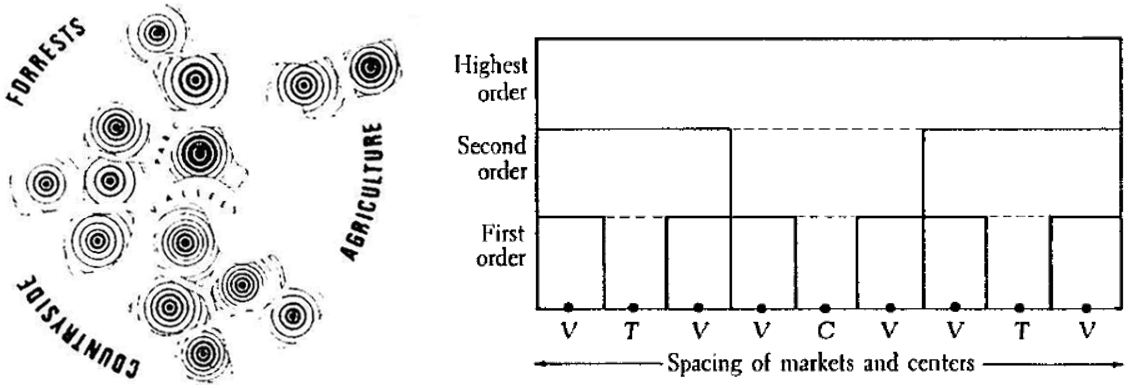

Figure 1: Léon Krier's "The Cities within the City" compared to the network of Cities, Towns, and Villages described by Central Place Theory.

To preserve the countryside and natural lands infrastructure investments must encourage concentrated growth in cities. The city and countryside are codependent. An abstraction between the two zones will lead to the demise of both the city and the countryside. *New urban infrastructure should relate to public spaces creating economic, cultural, and social value in dense development. This value is achieved by generating a multiplicity of connections, program, and places within the existing urban fabric.*

The design of this new infrastructure demands the attention of architects and urban designers. To be effective, thought must be given to the design of public policy, regional infrastructure, urban form and the buildings that define it. Design at each of these scales is interconnected and interdependent. For this infrastructure to be successful designers need to understand the strengths and weaknesses of a free market in land as "a rational allocator of scarce central sites." A design study in Pensacola, Florida tests the viability of this new infrastructure as a way to shape urban growth in the free market.

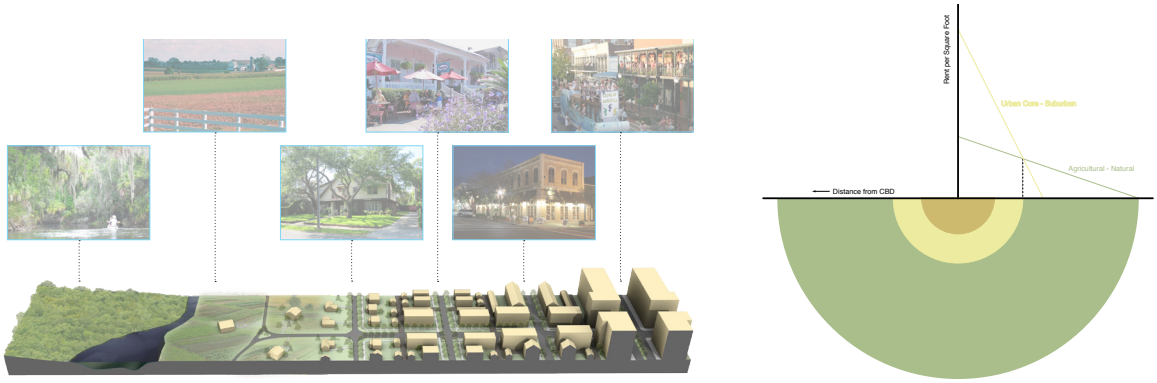

Figure 2: Urban to Rural Transect compared to Bid-Rent Model predicting land use and land valuation.

2 | The Ideal City

“A town is saved, not more by the righteous men in it than by the woods and swamps that surround it.” - Henry David Thoreau

An *ideal city* is the concept of a plan for a city conceived to achieve a rational or moral objective. The concept is an abstraction, usually represented on an open plain. It represents the ideal, general goals and values to be achieved through urban design. Many ideal cities have been conceptualized throughout history. Most applicable for today’s use are Léon Krier’s *Town and Country*, and Andrés Duany’s *Urban Transect*.

Town and Country

Léon Krier’s depiction of the ideal city, *Town and Country*, promotes a network of vibrant urban centers surrounded by preserved agricultural and natural lands. There should be a clear distinction between rural and urban areas. An abstraction between the city and countryside, will result in the decentralization of the center city and consumption of valuable rural and natural lands by low density sprawl.

“Against the global destruction of the city and countryside that we are witnessing, we propose a global philosophical, political and technical project of reconstruction. One cannot destroy the city without also destroying the countryside. City and countryside are antithetical notions. The reconstruction of the territory must be defined in a strict physical and legal separation of city and countryside. First of all we must drastically reduce the built perimeters of

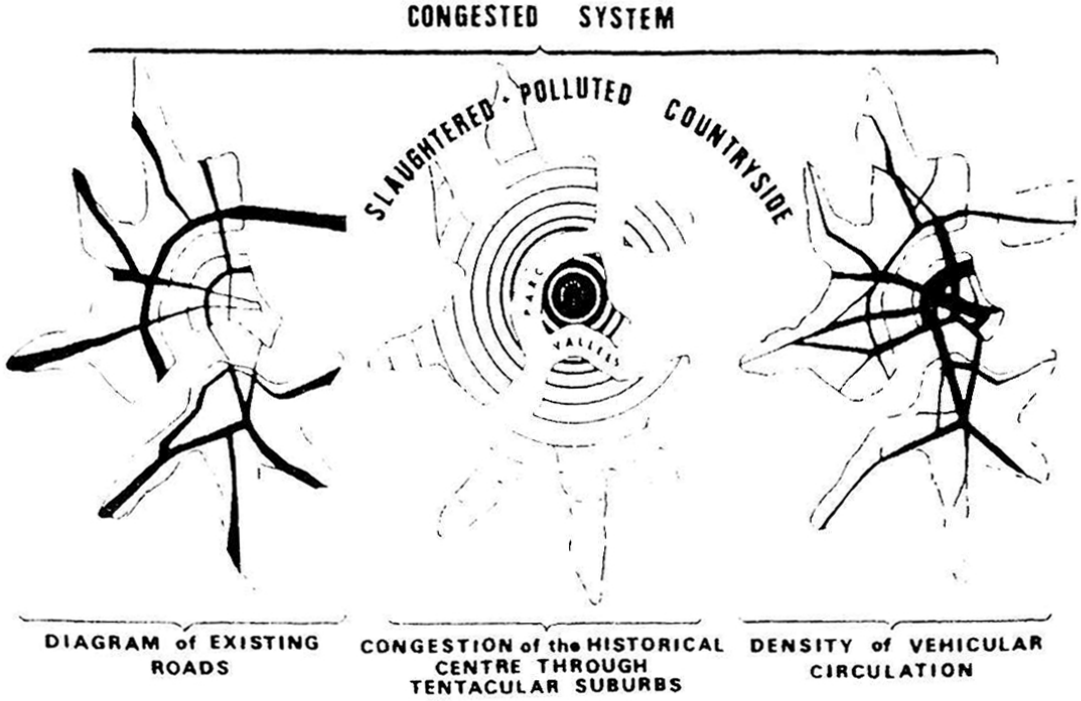

Figure 3: Drawing by Léon Krier depicting flaws of American cities.

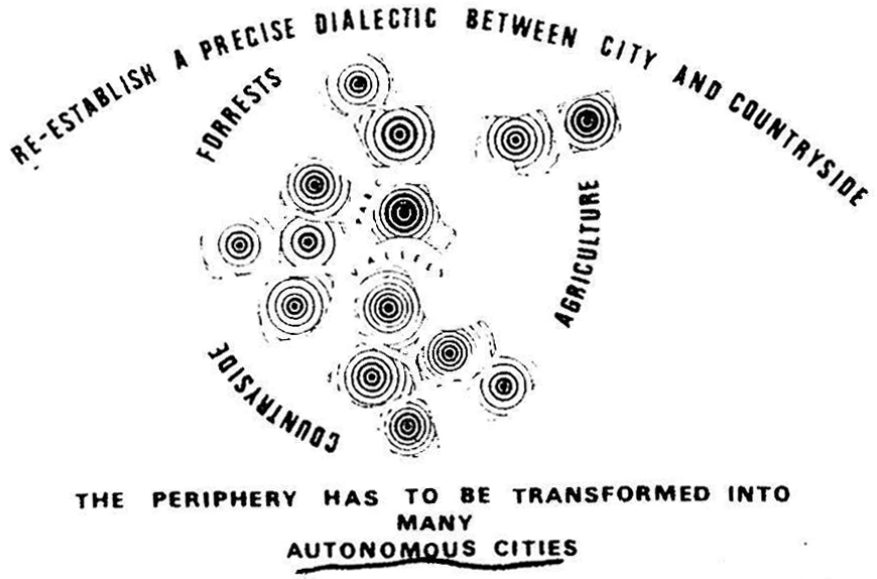

Figure 4: Ideal city by Léon Krier, "The Cities within the City."

the city and precisely redefine rural land in order to establish clearly what is city and what is countryside. Any notion of functional zoning must be abolished. There can be no industrial zones, pedestrian zones, shopping or housing zones. There can only be urban quarters which integrate all the functions of urban life."

Krier's network of autonomous cities has the potential to offer citizens choice in preferences, while at the same time taking advantage of economies of scale through a tiered system of government. Krier's ideal city promotes the following values and goals:

1) Re-establish a precise dialectic between city and countryside.
2) Transform the periphery into a network of autonomous cities.
3) Mixed-use urban quarters should integrate all the functions of urban life.
4) Dense urban pattern of small urban blocks should form well defined public space promoting intense social, cultural, and economic exchange.

The Urban Transect

The *urban transect* depicts the dialect between rural and urban areas. The *ideal urban transec*t appropriates the transition between the countryside and urban centers in Léon Krier's network of cities. A *transect* is a cut or path through part of the environment showing the progression through different habitats. Biologists and ecologists study transects in the natural environment. These transects illuminate a sequence of habitats where certain plants and

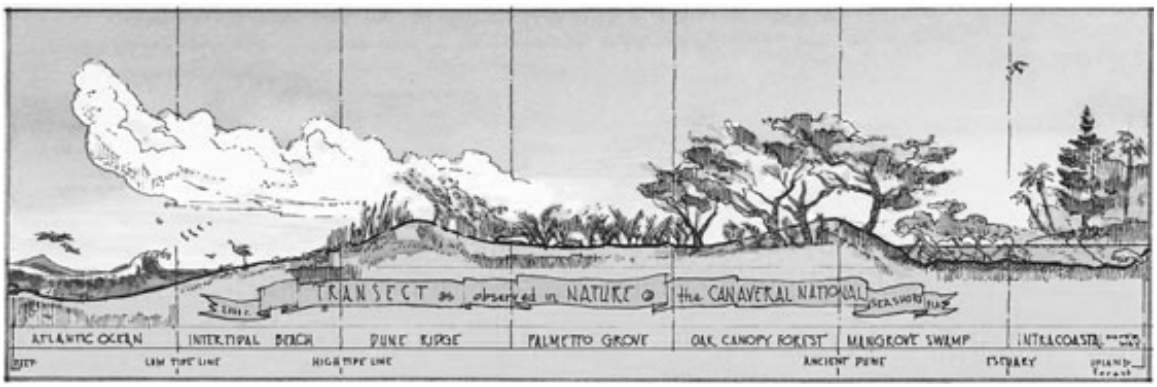

Figure 5: Natural Transect by James Wassel

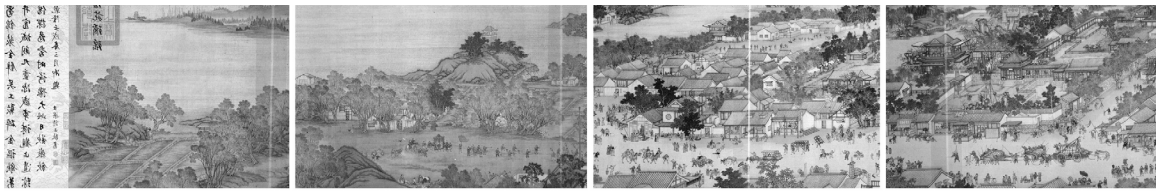

Figure 6: Periodic extractions from a continuous 40-foot ancient scroll, illustrating a Chinese transect. Museum of Taipei / Duany Plater-Zyberk and Company

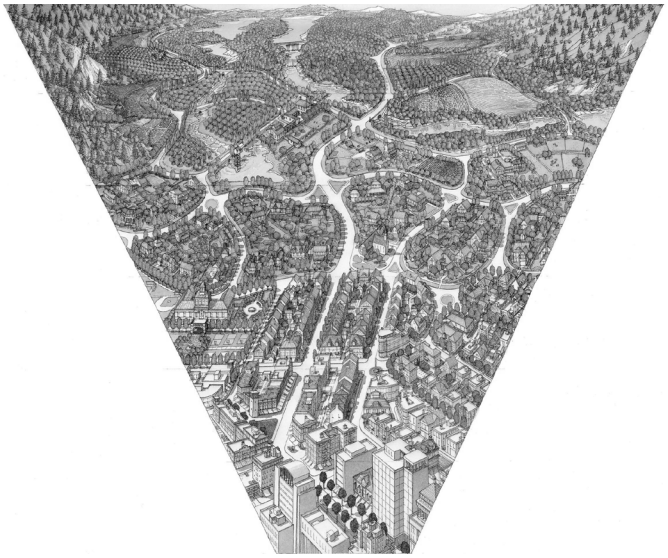

Figure 7: Urban transect zones, with their greater density use less land per capita than rural zones. Wedge Transect, Duany Plater-Zyberk and Company

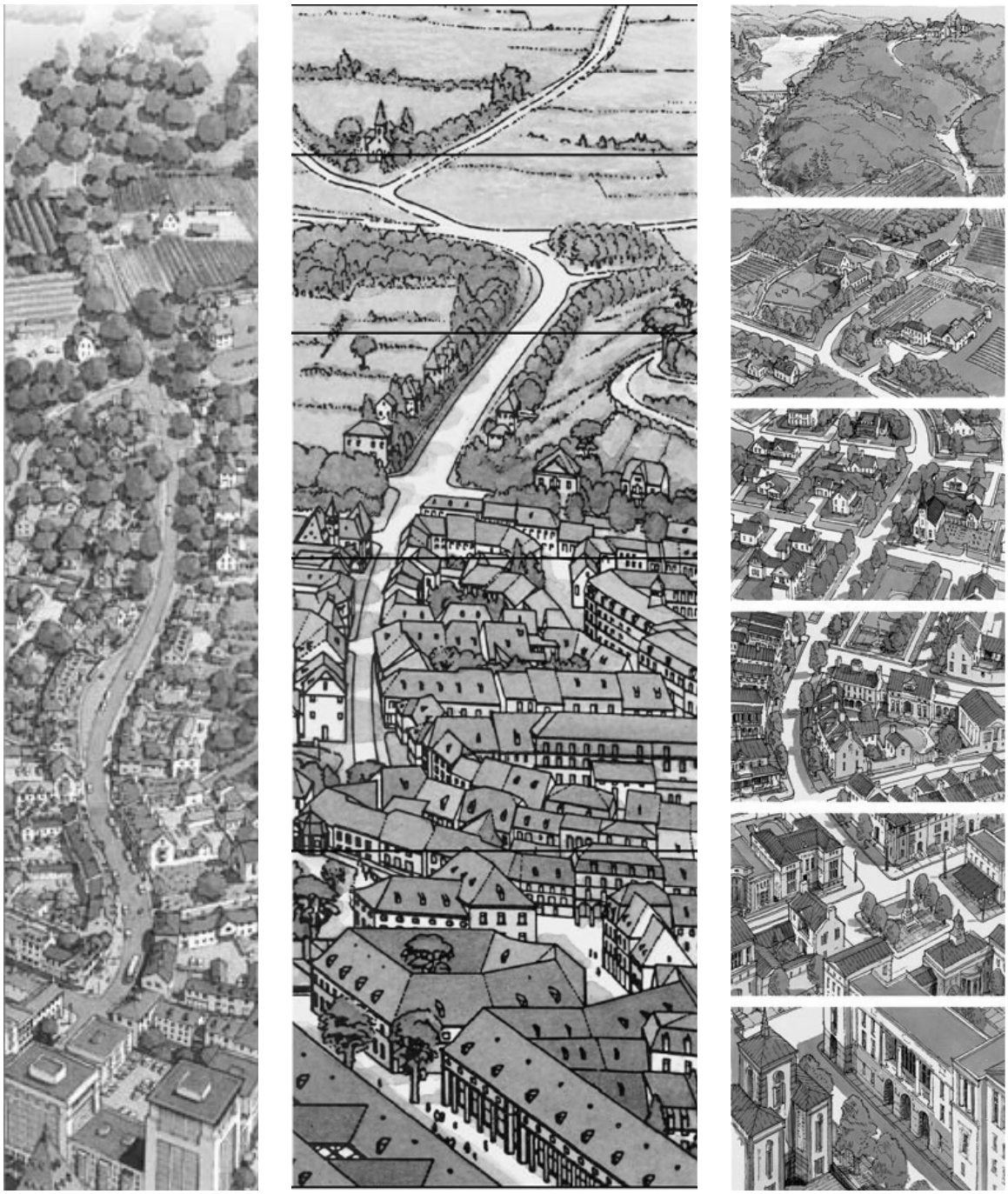

Figure 8: Depictions of rural to urban transects. From left to right: Transect by the Center for Applied Transect Studies, Illustration from the early plan for Echternach in Luxembourg, American Transect by James Wassel

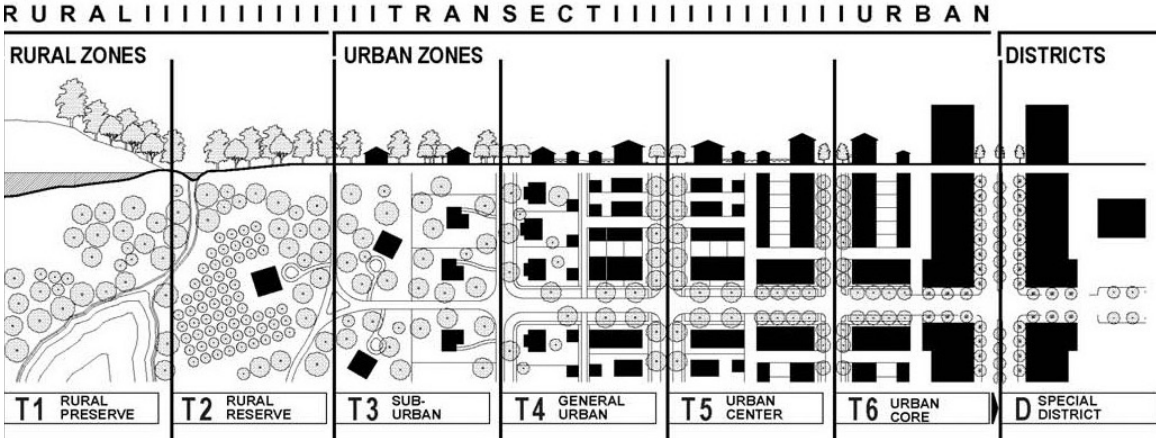

Figure 9: Urban to Rural Transect, Duany Plater-Zyberk and Company

animals thrive.

Human beings also thrive in different habitats. Some people prefer urban centers, while others would rather live in rural or sub-urban zones. The transect occurs naturally in urbanism. Before the automobile and the development of interstate highway systems, American development patterns were walkable; urban transects revealed a “precise dialect between city and country side.”

Andrés Duany recognized the natural occurrence of urban transects throughout history. He created the rural to urban transect pictured in figure 9 as a tool to reestablish an appropriate dialect between city and countryside through *performance zoning*. In contrast to traditional functional zoning, performance zoning encourages different uses to locate within communities, but specifies certain performance criteria such as building street frontage requirements.

Charter of the New Urbanism

The *Charter of the New Urbanism* was formed to advocate for farmland preservation, community enhancement, urban reconstruction, and social equity. Design can play a critical role in resolving problems that governmental programs and money alone cannot. The Charter of the New Urbanism structures design principles at three scales: the region, the neighborhood, and the building. These three scales are interconnected and interdependent. The following are principles put forth by the Charter of the New Urbanism to guide public policy, development practice, urban planning and design:

The Region: Metropolis, City and Town

1) Metropolitan regions are finite places with geographic boundaries derived from topography, watersheds, coastlines, farmlands, regional parks, and river basins. The metropolis is made of multiple centers that are cities, towns, and villages, each with its own identifiable center and edges.

2) The metropolitan region is a fundamental economic unit of the contemporary world. Governmental cooperation, public policy, physical planning, and economic strategies must reflect this new reality.

3) The metropolis has a necessary and fragile relationship to its agrarian hinterland and natural landscapes. The relationship is environmental, economic, and cultural. Farmland and nature are as important to the metropolis as the garden is to the house.

4) Development patterns should not blur or eradicate the edges of the metropolis.

Infill development within existing urban areas conserves environmental resources, economic investment, and social fabric, while reclaiming marginal and abandoned areas. Metropolitan regions should develop strategies to encourage such infill development over peripheral expansion.

5) Where appropriate, new development contiguous to urban boundaries should be organized as neighborhoods and districts, and be integrated with the existing urban pattern. Noncontiguous development should be organized as towns and villages with their own urban edges, and planned for a jobs/housing balance, not as bedroom suburbs.

6) The development and redevelopment of towns and cities should respect historical patterns, precedents, and boundaries.

7) Cities and towns should bring into proximity a broad spectrum of public and private uses to support a regional economy that benefits people of all incomes. Affordable housing should be distributed throughout the region to match job opportunities and to avoid concentrations of poverty.

8) The physical organization of the region should be supported by a framework of transportation alternatives. Transit, pedestrian, and bicycle systems should maximize access and mobility throughout the region while reducing dependence upon the automobile.

9) Revenues and resources can be shared more cooperatively among the municipalities and centers within regions to avoid destructive competition for tax base and to promote rational coordination of transportation, recreation, public services, housing, and community institutions.

The Neighborhood, the District and the Corridor

10) The neighborhood, the district, and the corridor are the essential elements of development and redevelopment in the metropolis. They form identifiable areas that encourage citizens to take responsibility for their maintenance and evolution.

