

## ABSTRACT

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The Hudson County Ferry Service Expansion Study examined several potential ferry landings around Hudson County to conduct an initial assessment of the feasibility of new or additional service. Current and future travel demand of proposed routes were assessed using the NJTPA's travel demand model, North Jersey Regional Transportation Model-Enhanced (NJRTM-E) and future population growth. Although the public outreach and commuter trends were impacted by the COVID-19 pandemic, the study identified significant public interest in adding ferries to the region. The study then focused on concept routes in Newark Bay, identifying conditions to monitor which could create the environment for a successful, financially sustainable ferry service, as well as potential funding sources and partnerships. The study provided Hudson County with a greater understanding of the benefits and complexities of implementing and operating additional ferry service in the region, as well as an outline of milestones needed to implement service in the future.



# HUDSON COUNTY FERRY SERVICE EXPANSION STUDY

FINAL REPORT

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JUNE 30, 2021



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## REPORT PREPARED BY

This Hudson County Ferry Service Expansion Study report has been prepared by McLaren Engineering Group with input from Steer, FHI Studio, and GGES (Consultant Team) for the Hudson County Division of Planning (County) as part of the North Jersey Transportation Planning Authority (NJTPA) Subregional Studies Program.



## DISCLAIMER

This report has been prepared as part of the North Jersey Transportation Planning Authority (NJTPA) Subregional Studies Program with financing by the Federal Transit Administration and the Federal Highway Administration of the U.S. Department of Transportation. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The NJTPA is solely responsible for its contents.



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## Photo Contest Winners

Dana Greiman – 1st Place

Marvin Matias – 2nd Place

Samantha Szekely – 3rd Place

*Thank you to all Hudson County residents, organizations and representatives that participated in our outreach and virtual meetings*



# FINAL REPORT

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## EXECUTIVE SUMMARY

The Hudson County Ferry Service Expansion Study assesses the potential for additional ferry service in Hudson County. The study was conducted by Hudson County in partnership with the North Jersey Transportation Planning Authority (NJTPA). The goal of the study was to evaluate the feasibility and market demand for additional passenger ferry service expansion to serve new destinations within the context of the existing transportation system. To achieve this goal, the current and future travel demands of proposed routes were examined and concept routes in Newark Bay were chosen for more detailed analysis. This study identifies conditions to monitor which could create the environment for a successful, financially sustainable ferry service, as well as potential funding sources and partnerships.

### Study Findings

The study provided insight into the potential for new transportation options to serve travel needs, while determining what would be required to achieve a successful new ferry service. The study also provides a guide to implement future ferries in the region, including financial and infrastructure requirements and potential partnerships. Key findings from the study include:

- Interest in ferry service exists from the public, local and regional government entities, developers, businesses, and other stakeholders.
- The concept ferry landing sites are currently underserved by public transportation and have large numbers of residents who rely on transit service, with the percentage of zero vehicle households well above the regional and state averages.

- Estimated ridership demand based on current conditions for the concept routes examined through the study is insufficient to generate enough revenue based on fares for a financially sustainable service without some form of operating subsidy. Proposed land developments are expected to significantly increase overall demand and fare revenue for the concept routes through a substantial number of additional potential riders among residents and workers.
- Opportunities for future funding exist through grants, partnerships, and creative financing mechanisms.
- Navigation to each proposed concept landing is feasible, however, further expansion may be challenging, as Port Newark and the Kill Van Kull may slow travel due to existing vessel traffic.
- There is a potential for future connections to multiple different destinations in the region, including Newark, Carteret, Elizabeth, and Staten Island.

### Background & Purpose

Through consideration of the existing conditions of the region's transportation systems, as well as current and future travel needs for the County and northern New Jersey, the Hudson County Division of Planning sought to explore additional transportation options which could serve these needs.

The expansion of ferry service could reduce dependence and congestion on roads and other transit systems and allow for additional travel capacity for residents throughout Hudson County

and the region. Further, ferry service to new locations across Hudson County's waterfronts could potentially fill transportation gaps, provide new access for different communities that lack suitable transportation options for their travel needs, expand opportunities for residents, employment, and recreation, and supplement existing transportation service. Ferry routes along western Hudson County could provide transit options to a currently undeserved market and may serve a larger environmental justice population.

fares and accessibility to the waterfront and ferry landings. Similar feedback was heard throughout all outreach methods:

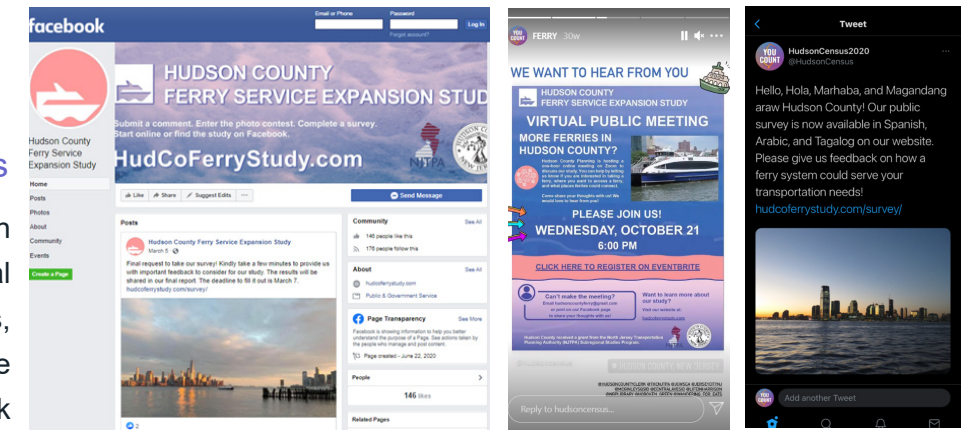
- Cost is critical; keep service affordable for all
- Convenience and access
- Focus on underserved areas
- Alternative ferry destinations besides Manhattan
- Multimodal connections

## Study Process

### Outreach and Partnerships

Utilizing several outreach methods, especially social media and virtual meetings, the study was able to engage and obtain valuable feedback from the public, partnerships, and stakeholders. The team gathered information on the preferences of those who live and work in Hudson County, and compiled "best practices" from established operations.

The inclusive public outreach process for the study provided insightful feedback on ferries and transportation to inform the study process and content. Overall themes from the public outreach included general interest, support for new routes connecting destinations throughout the region, and the necessity of connecting with other modes of transportation. Concerns included the cost of



## Data Collection

A significant component of the study process was the collection and analysis of data for the purposes of assessing the feasibility of future ferry service at the sites identified, determining any potentially restricting conditions, identifying future projects that could impact feasibility, supporting the understanding of the populations who might utilize the service, and estimating potential ridership demand.

The data collected included site data and physical conditions to determine physical restrictions to service routes, landing locations, and impacts to ferry service. Demographic data, including total population, environmental justice factors, labor force, employment, and median income from the American Community Survey (ACS) was collected to help understand the communities where concepts for ferry landings were being assessed. Resident characteristics were collected for multiple years and compared in order to understand historical growth rates. Planned development information was compiled to understand the future potential for population and employment growth. Transportation data was collected and analyzed to determine where travel demand exists and how it may change in the future. Daily trip patterns, including residence and workplace location, and the mode of transportation that people used, was collected from Census Transportation Planning Products based on ACS data. The number of estimated daily trips of the potential users at each site was obtained from the regional transportation model maintained by the NJTPA.

## Site Selection

At the start of the study, six locations were identified as potential candidates for ferry landings based on a review of data including bridge heights, water depths, land use, existing transportation

service, and existing maritime infrastructure. The six sites were: Bayonne’s Newark Bay waterfront, the Bayfront Redevelopment Area in Jersey City, south Harrison, Hoboken, South Kearny, and West New York.

The characteristics of the sites as determined through data collection and analysis were key drivers in understanding ferry service potential as well as any physical site limitations or fatal flaws. Hoboken and West New York are served by or have connections to existing ferry operations. In addition, the shoreline of West New York is shallow, and a new landing would require yearly maintenance. Travel through the Kill Van Kull could result in logistics issues due to barge traffic, and ferry travel from western Hudson County to existing landings in the Hudson River would not provide a time savings to passengers.

This information helped the team narrow the site list down to the four that advanced to detailed modeling. The four sites selected for detailed modeling were Bayfront, west Bayonne, south Harrison, and South Kearny, with proposed routes developed to connect the sites and nearby destinations. Focusing on the west side of Hudson County, the study was also able to concentrate efforts on the potential to provide transportation options for environmental justice populations in Hudson County, as well as intra- New Jersey ferry service, which had not been analyzed before.

## Estimated Ridership and Financial Analyses

The NJTPA’s regional travel demand model was used to develop base ridership for the four sites. In addition, an in-depth analysis of growth and planned developments was used to estimate additional future riders. Combined, these ridership forecasts were used to test three route configurations:

1. Base Route: South Harrison – South Kearny – Bayfront – West Bayonne

2. ‘Three Stops Only’: South Kearny – Bayfront – West Bayonne
3. Newark Route: Newark – South Kearny – Bayfront – West Bayonne

The ridership projections as well as capital and operating costs were estimated for each of these routes. A financial analysis compared the operating costs and revenue to understand the financial profile of each potential route. Additionally, capital costs were developed for vessel and landing construction.

## Conclusions

The Hudson County Ferry Service Expansion Study drew a number of conclusions on the feasibility of increasing ferry service in the County.

Through outreach, it was determined that there is some overall general interest, both public and private, for expanding ferry service in the region. Connections with other transportation modes are vital. Ferry landings must be accessible to riders who cannot afford to live on the waterfront, and other transportation modes help riders to complete their trips to their final destinations. To be competitive, ferry service must supplement- not compete with- existing transit service.

Partnerships are essential; partners can assist with promotion, support for legislative changes, hosting or sharing of infrastructure, route connections, and funding.

From a technical perspective, construction of ferry infrastructure was found to be feasible at all study locations, some sites would require more costly designs. Navigation between sites was also deemed feasible, but the Kill Van Kull could impact travel times. Moreover, travel around the peninsula, through the Kill Van Kull, creates a competitive disadvantage for ferry service compared to other travel options from the west side of the county to

the east. Coordination with regional partners and other maritime traffic is essential.

After evaluating routes along Newark Bay, study findings indicate that ridership demand based on current conditions for the concept routes is insufficient to generate enough revenue based on fares for a financially sustainable service without some form of operating subsidy. However, proposed developments and potential partnerships indicate that favorable conditions may exist in the future. From this finding, it is important to understand the key drivers of a successful service, so that the qualifications for necessary conditions can be monitored over time.

It is recommended that the County and other interested parties monitor driving factors to best anticipate the feasibility of new ferry service in Hudson County as conditions change. These include ridership demand as well as funding, partnerships, and cost savings opportunities

## Next Steps

The study provides recommended actions to take and conditions to monitor which could lead to the success of a ferry expansion in Hudson County in the future. Hudson County, along with local, regional, and state partners are encouraged to monitor impacts to the ridership demands and costs associated additional ferry service. Once the conditions exist to support additional ferry service in Hudson County, additional steps should be taken for implementation.



## INTRODUCTION

As the most densely populated county in the state, Hudson County experiences congestion that poses an issue for residents, commuters, and travelers in the region. Hudson County’s road and transit network provides a connection to Manhattan, and many commuters throughout the region travel through Hudson County for part of their trip. Excessive use and limited capacity have burdened the existing infrastructure in the region. Although Hudson County has numerous roads, transit systems, transportation hubs, and infrastructure, the demand for these facilities outpaces the supply, and the issue will only worsen as the region grows and necessary restoration projects, such as work on the Hudson River tunnels and feeder roads, get underway.

Existing trans-Hudson River passenger ferry service connects Hudson County with Manhattan. Expanding trans-Hudson ferry service and the creation of new intra-county and inter-county service may lessen the strain on the region’s roads and other transit systems and allow for additional travel capacity for residents throughout the region. Expanded ferry service would enhance the existing transit network through Hudson County.

The Hudson County Ferry Service Expansion Study examines opportunities to expand existing ferry service or create new ferry service within Hudson County. This study explores the market feasibility for intra-county, inter-county and inter-state ferry service along the Hudson, Hackensack, and Passaic Rivers at six primary areas identified by the County: south Harrison, South Kearny (Kearny Point Development Area), west Jersey City (Bayfront Redevelopment Area), west Bayonne, Hoboken and West New York.

This study does not provide guidance for immediate ferry service implementation, instead it identifies a regional interest in ferries and feasibility for ferries at the proposed locations, recommends factors to monitor that can lead to favorable conditions for future ferry service and outlines high-level implementation steps. Hudson County, along with local, regional, and state partners are encouraged to monitor conditions and implement infrastructure that will benefit future ferry service in the region.

This study was conducted during an unprecedented pandemic which impacted many aspects of life including transportation and in particular commuting. Many people throughout Hudson County and the country reduced their travel or stopped commuting altogether. The data, methodology, and future assumptions in this study are based on pre COVID-19 conditions. At the time of the study, the immediate impacts of a pandemic were noted and shaped the approach to study outreach. Although the economy is beginning to recover and both work and leisure travel is starting to increase as restrictions are lifted, it is uncertain how travel patterns and demand will be affected in both the short and long term and how future transportation will compare with historical trends. Future studies will be necessary to compare the ridership estimates produced through this study with actual post-pandemic observations.

## STUDY BACKGROUND, PURPOSE, AND OBJECTIVES

### Goals and Objectives

The Hudson County Ferry Service Expansion Study is the first phase in determining the feasibility of additional ferry service in Hudson County, with the goal of the study being to assess market demand for expanding intra-county, inter-county, and interstate passenger ferry service. Before the start of the project, the Division of Planning, with input from the NJTPA, identified the goal and objectives that they would seek to fulfill through the study. The goal and objectives were presented at the first meeting of the Technical Advisory Committee (TAC) for consideration and discussion of any additional input on how the project could serve the needs of the region. Several comments were provided, and the goals and objectives were revised and expanded. The objectives of the study were defined as:

- Examine the potential for new ferry nodes within Hudson County on the Hudson, Hackensack, and Passaic Rivers at identified potential locations: Hoboken, South Kearny, the Bayfront Redevelopment Area in Jersey City, Bayonne’s Newark Bay coastline, West New York, and south Harrison.
- Assess current ridership, future market demand, and price elasticity of demand for ferry service between various locations in Hudson County, northern New Jersey, and New York City.
- Analyze potential new ferry service routes within the context of existing transit services and multi-modal transportation corridors and determine possible connections to these systems.

- Ensure that prospective new ferry service for Hudson County explores all feasible options to grant all residents, regardless of income and location, access to the waterfront and to ferry transportation, with minimum possible physical and economic barriers.
- Identify potential constraints to access for ferry terminal sites, including bathymetric and geographic barriers, and deficient vehicular access or lack of bus or rail connections.
- Recognize natural resources, habitats, and species within Hudson County’s waterways and restrict impacts to ensure their conservation.
- Identify potential public and private partners who could help advance ferry service.
- Engage in local and regional coordination and consider the context of related priorities, projects, and connections.
- Identify potential funding sources for landside infrastructure investments.
- Develop case study profiles of comparable ferry service systems including descriptions of their operational and financial models.
- Outline next steps toward implementation for identified potential ferry service.

## Hudson County Ferry History

Historically, Hudson County communities were well served by a robust ferry network. Ferry services crossing the Kill Van Kull and Hudson River provided interstate access to Manhattan and Staten Island from Hudson County for decades. Several locations along the Hudson River benefited from end point, local and long-distance rail lines that terminated at large multimodal ferry facilities. These facilities serviced rail, bus, trolley, and automobile-based passengers, as well as freight, for decades. They ultimately yielded their dominance to the bridges and tunnels due to the Aldene Plan, which was implemented in the 1960s. The Aldene Plan was a regional plan that called for the systematic closing of intermodal rail and ferry crossings in favor of a regional rail network that relied on Newark's Penn Station and

PATH. By 1967 all land-based connections to ferry operations were gone. Without the coordinated intermodal connections, ferry ridership dropped significantly, and all the routes closed. This left Hudson County residents dependent primarily on the publicly subsidized bus and PATH services.

It was not until 1989 that a successful transit based intermodal ferry service returned to Hudson County and NJ TRANSIT's Hoboken Terminal. This ferry service runs to midtown and downtown Manhattan and competes directly with NJ TRANSIT buses and PATH. It runs without an operating subsidy and is a prime example of a how a successful ferry operation can be achieved with adequate intermodal support. This ferry service was the recipient of public capital investments for modern ferry terminals on the New Jersey and New York City sides of the Hudson River.

