Older, Smaller, Better

Measuring how the character of buildings and blocks influences urban vitality

MAY 2014

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ABOUT THE PROJECT TEAM AND COLLABORATORS

NATIONAL TRUST FOR HISTORIC PRESERVATION

(www.preservationnation.org)

The National Trust for Historic Preservation is a privately-funded nonprofit organization that works to save America's historic places for the next generation. We are committed to protecting America's rich cultural legacy and to helping build vibrant, sustainable communities that reflect our nation's diversity. We take direct action to save the places that matter while bringing the voices of the preservation movement to the forefront nationally.

PRESERVATION GREEN LAB

(www.preservationnation.org/greenlab)

A department of the National Trust for Historic Preservation, the Preservation Green Lab strengthens the fabric of communities by leveraging the value of existing buildings to reduce resource waste, create jobs, and bolster a strong sense of community. The Preservation Green Lab integrates sustainability with historic preservation by developing research, demonstration projects, and policies that decrease demolition and promote building reuse. Guided by a belief that historic preservation is essential to sustainable development, the Preservation Green Lab works with partners to create new pathways to shared prosperity and to bring people together around a common vision for their neighborhoods, towns, and cities.

IMPRESA, INC.

(www.impresaconsulting.com)

Impresa is a Portland, Oregon-based consulting firm specializing in metropolitan economies and knowledge-based industries. Founded by noted economist Joe Cortright, Impresa's policy advice is built around a proven framework for developing successful urban economies. Impresa developed the Vibrancy Indicators project for ArtPlace America, a collaboration of leading national and regional foundations and financial institutions supporting creative placemaking through grant-making, research, communication, and advocacy.

GEHL STUDIO—A GEHL ARCHITECTS COMPANY

(www.gehlarchitects.com)

Gehl Studio, Inc., a Gehl Architects company, is a dynamic group of talented urbanists from a variety of backgrounds that share the values and ambitions for creating Cities for People around the globe. With offices in New York and San Francisco, Gehl Studio is a networked organization capable of drawing on the experience and talent of its Copenhagen staff to leverage it locally through people that are in tune with the specific needs of a culture and place.

STATE OF PLACE™

(www.urbanimprint.com/about/state-of-place)

State of Place™ is a data-driven, decision-making and community engagement tool to guide investments, interventions, and policies that boost walkability and economic development. Using on-the-ground data covering over 280 built environment features, State of Place™ calculates the State of Place™ Index, an overall walkability score composed of ten urban design dimensions empirically known to impact walking. The Index is visually represented in the State of Place™ Profile, an easy-to-read snapshot of a community's walkability assets and needs. As each dimension is tied to different predicted returns on investment, the State of Place™ Profile produces customized strategic economic development and walkability plans based on communities' performance, goals, and capacity, and allows stakeholders to predict the impact of proposed plans on both State of Place™ and economic performance.

BASEMAP

(basemap.io)

Basemap is a data science and visualization consultancy focused on mapping data in a human context and matching indicators to actions.

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EXECUTIVE SUMMARY

All across America, blocks of older, smaller buildings are quietly contributing to robust local economies and distinctive livable communities. Buildings of diverse vintage and small scale provide flexible, affordable space for entrepreneurs launching new businesses and serve as attractive settings for new restaurants and locally owned shops. They offer diverse housing choices that attract younger residents and create human-scaled places for walking, shopping, and social interaction. These modest, often-overlooked buildings are irreplaceable assets for America's new urban age.

This study demonstrates the unique and valuable role that older, smaller buildings play in the development of sustainable cities. Based upon statistical analysis of the built fabric of three major American cities, this research finds that established neighborhoods with a mix of older, smaller buildings perform better than districts with larger, newer structures when tested against a range of economic, social, and environmental outcome measures.

For generations, planners, preservationists, and community leaders have debated and discussed the importance of retaining older, smaller buildings. Jane Jacobs' 1961 book, *The Death and Life of Great American Cities*, launched the conversation. Jacobs asserted that urban renewal, which replaced richly textured streets of small, mixed-age buildings with blocks of much larger new structures, drained life from neighborhoods and deadened urban centers. She argued that older buildings provide critical space for entrepreneurial ventures and a healthy mix of local businesses. Today, after decades of advocacy by preservationists and community groups, Jacobs' ideas are widely accepted. Her insights about the contributions of older buildings inform community plans across the country.

The tools for implementing these ideas are not fully developed in many cities, however. Outdated zoning regulations, overly prescriptive building and energy codes, misdirected development incentives, and limited financing tools continue to make it difficult to reuse older structures and to retain the human scale of older blocks and neighborhoods. In addition, and perhaps more significantly, some leading urban thinkers have recently raised fundamental questions about the validity of Jacobs' ideas for today's world. Where do older, smaller buildings fit within cities

Analysis of data from three major American cities shows that areas with a mix of older, smaller buildings perform better than districts with larger, newer structures when tested against a range of economic, social, and environmental outcome measures.

that are seeking to maximize transit investments, increase density, and compete in the global economy? Are the lessons of Jacobs' 1961 book still valid in the 21st century? What have we learned from more than 50 years of experience? What does the growing mountain of data reveal about the contributions of older buildings to successful urban places?

In an effort to answer these questions, the National Trust's Preservation Green Lab mined newly available public and private sources to examine the role that older, smaller buildings play in the context of overall urban development. This research focused on three cities with strong real estate markets and extensive older fabric: San Francisco, Seattle, and Washington, D.C. Looking not just at historically designated or older buildings, but *all* existing structures across these three urban landscapes, the research team empirically documented the age, diversity of age, and size of buildings and statistically assessed the relationships between these characteristics and 40 economic, social, cultural, and environmental performance metrics. Each city was divided into a grid of 200-meter-by-200-meter squares (about one to two square city blocks). Squares composed of commercial and mixed-use areas of the city were analyzed using statistical models, generating "apples to apples" comparisons of results across diverse urban landscapes.

YOUTHFUL CROWD AT A STREET FESTIVAL ON WASHINGTON, D.C.'S HISTORIC H STREET CORRIDOR. Photo: Flickr ~ Ted Eytan

The research team empirically documented the age, diversity of age, and size of buildings and statistically assessed the relationships between these characteristics and 40 economic, social, cultural, and environmental performance metrics.

KEY RESEARCH FINDINGS

In *The Death and Life of Great American Cities*, Jane Jacobs observed that "Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them."[1] This Preservation Green Lab report provides the most complete empirical validation to date of Jacobs' long-respected, but largely untested hypothesis: That neighborhoods containing a mix of older, smaller buildings of diverse age support greater levels of positive economic and social activity than areas dominated by newer, larger buildings. These findings support the idea that retaining blocks of older, smaller, mixed-vintage buildings can help cities achieve sustainable development goals and foster great neighborhoods.

Below are insights from this research that demonstrate how the character of buildings and blocks influences urban vitality in some of the nation's strongest urban real estate markets:

Older, mixed-use neighborhoods are more walkable.

In Seattle and San Francisco, older neighborhoods with a mixture of small, mixed-age buildings have significantly higher Walk Score® rankings and Transit Score® ratings than neighborhoods with large, new buildings.[2]

This Preservation Green Lab report provides the most complete empirical validation to date of Jacobs' long-respected, but largely untested hypothesis: That neighborhoods containing a mix of older, smaller buildings of diverse age support greater levels of positive economic and social activity than areas dominated by newer, larger buildings.

BARRACKS ROW, WASHINGTON, D.C. Photo: Barracks Row Main Street

Young people love old buildings.

In Seattle, San Francisco, and Washington, D.C., the median age of residents in areas with a mix of small, old and new buildings is lower than in areas with larger, predominantly new buildings. These areas are also home to a significantly more diverse mix of residents from different age groups.

Nightlife is most alive on streets with a diverse range of building ages.

San Francisco and Washington, D.C., city blocks composed of mixed-vintage buildings host greater cellphone activity on Friday nights. In Seattle, areas with older, smaller buildings see greater cellphone use and have more businesses open at 10:00 p.m. on Friday.

Older business districts provide affordable, flexible space for entrepreneurs from all backgrounds.

In Seattle and Washington, D.C., neighborhoods with a smaller-scaled mix of old and new buildings host a significantly higher proportion of new businesses, as well as more women and minority-owned businesses than areas with predominantly larger, newer buildings.

The creative economy thrives in older, mixed-use neighborhoods.

In Seattle and Washington, D.C., older, smaller buildings house significantly greater concentrations of creative jobs per square foot of commercial space. Media production businesses, software publishers, and performing arts companies can be found in areas that have smaller-scaled historic fabric.

Older, smaller buildings provide space for a strong local economy.

In Seattle and Washington, D.C., streets with a combination of small, old and new buildings have a significantly higher proportion of non-chain restaurants and retailers, and in Seattle, San Francisco, and Washington, D.C., areas of the city with older, smaller buildings host a significantly higher proportion of jobs in small businesses.

Older commercial and mixed-use districts contain hidden density.

In Seattle, San Francisco, and Washington, D.C., streets with a mix of old and new buildings have greater population density and more businesses per commercial square foot than streets with large, new buildings. In Seattle and Washington, D.C., these areas also have significantly more jobs per commercial square foot.

Smaller buildings and blocks "punch above their weight class" when considering a full spectrum of outcomes on a per-square-foot basis.

PRINCIPLES FOR OTHER CITIES

This report provides new information about the role that blocks of older, smaller buildings can play in the future development of Seattle, San Francisco, and Washington, D.C. The results from these three cities suggest some general planning and development principles that can be applied in other communities as well:

Realize the efficiencies of older buildings and blocks.

This research shows that older, smaller buildings and blocks "punch above their weight class" when considering a full spectrum of outcomes on a per-square-foot basis—from the number of jobs and businesses to the vitality of nightlife and presence of young residents. Older buildings employ time-tested, practical solutions to achieve these efficiencies: mixed daytime and nighttime uses; common entrances and shared services; creative use of small spaces and storage areas; and very little space dedicated for cars. With the new "sharing economy" emerging, older buildings also offer lessons in how to get more round-the-clock performance from our bricks and mortar investments. Codes and regulations can limit these uses, however, and may need to be revised to encourage the efficiencies that older, smaller buildings offer.

Fit new and old together at a human scale.

Findings from the three study cities show that mixing buildings from different vintages—including modern buildings—supports social and cultural activity in commercial and mixed-use zones. Many of the most thriving blocks in the study cities scored high on the diversity of building-age measure. Scale also played an important role. Grid squares with smaller lots and more human-scaled buildings generally scored higher on the performance measures than squares characterized by larger lots and structures. These results support the concept of adding new infill projects of compatible size alongside older buildings.

Support neighborhood evolution, not revolution.

While this research indicates that successful commercial and mixed-use districts benefit from new construction, these changes should be gradual. The rate of change is important. The higher performance of areas containing small-scale buildings of mixed vintage suggests that successful districts evolve over time, adding and subtracting buildings incrementally, rather than comprehensively and all at once.

Steward the streetcar legacy.

Many of the highest performing grid squares in our study cities are commercial areas with buildings that date to the streetcar era. Nearly every American city (and plenty of small towns) once boasted a network of streetcar lines. From the late 1900s until World War II, these lines spurred the construction of neighborhood service centers. Although most streetcar lines are long buried, the commercial districts they created can still be found in urban neighborhoods across the country. Examples of streetcar-era districts from the study cities include Seattle's Pike/Pine Corridor and Washington, D.C.'s H Street NE, which both scored well (and will soon have streetcars again). As cities seek to re-establish transit corridors and foster mixed-use development, the armature of streetcar-era commercial districts provides a head start.

Make room for the new and local economy.

Richard Florida and other scholars have noted that technology start-ups and other creative companies are moving into diverse neighborhoods full of older buildings, such as New York's Silicon Alley, where even former warehouses are small relative to Manhattan buildings overall.[3] The *Older, Smaller, Better* research confirms this connection, finding a correlation between a higher concentration of creative jobs and older, smaller-scaled buildings and blocks. These areas also support higher levels of small businesses and non-chain business, helping to keep dollars in the local economy, and providing more resilience against future economic storms.

Cities can help unlock the potential of these spaces by removing barriers, such as outdated zoning codes and parking requirements, and streamlining permitting and approval processes.

Make it easier to reuse small buildings.

Vacant and underused buildings are an untapped reservoir of already built density. The *Older, Smaller, Better* research illustrates the value of keeping older, smaller, diverse-age buildings viable and in full use. In some cities, however, older commercial buildings languish, with empty upper floors or vacant storefronts. Cities can help unlock the potential of these spaces by removing barriers, such as outdated zoning codes and parking requirements, and streamlining permitting and approval processes. Targeted incentives and financing programs are also needed to assist small-scale projects.

This study is the first phase of a broader Preservation Green Lab research agenda focused on the role of older buildings in sustainable development. With the help of interested funders, local governments, and partner organizations, our research scope is expanding into additional cities with different economic, social, and physical contexts, including weak real estate markets and high building vacancy rates. The Green Lab's goals are to identify opportunities and to share solutions

that benefit residents, property owners, investors, and community leaders alike.

The complete *Older, Smaller, Better* report provides more detailed results and recommendations that expand upon the findings and principles discussed in this Executive Summary. The report details the research methodology, statistical modeling results, and mapping analysis, and includes community case studies from the three study cities. Recommendations based upon the research are offered for community leaders, developers, and policymakers, along with directions for future research and empirical investigation.

ABOUT THE PROJECT TEAM

This research was made possible through the generous support of the Summit Foundation, the Prince Charitable Trusts, and the Kresge Foundation. The project was managed and led by the Preservation Green Lab, a department of the National Trust for Historic Preservation that researches the sustainability value of older and historic buildings and identifies policy solutions that help communities leverage their built assets. This project benefitted from collaboration with Impresa, Inc., Gehl Studio, and State of Place™.

OLDER, SMALLER BUILDINGS, HAYES VALLEY NEIGHBORHOOD, SAN FRANCISCO.
Photo: Jim Lindberg.
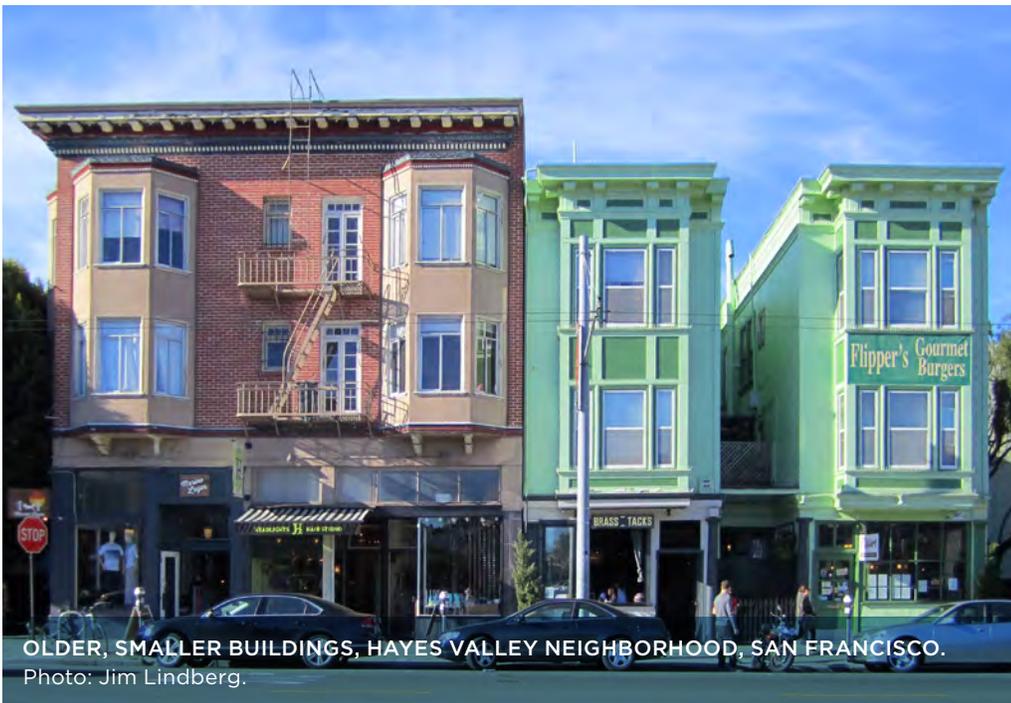
Endnotes

1 Jacobs, J. (1961). *The Death and Life of Great American Cities.* New York: Vintage Books.

2 Walk Score® is a Seattle-based company that measures the walkability, bike friendliness, and transit accessibility of neighborhoods across the United States and around the world. It developed three proprietary metrics: the Walk Score® ranking, Bike Score™ index, and Transit Score® rating. A Walk Score® ranking measures the distance someone would have to walk to reach amenities like coffee shops and grocery stores. The Transit Score® rating is based on how well an area is served by public transit. The Bike Score™ index assesses the biking infrastructure, number of bike commuters, and road connectivity associated with addresses throughout the U.S. For more information on Walk Score®, visit www.walkscore.com.

3 For example, see Florida, R. (2012, July 27). "For Creative Cities, the Sky Has Its Limit." *The Wall Street Journal.* Retrieved from http://online.wsj.com/news/articles/SB10000872396390443477104577551133804551396

SEATTLE, WA

JOBS PER 1,000 SQ FT

36.8%
MORE
JOBS/SQ FT

There are more jobs per commercial square foot in areas of Seattle composed of older, smaller, more age-diverse buildings than in areas with mostly newer, larger buildings.

Oldest, most diverse & finest-grained buildings

4.39 jobs

Newest, largest, least age-diverse buildings

3.21 jobs

Photo: Nancy Leson

SEATTLE, WA

BUSINESSES WITH WOMEN OR MINORITY OWNERSHIP
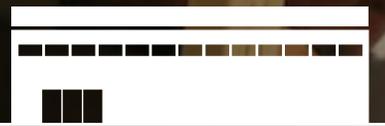
2x
WOMEN AND MINORITY OWNERSHIP

Areas of Seattle with older, smaller, more age-diverse buildings have more than twice the rate found in areas with mostly newer, larger buildings.

Oldest, most diverse & finest-grained buildings

19.2%

Newest, largest, least age-diverse buildings

9.5%

Photo: Flickr user Caffe Vita

WASHINGTON, D.C.

NON-CHAIN LOCAL ESTABLISHMENTS

MORE
NON-CHAIN ESTABLISHMENTS

There are significantly more non-chain businesses in areas of Washington, D.C. composed of older, smaller, more age-diverse buildings than in areas with mostly newer, larger buildings.

Oldest, most diverse & finest-grained buildings

90.9%

Newest, largest, least age-diverse buildings

78.6%

Photo: Flickr user afagen

SAN FRANCISCO, CA

JOBS IN SMALL BUSINESSES

MORE
JOBS IN SMALL BUSINESSES

Areas of San Francisco composed of older, smaller, more age-diverse buildings have significantly higher percentages of jobs in small businesses than in areas with mostly newer, larger buildings.

Oldest, most diverse & finest-grained buildings

44.6%

Newest, largest, least age-diverse buildings

34.3%

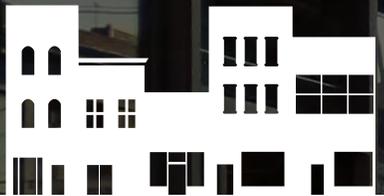Photo: Jim Lindberg

INTRODUCTION

INTRODUCTION: OLD BUILDINGS IN THE NEW URBAN AGE

After decades of decline and neglect, American cities are once again attracting attention, investment, and new residents. New books document the revival of urban centers and the decline of suburbia.[1] Fast-proliferating blogs and websites track the latest developments and hottest neighborhoods, while magazines profile the most innovative mayors. Geographers and demographers confirm that these are more than passing media trends. Population numbers are up in almost every historic city.[2, 3] Even cities that have suffered some of the steepest population losses are seeing their numbers turn around. Philadelphia and Baltimore, for example, recently posted their first population gains since the 1950s.[4, 5]

But these positive forces are not evenly dispersed across the urban grid. Some neighborhoods are attracting new residents, businesses, and capital, while others in the same city are languishing or declining. Preservationists have noted that in most cities the path back to urban health began with the rediscovery of great old neighborhoods and the rehabilitation of vacant landmarks.[6] Examples of this kind of urban revival can be found across the country, from the brick warehouses of Lower Downtown Denver to the Art Deco hotels of Miami Beach. These success stories and hundreds of others like them restored confidence in city living and spurred additional revitalization.

Are these examples enough to demonstrate a broad correlation between the retention and reuse of older buildings and urban vitality, or is the evidence merely anecdotal? How are the patterns of urban vitality and development related to the character of the specific buildings and blocks that make up U.S. cities? What can be learned from a deeper understanding of these connections that will inform better policy decisions and more profitable private investments in this new urban age? The *Older, Smaller, Better* project investigates these questions through a comprehensive, citywide analysis of the relationships between the character of the built environment and 40 economic, social, cultural, and environmental measures in three major cities: Seattle, San Francisco, and Washington, D.C.

Various scholars and experts, most notably Donovan Rypkema, have measured the economic and community benefits of preservation activities in communities across the country.[7] Others have examined the connections between the character of the built environment and specific outcomes such as pedestrian counts, transit use, housing

How are the patterns of urban vitality and development related to the character of the specific buildings and blocks that make up U.S. cities? What can be learned from a deeper understanding of these connections that will inform better policy decisions and more profitable private investments?

affordability, social diversity, and local business development.[8] The *Older, Smaller, Better* project complements this research and introduces a new methodology to facilitate city-wide measurement and assessment. Overlaying a grid of 200-meter-by-200 meter squares across the entire landscape of three historic cities, this study comprehensively evaluates the relationships between the character of existing buildings and blocks and a diverse range of economic, social, and environmental outcomes.

Historic preservation research and policy often focus on buildings that are either protected through local landmark ordinances or listed on the National Register of Historic Places. This study encompasses all of the existing buildings in the three study cities, including large numbers of older structures that are not currently designated as historic. From apartments and rowhouses to small office buildings and Main Street storefronts, these long-standing structures help define the physical character of each city. In San Francisco, for example, only two percent of the city's 147,111 buildings are designated as historic, at either the local or national levels. Yet roughly two-thirds of San Francisco's existing buildings—more than 100,000 structures—were constructed before 1945. Similar percentages can be found in many other American cities.

The *Older, Smaller, Better* project joins other research conducted by the National Trust's Preservation Green Lab to better understand and document the sustainable development value of the millions of older structures across the country. In 2012, the National Trust released a groundbreaking report, *The Greenest Building: Quantifying the Environmental Value of Building Reuse*.[9] This study used life-cycle assessment methodology to prove that saving and retrofitting older buildings consumes fewer resources than demolition and new construction. Last year, the National Trust published *Realizing the Energy Efficiency Potential of Small Buildings,* which documents the opportunities to reduce energy use in the more than four million small commercial buildings around the country.[10] While these reports centered on energy and environmental issues, the *Older, Smaller, Better* research focuses particular attention on the relationships between existing buildings and the economic, social, and cultural aspects of sustainability. Energy and environmental performance metrics are well-established in the green building industry, but tools for documenting other aspects of the sustainability equation are lacking. This report suggests strategies for how to begin filling that measurement gap.

This report also seeks to contribute new information and analysis to discussions about the role of older and historic buildings in strong urban real estate markets, such as San Francisco, Seattle, and Washington, D.C. Passionate debates have arisen in these cities around issues ranging from the lack of affordable housing in San Francisco to the impact of

This study comprehensively evaluates the relationships between the character of existing buildings and blocks and a diverse range of economic, social, and environmental outcomes.

building height restrictions on the Washington, D.C. office and residential market.[11] In these cities and elsewhere around the country, a central question is whether to retain older buildings or replace them with new, larger structures.

In many ways, these are continuations of a discussion that began more than 50 years ago, when Jane Jacobs, the great critic of postwar urban planning, famously extolled the value of older buildings in her 1961 book, *The Death and Life of Great American Cities.* Living in Greenwich Village in New York City and watching in horror as city planners oversaw the demolition of thriving urban neighborhoods, Jacobs argued that old buildings should be retained because they kept neighborhoods socially and economically diverse, created places that encourage healthy social interaction, and fostered local entrepreneurship.[12] "Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them," she said.[13]

Remarkably, despite Jacobs' prominence as an urban theorist and her broad influence on planning practice, these assertions have received little direct empirical investigation.[14] One might argue that few have tested Jacobs' theories because for a long time no one seriously doubted their validity. But the context has changed since 1961, when Jacobs offered her stinging critique. Today it is Jacobs' theories that have become planning orthodoxy.

Perhaps it is not surprising then that Jacobs' principles, along with many of the basic tenets of local preservation policy, are now being scrutinized and questioned by renowned urbanists, including Harvard economist Edward Glaeser.[15] In his book, *Triumph of the City,* Glaeser directly challenges Jacobs' assertion about the value of retaining older buildings, arguing that historic preservation constricts the supply of real estate and drives up the cost of living and working in a city.[16] Instead of preserving smaller, older, human-scale neighborhoods, Glaeser urges their replacement with much taller structures that will add supply to housing and office markets, increase density near transit, and concentrate population in high energy urban centers.[17] While Glaeser's call to re-densify urban centers aligns in many ways with the decades-long revitalization efforts of preservation advocates, his portrayal of historic preservation as an impediment to sustainable urban development raises thorny issues. Has preservation "gone too far?" Are the older, smaller buildings and blocks that characterize historic neighborhoods getting in the way of more sustainable, high-rise alternatives?

"Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them."

– JANE JACOBS
The Death and Life of Great American Cities

This study seeks to enrich understanding and inform discussions about density and the role of older buildings and blocks in creating healthy, sustainable communities. A central question is whether all density is the same. How can the density of buildings and blocks best be measured? Is built form simply a commodity, measured only by the square foot? Or do other factors, such as the history, scale, and development patterns of existing buildings and blocks, matter as well?

In *The Death and Life of Great American Cities,* Jane Jacobs argued that the health and vitality of cities is related to their social, economic and physical *diversity.*[18] She used an ecological framework to describe cities, borrowing concepts from natural science and referring to healthy neighborhoods of mixed uses and varied character.[19] Inspired by Jacobs' insights, this study offers a new methodology to help understand the relationships between urban ecosystems of buildings and blocks and the community life they support.
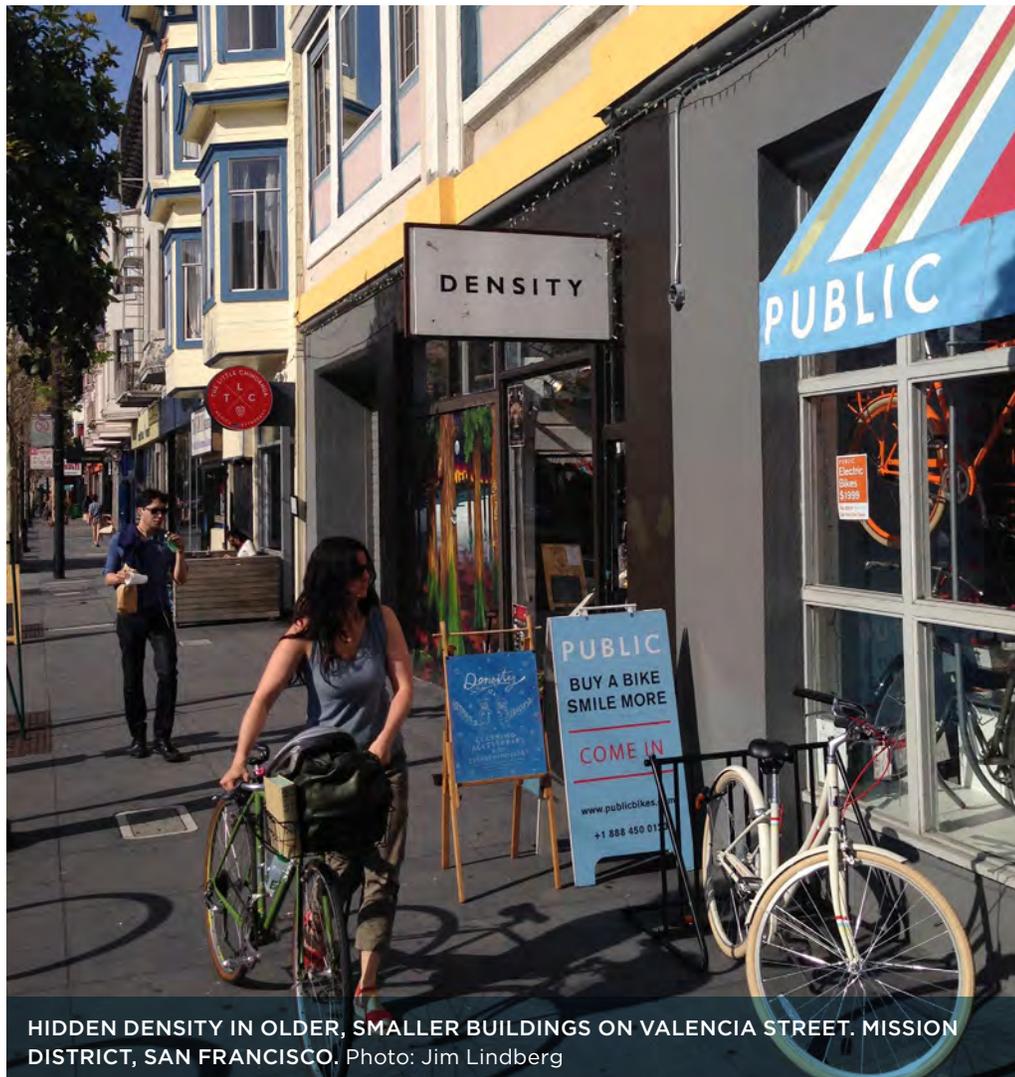
HIDDEN DENSITY IN OLDER, SMALLER BUILDINGS ON VALENCIA STREET. MISSION DISTRICT, SAN FRANCISCO. Photo: Jim Lindberg

This study seeks to enrich understanding and inform discussions about density and the role of older buildings and blocks in creating healthy, sustainable communities.

