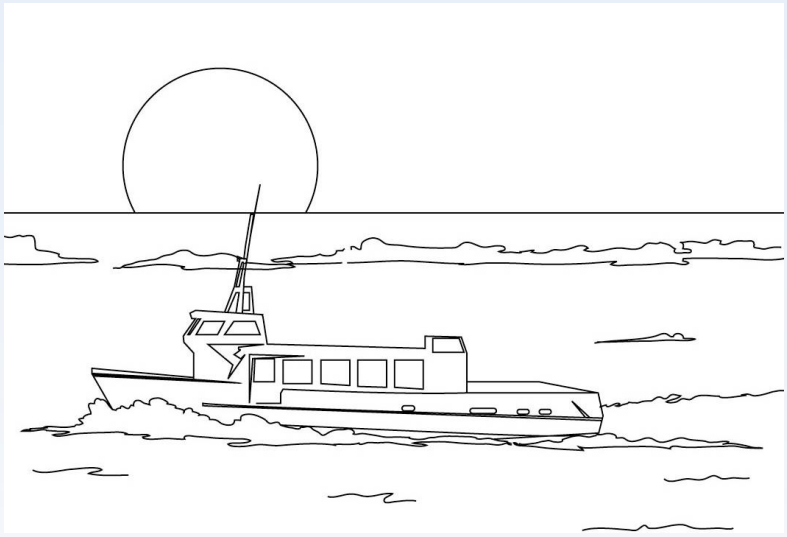
UNDERSTANDING THE CHALLENGES OF REGIONAL FERRY SERVICE IN NEW YORK CITY

Patrick McCandless



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INTRODUCTION

PROLOGUE AND THESIS

On February 12th, 2008, Christine Quinn, Speaker of the New York City Council, took to the dais at the City Council Chambers to deliver the State of the City Address. Towards the 17th page of an 18-page address, the Speaker's remarks turned to public transit and the Mayor's recently released PlaNYC initiatives. While transit is generally a hot topic in New York, Mayor Bloomberg had made transportation a centerpiece of his second term and was spending the winter in a campaign to convince the State Legislature to approve a congestion pricing scheme in Manhattan to finance transportation capital projects.

"It's only natural to look at our natural highways, our water ways... to move New Yorkers efficiently and sustainably." Said Speaker Quinn, "That's why we are proposing and the Mayor has agreed to begin developing a comprehensive five borough, year-round New York City Ferry System." The Speaker explained that the idea for ferry service originated through a series of public hearings she held with her colleagues in the Council:

"Soon after, we began exploring the concept of a pilot ferry service for the Rockaways, got a commitment from the Mayor to fund it…and that service should be up and running by this summer.

But why limit ourselves to Rockaway?

Imagine getting on a ferry in Hunts Point for a day trip to Coney Island.

Or commuting from Astoria to downtown without having to brave the traffic at the Triboro Bridge.

Or traveling from Brooklyn to Queens…without waiting for the G train.

And think of how it will enhance our infrastructure, open up our waterfronts and create jobs."[1]

Two years and twelve days later, the rhetoric of the State of the City speech came crashing to an anti-climactic end, as a report in the Daily News announced the cancellation of the Rockaways service. The ferry would cease operations at the end of March.[2]

Plans for a five borough Ferry System have not materialized, except for an East River ferry serving developments along the Queens/Brooklyn waterfront, currently with two sailings during the AM and PM peak hours is expected to offer more frequent service next year[3] The Rockaway route had not met ridership projections and was recovering only 15-30% of its operational costs from revenues collected at

[1] Quinn, Christine, "State of the City Address," New York (February 12, 2008)
[2] Hirschon, Nicholas, "Ferry Short Lived," Daily News (February 24, 2010)
[3] Source: New York Water Taxi Website: http://www.nywatertaxi.com/commuters/east-river-line/ (Accessed 5/20/10); According to interviews with officials at NYC EDC.

the farebox.[4] The failure of the Rockaway ferry service, combined with the cancellation of another newly opened ferry service between Yonkers and Lower Manhattan in 2009 has dashed the hopes of some who wished to exploit New York's water resources to improve commuting options via ferries. This has led to questions about the feasibility of expanding ferry service in New York City more broadly.

As large sections of the New York City waterfront are reclaimed from decades of industrial land use, idyllic waterfront parks have been developed next to gleaming residential towers. It seems only natural that ferries will soon serve a role in transporting residents and visitors to these new neighborhoods throughout the City. However, recent experiences illustrate the many obstacles facing expanded ferry services in New York City

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This paper seeks to make sense of the Rockaway and Yonkers ferry service's suspension, and draw lessons for those seeking to expand ferry service in New York City in the future. New ferry service has captured the attention of citizens, elected officials and many in the civic community, but a workable network of ferry service has so far eluded New York. Why has a network of publicly funded ferry service failed to take root in New York City? Also, What would a model to fund a ferry route over the long term look like? To understand this, the paper has sought to examine:

1) The existing network of private ferries in New York/New Jersey.
2) The existing transportation network.
3) How ferry systems in other cities do or do not offer good models for New York, and
4) New York's recent attempts to implement ferry service from the Rockaways and Yonkers.

Chapter One begins with an examination of the history of ferry service in New York City and its reemergence as a form of transportation in the 1980s. The existing network of private ferries serving the New York/New Jersey region is analyzed. Based on the limited amount of publicly available information, a few assumptions about its operations need to be made. The attributes to be taken into account include the cost of ticket, headway intervals, distances traveled, ridership profiles, geographic areas served, existing available transportation options, and how the system was started. Based on this analysis, the paper seeks to draw lessons from the existing network of private ferries.

Chapter Two, examines the ferry systems of San Francisco, Boston and Seattle as case studies that may offer lessons for New York City. The factors to be examined

[4] Source: NYC Economic Development Corporation, Briefing Document

are similar to those relevant to the study of the New York / New Jersey ferry networks.

The failed attempts to establish long-term ferry service to the Rockaways and Yonkers in New York City is the topic of Chapter Three. The ridership projections and the assumptions behind these projections are detailed. The chapter also examines these routes' background and their identified market populations, and also offers a discussion about the operating assumptions of these services. Finally, lessons learned from the failure of these routes may be drawn by comparing these routes to those of the other four ferry networks studied (San Francisco, Boston, Seattle, New York-New Jersey private ferries.)

Chapter Four identifies major challenges to expanding ferry service, offers a financing solution based on a Tax Increment Finance (TIF) proposal, and recommends strategies for expanding ferry service in the long-term. If financed by the upper middle class for the upper middle class, an expanded ferry network could be sold as a long-term strategy to attract and retain high-income earners in the City's new developments along the waterfront. The paper concludes with specific recommendations for New York City ferry routes based on the characteristics studied of ferry networks in other cities.

GOALS

This paper originally sought to understand why expanded ferry service in New York City had failed. Efforts to identify the policy benchmarks reached by other cities with urban ferry systems, were intended to distill lessons about how a network of urban ferries could be conceived in New York City. In addition, the paper endeavored to construct a business model for a workable ferry system in New York City. Unfortunately, because local private companies operate the small to medium size ferry services, some key information was not available for review.

Given this problem, the author then sought to draw conclusions from the experiences of other cities and the New York-New Jersey ferries, as well as to review the main factors that may have contributed to the cancellation of two ferry routes in New York City.

This paper does not offer a roadmap to create a ferry system in New York City, but it does provide meaningful insights and analysis of other urban ferry system's characteristics for use in future studies.

METHODOLOGY

The research study started with interviews of transportation professionals, government officials and other New York stakeholders. Following these interviews, San Francisco, Boston and Seattle's ferry systems were analyzed using materials publicly available on the internet. Common components for analysis were identified, such as trip distance, ticket price, existing transportation infrastructure, the political context of the ferry system's origin, and connections from the ferry to other transit. The author has concluded that common policy "benchmarks" for creating a ferry system in New York City do not exist.

Interviews

People listed below were interviewed as part of the research for this paper. Their contributions to the research were invaluable and are greatly appreciated.

