



NFK2050

Appendix II: Existing Conditions

What We Found

EXISTING CONDITIONS ANALYSIS

Before we could plan for 2050, we needed to understand present day Norfolk. With a data-driven overview of the current physical, social, and economic conditions, this plan was built on a nuanced understanding of the city and its people.



Demographic Snapshot

GROWTH

Norfolk’s population, stable for decades, has seen a slight decline since 2010. The city observed a 2.4% decrease from 2010 to 2022, while the population of Virginia and the Greater Hampton Roads region grew by 7.79% and 4.8% (respectively) in the same period. It should be noted that the regular deployments of large numbers of Norfolk’s military population can make truly accurate population counts difficult.

Statewide, the past year marked the slowest growth rate for Virginia. While this can be partially attributed to a declining birth rate (13,000 more births than deaths in 2022 as compared to 27,000 in 2019), since the COVID-19 pandemic, more people are leaving larger metro areas in favor of smaller southern states. This national trend of migration out from cities into suburbs and outlying regions, for example, helped boost the number of residents in Suffolk past 100,000 in 2023 (Weldon Cooper Center, University of Virginia).

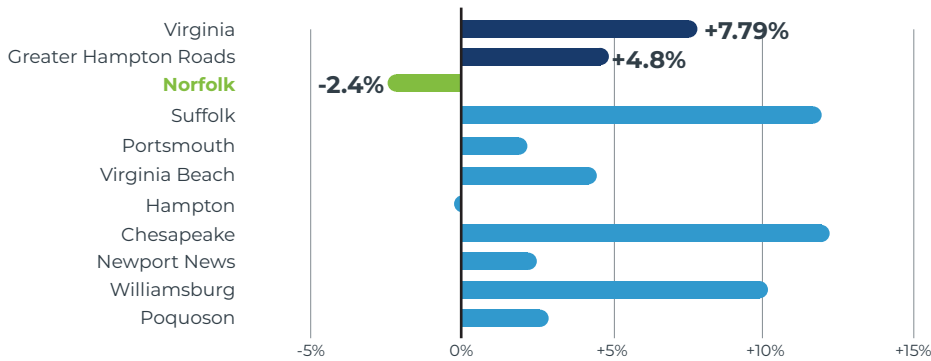


Figure 2: Regional growth rate, 2010-2022

Source: US Census Bureau, ACS 5-year Estimates, 2010-2022

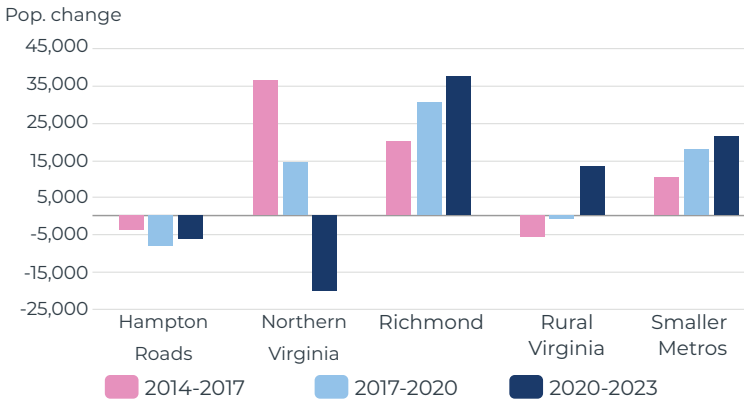


Figure 1: Net Migration by Region in Virginia

Source: Weldon Cooper Center Population Estimates

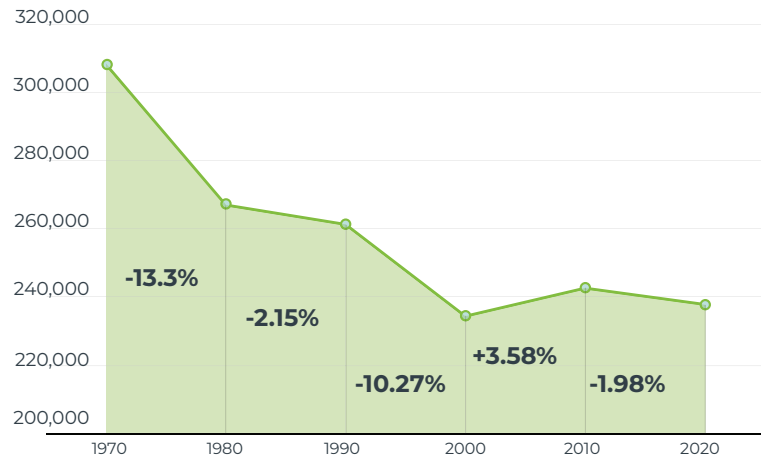


Figure 3: Population change in Norfolk, 1970-2020

Source: CivicLab, City of Norfolk

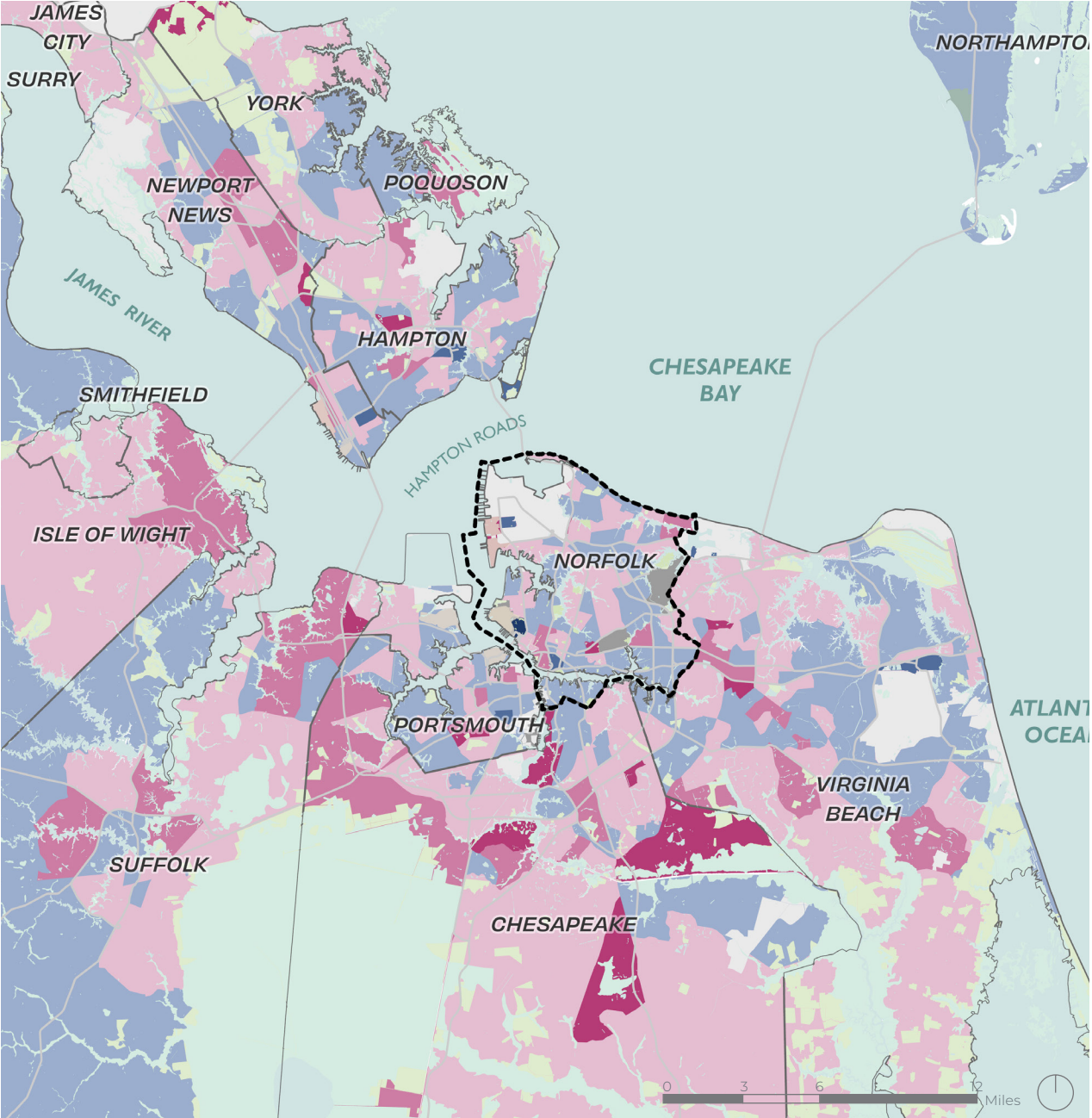
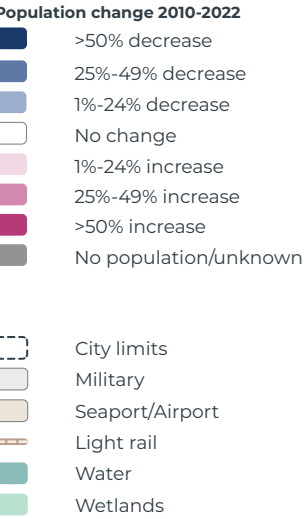


Figure 4: Population Change 2010-2022

Source: US Census Bureau, ACS 5-year Estimates, 2010-2022



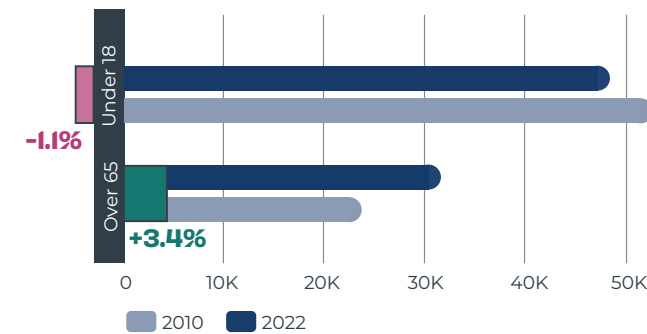


We have a pretty diverse neighborhood. There are kids who are white, Hispanic and then some of Asian origins. I feel like we have stumbled upon a magical little community. It's not perfect, but it is great!

— Norfolk resident, Workshop #1, October 2023

Age

Norfolk's population is aging. Between 2010 and 2022, the population above 65 years of age increased by 3.4% while those under 18 decreased by 1%. The median age has grown from 29.7 to 32.2 as of 2022. The city also saw a decline in public school enrollment rate by 18.6% as compared to the 7.5% decline in the Hampton Roads region (Virginia Department of Education, Fall Membership 2010-2011 & 2021-2022).

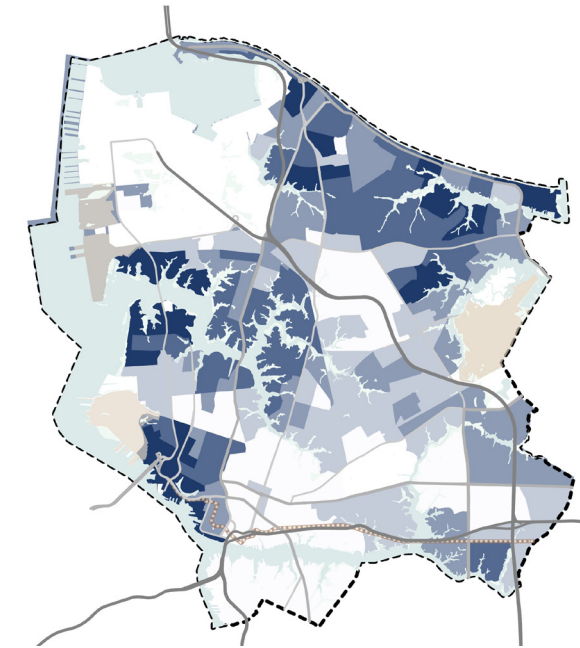


Diversity

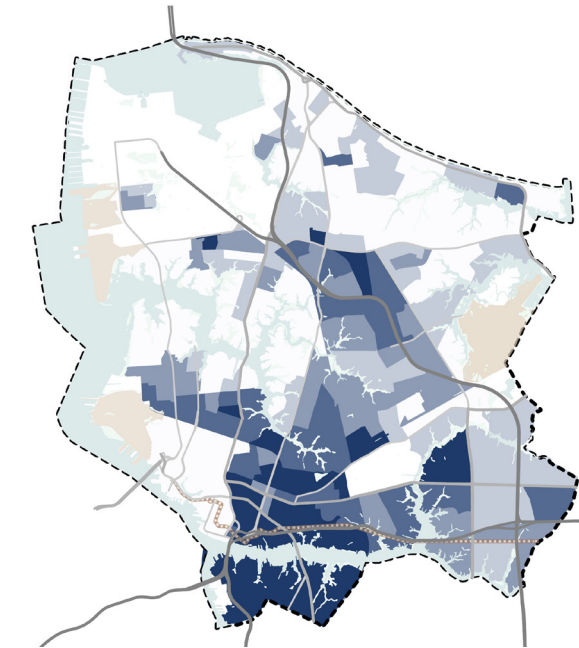
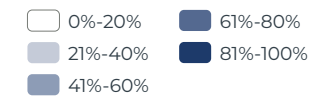
Norfolk is becoming more Hispanic and more multi-racial. While 42% of Norfolkkians are white, the city observed an increase in Asian, Hispanic and multi-racial populations in the last decade. Neighborhoods like Chesapeake Gardens and Glenwood Park are home to the largest concentrations of Hispanic and Asian communities in Norfolk.

Figure 5: Change in youth and senior population between 2010 and 2022

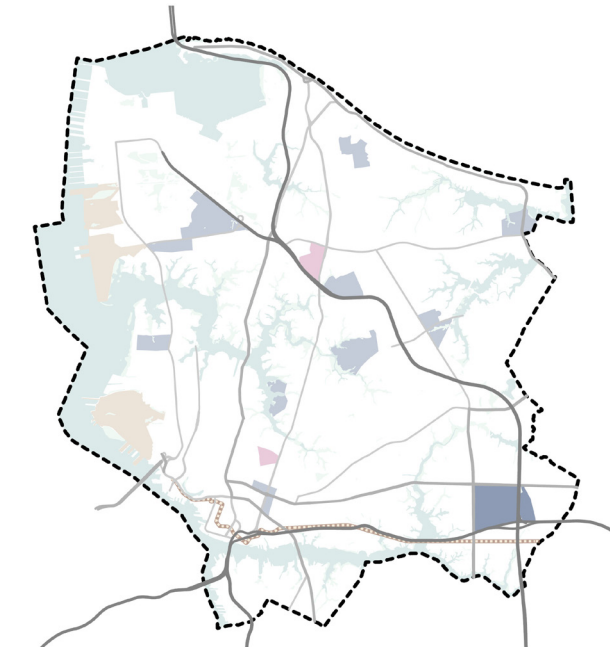
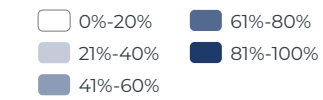
Source: US Census Bureau, ACS 5-year Estimates, 2010 and 2022



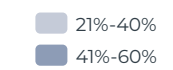
WHITE POPULATION



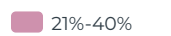
BLACK POPULATION



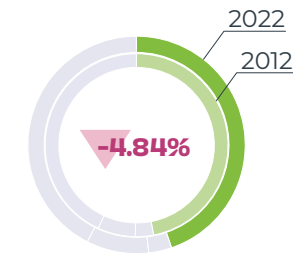
HISPANIC POPULATION



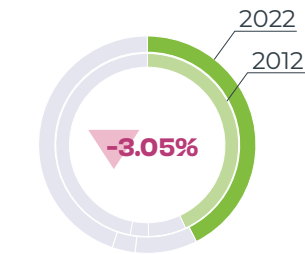
MULTI-RACE POPULATION



WHITE POPULATION CHANGE 2012-2022



BLACK POPULATION CHANGE 2012-2022



HISPANIC AND MULTI-RACE POPULATION CHANGE 2012-2022

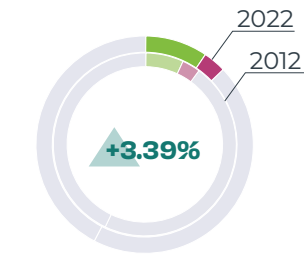
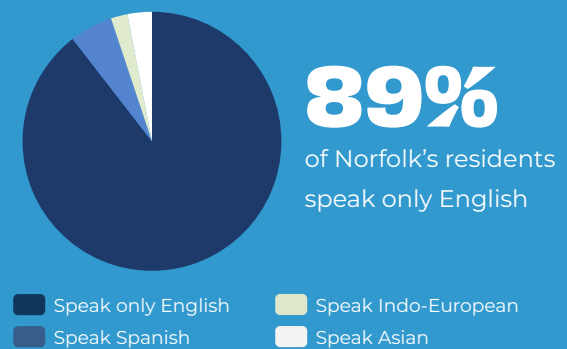
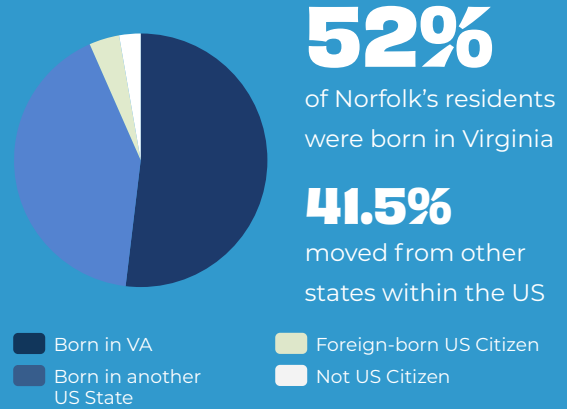
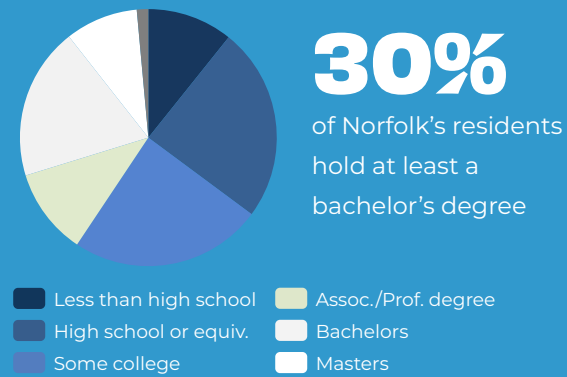


Figure 6: Racial/Ethnic make-up of Norfolk, 2022

Source: US Census Bureau, ACS 5-year Estimates, 2010 and 2022



Source: US Census Bureau, ACS 5-year Estimates, 2022

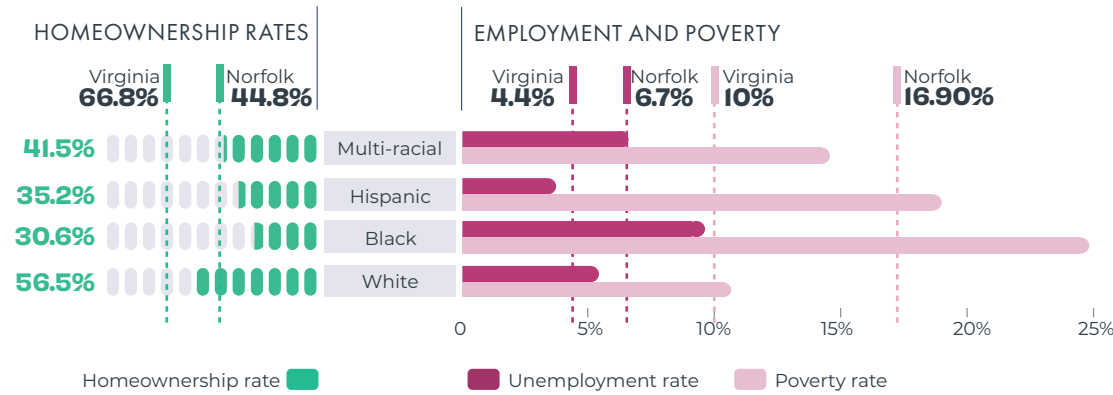


Figure 7: Social inequities in poverty, unemployment and homeownership rates by race/ethnicity

Source: US Census Bureau, ACS 5-Yr Estimates 2022

EQUITY

Norfolk has a higher rate of poverty and unemployment than Virginia on average. With a 16.9% poverty rate, Norfolk has a significantly larger population living below poverty level compared to the 10% state average.

Economic opportunities vary significantly across racial lines. In Norfolk, where the population is 42% white and 40% Black, a disproportionate number of residents living below the poverty level are Black — 21,544 Black residents are living below poverty level, the highest in the city and over twice the number of white residents in similar circumstances. This inequality extends to housing security, with white residents having a median household income of \$76,706

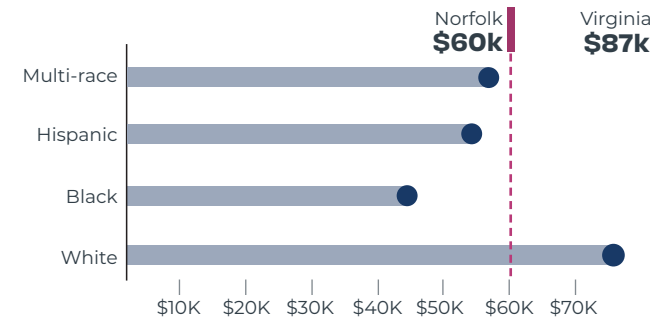


Figure 8: Median household income by race/ethnicity

Source: US Census Bureau, ACS 5-Yr Estimates 2022

compared to \$44,814 for Black residents, which is significantly below the city average of \$60,998. Such disparities severely affect the ability of Black residents to accumulate wealth, evidenced by a homeownership rate of just 30.6% among Black Norfolk residents.



Neighborhoods and History

Norfolk's Neighborhoods

Norfolk has many small and close-knit neighborhoods, each building a strong sense of identity and culture with their residents.

Most of Norfolk's neighborhoods, whether historic or newly developed, are represented by active Civic Leagues. Civic Leagues in Norfolk represent more than a name or a boundary. These organizations are empowered to play an active role in the development of their own community. Through formalized processes within the Zoning Ordinance and other City policies, Civic Leagues and other neighborhood organizations are invited into the conversation any time property is rezoned, City-owned property changes hands or is developed, or significant changes are made to public infrastructure within or around their community.



(City of Norfolk)

Norfolk currently has more than **80** active Civic Leagues across the city



Many neighborhoods are marked with distinctive mermaid gateway signage (City of Norfolk)

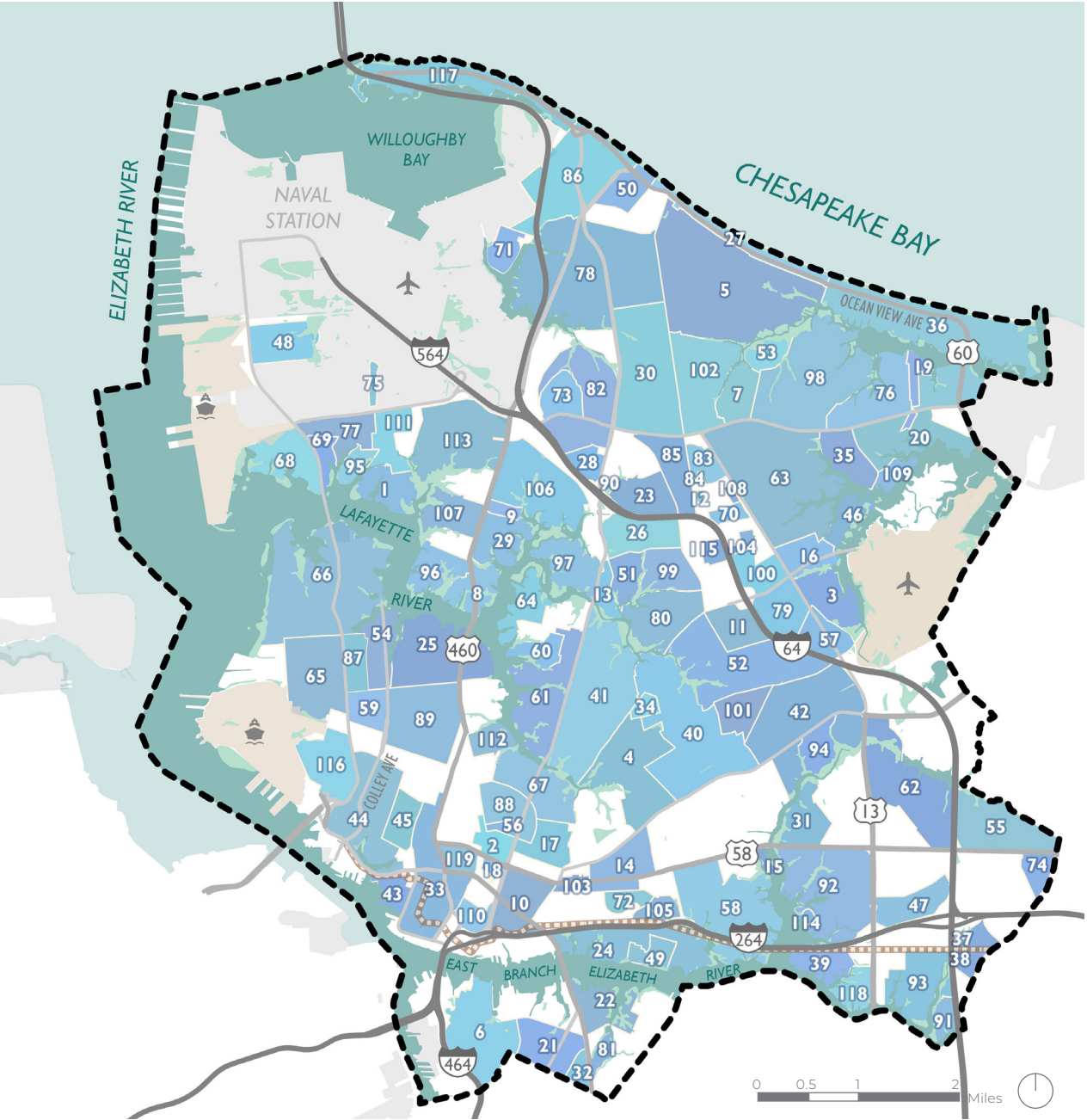


Figure 9: Norfolk's rich network of Civic Leagues, covering most of the city's geography

Source: City of Norfolk; WPA

- | | |
|--|--|
| 1 Algonquin Park/ North Shore Point | 61 Lafayette/ Winona |
| 2 Attucks/ Barberton/ Church | 62 Lake Taylor |
| 3 Azalea Acres/ Azalea Lakes | 63 Lake Whitehurst West |
| 4 Ballentine Place | 64 Lakewood |
| 5 Bayview | 65 Lamberts Point |
| 6 Beacon Light Berkley | 66 Larchmont/ Edgewater |
| 7 Bel-Aire | 67 Lindenwood/ Barraud Park/ Cottage Heights |
| 8 Belvedere | 68 Lochhaven |
| 9 Bollingbrook | 69 Meadowbrook |
| 10 Brambleton | 70 Meadowbrook Woods |
| 11 Brandon Place | 71 Merrimack Landing |
| 12 Braywood Manor | 72 Middle Towne Arch |
| 13 Brightly - Norview Heights | 73 Monticello Village |
| 14 Broad Creek | 74 Newtown South |
| 15 Broad Creek Shores | 75 Norfolk Crossing |
| 16 Bromley | 76 North Camelia Acres |
| 17 Bruces Park | 77 North Meadowbrook |
| 18 Calvert Square | 78 Northside |
| 19 Camellia Gardens | 79 Norvilla Heights |
| 20 Camellia Shores/ Camellia Acres | 80 Norview |
| 21 Campostella | 81 Oak Leaf Forest |
| 22 Campostella Heights | 82 Oakdale Farms/ Denby Park |
| 23 Chesapeake Gardens/ Mamie Homes | 83 Oakmont North |
| 24 Chesterfield Heights | 84 Oakmont North Home Owners |
| 25 Colonial Place/ Riverview | 85 Oakwood |
| 26 Coronado/ Inglenook | 86 Ocean View |
| 27 Cottage Line | 87 ODU Village |
| 28 Cottage Road Park | 88 Olde Huntersville |
| 29 Cromwell Farms/ Elsworth | 89 Park Place |
| 30 Crossroads | 90 Partrea |
| 31 Crown Point | 91 Pleasant Point |
| 32 Diggs Town | 92 Poplar Hall |
| 33 Downtown Norfolk Civic League | 93 River Forrest Shores/ Wayside Manor |
| 34 East Fairmount | 94 River Oaks |
| 35 East Lynne/ Saratoga | 95 Riverfront |
| 36 East Ocean View | 96 Riverpoint |
| 37 Easton Forest | 97 Roland Park |
| 38 Easton Place | 98 Roosevelt Area |
| 39 Elizabeth Park | 99 Sewells Gardens |
| 40 Estabrook/Coleman Place | 100 Shadywood East |
| 41 Fairmount Park | 101 Sherwood Forest |
| 42 Fox Hall | 102 South Bayview |
| 43 Freemason Street Area Association | 103 Spartan Village |
| 44 Ghent Neighborhood League | 104 St Andrews Place |
| 45 Ghent Square Community Association | 105 Stonebridge Crossing |
| 46 Glengariff | 106 Suburban Acres |
| 47 Glenrock | 107 Talbot Park |
| 48 Glenwood Park | 108 Tanners Creek |
| 49 Grandy Village Advisory Council | 109 The Gardens |
| 50 Greater Pinewell | 110 Tidewater Gardens |
| 51 Greenhill Farms | 111 Titus town |
| 52 Greenwood/Elmhurst/Norview Heights | 112 Villa Heights |
| 53 Hewitt Farms | 113 Wards Corner |
| 54 Highland Park | 114 Waverly on Broad Creek |
| 55 Hollywood Homes/ Maple Hall | 115 Wellington Oaks |
| 56 Hunters Square | 116 West Ghent |
| 57 Idlewood/ Sandy Heights | 117 Willoughby |
| 58 Ingleside | 118 Woodbine |
| 59 Kensington/ Old Dominion | 119 Young Terrace |
| 60 Lafayette Shores Homeowners Association | |

Historic Districts and Landmarks

Norfolk’s rich neighborhood infrastructure is quite literally built on the city’s history: historic districts mark the early city development and align with historic streetcar lines.

By 2050, Norfolk will be a great example of architecture and historic place preservation.

— Norfolk resident, online engagement, Winter 2023

Norfolk has a strong community of historic preservation advocates dedicated to preserving the city’s history through its built environment. The city’s historic districts and landmarks generally align with the development timeline of the city, with the largest number of sites in the portions of the city that were developed earliest, or along the historic streetcar lines (Figure 10). That said, many of Norfolk’s neighborhoods more recently annexed into city limits are or will soon be candidates for new designation.

Currently Norfolk has five locally-designated historic districts: East Freemason; Ghent; West Freemason; Norfolk & Western; and the Downtown Historic Overlay District. Within these districts, all major architectural changes must be approved through the design review process. The City of Norfolk has two sets of guidelines: Local Historic District Guidelines, used for all local historic districts and landmarks, and Norfolk & Western Historic Overlay District Guidelines.

There are also 15 National Register Historic Districts, and 47 individual listed resources, including the USS Wisconsin, Talbot Hall, First Colony, Zion Methodist Church, and Fire Station 12.



