

ABSTRACT

Title of Thesis: SHIFTING SCALES, ADJUSTING LENSES:
A FRAMEWORK FOR INVESTIGATING
BALTIMORE’S URBAN VACANCY

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This thesis addresses contemporary gaps of vacancy within literature by using qualitative and quantitative methods and tools to determine the quantity, location, and interspatial relationships of vacant buildings and lots located in Baltimore Maryland. Spatial analyses were conducted to answer three questions of vacancy: 1) how many vacant lots and vacant buildings exist, 2) whether there are spatial patterns of vacancy, such as clustering around geographic locations or within watersheds, and 3) how to prioritize intervention opportunities that respond to the city's larger issues? Two concepts emerged from these investigations. Using the city’s vacant lot and vacant building data-sets, this study found that 49% of the approximate 7,000 acres of vacant land in the city are parks, natural corridors, or cemeteries. These lands are **Utilized Landscapes**, lands that serve a function but have un-traditional qualities that make them susceptible to being labeled “vacant.” Ultimately, these interspatial

examinations of vacant land exposed relevant **Transitional Zones**, geographical areas with a high density of vacant buildings or lots that should be prioritized.

SHIFTING SCALES, ADJUSTING LENSES:
A FRAMEWORK FOR INVESTIGATING BALTIMORE'S URBAN VACANCY

by

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Dedication

This thesis was more than a series of investigations; it was a journey—one I would like to dedicate to my family:

To my father, who saw the path I needed to travel down before I knew it.

To my mother, my role model of courage, strength, and determination.

To my brother, who taught me success comes to those who hustle and have a sense of humor.

To my sister and her lovely husband, for equipping me with laughter and a laptop.

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Table of Contents

Dedication	ii
Acknowledgements	iii
Table of Contents	iv
List of Tables	vi
List of Maps	vii
List of Illustrations	vii
List of Abbreviations	ix
Chapter 1: Introduction	1
Chapter 2: Defining and Measuring Vacancy.....	6
Defining Vacancy	6
Quantifying Vacancy	14
Comparison of Vacant Land Estimates in Baltimore, Maryland	17
Conclusion	19
Chapter 3: Spatial Patterns of Vacant Buildings and Lots in Baltimore, Maryland ...	21
Investigation of the Distribution of Vacant Lots and Buildings	21
Baltimore’s Vacant Land	23
Methodology	25
<i>Removing Assumption 1: The Data is Inaccurate</i>	26
<i>Removing Assumption 2: The Relationship of City Features to Vacant Lots and Buildings Are Not Fully Known</i>	28
Findings of the Distribution Investigation	30
<i>Qualitative Findings: Forms and Relationships to Urban Components</i>	31
Forms of Vacant Lots and Buildings	31
Urban Components: Watershed and Vacant Land	34
Urban Components: Major Roads and Vacant Land	38
Urban Components: Parks, Natural Resources, and Vacant Land.....	45
<i>Quantitative Findings: Vacant Land and Utilized Landscapes</i>	49
Summary	53
Investigation of the Density of Vacant Lots and Buildings	55
Methodology	55
<i>Shifting Scales & Units</i>	56
<i>Analytical Assessment</i>	59
Findings.....	60
<i>Watershed and Drainage Basins</i>	63
<i>Limitations and Future Research</i>	67
Summary of Findings.....	67
Investigation of the Interspatial Relationships of Vacant Lots and Buildings.....	70
Methodology of the Hot Spot Analysis	71
Findings of the Hot Spot Analysis	72
<i>Drainage Basin</i>	79
Extrapolating Meaning: Transitional Zones and Concentrated Hot Spots	80
Summary	82

Chapter 4: Concepts and Strategies for Addressing and Prioritizing Vacant Lots and Buildings in Baltimore, Maryland	84
Utilized Landscapes	85
Transitional Zones	90
<i>Policy Implications and Implementation Strategies</i>	93
<i>Comparison of Strategies: Transitional Zones and Project C.O.R.E.</i>	98
Conclusion	103
Appendices.....	106
Appendix I: Density Investigation Supplementary Material	107
Appendix II: Calculating Hot Spots.....	110
Appendix III: Vacant Building and Lot Hot Spot Maps.....	113
Bibliography	116

List of Tables

Table 1: A comparison of Vacancy Assessments

Table 2: A comparison of Vacancy Estimates in Baltimore, Maryland

Table 3: Vacant Buildings and Lots within Baltimore, Maryland

Table 4: Types of Vacant Lands and Utilized Landscapes in Baltimore, Maryland

List of Maps

- Map 1: Forms of Vacant Buildings and Lots
- Map 2: Relationships of Watersheds to Vacant Buildings and Lots
- Map 3: Labeled Relationships of Watersheds to Vacant Buildings and Lots
- Map 4: Relationships of Major Roads to Vacant Buildings and Lots
- Map 5: Labeled Relationships of Major Roads to Vacant Buildings and Lots
- Map 6: Relationships of Parks and Natural Resources to Vacant Buildings and Lots
- Map 7: Labeled Relationships of Parks and Natural Resources to Vacant Buildings and Lots
- Map 8: A Selection of Labeled Vacant Buildings and Lots in Baltimore, Maryland
- Map 9: Overlap of Neighborhoods with Highest Density Count
- Map 10: Neighborhoods with Highest Density Count of Vacant Buildings or Vacant Lots
- Map 11: Drainage Basins within Baltimore, Maryland
- Map 12: Findings of Drainage Basins with the Highest Density in Baltimore, Maryland
- Map 13: Seeing the Density of Vacant Buildings and Vacant Lots within Baltimore, Maryland
- Map 14: Comparison of 99% Confidence Hot Spots
- Map 15: Comparison of 95% Confidence Hot Spots
- Map 16: Comparison of 90% Confidence Hot Spots
- Map 17: Hotspots of Vacant Buildings and Lots in Baltimore, Maryland
- Map 18: Concentrated Hotspots of Vacant Buildings and Lots
- Map 19: Transitional Zones of Vacant Buildings and Lots
- Map 20: High Vacant Density within Transitional Zones of Vacant Buildings and Lots
- Map 21: Transitional Zones and Watersheds
- Map 22: Project C.O.R.E. – Phase I
- Map 23: Comparison of Primary Transitional Zones and Project C.O.R.E. Phase I Clusters

List of Illustrations

- Illustration 1: Vacancy as Voids
- Illustration 2: Urban Landscape
- Illustration 3: Vacancy within the Landscape
- Illustration 4: Vacant Properties
- Illustration 5: Creation of Refined Datasets
- Illustration 6: Comparison of Neighborhood and Census Block Group Scales
- Illustration 7: Overlay of Census Block Group and Neighborhoods
- Illustration 8: Watershed and Drainage Basin Scale Comparison
- Illustration 9: Density Analysis by Count

List of Abbreviations

ACS	American Community Survey
AHS	American Housing Survey
B&O	Baltimore & Ohio Railroad
BHA	Baltimore Housing Authority
BNIA	Baltimore Neighborhood Indicator Alliance
CBG	Census Block Group
CPS/HVS	Current Population Survey/Housing Vacancy Survey
DSF2	Delivery Sequence File 2
FDR	False Discovery Rate
HON	Housing Our Neighbors
US	United States
USPS	United States Postal Service

Chapter 1: Introduction

Vacancy takes many forms throughout the United States and is found in rural, suburban, and urban conditions. The type of vacancy that occurs in post-industrial and legacy cities such as Detroit, Michigan, Cleveland, Ohio, and Baltimore, Maryland all face similar challenges of abandoned factories, unoccupied residential properties, and forgotten land (“Vacant and Abandoned Properties: Turning Liabilities into Assets | HUD User,” 2014). Cities and municipalities face common issues of how to identify and thus quantify vacant properties within their jurisdiction boundaries. These obstacles influence the strategies and programs that get implemented by the local governing bodies to address vacancy as well as the effectiveness of these methods (Garber, Kim, Sullivan, Dowell, 2008, p. iii; Bowman & Pagano, 2004, p. 13; “Vacant and Abandoned Properties: Turning Liabilities into Assets | HUD User,” 2014).

The catalyst for this thesis came from a graduate project from the previous spring. The project identified vacant lots and proposed reuses of these spaces to help meet a sample of the city’s initiative and goals. The initiatives that guided the scope of the project were the TreeBaltimore program and the Growing Green Initiative. The TreeBaltimore program is a program that was implemented by Mayor Stephanie Rawlings-Blake in 2014; the initiative aims to increase the total tree canopy within the city from approximately 27% to 40% by 2037 (“TreeBaltimore,” 2015). The second initiatives referenced within the project was Growing Green Initiative, a

program focusing on the reuse of vacant lots by utilizing the city's Green Pattern Book, a resource with 10 typologies of how to reuse and reactivate vacant lots ("Baltimore Growing Green Competition", 2015).

The first stage of this project examined ways of prioritizing vacant lot reuse by location by utilizing a planning tool called scenario planning. Scenario planning compares the effectiveness and outcomes of potential plans. The use of this tool resulted in devising two scenario plans to address vacant lot reuse. The first scenario plan focused on increasing opportunity within the city which was evaluated using an "opportunity index". An opportunity index is a method of assessing variables that contribute or detract from the overall "opportunity" of an area. The aggregation of these variables creates the opportunity index. The definition of opportunity will vary depending on the investigation but typically refers to health, wellness, equality, accessibility, and equity. For the investigation, an opportunity index was established through literature reviews as well as consideration of factors to help meet city's initiatives. The second scenario plan aimed to increase access to recreational, agricultural, other types of open spaces, as well as access to healthy food options.

The two scenario plans prioritized different vacant lots for reuse. This difference was the result of each plan answering different questions, e.g. where to increase tree canopy and where to increase opportunity within the city. As a method and set of tools, the scenario planning investigation answered where within the city the reuse of vacant lots can strategically contribute and provide additional services to local communities. Scenario plans and opportunity indexes are useful implementation

and prioritization tools, however they are not assessment tools because they identify specific locations of interventions rather than analysis.

The city of Baltimore has approximately 7,000 acres of vacant land (see Chapter 3, Distribution Investigation). In order to address the prevalent vacant properties within the city, the local government has multiple initiatives and programs such as Vacants to Value and Adopt-a-Lot programs which focuses on the reactivation of these properties either through redevelopment or through new ownership for vacant buildings and lots (“Vacants 2 Value - About,” 2015). However, these programs are focus on addressing vacant land on a single parcel-to-adjacent-parcel basis. These initiatives focus on individual properties and do not necessarily address the broader issue of vacant land within the city. The broader scale assessment of vacant land within the city of Baltimore is currently under studied and is absent in current discussions. This thesis aims to address the gap by answering questions of how much vacant land is in the city, its location, as well as the spatial patterns and relationships of vacant land by using tools that answer those questions.

This thesis is a series of investigations into urban vacancy in Baltimore, Maryland. There are six leading questions that guide the investigations of this thesis:

1. How is urban vacancy defined by the Department of Housing Authority in Baltimore, MD? What do the current definitions of vacancy identify and what is missing from the current working definition?
2. What are the forms and the characteristics of vacancy?
3. How is vacancy spatially distributed within the city and are there any patterns that emerge?

4. How can vacancy interventions be prioritized by need and impact?
5. What roles can landscape architects and planners contribute to the working body of knowledge of urban vacancy?

This thesis develops a framework for examining vacancy within the city of Baltimore. From the analyses, **two concepts** were developed: utilized landscapes and transitional zones. Organized in four chapters, this thesis began by discussing the catalyst for the scope of this research thesis. Chapter two identifies the current working definition of vacancy in literature and within practice as well as a sample of how variably the measurement of vacant land can differ by examining the methods and estimates of three entities at a federal, local, and an institutional level.

Chapter three examines the city of Baltimore's vacant land through a series of three investigations: distribution, density, and interspatial relationships. The concept of **utilized landscapes** was developed through the distribution analysis of vacant buildings and lots within the city. The statistical analysis of the interspatial investigation identified spatial relationships of vacant land and led to the conceptualization of **transitional zones**.

Finally, chapter four discusses the potential strategies that emerged from this series of investigations. This chapter discusses how the series of investigations and research informed the development of **utilized landscapes** and the opportunities that it conceptual presents when examining vacant lands. In addition, the concept of **transitional zones** is discussed as a strategy, identifying geographical priority areas within Baltimore. This thesis concludes by discussing the limitations and additional

research to further enrich and inform studies and interventions of Baltimore's vacant land.

The application of this framework extends beyond a single discipline; the tools and methods used can provide critical insight and information to the dynamics and conditions of vacancy in Baltimore, Maryland, influence the manner in which landscape architects and planners approach future design, as well as funding and policies to address vacancy in the city. The framework creates a methodology that identifies need, guides prioritization, and informs the potential impacts and larger connections to the city.

Chapter 2: Defining and Measuring Vacancy

Urban vacancy is a broad concept used to describe a wide range of conditions and characteristics of land. The definition and methods used to measure and account for vacant land is variable. This chapter is organized into two sections to review the current literature of vacancy. The chapter begins by discussing the range of definitions used and the subjective application of common descriptive terms associated with vacancy. While the definition of vacancy is inconsistent, there are four characteristics often referred to when discussing vacant land. The chapter continues on to compare the variations in quantifying vacancy on federal, city, and local institutional levels. This literature review serves as the foundation for the three investigations of this thesis.

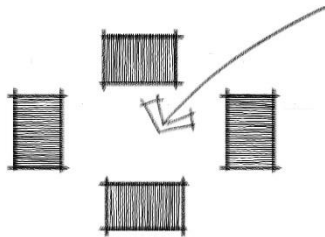
Defining Vacancy

The subject of urban vacancy is a broad topic that varies within academic literature and in practice. Vacancy was vastly under studied prior to the 1990's (Bowman & Pagano, 1998, p. 24-28). Today there is still no singular working definition that exists. This lack of consensus inhibits the working knowledge of how vacancy is defined, the methods used to assess it, as well as the effectiveness of designs and regulations that address it. This gap in knowledge fundamentally inhibits the ability of planners, landscape architects, and designers to adequately address

issues of vacancy, which further impacts communities, local residents and businesses. This obscurity prevents the understanding and implementation of complex trends, spatial relationships, and strategies to redevelop and activate vacant properties. This section describes the range of definitions of urban vacancy, characteristics that are often associated with vacant land, and the frameworks that drive vacancy as a topic of study.

The definition of urban vacancy is

Illustration 1: Vacancy as Voids



loose and flexible describing a broad range of nebulous spatial conditions. The concept of vacancy is often associated as void space (see Illustration 1) that inherently carries a negative connotation and association. The mainstream perception of vacant land does not always

reflect the needs and uses of cities. The relationship between cities and their vacant land is greatly influenced by the needs of the city (Bowman & Pagano, 2004, p. 19). Rather than framing vacancy as voids, it is important to establish that vacancy can occur anywhere within the landscape (see Illustration 2-3). In addition, vacancy does not occur simply in urban conditions, rather it can be found in suburban and rural areas as well (Bowman & Pagano, 2004, p. 112-113).

Illustration 2: Urban Landscape

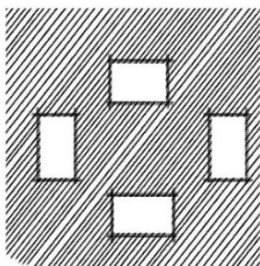
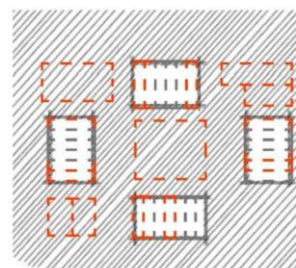


Illustration 3: Vacancy within the Landscape



Conceptually vacancy describes land conditions; the basic building block of a city is the land located within the legal boundary (Bowman & Pagano, 1998). As the basic unit of measure land is described as limited and fixed, containing inherent constraints and opportunities that make it more or less desirable (ibid). The desirability of the land can fluctuate, responding to social, environmental, political, and economic changes. Bowman and Pagano describe this response to change as “elastic” (1998). A regression model performed based on the survey results from 70 cities found that certain qualities of vacancy are more elastic than others, specifically the flexibility a city or municipality has in adjusting its legal boundary (Bowman & Pagano, 2004, p. 31-35). In addition, the regression model found that a large collective of vacant structures was typically tied to a significant decrease in total population within a city (ibid). While the term “elasticity” was originally coined to describe the results of the regression analysis and highlight specific characteristics of vacancy, the application of the term was expanded to account for the variety of conditions of land identified as “vacant” (ibid).

While there is no singular definition of vacant land, there are terms that are commonly used to describe the qualities of vacancy. The vocabulary found within literature and in discussions of vacancy use terms such as “abandoned,” “derelict,” “unused,” “brownfield,” and “blight” (Bowman & Pagano, 2004; Berger, 2006; “Vacant and Abandoned Properties: Turning Liabilities into Assets | HUD User,” 2014). In the past these terms have been used as evidence to support, at times, aggressive and even discriminatory interventions of urban renewal. Over the course of the 1930’s to the 1970’s many unfortunate impacts of planning and development

were implemented under the guise of urban renewal in order to address “blight” can still be seen today. Many of these scars, some literal depressions into the land¹, can still be seen in some communities today. The use of the aforementioned terms can subjectively refer to any number of conditions and types of land. While the application of these terms may vary, terminology such as these frequently used in discourse identify overlapping characteristics of vacancy.

There are four characteristics that arise within literature and are looked for when identifying vacant land in practice. These characteristics concern *ownership*, *temporality*, *activity*, and *condition*. These characteristics should be considered as a gradient of occurrences rather than a single definition. In addition, these characteristics tend to impact and respond to other conditions, making it difficult to isolate any singular characteristic independently of others.

Ownership of a property refers to the individual or party legally responsible for the upkeep, maintenance, and taxes of a property. Literature and practice often relies on visual “cues of care” (Nassauer & Raskin, 2014, p. 250) and disrepair as signs of vacancy. However, the issue of ownership has layers of complexity that must first be acknowledged. For example, a shift in care and responsibilities, a passing of the sole owner of an estate, and distance may affect the ownership status of a property and/or the ability of an owner to maintain his/her responsibilities. Ownerless land is on the other side of the ownership dichotomy. This describes land that may either not have a legal owner or a traditional ownership role.

¹ A local example of this is Highway 40 in West Baltimore that is located in the Harlem Park, Poppleton and nearby communities.

There are complexities associated with spectrum of ownership; abandonment emerges as a way of describing vacancy, however it is tied directly to the other three conditions: *temporality*, *activity*, and *condition*. “Abandonment” is often used to describe vacant land, however the term itself does not acknowledge the causes or context of inactivity. There are different types of abandonment, some of which are intentional and others unintentional, resulting from other forces. For example, intentional disownment due to a monetary burden, hardship of care or distance from land might contribute to the abandonment of a property in a conscious manner. However, there are instances of unintentional and unaware abandonment that occur through issues of loss of family members that results in the bequeathal of a property or inherited as part of a will. There are complexities associated with the range of ownership and abandonment that are not definitive nor clear, resulting in a spectrum between ownership and ownerless, where abandonment can be found throughout the dichotomy.

The type of ownership of land is an important variable in what is known about the land as well as its development potential (Bowman & Pagano, 2004, 4-5). The city of Baltimore estimates that 75% of vacant properties are privately owned and held (“Housing Code Enforcement”, 2016). However, the phrasing by the city does not necessarily identify the type of the private owners nor the ownership status of the remaining 25%. A 2013 Report by Baltimore Green Space found that the city owns approximately 6,650 vacant lots (Avins, 2013, p. 4). However, the specifics associated with the vacant lots owned by the city is not well documented. It is unclear

as to the acreage, the range of lot size, where within the city, and the type of vacant land that the city of Baltimore owns.

There are overarching issues associated with the current framework as well as the use of ownership as an important criterion for determining vacancy. Local jurisdictions have the legal authority to define and identify vacant properties, often building on the legal definitions classification of properties within the jurisdiction. Legally, the owner of a property is responsible for ensuring the land meets health, safety, and wellness codes. However, by framing vacancy based on ownership it implies that land without traditional owners are “vacant.” The lack of an owner for a parcel of land should not definitively determine the status of vacancy as there are scenarios and instances that land may inherently not have a traditional owner. By framing vacant land as ownerless, it then creates a framework of land requiring ownership. It also implies that land is and should be developable, with undeveloped land or land that is difficult to develop as “vacant” (Bowman & Pagano, 2004, p. 4-5).

Issues of temporality and activity are often closely related and can be examined either from the perspective of the length of time temporarily in use or the length of inactive use. Some land is in use for only a short period of time, such as homes for pleasure or for seasonal work. These properties by their nature will be inactive for a variable amount of time depending on the type of temporary use. There are other types of temporary vacancy, such as short-term transition property. These lands are inactive for a period time due to change in ownership or use and will transition to reactivity (e.g. redevelopment of a property). The last type of temporality

is long-term vacancy. This type of vacancy faces issues of inactivity and reactivating of space whether that be through change of ownership, lack of ownership, change in use, or difficulties in reactivating a space due to disinvestment. The definition as to what is deemed the threshold of vacancy varies, creating a gradient of standards inclusive of these characteristics. It is difficult to divorce any of these characteristics from the other as each plays a role into the overall condition of a space.

Local jurisdictions are responsible for identifying and managing vacancy within their legal limits. As part of this responsibility, each jurisdiction identifies a legal definition of what constitutes as vacant land. However, these definitions are typically formed from the legal perspective and necessity of identifying ownership; the priority is to legally specify types of property in broad enough terms to describe as much land as possible. While the legal definition is broad enough to refer to a wide range of land conditions, it needs to represent the diversity of properties within a jurisdiction. The term “property” carries within its definition the component of ownership and the responsibility of the owning party to care and maintain the land.

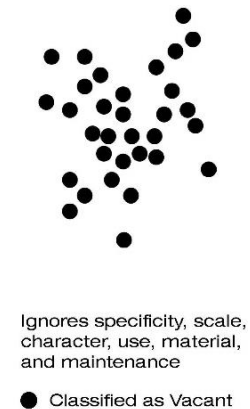
There are difficulties associated with measuring temporary activation or de-activation of space, or time in which a property is in use or not. Herein lies the difficulty of separating out temporary use and abandonment, especially in regards to the legality of dictating the level of activity required of a property. As long as a property maintains a standard level of maintenance that meets local codes and ordinances, it is not illegal to leave a space unoccupied, though it does not contribute to community dynamics and development.

The use of terms such as “urban vacancy,” “vacant land,” or “vacant property,” results in the grouping of a wide range of conditions. This broad classification consolidates all vacant land into a single category which is useful in a few applications, such as when describing vacancy in broad terms. However, this unjudicial classification of all vacant land ignores specificity and is unable to indicate specific characteristics and conditions that are relevant when assessing the types and quality of

vacant spaces. For example, Illustration 4 depicts a sample of vacant properties within a city. While it is clear from the illustration *how many* vacant properties exist and broadly where the properties are grouped, it is unclear *what types* of land and *conditions* each property has and *what role* each property plays within the urban landscape.

In fact, the use of the term urban vacancy deters specificity because it does not allow for categorization or classification of types of land. The definitions of urban vacancy vary based on the discipline consulted; for example, the definitions of planning tend to focus on land use (Hampton, 1995) whereas urban economics focuses on ownership and productivity (Northam, 1971). There is not a consistent definition of vacancy within the discipline of landscape architecture. The current working definitions of urban vacancy in academic literature and jurisdictions are based on a framework of property and ownership, typically with a minimal emphasis on landscape and spatial context of vacancy in relation to adjacent land. This in turn

Illustration 4:
Vacant Properties



ignores complexity of elements that create social uses, value, and maintenance requirements. The variations in these definitions impacts the ability to understand other qualities and characteristics of vacant land, such as basic questions of how much vacant land exists and the methods used to quantify it.

Quantifying Vacancy

Measuring of vacant land within the United States was vastly under studied until the last 20 years. Prior to the 1990s, the most recent assessment of national vacancy was conducted by Niedercorn and Hearle in 1962. Their study sampled the land use of 48 cities and found that 23% of urban land was undeveloped (Niedercorn & Hearle, 1963). Bowman and Pagano completed the first contemporary comprehensive nationwide study of vacant land in America, surveying 70 cities and metropolises, the findings of which estimate 15 percent of the land mass of large cities is vacant (Bowman & Pagano, 1998). The independent survey conducted by Bowman and Pagano was groundbreaking in that it began classifying and asking systematic questions of definition, quantity, maintenance and perspective of vacant land within some of the most prominent cities within the United States.

The United States (US) Census Bureau maintains historical and current estimates of the nation's population and demographics. As part of the Census Bureau's scope, it accounts for residential units, educational attainment, as well as family, housing, and employment characteristics. However, a limitation of the bureau's method scope is that the data only represents residential housing units (Pagano & Bowman, 2000; U.S. Census Bureau, 2011). This is particularly difficult

when using the Census Bureau's data and findings as it excludes all other vacant land use types, skewing estimates.

The US Census Bureau utilizes four surveys that captures aspects of residential vacancy. First, the American Community Survey (ACS) provides annual and averages of multiple years creating estimates relating to social, economic, and housing attributes and characteristics (U.S. Census Bureau, 2011). As a tool, the ACS provides information of demographic and other characteristics that is aggregable; the demographic information is tabulated on a city, neighborhood, census tract and to a census block group (CBG) level ("Geographic," 2010). A census block group is a small unit of measure that accounts for approximately 600 to 3,000 residents (ibid). The ACS survey samples approximately 3 million residents, the largest mandatory sample of the four surveys used by the Census bureau (ibid).