STUDY APPROACH AND METHODOLOGY

STUDY APPROACH AND METHODOLOGY

Using maps and spatial statistics, the research team aimed to test the hypothesis that older building age, greater diversity of building age, and smaller-sized buildings are associated with greater social, cultural, and economic vitality. The study explored the relationship between the built fabric in San Francisco, Seattle, and Washington, D.C., and 40 key measures of urban vitality.

RESEARCH OBJECTIVES

1. Assess the contributions of older, smaller buildings to economic, social, and cultural vitality

2. Create a methodology for measuring the performance of older, smaller buildings that can be used to inform plans, policies, and sustainability metrics in communities nationwide.

The Preservation Green Lab conducted this research in six stages. Additional details on the research methods employed in this study can be found in Appendix A.

DATA COLLECTION AND ANALYSIS

In order to measure and assess the relationships between key character-istics of buildings and blocks and measures of urban vitality, this study involved the assemblage and geocoding of disparate datasets and the analysis of this data using spatial statistics. Building on previous work by Impresa, Inc., and ArtPlace America, the Preservation Green Lab research team overlaid a 200-meter-by-200-meter grid over the maps of the study cities, and all data was built into this grid structure (see images on the following pages). While archaeologists, ecologists, and surveyors have long used grid overlays to systematically survey and map physical spaces, the application of a grid using geographic information systems (GIS) is a recent innovation. By building data into spatial units of identical size and shape, a grid overlay enables easy visual comparison of data and simplifies statistical analysis of spatial data. The grid overlay approach seems to be gaining popularity. Recently, the U.S. Census Bureau created Demobase, an award-winning interagency project that uses a geometric grid overlay to enable users to obtain population estimates for any geographic area, including those that cross political boundaries.[20] The use of the grid overlay for the study of urban vitality presents new opportunities.

By building data into spatial units of identical size and shape, a grid overlay enables easy visual comparison of data and simplifies statistical analysis of spatial data. The grid overlay approach seems to be gaining popularity.

SEATTLE GRID SQUARES.

SEATTLE COMMERCIAL GRID SQUARES.

In order to analyze each city, a grid of 200-meter-by-200-meter squares was overlaid on the cities' geographies. The map on the left shows a grid of 12,675 squares covering the entire city of Seattle

The map on the right shows the 1,944 grid squares containing commercial and mixed uses highlighted in yellow. This study focused on these commercial and mixed-use grid squares in each city.

Using statistical models, the research team explored the roles of building age, diversity of building age, and built granularity in explaining variation in economic, social, and cultural vitality. The team also combined data on key characteristics of building fabric into a composite "Character Score" that served as a single measure for testing the role of older, smaller buildings and mixed-vintage blocks. In order to statistically control for other key predictors of vitality, the models accounted for private investment in construction, median income, and transit accessibility. A step-by-step description of the research methodology and analysis is included on the following pages.

STEP 1: Collected data from city, county, state, and federal governmental departments and agencies, as well as publicly accessible private websites.

The Green Lab began by seeking out the desired data to include in this project, including characteristics of the built fabric of the three study cities and various measures of community vitality. The research team then searched for these data using the open data portals hosted by each of the study cities, the websites of the respective county assessors for each city, databases of the U.S. Census Bureau, major websites like Yelp and Craigslist, and data of the project's collaborative partners. Finally, the Green Lab reached out to key contacts within the city governments of the three study cities for any data that was not accessible through public data portals.

CHINATOWN INTERNATIONAL DISTRICT, SEATTLE.

This image shows grid squares with a satellite view of the city underneath. Grid squares typically encompass between one and two full urban blocks in the study cities. Colored squares indicate the commercial and mixed-use areas that are included in the analysis.

Data on the historic built environment is generally difficult to locate and often exists only in non-digital files. For that reason, it was critical that the research team find data on the age and size of buildings across an entire city through county assessor records. Once obtained, this data was extensively reviewed and processed to search for errors and missing information. Additional detail on the data used in this project is included in Appendix B.

STEP 2: Overlaid 200-meter-by-200-meter grid over the base maps of Seattle, San Francisco, and Washington, D.C.

Building on the work of one of this project's collaborative partners, Impresa, Inc., and their partners at ArtPlace America, the research team overlaid a 200-meter-by-200-meter grid over the geographies of the study cities. The grid enables "apples to apples" comparisons across diverse urban areas. Whereas ArtPlace America's Vibrancy Indicators project used an 800-meter–by-800-meter grid, this project used a finer-grained, 200-meter-by-200-meter grid to investigate relationships closer to the block level.

STEP 3: Matched and fitted source data to grid squares.

Because much of the data used in this study was linked to traditional geographic units such as census blocks, each piece of data was reassigned to one of the 200-meter-by-200-meter grid squares. Where the native geography of the data exceeded the size of grid squares or ran across multiple squares in the grid, the data was spatially adjusted by multiplying the data point's value by the percent of the original geographical unit contained within the grid square. For instance, if only 10 percent of a census block fell in a grid square, only one-tenth of the census block's original data was included in the square. These

calculations are based on the assumption that the spatial distribution of the data is uniform across the native geographical units. While this assumption led to some minor misalignment of data, the small spatial area of the grid squares ensured that deviations from a uniform spatial distribution were relatively small and random. The geographic units of source data ranged from point-based data (smallest) to census block groups (largest). All point-based data was spatially joined to the grid geometry.

STEP 4: Excluded squares that are not in mixed-use and commercial areas.

Once the data was reorganized into the grid geometry, the research team separated out all squares that were not located in mixed-use or commercial areas. The inclusion of purely residential areas in the analysis would weaken the performance of the statistical models by drawing comparisons between fundamentally different types of urban development.

The research team excluded non-commercial or mixed-use areas using ESRI®'s ArcMap™ GIS software, selecting only cells that had at least three businesses, one primary (full-time) job, ten commercial square feet, one percent non-single family housing property, and one complete record for a parcel or building in the county assessor data. These criteria were iteratively developed and tested to include areas that have commercial activity and to exclude areas that are purely residential. This step reduced the number of grid squares analyzed in Seattle from 12,675 squares to 2,127 squares (16.8 percent), in San Francisco from 5,110 squares to 1,555 squares (30.4 percent), and in Washington, D.C., from 7,625 squares to 1,609 squares (21.1 percent).

STEP 5: Developed a "Character Score" composite measure that combined select building characteristics (building age, diversity of building age, and building granularity) into a single independent variable.

To calculate the "Character Score" composite measure of building age, diversity of building age, and building granularity, the research team first "z-standardized" the median building age, standard deviation of building age, and number of buildings or parcels according to the unique overall building fabric of each city. *Z*-standardization involves subtracting the average value from each score and dividing that number by the overall standard deviation of values, producing a number that reflects the number of standard deviations above or below the city average. The Character Score is a combination of the *z*-standardized building granularity, diversity of building age, and median building age values.[21]

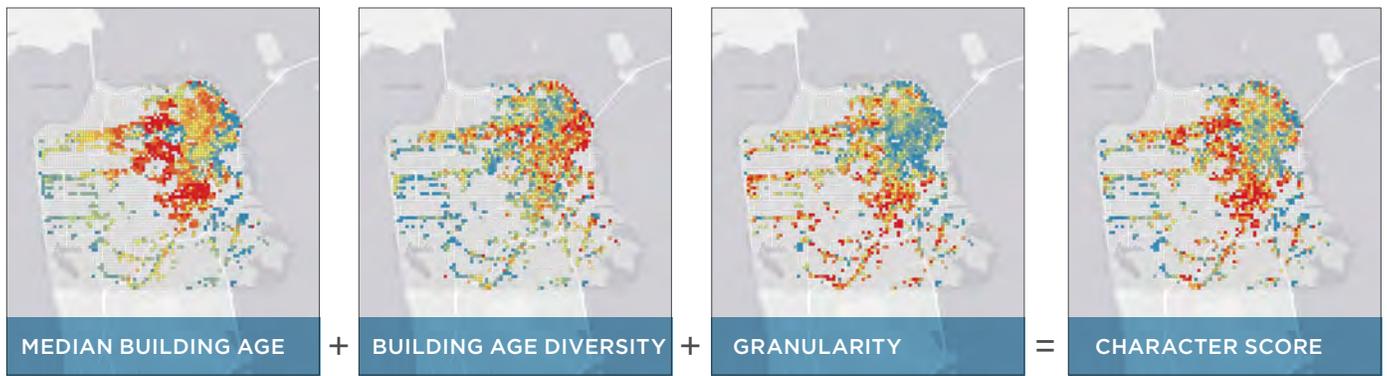| MEDIAN BUILDING AGE | + | BUILDING AGE DIVERSITY | + | GRANULARITY | = | CHARACTER SCORE |

FIGURE: COMPONENT MEASURES OF CHARACTER SCORE FOR SAN FRANCISCO

From left to right: Maps of San Francisco's median building age, diversity of building age, and built granularity. The Character Score measure used in this report combines data on the median building age, diversity of building age, and granularity in each grid square. All maps are included in Appendix D: City Atlas.

STEP 6: Developed and ran statistical models to test the relationships between building characteristics and 40 economic, social, cultural, and environmental outcome measures.

This study employed spatial regression analysis to assess the statistical links between the presence of older, smaller buildings and various measures of social, economic, and cultural vitality. Spatial regression analysis is one of many tools used in the growing field of spatial statistics and is built around the calculation and parsing of correlations in spatial data. The spatial regression models used in this study measure the variation in data on the character of an area's buildings—the median age of structures, diversity of building age, and granularity or size of parcels—against the variation in data on a range of publicly accessible economic, social, cultural, and environmental performance data. The models also took into account variations in median income, private dollars invested in construction between 2007 and 2012, and transit accessibility, as measured by Walk Score®'s Transit Score® index. Using these models, this research measures the extent to which differences in the character of buildings and blocks are statistically tied to differences in measures of activity, vitality, and opportunity, even when considered alongside transit, income, and private reinvestment dollars.

Spatial regression analysis differs from other regression modeling techniques in that it statistically factors in the spatial dimension of data. To control for non-random spatial relationships, the research team used spatial lag and spatial error models that account for the effects of spatially contiguous grid squares. The model was first run using the composite Character Score. In order to learn about the unique impact of building age, diversity of building age, and granularity, a second set of analyses was run with models that included the *z*-standardized

MULTIPLE SMALL BUILDINGS CREATE "GRANULAR" BLOCKS. H STREET NE, WASHINGTON, D.C. Photo: Elise Bernard

LARGE, FULL-BLOCK DEVELOPMENTS SCORED LOW ON THE "GRANULARITY" MEASURE. WASHINGTON, D.C. Photo: Flickr-NCinDC

constituent parts of the Character Score as well. (For more information on this project's statistical modeling and methodology, please refer to Appendix A.)

DEFINING TERMS AND MEASURES

BUILDING AGE – In T*he Death of Life of Great American Cities,* Jane Jacobs points to the importance of older buildings in part because they offer more affordable rents for small and start-up businesses. "Old ideas can sometimes use new buildings. New ideas must use old buildings," she said.[22] For this study, data on building age is drawn from property assessor's records, which in each of the three cities includes a year built for the structures on each parcel. The measure of building age for each grid square represents the median age of all primary buildings in that grid square.

DIVERSITY OF BUILDING AGE – Related to the concept of retaining older buildings is Jacobs' idea that healthy neighborhoods and communities must "mingle buildings that vary in age and condition, including a good proportion of old ones."[23] This is in contrast to districts that are constructed all at once and points to the importance of allowing neighborhoods to change over time at an incremental rate. Diversity of building age is also drawn from property assessor's records. Once building age data was built into the grid squares, the research team analyzed and compared the range and distribution of building age within each grid square. The measure of diversity of building age is equivalent to the standard deviation of building ages within a grid square. Neighborhoods with a combination of new and old buildings were assigned higher diversity of building age scores than neighborhoods composed of buildings constructed at around the same time.

GRANULARITY – Granularity refers to the size of buildings and the size of the parcels upon which they are located. Areas of high granularity have large numbers of small buildings on small lots, while areas of low granularity have fewer, bigger buildings occupying large lots, sometimes in the form of superblocks. The ability to measure granularity varied in each city according to the data available. In Washington, D.C., and San Francisco, granularity is equal to the number of buildings in a grid square. For Seattle, granularity is equal to the number of parcels in a grid square.[24] Small-scale buildings and parcels allow more diverse ownership, support small business development, and facilitate mixed uses. When neighborhoods and cites are made up of many smaller buildings, they may be more resilient and adaptable to change.

URBAN VITALITY – In this report, urban vitality refers to the amount of regular social, cultural, and economic activity that occurs in an area of the city. This research used 40 measures of activity ranging from counts of jobs and businesses to measures of population density and diversity. Following Jane Jacobs, diversity is included as an indicator of vitality.[25] In addition to considering the diversity of building age, this study includes measures of diversity in terms of an area's population of residents, advertised residential rents, and character and ownership of businesses. The measures used here constitute a select set of urban vitality indicators built around existing data; as a collection, they are not meant to serve as an exhaustive measure of the liveliness of a neighborhood. The true health and vitality of a neighborhood cannot be measured with data alone, of course. Jane Jacobs, who scoffed at planner's formulas, metrics, and studies, would surely agree that the most important "data" about cities and neighborhoods is that which we collect through our own experience and careful observation of people and places.

STUDY CITIES

This research focused on the cities of Seattle, San Francisco, and Washington, D.C. These cities were selected in part because all three have extensive areas of older, fine-grained urban fabric. In addition, each city is experiencing intense growth and development pressure, resulting in debates about the appropriate level of building density that should be allowed and whether historic preservation is adversely affecting housing affordability, business development, and social diversity. These three urban areas are in no way representative of all American cities, but rather provide a sample of older cities with robust real estate markets.

This study is the first phase of a broader Preservation Green Lab research agenda. With the help of interested funders, cities, and partner organizations, the scope of this work is expanding into additional cities

This study is the first phase of a broader Preservation Green Lab research agenda to identify sustainable solutions for cities.

with sharply different economic, social, and physical contexts, including areas with weak real estate markets, declining population, and high building vacancy rates.

The *Older, Smaller, Better* report opens the dialogue about the role that older, smaller buildings play in supporting urban vitality. In the report, Gehl Studio and State of Place™, two leaders in research and practice regarding the relationships between the built environment and human behavior, offer insights on the Green Lab's analysis that build upon their own work in Washington, D.C., and San Francisco. Further conversation connecting the *Older, Smaller, Better* data and analysis with other researchers and strands of inquiry will take place online in the months ahead at www.oldersmallerbetter.org.

METHODOLOGICAL LIMITATIONS

The results from this study rely on the accuracy of data that inevitably contains some erroneous information. The extent and complexity of data on an entire city's building stock makes it difficult to comprehensively and accurately capture complete information. Data on buildings that are more than 100 years old is particularly uneven in many cities. Major events, such as the 1906 San Francisco earthquake and fire, resulted in the loss of some important records, for example. To eliminate obvious errors, the research team removed any buildings from analysis that listed a "year built" date that was either in the future or preceded the original settlement date of the respective city. Building data with a "year built" date of zero were also removed. Similarly, any grid square with less than ten square feet of commercial space was removed. Altogether, approximately ten percent of all buildings in each city were removed from analysis during the data processing and cleaning process. The research team removed data that was clearly erroneous, but it is possible that some other incorrect data was included.

Finally, this analysis cannot fully account for the causal mechanisms that connect older, smaller buildings to urban vitality. The spatial regression analysis used in this study establishes a model that statistically links measures of buildings and blocks with measures of social, cultural, economic, and environmental performance, even when statistical variations of transit accessibility, median income, and private real estate reinvestment are also accounted for in the model. The results from these models do point to significant statistical connections between numerous sustainable development measures and the presence of older, smaller buildings in the Seattle, San Francisco, and Washington, D.C., datasets. However, the results should be interpreted as general trends in these cities and not as unequivocal, direct causal forces.

SUMMARY
OF FINDINGS

Photo: Jim Lindberg

SUMMARY OF FINDINGS: THE CONTRIBUTIONS OF OLDER, SMALLER BUILDINGS

This analysis found that blocks and districts with a fine-grained mix of old and new buildings in Seattle, San Francisco, and Washington, D.C., were more economically, socially, and culturally vital than areas with mostly newer, larger buildings along a variety of metrics. Building age, building age diversity, and the granularity of building fabric emerged as significant predictors of community vitality, even when taking into account the effects of income, access to transit (Transit Score® metric), and construction permit dollars. The overarching findings from this research are detailed below.

DENSITY OF HUMAN ACTIVITY

By various measures, areas with a combination of small old and new buildings had significantly greater human activity than areas predominantly composed of large, new buildings. The research team analyzed the relationship between the built fabric of the cities and data
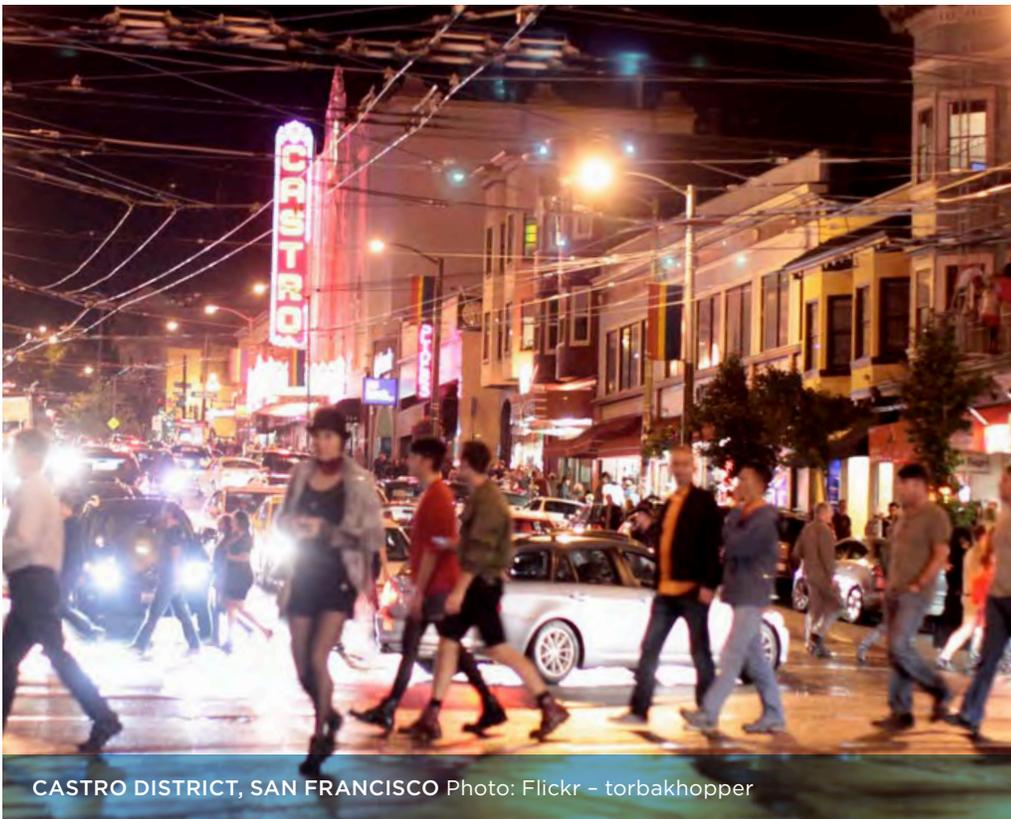
CASTRO DISTRICT, SAN FRANCISCO Photo: Flickr – torbakhopper

NIGHTLIFE IS MOST ALIVE ON STREETS WITH A DIVERSE RANGE OF BUILDING AGE.

San Francisco and Washington, D.C. blocks composed of buildings from different eras have greater cell phone activity on Friday nights. In Seattle, greater Character Score areas have significantly greater Friday night cell phone activity.

related to business operating hours, cellphone activity, residential density, outdoor cafe seating permits, and the locations of photos posted to Flickr.

INTENSITY OF CELLPHONE ACTIVITY. Cellphone usage served as a proxy for people's location. This research assumes that people use their mobile phones wherever they are, so the overall intensity of cellphone use corresponds to where people cluster at various times throughout the week. The research team analyzed data on the location and intensity of cellphone activity at three specific hours during the week: 4:00 p.m. Sunday, 10:00 a.m. Wednesday, and 10:00 p.m. Friday. These time periods were selected by the research team to represent a range in the typical activity of city residents. The Sunday afternoon time corresponds to a non-working hour with a diverse range of casual activities. The Friday night time corresponds to a non-working hour when "nightlife" activities—visiting bars and restaurants—might be expected. Finally, the Wednesday morning time corresponds to a typical weekday work hour.

In Seattle, neighborhoods with a high Character Score—reflecting their older, fine-grained, mixed-vintage built fabric—had significantly greater cellphone activity on Friday at 10:00 p.m., compared to neighborhoods with a lower Character Score, which is associated with larger, mostly new buildings. An increase in building age diversity was associated with greater cell activity on Friday nights in San Francisco and Washington, D.C., and older buildings were associated with greater Friday night cell activity in San Francisco and Seattle.

There was a clear pattern of significantly less cell activity at 10:00 a.m. Wednesday in all three cities' areas with high Character Scores and less cell activity at 4:00 p.m. Sunday in San Francisco and Washington, D.C.'s high Character Score areas. High Character Score areas likely have less cellphone usage at 10:00 a.m. Wednesday, when workers cluster in large office buildings. Because the cellphone data only captures intensity of cellphone use at latitude and longitude and not on a "per square foot" basis, one might safely expect that areas with office towers would dominate during work hours. The finding that low Character Scores areas in San Francisco and Washington, D.C., have greater cellphone usage at 4:00 p.m. Sundays may be explained by tourist activity. These findings warrant further research.

BUSINESS HOURS OF OPERATION. Human activity can also be measured by the presence of open businesses during the course of the week. Using hours of operation data from Yelp, the research team assessed whether businesses were open at key points during the week: Sunday at 4:00 p.m., Wednesday at 10:00 a.m. and Friday at 10:00 p.m. As with the analysis of cell activity, these hours were selected to capture a diversity of activity in terms of operating businesses and business clientele.

In Seattle, a significantly greater percentage of businesses were open on Friday nights at 10:00 p.m., Wednesday at 10:00 a.m., and Sundays at 4:00 p.m. in older, mixed-vintage, granular neighborhoods, compared to Seattle's neighborhoods composed of mostly large, new buildings.

RESIDENTIAL DENSITY. Areas with high Character Scores in Seattle, San Francisco, and Washington, D.C. are home to significantly higher levels of residential density compared to blocks composed of mostly large, new buildings. In all three cities, these areas had significantly more households per acre, housing units per acre, and people per square mile, when compared to areas of consistently newer, larger buildings. A closer inspection of the unique contributions of building age, building age diversity, and granularity revealed that granularity—the size of the building footprints and parcels—was consistently associated with greater residential density.
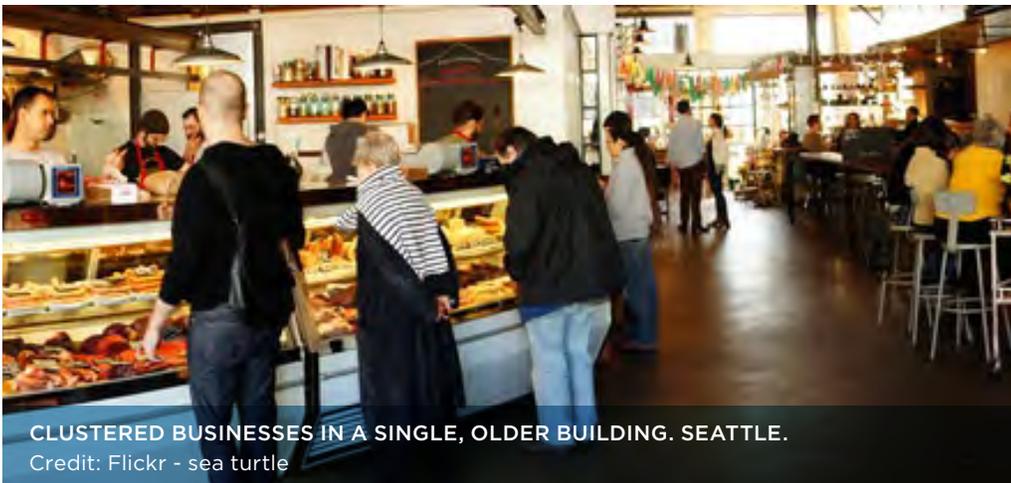
In all three cities, the statistical model indicated that older median building age at the grid square level was associated with less residential density. Analysis of simple correlations between building age and density, however, shows that areas with older buildings have *greater* residential density. The spatial patterns of building age (which is accounted for by the spatial error term in the regression model) and the roles of private real estate investment and transit accessibility may be distorting the role of building age.

OTHER MEASURES OF INTENSITY OF HUMAN ACTIVITY. The research team also explored the relationships between the character of building fabric and sightseeing and people-watching behaviors. The locations of permits for outdoor cafe seating and the number of photos uploaded to Flickr from different parts of the city served as measures of these behaviors. In Seattle, high Character Score areas had significantly more permitted businesses with sidewalk seating. A closer look at different aspects of

CLUSTERED BUSINESSES IN A SINGLE, OLDER BUILDING. SEATTLE.
Credit: Flickr - sea turtle

OLDER COMMERCIAL AND MIXED-USE DISTRICTS CONTAIN HIDDEN DENSITY.

In Seattle, San Francisco, and Washington, D.C., mixed-use and commercial areas with older, smaller buildings have greater population density and more businesses per commercial square foot than mixed-use and commercial areas with larger, newer buildings.

building character revealed that older median age and greater diversity of building age were associated with significantly more outdoor cafe seating permits and more photos posted to Flickr in multiple cities. Contrary to the theorized relationship between building character and sightseeing behaviors, the analysis showed that an increase in granularity was *negatively* associated with the number of photos posted to Flickr in all three cities. This could reflect a general inclination for people to photograph larger, more monumental structures rather than small buildings.

DENSITY OF ECONOMIC ACTIVITY

This study documented a clear connection between the older, more age-diverse and fine-grained areas of the three study cities and various measures of economic activity. To explore different conceptions of density, the Green Lab analyzed both the aggregate count of jobs and businesses as well as the "rates of return" per commercial square foot of space.[26] The study also explored data on the percentage of all pivate sector jobs that are in small businesses with less than 20 employees.