11) Neighborhoods should be compact, pedestrian friendly, and mixed-use. Districts generally emphasize a special single use, and should follow the principles of neighborhood design when possible. Corridors are regional connectors of neighborhoods and districts; they range from boulevards and rail lines to rivers and parkways.

12) Many activities of daily living should occur within walking distance, allowing independence to those who do not drive, especially the elderly and the young. Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.

13) Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.

14) Transit corridors, when properly planned and coordinated, can help organize metropolitan structure and revitalize urban centers. In contrast, highway corridors should not displace investment from existing centers.

15) Appropriate building densities and land uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.

16) Concentrations of civic, institutional, and commercial activity should be

embedded in neighborhoods and districts, not isolated in remote, single-use complexes. Schools should be sized and located to enable children to walk or bicycle to them.

17) The economic health and harmonious evolution of neighborhoods, districts, and corridors can be improved through graphic urban design codes that serve as predictable guides for change.

18) A range of parks, from tot-lots and village greens to ballfields and community gardens, should be distributed within neighborhoods. Conservation areas and open lands should be used to define and connect different neighborhoods and districts.

The Block, the Street, and the Building

19) A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.

20) Individual architectural projects should be seamlessly linked to their surroundings. This issue transcends style.

21) The revitalization of urban places depends on safety and security. The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.

22) In the contemporary metropolis, development must adequately accommodate automobiles. It should do so in ways that respect the pedestrian and the form of public space.

23) Streets and squares should be safe, comfortable, and interesting to the

pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.
24) Architecture and landscape design should grow from local climate, topography, history, and building practice.
25) Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy. They deserve distinctive form, because their role is different from that of other buildings and places that constitute the fabric of the city.
26) All buildings should provide their inhabitants with a clear sense of location, weather and time. Natural methods of heating and cooling can be more resource-efficient than mechanical systems.
27) Preservation and renewal of historic buildings, districts, and landscapes affirm the continuity and evolution of urban society.

The Congress of the New Urbanism asserts the importance of design at the regional, neighborhood, and architectural scale to establish a framework for urban growth. Urban economic models identify infrastructure, public services and spaces, as the key variable impacting urban growth and form. We must redefine the way we approach the design of urban infrastructure to reestablish the “precise dialect between city and country side” depicted in the urban transect and Leon Krier’s network of cities.

3 | Urban Economics

Urban economics seeks to identify the economic forces that lead to the existence of cities and regional agglomeration. It provides theories and evidence on the emergence of cities and their effect on worker productivity, urban amenities, and congestion. Economic models predict industrial location, land use, and land valuation. Three main theories developed sequentially:

1) *Classical Location Theory*
2) *Central Place Theory*
3) *Bid-Rent Theory*

Classical Location Theory

Economic activity tends to concentrate geographically because external economies of agglomeration have the effect of reducing costs or increasing sales for many types of industry. Urban growth at particular places depends largely on forces that determine the location of economic activity.

Classical Location Theory focuses on the factors that are unique to a particular area and therefore influence industrial location decisions. The following factors influence location decisions of industrial firms:

1) *Agglomeration Economies*
2) *Transfer Costs and the Firms Production Process*
3) *Localized Inputs in Production*

Agglomeration Economies

Agglomeration means "grouping together." Firms group together to benefit from *input side* or *output side* agglomeration economies. *Input side agglomeration economies* occur as a result of cost reduction for firms that are in a particular industry grouping together at one location.

Industries will group together to reduce the cost in the production of intermediate inputs. This occurs when "economies of scale" exist that cannot be exploited by the demanding firm and when transportation cost are high. Transportation cost might be high for the following reasons:

1) It is expensive to ship the input in production because it is bulky, fragile, or perishable.
2) Suppliers and demanders need to interact in the design and/or fabrication of the intermediate input and face-to-face contact is required.
3) Inventory cost are high, but "stock-outs" are costly to the firm. Therefore "lean manufacturing" principals would dictate that inventory is low, but the input could be delivered quickly.

For example, corporate headquarters cluster together allowing the exploitation of scale economies for intermediate inputs for which face to face contact may be important (advertising, legal services, economic consultation). Another example is high tech firms, who group together close to suppliers of non-standard electronic parts and/or test facilities that need face-to-face interactions often as quickly as possible.

Certain industries will locate close to one another to increase the efficiency of labor markets. Close proximity to a large skilled workforce cause labor costs to decrease and a firms productivity to increase if firms in the industry are located close together. This is most important if the industry changes rapidly both in terms of growth and technology. From an employee's perspective, job information is spread quickly through informal channels, and all employers are in one place so job transfer is easy and low cost. Employers benefit because they are able to rapidly fill vacancies. Examples of agglomeration economies for efficiency of labor markets include the computer industry in the Silicon Valley and the TV and movie industry in LA.

Input side agglomeration economies also occur for communication efficiencies, or the rapid exchange of information and diffusion of technology. For example, if computer manufacturers cluster together, scientists and engineers can interact and exchange ideas in an informal setting.

Output side agglomeration economies occur due to increases in revenues resulting from firms grouping close together. Typically this is a function of decreasing search costs for consumers of a firms product or service, for example, car dealerships and boutique stores.

There are many positive societal externalities associated with agglomeration. Agglomeration economies support many specialized consumer alternatives, provide a larger number of employment opportunities, and have a lower per unit cost of public services due to economies of scale.

Transfer Costs and the Firms Production Process

If transfer costs (includes traditional transportation cost and the cost of moving data or other information from place to place) are a significant portion of total cost then firms will orient themselves geographically to minimize transport cost. If inputs are very heavy, perishable, hazardous, or otherwise difficult to transport, a firm will locate close to the source of the input. For example, paper production, a weight losing industry, would locate close to sources of timber. Likewise, if outputs are very heavy, perishable, hazardous, or otherwise difficult to transport, a firm will locate close to the market for its final product. For example, soda or beer production, a weight gaining industry, would locate regionally close to consumers.

Localized Inputs in Production

The geographical orientation of some firms is determined when inputs are higher quality and/or lower cost at a particular location, and they cannot be transported directly from one location to another. Examples include energy orientation, labor orientation, amenity orientation, and public sector (services/tax orientation).

Central Place Theory

Because Classical Location Theory could not explain many aspects of the location of economic activity and the development of cities across the country, economists developed an additional theory that abstracted from the forces that

determined location under the Classical Location Theory. Specifically, they tried to determine if market networks would develop in the absence of unique locational features of the Central Location Theory, and would these market networks give rise to a system of cities. It is meaningful to speak of a "system of cities" because the power of an urban place to attract activity is influenced by the size, character, and location of other related places.

Economic Forces that Determine Market Structure

Central Place Theory identifies the following economic forces that determine market structure:

1) *Economies of Scale in Production*
2) *Transportation Cost*
3) *Aggregate Demand per Unit of Distance*

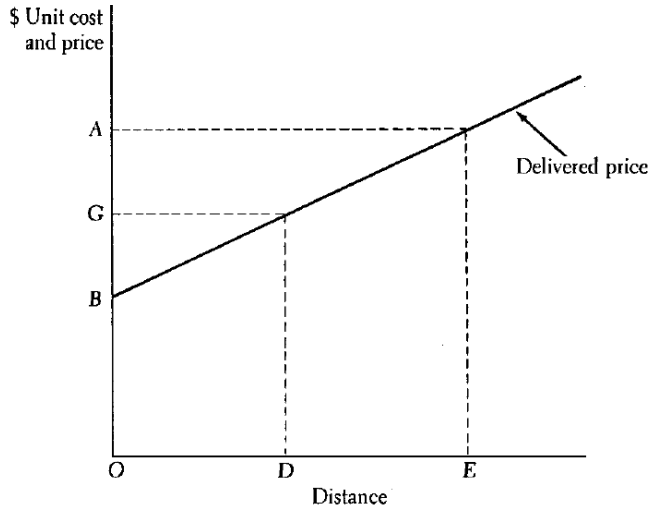

Figure 10: Depiction of relationship between production cost, transport cost, sale price, and market extent.

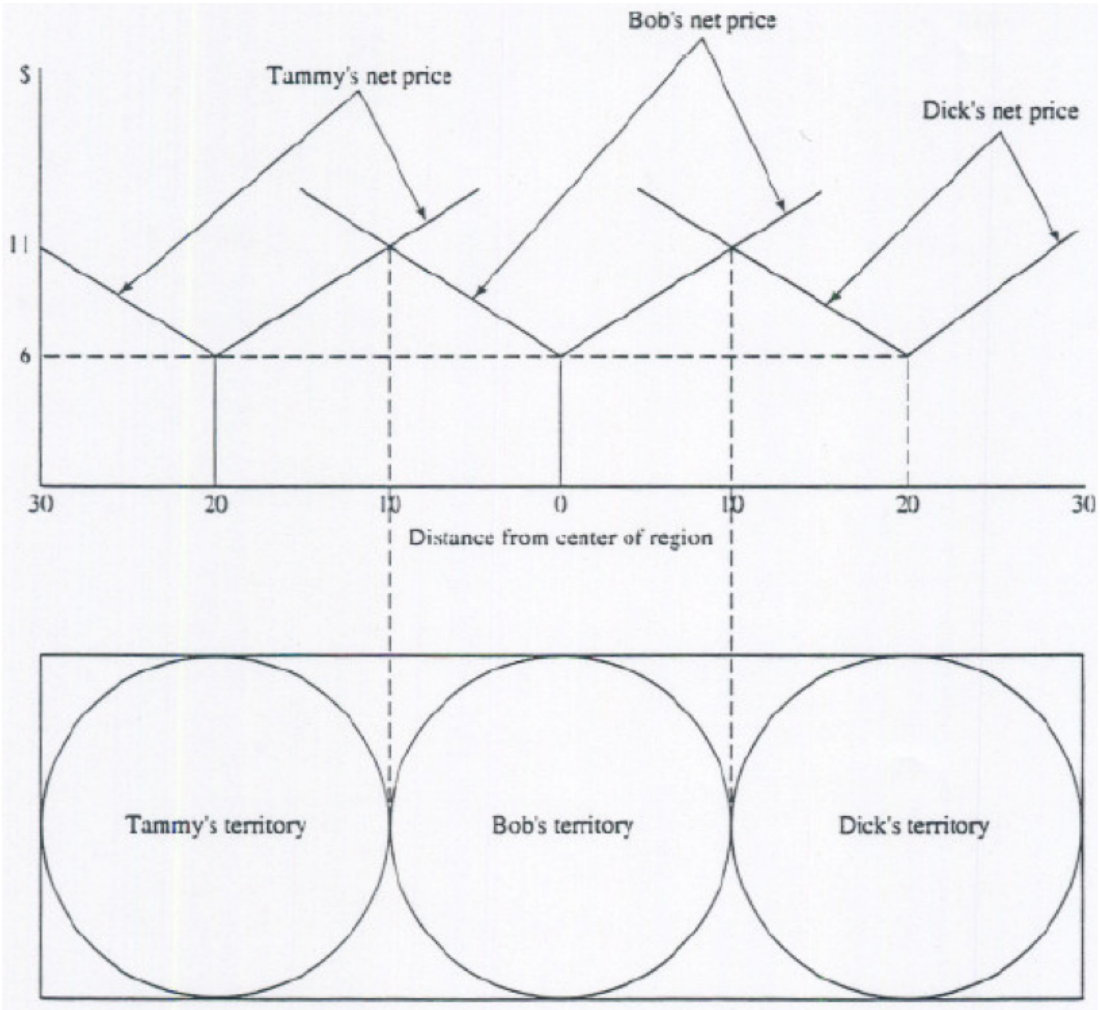

Figure 11: Each store's market area is the area over which its net price is less than the net prices of other stores. Each store has a circular territory with a 10-mile radius.

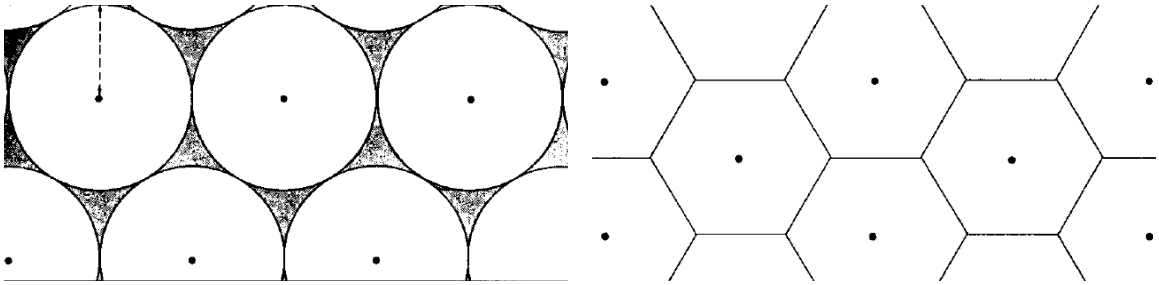

Figure 12: Ultimately, these markets would cover the entire area.

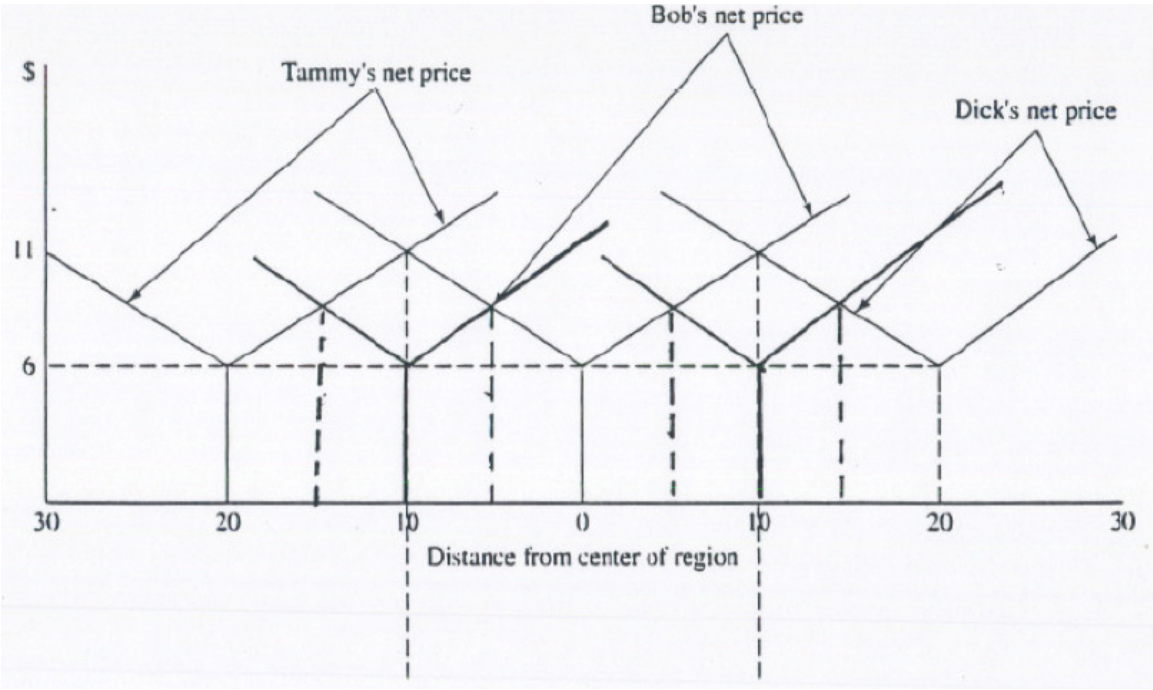

Figure 13: Impact of new market entrants.

A business will be helped by the economies of large scale production and handicapped by costs of transportation.

In Figure 11, the market system was assumed to be in an economic equilibrium. That is, no excess profits were being made. The three firms in this market were making just enough of a return on their assets to stay in the business, but not so much as to attract other new firms to the area. Assume that population and/or disposable income increases in the region. If the goods in question are "normal" economic goods, the *aggregate demand per unit distance* should increase. Increased demand would lead to excess economic profits. This should attract other firms into the region. Thus, *market areas could be expected to shrink as demand per unit distance increases* (Figure 13).

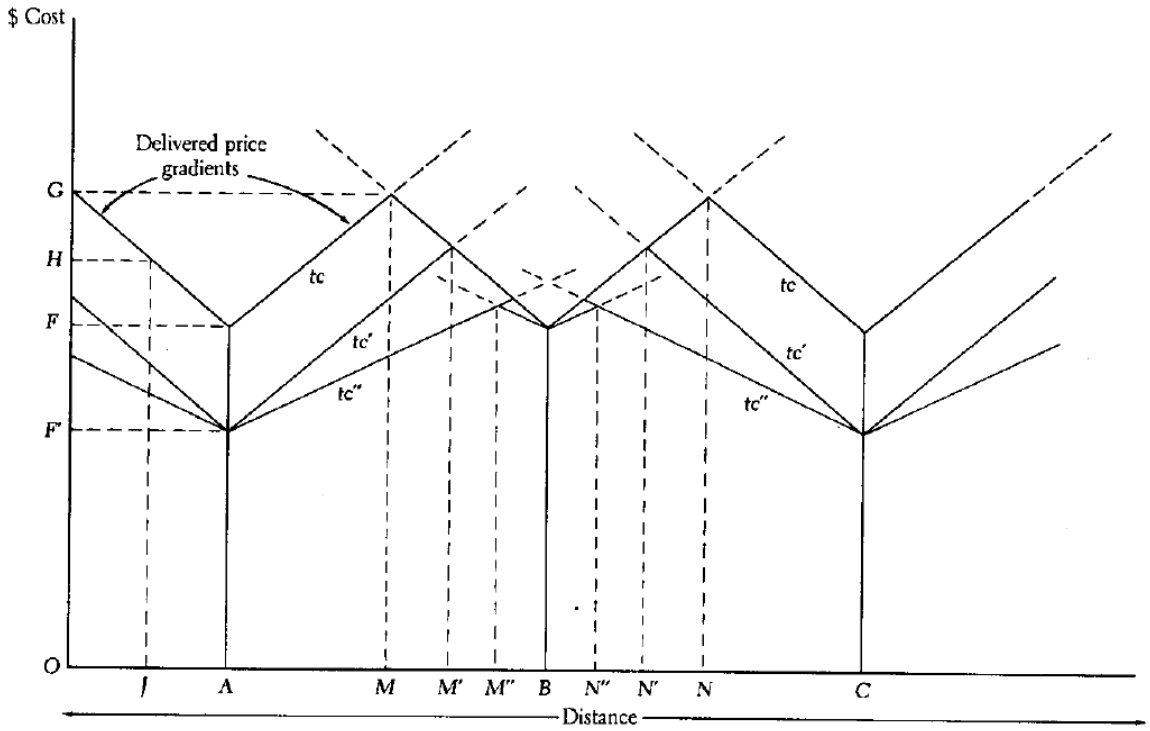

Figure 14: Producers A and C adopt a new technology that allows them to produce more with greater scale economies. As a result they erode the market area of producer B.

The impact of *transport and production cos*t also changes in the context of Figure 11 and 13. If everyone's transport cost and production cost decrease equally then the market size and shape should, initially, remain unchanged. However, these cost efficiencies should lead to excess profit, more producers would enter the market and market size would shrink.

In Figure 14 low cost production techniques (scale economies and/ or new technology) are not adopted by all suppliers. Initially Producers A, B, and C are in a market equilibrium situation with just enough returns to stay in

business in this region. Assume that new technology allows A and C to produce more with greater scale economies, so cost per unit of output go down. The cost efficiencies allow A and C to erode the market area of B, who (for whatever reason) does not or cannot take advantage of the new technology. Assume B can still exist because aggregate demand per unit distance, for the product in question, has increased enough during the period in which this change occurred. If transportation technology improves substantially, lowering every producers cost of transportation producers A and C will benefit more from this transportation cost reduction because of their greater economies of scale in production. In this case, B may be driven out of business.

Market Networks Give Rise to a System of Cities

Each good or service produced in the economy has different scale economies, transportation cost, and aggregate demand. The wide variation in the market size for these goods and services implies the existence of a hierarchy of central places. For instance, a service such as haircuts, would be distributed through many small markets, while others such as finished lumber or television broadcasts, would be distributed through a smaller number of larger markets. To take advantage of economies of agglomeration, firms proving these various goods and services will tend to cluster in villages, towns, and cities instead of seeking isolated locations.

Assume there are three goods or services being produced in a given area:

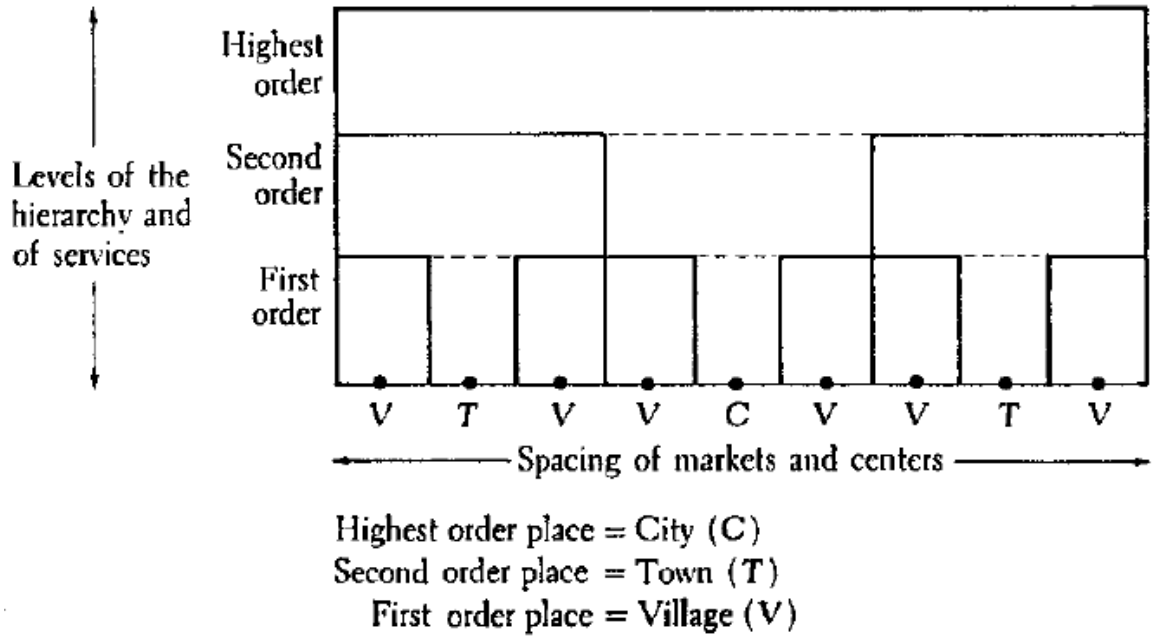

Figure 15: Central Place Theory; The rise of a system of cities

Product (1) has great scale economies in production.

Product (2) has moderate scale economies in production.