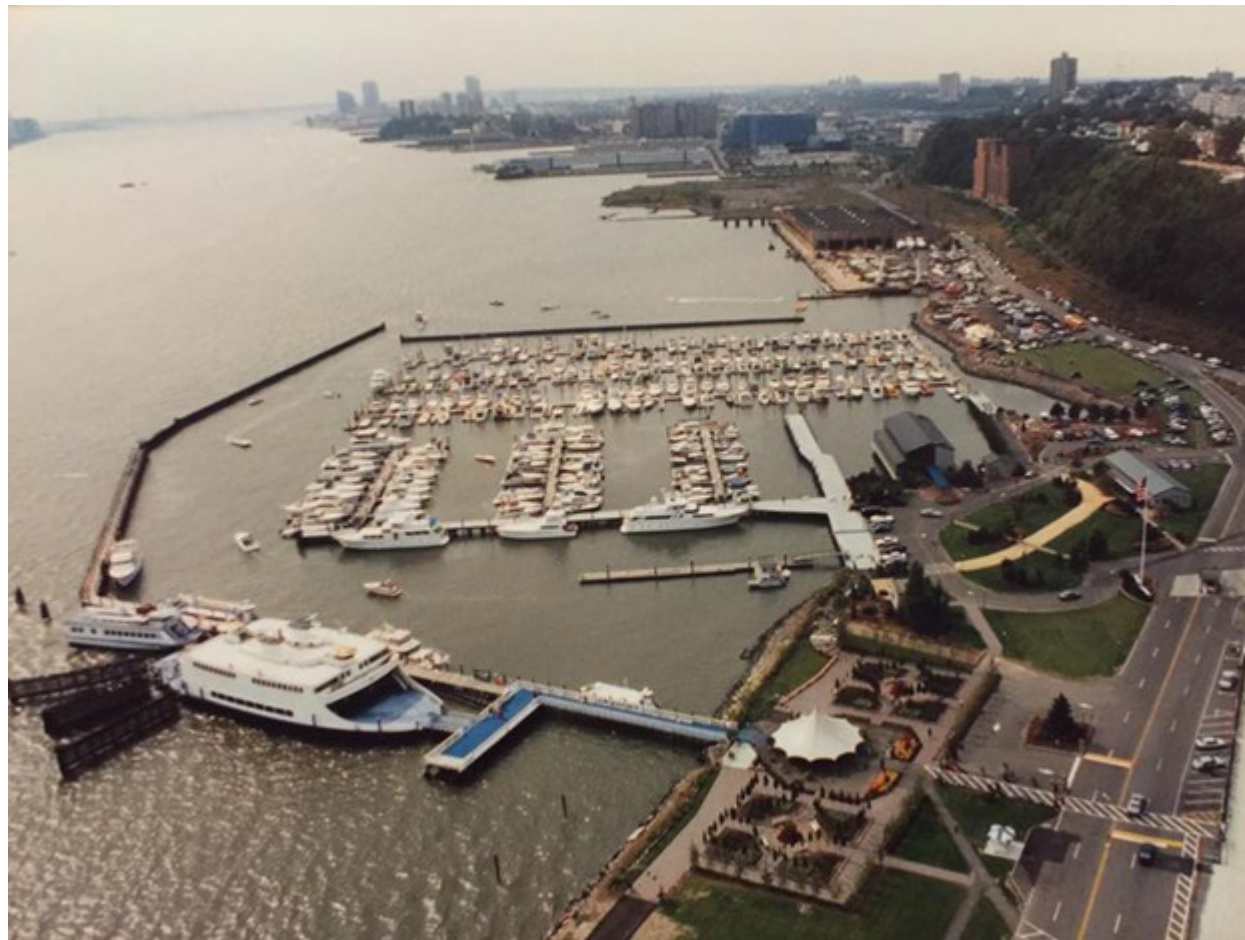


Figure 1: Old Jamestown Terminal, Weehawken, NJ, circa 1996

Today, Hudson County is served by several different ferry routes. These routes are provided by a few different private operators and exclusively serve the trans-Hudson market (New Jersey to Manhattan). While current ferry service is primarily focused on providing transportation for commuters, off-peak and weekend service is available at several locations. Ferries from Hudson County are also popular with recreational riders, and there is a dedicated ferry service for tourists from Liberty State Park in Jersey City to the Statue of Liberty and Ellis Island.

In addition to transit connections, some successful ferry operations in Hudson County rely on large parking facilities. In Weehawken and Jersey City, vehicular based ferries draw commuters from the surrounding counties and municipalities not well served by mass transit rail and bus service. These locations provide hundreds of garaged and surface parking spaces dedicated to the "park and sail" operations. Other successful Hudson County ferry services rely primarily upon nearby developments, convenient pedestrian access, and transportation connections for their ridership. These operations are successful due to the demand generated by the residential and employment density of the sites. Overall, the existing Hudson County ferry services provide time savings when compared to other modes of travel to New York City. Thus, density of sites, multimodal connections, and time savings of a route are helpful features in the feasibility of a ferry service.

Ferries and other watercraft helped evacuate people from lower Manhattan after 9/11 and brought aid from New Jersey. Between July and September 2017, NY Waterway provided weekday ferry service between Hoboken Terminal and Midtown Manhattan, cross honoring NJ TRANSIT rail tickets for the duration of construction at Penn Station in Manhattan. Following the completion of the construction, the service became permanent.

During work to repair the downtown PATH tunnels between New Jersey and the World Trade Center following damage from Hurricane Sandy, which required the closure of the tunnels on weekends in 2019, the PATH provided a free transfer for ferry service between Exchange Place in Jersey City and Brookfield Place in Manhattan. Adding in-service ferry vessels supports transportation system redundancy to reduce overcrowding, mitigate ridership overcapacity and provide additional service during emergencies, repair work, and other transit network failures or closures. Ferries allow for the transportation of passengers safely and efficiently under most conditions.

## Study Background

In considering the existing conditions of the region's transportation systems, as well as current and future travel needs for the County and northern New Jersey, the Hudson County Division of Planning sought to explore additional transportation options which could serve these needs.

Existing trans-Hudson River passenger ferry service connects Hudson County with Manhattan. This includes service run by several private operators, with additional service and infrastructure in the region provided by the New York City Department of Transportation (NYCDOT) and Economic Development Corporation (NYCEDC), and the Port Authority of New York and New Jersey (Port Authority). Transportation agencies, organizations, and local governments within the region have been studying ferries and their potential expansion as a component of the transportation. The Port Authority studied trans-Hudson Commuting Capacity in 2016, the Regional Plan Association released *Crossing the Hudson*, a report of its *Fourth Regional Plan* in 2017, and the Waterfront Alliance released a study on integrating New York Harbor ferries with upland communities



in 2014. NJ TRANSIT has examined ferries within the context of its transportation network. The NJTPA conducted an *Inventory and Assessment of Waterborne Transportation Resources* study in 2016, which includes a database of maritime infrastructure and a list of opportunity sites for further development of increased activity.

Ferry service in the region continues to grow. New York City expanded its ferry service to Astoria, Rockaway, and South Brooklyn in 2017, to Soundview in 2018, and anticipates additional expansion to Staten Island, Coney Island and the Bronx in 2021; following studies done in 2013 and 2019. With service expansions creating more vessel traffic and route connections, some locations, such as Pier 11 in Manhattan, experience vessel and passenger congestion. This existing congestion could deter future connections and routes to other landings. Ferry terminals on the Military Ocean Terminal in Bayonne and the City of South Amboy in Middlesex County have received federal funding for construction, and the Borough of Carteret, along the Arthur Kill in Middlesex County has received funding through an agreement with NJ TRANSIT to purchase a ferry vessel. With the growth throughout the region, Hudson County wanted to evaluate the potential for additional ferry service as well.

From a geographic perspective, Hudson County is comprised of two peninsulas. Surrounded by the Hackensack, Hudson,

and Passaic Rivers, Newark Bay, and the Kill Van Kull, the county has a combined total of 72 miles of shoreline. The Division of Planning was interested in whether it would be feasible to further utilize the region's waterways to provide additional transportation options.

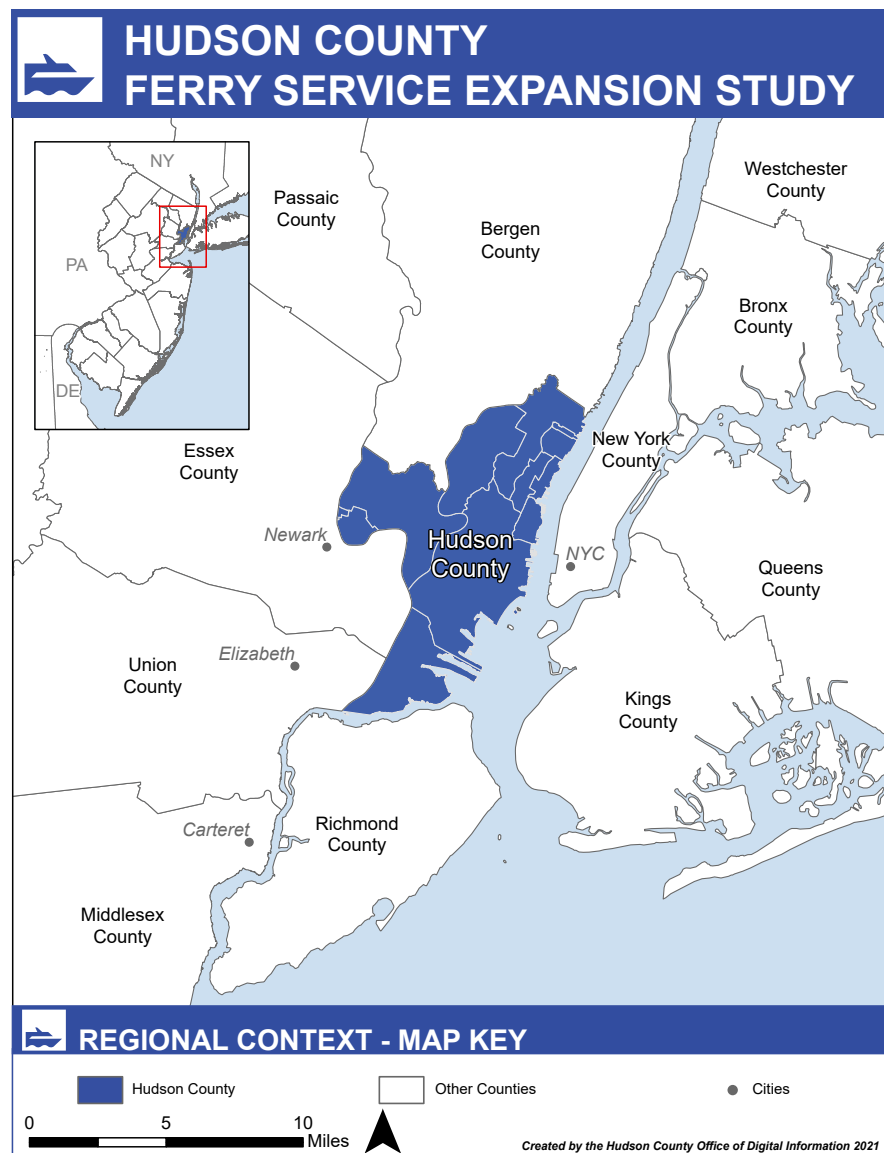
The expansion of trans-Hudson ferry service and potential creation of new intra-county and inter-county service could lessen the strain on the region's roads and other transit systems and allow for additional travel capacity for residents throughout Hudson County and to New York City. Further, ferry service to new locations across Hudson County's multiple waterfronts could

potentially fill transportation gaps, provide new access for different communities which lack suitable transportation options for their travel needs, expand opportunities for residents, employment, and recreation, and supplement existing transportation service. Transportation options in Hudson County are critical as the percentage of households with no vehicles is 32.6 percent, compared to the NJTPA region with 12.4 percent and New Jersey with 11.5 percent of households with no vehicles. In addition, just under 50 percent of the Hudson County population takes public transportation to work. These percentages were obtained from 2019 Census data.

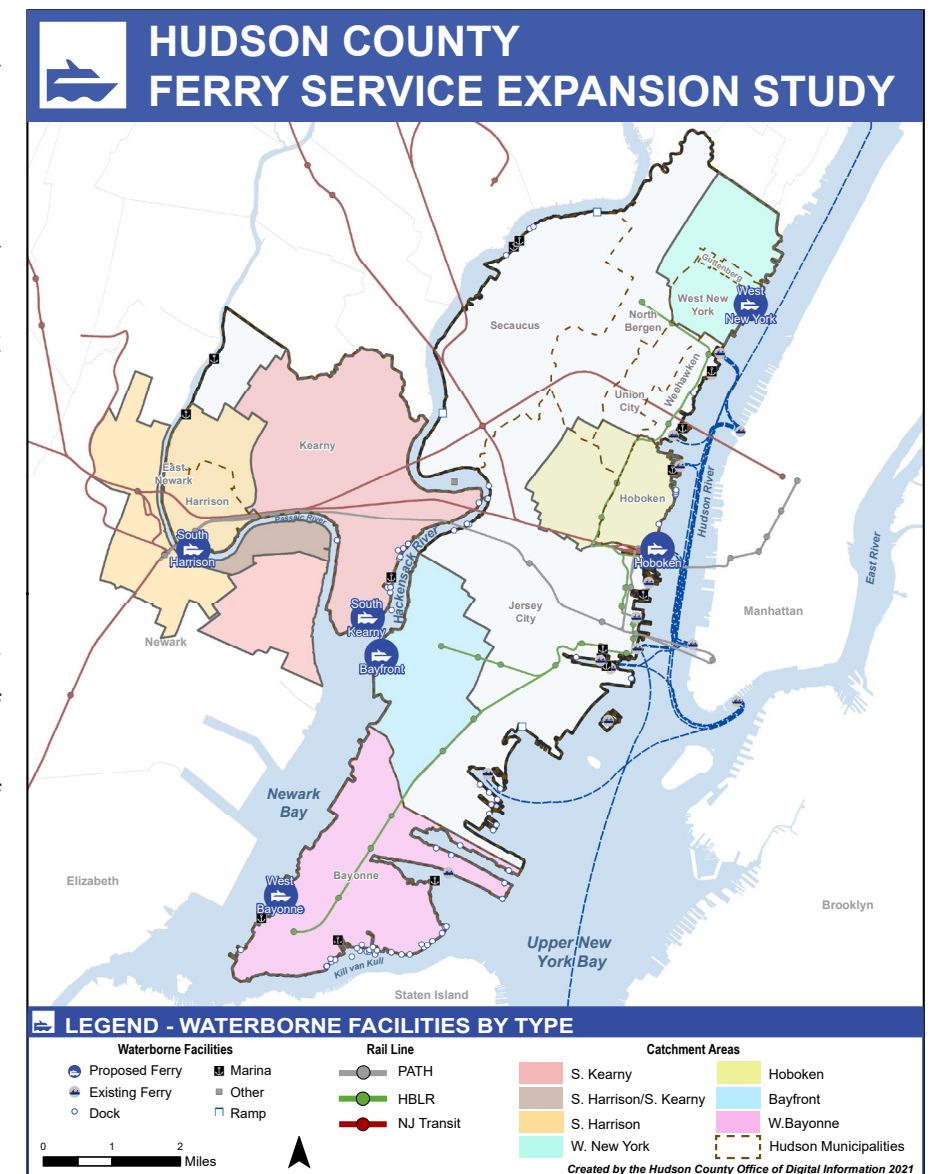
**Sites**

Prior to applying to the Subregional Studies Program, the Division of Planning collected and reviewed several sources of data related to waterfront sites, bathymetry, infrastructure, environmental conditions, maritime navigation, and regional transportation. Information from the National Oceanic and Atmospheric Administration (NOAA) on tide heights and water depths was reviewed to make a preliminary determination to remove from consideration any sites which would require the raising of bridges or dredging. The NJTPA provided data collected through its 2016 *Inventory and Assessment of Waterborne Transportation Resources* study, which the County reviewed to identify and consider

existing infrastructure that is not being utilized. The Division of Planning analyzed service gaps within the County's transportation systems, engaged in discussions with municipalities to identify their transportation needs and interest in considering a ferry service. Following these steps, the Division of Planning identified six locations the study would assess for feasibility of an expansion of existing ferry service or potential new ferry service: south Harrison, South Kearny, the Bayfront Redevelopment Area in Jersey City, the west (Newark Bay) shoreline of Bayonne, Hoboken, and West New York.