Attucks Theatre, circa 1919 (nfkva.com)



Attucks Theatre (National Trust for Historic Preservation)

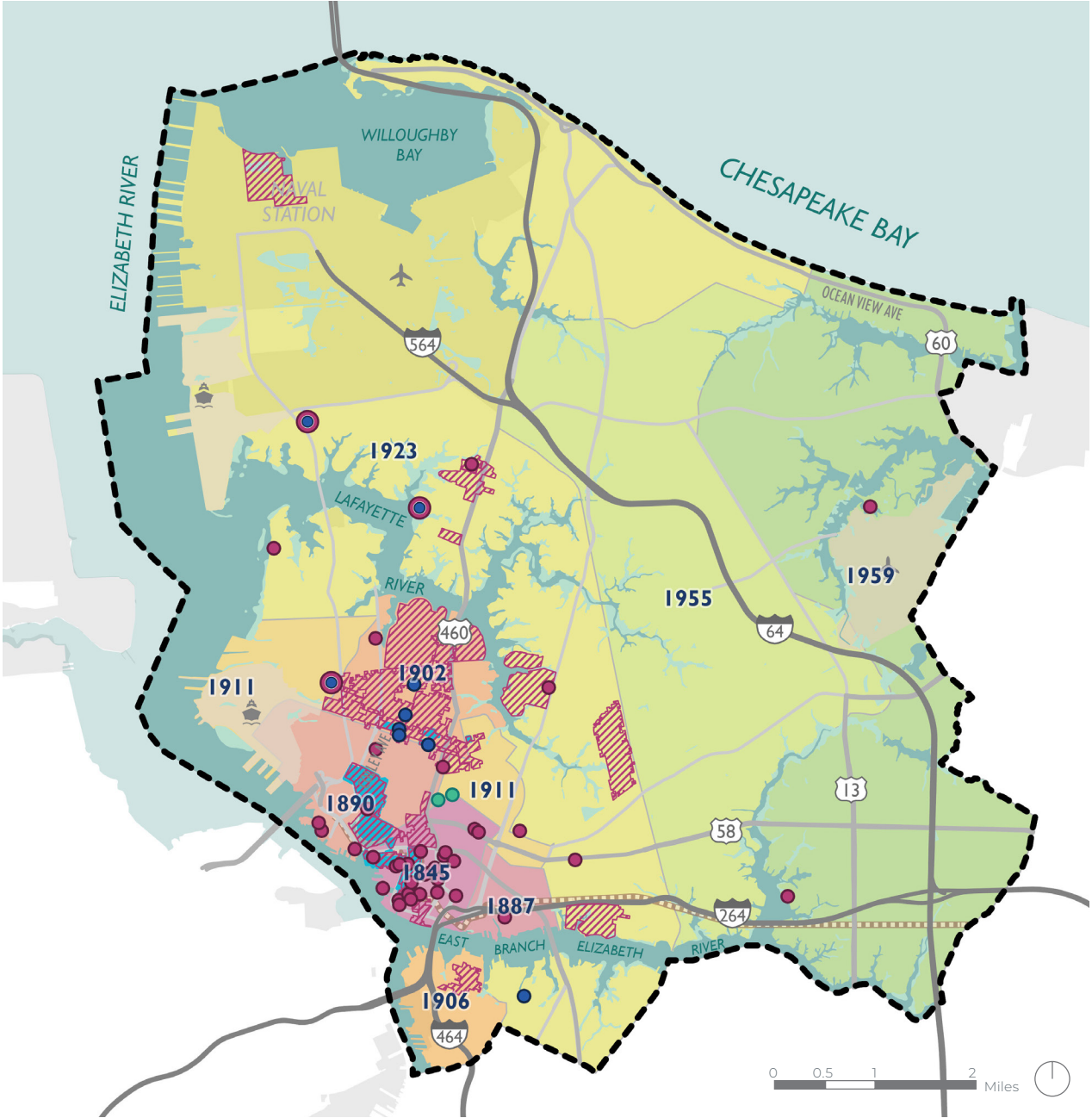


Figure 10: Historic resources, historic annexations, historic streetcar lines, and streetcar neighborhoods

Source: City of Norfolk; Sargeant Memorial Collection; Virginia Department of Historic Resources; WPA

HISTORIC RESOURCES

- Cemetery - State/National Individual Listed
- Local Historic Landmark
- State/National individual Listing
- State/National Historic District

HISTORIC STREETCAR LINES

- Historic Streetcar lines
- Historic Streetcar neighborhoods

ANNEXATIONS:

- | | | |
|------|------|------|
| 1845 | 1902 | 1923 |
| 1887 | 1906 | 1955 |
| 1890 | 1911 | 1959 |

- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands

Gathering Places and Social Infrastructure

Norfolk’s neighborhoods developed in what is now known as the Traditional Character District are defined by smaller parcels with varied land uses and dense street networks. Today, this supports a great density and variety of gathering places, sometimes known as “social infrastructure” — the places outside of home and work that Norfolk residents and stakeholders gather, socialize, and relax. **These places, such as restaurants, coffee shops, libraries, and other places where a community can engage in social activities are typically within walking distance of most residents and are in some cases integrated within the neighborhood.**

The consolidation of commercial uses along larger arterials can be seen in the eastern part of the city that was developed later in the 20th century. This development pattern is also based on larger parcel sizes with more uniform land uses and a branching street network that funnels residents to the large collector and arterial roads, along which the commercial zoned properties are concentrated. In these areas of the city,



Pop-up concert at “The Plot,” a repurposed vacant lot in Downtown Norfolk (City of Norfolk)

secular gathering places are typically limited to those commercial centers and are primarily accessible by automobile. Where commercial or secular gathering places are absent from large regions of the middle and late-20th century-annexed portions of the city, religious institutions fill in those gaps.

The analysis shows a disparity in access to gathering places and daily amenities: neighborhoods that developed early in the traditional pattern (city founding through the early 20th Century) have easier access than those that developed later in the auto-oriented era (post-WWII).

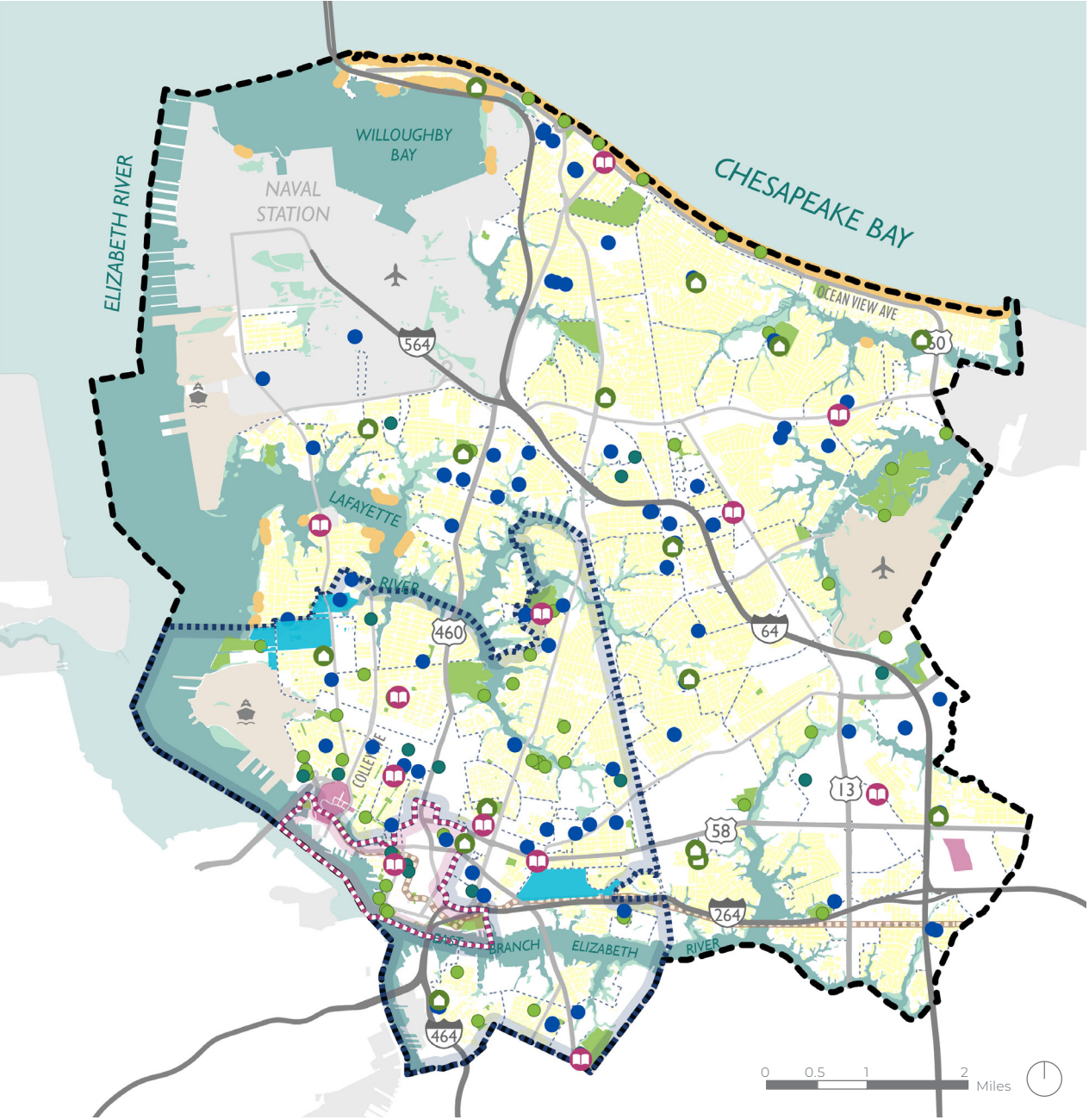


Figure 11: Gathering Places and Social Infrastructure in Norfolk

Source: City of Norfolk; Open Street Map; WPA

GATHERING PLACES AND SOCIAL INFRASTRUCTURE

- Park
- Medical facility
- College/University
- Religious institution
- School
- Outdoor recreation
- Indoor recreation
- Recreation Center
- Libraries
- Residential
- Civic Leagues
- Downtown Character District
- Traditional Character District

- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands

Walkable Neighborhoods

While much of Downtown and adjacent neighborhoods are quite walkable, neighborhoods across the city could pursue more safe, attractive infrastructure for pedestrians.

Through an analysis of factors that encourage walkability — including street trees for shade and cooling, sidewalks, dining and shopping destinations, and proximity to open spaces, schools, and libraries — Norfolk is shown to have uneven walkability across the city (Figure 12).

Some neighborhoods in the eastern and northern areas of the city, typically developed later in the 20th century when car access was already widespread, are found to lack street infrastructure or meaningful destinations or both. Many of these least walkable neighborhoods are relatively isolated by water, industry, or infrastructure.



Neighborhoods with sidewalks and street trees are much more pleasant to walk than those without (WRT)

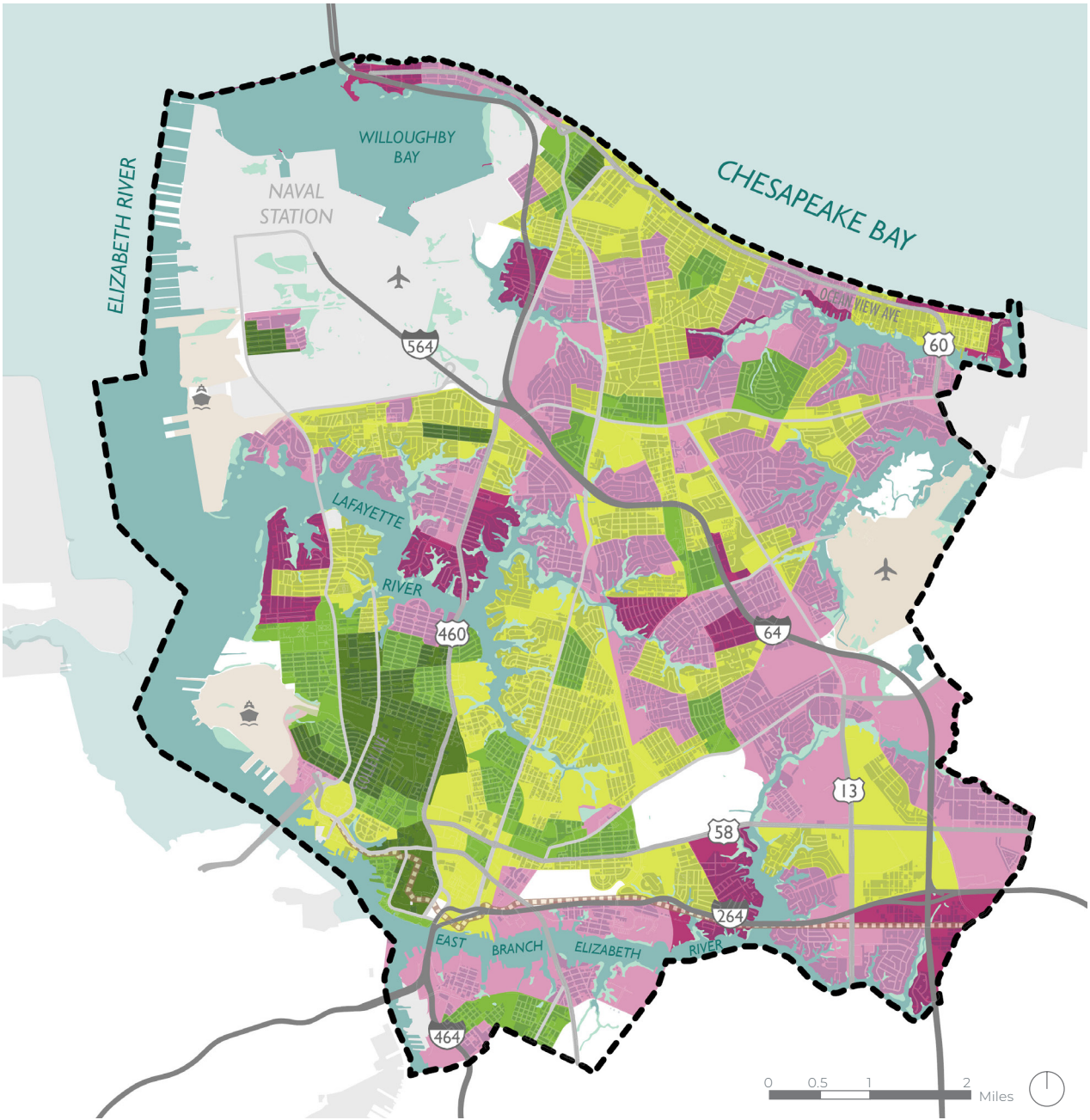


Figure 12: Norfolk neighborhood walkability analysis
Source: City of Norfolk; WPA; HRTPO

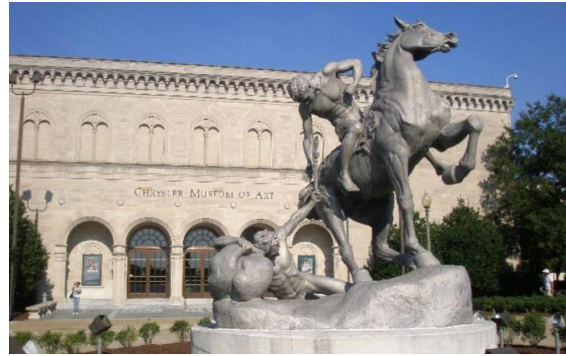
- Walkability factors:
- 1. Density of trees
 - 2. Density of sidewalks
 - 3. Density of dining (restaurants, cafes, bars, etc.)
 - 4. Density of shopping (retail, grocery, convenience)
 - 5. Area within 10 min walk to an open space
 - 6. Area within 10 min walk to schools and libraries

WALKABILITY SCORE

Least Walkable

Most Walkable

- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands



The Chrysler Museum of Art (City of Norfolk)



Painting a leopard-themed Mermaid for public display (City of Norfolk)



One of many murals in the NEON District (The NEON District)

Public Art and Culture

Norfolk is fortunate to have public art – sculptures, murals, and the city’s iconic mermaid statues – throughout the city, with a particular presence Downtown, in the NEON District, and in the nearby neighborhoods.

PUBLIC ART:

Norfolk has a very active Public Art Commission, known as Norfolk Arts. The commission seeks opportunities to install

public art in diverse parts of the city to enhance the public realm. Works are commissioned in all media from artists of varied backgrounds. Sculptures are commissioned to commemorate people, places, and events as well as to reflect individual community’s sense of identity. Murals are painted throughout the city on streets and buildings to beautify spaces and provide passersby with delightful moments of inspiration, affirmation, and wonder. Norfolk’s Mermaids on Parade was introduced to the community by prominent lawyer and businessman Pete Decker and his wife, Bess Decker in 1999. Currently there are 85 official mermaids throughout the city put up by residents,

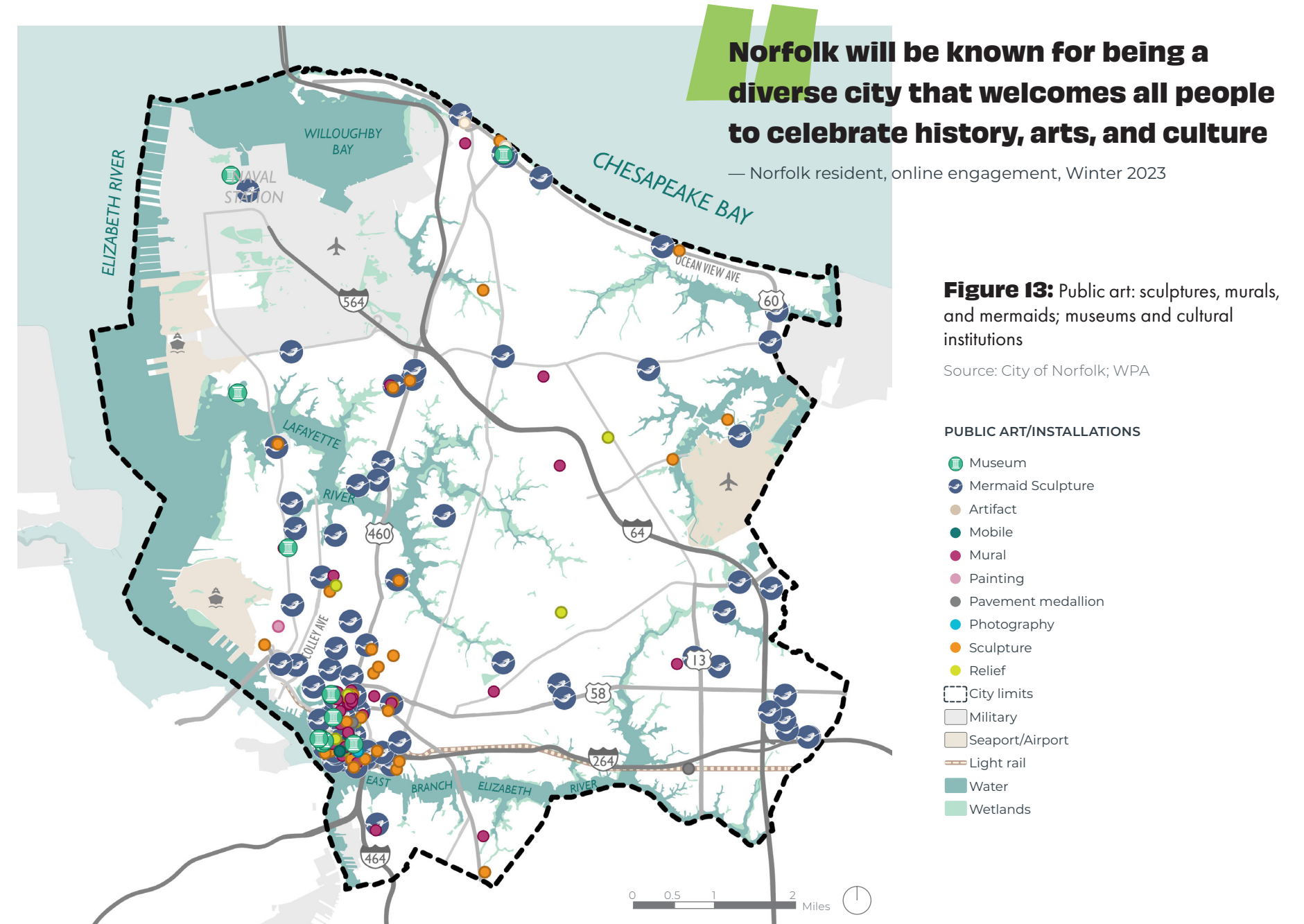
businesses, organizations, and institutions (Source: City of Norfolk). Each mermaid is an individual work of art with a distinct theme.

MUSEUMS:

Norfolk has several museums dedicated to organizations such as Fire and Police and the Navy, as well as museums that are focused on a specific structure such as the Hunter House Museum and the Moses Myers House. Museums dedicated to the arts include the Chrysler Museum of Art, the Chrysler Museum Perry Glass Studio, the Barry Arts Museum, and the Hermitage Museum and Gardens.

Norfolk will be known for being a diverse city that welcomes all people to celebrate history, arts, and culture

— Norfolk resident, online engagement, Winter 2023



Regional Anchors

Downtown Norfolk: A Regional Gem

Situated on the original 50 acres of the Town of Norfolk, Downtown is the historical, commercial, and cultural heart of the city and the entire Hampton Roads region.

Formerly a center of maritime trade with a waterfront lined with wharves, oyster packing houses, and warehouses, **Downtown has evolved into a regional business center with 1,100 businesses calling it home** (Progressive Urban Management Associates - P.U.M.A., 2024). The core of the city features the greatest concentration of Class A office space in the area, housing a workforce that is 50% knowledge sector workers (P.U.M.A., 2024). Over 18,000 workers commute into Downtown each day, representing 15% of the city's total workforce (P.U.M.A., 2024).

Downtown's cultural attractions include restaurants, performing arts, sports, and outdoor festivals. Of the storefront businesses in Downtown, 46% are restaurants, bars, cafés or other types of dining establishments

(P.U.M.A., 2024. Downtown Storefront Inventory). Chrysler Hall, Harrison Opera House, the Wells Theatre, Scope Arena, and Harbor Park are all located within Downtown and respectively house the Virginia Symphony Orchestra, the Virginia Opera, the Virginia Stage Company, the Norfolk Admirals ECHL hockey team, and the Norfolk Tides MiLB baseball team in addition to concerts, speaking engagements, Broadway shows, and many other performances. Chrysler Hall is also the home venue for the Norfolk Forum, “the oldest publicly-subscribed speakers' forum in the country” which hosts “series of lectures



Downtown Norfolk (WRT)

from eminent individuals covering cultural, literary, and governmental issues before the nation” (The Norfolk Forum, 2024).

Tourism brings several hundred thousand visitors per year to Downtown through conferences and conventions, cruise ship travel, and the many festivals and events programmed by FestEvents and the Virginia Arts Festival (P.U.M.A., 2024. Downtown Attractions). The Downtown hotel industry has remained strong post-COVID and posted a 6-year high Average Daily Rate in 2023 (P.U.M.A., 2024. Visitation by the Numbers).

Being situated in the first 50 acres of the city, Downtown was Norfolk's first neighborhood. However, like many downtowns throughout the United States, Downtown Norfolk transitioned to a commercial and financial center through the mid-twentieth century, providing employment for suburban residents of surrounding communities while being home to very few residents itself. This trend is reversing and **Downtown Norfolk is reemerging as a vibrant neighborhood, increasing in population by over 85% since 2010** (P.U.M.A., 2024). This increase in residents has also resulted in an increase in neighborhood-serving businesses located

in Downtown to provide goods and services to these new residents. This early stage of neighborhood restoration has primarily attracted young people in the 25-34 year old range and empty nesters 65 years and older, resulting in an average household size of 1.44 (P.U.M.A., 2024). To attract and retain larger households and a broader range of ages and family types, Downtown will need to make schools, child care, groceries, and a greater variety of goods and neighborhood-scale services available within a conveniently walkable distance.

over 18,000 workers commute into Downtown Norfolk every day



Downtown Norfolk (WRT)

Naval Station Norfolk

Naval Station Norfolk is one of the region’s largest employers with over 110,000 employees. Constructed on the site of the Jamestown Exposition shortly after World War I, the naval base occupies 4,600 acres and is currently homeport to 47 ships including six aircraft carriers.

Naval Station Norfolk supports the operational readiness of the US Atlantic Fleet and is critical to national security in an increasingly volatile time across the globe. The safety, well-being and mission-readiness of service members and private contractors that work at Naval Station Norfolk are of paramount importance. In 2019, the Hampton Roads Planning District Commission developed the Norfolk-Virginia Beach Joint Land Use Study (JLUS) that honed in on addressing accessibility challenges on Norfolk’s roads resulting from sea level rise and tidal/ nuisance flooding. The Navy depends on the region’s local governments for its roadways, utilities, and many support services. Five core challenges were identified that influenced the analysis of interdependencies and vulnerabilities.

GETTING TO WORK

Over 200 miles of regional and local roadways were identified in the JLUS planning process as either primary or secondary corridors serving the Navy, including those corridors that are part of the Department of Defense Strategic Highway Network (STRAHNET). The impacts of tidal flooding on roadways will be exacerbated by additional sea level rise in the future. If these routes are congested, flooded, or otherwise impeded, the ability of Navy personnel and civilians to get to work could be impacted, thereby impacting mission readiness. These conditions can result in operational inefficiencies, impact planned operations or security, and result in loss of work time. A reliable transportation network is essential for ensuring mission readiness and the smooth, efficient movement of both people and goods to and from the Navy installations.

ACCESSING COMMUNITY FACILITIES AND SERVICES

Roadway flooding along key corridors and in neighborhoods also limits access to community facilities that military personnel and their families regularly rely upon, such as schools and hospitals, and life-safety services that they may require, such as police, fire, or emergency response. Floodproofing assets or elevating them above the floodplain

Naval Station Norfolk welcomed over **110,000** employees in 2022

will provide minimal benefit to the greater community if large numbers of residents are unable to access the facility due to roadway flooding.

MANAGING STORMWATER

Undersized and/or inadequately maintained stormwater infrastructure can cause or exacerbate flooding issues on roadways and adjacent properties. Each locality owns its own stormwater infrastructure, which is managed and maintained by the City’s Public Works department. Likewise, the Navy owns and maintains stormwater management infrastructure that is located on base. However, runoff from the installations often ends up in the localities’ stormwater systems, and vice versa. Varying design standards and inconsistent maintenance regimens across the network can contribute to degraded system performance in some areas.

MAINTAINING UTILITY SERVICES

Infrastructure providing utilities such as power, water, and wastewater is critical for maintaining operations on a military base. These networks are provided by the cities and other sources outside of the installation. Any disruption to the utility network infrastructure from current or future flooding could significantly disrupt military operations. Facilities located in vulnerable locations may face additional challenges due to flooded roadways that limit access for repairs.

COORDINATING BETWEEN JURISDICTIONS

Effective regional planning requires coordination among federal, state, and local government agencies and the private sector. Good examples of partnering exist and can serve as a model for building on the cities’ existing mechanisms for coordination with the Navy moving forward.

Source: Virginia Beach Joint Land Use Study; Hampton Roads Planning District Commission, August 2019; AECOM



Housing

Norfolk's Housing Landscape

Like most cities, Norfolk has produced less new housing in the past decade than in any previous era.

The pace of housing development in Norfolk and the surrounding region has slowed in the past decade. The total number of housing units (both rental and homeownership units) produced fell by 1,000, from about 7,100 in 2000-2009 to 6,150 in 2010-2019. Of that total, only 2,170 were rental units.

Most new housing developments are focused in Downtown Norfolk, East Beach, and the vicinity of Old Dominion University, with average monthly rents of \$1,500. These units, predominantly studios to two bedrooms, lack affordability restrictions and thus tend to cater to residents with higher incomes. Additionally, the limited number of bedrooms means they are less suitable for families or larger households, further narrowing their accessibility.



A tree-lined residential neighborhood (City of Norfolk)

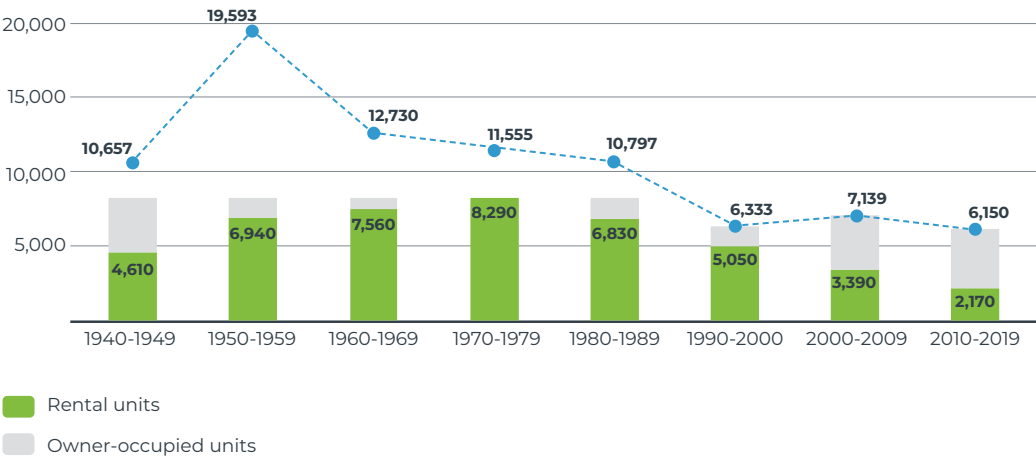


Figure 14: Change in total housing units produced by decade

Source: ACS 2020, 5-year estimates

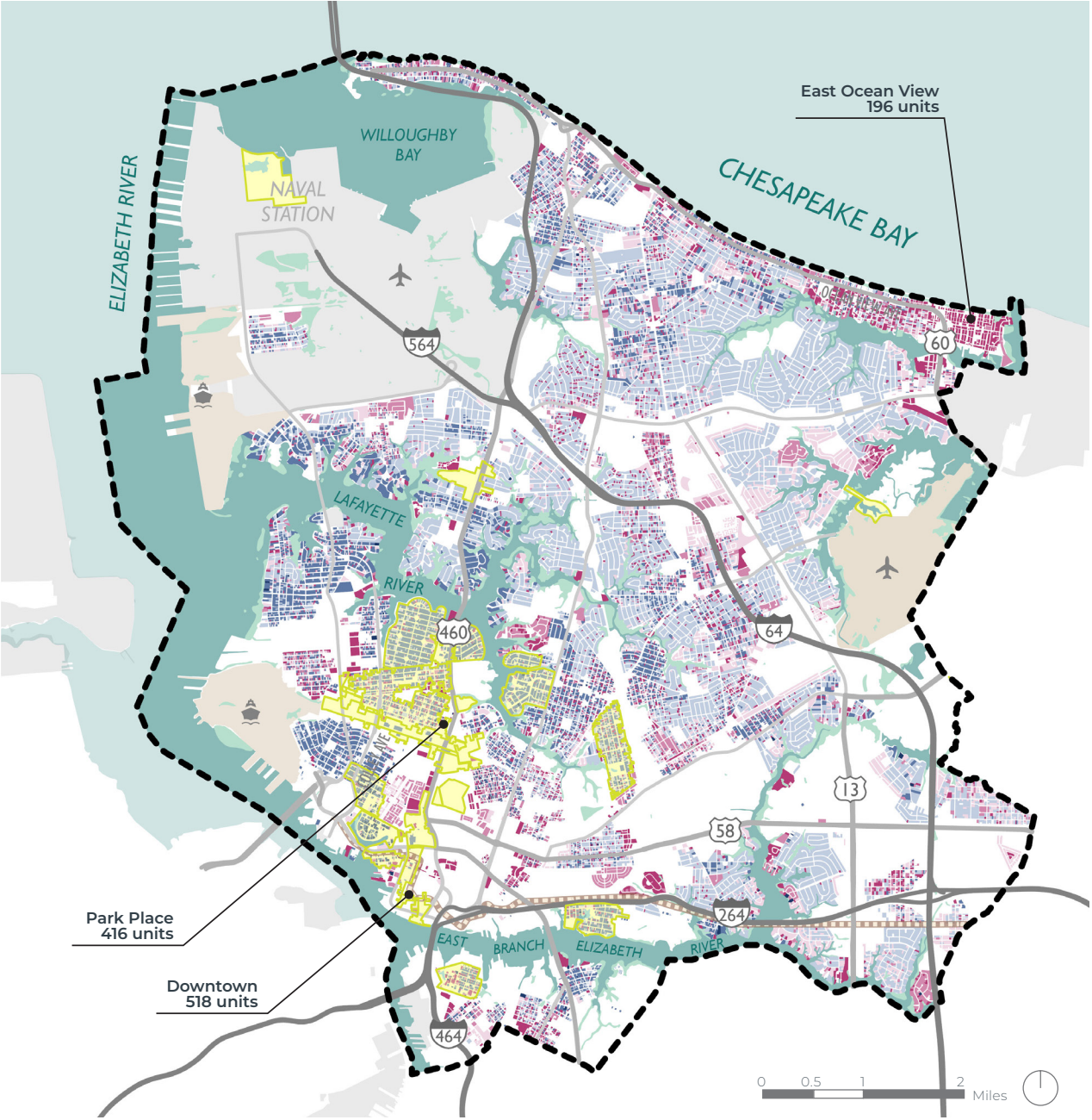


Figure 15: Housing age by decade and historic districts

Source: US Census Bureau, ACS 5-Year Estimates, 2022; City of Norfolk

YEAR BUILT - HOUSING

- 1800-1900
- 1901-1940
- 1941-1960
- 1961-1980
- 1981-2000
- 2001-2023

HISTORIC DISTRICT

- Historic District / Site

- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands

77% of housing units were built before 1990

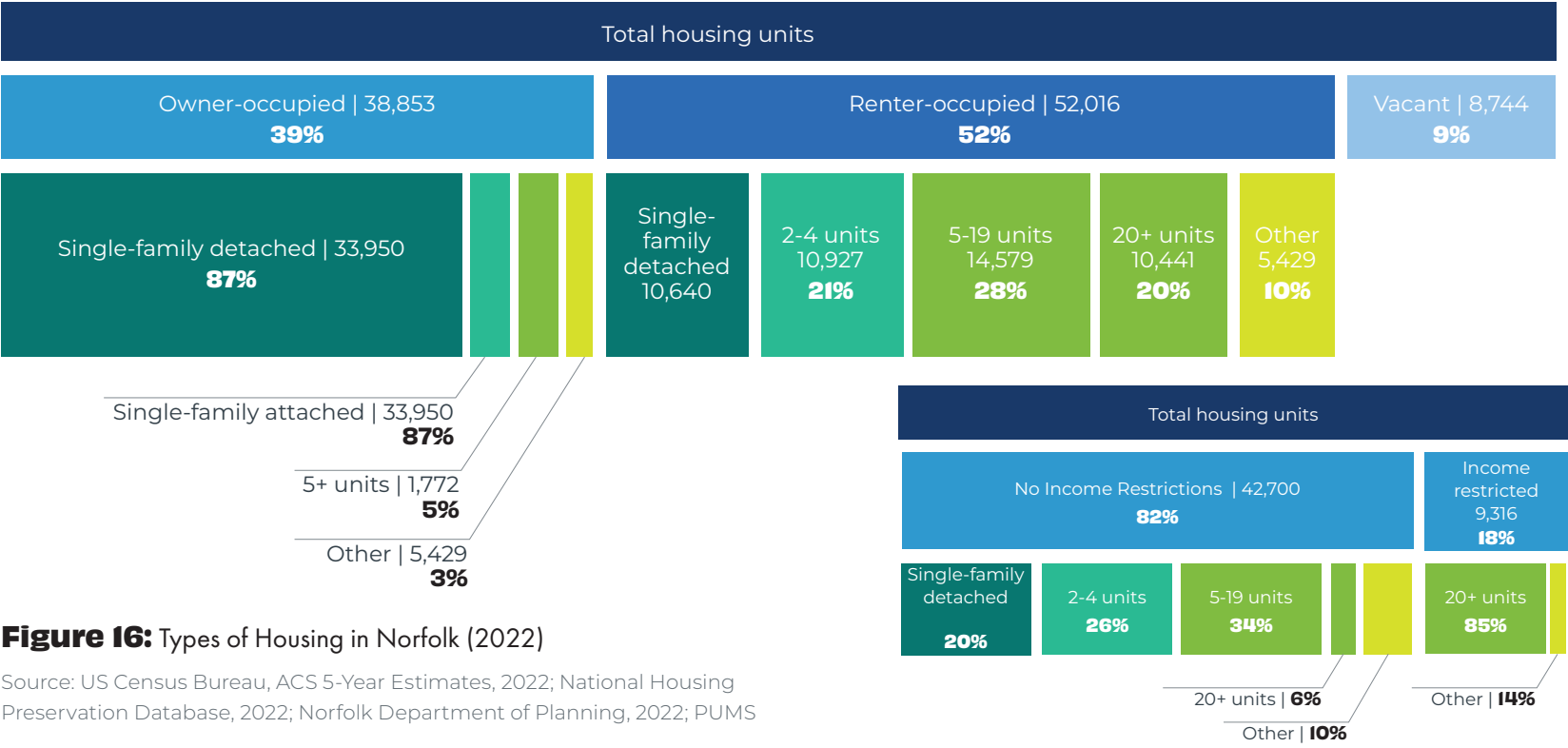


Figure 16: Types of Housing in Norfolk (2022)
 Source: US Census Bureau, ACS 5-Year Estimates, 2022; National Housing Preservation Database, 2022; Norfolk Department of Planning, 2022; PUMS

Norfolk has more diversity in existing housing stock than the rest of the region.