This analysis showed that the older, more age-diverse built fabric of cities has a higher concentration of businesses, jobs, and creative jobs. Significantly more jobs in these areas are associated with small businesses. Such districts support an equal or greater density of economic activity per commercial square foot than areas of cities composed of mostly large, new buildings.

BUSINESSES. As an aggregate, raw number, areas with newer, larger buildings have a greater number of businesses than areas of the city with older, more granular built fabric. This is unsurprising. After all, a multi-floor office block is likely to house a substantial number of businesses on a very small footprint. Square foot for square foot, however, the older, more granular blocks and neighborhoods in the three cities outperformed areas characterized by newer, larger buildings. In Seattle, San Francisco, and D.C., the mixed-vintage, older, and more granular blocks have a greater concentration of businesses per commercial square foot. When grid squares are aggregated and averaged at the neighborhood level, places like Phinney Ridge in Seattle, Georgetown in D.C., and Pacific Heights in San Francisco host a greater concentration of businesses than those cities' respective downtowns or financial districts.

JOBS. As with the overall number of businesses, areas with newer, larger-scale developments—skyscrapers and block-length buildings—have a greater number of jobs in the aggregate. On a per square foot basis, however, the older, age diverse, granular fabric supports a greater concentration of jobs per square foot in the cities of Seattle and Washington, D.C.

FLEXIBLE OFFICE SPACE IN AN OLDER, SMALLER BUILDING. SEATTLE.
Photo: Nancy Leson.

THE CREATIVE ECONOMY THRIVES IN OLDER, MIXED-USE NEIGHBORHOODS.

In Seattle and Washington, D.C., mixed-use areas with a mix of old and new buildings have significantly more creative jobs per commercial square foot than areas with newer, larger buildings.

CREATIVE JOBS. Building on research about the "creative economy" by Richard Florida, Ann Markusen, and others, this study explored the relationship between older, granular, mixed-vintage blocks and corridors and the location of creative jobs, which are defined as jobs in Information and Arts, Entertainment, and Recreation industries, as coded by the North American Industry Classification System (NAICS).[27] The Preservation Green Lab found a significant positive relationship between areas with older, smaller buildings and the number of creative jobs per commercial square foot in Seattle and Washington, D.C.

JOBS IN SMALL BUSINESSES. This research found evidence that the older, more human-scaled fabric of cities provides space for small businesses. Areas with older, smaller buildings have significantly higher percentages of jobs located in businesses with less than 20 employees, relative to all private sector jobs.

OPPORTUNITIES FOR NEW ECONOMIC VITALITY

Blocks with older, smaller buildings have many startup businesses and non-chain businesses. New businesses and non-chain businesses signal regular economic activity and distinctiveness. Non-chain businesses are frequently locally owned, and dollars spent in non-chain, local businesses are likely to be "recycled" in the local economy through use of local auxiliary business services and local sources of labor. According to research by Civic Economics, every dollar spent in a locally-owned

retailer recirculates in the local economy far more than dollars spent in national chains.[28]

The research team explored the relationship between measures of the character of buildings and blocks and the percentage of businesses that were newly launched in 2012, the aggregate number of new businesses in a grid square, the number of new businesses launched per square foot of commercial space, and the percentage of non-chain restaurants and retailers.

NEW BUSINESSES. This study found that older, mixed-vintage, granular areas in Seattle and San Francisco hosted more businesses launched in 2012 than areas with larger, newer buildings, both on a per square foot basis and as a proportion of the total number of businesses. High Character Score areas also had significantly more new businesses per commercial square foot.

NON-CHAIN BUSINESSES. Blocks with older, smaller, mixed-vintage buildings contain unique, non-chain businesses. In Seattle, San Francisco, and Washington, D.C., this study found significantly higher percentages of non-chain restaurants and retailers in areas with older, smaller, mixed-vintage buildings.

DIVERSITY OF SOCIAL AND ECONOMIC ACTIVITY

The older sections of the study cities are thriving, and contain younger populations and more diverse places. This analysis showed that areas with older, smaller, mixed-vintage buildings have younger residents and greater age diversity of residents and contain a higher percentage of
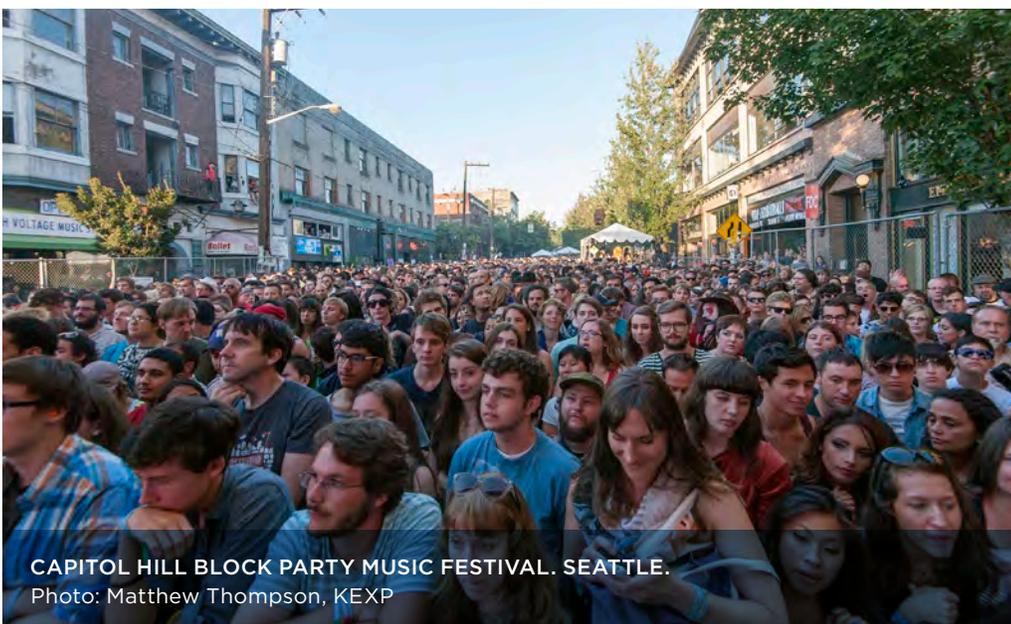
CAPITOL HILL BLOCK PARTY MUSIC FESTIVAL. SEATTLE.
Photo: Matthew Thompson, KEXP

YOUNG PEOPLE LOVE OLD BUILDINGS.

Neighborhoods with older, smaller, mixed-vintage buildings have significantly younger residents than areas with newer, larger buildings.

women and minority-owned businesses. They also have greater diversity of residential rents.

MEDIAN AGE OF RESIDENTS. In all three of the study cities, the median age of residents of older, smaller, mixed-vintage areas was significantly lower than residents of districts with newer, larger buildings. To determine whether or not this finding merely reflected younger residents' limited financial means and desire to live in cheaper housing, the study included an additional model that included median residential rents. In this model, the significant positive relationship between the Character Score measure and younger median age of residents persisted in Seattle and San Francisco, but not in Washington, D.C.

WOMEN AND MINORITY-OWNED BUSINESSES.[1] Hypothesizing that older, smaller buildings may have high levels of entrepreneurial activity among woman and minority groups, the Green Lab analyzed records of registered women and minority-owned businesses in each of the three study cities and found a significantly higher proportion of women and minority-owned businesses in high Character Score areas in Seattle and Washington, D.C. Looking only at the raw numbers of registered businesses, the older, smaller, mixed-vintage blocks had more women and minority-owned businesses in Seattle. In San Francisco, however, significantly fewer women and minority-owned businesses were located in high Character Score areas. This could be explained by a tendency for businesses located nearer San Francisco's municipal buildings to register with the city; areas in and around San Francisco's Civic Center and Financial District are composed of mostly larger, newer buildings.

DIVERSITY OF RESIDENTS. This study included three indices of diversity of residents: a Racial and Ethnic Diversity Index, a Resident Age Diversity Index, and an Income Diversity Index. The Racial and Ethnic Diversity Index measures the extent to which the neighborhood is composed of a balanced resident representation from non-Hispanic whites, non-Hispanic African-Americans, non-Hispanic Asians, Hispanics (all races), and other races and ethnicities. The Resident Age Diversity Index measured the mix of residents that are 0-17, 18-34, 35-49, 50-64, and older than 65 years old. Finally, the Income Diversity Index measured the mix of households making less than $35,000, between $35,000 and $100,000, and more than $100,000.

1 The findings on this measure were impacted by the limitations of the dataset, which included businesses registered as women or minority-owned with city agencies. The incentives for registering and participating in city programs are inconsistent across sectors, and for this reason and others, registration with the city was likely highly inconsistent. In this study, Seattle had an average of 14.33 percent registered women and minority-owned businesses per grid square. Average registration rates were much lower in San Francisco (2.08 percent) and Washington, D.C.(1.46 percent) grid squares. Given the smaller spaces offered by older commercial and mixed-use corridors, it seems probable that businesses occupying such spaces may be less likely to register with the city than businesses occupying more costly real estate in larger, newer buildings. (See the "Opportunities for Future Research" section for further discussion.)

High Character Score areas had significantly greater resident age diversity in all three cities. In San Francisco, a higher Character Score was associated with significantly greater diversity of resident age, income, and race and ethnicity. Greater granularity was associated with significantly greater resident age diversity in all three cities, suggesting that granularity may be a critical factor for mixed-age communities. There was no significant relationship between Character Score and racial and ethnic diversity or income diversity in Seattle or Washington, D.C.

Because race and income are tied to the character of neighborhoods and intertwined with issues of market segmentation and racial segregation, measures of racial and ethnic diversity and income diversity may be a poor fit with analysis at the block level. Analysis at a neighborhood scale may be more useful. This warrants more attention in future research.

RESIDENTIAL RENTS. To learn more about the connections between building character and housing affordability, the research team collected data from Craigslist postings of residential rental offerings between August and October 2013 and analyzed the median and diversity (standard deviation) of advertised rents. Areas of Seattle with a high composite score had significantly greater diversity of offered residential rents. In Seattle and San Francisco, greater diversity of building age was associated with a significantly greater diversity of offered rents, and in those cities, more granularity was significantly associated with lower median rents.

SMALL COMMERCIAL SHOPS ON 2ND STREET. SAN FRANCISCO. Photo: Jim Lindberg


OLDER, MIXED-USE NEIGHBORHOODS ARE MORE WALKABLE.

In Seattle and San Francisco, older neighborhoods with a mixture of small, old and new buildings have significantly higher Walk Score® and Transit Score® ratings than neighborhoods with mostly newer, larger buildings.

OTHER MEASURES OF COMMUNITY LIVABILITY

Finally, this research explored the relationship between the characteristics of buildings in commercial or mixed-use areas and active or sustainable transportation options available in those places. To measure the availability of non-automobile transportation options, the research team used Walk Score®'s well-known pedestrian measure, along with its newer Bike Score™ and Transit Score® measures. In Seattle, older, more granular and age-diverse areas had significantly higher Walk Score® index values. In San Francisco, blocks with a higher Character Score had significantly higher Walk Score® and Transit Score® metrics.[29] Finally, in Washington, D.C., higher Character Scores were significantly correlated with greater Bike Score™ ratings.

FINDINGS
FROM SEATTLE
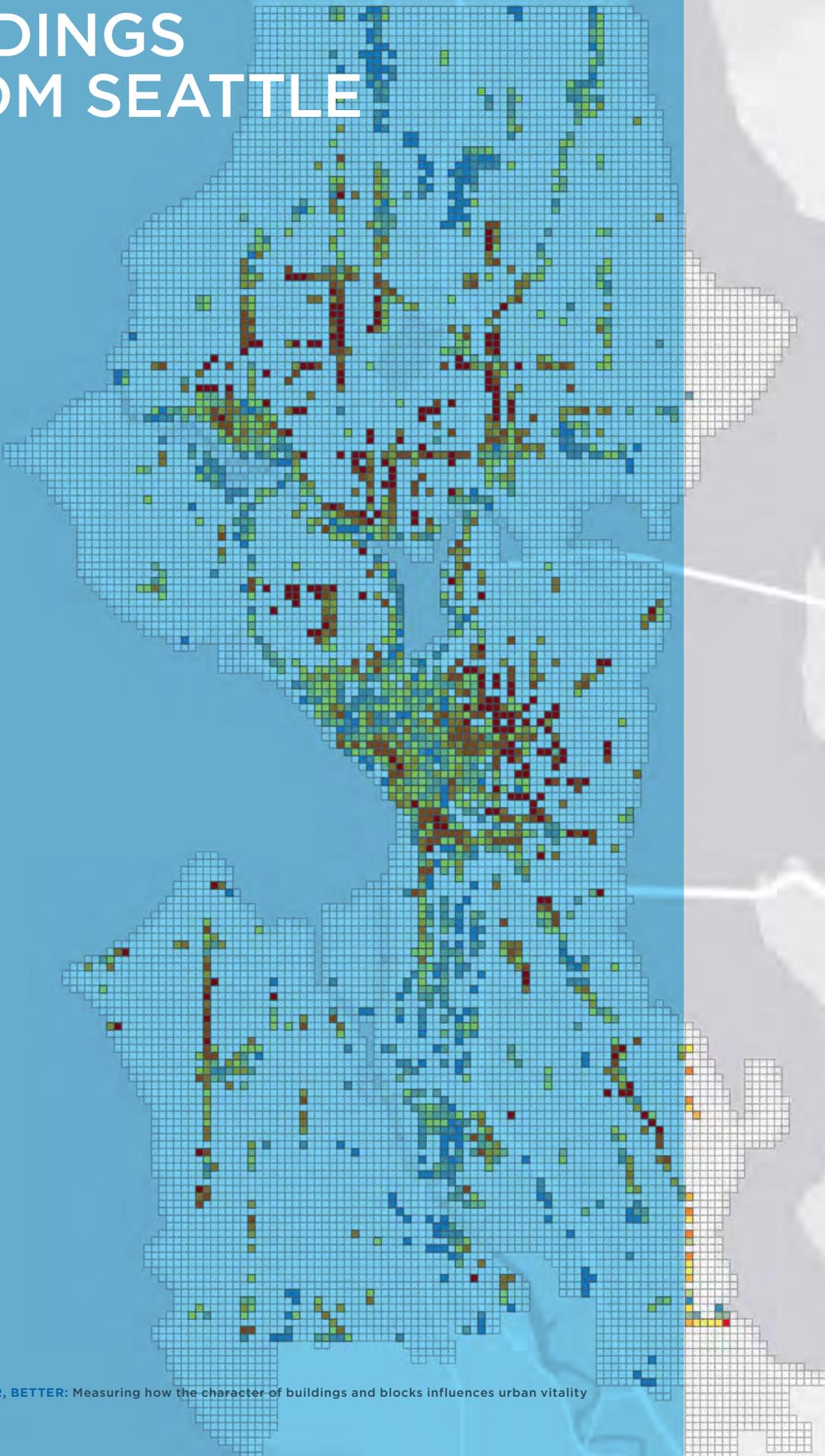
FINDINGS FROM SEATTLE

Seattle's blocks of older, smaller, mixed-vintage buildings make up many of the city's most socially, culturally, and economically vibrant neighborhoods. Adaptive use projects house the city's most celebrated restaurants in Ballard, Capitol Hill, Fremont, and Pioneer Square. The older fabric of Seattle "works hard," housing dense clusters of businesses, residences, and street activity from morning to night. Blocks of older, smaller buildings with small-scale infill development provide space for the entrepreneurial economy: In Seattle, high Character Score was significantly associated with greater activity of new businesses, women and minority-owned businesses, and non-chain businesses (see maps on the following pages). There are a significantly higher percentage of jobs in small businesses in these places. High Character Score areas also had significantly greater population and housing density, age diversity of residents, and diversity of residential rents. Finally, these areas are culturally rich. Areas with a great mix of old and new buildings had a greater percentage of open businesses at every hour analyzed in this study; greater cellphone activity on Friday nights; a greater number of permitted businesses with outdoor seating; and a greater number of photographs posted to Flickr. According to measures created by Walk Score® index, high Character Score areas are more walkable, bike friendly, and transit accessible.

Closer analysis of this study's key measures of building character reveals that areas of Seattle that have older buildings are often particularly active, vibrant places. Older median building age was significantly associated with important neighborhood "vital signs," ranging from increased cellphone activity on Friday nights; greater numbers of outdoor seating at cafes; greater numbers of businesses, jobs, and creative jobs per commercial square foot; higher percentages of non-chain businesses; and higher Walk Score® and Bike Score™ ratings (see maps on the following pages).

Though older buildings by themselves supported active and vital places, building age diversity and granularity also play a major part in Seattle neighborhoods. Mixed-vintage blocks of smaller, more granular building fabric had greater percentages of women and minority-owned businesses, greater racial and ethnic diversity, lower residential rents, and greater rent diversity.

Areas with small-scale buildings had significantly lower median age of residents. Small buildings constructed in the early 20th century established the high level of granularity at the parcel level, and this

SMALL BUSINESSES IN CAPITOL HILL. SEATTLE. Photo: Jim Lindberg

Close analysis of this study's key measures of building character reveals that areas of Seattle that have older buildings are often particularly active, vibrant places.

pattern of land subdivision remains in many parts of the city today. The city's old buildings enable striking architectural contrasts with new, small-scale infill developments. This analysis suggests that without Seattle's older buildings, the city's neighborhoods would not have the high levels of vitality and diversity of businesses that are seen today.

Based on the popularity of several areas with historic fabric, it seems Seattleites prize the city's older buildings. However, in the burgeoning neighborhood of South Lake Union, home to the growing headquarters of Amazon and predominantly large, newer buildings, some older buildings are being adaptively used. For instance, the Supply Laundry

Building, a 1906 commercial laundry building being redeveloped by Vulcan Real Estate, recently served as a pilot for the city's new Outcome-Based Energy Code, which allows building developers and managers flexibility in how they meet the city's overall energy targets.[30]

Over the next few years, Seattle will enact policies that will either support further reuse of the city's existing built fabric or put the city's older districts at risk. The City is currently planning to require seismic retrofits to buildings with unreinforced masonry (URM) bearing walls. Such a policy would likely spur action from building owners—either requiring investment in the supporting structure of older buildings or hastening their demolition.[31] In Capitol Hill, a Conservation Overlay District policy has preserved the facades of historic buildings by offering developers a Floor Area Ratio bonus. Both the Conservation Overlay District and URM policies could have a major impact on the character of Seattle's neighborhoods. These policies and others are discussed further in the Pike/Pine Corridor and International District case studies.

These two neighborhoods were selected for more detailed analysis because they are both areas where significant physical changes are underway and expected in the future. The Pike/Pine neighborhood is also the current home of the Preservation Green Lab.
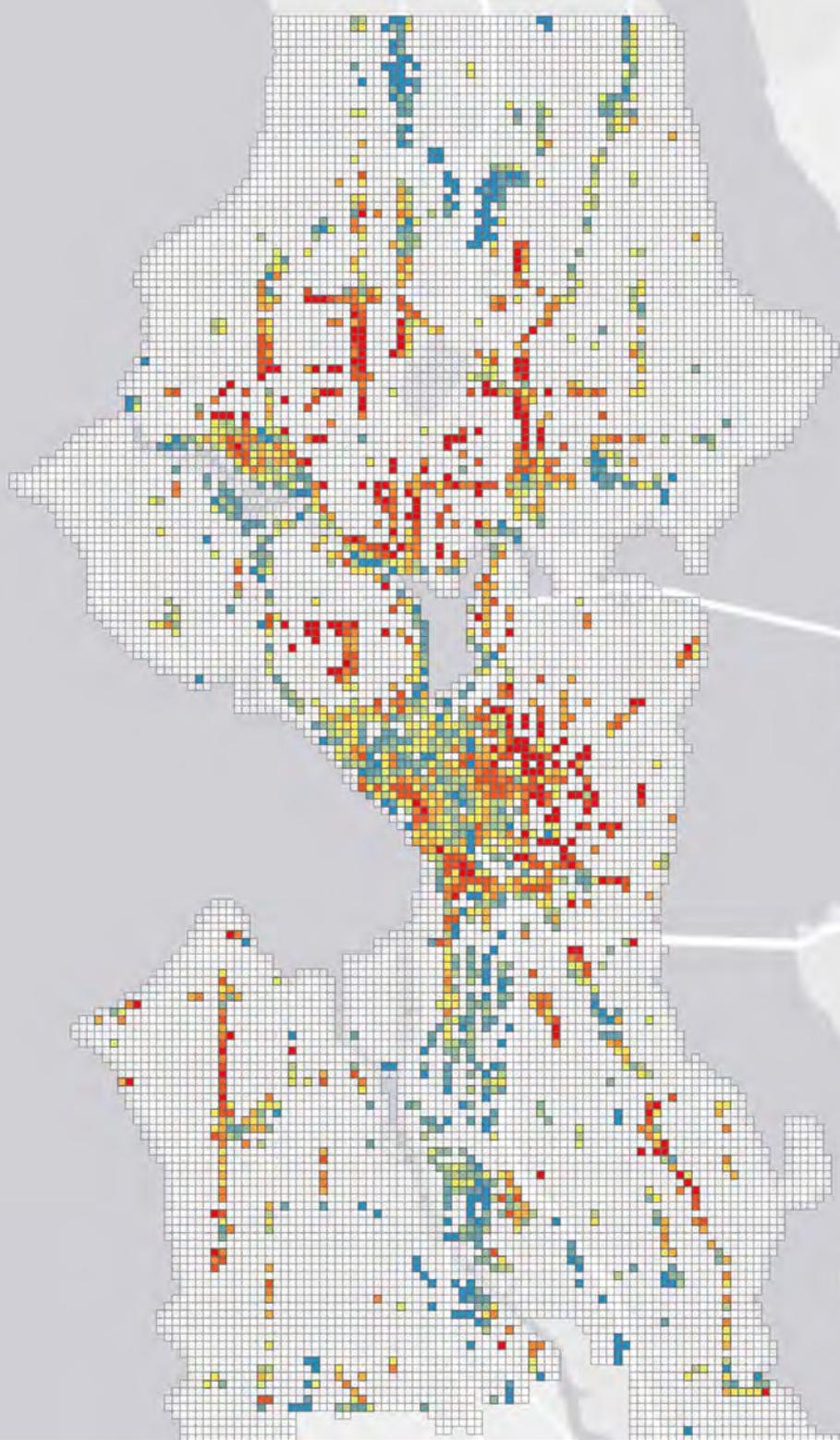
CHARACTER SCORE, SEATTLE

**Newer, larger,
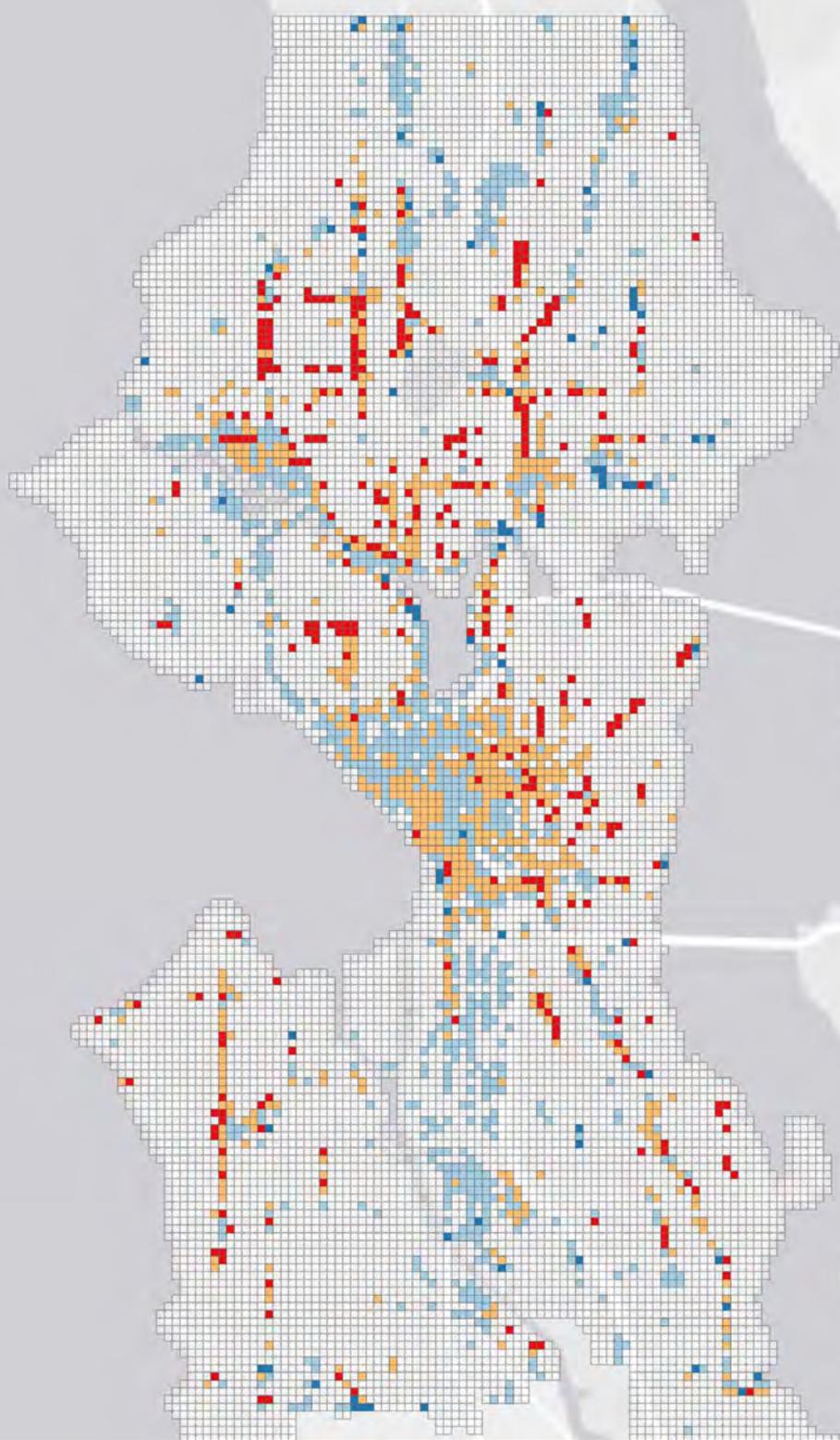built at one time**

**Older, smaller,
mixed-vintage**

**Commercial and mixed
use grid squares:**

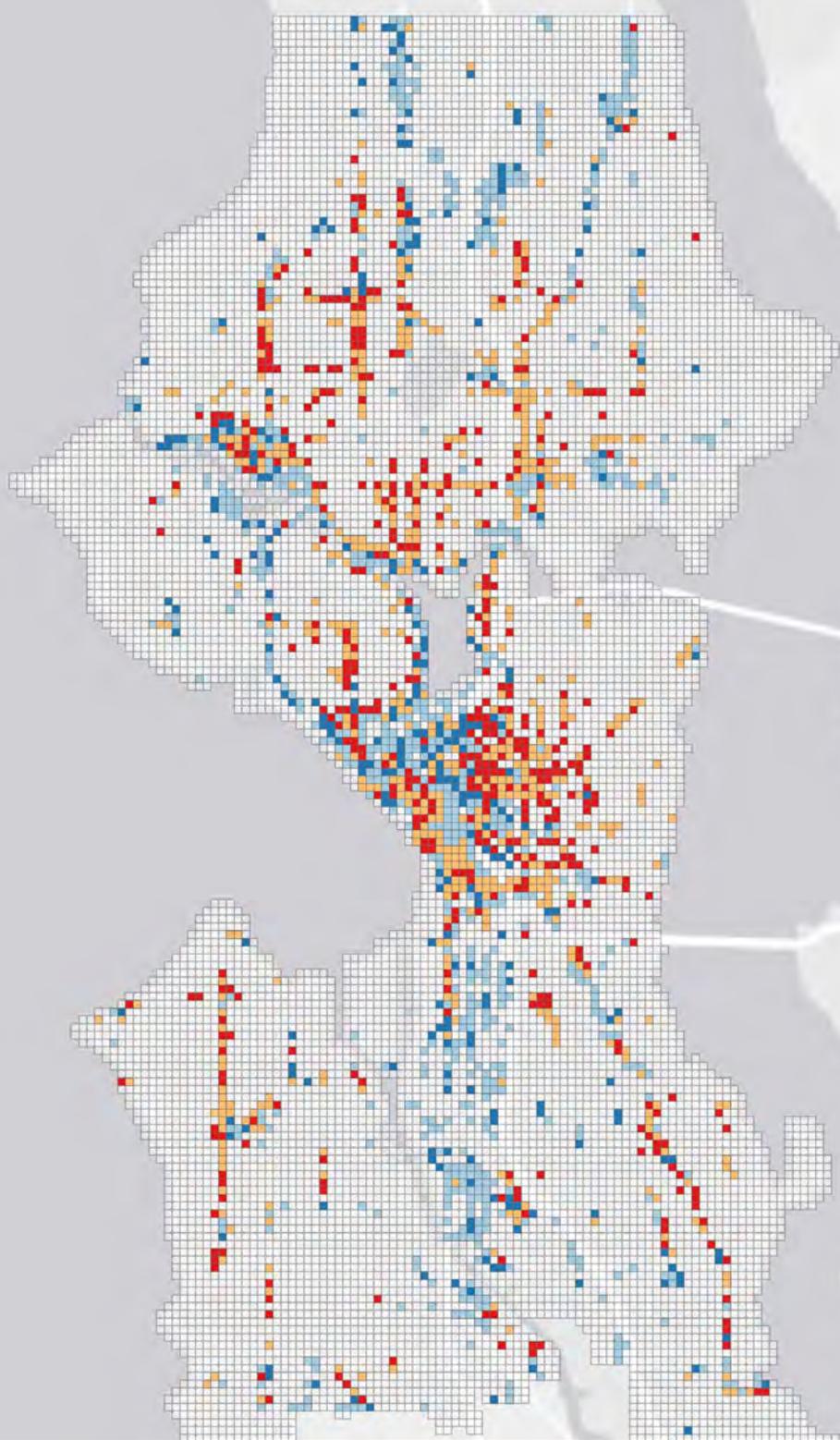2,127 out of 12,675

LOWEST SCORE

HIGHEST SCORE

BUSINESSES PER COMMERCIAL SQUARE FOOT BY CHARACTER SCORE, SEATTLE

Below avg. Character Score; Below avg. businesses per comm. sq ft.