Product (3) has minimal scale economies in production.

Differences, in economies of scale in production, imply different numbers of providers are needed to serve the area.

1 provider will efficiently serve the area for product (1)

3 providers will efficiently serve the area for product (2)

9 providers will efficiently serve the area for product (3)

This gives rise to a hierarchy of places and a system of cities depicted in Figure 15.

The city (C) has all three activities being produced - Highest Order Place

The town (T) has two activities being produced - Second Order Place

The village (V) has one activity being produced - First Order Place

The city center and its network of “towns” and “villages” are interrelated. A major center contains not only more diverse kinds of shops than does a small town, but also provides services like wholesaling. A town with a corner store is a focal place for the activities of a group of households; a city with a wholesale establishment is a focal place for the activities of a group of towns containing corner stores. And so forth, up the levels of services, to the highest order place, which provides leadership to the economy as a whole.

Bid-Rent Theory

The *Bid-Rent Model* was developed to explain intra-metropolitan land pricing, land use, and urban form. The general form of the city concentrates activity and development at the center and declines in intensity as one moves toward the edge. Bid-Rent Models generate this observed pattern as *a function of transport cost and the need for accessibility*. They explain the general pattern of land use, land value, and density of development. Bid-Rent Models “illuminate the process by which the real estate market sorts out potential occupants of land, allowing those who can make the most productive use of central sites to obtain them and pushing those less dependent on centrality out toward the edge.” From these models urban designers gain an understanding of the allocation of land in the free market and the *interdependence of land values, land use, and transportation infrastructure*.

For basic understanding, start with a simple Bid-Rent Curve predicting residential housing sites based on the following assumptions:

(1) The city is on a flat plane, equal transportation cost exist in all direction form the city center.

(2) All economic activity (production and distribution) occur at one

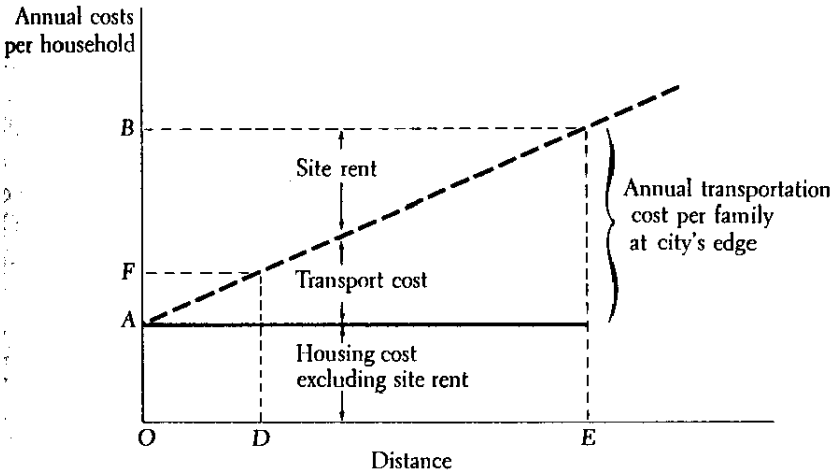

Figure 16: Transportation costs increase with distance from city center.

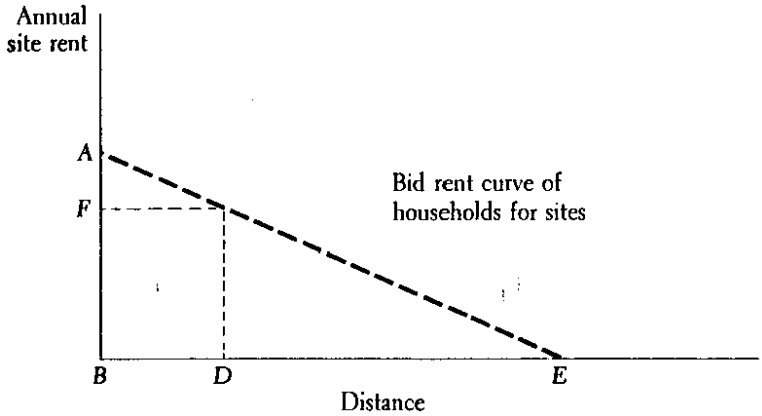

Figure 17: Bid-Rent Curve for residential housing sites.

central location, the city center.

(3) Families have similar preferences, income and wealth.

(4) All houses and lots are uniform in their characteristics other than location.

(5) Building and maintenance costs are the same regardless of location.

Since jobs and all consumer services are located at the city center, households bear a transportation cost to commute back and forth. This cost increases with the distance for the city center.

Economic rent, or "economic surplus," is defined by economists as *a payment to a factor of production in excess of its opportunity cost*. The "opportunity cost of a factor" of a given use is the payment it could command in its next best use. The next best use for urban sites is agricultural land.

In Figure 17, site rent represents this "economic surplus" over and above a sites next best use. Rents arise because of scarcity of access to the city center. They can be affected by changes in transportation technology. The magnitude of the rent depends upon the benefits associated with obtaining access to the central city. Different types of households, firms, or other kinds of activities could have different site-rents for the same land.

The free market allocates urban sites to their "highest and best use." In other words, competition puts sites in the hands of the highest bidder, or the bidder who can make the most economically productive use. In a free market, people and businesses organize themselves efficiently, maximizing the contribution that each site adds to the total output of society as a whole. Figure

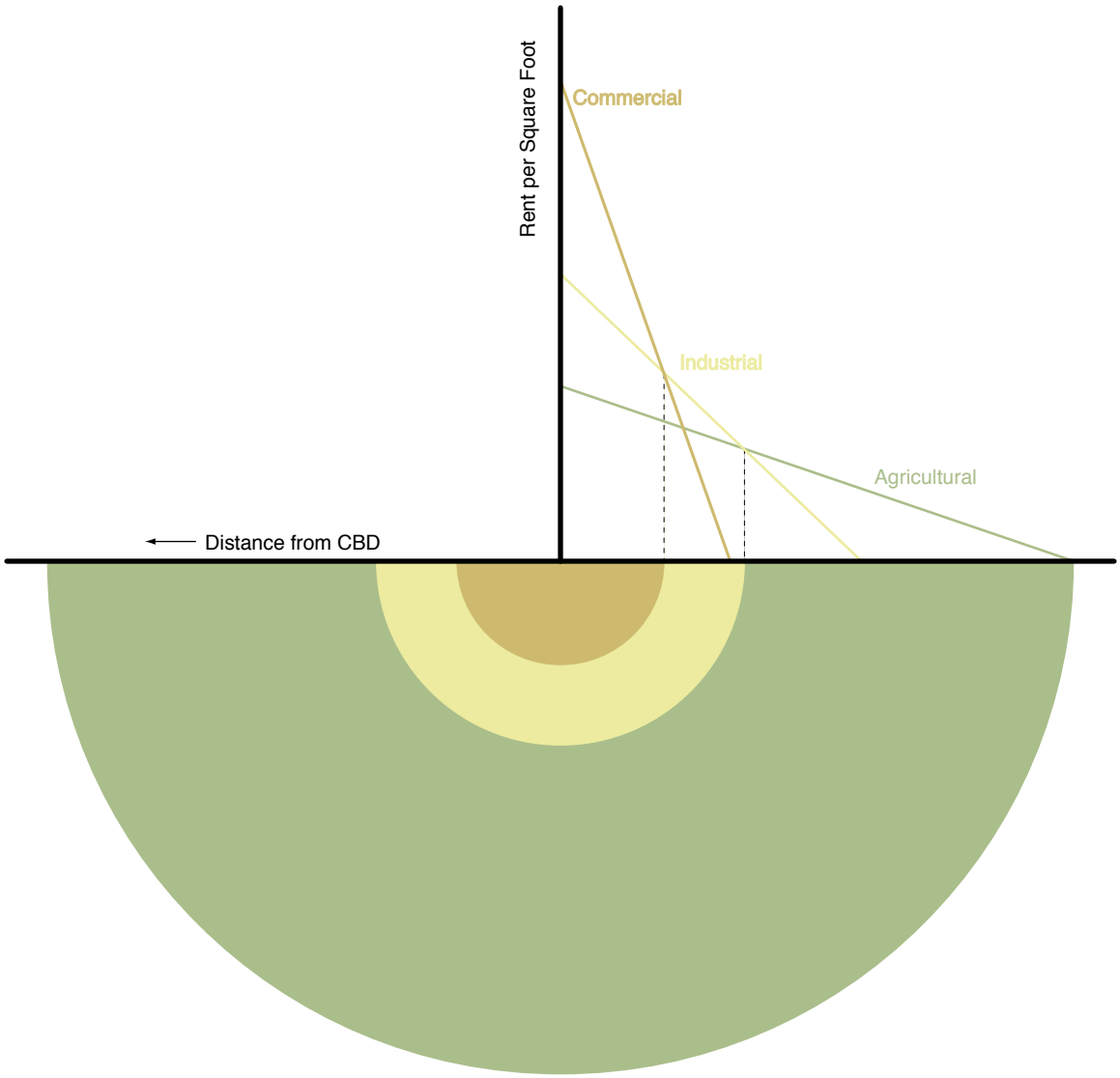

Figure 18: Model depicting Bid-Rent Curves for central office commercial functions, industrial uses, and agricultural lands. The Bid-Rent Model depicts the absolute maximum rent a firm with specific profit profile can pay and still find remaining in business a worthwhile endeavor. The price and demand on real estate changes as the distance towards the Central Business District (CBD) increases.

18 depicts the allocation of land to different (and most productive) uses. The inner envelope of these bid rent curves is the city's "rent gradient." It will differ over time and from city to city depending upon transportation costs and the importance of access to the central city for firms and households.

The Bid-Rent Model in Figure 18 depicts the Bid-Rent Curves for central office commercial functions, industrial uses, and agricultural lands. These various groups have different premiums they are willing to pay for access to the central city depending upon how much they benefit from being close to the city center. Central office functions benefit the most and as a result have the steepest Bid-Rent Curves. Industrial uses benefit less than the central office functions and have slightly flatter bid-rent curves. Agricultural lands benefit the least and have the flattest bid-rent curves.

Relaxing the original assumptions, if transportation cost decrease due to improvements in technology or transportation infrastructure, then rent at the center would fall and the cities edge would move out, flattening the bid rent curve.

If a household's income changes, their choice of location relative to the Central Business District may also change. As your income increases the value of your time increases. Thus, time spent commuting is more costly. With an increase in income, a household would move closer to the center city. As distance from the city center increases housing prices decrease due to a decrease in the cost of land further out. This is often not the case in American cities. A difference in the quality and quantity of public services (schools,

recreational spaces, security, etc.) provided in the central city and its suburbs account for this.

Land value per acre in a city generally rises with a growing population. High rents in a city measure the extent of the positive economies of agglomeration and location to be found there. Further more, higher rents reflect an increased quality of living due to the economic, social, and cultural benefits of condensed development.

Infrastructure investments decisions (regarding transportation and other public services) affect site rent, land-use patterns, and the form of the city. *An understanding of urban economic location, land-use, and land valuation theories will allow urban designers to promote ideal city values with calculated infrastructure investment decisions.*

4 | Infrastructure the Common Variable

"The outcome of the city will depend on the race between the automobile and the elevator, and anyone who bets on the elevator is crazy." - Frank Lloyd Wright

In theory people organize themselves efficiently within dense urban centers surrounded by substantial agricultural fields and vast undisturbed wilderness. However in reality, as shown in the greenprint of the Pensacola Metropolitan Statistical Area (Figure 20), the boundaries of our human habitats are not always so clear.

Under the assumptions and simplified conditions of economic models, urban form resembles that of the ideal cities described in chapter two. When these assumptions are relaxed, changes in transportation infrastructure and public services influence the model. Highways connecting the city to its peripheries reduce travel time to the Central Business District (CBD). This increases the supply of land available to businesses who benefit from locating near the CBD. It also increases the supply of land available for residential use by the people who work at these businesses. The highest and best-use (use that will produce the highest property value) of rural periphery land is increasingly no longer agricultural. Constant widening of these highways to accommodate this outward growth distorts the Bid-Rent Model. The result is urban sprawl: an unplanned, uncontrolled expansion of low density residential developments, scatter big box stores, and drive through restaurants swallowing up valuable agricultural and natural lands.

Infrastructure is the basic framework of society. It supports and facilitates

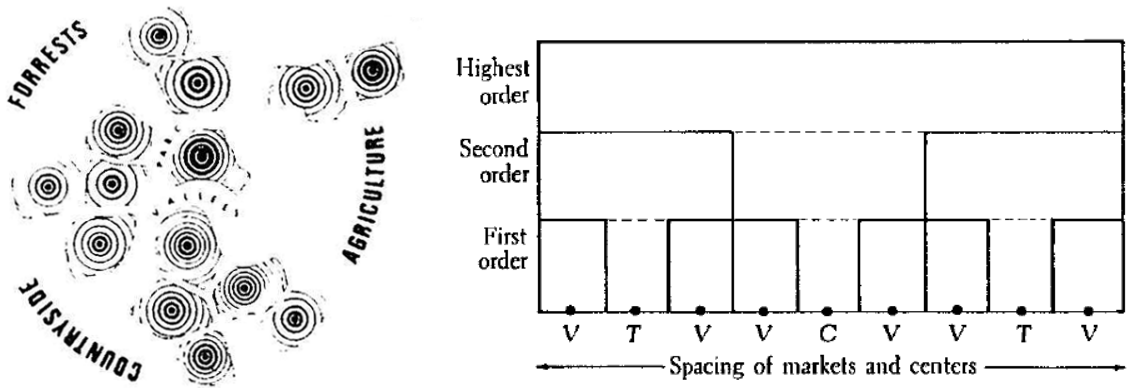

Figure 19: Léon Krier's "The Cities within the City" compared to the network of Cities, Towns, and Villages described by Central Place Theory.



Figure 20: Regional Greenprint of Pensacola, FL

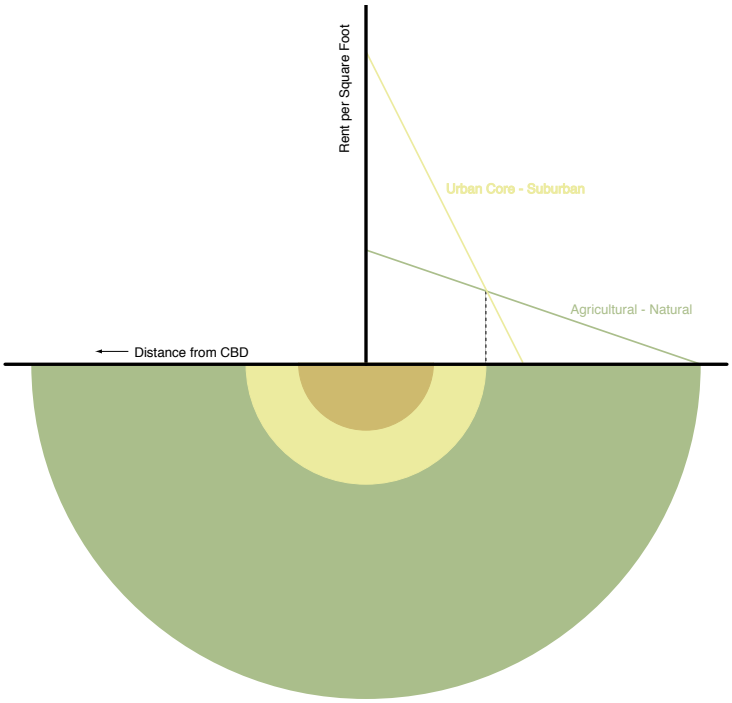

Figure 21: Bid-Rent Curves of Urban and Agricultural Uses (Ideal Model)

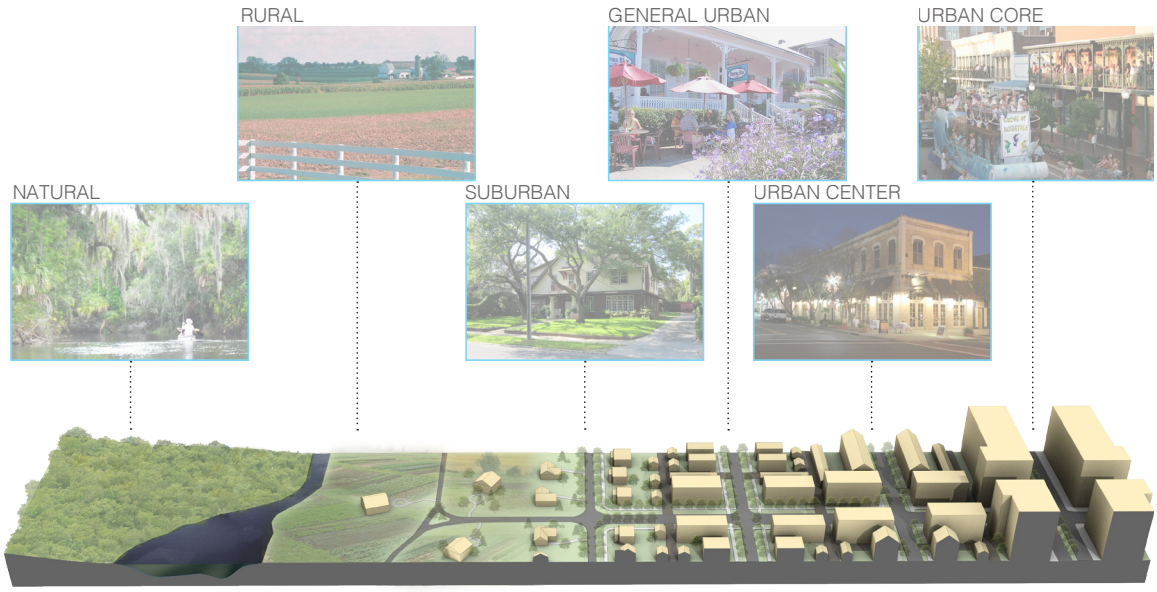

Figure 22: Ideal Urban to Rural Transect for Pensacola, Florida

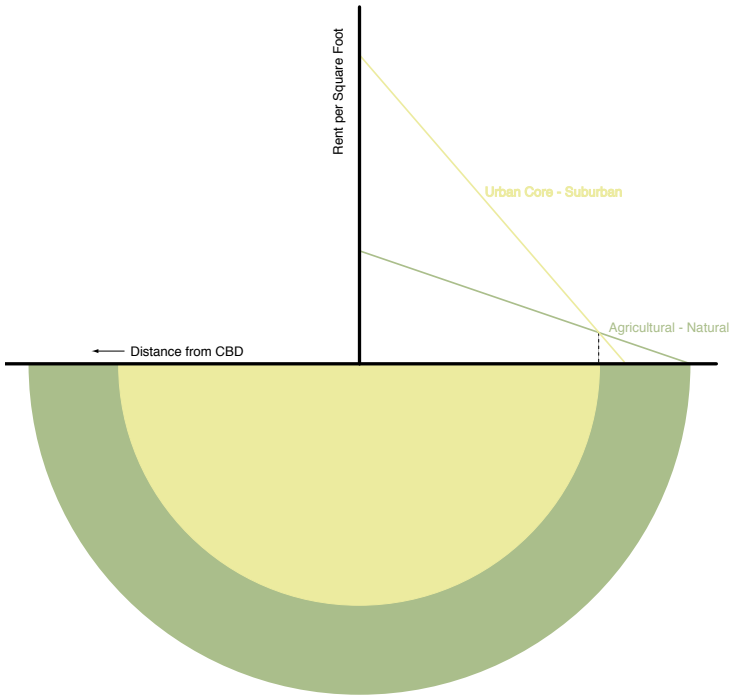

Figure 23: Bid-Rent Curves of Urban and Agricultural Uses (Sprawled Condition, the ideal model is distorted by infrastructure encouraging development further away from the Central Business District, CBD)

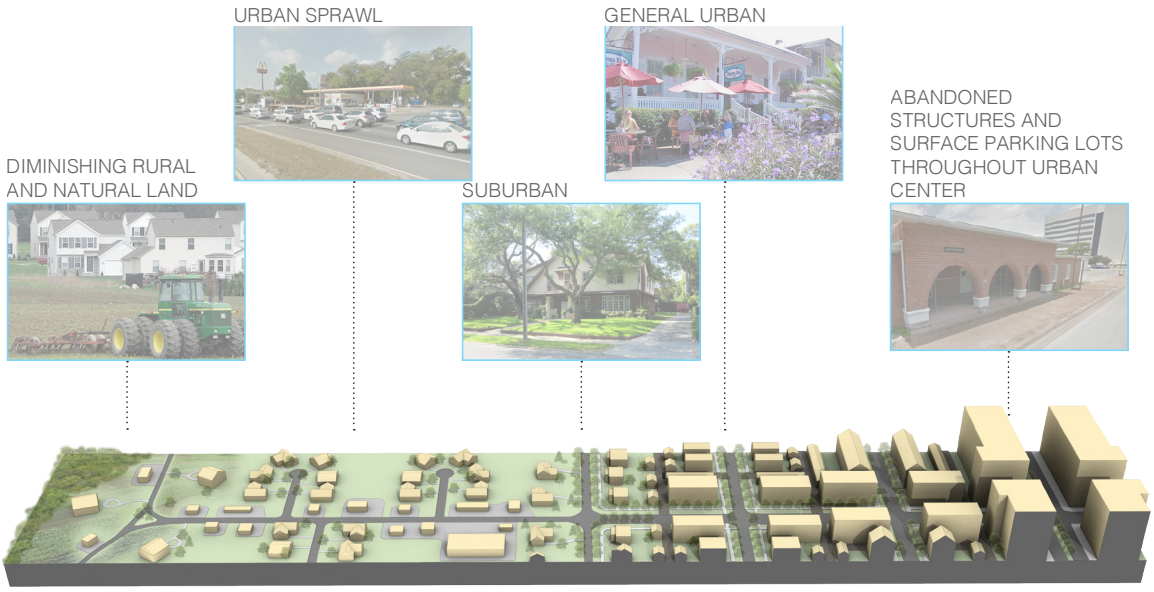

Figure 24: Depiction of Existing Urban to Rural Transect in Pensacola, Florida

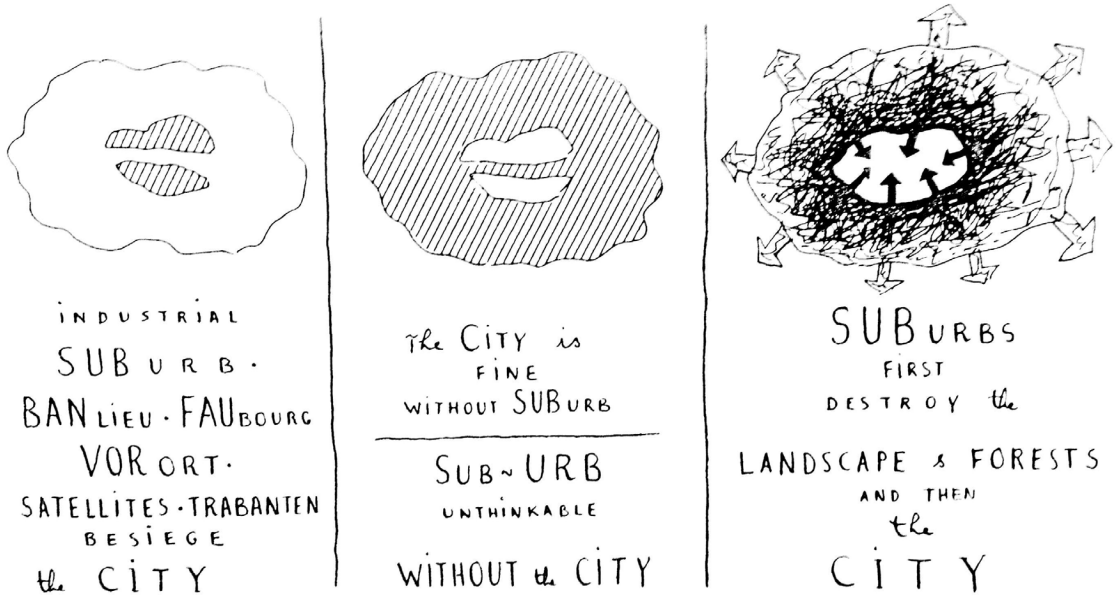

Figure 25: Sketch by Léon Krier depicts the decentralization of the city and consumption of the countryside by urban sprawl.