Over a third of Norfolk’s housing stock is rental housing with two or more units, the highest in the region. Today the city’s total housing inventory is comprised of 98,000 units, 91% of which are occupied. Of these, 52,000 are renter-occupied units that are made up of a diverse range of housing types.

Norfolk’s households are increasingly renting rather than owning, particularly for moderate to higher income households.

This increase is reflective of both macroeconomic trends such as rising interest rates that drive decreasing homeownership access and local housing inventory trends. Norfolk’s rental housing inventory has grown since 2010 while the for-sale inventory declined modestly during that period.

Norfolk’s rental housing stock at attainable rents is aging.

In Norfolk, the bulk of rental properties priced under \$1,000 per month were constructed prior to 1980, suggesting that the rental options affordable to households earning below 100% of the median household income are predominantly over 40 years old. Consequently, these older properties are more likely to require rehabilitation or repairs than those built more recently. It is vital to maintain the quality of these older homes without significantly raising the rent to ensure long-term housing stability in Norfolk.

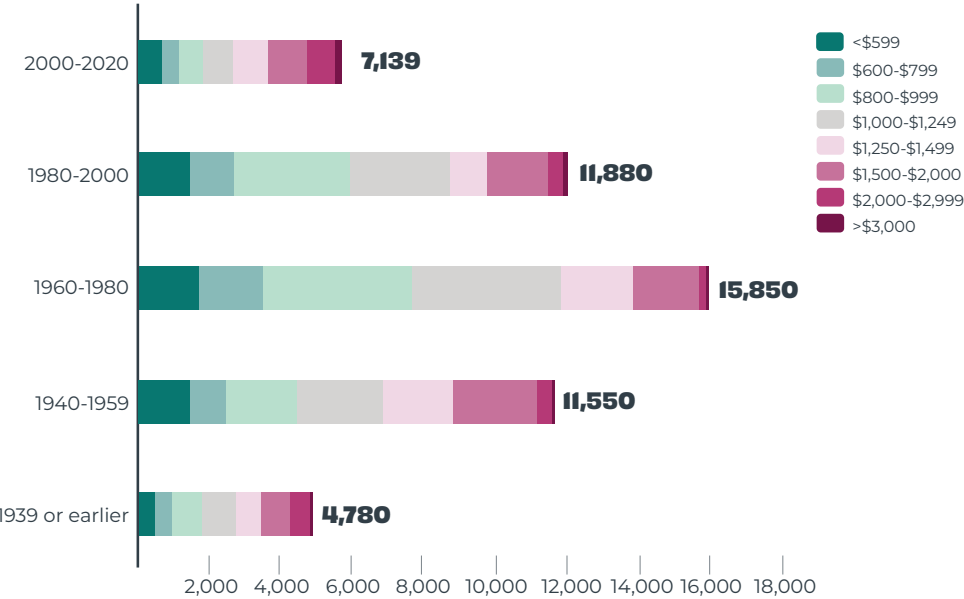


Figure 17: Rental units by monthly rent and decade built
 Source: US Census Bureau, ACS 5-Year Estimates, 2022; HR&A



St. Paul's Transformation

As the site of the former Tidewater Gardens, the St. Paul’s Transformation Project just east of Downtown Norfolk will fully transform a 1950s distressed housing site into a resilient community of the future, addressing decades of flooding and poverty. The project implementation started in 2023.

Spearheaded in partnership between the City of Norfolk and the Norfolk Redevelopment and Housing Authority (NRHA), the newly redeveloped St. Paul’s is slated to become a large-scale mixed-use, mixed-income community, welcoming back former residents and adding in new neighbors from all ends of the socioeconomic spectrum.

As of spring 2024, residents had been temporarily relocated, demolition has been completed and much of the new housing is under construction. The reimagined site infrastructure features new blocks, streets, parks, public spaces, and a generous amount of green infrastructure to help with stormwater capture.

Housing Affordability

Recent increases in interest rates have impacted home purchase affordability for Norfolk’s average household. The purchasing capacity of a median-income household was relatively in line with home prices until recently: since 2020, inflating home values and rising interest rates have risen sharply, opening a median gap in affordability of nearly \$100,000.

The median gross rent has been consistently unaffordable for the median-income renter household, which makes about \$41k annually compared to \$90k for owner households.

With persistent poverty and rising prices, rental affordability is a challenge in Norfolk, especially for low-income households.

The majority of Norfolk’s low income households struggle to afford rents. Renter households making an annual income between 30-50% Area Mean Income (AMI, Figure 20) are the most severely cost burdened with more than 87% paying over 30% of their income on rent.

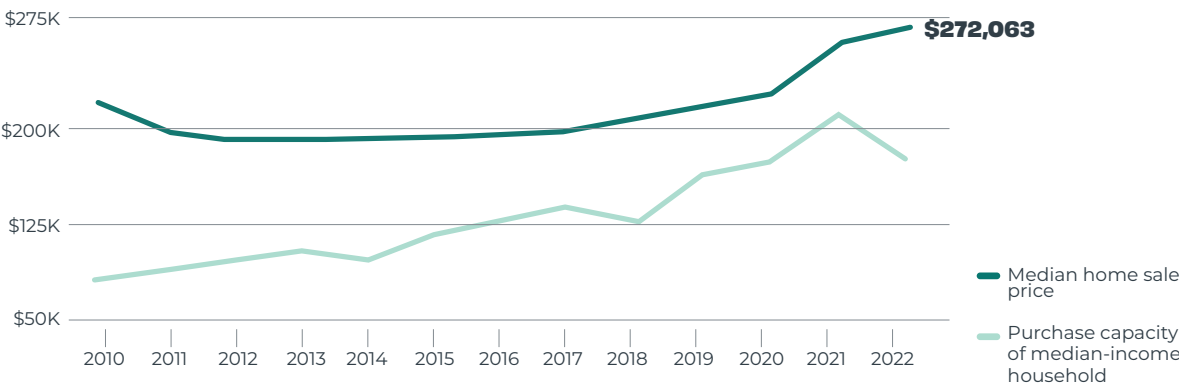


Figure 18: Homeownership affordability

Source: US Census Bureau, ACS 5-Year Estimates, 2022

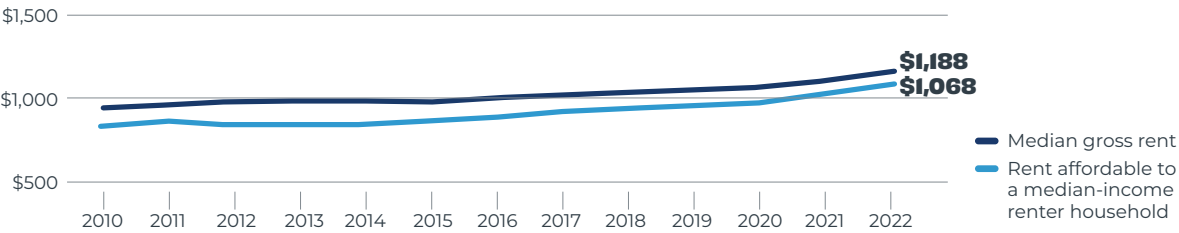


Figure 19: Rental affordability

Source: US Census Bureau, ACS 5-Year Estimates, 2022

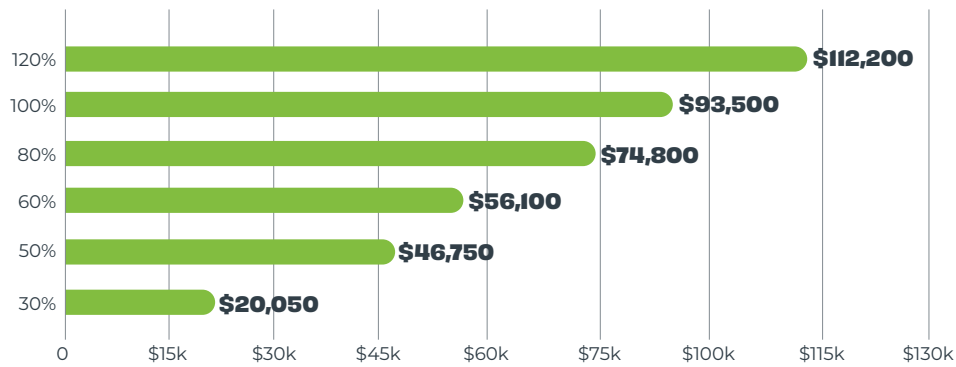


Figure 20: Norfolk AMI thresholds for a family of four

Source: US Census Bureau, ACS 5-Year Estimates, 2022

Affordable Rental Housing

Approximately 16,300 low-income renters in Norfolk receive federally subsidized housing. These renters have an average household income per year of \$17, 585. 94% percent of households receiving federal assistance are very low income and 76% are extremely low income. Further, 93% of subsidized households are racial/ethnic minorities, with the vast majority being Black Non-Hispanic. A high percentage of subsidized households are single-parent households (39%), and the majority of households are female-headed.

The majority of Norfolk’s affordable rental housing (i.e., affordable to households making 80% of the median household income of \$60,998) is naturally occurring affordable housing without income restrictions. Norfolk’s unsubsidized affordable housing is made up of more diverse, moderate density housing types, while Norfolk’s subsidized affordable housing stock is mostly located in high density multi-family buildings.

While Norfolk is home to 13% of the region’s population, it possesses 22% of the region’s subsidized, income-restricted, affordable housing.

The City’s housing stock includes about 36,000 affordable rental homes, 75% of which are naturally occurring affordable housing. While recent rent increases are causing this stock to lose its affordability, this diversity in the inventory creates a strong base that warrants preservation and reinvestment efforts to support long-term affordability and growth.

I look forward to seeing the growth of the Community and the Hampton Roads area as a whole.

— Norfolk resident, Workshop #1, October 2023

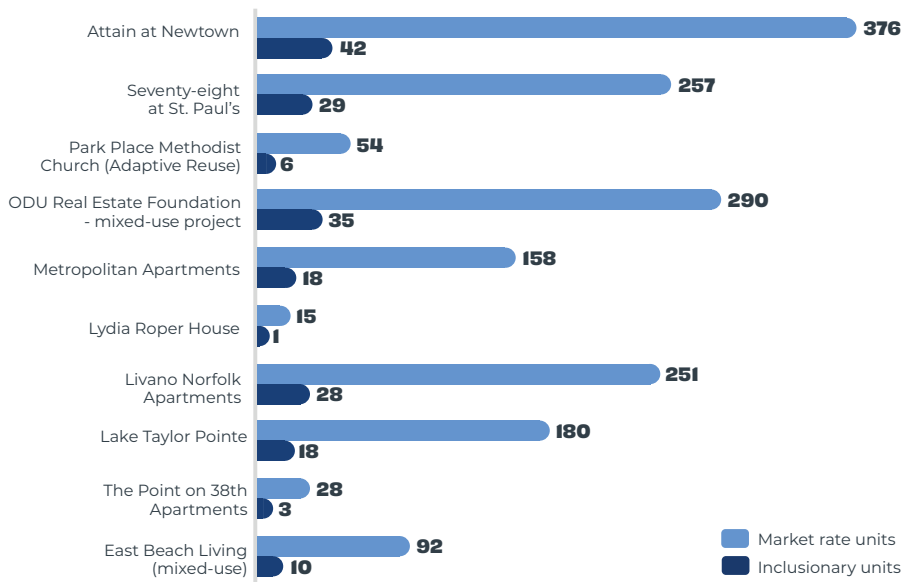


Figure 21: Proposed affordable units created by inclusionary zoning requirements (as of 2022)

Source: City of Norfolk



City-owned property sold at auction, January 2024 (City of Norfolk)

A granular understanding of housing cost burden by income bands sheds light on how Norfolk residents are struggling to keep roofs over their heads.

Stratifying households by tenure (rental vs. owner) and income levels is important because federal and state programs are designed within these parameters. Of the major cities in Hampton Roads, Norfolk’s poverty rate is highest, which is evident in the housing cost burden chart (Figure 22). Housing cost burden is measured against Area Mean Income (AMI), which in the City of Norfolk is \$60,998.

Regardless of whether a renter or a homeowner, **a Norfolk household making less than 80% of the AMI (\$49K) is very likely housing cost burdened**. In other words, a majority of households making less than \$49K in annual income pays more than one third of their income on housing costs – taking away from affording other essential household needs such as fresh foods, childcare, transportation, and recreation.

Public housing is an important social safety net for Norfolk residents. While public housing is eligible for households making up to 80% of AMI (about \$49K), most public housing households are extremely low-income (less than 30% AMI, \$18K). Norfolk Redevelopment and Housing Authority (NRHA) has made strides in removing stigma around public housing by reimagining public housing sites as mixed-income communities. Recent Choice Neighborhoods funding from the federal government has facilitated this transformation at St. Paul’s. Low-Income Housing Tax Credits (LIHTC) housing is another program that provides affordable rental housing for Norfolk residents through public-private partnerships. LIHTC housing is eligible for households making below 60% AMI (\$36K), and typically targets rental households making between 40%-60% AMI (\$24K-\$36K). Norfolk uses the following tools to address housing affordability for existing homeowners: HomeNet & Homeward Norfolk, Renovate Norfolk and sale of vacant land with affordability covenants. Some of these programs are eligible for households making up to 120% of AMI (\$73K). Many affordable rentals in Norfolk are considered naturally occurring (without deed restrictions) – these units will likely become unaffordable as market conditions change.

By 2050, Norfolk will be well-connected, more equitable, affordable for all walks of life, and have a high quality of life.

— Norfolk resident, Workshop #1, October 2023

✦ To see Area Median Income thresholds for the City of Norfolk, please reference p. 28

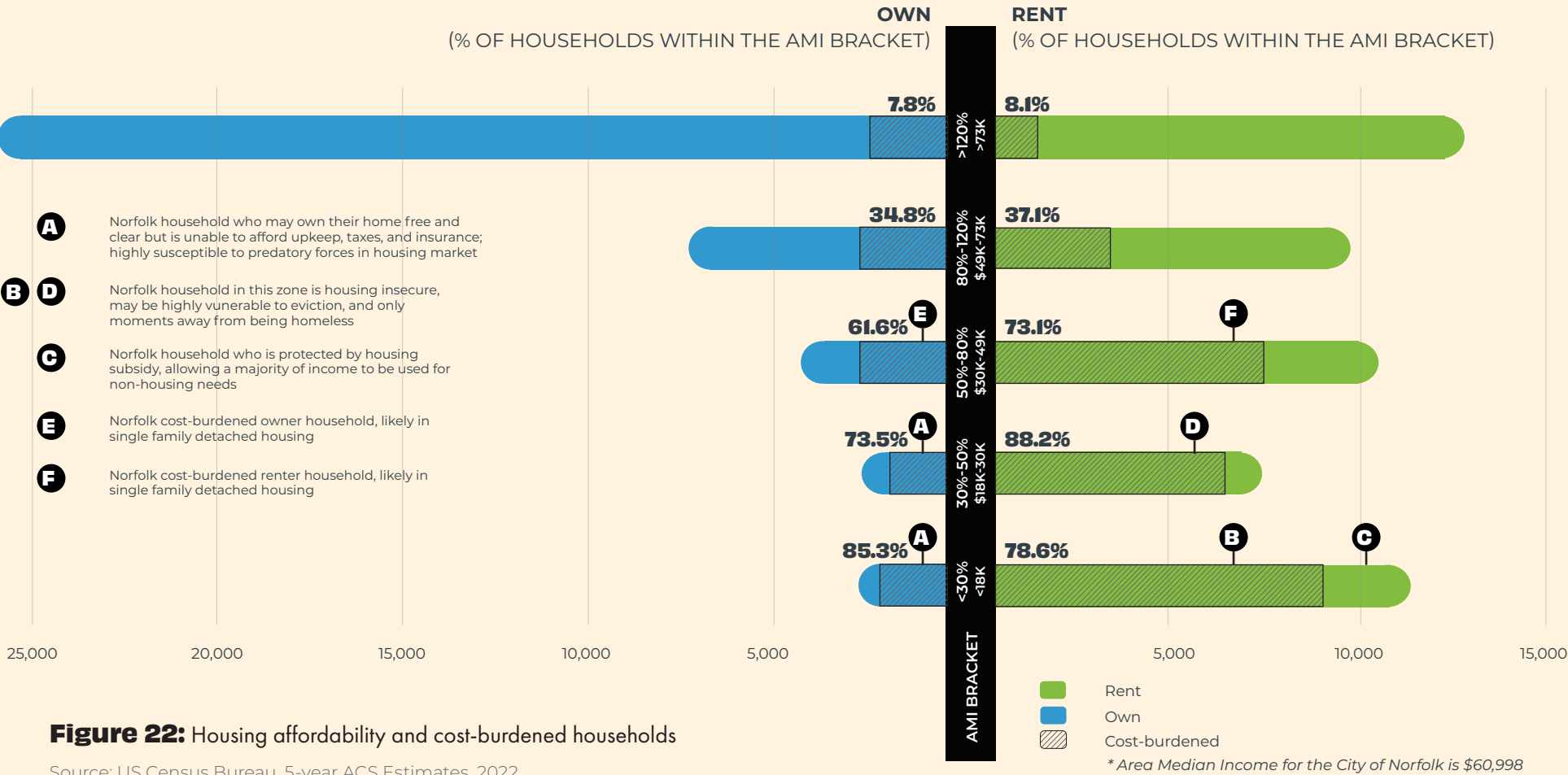


Figure 22: Housing affordability and cost-burdened households

Source: US Census Bureau, 5-year ACS Estimates, 2022

Historic Redlining

Legacy racial segregation continues to impact Norfolk’s housing market.

“Redlining” was the discriminatory practice of determining which neighborhoods were “good investments” for mortgage lenders, and which were deemed as too risky. As mapped in the 1930s, **overwhelmingly, the neighborhoods that were seen as too risky to back with federal dollars were communities of color.**

The designation of neighborhoods from “best” to “hazardous” as a consequence of redlining had a significant impact on Norfolk’s housing market. Entire neighborhoods graded “hazardous” — comprised primarily of African Americans, immigrants, and low-wealth households — were denied mortgages.

These discriminatory lending practices caused a negative feedback loop. As mortgage loans became harder to federally insure, redlined neighborhoods received less public and private investment. Consequently, home values did not increase at the same pace of comparable homes located in non-redlined neighborhoods, artificially suppressing homeowners’ equity creation — and continuing the vicious cycle of a racial wealth gap.

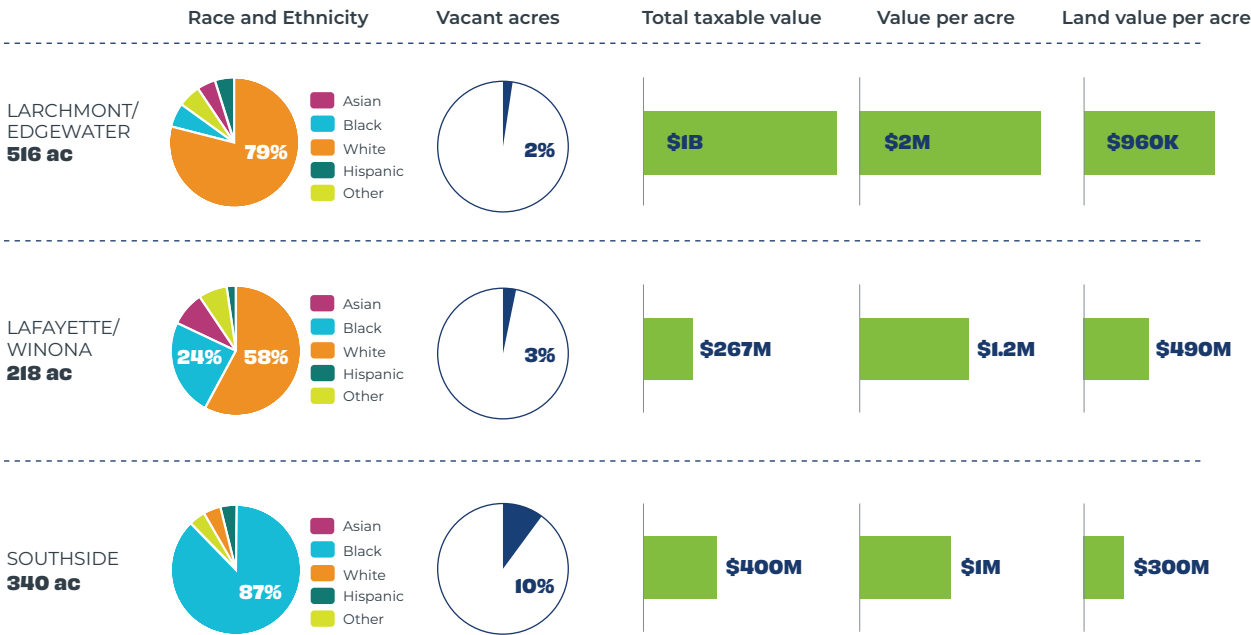


Figure 23: Neighborhood comparison summary

Source: City of Norfolk Assessor, 2023; 2020 Decennial Census; University of Richmond; HOLC

Much like many other historically redlined cities, the lasting impacts of this discriminatory practice are still present in Norfolk. This can be illustrated in the figures above that compare the following Civic Leagues: Larchmont/Edgewater (Home Owners Loan Corporation rating: “B - Still Desirable”), Lafayette/Winona (“C - Definitely Declining”), and Southside (“D - Hazardous”). When looking at demographics, we can see that Larchmont/Edgewater is a predominantly white community, Lafayette/Winona hosts

more diversity, and Southside is nearly 90% African American. Of the three communities, Southside also contains significantly more vacant land, as well as the lowest property and land value per acre.

While discrepancies persist, these differences in metrics between the historically “safe to invest” neighborhoods and Norfolk’s historically redlined neighborhoods are actually less extreme than many other American cities due to city policies which have aimed to rectify these injustices.

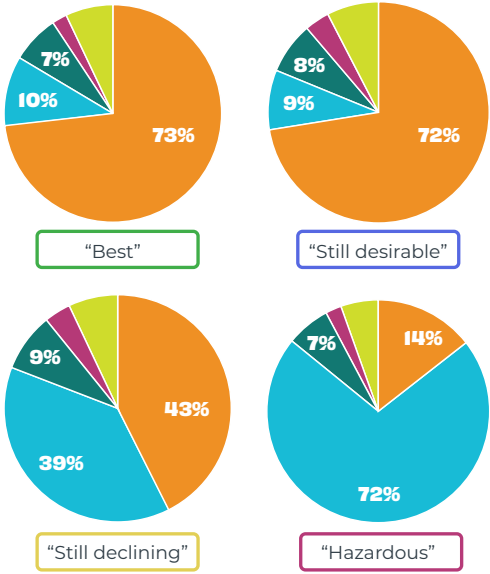
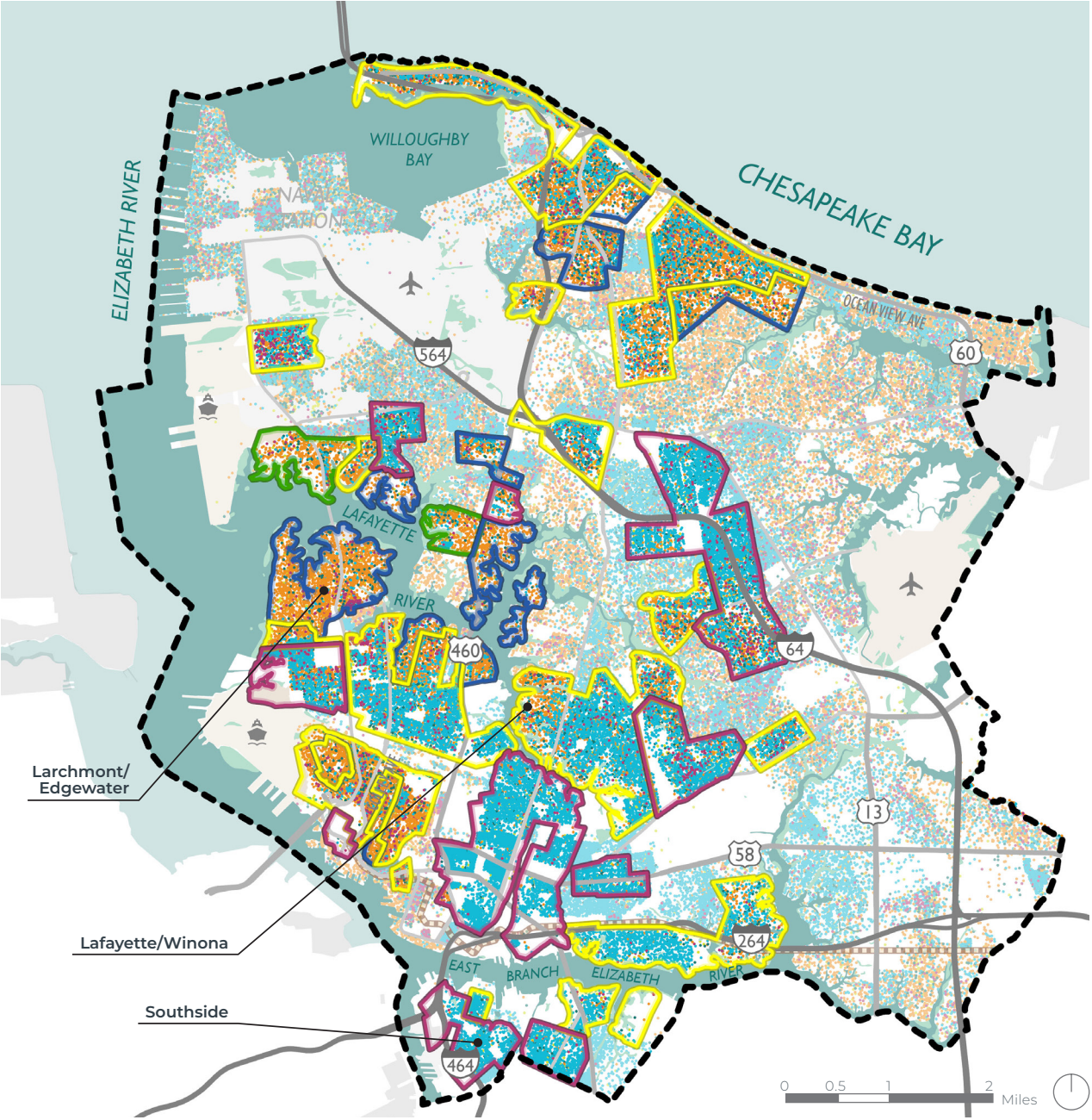
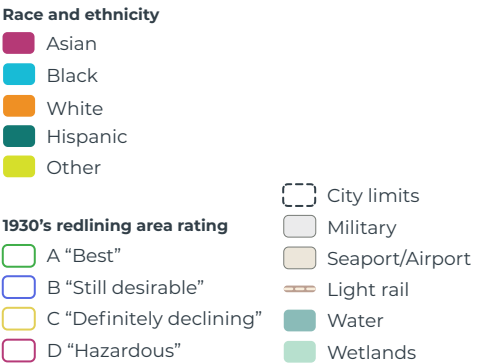


Figure 24: 1930s redlining area ratings and 2020 population demographics

Source: 2020 Decennial Census; University of Richmond; HOLC





Many of Norfolk's housing sites face flood risk (WRT)

Living with Water

Flood risk poses a threat to renters and owners at all ends of the socioeconomic spectrum in Norfolk. Of note, some of Norfolk's wealthiest residents are actually most at risk of flooding.

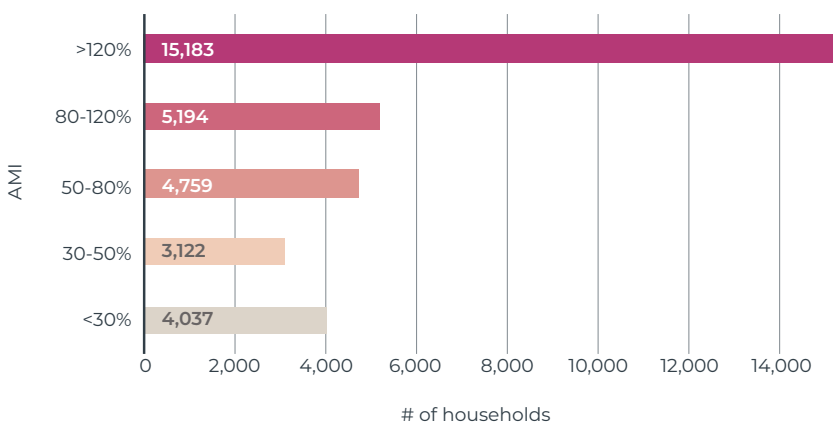
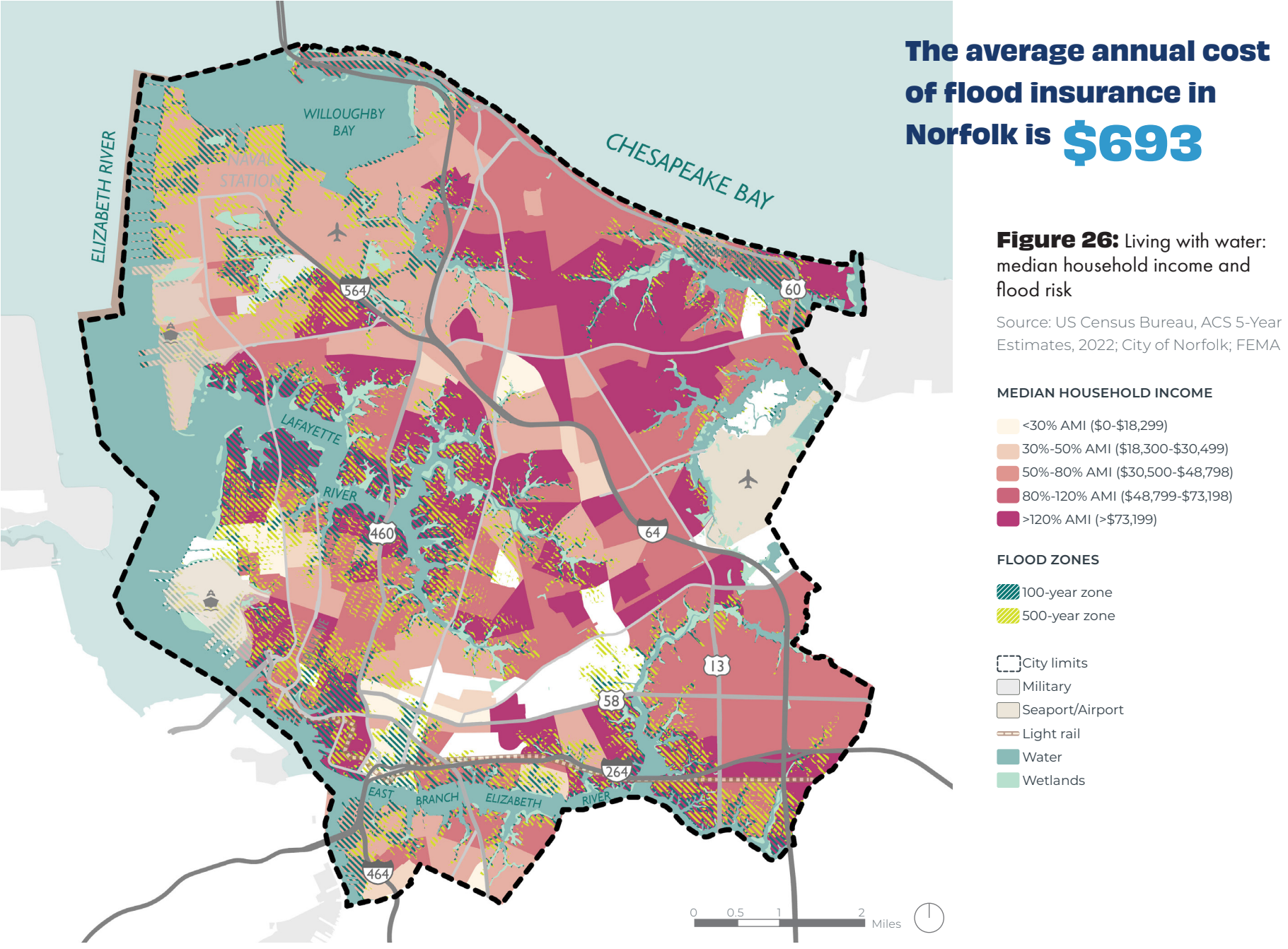


Figure 25: Households by average median income located within a 100-year or 500-year floodplain (combined)
Source: US Census Bureau, ACS 5-Year Estimates; City of Norfolk; FEMA

Increasing flood risk from future storm events, rising sea levels, and rainfall flooding has the potential to economically and physically undermine Norfolk's housing market. Flooding contributes to housing quality issues, further constrains the capacity of the housing ecosystem, exacerbates racial inequities in Norfolk and makes the economics of development more financially infeasible.