Above avg. Character Score; Below avg. businesses per comm. sq ft.

Below avg. Character Score; Above avg. businesses per comm. sq ft.

Above avg. Character Score; Above avg. businesses per comm. sq ft.

Commercial and mixed use grid squares:

2,127 out of 12,675

PERCENTAGE OF NEW BUSINESSES LAUNCHED IN 2012 BY CHARACTER SCORE, SEATTLE

Below avg. Character Score; Below avg. businesses per comm. sq ft.

Above avg. Character Score; Below avg. businesses per comm. sq ft.

Below avg. Character Score; Above avg. businesses per comm. sq ft.

Above avg. Character Score; Above avg. businesses per comm. sq ft.

Commercial and mixed use grid squares:

2,127 out of 12,675

NEIGHBORHOOD CASE STUDY: PIKE/PINE CORRIDOR

The setting for Seattle's burgeoning grunge rock scene in the early 1990s, today Seattle's Pike/Pine Corridor is a cultural hive of restaurants and nightclubs, apartments and condominiums, local retailers and coffee shops, and creative office spaces. Located at the southern end of Seattle's Capitol Hill neighborhood, between Interstate 5 and Madison Street, the Corridor encompasses 26 square blocks. Along with the rest of Capitol Hill, Pike/Pine has for decades been the center of Seattle's LGBTQ community.[32] The neighborhood originally sprang to life in the 1890s as streetcar lines were developed on Pike and Pine Streets.[33] Shortly after the arrival of the Seattle's first automobile in 1905, Pike/Pine became Seattle's "auto row," home to a concentrated cluster of car dealerships and other auto-oriented businesses.[34]

Today, the old "auto row" buildings continue to serve as the signature architectural form of the neighborhood. Built of concrete or masonry and standing three to four stories high, "auto row" buildings now serve a variety of uses. Frequent garage and bay doors, just wide enough for cars to enter, now give the neighborhood an architectural character and granularity that make the structures popular for new uses such as coffee roasters, cafes, and clubs.

Given the relatively large size of the auto row buildings, the overall built granularity of Pike/Pine is approximately equal to the citywide average for commercial corridors. The neighborhood stands out from the rest of the city, however, in terms of the age of its built fabric and the creative reuse of many of the area's buildings. On many blocks in the Pike/Pine corridor, new and old buildings are intermixed. At the eastern end of the neighborhood, for instance, one of the world's "greenest" office buildings, the Bullitt Center, was recently constructed adjacent to a set of apartment buildings dating from the early 1900s.

NIGHTLIFE ON PIKE/PINE, SEATTLE. Photo Credit: Flickr user Michael Hanscom
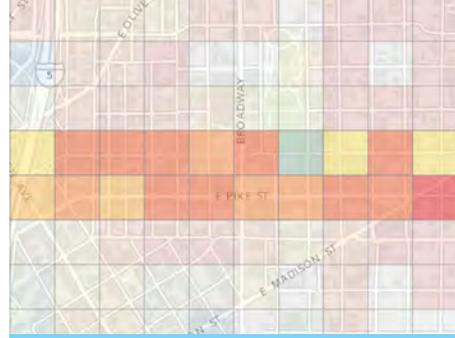
BUILDING CHARACTER: Early 20th century auto-oriented businesses

AVERAGE MEDIAN AGE OF BUILDINGS: 1930

PERCENT PRE-WAR BUILDINGS: 75.2%

AVERAGE BUILDING AGE DIVERSITY: Greater diversity than city average

AVERAGE NUMBER OF PARCELS PER 200m x 200m AREA: 19.1 parcels (nearly equal to the city average)

CHARACTER OF ACTIVITY: Hub of restaurants and nightlife, coffee roasters, creative offices, and local retailers

POPULAR EVENTS IN THE NEIGHBORHOOD: Pride week celebration, Capitol Hill Block Party, Capitol Hill Farmers' Market

DEVELOPMENT ACTIVITY: Several new mixed-use projects under construction. Some replacement of older, smaller buildings through demolition and/or preservation of exterior facades only.

ADAPTIVE REUSE OF HISTORIC AUTO ROW BUILDINGS. PIKE/PINE, SEATTLE.
Photo: Mike Powe

The Pike/Pine corridor is a showcase for the creative reuse of existing structures. Historic "auto row" buildings (above), once home to dealerships and mechanics, now accommodate coffee houses, restaurants, and retailers. Mixed-use apartment buildings on Pike/Pine house a variety of local retailers as well.

Using this study's performance metrics, the Pike/Pine corridor scores among Seattle's most active and vital neighborhoods in many measures. Average cellphone activity at 10:00 p.m. on a Friday night was greater on Pike/Pine than any other area in the three cities studied in this report. Pike/Pine also hosts more jobs per square foot of commercial space and has a much higher Walk Score® rating than the city average. Pike/Pine has very few chain retailers or restaurants; more than 96 percent of the businesses in the area are local, non-chain establishments.

Seattle city officials have attempted to preserve the "auto row" character and architectural rhythm of Pike/Pine through the use of a special overlay district in the city's land use code. The Pike/Pine Conservation Overlay District aims to promote mixed-use development that retains a portion of existing pre-1940 buildings that "contribute to the character of the neighborhood." Real estate developers who preserve a portion of a pre-1940 character structure are eligible for a height and density bonus, allowing the development to be built above normal zoning restrictions.[35] Developers have taken advantage of the ordinance's incentives on many major projects over the past year to gain a density bonus for their developments.

Recently, some Seattleites have expressed concerns that the ordinance allows developers to construct buildings that dwarf the original facades,

FACADE PRESERVATION. PINE STREET, SEATTLE. Photo: Mike Powe
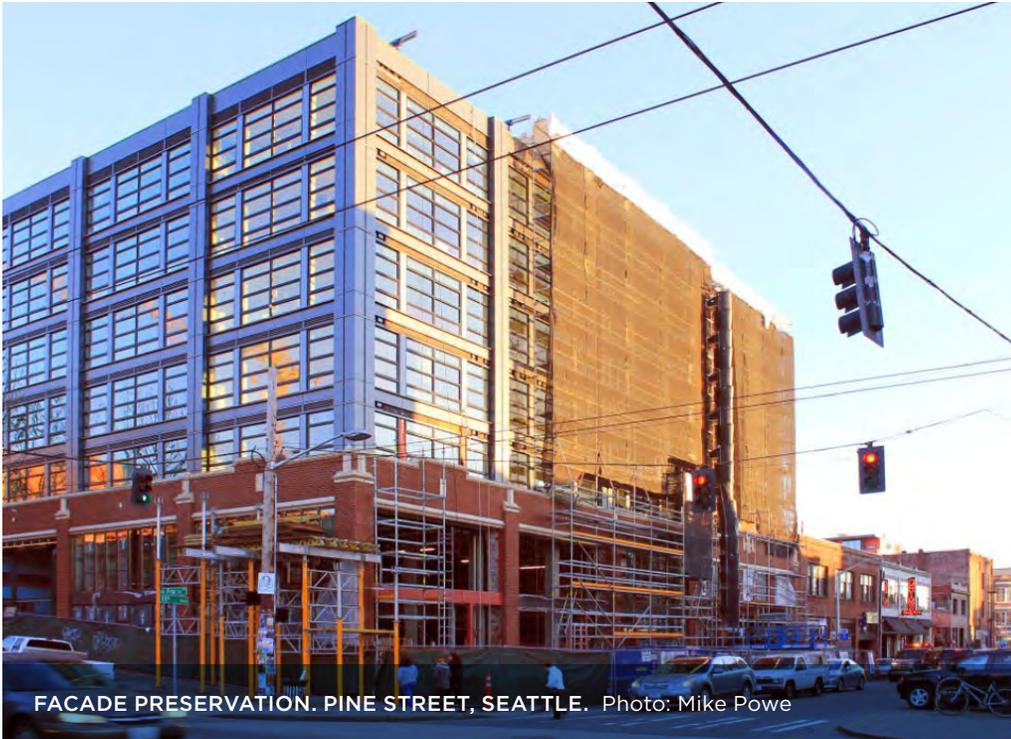
The historic facade from the Sunset Electric building (1916) on Pine Street stands below a nearly-completed 89-unit apartment building.

resulting in bulkier structures and little meaningful preservation. Critics of the current ordinance point to developers who have successfully assembled multiple parcels of land, preserved only small sections of facades on a select portion of the assembled parcel, and still gained a density bonus for their full project. The Seattle City Council will soon vote on proposed revisions to the ordinance, which would require developers to preserve all historic structures in a project and would offer smaller square footage bonuses.

This analysis indicates that the Pike/Pine corridor is one of Seattle's most active neighborhoods and that the historic character of the area's older, smaller buildings is an asset to the neighborhood's social, cultural, and economic vitality. Further analysis of the performance of Pike/Pine and other neighborhoods undergoing similar redevelopment may be necessary to determine what outcomes can be expected from such "hybrid" projects that combine facade preservation with substantially new construction.
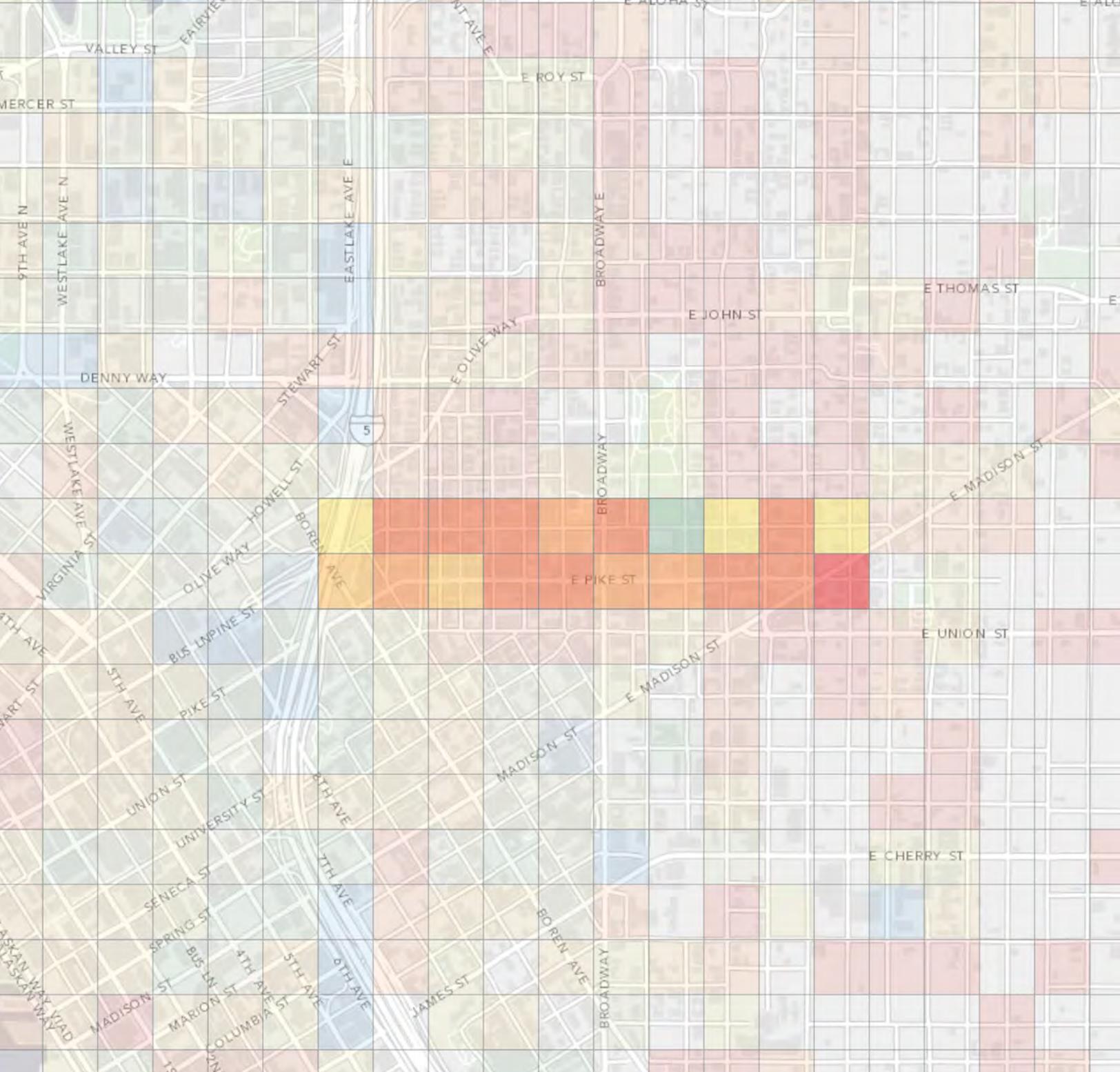
PIKE/PINE, SEATTLE

Newer, larger, built at one time

Older, smaller, mixed-vintage

Commercial and mixed use grid squares:

20

LOWEST SCORE   HIGHEST SCORE

NEIGHBORHOOD PERFORMANCE –
PIKE/PINE CORRIDOR

		Pike/Pine	Seattle Average
	AVERAGE CHARACTER SCORE	1.60	0.00
	BUSINESSES PER 1,000 COMM. SQ. FT.	0.34	0.58
	JOBS PER 1,000 COMM. SQ. FT.	4.84	3.80
	% BUSINESSES OPENED IN 2012	14.9 %	14.5%
	% WOMEN AND MINORITY-OWNED BUSINESSES	12.9 %	15.3%
	% JOBS IN SMALL BUSINESSES	37.6 %	38.9 %
	% NON-CHAIN BUSINESSES	96.1 %	87.5%
	RACIAL AND ETHNIC DIVERSITY INDEX	39.5	40.3
	WALK SCORE® RATING	96.6	81.5
	AVERAGE STANDARD DEVIATION OF RESIDENTIAL RENTS	$347	$298
	POPULATION DENSITY (PERSONS PER SQ MILE)	19.970	11,940

The chart at left shows how the Pike/Pine neighborhood compares with the city of Seattle overall on a range of performance measures. Shaded squares indicate higher performance.

Racial and Ethnic Diversity Index is scored on a scale of 0 – 100 where 100 is equivalent to perfectly equal representation of non-Hispanic whites, non-Hispanic African-Americans, non-Hispanic Asian-Americans, Hispanics (all races), and all other ethnic groups in the population. A score of 0 indicates a population entirely composed of people from one group.

Walk Score® rating values range from 0 to 100. A score between 90 and 100 indicates that daily errands do not require a car. A score between 0-24 indicates that almost all errands in the area require a car.

NEIGHBORHOOD CASE STUDY: CHINATOWN INTERNATIONAL DISTRICT

With several ethnic enclaves sitting side-by-side, the Chinatown International District (ID) is the historic home of Seattle's Chinese, Japanese, Filipino, and Vietnamese communities. The neighborhood first developed in the early 20th century, when Chinese immigrants who came to Seattle to construct railroads and work in timber mills set roots in the neighborhood just southeast of Pioneer Square. The western portion of the ID is one of Seattle's eight locally-designated historic districts and is also listed on the National Register of Historic Places.

The neighborhood is home to an outstanding collection of pre-war buildings west of the I-5 freeway. Historic single room occupancy (SRO) hotels house ethnic shops and restaurants on the ground floor, with SRO or rehabbed residential units above. In contrast, blocks in the Little Saigon subarea of the neighborhood east of I-5 are mostly composed of large post-war buildings and vacant lots. With an average of 16 parcels per 200-meter-by-200-meter grid square, the Chinatown International District has lower building granularity than the city average, which is about 20 parcels per grid square.

BUILDING CHARACTER: Early 20th century hotels and commercial buildings

AVERAGE MEDIAN AGE OF BUILDINGS: 1954

PERCENT PRE-WAR BUILDINGS: 46.1%

AVERAGE BUILDING AGE DIVERSITY: Greater diversity than city average

AVERAGE NUMBER OF PARCELS PER 200m x 200m AREA: 16 parcels

CHARACTER OF ACTIVITY: Ethnic shops and cultural spaces celebrating Chinese, Japanese, Vietnamese, and Filipino heritage

POPULAR EVENTS IN THE NEIGHBORHOOD: Lunar New Year Festival (February), Chinatown International District Dragon Fest (July), Night Market and Autumn Moon Festival (August or September)

DEVELOPMENT ACTIVITY: Large new developments underway or planned adjacent to the district. Streetcar development also in progress.

A HISTORIC HOTEL IN SEATTLE'S CHINATOWN INTERNATIONAL DISTRICT.
Photo: Flickr - camknows

Though the district has blocks of mixed-vintage buildings and a substantial stock of pre-war buildings, it does not perform well on many of this project's metrics. The neighborhood scores below the city average on the number of businesses per commercial square foot, number of jobs per commercial square foot, and number of creative jobs per commercial square foot. By this study's measures, the neighborhood also has a lower than average percentage of newly opened businesses and women and minority-owned businesses. When grid square data is aggregated and averaged at the neighborhood scale, the ID has the city's oldest residents; the average median age of residents in the neighborhood is 48.6 years, compared to a city average of 38.5 years. Similarly, the International District has one of the city's lowest average median incomes at the neighborhood level ($32,154 in the ID compared to a citywide average of $59,241). Finally, the district scores low on the Racial and Ethnic Diversity Index: The city average of 40.3 bests the neighborhood score of 34.4[2] This is likely due to the predominance of Asian Americans in the neighborhood's racial and ethnic composition. The Racial and Ethnic Diversity Index prioritizes a balance of racial and ethnic groups.

While the Chinatown International District has seen some reinvestment in recent years, crime and high rates of commercial and residential vacancy continue to pose problems.[36] Some argue that the neighborhood has too large a share of subsidized affordable housing and that the area may benefit from more residents with disposable income; the metrics in this report support this argument.[37] Construction of a streetcar line connecting Seattle's Downtown and Capitol Hill neighborhoods resulted in over a year of torn-up streets and traffic snarls on the Jackson Street thoroughfare, contributing to acute economic difficulties for many small businesses. Additionally, upper floors of many older buildings in the neighborhood do not comply with the city's building codes and sit vacant. These vacancies may offer an opportunity to bring in workforce and market-rate residents without displacing lower-income residents.

Two impending policy changes in the City of Seattle will challenge owners of buildings in the International District to act. The City is taking steps to require seismic retrofits of buildings with unreinforced masonry (URM) bearing walls, many of which are located in older, more granular blocks. Many buildings in the International District will likely be affected.

> Additionally, upper floors of many older buildings in the neighborhood do not comply with the city's building codes and sit vacant. These vacancies may offer an opportunity to bring in workforce and market-rate residents without displacing lower-income residents.

2 The authors of this study discussed the measured performance of the International District with a group of senior staff from the Seattle Chinatown International Preservation and Development Authority (SCIDpda), a 40-year-old community development organization focused on neighborhood revitalization. SCIDpda staff wondered aloud whether "off-the-books," informal activity was missed in the study's measures. Whereas the demographics and business makeup of the International District likely place it among the city's strongest neighborhoods in terms of women and minority-owned businesses, the degree to which such businesses in the neighborhood register with the city – or report jobs - is questionable. See further discussion of the limitations of this study's data in the "Opportunities for Future Research" section at the end of this report.

Also, a recently adopted ordinance requires registration and inspection of most rental housing in Seattle. The Rental Registration and Inspection Ordinance (RRIO) requires that all landlords register their properties in the next two years and undergo inspection in the years following. The RRIO will likely result in better building maintenance and upgrades where rental units do not comply with city code.

There is great uncertainty about how the proposed policy changes will affect the ID's older buildings. Property ownership in the district is characterized by unique and complex multi-party structures. Many buildings are owned by family associations, investment companies, and other multi-party groups that are composed of dozens or even hundreds of individuals, many of whom do not live in the area. Buildings are sometimes poorly maintained, and decisions to reinvest in buildings and adapt to changing real estate markets are often delayed. The RRIO and the required URM retrofits will test property owners' ability to pay for costly building upgrades on a relatively short timeline—even as they prompt much-needed investments in older buildings.

In addition to these policy challenges, development pressures facing the neighborhood will likely intensify in the years ahead. A massive redevelopment effort is currently underway in the Yesler Terrace neighborhood to the east, where 561 public housing units in low-slung garden apartments will be replaced by 5,000 housing units in high-rise towers. (Up to 3,199 of the housing units will be market rate; the rest of the units will be subsidized and reserved for low-income residents).[38] Another large development project on the other side of the Chinatown International District, adjacent to Seattle's sports stadiums, will eventually include three residential towers, an office tower, and a major hotel facility.[39] Finally, one of the city's busiest transportation nodes lies on the neighborhood's western border, raising additional opportunities for the redevelopment or reuse of the neighborhood.

Given the pressures facing the Chinatown International District, it seems clear that the neighborhood is at the cusp of major changes. Within a few years, thousands of new residents and workers will travel through the district using new streetcar lines to connect to other parts of the city or the existing light rail line to reach the airport or other cities in the region. The ID's stock of older buildings offers opportunities for increased economic and social vitality; however, its potential is not being realized at present. The city's new policies around URM retrofits and rental properties could spur reinvestment, improve fire safety, and open the upper floors of older buildings to new life as residences and offices. Alternatively, the policies could lead to demolition and new construction.

The metrics used in this study point to the potential of the neighborhood's built fabric that is currently unrealized. Given the neighborhood's historic built character, its historic designations, and the multi-party ownership of many of the neighborhood's buildings, the City of Seattle should consider working closely with community organizations in the Chinatown International District to encourage property owners to reinvest in older buildings and pursue the rehabilitation and reuse of buildings' unused square footage. Care should be taken to foster vitality and reinvestment in a way that does not fundamentally change the cultural character of the neighborhood, but rather helps that character come to the forefront and thrive.
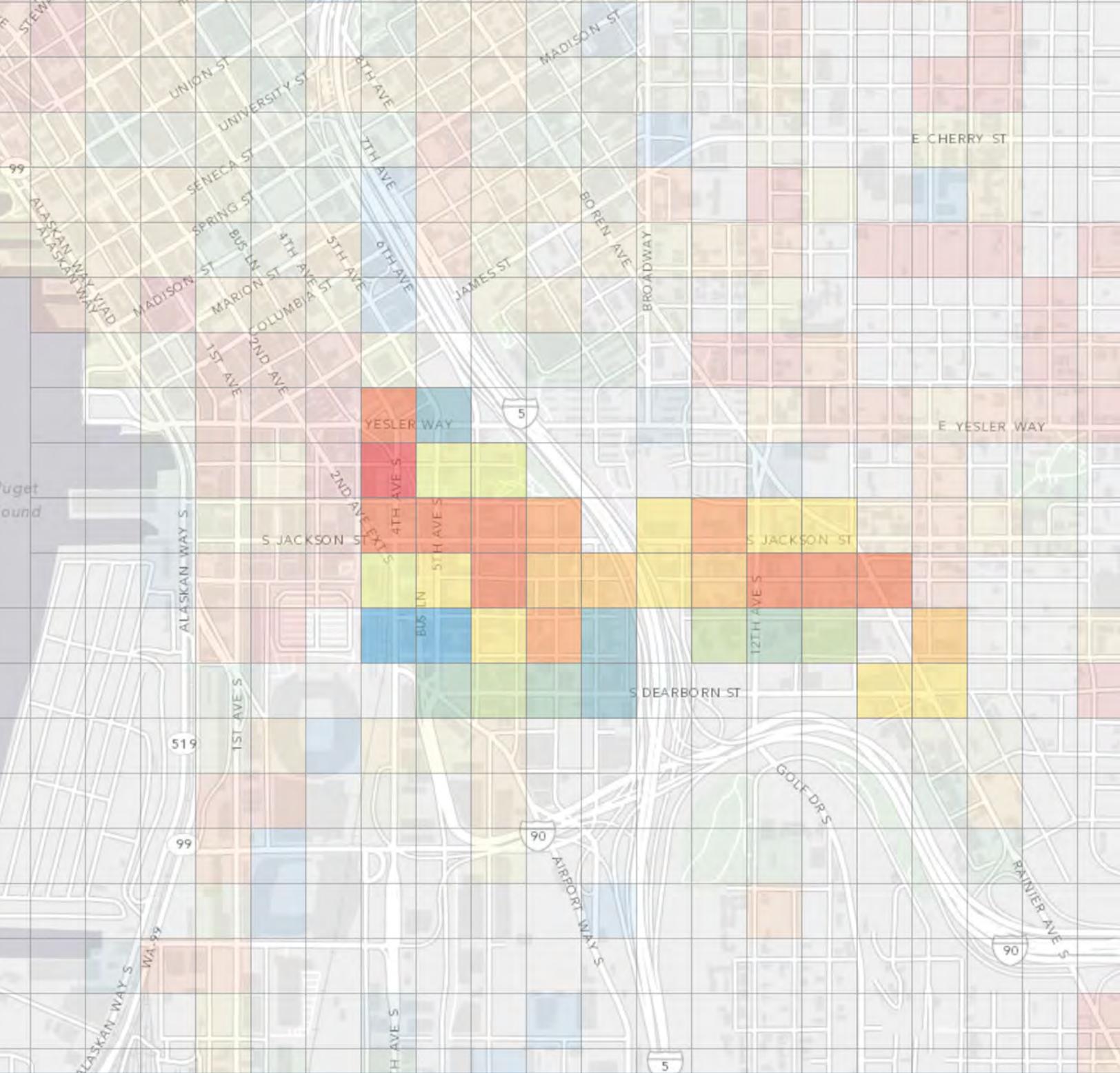
CHINATOWN INTERNATIONAL DISTRICT, SEATTLE
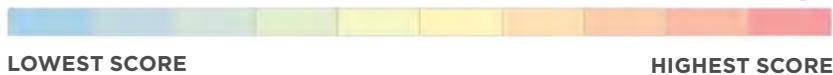
Newer, larger,
built at one time

Older, smaller,
mixed-vintage

Commercial and mixed
use grid squares:

38

LOWEST SCORE　　　　　　　　　**HIGHEST SCORE**

NEIGHBORHOOD PERFORMANCE – CHINATOWN INTERNATIONAL DISTRICT

		International District	Seattle Average
	AVERAGE CHARACTER SCORE	0.26	0.00
	BUSINESSES PER 1,000 COMM. SQ. FT.	0.25	0.58
	JOBS PER 1,000 COMM. SQ. FT.	3.14	3.80
	% BUSINESSES OPENED IN 2012	10.4%	14.5%
	% WOMEN AND MINORITY-OWNED BUSINESSES	11.6%	15.3%
	% JOBS IN SMALL BUSINESSES	36.2 %	38.9 %
	% NON-CHAIN BUSINESSES	96.6%	87.5%
	RACIAL AND ETHNIC DIVERSITY INDEX	34.4	40.3
	WALK SCORE® RATING	92.5	81.5
	AVERAGE STANDARD DEVIATION OF RESIDENTIAL RENTS	$330	$298
	POPULATION DENSITY (PERSONS PER SQ MILE)	10,908	11,940

The chart at left shows how the Chinatown International District compares with the city of Seattle overall on a range of performance measures. Shaded squares indicate higher performance.