**Figure 2: Hudson County - Regional Context**



**Figure 3: Waterborne Facilities by Type**



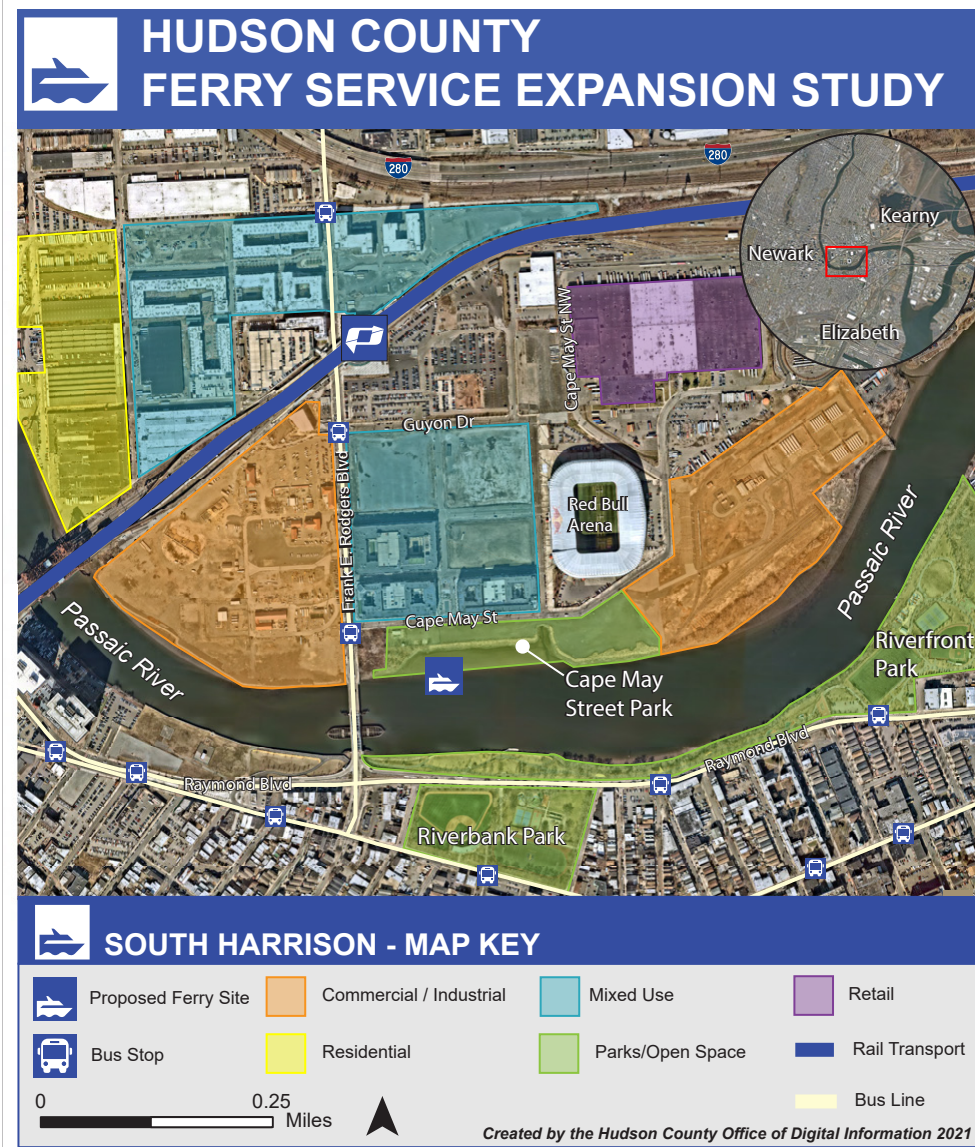


Figure 4: South Harrison

**Harrison**

The southern section of Harrison is a former industrial area experiencing a large-scale redevelopment with multi-family residential housing, following the Town’s Waterfront Redevelopment Plan. The area includes several transportation connections, including a PATH station and the NJ TRANSIT 40 bus which runs along Frank E. Rodgers Boulevard, the main thoroughfare in the area. Harrison is directly across the Passaic River from Newark, and the two municipalities have a direct vehicular and pedestrian connection via several bridges.

The area is also the site of Red Bull Arena. A former industrial property bordering the Passaic River is set to be transformed into Cape May Street Park. This future recreational site is immediately downriver of the Jackson Street Bridge, which has a low clearance.

**Kearny**

South Kearny is home to Kearny Point, a business and innovation hub with a 130-acre campus. Developed and managed by the Hugo Neu Corporation, Kearny Point, home to over 200 businesses, is a major employment center in the region. The site has a legacy of maritime use as the site of the former Federal Shipbuilding and Drydock Company from 1917 through 1948, which at its peak had 35,000 employees and constructed 470 vessels for the Second World War. Legacy infrastructure, notably two large boat slips, still exist at the site. Kearny Point comprises multiple buildings, including adaptive reuse of historic buildings and new construction, with plans for additional development in the future. The buildings have flexible space to accommodate different tenants. The site is also activated through multiple amenities, including restaurants, outdoor gathering spaces, and native landscaping. The Kearny Point Master Plan emphasizes connection to the Hackensack River. The long-range buildout of the site according to the Master Plan will create an accessible waterfront with recreational opportunities, scenic views, and the potential for transportation opportunities. Kearny Point is working to expand transportation access to its site and the area. They have worked to create Complete Streets within the site’s roadway network to provide safe and efficient vehicular and pedestrian

circulation. The area is currently served by the NJ TRANSIT 1 Bus. Kearny Point is seeking expanded transportation access through additional modes to increase opportunities for additional tenants and their employees to conveniently reach the site.

Several other large facilities are present in the area as well, including an Amazon delivery center, the Hudson County Emergency Operations Center, the Hudson County Correctional Facility, and numerous warehouses and intermodal freight centers just to the north of U.S. Route 1&9 Truck.



Figure 5: South Kearny

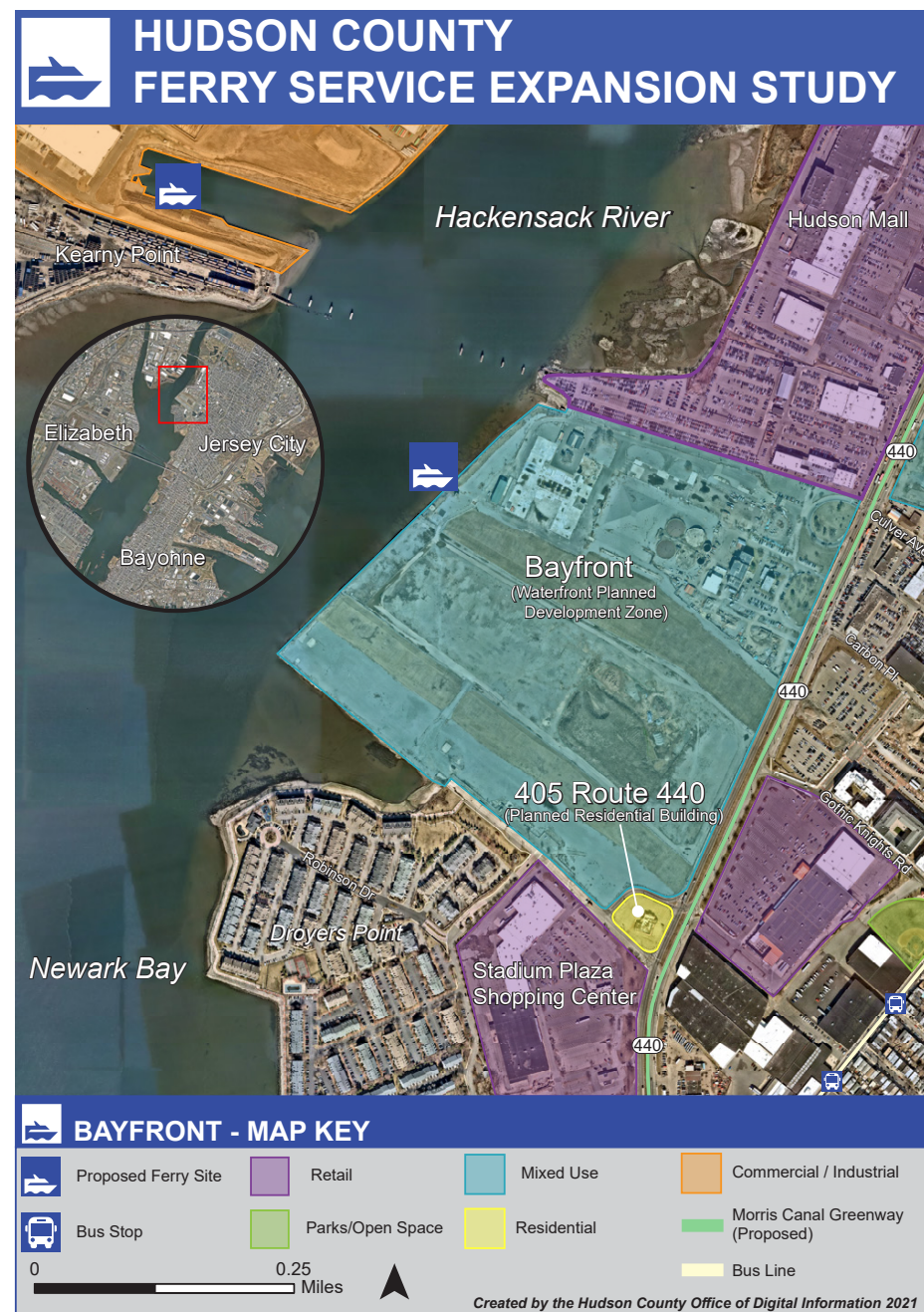


**Bayfront**

Bayfront is a 103-acre redevelopment site located on Newark Bay on the west side of Jersey City. Formerly the site of the Mutual Chemical Company chromate chemical facility, the site was contaminated with chromium. Honeywell International, which took over the property from Mutual Chemical, has completed remediation of the site. The site was purchased through bonds and is now owned by the City of Jersey City. The

Redevelopment Plan for the site, adopted in February 2021, details a mixed-use development with 8,000 units (35 percent affordable), retail, office, a school, and 19 acres of open space. The development is envisioned as a new downtown for Jersey City's west side, and as a transit hub, with a planned transit connection through the extension of the Hudson-Bergen Light Rail over NJ-440. The redevelopment plan also emphasizes connection to the river through a publicly accessible

waterfront with recreational opportunities.



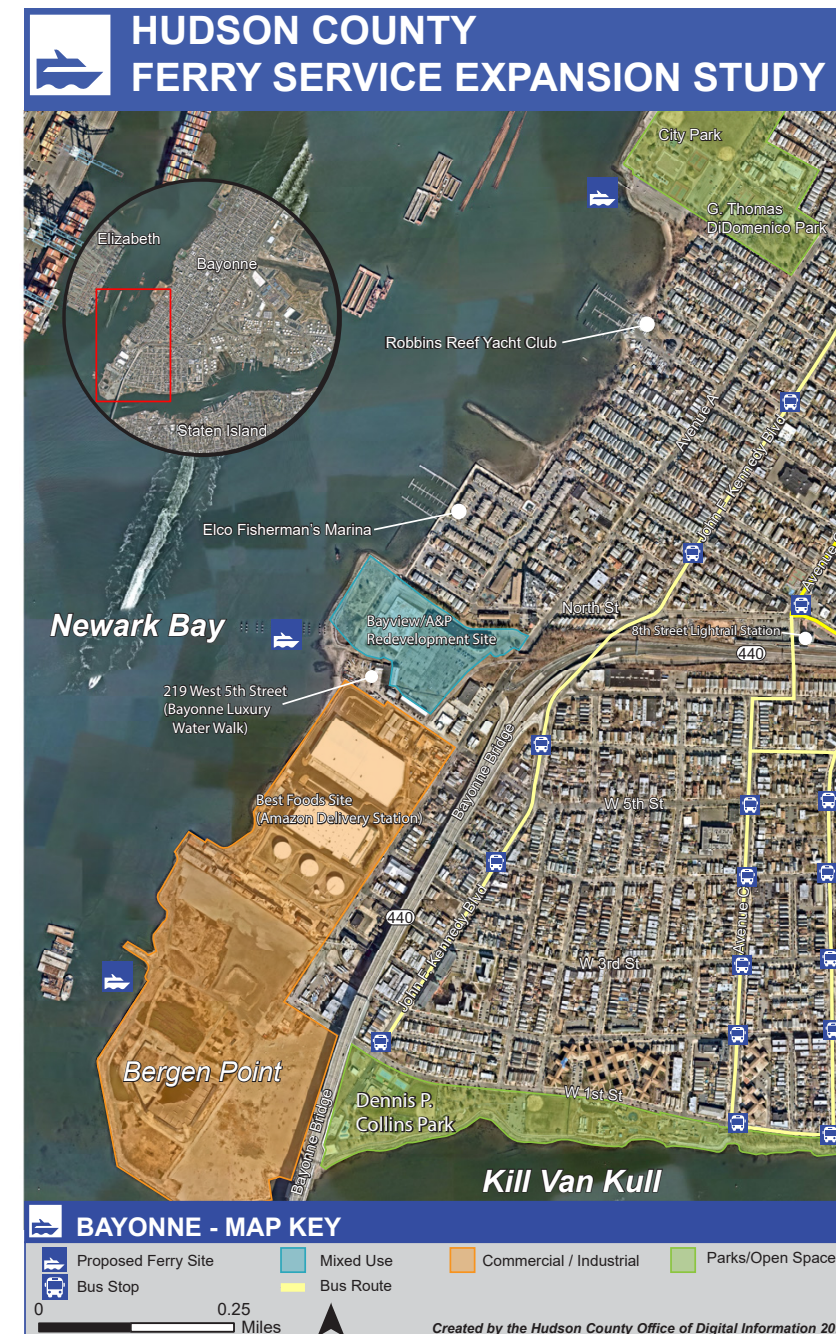
**Figure 6: Bayfront**

**Bayonne**

In 2017, the City of Bayonne conducted a study for a potential ferry service to Manhattan from a site on the Military Ocean Terminal (MOTBY). Due to additional transportation needs and a lack of connections to adjacent municipalities, the Hudson County Division of Planning wanted to assess the potential for ferry service on the west side of Bayonne along Newark Bay. The west side of Bayonne is characterized by established, single

family residential communities, with a few large commercial centers and industrial sites. Several potential sites were identified, including the Bergen Point (Texaco) Redevelopment Area, West 5th Street (Bayonne Luxury Waterwalk) Redevelopment Area, Bayview (A&P) Redevelopment Area, and the City Park at 16th Street. While a ferry terminal at the redevelopment areas could be designed as an integral component

of a redevelopment project and serve a market immediately available on site, the City Park site offers several advantages as well, including established residential areas with few other competing transportation options, pedestrian access walkways, and existing dock facilities.



**Figure 7: Bayonne**



**Hoboken**

Hoboken has two existing ferry landings. The largest is at the Hoboken NJ TRANSIT Rail and Ferry Terminal, which provides direct connections to NJ TRANSIT rail service, the Hudson-Bergen Light Rail, and PATH. A second, and much smaller facility can be found at the 14th Street Pier. The dense, walkable community with established residential,

commercial, and office buildings, in close proximity to the waterfront, has a large market for ferry service and could potentially benefit from connections to new destinations to better serve residents' travel needs and provide new opportunities for access.

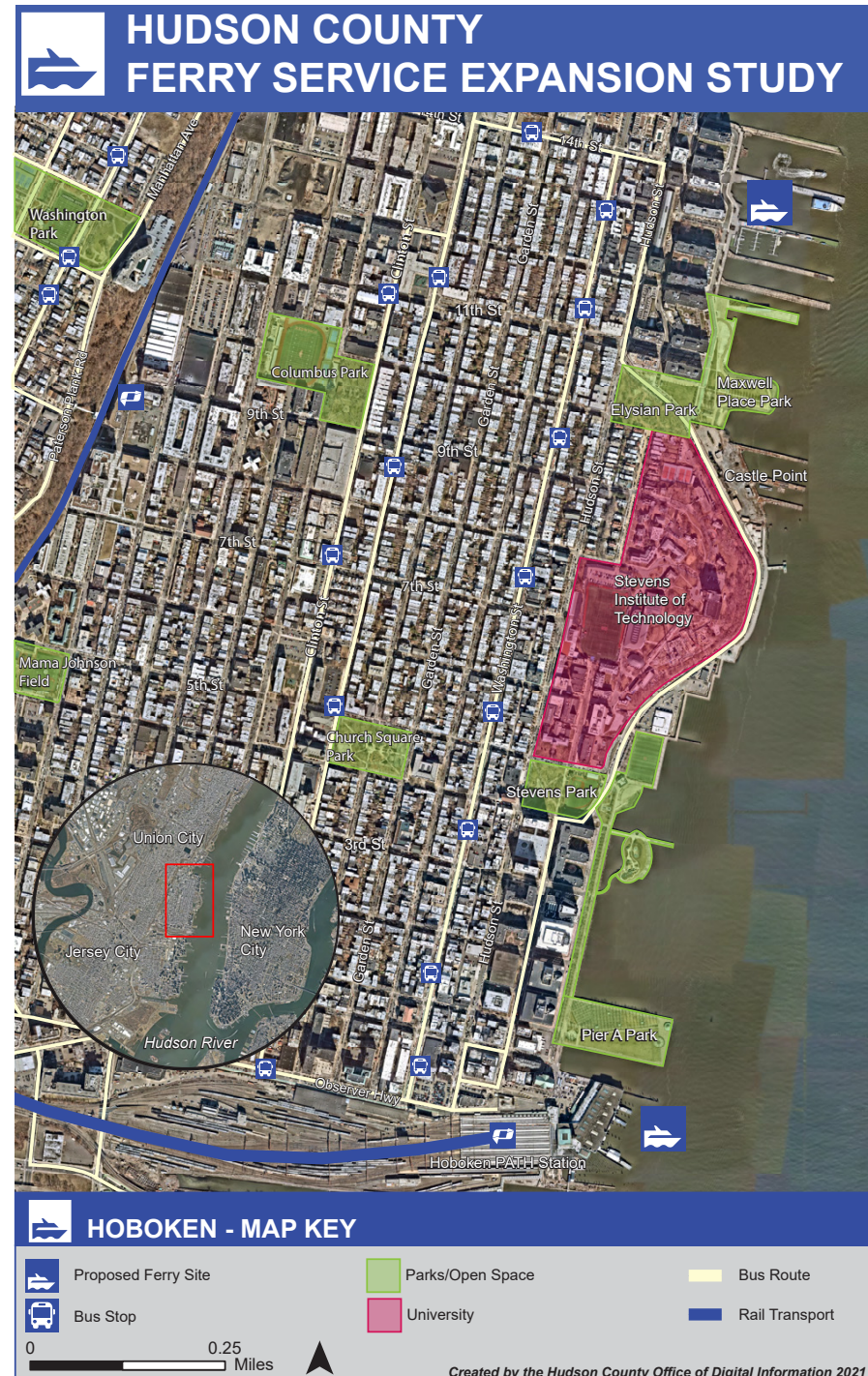


Figure 8: Hoboken

**West New York**

West New York's Hudson River waterfront is directly across from Manhattan and is a distance from existing ferry terminals at neighboring Weehawken, and Edgewater in Bergen County. In the past few decades, West New York's waterfront has been redeveloped with multifamily residential buildings, including some retail spaces and restaurants, as

well as recreational amenities. Within the *Inventory and Assessment of Waterborne Transportation Resources Study* data provided by the NJTPA, the Division of Planning identified legacy dock infrastructure, and sought to explore the feasibility of ferry service to fill the gap for West New York residents between existing ferry terminals.