Rising costs of flood insurance and maintenance to repair home damage from storms is a challenge for market-rate housing, subsidized housing, and homeownership in Norfolk. Properties in the floodplain with a mortgage are required by lenders to carry flood insurance, but owners who own their homes outright may opt out of coverage. Conversely, property owners outside of the designated floodplain are still able to purchase flood insurance, although most do not. It should be noted that current floodplains are determined from past flood events and other complex models, and do not entirely approximate increasing future risk.

As of February 2024, **7,637 of Norfolk's buildings lie within a FEMA 100-year or 500-year floodplain.** There are approximately 6,650 flood insurance policies in place. Property owners who fall within the designated FEMA flood zones are eligible to participate in the Community Rating System (CRS) which provides a reduction in flood insurance premiums for residents, thanks to the ongoing resilience efforts the City and its partners have been undertaking.





less dense

more dense



MISSING MIDDLE HOUSING IS:

- **A form of housing that fits in with single-family** walkable neighborhoods.
- **House-scale buildings** that happen to have multiple tenants (both renters and owners).
- **A diverse housing choice** - broad range of housing types such as duplexes, triplexes, “Norfolk’s six-packs”, town-homes, courtyard apartments, cottage courts and more.
- **Attainable** - high quality homes that are sustainably affordable by virtue of design for our workforce - teachers, firefighters, nurses, and long-term care professionals.



SINGLE-FAMILY DETACHED
Lavalette Ave, Norfolk



DUPLEX | SIDE BY SIDE Ocean View, Norfolk



TRIPLEX | STACKED
Westover Ave, Norfolk



FOURPLEX | STACKED
Graydon Ave, Norfolk



COTTAGE COURT (Small cottages around a central green)
East Beach, Norfolk



DUPLEX | STACKED Harrington Ave, Norfolk



ACCESSORY DWELLING UNITS East Beach, Norfolk



SIXPLEX | STACKED + SIDE BY SIDE
Brandon Ave, Norfolk



SIXPLEX | STACKED (NORFOLK SIX PACK)
323 W. 28th St, Norfolk



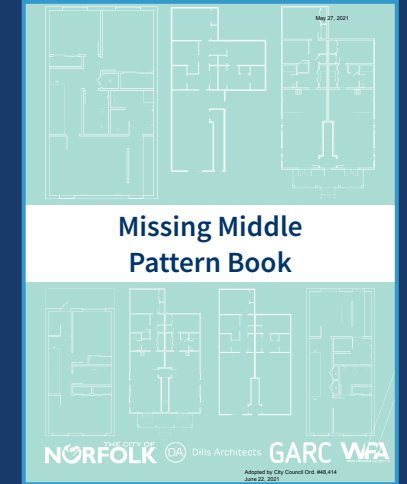
COURTYARD APARTMENTS Westover Ave, Norfolk



TOWNHOUSES AND MULTIPLEX Greenway Ct, Norfolk



LIVE + WORK UNITS East Beach, Norfolk

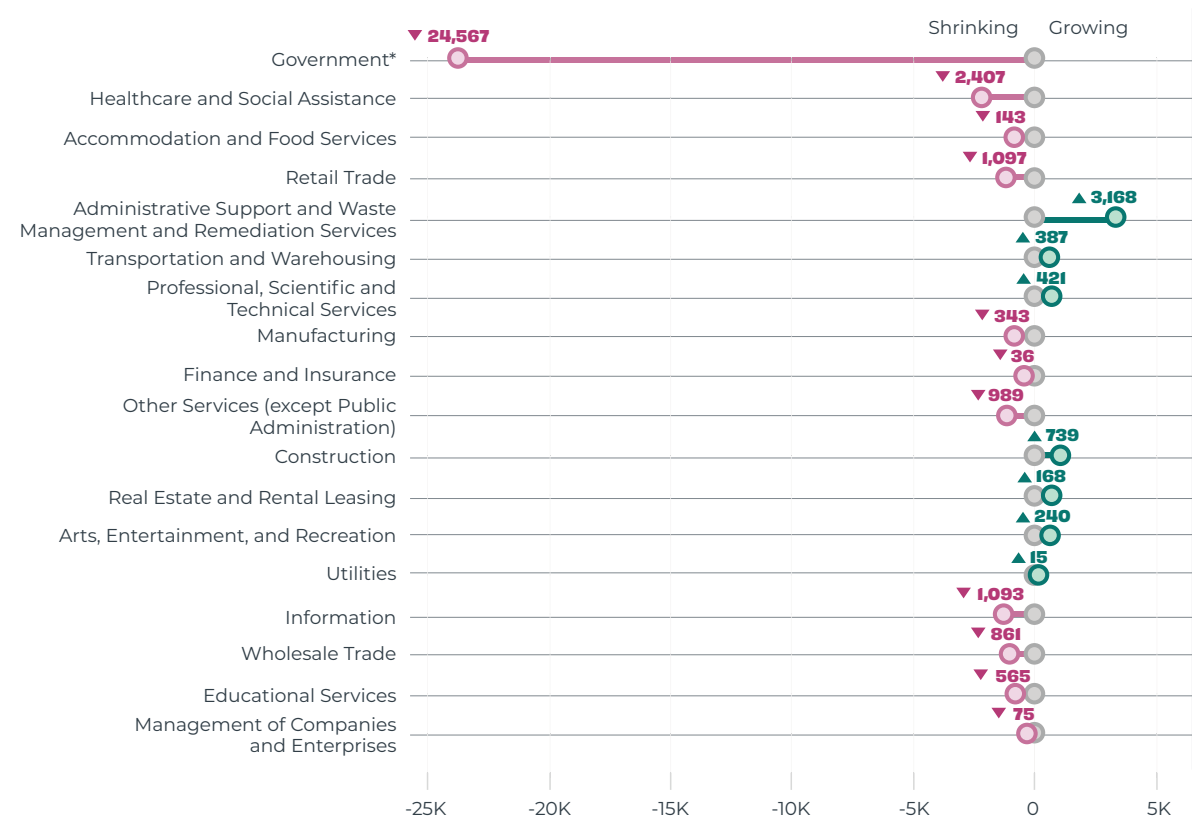


Norfolk’s “Missing Middle Pattern Book,” adopted in 2021, outlines these housing types and more, and the regulatory and financing steps that can support their development.



MID-RISE APARTMENTS Fort Norfolk, Norfolk

Jobs and Industry



*NOTE: Military employment numbers may be skewed by deployments, and are difficult to accurately measure.

Figure 27: Shrinking and growing industries

Source: Lightcast

professional services, transportation and real estate. Government saw the largest decline, losing 24,500 jobs between 2012 and 2022 - the majority of loss in military jobs, while the civilian workforce saw an increase. It should be noted that due to deployments, military data can be difficult to accurately measure.

Norfolk's government sector is the backbone of the city's economy, comprising over 56,000 jobs (35%). Federal employment of civilians and military personnel far outweighs other sub-industries, employing 20,000 and 18,000 respectively.

Healthcare, the second-largest industry, is significantly smaller with approximately

19,000 jobs. While Norfolk is known for its port, the largest sub-industry related to this economic driver is ship and boat building which only comprises around 3,200 jobs.

Over the last decade, the administrative services sector stands out with a robust growth of +47% in jobs. Other sectors demonstrating growth include construction,

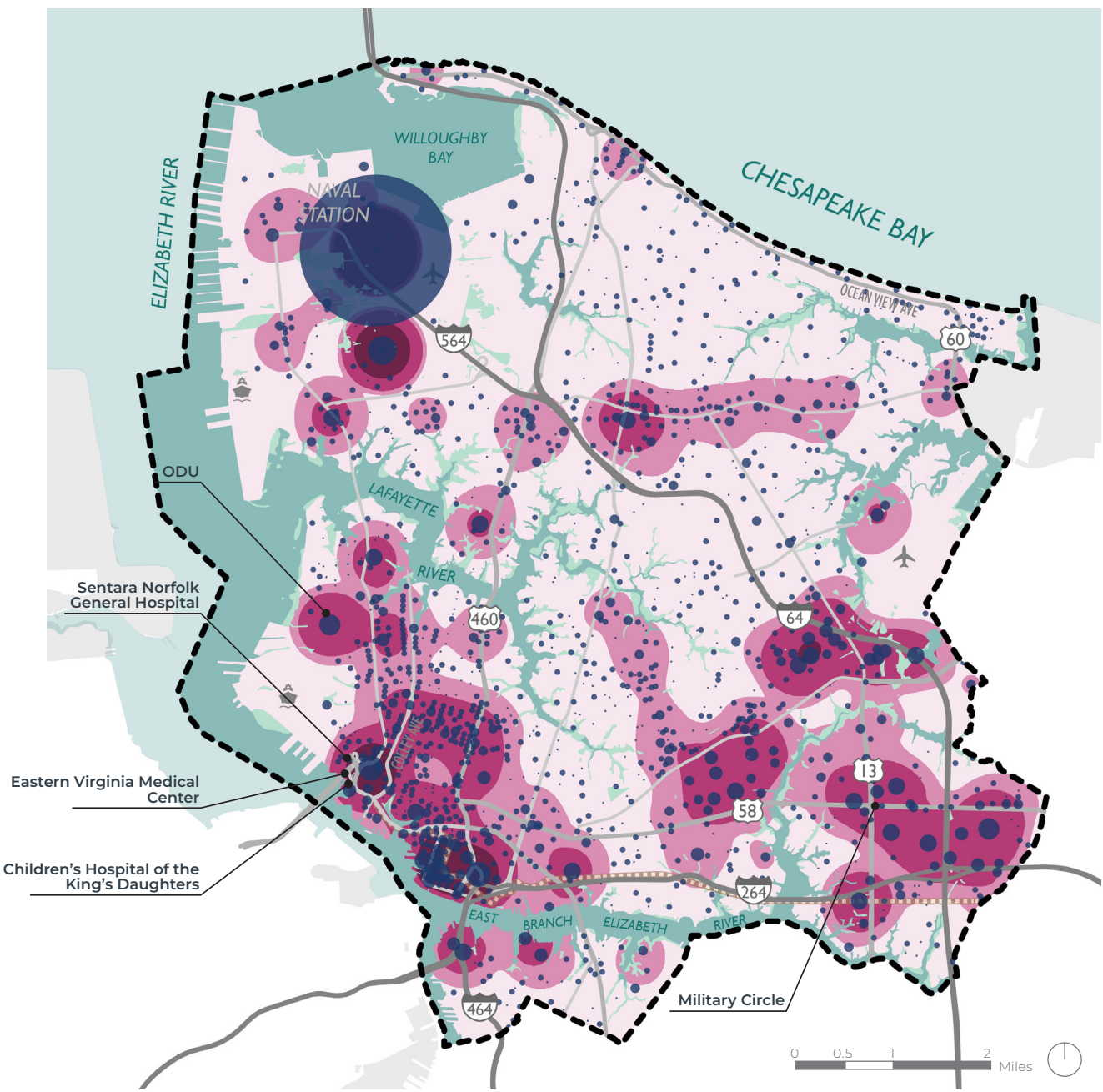


Figure 28: Job centers in Norfolk and employment density

Source: US Census Bureau, On the Map, 2021; City of Norfolk

Regional Job Competition

Compared to neighboring cities, Norfolk has seen a more diverse shift in jobs by sector.

Virginia Beach has experienced a significant increase in Transportation and Warehousing jobs (+66%), which could suggest an attraction of jobs from Norfolk in this sector, given Norfolk’s smaller increase (+9%). has made strides in removing stigma around public housing. This could point towards a competitive edge for Virginia Beach in attracting professional services jobs. However, Norfolk has shown a significant increase in administrative service jobs, which is the highest among the compared cities. This suggests that **rather than losing jobs to neighboring areas, Norfolk may be capitalizing on and possibly drawing jobs in the administrative services sector.**

In Norfolk, the medical services sub-industry is experiencing growth, reflecting a burgeoning demand for healthcare expertise. Simultaneously, other sub-industries, such as education and shipbuilding, are slowing, leading to concerns about talent retention. Contrastingly, neighboring cities exhibit a different pattern, with Virginia Beach showing a decline in government civilian roles and Newport News experiencing an upswing in medical hospital staff. **This dynamic indicates a regional redistribution of jobs,** with Norfolk becoming a hub for certain growing sub-industries while others are shifting elsewhere.

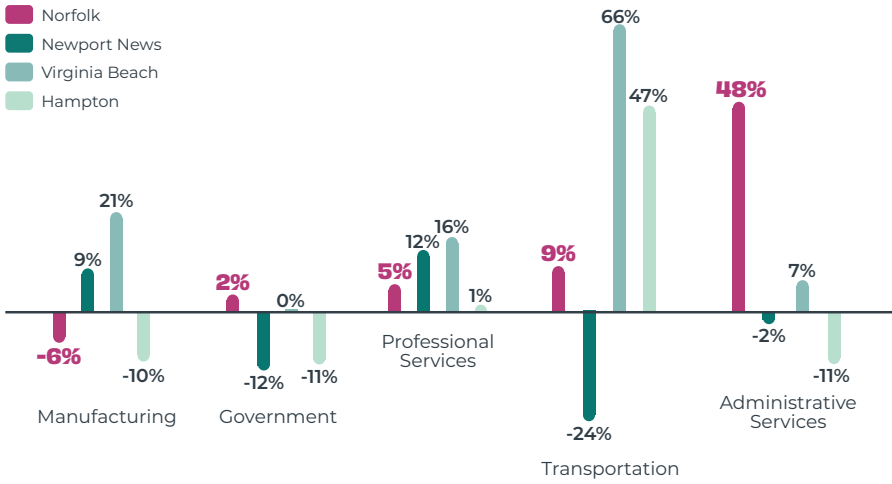


Figure 29: Regional comparison of key industries (2012-2022)

Source: Lightcast

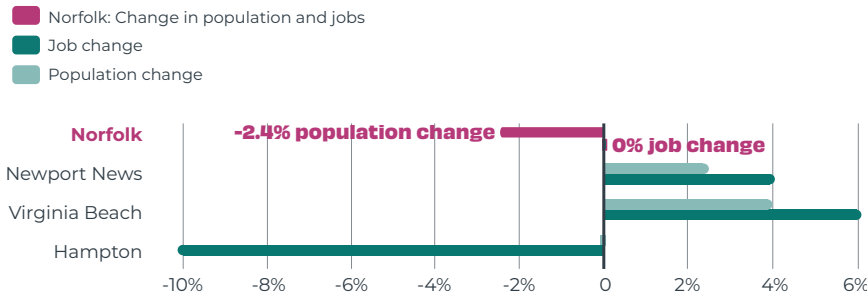


Figure 30: Regional population and employment metrics (2012-2022)

Source: Lightcast

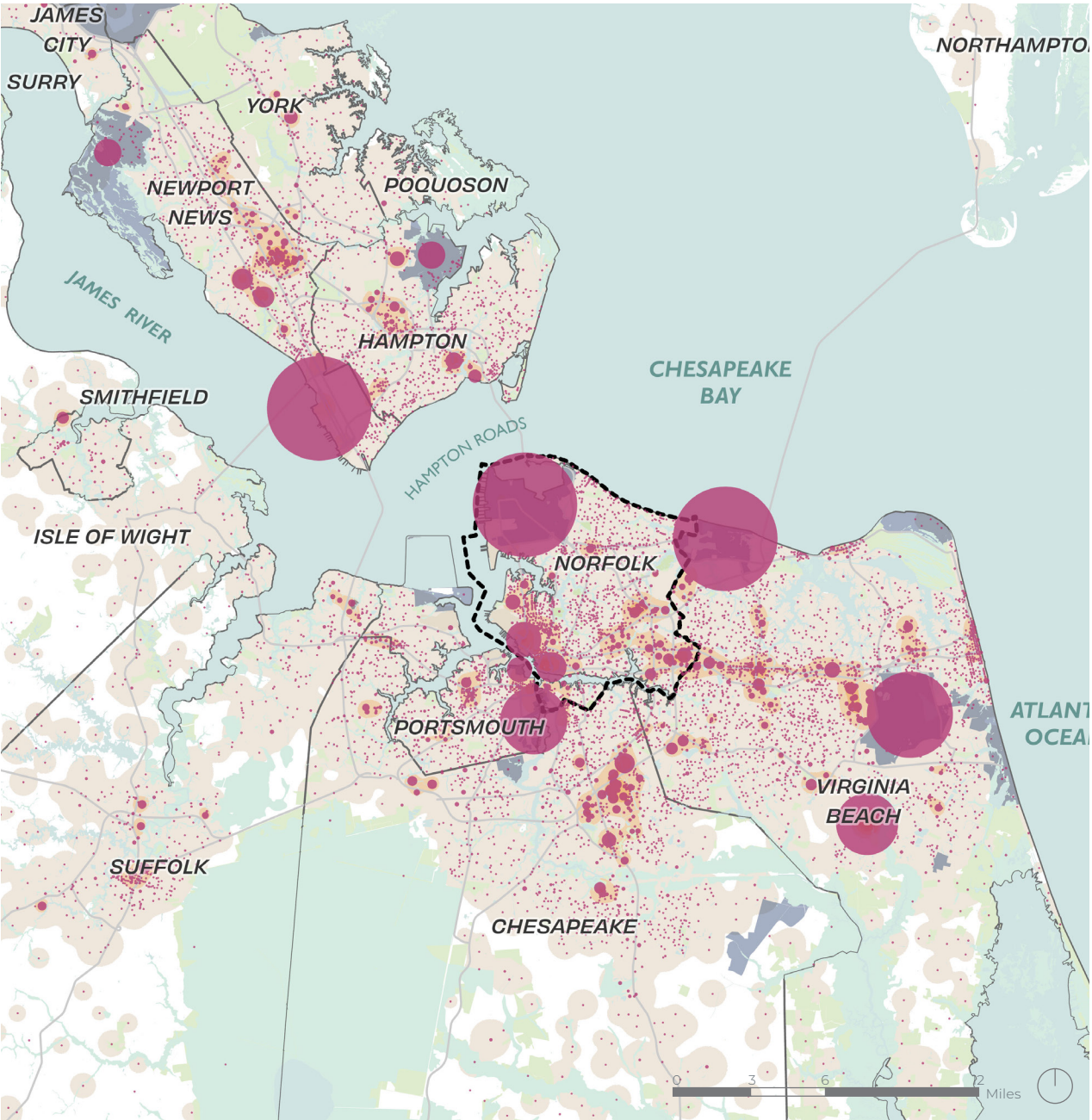


Figure 31: Job centers and employment density in Hampton Roads

Source: US Census Bureau, On the Map, 2021; City of Norfolk

JOB PER SQUARE MILE

- Low
- High

JOB

- 1
- 10
- 50
- 100
- 500
- 1,000
- 10,000

- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands

Environment

Waterfront Character

Surrounding the city on almost all sides, Norfolk’s waterfront is diverse in character, and has been a cornerstone of industry, economy, habitat, and recreation since the city’s inception.



USS Wisconsin (City of Norfolk)

The City of Norfolk continues a 250-year history of maritime industry and activity. This relationship with the water has shaped the city throughout its history. Military, commercial shipping, commercial and recreational fishing, and all manner of support and maintenance industries call Norfolk home, defining much of its coastline as a working waterfront.

Naval Station Norfolk is one of the region's largest employers. Constructed on the site of the Jamestown Exposition shortly after World War I, the naval base occupies 4,600 acres and is currently home port to 47 ships including six aircraft carriers. The Naval Station fleet provides steady business for a number of large and small ship repair yards and companies up and down the Elizabeth and James Rivers. Many of these are located on the Southern and Eastern Branches of the Elizabeth River.

The Port of Virginia operates Norfolk International Terminal, the largest port in Virginia, which can accommodate some of the largest commercial cargo ships on the East Coast. Lambert’s Point Coal Terminal is, according to Norfolk Southern, the “largest,

fastest, and most efficient transloading facility for coal in the Northern Hemisphere.” The terminal has been in operation since 1865 and continues operating 24/7 today.

Likely in response to the industrial nature of Elizabeth River frontage, recreational boating and fishing activities are concentrated around the Lafayette River and the Chesapeake Bay shorelines.



Elizabeth River Ferries (City of Norfolk)

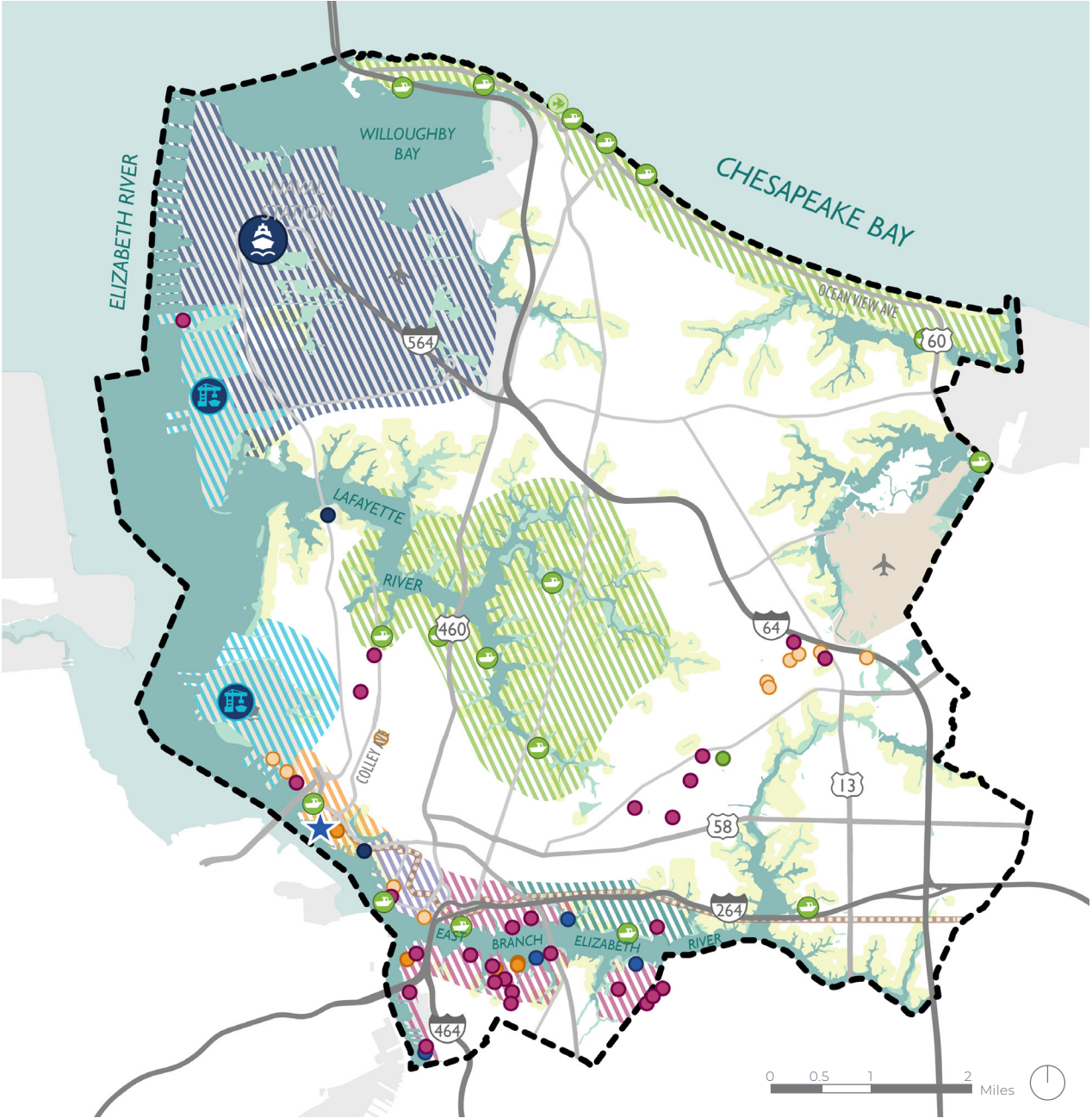


Figure 32: Waterfront character and types of access

Source: City of Norfolk; WPA

WATERFRONT CHARACTER

- Fleet and defense
- Port
- Recreation
- Ship building/Maritime commercial
- Downtown
- Recreation/Education
- Redeveloping industrial
- Commercial/Mixed-use

- US Government
- Port
- US Navy
- Public boat launch
- Recreational fishing

MARITIME INDUSTRY

- Seafood distribution
- Maritime construction and dredging
- Maritime transportation; shipping and logistics
- Maritime engineering, design, and technology
- Ship repair and maintenance

- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands

Access to Water

Norfolk is defined by its relationship to water, but not everyone in the city has equal access. Large sections of the city's shoreline are private; however, there is an emerging and diverse network of trails and public waterfront access.

Public access to the waterfront provides an opportunity for Norfolk's citizens to enjoy many environmental and social benefits. Equitable access to the water is integral for the welfare of the community, especially in a city where every one of the five wards contains at least some shoreline. [plaNorfolk2030](#) envisioned a rich variety of waterfront parks and recreational opportunities for citizens, setting a goal of providing a public access point to the water for every ¼ miles of shoreline.

In total, Norfolk has almost **190 miles of shoreline.**

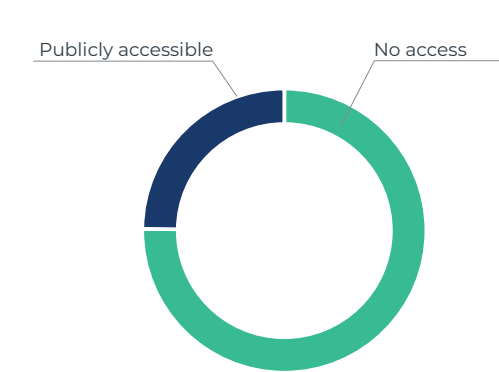


Figure 33: Waterfront accessibility (based on total miles of shoreline)

Source: City of Norfolk



Ocean View beach (WRT)

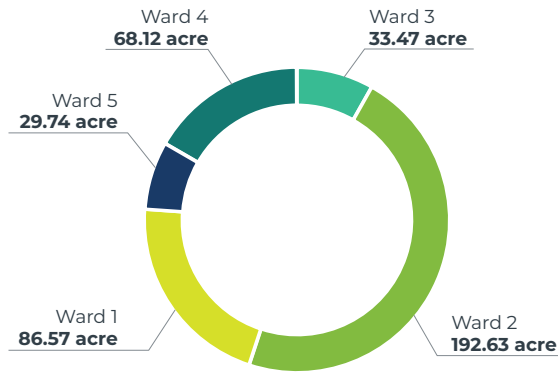
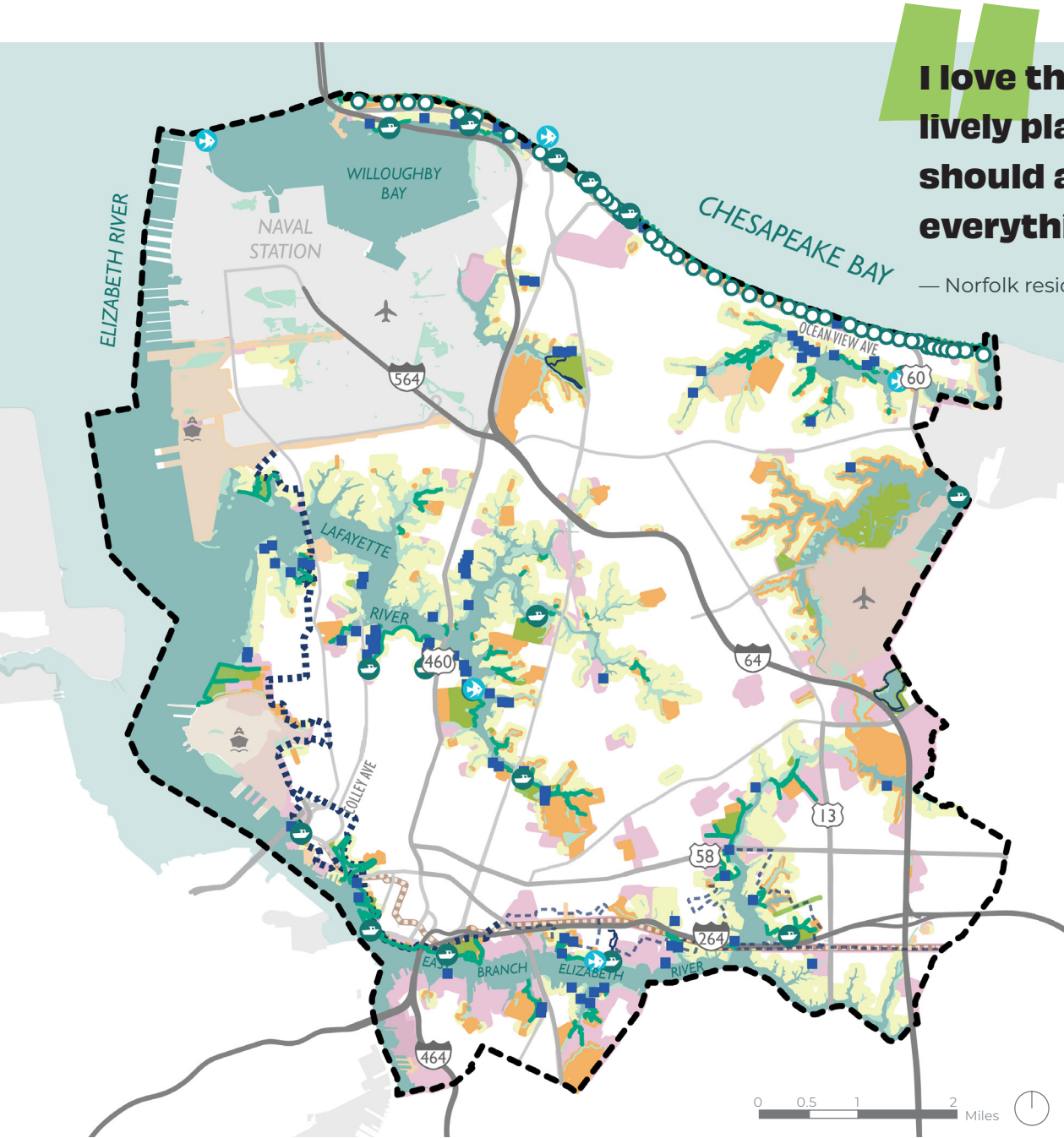


Figure 34: Waterfront parks per Ward

Source: City of Norfolk



I love the waterfront. It's a very lively place and I think that Norfolk should always incorporate that in everything they do.