Amit K. Bhowmick, Manager, Ferry Operations, Ferry Transportation, The Port Authority of New York and New Jersey
Janet Cox, General Manager, Ferry Transportation, The Port Authority of New York and New Jersey
Tom Fox, President, New York Water Taxi
David Hopkins, Vice President, Maritime, NYC Economic Development Corporation
Robert E. Paaswell, Ph.D., Interim President, City College of New York
Phillip M. Plotch, Director of WTC Redevelopment and Special Projects, Lower Manhattan Development Corporation

Robert Miller, Vice President, Lower Manhattan Development Corporation
Alan Olmstead, Executive Director, Office of Private Ferries, NYC Department of Transportation
Bill Wheeler, Director of Planning, Metropolitan Transportation Authority
Adam Zaranko, Senior Project Manager, Maritime, NYC Economic Development Corporation
Jeff Zupan, Senior Fellow, Regional Plan Association

CHAPTER 1: FERRY SERVICE IN THE NEW YORK / NEW JERSEY REGION

To better understand why a system of publicly funded regional ferries has failed to take root, this chapter examines the New York-New Jersey ferry network and New York's own existing transportation infrastructure.

Ferry's have served and continue to serve a key segment of trips between New York and New Jersey. Prior to the development of New York's extensive network of bridges and tunnels connecting Manhattan to the US mainland in 1883, ferries were the only means of accessing Manhattan. In the 1980s, a network of commuter ferries was started to serve development on the New Jersey side of the Hudson.

While New York's existing transportation infrastructure and relatively high farebox recovery ratio (compared to other US cities) present challenges to expanding ferry service, new waterfront development and the MTA's long-term capacity issues make a case for exploring ferry's ability to decreasing commute times while adding transit capacity.

I. BACKGROUND

Prior to 1980s[5]

Prior to the construction of bridges and tunnels spanning the Hudson, Harlem and East Rivers, ferry's served an essential role in New York

As bridge and tunnel connections were built in the late 19th Century, ferry's dominance in transporting goods and passengers to and from Manhattan began to wane. While the completion of the Brooklyn and Williamsburg Bridge impacted ridership between Brooklyn and Manhattan, the overall number of vessels and gross tonnage of freight carried by ferry boats grew until 1910. This year marked the opening of Pennsylvania Station, a direct tunnel link from Manhattan to New Jersey. In 1967, the last ferry between Hoboken, NJ and Barkley Street (or Barclay Street, in Manhattan?) ceased operations.[6] For 19 years, the Staten Island Ferry was the only passenger ferry service in the New York region.

1980s – Present[7]

Three trends have influenced the current reemergence of ferry service. Since the 1980s, existing transportation networks began to experience peak hour congestion.

[5] Cudahy, Brian J., "Over and Back," Fordam Press University (New York) 2 NEEDS PUBLICATION YEAR
[6] Ibid
[7] This section derived from: Alan Olmstead, (Speech, The Future of Ferry's in New York Harbor, Transportation Research Forum – NY Chapter Luncheon, 3/4/10)

Road traffic had increased congestion for decades, but this phenomenon was new for mass transit. Congestion on the Port Authority Trans-Hudson (PATH) led the agency to study supplementing PATH with subsidized ferry service to avoid expanding rail platforms.

Second, changes in the global economy influenced land use patterns at the waterfront. Containerization of shipping goods led to less land intensive activities at the waterfront. At Port Imperial in Weehawken, New Jersey, Arthur Imperatore purchased a 350-acre parcel in Weehawken in the 1980s that was previously owned by the Penn Central Railroad[8]. To lure wealthy New Yorkers to his development, Mr. Imperatore began ferry service operating directly from his real estate holdings to Lower Manhattan and West 38th Street in Manhattan. A private bus service linked to the ferries on the Manhattan side allowed for a quick arrival at the end destination.

Finally, the third trend influencing a revival of passenger ferry service was the improvement of marine technology. Prior to such innovation, boats generally traveled from 12 to 14 knots, while starting in the 1980s many traveled up to 25 knots per hour. Increased speed shortens journey times for ferry passengers.

In response to these trends, the Koch Administration issued a policy framework for waterborne transportation in 1986. The framework stated that the City would support ferries as an alternate service mode by providing capital, but not as an operating subsidy. The City would also make piers available for use to private ferry operators. This framework allowed operators to charge premium rates for its services. This policy framework is largely intact at present.

Despite a lack of support for daily operations, ferry ridership (not including the Staten Island ferry) grew modestly every year between 1986, when ridership was 4,000 per day until July 2001, when ridership increased to 37,000 per day.[9]

Ferryboats served a critical role in the aftermath of September 11th, when the PATH Terminal at the World Trade Center was destroyed. Not only were ferries the only means to points west of Manhattan in the direct aftermath of the attacks, they became essential to maintaining access to Lower Manhattan in the months after the attacks.

Geography and Existing Transportation Infrastructure

New York is often referred to as a city of bridges and tunnels. While the vast majority of these bridges and tunnels connect Manhattan to the Bronx, Queens and Brooklyn, all but seven connect to New Jersey. Of the four rail tunnels that link to Manhattan, three are used for PATH and NJ Transit, and one is through Amtrak.

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[8] Gary Pierre-Pierre, "Traveling by Ferry, Once Common in New York Harbor, May be Again," *The New York Times*, 9/22/96 - is this available online?

Cars and buses access Manhattan from the Lincoln Tunnel, the Holland Tunnel or the George Washington Bridge.[10] Sources?

In contrast, the New York City Transit Authority alone operates 17 tunnels linking Manhattan to the Bronx, Queens and Manhattan across the East River.[11] Nine bridges and tunnels provide auto access to Manhattan from points north, south and east.[12] And two tunnels connect commuter rail service from Westchester and Long Island via the Metro-North Railroad and the Long Island Railroad.

Given the relative lack of trans-Hudson commute options relative to the East River, the development of private ferries as a means of transportation from New Jersey begins to make sense.

[10] Source: Port Authority of New York and New Jersey: http://www.panynj.gov/bridges-tunnels/
[11] Source: MTA Subway Map: http://mta.info/nyct/maps/submap.htm
[12] Source: NY.com, http://www.ny.com/transportation/crossings/

II. FERRY SERVICE IN NEW JERSEY AND STATEN ISLAND

Transportation Infrastructure

New Jersey Transit operates commuter rail service to Penn Station and Hoboken. From the site of the Hudson County ferries (Edgewater, Port Imperial, Lincoln Harbor), the nearest rail mass transit to Midtown is located at Secaucus Junction, two to seven miles away (in the wrong direction).[13] Rail service to Midtown is also available via PATH at Hoboken, which is 1.5 to nine miles away.[14] A number of buses provide service in the eastern Hudson County to Midtown.[15]

From the South Hoboken ferry terminal, the Port Authority Trans-Hudson (PATH) provides service to Manhattan along three routes. The first runs from Hoboken to Christopher Street at Hudson Street and then along 6th Avenue between 9th Street and 33rd Street in Manhattan. Two routes run from Hoboken or Jersey City directly to the World Trade Center.[16] Ferry service from Hoboken South is provided to the World Financial Center and Pier 11, but not to Midtown.