Figure 9: West New York



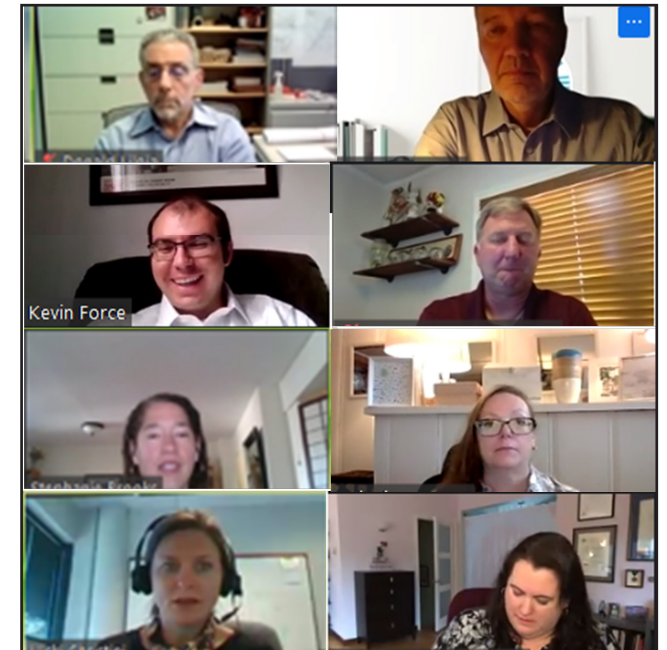
## OUTREACH AND PARTNERSHIPS

Public outreach and involvement were critical components of this study. The study team developed a Public Outreach Plan (POP) that aimed to engage the public, and more critically, environmental justice populations, throughout the study. The requirements of a POP are well documented by the NJTPA and the team aimed to exceed the goals of this study through creativity and technology. This goal became even more critical when the COVID-19 pandemic and associated restrictions came to Hudson County at the onset of our study in March 2020. Due to the restrictions of in person outreach mandated by the pandemic, the team worked diligently to reach as many members of the public as possible from safe, socially distanced means. The team engaged the

public through an online presence including a project website with online survey, email which connected to the community and distributed newsletters, Twitter and Instagram accounts, and a Facebook page, through which a photo contest was implemented. We reached out to community groups to seek their aid in publicizing our study and events.

The team hosted numerous engaging virtual meetings involving various stakeholder groups and members of the public, distributing information about the study, while being able to gather feedback from a variety of sources. While virtual meetings have the drawback of requiring participants to have access to the necessary equipment and internet, which can impact access for some populations, they are not confined to the restrictions of an in-person location, such as capacity limits and the need to travel to the proposed site. As a part of this study, the County hosted five virtual public meetings; two general and three additional presentations that were focused on specific locations of the sites analyzed through the study. In addition to public meetings, the team presented to technical groups including the Harbor Safety, Navigation, and Operations Steering Committee (both the full Committee and the Passenger Vessel Subcommittee on separate occasions); the Bayfront Advisory Board, a Technical Advisory Committee composed of representatives from regional governments, transportation organizations, and waterfront nonprofits; and a series of Roundtable discussions with regional governments with ferry service, private ferry operators within the region, and national transportation and metropolitan planning organizations with ferry options.

The Hudson County Ferry Study Team found common feedback themes throughout all engagement types, from Round Table and TAC meetings to meetings with the Hudson County public. Below is a list of overarching themes



seen throughout the outreach efforts. For a more in-depth discussion of the outreach efforts and partnerships developed throughout this study, refer to **Appendix A – Technical Memorandum #1**.

- Connections:
  - » Multimodal connections
  - » Public transportation options to and from ferry and first/last mile considerations
  - » Bus shuttles
  - » Bicycle access (e.g. Citibike)
  - » Park & Ride
  - » Pedestrian access
  - » Redundant transportation
- Destinations:
  - » Regional focus
  - » Focus on areas underserved by transit
  - » Recreational access/tourism
  - » Jersey shore
  - » Atlantic City
  - » Ferry service to other parts of New York City besides Manhattan

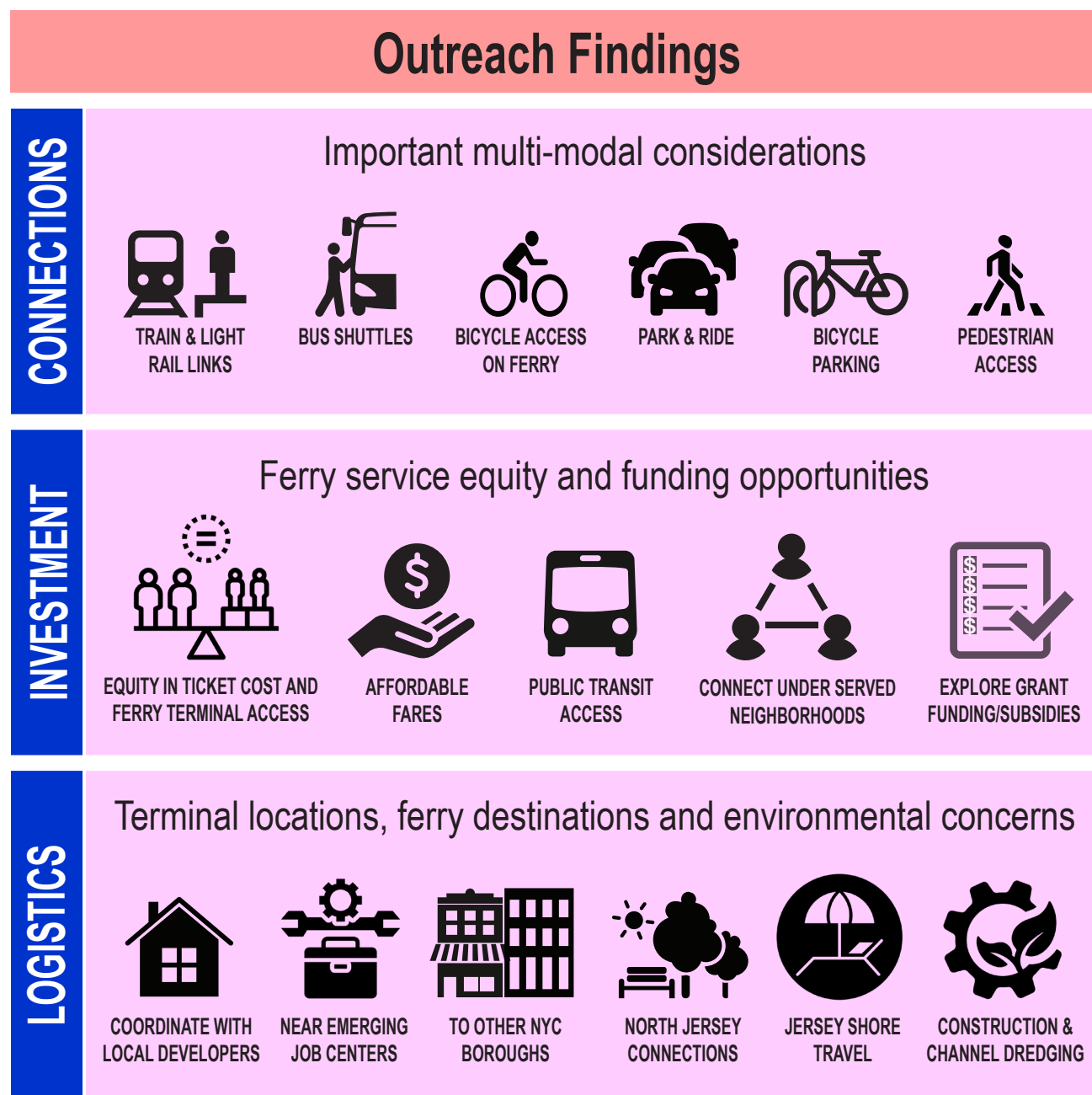
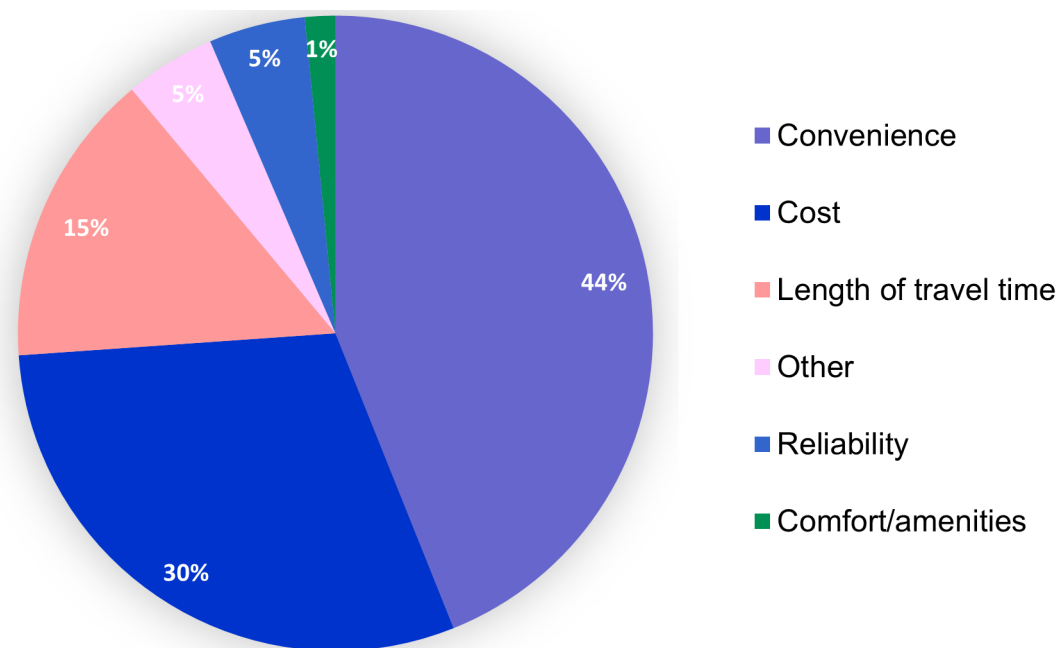


Figure 10: Outreach Findings

- » Situate ferry terminals near emerging job centers
- Cost
  - » Cross-platform payment/ticketing
  - » Affordability (high cost of ferries is deterrent)
  - » Municipal/agency subsidies if possible
  - » Transportation development incentive/ Coordinate with real estate developers in emerging development/job centers
- Vessels/Operations
  - » Frequent service
  - » Commuter-centric service
  - » Large enough vessels to accommodate future capacity
  - » Environmental considerations/emissions
  - » Electric vessels
  - » Multi-stop routes
- Dredging impacts
  - » Passaic River cleanup
  - » Kill Van Kull and Newark Bay widening

**What is the most important factor for you when deciding whether or not to ride the ferry?**



## DATA COLLECTION

### Site Data Collection

Data was collected on the physical attributes of the six potential sites for ferry service, including current land use, environmental conditions, characteristics of adjacent bodies of water, and weather conditions of the project area, to determine the feasibility of ferry service and narrow down the suggested areas for ferry landing sites along the waterfront. Detailed information on these site conditions can be found in **Appendix B - Technical Memorandum #2**.

### Navigation

With significant recreational, transportation, and commercial vessel traffic around Hudson County, impacts on identified routes was an initial concern. Throughout the course of the study, identification

and understanding of the region's existing and future vessel traffic, along with coordination with relevant agencies for awareness, administration, oversight, and consensus, was an essential priority. The project team presented the potential sites and routes being examined in this study to the both the full Harbor Safety, Navigation, and Operations Committee of the Port of New York/New Jersey and the Passenger Vessel Subcommittee. Representatives from the Maritime Association of the Port of NY and NJ, Worldwide Ferry Safety Association, Port Authority, and United States Coast Guard served on the study's Technical Advisory Committee. Separate meetings were held with the Port Authority and the Coast Guard. A primary purpose of these discussions



**Figure 11: Hackensack River Looking Towards Newark Bay**



was to understand vessel traffic in the region and considerations for safe operation with the waterways, as well as to identify any concerns of existing stakeholders, operators and governing bodies that could lead to the elimination of any of the sites or routes. The project team also drafted a concept Navigation Safety Risk Assessment for the Coast Guard for review and feedback in support of further information and dialogue.

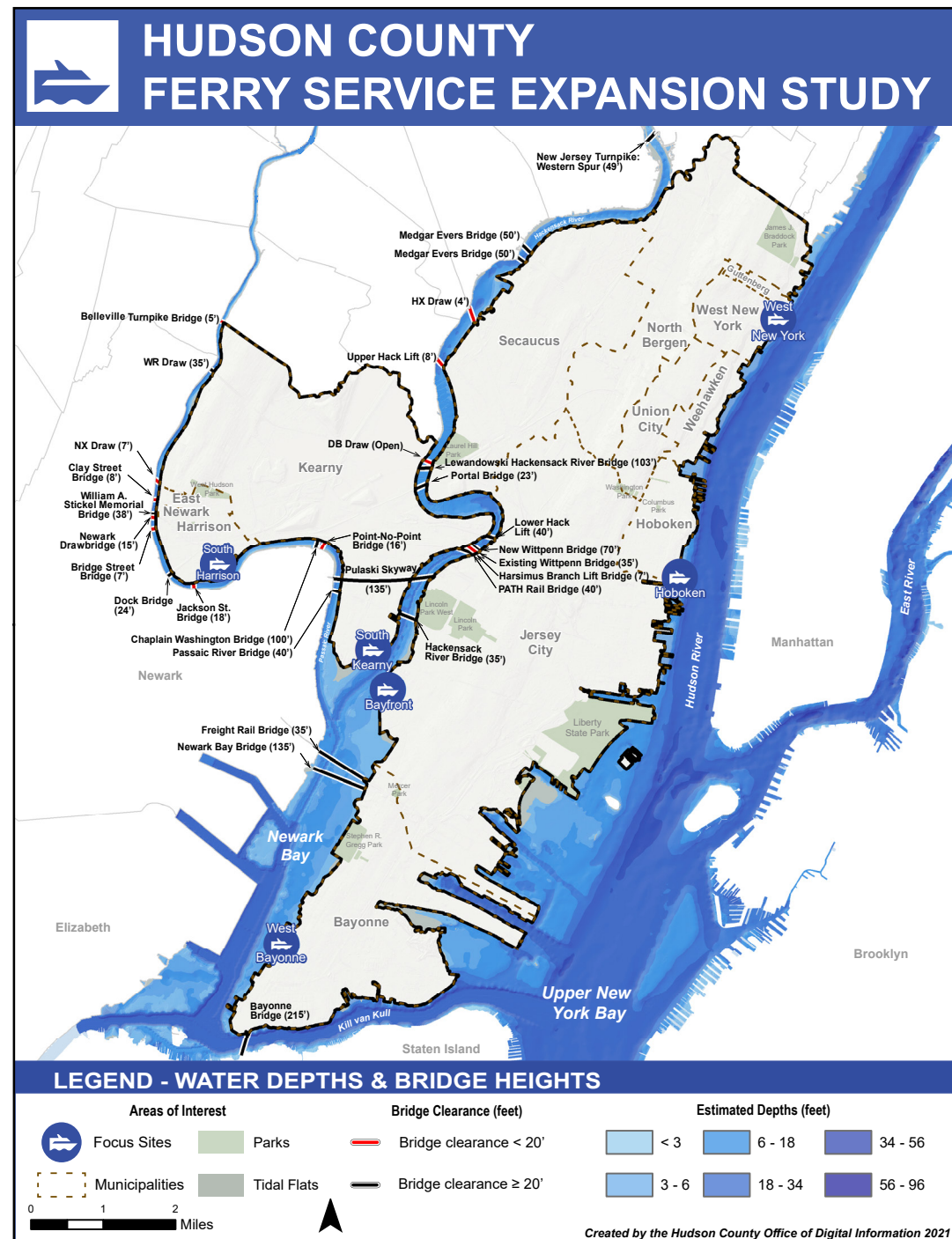
It was concluded that Hudson River and Newark Bay navigation would not be impacted by vessel traffic, but travel through the Kill Van Kull will most likely have an impact on schedules and speed. Due to the barge and cargo vessel traffic to the Port of Elizabeth and Newark, the Kill Van Kull can have speed restrictions and temporary closures to accommodate these ships which have the overriding right-of-way. A route through the Kill

Van Kull would impact speed and reliability, which are two of the primary traits of ferry service that results in their success. Due to this challenge, a route connecting the west side of Hudson County with Hudson River locations would not prove competitive against other transportation at this time. A route through the Kill Van Kull was eliminated from further consideration in this study. However, it was noted that future ferry routes from locations including Carteret and Staten Island may pass through the Kill Van Kull. A future route through the Kill Van Kull to destinations farther than Manhattan, such as Brooklyn, should be considered as the extended distance in a single seat may present an advantage over other options. There is also a *New York New Jersey Harbor Deepening Channel Improvements Navigational Study* underway that suggests widening and deepening the Kill Van Kull, which may reduce impacts to future ferry service. Coordination with any future services through Kill Van Kull should be considered, especially after the widening project is complete, and could potentially provide a benefit to the region once implemented and conditions can be reevaluated.