Racial and Ethnic Diversity Index is scored on a scale of 0 – 100 where 100 is equivalent to perfectly equal representation of non-Hispanic whites, non-Hispanic African-Americans, non-Hispanic Asian-Americans, Hispanics (all races), and all other ethnic groups in the population. A score of 0 indicates a population entirely composed of people from one group.

Walk Score® rating values range from 0 to 100. A score between 90 and 100 indicates that daily errands do not require a car. A score between 0-24 indicates that almost all errands in the area require a car.

FINDINGS FROM WASHINGTON, D.C.
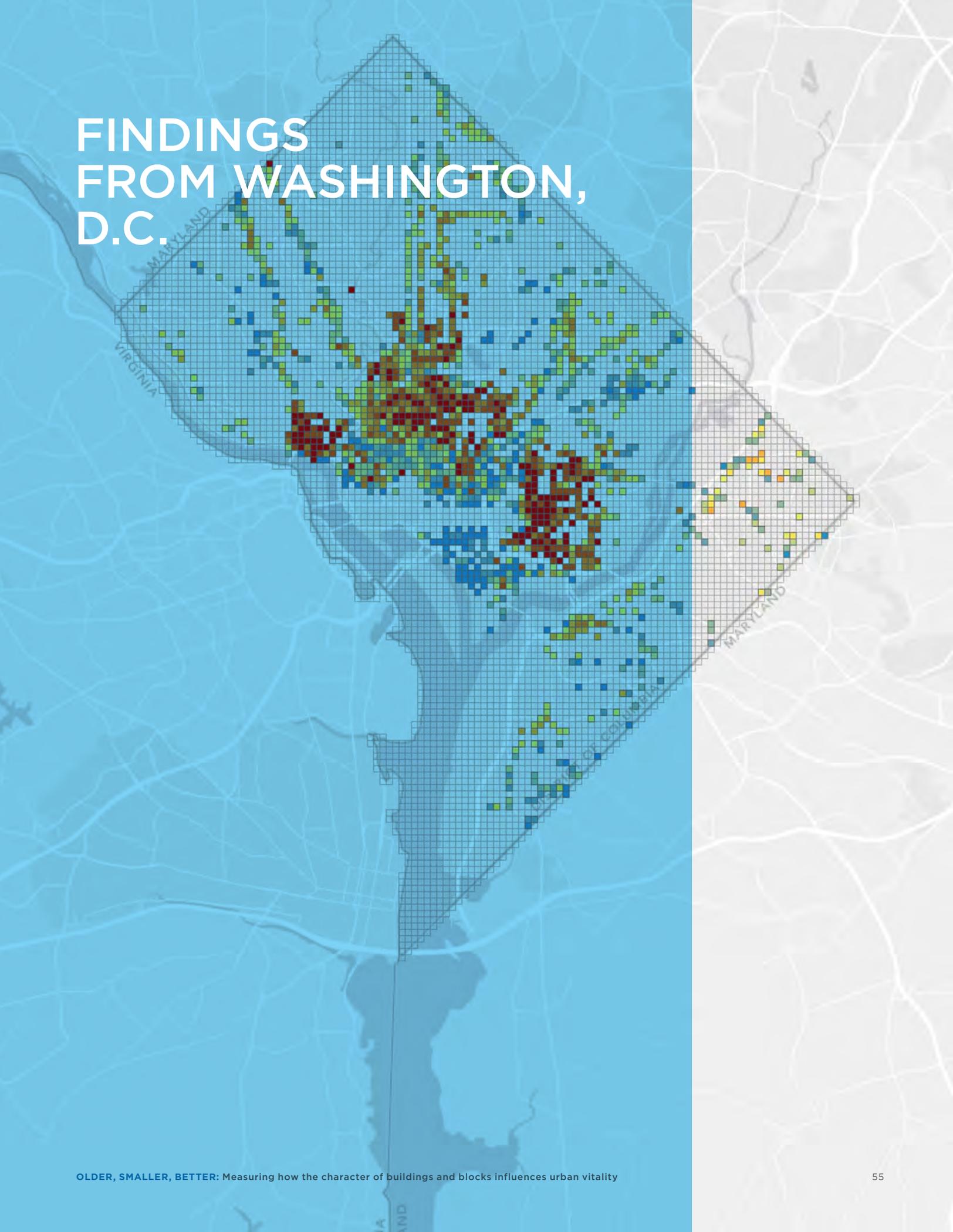
FINDINGS FROM WASHINGTON, D.C.

Washington, D.C., is known for its monuments, grand avenues, and historic buildings. The city has high performing historic fabric in neighborhoods throughout the city, from Georgetown to Brookland, Dupont Circle to Capitol Hill, H Street to U Street. The Preservation Green Lab found significant associations between higher Character Scores and measures of vitality, including significantly greater numbers of businesses, new businesses, jobs, and creative jobs per commercial square foot; higher percentages of jobs in small businesses; greater housing and population density; and higher proportions of non-chain businesses and women and minority-owned businesses. Areas with older, smaller, mixed-vintage buildings are home to significantly younger residents and greater age diversity among residents, and these places have had significantly greater increases in property value over the past 12 years, compared to areas with newer, larger buildings.[40]

Diversity of building age is an important predictor of community vitality in Washington, D.C. Diversity of building age had a significant association with nearly all of this study's intensity of human activity measures. Age diversity was positively associated with significantly greater cellphone activity at 4:00 p.m. Sunday, 10:00 a.m. Wednesday, and 10:00 p.m. Friday. According to city permit data, areas with a mix of old and new buildings are more likely to have cafes with outdoor seating where residents and visitors alike can sit outside and watch people pass.

A DENSE CONCENTRATION OF SMALL BUSINESSES ON THE U STREET CORRIDOR. WASHINGTON, D.C. Photo: Flickr user afagen

In Washington, D.C., areas with older, smaller buildings have significantly higher percentages of jobs in small businesses than areas composed of mostly new, large buildings.

Building granularity was positively associated with several measures of economic vitality. Along with older median building age, granularity was a significant predictor of a greater number of businesses and jobs per commercial square foot, as well as a higher percentage of non-chain businesses and jobs in small businesses. Greater building granularity was also associated with a greater number of creative jobs per commercial square foot and the number of businesses launched in 2012 per commercial square foot.

District of Columbia officials, along with the United States Congress, are currently considering an amendment to the 1910 Height of Buildings Act, which dictates that all commercial buildings in the city must be no taller than the width of the street plus 20 feet and no higher than 130 feet overall.[41] Defenders of the Height Act say that the policy has been effective in maintaining the character of the city and preserving views of the city's landmarks and monuments.[42] Proposed changes to the Height Act could remove blanket height restrictions outside of the original L'Enfant City. The L'Enfant Plan included areas south of Florida Avenue and north of the Potomac and Anacostia Rivers. Under the proposed revisions, buildings outside this area would be permitted to rise up to 200 feet along the District's widest streets.[43]

The findings of this study suggest that older sections of the city with one-to-four-story buildings (about 50 feet tall) perform extremely well. These sections of the city consistently emerged as the city's most active and vital places, especially by measures related to entrepreneurship: percentages of non-chain businesses, new businesses, and women and minority-owned businesses. These areas also have a greater percentage of jobs in small businesses. The sections of the city with the tallest buildings, most notably the blocks just north of the White House and the National Mall, have a substantial number of the city's businesses and jobs on an aggregate basis, but they are outperformed by older buildings on a per square foot basis.

Building height is only one of the important ingredients that affect neighborhood vitality. This study suggests that careful attention to the overall building footprint is also important. Narrow buildings create fine-grained city blocks and neighborhoods, and support dense clusters of small businesses. Taller buildings may be necessary if the city is to welcome its projected population growth, but the benefits of older, smaller buildings should be considered as well.

Two Washington, D.C. neighborhoods were selected for more in-depth case studies. The H Street NE Corridor just east of Union Station is a historic commercial district in transition, with significant new construction underway and more contemplated for the future. Barracks Row is a more established commercial corridor, with some sections notably more successful than others.
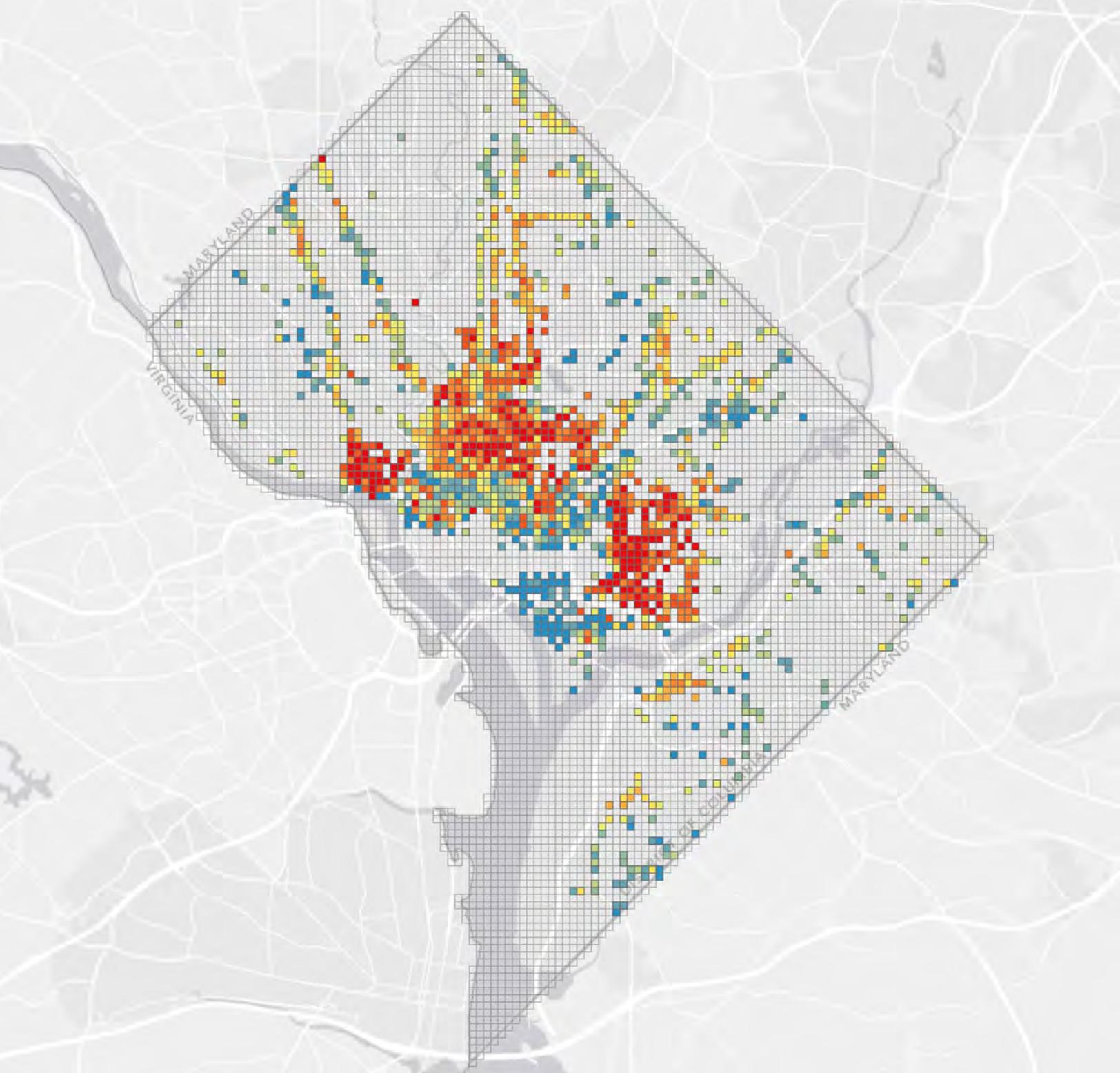
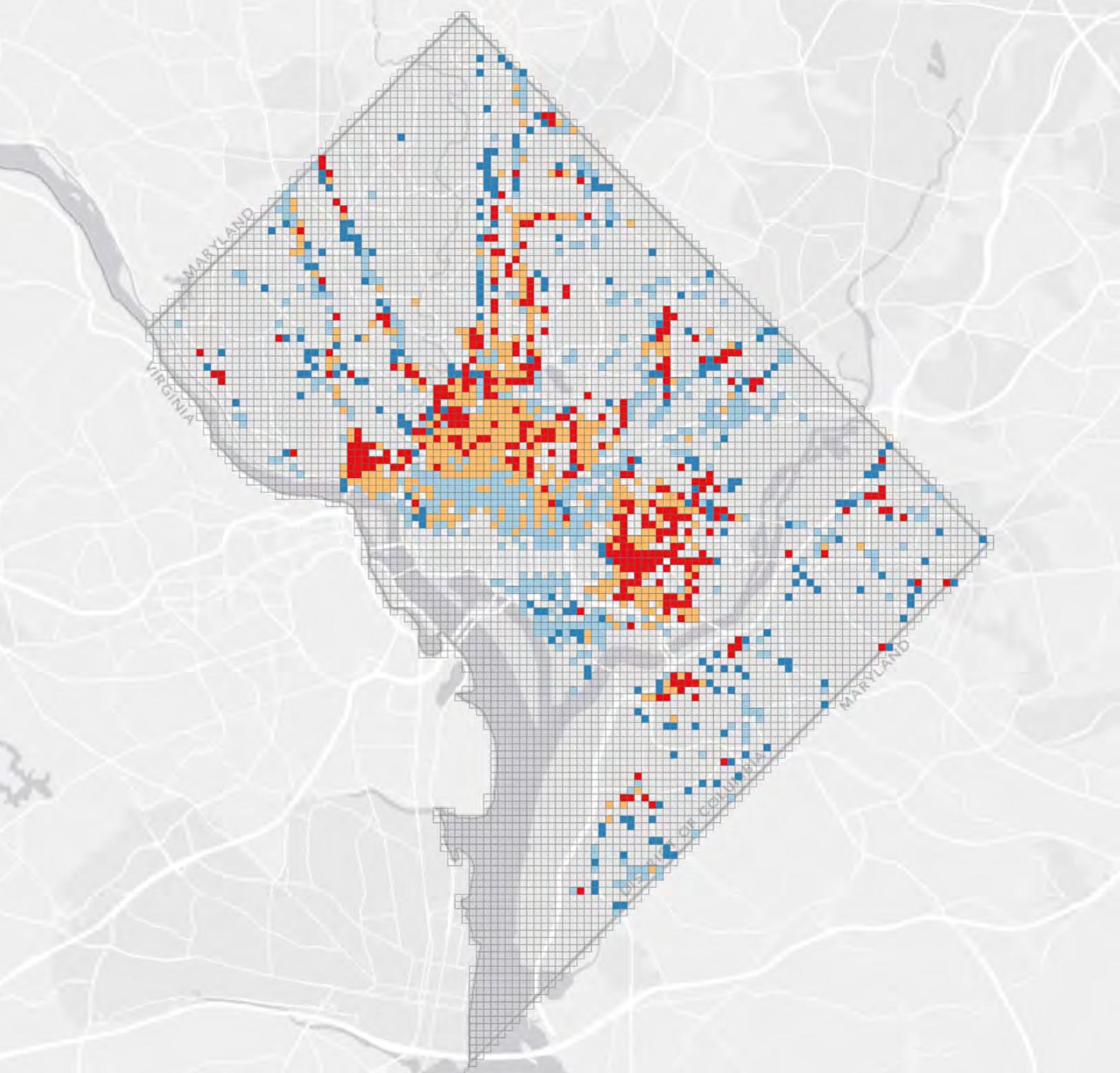## CHARACTER SCORE, WASHINGTON, D.C.

Newer, larger,
built at one time
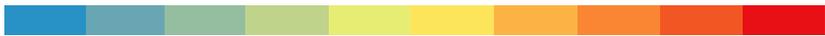
Older, smaller,
mixed-vintage

Commercial and mixed
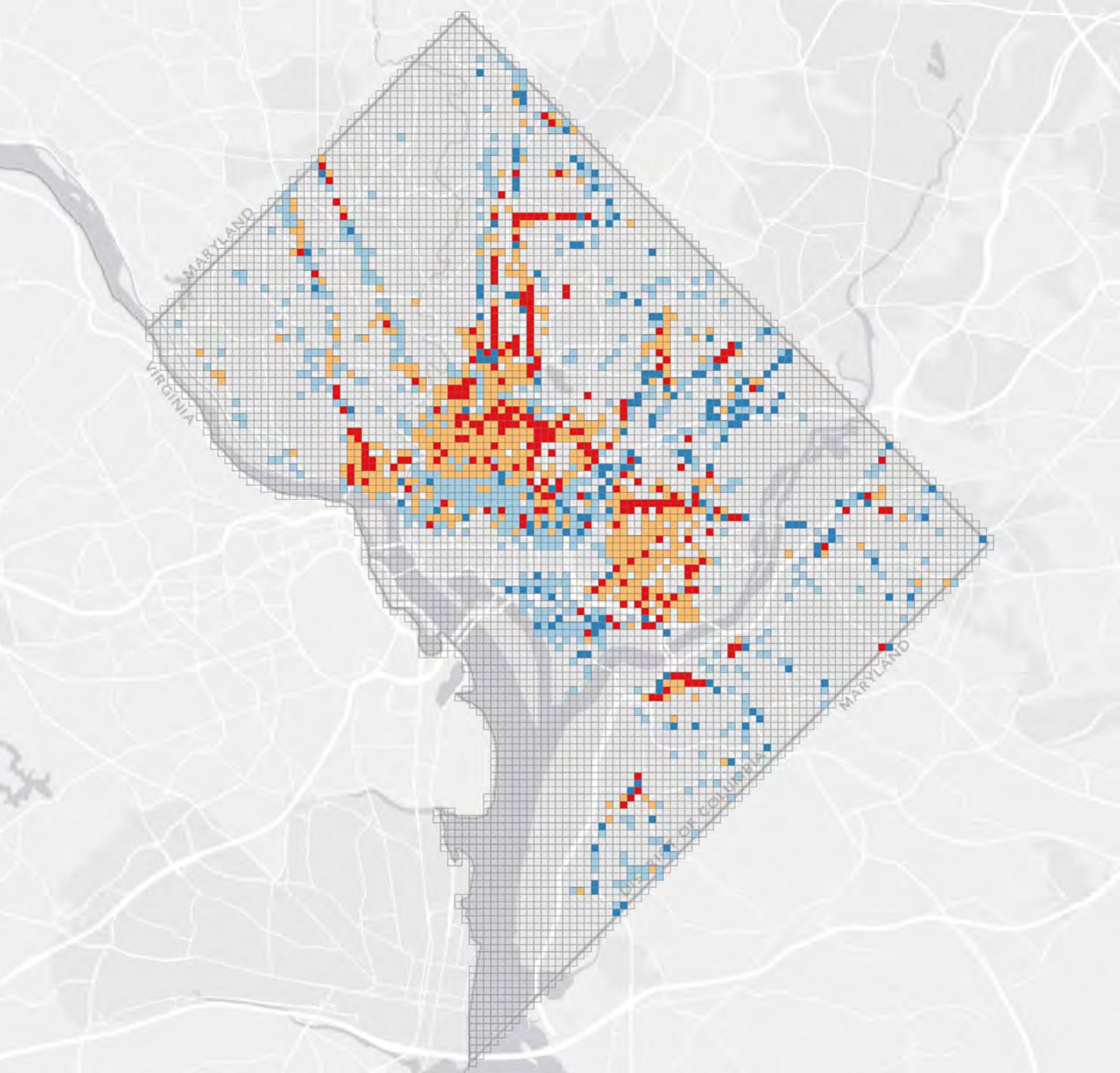use grid squares:

1,609 out of 7,625

LOWEST SCORE

HIGHEST SCORE

PERCENTAGE OF JOBS IN SMALL BUSINESSES BY CHARACTER SCORE, WASHINGTON, D.C.

Below avg. Character Score; Below avg. businesses per comm. sq ft.

Above avg. Character Score; Below avg. businesses per comm. sq ft.

Below avg. Character Score; Above avg. businesses per comm. sq ft.

Above avg. Character Score; Above avg. businesses per comm. sq ft.

Commercial and mixed use grid squares:

1,609 out of 7,625

PERCENTAGE OF BUSINESSES LAUNCHED IN 2012 BY CHARACTER SCORE, WASHINGTON, D.C.

Below avg. Character Score; Below avg. businesses per comm. sq ft.

Above avg. Character Score; Below avg. businesses per comm. sq ft.

Below avg. Character Score; Above avg. businesses per comm. sq ft.

Above avg. Character Score; Above avg. businesses per comm. sq ft.

Commercial and mixed use grid squares:

1,609 out of 7,625

NEIGHBORHOOD CASE STUDY: H STREET CORRIDOR

H Street NE is nationally recognized for its remarkable revitalization. In recent years, H Street was highlighted on a list of ten "great urban neighborhoods" in USA Today, and Forbes magazine named the corridor sixth on its list of "America's Best Hipster Neighborhoods."[44] In 2013, H Street NE's Main Street organization was awarded the Great American Main Street Award from the National Main Street Center.[45]

The H Street Corridor is composed of 12 blocks between Washington, D.C.'s Union Station and the "Starburst Intersection" of Florida and Maryland Avenues, H Street, and Benning Road, just over a mile east. Large sections of the corridor are lined with narrow, century-old two- and three-story homes and commercial blocks housing local retailers, restaurants, and bars. The vast majority of the structures in the H Street Corridor were constructed before World War II, and the buildings are small-scaled and highly granular. In fact, the corridor's average of 81.5 buildings per grid square makes it one of the most fine-grained sections of a city known for its row houses and other small structures. In 2011, the Washington, D.C. Zoning Commission created the H Street Northeast Neighborhood Commercial Overlay District, which includes the entire H Street Corridor. The overlay district was created to encourage residential uses and the reuse of existing buildings and to cluster uses into destination districts at different points along the corridor.[46]

H Street performs very well on the key metrics of this study. The corridor has more than the citywide average number of businesses per commercial square foot and greater than average proportions of new businesses, woman and minority-owned businesses, and non-chain businesses. Population density, racial and ethnic diversity, and Walk Score® index are also higher than the Washington, D.C., average. The

CROWDED STREETS AT THE H STREET FESTIVAL. H STREET NE, WASHINGTON, D.C. Photo: Flickr user Ted Eytan
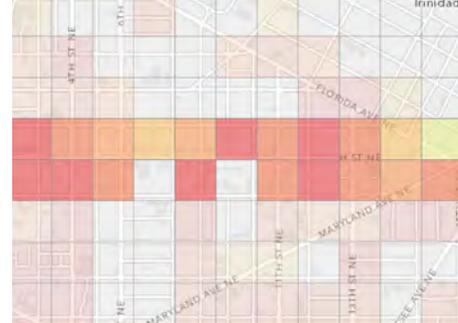
BUILDING CHARACTER: Mostly two-to-three story late 19th century row houses and commercial buildings

AVERAGE MEDIAN AGE OF BUILDINGS: 1910

PERCENT PRE-WAR BUILDINGS: 84.5%

AVERAGE BUILDING AGE DIVERSITY: More diverse than city average

AVERAGE NUMBER OF PARCELS PER 200m x 200m AREA: 81.5 buildings (much more granular than the city average)

CHARACTER OF ACTIVITY: Mix of upscale restaurants and bars with some chain retail and large services

POPULAR EVENTS IN THE NEIGHBORHOOD: H Street Festival

DEVELOPMENT ACTIVITY: Numerous storefront rehabilitations, with some recent large new buildings on the west end of the corridor. A new streetcar line will open in 2014.

corridor's high percentage of newly opened businesses stands out as among city's most vibrant areas of economic growth. Its highly granular built fabric and concentration of small businesses make the neighborhood very walkable, as evidenced by its high Walk Score® rating.

H Street continues to undergo major changes. After years of preparation and construction, Washington, D.C.'s first new streetcar line was recently installed on the H Street Corridor, and it will soon deliver service between Union Station and the banks of the Anacostia River.[47] The neighborhood previously had streetcar service between 1872 and 1949.[48] In recent years, H Street was also a participant in Washington, D.C.'s Great Streets Initiative, which supported expansions and renovations for small businesses. One major grocery store chain, Giant, recently opened a location on H, and in November 2013, Whole Foods announced that it had signed a lease to open a store on H Street in fall 2016.[49,50] Guiding much of this change is Anwar Saleem, director of the H Street Main Street organization.

Today, the neighborhood's greatest threat might be its own success as development pressures threaten the neighborhood's diverse character. Planned future reinvestment and revitalization around Union Station on the H Street NE's western end and a cluster of successful bars and restaurants on the area's eastern end are pushing development inward. Long-time African-American residents have seen favorite businesses shuttered and replaced by bars catering to college students and young professionals. During the day, the neighborhood is alive with African-American residents visiting familiar retail shops, salons, and barber shops. By night, a distinctly younger, whiter crowd packs the neighborhood's restaurants and bars.

When this study's research team visited H Street in December 2013, the neighborhood's transformations were immediately apparent, even to team members who were seeing the neighborhood for the first time. An initial test of the Washington, D.C., streetcar on H Street was imminent, and large-scale, gleaming new developments stood next to the neighborhood's older building stock. Anwar Saleem enthusiastically led the team on a tour of the western end of the corridor and pointed to redevelopment opportunities afforded by a few large underperforming buildings on the neighborhood's central blocks.

The H Street Corridor has an extensive stock of older, smaller buildings, and according to many of this study's performance metrics, the neighborhood is capitalizing on its historic fabric. Though it is a place that is constantly evolving, the current development pressures surrounding the neighborhood seem to be accelerating change, posing

both a great opportunity and a real challenge to the corridor's long-term vitality.