New Jersey Transit's North Jersey Coast Line connects residents of Monmouth County to New York Penn Station via a transfer at Hoboken. From Hoboken, those continuing to Lower Manhattan can take the PATH to the World Trade Center.[17]

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[13] Source: Google Earth
[14] Ibid.
[15] Source: NJ Transit, Bus, http://www.njtransit.com/sf/sf_servlet.srv?hdnPageAction=BusTo
[16] Source: The Next Train website, http://thenexttrain.com/static/PATH_system_map.png
[17] Map found through Google Search, http://newyorkcity2005.web.infoseek.co.jp/information/maps/images/maps/path-map.jpg, Accessed 5/01/2010

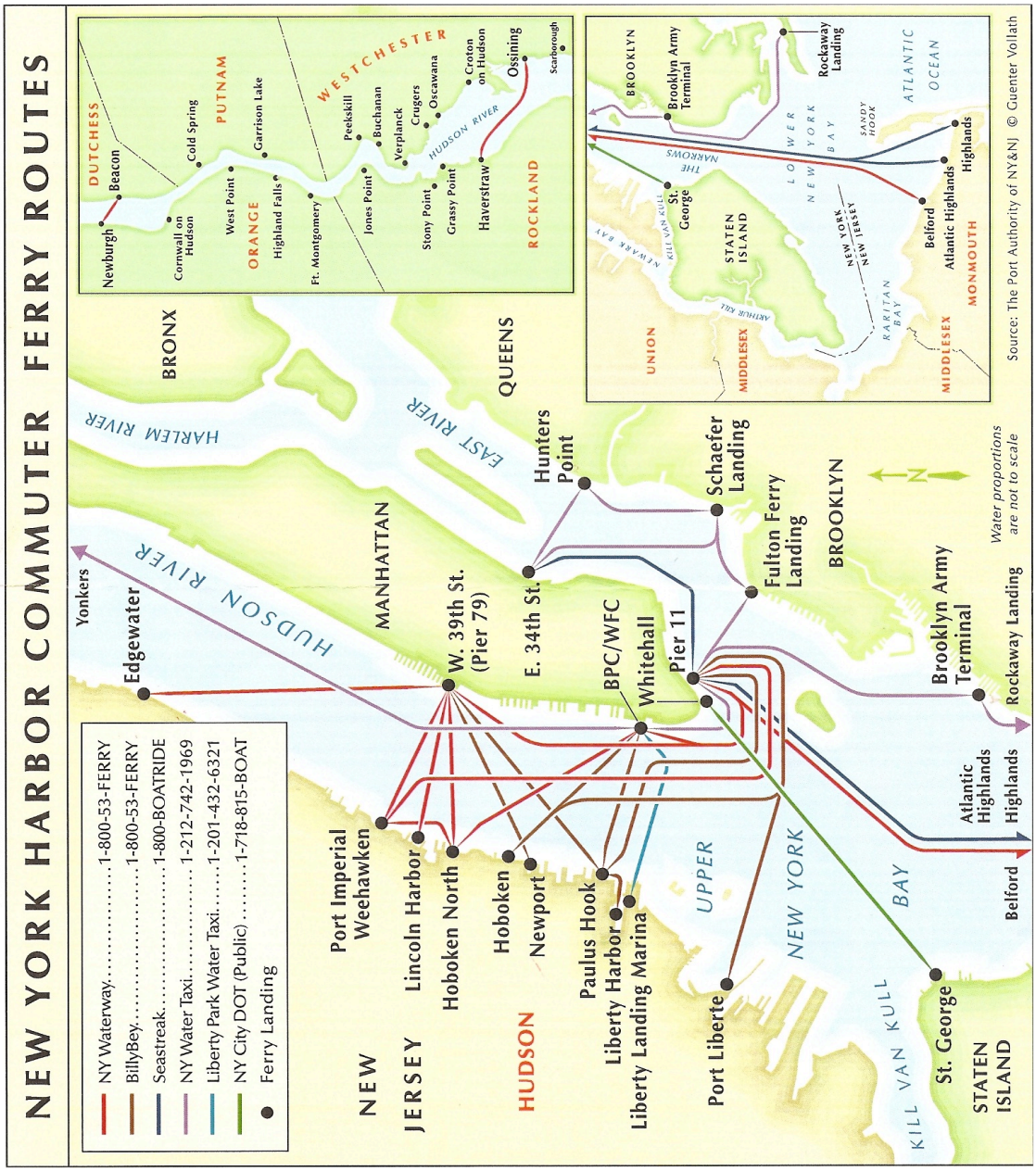

Figure 1: New York Commuter Ferries; Source: Port Authority of New York / New Jersey

New Jersey and New York Ferries[18]

In 2009, twenty-two privately operated ferry routes served 28,445 passengers in the New York/New Jersey region on an average weekday.

Sixteen of these routes, carrying an average of 27,253 passengers, served New Jersey residents traveling to Manhattan. Two routes operated as feeder-ferry services to Metro-North Hudson River stations from towns on the western side of the Hudson.

In New York City, private ferry service operated between the Rockaways in Queens and Lower Manhattan. In Westchester and Orange Counties, service operated between Yonkers/Haverstraw and Lower Manhattan.

Of the sixteen New Jersey ferry routes, thirteen originated in Hudson County (across from Manhattan) and three originated in Monmouth County. Most of these routes ran point-to-point service.

Ten of the thirteen Hudson County routes are destined for Lower Manhattan. Combined, they served 14,175 riders. Of these thirteen, seven stop at Pier 11, serving 10,112 residents. Three stop at the World Financial Center, serving 4,063 riders.

Six of the New Jersey ferries terminate at Pier 79 (West 39th Street), carrying 10,450 passengers on an average weekday.

Distance and Cost

Ten of the sixteen New Jersey routes are less than four miles long. Three are 4.5 to 7 miles long, and three are between nineteen and three/fourths of a mile to twenty-two miles long. Routes less than four miles charged passengers between $5.50 and $9.25 for a one-way fare; those between four and a half and seven miles charged $9.50 to $12 for a one-way fare; and those exceeding nineteen miles charged $20-$23 for a one-way fare.[19]

While the cost for trips increases with distance, the table on the next page shows that the costs per mile decreases as distance increases. The three routes from Monmouth County charge between $20-23 one-way, but this comes to just $1.01 and $0.89 per mile.[20] The routes with the shortest distance charge the most per mile. Paulus Hook to the World Financial Center is .8 miles. The fare is $5.50, or approximately $6.88 per mile.[21]

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[18] All data in this section derived from Port Authority of NY/NJ, *2009-2010 Weekday Ridership Statistics*, (excel spreadsheet)
[19] Ticket Price information obtained from NY Waterways Website, http://www.nywaterway.com/GetTickets.aspx, Accessed 5/2/10
[20] Derived by dividing the cost of the ticket by the number of miles in the trip route.
[21] Equation: .8*X = 5.50 → X= $6.88

Routes and Companies (2009)	Distance	Cost Per Mile, One-Way Ticket	Cost per Mile, Monthly Ticket
Billy Bei			
Hoboken South - Pier 11	4.0	1.6	1.3
Hoboken South - WFC	1.9	3.0	2.4
Port Liberte - Pier 11	4.0	2.3	2.0
Paulus Hook - Pier 11	3.6	2.4	2.0
Paulus Hook - WFC	0.8	6.9	5.7
Paulus Hook - Pier 79 (W 39th St.)	2.7	2.4	2.0
Liberty Harbor - WFC	1.5	3.3	2.8
Liberty Harbor - Pier 11	3.6	1.8	1.5
Newport - Pier 79 (W 39th St.)	3.2	2.2	1.4
Billy Bei, Average	**3.1**	**3.2**	**2.6**
NY Waterways			
Edgewater - Pier 79 (West 39th Street)	5.2	1.8	1.3
HB 14th St - Pier 79 (West 39th Street)	1.4	6.3	4.6
Weehawken - Pier 11	7.0	1.7	1.2
Weehawken - WFC	4.8	1.5	0.9
Weehawken - Pier 79 (West 39th Street)	1.4	6.2	3.3
Lincoln Harbor - Pier 79 (West 39th Street)	1.2	7.0	5.2
Belford Ferry - Pier 11	19.8	1.0	0.8
NY Waterways, Average	**5.8**	**3.6**	**2.5**
SeaStreak			
Highlands - Pier 11 - East 34th Street	25.7	0.9	0.6
Atlantic Highlands - Pier 11 - East 34th Street	25.7	0.9	0.6
Seastreak, Average	**25.7**	**0.9**	**0.6**

Table 1: Distance for Various NY/NJ Routes and Cost Per Mile;
Source: Google Earth (Distance), NY Waterway website (ticket price)
www.nywaterway.com/; Accessed 5/1/10

mile and Liberty Harbor to the World Financial Center is 1.5 miles and charges $3.33 per mile traveled.[22]

One notable feature of the New Jersey private ferries is the consistency of its ridership base, even through the winter months. As discussed earlier, this is primarily because people living there do not have easy access to rail. But, another reason may be that the vast majority of these terminals offer enclosed passenger waiting facilities – many of them with amenities. Thirteen of the New Jersey ferry terminals possess indoor waiting facilities, while one has a partially enclosed facility, and three do not have any enclosed facilities.[23]