The Current Population Survey (CPS) and Housing Vacancy Survey (HVS) contrastingly estimates the vacancy rates of rental and homeowner units in greater depth. The CPS/HVS accounts for seasonal or temporary residence, identifying whether the unit location is the primary residence or seasonal/temporal (U.S. Census Bureau, 2011). As a tool, the CPS/HVS provides insight into the types of residential vacant housing units, identifying a total of 11 conditions for vacancy, which include foreclosure, personal or family reasons, legal proceedings, preparation for renting or selling of a unit, holding for storage of household furniture and material, the need for repairs, currently undergoing repairs or renovations, specific housing use, extended absence, the possibility of abandonment, demolition or condemnation, or other conditions ("Housing Vacancies and Homeownerships," 2016). These detailed

conditions provide insight into the reasons why a housing unit may not be currently occupied. A third method is the American Housing survey (AHS), a longitudinal study that began in 1985, examining the same location within the United States every two years that accounts for the changes in American housing stock (ibid). The ACS is a mandatory survey whereas the AHS is voluntary, limiting the results and has the potential of the findings to be skewed (ibid).

A limitation of the U.S. Census Bureau is the extent of information relating to non-residential properties. The Census data measures the quantity and location of residential properties with a clear working definition that defines vacancy as residential units. However, the US Census data is incomplete because it is unable to account for non-residential properties, which impacts cities such as Baltimore that have experienced a swift change from a manufacturing based industries to knowledge-based (Friedman, 2003; Cohen, 2001). The United States Postal Service (USPS) offers a separate source of information that bridges the gap of the US Census Bureau. The USPS's method to determine vacancy is based on a 90-day mail return to identify possible properties. Due to the focus on time rather than land use, the USPS is able to identify and record in a Delivery Sequence File 2 (DSF2). This method and system is able to identify and track properties regardless of the use (e.g. residential, commercial, etc.) and how the property is used (e.g. year round, seasonal, temporary) ("RIBBS - USPS National Customer Support Center," 2016). The US Census Bureau and the USPS datasets' content are complementary to each other.

Comparison of Vacant Land Estimates in Baltimore, Maryland

The measuring of vacant property is as variable as the definitions found in literature and in practice. The inconsistencies in definition and lack of a universal method to measure vacancy further complicates comparing city estimates on the amount of vacant land. Issues of scale, definition, and method quantifying vacant land became apparent when examining the estimates of vacancy from a federal, local, and institutional level.

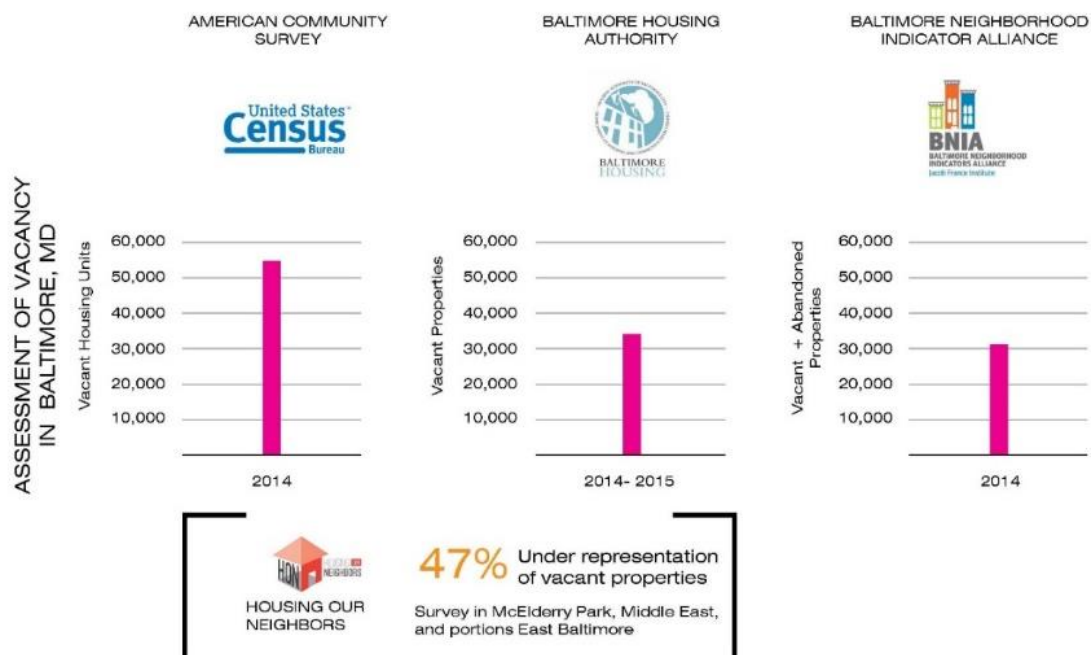
A comparison of estimates from three entities on a federal, local, and institutional level was conducted. The three entities were the US Census Bureau's ACS, the Baltimore Housing Authority (BHA), the legal entity responsible for identifying and estimating the number of vacant properties within the city, and the Baltimore Neighborhood Indicator Alliance (BNIA), a subgroup of the Jacob France Institute at the University of Baltimore. This cross-comparison identified issues of incompatibility and inconsistencies in definition, scope, methods, scale, and an aggregation of data arose (see Table 1).

Table 1: A comparison of Vacancy Assessments

	AMERICAN COMMUNITY SURVEY	BALTIMORE HOUSING AUTHORITY	BALTIMORE NEIGHBORHOOD INDICATOR ALLIANCE
			
LEVEL	Federal	City	Local: Jacob France Institute at the University of Baltimore
TYPE OF VACANCY	Residential housing units Additional characteristics: economic, social, housing	Vacant properties regardless of land use	Vacant and abandoned properties, residential
DEFINITION	2 months or less occupancy	Violation Building Notices (VBNs)	Based on the Baltimore Housing Authority
METHOD	Mandatory sample (3 million); mail, telephone, interviews	Multiple methods; VBNs + 311 calls	Based on Baltimore Housing Authority
SCALE	Aggregated to city, neighborhood, census tract, and census block	Individual locations within city	Aggregated to neighborhoods (defined by institution)

The variability in the scope and method of assessing vacancy impacts vacancy estimates (see Table 2). While the scope and method of assessing vacancy may vary, a comparison between these different entities found varying estimates as to the number of vacant land within the city. However, this variation is not the only issue when trying to cross-compare vacancy estimates between multiple agencies. For example, the units of measure are not the same; the US Census Bureau measures based on residential housing units whereas BHA and the BNIA measure by the total number of properties, which is not limited to residential use. In addition, the time frame of these estimates is inconsistent. The ACS is a sample conducted over a 1, 3, and 5-year time spans, whereas the BHA's datasets range from March of 2014 for vacant lots and September 2015 for vacant buildings, to calculate the total vacant properties. The age of the datasets is inconsistent and does not represent the same time frame.

Table 2: A comparison of Vacancy Estimates in Baltimore, Maryland



These city estimates were compared further by a small scale study conducted by Housing Our Neighbors (HON), a local community group in Baltimore. HON conducted a door-to-door survey within the McElderry Park, Middle East, and a portion of the East Baltimore community to identify vacant properties within the study area. This ground-truthing study found that of the 381 vacant buildings are identified as part of the study, 181 of the properties did not receive Vacant Building Notices (VBNs) by the city (Pousson, 2015). This study area is an example of the issue of scales when estimating the number of vacant properties within a single jurisdiction.

Conclusion

This illusiveness in both definition and as a variable is neither well understood in academic literature nor in application within cities. The lack of universal standards and methods for defining, identifying, and measuring vacancy within the nation makes it difficult to determine an agreed upon estimate of the extent of vacancy within the United States as well as comparable to other cities and municipalities across the nation.

An obstacle in the understanding and analysis of urban vacancy is the lack of consensus and application of a single definition. Typically, the local jurisdiction establishes a working definition that is used within the city or municipality. This range in definitions is problematic because it does not allow for a transferable evaluation of urban vacancy. In addition, there are many characteristics that are

associated with vacancy that are underlying issues of ownership, temporality, activity, and condition.

Although these characteristics are generally agreed upon, it is the threshold and the specifics of these characteristics that make it difficult to be able to identify and measure vacancy consistently between different jurisdictions. Similarly, there is an absence of an agreed upon classification system of urban vacancy. Vacancy classification systems categorize aspects or attributes of the vacant property. This lack of agreed upon standard is challenging and an obstacle for getting a clear picture of the amount and types of vacant properties within the United States.

Chapter 3: Spatial Patterns of Vacant Buildings and Lots in Baltimore, Maryland

This chapter examines the spatial relationships of vacant land within Baltimore, Maryland. The city of Baltimore categorizes vacant land as either a vacant building or lot. A series of investigations are used to answer questions of the quantity, quality, and spatial patterns of vacancy. This chapter is organized into three sections, each representing an investigation of the city's vacant lots and buildings by: 1) distribution, 2) density, and 3) interspatial relationships. Within each investigation, there is an introduction to the questions asked, followed by the methodology, findings, and summary. Each investigation utilizes a different set of tools, building off of the previous investigation's findings. From this series of investigations two concepts emerged: **utilized landscapes** (see Distribution Investigation) and **transitional zones** (see Interspatial Investigation).

Investigation of the Distribution of Vacant Lots and Buildings

Baltimore's vacant land is located throughout the city, however a thorough analysis of the location and spatial organization of vacant land is variable. The need to investigate the distribution of vacant buildings and vacant lots emerged due to inconsistent report estimates by the local government agencies and the information within publicly available city datasets. For example, the city often states in reports and in working statements that there are approximately 30,000 vacant properties

within the city (“Housing Code Enforcement,” 2016). However, a quick calculation of the city’s vacant building and vacant lot datasets showed that there are 34,122 (“Baltimore | Open Data,” 2016). This exercise and comparison emphasized the need to examine if there are any assumptions about what is known about vacancy in Baltimore and to systematically address them. In addition, four questions guide the distribution investigation of Baltimore’s vacant land: 1) how does Baltimore categorize vacant land, 2) how much vacant land is in the city, 3) where is the vacant land located, and 4) what is the spatial relationship of vacant land to other city features?

This investigation begins by identifying how Baltimore defines vacant land in the city and the data that is currently available to quantify vacancy, followed by the methodology. Within the methodology, two assumptions are challenged: 1) the accuracy of the datasets and 2) the relationships of vacant lots and buildings to urban components are known. This investigation resolves these assumptions while answering the main questions of the investigation.

The findings of this investigation are divided into two categories: qualitative and quantitative. The qualitative findings detail the geographic location of vacant buildings and lots in the city as well as patterns and forms of vacant land. In addition, the relationships between vacant land and three urban components are discussed at length. The three urban components examined were watersheds, major roads, and parks as well as natural resources. The quantitative findings of how much vacant lots and buildings are within the city, clarify the count and acreage of vacant land within the city. It is through this examination that the concept of **utilized landscapes** is

introduced. Finally, the section concludes with a summary of the findings as well as the role utilized landscapes offer within the discussion of vacant land and the gap within the current knowledge of vacancy it addresses.

Baltimore's Vacant Land

The city of Baltimore is located in central Maryland along the Patapsco River. Originally founded in 1729, the city became an independent city in 1851, differentiating itself from the other counties within the state. Historically, Baltimore was a small mill town that grew, becoming one of the major prominent ports along the East Coast. The city of Baltimore proceeded to expand its presence in the manufacturing realm with the addition of the Baltimore & Ohio (B&O) Railroad and CSX rail lines as well as the development of several major roads, allowing it to have a solid manufacturing market for decades.

Over the course of forty years, Baltimore lost approximately two-thirds of its manufacturing jobs within the city by the 1990s (Cohen, 2001, p. 415-420). A 2000 study found that the city's vacancy ratio was 22.22 abandoned buildings per 1,000 residents within the city (Pagano & Bowman, 2000). This was an extraordinary high ratio as compared to an average of 2.63 vacant structures for every 1,000 residents of the 70 cities surveyed for the study (ibid). The amount of vacant land and properties within the city is at a scale that is similar to post-industrial cities within the nation. Due to the variability of Baltimore's past industries, it is important to examine the types and conditions of the city's vacant land.

The city of Baltimore categorizes vacant land as either a vacant building or vacant lot. The definition of these vacant lands are based first on the definition of types of land legally recognized by the city. Article 13 of the Housing and Urban Renewal of the Baltimore City Code defines a “building” as any form of structure or enclosure with a purpose for people, animals, or productions and operations (2013, p. 109). Contrastingly, a “lot” is defined as an “individual parcel of real property or a portion of a block” (ibid). In addition, a lot must be identified in the Department of General Service’s records of a block plat. An interesting distinction between a building and lot is the lack of specification of purpose, function, or operation, which is not legally specified for lots.

The definition and process of identifying a building or lot as “vacant” is complicated and not entirely clear. The Baltimore City Code identifies different criteria and conditions for what qualifies a building and lot as “vacant.” The Baltimore City Code more clearly identifies the justifications and attributes of a vacant structure rather than lot. Division II, Dwelling and Vacant Structures, of city’s Code specifies that a structure can be deemed vacant if it is unsafe for habitation and continuously receives violation notices (“Article 13 Housing and Urban Renewal,” 2013, p. 65). Legally, the City Building Code’s Article 116 of Unsafe Structures looks for visual cues such as open and casual entrance, contains any boarded windows or doors, and shows distressed or missing windows, walls, and structural components (Maryland Department of Housing and Community Development, 2012). However, a vacant lot is not as clearly specified within legal terms as much as how to purchase vacant lots. Article 13 loosely discusses the concerns of vacant land within

the city, specifically section 2-7 in three regards: 1) to “public health, safety, and welfare,” 2) the contribution and furthering of deterioration, vacancy, or blight within an area, and 3) the failure of an owner to maintain levels of care in relation to the health, safety, and welfare (2013, p. 13). Under Division II, 2B-1, residential vacant dwellings have a more specified timeline of vacancy; a dwelling unit that has been unoccupied or abandoned and issued violation notices from the Building, Fire, and Related Codes of Baltimore City for 1 year is considered vacant by the city (“Article 13 Housing and Urban Renewal” 2013, p. 13, 34). In addition, the city relies on 311 calls to the Baltimore Housing Authority (BHA) to identify properties that are not complying with health and safety standards and do not meet building codes. 311 calls to the BHA result in violation and vacant building notices by the city (“Housing Code Enforcement,” 2016).

Methodology

This thesis uses the definitions and dataset of the city to analyze the distribution of vacant buildings and lots in the city. The methodology of the distribution investigation discusses the two main components of the methodology: 1) the removal of assumptions and how it influenced the investigation and 2) the methods used to perform the distribution analysis.

This investigation began by acknowledging the need to remove preexisting assumptions of what is known about the quantity and relationships of vacant land. The two assumptions identified were: 1) the data is accurate and 2) the relationships between vacant land and the city features are known. A city feature, within the

context of this paper, refers to elements that are present in the city. These elements can be social, physical (e.g. structural elements), or environmental conditions (e.g. parks). These city features can also include invisible boundaries that are agreed upon by society, such as neighborhood boundaries or watershed delineations. This distribution analysis focuses on the relationships between the urban components of the city and to the vacant buildings and vacant lots.

Removing Assumption 1: The Data is Inaccurate

The City of Baltimore estimates there are approximately 30,000 vacant properties, with 75% of those properties owned by private citizens or organizations (“Housing Code Enforcement,” 2016). However, an examination of the city’s datasets of vacant buildings and lots identified an estimated 34,122 total vacant properties. These inconsistencies between estimates of the quantity of vacant property are significantly different, leading to two questions: how many vacant buildings and vacant lots are within the city and how many acreage is associated with these properties? In order to answer these questions, it is important to begin by examining the dataset.

Currently there is a trend of local, state, and federal agencies increasing transparency of data and knowledge by sharing content possessed by government agencies through data platforms. The datasets used in this thesis are all content made publicly accessible by the city and state. The city releases a selection of collected data that is used by local government agencies, making it publicly available through Open Baltimore, an open source platform. The Baltimore Housing Authority (BHA) is the

local agency responsible for identifying, tracking, and maintaining vacant building and lots in the city. BHA records and tracks vacant lots and buildings in separate datasets. The City of Baltimore's raw data sets identify 17,230 vacant lots as of March 2014 and 16,892 vacant buildings as of September 2015. These datasets are used for all subsequent analyses in this thesis.

The city generates and maintains two separate datasets, one for vacant buildings and the other for vacant lots. The data set was examined by block lot numbers to determine if there were any duplicate entries for single property of land. Upon further review of the datasets, two types of duplicates were identified: 1) duplicates within datasets and 2) duplicates between datasets. In order to identify and remove any duplicate entries, the two datasets were combined into a single larger dataset, entitled "vacant property." Then the data was sorted to identify if there were duplicate entries by block lot number. Block lots with multiple entries were closely examined to identify whether the duplicate entry was a duplicate of the same type of vacant land condition (i.e. building or lot), or was a duplicate between the datasets (i.e. a block lot number with an entry of vacant building *and* vacant lot). For the latter, the block lot in question was examined further in Google Earth, a program that allows users to view the aerial and street conditions of addresses. The property was examined to determine if there was a structure or if the property was a lot. Once the duplicate entries had been identified and resolved, the vacant building and lot datasets were once again separated (see Illustration 5, located on the next page).

Illustration 5: Creation of Refined Datasets

Creation of refined datasets



Removing Assumption 2: The Relationship of City Features to Vacant Lots and Buildings Are Not Fully Known

The second assumption that was identified is that the relationship of city features to vacant land is known and understood. There is literature to support that specific urban conditions are challenging and can encourage vacancy, however the literature as to where those conditions manifest within the city of Baltimore is not clearly documented. A goal of this investigation is to *reframe* what is known about vacant buildings and vacant lots within Baltimore City leading to the documentation and discussion of a selection of city features and the types of relationships that emerge with differences in vacant land.

This thesis uses ArcGIS 10, a geographic information system tool, to map and spatially analyze vacant buildings and lots within Baltimore. The vacant building and lot datasets were exported from excel and brought into ArcGIS where they were each transformed into the State Plane 1990 FIPS MD (Feet) projection, the standard projection of the state of Maryland. The vacant building and lot datasets were intersected with the city's boundary line to remove any properties that are located beyond the city limits. This step was necessary to conduct in the beginning of the investigation to remove any outliers prior to the spatial analyses and investigations being conducted, minimizing the loss of vacant lot or building entries during this process. The datasets were then intersected by parcel, allowing for each vacant building and lot to take the shape with the property to which it corresponded.

In order to study the distribution of vacant buildings and vacant lots within the city, a reframing of the methods and information used to understand the location and adjacent relationships within the city was required. The process of reframing the distribution investigation included the removal of all information and content relating to the city. This included any discernable landmarks and features, including the Patapsco River, allowing for the viewer to look at the forms, shapes, and locations of vacant buildings and vacant lands within the city, without getting lost in the vast details of the urban condition.

The reframing and examination of the city's urban components to vacant buildings and lots was a multi-stepped process. The vacant land within the city was examined through different lenses to understand the relationship vacancy has with three urban components: watershed, major roads, and parks and natural resources.

The vacant building and lot parcel forms were then overlaid with information relating to each component separately. Maps were generated for each urban component and were visually studied with notes and observations of patterns catalogued. Additional contextual information relating to each component was then added to each map to connect the observations with locations, places, and uses of the city.

Lastly, a quantitative analysis of vacant buildings and lots was conducted. This analysis calculated the total number of vacant buildings and lots that fall within ArcGIS spatial boundaries of the city. In addition, the findings of the different urban components led an investigation of the quantity and types of land uses within the city that are identified as vacant. The number of parcels and acreage by these land uses was calculated and the findings discussed in detail.

Findings of the Distribution Investigation

The findings of this distribution analysis is broken into four subsections, each representing the framing or lens from which vacancy was examined: 1) forms of vacant buildings and lots, 2) watershed component, 3) major road component, and 4) parks and natural resources components. Each subsection discusses the findings, specifically the patterns, forms, and relationships that vacant buildings and lots display through the lens of each sub-investigation. These findings are broad and general, allowing the reader to critically examine the same material. For each of the three urban components, watershed, major roads, and parks and natural resources, a second set of maps that provide contextual information of the city will then highlight more specific findings of locations, uses, and relationships of city features.

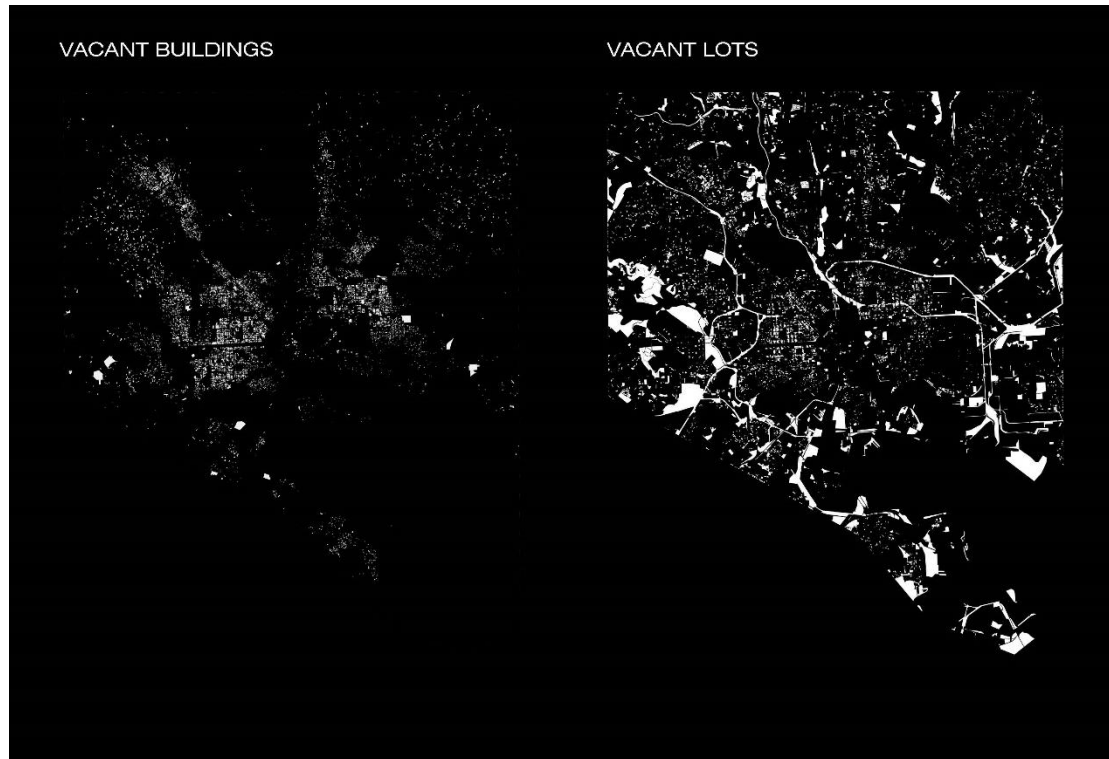
Qualitative Findings: Forms and Relationships to Urban Components

This section discusses the qualitative findings of the distribution investigation. There are four subsections within this unit that detail the forms and relationships of vacant land to urban components examined. The first subsection details the similarities and differences of the forms of the properties of vacant buildings and lots. The subsequent three subsections examine spatial relationship of three urban components: 1) watersheds, 2) major roads, and 3) parks and natural resources. Within each section, there is a detail catalogue of findings that describe the relationship of vacant land within the city.

Forms of Vacant Lots and Buildings

The forms of vacant buildings and lots differ in shape, conglomeration, and overall patterns within the city. Map 1 entitled Forms of Vacant Buildings and Lots (see next page), contains two maps: vacant buildings to the left and vacant lots to the right. Throughout this thesis, images containing two maps are consistently organized with buildings to the left and lots to the right. The maps within the distribution investigation intentionally remove details of the city that may help orient the viewer such as city boundary line, the Patapsco River, and neighborhoods. This is intentional and part of the process of *seeing* the location, character, and forms of vacant building and lot parcels.

Map 1: Forms of Vacant Buildings and Lots



The conglomeration of vacant land differs greatly between vacant buildings and lots. Located to the left of Map 1 is a map of vacant buildings' parcel, which are conglomerationed in four main areas within the city: to the east, west, southwest, and northwest. Contrastingly, vacant lots, shown in the map to the right, are more widely distributed throughout the city with no discernable clustering. Interestingly, there are more vacant lots that are located along the edges of the city making the city boundary readable, unlike that of vacant buildings. Map 1 shows that there are distinct differences in the physical location and overall distribution of the vacant building and lot parcels in the city.

The most obvious difference when examining Map 1 is the variety in forms and shapes that vacant land takes within the city. The overall shape and size of the

parcels of vacant buildings are relatively small in comparison to that of vacant lots. In addition, upon closer look vacant buildings take the form of blocks. This pattern is shared with vacant lots, but limited to areas in the center and west of the city. Vacant lots, the map on the right, has a wider range in shapes and forms, ranging from small rectangular forms to larger polygons, and large curvilinear paths. These curvilinear swaths of land are long, extending from one corner of Baltimore, stretching far distances to the center or opposite end of the city. Upon closer examination, these curvilinear paths are present in a few conditions: some are singular and longer parcels that extend for long distances while others are multiple adjacent parcels that create the impression of a long singular form.