Saleem suggested that several of the neighborhood's large, vacant buildings constructed in the 1970s and 1980s might serve as strong opportunities for redevelopment. Such a strategy could save the high-functioning older fabric while building additional capacity on the lower-performing large parcels.
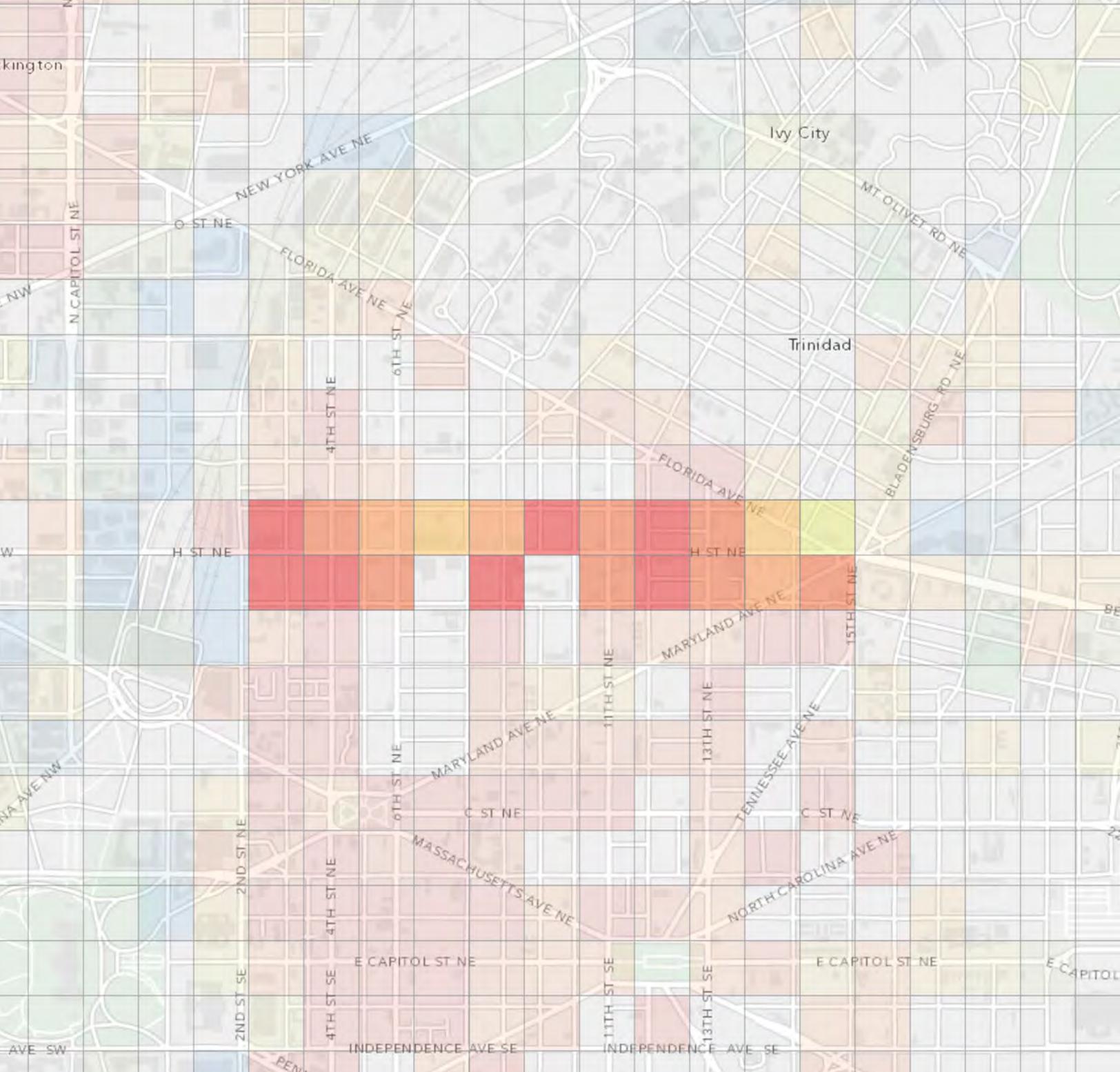
H STREET NE, WASHINGTON, D.C.
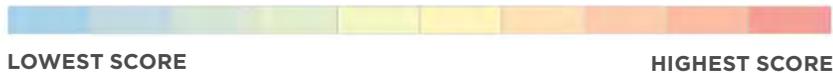
**Newer, larger,
built at one time**

LOWEST SCORE

**Older, smaller,
mixed-vintage**

HIGHEST SCORE

**Commercial and mixed
use grid squares:**

20

NEIGHBORHOOD PERFORMANCE –
H STREET NE CORRIDOR

		H Street NE	Average for Washington, D.C.
	AVERAGE CHARACTER SCORE	2.41	0.00
	BUSINESSES PER 1,000 COMM. SQ. FT.	0.62	0.45
	JOBS PER 1,000 COMM. SQ. FT.	2.77	4.99
	% BUSINESSES OPENED IN 2012	9.1%	4.6%
	% WOMEN AND MINORITY-OWNED BUSINESSES	3.5%	1.5%
	% JOBS IN SMALL BUSINESSES	39.8 %	38.2 %
	% NON-CHAIN BUSINESSES	88.9%	85.2%
	RACIAL AND ETHNIC DIVERSITY INDEX	47.0	35.7
	WALK SCORE® RATING	91.3	79.7
	AVERAGE STANDARD DEVIATION OF RESIDENTIAL RENTS	$385	$397
	POPULATION DENSITY (PERSONS PER SQ MILE)	19,576	17,420

The chart at left shows how the H Street NE Corridor compares with the city of Washington, D.C. overall on a range of performance measures. Shaded squares indicate higher performance.

Racial and Ethnic Diversity Index is scored on a scale of 0 – 100 where 100 is equivalent to perfectly equal representation of non-Hispanic whites, non-Hispanic African-Americans, non-Hispanic Asian-Americans, Hispanics (all races), and all other ethnic groups in the population. A score of 0 indicates a population entirely composed of people from one group

.

Walk Score® rating values range from 0 to 100. A score between 90 and 100 indicates that daily errands do not require a car. A score between 0-24 indicates that almost all errands in the area require a car.

NEIGHBORHOOD CASE STUDY: BARRACKS ROW

One of Washington, D.C.'s oldest commercial corridors, Barracks Row is a high-functioning neighborhood center with restaurants, retail, offices, and housing.[51] Located near the city's historic Navy Yard and a cluster of barracks for the United States Marine Corps, the corridor functions as both a place to buy a daily wake-up coffee and a locally-famed "homemade pop tart" and as a bustling weekend destination neighborhood with parades and food festivals. Barracks Row has an older, quieter character than some of Washington, D.C's other corridors, but it attracts people from a variety of backgrounds. The street comes to life during the baseball season as fans of the Washington Nationals enjoy food and drink before and after taking in a game at the nearby ballpark.[52] In 2006, the neighborhood was selected for the Great American Main Street Award from the National Main Street Center.[53]

Barracks Row lies along a six-block stretch of 8th Street SE connecting Pennsylvania Ave SE to the Washington Navy Yard, adjacent to the Anacostia River. Its blocks are primarily composed of two- and three-story commercial buildings constructed in the early decades of the 20th century. All six grid squares included in the corridor have buildings with a pre-war median year of construction, and new buildings are intermixed with the old, making the street one of the more diverse areas in the city in terms of building age. The building fabric of Barracks Row is

EVERYDAY LIFE ON BARRACKS ROW. WASHINGTON, D.C.
Photo: Barracks Row Main Street
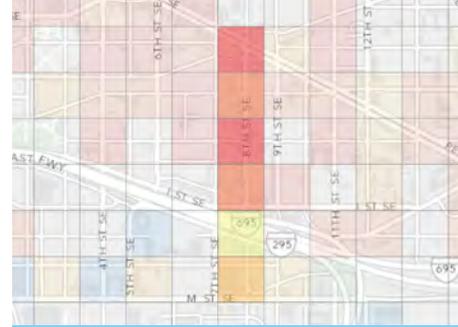
BUILDING CHARACTER: Two and three story "Main Street"-style commercial buildings and military buildings

AVERAGE MEDIAN AGE OF BUILDINGS: 1910

PERCENT PRE-WAR BUILDINGS: 62.1%

AVERAGE BUILDING AGE DIVERSITY: Much more diverse than city average

AVERAGE NUMBER OF PARCELS PER 200M X 200M AREA: 46.5 buildings (slightly more granular than city average)

CHARACTER OF ACTIVITY: Full blocks of restaurants, cafes, and retailers

POPULAR EVENTS IN THE NEIGHBORHOOD: Evening Parades of the United States Marine Band (summer) , Fourth of July celebrations, Barracks Row Fall Festival (September)

DEVELOPMENT ACTIVITY: Facade improvement projects, as well as mixed-use infill proposals. Public space improvements at Eastern Market Metro Station.

fine-grained, as is typical of most local commercial strips. The entirety of Barracks Row is part of Washington, D.C.'s Capitol Hill Historic District.

Barracks Row's performance across this study's measures is uneven. In general, the blocks north of the I-695 freeway perform better than the blocks just south of the freeway and north of the Navy Yard. For instance, areas surrounding the intersection of 8th Street and G have about five times more businesses per commercial square foot than the areas near the entrance to the Navy Yard at 8th and M Street SE. Differences in the density of jobs per commercial square foot are even more pronounced when comparing the northern and southern ends of the corridor.

In recent years, the local Barracks Row Main Street organization has focused its efforts on the two-block area south of I-695, but successful transformation of that section of the neighborhood has proved to be a challenge.[54] Local officials have added colorful murals and historic images to concrete walls under the freeway overpass in an attempt to increase pedestrian traffic under the freeway, and they have paid careful attention to a large, significant property at 8th and M, across the street from the entrance to the Navy Yard. The building, which originally served as the Navy Yard Car Barn in the late 19th century, has changed hands and uses in recent years but remains underused.[55] (See photograph below). In December 2013, the property was again put up for sale, and local officials hope to see it become a hub of activity and an anchor for the southern end of the neighborhood.[56]

THE "BLUE CASTLE" ON BARRACKS ROW. WASHINGTON, D.C. Photo: Mike Powe

The "Blue Castle" at 8th and M Street SE, an area with less granularity and across the physical barrier of I-695, was recently put up for sale after earlier plans to redevelop the building for commercial use stalled.
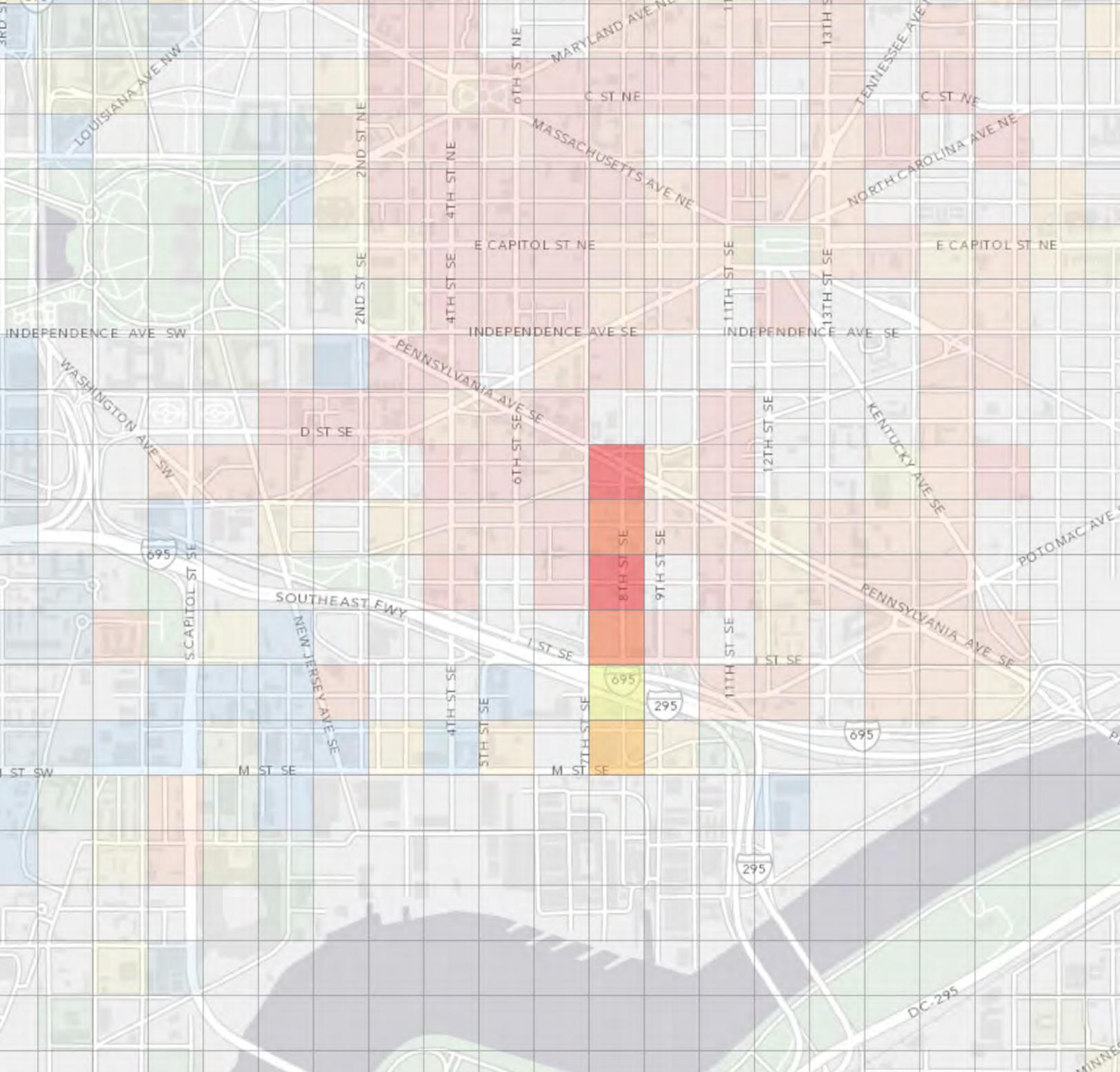
BARRACKS ROW, WASHINGTON, D.C.

Newer, larger, built at one time

LOWEST SCORE

Older, smaller, mixed-vintage

HIGHEST SCORE

Commercial and mixed use grid squares:

6

NEIGHBORHOOD PERFORMANCE –
BARRACKS ROW

		Barracks Row	Average for Washington, D.C.
	AVERAGE CHARACTER SCORE	2.05	0.00
	BUSINESSES PER 1,000 COMM. SQ. FT.	0.30	0.45
	JOBS PER 1,000 COMM. SQ. FT.	3.78	4.99
	% BUSINESSES OPENED IN 2012	9.1 %	4.6%
	% WOMEN AND MINORITY-OWNED BUSINESSES	2.0 %	1.5%
	% JOBS IN SMALL BUSINESSES	14.0 %	38.2 %
	% NON-CHAIN BUSINESSES	86.5 %	85.2%
	RACIAL AND ETHNIC DIVERSITY INDEX	33.0	35.7
	WALK SCORE® RATING	90.8	79.7
	AVERAGE STANDARD DEVIATION OF RESIDENTIAL RENTS	$464	$397
	POPULATION DENSITY (PERSONS PER SQ MILE)	6,145	17,420

The chart at left shows how Barracks Row compares with the city of Washington, D.C. overall on a range of performance measures. Shaded squares indicate higher performance.

Racial and Ethnic Diversity Index is scored on a scale of 0 – 100 where 100 is equivalent to perfectly equal representation of non-Hispanic whites, non-Hispanic African-Americans, non-Hispanic Asian-Americans, Hispanics (all races), and all other ethnic groups in the population. A score of 0 indicates a population entirely composed of people from one group.

Walk Score® rating values range from 0 to 100. A score between 90 and 100 indicates that daily errands do not require a car. A score between 0-24 indicates that almost all errands in the area require a car.

FURTHER INSIGHTS ON WASHINGTON, D.C. FINDINGS FROM STATE OF PLACE™

State of Place™ collaborated with the Preservation Green Lab on this research. Mariela Alfonzo, founder of State of Place™, offers insights on the *Older, Smaller, Better* findings that build upon her own research into the relationship between walkability and economic development in Washington, D.C.

State of Place™ is a data-driven decision-making and community engagement tool used to guide investments, interventions, and policies that boost walkability and economic development. This tool quantifies the "touch, see, and feel" of walkability, collecting on-the-ground data on more than 250 built environment features that affect how people feel about and behave in a neighborhood. State of Place™ includes the "nuts and bolts" of streets like sidewalks, crosswalks, street trees, and land uses, as well as smaller-scale variables such as street facades, benches, landscaping, and signage. The State of Place™ Index groups these features into 10 urban design Dimensions empirically linked to walking, providing communities with not just a walkability rating but a snapshot of their walkability assets (dimensions with high scores) and needs (dimensions with low scores). Combining this diagnosis with the fact that the Index and Dimensions are tied to the economic bottom line, State of Place™ points financially constrained stakeholders to the most strategic ways to boost walkability and returns on investment."

The State of Place™ Index was first tied to economic value in a Brookings Institution study titled, *Walk this Way: The Economic Promise of Walkable Places in Metropolitan Washington DC.* Aiming to create an operational definition for "walkable urban places" and to evaluate their economic value, built environment and real estate performance data were collected for 61 neighborhoods throughout the Metropolitan Washington, D.C., area. Built environment data was collected using the Irvine Minnesota Inventory (IMI), an objective, reliable audit tool developed to measure urban design features linked to physical activity and walkability in 2005. The original IMI included 162 micro-scale built environment features and has been widely used in the urban planning, design and public health fields. (It has since been updated to the IMI 2.0, which includes 280+ items.) The IMI was designed to collect built environment data at the block (or segment) scale. Raters, including George Washington University undergraduate geography students and three independent contractors, collected data on five test segments. Real estate data was drawn from a variety of sources, including CoStar,

for office and retail rents; Zillow, for for-sale residential data; REIS, for residential rents; and ESRI® for retail sales.

The Brookings study evaluated the relationship between walkability and urban design, as measured by State of Place™, and economic value. The study revealed that places that have a higher State of Place™ Index have higher real estate values. According to the analysis, a one point increase in a neighborhood's State of Place™ was related to increases of $0.44/ sq. ft. in office rents, $0.35/sq. ft. in retail rents, four percent in retail revenues, $15.08/month in per-unit residential rents, and $4.08/sq. ft. in for-sale residential property values. Additionally, the study found that places with an above average State of Place Index benefit significantly from being near other places with an above average State of Place™ Index. Clusters of neighborhoods with an above average State of Place™ Index commanded nearly 41 percent more in office rents, 47 percent more in retail rents, and nearly 31 percent more in residential rents than a neighborhood with an above average State of Place™ Index that "stood alone." Further, residential values in the former were on average 86 percent higher on a per sq. ft. basis than the latter. While other studies had previously linked walkability (macro-based measures like the Walk Score® rating) with economic performance, the Brookings study was the first to do so using on-the-ground data about the micro-scale built environment features that are empirically known to affect physical activity and walking. Linking State of Place™ to economic performance offered more specific, targeted recommendations regarding the most appropriate interventions, investments, and policies needed to boost walkability and value.

Both the Brookings/State of Place™ *Walk This Way* study and the Preservation Green Lab's *Older, Smaller, Better* research confirm the economic value of the fine-grained, human-scaled built environment. The Green Lab study significantly adds to this discussion by integrating a broader set of performance metrics, making the case for an even more robust relationship between urban design and value. While the Brookings study helped set the stage for thinking about the economic development potential of walkability, it was met with concerns about gentrification and affordable housing. The Green Lab study shows that the benefits of human-scaled built environments extend beyond real estate premiums. In fact, *Older, Smaller, Better* offers evidence that the *urban vitality* that a growing number of Americans crave is unlocked by older, historic, mixed-use buildings woven into an intricate, diverse streetscape. The Green Lab research team amassed an unprecedented number of metrics to help tell the broader story that human-scaled building fabric is a magnet for foot traffic, commercial activity, urban inhabitants, outdoor life, jobs (including those in creative industries), new businesses and localism, and diverse resident bases.

ACTIVE SIDEWALKS ON BARRACKS ROW. WASHINGTON, D.C.
Photo: Barracks Row Main Street

In fact, *Older, Smaller, Better* offers evidence that the urban vitality that a growing number of Americans crave is unlocked by older, historic, mixed-use buildings woven into an intricate, diverse streetscape.

The *Older, Smaller, Better* study also advanced our understanding of the relationship between urban design and value through its innovative spatial regression technique. Accounting for the impact of built environment features at the block level while adjusting for spatial "spill-over" effects delivers a more accurate estimate of the benefits of human-scaled urban design. Additionally, the geographic comprehensiveness of the data coverage addresses some of the issues that can arise with sampling techniques.

Combining the advancements made in the Green Lab study with the State of Place™ framework offers exciting opportunities. While the Preservation Green Lab research revealed the broader value offered by older, historic buildings, the block and neighborhood scale in which these buildings are situated also matters. The State of Place™ Index captures the many other micro-scale features known to impact walkability and quality of place. Combining the Green Lab metrics focused on the age and scale of the built environment with the State of Place™ framework would increase our understanding of how the interplay between the building fabric and other urban design dimensions captured by State of Place™ together impact value and vitality. An approach that combined efforts could inform recommendations for policy, investment, and development in the form of both general principles and nuanced, locale-specific strategies.

FINDINGS
FROM SAN FRANCISCO

Golden Gate
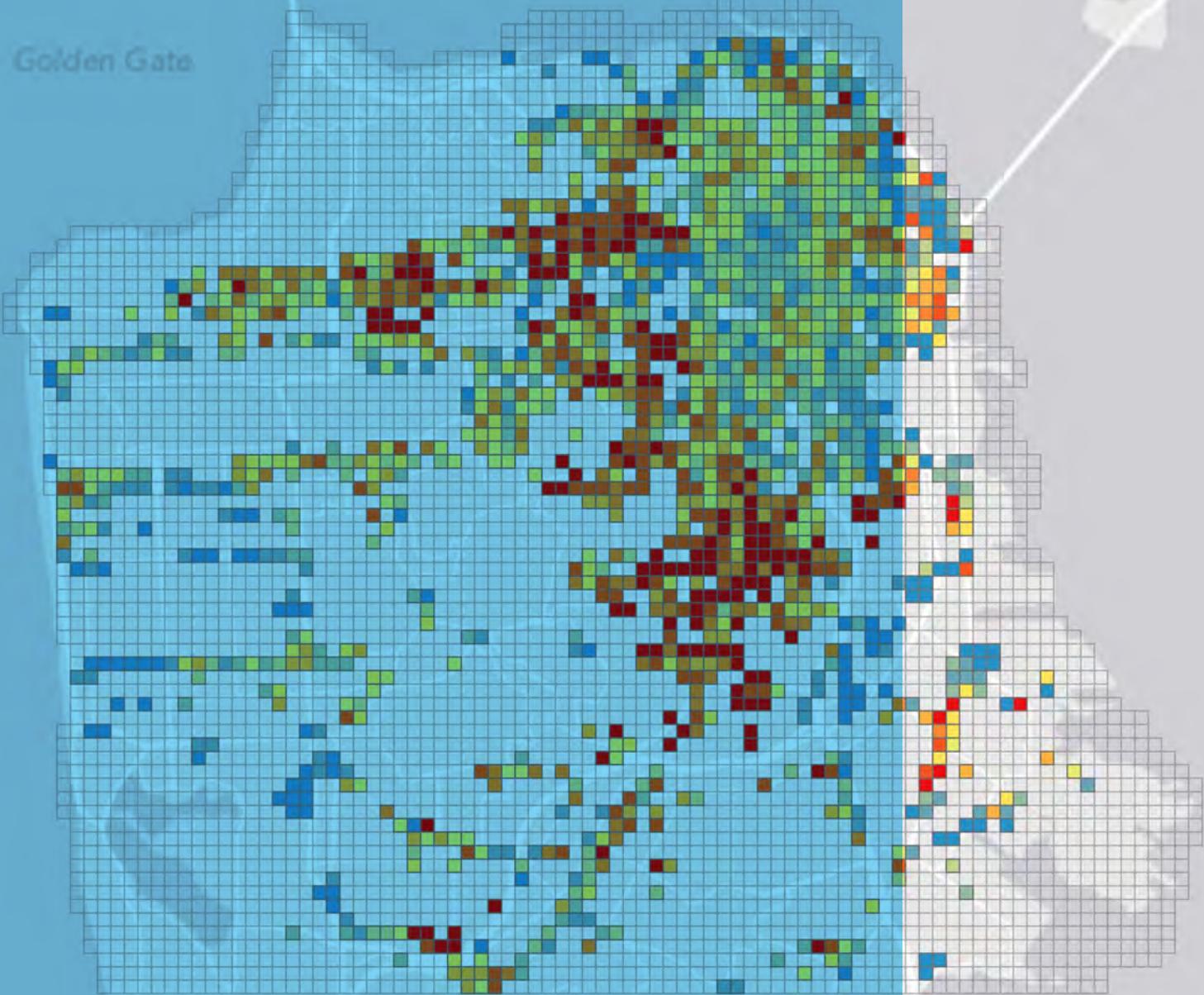
FINDINGS FROM SAN FRANCISCO

San Francisco has been very successful at preserving its historic buildings and leveraging that built fabric to support great neighborhoods. The city has a much higher share of pre-war buildings than the other two cities analyzed for this study. Of the mixed-use and commercial corridors considered in this analysis, 85 percent of the grid squares in San Francisco have pre-war median building age. In comparison, about 70 percent of the Washington, D.C. grid squares and 39 percent of Seattle's mixed-use grid squares have pre-war median building ages.

Large sections of San Francisco performed very well on several of this study's metrics. Higher Character Scores were significantly associated with greater population density, more businesses and new businesses per commercial square foot, and higher proportions of new businesses and non-chain businesses. These areas have a significantly greater percentage of jobs in small businesses. Areas of San Francisco with older, smaller, mixed-vintage buildings are home to highly diverse residents. This study found that high Character Score areas had significantly younger residents and a greater mix of residents from different age groups, greater racial and ethnic diversity, and greater income diversity.

DENSE CONCENTRATION OF SMALL BUSINESSES ALONG MISSION STREET, SAN FRANCISCO. Photo: Jim Lindberg

Large sections of San Francisco performed very well on several of this study's metrics. Higher Character Scores were significantly associated with greater population density, more businesses and new businesses per commercial square foot, as well as higher proportions of new businesses and non-chain businesses.

Areas with a fine-grained mix of old and new buildings are also significantly more walkable and transit-accessible than blocks of larger, newer buildings constructed at about the same time, based on Walk Score® and Transit Score® measures. Finally, these sections of the city saw significantly greater gains in property value over the past 12 years, compared to areas composed of mostly large, new buildings.

Of the three cities studied in this project, San Francisco's built fabric had the most complex results. Although high Character Scores were associated with significantly greater residential density, closer analysis of the built fabric suggests that increased granularity is the most important predictor of residential density. Analysis of the number of businesses per commercial square foot yielded a similarly complex relationship: Character Score was positively associated with significantly greater concentrations of businesses per commercial square foot. However, analysis of the built character showed that areas with predominantly older, smaller buildings were critical ingredients in hosting highly dense clusters of businesses, but a decrease in age diversity supports a greater density of businesses. Concentrations of jobs are greatest in areas that are more uniformly historic. This deserves further analysis and a closer investigation of the unique characteristics of San Francisco.

Some of the analysis of San Francisco's built fabric and community performance yielded clear, unmistakable trends. For instance, areas with older buildings were significantly more walkable and were more likely to have a greater proportion of non-chain businesses. Areas with greater granularity were more racially and ethnically diverse, and areas with greater diversity of building age had significantly higher Transit Score® ratings and greater diversity of offered residential rents.

Recently, prominent urban writers have argued that historic preservation, slow-growth policies, and barriers to new development are driving up the price of housing in San Francisco.[57] The city has one of the most expensive housing markets in the country, and given its limited land size, it is clear that land constraints play a role in limiting its housing supply and driving up costs. It is also important to acknowledge that San Francisco's older buildings play a large part in making the city a desirable place to call home in the first place.

In this analysis, older median building age was associated with greater cellphone activity on Sundays at 4:00 p.m. and Fridays at 10:00 p.m., suggesting that people frequent these areas during their free time. Blocks with older buildings are more likely to have cafes where people can sit outside, and in 2012 Flickr users posted significantly more photos taken on blocks with older buildings than blocks with newer buildings.

Areas with older buildings are also more walkable, have more non-chain businesses, and have fewer vacant lots.