As the table below demonstrates, thirteen of the fifteen New Jersey ferry routes experienced a 5-9% change in ridership over the course of 2009. Service was highest in the summer and lowest in the winter. Two ferry routes experienced 13-16% ridership swings over the course of a year. One of these routes began

Ferry Routes	Weather Protected Facilitiies?	Average Daily Ridership	Standard Deviation	Percent Standard Deviation
Hoboken - Pier 11	*Yes*	3751	147	4%
Hoboken - WFC	*Yes*	2172	198	9%
Paulus Hook - Pier 79 (West 39th St.)	*Yes*	418	54	13%
Paulus Hook - WFC	*Yes*	1343	117	9%
Port Liberte - Pier 11	*Yes*	501	31	6%
Liberty Harbor - Pier 11	*Partial*	787	57	7%
Paulus Hook - Pier 11	*Yes*	2487	216	9%
Weehawken - Pier 79 (West 39th St.)	*Yes*	5515	448	8%
Weehawken - Hobo N - WFC	*Yes*	548	30	5%
Hoboken North - Pier 79 (West 39th St.)	*Yes*	1703	117	7%
Weehawken - Pier 11	*Yes*	942	56	6%
Lincoln Harbor - Pier 79 (West 39th St.)	*No*	2105	180	9%
Edgewater - Pier 79 (West 39th St.)	*Yes*	470	43	9%
Belford - Pier 11	*Yes*	1644	96	6%
Haverstraw - Ossining	*No*	460	71	15%
Newburgh - Beacon	*No*	364	38	10%
Highlands-Pier 11, E34th St.	*Yes*	1647	305	18%
Atlantic Highlands-Pier 11, E34th St.	*No*	963	173	18%
Brooklyn Army Terminal - Pier 11	*Partial*	55	10	17%
Rockaway - Pier 11	*No*	97	44	46%
East River (Pier 11- Hunters Point, East 34th- Fulton Landing - Shaefer Landing)	*Partial*	151	43	29%
Haverstraw -Yonkers- BPC & Pier 11	*No*	83	13	16%

Table 2: Weather Protected Facilities and STD of Ridership;
Source: See List of Figures and Tables

[22] Ibid.

[23] The presence of outdoor facilities was determined using different methods. Most stations had pictures of the terminal facilities on the NY Waterways website (http://www.nywaterway.com/FerryTerminals.aspx) Accessed 5/2/10. For Highlands and Atlantic Highlands, information was obtained by calling the operator at NY Waterways.

operations from a terminal with indoor dock facilities, and one did not.

Headways

The fifteen New Jersey ferries operate at a range of headways. Some routes operate at twelve-minute headways, and some offer only one or two trips during the morning rush.[24]

Monmouth

These three ferries, which travel nineteen to twenty-two miles, operate the fewest trips during the AM rush. As of 2009-2010, Sea Streak service from the Atlantic Highlands operates April through the fall, with three trips in the morning rush.[25] New York Waterways service from Belford to Pier 11 operates once during the AM peak.[26]

Even with infrequent sailings, the Belford service averaged 1644 passengers per day and the Sea Streak routes averaged 1647 and 963 passengers per day.[27]

It should also be noted that ferry service to this part of Monmouth County has been on-again/off-again for a number of years.[28] Given the unreliability of the service and low-level of service over the years, the large ridership on these routes seems counterintuitive.

Hudson

Headway intervals for Hudson County ferries are much shorter than those from Monmouth. Most offer service to Manhattan at 10-20 minute intervals.[29] This is possible because journey times are shorter. The same boat can make multiple journeys across the river in one hour.

Even when considering this, it appears that most of the New Jersey routes are served by at most two vessels. This short distance allows for short headway intervals at a negligible cost to the operator. Of course, this also impacts the capital costs of running these ferries. Fewer boats are needed to provide frequent service compared to longer routes.

Also of interest is the relationship between short headway intervals and ridership. While one would expect increased headways to impact ridership, this does not

[24] Data compiled from NY Waterways website (http://www.nywaterway.com/Home.aspx) Accessed 5/2/10
[25] SeaStreak site (http://www.seastreak.com/) Accessed 5/2/10
[26] NY Waterways site (http://www.nywaterway.com/Home.aspx) Accessed 5/2/10
[27] Port Authority of NY/NJ, *2009-2010 Weekday Ridership Statistics*
[28] For example, service from South Amboy, a nearby town, operated from 2001-2006 (Cambridge Systematics, *South Amboy Ferry Research Study* March 2007) (1-1)
[29] Data compiled from NY Waterways site (http://www.nywaterway.com/Home.aspx) Accessed 5/2/10

appear to have the effect that has been attributed to the failures of the services to the Rockaways and Yonkers.

A number of ferry routes with short headway intervals times have low average ridership compared to the Monmouth County ferries. Paulus Hook to West 39th Streets operates at 30 minutes headways in the morning rush but has an average daily ridership of 418. Port Liberte to Pier 11 operates at 40-minute headways (6 trips in the AM rush), and averages 501 passengers on a daily basis. In comparison, the Monmouth County ferries offer 1-3 trips in the AM rush and average 1418 riders per day.[30] This suggests that, while a factor in ridership, frequent headway does not determine a ferry route's success. In the case of Monmouth County, the lack of convenient transportation options to Lower Manhattan means that a large percent of those working in Lower Manhattan will schedule their day around making the one ferry trip. Thus, we can see that populations might be more willing to take inflexible transit options if it is the only option available.

[30] Source: PA NY/NJ Ridership Statistics and NY Waterways Schedule Information

Ridership Profiles

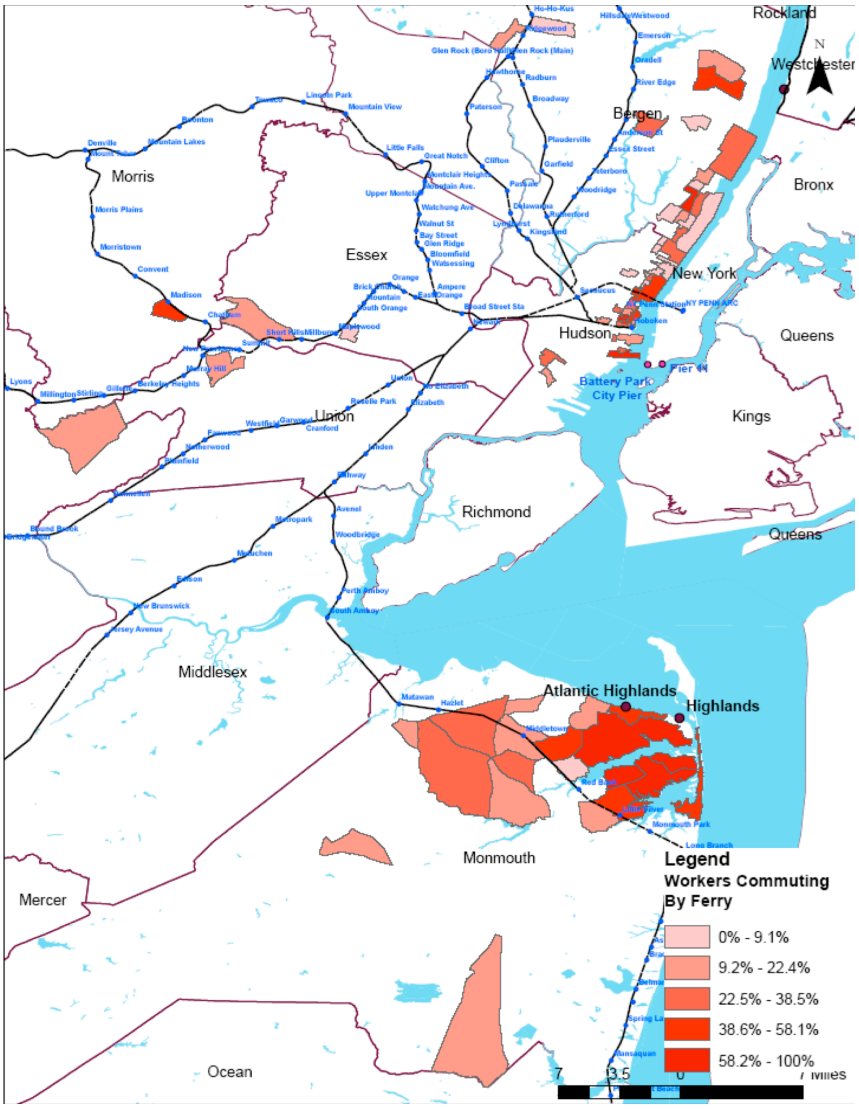

Figure 2: Workers Commuting by Ferry in Select Census Block Groups; Source: Louis Berger Group

While the number of actual ferry riders between New Jersey and Manhattan appears small by New York standards, a study by the Louis Berger Group indicates that ferry commuting has come to dominate the Manhattan-bound commuter market in many parts of Hudson and Bergen Counties.