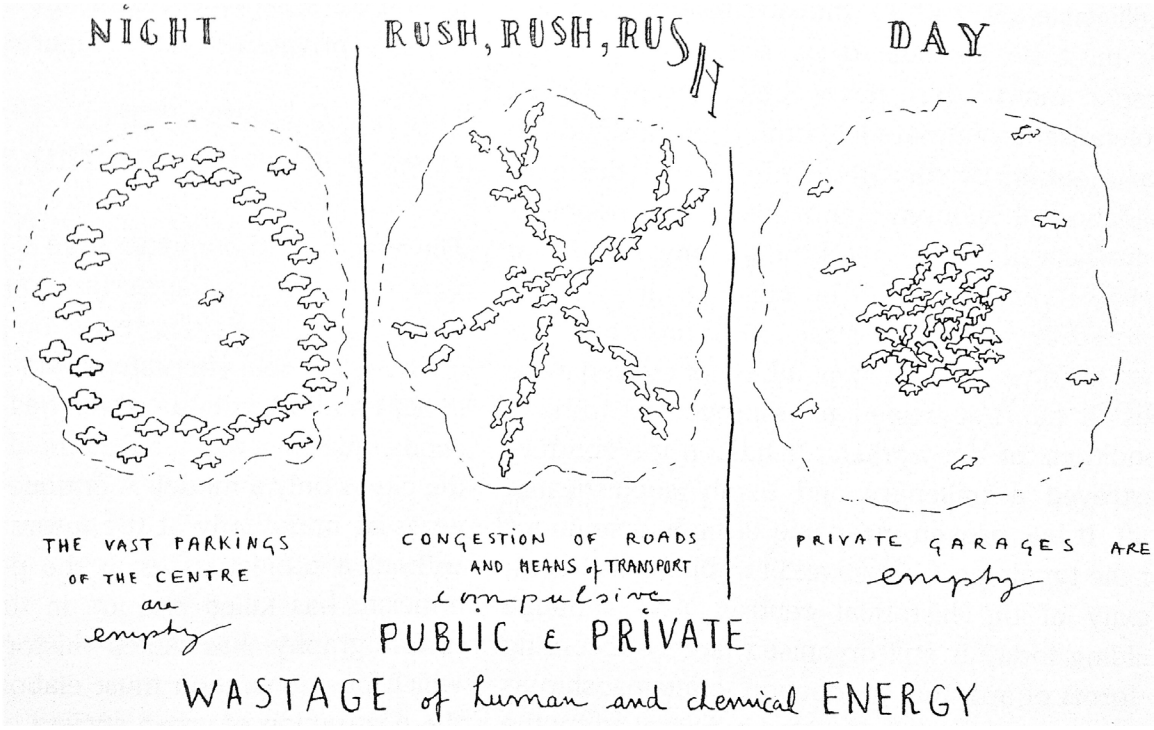

Figure 26: Sketch by Léon Krier illustrates inefficiency of current infrastructure.

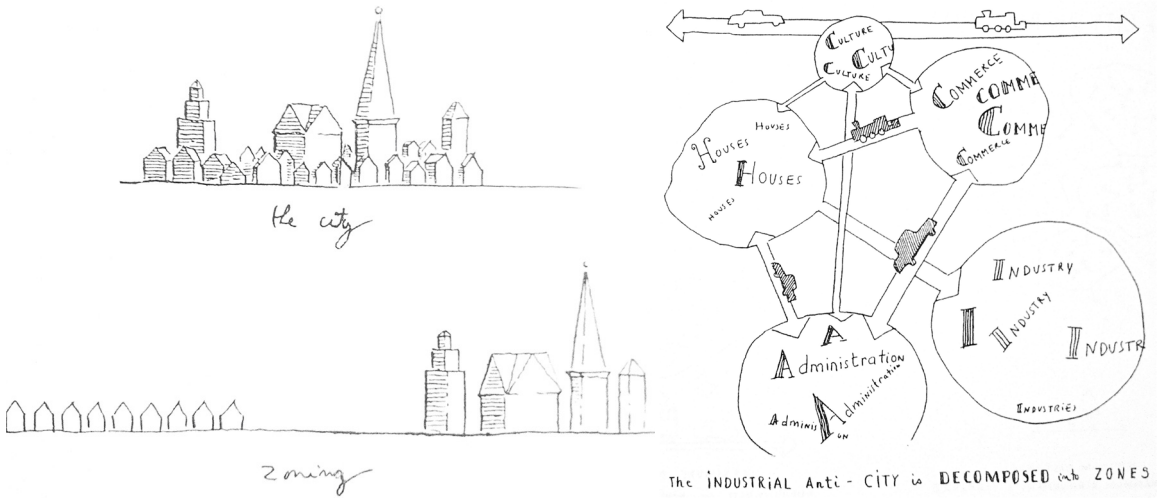

Figure 27: Sketches by Léon Krier showing how auto centric cities are decomposed into mono-functioning zones.

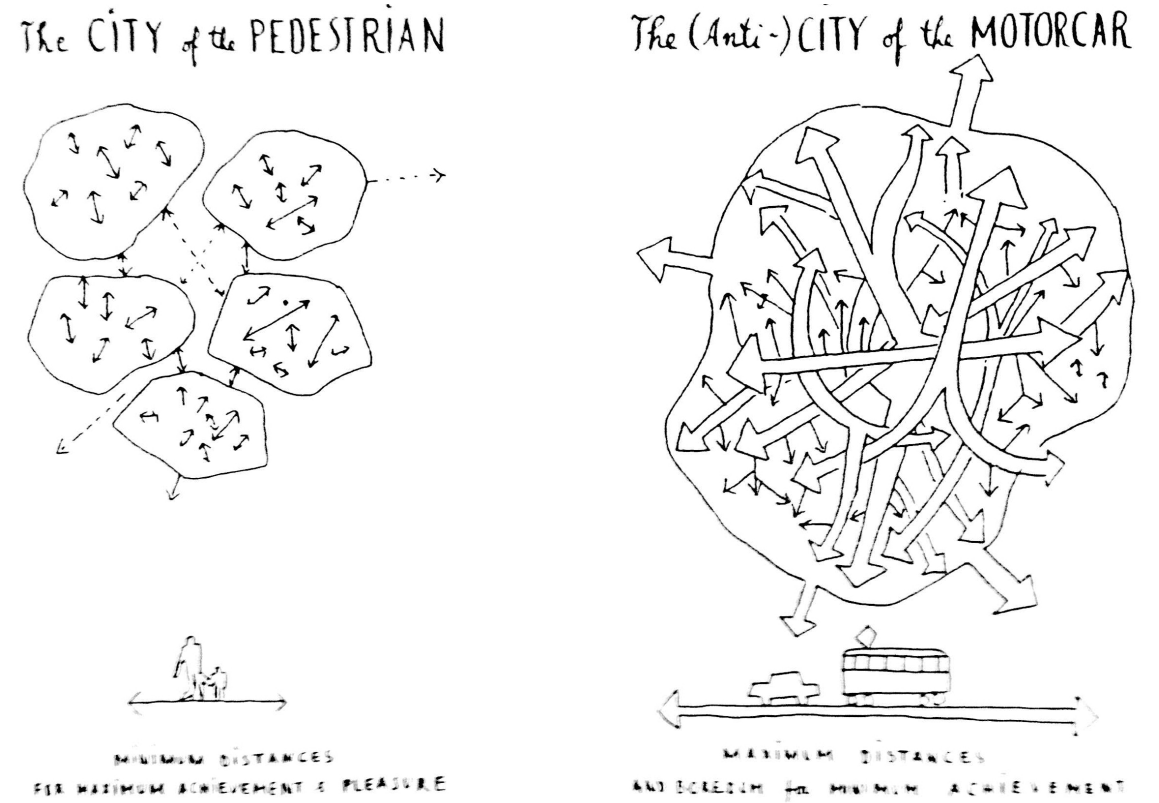

Figure 28: Sketch by Léon Krier compares the auto-centric city to a walkable city. Walkable cities develop as a network of autonomous urban centers.

human activity. Including everything from the Internet, to schools, public policy, civic buildings, transportation systems, power plants, etcetera; infrastructure has the ability to create place and suggest future growth.

Expanding rural roadways along with a growing investment in suburban schools, water systems, and communication infrastructure continues to accommodate urban sprawl. In Pensacola, rural county schools are ranked third in the state, while the schools within the city are ranked forty-eighth out of sixty-six districts (2013 Florida school district rankings). This incentive alone convinces many families to locate outside of the city and commute in, to work, each day. Figure 26 illustrates the inefficiencies of this commute.

Investments in urban highways and suburban infrastructure create value in suburban living. A seemingly limitless supply of cheap land, growing schools, and open recreational spaces are attracting people to the suburbs. American transportation infrastructure is often isolated and mono-functioning. It supports development decomposed into zones absent of cultural and social exchange (Figure 27). New urban infrastructure should create value in dense development. This value is achieved by generated a multiplicity of connections, program and places within the existing urban fabric. Just as urban highways made rural periphery land too valuable to be used for agriculture, new urban infrastructure should make downtown city blocks too valuable to be used for surface parking lots.

Investing in suburban infrastructure to accommodate low density sprawl is like telling a fat man to add another notch to his belt. The infrastructure

investments and public policies of many American cities contribute to the consumption of the countryside and decentralization of the city. A comparison of a 1907 figure ground of downtown Pensacola (Figure 31) and a 2013 figure ground (Figure 32) shows the decentralization over the last century. Surface parking lots and urban highways replace the finer grain of the 1907 figure ground.

New urban infrastructure must encourage concentrated development (Figure 33). It should support a network of vibrant urban centers surrounded by agricultural and natural lands.

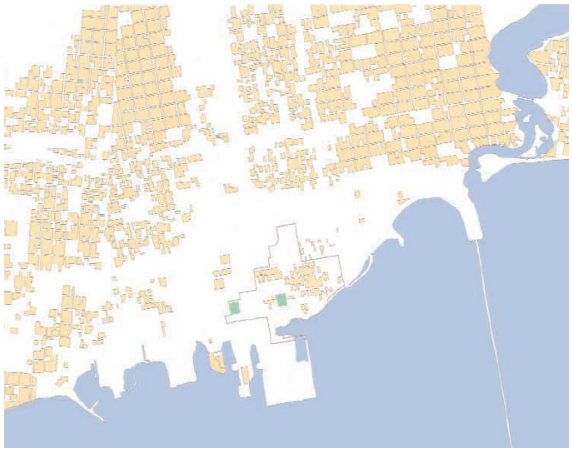

Figure 29: Residential Settlement Patterns

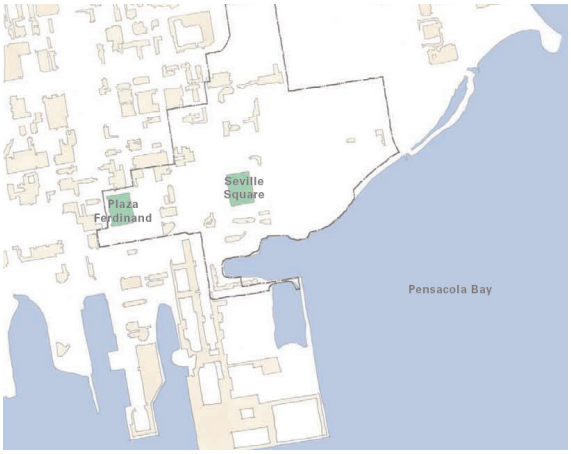

Figure 30: Parking X-Ray



Figure 31: 1907 Figure Ground Pensacola CBD (Compiled From Sanborn Maps)

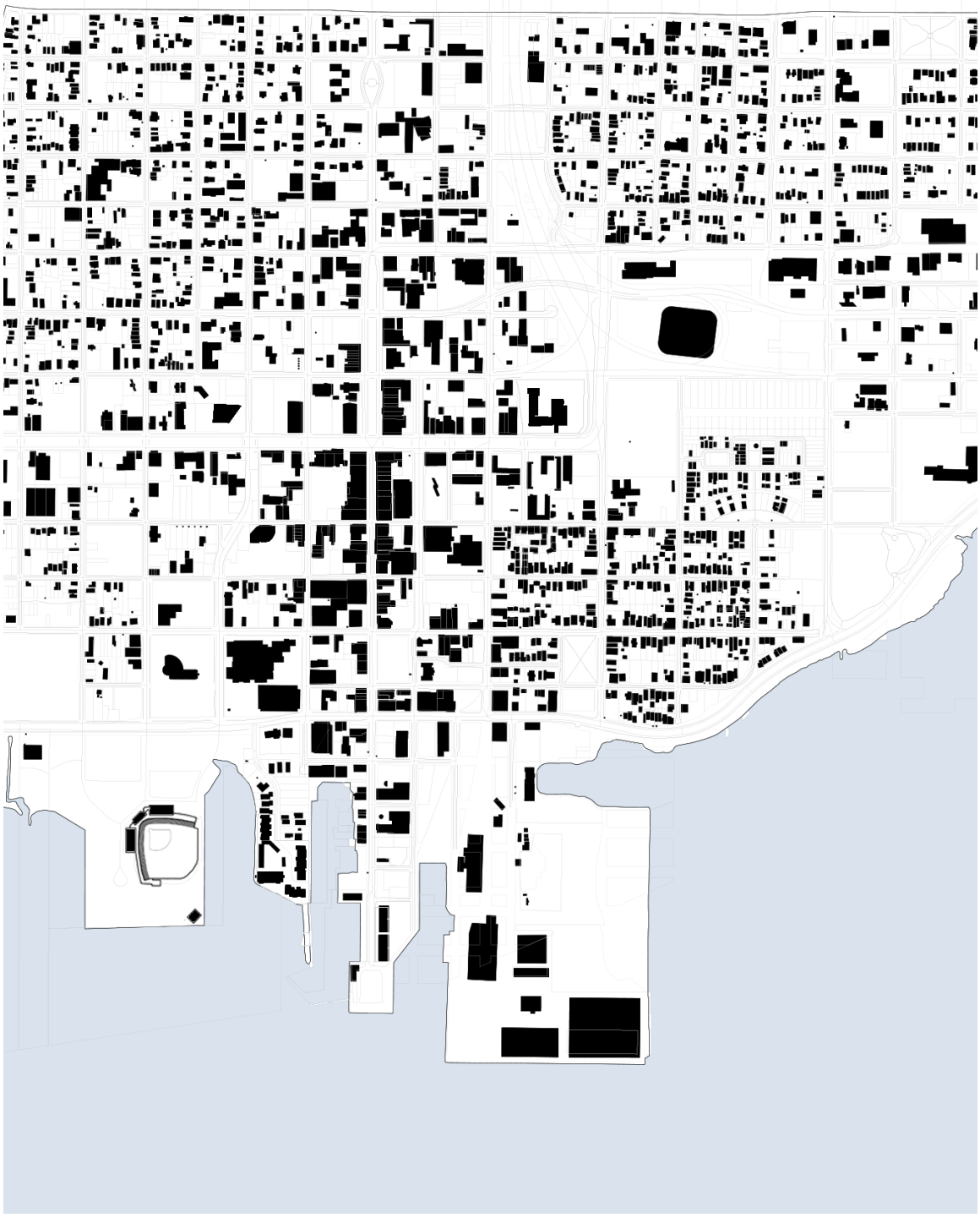

Figure 32: 2013 Figure Ground Pensacola CBD

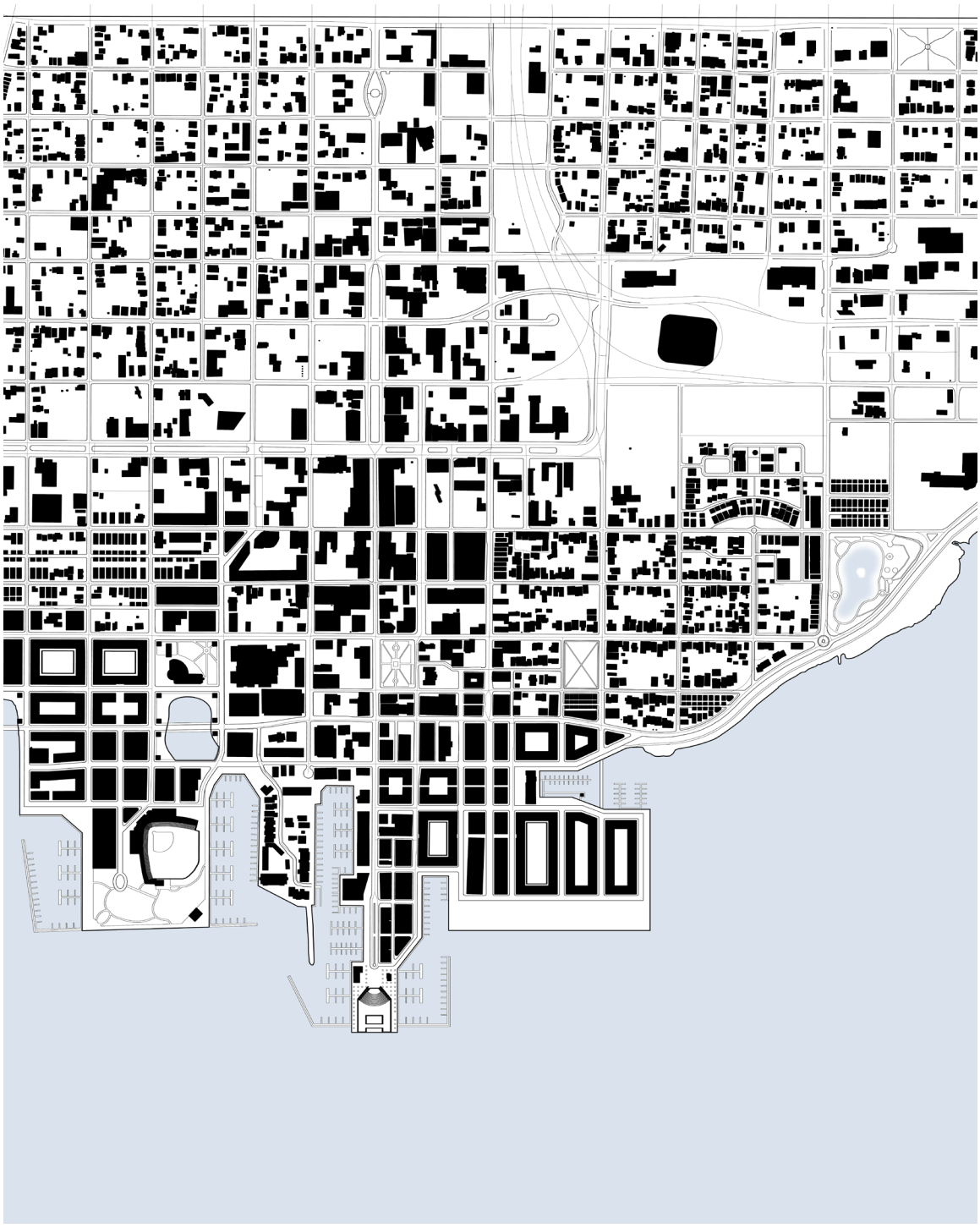

Figure 33: Proposed Figure Ground Pensacola CBD

5 | Pensacola as the Study City



Figure 34: "City of Five Flags", flags flying on Bayfront Parkway

As North America's first European settlement, Pensacola's growth can be charted from the founding of the centralized historic city to the sprawling metropolitan area that surrounds it today. Diverse downtown neighborhoods have potential to support concentrated growth. A populous metropolitan area with several economic centers surrounds the city.

History and Development

Known as the "City of Five Flags," Pensacola has been under the possession of the Spanish, French, British, United States, and Confederate States.

First Spanish Period (1559-1719)

The area was first sighted by Spanish explorer Juan Ponce de León. Three years later, Don Diego Miruelo became the first European to sail into



Figure 35: 1700 Spanish West Florida Coast Map

Pensacola Bay. Conquistador, Tristán de Luna established the first European settlement in the continental United States on Santa Rosa Island in 1559. The settlement was called “Panzacola.” Two years later, in 1516, the settlement and its fleet were destroyed by a hurricane and the site was abandoned. Two survivors managed to walk the arduous journey to Mexico City. Pensacola was permanently reestablished by the Spanish in 1698, becoming the largest city in Florida and the capital of the colony of West Florida.

French Period (1719-1722)

The French, who had established other settlements further west as Mobile and Biloxi, captured Pensacola in 1719 and remained in control for three years. A hurricane drove the French from Pensacola, and they burned the settlement

upon their retreat in 1722.

Second Spanish Period (1722-1763)

The Spanish moved the town from the storm-vulnerable barrier island to the mainland. Population growth remained modest. Missionary work with Indians and the development of Pensacola as an important port and military outpost characterized the period.