This is important to note the distinction because in instances where there are multiple parcels, there is a chance of multiple owners, which can make redevelopment, infill, or the coordination of maintenance efforts difficult. In addition, in situations where there are multiple adjacent parcels identified as vacant, there is a smaller chance of these spaces being accidentally identified as vacant. These curvilinear paths, as well as the other various shapes of vacant lots and vacant buildings have been intentionally identified and it begs the question: *what are these spaces?* The shapes and forms of the vacant parcels, specifically those of vacant lots is curious and widely varies. While it is unclear from map 1 what is contributing to the various forms and widespread locations, it is apparent that there is a strong diversity in vacant lot conditions.

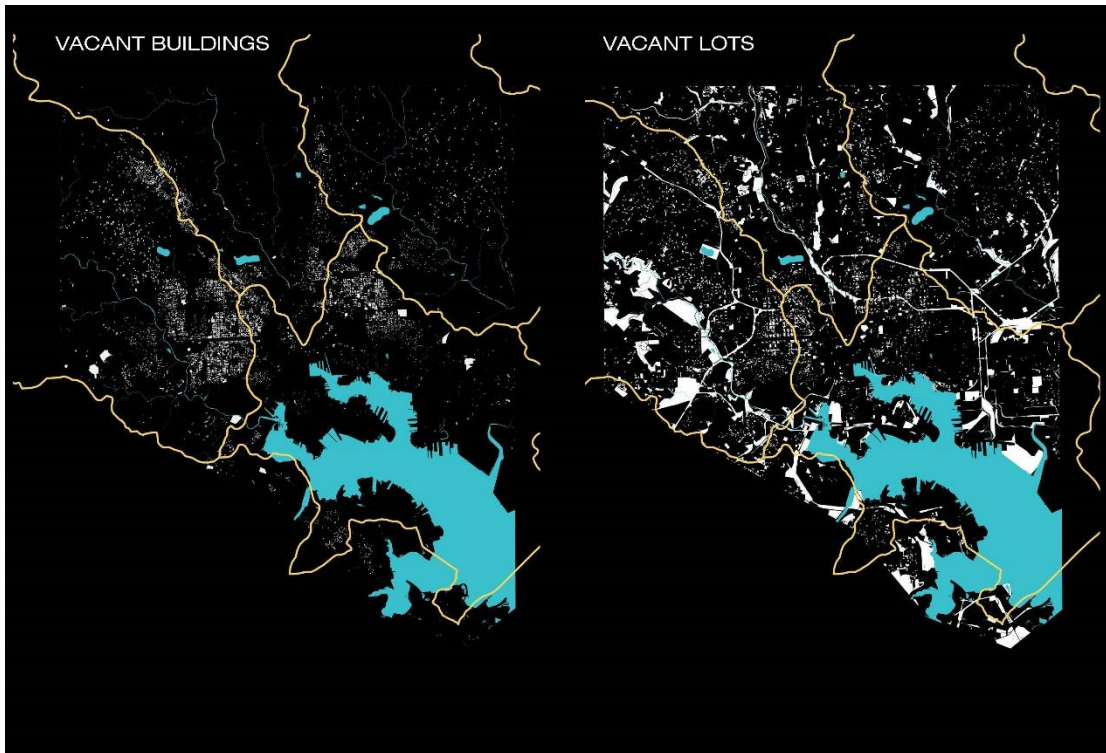
Urban Components: Watershed and Vacant Land

The relationship of watersheds to vacant land is currently an unstudied perspective within the city of Baltimore. Baltimore's watersheds are a part of the larger Chesapeake Bay watershed region. The water quality of the Chesapeake Bay has been a concern and resulted in aggressive regulations to address the failing health of the region. Specifically, Baltimore's watersheds have also received failing grades by local water quality and health assessments. Viewing the relationship of vacancy by watershed boundary is not a traditional scale nor lens to view vacancy. However, as a vastly under studied perspective, it may hold additional insight as to where and why vacancy occurs in some areas. In addition, the health and quality of local watersheds are becoming more heavily regulated and additional funding is geared towards watershed health and sustainability, this investigation views the relationship of watersheds to determine if there is any relationship that is currently unknown that is missing from vacancy studies.

Qualitatively assessing the location of vacant buildings and lots in relation to the watershed boundaries of the city reveals some similarities. Map 2 (see next page) illustrates the location and parcel shapes of vacant building and lots overlaid with the local watershed boundaries. A comparison of vacant buildings (to the left) and lots (to the right) shows that both types of vacant land have a cluster that conglomerates at the intersection of three watersheds located in the center of the city. In addition, both vacant buildings and lots are located along the boundary edge of two watersheds to the northwest of the city. These shared relationships between both types of vacant land and watersheds identifies a unique finding; the land within this area may have

other conditions or factors that have led to both types of the city's vacant land to conglomerate along the edges of those watershed boundaries.

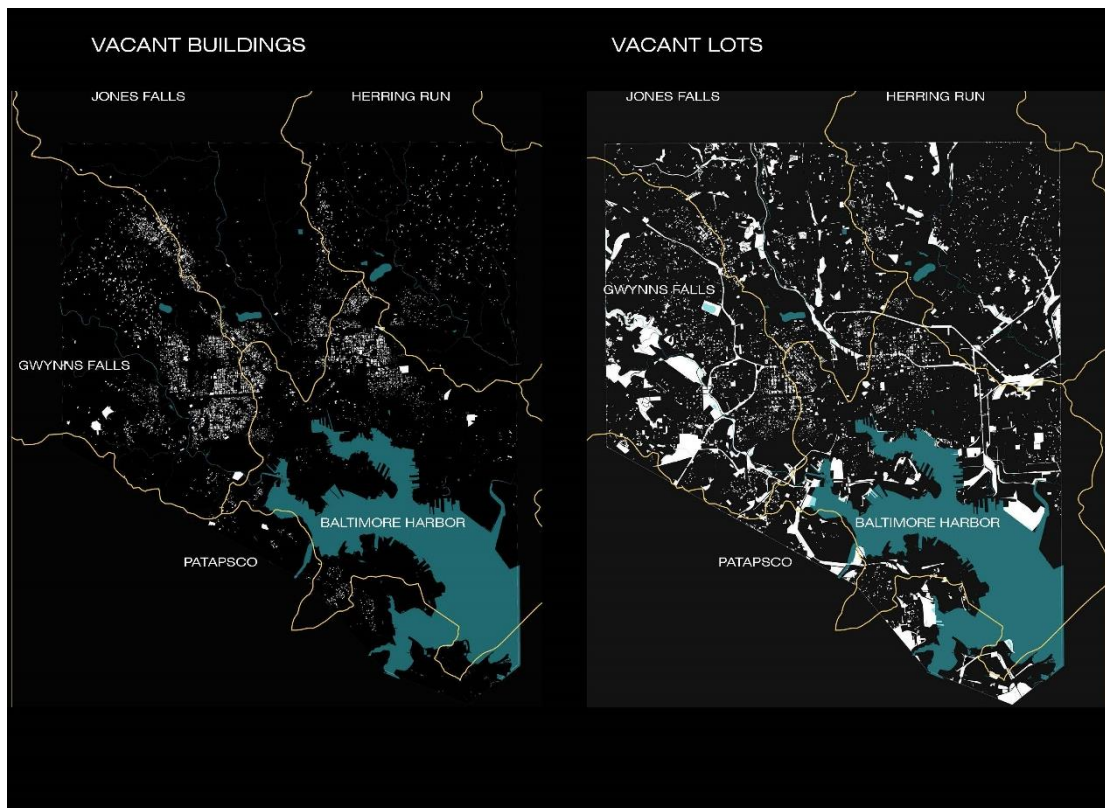
Map 2: Relationships of Watersheds to Vacant Buildings and Lots



The relationship of watershed boundaries to vacant land differs in a few substantial ways. First, the manner in which vacant buildings conglomerate into four major areas allows for ease in readability of watershed patterns; this visual ease is not consistent when examining the relationship of watershed to vacant lots as the locations of lots are substantially and more widely distributed within the city. In addition, there are subtle differences where types of vacant land are identified within the watershed and along its edge.

Reading forms and patterns without an overbearing amount of contextual information allows the viewer to see forms and patterns uninhibited by details. However, it is important to shift the lens back into focus, reintroducing key contextual and locational information to understand where and what relationships are occurring. Map 3 identifies the five watersheds within the city, Jones Falls, Herring Run, Gwynns Falls, Inner Harbor, and the Patapsco River, and where they are located in relation to vacant buildings (map to the left) and vacant lots (map to the right).

Map 3: Labeled Relationships of Watersheds to Vacant Buildings and Lots



Examining through the lens of watersheds a trend emerged of vacant land located near the edges of watersheds. There are two areas within the city where both

vacant buildings and lots are found in the same area along a watershed boundary.

Where Jones Falls, Gwynns Falls, and Baltimore Harbor intersect, there is a conglomeration of both vacant buildings and lots. Three neighborhoods within West Baltimore, Harlem Park, Pigtown, and Westport, have a particular strong distribution of both vacant buildings and lots located along the Gwynns Falls and Baltimore Harbor watersheds. Similarly, the Mid-Govans and Pen Lucy also have vacant buildings and lots located along the edges of Herring Run and Jones Falls watersheds.

There are differences in where vacant buildings and lots are located relative to the boundaries of watersheds. For example, Pimlico Good Neighbors has vacant lots located along the edges of the Jones Falls and Gwynns Falls watersheds. Meanwhile, vacant buildings are more prominently found in the Greenspring neighborhood. Not all neighborhoods have vacant land located along the boundary of watersheds. For example, Herring Run and Baltimore Harbor have a limited occurrence of vacant land found there. Only a minimal presence of vacant buildings exist along the watershed boundary within the Four by Four community.

The Jones Falls and Baltimore Harbor watersheds have some similarities and differences of where vacant land is located within the watershed boundary. Vacant buildings are widely located along the edges of the Jones Falls and Baltimore Harbor watersheds in the Madison Park, Downtown, Olive, Darley Park, and Coldstream Homestead Montebello communities. However, along the Jones Falls and Baltimore Harbor watersheds, vacant lots are located between North Martin Luther King Boulevard and McHenry Street in the Seton Hill community.

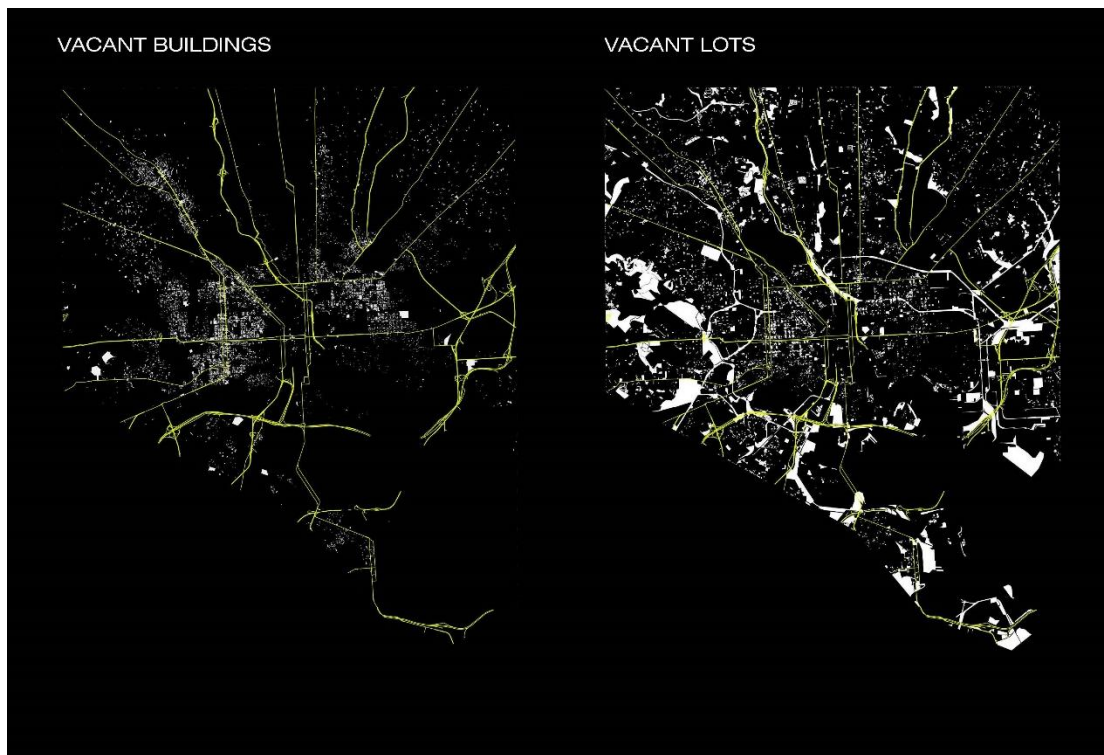
From this qualitative assessment it was found that there are conglomerations of vacant land types in certain areas of the city, specifically to the northwest and West Baltimore. From Maps 2 and 3 it is unclear what the current use of these vacant parcels is, however, how these spaces are *utilized* may provide additional insight. In order to identify what these spaces are and how they are used requires both an adjustment in the lens in which these vacant lands are viewed and the scale at which they examined from.

Urban Components: Major Roads and Vacant Land

The second lens from which vacant land was analyzed from was that of major roads. Baltimore City was once considered a major port within the region in the 19th Century, prior to the Industrial Revolution. The prominence of the city as a major manufacturing and port hub as well as the city's strategic location between other major cities of the time, such as Philadelphia, New York, and Washington D.C., led to the building of significant infrastructure such as major rail lines and roads in addition to the many ports of the city. Today, Baltimore still is a connector from Washington D.C. to Philadelphia and New York. There are numerous major roads that cut through the Baltimore city, connecting to larger cities and metropolitan hubs to the North and South. While there is a known relationship between vacancy occurring along major roads, it is unclear if vacant buildings and lots can be found along all major roads within the city or if there are specific roads that have a higher distribution of vacant land than other roads.

Examining Map 4 (see next page), relationships between major roads and vacant land within the city, there are some similarities in the location of vacant building parcels compared to those of vacant lots. For example, there are areas between the two East-to-West roads that have a strong cluster of both vacant buildings and lots. This is most heavily observed in areas in West Baltimore. Within West Baltimore, both vacant buildings and lots are close together creating strong linear and block forms, some of which are immediately adjacent to the major East-West roads through the city. However, secondary roads can be interpreted as the voids between the larger block forms that can be read. A major distinction between this East-West patterns is the location of vacant buildings and lots in East Baltimore. While there are some buildings and lots located between the two main East-West roads, the patterns of buildings are different from that of lots. Buildings in East Baltimore located between the two major East-West roads are located farthest east and located closer to the northernmost road. Meanwhile, lots are located in between the two East-West roads are located throughout, composed of smaller forms as well as larger curvilinear shapes.

Map 4: Relationships of Major Roads to Vacant Buildings and Lots



Another area within the city where vacant buildings and lots are both located in close proximity to major roads is to the major road in Northwest Baltimore. Here a conglomeration of both buildings and lots in similar forms follows along both sides of the road. These similarities in the distribution of vacant buildings and lots indicate a strong grouping of overall vacant land in specific areas of the city to the Northwest, West, East and North, along major roads suggest that the impacts and close proximity to these structures may be impacting the quality and uses of these lands.

The similarities in location of these buildings and lots are significant, but the differences are even more prevalent. For example, some vacant lots follow along the edges of major roads in the center and Southern portions of the city. In these areas there is an absence of vacant buildings. The overall relationship of vacant buildings

visually appears to follow specific roads more closely than vacant lots. This could be in part due to the variety of types of vacant lots, which is inferred from the wide ranging forms and configurations of the parcels within the city.

While these loose qualitative relationships are informative, it is imperative to shift lenses to see what these major roads mean to the city and what role they play with transportation flows into, out of, and within the city. Map 5 (see next page) labels the major roads within the city and is overlaid by the vacant building parcels, located to the left, and vacant lots located to the right. From these maps, it is clear that the two major East-West roads within the city are U.S. Route 1, or North Avenue, is the northern most road and U.S. Route 40, or Orleans Street, is the southern road.

Along Maryland Route 45, or York Road, here there is a small conglomeration of both buildings and lots scattered in the middle to Northern communities on both sides of the road. The process of identifying these urban forms assists in understanding the context of the vacant lots and buildings and the spatial relationships of where these types of vacancy are located. An analysis of these patterns found that there are similarities of where vacancy is located within the city. For example, vacant lots and buildings share block patterns and linear forms in the similar areas of the city. Both vacant types are found in six communities surrounding the Greenmount Cemetery, mimicking a larger block. Adjacent patterns to this area include a linear stretch of both vacant lots and buildings to the north of the cemetery, along North Avenue (see Map 5, see next page). In addition, both vacancy types are found to the south and east of the cemetery where railroad lines can be found for the nearby light rail and MARC train.

Map 5: Labeled Relationships of Major Roads to Vacant Buildings and Lots



The block pattern that is present in the Harlem Park, Franklin Square, and Poppleton neighborhoods, communities adjacent to U.S. Route 40, continues along until Route 40 intersects with North Fulton and North Monroe Streets. The vacant buildings repeat a block pattern continuing along Fulton and Monroe Street, through Midtown-Edmondson, Sandtown-Winchester, and Easterwood neighborhoods, continue up to North Avenue.

Strong linear patterns are easily readable when visually analyzing vacant buildings. The majority of these linear patterns are indicative of roads, some of which are the major roads into and through the city. For example, Watkins Avenue in the mid-south portion of the city connects up to Fulton Avenue and Monroe Street, both of which are heavily used for movement in and out of the city. These streets intersect U.S. Route 40, which has a strong presence of vacant buildings in the form of blocks.

The block pattern present in the Harlem Park, Franklin Square, and Poppleton neighborhoods, communities adjacent to U.S. Route 40, continues along until Route 40 intersects with North Fulton and North Monroe Street. The vacant buildings repeat a block pattern, continue along Fulton and Monroe Streets, through Midtown-Edmondson, Sandtown-Winchester, and Easterwood neighborhoods, then continue up to North Avenue. It is worth noting that in the Bridgeview and Greenlawn community, a neighborhood that is immediately west of Sandtown-Winchester and follows along North Monroe Street, has a notable lack of both vacant buildings and lot. This is additionally curious as there are two residential blocks situated between Monroe Street and a rail line that intersects the community.

Fulton and Monroe continue up past U.S. Route 1/North Avenue, which runs east-west with a strong presence of vacant buildings to the east, finally meeting up to U.S. Route 140. Route 140 briefly intersects with U.S. Route 129/McCulloh Street² and Druid Hill Avenue runs parallel where there is a lot of vacant buildings on the edges of and in between these streets, as noted earlier. North Avenue continues to connect to vacant buildings in the city from the West to the East. Along North Avenue in the Penn North, Druid Heights, and Upton neighborhoods, there is a strong presence of vacant buildings. The pattern of vacant buildings breaks apart through the Charles North and the larger portion of Bolton Hill. Moving east along North Ave to Orleans street there is another strong cluster of vacant buildings east of downtown in the Broadway East, Oliver, Middle East, Middle Street, Milton-Montford, Berea, Care, McElderry Park, Ellwood Park/Monument, Madison-Eastend, and Biddle Street neighborhoods. Finally, vacant buildings are present following North Avenue until it

² McCulloh Street is located in the Druid Heights area and then transitions into U.S. Route 129.

transitions to Belair Road, following the gesture of the road through the Four by Four and Belair-Edison communities.

The last major gesture of vacant buildings is north of the city where North Avenue and U.S. Route 45 meet. Here, vacant buildings in the form of blocks are present in the East Baltimore Midway, Barclay, Better Waverly, and Harwood communities. U.S. Route 45 splits Barclay and Harwood from East Baltimore Midway and Better Waverly. In East Baltimore Midway, the location of vacant buildings is present as diagonal offshoots away from Route 45, following local roads, such as Homewood Road and Loch Raven Road. Vacant buildings can be seen while following 45 north, but they are not as dense until the boundaries of the Woodbourne-McCabe and Winston-Govans neighborhoods, located closer to the northern boundary of the city.

The location of vacant lots in relation to roads differs slightly to that of vacant buildings. For example, there is a lack of strong observable form, but rather a large scattering of vacant lots in the community. Route 140 cuts through these neighborhoods as well as the Maryland Department of Transportation (MDOT) Metro Rail Division and the metro's Rogers Station. In addition, vacant lots are prolific along Interstate 95 and Annapolis Road in the southwestern portion of Baltimore near Saint Paul neighborhood.

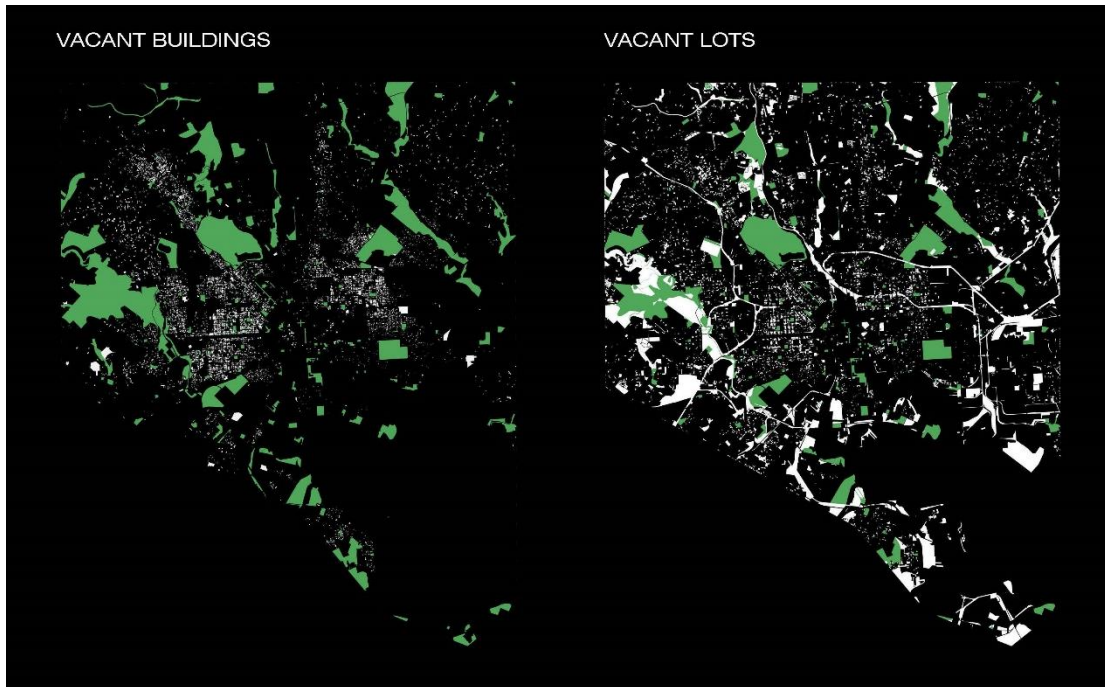
The examining of relationships and patterns of vacant land to major roads revealed that different forms of vacant buildings and lots differ throughout the city. Moreover, by shifting the lens to reveal the juxtaposition of vacant land and major roads, it is visually apparent that there are several forms that frequently appear near

roads. An example is that of vacant buildings and lots with small rectangular shape, primarily located in East and West Baltimore. Another example is that of vacant lots with long curvilinear areas that nestle immediately adjacent to some roads. Based on the shape and location within the city, it can be inferred that the **use** of these spaces are very different. A closer examination of the vacant buildings and lots with smaller rectangular shapes in West and East Baltimore found that moreover, how these spaces are used and their role within the urban environment may impact how they are classified as “vacant”.

Urban Components: Parks, Natural Resources, and Vacant Land

The final feature relationship is examination of the relationship of vacant buildings and lots to parks and natural resources within the city. There are strong spatial relationships between vacancy and parks. As shown in Map 6 (located on the following page), these relationships emerge through strong linear forms as well as amorphous aggregations. Previous discussions of patterns, such as linear progressions within the city were representative of major roads and highways. While some linear forms are indicative of roads, others represent other urban forms such as squares, inner residential blocks, and cemeteries varying in scale and location.