As we can see in Figure 2, in certain New Jersey census tracks, over 58% of all Manhattan bound commuters take the ferry to work. Qualify this statistic by saying it's a small population. In Monmouth County, 43% of this population takes the ferry to work.[31] These people pay $510 per month; trip times are 82 minutes. [32]

In the selected Hudson/Bergen Counties, 30% of the Manhattan bound market takes ferries to work, paying $134 per month. Door-to door journey times are thirty-eight minutes.[33]

Of course, the overall number of people taking the ferry compared to the working population of Monmouth County is still small. According to the US Census, 236, 746 were employed in Monmouth County in 2007.[34] 58% of the people living in these census tracts commuting to Manhattan take the ferry, but according to Port Authority ridership estimates, the total combined ridership from Monmouth County Routes is 2,610.[35] Even given the apples to oranges nature of these statistics, we can see that the number of workers commuting by ferries is a relatively small percent of the overall population.

A survey of ferry riders on a now cancelled ferry service from Monmouth County showed that ferry riders in Monmouth are wealthier than those commuting by New Jersey Transit. Ferry passengers were three times more likely to earn over $200,000 annually than those riding NJ Transit.[36] While 37% the NJ Transit customers viewed the Monmouth ferry as a valid alternative for their commute, they chose to take the less expensive transit option. [37]

Funding

The New York/New Jersey system is practically the only ferry service in North America that is both privately owned and operated. With the exception of capital funding for city owned docks and a couple of pilot routes, ferry operators receive no financial support from taxpayers. While privately owned/operated systems were prevalent in the US prior to 1950, the proliferation of US spending on highways and bridges in the period since World War II decimated the market for private ferry operations. [38]

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[31] The Louis Berger Group, "Ridership and Revenue Analysis for a Proposed Ferry Service to Lower Manhattan," Submitted to the Lower Manhattan Development Corporation (June 2006) 8

[32] In contrast, Those taking the train from Monmouth County represent 31% of the total population. They pay $260 per month and experience 82 minute total trip times (including waiting, walking, etc.) 14% of Manhattan-bound commuters in Monmouth drive to work. They pay up to $874 and experience 71-minute travel times. What is the source of this information?

[33] PATH service captures 52% of the market, costs an average of $93/month, and offers 33 minute travel times. Auto travel captures 7% of the market, costs an average of $592, and offers 44 minute travel times.

[34] Source: US Census, Quick facts website (http://quickfacts.census.gov/qfd/states/34/34025.html)

[35] Source: PA NY/NJ Ridership Statistics

[36] Cambridge Systematics, "South Amboy Ferry Research Study," Prepared for the New Jersey Transit Corporation, (March 2007) Chapter 3, 4-5

[37] Ibid.

[38] Port Authority of NY/NJ, "Interagency Study of Regional Private Passenger Ferry Services in the New York Metropolitan Area," 11

While New York hasn't established funding mechanisms to support ferries, it has invested over $350 Million on capital improvements for docking facilities in Hoboken and Edgewater in New Jersey, the World Financial Center, at locations on the East River, Yonkers, and on Staten Island since the 1980s.[39]

Takeaways

The large network of ferry service between New Jersey serves two distinct New Jersey markets. The Hudson/Bergen County ferries supported the development of the New Jersey side of the Hudson River by providing a quick, premium commute option to Manhattan. While convenient access to rail exists, such as the Hoboken South terminal, the ferry routes serve locations not served by rail. This suggests that the demand for ferry service is less compelling in locations where rail is easily accessible.

In contrast, the Monmouth County ferries developed to serve an existing population that is geographically *closer to Manhattan* by sea compared to land or rail. Even with fewer runs and high ticket prices, there is a strong demand and ridership is high.

The Hudson/Bergen ferries demonstrate the advantages of ferries that *travel short distances*. First, they allow for frequent headways. Furthermore, short distances translate into less fuel expended per passenger. As we will see, fuel costs can make up 30-40% of a ferries expenses – so minimizing this expense is key to developing an affordable system.

[39] Jeffrey Zupan, "Paper on NY Regional Ferry Service," Regional Plan Association (November 2006.)

Staten Island Ferry

The Staten Island Ferry is a passenger ferry service operating between Whitehall Street in Lower Manhattan and St. Georges in Staten Island. The ferry is run by the New York City Department of Transportation. It serves 65,000 people on an average weekday.[40]

Since 1997, the ferry has operated without a fare. Prior to 1997, the fare was 50 cents one-way. New York City Department of Transportation operates 2 municipal lots at the ferry terminal and charges $5.50 to park per day, $5 with a muni-meter parking card or $300 for ¼ a year.[41]

Vessels make trips twenty-four hours a day. Headway intervals are fifteen minutes during the AM and PM peak periods, thirty minutes during non-peak periods, and sixty minutes between 1AM and 5AM. It takes twenty-five minutes to travel the 5.2 miles between St. George and Whitehall Street.

There are eight ferry boats. Two vessels carry 6,000 people, three carry 4,400 people, one carries 3,500 people and two carry 1,280 people.

New ferry terminals at St. Georges and Whitehall Street were opened in 2005. The MTA spent $530 Million to improve operations to the South Ferry 1 Train Station, which is adjacent to the ferry. This project was completed in 2009.[42]

Similarly to the ferries crossing the Puget Sound in Washington State today, the Staten Island ferry exists because a bridge was never built to connect it to the central business district in Manhattan. Although a long distance from each other, a bridge connecting to the two landmasses would be only slightly longer than the 4.5 mile San Francisco Bay Bridge.

The scale of the Staten Island ferry's operations is much larger than any new potential route in the New York region. The ferry will be able to operate at a much lower cost per person simply because of the sheer volume of passengers served. As a result, the Staten Island ferry does not provide relevant insight to draw upon when identifying reasons for expanded ferry services failure or how to expand on the existing network of ferries.

[40] Source: Wikipedia
[41] Ibid.
[42] Ibid.

III. ARGUMENTS TO EXPAND FERRY SERVICE IN NEW YORK

The region's long average commute times, existing and projected transit capacity and the city's long-term growth aspirations all make a strong case for expanding ferry service in the New York region.