Typical passenger vessels operating in the region require water depths of at least 10 feet at low tide for safe operation. As part of this study the NOAA Navigational Charts and United States Army Corps of Engineers surveys were reviewed for the project sites to determine if adequate water depths are available and navigable. The review concluded that South Kearny, Bayfront and Hoboken all have locations along the shoreline with adequate water depth in an area that could support a ferry landing without interfering with adjacent channels, while also being close enough to the shoreline to not require significant infrastructure over the water. There is limited area along the shoreline of south Harrison, east of the low clearance Jackson Street Bridge, with the potential to support a ferry landing that does not interfere with the channel. However,

there is an active Lower Passaic River Restoration Project to remediate dioxin contamination from the Diamond Alkali superfund site in Newark through the removal of contaminated sediments and construction of a cap over the river bottom to contain any remaining contaminants. The dredging of contaminated sediments is planned to a depth of 10 feet to allow for recreational purposes. Once the cap is installed, it cannot be disturbed. Coordination with the project is essential for maritime facilities in this area. Construction of a ferry landing after the completion of the remediation project would require a less traditional, and more costly design, such as a cantilevered barge, as seen at the Battery Maritime Building in New York City. We also noted for possible future consideration, the Newark shoreline across from south Harrison appears to be a potential alternate site for a ferry landing. The identified area in West Bayonne at City Park at West 16th Street has adequate depth to support a ferry landing, however, a more detailed survey would be needed to confirm depths as the bathymetry shows an uneven river bottom and a pier will likely be required to reach navigable depths. West New York has a shallow shoreline out to the Hudson River Channel and it is likely that maintenance dredging will be required for this location. The Port Imperial ferry landing is a half mile south of West New York and has a yearly dredging program.

In addition to static conditions of the proposed sites, the Team also reviewed tidal and current data and weather conditions experienced in the navigable waters of the potential routes associated with this study. The waters of the Hudson River, Lower Passaic River, Lower Hackensack River and Newark Bay are tidal and due to the tidal nature of the study area, the currents fluctuate throughout the day. No currents in the study area were considered strong enough to impact operations, with the Kill Van Kull experiencing the swiftest



**Figure 12: Water Depths and Bridge Heights**

currents of the study area at 1.9 knots. While adverse weather and ice conditions can severely restrict the ability to conduct ferry operations in a safe, efficient, and financially viable manner, usually ferries in the New York Harbor can operate 365 days year with little disruption due to weather conditions and it is rare that a Coast Guard Notice impacts ferry operations.

### Population Data Collection

A preliminary catchment area was identified for each landing representing the area from which the landing would draw the majority of its users. The preliminary catchment area encompasses roughly a 10-15-minute walking or driving access time from the ferry landing. This area was modified at times to account for structural barriers, such as highways,

bridges or natural barriers, or competing transit modes. Overall, the preliminary catchment areas were estimated to include the users that would be the primary market for the ferry and **Table 1** shows the total population for each catchment area. The preliminary catchment area for each landing is shown in **Figure 13**.

The preliminary catchment areas were not redrawn as part of the detailed modeling as the model was not restricted to these estimated catchment areas.

Data was collected on the populations in the catchment areas of the proposed sites, including total population numbers, daytime population change, environmental justice populations, income, employment and commuting patterns. This information was used to further analyze the characteristics of those who will be impacted by the addition of ferry service to an area.

According to the Federal Highway Administration, environmental justice is defined as “identifying and addressing disproportionately high and adverse effects of the agency’s programs, policies, and activities on minority populations and low-income populations to achieve an equitable distribution of benefits and burdens.”

Hudson County includes large numbers

of environmental justice populations. These communities have been historically underrepresented in planning and other public projects and processes. Engaging environmental justice communities is critical to understanding their needs and providing equal opportunity for participation. This results in feedback that is more representative of the county’s diverse population.

The review and comparison of the data within the study area and at the different geographic scales found several clusters of environmental justice populations within the catchment areas. The catchment areas are very racially diverse with over 40 percent of the residents born outside of the United States, significantly higher than the NJTPA region and New Jersey at 25.8 percent and 22.4 percent respectively. The percentage of the population over 25 years old in the catchment areas with less than a high school education is over 18 percent, which is much higher than the percentage in the NJTPA region and New Jersey as a whole at just over 10 percent. The catchment areas have a slightly higher percentage of people below the poverty level than Hudson County as a whole, and a significantly higher percentage than the NJTPA region and New Jersey.

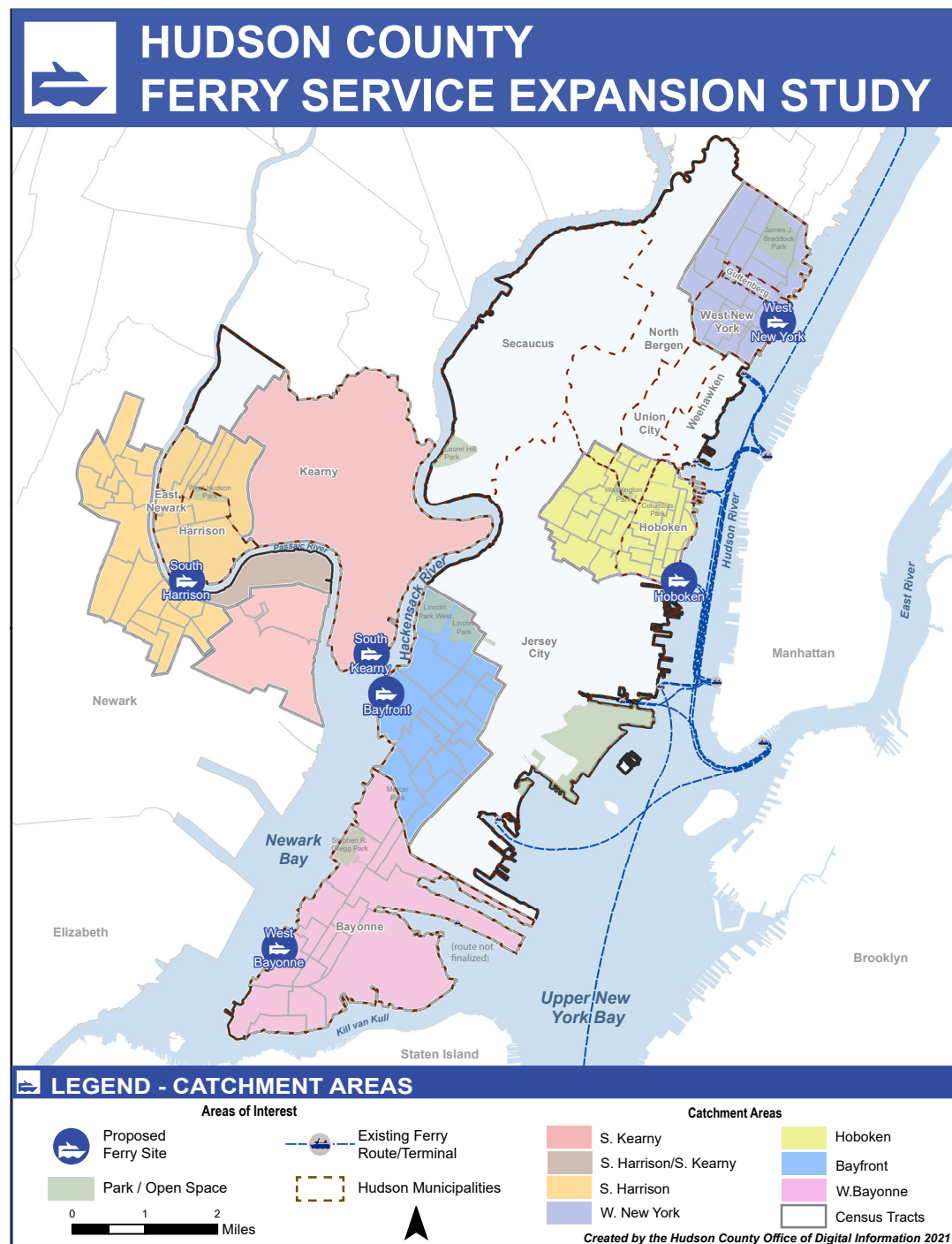


Figure 13: Catchment Areas

Table 1: Population and Population Growth by Catchment Area

	2008-2012 ACS	2014-2018 ACS	Annual Growth Rate 2012-2018
South Harrison	101,409	106,487	0.82%
Kearny Point	19,558	18,842	(0.62%)
Bayfront	72,025	76,596	1.03%
West Bayonne	63,164	65,300	0.56%
Hoboken	116,963	119,462	0.35%
West New York	103,641	106,674	0.48%
Hudson County	636,194	668,631	0.83%

Source: U.S. Census Bureau; American Community Survey



The identification of environmental justice populations within the study area was critical to the process of assessing the potential for ferry service. New transportation service can create opportunities and provide travel routes to different destinations, particularly for residents who lack access and face disproportionate challenges. These opportunities are only possible if the transportation service is equitable. Riders must be able to easily access and afford to use the service. The impact on environmental justice populations within the study area was considered when identifying the locations of potential ferry landings, new routes, and connections from nearby neighborhoods away from the waterfront. Additionally, the cost of fares, affordability, and subsidies were factored in to the financial analyses.

### Transportation Data Collection

For a preliminary understanding of the potential ferry ridership from the identified concept landings, the team looked at the demographic profile (population, labor force, commuting patterns), the overall level of travel demand and how people are traveling in the areas around each landing.

Data from the Census Transportation Planning Products (CTPP) was collected on the home and work locations of people based on responses to the American Community Surveys from 2012-2016. This data helps narrow in on commuters and

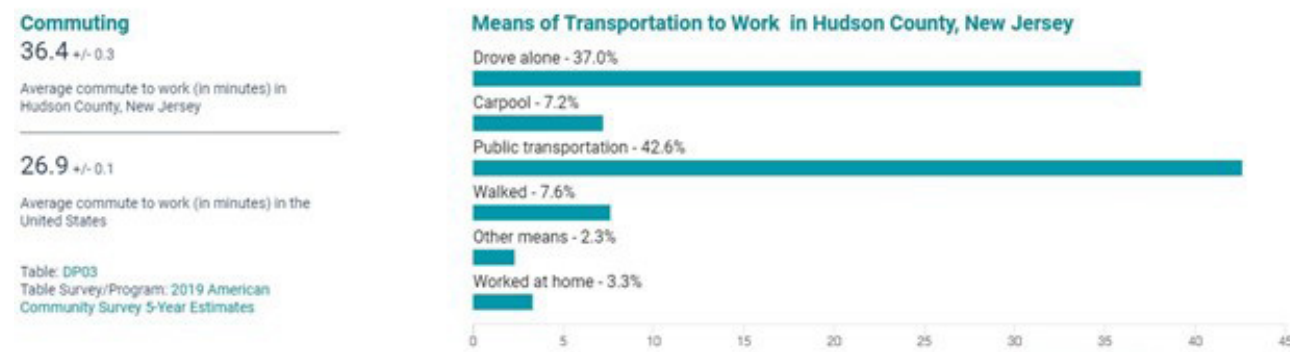
their travel behavior in the region.

Data collected showed that Hudson County and the catchment areas have a high percentage of residents that use public transportation to commute to work. Tying this together with the high percentage of households with no vehicles, the need for consistent and convenient transportation options in the catchment areas is evident.

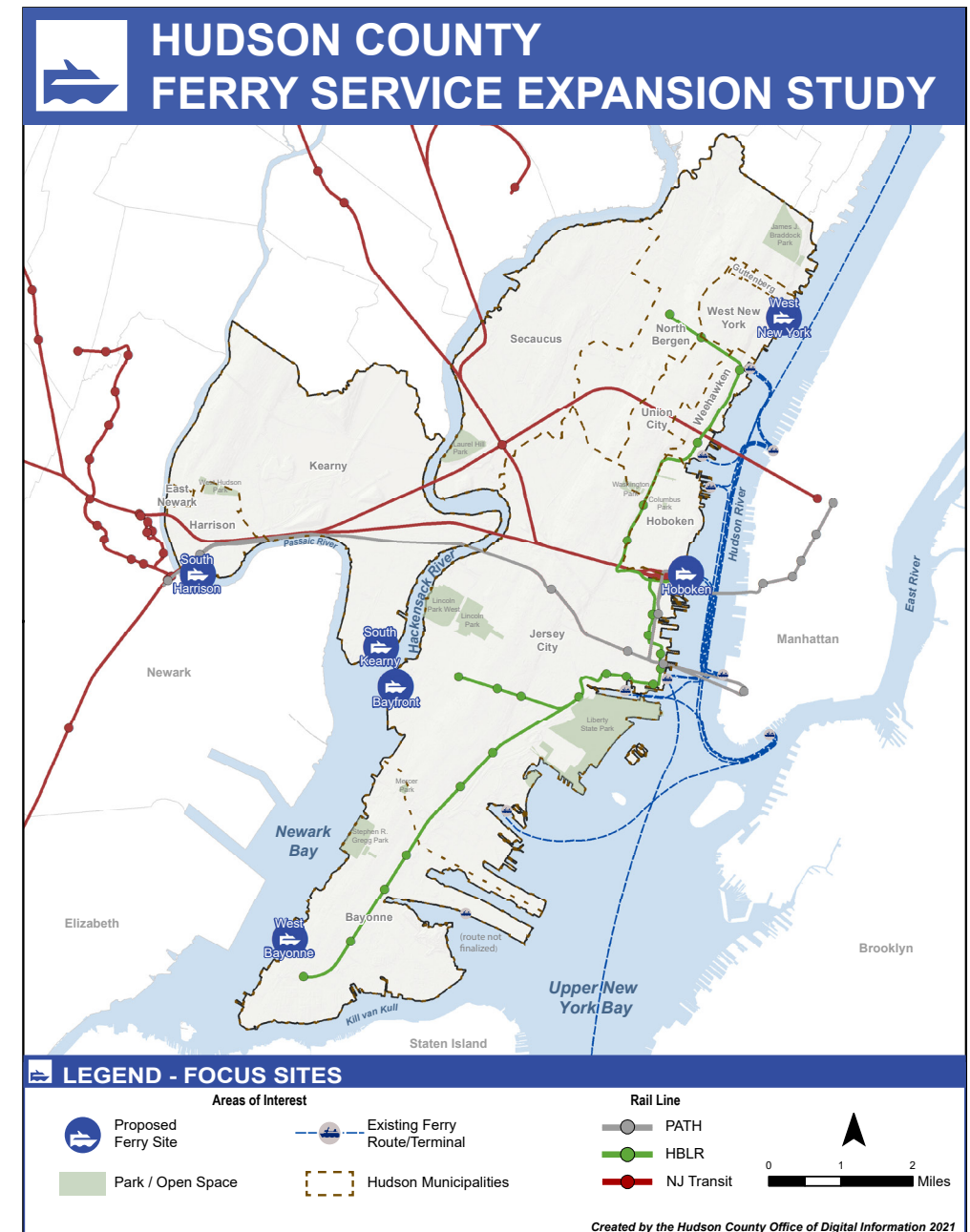
The total travel demand between catchment areas and major travel destinations along the water generally drive ferry ridership. To obtain an initial understanding of existing trip volumes and the commuting patterns of people who live within the potential catchment areas, the team collected the estimated number of total trips for all transportation modes between the catchment areas from the NJTPA's North Jersey Regional Transportation Model – Enhanced (NJRTM-E). The NJRTM-E is a regional travel demand model developed by the NJTPA with New Jersey Department of Transportation (NJDOT) and NJ TRANSIT. The NJTPA maintains the NJRTM-E to understand and plan for the region's multimodal transportation needs.

The total demand by catchment area is shown in **Table 2**.

In addition to the travel demand between potential catchment areas, the team also collected travel demand data for all transportation modes between the preliminary catchment areas and Manhattan.