— Norfolk resident, Workshop #1, October 2023

Figure 35: Public waterfront access and proximity to residential areas

Source: City of Norfolk

CURRENT WATER ACCESS

- Boat ramp
- Fishing pier
- Beach access
- Publicly accessible shoreline
- Waterfront parks

PUBLIC/PRIVATE COAST

- City owned
- Other public
- Private residential
- Private other

TRAILS

- Elizabeth River Trail
- Park trail
- Proposed Elizabeth River Trail extension
- Roads ending at water

- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands

By 2050, Norfolk will be known for its environmental stewardship, numerous city parks, and bike-friendly streets.

— Norfolk resident, online engagement, Winter 2023

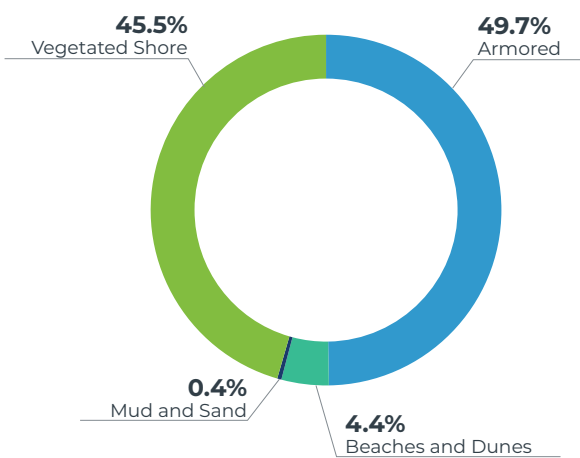


Figure 36: Shoreline types

Source: NOAA, 2016; Office of Response and Restoration, Environmental Sensitivity Index

Living Waterfronts

Norfolk’s shoreline is comprised of a variety of physical types. While much of the Norfolk’s coast has been “armored” — a manmade constructed edge to hold back the tides — there are still ample areas of soft shores, which can provide future opportunities for ecosystem restoration and nature-based flood risk adaptation projects.

The NOAA Office of Response and Restoration prepares Atlases of Environmental Sensitivity for the coastal geographies potentially most affected by oil spills. Environmental Sensitivity Index (ESI) maps overview biological resources, sensitive shorelines, and human-use resources.

The Chesapeake Bay 2016 dataset identifies five major types of shorelines, establishing protection priorities. Almost one-half of Norfolk’s shoreline is armored (93 out of 187 mi), with vegetated shores and beaches making up the balance. Ecosystem restoration is most suitable at Little Creek and Lake Whitehurst, along Broad Creek and inland parts of Elizabeth and Lafayette rivers.

Opportunities for resilience measures along Norfolk’s waterfront include the following:

- Sand and vegetated shorelines are the primary opportunity areas for tidal and coastal surge flood impact reduction. The beachfront in Ocean View has been adapted inconsistently, with some parts protected by bulkheads, and other areas with beach replenishment. A more systematic hybrid approach would benefit the communities living next to the beach.
- Existing wetlands and parks create opportunities for green corridors around Downtown, Park Place and Huntersville.
- Beaches along the Chesapeake Bay, on the north side of the city, serve as a natural coastal protection when sand trapping and dune restoration measures are applied. Norfolk’s beach is partially protected with structural measures such as bulkheads, levees, and groins.
- Continued use of oyster restoration should be considered city-wide for the substantial ecosystem and coastal protection benefits.



Riverine wetlands, Lafayette River



Oyster habitat, Edgewater



Beaches and dunes, Oceanview



Fresh water pond and lake wetlands, Lake Whitehurst



Estuarine and marine wetlands, Campostella Heights

Flooding and Resilience

Flood Events

Even in areas of the city not proximate to the coastline, much of Norfolk is prone to flooding. Ocean View, Downtown, and areas around the Lafayette River are particularly vulnerable. Extreme weather events, though not as devastating as coastal storms, are the most frequently occurring. Because stormwater cannot drain at high water levels, sea level rise will increase the impacts of such storms: as it is, “blue sky flooding” due to sea level rise is already increasing across the city.

As opposed to coastal flooding, which is longer lasting and can be seen coming, rain-driven floods occur suddenly and intensely, but also subside more quickly. They often affect smaller, dispersed areas intensely, while coastal flooding tends to impact larger, consistent lengths of coastline.

Historic weather records show the high frequency of storm events in the area. From the “Dreadful Hurricane” of September 1667, a record storm in August 1933, the Ash Wednesday storm of 1962, and the costliest disaster in Virginia’s history, Hurricane Isabel

in 2003, major storms in Norfolk follow similar paths: they are either seasonal Nor’Easters or they coincide with high tides. Consequently, extreme rainfall — such as that occurring during Hurricane Isabel, 4-7’ of rainfall — exacerbates tidal risks and causes more damage.

Resilience Strategies

Norfolk is already a leader in climate resilience, with many projects in various stages of development to mitigate stormwater, tidal, and coastal flooding risk.

Most of the city’s coastal protection projects are expected to be implemented within the next decade, but parts of the city will require longer-term protection to mitigate multi-layered climate threats like increased stormwater flooding and sea level rise.

Norfolk has already implemented over 2,000 green infrastructure best management

practices — largely in Downtown, Ghent, and Ocean View. Coastal protection measures are fewer (24), and only seven of those 24 have been completed. Living shoreline strategies might work effectively as smaller scale adaptation solutions considering the uncertainties of construction horizons for large-scale coastal protection projects, such as the US Army Corps of Engineers (USACE) Norfolk Coastal Storm Risk Management Project.

More adaptation measures are still needed on the Southern shore of the Elizabeth River, Pretty Lake and the Chesapeake Bayfront. Connecting coastal protection with large transportation facilities will also be important for rapid response during emergencies.

By 2050, Norfolk will be known for finding equitable, just, and innovative ways for living with water and climate change impacts.

— Norfolk resident, Workshop #1, October 2023

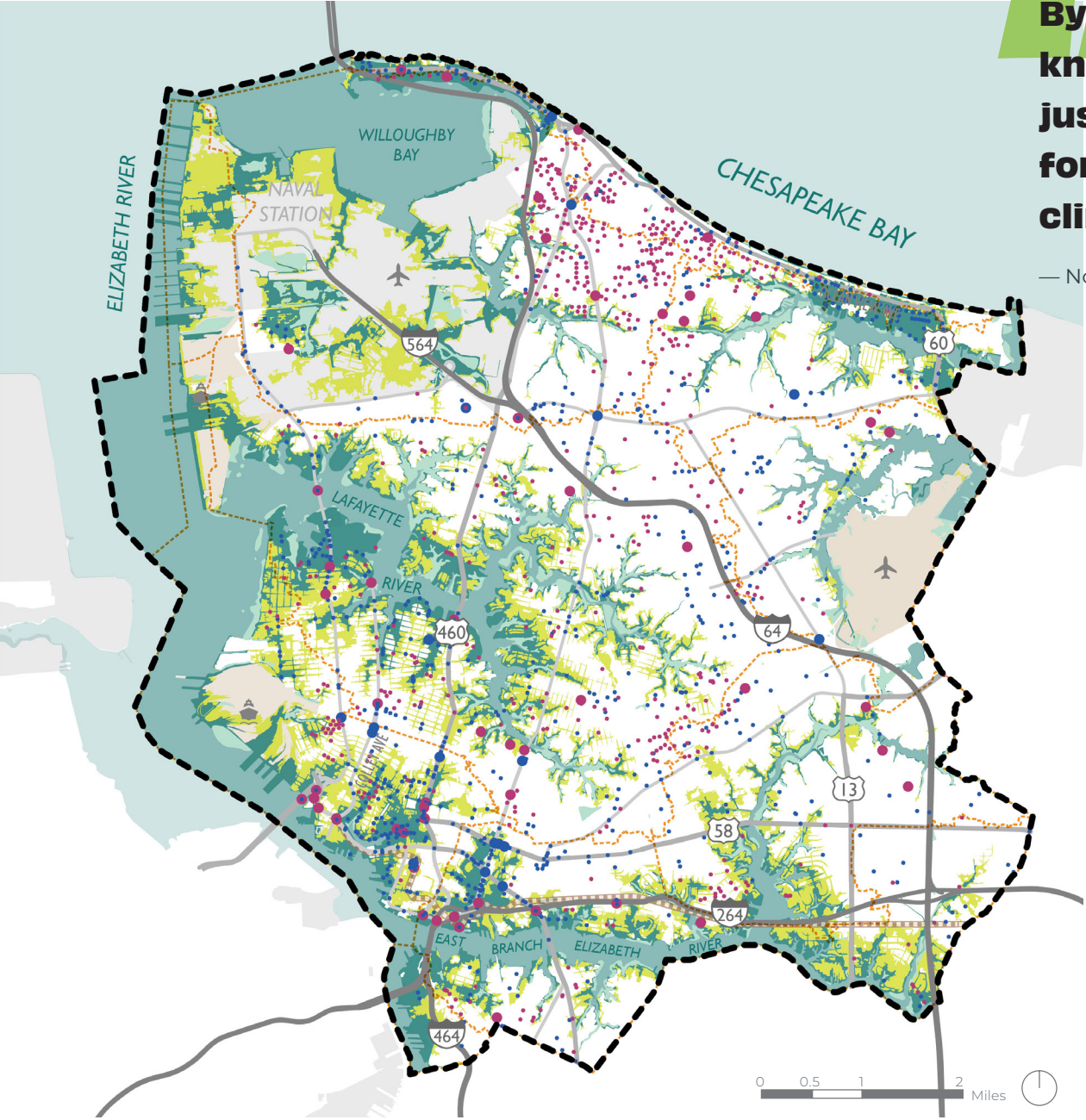


Figure 37: Flood zones and storm hazard records

Source: City of Norfolk; FEMA; NOAA, 2022; USGS

- Storm hazard records**
 - Closed street
 - Debris blocking street
 - Flooded underpass
 - Flooded street
- Flood zones**
 - 100-year zone
 - 500-year zone
- Watershed
- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands

FLOOD ADAPTATION EFFORTS AT LOCAL SCALE INCLUDE (SEE MAP AT RIGHT):

1. USACE COASTAL STORM RISK MANAGEMENT PROJECT (4 KEY AREAS AND 5 IMPLEMENTATION PHASES):

- 1.1 Ghent-Downtown-Harbor Park (2028-2032) (16.5 ft). One of the critical components is Harbor Park Brownfields Shoreline/Flood Protection System (Under Design)
- 1.2 Pretty Lake (2029) 15 ft
- 1.3 Lafayette (2030) 15.5 ft
- 1.4 Broad Creek (2030) 16.5 ft
- 1.5 Citywide — nonstructural measures (2026, 2032); critical elements are house elevations, floodproofing, and/or buyout for Elizabeth Park, Ingleside Road, and Willoughby Bay

2. PlaNORFOLK 2030:

- 2.1 Wetland restoration
- 2.2 Citywide GI BMP

3. HAMPTON ROADS HAZARD MITIGATION PLAN (14 PROJECTS), INCLUDING:

- 3.1 Structural protection for beaches and shorelines (Bay Point Drive, Westwood Terrace, Cambridge, and Carroll Place)
- 3.2 Natural shoreline protection measures (Pleasant Point Living Shoreline, Virginia Port Authority Thimble Shoal Channel Deepening)

- 3.3 Stormwater management Improvements (Glenwood Park, East Ocean View, Glenrock, Coleman Place, Lowery Road, and Janaf Place, St Paul's Blue Greenway, Meadow Lake, Silver Lake, and Lake Whitehurst, Chesapeake Blvd Outfall Extension)
- 3.4 Critical facilities and infrastructure improvement to minimize flood and wind damage (Norfolk Public Schools food warehouse)
- 3.5 Flood-prone structures protection (Yarmouth Street)

4. NORFOLK AND VIRGINIA BEACH JOINT LAND USE STUDY

- 4.1 East Amphibious Drive, Chubb Lake, and Lake Bradford Flood Mitigation and Stormwater Management Strategy
- 4.2 Hampton Boulevard Comprehensive Flood Mitigation and Stormwater Management Strategy
- 4.3 Norview Avenue Drainage Study
- 4.4 Willoughby Bay Shoreline Floodwall Options
- 4.5 Terminal Boulevard Rail and Roadway Grade Separation

5. OHIO CREEK WATERSHED PROJECT:

- 5 Coastal defense, stormwater management with tide gate, transportation infrastructure community amenities

6. ST. PAUL'S BLUE-GREENWAY PROJECT:

- 6 Stream restoration, blueways, flood resiliency, safety, housing availability, and community spaces

7. OCEAN VIEW BEACH REPLENISHMENT

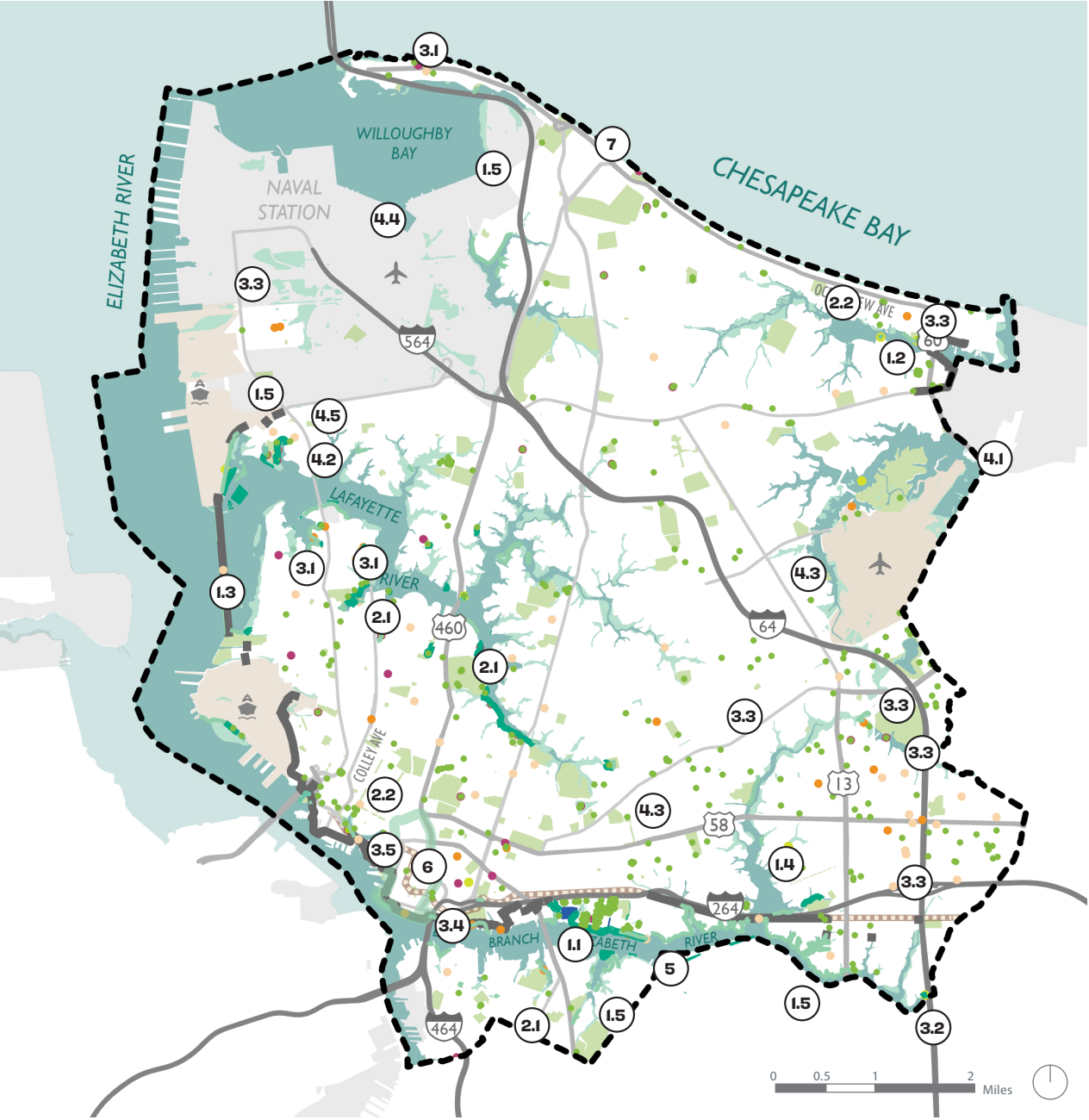


Figure 38: Local resiliency strategies

Source: City of Norfolk; USACE; Hampton Roads Resilience Projects Dashboard

- Structural adaptation:**
- Completed / under construction
 - Designed
 - Programmed and proposed
 - Proposed Floodwall (USACE)
 - Constructed floodwalls and breakwaters
- Nature-based and hybrid adaptation (Living shorelines, oyster reefs, constructed wetlands)**
- Complete
 - Construction, maintenance
 - Planned, proposed, designed
- Green stormwater strategies**
- Completed
 - Under construction
 - Programmed, proposed, or designed
- Adaptation Plan References**
- 1. USACE Coastal Storm Risk Management
 - 2. PlaNorfolk2030
 - 3. Hampton Roads Hazard Mitigation Plan
 - 4. Joint Land Use Study
 - 5. Ohio Creek Watershed Project
 - 6. St Paul's Blue Greenway Project
 - 7. Ocean View Beach replenishment
- Legend:**
- City limits
 - Military
 - Seaport/Airport
 - Light rail
 - Water
 - Wetlands

Regional Flood Exposure

The Hampton Roads region is at high risk of flooding both now and in the coming decades. All of Norfolk’s geography will be at risk of some sort of flooding by 2080, based on the intermediate-high emission scenario.

The region's highest flood exposure hotspots were identified with the USACE NAACS combined index (NACCS, 2014). This analysis compares many factors to identify the areas at highest risk, with a focus on population density and infrastructure exposure (80%), followed by social vulnerability (10%) and environmental and cultural resources exposure (10%).

When critical infrastructure is flooded or impaired, the entire region is affected.

Compounding the challenge, any adaptation efforts in Norfolk must also take into consideration the level of risk in adjacent Portsmouth — sharing the same estuary and the Elizabeth River waterway.

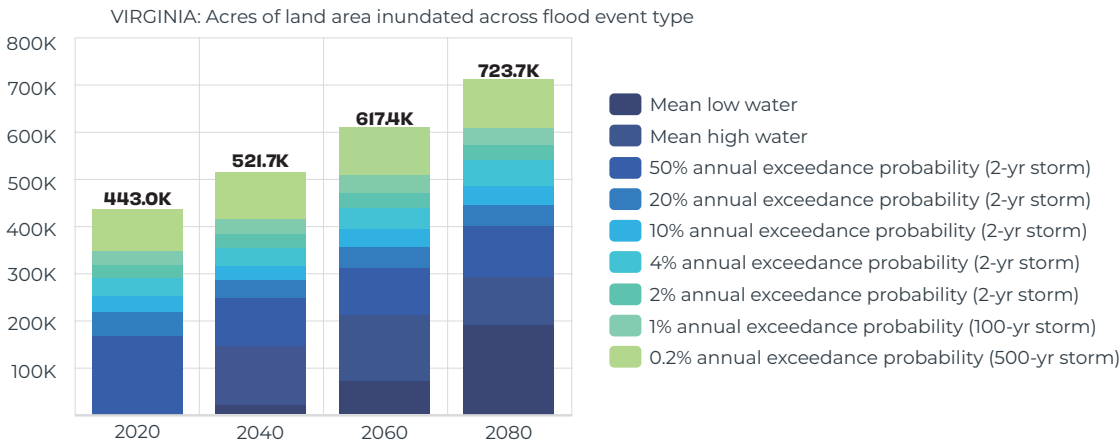


Figure 39: Impacts of projected flood levels, Commonwealth of Virginia

Source: VA CRMP, 2021

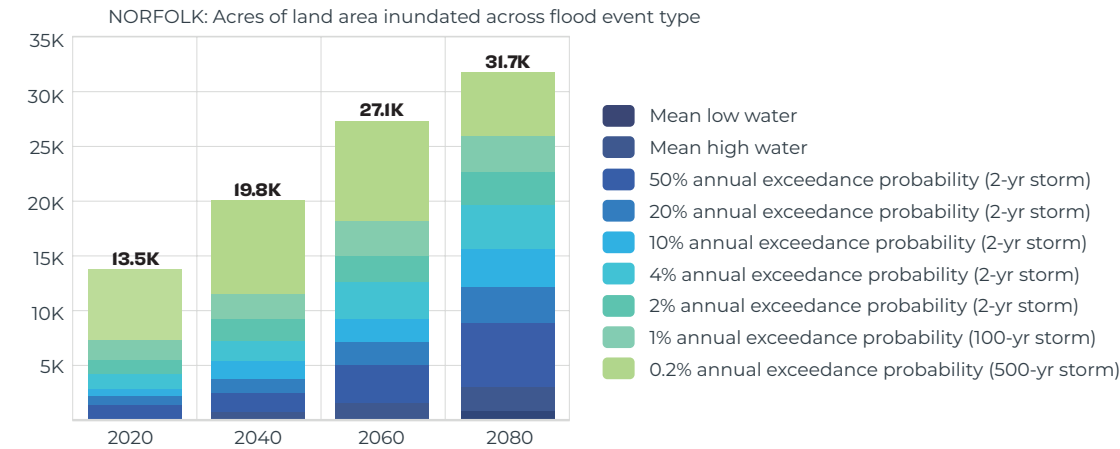


Figure 40: Impacts of projected flood levels, Norfolk

Source: VA CRMP, 2021

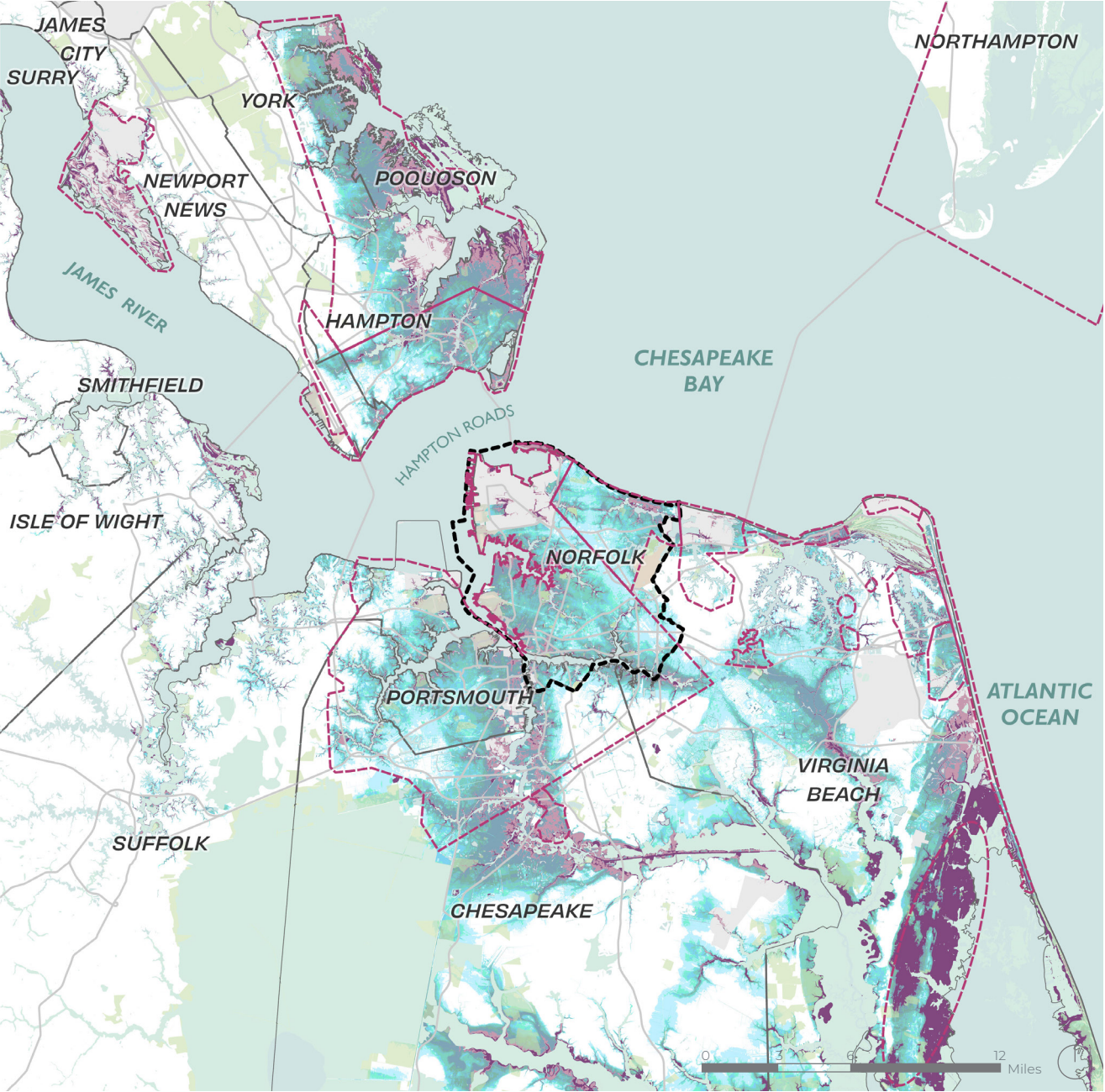
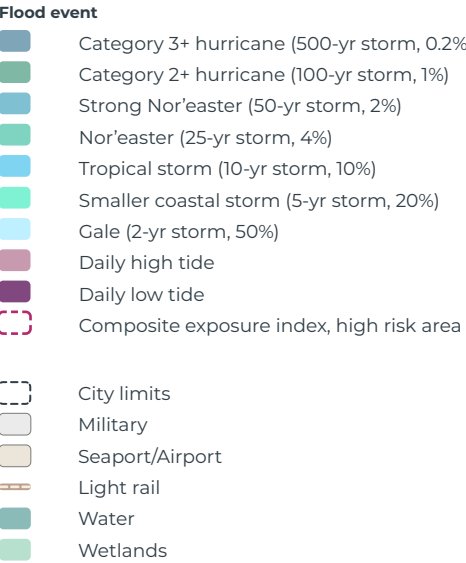


Figure 41: Regional Coastal Flood Risk

Source: USACE NAACS combined flood exposure index, 2015; Commonwealth of Virginia, Virginia Coastal Resilience Master Plan Flood Scenarios, 2017



Parks and Access

Norfolk's Parks and Recreation Department manages and oversees over 4,000 acres of parks, facilities, and open spaces, including a diverse range of neighborhood parks, greenspaces, indoor recreation centers, special event spaces, school park sites, cemeteries, and water access points. Residents enjoy public access to the beaches and waterfront (including boating and fishing) along the Chesapeake Bay and in limited locations along the Lafayette River and East Branch of the Elizabeth River.

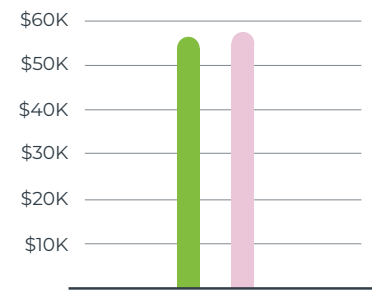


Figure 44: Park access by median household income

Source: US Census Bureau, ACS 5-Year Estimates, 2022; City of Norfolk

■ Households with walkable access to parks
■ Households with limited park access

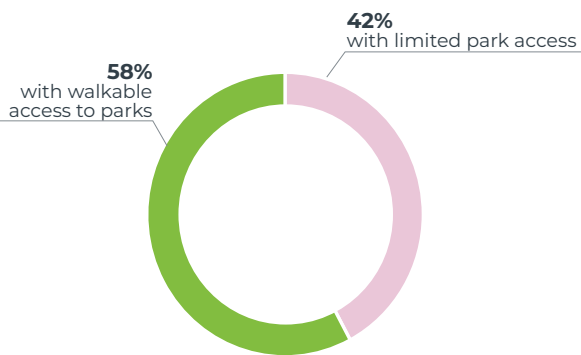


Figure 42: Percent of Norfolk households lacking park access

Source: US Census Bureau, ACS 5-Year Estimates, 2022; City of Norfolk

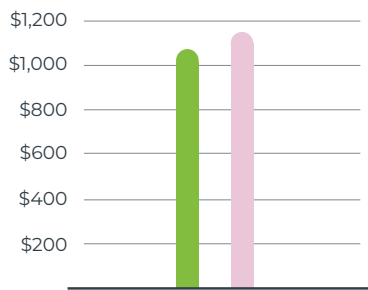


Figure 45: Park access by median household rent

Source: US Census Bureau, ACS 5-Year Estimates, 2022; City of Norfolk

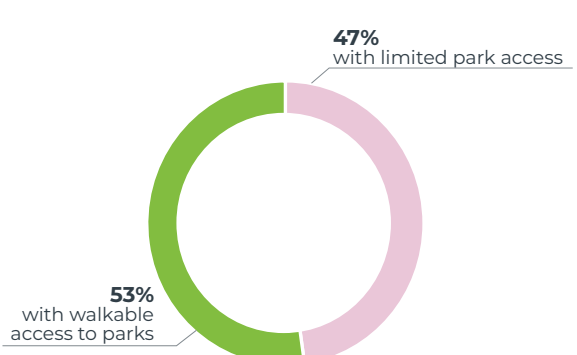


Figure 43: Percent of households with children under 18 who lack park access

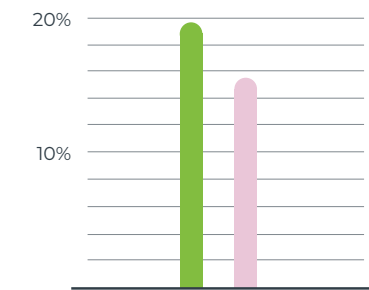


Figure 46: Park access by percent of population below poverty

Source: US Census Bureau, ACS 5-Year Estimates, 2022; City of Norfolk

As part of the City of Norfolk's 2022 Parks and Recreation Master Plan Assessment, **residents rated beaches and walking / biking trails as the top two most important amenities within the city's parks and recreation network.**

Ease of park access, in terms of walking and biking, is typically measured by a 5-minute (¼ mile) or 10-minute (1/2 mile) walk to a park. In recent years, cities across the US, with support from organizations like the Trust for Public Land (TPL), have added park access and walkability metrics as ways to measure community health and determine areas with little or no park access, taking into consideration the sidewalk and road network, as well as roadway and infrastructure barriers.

While parks and facilities are spread across Norfolk, many are concentrated downtown and in the southwestern areas of the city resulting in eastern and northern areas of the city with little walking access to parks. **Overall, about 42% of Norfolk households are not within a ten-minute walk to a park** (as shown in Figure 42). For households with children under the age of 18, the percentage is even higher: 47% of Norfolk family households do not have a park within a ten-minute walk of their home. Opportunities throughout

the city exist to strategically expand the park network (e.g., through improving pedestrian connections to parks and trails in underserved areas and coordinating with the city's resilience strategies and projects that are underway).



Freemason Playground (City of Norfolk)

Norfolk: Biophilic City

As of 2019, Norfolk is part of the Biophilic Cities Network, an organization that prides in building an understanding of the value and contribution of nature in cities to the lives of urban residents. As a central element of their work, Biophilic Cities facilitates a global network of partner cities working collectively to pursue the vision of a natureful city within their unique environments and culture.

Norfolk's commitments as a Biophilic City and part of this network:

- (1) Track tree canopy coverage and land area of wetland and shoreline restoration projects;
- (2) Track annual number of visits to the Learning Barge;
- (3) Incorporate a Biophilic Lens into Planning Practices (like NFK2050);
- (4) Track Distribution of Parks and Natural Areas in Norfolk.

City of Norfolk; Biophilic Cities



Trail Expansion

Norfolk residents place a high value and demand on extended walking and biking trails, beaches, fitness and exercise facilities, indoor pools / aquatics, and neighborhood parks. Given the community interest in multi-use trails (walking and biking trails were ranked as the highest need in the 2022 citywide parks survey), the City plans to invest in and strengthen Norfolk’s network of **blueways and greenways** – seeking opportunities to extend the trail system, providing opportunities for recreation and enhanced mobility via biking, walking, and boating. The Elizabeth River Trail is one such opportunity, with plans for expansion, increased environmental awareness, and economic development as described in the Reconnecting the City section. The St. Paul’s Blue Greenway, an innovative 22-acre stormwater park in the St. Paul’s area is another project that is underway – one that will improve recreation, open space, resilience to flooding, and daylighting of a creek, designed with the community and extending Norfolk’s multi-use trail and greenway / blueway network.