Long Commute Times

New York City alone is home to the top four counties with the longest commutes in the nation. Residents of Richmond, Kings, Queens and the Bronx Counties experience average commute time of 44.1, 42.5, 41, and 40 minutes, respectively. Although residents of Manhattan enjoy faster commute times than these counties, their commutes are still the 33rd longest in the US.[43] The City's suburbs also perform poorly on this measure: Nassau and Westchester have the 8th and 9th longest commuting times in the US, Monmouth in New Jersey has the 11th, Suffolk the 12th, Hudson County, New Jersey and Orange are tied for the the 18th, and Orange County is the 22nd.[44]

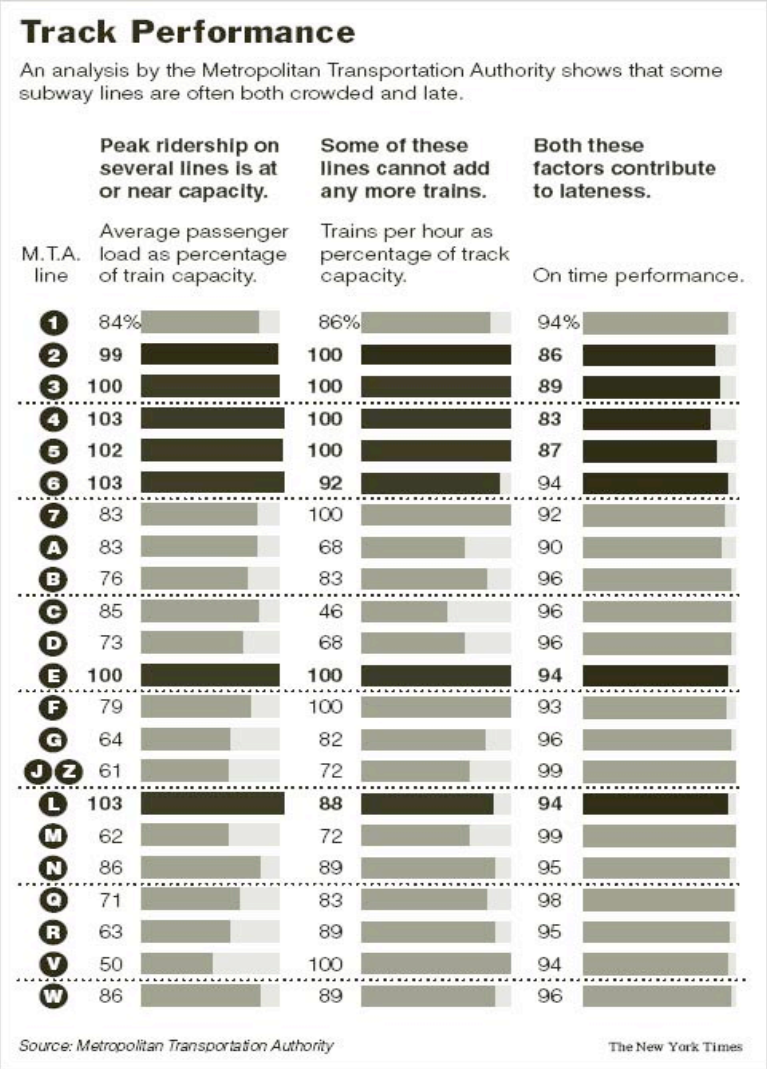

Figure 3: Subway Line Performance by Subway Line. Source: *The New York Times* (June 26, 2007)

If New York wishes to retain and grow its population, it will need to reduce average commute times to work. While this will largely be done through rail capital projects and possibly transportation demand strategies, increased ferry service could serve a role in reducing travel times for some commuters.

Existing Transit at Capacity

[43] American Community Survey, Journey to Work, County Level (2000)
[44] Ibid.

Even with 23 subway lines, 17 subway crossings between the outer boroughs and Manhattan, 2 commuters rail lines and numerous bus routes serving its residents, many parts of the MTA's system is currently at capacity – and ridership is only expected to grow in the next two decades.

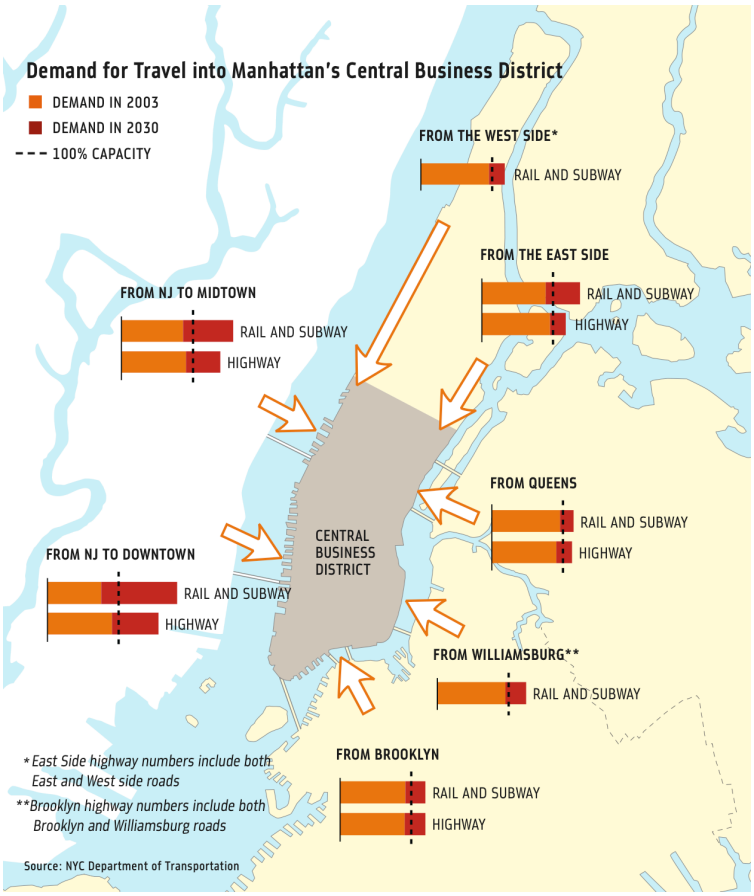

Figure 4: Demand for Travel into Manhattan's CBD; Source: New York City PlaNYC 2030

A 2007 analysis by the Metropolitan Transportation Authority found that the vast majority of existing subway service was at 80-100% capacity, and that four (3,4,5, E) trains were already operating at peak capacity.[45] Without increased service capacity, the City will not be able to transport the million extra people it expects to live in the city by 2030.

While most of these people will likely be transported by rail or bus, it is unclear that even planned network expansions will be sufficient to meet future demands. For example, the MTA's Environmental Impact Statement for the Second Avenue Subway shows
that the first segment of the subway (96th to 63rd Street) will not significantly reduce the capacity problems on the Lexington Avenue line.[46]

The impacts of adding one million new people to the City will further increase the strains on our transportation system. The Bloomberg Administration has estimated that 750,000 new people will commute to the Manhattan Central Business District by 2030.[47] The picture to the right shows where these new commuters will be traveling from. Interestingly, while a significant portion of new commuters are expected to commute from the Bronx, Queens, and Brooklyn, PlanNYC's major

[45] William Neuman, "Some Subways Found Packed Past Capacity," *The New York Times*, (June 26, 2007) Accessed 4/5/10
[46] MTA, Second Avenue Subway Environmental Impact Statement, Chapter 5B, (May, 2004) 20; The full capacity benefits of the new subway line will not be experienced until completion of the entire Second Avenue subway from 125th Street to Hanover Sqaure. At this point, the Southbound 4,5 trains will operate at 80% capacity below 86th Street and 94% capacity below Grand Central Terminal.
[47] "PlaNYC: A Greener, Greater New York," *Introduction* New York City (3)

solution to these constraints is adding Bus Rapid Transit routes and increasing opportunities to commute via NYC stations on the Metro-North and Long Island Railroad.

As mentioned earlier, while the vast majority new transit capacity will need to come from investments in new rail and bus, the demand for new transit capacity in future years is so great that adding new ferry service into the mix should be considered.

New Waterfront Housing and Commercial Office Capacity

Mayor Bloomberg's time in office has been marked by a number of rezoning changes – many of which are on or near the waterfront.

As discussed earlier in this Chapter, the changing US economy has led to dramatic changes in land use at the waterfront. As a result, a number of the rezonings have occurred. These include: Williamsburg/Greenpoint, Coney Island, the Hudson Yards, the Highline district, the Con Edison Waterside site, Saint George and the Stapleton Waterfront in Staten Island, Hunter's Point, the South Bronx, and the Gowanus Canal.[48] In addition, new housing has recently come online or is expected to be built on the waterfront at Riverside South and Queens West.

All together, the rezoning changes under Mayor Bloomberg has allowed for 98 Million Square Feet of new residential capacity as of 2007, of which 5.8 Billion square feet has been developed since 2003.[49]

Developing ferry services that link new waterfront developments to jobs in Manhattan could be an effective long-term strategy to attract and retain residents by providing them with premium transportation options. Such a plan could be justified as an economic investment strategy to retain high income, highly skilled workers by providing them with an urban alternative to the conveniences of the suburbs. The idea of employing a waterfront development strategy to building new ferry services will be discussed in greater detail later in this report.