**Figure 14: Hudson County Commute Data from 2019 American Community Survey Data**



**Figure 15: Focus Areas**

**Table 2: Total Daily Travel Demand from Potential Ferry Catchment Areas to Major Destinations in the Region**

	South Harrison	South Kearny	Bayfront	West Bayonne	Hoboken	West New York	Rest of Hudson County
South Harrison	-	8,150	1,086	530	1,472	851	10,390
South Kearny	10,419	-	316	94	330	118	2,198
Bayfront	3,497	1,592	-	6,716	3,826	1,075	35,744
West Bayonne	1,885	786	15,043	-	2,193	762	16,229
Hoboken	2,298	648	2,173	1,102	-	4,371	60,313
West New York	1,671	284	752	624	7,100	-	38,355

Source: NJTPA NJRTM-E travel demand estimates for 2018

**Table 3: Total Daily Travel Demand from Potential Ferry Catchment Areas to NYC Locations**

	Manhattan-south of 14th St	Manhattan-14th-59th St	Manhattan-North of 59th St and Islands	Bronx	Brooklyn	Queens	Staten Island
South Harrison	5,588	9,794	2,508	374	703	556	931
South Kearny	941	1,442	361	45	125	130	134
Bayfront	5,686	7,054	1,227	228	1,097	750	666
West Bayonne	5,014	7,410	979	120	726	529	2,397
Hoboken	13,825	24,648	4,607	738	2,534	1,104	273
West New York	3,987	12,637	5,903	1,121	598	473	181

Source: NJTPA NJRTM-E travel demand estimates for 2018

This information is particularly relevant for the Hudson River sites and West Bayonne, as these landings are geographically closest to Manhattan, and routes serving those landings would be most likely to make a connection to Manhattan in the near term. For the Newark Bay sites, the travel demand volume to Manhattan helped the team to understand that there is the potential for a Newark Bay route to be extended to Manhattan. **Table 3** shows the breakdown of trips from the preliminary catchment areas to Manhattan and the rest of New York City.

These tables show that there are travel connections between the study sites and between the study sites to New York City sites. This existing travel demand could shift the proposed concept ferry, depending on cost, frequency, and trip duration, which is studied below in the report.

Further information on the sociodemographic, commutation, and modes of transportation used can be found in **Appendix B – Technical Memorandum #2**.

### Case Studies

The team studied other ferry services in the Northeast region with profiles similar to the

potential Hudson County ferry routes to gain insight into successful ferry operations. The two services selected were the Massachusetts Bay Transportation Authority's (MBTA) Ferry service in Massachusetts and the NYC Ferry. The MBTA service was selected as it is a publicly funded ferry service whose primary market is commuters and it competes with alternative modes similar to the proposed Hudson County ferry service. The NYC Ferry was chosen as it is the only publicly funded multi-stop ferry service in the NY metropolitan region.

While the overall services are similar, the landings for each (MBTA, NYC Ferry and the potential Hudson County ferry stops) are unique. For example, Bayonne and the MBTA landings Hingham and Hull have relatively similar densities, however, Bayonne is closer to multiple regional employment hubs while Hingham and Hull populations both are drawn to Boston. For this reason, the team focused on identifying the features and best practices of successful ferry operations instead of focusing on directly comparable site features.

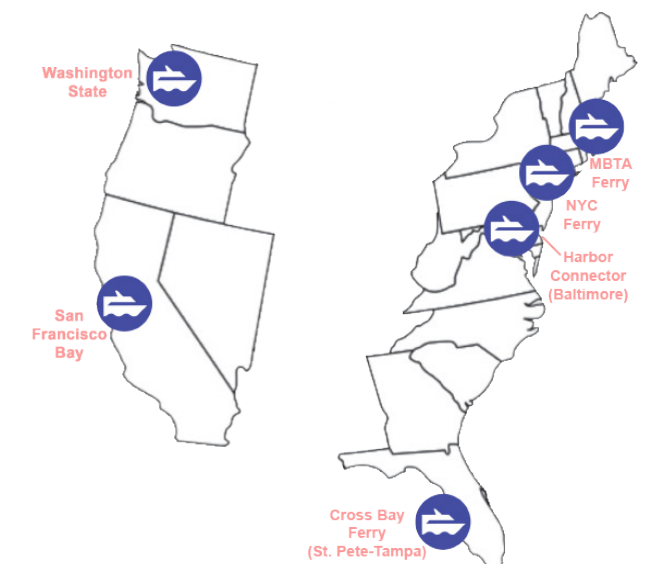
Examining these case studies, the team identified 12 salient features that could be used to inform a successful ferry service operation.

- **Comfort, Convenience, and Reliability:** These are key traits that attract riders to ferries based on repeated polling of people in the NYC Ferry and MBTA regions. Ferry service with these traits can attract riders away from more economical modes.
- **Short Routes have Lower Operating Costs:** By focusing on routes that cover short distances, less fuel is needed to cover each fare and more frequent service can be provided with a single vessel.
- **Multi-modal Coordination:** When service schedules are aligned it allows for quick connections with minimal waiting. This coordination can increase a ferry's catchment area.
- **Single Payment Method/Joint Ticketing:** When tickets can cover ferry, bus, subway, train, or some combination of those, it makes the full ride much more accessible to more riders and more affordable if free transfers are provided.
- **Redundant Transportation Available:** Transit options that run parallel with ferries can complement the ferry service by covering off peak time periods and allow riders to return to their origins when ferries are not operating.
- **Only Operate at Commute Times:** Some ferries have been successful by only operating at peak commute times which then reduces operating costs. These ferries tend to have redundant transportation available so users are not 'stranded' should they need to travel outside of the ferry's operating hours.
- **Attract Tourists:** Tourists will pay a high single use fee to a ride the ferry. Their contributions can help

to subsidize daily commuter fares at a lower rate.

- **Fare Subsidies:** Fare subsidies can allow access to a greater number of users and those in underserved areas.
- **First/Last Mile:** Provide buses and other intermodal connections to help expand the area that people can reach within a short /15-minute travel from the landing.
- **Parking Lot:** Free car parking at the landing can increase the volume of riders who will travel to the ferry landing.
- **Transportation Development Incentive:** Transit facilities increase adjacent property values. This measurable and known increase could potentially be used to help fund the ferry by the local property owners/developers with a small square-footage tax.
- **Electric Ferry Vessel:** Electric ferries are new to the market. They provide reduced air emissions and lower operating costs due the price different of electricity and fuel. The capital cost for these vessels are just beginning to be understood because of their unique nature.

The full case study profiles can be found in **Appendix B - Technical Memorandum #2**.



**Figure 16: Case Studies and Best Practices Review**



## FATAL FLAW ANALYSIS

The team reviewed the viability of each of the six sites as well as the physical constraints, travel demands, and any competitive disadvantages in order to prioritize the focus of the study. Initially, the study team sought to select the three sites that best aligned with the study goals to perform additional modeling and analysis for future ferry service. However, when the team reached this point in the study, it became clear that it was best to view the six sites in terms of proposed route options instead of individual sites. The sites were grouped into Hudson River routes, Hoboken and West New York, and Newark Bay routes, south Harrison, South Kearny, Bayfront, and Bayonne.

A detailed breakdown of the fatal flaws and site elimination criteria is found in **Appendix C – Technical Memorandum #3**.

### Hudson River

Ferry service to New York currently operates from two locations in Hoboken, two in Weehawken (Port Imperial at the border of West New York and Lincoln Harbor), as well as several locations in Jersey City along the Hudson River. Feedback from public outreach showed that while there is an interest in additional service along the Hudson River, the primary concerns were with the cost, frequency, and destinations of the existing services. Discussions with existing operators in the area indicated that the feasibility of new routes between existing landings, schedule alterations, and pricing are being continually evaluated and that a new landing in Hudson County along the Hudson River has a higher likelihood of capturing existing riders than providing service to a new population. Routes, schedule, and fares are all dependent on demand and funding. The potential for operating subsidies is a complicated issue that would require further

assessment and consideration as part of a future study. Since existing operators are continuously examining sources of subsidies or other funding for routes to existing terminal locations, study resources were thought to be best utilized to analyze locations without existing landings. With the need to narrow the focus of the study, Hoboken and West New York were not considered during the detailed analysis. This decision was influenced by the existence of ferry landings in the vicinity of these locations, the existing access to other modes of public transportation in these areas, the catchment areas' lower percentage of environmental justice populations, and the shallow shoreline along the West New York location which would require costly maintenance. The findings from this study, including all data collection, modeling and analyses will be publicly available, so operators may review them for their consideration.

### Newark Bay

The initial analysis showed ferry service between the Newark Bay locations and New York as being at a competitive disadvantage when compared with the other modes of transportation available. The time advantage normally associated with ferry service is lost primarily due to the travel time associated with going around the peninsula. An intra-county route has not been previously examined and is less likely to be studied in depth by private operators as there are no existing ferry landings to branch out from. In addition, considering the four sites as a combined multi-stop route in lieu of single point destinations allows the potential for additional ridership capture. With potential funding sources available to assist with the construction of infrastructure for a service, planned developments in the locations, and the

benefits that this service could provide to Hudson County and the northern New Jersey region, the intra-county route was deemed the best use of study resources. Due to the proximity of south Harrison to Newark and discussions the County had with Newark representatives, a landing in Newark was also added as a possibility in the study as a route destination.

The flexibility of ferry routes is one of the characteristics that makes them stand out from other transportation options. Ferry service can be provided to and from any terminal, as long as the route between them is navigable. Once infrastructure is in place in Newark Bay, operators can look into the feasibility of service from these locations into New York and other New Jersey locations. As long as infrastructure is designed to accommodate the standard vessels operating in the New York Harbor, adding routes and connections to additional destinations in the future

would not require significant startup costs.

With a keen interest in supporting environmental justice communities, the study focus was shifted from the Hudson River to Newark Bay. By studying an area that does not currently have ferry infrastructure, the team hoped to gather momentum and justification to consider ferry service in neighborhoods that currently are underserved by public transportation options. The team felt the concentration on the Newark Bay sites best aligned with the study goals.





## DATA ASSESSMENT, ANALYSIS AND MAPPING

### Modeling

#### Base Ridership

The NJRTM-E was used as the tool for estimating the base ridership as it is well-suited for a feasibility level study. The model is calibrated to replicate existing auto demand, transit ridership, and behaviors in the region. The NJRTM-E provides a point in time analysis of specific years and is based on historical ridership and survey data. The model also incorporates regional growth forecasts and planned changes to land use.

While the NJRTM-E is good at replicating existing transit ridership and incorporating changing travel patterns, it does not specifically account for individual planned developments. Additionally, should travel patterns change unexpectedly the model will not predict this until more recent ridership and survey data is collected.

These limitations of the regional model led the team to estimate the impacts of developments outside of the model and to use data from trips in 2020 collected through the cell phone network and obtained for the study to confirm that the travel patterns in the model were still reasonable. No adjustments were made to the base model.

Ferry ridership was estimated for three concept routes connecting the ferry landings identified through the study:

1. Base Route: South Harrison – South Kearny – Bayfront – West Bayonne
2. 'Three Stops Only': South Kearny – Bayfront – West Bayonne
3. Newark Route: Newark – South Kearny – Bayfront – West Bayonne

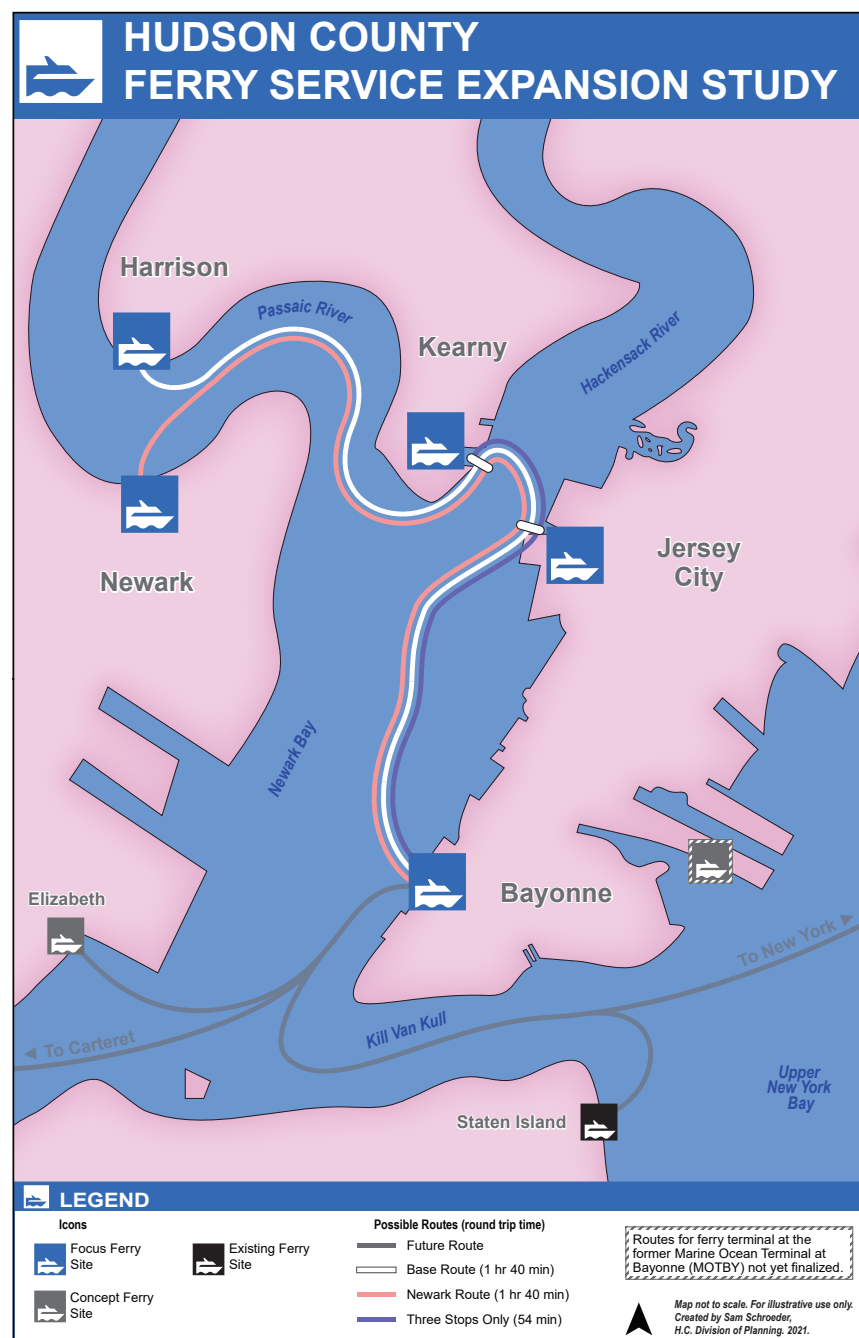


Figure 17: Concept Routes

For each of these routes the travel times were calculated based on estimated ferry boat speeds, accounting for waterborne traffic along different parts of the Passaic River and Newark Bay. Multiple operating scenarios were modeled for each of the routes varying the number of boats and fare levels. **Table 4** shows the one-way travel times including dwell times for loading and unloading of passengers for each of the three routes.

For each of the sites, both walk and drive access were allowed within the model. Additionally, transfers to/from other transit modes were tested for each of the landings. For example, the south Harrison site allowed transfers from nearby bus stops and the Harrison PATH station. Allowing connecting modes increases the geographical market of the ferry since people can use an alternate mode and then quickly and reliably access a ferry landing.

More detailed information on the modeling process can be found in **Appendix C – Technical Memorandum #3**.

#### Growth from Developments

The NJRTM-E is a regional model spanning 13 counties and, as such, does not always reflect specific local developments that may have a large impact on a specific route. When developing and updating the model, the NJTPA estimates future

population growth within the region. However, the model does not always reflect individual developments at a site-specific level.

The study area, the western section of Hudson County along Newark Bay and the Hackensack and Passaic Rivers, is experiencing a massive concentration of residential, commercial, and industrial redevelopment demand, with specific large redevelopment projects in the planning stages, approved, or under construction identified at each of the four Hudson County concept ferry landing sites considered through this study. Tens of thousands of residential units, and several million square feet of commercial and industrial space are anticipated across the study area. Multiple new, large land development projects were announced during the course of the study process; more recently than the NJRTM-E model has been updated. Any residents or workers of these developments in the immediate vicinity of the concept ferry landings would not be included in the model as it is currently set up, and their transportation options and choices would not be accounted for. It was essential for the County to identify and plan for the travel demands and needs of residents and workers within the project area currently, as well as in the future, when considering the potential for additional transportation service. To incorporate the appropriate impact of identified future planned developments within the catchment

Table 4: Ferry Travel Times between Landings for Modeled Routes (including dwell times)

	Base Route	'Three Stops Only'	Newark Route
South Harrison - South Kearny	18 minutes	-	-
Newark - South Kearny	-	-	18 minutes
South Kearny - Bayfront	6 minutes	6 minutes	6 minutes
Bayfront - West Bayonne	11 minutes	11 minutes	11 minutes
<b>South Harrison - West Bayonne (including dwell times)</b>	<b>50 minutes</b>	<b>27 minutes</b>	<b>50 minutes</b>
<b>Round trip (including dwell times)</b>	<b>1 hour 40 minutes</b>	<b>54 minutes</b>	<b>1 hour 40 minutes</b>

area of each landing, majority of which are expected to be completed by 2030, into the travel demand estimates developed through the study, a spreadsheet model was developed.

The spreadsheet model estimates the impact of each development within a site catchment. This is done by estimating the number of daily trips produced by the development and distributing those trips to destinations using the trip distributions from the NJRTM-E. Once these are estimated, the NJRTM-E estimated capture rates for each route are applied to estimate the number of ferry trips.