British West Florida (1763-1781)

At the close of the French and Indian War in 1763 the British took control of Pensacola. The city began to prosper during this period. Pensacola

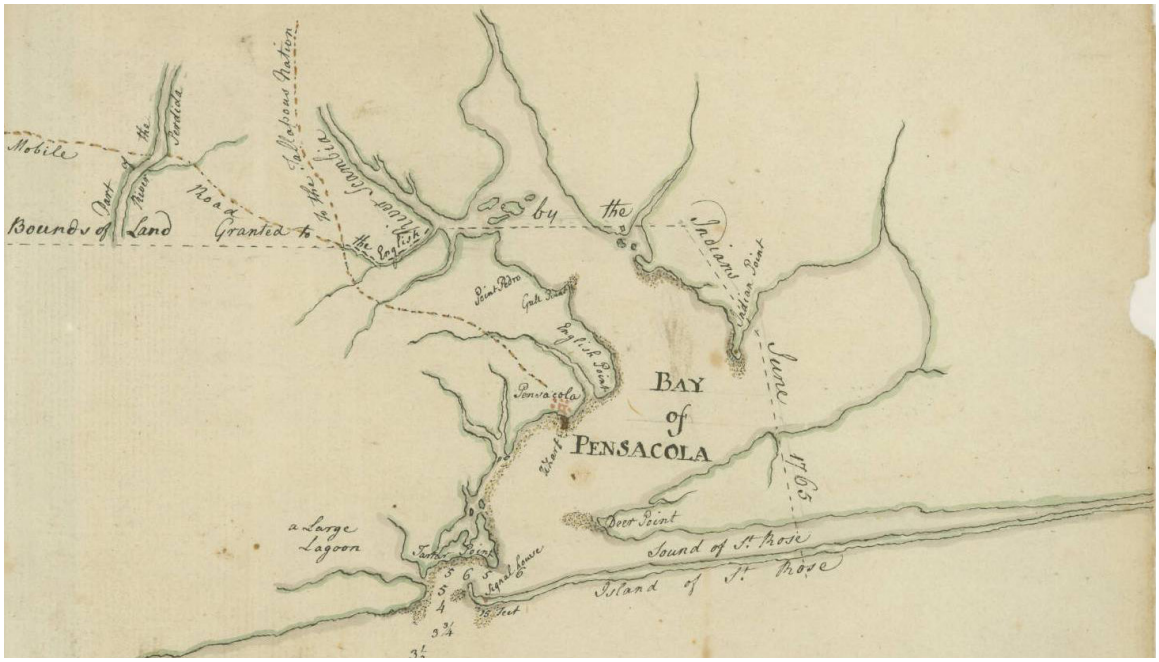

Figure 36: 1764 British Map of Pensacola Bay

was made the capital of British West Florida. The British colony of West Florida included all of the Panhandle west of the Apalachicola River, as well as southwestern Alabama, southern Mississippi, and the Florida parishes of modern Louisiana. In addition to its capital, Pensacola, British West Florida included the important cities of Mobile, Biloxi, Baton Rouge, and disputably, Natchez.

The British designed Pensacola's downtown street grid. The town was laid out in its current form around the Seville Square district by surveyor and engineer Elias Durnford.



Figure 37: 1764 Plan of British Fort George



Figure 38: 1764 British Plan of the Harbor of Pensacola

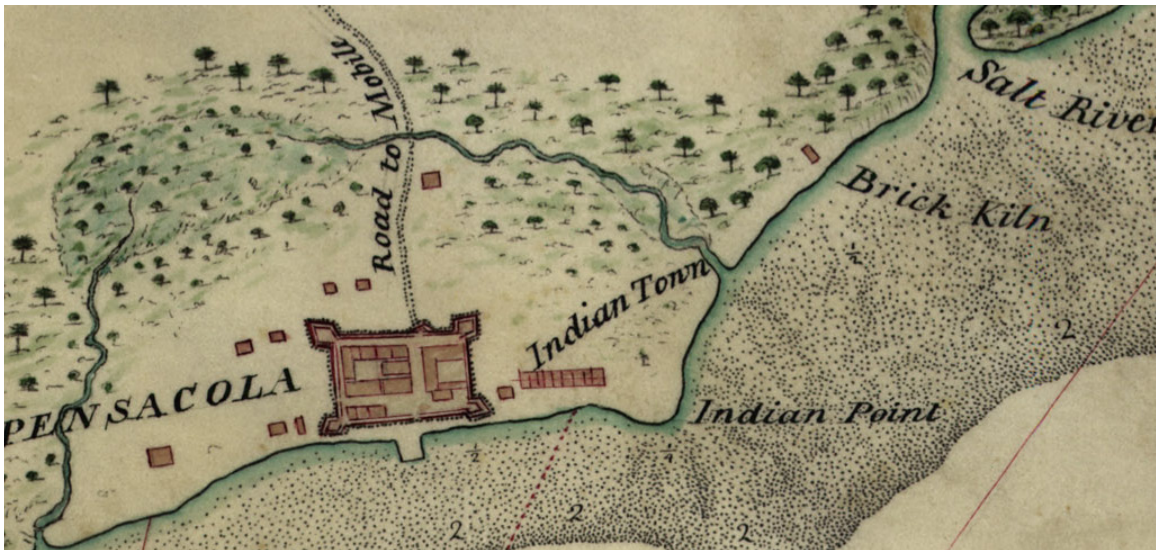

Figure 39: 1764 Plan Detail

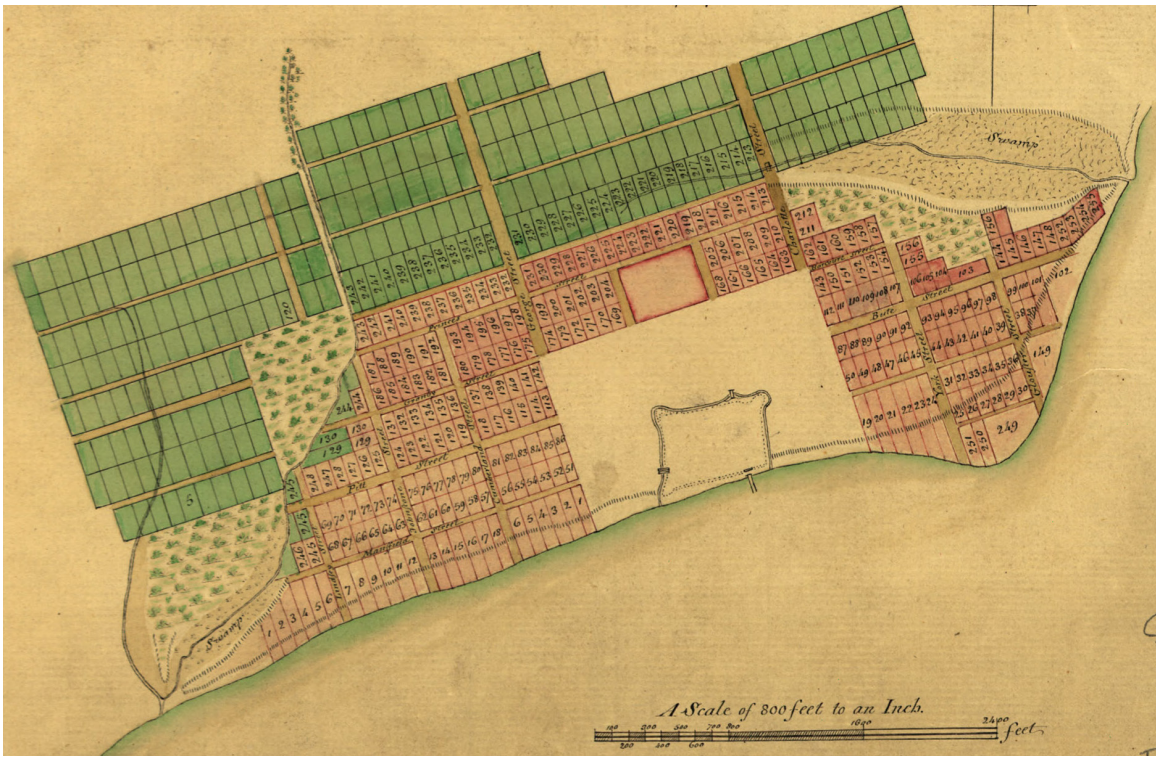

Figure 40: 1767 Plan for Pensacola. Pink parcels represent urban development and green parcels are supporting agricultural fields.

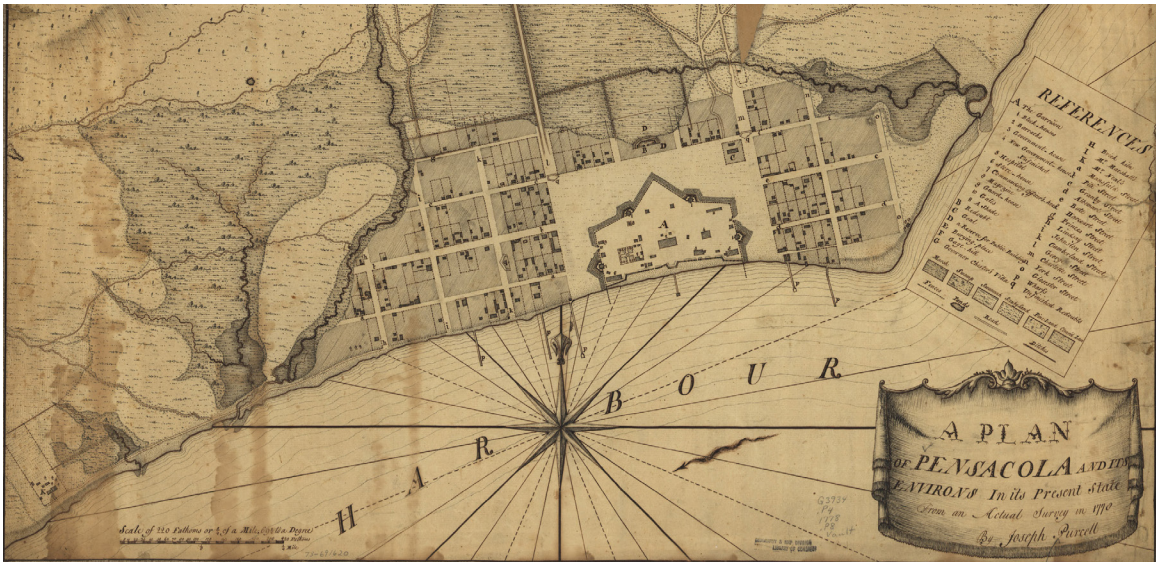

Figure 41: 1778 Drawing of Pensacola

Third Spanish Period (1781-1819)

During the American Revolution East and West Florida remained loyal to the British. The French and the Spanish allied themselves with the American rebels. In 1781, in the Battle of Pensacola, the Spanish attacked the British there and succeeded in capturing West Florida for Spain. East Florida was also given to Spain after the American victory over the British.

The Spanish now controlled the entire Gulf Coast and Mississippi River Valley, a region vital for shipment of American goods such as cotton, tobacco, and corn.

First United States Period (1819-1861)

With the help of General Andrew Jackson, the United States took control of Pensacola in 1819. In 1821, all of modern Florida was transfered to the

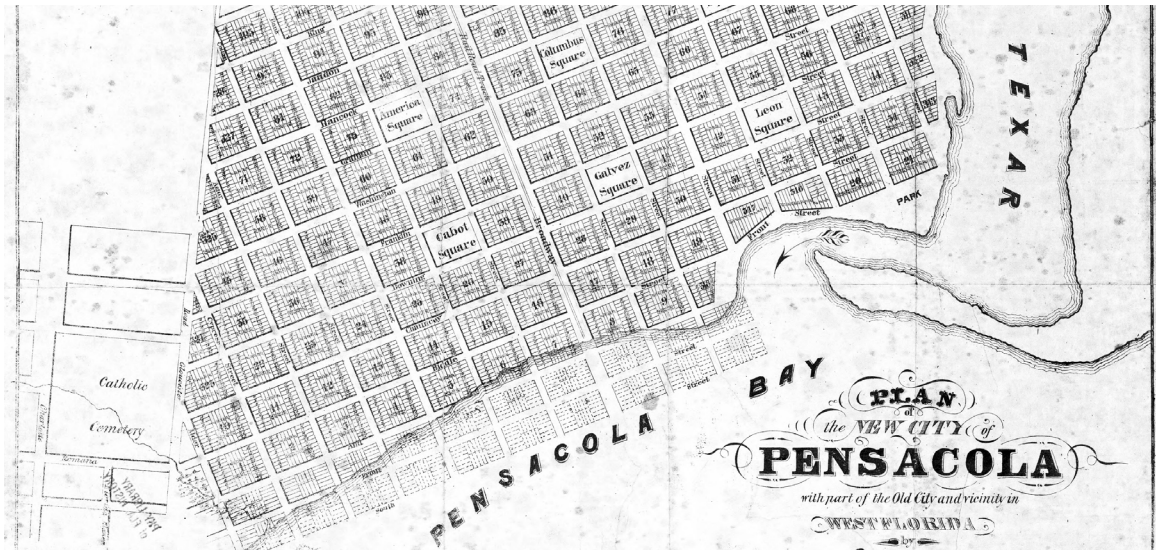

Figure 42: 1836 New City Plat (East of Downtown)

United States. Residents of Pensacola voted to become part of Alabama, however, as Pensacola was the largest city and most important port in Florida, Pensacola remained part of the American Florida territory, giving Florida its current borders for the first time.

In 1825, the area for the Pensacola Navy Yard was designated and Congress appropriated $6,000 for a lighthouse. Pensacola is home to three historic U.S. forts: Fort Pickens, Fort Barrancas, and Fort McRee.

Confederate Period (1861-1865)

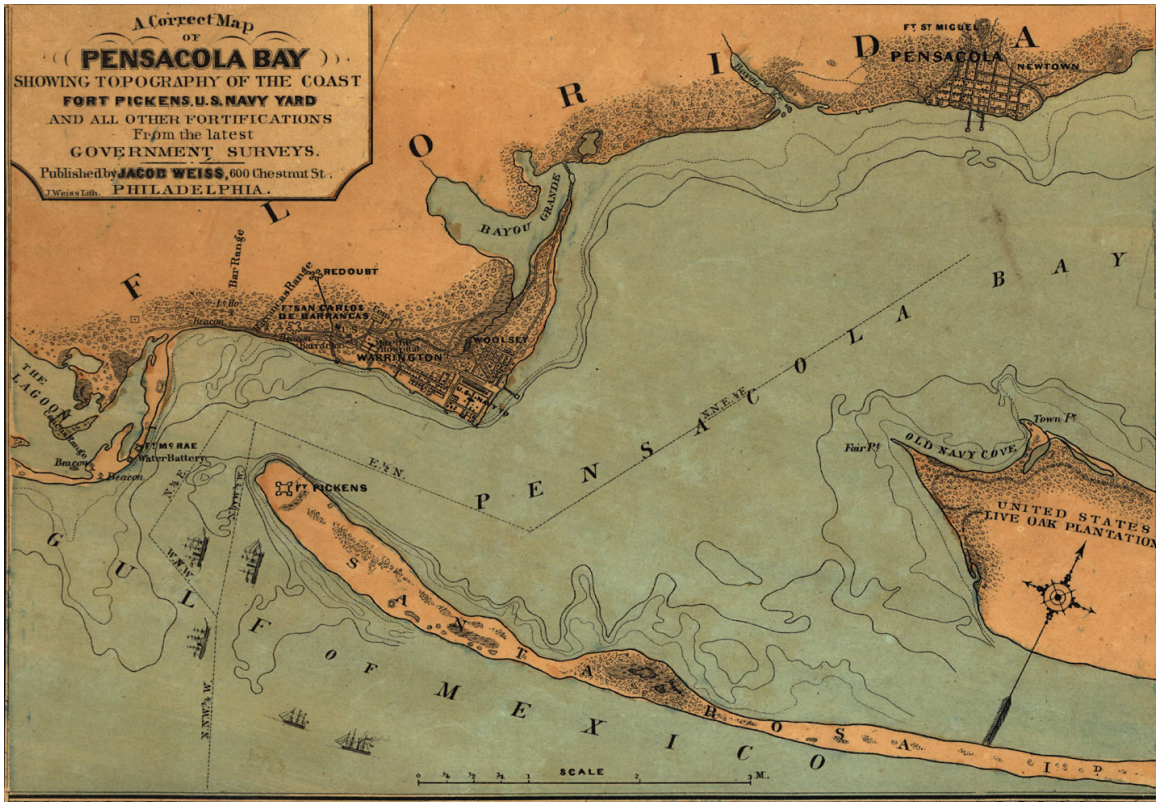

Figure 43: 1861 Civil War Map

Florida joined the Confederacy on January 10th, 1861, becoming the third state to secede from the union. Remaining union forces evacuated to Fort Pickens. The Confederacy held Pensacola until the northern invasion of the city in May 1862. The Confederate forts (Fort Barrancas and Fort McRee) fought against an invading United States army and forces stationed at Fort Pickens. Pensacola was conquered by U.S. troops and most of the city was burned. Pensacola residents evacuated north to Greenville, Alabama. Fort Pickens was never captured by Confederate forces.

Second United States Period (1865-Present)

The Civil War ravaged the economy and reconstruction was slow. Cotton remained crucial to the economy. Economic diversification and urbanization slowly returned to the area. Vast pine forest, their wood used to produce paper, became an economic basis. A brick-making industry thrived at the turn of the twentieth century. Shipping declined overtime and military and manufacturing became prominent.

In the late twentieth century the area saw a dramatic increase in the beach-based tourism industry which resulted in the rapid development of previously undisturbed barrier islands. Designation of a national and state seashore parks preserved some of the pristine barrier island land in Pensacola. A comparison of Pensacola's barrier islands to the nearby sprawling developments of Destin and Panama City proves the value of these preserves.