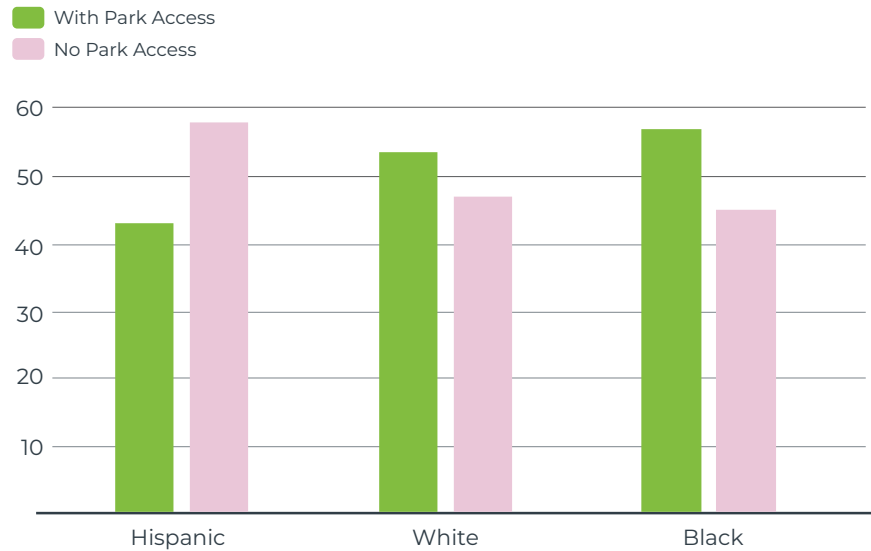


Figure 47: Park access by race and ethnicity
 Source: US Census Bureau, ACS 5-Year Estimates, 2022; City of Norfolk

In addition to considering how accessible a park is, the quality and condition of a park or recreational facility impacts how residents experience their communities daily. The Parks and Recreation Master Plan includes a condition assessment of Norfolk parks, finding that for the most part the city’s parks are in good condition. However, **not all parks are created equal, with some lacking park amenities like playgrounds, paths, benches, or recreational fields**, as illustrated on Figure 48, classified as passive parks.

The City provides high quality recreational opportunities for residents; however, with a large and aging park system and limited resources, maintaining facilities and services across Norfolk is challenging. The park condition assessment identified several common themes and areas of need, including a lack of / limited ADA accessibility, poor neighborhood connectivity, aging amenities, deferred maintenance, and opportunities for improved design and materials.

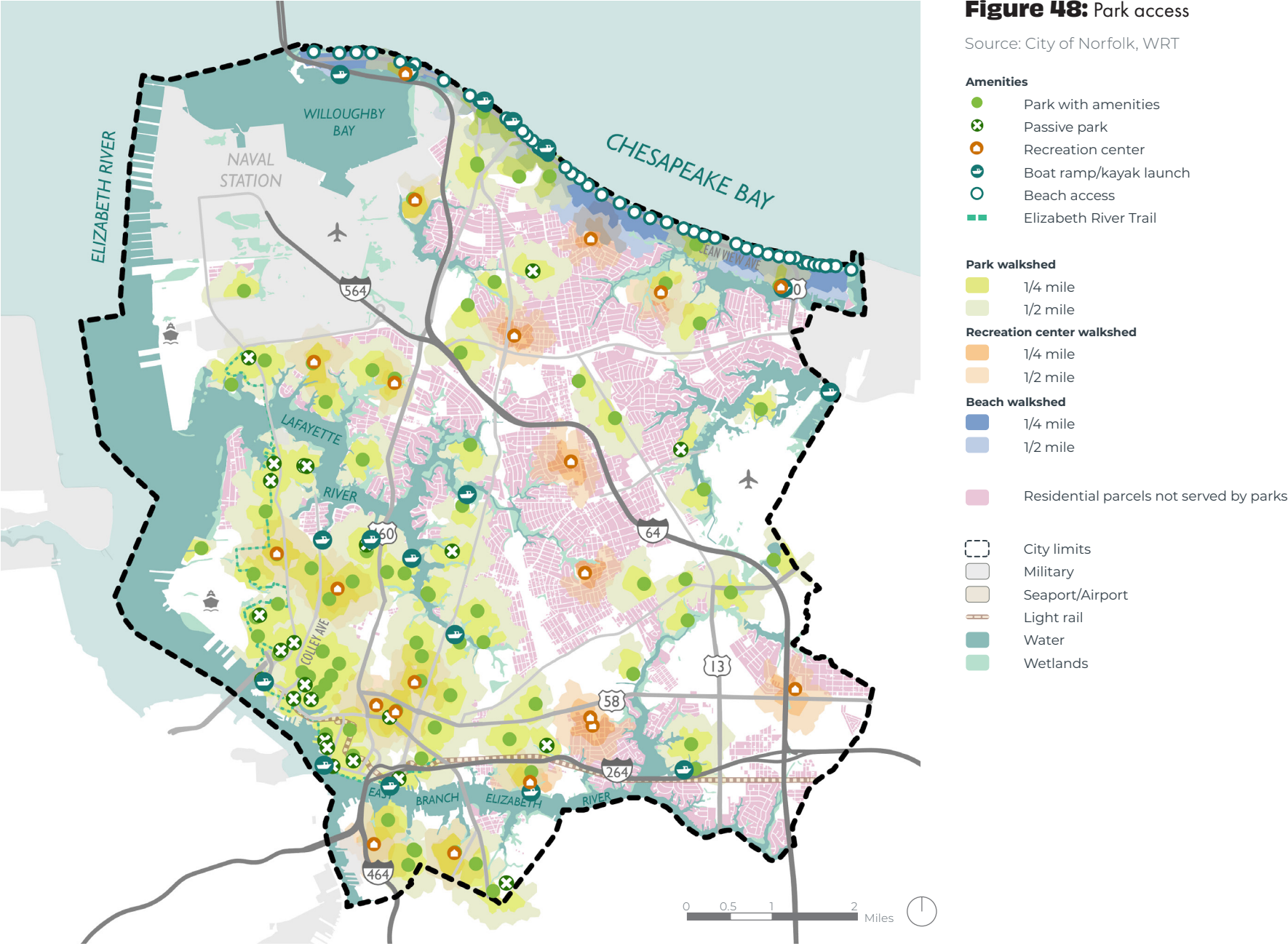


Figure 48: Park access
 Source: City of Norfolk, WRT

Mobility and Transportation

Historic Connections

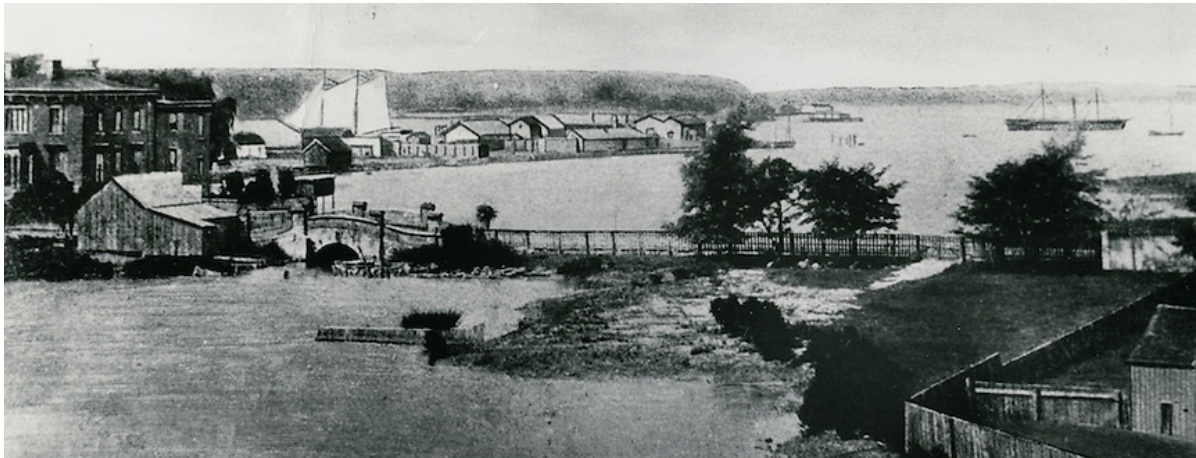
Any conversation about Norfolk’s physical connectivity should begin with a look back at the city’s past: **historically, Norfolk had a network of granular, neighborhood-to-neighborhood connections that have since disappeared**, including a robust streetcar network and a series of small pedestrian bridges connecting across the city’s many inlets and creeks.

Overlaying streetcars onto a 1942 map of Norfolk (Figure 49) illustrates the development pattern of “streetcar suburbs”: neighborhoods that developed in a walkable grid pattern, within 3/4 mile of a streetcar track, for residents to easily hop a streetcar to work. In addition to the streetcars, small bridges served as neighborhood-to-neighborhood connectors for those without cars.

This historic infrastructure has left legal rights-of-way that could potentially be repurposed: the streets that formerly contained streetcars—including Granby; Chesapeake; and Hampton — have retained the width of their historic rights-of-way, while waterfront public access from the former bridges could be reused in the future.



A streetcar in the Norview neighborhood circa 1910 (Virginian-pilot)



Historic pedestrian bridge connection at Granby Street, 1868 (NRHA)

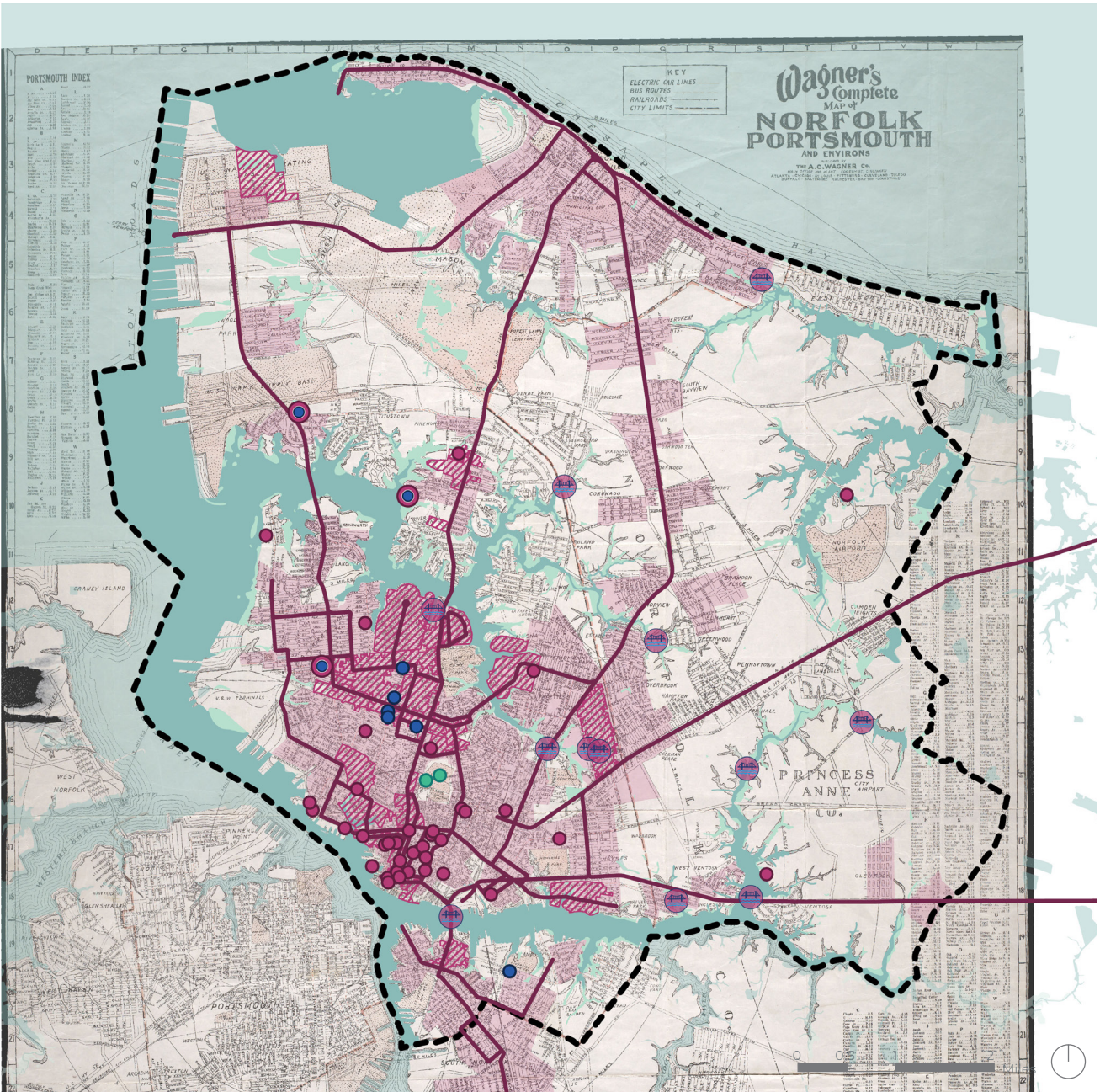


Figure 49: Historic streetcars and bridges, historic districts and resources, and neighborhoods where the city developed before cars

Source: City of Norfolk; Sargeant Memorial Collection; Virginia Department of Historic Resources; WPA

Mobility Network

HOW DO PEOPLE GET AROUND?

While Norfolk has many transportation options available, the way people move around is influenced by factors such as home location, job location, income level, age, personal health, and lifestyle choices. These individual personal factors and choices play out across Norfolk and the Hampton Roads region to impact congestion on roadways, bus speeds, riders on light-rail, investment decisions, and varying levels of government.

While a lot of travel data is focused on commuting, those types of trips only represent a portion of the trips people take in Norfolk. For that reason, the data shown represents the modes taken for all trips, not just commuting.

Figure 50 shows the typical mode type for Norfolk residents traveling within the city, and for non-Norfolk residents traveling to and within the city. Both Norfolk residents and non-residents primarily travel by car, but residents of Norfolk walk much more than

non-residents. This is likely due to longer trip distances for non-Norfolk residents traveling into the City. However, vehicle-dominated roads can often create conditions that are unsafe for pedestrians.

Across the board, the data indicates that despite the variety of modes available for travel, there is still a heavy reliance on personal cars. Despite the presence of a robust bus network, a light-rail system, regional rail connections, ferries, and bike and scooter sharing systems, many people in Norfolk still choose to take their cars. This is likely due to land use patterns that make it difficult or dangerous to travel by foot or bike, inconvenient or impossible to take transit, and highly convenient to travel by car.

Low density travel patterns spread residences far distances from places of employment and create conditions that make it hard for transit to be effective. Since the pandemic, we have seen an increase in the number of people driving alone, carpooling, and working from home, and a decrease in the number of people taking public transportation, walking, and biking.

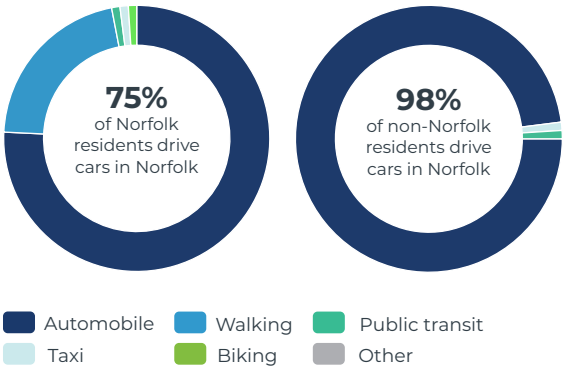


Figure 50: Mode of commute for Norfolk residents and workers commuting to Norfolk, 2019

Source: ReplicaHQ



Public Transportation (WRT)

DESTINATIONS

The way people travel is important for Norfolk and the people living there because the city is a top destination for employment in the region. Norfolk holds three of the top ten census tracts by destination and represents the largest percentage of trip destinations of any city in the region. That means that how people decide to get to their jobs in Norfolk directly impacts activity at the street level. The more people who drive to work in Norfolk, the more traffic congestion there is on the street, the more dangerous it is for residents to walk and bike, and the less healthy the air is.



Brambleton Bridge (City of Norfolk)

Three census tracts bring in the most trips each day: Downtown Norfolk, Military Circle, and Naval Station Norfolk. When combined with the known mode share of trips in Norfolk, it becomes clear that these become areas of heavy traffic.

In 2022, 88.2% of households in Norfolk owned at least one vehicle

Area	Workers
Virginia Beach	17,910
Chesapeake	10,145
Portsmouth	3,633
Newport News	2,923
Hampton	2,638
Fairfax County	1,622
Henrico County	1,444
Suffolk	1,059
Richmond	962
Chesterfield county	809

Figure 52: Top 10 places Norfolk residents are commuting to

Source: Virginia Employment Commission, 2014

Area	Workers
Virginia Beach	35,277
Chesapeake	18,840
Portsmouth	6,679
Suffolk	4,735
Hampton	4,491
Newport News	3,803
Fairfax County	1,241
Isle of Wright	1,192
Chesterfield County	1,022
York county	1,018

Figure 51: Top 10 places Norfolk workers are commuting from

Source: Virginia Employment Commission, 2014

A CONGESTED AND VULNERABLE SYSTEM

Because the majority of trips in and to Norfolk take place in cars, the roadway network carries a significant amount of the burden. This leads to overly burdensome congestion on some corridors, particularly major highways in and the few connecting arterials that cross the city.

Some of Norfolk’s most congested corridors are also those most vulnerable to flooding.

In the event of a storm surge, some of the critical roadways that could be used by residents to leave the city or for aid to enter the city could be inundated with water and therefore be unusable.



Flooded streets are a regular occurrence in Norfolk (WRT)



One of Norfolk’s main arterials (City of Norfolk)

Rail crossings are also locations where roads can be vulnerable to flooding if they happen to cross underneath the rail line. In the event where the railroad crosses the road directly, there can be long delays increasing congestion on surrounding roadways.

This pattern of congestion and vulnerability is repeated around the city. The congestion, when paired with the known mode share, shows that

the transportation system is overburdened. Too many trips are occurring in one single mode, which is creating more traffic on roadways than can be supported. This over-reliance on one single mode can also create vulnerability when those key roadways are unusable and there isn’t infrastructure or knowledge to take other modes to reach key destinations.

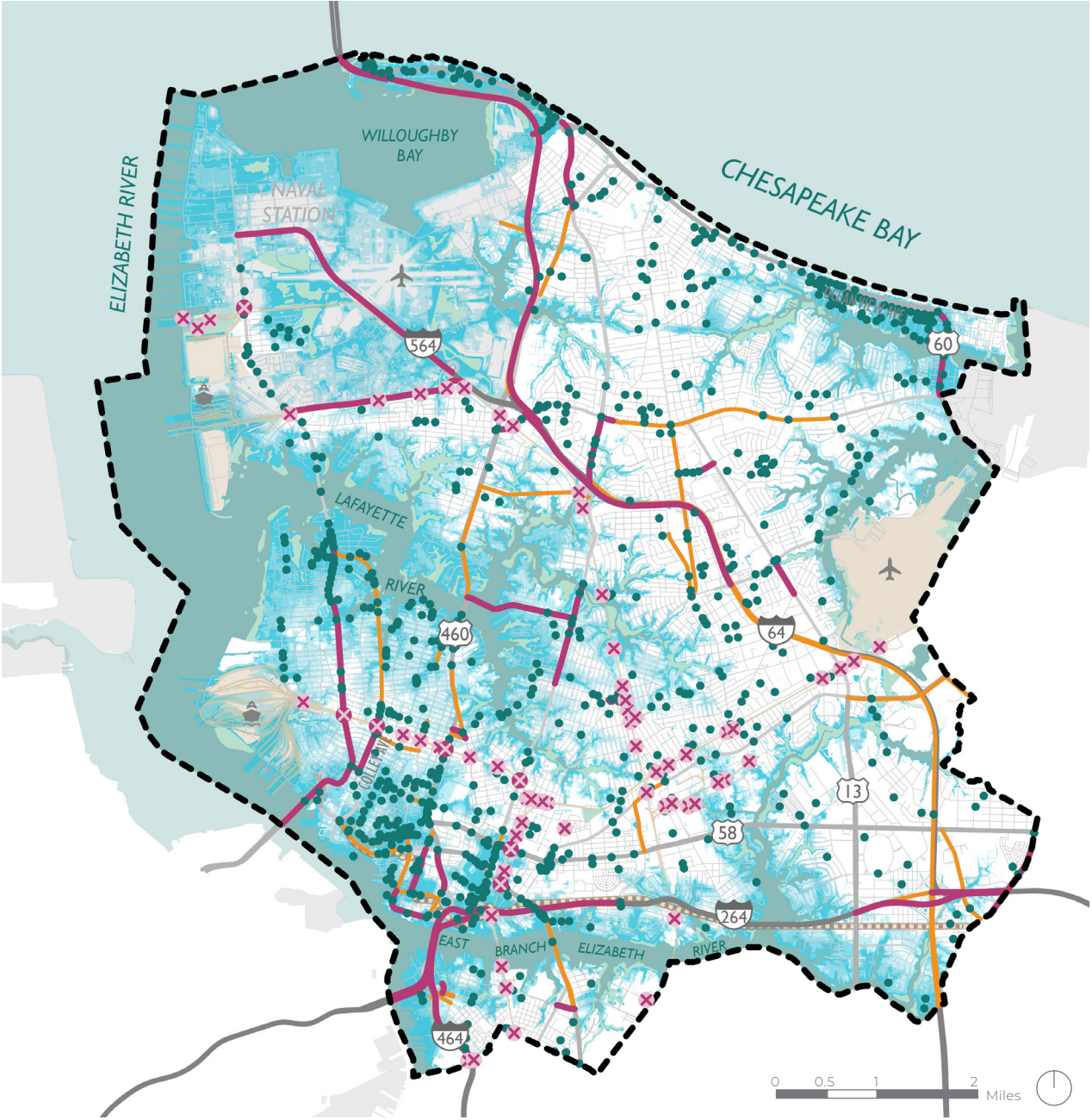


Figure 54: Infrastructure and flooding barriers to transportation systems

Source: City of Norfolk; JLUS; NOAA; Federal Railroad Administration; Virginia DOT

- Infrastructure barriers**
 - Railroad grade crossings
 - Railroad over crossings
- Historic flood incidents**
 - Flooded street or underpass
- Road congestion**
 - Congested
 - Most congested
- 100-year storm inundation, 2100**
 - 2050 1% probability extreme storm, 7.99ft
 - 2080 1% probability extreme storm, 9.37ft
 - 2100 1% probability extreme storm, 10.75ft
- Other features**
 - City limits
 - Military
 - Seaport/Airport
 - Light rail
 - Water
 - Wetlands

TRANSIT NETWORK

Norfolk has a robust transit network, operated by Hampton Roads Transit. This consists primarily of the bus network and is supplemented by the light-rail transit system. Amtrak operates a regional station directly in downtown Norfolk, which can connect riders to Richmond and the entire Northeast Corridor. Amtrak also operates a bus shuttle to Newport News, which provides another method of transport to Richmond via a route north of the James River.

Norfolk has done a considerable amount of work studying its transit network and developing plans to improve it. One of the key efforts that was completed during the COVID-19 pandemic was the Norfolk Transit System Redesign. One of the key changes that this plan made was to increase bus frequency on a key number of routes, while removing some routes that were redundant or underused. Under this plan, **accessibility of jobs via the bus network will increase by 31%**. Consequently, under the new bus network, the average Norfolk resident will be able to access 41,700 jobs within a 45-minute journey that includes walking and using transit.

MULTI-MODAL CONNECTIONS

One of the best ways to amplify the impact of public transportation is by creating numerous connections to other modes — park-and-ride lots for drivers to switch modes, bike lanes intersecting with bus routes. These connections help solve “**first- and last-mile**” connection issues for public transit, connecting residents with their final destinations. While there are places where these modes overlap, there are many neighborhoods in Norfolk that lack these connections.

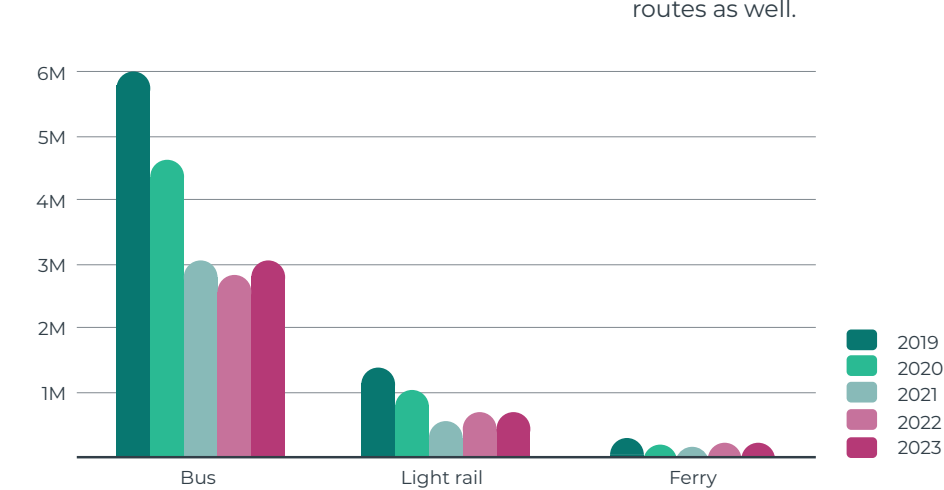


Figure 55: Annual Transit Ridership

Source: Hampton Roads Transit

One of the key issues currently facing the transit network in Norfolk is the low ridership on the lightrail system, exacerbated by the COVID-19 pandemic which affected ridership on transit systems across the country. On the light-rail specifically, many residents cite the lack of relevant destinations as the reason they don't take the light-rail. Efforts to connect the light-rail to destinations in Virginia Beach and northern areas of Norfolk have not yet been successful, limiting the potential of this critical piece of transportation infrastructure. Infrequent headways on bus routes have impacted ridership on certain routes as well.

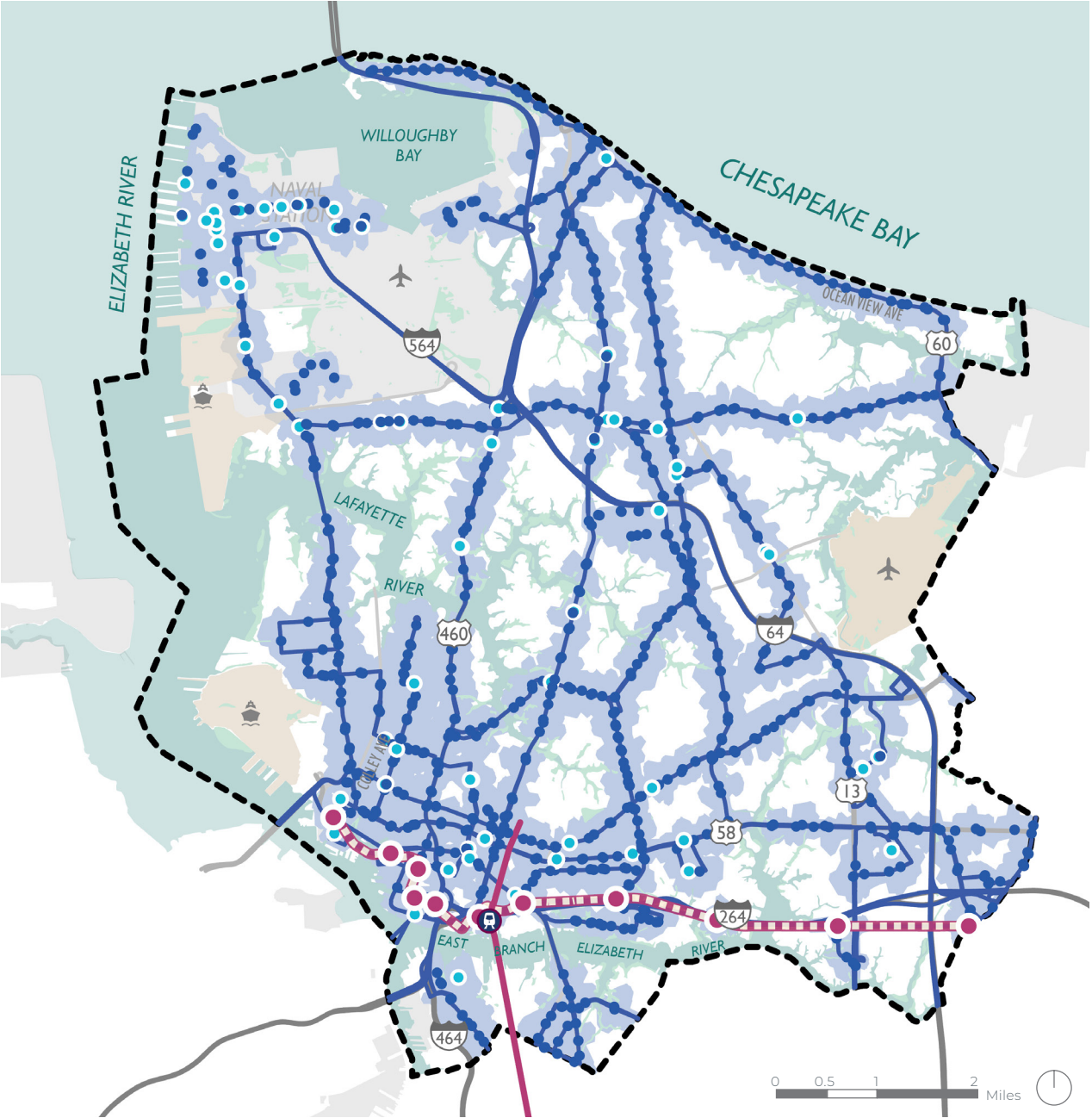


Figure 56: Norfolk Transit Network: Bus, Light Rail, and Amtrak connections

Source: City of Norfolk; HRTPO; Amtrak

- Transit
 - Amtrak stations
 - Amtrak routes
 - Light rail stations
 - Sheltered transit stop
 - Transit stop
 - Norfolk HRT routes
 - 1/4 mile transit walkshed
- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands

Public transit options are particularly important for Norfolk's disadvantaged communities.

FREIGHT RAIL

In the last several decades, the share of containerized rail cargo handled by the Port of Virginia has steadily increased. In recent years, the percent of rail cargo has hovered around 32% of all cargo handled at the Port of Virginia (Source: Port of Virginia). This means that the amount of freight rail traffic in the city has also increased. Freight rail is an important component of the city's economy, and it represents a more efficient way to ship cargo when compared to on-road trucking. A higher percentage of freight is transported by rail at the Port of Virginia



Norfolk Southern Lambert's Point Railyard (City of Norfolk)

than at any other east coast port (Hampton Roads Regional Freight Study 2017). Norfolk Southern owns a large part of the rail lines within the city limits, notably those going to the Port of Virginia and the Norfolk Southern rail yard. The location of the Norfolk Southern rail lines, surrounding the downtown area and bisecting the city north to south, results in significant at-grade road crossings throughout Norfolk. While there is no data available about freight rail schedules, anecdotal evidence indicates that these crossings create frequent delays on roadways (Virginian Pilot). In addition, the length of

freight-rail trains has increased over time, which increases the amount of time it takes for a train to pass through a road crossing. **At-grade crossings create safety hazards for all road users — drivers, pedestrians, and cyclists alike.** Since 2017, there have been four incidents at railroad crossings in Norfolk, one of them resulting in injury (Federal Railroad Administration). On the other hand, instances where the roadway passes underneath a railroad crossing creates opportunities for flooding, which causes other safety and delay issues for road users. Rail lines can create barriers between neighborhoods, limiting connection and creating possible inequities between different communities. Efforts are underway to rethink and improve rail crossings throughout Norfolk.

Norfolk also has several abandoned freight rail lines such as the Justice 40 Rail Explorer. The Tide light-rail currently uses the corridor of one of these lines, and the continuation of the corridor into Virginia Beach presents an opportunity to extend the light-rail system. Abandoned rail lines can also be converted into multi-use trails and other means of connecting neighborhoods and increasing park space.