This process allowed the team to layer the ridership impacts from planned developments on top of base NJRTM-E estimated ridership. For further information on the modeling process and a list of all planned developments considered, see

**Appendix C – Technical Memorandum #3.**

**Ridership Results**

The average daily weekday ridership for the three different routes was estimated and then the ridership from planned developments was layered on top. The ridership from planned development is for 100 percent build out of all identified developments. **Table 5** shows the ridership for the different routes at a fare of \$7 and headways related to three boats.

**Table 6** below shows the base demand broken out by landing and **Table 7** shows the demand including estimates from planned developments.

Ridership was also modeled at different fare levels to test the sensitivity of the fares as seen in **Table 8**.

**Table 5: Average Weekday Ridership by Route**

	Base Route	'Three Stops Only'	Newark Route
Base Demand	187	141	142
Planned Developments (estimated completion between 2021-2066)	529	544	497
<b>Total Ridership</b>	<b>717</b>	<b>685</b>	<b>639</b>

**Table 6: Average Weekday Ridership by Landing (Base)**

Proposed Ferry Landing	Base Route	'Three Stops Only'	Newark Route
Newark	-	-	5
South Harrison	18	-	
South Kearny	17	2	4
Bayfront	75	69	65
Bayonne	78	70	68
<b>Total Route Ridership</b>	<b>187</b>	<b>141</b>	<b>142</b>

**Table 7: Average Weekday Ridership by Landing (including estimates from planned developments)**

Proposed Ferry Landing	Base Route	'Three Stops Only'	Newark Route
Newark	-	-	6
South Harrison	53	-	-
South Kearny	29	14	16
Bayfront	552	596	544
Bayonne	83	75	73
<b>Total Route Ridership</b>	<b>717</b>	<b>685</b>	<b>639</b>

**Table 8: Average Weekday Ridership by Route and Fare Level**

Fare	Base Route	'Three Stops Only'	Newark Route
\$2.75	241	179	189
\$5	211	160	165
\$7	187	141	142
\$10	161	121	123
\$12	152	116	120



Credit: Photo contest winner Marvin Matias



## FINANCIAL ANALYSIS

Ferry service offers several distinct advantages over conventional mass transit systems and road-based travel options. These include minimal infrastructure investment and minimal property needed due to the public nature of the waterways. Similarly, ferries have relatively low per seat hourly operating costs and, as in Hudson County where private operations are the norm and fares are not artificially constrained, result in a much higher fare box return.

Yet even with these advantageous attributes, ferry services struggle with competitive disadvantages and, if not subsidized, must rely on market share, like any other business. The disadvantages generally include highly subsidized public transit competition, and the lack of landside intermodal connections including bike and pedestrian connections. The latter is particularly important where convenient waterfront transit connections are unavailable.

### Potential Vessel Requirements

Ferry vessels have a wide variety of designs, allowing them to cater to the physical characteristics of their routes, including water depths, clearances and landing configurations, as well as ridership demands, including vessel capacity, speed, and cargo requirements. Key considerations an operator must consider when selecting a vessel include:

- **Local, State, and Federal Requirements** – vessels must be designed and inspected per Coast Guard regulations. Vessels must be designed and operated to comply with all emissions regulations and wake standards, where applicable.
- **Efficiency** – vessel design regardless of

the hull type aims to minimize a vessel's resistance and displacement in the water to reduce operating expenses, particularly fuel burn.

- **Motion Sickness Incidence** – vessel design aims to minimize motion sickness incidence, which is a function of motion, rolling and slamming of the hull. The overall goal is to maintain passenger comfort.
- **Maneuverability** – the ability to maneuver in confined port areas, during strong winds and while underway.
- **Sea Keeping** – a vessel's ability to withstand and maintain speed during poor weather conditions and high waves.

Due to the conceptual nature of this study, the vessel requirements and statistics used were consistent with the standard passenger ferries currently operating in the New York Harbor under similar conditions. The design of new landings that can accommodate these vessels will allow for future flexibility and compatibility with existing destinations. Electric vessels are relatively new to the market at the time of this study. At the time of implementation, it may benefit the proposed service to consider electric vessels from an environmental and cost savings perspective.

A more detailed discussion of vessel requirements and trends can be found in **Technical Memorandum #2**.

### Concept Financial Plan

#### Overview

Key in identifying if the above estimated ridership is enough to sustain a ferry service is understanding

the required operating and capital costs. By identifying these costs and revenue derived from the estimated ridership one can estimate the required profit or subsidy of the potential services.

The potential services' primary revenues were estimated based on the ridership and fare for each scenario. Additional revenue was estimated to come from onboard concessions sales or advertisements.

In the financial analysis the project team estimated operating costs based on each of the routes' operational profiles. The operating costs include labor, fuel, maintenance, insurance and management costs. The operating costs are primarily associated with vessel operations; however, they also include shoreside or facility expenses.

Capital costs were estimated based on the number of boats required to deliver the potential service and the landings required. As the number of boats vary by operating scenario, multiple financial scenarios were evaluated.

### Scenarios

The financial analysis considers a range of operational and capital costs required to operate a ferry service. These costs vary based upon the number of vessels in service, governance and operational structure. Operating deficits or profits reflect the projected fare revenue which is based on estimated ridership levels. Three separate scenarios were modeled based on the number of boats in operation during peak and off-peak periods for each of the three routes. For the purpose of this report, service start-up was assumed to be in 2020 and all costs are in 2020 USD. The scenarios modeled were 2, 3, and 4 boats in the peak and 2 boats in the off peak, for each of the three routes. The results shown in this report are for 3 boats in the peak. The full financial analysis of ridership and

revenue can be found in **Appendix C – Technical Memorandum #3**.

In addition to the different headways and fare levels, the impact of varying governance structures on costs were also modeled. The governance structures presented are for illustrative purposes only, and do not reflect Hudson County's intentions with regard to operating a ferry service. The governance structures and associated scenarios are reflective of costs within the region and would apply to any local or regional government within the study area.

The three governance structures considered were:

- Hudson County (or other local government) buys vessels and operates the ferry service
- Hudson County (or other local government) leases vessels and operates the ferry service
- Hudson County (or other local government) contracts an operator to operate the service

These scenarios vary in costs. In the scenario where Hudson County (or other local government) buys and operates the vessels, there are high startup costs associated with vessel construction. The scenario in which the County (or other local government) leases the vessels assumes that there are suitable vessels available to charter. While this approach allows the County to avoid the capital costs associated with vessel construction, the cost of leasing a vessel is significantly higher than new construction if vessels are leased for many years and does not allow the public sector to take advantage of public capital finding or grants. The third scenario assumes the County (or other local government) contracts with a private operator to operate the service using the operator's vessels. In this scenario it is assumed that the operator would charge a fee for the service. The difference in these costs should be taken into account when considering the governance structure of the service.

**Results**

The results discussed in this section are for the scenario using a fare level of \$7, operating with 3 boats in the peak and under a governance structure of the County (or other local government) owning and operating the service.

The capital costs for the routes are shown below. These include vessels, if the vessels are bought by the County, and landing construction.

For this scenario, the three potential routes have projected revenues of \$655,000 to \$855,000 annually, while operating costs could be expected to be \$3.2-3.5 million annually. Given this imbalance, a subsidy would be needed to cover the operating costs. This subsidy would range from \$2.5 million to \$2.8 million annually for this scenario.

A core part of both the ridership and financial analysis is considering the impacts of future planned developments. While 100 percent build-

out rates for all the developments vary, complete buildout of all the developments will bring in substantially more ridership and thus farebox revenue. The most impactful developments are at the South Kearny and Bayfront landings and these affect all three routes, increasing farebox revenue by \$800,000 and in turn reducing the average subsidy required to \$1.7 million annually.

**Table 10** shows the pro forma (profit versus expenses for the system) for the three routes studied using a fare level of \$7, operating with 3 boats in the peak and under a governance structure of the County (or other local government) owning and operating the service. If the County chooses to lease the vessels instead, this will cost an additional \$720,000 annually when leasing 2-3 vessels and \$1,080,000 annually to lease 4 vessels. If the County contracts an operator, this will add on \$250,000 operator fee in addition to the leasing cost annually.

**Table 9: Route Capital Costs**

Capital Expenditure		Base Route (USD)	3 Stops Only (USD)	Newark (USD)
Vessels (if bought) <sup>1</sup>				
	Acquisition Costs	7,600,000	7,600,000	7,600,000
<b>Total Vessel Capital Expenditure</b>		<b>7,600,000</b>	<b>7,600,000</b>	<b>7,600,000</b>
Shoreside Infrastructure				
	<b>Construction</b>			
	South Harrison	3,000,000	-	-
	Newark	-	-	3,000,000
	South Kearny	3,000,000	3,000,000	3,000,000
	Bayfront	3,000,000	3,000,000	3,000,000
	West Bayonne <sup>2</sup>	4,000,000	4,000,000	4,000,000
<b>Total Shoreside Infrastructure Capital Expenditure</b>		<b>13,000,000</b>	<b>10,000,000</b>	<b>13,000,000</b>
<b>Total Capital Expenditures</b>		<b>20,600,000</b>	<b>17,600,000</b>	<b>20,600,000</b>

<sup>1</sup> Note that it is typical for vessels to require a major rebuild during their operational life. These costs can be expected to be around \$1 million for the type of vessels needed to operate the routes.

<sup>2</sup> Preliminary review of West Bayonne site conditions indicate additional infrastructure may be required to reach depths necessary for ferry operations.

**Table 11** incorporates the impact of future planned developments into the ridership and as such the additional farebox revenue.

**Table 10: One Year Pro Forma – without future developments (2020)**

Operations		Base Route (USD)	3 Stops Only (USD)	Newark (USD)
<b>Operating Revenue</b>				
	Fare	855,750	712,250	649,250
	Other Operating	8,558	7,123	6,493
<b>Total Operating Revenue</b>		<b>864,308</b>	<b>719,373</b>	<b>655,743</b>
<b>Operating Expenditure</b>				
<b>Vessel</b>				
	Crew Labor	551,940	551,940	551,940
	Fuel	936,000	936,000	936,000
	Maintenance	384,000	384,000	384,000
	Insurance	200,000	200,000	200,000
<b>Total Vessel Operating Expenditure</b>		<b>2,071,940</b>	<b>2,071,940</b>	<b>2,071,940</b>
<b>Shoreside</b>				
	Insurance	360,000	270,000	360,000
	Staff Expenditure	272,000	204,000	272,000
	Misc Facility Expenditure	500,000	375,000	500,000
<b>Total Shoreside Expenditure</b>		<b>1,132,000</b>	<b>849,000</b>	<b>1,132,000</b>
<b>Management &amp; Support</b>				
	Management	250,000	250,000	250,000
<b>Total Management &amp; Support Expenditure</b>		<b>250,000</b>	<b>250,000</b>	<b>250,000</b>
<b>Total Operating Expenditure</b>		<b>3,453,940</b>	<b>3,170,940</b>	<b>3,453,940</b>
<b>Net Operating Income</b>		<b>(2,589,633)</b>	<b>(2,451,568)</b>	<b>(2,798,198)</b>

Table 11: One Year Pro Forma – with all future developments

Operations		Base Route (USD)	3 Stops Only (USD)	Newark (USD)
<b>Operating Revenue</b>				
	Fare	1,731,975	1,588,475	1,525,475
	Other Operating	17,320	15,885	15,255
<b>Total Operating Revenue</b>		<b>1,749,295</b>	<b>1,604,360</b>	<b>1,540,730</b>
<b>Operating Expenditure</b>				
<b>Vessel</b>				
	Crew Labor	551,940	551,940	551,940
	Fuel	936,000	936,000	936,000
	Maintenance	384,000	384,000	384,000
	Insurance	200,000	200,000	200,000
<b>Total Vessel Operating Expenditure</b>		<b>2,071,940</b>	<b>2,071,940</b>	<b>2,071,940</b>
<b>Shoreside</b>				
	Insurance	360,000	270,000	360,000
	Staff Expenditure	272,000	204,000	272,000
	Misc Facility Expenditure	500,000	375,000	500,000
<b>Total Shoreside Expenditure</b>		<b>1,132,000</b>	<b>849,000</b>	<b>1,132,000</b>
<b>Management &amp; Support</b>				
	Management	250,000	250,000	250,000
<b>Total Management &amp; Support Expenditure</b>		<b>250,000</b>	<b>250,000</b>	<b>250,000</b>
<b>Total Operating Expenditure</b>		<b>3,453,940</b>	<b>3,170,940</b>	<b>3,453,940</b>
<b>Net Operating Income</b>		<b>(1,704,645)</b>	<b>(1,566,580)</b>	<b>(1,913,210)</b>

## Potential Funding Sources and Partnerships

To close the gap between operating revenues and expense and to fund the necessary capital investments, there are a range of funding sources that could be considered. These include public subsidies, private subsidies, public/private financing partnerships, grants and additional revenue from concessions, advertising, charters, and special events.

### Public Subsidies

Public subsidies take a number of forms throughout the country, however there are four sources that are most standard:

- **Local general fund allocation.** This is used to subsidize operating costs and cover capital investments for the NYC Ferry system. Funds come from the City’s operating budget and are dispensed through NYCEDC.
- **Sales or property tax.** Kitsap County, WA funds their passenger ferry system through a voter approved 0.3 percent sales tax.
- **Bridge or road tolls.** The San Francisco Bay Ferry is supported by toll revenue.
- **Transportation district.** Casco Bay Ferries, which depart from Portland, Maine use this model. Major investment relies on federal funds with matching funds coming from an allocation of voter approved statewide bonds, parking, and other non-farebox revenue.

### Private Subsidies

Private subsidies can be another option for non-farebox revenues. These can take the shape of sponsorships, which often fund pilots or the initial years of a new service as it ramps up. These have also taken the form of a private employer providing vessels or other infrastructure. In the New York

region, private developers have enhanced the marketability of property while employers have given improved access and transportation options for their workforce by supporting ferry services. The role of developers could be very significant for the proposed routes in this study given the number of trips driven by these developments.

### Public/Private Partnerships

Public/private partnerships (P3) are an option for financing that may be used for securing capital for infrastructure or new vessels. With a P3, the private partner(s) can take on some of the risk. However, this type of arrangement is complex and typically comes at a higher cost than traditional bond financing, primarily due to the increased administration costs of this arrangement. It would also require concession terms long enough for the private entity to amortize their investment. For example, if the concession term is shorter than 10 years, a contractual arrangement would be required such that the private entity would not be left owning vessels for a service they were no longer operating.

### Grants

Federal, state, and local grants are typically focused on funding capital improvements, including new landing construction and vessel procurement. Grant availability can vary year to year, previous grant programs have included the FTA’s Passenger Ferry and BUILD grant programs. Grant revenues can vary in availability, applicability, funding allotment, and local matching requirements. Most grants are highly competitive and cannot be guaranteed as a source of funding in the early phases of a planning process. Securing competitive grants generally requires having the right staff expertise to develop a compelling application.



## NEXT STEPS

### Recommendations

Study findings indicate that conditions in the study area along Newark Bay and the Hackensack and Passaic Rivers should be monitored and reevaluated over time to assess when the criteria for a successful service are met. Current conditions are not sufficient to support a ferry system without subsidies. However, the anticipated growth of south Harrison, South Kearny, Bayfront, and west Bayonne warrants monitoring the feasibility of the proposed ferry routes in the future. The County should anticipate changes that can increase revenue, as well as look for funding, partnership, and cost saving opportunities. Scenarios developed as a part of this study can be reevaluated as conditions change to best determine when and how the proposed new ferry service should be implemented. The following conditions should be reevaluated.

### Ridership

Potential ridership is perhaps the simplest but most important area to monitor for change and optimization. While most ferry service revenue is derived directly from ridership, there are non-fare box revenue sources that also increase with ridership such as advertising, concessions, and parking fees. For the three routes tested, it is important to monitor future trip patterns between catchment areas and development sites. Currently the majority of residents near the proposed ferry landings are not employed near or at the other landings. These journey to work patterns will likely change over time as development proceeds, creating additional employment and residential travel demand. An added benefit of large-scale redevelopment will be the concomitant creation of other modes of transit or intermodal connections which are fundamental for expanding the ferry ridership market.

### Partnerships

The value of partnerships for ferry implementation are multifaceted. Partnerships can amplify support for new transportation service and promote necessary policies, legislation, and funding at the regional and state levels. Partnerships can lead to increased ridership through multi-modal and connecting transportation options or new residential and commercial developments. Partnerships can reduce costs by assisting with funding of vessels or infrastructure. It's important to continue engaging the following partners to ensure all parties are kept abreast of changing conditions and potential impacts to a proposed ferry service.

- NJ TRANSIT is an essential partner in ensuring the success of future ferry services. Ferry service that is supported by additional connecting transportation services, which enhance and complement the operation, expands rather than competes with traditional transportation service in our north Jersey region. It is recommended that NJ TRANSIT remain engaged throughout the discussion of potential ferry service. This will allow potential ferry sites to influence future service and route considerations. Changes in service or routes that could impact ridership levels can also be monitored.
- The Port Authority, which oversees infrastructure and maritime operations within the Port District, is an important potential partner in the expansion of ferry service. The Port Authority considers ferry service as a supplement to PATH and where services run parallel, a load shedding or congestion mitigation measure for crowded PATH trains. The Port Authority should remain engaged to ensure all parties are aware of service and

route changes that could impact ridership.