SPUR, a San Francisco-based planning and urban research organization, recently argued that smart infill development could boost housing supply while retaining the built fabric that makes the city such an attractive place.[58] In a 2013 joint policy paper, SPUR and San Francisco Heritage recognized that "variations in scale may be desirable to achieve other public policy goals, such as higher density construction near transit."[59] One example of this is San Francisco's downtown, where many smaller-scale historic buildings are found directly adjacent to taller contemporary structures, leading to greater urban texture that amplifies the relationship between old and new. City planners in San Francisco encouraged such mixing of tall, new buildings alongside shorter, older buildings in the 1985 Downtown Plan. The Downtown Plan created conservation districts to protect the scale and character of select areas, mandated that a set of especially significant buildings be retained, and established incentives for the protection of older, smaller buildings through the creation of transferable development rights.[60]

The findings of this research suggest that building compatible new infill projects alongside the city's older buildings in mixed-use and commercial districts—thereby boosting a block's diversity of building age—could leverage the city's strengths and support even greater vitality in the city. Diversity of building age was associated with significantly greater intensity of cellphone activity on Wednesdays at 10:00 a.m. and Friday at 10:00 p.m., greater transit accessibility (higher Transit Score® ratings), more Bay Area Bike Share stations, and greater diversity of residential rents. One caution, however: On a commercial square foot basis, the analysis also showed that a greater diversity of building age was associated with significantly fewer businesses, fewer businesses launched in 2012, and fewer jobs. With thoughtful development, a combination of old and new buildings could support greater economic activity. City planners and developers should prioritize retention of historic built fabric, an irreplaceable community asset, as a hallmark of the most successful infill development projects.

This report includes a case study focused on San Francisco's Mid-Market district. Mid-Market is experiencing considerable new investment and proposals for additional development are being considered. In addition, the Market Street and Mission Street corridors through the area were the subject of recent study by Gehl Studio, which offers an opportunity to compare the findings of this report with Gehl's observation-based analysis.
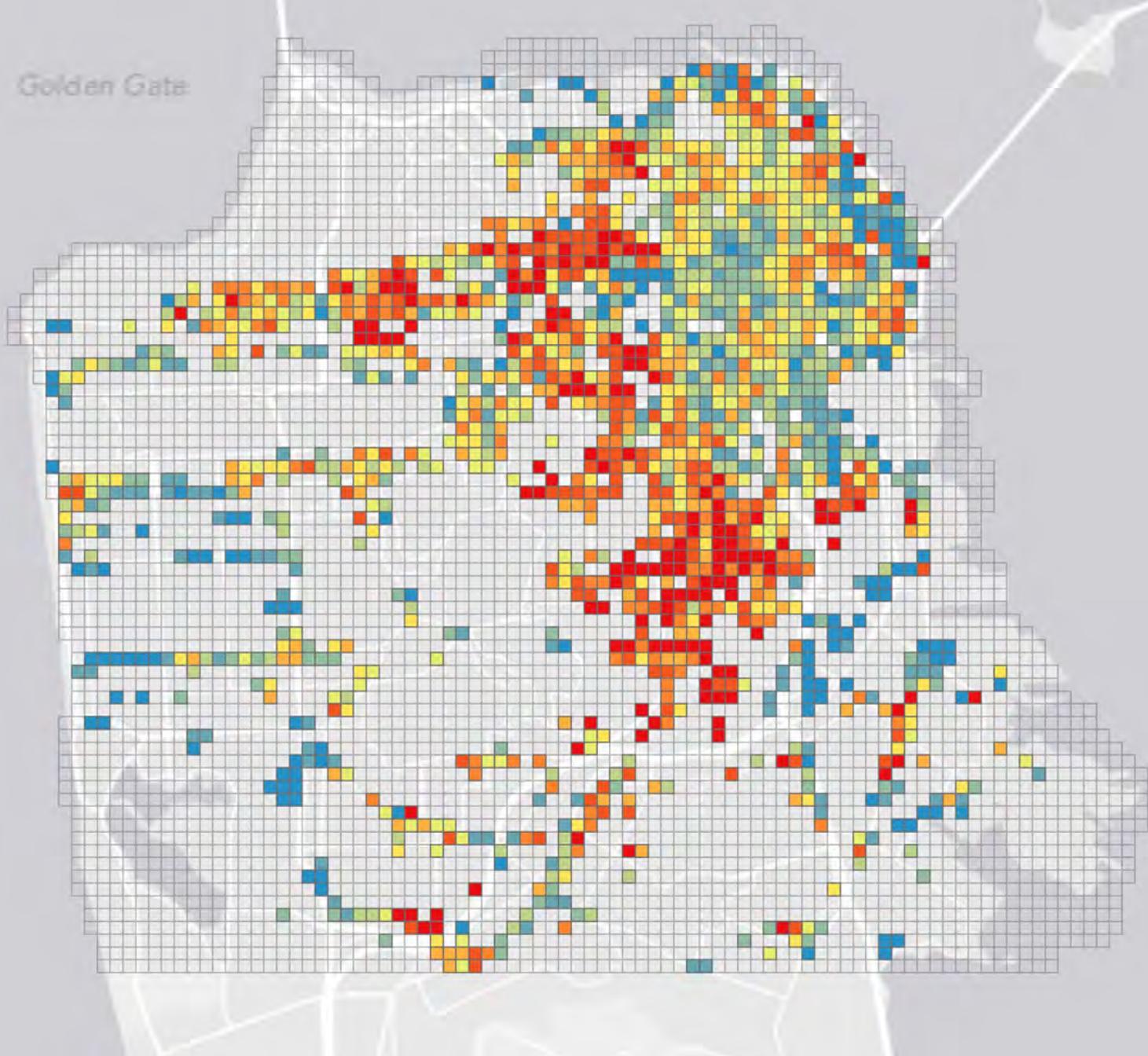
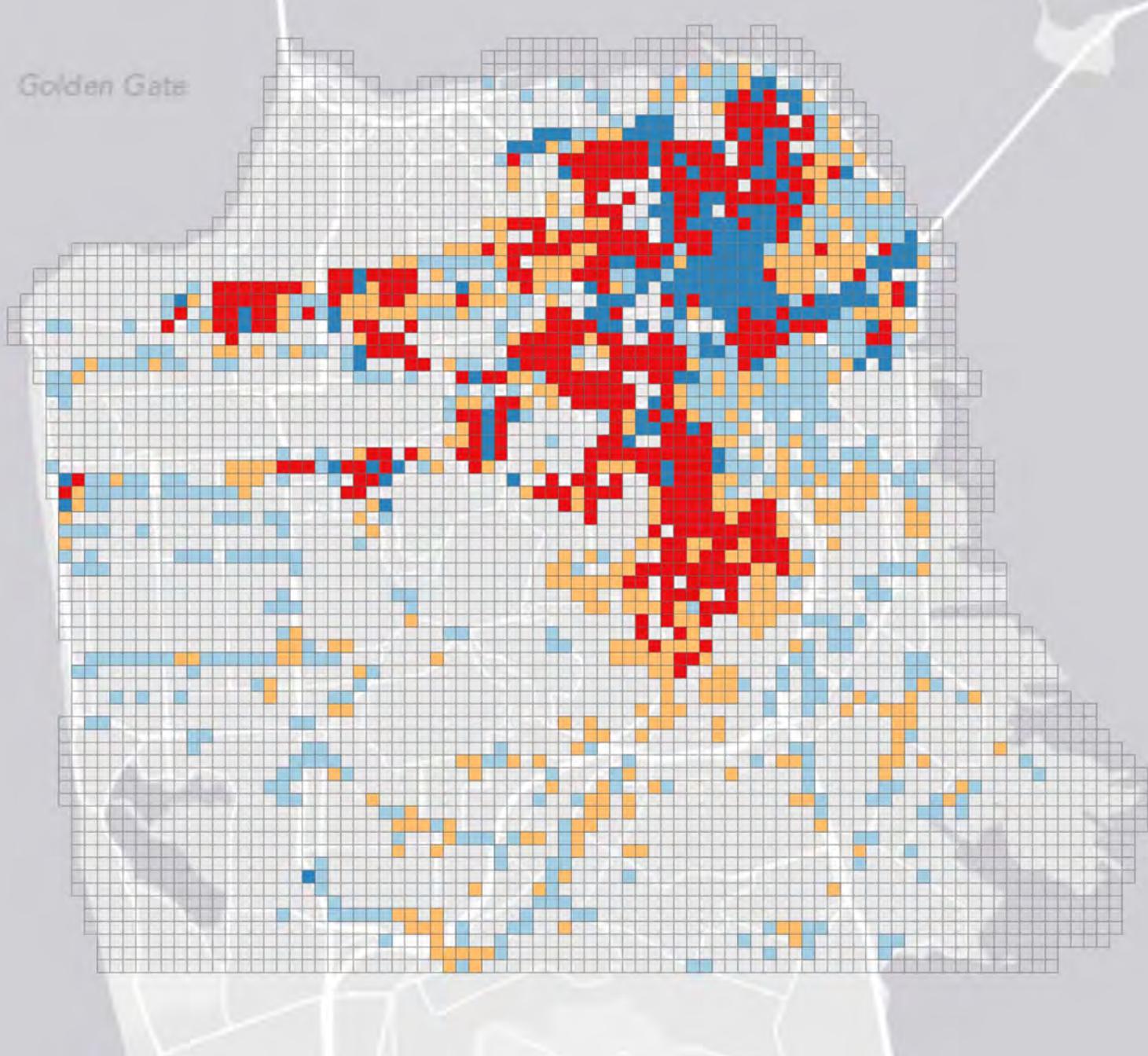## CHARACTER SCORE, SAN FRANCISCO

Newer, larger, built at one time

Older, smaller, mixed-vintage

Commercial and mixed use grid squares:

1,555 out of 5,110

LOWEST SCORE

HIGHEST SCORE

RESIDENTIAL DENSITY (Households per Acre) BY CHARACTER SCORE, SAN FRANCISCO

Below avg. Character Score; Below avg. businesses per comm. sq ft.

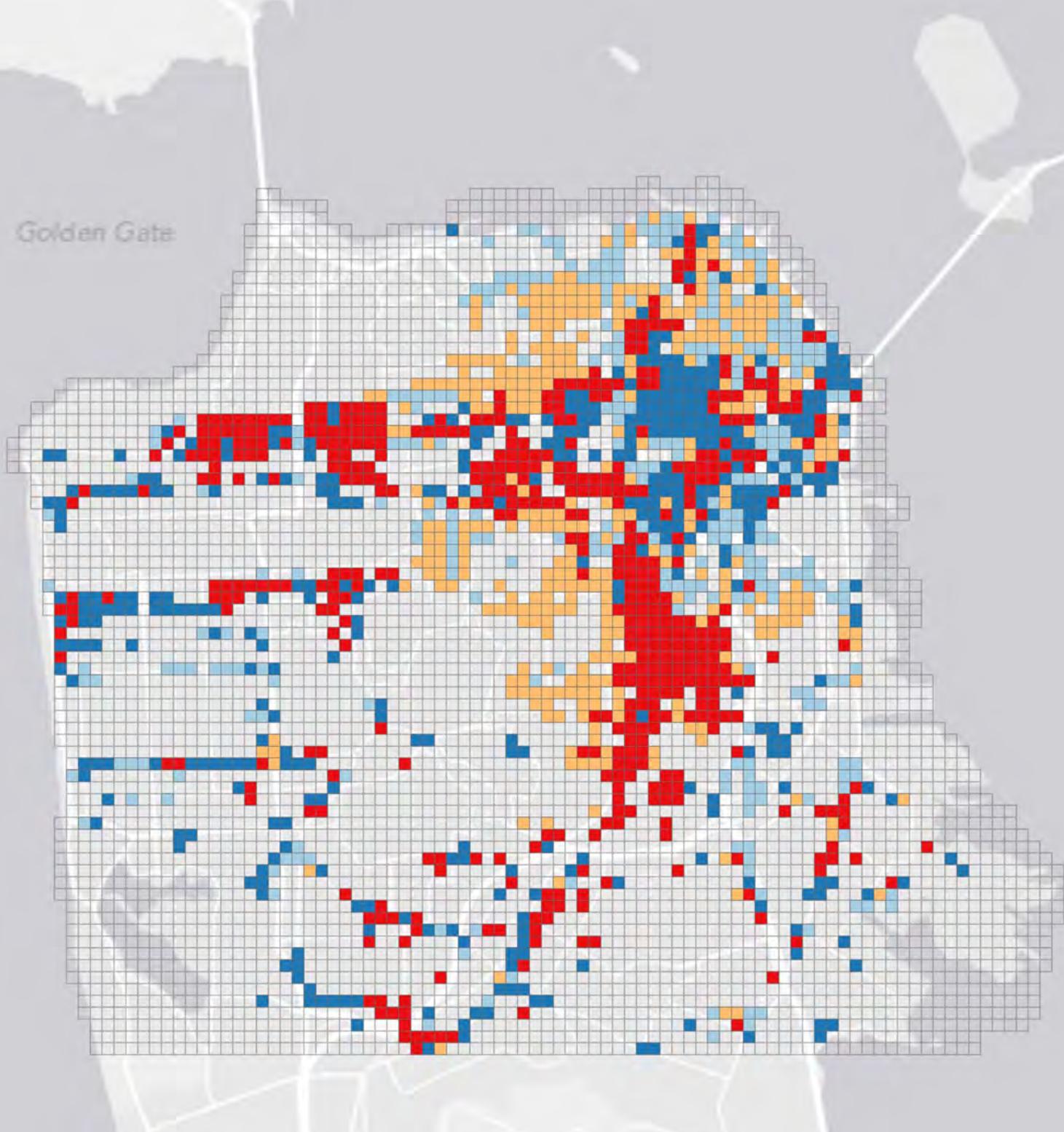Above avg. Character Score; Below avg. businesses per comm. sq ft.

Below avg. Character Score; Above avg. businesses per comm. sq ft.

Above avg. Character Score; Above avg. businesses per comm. sq ft.

Commercial and mixed use grid squares:

1,555 out of 5,110

RACIAL AND ETHNIC DIVERSITY INDEX BY CHARACTER SCORE, SAN FRANCISCO

Below avg. Character Score; Below avg. businesses per comm. sq ft.

Above avg. Character Score; Below avg. businesses per comm. sq ft.

Below avg. Character Score; Above avg. businesses per comm. sq ft.

Above avg. Character Score; Above avg. businesses per comm. sq ft.

Commercial and mixed use grid squares:

1,555 out of 5,110

NEIGHBORHOOD CASE STUDY: MID-MARKET

San Francisco's Mid-Market neighborhood is in the midst of a high-profile transformation. Long known as the site of social service agencies and single room occupancy hotels, the neighborhood is attracting considerable investment, sparked by a new city tax break to encourage revitalization. When the microblogging site, Twitter, considered leaving San Francisco in 2011 for a larger office space, city officials created an economic development program aimed at encouraging companies to relocate to Mid-Market by offering a payroll tax incentive. In June 2012, Twitter moved its headquarters to the historic Merchandise Mart Building (1937) at 10th and Market, serving as an anchor for the neighborhood's revitalization. Other tech companies—Dolby, the audio specialist; Spotify, a digitial music service; Square, the merchant services and mobile payments firm—have moved into existing buildings on historic blocks or have pledged to follow Twitter to Mid-Market. New residential towers are sprouting up to house incoming workers.[61]

The city has enlisted the help of these tech companies to assure that the revitalization of Mid-Market does not come at the expense of the neighborhood's low income residents. A set of "Community Benefit Agreements" detail how the companies will support the surrounding neighborhood, through volunteer hours, cash donations to nonprofits, and purchases from local businesses.[62]

HISTORIC BUILT FABRIC ON MARKET STREET. SAN FRANCISCO.
Photo: Flickr user Ken Lund

LOCATION: Market and Mission Streets between 5th and 10th St.

BUILDING CHARACTER: Small and mid-size commercial buildings, theaters, government buildings

AVERAGE MEDIAN AGE OF BUILDINGS: 1916

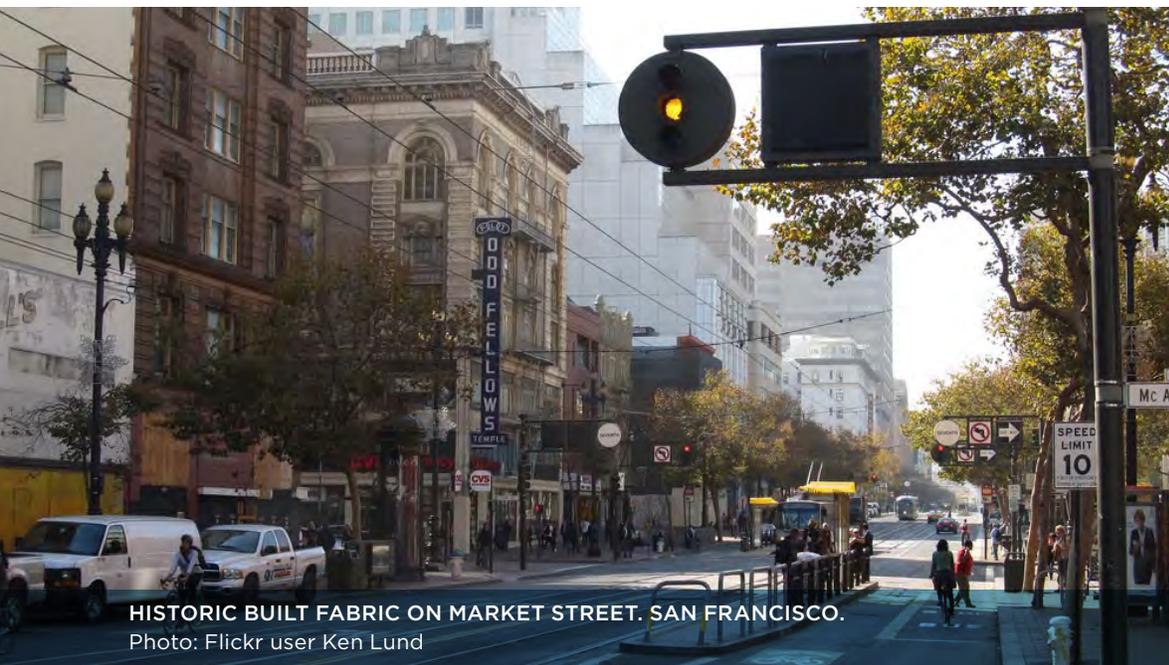**PERCENT PRE-WAR BUILDINGS:** 56.6%

AVERAGE BUILDING AGE DIVERSITY: Slightly more diverse than city average

AVERAGE NUMBER OF PARCELS PER 200m x 200m AREA: 10.1 buildings (less granular than city average)

CHARACTER OF ACTIVITY: Gritty mix of struggling restaurants and retailers with a few new businesses catering to young professionals

POPULAR EVENTS IN THE NEIGHBORHOOD: Year-round Heart of the City Farmers' Market

DEVELOPMENT ACTIVITY: Reuse of older buildings for tech company offices, large new residential infill, some retail storefront renovations.

Mid-Market's built fabric is largely composed of low- and mid-rise early 20th century commercial buildings, including hotels and theaters, but the neighborhood also includes some new, modern structures, such as the San Francisco Federal Building, constructed in 2007. Buildings in the area are generally older than the San Francisco city average. Mid-Market grid squares have slightly more building age diversity than the city average, but the built fabric is significantly less granular than what is typical for San Francisco. Large office buildings and city offices occupy full blocks in some sections of the neighborhood.

Despite Mid-Market's diverse collection of older buildings, the area falls short of city averages on several of this study's metrics. The number of businesses and jobs per square foot of commercial space in Mid-Market are lower than the city average, and the percentages of newly launched businesses, women and minority-owned businesses, and non-chain businesses all lag behind other neighborhoods. Mid-Market performs well, however, on indicators of density of human activity and diversity of social and economic activity. The neighborhood is highly diverse in terms of its residents' race and ethnicity and the diversity of residential rents in the area. Residential density was higher than the city average for commercial and mixed-use areas. Finally, cellphone activity on Friday nights at 10:00 p.m. was much greater on Mid-Market than the San Francisco city average.

The neighborhood may be changing faster than some of the metrics used in this study were able to detect. According to analysis by the San Francisco Office of Economic and Workforce Development, Mid-Market storefront vacancies dropped from 30 percent (compared to three percent citywide) in 2011 to 22 percent in 2013, and commercial office availability dropped from 22 percent in 2011 to 8.5 percent in 2013.[63]

The built fabric of Mid-Market has remained intact and strong during the neighborhood's transformation. Few buildings in Mid-Market have been demolished, and new, high-density development is largely taking place on vacant parcels and surface parking lots. Notably, the neighborhood's historic and older building stock is playing a significant part in attracting new tech firms and other companies.[64] New headquarters for companies like Twitter, Square, Spotify, and Dolby are located in existing buildings. New housing projects are springing up in the area where no buildings previously existed, minimizing direct displacement and demolition of existing buildings. In December 2013, Shorenstein Properties, the same real estate firm that owns Twitter's new Market Street headquarters, announced plans to develop a 301-unit apartment tower on a Mid-Market surface lot.[65] This follows a 273-unit apartment complex being developed on a vacant lot east of the Twitter headquarters, a 700-unit development on a parking lot a block west of Twitter, and a pair of residential towers

Notably, the neighborhood's historic and older building stock is playing a significant part in attracting new tech firms and other companies.[64]

on parking garages and surface lots one block south of Twitter, one of which includes 190 units of affordable housing. Through reuse of existing structures and high-density development of the "missing teeth" parcels in Mid-Market's built fabric, immediate demolition is avoided and market demands for housing are addressed.
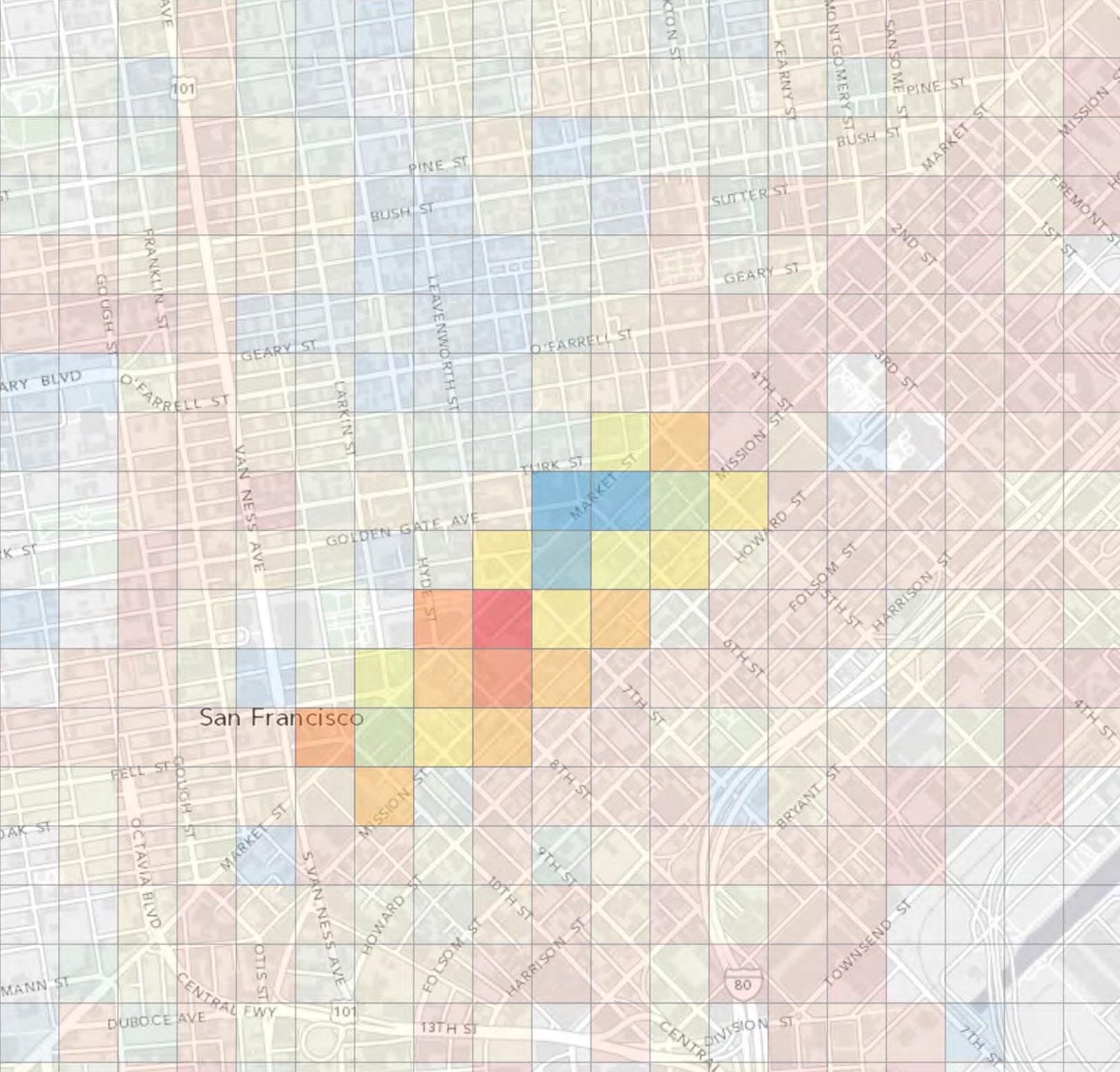
MID-MARKET, SAN FRANCISCO

Newer, larger, built at one time

Older, smaller, mixed-vintage

Commercial and mixed use grid squares:

23

LOWEST SCORE

HIGHEST SCORE

NEIGHBORHOOD PERFORMANCE – MID-MARKET

		Mid-Market	San Francisco Average
	AVERAGE CHARACTER SCORE	-0.38	0.00
	BUSINESSES PER 1,000 COMM. SQ. FT.	0.23	1.32
	JOBS PER 1,000 COMM. SQ. FT.	3.90	11.90
	% BUSINESSES OPENED IN 2012	19.8 %	25.4 %
	% WOMEN AND MINORITY-OWNED BUSINESSES	1.4 %	2.1 %
	% JOBS IN SMALL BUSINESSES	19.7 %	39.0 %
	% NON-CHAIN BUSINESSES	91.6 %	94.1 %
	MEDIAN AGE OF RESIDENTS	41.3	39.3
	RACIAL AND ETHNIC DIVERSITY INDEX	60.6	49.6
	WALK SCORE® RATING	97.6	88.7
	AVERAGE STANDARD DEVIATION OF RESIDENTIAL RENTS	$846	$602
	POPULATION DENSITY (PERSONS PER SQ MILE)	39,944	27,277

The chart at left shows how the Mid-Market neighborhood compares with the city of San Francisco overall on a range of performance measures. Shaded squares indicate higher performance.

Racial and Ethnic Diversity Index is scored on a scale of 0 – 100 where 100 is equivalent to perfectly equal representation of non-Hispanic whites, non-Hispanic African-Americans, non-Hispanic Asian-Americans, Hispanics (all races), and all other ethnic groups in the population. A score of 0 indicates a population entirely composed of people from one group.

Walk Score® rating values range from 0 to 100. A score between 90 and 100 indicates that daily errands do not require a car. A score between 0-24 indicates that almost all errands in the area require a car.

FURTHER INSIGHTS ON SAN FRANCISCO FINDINGS FROM GEHL STUDIO

Gehl Studio collaborated with the Preservation Green Lab on this research. Jeff Risom and Kasey Klimes of Gehl Studio offer insights on the *Older, Smaller, Better* findings that build upon Gehl Architects' Better Market Street research, which focused on human-centered urban design in San Francisco's Market corridor.

The Better Market Street project is a $250 million streetscape redesign focused on improving mobility and the quality of public space along downtown San Francisco's Market Street corridor. Gehl Architects—an urban quality consultancy based in Copenhagen, Denmark—serves as the project's design lead, collaborating with an interdisciplinary team. The team conducted expansive surveys of public life to better understand the street's social and spatial dynamic and to inform the design process.

FIGURE: MARKET AND MISSION STREET PEDESTRIAN COUNTS, COURTESY GEHL STUDIO.
Full day pedestrian traffic based on weekday hourly counts from 8am to 9pm
*Full day pedestrian traffic estimates extrapolated from hourly counts at 8am, 9am, 11am-1pm, 4pm, 5pm
** Full day pedestrian traffic estimates extrapolated from hourly counts from 8am to 6pm

The methodology of Gehl Architects relies heavily on observational study of social behavior and active mobility patterns in conjunction with a qualitative analysis of the streets and public spaces in which that behavior takes place. This approach, known as a Public Space Public Life survey, is overlaid on top of more traditional design processes and used in conjunction with demographic and other city data sets to inform design choices which support vibrant public life.