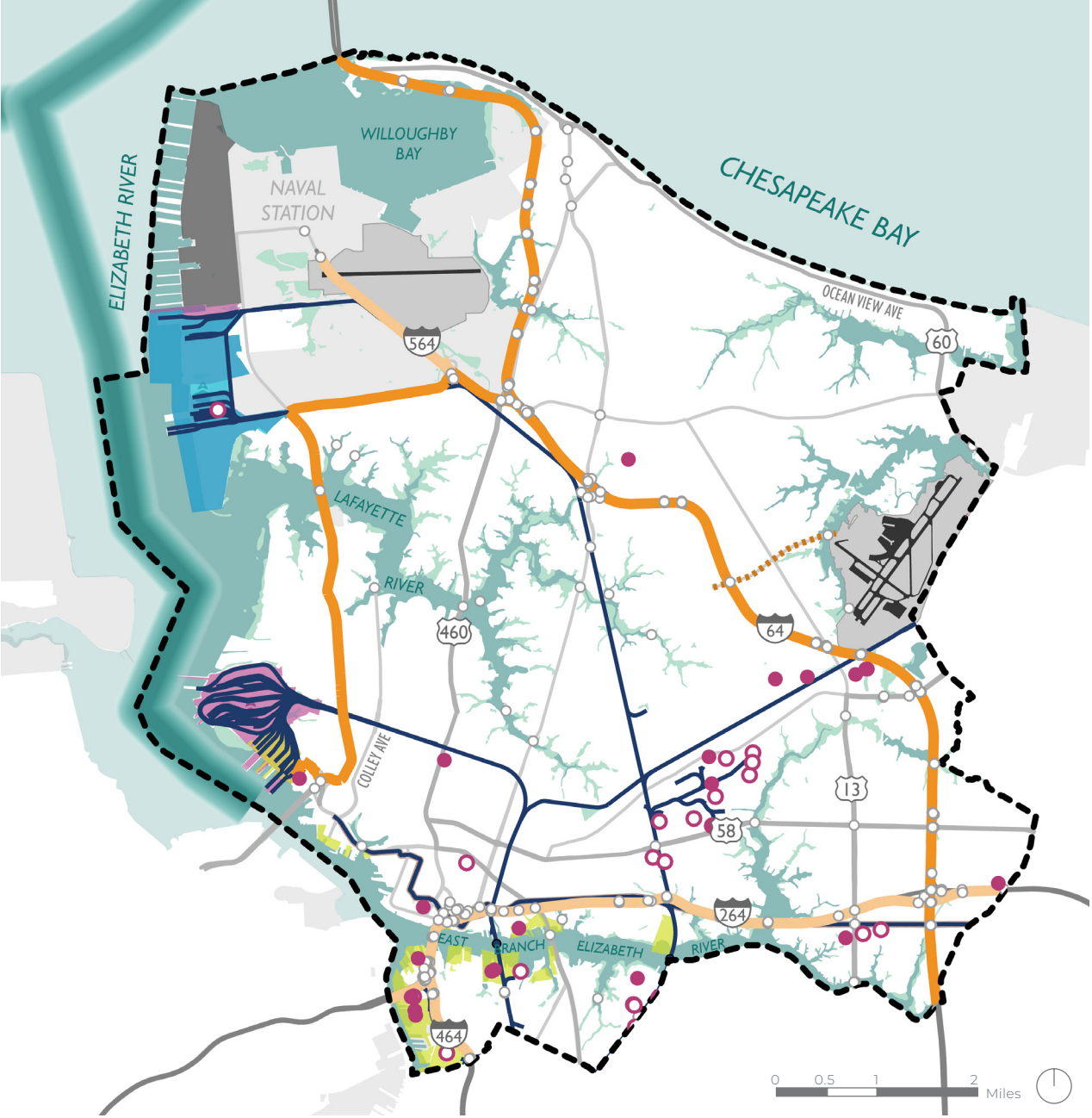


Figure 57: Freight Facilities

Source: City of Norfolk; HRTPO

ACTIVE TRANSPORTATION

Norfolk has a strong foundation of bike lanes that provide safe infrastructure for commuters, families, and visitors. Many of these bike lanes are focused in the neighborhoods surrounded by the Elizabeth and Lafayette rivers. The bike network provides connections between the Elizabeth River Trail, parks, homes, jobs, The Tide, shopping, and other recreational destinations.

The City of Norfolk analyzed available bike crash data for the years 2016-2020 and found that 85% of crashes occurred outside of the bike network, and 70% of those off-network crashes occurred at intersections. This data illustrates the importance of bike infrastructure at intersections as well as the overall safety benefits of bike lanes and indicates that **there is still a lot of progress to be made in Norfolk to make it a bike-friendly city.**

The City of Norfolk initiated a Bike-Pedestrian Counter Program in 2021 to provide a more reliable method of data collection. The first phase included 15 counters, and the total number has since expanded to 22 counters. This program allows for a quantitative measure for tracking the success of the Multimodal Transportation Master Plan and the City of Norfolk Bicycle and Pedestrian Strategic Plan. While the counters have not been functional long enough to derive

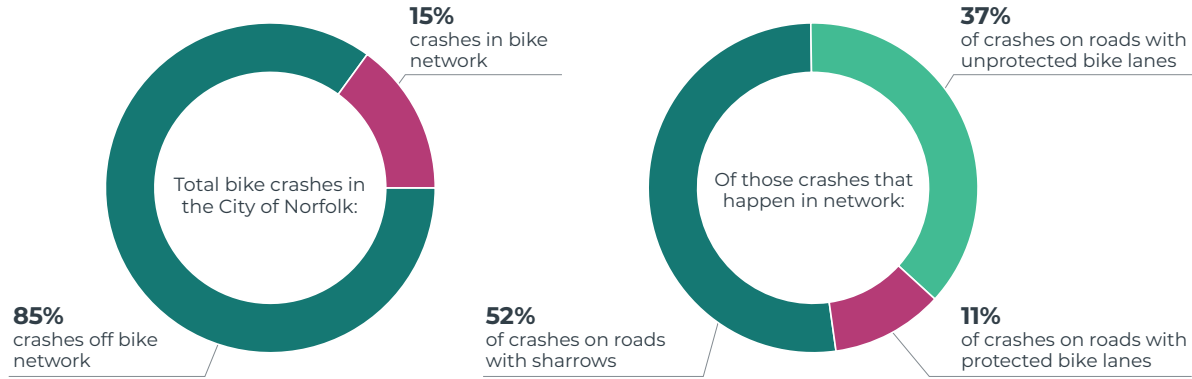


Figure 58: Bike crashes in Norfolk (2016-2020)

Source: City of Norfolk

long-term trends from the data, many of the locations where the counters were installed have seen increases in bike counts since 2021.

As of 2024, the bike network is currently far from complete. The Norfolk Multimodal study lays out key corridors and recommendations for improving this network.

Improving bike infrastructure across the city increases safety for all road users and provides more mobility options for people to travel. This can support residents who may want to live a more active lifestyle, as well as residents who do not or cannot own vehicles. This is especially beneficial for young people who still need to travel to schools, stores, sporting events, and many activities that allow them to thrive.

As Norfolk continues to advance its goal of becoming the most bike-friendly city in Virginia, the existing bike infrastructure throughout the city provides best practice examples for residents to explore. The City's Bike and Pedestrian Strategic Plan provides a strong framework for building out a more robust network citywide.

Norfolk has **60 miles** of dedicated bike lanes and shared lane markings.

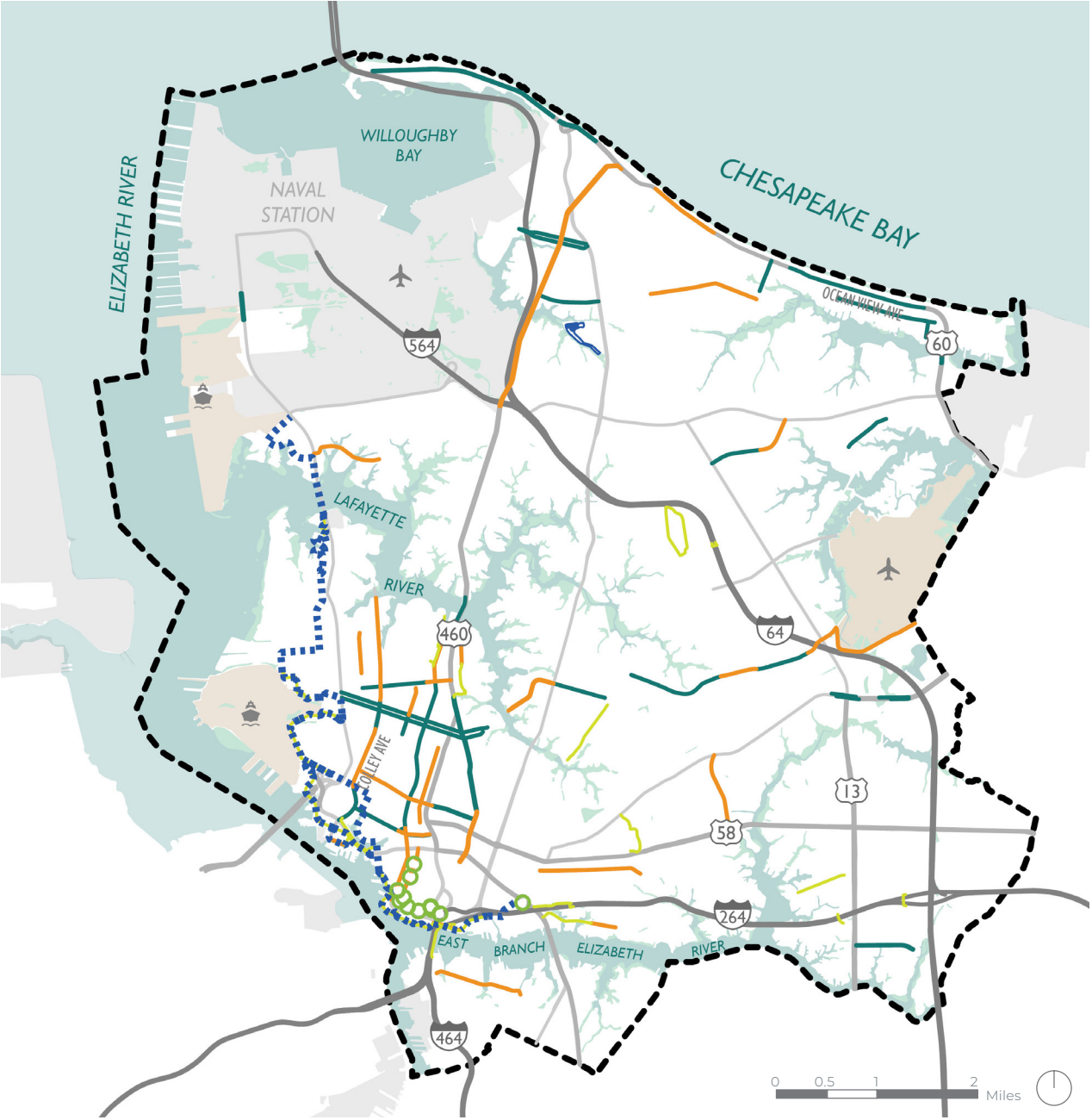


Figure 59: Current bike infrastructure

Source: City of Norfolk; HRTPO

- Mobility**
- Buffered bike lane or trail
 - Bike lane/two-way cycle track
 - Shared road (sharrow)
 - Lime bike/scooter corral
 - Elizabeth River Trail
 - Park trail
- City limits
Military
Seaport/Airport
Light rail
Water
Wetlands

Barriers to Mobility

Norfolk's neighborhoods feel distinct from each other, both socially and physically, because they are geographically disconnected; more often than not, the streets within Norfolk's many neighborhoods do not connect to other communities. Many streets do not connect due to dead ends at water, rail infrastructure, or highway barriers.

The primary characteristic that defines Norfolk's identity — its access to water — is also the aspect of the city's development that most acts as a barrier to connections across the city. The frequent inlets, creeks, and rivers cut off streets and necessitate bridges or, more frequently, detours to major arterials. **Few roads actually connect across the entire city, especially south to north.** Through an analysis of through-streets (Figure 60), non-Interstate arterials running north/south across the city are found to be generally



Norfolk's waterways are key to the city's identity and economy, but create challenges for connecting roads, as seen in this dead-end street (WRT)

limited to Hampton Blvd, Granby St, Tidewater Dr, Chesapeake Blvd and Military Highway. Major east-west connections are primarily Ocean View Ave; Little Creek Rd; Princess Anne Rd; and Virginia Beach Blvd.

Accordingly, **these streets carry heavy traffic on a daily basis and can get quite congested.** This congestion also maintains the need for these roads to carry high volumes and challenges attempts to redesign roadways to accommodate bike lanes or bus-only lanes.

Norfolk's primary mobility challenge may be what makes the city a pleasant place to live: the neighborhoods are quiet and do not have to field much through-traffic. But these barriers to mobility become quite challenging when residents need to move beyond their neighborhoods to connect to jobs, recreation opportunities, Downtown Norfolk, the beachfront, and other citywide assets.

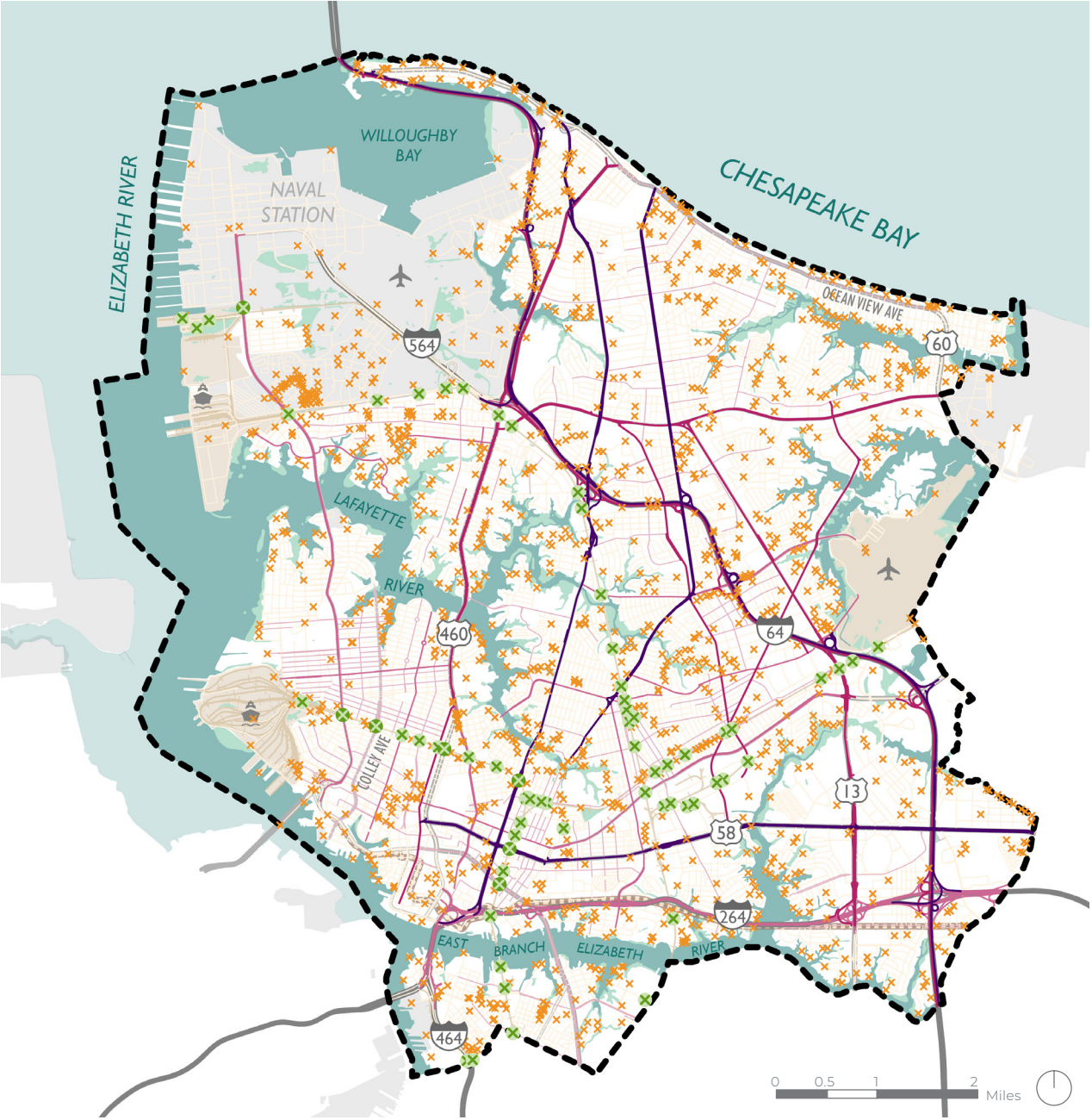


Figure 60: Mobility barriers
Source: City of Norfolk; Federal Railroad Administration; NOAA 2022

- Infrastructure barriers**
 - Railroad grade crossings
 - Railroad over crossings
 - Dead end streets
- Number of Civic Leagues streets enter**
 - 0-2
 - 3-5
 - 6-10
 - 11-15
 - 16-25
- Streets within the FEMA flood zones**
 - 100 year
 - 500 year
- Other features:**
 - City limits
 - Military
 - Seaport/Airport
 - Light rail
 - Water
 - Wetlands

HERE ARE SOME OF THE WAYS NORFOLK RESIDENTS AND VISITORS CAN MOVE AROUND THEIR CITY WITHOUT A CAR:

ELIZABETH RIVER TRAIL:



Norfolk's Elizabeth River Trail (ERT) is a 10.5-mile urban trail that has connected Norfolk residents to their waterfront since 2003. The trail connects 28 neighborhoods, providing active transportation infrastructure for commuting and recreational travel from Norfolk State University to Norfolk International Terminals. On top of that, **the ERT Foundation has been strategically improving the trail to provide a place for innovative economic development, enhanced environmental awareness, and neighborhood connectivity.**



The ERT has plans to continue expanding, connecting to Virginia Beach, the Virginia Capital Trail, the Birthplace of America Trail (BoAT), and the East Coast Greenway. Many of the successes of the ERT can be used to enhance public spaces, connectivity, and economic vitality throughout the city. The ERT's focus on businesses can be used as a model to improve biking and walking facilities throughout Norfolk. Additionally, the trail's use of historic railroad right-of-ways can function as a model for repurposing additional railroad right-of-ways for public and mobility uses.

ELIZABETH RIVER FERRY:



Hampton Roads Transit runs a small ferry system, called the Elizabeth River Ferry, connecting Norfolk to Portsmouth across the Southern Branch of the Elizabeth River. The ferry typically runs every 30 minutes, and in the summer afternoons and evenings runs on a 15-minute schedule. In early 2024, two new ferry boats were added to the system, modernizing the fleet of boats. **The Elizabeth River Ferry has seen increased ridership indicating that it is still a reliable and important transportation method.** Riders include commuters, residents, and tourists exploring the area. The continued increase in ridership also shows that the ferry can act as a model for connecting additional destinations via the many waterways interlacing Norfolk's geography.

LIGHT RAIL SYSTEM:



Hampton Roads Transit (HRT) operates Norfolk's light-rail system, called The Tide. Opening in 2011, The Tide operates along a 7.4-mile corridor that connects Eastern Virginia Medical School and the Ghent neighborhood, Downtown Norfolk, Norfolk State University, and Newtown Road. The service typically runs every 15 minutes from 6:00am until 11:00pm, and during peak commuting periods runs every 10 minutes. On the weekends, the service runs until midnight, providing another mode of transportation for people to use when traveling to or from social activities later in the evening. The Tide has been critical to new developments along its path that are increasing density and recreating the urban fabric of Norfolk.



Currently, the eastern terminus of the light-rail system lies directly on the border between Norfolk and Virginia Beach. A park-and-ride lot here provides the opportunity for commuters to leave their cars and avoid driving into the heart of Downtown Norfolk. While ridership on The Tide is currently not as high as it could be, and ridership numbers decreased during COVID-19, the system has potential to provide connection to more jobs, homes, and destinations. NFK2050 will examine potential plans to expand the system for more meaningful connections. **As the City of Norfolk looks to expand mobility options, the light-rail system can provide a critical spine for connection between modes and an opportunity to expand an existing system to new destinations.**

LIME SCOOTER AND BIKE SHARE:



Norfolk has had access to electric scooters since 2019, when Lime began operating in the city. Dockless bikes were added in 2021, providing additional options for people to move around. Use has steadily increased each year. In 2023, the system saw its highest level of use so far, with nearly 750,000 trips and over 700,000 miles ridden. **There is a direct relationship between where the trips are occurring and where there is physical infrastructure like bike lanes, bike parking, and docking corrals to support the safe use of the bikes and scooters.** As the City looks to provide more mobility options, the growing success of this system should be used as a model for expansion elsewhere in Norfolk.

Critical Infrastructure

Broadband and the Digital Divide

In light of the COVID-19 pandemic and the rise of remote work and learning, internet access can be viewed as an essential service for participation in today’s society.

In Norfolk, the question of internet access is not an infrastructure question, as all of the city has fiber availability: Cox Communications, the primary broadband provider, has installed 1 GB data fiber throughout the city, to which all businesses and homes have the ability to subscribe.

As part of their Digital Equity Programs, Cox offers \$9.99 monthly service to governmentally-assisted households with a K-12 student in their household and \$29.99 monthly service to assisted households without a student. MetroNet, another internet service provider, is currently about halfway through their construction of 100% fiber optic network in Norfolk. Construction began

in November 2021 and is estimated to last four years. **Despite these more affordable options, 11.1% of Norfolk households still do not have internet access at home.**

For those households, resources like local libraries become of vital importance. For Norfolk’s K-12 students, schools are another crucial resource for internet and computing access.

Regionally, the Greater Norfolk Corporation (GNC) and its Virginia Beach counterpart Virginia Beach Vision have established a joint Broadband Task Force to leverage the Southside Fiber Ring. Once complete, the Southside Fiber Ring will be a 103-mile-long fiber ring connecting government, business, and education centers in the five Southside cities, also with connection to one or more transatlantic cables that have landed or will land in Virginia Beach. The Southside Cities look to provide this dark fiber network and then allow private-sector companies to provide businesses with ultra-high-speed broadband at an affordable price.

13.7%
of Norfolk households
do not have home
internet subscriptions

6.3%
of Norfolk households
do not have computing
devices

Source: US Census Bureau, ACS 5-Year Estimates

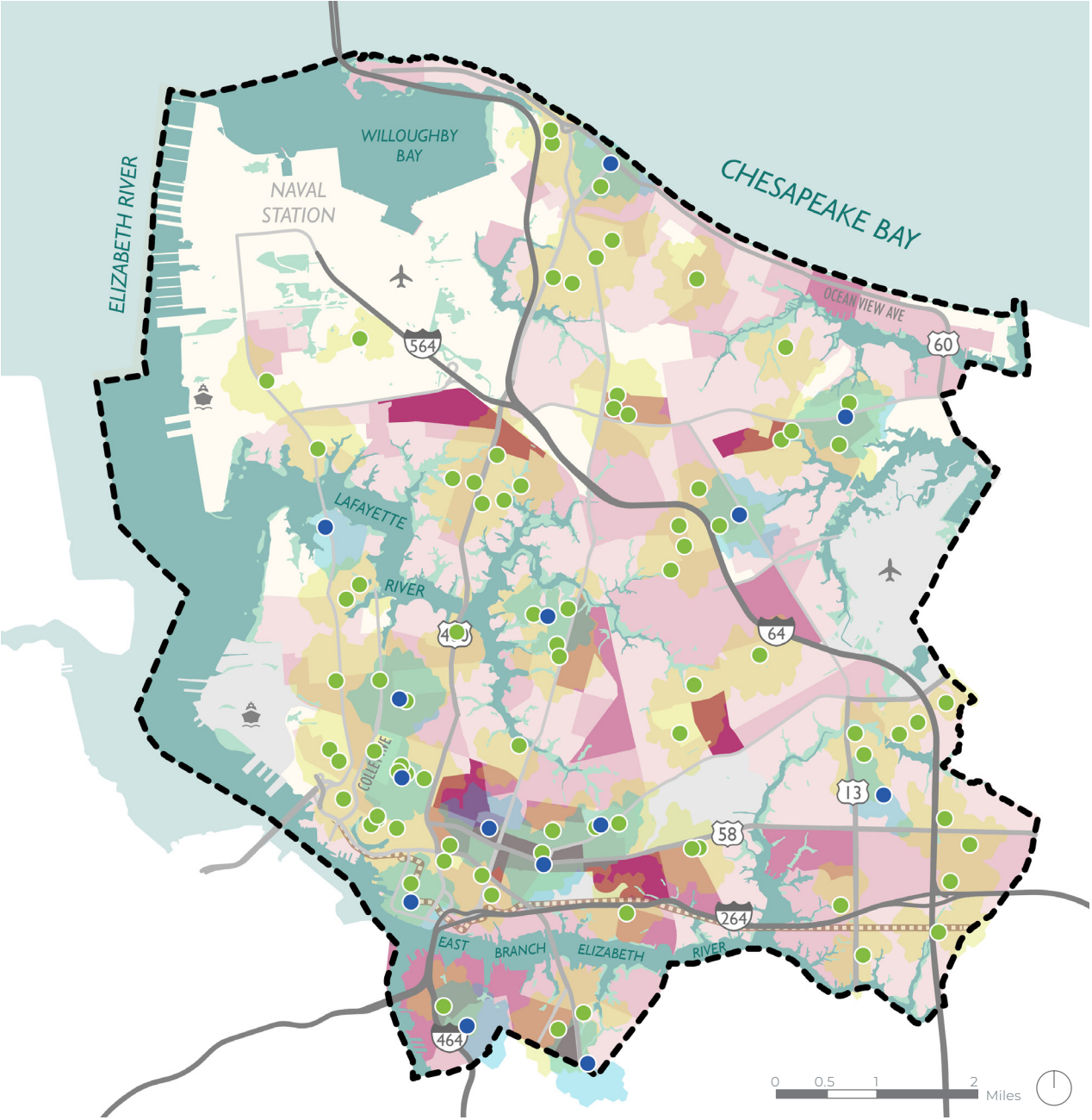


Figure 61: Households without internet access, walkability to schools and libraries
Source: US Census Bureau, ACS 5-Year Estimates, 2022

Water Supply

The City of Norfolk Department of Utilities provides potable water to city residents, businesses, U.S. Navy facilities, and some residents of Chesapeake and Virginia Beach. When Norfolk originally purchased water reservoirs across the region, Norfolk was the primary consumer of water in the region. However, growth of the surrounding cities has led to increased demands for raw water across the Hampton Roads region. **Now more than 800,000 residents of Norfolk, Chesapeake, and Virginia Beach get their drinking water from one of Norfolk’s water sources.** Norfolk owns several water sources throughout the Hampton Roads region, including eight reservoirs, two rivers, and four deep wells. Raw (untreated) water is pumped from these sources to one of the Department of Utilities’ two water treatment plants where it is filtered, disinfected, and tested against water quality standards. It is then pumped to demand to its end users.

As the Hampton Roads region draws from the Potomac Aquifer faster than the groundwater can naturally replenish itself, land subsidence and saltwater intrusion have become important considerations for Norfolk and the greater region. The issue of sea level rise further exacerbates the issue of saltwater intrusion into the region’s freshwater sources. The Hampton Roads Sanitation District (HRSD) has developed the Sustainable Water Initiative for Tomorrow (SWIFT) program with aim to replenish the aquifer.

Norfolk’s two water treatment plants, Moore’s Bridges Water Treatment Plant and Kristen M. Lentz Water Treatment Plant (previously known as 37th Street Water Treatment Plant) have a combined capacity to treat approximately 72 million gallons per day (MGD) of water. The treated water is delivered to customers via distribution infrastructure including: over 800 miles of distribution mains, two pump stations, four ground storage tanks, two elevated tanks, and two elevated clear wells. The drinking water produced in Norfolk is tabulated by year in Figure 62.

Year	Million Gallons per Day (MGD)	% Change
2017	60	2.9%
2018	59.9	-0.16%
2019	58.5	-2.3%
2020	56.4	-3.6%
2021	57.9	2.7%
2022	58.6	1.2%
2023	59.4	1.4%

Figure 62: Drinking water produced in Norfolk (2017-2023)

Source: City of Norfolk



Kristen M Lentz Water Treatment Plant (City of Norfolk)

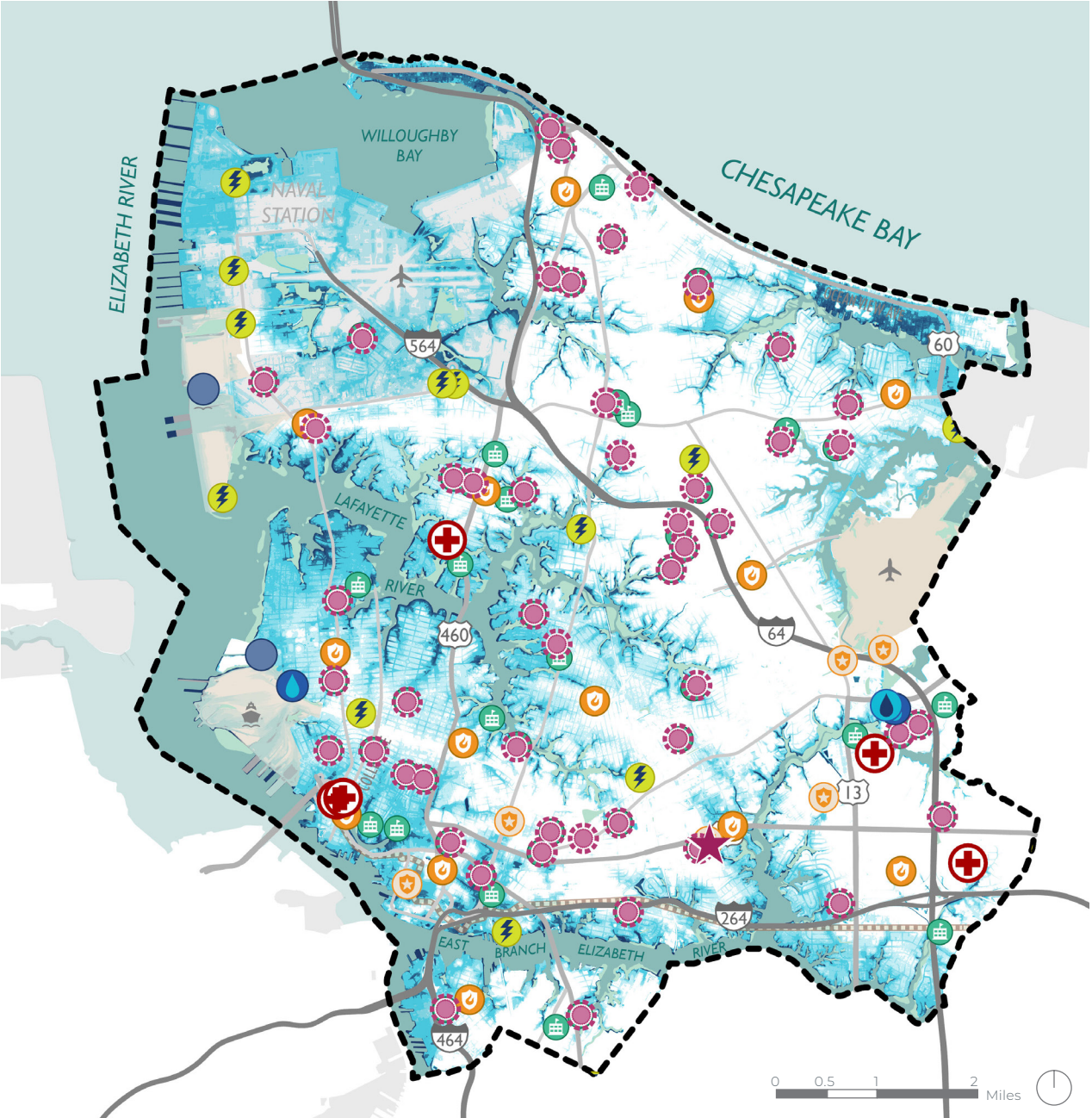


Figure 63: Critical Infrastructure affected by potential flood risk (SLR & Storm inundation projections)

Source: City of Norfolk; JLUS; NOAA 2022

Water treatment assets

- Water pump station
- Water treatment plant
- Wastewater treatment plant

Community assets

- Police station
- Fire/emergency station
- Hospital
- School
- Emergency operations
- Emergency shelter

100-year storm inundation, 2100

- 2050 1% probability extreme storm, 7.99ft
- 2080 1% probability extreme storm, 9.37ft
- 2100 1% probability extreme storm, 10.75ft

Tidal flooding

- 2050 high tide inundation, +1.44ft SLR
- 2080 high tide inundation, +2.82ft SLR
- 2100 high tide inundation, +4.2ft SLR

- City limits
- Military
- Seaport/Airport
- Light rail
- Water
- Wetlands



SWIFT Initiative

As part of their Sustainable Water Initiative for Tomorrow (SWIFT), the Hampton Roads Sanitation District (HRSD) takes treated wastewater and places it through additional advanced water treatment, bringing it to drinking water quality standards. The SWIFT water is then added back to the Potomac Aquifer, in a first-of-its-kind program for the State of Virginia. By replenishing the Potomac Aquifer — the primary source of groundwater in Hampton Roads — the SWIFT project seeks to alleviate issues of land subsidence and saltwater intrusion.

Wastewater Treatment

Regional wastewater is treated by facilities owned and managed by the Hampton Roads Sanitation District (HRSD). HRSD is a political subdivision of the Commonwealth of Virginia, serving 1.9 million people in 20 cities and counties in coastal southeastern Virginia. **HRSD operates eight major treatment plans and eight smaller plants with a combined treatment capacity of 225 million gallons per day (MGD).**

Within Norfolk there are three sewerage districts. Each district’s wastewater is treated by one of three wastewater treatment plants, two of which are located within the City of Norfolk limits (Army Base Treatment Plant, 9.68 MGD, and Virginia Initiative Treatment Plant, 28.94 MGD), and one located in Virginia Beach (Atlantic Treatment Plant, 33.32 MGD).

The Norfolk Department of Utilities is responsible for providing and maintaining the infrastructure to convey wastewater from users to the HRSD plants, which includes 129 pump stations and 879 miles of sewer mains. Figure 64 is a tabulation of the linear feet of sewer cleaned each fiscal year since 2013.