Map 6: Relationships of Parks and Natural Resources to Vacant Buildings and Lots

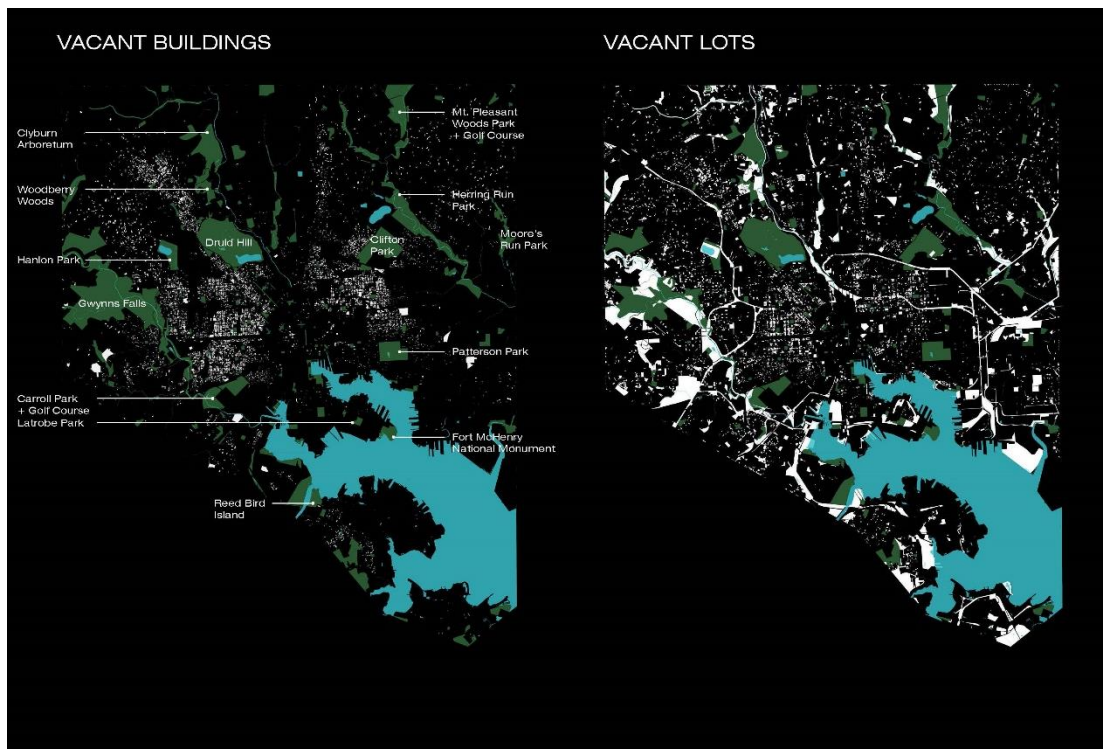


The relationships between Baltimore's parks and natural spaces differ when examining the relationship between vacant buildings as opposed to lots. There is a stronger visual relationship with vacant buildings to these open spaces than lots, likely due to the geographic locations of vacant buildings, which are more closely grouped in three areas of the city.

Taking a closer look at what the vacant parcel forms represent, more clearly identifies the roles of these spaces within communities and the city. As shown in Map 7 (see next page), there is a sizable conglomeration of vacant buildings located along the western edge of Clifton Park and Clifton Park Golf Course, along Route 147. Route 41 and 542 meets Clifton Park, where we can see a lot of vacant buildings within the Coldstream Homestead Montebello community. There are instances in which vacant buildings create a perimeter around urban forms. For example,

Collington Square Park and Baltimore Cemetery located in East Baltimore, to the south and east of North Avenue. This pattern of vacant buildings closely situated adjacent to parks and open space is most heavily observed in west Baltimore, between W. Franklin Street and North Avenue. North of W. Franklin Street there is a large number of inner block parks, an invention of the 1960's as part of the urban renewal efforts ("West Baltimore Square," 2015). Other instances include the Harlem Park community where the Harlem Park Square is located. An additional location of vacant buildings located closely to open spaces is seen adjacent to Traci Atkins Park, located to the north of Carroll Park.

Map 7: Labeled Relationships of Parks and Natural Resources to Vacant Buildings and Lots



There are also instances of the location of vacancy not manifesting with a clear pattern such as in linear forms or square perimeters; amorphous forms appear reflecting the shape of natural resources and parks within the city. For example, Druid Hill Park has a strong presence of vacant lots that abut up to the park's southwest corner. In addition, there are some vacant lots present within the same areas. A mixture of both types of vacant land creates a void, or an underutilized and fragmented connection with the park edge.

The location and forms of vacant lots that manifest between parks and natural spaces are different than those of buildings. First, there are fewer dense areas of vacant parcels; rather vacant lots are more widely disbursed. There are some smaller areas of clusters that are present. For example, the western edge of Moore's Run Park has a strong presence of vacant lots. Another example is in the northwest area of the city, south of Clyburn Arboretum in Woodsberry Woods, where there is a cluster of vacant lots present.

In East and West Baltimore there are occurrences of vacant lots in the form of blocks; upon closer examination these areas they are representative of either the interior of residential blocks or embedded in blocks with widespread vacancy where structures on large portions of the block have been removed. In the east, this can be seen along North Avenue and south towards E. Chase Street.

There is a tension between various open space and vacant land in the city. From Maps 6 and 7 it is clear that there is some overlap of vacant land with parks. This is a curious finding to determine if and how much park land is considered

vacant; this is an opportunity to further explore and understand the context of these spaces.

Quantitative Findings: Vacant Land and Utilized Landscapes

The large amount of overlapping vacant lots with parks led to the need to take a closer look at the quantity of vacant buildings and lots within the city as well as the **use** of these spaces. The Housing Authority of Baltimore City identified 17,230 vacant lots as of March 2014 and 16,892 vacant buildings as of September 2015. Of the total 34,122 vacant properties, 69 entries were identified as duplicates. 5 of the duplicates were of the same vacant type, and 64 were identified as both a vacant building and lot. A total of 210 vacant buildings and lots were identified beyond the city boundary's ArcGIS shapefile and were removed from this study. The final cleaned dataset found that there are a total of 33,834 vacant buildings and lots, with an estimated 7,039 acres of vacant land within the city (see table 3).

Table 3: Vacant Buildings and Lots within Baltimore, Maryland

Cleaned Data Sets		
Type	Quantity	Acreage
Vacant Lot	17,011	6,176.22
Vacant Buildings	16,823	862.86
Total	33,834	7,039.08

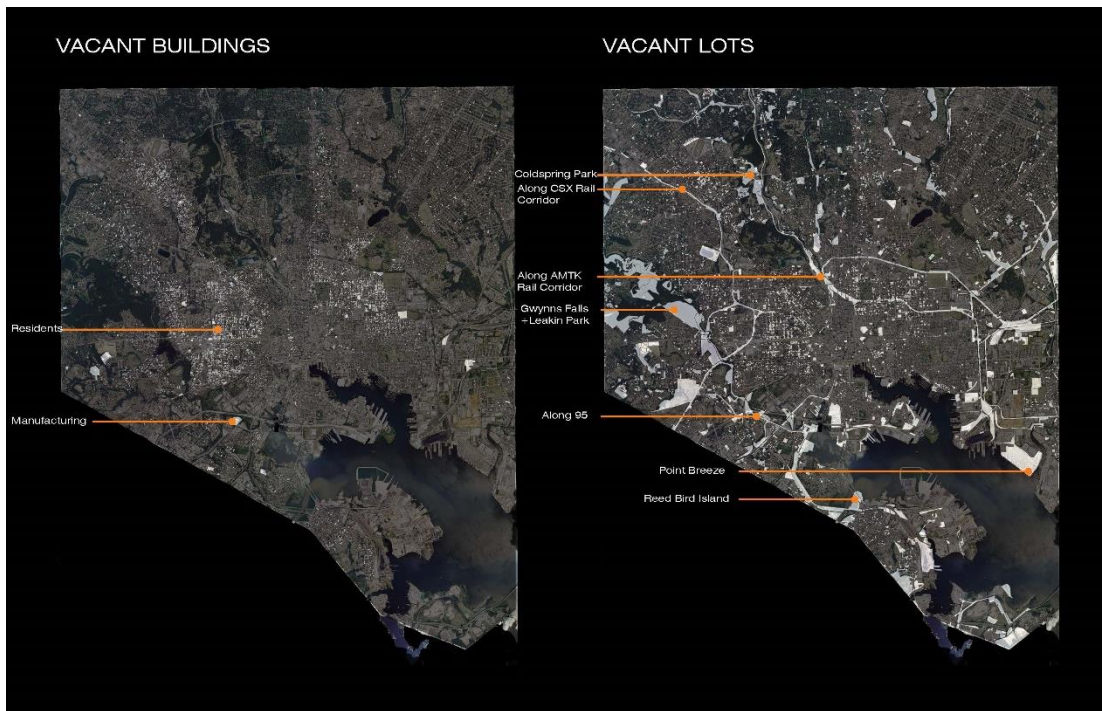
The distribution investigation identified concerns regarding parcels identified as “vacant”. A closer examination of these buildings and lots found that the uses of

these spaces greatly varied. As shown in Map 8, vacant buildings (located to the left) largely represent residential and industrial or manufacturing areas. In fact, approximately 90% of vacant buildings are located in residential areas³.

Contrastingly, the use of vacant lots varies more substantially than that of vacant buildings. For example, the map to the right (see Map 8, located on the following page) shows that vacant lots have a wider range of uses associated with the identified vacant land. In the north and center of the city, the large curvilinear stretches previously noted when investigating the relationship of major roads to vacant land shows that these spaces represent corridors of the CSX Rail Line and Amtrak; two railroad lines found within the city. In addition, to the south there are vacant lots located along Interstate 95, specifically adjacent to the on and off ramps. It is worth noting that the land use breaks down of vacant lots still has a relatively high percentage of residential zoning, with approximately 80%, however there is a wider range of other land uses and spaces.

³ This was calculated by intersecting the vacant building or lot parcels with a land use shapefile to determine the percentage of land use by total vacant buildings or lots.

Map 8: A Selection of Labeled Vacant Buildings and Lots within Baltimore, Maryland



A combination of visual analyses verified through aerial and interactive maps, as well as ArcGIS spatial analysis identified a variety of lands such as parks, rail and road rights of ways, and vegetated medians that are currently classified as “vacant” buildings or lots. A process of cataloguing occurred and three categories emerged from this observation of land with other uses that may be alternatively better described as something other than vacant. These categories included cemeteries, natural areas and corridors, and parks and recreation. These three types of landscapes have functional uses within the land, or are **utilized landscapes**.

“**Utilized landscapes**” is a term used to describe other spaces within urban environment that serve a purpose and function but may not have a traditional owner, role, or economic revenue. Bowman and Pagano relate the framing and classification of vacant land back to taxes due to the strong relationship land plays in funding local

jurisdictions (2004, p. 56-84). The lands shown in Table 4 depicts the breakdown of utilized landscapes that have been identified by the city of Baltimore as either a vacant building or vacant lot. The term “utilized landscape” is a way to describe a wide range of landscapes that are currently labeled as vacant but serve a utilized and important function within the city. This function can be social, such as cemeteries and parks, environmental, such as natural corridors, or logistical, such as rights of ways and vegetated medians.

Table 4: Types of Vacant Lands and Utilized Landscapes in Baltimore, Maryland

Types of Lands and Utilized Landscapes		
Type	Quantity	Acreage
Vacant Lot	17,011	6,176.22
Vacant Buildings	16,823	862.86
Utilized Landscapes		
Cemetery	84	254.33
Natural Areas/Corridors	3090	2024.01
Parks + Recreation	537	1195.49
Total	33,834	7,039.08

By intersecting the parcels of vacant buildings and lots an estimated 3,711 vacant parcels was found to fall into these categories (see Table 4). These parcels are approximately 3,473 acres of the total 7,038 vacant acres within the city. Of the properties identified by the city as vacant 10.9% of properties are utilized landscapes. In addition, 49.3% of the total vacant acreage are these utilized landscapes.

Additional clarity emerges when shifting the lens from which vacancy is observed. By shifting the lens to examine the relationship between different urban components and vacant lands, different parcels are identified with strong relationships

to these forms. While some of these functions, such as the buffers along major roads and on and off ramps may not be traditionally actively used by people, they serve a much needed function and purpose. There is an added complexity as well, in that the relationship between lands such as this is not traditional in **ownership, activity, nor value**.

It is difficult to determine ownership of these spaces, some of which may be owned by the local city, state, or federal highway administration. Another reason ownership can be vague is because the purpose of these spaces is to provide a subsidiary/secondary function to a more dominant use. For example, some of the long curvilinear vacant lots are vegetated buffers for roads. Their purpose is foundational for a more prominent use: the flow of vehicular traffic. The use of this land is transitional in nature where people flow through these spaces rather than gather to actively use this space. Because the relationship of individuals to this land is experienced through a vehicle and does not have an *active* use within the space it is challenging to create social and monetary *value*.

Summary

As a concept, *utilized landscapes* is a term is a concept developed to classify land that has nontraditional use, value, and activity, but still serves a substantial role within the urban environment. It is important to emphasize that these roles may be supportive of other more dominant and primary activities and uses, but that does not negate their value and need to exist. The term **utilized landscapes** offers an alternative classification that acknowledges the functions of these spaces and is a

more accurately descriptive term than “vacant.” This issue requires further researcher and is an opportunity for the discipline of Landscape Architecture to provide insight into the types of landscapes found within an urban context.

Investigation of the Density of Vacant Lots and Buildings

Similar to the definition and classification of vacancy, there is no universal method used to measure the amount of vacant land within a city. For this investigation, the density of vacancy in Baltimore, was quantified and measured by the count of vacant buildings and lots. This investigation has three parts: 1) methodology, 2) findings, and 3) summary. The methodology section of this investigation includes two major topics: issues of scale and the density method used in this analysis. The subsequent section describes the findings of this investigation by examining the density of vacant buildings and lots on a neighborhood, census block group, and drainage basin scale. Finally, the investigation concludes with a summary of the investigation, which discusses the benefits and limitations associated with shifting base units of scale as well as opportunities for future research.

Methodology

The density investigation of vacancy examines where conglomerations of vacant land are located within the city. Investigations into the density of vacancy are useful assessments of how compact or grouped together vacant land is situated. For this investigation, the density of vacant land is determined by the count of vacant buildings or vacant lots within the city. This methodology section describes the two main aspects that assess density of vacancy: 1) scale and units, and 2) the analytical method used in this investigation.

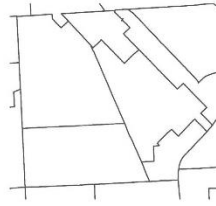
Shifting Scales & Units

The process of using these analytical tools identified an inherent issue of examining vacancy: scale. In order to address this issue, spatial analyses in this and the subsequent investigation were conducted simultaneously using two units of scale: by neighborhood and by census block group. This study utilized information and resources provided by the city and the US Census Bureau. The neighborhood boundaries are established by the city, while the census block group boundaries are those established by the US Census Bureau.

The use of a neighborhood scale as the base unit of measurement provides a spatial understanding of where in the city vacancy is found. However, neighborhoods as a base unit of scale are broad, covering a larger area that is not a fixed unit of measurement. This is an issue, as it does not clearly identify where within a neighborhood vacant land is found or potential relationships between different areas of vacancy. A way to address this issue is a subsequent analysis at a census block group scale. Census block groups are a unit of measurement created by the United States Census Bureau as a way of recording and tracking demographic and census information. As a unit of measure, census block groups represent an area with a range of 600 to 800 residents and typically reflect a smaller tract of area (see Illustration 6, located on the next page).

Illustration 6: Comparison of Neighborhood and Census Block Group Scales

Neighborhoods



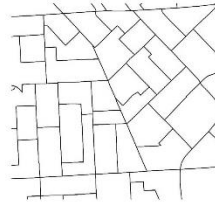
278 units

social and physical boundaries

known location within city

refers to a broader area

Census Block Group



653 units

600 to 3,000 people

challenging to physically locate

finer grain of analysis

However, neighborhood boundaries are based on social and physical boundaries and are ideal for communicating locations within the city. While a census block group allows for a more detailed and finer unit of analysis, an inherent challenge of using it is in referencing where within the city the block group is located. As a way of addressing these challenges, the analyses performed as part of this investigation includes an analysis by neighborhood as well as by census block group as a finer grain and specificity of spatial location (see Illustration 7).

Illustration 7: Overlay of Census Block Group and Neighborhoods

Census Block Group



Census Block Group Overlaid with Neighborhoods



The previous investigation examining the distribution of vacant land revealed that there are groupings of vacant buildings and lots situated along the boundaries of the Jones Falls, Gwynns Falls, and Baltimore Harbor watersheds. A 2014 study of Baltimore's watersheds found that the Jones Falls and Baltimore Harbor received failing evaluations of water quality and overall health (Waterfront Partnership of Baltimore & Blue Water Baltimore, 2014). The Gwynns Falls fared marginally better than the other local watersheds. Given the findings of the distribution investigation, it is worthwhile to examine the density of vacant buildings and lots from a watershed scale.

Building off of the previous investigation's findings, the density of vacant land by watershed was conducted. Due to issues of scale, the density analysis it was necessary to shift units of measurement. The density investigation was conducted at a drainage basin scale instead of a watershed level. This is because the watersheds within Baltimore extend far beyond the city limits and cover tens of thousands of acres. Using the Baltimore City's drainage basin shapefile, located on Baltimore's Open Data website, the density was analyzed by drainage basin, which covers thousands of acres (see Illustration 8, see next page).

Illustration 8: Watershed and Drainage Basin Scale Comparison

WATERSHEDS

Tens of thousands of acres



DRAINAGE BASINS

Thousands of acres

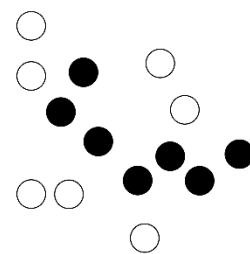
Finer analysis of location



Analytical Assessment

The density analysis examined the number of vacant lots and buildings within the city. This count of vacant land was calculated using the refined vacancy data, which previously removed duplicate entries (see previous investigation). The density was calculated by quantifying the number of vacant buildings or lots within a census block group (see Illustration 9). The count from each census block group was then divided by the total vacant buildings or lots, respectively. This created a percentage which was then represented within a series of maps. The findings of the vacant buildings and vacant lots maps is

Illustration 9:
Density Analysis by Count



distributed by natural breaks. This analysis was first performed at a census block group scale because it is the smallest unit of measurement used in the investigation. Once the count by census block group was calculated, an additional calculation was performed to determine the count of vacant buildings and lots on a neighborhood scale. Last, an additional calculation was performed at a drainage basin scale.

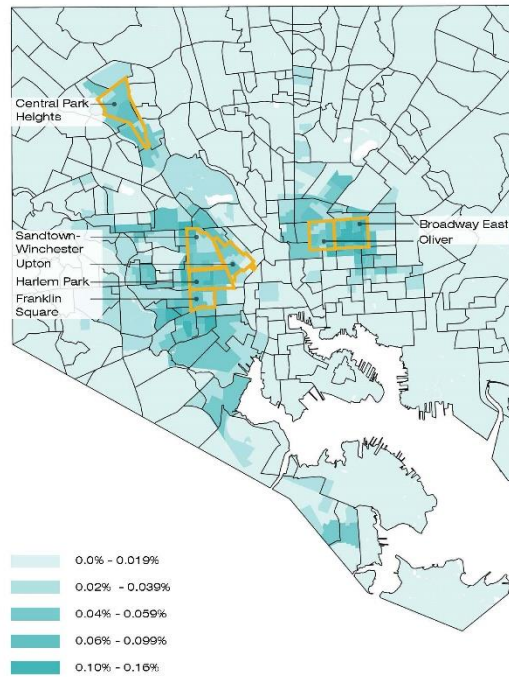
The mappings of these analytical methods were done using multiple tools. First, the density of vacant buildings and lots within Baltimore was calculated using ArcGIS. The findings were then digitally mapped using ArcMap 10 and were printed. Hand mapping was used to create overlays and to document the findings. This information was applied at all three units of scale, census block group, neighborhood, and drainage basin, to extrapolate any additional quantitative and qualitative findings within the city.

Findings

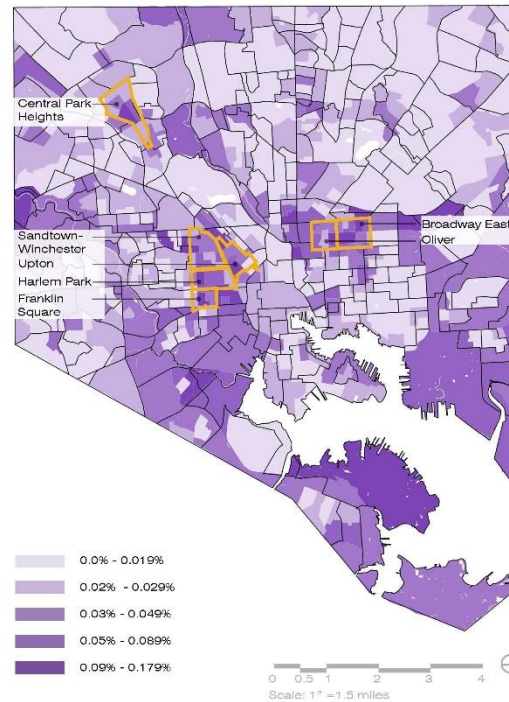
The distribution of vacancy examines where and how much vacant land is situated throughout Baltimore City. This section examines the composition of Baltimore's vacancy through two lenses: neighborhoods and watersheds. The first density analysis, based on the count of vacant lots or buildings, had similar neighborhoods. The neighborhoods of Broadway East and Sandtown-Winchester had the highest count of vacant lots and buildings. Similarly, five additional neighborhoods were found to have similar high counts of vacancy (see Appendix I), such as Oliver, Upton, Central Park Heights, Harlem Park, and Franklin Square, as shown in yellow in Map 9 (see next page).

Map 9: Overlap of Neighborhoods with Highest Density Count

VACANT BUILDINGS

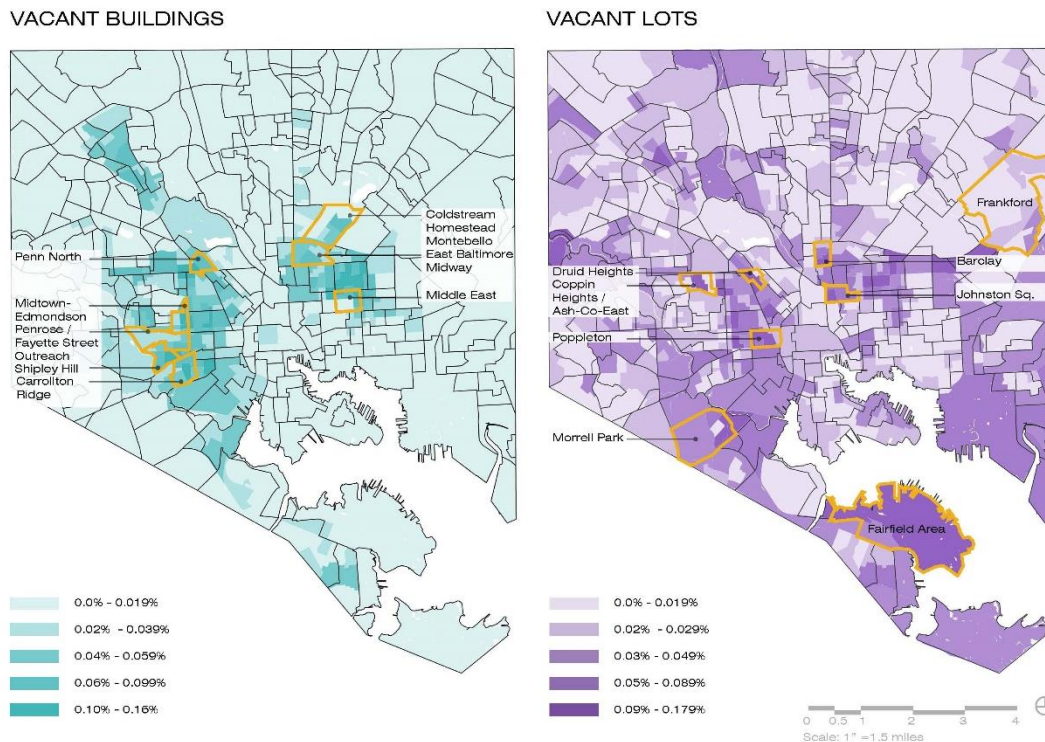


VACANT LOTS



While some neighborhoods shared high counts of vacant lots and buildings, there were other neighborhoods with a significantly larger number of one vacancy type over another (see Map 10, located on the next page). For example, Carrollton Ridge and Midtown-Edmondson had high counts of vacant buildings. Whereas the Poppleton and Johnston Square neighborhoods have 478 and 355 vacant lots, a large portion of which are zoned residential. In these communities, portions of the vacant lots present today are the result of razed row houses. There are numerous reasons as to why row houses are removed, typically associated with abandonment or disintegration and lack of stability of structure. While some lots are the result of razed row houses that is not always the case and should be examined further.

Map 10: Neighborhoods with Highest Density Count of Vacant Buildings or Vacant Lots



The land use of vacant lots and buildings impacts the characteristics of vacancy in the city. Overlaying the findings of the distribution analysis of vacant buildings with land use found that 92.2% of vacant buildings in the city are zoned as residential, as compared to 81% of vacant lot parcels. The distribution analysis found that vacant buildings typically take small, rectangular forms that create larger blocks. This is also indicative of the iconic row houses of Baltimore City and supports the majority of residential land use of vacant buildings.

The land use of vacant lots are more diverse than those of vacant buildings with 8.3% of vacant lots are found in industrial zoning and 9.3% in mixed use. An examination of land use is telling; the shape and acreage of parcels become less predictable and more diverse when there is a larger diversity of land use, specifically

when there is less residential zoning and more industrial and mixed use. The shape, character, and environmental quality of these properties are more likely to be diverse given Baltimore's industrial roots.

Watershed and Drainage Basins

Baltimore City has 4 main watersheds, Baltimore Harbor, Gwynns Falls, Herring Run, and Jones Falls, with a small portion of a 5th watershed, the Patapsco River watershed, located on the Southwest edges of the city⁴. Qualitative analysis of the presence of vacancy within watersheds identifies how many vacant parcels are located within each watershed and how much of the watershed acreage is identified as vacant land. Gwynns Falls has the highest percentage of vacant lots, 38.8%, and vacant buildings, 49.5%, compared to all the watersheds within the city, followed by the Baltimore Harbor. Similarly, the percent of vacant acreage as compared to the watershed acreage within the city is highest for vacant lots and buildings within the Gwynns Falls watershed. Gwynns Falls is located west of the city, with approximately 12,305.03 of the watershed's acreage located within the city boundaries.