[48] NYC Department of City Planning, "Celebrating 100 Rezonings," http://nyc.gov/html/dcp/html/rezonings/index.shtml Accessed 5/5/10

[49] NYU The Furman Center, "How Have Recent Rezonings Affected New York City's Ability to Grow?" New York Univeristy (March 2010) 8

IV. KEY ISSUES IMPACTING REGIONAL FERRY EXPANSION

Farebox Recovery

Planners refer to a system's "farebox recovery ratio" as the percent of a ride's cost captured by the fare charged to the commuter. The rate of farebox recovery for ferry systems in other cities will be discussed in subsequent chapters.

The New York City farebox recovery ratio is the highest in the United States. Transportation advocates often refer to it as the "fare burden." New York City subways and buses revenues account for 55% of New York City Transit's operating expenses.[50] This rate is much higher than most US cities.

The top 50 cities in the US have an average fare burden of 37%, and many cities with large transit dependent populations have much lower fare burdens. For example, Chicago's fare burden is 43%, Boston's is 29%, NJ Transit is 37% and Washington DC is 40%.[51]

As the New Jersey ferry systems are 100% private, fares cover 100% of the cost of operation. They are "public" only in the sense that they use publicly owned and maintained docking facilities, which have sometimes been enhanced with funding from public entities.

Public Transit Financing Issues

The Metropolitan Transportation Authority has experienced ongoing financial difficulty in recent years. Current estimates project a $751 Million operating deficit for the current budget year and continued deficits in future operating budgets.[52] In addition, the MTA's 2010-2014 Capital Budget is $10 Billion of its projected need.[53]

Because of the significant needs on New York's existing transportation infrastructure, new ferry services are seen by many as another piece, and a potentially less deserving piece, of the pie of transportation capital projects. Included in this list is the Second Avenue Subway, East Side Access to Midtown Manhattan, and the ongoing replacement maintenance and replacement of existing infrastructure.[54]

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[50] NYPIRG Straphanger's Campaign, "MTA Hearings: Points You Can Make," New York (http://www.straphangers.org/farehike08/pointstomake.html)
[51] Source: National Transit Database, Federal Transit Administration, Accessed 5/5/10
[52] Christopher Jones, "Testimony of Christopher Jones before the Metropolitan Transportation Authority Hearing on Proposed Service Changes, Student Fares, and Crossing Charges," Regional Plan Association (March 2010)
[53] Ibid.
[54] Source: Interview with Jeff Zupan, March 2, 2010; Interview with Buzz Paaswell, March 19, 2010

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It's important to note that New York City has a relatively thriving system of ferries serving the Central Business Districts of Midtown and Lower Manhattan. The combined ridership of New Jersey's private ferries with Staten Island Ferry is over 85,000 passengers per day, far exceeding in sheer numbers the passengers served per day in any other city.

Other than the Staten Island service, the specific nature of New York's ferry network is more limited in terms of the markets it serves. New Jersey's ferries serve wealthy outer suburbs and new waterfront development. The Staten Island ferry serves as the only direct link between Staten Island and Manhattan. Given the relative abundance of subway and highway connections to Manhattan from the other four boroughs, one can see how ferries would have a hard time competing for limited public resources.

CHAPTER 2: FERRY SYSTEMS IN OTHER US CITIES

What quickly becomes apparent when researching the systems of other cities is that the scale of a ferry system as proposed by Speaker Quinn in 2007 has not been achieved anywhere in the US. While a number of other cities have developed ferry routes for commuters, no one system is sufficiently comprehensive so as to provide a model for how a city such as New York should proceed with developing a network of urban commuter ferries.

San Francisco offers the closest example of a city that has developed a regional ferry system akin to the vision articulated by Speaker Quinn. While this California City provides a number of lessons about creating political momentum for, and developing a regional ferry system, it has begun operations just recently and any judgments about its successes or failures are premature at this time.

A primary takeaway is that New York does not have similar conditions to the three cities analyzed in this section of the paper. Unlike San Francisco and Seattle, New York generally has excellent transportation options to transport commuters to the central business district (CBD) across a body of water. Given Boston's limited network and the lack of publicly available information on its origins, this network does not provide much useful information on which to base a New York City system. To illustrate, Seattle developed ferry systems instead of constructing bridges across the Puget Sound while New York has several bridges and tunnels connecting Manhattan to surrounding residential neighborhoods.

SAN FRANCISCO

Existing Transportation Network

San Francisco is located on a 7.5 mile wide peninsula between the San Francisco Bay and the Pacific Ocean. It is connected to Oakland in Alameda County by the San Francisco Bay Bridge, a four and a half mile span of bridges and tunnels. The Golden Gate Bridge connects San Francisco to Marin County to its north. [55]

Mass transit service is available through the Bay Area Rapid Transit (BART). Five routes connect San Francisco across the Bay to Alameda and Contra Costa County.[56] BART's farebox recovery rate is 53%.[57]

Figure 5: BART System Map; Source: Bay Area Rapid Transit; Source BART http://www.bart.gov/

[55] Source: Wikipedia, Accessed 5/5/10
[56] Ibid.
[57] Source: National Transit Database, Federal Transit Administration, Accessed 5/5/10

The San Francisco Municipal Railway (MUNI) operates 80 routes within San Francisco proper. A variety of vehicles serve MUNI, including light rail, buses and the iconic streetcars.[58]

The Bay Area is the 6th largest metropolitan region in the United States, with a total population of 7.3 Million.[59] Given the area's large population and the few bridge or tunnel connections to the City itself, the case for a robust ferry system is compelling.

Alameda County[60]

Commuter ferry service from Alameda County to San Francisco began in the late 1960s. The City of Tiburon contracted the Blue and Gold Fleet to operate unsubsidized service to San Francisco.

In the 1980s, the City of Alameda contracted service to operate two ferry routes to San Francisco following the Loma Prieta earthquake of 1989. Service continued after the earthquake clean up. In 1992, Alameda contracted Blue and Gold to take over the service. Blue and Gold would operate service with 2 vessels purchased by Alameda.

A second Alameda route began as mitigation for a harbor residential development in 1992. The City purchased a vessel for its operator, Harbor Bay Maritime. While the developer provided service for six years, the City took responsibility for the service after 1998.

Private ferry service between the City of Vallejo and San Francisco began in 1986 by the Red and White Fleet. After one year, the operator tried to cancel operations due to poor finances. Vallejo took over the service, and purchased a high-speed catamaran in 1994. While the circumstances of the takeover are unknown, one could speculate that the significant ridership of the route resulted in political pressure for the City to continue service. The service contract was later awarded to

	Peak AM Trips	Headway, Peak AM (minutes)	Daily Ridership	Travel Time
Alameda/Oakland	4	55	1700	20
Alameda Harbor Bay	3	60	500	25
Vallejo	5	30-60	2300	65
Larkspur (Mendocine)	3	70-110	Unknown	30

Table 3: Characteristics for Selected San Francisco Ferry Routes;
Source: Various Websites (See Appendix)

[58] Source: SF MUNI site (http://www.sfmta.com/cms/home/sfmta.php) Accessed 5/2/10
[59] Source: Wikipedia, Accessed 5/2/10

the Blue and Gold Fleet. Vallejo has since purchased three more vessels for the use of the Blue and Gold fleet.

Marin County[61]

The Golden Gate Bridge and Highway District was established as a special district in 1921 to operate and maintain the Golden Gate Bridge and operate bus service between Marin, Sonoma and San Francisco Counties. In the 1970s, the district began two ferry services between Sausalito and Larkspur to San Francisco. Unlike the contract models of Alameda County, service is provided directly by the Golden Gate Bridge and Highway District.

Operations[62] -

Ferry service throughout the Bay area operates at headway intervals of 30 to 110 minutes.[63] Even with the relatively long headway intervals and a handful of scheduled AM peak trips to the San Francisco Ferry building, ridership remains relatively high.