- Municipal governments are key partners in hosting infrastructure, appealing for funding, petitioning for regulatory changes, and arranging stakeholder collaborations.
- Non-profit and community organizations can play an important role in providing support and promoting legislative changes necessary for creative funding options.
- Private developers could contribute support, promote the use of transportation service to residents and employees, and potentially contribute infrastructure, or financial support for infrastructure and/or operations. Partnership opportunities can help to make the service more feasible by sharing the costs between multiple parties. Based on the significant impact the future developments have on projected ridership, it is highly recommended that the developers are brought into the discussion of potential ferry service near their properties in the earliest

stages. Engaging property developers allows them to understand the potential benefits of a ferry service such as increased property values. The increased property values associated with proximity to ferry service encourages collaboration with developers when designing and funding any required transit infrastructure and upgrades, which in turn provides an increase in potential ridership. Collaboration with the current developments underway in proximity to the sites would benefit ferry service to those areas. Given the large role future developments play in the estimated ridership, it would be sensible to work with developers and local governments as they produce master and site plans for the redevelopment areas. By integrating ferries into development plans and marketing materials early in the process, it is possible both to secure funding from developers and attract future residents who intend to use a ferry.



Credit: Photo contest winner Samantha Szekely



### Future Connections

Seasonal and recreational opportunities offer some potential to increase the ridership of ferry routes. Across the country, ferry service has provided access to previously difficult to reach locations. Recreational destinations within the project area include parks, waterfront walkways, shopping centers such as the Hudson Mall and Jersey Gardens in Elizabeth, and sports venues such as the Red Bull Arena and Prudential Center in Newark. Also, with a connecting bus or shuttle service, ferries may potentially provide a future transportation connection to Newark Airport. As noted above in the Best Practices section, tourists will pay a high single use fee to a ride the ferry, and their contributions cross subsidize daily commuter fares and result in a lower commutation cost. Promotion with agencies such as the Hudson County Office of Cultural and Heritage Affairs/

Tourism Development, and special event service and ticket options may be considered.

The growing disparity between transportation needs of the area and capacity of existing infrastructure will only further the desire for alternative transportation modes, including ferries. Hudson County currently has nine ferry landings along the Hudson River with service to Manhattan, with another under construction. Bergen, Middlesex, and Monmouth counties all have or will soon have ferry service to Manhattan. Based on feedback from the outreach performed throughout the study, it is recommended that Hudson County work with other counties and municipalities in New Jersey, including Elizabeth, Carteret, Newark, South Amboy, and Highlands, to further consider the possibility of intra-New Jersey ferry routes. Once the proposed ferry landing in east Bayonne is constructed, it should consider service to existing ferry landings directly across



the bay in Brooklyn. Connecting the concept ferry site in west Bayonne to the east Bayonne location could provide additional access to the residents of Bayonne and provide a new connection to the destinations of each ferry. Adding public transportation connections along the New Jersey waterfronts will serve to boost, tourism, local economies, and encourage development.

### Transportation Connections

The importance of intermodal connections was a theme throughout the study. Creating a connection between existing residential and business areas, especially areas not currently served by a robust public transportation system, to the proposed landing sites allows for the increase in catchment area and ridership potential. Increased connections will support equity in transportation by providing access to the waterfront and ferry service for residents who cannot afford to live there. The Hudson-Bergen Light Rail extension to Bayfront is a key transit connection which will expand the Bayfront catchment area. Reevaluating bus routes to bring connections closer to proposed landing

sites and increased frequency could also lead to increased ferry ridership.

Hudson County's transportation network includes a large number of privately owned and operated jitneys. These jitneys provide convenient, affordable transportation options, often filling in gaps from other transportation providers, with more frequent service or connections to additional destinations. Jitneys could provide additional transportation service to and from ferry landings, providing access to more ferry riders. Shuttles run by private residential developments or employers could also provide a travel option to ferry landings for residents or employees at specific locations.

Bicycle routes can provide further connections to access the waterfront and ferry landings. The East Coast Greenway and Morris Canal Greenway run near the Bayfront site. The Hackensack River Walkway will run along the waterfront of Newark Bay in Bayonne when completed, providing a connection for pedestrians and cyclists to access a ferry terminal. Connections with bicycle routes should continue to be explored as new routes





are planned and created. Coordination with municipalities and developers can help create connections to the waterfront and potential future ferry terminals. These connections should be considered when establishing partnerships to include connections as part of plans, such as Jersey City's Bicycle Master Plan and Hackensack Avenue Streetscape Improvements in South Kearny. Bicycle infrastructure is a cost effective, space efficient way to provide access to an increased number of riders.

### Funding

Public funding opportunities should be monitored as federal grants and particularly capital grants may be applicable to this conceptual ferry service. Hudson County ferry services and particularly those in Weehawken and Hoboken have received public resources for terminal construction and

vessel repower programs. Last year alone and nationwide a total of 12 projects in 12 states received more than \$47 million in funding from the Federal Transit Administration's [Passenger Ferry Grant Program](#). In 2020 the Federal Highway Administration's Ferry Boat Program allocated over \$92 million nationwide including over \$6.8 million to the State of New Jersey. Federal funds are utilized for ferry services in various ways. For example, the case for Kitsap County where Kitsap Transit took advantage of a federal grant related to understanding and monitoring the impact of vessel wake on beaches and bulkheads. This grant was used to develop, design, construct, and test the feasibility of operating a high-speed vessel in Rich Passage. This research led to the current fast ferry service. Closer to Hudson County, the Staten Island Ferry was able to utilize a hazard mitigation grant following Hurricane Sandy to help fund the

construction of three new vessels. Special grants such as these can help to cover significant portions of capital costs.

### Electric Vessels

Fully electric or hybrid electric ferries, while not commonly in operation yet in the US, are expected to greatly reduce fuel costs. As can be seen above in the financial analysis, fuel makes up between a quarter and a third of the overall operating expenses of the potential service. A significant reduction in these costs would bring the proposed routes much closer to breakeven status. In addition to providing cost savings, electric and hybrid vessels have the added benefit of lower emissions, reducing the environmental impact of this transportation mode. It is recommended to reevaluate the feasibility of the proposed ferry service if electric vessels become more readily available in the US market.

### Key Findings

Several important conclusions can be drawn from this study, particularly from the operating and financial sustainability perspectives. There are various key drivers or parameters that lead to successful ferry operations including terminal location, intermodal access, market penetration, ridership, revenue, and when necessary, public or private operating subsidies. Ferry service in Hudson County is unique in this country in that it largely exists because of private initiatives. The existing services receive no public operating subsidies; although, there have been public-private capital partnerships which have resulted in the construction of large multi-user ferry facilities.

Because of this unique status most of the "low hanging fruit" or sustainable ferry routes have been initiated and serve primarily trans-Hudson commutation. Nonetheless, as additional waterfront sites that formerly housed traditional Hudson County

commercial and industrial uses are redeveloped into residential and more technologically advanced commercial uses, opportunities for new and different types of ferry services will emerge. How and when these services are brought to fruition will depend on the maximization of certain opportunities or conditions including revenue or ridership, public funding, partnerships and cost saving and other efficiencies.

### Key Takeaways:

- Public and private interest exists for additional ferry service in Hudson County
- While ferry service infrastructure is feasible at all locations, West New York would require costly, reoccurring dredging and Harrison, Newark, and Bayonne may require additional design coordination
- Navigation between proposed landings and select existing destinations is feasible. Travel through Kill Van Kull may result in challenges
- Ferry travel from landing sites along the western side of Hudson County to destinations on the Hudson River, with current conditions, would not be competitive against existing transportation options
- Existing ferry operators are monitoring potential new routes and destinations along the Hudson River
- Ferry routes connecting the western waterfronts of Hudson County have potential, however current conditions do not support unsubsidized operations
- Ferry routes along west Hudson County could provide transit options to a currently underserved market and may serve a larger environmental justice population
- Ferry routes can enhance the region's transportation network and provide direct



- connections to new destinations
- Ongoing communication and coordination with partners is essential
- Multi-modal transportation connections are essential, increasing ridership and reaching underserved communities
  - » Waterfront access is included in the master plans of proposed developments in Bayfront and South Kearny. New transportation infrastructure along the waterfront could lead to additional development and investment in the area
- There are numerous factors that could increase ridership and/or decrease operational costs and create the conditions for a successful ferry service, including:
  - » Development near destinations
  - » Transit connections at destinations
  - » Connections to tourist destinations
  - » New landings that would provide popular connections
  - » More efficient vessels
  - » Faster travel times
  - » Grant funding
  - » Subsidies
- » Coordinate with any improvement projects planned in the areas, such as the Passaic River Restoration Project and the New York and New Jersey Harbor Deepening Channel Improvements
- » Partner with property owners and developers, obtain land use agreements, rights, or acquire sites
- Secure vessel(s) either through charter, construction or purchase of an existing vessel after confirming it meets all the operational, regulatory and environmental requirements. Secure a homeport for vessel maintenance and fueling
- Secure experienced vessels operator
- Promote ferry service with a multi-faceted marketing plan

## Conclusion

The study of ferries in Hudson County has shown the potential for different transportation modes to connect people and places throughout the region. Bringing ferries to new areas of Hudson County and the northern New Jersey region could expand access and choice, fulfill travel needs, and improve our transportation network. The flexibility for ferries to create different routes is a great advantage of the waterways. Although current estimated ridership numbers are low for the routes considered, our region is always developing, shifting, and evolving. As Hudson County continues to grow and regional neighbors add ferry landings as additional destinations, the potential for ferry service should continue to be reexamined. The following section contains an Implementation Matrix that can help guide the implementation of additional ferry service in Hudson County in the future.

## Implementation

Once conditions support the initiation of ferry service without significant subsidies, or subsidies and potential partnerships are established, the next steps towards implementation of the concept ferry service are:

- Establish service characteristics including hours of operation, departure schedule and fares
- Construct ferry landings at proposed locations





## IMPLEMENTATION MATRIX

This study determined that current conditions are not expected to support a successful, financially sustainable ferry service. As a result, no specific ferry service implementation recommendations would be applicable to the routes proposed in this study. The team concluded that a matrix of recommendations for advancing ferry service planning and factors that could lead to favorable conditions, along with high level implementation recommendations, would provide the greatest benefit. A list of conditions to monitor and subsequent steps to implement a ferry service are listed below.

Recommendations	Actions	Implementing Agency	Timeframe for Implementation
<b>Watch for Conditions to Improve:</b>			
Revisit ridership after another regional landing is implemented	Several neighborhoods in the region are considering adding ferry landings. Newark, Elizabeth, Staten Island North, and Carteret are all considering installing ferry landings. If these landings are further progressed or built, the ridership should be modeled again considering connections to the landings. The landings outside Hudson County could increase ridership to a level of profitability.	Hudson County or developers of other landings or existing ferry operators	Once other landings in region are in design or construction.
Revisit ridership after more development in area	Land development projects are continually under consideration. Once more projects are in the planning process, the total ridership for the region can be reconsidered.	Hudson County	2026. Five years from now, compare planned development with that known about in this study. If a vast number more are noted, then rerun ridership numbers. Otherwise wait ten years until 2031.
Collaboration with developers	Reach out to developers to see if they are interested in building a ferry landing at their site. See if developers would be open to helping subsidize a ferry. At a minimum encourage them to promote ferries to the renters.	Hudson County	Ongoing.
Establish TOD to help subsidize	Work with cities and state government to implement Transit Orient Development (TOD) which incorporate ferry allowances in zoning revisions and site approvals.	Municipalities, Hudson County, or state government	Ongoing.
Collaboration with transportation partners	Maintain coordination and communication with Port Authority and NJ TRANSIT to evaluate new transportation connections that would increase ridership and catchment areas. Review feasibility of connecting greenways and parks to increase ridership and accessibility.	Hudson County, Port Authority, NJ TRANSIT, Municipal Governments, etc.	Ongoing.
Monitor developments in electric vessels	Monitor the availability, reliability, and costs of electric vessels. As associated costs decrease, this can directly impact the overall funding required for new service. There may also be the potential for funding associated with the implementation of service utilizing electric vessels.	Hudson County	Ongoing.

Coordinate with Carteret Ferry Service	Carteret's ferry route will pass through the Kill Van Kull and coordination with this service may provide a benefit to Hudson County. Possibly this ferry could stop in Newark Bay and pick up riders either at one stop or several stops. Carteret has procured funding to build a ferry terminal (as of January 2021) but has not yet built its terminal.	Hudson County	Ongoing and after launch of Carteret ferry service.
Look at other markets	<ul style="list-style-type: none"> <li>&gt; Consider a Bergen County to Hoboken route to utilize existing landings within New Jersey.</li> <li>&gt; Consider a Hoboken to 14th Street in Manhattan route. There is no existing landing at 14th Street but the Tech companies in the area (Google) have created a lot of demand to the region.</li> <li>&gt; Consider an Edgewater to 125th Street in Manhattan Route. The existing ferry landing in Edgewater is directly across from 125th Street which would allow for a fast connection to Manhattan. There is no landing yet at 125th Street.</li> <li>&gt; Once the East Bayonne ferry landing is open at the marine terminal, consider a route to Sunset Park (Brooklyn Army Terminal) or Bay Ridge, Brooklyn as these neighborhoods have existing ferry landings and are directly across the bay.</li> </ul>	Hudson County or developers of other landings or existing ferry operators	Once other landings in region are in design or construction.
<b>Steps to Start a Ferry:</b>			
Update Demand Modeling	After additional developments are built or planned, run the demand modeling again. See if demand has risen to 1,000 passengers/day per route. This volume is not needed if operating subsidizes have been identified or operating costs have decreased.	Hudson County	2026. Five years from now, compare planned development with that known about in this study. If a vast number more are noted, then rerun ridership numbers. Otherwise wait ten years until 2031.
Establish Operating Structure	Identify ferry operations approach, examples including: <ul style="list-style-type: none"> <li>- Government operated</li> <li>- Government managed, government infrastructure, privately operated</li> <li>- Government managed, leased infrastructure, privately operated</li> <li>- Privately owned and operated</li> </ul> If government managed and utilizing private operator, prepare and issue RFP, onboard private operator.	Municipal Governments, Hudson County, transportation agencies	After sufficient ridership is identified.
Landings	Study landing sites. Perform an Environmental Impact Statement (EIS) to identify potential impacts from a new ferry route. Review proposed landing sites and check water depths. Secure Memos of Understanding with the property owners. Look for capital investment grants. Hire a designer. Build the landing.	Municipal Governments, Hudson County	After sufficient ridership is identified.

Homeport	Identify a Homeport for the vessels to dock at night and be serviced and refueled. This may be an existing port or a new location.	Municipal Governments, Hudson County or Regional Governments	After the operator has been chosen. Existing operators will have their own homeports.
Check current vessel emission requirements	Review current criteria for vessel emissions. This may impact if new vessels need to be purchased and of what criteria.	Ferry Operator	After the operator has been chosen.
Attempt to Procure a Dedicated Source of Subsidies	Federal Grants	<b>Type of Grant</b>	<b>Category</b>
		Accelerating Innovative Mobility	Planning, Design, Infrastructure
		Vehicle Technologies Office Research Funding Opportunity Announcement	Infrastructure, Operating
		Metropolitan Planning Program through the Fixing America's Surface Transportation (FAST) Act for the Metropolitan Transportation Plan (MTP)	Planning
		Planning Program & Local Technical Assistance Program	
		National Highway Freight Program (NHFP) through the FAST Act	
		Healthy Communities Grant Program	
		Environmental Justice Small Grants (EJSG) Program	Planning, Design, Construction, Infrastructure
		Hazard Mitigation Grants	
		Transportation Alternatives Grant Program	
		Economic Development Assistance Programs/Public Works Program	
		Passenger Ferry Grant	
		Transportation Districts	
		Congestion Mitigation & Air Quality (CMAQ) Improvement Program through Fixing America's Surface Transportation (FAST) Act	Planning, Design, Construction, Infrastructure, Operating
State Grants	It Pay\$ to Plug In	Operating	
Private	Sponsorships (pilots, startup costs)		
Local Funding	Development/Employer - Fare offset for residents	Design, Construction, Operating	
	Tax Revenue (sales or property)		
	New Tolls		
Loan	New Jersey Transportation Infrastructure Bank	Construction	
	Transportation Infrastructure Finance and Improvement Act		

Continue to monitor the Lower Passaic River Restoration Project	The Lower Passaic River Restoration Project plans to dredge and cap the river. Follow the progress of the project and the results. Assess what the new water depths are. Reach out to the EPA to discuss if piles for the landings can be anchored to the ground or if the landing needs to be anchored off of the adjacent land (as is done at Battery Maritime Building).	Municipal Governments, Hudson County or Regional Governments or Ferry Operator	During the project EIS.
Once launched, promote tourist destinations along the route	Additional demand could be created for the ferry service by helping people understand where the ferry can take them. People travel for entertainment on the weekends are often more willing to pay a high single use fee than a daily commuter, which can help subsidize the cost for the daily commuter. Such activities as sporting events, parks and other recreational facilities, cultural destinations, and culinary locations could all be promoted.	Municipal Governments, Hudson County or Regional Governments or Ferry Operator	Once the ferry is operating.







Credit: Photo contest winner Dana Greiman

## APPENDICES

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- A. MAPS AND FIGURES
- B. TECHNICAL MEMORANDUM #1
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POPULATION DATA
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