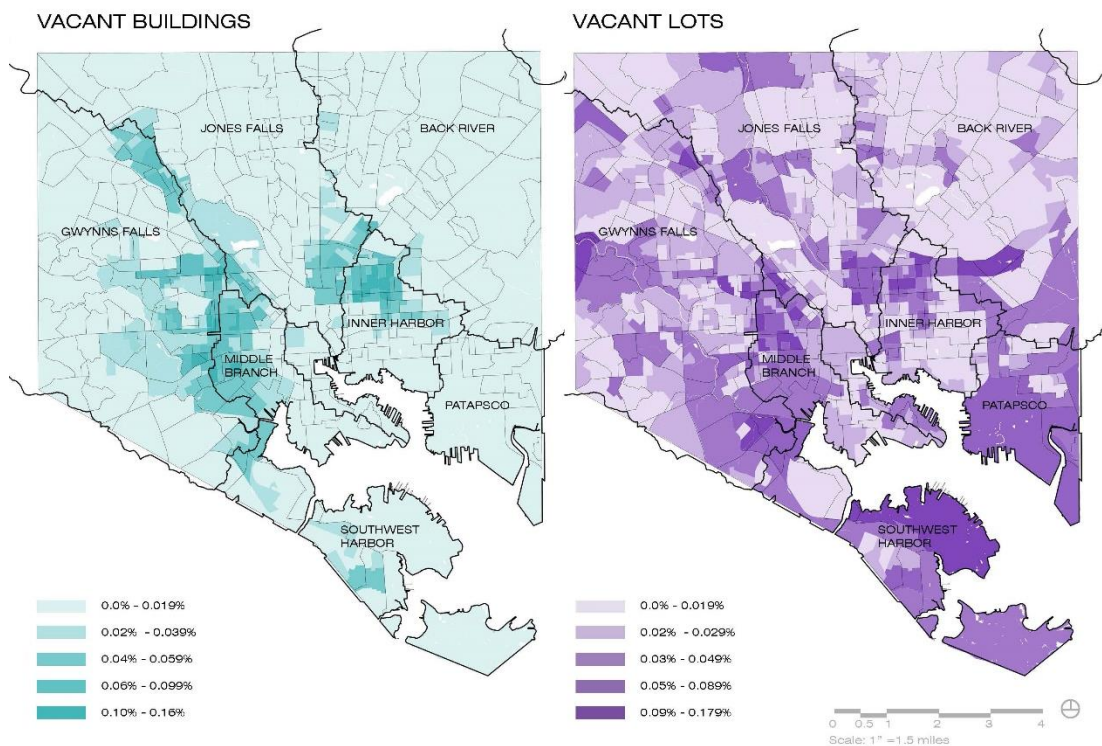
There are subtleties that differentiate the watersheds. Specifically, Herring Run has 10.86% of the city's vacant lots, the second lowest percentage compared to all the watersheds, however 11.08% of the watershed's acreage within the city is vacant, the second highest amongst the watersheds. However, this finding leads to an

⁴ See Illustration 8, located on pg. 59 for reference.

even larger question: *What is the range of spatial qualities of vacant lots within the city that has led to such a large presence of vacant land within Herring Run?*

The scale of watersheds is large, accounting for 10,000 acres or more per watershed; this scale is challenging as it does not account for smaller areas, such as neighborhoods or regions of the city. Additional analyses are conducted by drainage basins, a smaller scale to more accurately pinpoint areas within watersheds with a strong presence of vacancy (see Map 11).

Map 11: Drainage Basins within Baltimore, Maryland

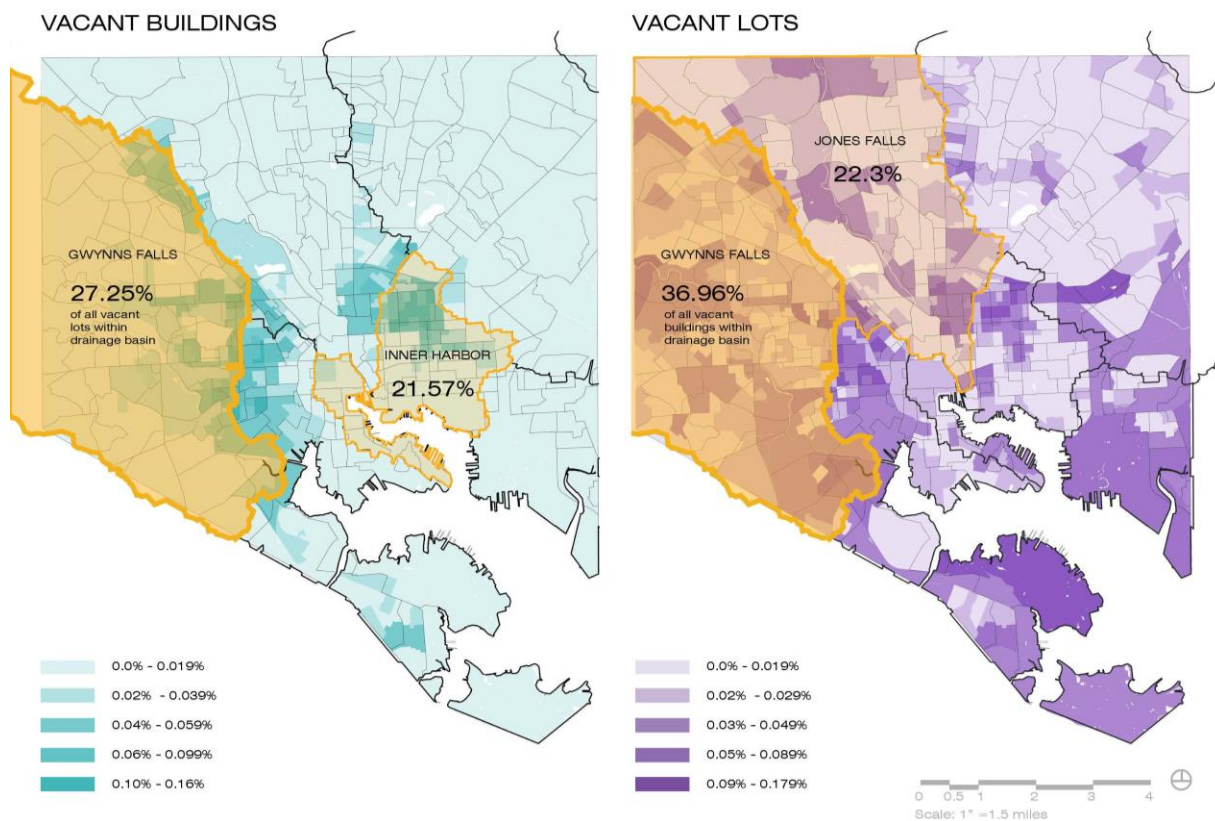


There are seven drainage basins within the city, Back River, Gwynns Falls, Inner Harbor, Jones Falls, Middle Branch, Patapsco, and Southwest Harbor, each ranging from 1,000 to 13,000 acres. The drainage basins' acreage was accounted for as it was in the watershed analysis. Gwynns Falls and Jones Falls are two drainage

basins with the lowest acreage located within the city. Similar to the previous watershed analysis, acreage of vacancy is calculated based on the acreage of the drainage basin located within the city and used to calculate the percentage of vacancy acreage by drainage basin.

Assessing the count of vacant buildings and lots by drainage basin differed slightly from the findings at a watershed scale. As shown in Map 12 (see next page), both vacant buildings and lots had high counts within the Gwynns Falls drainage basin. In addition, both vacancy types had the highest acreage within the Gwynns Falls drainage basin as well. Vacant buildings and lots differed when examining drainage basins with the second highest count of vacancy. The Inner Harbor has the highest vacancy acreage percentage by vacant buildings, likely due to the low acreage of the basin, which has approximately 3,937 acres. Once again, the zoning in which buildings or lots are located impacts the acreage of the properties. In this instance, 21.57% of the total number of vacant buildings within the city are located within the Inner Harbor drainage basin, which accounts for approximately 124 acres of vacant land. Contrastingly, Jones Falls had the highest count of vacant lots with 22.3% of the total vacant lots located in the drainage basin.

Map 12: Findings of Drainage Basins with the Highest Density in Baltimore, Maryland



The shifting of scales and units allowed for a critical examination of vacant buildings and lots within the city. As an analytical tool, the quantifying method used identified neighborhoods with the highest number of vacant properties. Shifting units to a census block group identified smaller areas within the city with higher densities. The shifting of units allows for finer grain of assessments identifies more specifically what geographic areas within the city have higher counts of vacant buildings and lots. This assessment can assist both planners and designers for future interventions.

Limitations and Future Research

A limitation of shifting scales is the tension and difficulties of transferring information of different units and scales. Using neighborhood boundaries is a unit of measurement, however, neighborhoods are inconsistent as a unit of measurement; there is a lack of consistent characteristics that are similar between neighborhoods. Neighborhoods vary as to the size (acreage), land use, and number of residents, making it a difficult unit of measurement to standardize. However, neighborhood boundaries are a unit of social identity and place, representing units of shared community interest and identity and are easily to geographically pinpoint colloquially.

This investigation analyzed the density of vacant lots and buildings by the quantity of properties identified by the city. Future research should consider comparing additional tools, specifically methods that quantify and/or qualify other characteristics of vacancy, such as examining acreage even further or expanding research to investigate ownership of vacant buildings and lots. Future investigations should continue to examine the relationship between watersheds and vacant land. For example, future research should continue to challenge issues of scale and scope by examining the water quality and health of sub-watersheds or the relationship to tributaries or the buried streams found within the city.

Summary of Findings

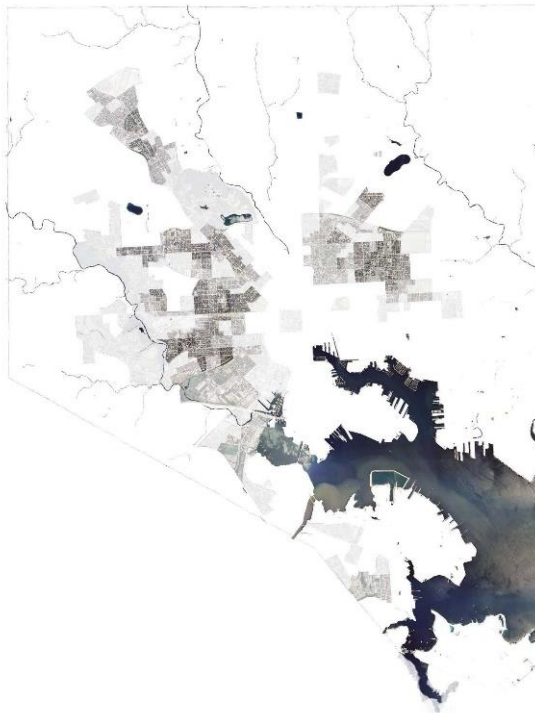
Shifting scales offers the ability to refocus the lens of observation; shifting the scale from a neighborhood level to a census block group level identifies more

accurately where a strong presence of vacancy exists. A comparison of the top 15 neighborhoods with either the highest count of vacancy shows that 10 neighborhoods are common amongst vacant buildings and lots. These neighborhoods (see Map 9 and Appendix I), are primarily located in West and East Baltimore.

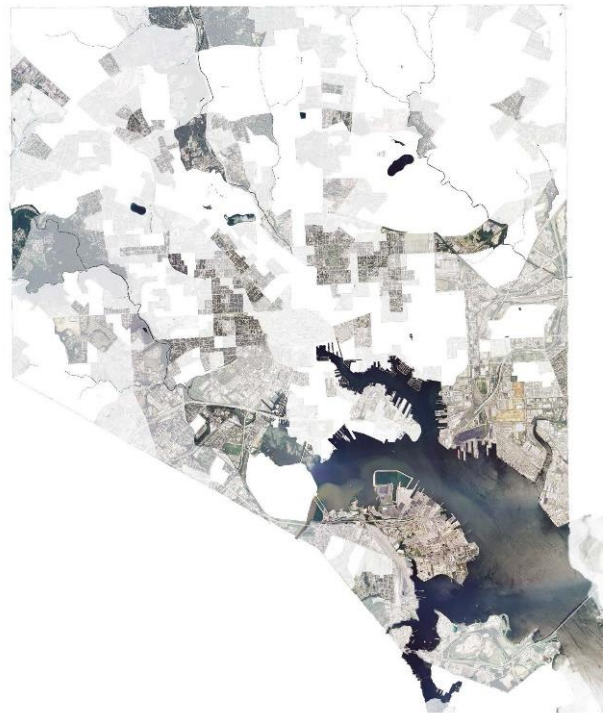
A goal of this investigation was to see the areas with the strongest densities of vacant buildings and lots. The map below visually represents census block groups with the highest density of vacant buildings and lots, respectively. This allows the viewer to see and focus on areas with vacancy, letting other portions of the city fall to the background (see Map 13).

Map 13: Seeing the Density of Vacant Buildings and Vacant Lots in Baltimore, Maryland

VACANT BUILDINGS



VACANT LOTS



While it is impossible to say with complete certainty what causes vacancy to occur it is possible to see where vacant land is located today and to refocus the view to highlight those areas and communities. There are contributing factors and practices within neighborhoods and communities that were discriminatory in nature and created an unequal and challenging for residents of particular nationalities and ethnicities to receive fair and equitable treatment. For example, red lining was a practice and restrictive housing covenants that were geared particularly toward African Americans, Jews, and European immigrants within the city. It is forces such as these that are the micro-level occurrences that influenced where and how people lived, how much opportunity was within a community, etc. (Bowman & Pagano, 1998 p. 16).

Investigation of the Interspatial Relationships of Vacant Lots and Buildings

Increasingly the impacts of vacancy on other lands within a city is investigated. A 2014 study examined the distance and magnitude that vacant properties had on nearby real estate values (Han, 2014). This 19-year cross-sectional study within Baltimore, Maryland found that properties that were abandoned for 3 years or less could impact property values up to 250 feet away (Han, 2014, p. 327). If a property was abandoned for more than 3 years, it could impact the value of properties as far away as was 1,500 feet (ibid). While this study shows the impact vacant land has on other property, a gap in current research is the spatial relationship of vacancy to other vacant land.

This investigation builds on previous investigations, such as the distribution analysis, to determine the spatial relevance of vacancy in the city. The preceding analysis of spatial patterns examined the density and geographic location of vacancy clusters, however it does not explain the implications of those clusters. A spatial concentration analysis examines if the clustering previously identified in the spatial pattern analysis is significant and determines the types of clustering that is occurring. This is accomplished by using a hot spot analysis. A hot spot analysis is an analytical tool that assesses a variable's spatial distribution. In the context of this study, the hot spot analysis calculates the statistical clustering determined by the density of vacant buildings and lots within the city. The clustering was calculated using ArcGIS's Gertis-Ord G_i^* function (see Appendix II). The findings of this interspatial analysis led to the conceptual development of **transitional zones**.

This last investigation is organized into four sections: 1) methodology of hot spot analysis, 2) findings of the hot spot analysis, 3) the extrapolating of meaning to develop transitional zones, and 4) summary of the investigation. The first two sections explain the statistical and analytical method used to conduct the interspatial investigation as well as the findings. The third section, “Extrapolating Meaning” discusses the conceptual implications of the findings of the hot spot analysis. This section more clearly outlines the conceptual implications and proposes a new strategy of how to reactivate vacant land based on the geographic location of dense groupings of vacant buildings and lots within the city of Baltimore. Finally, the investigation concludes with a summary of the findings, implications, and opportunities for future research.

Methodology of the Hot Spot Analysis

A hot spot analysis identifies the statistical relevance of vacant buildings in proximity to each other. This analysis results in the identification of clusters, called “hot spots” and “cold spots”. Clusters with a close proximal relationship with other vacant buildings or lots are considered “hot spots.” Contrastingly, areas with a notable absence of vacant buildings or lots are considered “cold spots.” These clusters are based on spatial statistical analysis that achieves multiple tasks simultaneously. First, it identifies clusters with a presence and absence of vacant buildings or lots respectively. Second, it evaluates the locations of a variable and whether the physical presence relates to other areas within close proximity. Locations of vacant buildings

or lots that are not found to have a relevant impact within close proximity of other vacant land are considered outliers and not statistically relevant.

A hot spot analysis results in a hot spot and cold spot cluster. Each cluster is based on the statistical confidence, or p-value, ranging from a 99%, 95%, and 90% confidence level. Typically, a hot spot and cold spot will consider all three confidence levels in conjunction with each other. The hot spot analysis was assessed under two lenses, by neighborhoods and by urban drainage basins, to further identify where within the city are there strongest statistical concentrations of vacancy within the city.

It is important to note that the hot spot analysis tool may exclude the presence of other areas with vacant buildings or lots, however it does not negate their presence. As a tool, a hot spot analysis focuses on the quantity and the proximity of vacant buildings and lots in relation to other vacant properties. As a tool, it is not recommended that it is used by itself, rather it should be used to inform where vacancy is found and how it relates on a broader scale to other properties. In this study, the findings of the hot spot analysis is used in conjunction with the density analysis, which indicates densities of vacancy by census block group level.

Findings of the Hot Spot Analysis

Reviewing the findings of the individual hot spot analyses conducted for vacant buildings and lots found some similarities. For example, there are 20 communities within West Baltimore that are located within the strongest hot spots of both analyses (see Map 14, on the next page): Bolton Hill, Charles North, Mid-town Belveder, Mount Vernon, Seton Hill, the western edge of Downtown, Hollins Market,

Northern portion of Pigtown, Carrollton Ridge, Millhill, Shipley Hill, Penrose and Fayette Street outreach, Harlem Park, Sandtown-Winchester, Druid Heights, Madison Park, and Upton.

Map 14: Comparison of 99% Confidence Hot Spots

CONCENTRATED HOT SPOT

the strongest proximity to other vacant buildings or lots


99% Confidence Hot Spot

 Overlap

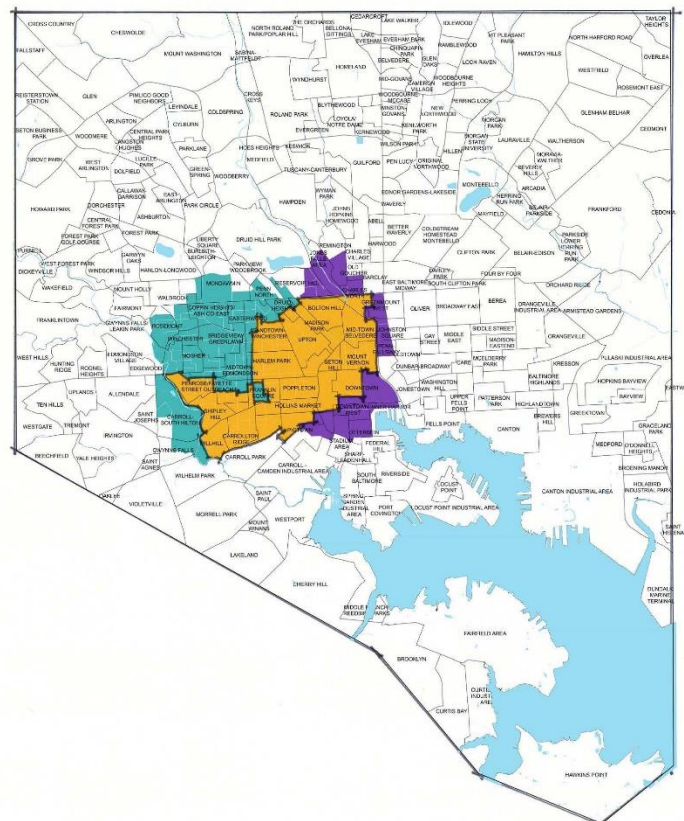
Bolton Hill
Madison Park
Upton
Druid Heights
Sandtown-Winchester
Harlem Park
Poppleton
Franklin Square
Penrose Fayette
Shipley Hill
Carrollton Ridge
Hollins Market
Downtown
Pigtown
Mid-town Belvedere
Mount Vernon
Seton Hill
Charles North
Boyd-Booth
Union Square

 Vacant Lots


Jones Falls Area
Remington
Old Goucher
Charles North
Reservoir Hill
Greenmount West
Johnston Square
Penn-Fallsway
Downtown
Downtown West
Inner Harbor
Otterbein
Pigtown

 Vacant Buildings

Mondawmin
Madison Park
Druid Heights
Penn North
Easterwood
Bridgeview/Greenlawn
Sandtown-Winchester
Harlem Park
Mid-town Belvedere
Franklin Square
Poppleton
Penrose/Fayette Street Outreach
Carroll-South Hilton
Gwynns Falls
Mosher
Winchester
Rosemont
Coppin Heights/Ash-Co-East
Evergreen
Rosemont Homeowners



99% Confidence Hot Spot

 Vacant Lots

 Vacant Buildings

 Overlap

0 0.5 1 2 3 4 
Scale: 1" = 1.5 miles

There are some differences between vacant buildings and lots with a 99% confidence level. For example, the strongest concentration of vacant lots are largely to the north and south of the downtown, whereas vacant buildings are more closely grouped to the west. These communities, especially those identified as communities in the strongest hot spot analysis of both vacant buildings and lots should be approached with care. These communities may be more susceptible to widespread redevelopment that may remove current residents or the existing character and history.

A 95% confidence level statistically translates to a 95% confidence level of the vacant lots or buildings found within these areas not resulting by chance; the conglomeration of these vacancy lots and buildings are significant and should be explored further. Similarly, a 90% confidence level represents the 90% confidence level of vacant land conglomerating intentionally within an area. In this study, communities with a hot spot with 95% and 90% confidence levels are identified as **transitional zones**: communities with a relatively strong presence of vacant buildings or lots that are conglomerated that do not have as strong of a spatial presence of vacancy as compared to other communities. The communities found within these *transitional zones* offer a new opportunity to approach addressing vacant land through the collaboration of local leaders and community partners. This coordination of efforts can yield important ground truthing knowledge that can improve our understanding of space and place regarding vacancy in these communities. In addition, it can begin to foster a relationship between planners and landscape

architects to help facilitate discussions of how vacant land can be reactivated with public input so as to address community needs and desires.

The comparative findings of transitional areas of community engagement vary more between vacant buildings and lots (see Map 15, located on the following page). There is some overlap in areas of Mondawmin, Penn North, Reservoir Hill, Remington, Charles Village, Old Goucher, Barclay, Harwood, Greenmount Cemetery, Johnston Square, Oldtown, Penn-Fallsaay, Jonestown, Stadium Area (which includes Camden Yards and the M&T Bank Stadium), Carroll-Camden Industrial Area, Saint Paul, Morrell Park, and Wilhelm Park. Additional transitional zones of vacant lots and vacant buildings continue to radiate out. Many of the transitional vacant lots are located in what was previously identified as the strongest concentrations of vacant buildings.

Map 15: Comparison of 95% Confidence Hot Spots

PRIMARY TRANSITIONAL ZONE

95% Confidence Hot Spot

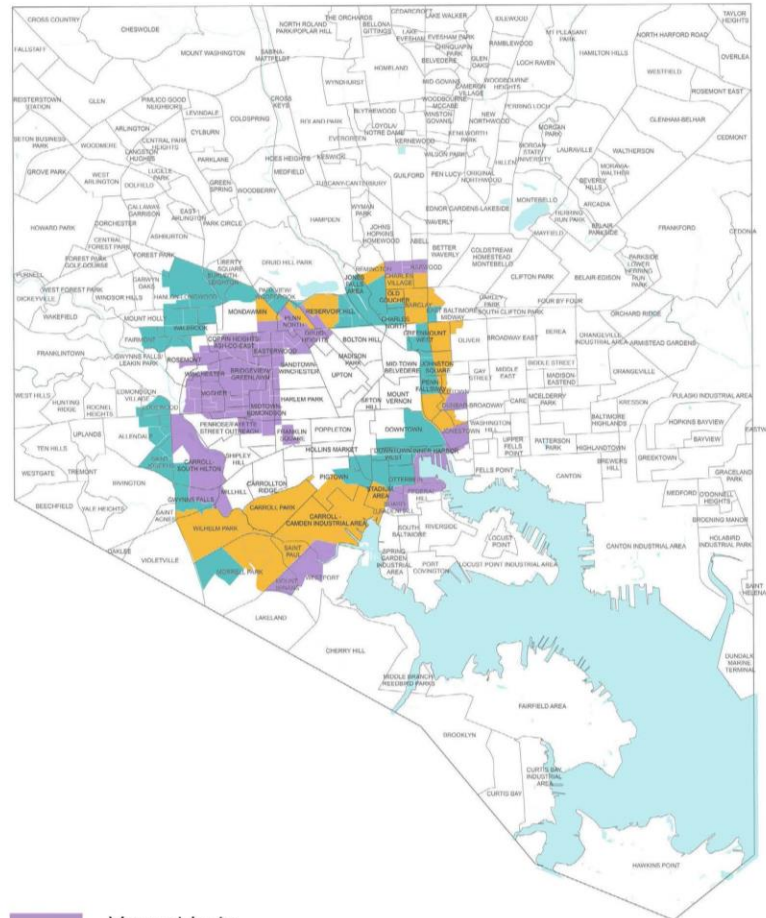
statistically significant
conglomeration of
vacant buildings or
lots within close
proximity

 Overlap

Mondawmin
Penn North
Reservoir Hill
Remington
Charles Village
Old Goucher
Barclay
Harwood
East Baltimore Midway
Greenmount Cemetery
Oliver
Johnston Square
Penn-Fallsway
Oldtown
Jonestown
Stadium Area
Carroll-Camden Industrial Area
Saint Paul
Wilhelm Park
Carroll Park
Morrell Park
Pigtown

 Vacant Buildings

Burleigh-Leighton
Hanlon-Longwood
Walbrook
Mount Holly
Fairmont
Rosemont
Panway/ Braddish Avenue
Edgewood
Edmondson Village
Allendale
Saint Josephs
Carroll-South Hilton
Gwynns Falls
Morrell Park
Pigtown
Barre Circle
Stadium Area
Otterbein
Downtown West
Downtown
Inner Harbor
Penn-Fallsway
Johnston Square
Greenmount West
East Baltimore Midway
Charles North
Remington
Jones Falls Area
Reservoir Hill



 Vacant Lots

Mondawmin
Penn North
Reservoir Hill
Druid Heights
Sandtown-Winchester
Coppin Heights/ Ash-Co-East
Bridgeview/ Greenlawn
Midtown-Edmondson
Harlem Park
Franklin Square
Penrose/Fayette Street Outreach
Mosher
Carroll-South Hilton
Gwynns Falls
Millhill
Rosemont
Winchester
Northwest Community Action
Rosemont Homeowners
Evergreen Lawn

95% Confidence Hot Spot

 Vacant Lots

 Vacant Buildings

 Overlap

0 0.5 1 2 3 4
Scale: 1" = 1.5 miles

Last, a comparison of the 90% confidence level hot spot analysis found the most variation between vacant buildings and lots. For example, vacant buildings with a 90% confidence level were strongly located within East and Northeast Baltimore (see Map 16, see next page). This location within the city more closely represents the findings of the distribution analysis. In addition, vacant lots were also located within the southernmost reaches of the city, near Curtis Bay and Curtis Bay Industrial Area. The smallest overlap between vacant buildings and lots was found in the 90% confidence level as well.