Figure 44: 1885 Drawing of Pensacola

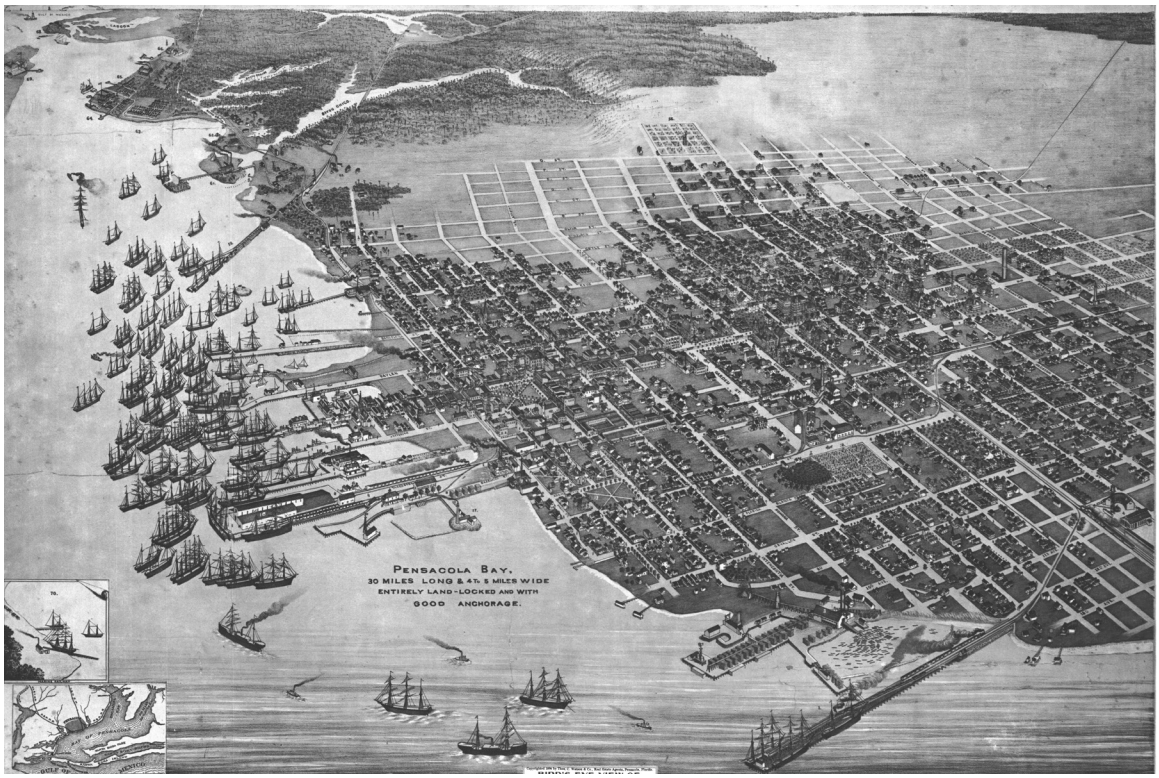

Figure 45: 1896 Drawing of Pensacola

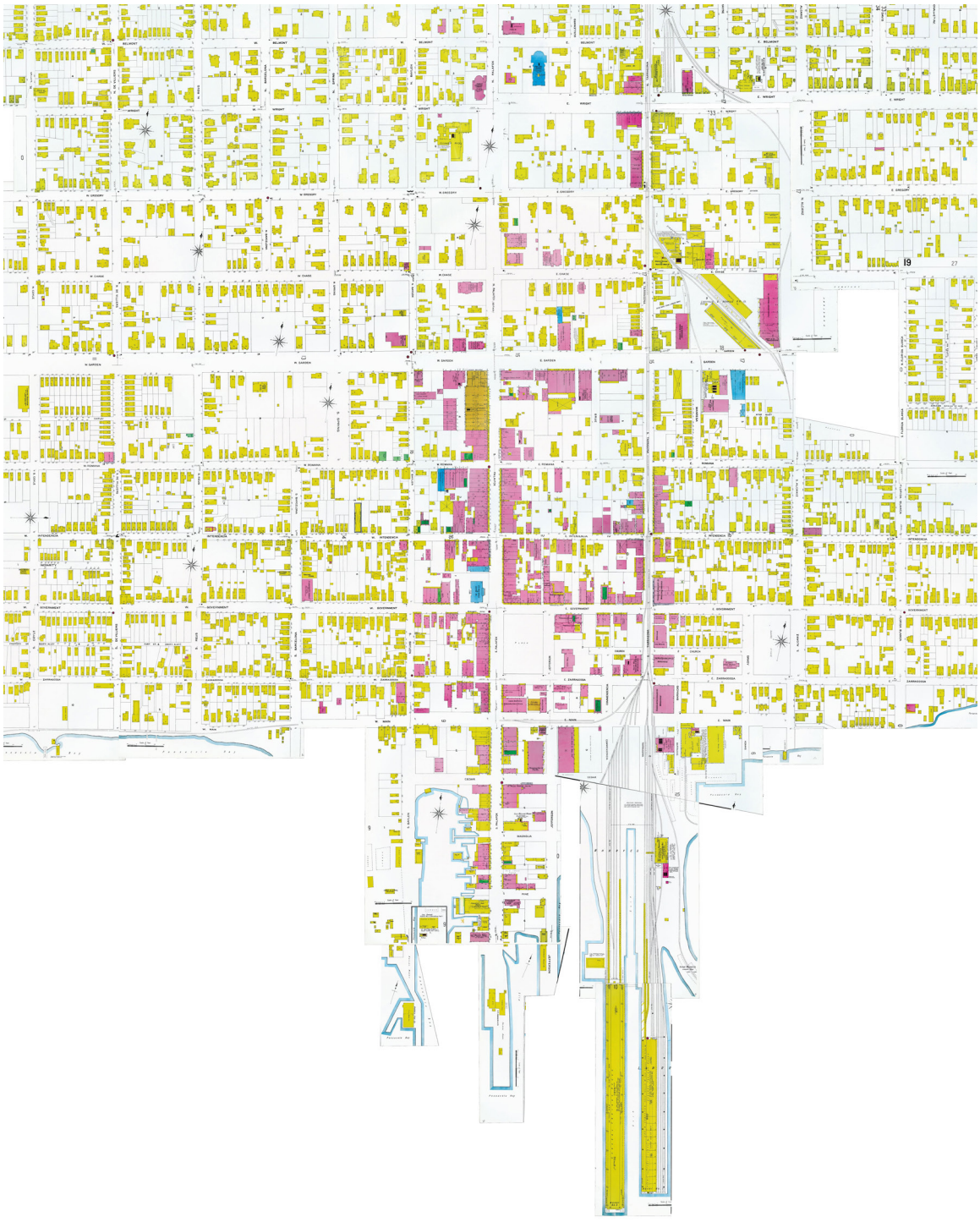

Figure 46: 1907 Compilation of Sanborn Maps



Figure 47: Drawing of Central Business District and Bay



Figure 48: 1940 Aerial



Figure 49: 2013 Aerial



Figure 50: Post Card of Palafox Pier 1896

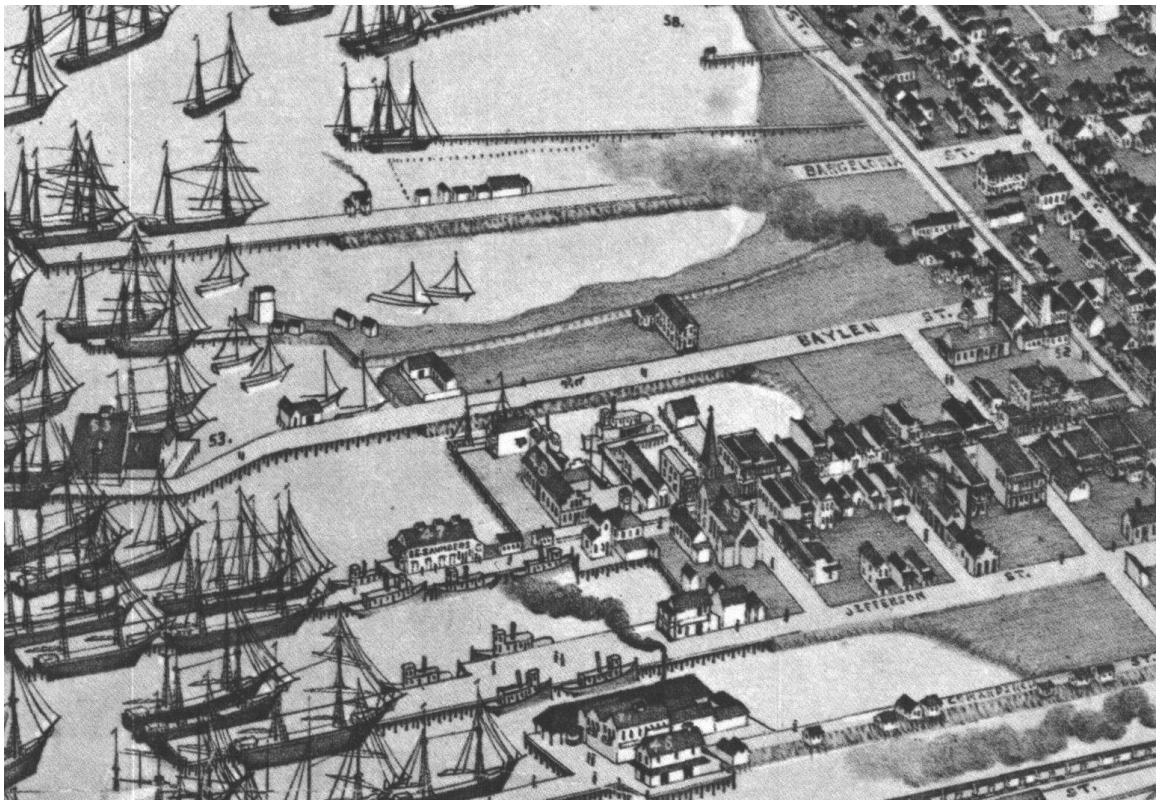

Figure 51: Palafox Pier 1896



Figure 52: Palafox Pier 2001



Figure 53: Palafox Pier 2012

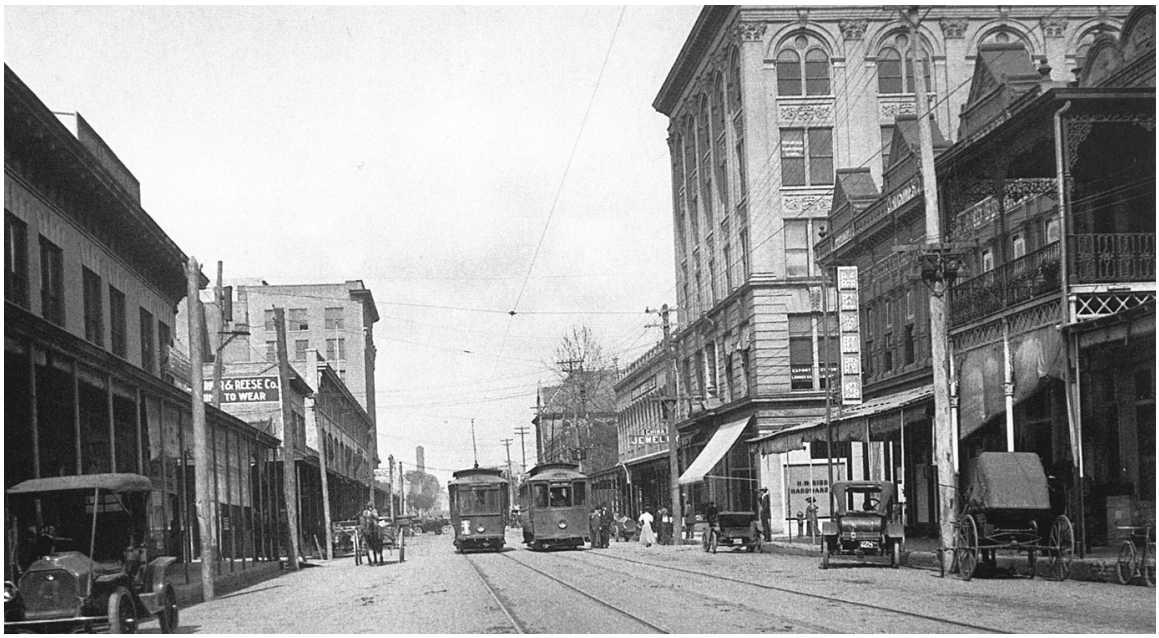

Figure 54: Palafox Street Early 1900s



Figure 55: Palafox Street 2010, Fiesta Parade

Downtown Neighborhoods

An array of culturally and economically diverse neighborhoods surround the central business district. These walkable neighborhoods have the potential to support condensed growth. All urban transect habitats are represented within the blue circle in Figure 58. Most of the surrounding gray area is low density development. Future infrastructure investments and public policy should encourage dense development within the diverse downtown neighborhoods shown in Figure 59. Future growth must occur within the existing urban fabric to preserve remaining rural and natural habitats.



Figure 56: Downtown Pensacola



Figure 57: Seville Square



Figure 58: The green-print highlights rural and natural habitats. Suburban, general urban, and urban core habitats are represented within the blue circle.



Figure 59: Neighborhoods within walking distance of downtown. The radius of the circles are increasing by 1000 feet.

Region

The Pensacola Metropolitan Statistical Area (MSA) consists of the two western most counties in Northwest Florida, Escambia and Santa Rosa. The MSA is an evolving metropolitan area, traditionally dependent on tourism and an extensive military presence. The MSA contains the cities of Pensacola, Milton and Gulf Breeze, and the towns of Century and Jay. The counties are situated along the Gulf of Mexico and the Intracoastal Waterway. The area



Figure 60: Regional Greenprint of Pensacola, FL

is strategically placed between various large southern cities. It is located approximately 60 miles from Mobile, Alabama; 200 miles from New Orleans, Louisiana; 200 miles from Tallahassee, Florida; and 325 miles from Atlanta, Georgia. Escambia County encompasses approximately 661 square miles and Santa Rosa country encompasses approximately 1,024 square miles. There is an additional 100 square miles of water area within the county boundaries.

There are four forces that have significant influence on urban development and property values in the region:

1) *Economic Forces*
2) *Social/Cultural Forces*
3) *Governmental Forces*
4) *Environmental Forces*



Figure 61: Delineation of Escambia and Santa Rosa Counties

Economic Forces

Pensacola's regional economy continues to rely heavily upon governmental expenditures, which are primarily military. However, tourism, industry, health care and education make up the majority of its workforce and economy. In an effort to diversify the past/existing labor trend, local government has intensified their efforts in securing new industry to the area.

Military personnel have had a profound effect upon the area's economy. Escambia and Santa Rosa Counties are host to numerous military installations including Naval Air Station Pensacola, Saufley Field, Corry Stations and NAS Whiting Field. Known as the "Cradle of Naval Aviation", Naval Air Station Pensacola serves as the launching point for the flight training of every Naval Aviator, Naval Flight Officer (NFO), and enlisted air crewman. In addition, approximately 32,000 aviation personnel in aeronautical technical phases of naval operations are trained here. The Pensacola Naval Complex in Escambia and Santa Rosa counties employs more than 16,000 military and 7,400 civilian support personnel.

The majority of naval activities in the area are concentrated on the west side of the metropolitan area. The largest base is NAS Pensacola, which is located southwest of Pensacola's central business district at the entrance to Pensacola Bay. Additional military facilities include Eglin Air Force Base and Hurlburt Field. These facilities are located mostly in Okaloosa County but do provide economic impact to Santa Rosa County, and to a lesser extent, Escambia County.

Thirty-five percent of Northwest Florida's economy is related to the military. This military-oriented community provides an economic impact of more than $7.8 billion a year. The financial impact of the military is approximately 20% of the total economic base, which is why it is often referred to as the 'cradle of naval aviation' and is forever recognized as a military community.

Whiting Field near Milton provides primary and intermediate flight training for the U.S. Navy. One in every six hours of flying time for the Navy across the globe is flown from there. Santa Rosa County, in partnership with the Navy, The



Figure 62: Blue Angels loop over Naval Air Station and Pensacola Pass

Nature Conservancy, the Florida Division of Forestry and others, has acquired or otherwise protected more than 20,000 acres from encroachment around Whiting Field and its six nearby landing fields.

A significant number of jobs in the service sector are provided by the health care industry. Pensacola is a regional center for medical care in Northwest Florida and South Alabama, offering specialized health care services for people in a wide multi-state area. The three regional hospitals include Baptist Hospital, Sacred Heart Hospital, and West Florida Hospital.

Social/Cultural Forces

Pensacola is home to a growing, young, diverse population and sponsors a wide variety of festivals and cultural activities. Notable festivals include the Fiesta of Five Flags, Mardi Gras, and monthly Gallery Nights. The Fiesta of Five Flags, a 10-day celebration of Pensacola's founding in 1559, is one of the oldest and largest heritage festivals in the State of Florida. Americas first Mardi Gras celebrate took place just west of Pensacola in Mobile. Mobile, Pensacola, and New Orleans all celebrate Mardi Gras extensively. Once a month Palafox Street (downtown Pensacola's main axis) is closed to auto traffic and comes alive with a block party atmosphere for Gallery Night.

Frequented cultural attractions include: the National Museum of Naval Aviation, the Saeger Theater, Pensacola Little Theatre, Pensacola Museum of Art, Historic Pensacola's Museum of Industry, Historic Pensacola's Museum of Commerce, Fort Barrancas, Fort Pickens, and the T.T. Wentworth Jr. Florida

State Museum.

Pensacola is home to the Pensacola Ice Flyers, who began playing in the 2009-2010 season as a member of the Southern Professional Hockey League. The team plays their home games in the Pensacola Civic Center. The MSA is also home to the Pensacola Blue Wahoos, who began their first season in 2012 as an AA minor league baseball team affiliated with the Cincinnati Reds. The Blue Wahoos play their games in the Pensacola Blue Wahoos Stadium at the Community Maritime Park.



Figure 63: Palafox Street Gallery Night



Figure 64: 1964 Fiesta Parade



Figure 65: Palafox Street Gallery Night

Governmental Forces

Type of Government: Santa Rosa and Escambia Counties are both governed by a board of commissioners. The various cities of Pensacola, Gulf Breeze, and Milton and the Santa Rosa and Escambia County governments all operate separate planning and zoning departments.

The City of Pensacola has 51,923 residence and the Pensacola Metropolitan Statistical Area has 461,227 residence (2010 census). Overlap and inefficiencies occur with the current system. People residing outside of the City of Pensacola benefit from its public services, cultural amenities, and economic center without paying taxes. An appropriate degree of consolidation of these different governing bodies could take advantage of economies of scale in production and eliminate overlap and suburban exploitation.

Transportation: Federal Highway Interstate 10 runs through the MSA in its course from Los Angeles, California to Jacksonville, Florida. The MSA is dissected by a more than ample system of state, county, and local roads allowing quick transit from downtown Pensacola to periphery lands and bedroom communities. The Pensacola International Airport is served by American Eagle, Continental Airlines, Delta Airlines, Northwest Airlink, US Airways, and Southwest Airlines with an average of 90 flights per day. The City of Pensacola operates the Port of Pensacola, which can accommodate ocean-going vessels with drafts up to 33 feet. Amtrak and CSX Transportation provide rail service to and from Pensacola. However, service to Pensacola's Amtrak station has been suspended since Hurricane Katrina struck in 2005. Escambia

and Santa Rosa Counties are located along a sheltered 12-foot draft barge route, which runs from Brownsville, Texas to Apalachicola, Florida. Greyhound Lines, Inc. provides bus service to and from the Pensacola MSA.

Taxes: The State of Florida has no personal income tax. Additionally, there is no sales tax on food, medicine, packaging, boiler fuels or inventories. Sales taxes targeted toward tourism (retail sales, rentals, transient living accommodations) comprise 65% to 70% of Florida's tax revenue. There is a corporate state income tax of 5.5%. Ad valorem taxes are levied on property throughout the county to provide operating revenue to local government. Escambia County sales tax is at $0.075 on the dollar and Santa Rosa County is subject to $0.065 on the dollar.

Environmental Forces

Climate: The MSA is located in a generally warm climate, typical of the region along the upper Gulf Coast. The average temperature in January is 52 degrees and in July is 83 degrees. High winds, tropical storms or hurricanes often occur in late summer and in early fall.

Topography/Soil: Topography/Soil: The MSA is located on the Gulf Coastal Plain, which generally consists of level and flat land. The soils are mostly of the sandy loam nature and are generally well suited for buildings, roads and other common urban improvements.

Recreation: Canoeing, boating, hunting, fishing and other outdoor sporting activities are popular throughout the MSA. Several popular state and

national parks are located in the MSA: Blackwater River State Park, Big Lagoon State Park, and the Gulf Islands National Seashore Park, which contains Fort Pickens.

Regional Resources: Perhaps one of the most recognized resources of the Pensacola MSA are the sparkling white sandy beaches, which extend from Mobile Bay to peninsular Florida. The beaches in the Pensacola area are a major tourist attraction.

Agriculture continues to be a major contribution to the economy. It remains one of the prime resources of the area for row crop and tree farming. There are also extensive petroleum deposits offshore in the Gulf of Mexico. However, at the current time, only exploratory drilling has been permitted. The future impact of this resource is questionable as the prospect of full production drilling is vehemently opposed by environmentalists and local and state government.

The skepticism of state officials on the issue of offshore drilling was justified by BP's oil spill in the Gulf of Mexico. The crisis started when an offshore oil-rig exploded and sank in the gulf on April 20, 2010. The incident ruptured the oil well and caused a blowout, or an uncontrollable spill. The well spewed millions of gallons of crude oil into the Gulf of Mexico. The environmental and economical repercussions of this spill were immense and continue to be seen to a lesser degree. The oil spill caused the federal government to declare a fisheries disaster for neighboring states, but Northwest Florida escaped the worst of the effects. However, the area did see dead

dolphins, fish, birds, and turtles wash up on the beaches. The realization that the oil slick could have made landfall in Pensacola reminded residents how important the beaches and waterways of the Pensacola MSA are to the economy.

Hurricanes: As Florida endures the majority of Atlantic hurricane landfalls, with statistics identifying Pensacola as having a 1 in 8 chance of being the target, hurricane damage and their repercussions are major concerns for the Pensacola MSA. As described earlier in the Housing section, Hurricane Ivan was the initial onset of the current market decline for the Pensacola MSA. The Atlantic hurricane season extends from June to November. Within the past twelve years the Pensacola MSA has encountered six damaging and even deadly hurricanes, among multiple tropical depressions, tropical storms, and minor hurricanes.

These storms, along with several other 2004-2005 Florida hurricanes, created in the general public an awareness of the vulnerability of this hurricane prone area. Due to these natural disasters frequently targeting the Escambia and Santa Rosa County areas, multiple hurricane shelters, evacuation planning guides and assistance programs, have been formed to support local residents in preparing for and dealing the outcomes of these storms. There has been no detrimental hurricanes impact the area since Hurricane Katrina in August 2005.



Figure 66: Port of Pensacola



Figure 67: Pensacola Beach in foreground, Gulf Breeze, Pensacola, and the Naval Air Station in background

6 | Proposal

A design study in Pensacola, Florida challenges conventional public policy and infrastructure investments. To preserve the countryside and natural lands infrastructure investments and public policy must encourage concentrated growth in cities. The city and countryside are codependent. An abstraction between the two zones will lead to the demise of both the city and the countryside. Infrastructure has the ability to create place and suggest future growth. New urban infrastructure should relate to public spaces creating economic, cultural, and social value in dense development. This value is achieved by generating a multiplicity of connections, program, and places within the existing urban fabric.

Design Principles

1) Consolidate local government to appropriate scale to take advantage of economies of scale in production and eliminate suburban exploitation.
2) Local government should be tiered with smaller neighborhood units providing citizens choice, in terms of the nature and level of public service provision, allowing them to “vote with their feet.”
3) Infrastructure investments should support a system of urban centers surrounded by rural and natural lands.
4) There must be a “precise dialectic between city and country side.”
5) Urban habitats should integrate all the functions of urban life.
6) Infrastructure and public services should create value in dense development.

7) Development should occur within the existing urban fabric.

8) Transportation infrastructure must relate to public space.

9) Transportation infrastructure should have multiple uses.

10) Dense urban pattern of small urban blocks should form well defined public space promoting intense social, cultural, and economic exchange.

Program

Local Government

A consolidated government will govern the entire Pensacola Metropolitan Statistical Area, taking advantage of *economies of scale* in production and *eliminating suburban exploitation*. Suburban exploitation occurs when the central city provides services (entertainment, recreation, economic center, etc.) for whole metro area and people in the suburbs benefit without paying taxes. The local government will be tiered with smaller neighborhood units. Everyone in the region will pay taxes. Big picture decisions regarding transportation infrastructure and regional planning will be made for the metropolitan area as a whole. Decisions on types of services provided (vocational or traditional schools, recreational facility or library, community garden or playground, etc.) will be made by the neighborhood units. Each community provides a different level and nature of services so voters could express their preferences by "voting with their feet."

Regional Scale

A water taxi and ferry system will link urban centers within the Pensacola Metropolitan Statistical Area. The water taxis and ferries will provide each urban center with a link to downtown and the beach. The system will encourage dense development at existing harbors. The water front at each urban center will be public space. Promenades at harbors will support the water taxi and ferry systems, while also providing a recreational amenity to everyone in the area.

Neighborhood Scale

A retrofit of Pensacola's post industrial waterfront will support this new infrastructure. A public esplanade will stretch the extent of the downtown waterfront. The esplanade will provide a spot for ferries and water taxis to dock. New city greenways will run down existing railroad right-off-way linking neighborhoods to the downtown esplanade and providing a recreational amenity. The esplanade will also provide frontage for commercial development. Downtown street grids will be reconnected and the waterfront will be redefined to create public space and engage the existing urban fabric.



Figure 68: Girl walks down existing railroad right-of-way



Figure 69: Historic Village streets are reconnected to Bayfront Parkway. Bayfront Parkway is reduced from four lanes to two. The remaining right-of-way becomes a linear park along Pensacola Bay.

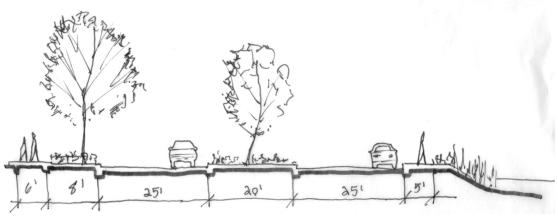

Figure 70: Existing condition of Bayfront Parkway: auto corridor creates a barrier between the Historic Village and the waterfront.

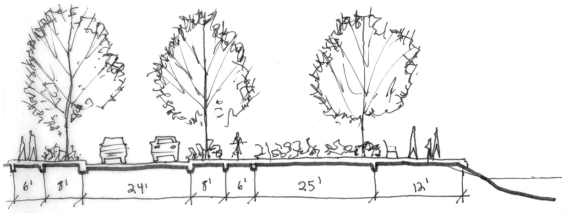

Figure 71: Proposed condition of Bayfront Parkway: walkable streets link the Historic Village to a new park along Pensacola Bay



Figure 72: Contiuous downtown esplanade connects to city greenways and provides a link between existing landmarks.



Figure 73: Greenway utilizes existing right-of-way, running along side the railroad.

Architectural Scale

A museum to the waterfront will culminate the city's main axis, Palafox Street. The building will define public space and support multiple uses to maximize activity and value. The Maritime Museum will integrate the following program:

1) The Pensacola Visitor's Center
2) Exhibit space curated by the University of West Florida's Marine Archeology and History departments
3) Pensacola's historic archive
4) Classrooms and study spaces for the University of West Florida's Marine Archeology and History departments
5) Restaurant tenant space
6) An amphitheater for gatherings, concerts, and shows
7) Outdoor event space for markets and festivals



Figure 74: Port of Pensacola



Figure 75: Downtown waterfront



Figure 76: Post industrial waterfront



Figure 77: Pensacola Pass and barrier islands



Figure 78: Couple skips across railroad trestle



Figure 79: View from Robertson Island in Pensacola Pass



Figure 80: Crumbling downtown seawall



Figure 81: Oil-rig under repair at Port of Pensacola

7 | Design Implementation

The design promotes a public policy, a regional infrastructure, an urban form, and an architectural intervention that all support dense urban centers preserving rural and natural lands. These scales are interconnected and interdependent.