The project concept sought to create a new synergy between pedestrian movement and place to re-imagine a 21st century street as a flexible design framework that promotes a more inviting, livable and inclusive city. The study identified three districts along Market Street: Mid-Market between Van Ness Ave and 6th St; the Retail District between 6th St and 2nd St; and the Financial District between 2nd St and the Embarcadero. Further study includes Mission Street (parallel to Market Street to the southeast) to develop a more multi-dimensional analysis of these districts and to identify potential for expanded mobility options.

FINANCIAL DISTRICT

San Francisco's Financial District is characterized by "necessary" use of the public realm. Pedestrians appear in massive numbers at weekday morning, lunch, and evening peak periods, only to vanish during off-hours. Despite the district's prominent location, few spend time here on weekends compared to weekdays. Market Street at Fremont Street sees 29,000 pedestrians per day on weekdays and fewer than 14,000 on weekends.[3] Public spaces are generally uninviting and under-utilized. Public spaces like One Market Plaza and Mission Plaza see moderate use during weekday afternoon lunch breaks, but otherwise tend to sit nearly empty. The district is characterized by a low degree of granularity in the built environment and neither buildings nor public spaces cater to a human-scale experience.

RETAIL DISTRICT

Conversely, Market Street's Retail District sees high volumes of pedestrians throughout the day and even higher numbers on weekends. Pedestrian volumes between 4th and 5th Street double from 44,000 on weekdays to 88,000 on weekends. This is the only stretch of Market Street's wide sidewalks that reach capacity and occasionally become crowded. The interplay of the district's high concentration of retail outlets and cultural attractions produces a consistent buzz of activity, but the quality of the urban experience is often lacking. Intersections often produce uncomfortable environments and obstruct pedestrian's

3 *Pedestrian counts taken every hour between 8:00 a.m. and 9:00 p.m.

desired paths. Public spaces like Yerba Buena Plaza and Mint Plaza see more consistent use than those in the Financial District, but activity is un-diversified as even pleasant spaces invite little more than sitting and standing. Hallidie Plaza sits on one of Market Street's most bustling blocks, but struggles to invite public life as a large portion of the public space is a sunken plaza removed from the life on the street. There is much potential for vibrant public life in spaces like these, but today 75 percent of stationary pedestrian activity on Market Street involves standing or waiting for transit.

MID-MARKET DISTRICT

The Mid-Market district is undergoing considerable transformation as the city of San Francisco pushes to create a tech hub in the formerly under-valued end of Market Street. The arrival of Twitter and other tech companies (alongside the resulting burst of real estate development) signals potential for an impending shift in public life as well. Despite being home to a burgeoning arts district and close proximity to other vibrant neighborhoods, it supports very little public life. The Tenderloin falls within this area, a neighborhood long associated with crime, homelessness, and single-room-occupancy hotels, but also a growing tech, cafe, and arts scene. Ground-floor vacancy and poor quality facades are a common problem in this area and throughout Mid-Market. Banks and office buildings have monotonous, impermeable facades while those of small shops are often poorly maintained and aesthetically inconsistent. Exacerbating this uninviting environment is a low ratio of building height to street width, which provides poor street definition and detracts from the street's sense of urbanity. Pedestrian volumes in this district are the lowest of the survey locations; fewer than 14,000 pedestrians per weekday on Market Street between 6th and 7th Street and 8,500 on Mission Street between 5th and 6th Street. New development and an influx of new employment centers like Twitter, Yammer, and Zendesk provide ample opportunity for the revisioning of the Mid-Market district. The tendency towards industry clustering suggests high potential for reuse of under-utilized spaces like adjacent surface parking for food service, social space, and recreational activity for a new community.

VACANT SIDEWALKS. MID-MARKET, SAN FRANCISCO. Photo: Gehl Studio
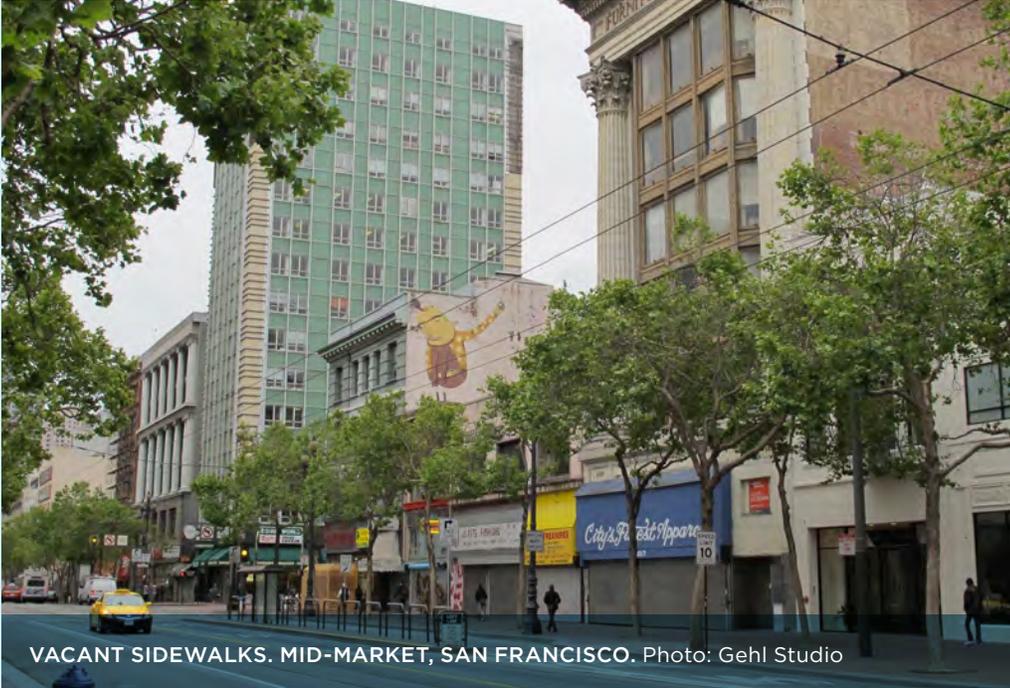
Some older buildings in the Mid-Market area of San Francisco have been rehabilitated, but the street level environment is still not inviting for pedestrians.

OLDER, SMALLER, BETTER RESEARCH AND PUBLIC LIFE DATA

The relationship between buildings and public space is complex. Public spaces are defined by their surrounding buildings, and the gradient between private and public life formed by these edges can either invite or discourage social interaction and quality experience in the city. For example, a permeable ground floor with a high level of interior use can activate adjacent streets and public spaces. In contrast, large building footprints and monofunctional and ground floor uses can create a physical (as well as psychological) barrier to life on the street. Cafes with outdoor seating spill life into the city and blur lines between public and private space. Buildings that do not take local climate conditions such as prevailing winds and sun path into consideration may contribute to uncomfortable micro-climates at street level that reduce the attractiveness of streets and spaces. As studies by Gehl Architects have identified, public space along Market Street fails to invite the tens of thousands of daily transit riders to spend time along the street. While it is the site for major city celebrations, these areas lack the quality to act as everyday neighborhood assets. Simply put, the street has not performed to its full potential, and current arrangements often create barriers rather than facilitate freedom of mobility for street users.

LINGERING ACTIVITY

Gehl Architects' survey of Market Street offers a quantified understanding of stationary activity in public spaces—how many people linger there, what they are doing, and at what times of day? The most successful public spaces are used intensely for a variety of activities, even into the evening hours. The factors critical to achieving this vibrant public life, however, are multi-faceted. Currently, public life along Market and Mission Street has a weak relationship with the *Older, Smaller, Better* granularity metric. Several blocks of Mid-Market have a high level of granularity but do not support public life. While spaces like UN Plaza, Hallidie Plaza, and Crown Zellerbach Plaza are less active than would be expected given their central location in the city, recent infusions of public life such as Living Innovation Zones and food trucks suggest the culprit is a lack of programming that initiates the self-reinforcing catalyst for vibrant public life. The lack of direct correlation between building granularity and public space lingering activity suggests potential for a more comprehensive research model that incorporates variables of space (such as scale, materiality, programming, street furnishings and environmental metrics) in conjunction with building metrics. Economic development, social fabric, and public life all rest in the nexus of the generally private realm of urban buildings and the public realm between them.

The future of the street will depend on a vision that incorporates an intimate understanding of inviting urban spaces and seeks to re-imagine the street as more than a transportation corridor—the street as an iconic and enjoyable place for people to stay and experience San Francisco's vibrant urban life.

CHARACTER SCORE

The "Character Score" produced by the Preservation Green Lab study suggests a relationship between buildings and pedestrian activity levels. There appears to be more foot traffic in areas with smaller building footprints and a diversity of building ages. Smaller building footprints and traditional architecture tends to cater to a human-oriented scale designed for experience at eye level. A psychological preference of pedestrians for these buildings and the public spaces they define is suggested in the correlative relationship. Should further study confirm this relationship, it would lend weight to the argument for preserving buildings for market value, traditional design, and architectural detail. Buildings with smaller footprints may offer a stronger sense of place in the public realm.

> The lack of direct correlation between building granularity and public space lingering activity suggests potential for a more comprehensive research model that incorporates variables of space (such as scale, materiality, programming, street furnishings and environmental metrics) in conjunction with building metrics.

OPPORTUNITIES FOR FURTHER RESEARCH

While these findings illuminate potential relationships between private and public spheres, they also raise new questions. Even where potentially strong relationships were found between neighborhood performance metrics and pedestrian activity, these relationships did not extend to cyclist volumes or levels of lingering activity in public spaces. In particular, we believe further research should seek to identify how and where activity in public spaces relates to area building metrics. Do people stay longer in areas with an older or more traditional built environment? Is there a quantifiable relationship between building scale and its effect on the experience of adjacent spaces? Do neighbors interact more frequently in historic neighborhoods? Can a neighborhood with new buildings and low granularity still support public life and the creative economy through imaginative cultural programming? The limited scope of available public life data makes latitudinal study a prime arena for potential future research. Comprehensive public life data from more granular and historic neighborhoods across San Francisco, Seattle, and Washington, D.C., would set the stage for nuanced understandings of the relationship between building metrics, public space, and public life. With comprehensive data available to identify and control for key variables, relationships between buildings and the life that occurs between them may be uncovered.

CONCLUSIONS

Photo: Barracks Row Main Street

RECOMMENDATIONS

This study has demonstrated the important role that older, smaller buildings play in fostering social, economic, and cultural vitality in mixed-use and commercial areas. The *Older, Smaller, Better* research shows how these areas serve as thriving incubators for small businesses, as vital centers of neighborhood services, and as regional destinations for restaurants, nightlife, and specialty retail. Older, smaller buildings also provide tangible connections to neighborhood history and community heritage. To realize the benefits of retaining these urban assets, the following recommendations are offered for consideration by city officials, community leaders, policymakers, developers, and citizens.

1. LEVERAGE PUBLIC DATA TO INCREASE UNDERSTANDING OF THE URBAN BUILT ENVIRONMENT. This study would not have been possible without access to data from multiple public entities. Public data provides a basis of information that allows public, private, and nonprofit partners to increase understanding of the relationship between the physical environment of communities and a range of social, economic, and environmental indicators.

Make city data freely accessible to the public to spur innovation and new partnerships. The free provision of public data presents a significant, low-cost opportunity for communities to leverage technology and strengthen civic engagement. Allow easy download of city data to help monitor performance, engage community members, and foster innovation. Pursue active partnerships with organizations seeking to access and analyze the data. Promote data competitions and hackathons.

Use newly available data to measure neighborhood performance and inform public policies and investments. Systematic assessment of the current performance of existing built assets ensures that land use and infrastructure decisions are based on solid evidence wherever possible. Identify key sustainable development metrics and data sources based on community priorities. Establish baselines and monitor performance over time. Use data to inform and calibrate neighborhood plans and public investments, including transit improvements. Calculate the future potential of existing built fabric and prioritize redevelopment and revitalization efforts accordingly.

Expand measures of performance to include data on the intensity of use. Communications technology and the emergence of the sharing economy are helping to spur greater use of existing and often hidden urban assets, from parking spaces to rental apartments. Consider both aggregate and "per square foot" measures to assess economic performance. Add measures that are related to diversity of use and affordability. Measure how buildings or districts serve (or could serve) diverse functions across a wider range of hours throughout the day and week.

2. PROMOTE A COMPATIBLE MIX OF OLD AND NEW BUILDINGS. One of the key findings of this research is that commercial and mixed-use areas with buildings constructed in different periods, including new buildings, scored higher on many measures of economic, social, and environmental performance. To achieve these results requires balancing conservation and new infill construction.

Conserve existing buildings using a full spectrum of zoning tools. A range of options can help conserve older, smaller buildings in mixed-use and commercial districts, while also allowing compatible new construction. Local historic districts are a proven tool for protecting the character of significant districts and neighborhoods and ensuring that alterations and new construction are compatible with older, neighboring structures. Conservation or design review overlays offer another alternative to help conserve valuable older structures while encouraging compatible new design. Form-based zoning codes can align base zoning regulations more closely with valued historic patterns in older commercial and mixed-use districts.

Encourage compatible new construction. Infill construction that contributes to the overall physical character of a district can add vitality to a block, while also offering financial opportunities for real estate developers and investors. Many districts include vacant land, underused parking lots, and greyfield sites. Such spaces offer opportunities to boost a block's diversity of building age without demolition, introducing new investment, and providing contrast with older built fabric. This research has shown that blocks with buildings from different eras are often the most vibrant, lively urban areas.

3. FACILITATE BUILDING REUSE THROUGH CODE REFORM.

Recent research by the Preservation Green Lab has shown that the adaptive use or retrofit of older buildings almost always yields fewer environmental impacts than new construction when comparing buildings of similar size and function.[66] The *Older, Smaller, Better* research builds on these findings to document how retaining and reusing older buildings and districts provides additional environmental, economic, and social benefits to communities.

Remove barriers to the reuse and retrofit of existing buildings. Many existing land use regulations discourage the reuse of older buildings through requirements tailored to new construction and auto-oriented uses. Support building reuse by removing barriers such as parking requirements and minimum setbacks. Reduce or eliminate non-conformities for existing buildings and uses. Broaden use definitions to reduce the need for expensive upgrades to meet building code requirements triggered by physically compatible changes in use. Develop pre-approved solutions for common building types and reuse scenarios.

Adopt flexible, performance-based building and energy codes. The expense of compliance with prescriptive building and energy codes can be a barrier to investment in older, mixed-use and commercial buildings. Adopting codes that focus on outcomes rather than specific treatments allows creative, often less expensive solutions. The International Existing Building Code (IEBC) has provided a model for numerous state and local building codes. The new Seattle Energy Code offers a model, outcome-based energy code for municipalities seeking to facilitate upgrades to older structures.

4. ENCOURAGE NEW INVESTMENT IN DISTRICTS OF OLDER, SMALLER, MIXED-AGE BUILDINGS. Whether in weak or strong markets, districts with a mix of older, smaller buildings offer affordable investment and development opportunities, especially for small businesses and startups.

Offer technical assistance and incentives to help small businesses and building owners. This research has shown the important role that blocks of older, smaller buildings play in housing new businesses, women and minority-owned businesses, and non-chain businesses. Use approaches such as business improvement districts and the Main Street Program to direct technical, financial, and promotional assistance to help owners of older, smaller buildings. Provide financial incentives through tax increment financing districts, facade improvement programs, and business development assistance for emerging commercial districts.

Support more intensive use of existing buildings. This study has shown that areas composed of a diverse mix of older, human-scaled buildings often host activity throughout the day and into nights and weekends. These areas could be even more vibrant and livable if development aimed to support a balance of residential, office, retail, and service uses. Encourage mixed-use development, including co-working spaces and other flexible office arrangements as well as residences, restaurants, and retailers.

Invest in transit alternatives that serve districts of older, smaller buildings. A growing body of research suggests that walkability improves affordability for residents and returns dividends for local economies.[67] Improved sidewalks, parks, and other public amenities can help support the rebirth of older, mixed-use districts. Transit alternatives including spaces for car sharing, dedicated bike lanes, and new streetcar lines can also help realize the economic and environment benefits of older, smaller, mixed-use districts that house residents, services, and small businesses.

OPPORTUNITIES FOR FUTURE RESEARCH

This research has yielded new insights into the importance of older, smaller buildings in supporting vital mixed-use areas and commercial corridors. As indicated in the commentaries from research collaborators Gehl Studios and State of Place™, there are numerous ways that this research could inform more detailed analysis and understanding of how human behaviors are connected to the character of buildings, blocks, and neighborhoods. The *Older, Smaller, Better* project has also revealed data issues requiring additional research and attention.

IMPROVE DATA FOR SELECT METRICS

Some of the measures used in this study had clear limitations that deserve attention in future research. For instance, to measure the relationship between the presence of women and minority-owned businesses and select characteristics of the built environment, the research team used listings of women and minority-owned businesses that had registered with their city government. Some types of businesses have much more to gain from registering with the city than others (e.g., businesses that may enter contracts with the city). Thus, the listings provided by the city likely include only a limited subset of the total

STREETS THAT HAVE A MIX OF OLD AND NEW BUILDINGS PERFORMED WELL ON THIS STUDY'S MEASURES OF SOCIAL, CULTURAL, AND ECONOMIC VITALITY.
Photo: San Francisco. Credit: Jim Lindberg.

number of women and minority-owned businesses. On-the-ground knowledge of businesses in Seattle's Chinatown-International District, for example, suggests that the neighborhood is a hotspot of minority-owned businesses, but the data used in this study does not show this. Future studies may consider augmenting city records with additional data or choosing a different dataset altogether.

The measure of racial and ethnic diversity used in this study also had somewhat limited utility. The REDI index of Racial and Ethnic Diversity, developed by Impresa, Inc., for ArtPlace America, measures the relative proportions of non-Hispanic whites, non-Hispanic African Americans, non-Hispanic Asian Americans, Hispanics (all races), and all other ethnic groups in the population. Future research may use a simpler measure of the racial and ethnic diversity of the population. For instance, a measure focusing on the size of the majority group relative to all minority groups may yield different results. This warrants consideration. Future research may also opt to measure income diversity and racial and ethnic diversity at a larger spatial scale than a city block. Changes in the character of buildings at the block level may not translate well to its racial and ethnic composition or income diversity. Racial segregation and discrimination and segmentation in the real estate market have produced longstanding geographic patterns of race, ethnicity, and income inequality in cities. The neighborhood scale may be a more appropriate level of analysis for these measures. Further research is needed to determine the extent to which the character of the built fabric influences these patterns.

Data on the number and location of businesses came from business listings on Yelp.com. Because Yelp's data is crowd-sourced and updated frequently, the research team believed these listings would likely be more accurate than city permitting data or listings from other third party sources. The team spot checked Seattle business listings from Yelp.com alongside other sources and found Yelp's data to be superior. However, Yelp's listings may miss out on some businesses, most notably informal businesses and very small companies operating in co-working spaces. Future studies may consider augmenting a major listing (like that of Yelp, Dunn and Bradstreet, Factual.com, etc.) with local sources to improve accuracy and catch businesses missed by national or global listings.

The measure of new businesses used in this study was limited to businesses launched in 2012. This approach might be improved upon by including multiple years of data on new businesses launched and excluding businesses that closed during that same time period. This would effectively measure the net change in business startups and inform discussions about where investment is taking place.

This study used jobs in two industries (as established by the North American Industry Classification System) for the count of creative jobs. Industry 51, Information; and industry 71, Arts, Entertainment, and Recreation. Given that many tech firms have recently opened offices in older buildings, a count of creative jobs that also included jobs in tech fields could yield interesting results. Data that includes work performed in co-working spaces may also add an interesting dimension.

Finally, a strong and accurate measure of taxable retail sales could inform a deeper discussion about the economic performance of commercial corridors. The research team tried to obtain taxable retail sales data in all three cities, but the data was often unavailable. Data for the City of Seattle was obtained from the State of Washington, but upon review, it seemed that the locations listed in the dataset were not reliably tied to the locations of a retailer. This data was subsequently removed from the study. In future studies, data on taxable retail sales would lead to a richer discussion of the economic character of blocks and neighborhoods with a mix of small, old and new buildings.

ADD NEW METRICS FOR ASSESSING COMMUNITY VITALITY

Over the course of this study, the research team considered additional measures of community vitality that were not incorporated in the current phase. Data and metrics related to the commercial real estate market could add another layer to this analysis and point to interesting new insights related to older, smaller buildings. In particular, detailed data on commercial vacancies and commercial rents would be useful for measuring the performance of the built fabric of commercial and mixed-use corridors. Additionally, a composite measure assessing the degree to which commercial, residential, industrial, and recreational uses are mixed in a block or neighborhood might highlight variations in different areas of a city. Similarly, data on the types of housing available could be used to assess the relationships between the age and size of buildings and the diversity of housing types offered in an area. Finally, the research team intends to add additional measures of a neighborhood's livability in future phases of this research. These measures could include data on crime, quality of nearby schools, access to healthy food and parks, and the presence of street trees and other pedestrian amenities. Partnerships with organizations like Gehl Studio, State of Place™, Impresa, Inc., ArtPlace America, and Basemap could be leveraged to build research models that consider qualities of public space, proximity to cultural institutions and venues, and street-level pedestrian amenities.

Conducting this research over time could greatly improve understanding of the opportunities for strategic policy interventions as well as public and private investment. Much could be gained by collecting data for multiple time points and assessing trends and flows in the social, economic, and cultural activities of neighborhoods. Historical data could inform richer discussions about the relationships between the character of buildings and blocks and urban vitality at the neighborhood level. Through longitudinal study, much could be understood about *how* a change in the diversity of building age affects economic vitality, for instance. Moving from data "snapshots" to data flows could greatly increase the power of this research methodology.

Adding temporal data using this methodology would allow deeper analysis of how neighborhoods evolve over time, greatly aiding our ability to understand issues such as housing affordability and how long-time residents are affected by rising property values. Understanding of the role of older, smaller buildings in providing space for new businesses—one of Jane Jacobs' key points—could also benefit from measurements of change over time, adding to our understanding of how long such enterprises remain in these spaces before moving, expanding, or closing down. Similarly, the collection of data over time could reveal much about the morphology of urban revitalization, including the relationships between changes in residential blocks and the commercial corridors and districts that serve them, the impact of large-scale rehabilitation projects on surrounding neighborhoods, and the role of public investments such as schools, parks, and transit.

ADDITIONAL OPPORTUNITIES FOR FUTURE RESEARCH

The three cities explored in this project are among the most economically robust and socially vibrant places in the United States. What is true in Seattle, San Francisco, and Washington, D.C., may not be true in other places. The Preservation Green Lab looks forward to exploring the relationship between older, smaller buildings and community performance in other contexts, such as legacy industrial cities, small or mid-size cities, and rural communities.

Future research using a "grid overlay" approach to spatial analysis might test the impact of constructing the grid in different ways. Shifting, rotating, or building the grid at a different scale would allow researchers to verify that the construction of the grid itself is not playing a role in the findings. In each of the three cities explored in this report, many streets neatly follow the cardinal directions of a compass and the geometry of the grid. Other, smaller sections of the cities' street patterns run

diagonally across grid squares. During this phase of the research, the research team spot-checked the data to see if values were systematically inflated or diminished on one section of the grid or another. This did not seem to play a significant role in the findings. Nevertheless, in the future, it would be useful to test this more systematically by developing at least two distinct grids to place over the geography of communities. A sensitivity analysis would be useful in testing the impact of different grid sizes and orientations on findings.

Future research could also consider the extent to which historic character in the older fabric of cities operates like a community resource that could be depleted, akin to ecologist Garrett Hardin's "tragedy of the commons."[68] In Hardin's social dilemma, a common resource is collectively owned and enjoyed, but no individual member of that community suffers penalties for the misuse or destruction of the resource. The dilemma points to the challenges of collectively maintaining something shared that can be consumed by some to the detriment of all. Are there "tipping points" at which the benefits associated with older, smaller buildings begin to diminish as a result of too much new development? To put it another way, if a historic commercial district benefits from incremental new development and an increase in the neighborhood's overall diversity of building age, is there a distinguishable point at which these benefits stop and new development begins to weaken community performance?

The *Older, Smaller, Better* research detailed in this report focused exclusively on mixed-use and commercial districts, which are not as frequently designated through local landmark preservation ordinances as are residential areas in most cities. Although only a small percentage of the grid squares included in our analysis contained locally designated historic districts that are subject to demolition and design review procedures, the impact of such designations warrants further analysis. Additional research could add to previous studies that have documented the economic benefits of local designations, with a particular focus on understanding the impacts related to the frequency, scale, and character of new construction in these districts.

The research team would also like to look more closely at the specific characteristics of buildings that lend themselves to reuse, moving the analysis from aggregations of "Big Data" to careful inspection of architectural features of individual buildings. Using massive datasets, researchers can clearly point to the existence of relationships between buildings and community performance. More detailed case study analysis would deepen understandings of the design features and other mechanisms that support the sustained use and reuse of corridors of older, smaller buildings.

Finally, a geodatabase like the one developed for this project could be deployed to analyze numerous questions about the effectiveness of urban and preservation policy, including the performance of historic districts. Using this approach, it would be possible to compare different sections of cities to analyze the impact of a range of public policies and initiatives, including economic development policies, urban revitalization programs, tax credits programs, tax increment financing districts, transit investments, new sports stadiums, museums, and parks. This type of research presents an exciting new frontier in public policy analysis for the Preservation Green Lab and other urban researchers.

CONCLUSIONS

The *Older, Smaller, Better* study found that the physical character of the urban environment—specifically the age, diversity of age, and scale of buildings—influences the economic, social, and cultural performance of neighborhood commercial districts and corridors. This research showed that districts consisting of smaller, older and mixed-vintage buildings support a greater density of residents, businesses, jobs, and creative jobs per square foot than newer areas. These places attract younger residents, support a more bustling nightlife, and are more pedestrian and transit friendly. In ways that Jane Jacobs predicted more than 50 years ago, these older neighborhoods incubate and sustain the growth of the local economy, providing affordable, flexible space for a higher proportion of new businesses, women and minority-owned businesses, and non-chain businesses than are found in newer areas of the city.

While this research demonstrates that a concentration of older, smaller buildings is often among the physical characteristics of strong neighborhoods in the study cities, it also points to the importance of other factors outside the scope of the first phase of the project. As Gehl Studio and State of Place™ noted in this report, these variables include the quality of urban design, provision of attractive pedestrian amenities, the character of public space, and the appeal of private businesses. Beyond the physical realm, factors such as the level of employment, public safety, and quality schools are of course essential to any successful neighborhood.

Future research using the *Older, Smaller, Better* approach will include data on these and other important indicators of community health and vitality. Application of this methodology in additional market types, including industrial legacy cities and smaller cities, will also help deepen our understanding of the role of older buildings in creating successful communities, now and in the future.

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25 Jacobs, J. (1961). *The Death and Life of Great American Cities*. New York: Vintage Books.

26 The number of commercial square feet was determined by analyzing assessors' records and parsing out residential uses. These figures likely include industrial, mixed-use, and commercial zones.

27 This study used jobs within the "Information" and "Arts, Entertainment, and Recreation" industries included within the North American Industry Classification System (NAICS), industry sectors 51 and 71. The "Information" sector includes media publishers, radio and television stations, libraries, internet publishing firms, data processing and hosting companies, and communications carriers. The "Arts, Entertainment, and Recreation" industry includes performing arts and spectator sports; museums, historic sites, and similar institutions; and amusements, gambling, and recreation industries, including fitness and exercise facilities. This constitutes an admittedly coarse representation of what one might think of as "creative" workers, but the combination of these two major industry sectors offers the best balance of a valid match with "creative" work and accessible, block level data. For more information on scholarly work in this area, please see Markusen, A., Wassall, G.H., DeNatale, D., & Cohen, R. (2008). Defining the creative economy: Industry and occupational approaches. *Economic Development Quarterly,* 22, 24-45. Markusen, A., & Schrock, G. (2006). The artistic dividend: Urban artistic specialization and

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