The differentiations between these three statistical confidence levels is important to note because each confidence levels expresses the statistical relevance of the findings. Again, it is important to look at the hot spot analysis within the context of vacancy as a whole to understand the depth of the statistical implications as well as interventions and strategies. In order to understand the larger picture, additional information, such as watersheds and densities should be overlaid with the statistical findings.

Map 16: Comparison of 90% Confidence Hot Spots

SECONDARY TRANSITIONAL ZONE

90% Confidence Hot Spot

lowest statistically significant
conglomeration of vacant
buildings or lots within close
proximity

Overlap

Druid Hill Park
Jones Falls Area
Remington
Johns Hopkins Homewood
Abel
Better Waverly
East Baltimore Midway
Oliver
Johnston Square
Gay Street
Oldtown
Dunbar-Broadway
Washington Hill
Pleasant View Gardens
Little Italy
Inner Harbor
Morrell Park

Vacant Lots

Burleigh-Leighton
Mondawmin
Parkview Woodbrook
Walbrook
Panway/Braddish Avenue
Rosemont
Winchester
Gwynns Falls/Leakin Park
Lower Edmondson Village
Allendale
Saint Josephs
Carroll-South Hilton
Gwynns Falls
Morrell Park
Spring Graden Industrial Area
Port Covington
South Baltimore
Sharp-Leadenhall
Federal Hill
East Baltimore Midway
Middle Branch/Reedbird Parks
Fairfield Area
Curtis Bay Industrial Area
Curtis Bay

Vacant Buildings

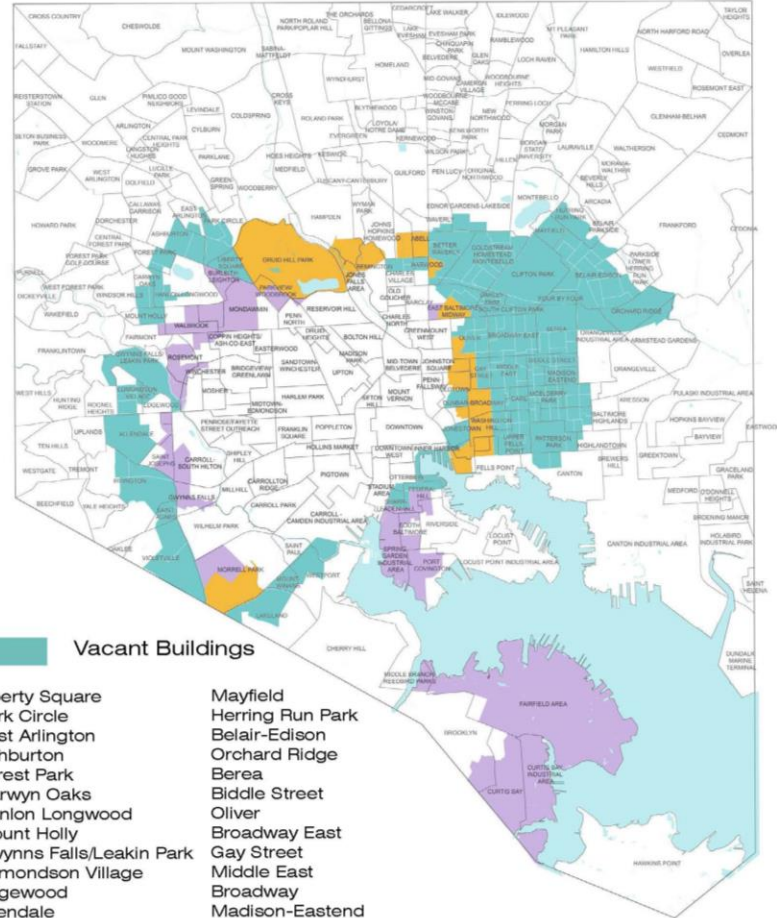
Liberty Square
Park Circle
East Arlington
Ashburton
Forest Park
Garwyn Oaks
Hanlon Longwood
Mount Holly
Gwynns Falls/Leakin Park
Edmondson Village
Edgewood
Allendale
Irvington
Saint Agnes
Violetville
Lakeland
Mount Winans
Westport
Sharp-Leadenhall
Federal Hill
Inner Harbor
Jonestown
Oldtown
Upper Fells Point
Canton
Patterson Park
Washington Hill/Waverly
Better Waverly
Coldstream Homestead Montebello
Clifton Park
Darley Park
East Baltimore Midway
South Clifton Park
Four by Four

Mayfield
Herring Run Park
Belair-Edison
Orchard Ridge
Berea
Biddle Street
Oliver
Broadway East
Gay Street
Middle East
Broadway
Madison-Eastend
Milton-Montford
Care
McElderry Park
Ellewood Park/Neighborhood
Patterson Place
Patterson Park Neighborhood

90% Confidence Hot Spot

Vacant Lots
Vacant Buildings
Overlap

0 0.5 1 2 3 4
Scale: 1" = 1.5 miles



Drainage Basin

Addressing issues of scale, shifting to drainage basin to more specifically identification of where within the city there is a strong presence of vacancy. The hot spot analysis was overlaid with the drainage basins to determine which basins had the strongest, statistically significant presence of vacancy. The hot spot findings and drainage basins were analyzed two ways: 1) how many vacant lots or buildings within a drainage basin and 2) what percentage of the drainage basin's acreage is vacant? The two analytical assessments were conducted as part of the distribution analysis, allowing for a comparison of vacancy presence and spatial concentrations.

The findings of the hot spot analysis of the vacant lot and vacant buildings analysis showed some consistency. For example, Back River, with a 95% and 99% confidence, and Gywnns Falls, with a 90% confidence, consistently had the strongest cold spots, a statistically significant lack of vacant properties concentrated in close spatial proximity, with the exception of the percentage of vacant lot acreage. The Patapsco basin had the highest 90% confidence cold spot, with a 90.42% of acreage not statically associated with vacancy.

There were similar trends of the drainage basins within the hot spots. Gywnns Falls and Middle Branch were the drainage basins consistently identified with the highest spatial concentrations of vacancy, with the exception of the percentage of vacant building acreage, in which the Inner Harbor had the highest concentration, with a 99% confidence. While there are overlaps and similarities in findings when examining vacant properties, there are many more notable differences based on the

type of vacancy examined as well as the number and the acreage of the vacant parcels.

The spatial concentration of vacant buildings remained consistent when assessing the number of vacant buildings and the percent of vacant acreage. The Inner Harbor had the highest confidence of concentration of vacant buildings, followed by Middle Branch and then Gywnns Falls. The Inner Harbor also had a substantial number of vacant buildings that were not spatially significant, 20.28% of parcels and 43.39% of acreage, that were spatially insignificant. This is interesting to note, as the Inner Harbor had the strongest confidence of hot spot.

Extrapolating Meaning: Transitional Zones and Concentrated Hot Spots

This framework sees the potential and distinctions that are found within each confidence level, elaborating further upon the traditional hot spot to give it new meaning. I believe that the different confidence levels indicate not only the extent of vacant buildings and lots in close proximity to each other but the amount of social capital that is present based on the relative amount of vacant properties. This framework outlines the interpretation of the hot spot components, identifying three distinct layers.

There are three layers to a hot and cold spot that indicate how prevalent the location of vacant buildings or lots are to other properties. Each cluster has three layers that are based on statistical confidence, or p-value, ranging from a 99%, 95%, and 90% confidence level. Areas that are within the 99% confidence level are called “concentrated” hot or cold spots, while 95% and 90% confidence levels are called

“transitional zones.” These layers indicate different proximity relationships with vacant land and the potential collaboration with local stakeholders.

A **concentrated hot spot** is an area with the strongest proximity to other vacant land. As a tool, the hot spot analysis identifies clusters and assesses the conglomeration of these vacant buildings or lots in relation to each other. While there may be other areas with high counts of vacancy within the city, a concentrated hot spot identifies areas with the highest and closest proximity of other vacant buildings or lots. Statistically speaking, a concentrated hot spot has a confidence level of 99%; properties located within a concentrated hot spot have a high probability that a force(s) have contributed to the occurrence of vacancy within these areas. This research hypothesizes that due to the high concentration and conglomeration of vacant buildings or lots, neighborhoods within the concentrated hot spot may face challenges relating to razing, the removal of cultural and historical artifacts and sense of place that may occur while trying to reactivate these vacant lands.

Transitional zones indicate a high presence of vacant land as well as existing social capital within close proximity. The concept is that these transitional areas have a presence of vacant land that can either transition to additional vacancy or to reactivity. As a strategy, transitional zones offer an unexplored opportunity for community collaboration and discussion to address vacancy in a holistic and community-oriented way.

There are two types of transitional zones identified through a hot spot analysis: a *primary transitional* and *secondary transitional zone*. Transitional zones are areas that maintain relevant close proximity to other vacant buildings or lots, but

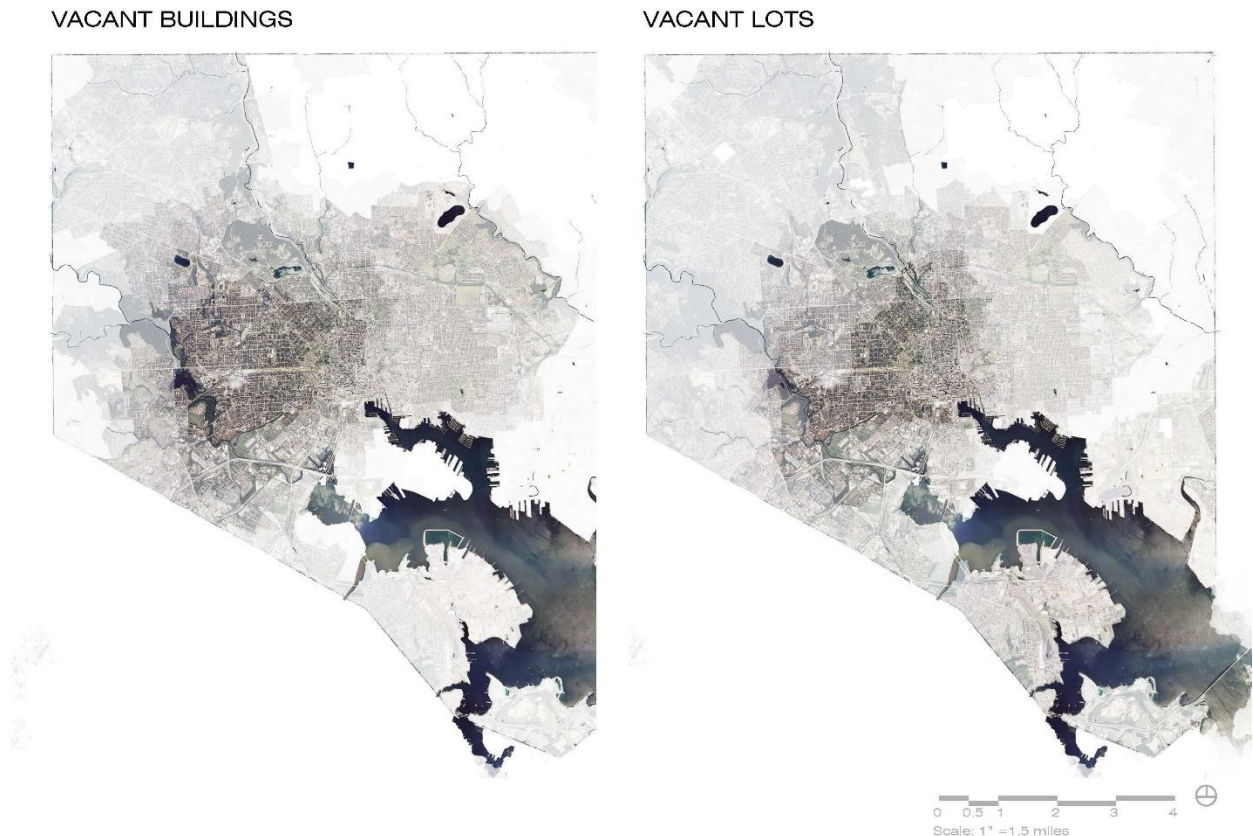
are not as statistically significant as those of a concentrated hot spot or cold spot cluster. A concentrated hot spot or cold spot has a 99% confidence level; this confidence level is a statistical method that indicates the probability of an event occurring. A **primary transitional zone** has a 95% confidence level, not as statistically strong as that of a concentrated hot spot, but still statistically relevant. Similarly, a **secondary transitional zone** has a 90% confidence level, still statistically relevant but not as much as a transitional zone. The areas within a transitional zone are still within close proximity to substantial vacant land but maintain enough of the social and urban fabric that public collaboration and local stakeholders should be pursued by designers and planners.

Summary

The nature of this investigation was to examine *where* and *how* vacancy is present and the spatial relationships of vacancy. These areas hold the greatest concentration of vacant properties with a strong statistical confidence that they are not the result of chance. As a tool, hot spot analysis is not an interchangeable and easily overlapped tool because the findings are the direct result of the information included. Similar to the previous investigations, it was important to once again reread vacancy. This was accomplished through an illustrative map similar to the distribution (Maps 1 through 8) and density maps (Map 13) that focused on “seeing” vacant parcels. Taking the findings of the interspatial investigation, Map 17 visually depicts the statistical confidence levels of vacancy hot and cold spots. The most clearly visible areas represent the concentrated hot spots. As shown in the illustrative maps, the

location of the densest and the strongest conglomerated areas of vacancy differ between vacant buildings and lots. A gradient of vacancy is created, allowing the viewer to see vacancy and its spatial relationship to other vacant land in a clearer and focused manner.

Map 17: Hotspots of Vacant Buildings and Lots in Baltimore, Maryland



The subtle differences in the spatial concentrations of vacant buildings as compared to vacant lots should be considered as part of a larger discussion of strategies. Prioritization should reflect the findings of the different analyses and scales of this investigation, while consulting the findings of the distribution and density investigation to provide additional insight and direction as the location of high levels of vacant land, as well as the character and type of vacancy present.

Chapter 4: Concepts and Strategies for Addressing and Prioritizing Vacant Lots and Buildings in Baltimore, Maryland

This research thesis conducted a series of qualitative and quantitative investigations of the vacant lots and buildings within Baltimore, Maryland. From these investigations, two concepts emerged. The first concept is a classification system of land identified as **utilized landscapes**. Using the city of Baltimore's vacant land datasets, this classification system was developed as an alternative to identifying some urban land as "vacant." These utilized landscapes serve a social, environmental, or physical purpose within the urban environment. The second concept that emerged from this thesis is a strategy of identifying and prioritizing areas for vacancy intervention. These areas are called **transitional zones**, representing geographic locations within the city that have a substantial amount of vacant land present, but also contain homes and businesses that may assist in the transition of vacant land towards active spaces.

Organized into three sections, this chapter summarizes the major findings, policy implications and opportunities for future research of the two concepts developed within this thesis: 1) utilized landscapes and 2) transitional zones. The first section discusses the framework outlined in this thesis and explains future application of these methods to cities beyond Baltimore, Maryland. In addition, it identifies how as a framework it begins to address some of the existing gaps within literature and in practice concerning vacant land, specifically with the conceptual development of *utilized landscapes*.

The next section discusses *transitional zones* as a strategy of intervention. The section begins by identifying the implications and locations of the concentrated hot spots and transitional zones for vacant lots and buildings within the city. In addition, this section provides an overview of the most recent initiative set forth by the city of Baltimore and the state of Maryland to address vacancy and blight. This initiative is assessed as a strategy and is then compared to the findings of this thesis, specifically to transitional zones. Finally, the chapter concludes with a summary of the findings, the implications of the two concepts developed within this thesis, and opportunities for future research.

Utilized Landscapes

The framework of this thesis can be applied to any city or municipality to assess vacant land. The three investigations systematically ask questions that logically inform the next investigation. As a framework, the methodology can be easily replicated by other jurisdictions by following the qualitative and quantitative methods laid out in chapter three as a process of assessing the distribution, density, and interspatial connectivity of vacant land within a city or municipality. A major obstacle of vacant land is defining what constitutes as vacancy. Through these investigations, this thesis proposes identifying *what vacant land is not*.

This framework first starts by asking how vacant lots and buildings are distributed in the city using a combination of qualitative and quantitative methods. The first investigation began by using qualitative methods to understand the

relationship between types of vacant land and urban components. It was this qualitative analysis that informed the depth at which the quantitative assessments needed to be conducted, as well as additional questions to ask, such as: Why are the forms of vacant buildings and vacant lots so different? What are these “vacant” lands on the ground level? Are some of these lands truly vacant or do they serve a different role within the landscape and thus require a different name?

In the process of answering these questions, this thesis developed the concept of **utilized landscapes**. Lands such as parks, urban forest patches, vehicular and rail rights-of-way, vegetated medians, and cemeteries are all examples of utilized landscapes. These *utilized landscapes* serve a function within the urban environment, even if the role is indirectly accessed by users. As a classification system, landscapes such as these should be excluded from vacancy datasets. These lands serve an important function. For example, the role of lands such as rights-of-ways or vegetated medians are used to create buffers and to create spatial hierarchies for the health, safety, and wellness of people and the environment.

Utilized landscapes can be assessed by the same terms and characteristics as vacant land (see chapter 2). The development of the utilized landscapes concept came from the qualitative and quantitative analysis of the distribution investigation of vacant lots and buildings in the city. Therefore, it makes sense to continue to describe utilized landscapes on the same gradient of characteristics of vacancy: *ownership*, *temporality*, *activity*, and *condition*, as a way of emphasizing *how* vacant land and utilized landscapes are *different*. Similar to vacant land, utilized landscapes can take

many shapes, forms, and roles within the landscape and should be examined for context.

The characteristics and qualities of utilized landscapes have nontraditional relationships of *ownership*, *value*, *productivity*, and/or *activity*. However, as discussed in Chapter 3 there are spaces within the city that serve functions and purposes but which may not have traditional monetary yield nor gain, but still serve *productively*. These spaces are utilized, providing a service or acting as a foundation for an adjacent or more dominant *activity*. In these instances, the role of these landscapes are foundational, where the other primary uses are to the foreground. There is a level of practicality associated to some of these spaces, such as vegetated medians and buffers for roads. These spaces are utilized in an indirect way, pushing them to the background in order to allow for more active and prominent roles that are more readily seen or experienced to come to the foreground. Due to the type of activity that is performed on or immediately adjacent to some of these landscapes, a traditional *owner* may not be present to actively reside in the space. For example, rights-of-way may be owned by the city or state but the use of the space does not require an owner to necessarily occupy it a manner that may be more common of residential or commercial spaces. Once again, this emphasizes the need to assess the context and utilization of space to determine whether or not it is vacant or if it serves a role in a nontraditional fashion. However, these spaces are not void of use or purpose; they are not vacant.

While the establishment of utilized landscapes as a form within the urban environment may assist in describing some of the manners in which land is utilized,

other issues of vacancy still remain. For example, the concept of utilized landscapes does not address issues of inconsistent definitions and methods of identifying vacant land. These variations will still be present because no single organization has established and standardized a working definition and methodology of identifying vacant land. However, the term “utilized landscapes” conceptually begins to narrow the range of lands that can be identified as vacant because it proposes that lands that have utility are not vacant.

Data is an additional issue present when studying urban vacancy. The purpose or use of a dataset greatly impacts the manner in how the data is collected, if and how it is aggregated, and the definitions and parameters used to generate it. All of these aspects impact the accuracy of the data as well as what the data specifies as vacant. The parameters and intentions should dictate how the data can be used. For example, in this thesis the vacant building and vacant lot datasets were accessed via the Open Data: Baltimore website, the city’s public interface platform. The datasets were generated by the BHA, the local agency responsible for identifying and tracking vacant buildings and lots within the city. However, the datasets were not updated continuously and simultaneously. The most recent vacant lot dataset was from March 2014 as compared to the most recent vacant building dataset that was publicly available was from September 2015. This difference in time creates issues and concerns.

Issues of accuracy were a concern of this thesis, which led to the necessity of identifying assumptions of the accuracy and organization of the datasets (see chapter 3, distribution investigation). In addition, additional questions were raised such as

how is the data collected, is the data managed once it has been collected and if so, how, is the data checked for accuracy or duplicates, and what is the specific process vacant buildings and vacant lots must go through to be identified as “vacant?” These questions are all opportunities for future research and further investigation. In addition, a level of transparency or disclosure as to the purpose of datasets, especially those openly accessible to the public, should be considered in the future. It helps users, whether they be academics, reporters, or citizen scientists and activists understand the opportunities and limitations of the data and whether it is appropriate to be cited and used.

Issues relating to vacant land are considerably under studied, especially in regard to the spatial relationships of vacant land. In addition, further clarification on the definition of vacancy would greatly assist cities, designers, planners, and communities. The discrepancy and variation in what constitutes as vacant land led to the critical examination of Baltimore’s vacant buildings and lots from which, the concept of *utilized landscapes* emerged. Further cataloging of vacant lands should be conducted to determine if there are any additional types of utilized landscapes that are currently unaccounted for. On a broader scale, determining the concept of “utilized landscapes” in relation to vacant lands should be explored further. Additional research methods that shift scale from a city-wide analysis to a select number of study areas is an example of how to examine and test the concept of utilized landscapes further.

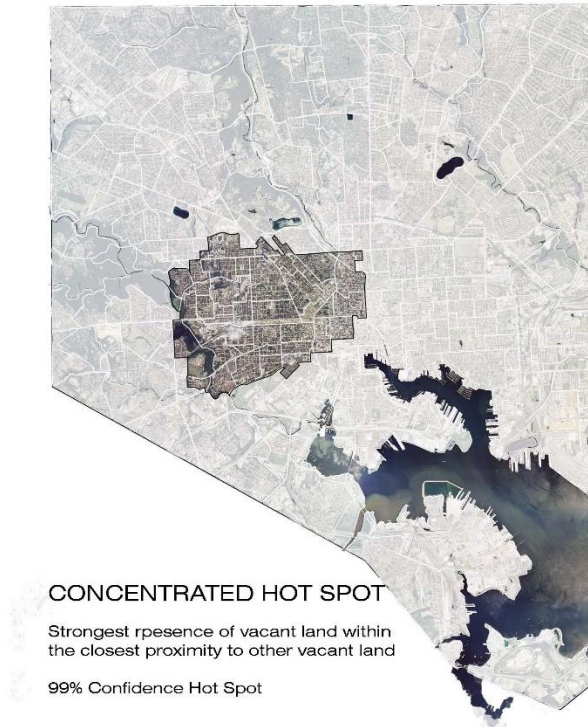
Transitional Zones

In order to assess the interspatial relationship of vacant land a hot spot analysis was used to examine the statistical relevance and impact of vacant buildings and lots to similar properties based on proximity and clustering. The output of this method is based within a statistical framework making it challenging to concisely and clearly indicate the meaning behind each set of findings. The statistical findings were extrapolated and a new conceptual manner of explaining the interspatial findings was developed to more clearly articulate the findings of the analysis and further implications it presents. The hot spot analysis identified three layers of concentrations of vacancy: a concentrated hot spot and two transitional zones: a primary and secondary. Each of these zones represent a 99%, 95% or 90% statistical confidence level and imply different interspatial relationships of vacant land within the city of Baltimore.