Optimal Size and Structure of Local Government



Figure 82: The yellow line delineates the existing boundaries of the City of Pensacola. These boundaries will be extended to include the entire area shown above. A consolidated, tiered government will govern both Santa Rosa and Escambia counties

Efficiency in the Provision of Services

A consolidated government will govern the entire Pensacola Metropolitan Statistical Area. Decisions affecting the entire region will be made for the metropolitan area as a whole. This will eliminate the duplication and overlap of public services, take advantage of *economies of scale* in production, better manage *common pool resources* (non-exclusive, but exhaustible goods; e.g. public transit), and eliminate *suburban exploitation*.

Efficiency in the Articulation of Preferences for Public Services

The local government will be tiered with smaller neighborhood units. Decisions regarding types of services provided (vocational or traditional schools, recreational facility or library, community garden or playground, etc.) will be made by the neighborhood units. Each community provides a different level and nature of services so voters can express their preferences by "voting with their feet."

Regional Infrastructure Plan

Implementation of water taxi and ferry systems will encourage dense development around existing harbors within the metropolitan area. A retrofit of Pensacola's post-industrial waterfront supports this system while simultaneously providing a recreational and cultural amenity for the city. The water taxi and ferry systems will provide links from urban centers at harbors to downtown and to the beach.



Figure 83: Regional water taxi and ferry systems encourage dense development around existing harbors. They provide each urban center with a link to both downtown Pensacola and the beach.

Retrofit of Post Industrial Waterfront

Pensacola's post industrial waterfront provides a site for intervention. A redefined waterline engages the urban fabric and filters runoff. Reflection basins approach important civic buildings and public squares. New marinas increase the density and contribute to the character of downtown. A continuous esplanade stretches across the downtown waterfront, supporting the water taxi and ferry systems, providing a recreational amenity, and creating premium commercial frontage. Historic streets are reconnected to Bayfront Parkway. Tree-lined axes link downtown neighborhoods to the public waterfront. Diverse downtown neighborhoods develop around well defined public spaces. Palafox Pier extends out becoming the focal point of the urban form. The "Museum to the Waterfront" sits at the end of the pier culminating the already prominent axis.

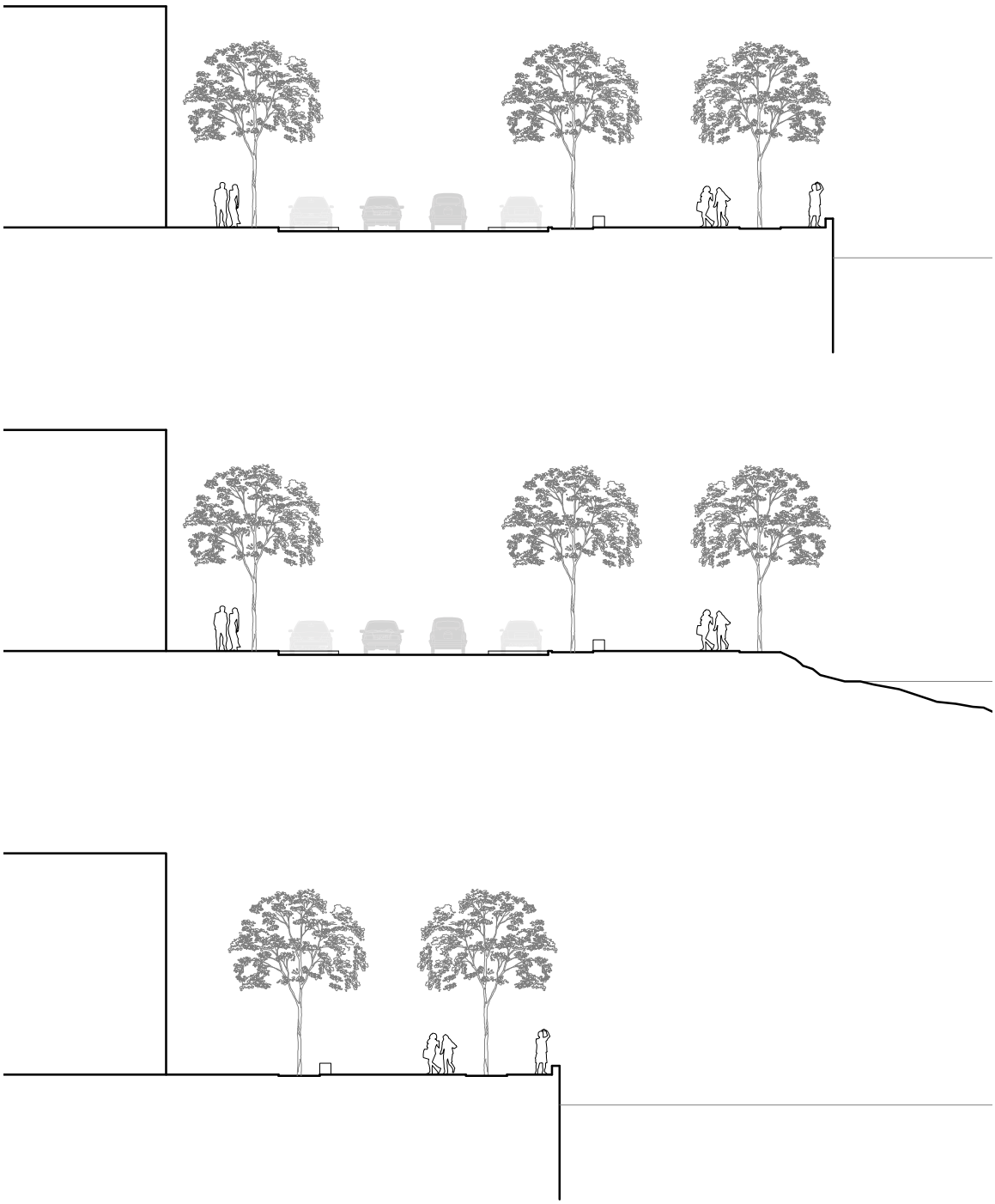

Figure 84: Typical street sections through the continuous downtown esplanade



Figure 85: Existing Figure Ground

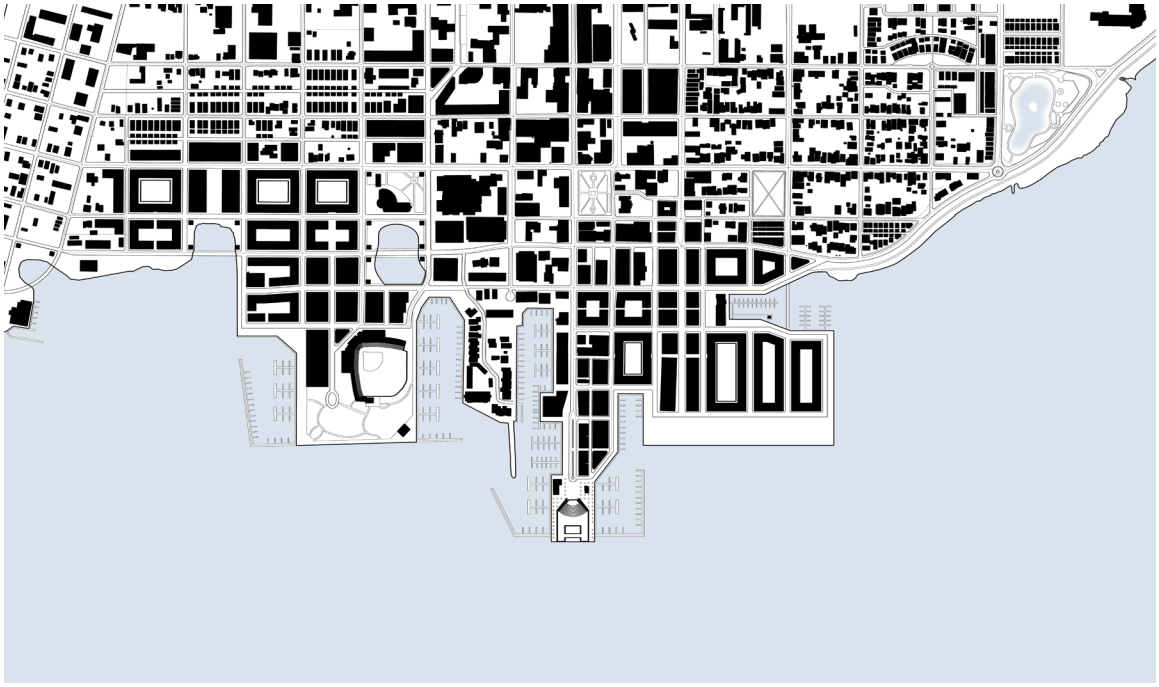

Figure 86: Proposed Figure Ground



Figure 87: Existing Aerial; Post industrial waterfront, surface parking lots, and abandoned structures provide development opportunities. Dense growth should occur within the existing fabric instead of sprawling outward.

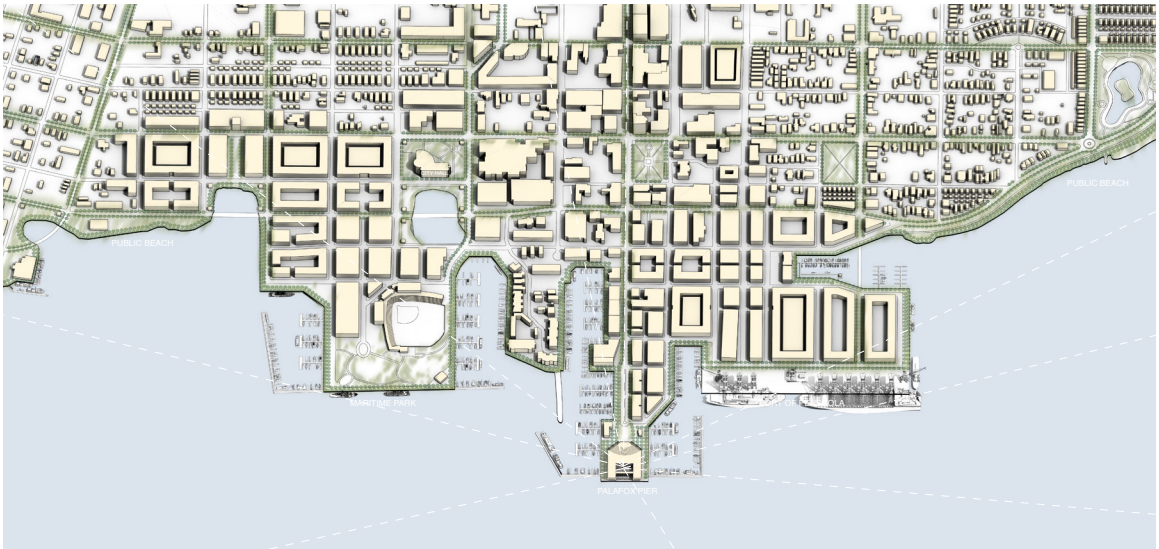

Figure 88: Proposed Axon; Dense urban pattern of small urban blocks define public space promoting intense social, cultural, and economic exchange. A redefined water-edge engages the urban fabric (e.g. reflection pond for City Hall). Axes link downtown neighborhoods to a continuous esplanade along the bay. Palafox Pier extends out becoming focal point of the urban form.

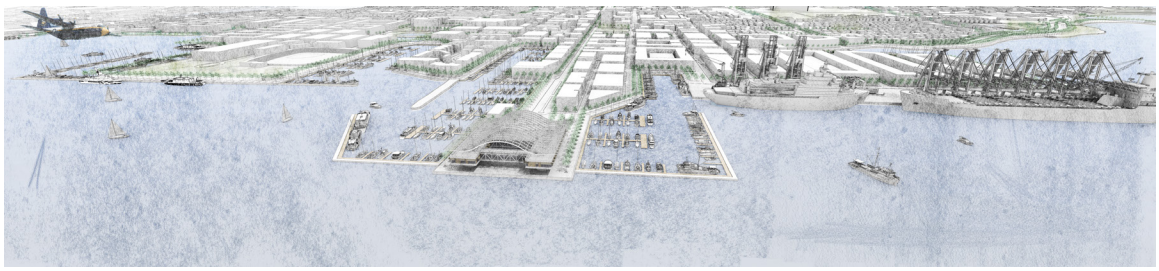

Figure 89: Downtown Waterfront



Figure 90: Blue Angles fly over Palafox Street.

Museum to the Waterfront

The Maritime Museum is an atrium and courtyard building. An entrance sequence from Palafox Street, into the Visitor's Center, through the museum atrium, and out into a breezy courtyard builds excitement. University of West Florida classrooms, study spaces, and historic archives are organized around the atrium and courtyard. Students using the study spaces control daylighting

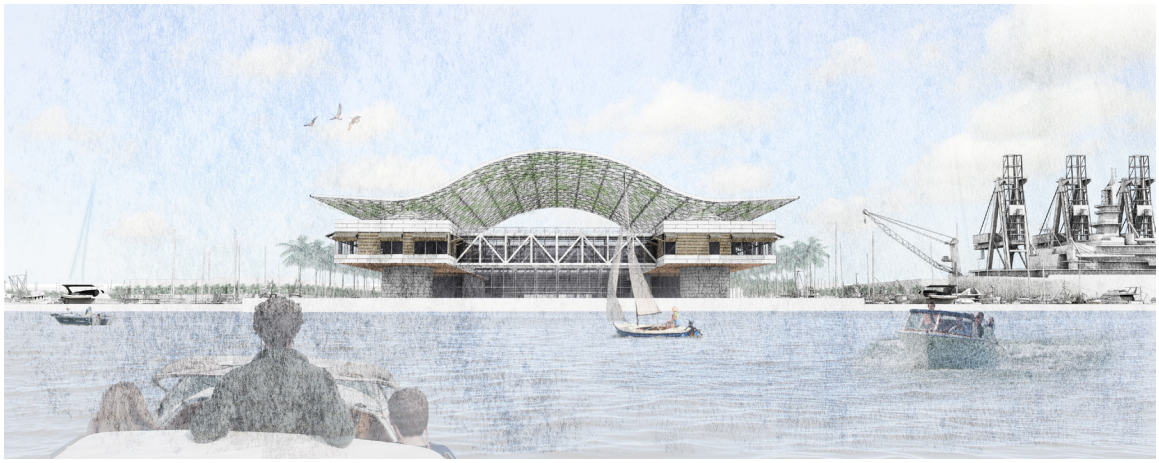

Figure 91: Water taxi approaches Palafox Pier.

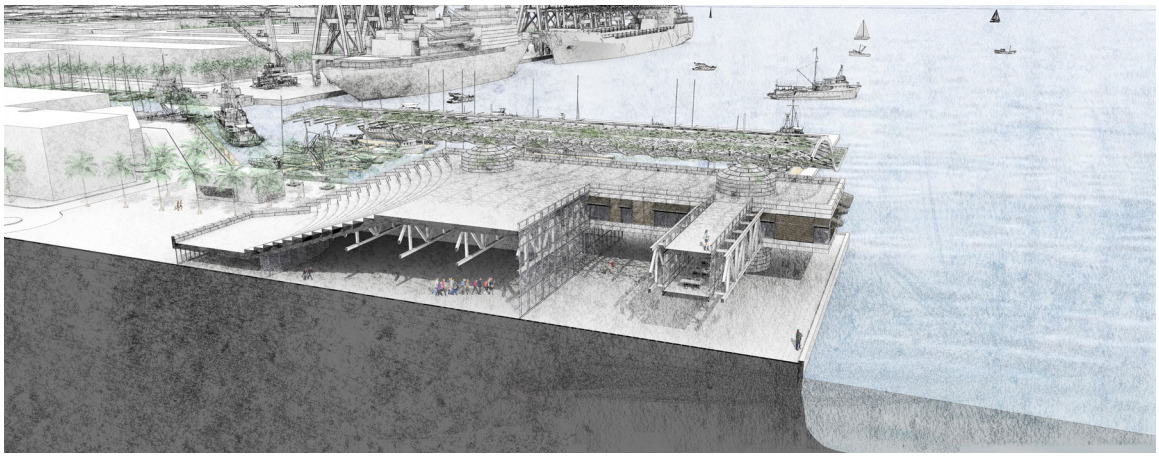

Figure 92: Longitudinal Section

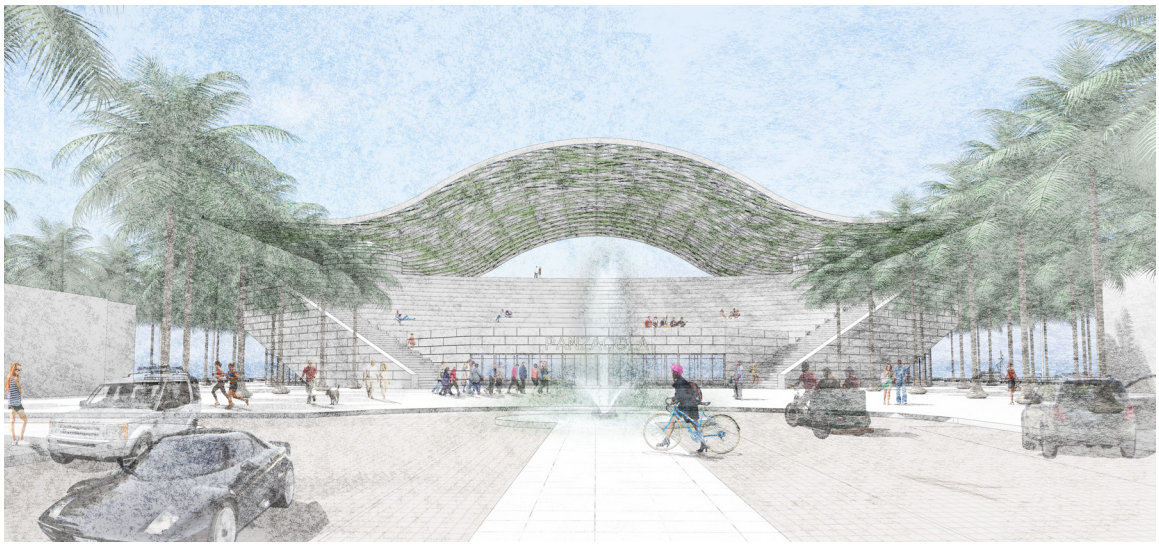

Figure 93: Building culminates the view down Palafox Street and becomes a poster card image for Pensacola.

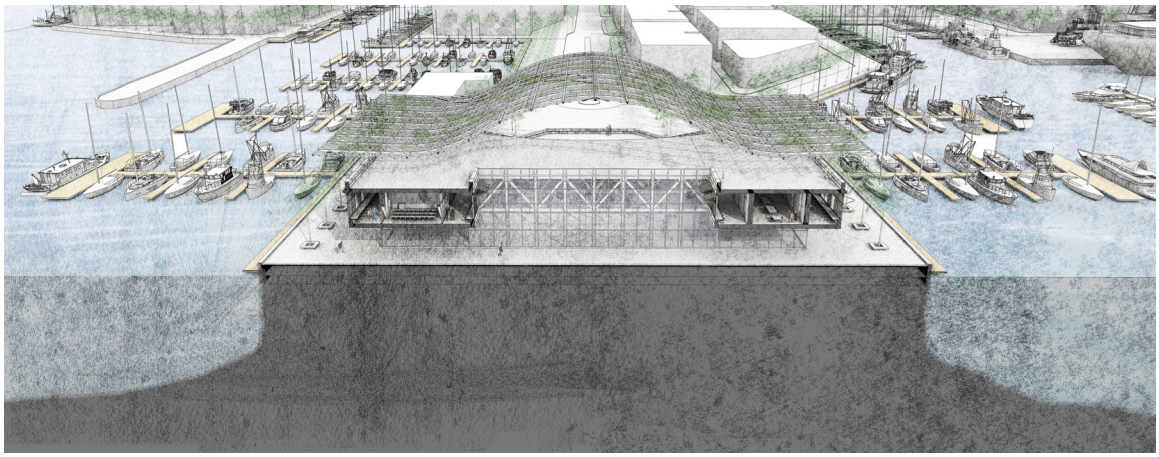

Figure 94: Cross Section

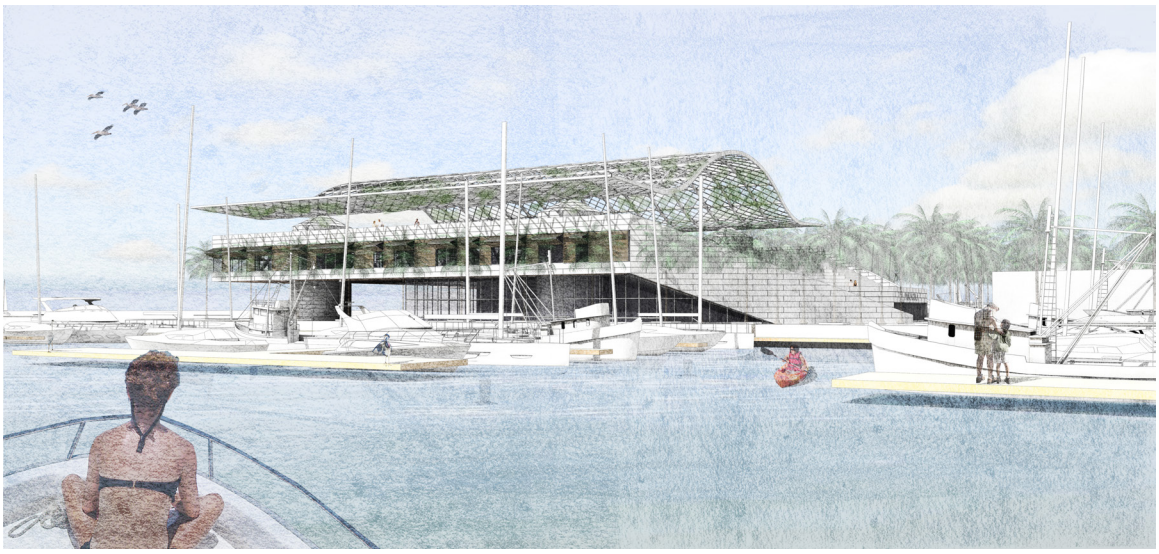

Figure 95: A new marina surrounds the building. Citizens fish off docks and boat residence increase the vibrancy and density of downtown.