Fiscal Year	Linear Feet Cleaned
2013	1,335,840
2014	1,246,080
2015	1,172,160
2016	670,560
2017	854,304
2018	827,904
2019	756,624
2020	685,344
2021	633,600
2022	975,744
2023	1,040,071

Figure 64: Linear feet of sewer cleaned by Norfolk Department of Utilities (2012-2023)

Source: City of Norfolk

Moore’s Bridges Water Treatment Plant (City of Norfolk)



Land Value

At their core, cities are composed of unique and finite areas of land that can neither be moved nor destroyed. This is especially true for Norfolk, where there is little room for city expansion. As a result, it is imperative that Norfolk uses what finite land we have as efficiently as possible.

Land use decisions have enduring impacts on both public infrastructure and service costs, as well as on municipal revenue. The following Land Value per Acre models are built on real estate concepts that make a quantifiable case for better city planning and smarter growth, and are designed to assist the community in understanding Norfolk’s fiscal health in terms of land use decisions.

WHY VALUE PER ACRE?

This work focuses on visualizing tax data utilizing the “per acre” metric as a unit of productivity to evaluate land use and value. **Cities have a finite area of land, and how that land is used has a direct effect on**

municipal coffers. The per acre metric normalizes tax values into a direct “apples-to-apples” comparison utilizing land consumed as a unit of productivity. Put another way, different cars have differently sized gas tanks; when looking at the efficiency of a vehicle, the gallon is used as the standard measure, not the tank. Therefore, “miles per gallon” is common practice to gauge efficiency, not “miles per tank.” We can apply the same principle to measure the financial productivity of various development types across a community.

The images on these pages illustrate the difference between **Taxable Values** and **Value**

Per Acre for select parcels throughout Norfolk. The image at opposite left, “Total Taxable Value,” reflects how we typically view and understand tax production. While parcels with the largest footprints often produce the highest revenue, they also carry the highest costs in regards to public utilities (i.e., streets, sewer, water). Thus, examining a development’s total tax production overlooks the amount of land and other public resources that are consumed in order to produce revenue. When we utilize the “Value Per Acre” metric (opposite right), values shift to highlight properties that yield **high property tax rates relative to their size.**



Broad Creek Shopping Center (Point Homes)

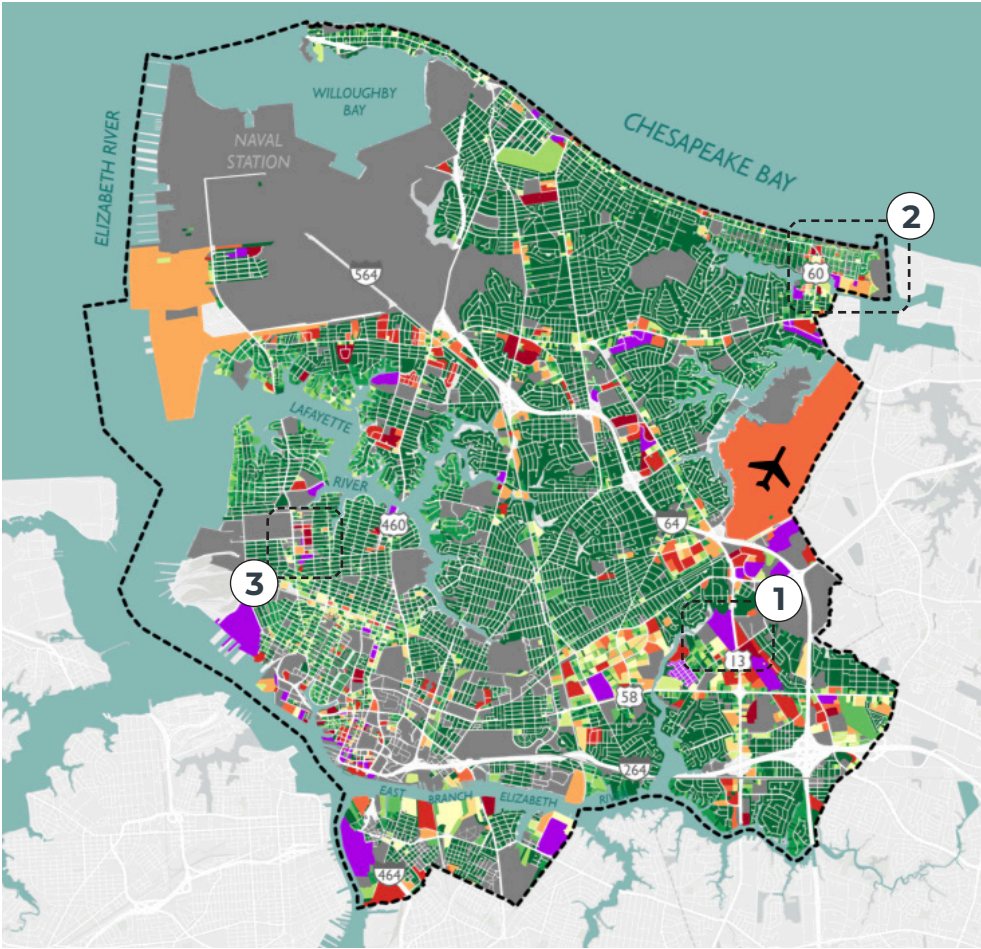


Homes at East Beach (City of Norfolk)



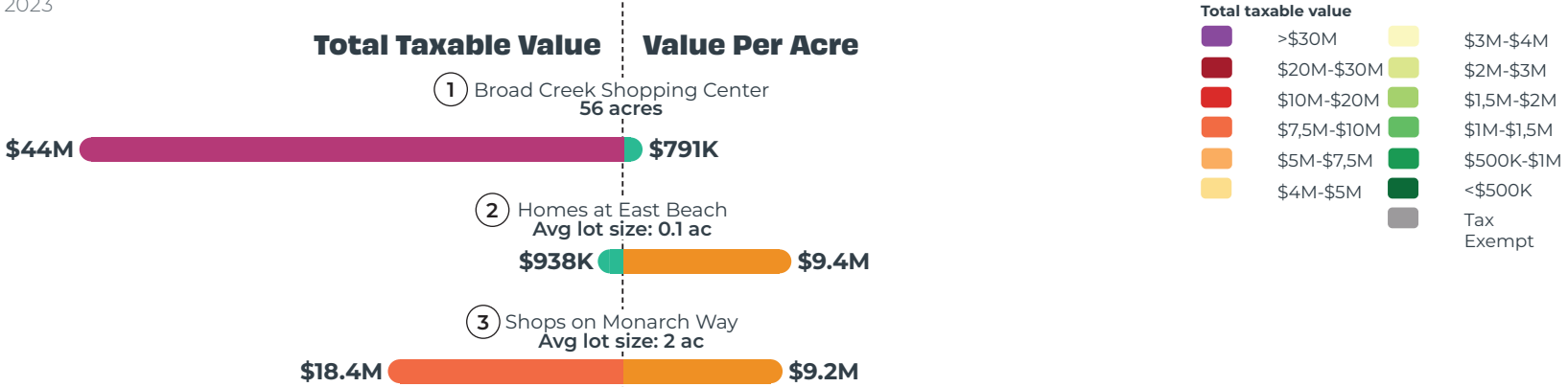
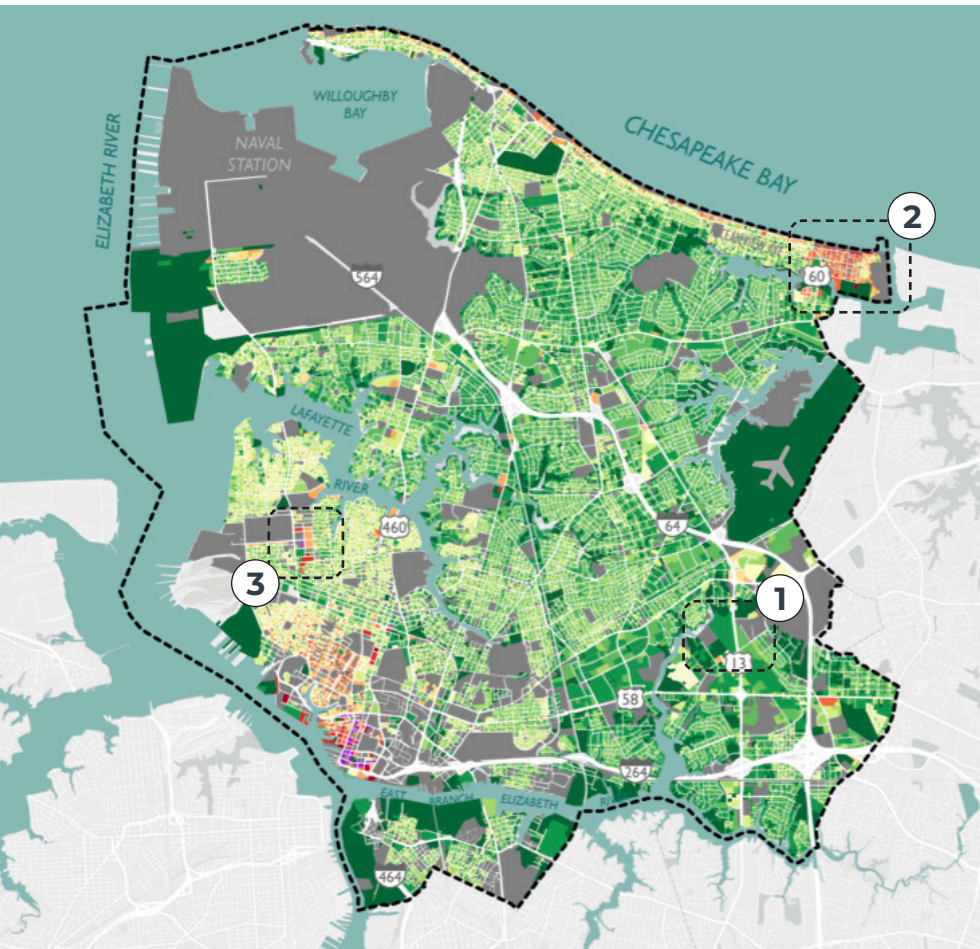
Shops on Monarch Way (Google Earth)

NORFOLK PARCELS - TOTAL TAXABLE VALUE



Source: City of Norfolk Assessor, 2023

NORFOLK PARCELS - TAXABLE VALUE PER ACRE

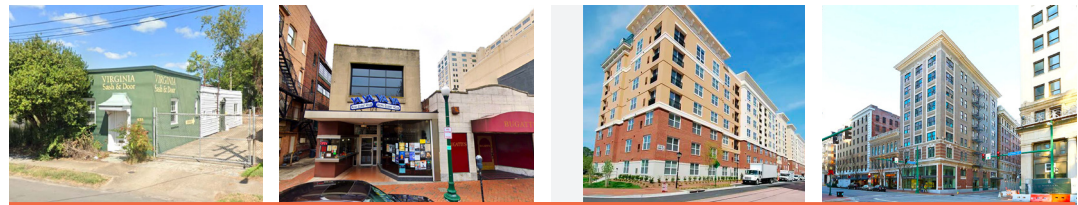




Low density, Industrial Low density, Commercial Low density, Residential Low density, Mixed-use



Medium density, Industrial Medium density, Commercial Medium density, Residential Medium density, Mixed-use



High density, Industrial High density, Commercial High density, Residential High density, Mixed-use

Google (all images)

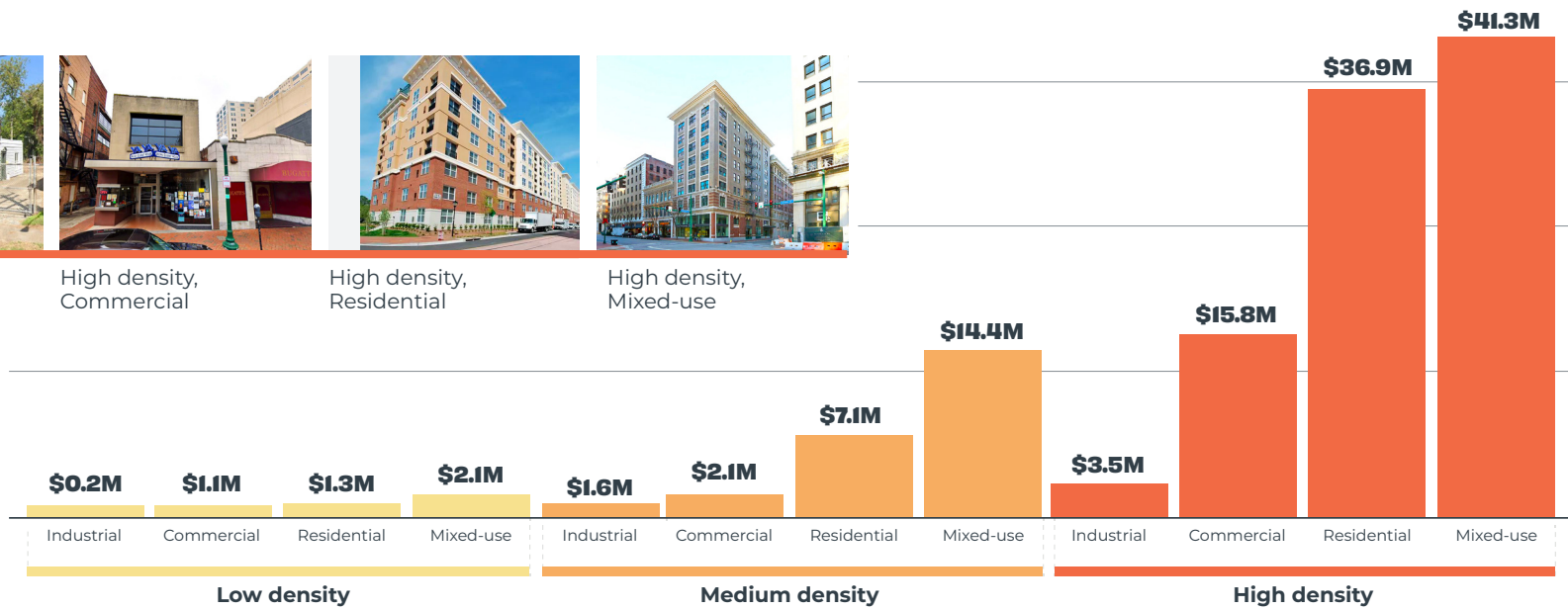


Figure 65: Property tax revenue per acre by building type

Source: City of Norfolk, 2023

When we look at taxable value per acre of parcels in three dimensions (Figure 66), we can see how productivity varies spatially across Norfolk. Most strikingly, tall purple spikes highlight the density of downtown. Beachfront properties are also visible along the spine of the coastline, as well as the dense developments of East Beach. The developed middle of the city consists primarily of greens and yellows, reflecting where the majority of Norfolk's single family housing and large commercial developments are located. **Generally speaking, sprawling developments yield a lower efficiency when we examine their values through the value-per-acre lens.**

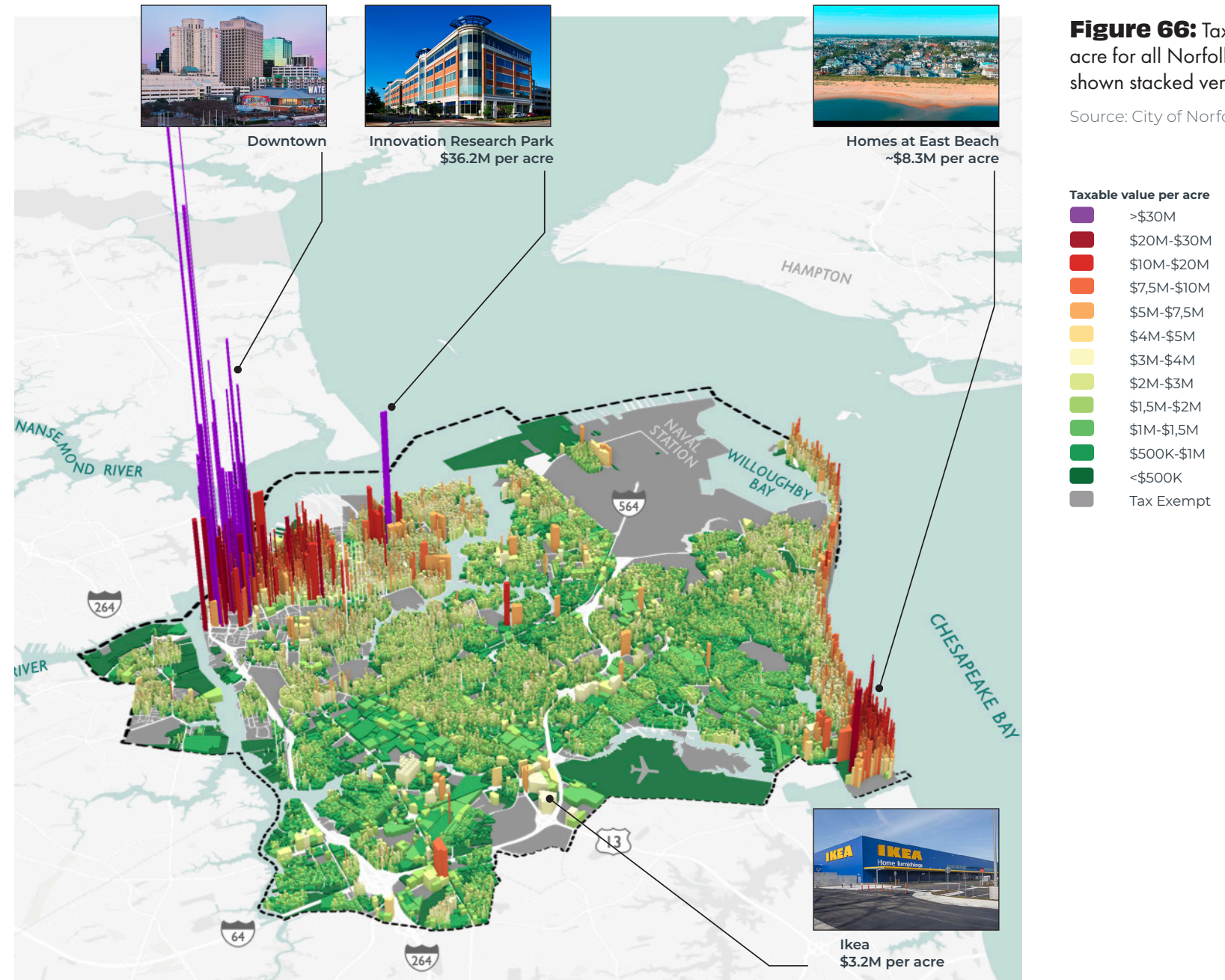


Figure 66: Taxable value per acre for all Norfolk parcels: value shown stacked vertically

Source: City of Norfolk Assessor, 2023

LAND USE PATTERNS

Our main takeaway from this analysis is that land use decisions matter. Whether we are considering the development of residential, commercial, or mixed-use properties, density has a great impact on value potency.

Property tax value is not the only way to quantify a site’s value to the Norfolk community: many culturally and economically important parcels are not taxed (ex. parks, military sites, public institutions). However, when it comes to the city’s revenue, whether sites are contributing efficiently to the overall budget has ramifications for infrastructure and other major expenses.

As NFK2050 moves into planning recommendations, the city’s existing landscape of land use and value should be kept top of mind for future development decisions.

INDUSTRIAL LAND

It should be noted that industrial land uses are an outlier in this valuation, as an important and necessary part of any city’s economy. In Norfolk, over 1,300 acres are designated for industrial land uses and contribute over \$2B in total taxable value. Although industrial land uses typically consume a large amount of land, they provide thousands of jobs and are an important part of Norfolk’s economy and culture.

HOUSING VALUE

Density has a tremendous impact on value efficiency for housing.

For residential properties, missing middle housing performs significantly better than other multi-family alternatives. While single family detached housing typically generates less revenue potency, waterfront access also significantly impacts property values. Homes along the Lafayette River and coastline reflect slightly higher values compared to the homes that are located farther inland and adjacent to major highways.

While the tall visual spikes in the apartment complexes of Downtown suggest significant land value per acre (Figure 68), the single family and ‘missing middle’ homes in Ghent historic district are also quite lucrative relative to their size. Similarly, homes in East Beach also demonstrate significant value productivity.

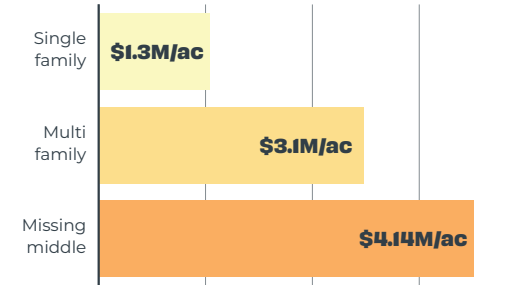


Figure 67: Residential Value per Acre
Source: “Norfolk Comprehensive Housing Study, 2023”



Housing in East Beach (City of Norfolk)

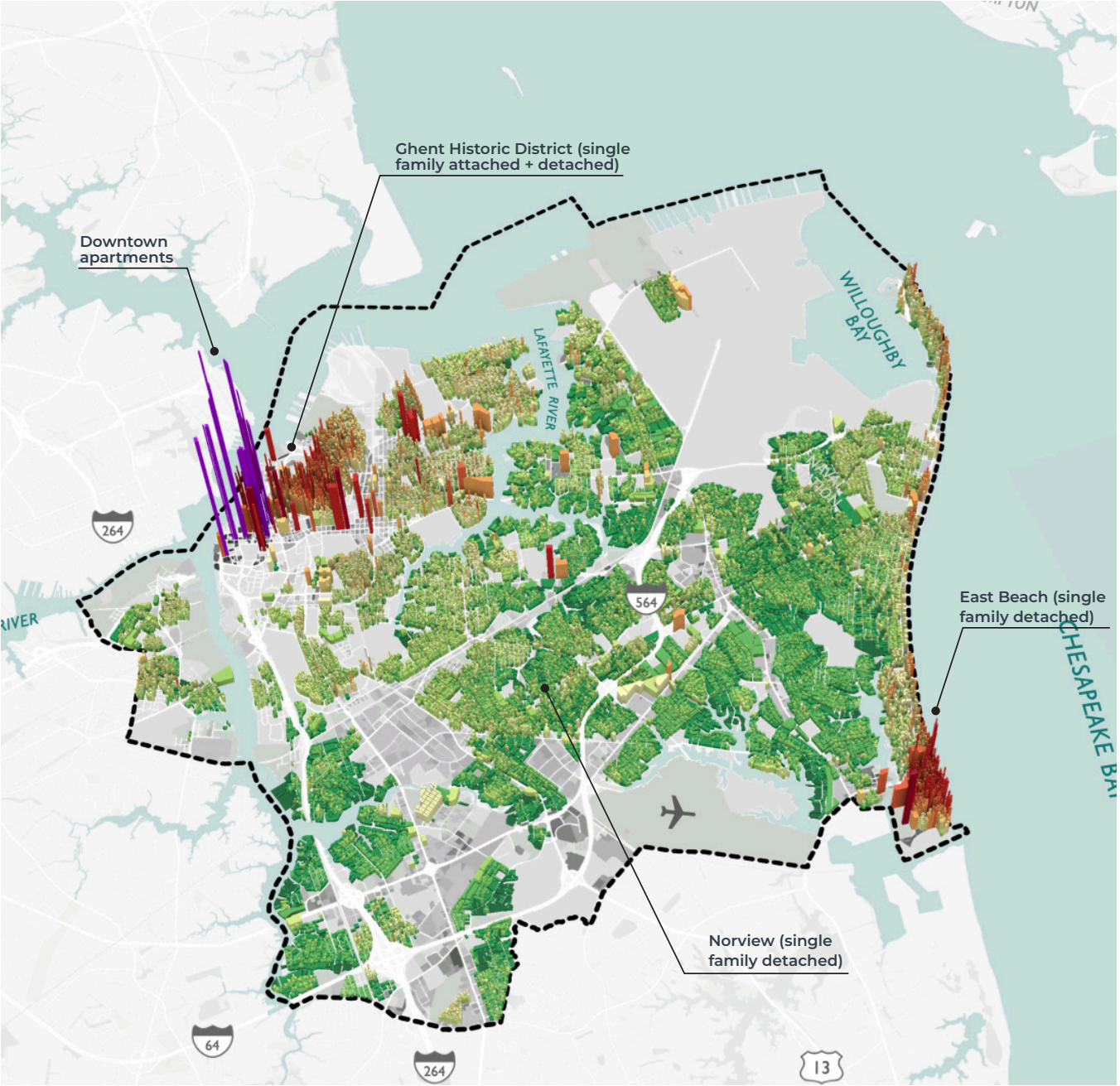
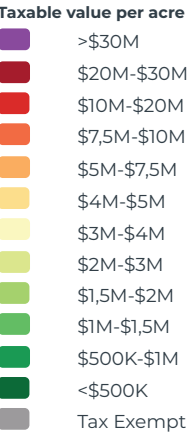


Figure 68: Residential land uses highlighted in Norfolk’s value per acre model

Source: City of Norfolk Assessor, 2023



Commercial Nodes

Norfolk has commercial districts in every Ward, but not all of them are equally vibrant — or economically productive.

Using the Value per Acre model (page 80), it is easier to understand how commercial land uses also impact value productivity. As illustrated opposite, the density of multi-story mixed use and commercial storefronts that populate Norfolk’s downtown are notable, but that is not the only type of development that can produce substantial value for a community. Other commercial nodes throughout the city also bring in a significant revenue stream, particularly along Monarch Way and 21st St.

Commercial and mixed use properties become exponentially more efficient in value when density increases. These land uses also create the potential for more jobs and give small and local businesses a chance to establish themselves.

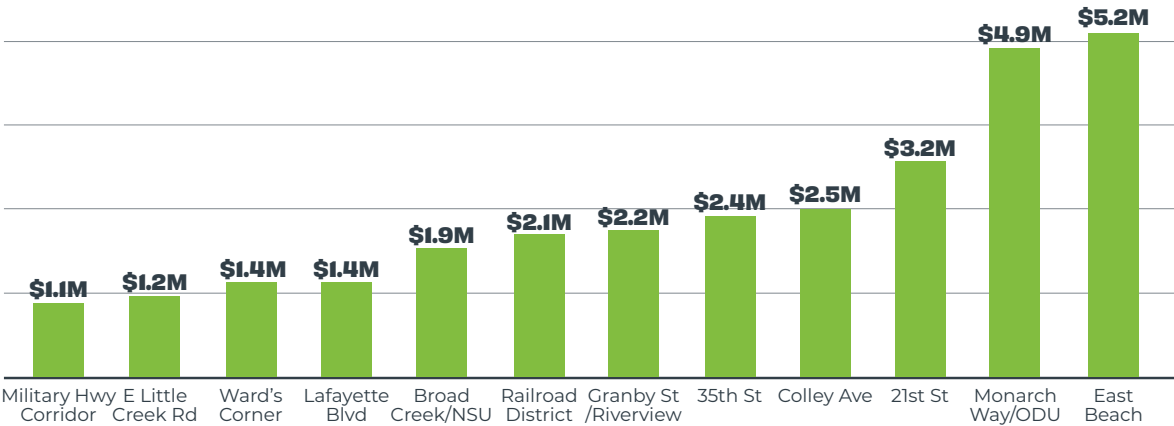


Figure 69: Norfolk commercial nodes: average tax revenue per acre

Source: City of Norfolk Assessor, 2023

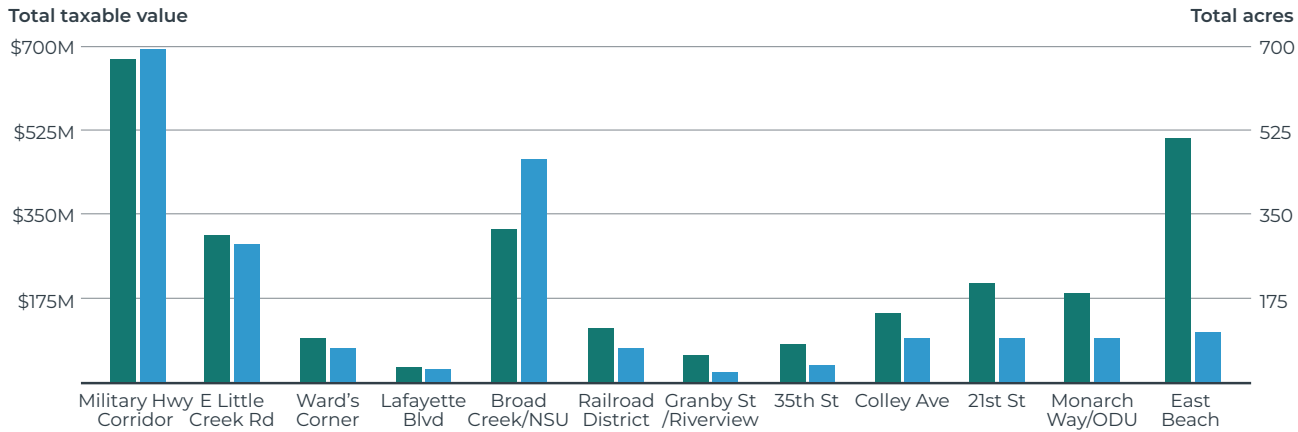


Figure 70: Norfolk commercial nodes: total taxable value

Source: City of Norfolk Assessor, 2023

Total Taxable Value
Total Acres

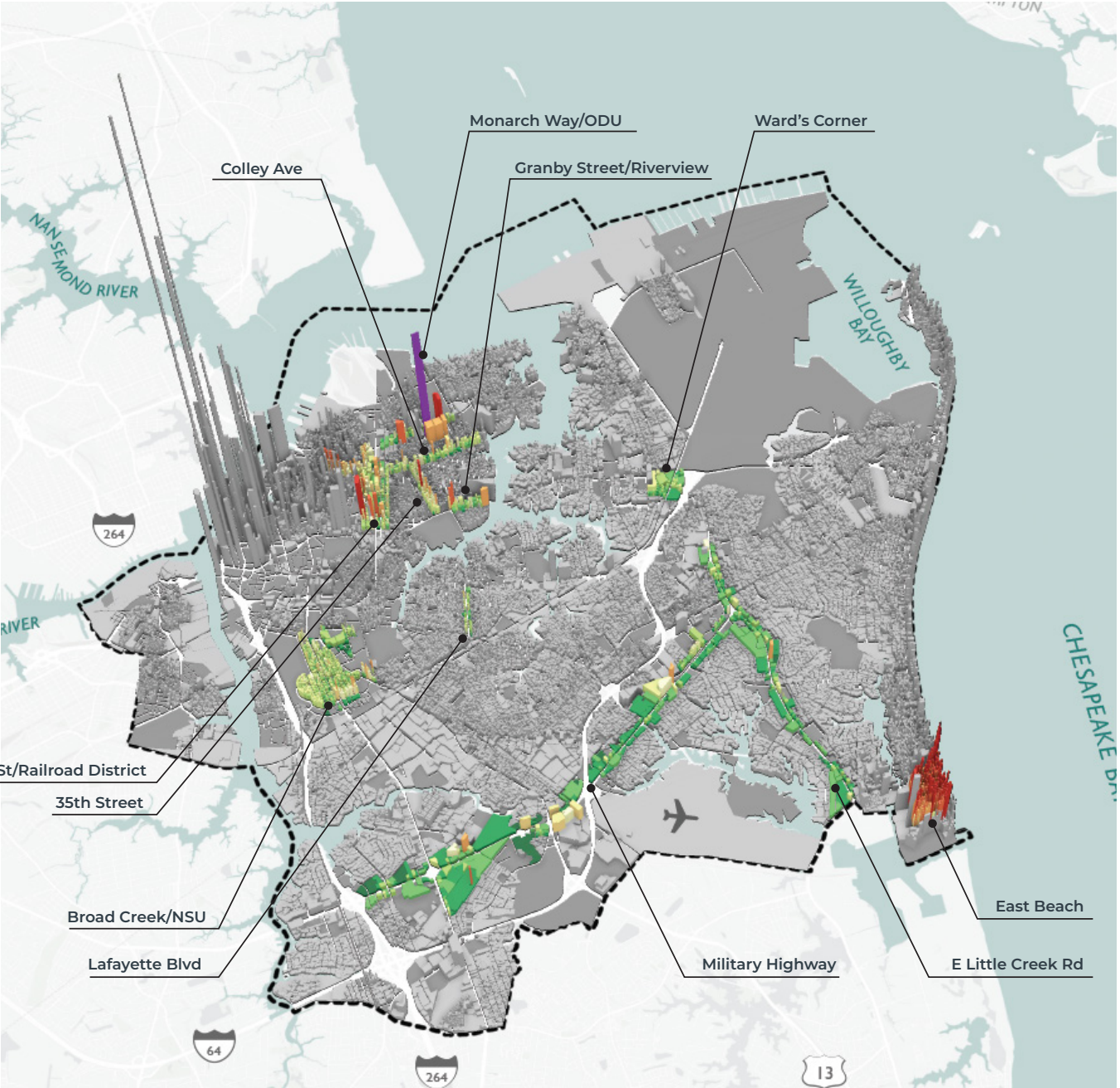


Figure 71: Commercial nodes outside of Downtown Norfolk highlighted in the value per acre model

Source: City of Norfolk Assessor, 2023



THE CITY OF
NORFOLK

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