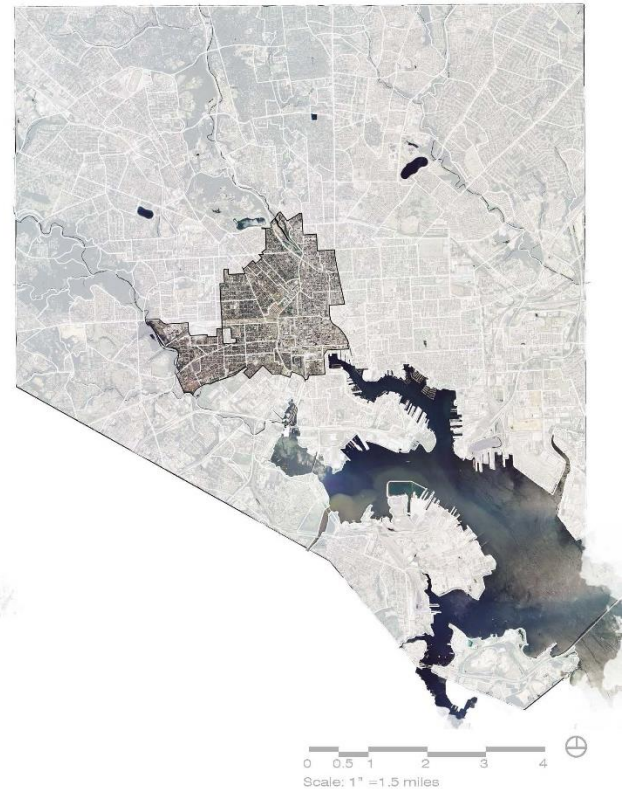
The concentrated hot spot is the area within the city with the highest density of vacant buildings or lots within the closest proximity to each other. The location of the concentrated hot spot of vacant buildings is located predominantly to the West and Southwest of Baltimore, whereas the concentrated hot spot of vacant lots are located more towards the center of the city and farther north (see Map 18, located on the next page).

Map 18: Concentrated Hotspots of Vacant Buildings and Lots

VACANT BUILDINGS



VACANT LOTS



This research hypothesizes that due to the high concentration and conglomeration of vacant buildings or lots, neighborhoods within the concentrated hot spot may face challenges relating to razing, the removal of cultural and historical artifacts and sense of place that may occur while trying to reactivate these vacant lands. From this series of investigations that examine the distribution, density, and interspatial relationships of vacant lands, this research recommends a strategy of prioritizing intervention in areas identified as “*transitional zones*.”

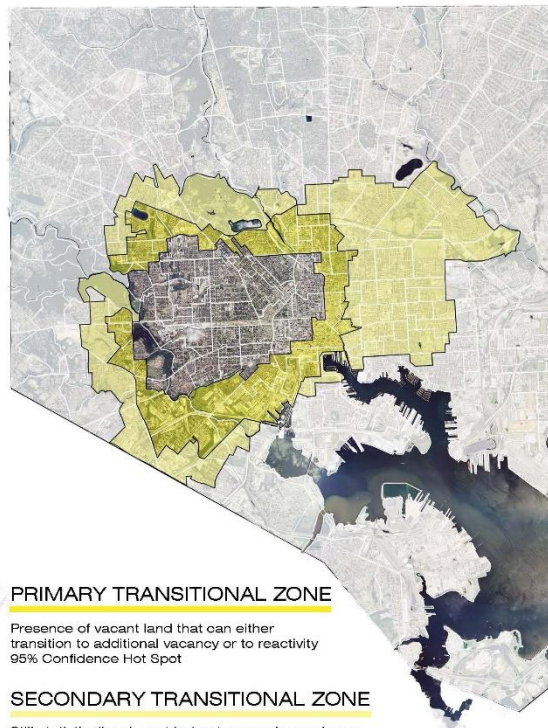
Transitional zones are areas immediately adjacent to a concentrated hot spot that indicate a high presence of vacant land as well as existing social capital. The

transition zones are ideal for primary collaboration as these areas are identified as having a high presence of vacant buildings and lots within close proximity but also containing additional active spaces nearby. These active spaces currently have residents, patrons, and other social capital present that create that activity. The findings of this research led to the development of utilizing transitional zones as a strategy of tapping into existing social capital and networks, encouraging the vacant property to transition towards activity.

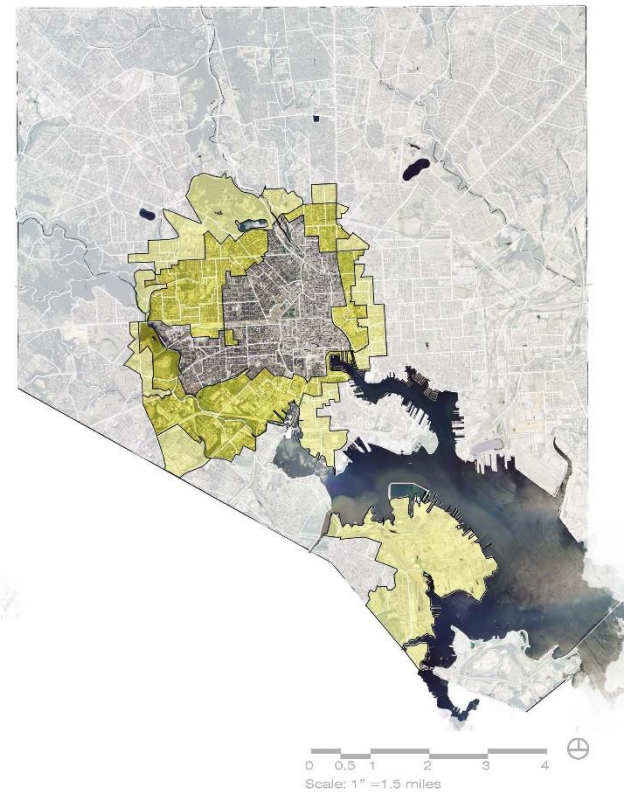
There are two types of transitional zones that emerged from the hot spot analysis: a primary and secondary transitional zone. A primary transitional zone represents a confidence level of 95% and a secondary transitional zone has a 90% confidence level (see map 19). The location of the primary and secondary transitional zones differs between vacant buildings and lots within the city. The primary transitional zone of vacant buildings is more widely located around West and Southwest Baltimore, whereas the primary transitional zone of vacant lots is located farther north within the city and a wider area of Southwest Baltimore. The secondary transitional zones of vacant buildings and lots differ more substantially. Vacant buildings extend substantially into East Baltimore, whereas vacant lots are located farther south (see Map 19, located on the next page).

Map 19: Transitional Zones of Vacant Buildings and Lots

VACANT BUILDINGS



VACANT LOTS



Policy Implications and Implementation Strategies

Transitional zones offer many policy implications and potential strategies to address vacancy. Transitional zones should be tested further through additional spatial analysis as well as ground truthing on a community level. Meanwhile, the concept of transitional zones can be incorporated into other strategies and interventions, such as master planning. As a tool, master planning simultaneously can address two challenging issues: scale and the consideration of multiple parcels of land. Many of the current initiatives within the city addresses vacancy on a small

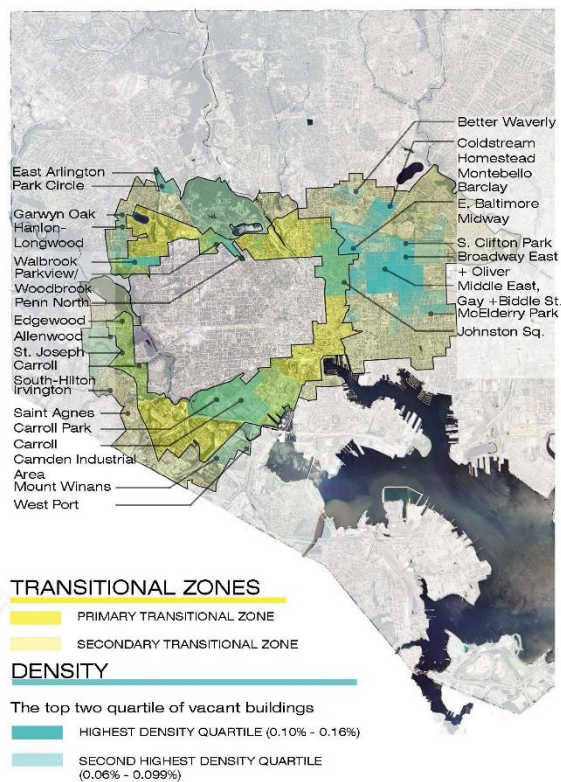
scale of the reactivation of a single parcel to multiple adjacent vacant parcels. A master plan allows for larger areas to be considered simultaneously for creative solutions. In addition, master plans can be conducted at a variety of scale, depending on the scope of the project. Master plans also offer an opportunity to begin to address multiple vacant parcels simultaneously, rather than individually which can happen when a dialogue is missing. Lastly, master plans allow for multiple stakeholders to come together as well as representatives from different disciplines, organizations, and entities. As a tool master plans are not expected to be strictly followed, rather they function as a guide to the future and can offer suggestions as to how to begin to transition vacant land to active places once again.

An additional strategy of transitional zones is to prioritize areas with a high density of vacant buildings or lots (see Map 20, located on the next page). Here is an opportunity to adjust from a city scale to a community and block group level and utilize the findings of the distribution and density analyses. The findings of these investigations identified specific locations and communities with high quantities of vacant buildings or lots. These communities include Walbrook, Panway/Braddish Avenue, Burleith-Leighton, Barclay, Harwood, Charles Village, Greenmount Cemetery, Jonestown, Otterbein, Stadium Area, Saint Paul, and Mount Winans neighborhoods. Additional neighborhoods include the eastern edges of Fairmont, northern Rosemont, southern Parkview Woodbrook, portions of Penn North and Remington, Old Goucher, Barclay, eastern edge of Oliver, majority of Johnston Square, Penn-Fallsway, Oldtown, Inner Harbor, Downtown West, Morrell Park, Westport, Sharp-Leadenhall, Pigtown, Gwynns Falls, Carroll-South Hilton,

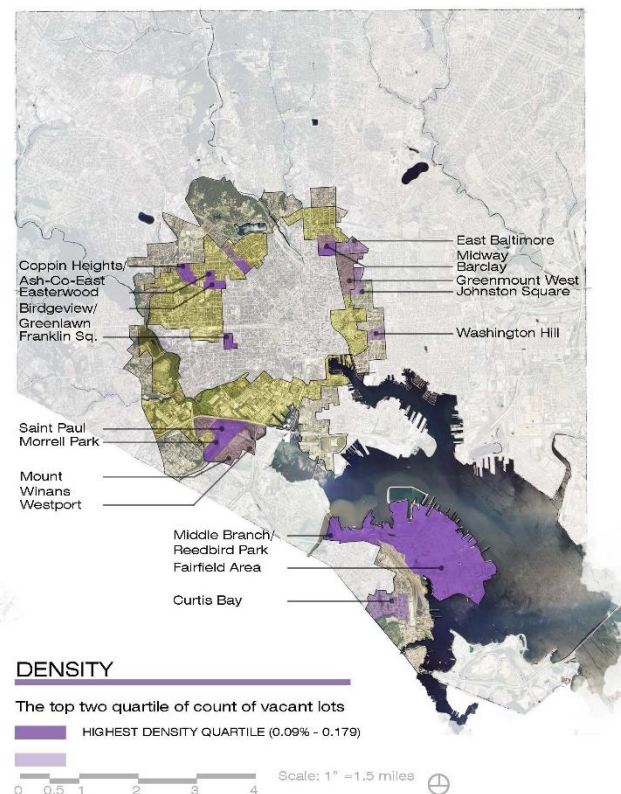
Allendale, Edgewood, and Edmondson Village. These communities are within the transitional zone and offer an opportunity to engage with locals and begin addressing vacancy just beyond the most extreme concentrations of vacancy. Future strategies should continue with the social capital and partnerships fostered early on in the transitional zones to engage in a fuller conversation that moves towards the strongest hotspots of vacancy.

Map 20: High Vacant Density within Transitional Zones of Vacant Buildings and Lots

VACANT BUILDINGS



VACANT LOTS

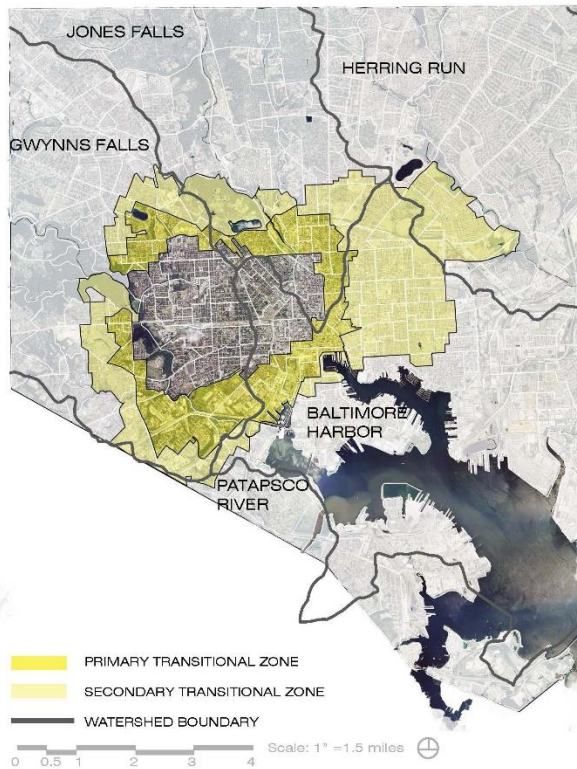


This study examined the relationships between vacant land and watersheds. The distribution investigation found a conglomeration of vacant buildings and lots located where the Jones Falls, Gwynns Falls, and Baltimore Harbor watershed

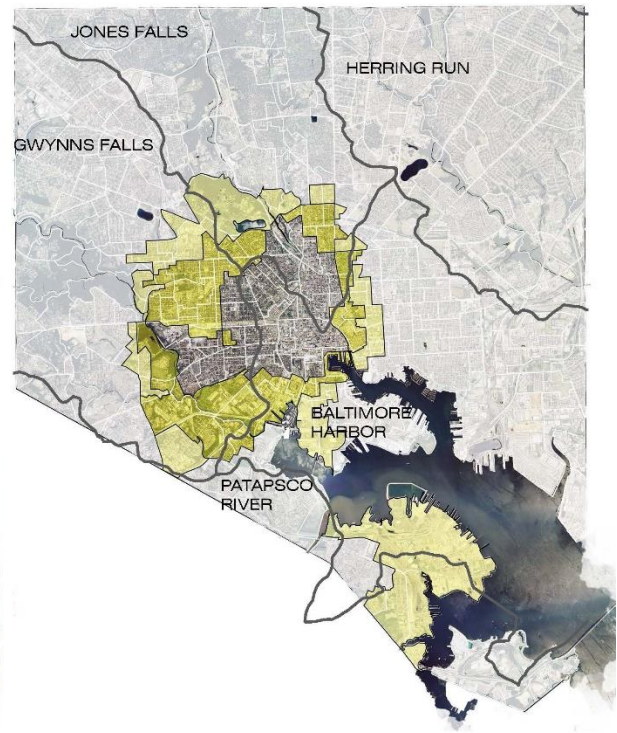
boundaries intersect. In addition, the Healthy Harbor Report Card has given the majority of the local watersheds a failing grade for ecological health and wellness, citing issues of bacteria and sewage as well as stormwater runoff as contributing to the poor health (Waterfront Partnership of Baltimore and Blue Water Baltimore, 2014). A goal when proposing vacancy interventions should consider the health and future of local watersheds. A resource for funding can include partners and organizations with a focus on watershed and water quality within the Chesapeake Bay region. Issues associated with vacancy often include inactivity and disrepair which are typically addressed in designs and proposals. Future designs and strategies should include assisting with water quality, the health of the harbor and Chesapeake Bay as well as integrate green infrastructure and stormwater best management practices into proposals. Map 21 (located on the next page) identifies where the primary and secondary transitional zones fall within the local watersheds, as well as the neighborhoods within the city.

Map 21: Transitional Zones and Watersheds

VACANT BUILDINGS



VACANT LOTS



Future research should expand upon this study. There are many areas of future research, one of which that would be useful is the examination of density and transitional zones with current housing market trends in the city. This analysis should also consider looking at the historical housing markets from the 1950's to present. By the 1950's the city of Baltimore was considered the 6th largest city in the nation (Han, 2014, p. 319). A richer analysis of Baltimore's population, economic, and housing markets should consult census data, preferably at a census block group level if possible.

Transitional zones are a new concept and require further research. Due to the gradient of conditions that are often associated with vacancy (see chapter 2). There is

currently no known or established threshold of when land becomes vacant. Due to this lack of establishment, it becomes difficult to theorize the threshold of these proposed transitional spaces; specifically, where does a primary transitional space end and a secondary transitional space begin? The concept of primary and secondary transitional zones should be tested within the city of Baltimore. Methods such as windshield surveys, individual interviews, and further analysis of ownership and use are potential avenues to ground truth the validity of transitional zones as a strategy. In addition, further interspatial research should be conducted that explores non-auto correlated methods, such as the parameters of the Hot Spot Analysis. This question of thresholds has yet to be explored, but is ripe for future research endeavors and should be explored further.

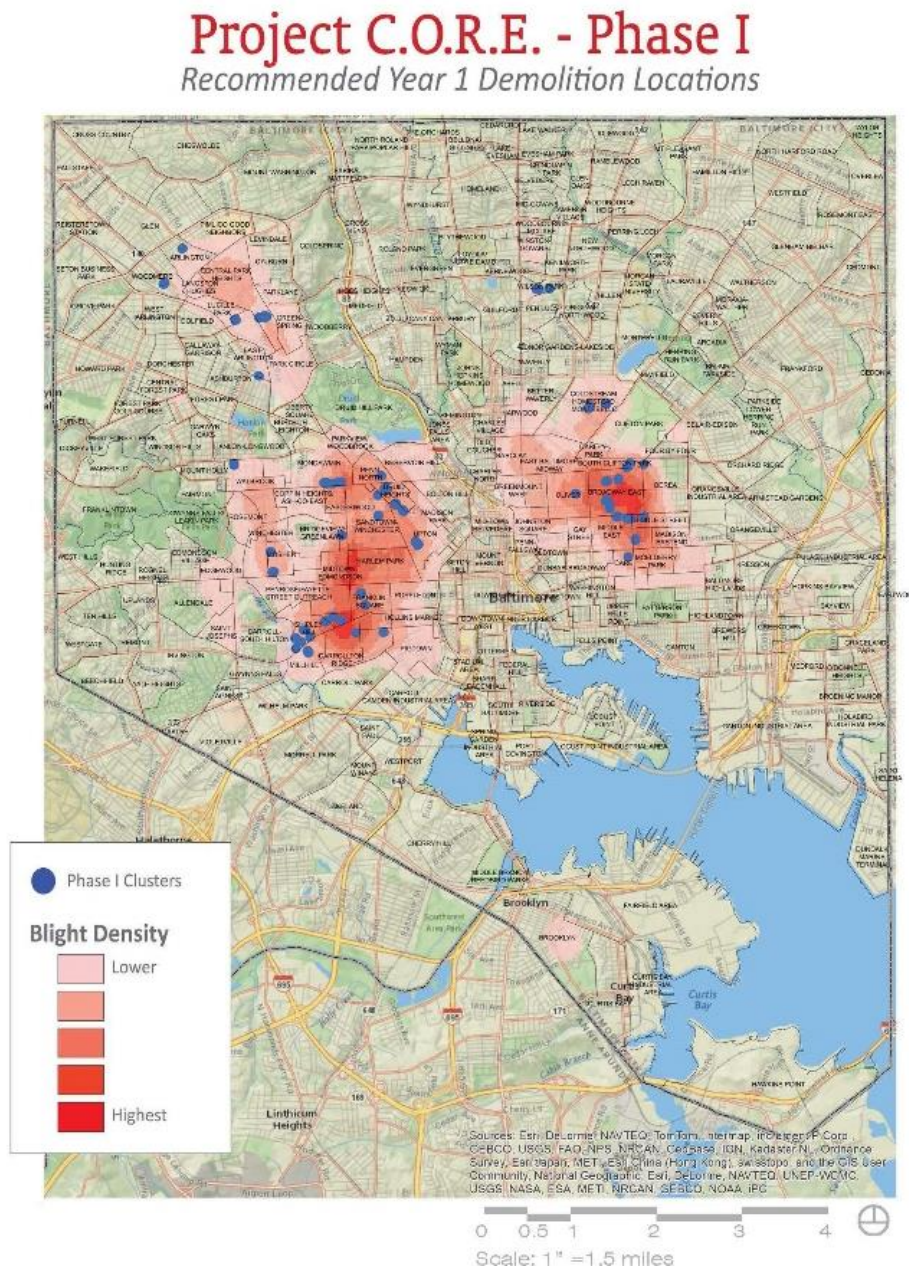
Comparison of Strategies: Transitional Zones and Project C.O.R.E.

This series of investigations into the quantity, distribution, and interspatial relationships of vacant buildings and lots reveals critical information as to the patterns and character of vacant land within the City of Baltimore. From the findings of these investigations, a strategy of prioritization emerged that responded to the density and proximity to other vacant land. This strategy differs from past and current programs implemented by Baltimore. In January of 2016, the city and the state of Maryland announced a new initiative to address blight within Baltimore.

Project C.O.R.E. is a multi-million-dollar partnership between the city of Baltimore and the state of Maryland. The initiative proposes razing blocks of blighted streets, converting the buildings to open space until phased for redevelopment. The

overall plan of the city is to “demolish as many city blocks of blight as possible” over the course of the next four years (“Project C.O.R.E.,” 2016). There is a limited amount of information regarding Project C.O.R.E. making it challenging to assess it as a strategy. A limited amount of material has been released by the city and the state regarding Project C.O.R.E.. One of the few materials is a blight density map and a listing of phase 1 demolition sites for 2016, the first of a four year. Map 22 is a map generated for this thesis that overlays neighborhood information over top of the original material provided by the city and state. The blight density map within Map 22 (located on the next page) was calculated by Project C.O.R.E., however it is unclear what data and method was used to calculate it. The blight density map released as part of Project C.O.R.E most closely represents the vacant building density map calculated as part of this research thesis (see Chapter 3). In addition, approximately 55 clusters are identified throughout the city. These clusters were quantified by the author. There is no detailed information about the definition of a cluster, the scale they represent, nor the streets that are identified as available of April 2016.

Map 22: Project C.O.R.E. Phase I Demolition Clusters with Neighborhood Boundaries



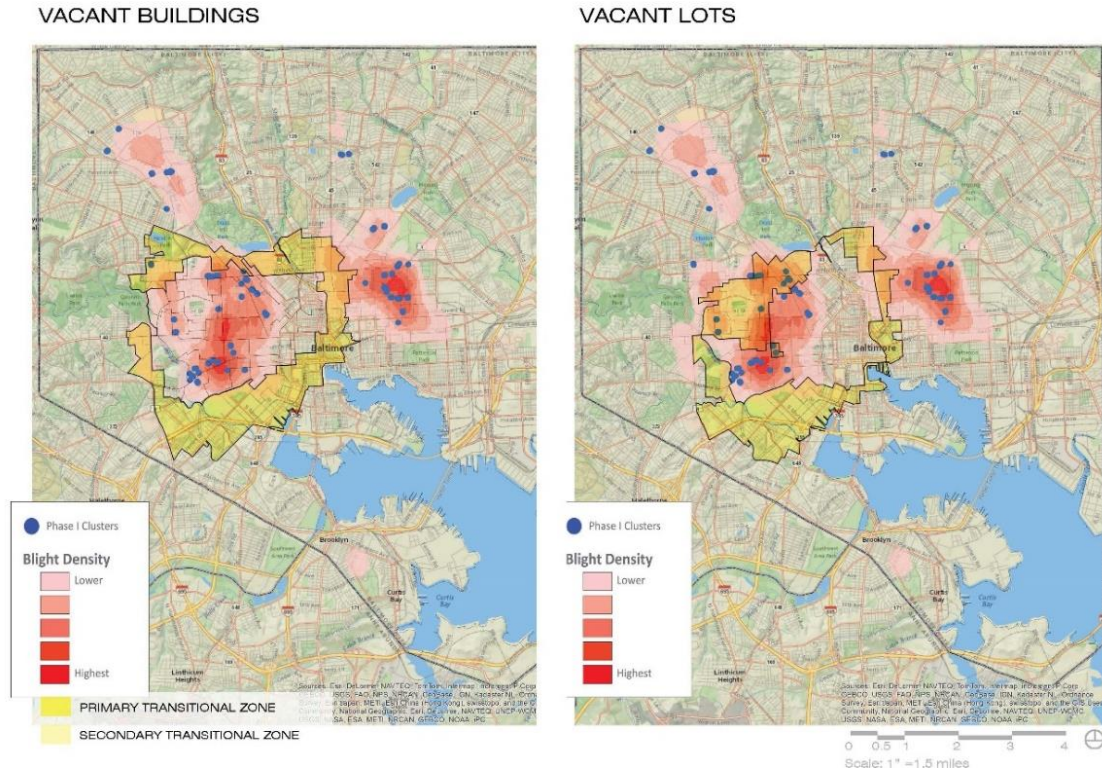
Project C.O.R.E. focuses on creating new opportunities and enterprise within the city by creating new uses for blighted properties and new owners for vacant land. Project C.O.R.E. has approximately 55 clusters⁵ identified for demolition in 2016,

⁵ This is an estimate calculated by the author by studying Project C.O.R.E.'s material at a high resolution.

however, there does not appear to be a geographic strategy; the location of the clusters representing areas to be razed are located throughout the blight density spectrum and not limited to any one location within the city. In addition, there does not appear to be a razing-to-revitalization timeline for the blighted properties. The city and state partnership has allocated approximately \$600 million dollars for financial assistance to developers (“Project C.O.R.E.,” 2016). The current timeline for razing-to-redevelopment is unclear; given the current information released by the city and state, the blighted properties are to be razed and turned to non-programed open space till the properties are developed. The funding and maintenance plans for these new open spaces has not been discussed, nor has any information relating to the nature and connectivity of these spaces been released.