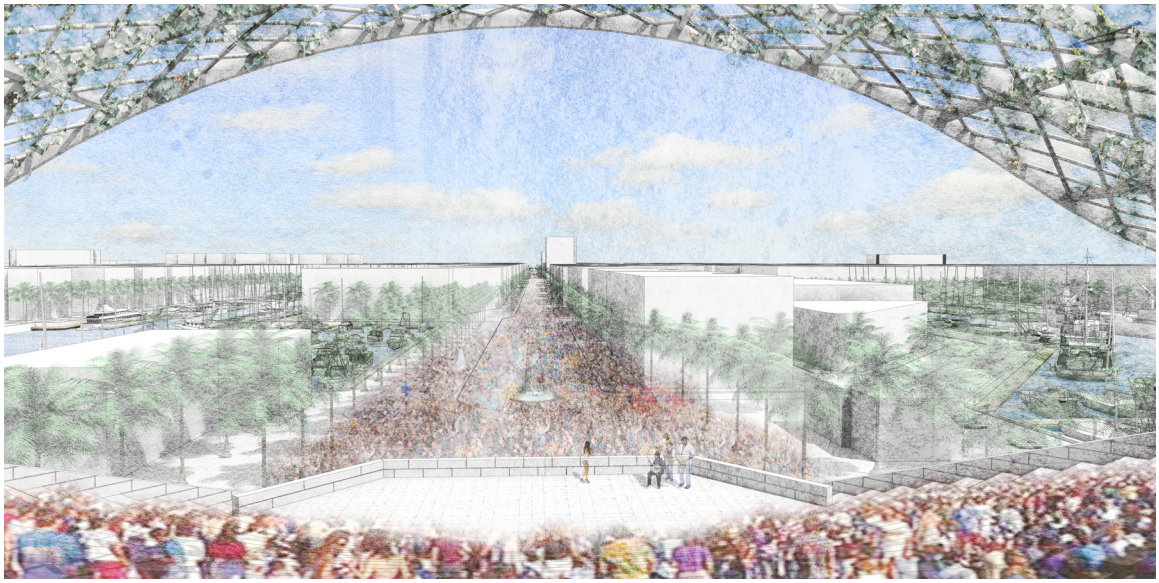

Figure 96: Pensacolians gather in amphitheater for Mardi Gras parade. Confederate Jasmine climbs steel pergola providing shade over amphitheater and elevated plaza. Amphitheater looks back down Palafox Street accentuating the prominent axis.



Figure 97: Pedestrians enjoy shade under arcade. Activity from Oyster Bar and Maritime Museum pours out onto Public Esplanade. Bohemian shutters allow students to control natural lighting in study spaces above. Views of harbor for all.

with vernacular bohemian shutters. The building maximizes public space with an amphitheater looking back down Palafox Street and a raised public plaza providing views across Pensacola Bay. Confederate Jasmine climbs up steel trellising providing shade over the amphitheater and elevated plaza. The form culminates the prominent Palafox Axis and becomes a poster card image for Pensacola.

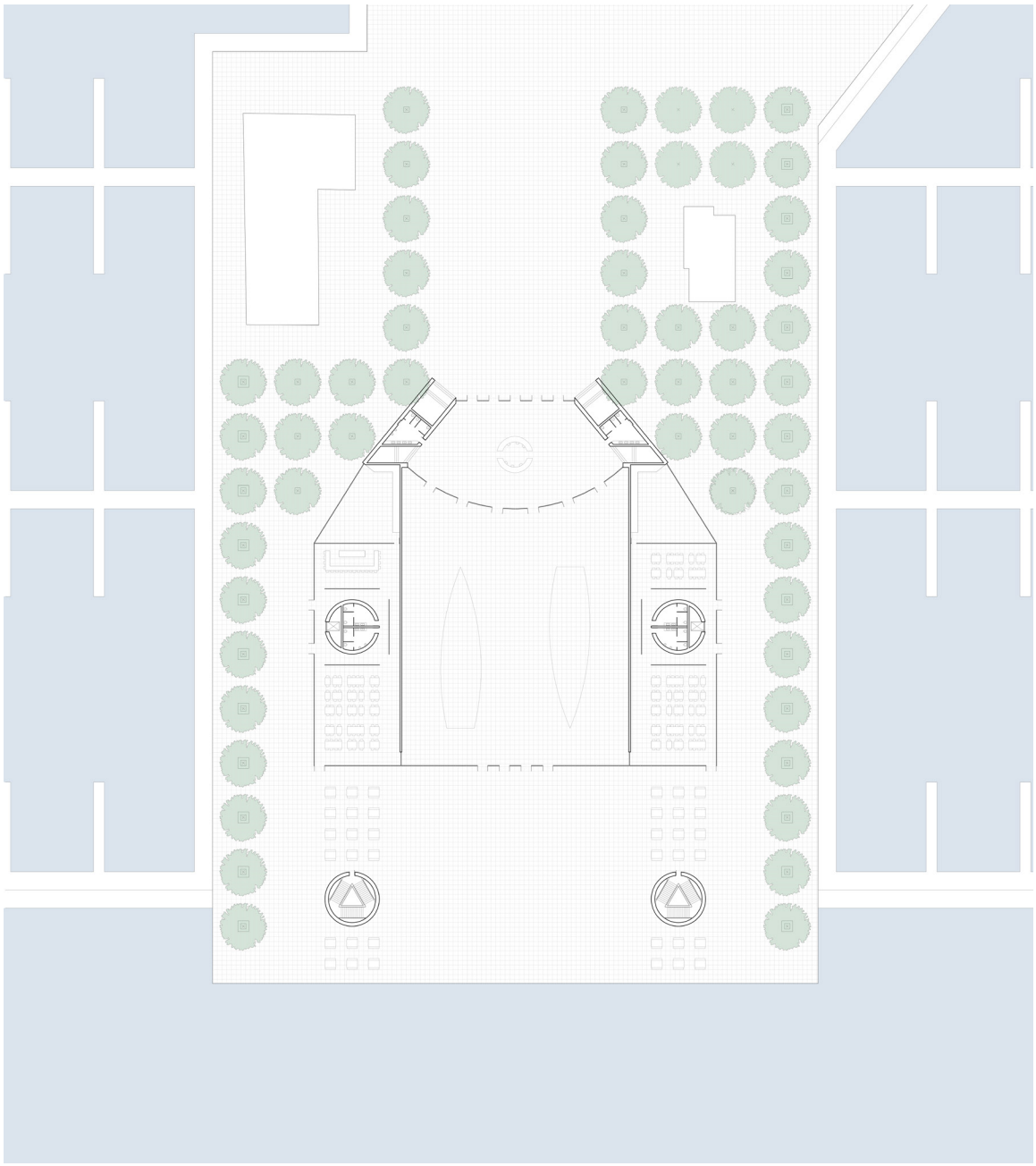

Figure 98: Pier Level; Oyster Bar and Sanders Seafood Restaurant spill out onto esplanade. Visitor's progress from Palafox Street, into Visitor's Center, through Maritime Museum, and out to enjoy breeze off bay in the courtyard.

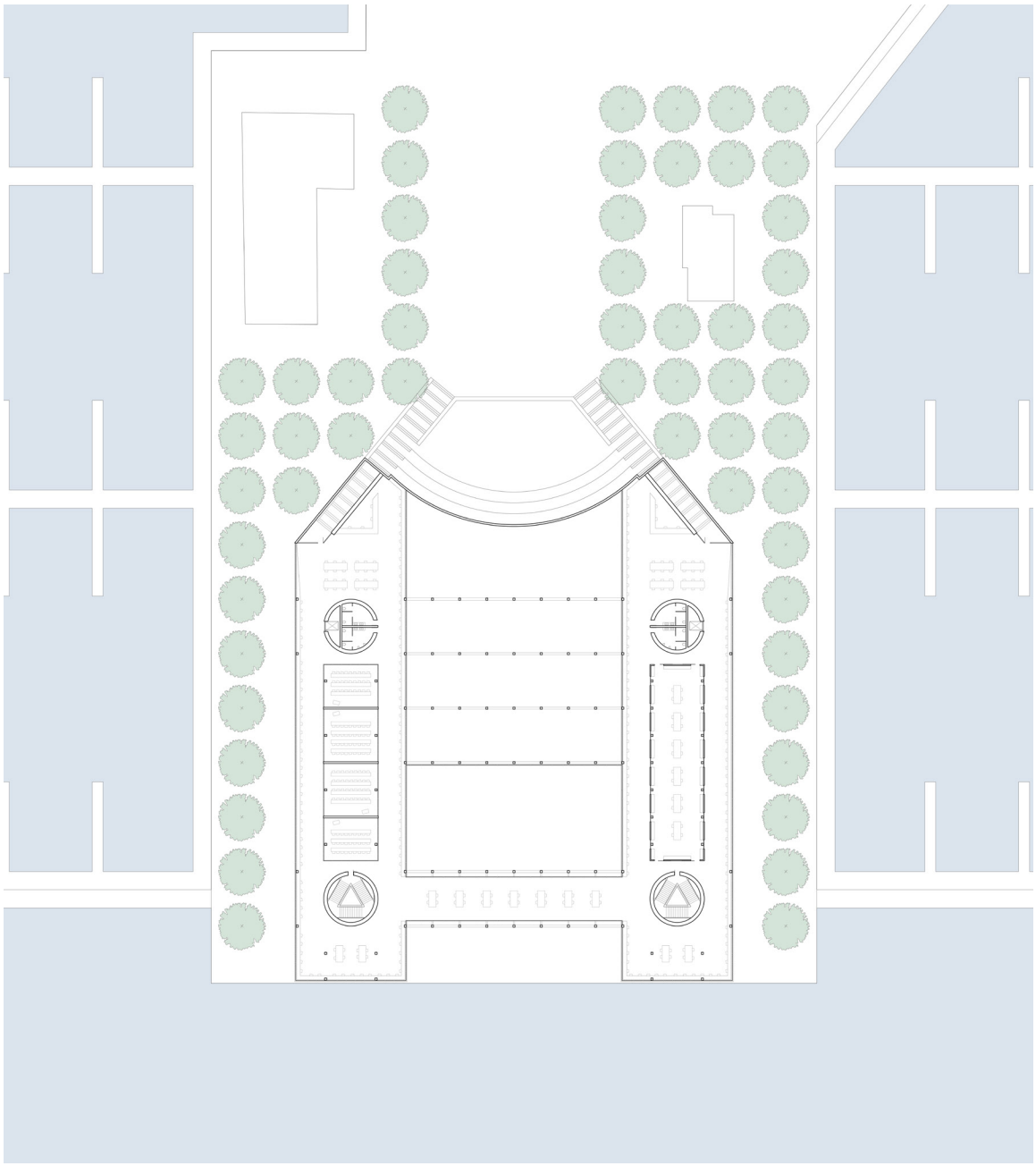

Figure 99: Second Level; The museum is an atrium building. Classrooms, study spaces, and the historic archive are organized around the atrium and courtyard.

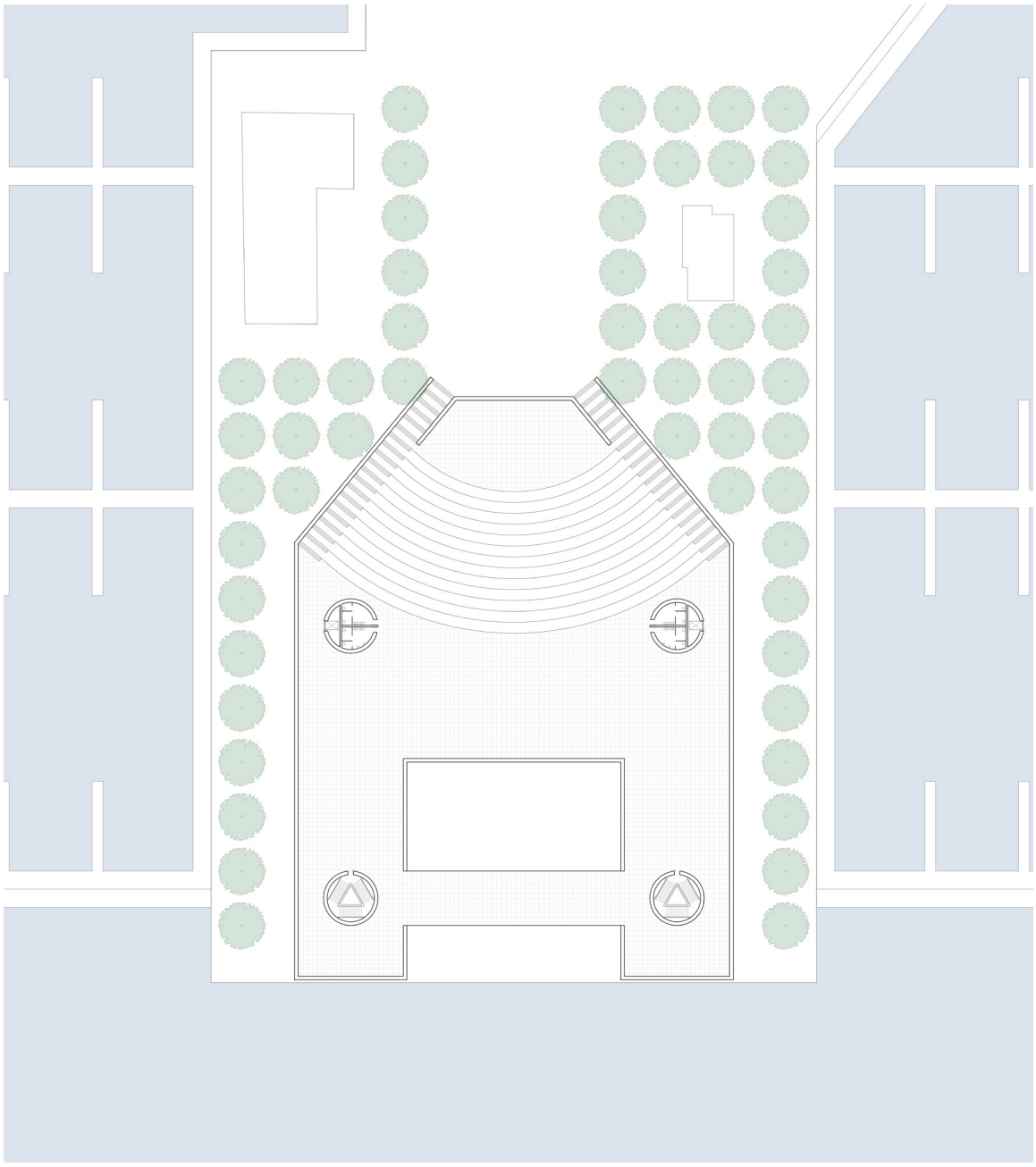

Figure 100: Plaza Level; The building maximizes public space. Pedestrians progress up the amphitheater onto a raised plaza providing views of barrier islands across Pensacola Bay and back at the cityscape.

8 | Conclusion

People misconceive infrastructure as an isolated mono-functioning entity. However as this thesis points out, through a comparison of the ideal city and urban economic models, it is much more than this. Infrastructure defines the framework of society. It supports and facilitates human activity, and has the ability to suggest growth.

Infrastructure demands the attention of professionals in varying fields. Engineers offer technical, structural, and functional expertise. However, the design of a societies infrastructure cannot be limited to the expertise of one profession. The design of infrastructure transcends interrelated and interdependent scales from public policy, to regional planning, to neighborhood development, all the way down to the detailing of buildings, flood control systems, etcetera. The design of infrastructure is an interdisciplinary field requiring the collaboration of professionals with backgrounds in design, engineering, economics, real estate, environmental studies, political science, and more. As professionals who know a little about a lot, architects and urban designers should lead this effort. The design of a successful system requires everyone to see the big picture. Great cities start with a vision.

The design study in Pensacola demonstrates how infrastructure that relates to public space and has multiple uses maximizes its value to society. The water taxi and ferry systems require minial investment by capitalizing on a local resource, waterways. The public waterfront supporting this infrastructure at harbors provides a recreational amenity to everyone in the city and creates premium commerical frontage for local businesses.

The uses of railroad right-of-ways for city greenways turns a negative externality into a positive one. Without diminishing the effectiveness of the original rail system, the greenways provide recreational space and a transportation alternative.

The incorporation of educational space, commercial tenant space, an amphitheater, and a elevated public plaza into the design for the Maritime Museum maximizes activity and public space.

Development within the existing urban fabric conserves periphery lands for agricultural use. Dense development takes advantage of the benefits of agglomeration economies. A dense pattern of small urban blocks forms well defined public space promoting intense social, cultural, and economic exchange.

To preserve the countryside and natural lands infrastructure investments must encourage concentrated growth in cities. New urban infrastructure should relate to public spaces creating economic, cultural, and social value in dense development. This value is achieved by generating a multiplicity of connections, program, and places within the existing urban fabric.

List of References

Appleyard, Donald. Toward an Urban Design Manifesto. Berkeley: Institute of Urban & Regional Development, University of California, 1982. Print.

Alonso, William. Location and Land Use. Cambridge, MA: Harvard University Press, 1964

Alonso, William. “A Theory of the Urban Land Market.” In Readings in Urban Economics. ed. Matthew Edel and Jerome Rothenberg. New York: Macmillan. 1972

Barrie, Thomas. Spiritual Path, Sacred Place: Myth, Ritual, and Meaning in Architecture. Boston: Shambhala, 1996. Print.

Bourke, Julia. Thematic Studies in Architecture. Princeton, NJ: Princeton Architectural,1983. Print.

Brebbia, C. A., S. Herná ndez, and Enzo Tiezzi. The Sustainable City VI: Urban Regeneration and Sustainability. Southampton, U.K.: WIT, 2010. Print.
-The Highway and the American City, Ted Shelton

Broadbent, Geoffrey, and C. A. Brebbia. Eco-architecture II: Harmonisation between Architecture and Nature. Southampton, UK: WIT, 2008. Print.
-Visualizing Sustainability in Urban Conditions, Ted Shelton

Brueggeman, William B., and Jeffrey D. Fisher. Real Estate Finance and Investments. Boston: McGraw-Hill Irwin, 2008. Print.

Brueckner, Jan K., Jacques-Francois Thisse, and Yves Zenou. “Why Is Central Paris Rich and Downtown Detroit Poor? An Amenity-Based Theory.” European Economic Review 43 (1999), pp. 91-107

“Center for Applied Transect Studies.” Center for Applied Transect Studies. Web. 16 Feb. 2014. <http://www.transect.org/transect.html>.

Crawford, Margaret, “Contesting the Public Realm: Struggles Over Public Space in Los Angeles,”Journal of Architectural Education 49/1 (1995), pp. 4-9

Deming, M. E. and Swaffield, S. “Integrating Design and Research” in Landscape Architecture Research Inquiry, Strategy, Design Hoboken, NJ: John

Wiley & Sons, Inc, 2011, pp. 48- 64.

Diamond, B. (2010), Safe Speech: Public Space as a Medium of Democracy. Journal of Architectural Education, 64: 94–105.

Duany, Andres, Plater-Zyberk, Elizabeth. The Lexicon of the New Urbanism. [S.l.]: Duany Plater-Zyberk & Co., 2000. Print.

Duany, Andres, Jeff Speck, and Mike Lydon. The Smart Growth Manual. New York: McGraw-Hill, 2010. Print.

Duany, Andres, Elizabeth Plater-Zyberk, and Jeff Speck. Suburban Nation: The Rise of Sprawl and the Decline of the American Dream. New York: North Point, 2000. Print.

Etlin, Richard A. Symbolic Space: French Enlightenment Architecture and Its Legacy. Chicago: University of Chicago, 1994. Print.

Glass, R. (1964) 'Introduction: Aspects of Change,' in Centre for Urban Studies (ed.) London: Aspects of Change (London: MacKibbon and Kee) 37

Jacobs, Allan, "Starting to Look" and "Observing and Interpreting Naglee Park," in Looking at Cities, Cambridge, MA & London, England: Harvard, University Press 1985, pp. 1- 29

Judd, Dennis R., and Dick W. Simpson. The City, Revisited: Urban Theory from Chicago, Los Angeles, and New York. Minneapolis: University of Minnesota, 2011. Print.

Krier, Leon, and Demetri Porphyrios. Houses, Palaces, Cities. London: Architectural Design, 1984. Print.

Krier, Léon, Dhiru A. Thadani, and Peter J. Hetzel. The Architecture of Community. Washington, DC: Island, 2009. Print.

Leccese, Michael, and Kathleen McCormick. Charter of the New Urbanism. New York: McGraw Hill, 2000. Print.

LeRoy, Stephen, and Jon Sonstelie. "Paradise Lost and Regained:

Transportation Innovation, Income, and Residential Segregation." Journal of Urban Economics 13 (1983), pp. 67-89

Meyboom, A. (2009), Infrastructure as Practice. Journal of Architectural Education, 62: 72–81.

Miljacki, A. (2011), From Model to Mashup: A Pedagogical Experiment in Thinking Historically about the Future. Journal of Architectural Education, 64: 9–24.

Mills, Edwin S. "The Value of Urban Land." In The Quality of the Urban Environment. H. Perloff. Washington. DC: Resources for the Future. 1969

O'Sullivan, Arthur. Urban Economics. Boston: McGraw-Hill/Irwin, 2007. Print.

"Pensacola." Pensapedia, the Pensacola Encyclopedia. Web. 18 Mar. 2014. <http://www.pensapedia.com/wiki/Main_Page>.

"The Original Green." The Transect. Web. 16 May 2014. <http://www.originalgreen.org/blog/the-transect.html>.

Vannini, Phillip, Dennis D. Waskul, and Simon Gottschalk. The Senses in Self, Society, and Culture: A Sociology of the Senses. New York: Routledge, 2012. Print.

Waldheim, Charles, "Precedents for a North American Landscape Urbanism," On Landscape Urbanism: Center 14, pp. 292-303.

"Welcome to an Engaged Community." City of Pensacola, Florida. Web. 16 Apr. 2014. <http://www.cityofpensacola.com/>.

Wheaton, William. "Income and Urban Residence: An Analysis of Consumer Demand for Location." American Economic Review 67 (1977), pp. 620-631

Vita

William Brantley was born and raised in Pensacola, where he attended public school at Pace High. His interest in architecture was invoked building tree forts as a child. He graduated from Clemson University with a Bachelor of Arts in Architecture degree in 2012. While attending Clemson he spent a summer studying in New York City, studied abroad for a semester in Genoa, Italy and gained invaluable experience interning at SMP Architecture in Pensacola. William received a Master of Architecture Degree from the University of Tennessee Knoxville in 2014. He will soon begin his career at tvsdesign in Atlanta, Georgia.