A comparison of Project C.O.R.E.’s Phase I clusters was compared to the findings and recommendations of this research of transitional zones as a strategy (see Map 23, located on the next page). It is interesting to note that the city and state’s blight density map most closely resembles the density map of vacant buildings, however vacant lot transitional zones have more overlap in clusters than that of vacant buildings.

Map 23: Comparison of Primary Transitional Zones and Project C.O.R.E. Phase I



Project C.O.R.E. is a partnership and initiative that aims to bring people back into the city and to increase employment and opportunity. However, there is a lack of transparency which is coupled with a limited amount of information and resources about the process, partners, and phases that makes it challenging to understand Project C.O.R.E.'s strategy. Shortly before Project C.O.R.E. was announced, Governor Hogan dismantled the Red Line, a proposed East-West light rail transit line that was to begin construction shortly. Some argue the removal of the Red Line removed an opportunity for natural redevelopment and infill that would have occurred in West Baltimore, which is where many of the densest vacant buildings and lots are located. More information is required as well as increased dialogue and partnerships with planners and landscape architects.

The research and analysis conducted through the three investigations of this thesis suggests using primary transitional zones as the priority geographical areas to reactivate spaces and begin infill as means of addressing vacancy within the city. The reactivating of spaces to places should not only welcome new residents and businesses to Baltimore, but also celebrate and integrate those who already work and live in the city. Based on the research conducted, specifically the density and interspatial relationship investigations, the research suggests that primary transitional zones have collections of vacant land as well as homes, businesses, and infrastructure nearby that can be used as a catalyst for reactivating spaces. These geographic areas are existing anchors of the city that should be used to tie vacant land back into the urban fabric.

Conclusion

The study of vacant land is timely. This thesis proposes a framework that begins to address some gaps within literature and practice. Although the issue of varying definitions and inconsistent methods of identifying vacant land changes based on the jurisdiction or entity conducting the inventory remain, this thesis addresses a gap within contemporary vacancy discussions. The concept of **utilized landscapes** as a classification that identifies land that is non-vacant is an approach to begin limiting the range of landscapes that can be identified and labeled as “vacant.” Specifically, establishing the concept of utilized landscapes as non-vacant land other jurisdictions can apply this definition of *what is not vacant* to their own datasets, beginning to lessen the gap and variation of what vacancy represents.

The discipline of Landscape Architecture makes practitioners uniquely qualified to provide insight into the types of landscapes present within the urban environment. Professionals and students alike should use this understanding to share knowledge with other disciplines about the values and roles different landscapes play. There is a need to address the definition of vacancy and the bounds of “land ethic” (Bowman & Pagano, 2004) as well as its application in the discussion of vacant land. The development of the concept *utilized landscapes* is a stance from a Landscape Architectural perspective about the role and value of specific types of lands that have a need, place, and value from an environmental and social perspective.

These series of investigations demonstrate that there are many ways to examine Baltimore City’s urban vacancy and there are important findings that can be extrapolated from these exercises. The purpose of this study was to dig deeper into the issue of vacant properties in Baltimore, and identify some of the intricate and subtle characteristics, relationships, and dynamics that may not be currently understood. From these investigations, the concept and strategy of prioritizing **primary transitional zones** as a geographical location to start addressing vacancy was developed.

There were many findings to this research thesis. While *utilized landscapes* and *transitional zones* are concepts that still require further development, they are two suggested strategies to provide ways of classifying lands that are not vacant and prioritizing geographic areas to address vacancy. It is hoped that a combination of new policies and implementation strategies that collaborate with local partners, communities, city planners, designers, and academics, and most importantly residents

will help secure funding for projects to address vacancy. Lastly, these investigations are meant to start a more intentional dialogue and course of action to create a more equitable Baltimore for all.

Appendices

Appendix I: Density Investigation Supplementary Material

Appendix II: Calculating Hot Spots

Appendix III: Vacant Building and Lot Hot Spot Maps

Appendix I: Density Investigation Supplementary Material

Table 1: 15 Highest Neighborhoods with Vacant Buildings

15 Highest Neighborhoods VB Count			
Neighborhood	Count	Acreage	% of Neighborhood Acreage
BROADWAY EAST	1258	32.98	14.88%
SANDTOWN-WINCHESTER	839	23.77	9.14%
HARLEM PARK	709	24.80	12.41%
CARROLLTON RIDGE	680	17.32	12.14%
CENTRAL PARK HEIGHTS	658	35.03	12.36%
OLIVER	572	15.86	9.43%
MIDTOWN-EDMONDSON	467	14.41	15.06%
UPTON	450	16.47	8.78%
COLDSTREAM HOMESTEAD MONTEBELLO	433	16.17	4.91%
EAST BALTIMORE MIDWAY	384	12.78	6.66%
MIDDLE EAST	383	10.62	8.38%
FRANKLIN SQUARE	363	11.74	10.66%
PENROSE/FAYETTE STREET OUTREACH	354	11.25	4.98%
SHIPLEY HILL	305	13.78	11.80%
PENN NORTH	299	11.00	12.71%

Note: the above highlighted neighborhoods are communities identified with high counts of vacant buildings and high percent of vacant acreage.

Table 2: 15 Highest Neighborhoods with Vacant Lots

15 Highest Neighborhoods VL Count			
Neighborhood	Count	Acreage	% of Neighborhood Acreage
BROADWAY EAST	775	25.76037495	11.62%
SANDTOWN-WINCHESTER	761	24.85484317	9.55%
OLIVER	569	18.62045836	11.07%
UPTON	564	20.09419174	10.72%
POPPLETON	478	18.0451569	15.48%
CENTRAL PARK HEIGHTS	402	33.68875445	11.89%
HARLEM PARK	364	28.96289026	14.50%
JOHNSTON SQUARE	355	20.69451917	18.92%
FRANKLIN SQUARE	333	10.90918511	9.90%
BARCLAY	298	9.620957639	10.70%
DRUID HEIGHTS	270	6.998754955	12.08%
MORRELL PARK	219	70.66134687	13.17%
FRANKFORD	218	131.6711915	9.68%
COPPIN HEIGHTS/ASH-CO-EAST	208	40.95741384	33.34%
FAIRFIELD AREA	203	83.09379566	5.40%

Table 3: Quantity of Vacant Buildings and Lots within Local Drainage Basins

Drainage	Vacancy by Drainage by Count			
	Count			
	Total	Lot	Building	Both
Back River	2763	1854	909	0
Gwynns Falls	10853	4619	6218	16
Inner Harbor	6195	2560	3628	7
Jones Falls	6597	3779	2804	14
Middle Branch	6015	3053	2936	26
Patapsco	542	476	66	0
SW Harbor	870	608	261	1
Total	33835			

Table 4: Acreage of Vacant Buildings and Lots within Local Drainage Basins

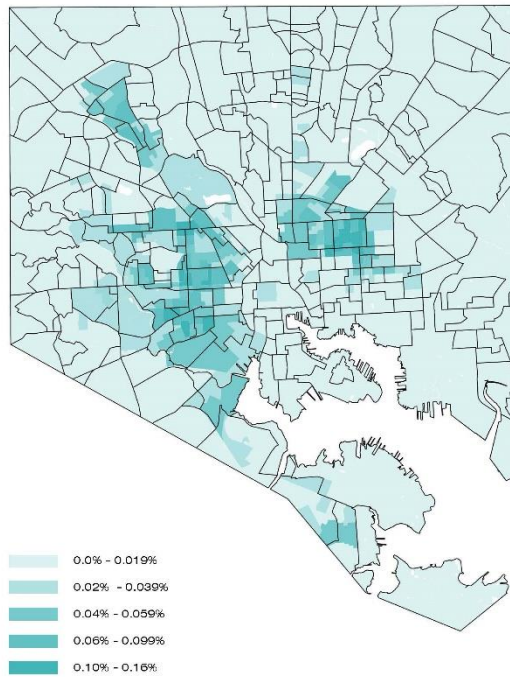
Drainage	Vacancy by Drainage by Acreage			
	Acreage			
	Total	Lot	Building	Both
Back River	1299.309	1214.127	85.18149	0
Gwynns Falls	2505.014	2119.046	385.1682	0.7999
Inner Harbor	379.2472	254.9661	124.0978	0.183368
Jones Falls	1044.386	930.0466	113.9161	0.42279
Middle Branch	639.2371	535.226	99.10369	4.907509
Patapsco	548.873	513.1892	35.68384	0
SW Harbor	616.6007	603.206	13.29132	0.103306
Total	7032.667			

Table 5: Range of Acreage of Vacant Buildings and Lots

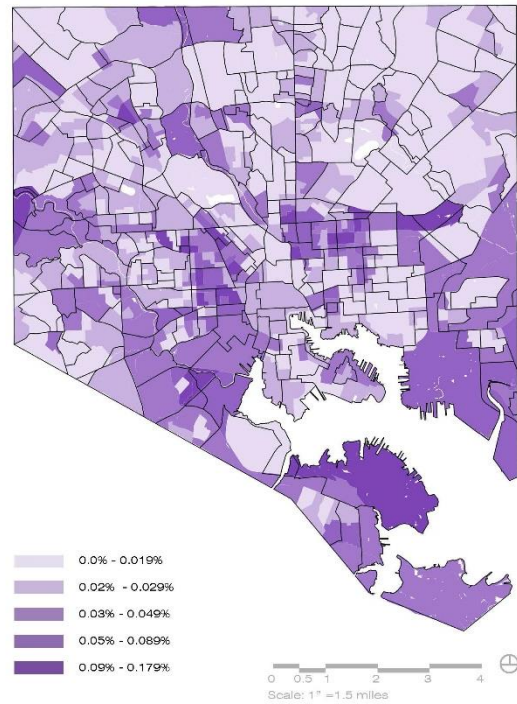
Lot Range		Building Range		Both Range	
Min	Max	Min	Max	Min	Max
0.000331	26.590000	0.022800	0.811000	0.000000	0.000000
0.000885	162.926200	0.006040	20.747000	0.011816	0.134000
0.001498	29.241792	0.008561	16.299173	0.014500	0.042300
0.001000	38.212300	0.006475	1.845600	0.011794	0.147315
0.001206	59.975445	0.007842	3.803700	0.008449	3.780955
0.001825	142.501499	0.011878	20.104663	0.000000	0.000000
0.002960	74.302634	0.014959	0.502960	0.103306	

Map 1: Density of Vacant Buildings and Lots by Count

VACANT BUILDINGS



VACANT LOTS



Appendix II: Calculating Hot Spots

A hot spot analysis is a spatial analysis tool to determine statistically significant concentrations of a variable, called a “hot spot” or “cold spot.” ArcGIS uses the Getis-Ord G_i^* formula (“ArcGIS Help 10.1 - Hot Spot Analysis (Getis-Ord G_i^*) (Spatial Statistics),” 2013) in the hot spot analysis tool; this statistical formula generates a significance level (p-value) and critical value (z-scores), identifying areas of notably higher or lower values spatially. A “hot spot” is a statistically significant presence of a variable; likewise a “cold spot” is a statistically significant absence of a variable (ibid). A hot spot has a statistically significant p-value and a positive z-score whereas a cold spot has a negative z-score.

The Getis-Ord G_i^* function in ArcGIS generates multiple columns containing a p-value, z-score, and other values for each occurrence of a variable. A total of 4 columns are generated containing values for each occurrence of a variable, including a p-value, a z-score, a Gi-bin, and Gi-index.

A hot spot analysis examines the statistical significance of a variable; the ArcGIS function calculates and creates attribute data to record the statistical results, specifically a p-value, a z-score, and a Gi-bin. The p-value and z-score are representative of their traditional statistical definitions. A Gi-bin is a composite of the z-score and p-value, however it does not include a False Discovery Rate correction (FDR). An FDR is an additional calculation that further refines the statistical outcome through multiple testing methods and a spatial dependency analysis (“P Values (Calculated Probability) and Hypothesis Testing - StatsDirect,” 2016). Multiple

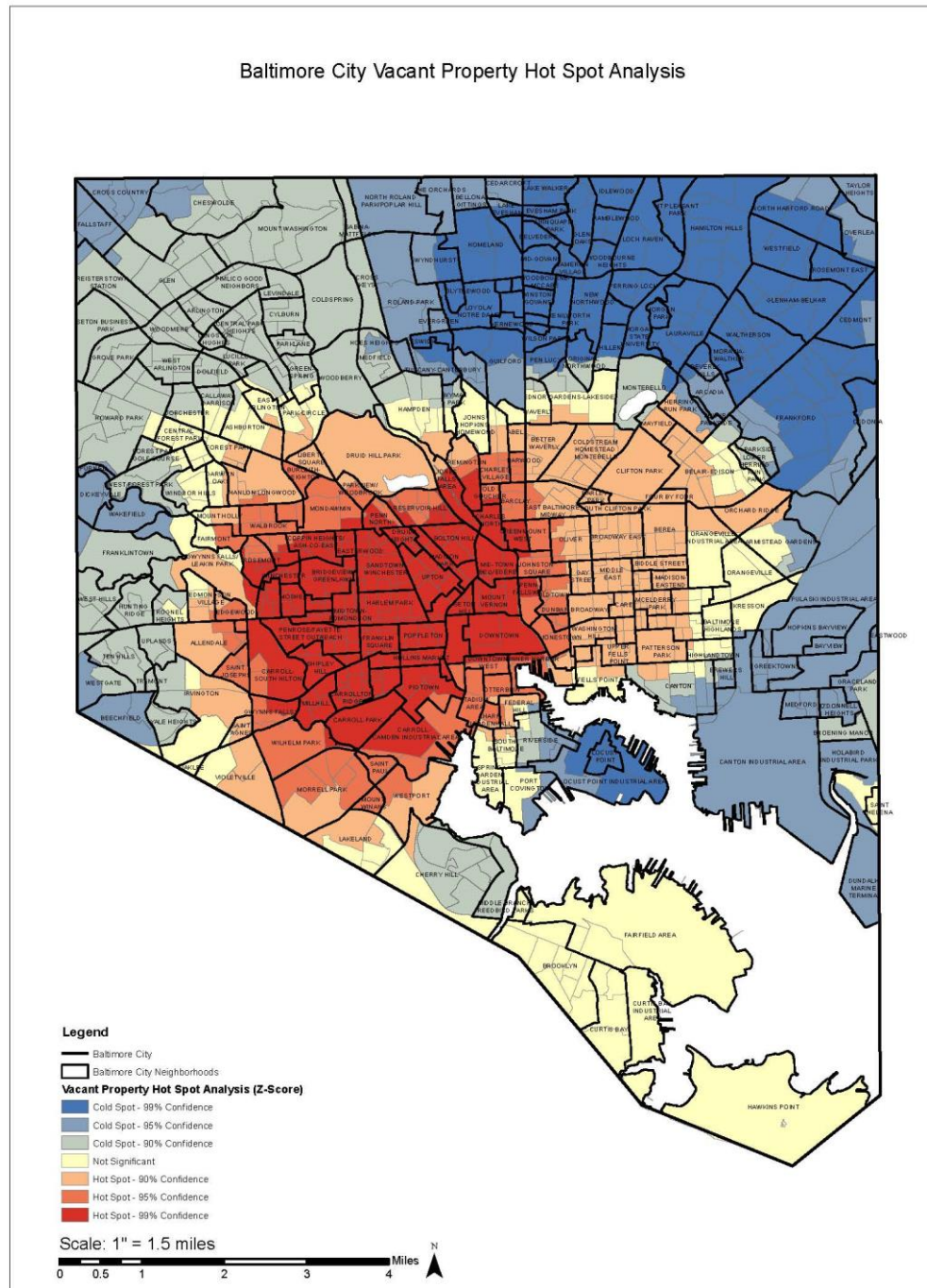
testing is the process of testing the confidence level with the number of occurrences of a variable to determine the potential false positives, or instances in which the null hypothesis was falsely rejected. This method uses probability to determine how many of the occurrences identified may be inaccurate. The second method used is the spatial dependency, which examines a variable's independent nature. If a variable is spatially dependent it can skew the results to identify occurrences that are the dependent to the surrounding context and influences (“What is a z-score? What is a p-value?—Help | ArcGIS for Desktop,” 2016).

While ArcGIS calculates the p-value, Gi-bin, and z-score to generate a full picture of the statistical and composite value, the z-score accounts for false positives, whereas the Gi-bin does not. While a function may be accurately executed, there is an opportunity for variance in the interpretation of the spatial analytical results. The visualization of the spatial data in the form of a map can depict a skewed narrative if the correct the values are not selected for the visual mapping. For example, the Gi-bin does depict the statistically significant hot spots and cold spots of a variable, however it does not account for the false negatives. A more accurate value to use is the z-score that is calculated simultaneously with Gi-bin, which includes the FDR correction. For example, this skewed data was mapped in iterations 1 through 3, and adjusted to reflect the z-score in iteration 4. Regardless of the value used to visualize hot spots and cold spots, a hot spot will always be represented in red, cold spot in blue, and statistically insignificant occurrences in a neutral tone. In addition, the visual representation of statistical significance is consistent; the stronger the statistical significance of a cluster, the darker the shade, respectively. While this study maps

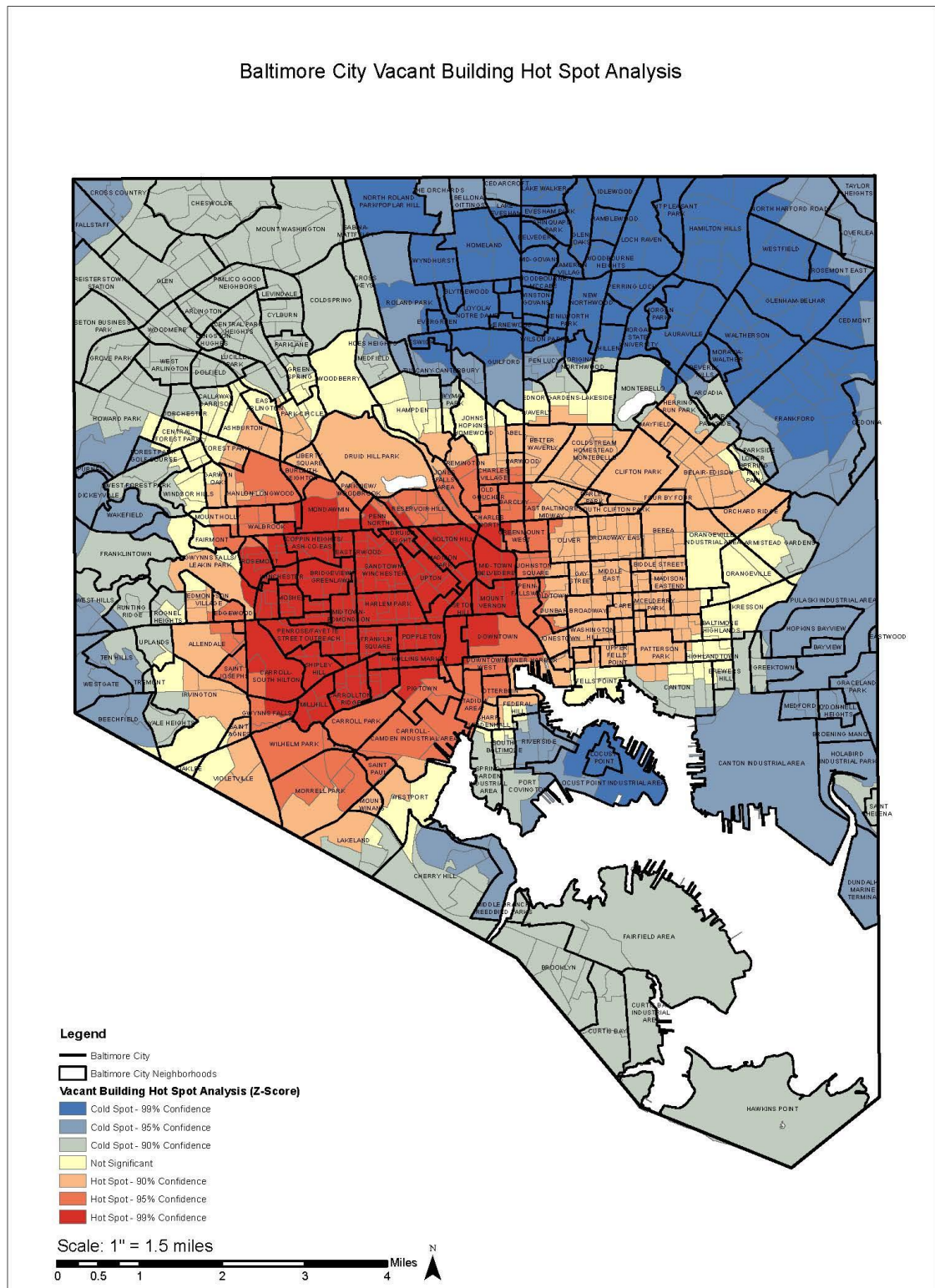
statistically insignificant occurrences as well as confidence levels 90% to 99%, areas of 95% to 99% confidence levels are considered the primary focus.

Appendix III: Vacant Building and Lot Hot Spot Maps

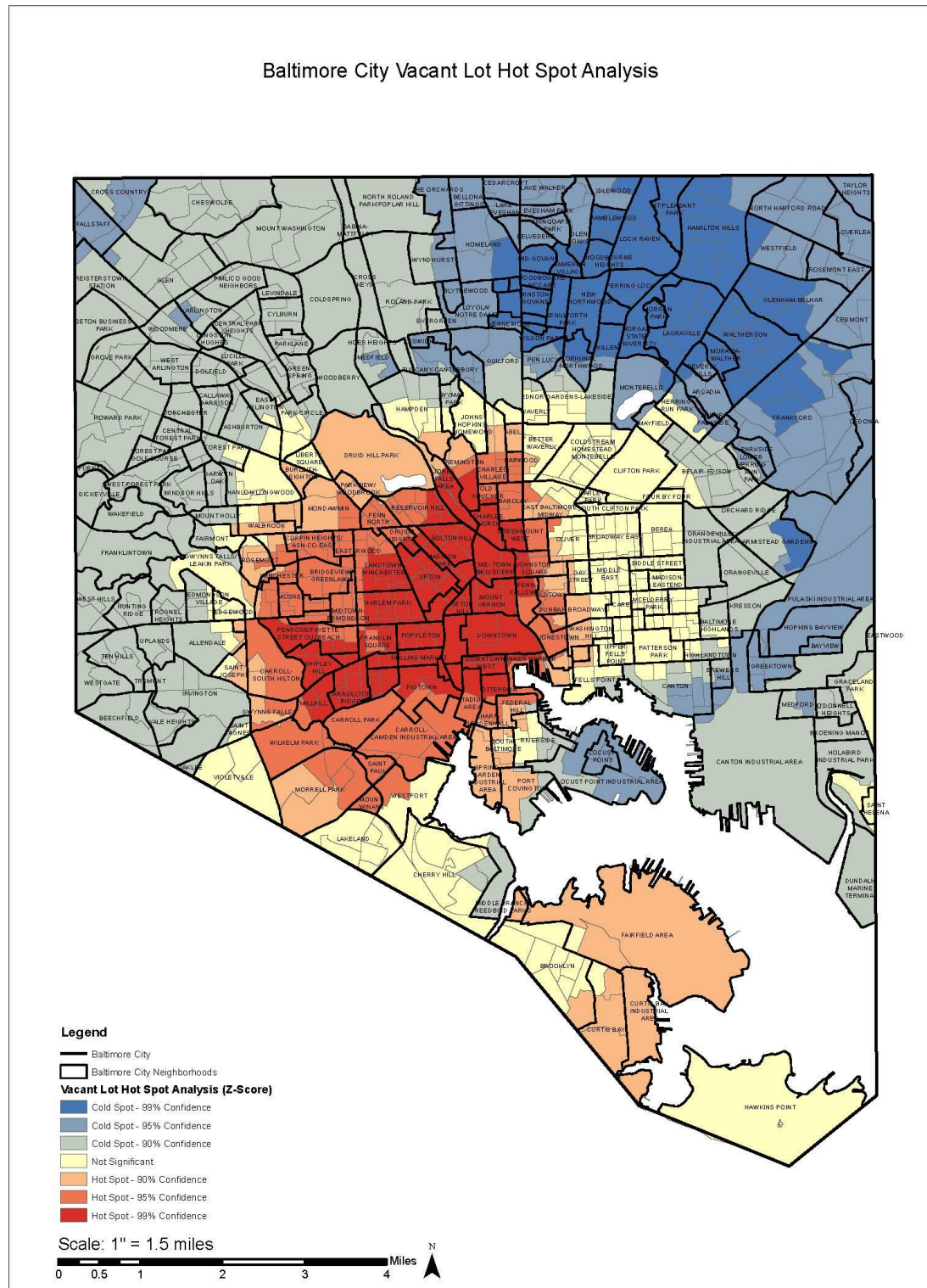
Map 1: Baltimore City Vacant Property Hot Spot Analysis



Map 2: Baltimore City Vacant Building Hot Spot Analysis



Map 3: Baltimore City Vacant Lot Hot Spot Analysis



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