Trip routes are generally short, although not quite as short as many of the NJ to Manhattan routes. Alameda/Oakland to San Francisco is the shortest, at five miles. The trip to Vallejo, at twenty-four nautical miles, is the longest route. Journey times to San Francisco are between twenty to thirty minutes, and 65 minutes from Vallejo.

The distance in nautical miles to San Francisco from Alameda Harbor is 8 miles, from Berkeley is 7 miles, Larkspur is 12.6 miles and Sausalito is 7 miles. Planned service to South San Francisco will be 12 miles.

Most one way tickets cost between six and eight dollars. For Vallejo, a one-way ticket costs $13. Packs of 40-tickets range from $170-185 for the Alameda ferries, to $280 for Tiburon and $290 for Vallejo. The Golden Gate ferries (Sausalito, Larkspur) significantly discount rates for those who sign up for a monthly discount card (Translink). Passengers with these cards pay $4.20-$4.90 for a one-way ticket, which results in a 40-ticket cost of $168-190.

The fleet is composed of high-speed catamarans, which carry 150 to 400 passengers and monohulls. These vessels carry 700 passengers. They run on bio-diesel low-sulfur fuel and travel at 25 knots per hour.

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[60] Summarized from PA NY/NJ "Interagency Study of Regional Private Ferry Services in the New York Metropolitan Area Study," 13-15

[61] Ibid

[62] Schedule and fare information compiled from various websites. Alameda and Oakland ferry's from http://www.eastbayferry.com/; Larkspur from http://www.goldengateferry.org/; Sausalito and Tiburon from http://www.blueandgoldfleet.com/; Vallejo from http://www.baylinkferry.com/; Accessed 4/15/10

[63]

	Daily Ridership	Route Distance (Miles)	Average Projected AM/PM Boat Occupancy	Expected Farebox Recovery
Alameda/Oakland	1700	5	33 - 41 %	42%
Alameda Harbor Bay	500	8	33 - 56%	57%
Vallejo	2300	24	64%	45%
South San Francisco	600	Unknown	60%	30%
Berkely	1130	Unknown	52%	29%

Table 4: Ridership Characteristics for Planned WETA Ferry Routes;
Sources: Various (See Appendix)

The table above shows the expected ridership, peak load and farebox recovery ratios for the five routes that will be operated by the Water Emergency Transportation Authority. The table shows that all of the ferry routes are expected to operate at less than full capacity. They are also expected to operate at low farebox recovery ratios, which means that they will be heavily subsidized by the public.

Managing Organization[64]

The establishment of the Water Emergency Transportation Authority and planned expansion of the existing routes provides useful guidance for cities looking to expand passenger ferry operations.

In 1999, the California state legislature created the Water Transportation Authority to plan a regional ferry service in the Bay area. At the time of its creation, all of the ferry services described above were in place. WTA identified seven new ferry routes for implementation (of 22 routes studied) in its "Final Implementation and Operations Plan." This plan outlined new service routes, and capital projects such as new vessels and terminals. It was published in 2003.

The WTA then began collaborating with civic groups and policymakers to identify and implement a funding mechanism. California voters approved a Regional Measure in March 2004. This Measure increased bridge tolls by $1 and raised the sales tax in the counties served by the service.

The Water Emergency Transportation Authority (WETA) was created in 2008, after the California legislature dissolved the Water Transportation Authority. WETA is now charged with consolidating control of all existing ferry services, budgeting and capital infrastructure. In addition, WETA was authorized to coordinate waterborne emergency services.

[64] Port Authority of NY/NJ, "Interagency Study of Regional Private Passenger Ferry Services in the New York Metropolitan Area,"

WETA's Final Implementation and Operations Plan called for new service between South San Francisco and San Francisco in January 2010, and service between Berkeley and Mission Bay beginning in 2011.

Identifying and Targeting a Market

During the planning and development of new ferry lines, a detailed Marketing Plan was developed by Cambridge Systematics for the WTA. This plan identified target ferry markets, developed new routes based on these markets, and developed an implementation plan.

The Marketing Plan has two components, the *Mode Choice Model* and the *Final Marketing Plan*. The *Mode Choice Model* is a complicated, sophisticated-looking description of how the target market was identified. The *Final Marketing Plan* is a description of the market for ferry routes in the Bay area. It proposes tactics to market the service to the public.

According to the *Final Marketing Plan,* the target ferry rider is a working trans-bay commuter "currently using an automobile to cross the Bay… The market is equally women and men with incomes high enough to afford fares considerably higher than bridge tolls and other transit options."[65] The target market is not current BART commuters.[66]

Because commuters from Alameda County have access to an equally fast and inexpensive commute via BART but have chosen to drive to work, the *Final Marketing Plan* advises WTA to message the quality of life and convenience options that ferry service will provide passengers.

In Marin County, where residents do not have access to quick mass transit, the *Final Marketing Plan* recommends messaging the time savings aspects of ferry transportation compared to driving.

Communication to the identified market was planned to last over three years. Phase I focused on building demand by: [67]

- Creating a system identify.
- Capitalizing on the strength of existing ferry systems.
- Messaging the unique personal benefits of using the ferry system.
- Advocacy advertising presenting the WTA's position on key issues.

Phase II built demand prior to the system's launch using the following tactics: [68]

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[65] Water Transit Authority, "Water Transit Authority Marketing Plan," Submitted by Johnson | Ukropina, (May 2005) 1
[66] Ibid 9
[67] Ibid 9
[68] Ibid 10

- Strong public relations program to introduce expanded ferry service to the media, opinion leaders, prospective patrons and the public.
- A targeted publicity campaign.
- Demonstrations and tours for the media and VIPs.
- Grand opening kickoff celebrations.
- Placement of paid media support.
- Use sales promotion and alliances to spike sales with specific targets.
- Terminal signage, boat decaling.

After the launch of a new line, WTA is to focus on meeting and exceeding ridership projections. Ridership projections will be measured against actual ridership, and promotions will be adjusted accordingly.[69]

WTA has invested significant time and resources to identify and reach its target market. This in itself seems unusual and innovative for a public agency. Of course, the proof will be in the pudding. The first new service to South San Francisco will begin operations this year and will provide insights into the strengths and weaknesses of the Marketing Plan.

Takeaways

A quick glance at San Francisco's transit system puts the development of regional ferry service in context. Unlike New York, San Francisco has few connections between its Central Business District and the residential neighborhoods where most of these workers reside. Even with infrequent sailings, if the ferry is the only option for commuters to get to work without a car, there will significant demand for ferries.

The lack of transit connections between the CBD and residential neighborhoods allows the service to attract significant ridership even with long headway intervals. While New Yorkers are accustomed to low headway intervals, it is possible to build a ridership base at intervals of up to 60 minutes. This was also seen in the private New Jersey service from Monmouth to Manhattan.

It might be argued that the lack of transit options in San Francisco allow policy makers more latitude to fund transit with low farebox recovery ratios compared to New York City. San Francisco's ferry system is expected to mainly draw from former drivers and will also produce ancillary security benefits. This may explain policy maker's willingess to accept a low farebox recovery ratio.

[69] Ibid 11

In addition, unlike New York, San Francisco developed new routes after careful study and research. As shown in Chapter 4, San Francisco's approach was a much more comprehensive than recently planned routes in the Rockaways and Yonkers. While its yet not possible to know if this will result in more accurate ridership predictions, it has been cited as an asset when WTA asked voters to increase bridge tolls in 2004.[70]

The creation of the Water Transportation Authority in 1999 laid the groundwork for the extensive system planned for today. WTA analyzed market conditions, identified new routes, and developed a strategy to convince the public to support new bridge tolls. As we will see, this is in contrast to the experience of New York, which chose which routes to implement first, and later commissioned studies to study potential ridership.

As we can see, the San Francisco Case Study offers a number of lessons as to why publicly funded ferry service has not succeeded.

[70] Port Authority of NY/NJ, "Interagency Study of Regional Private Passenger Ferry Services in the New York Metropolitan Area," 4

BOSTON

Boston's ferry system is limited both in terms of the scope of its routes and the number of passengers it serves. This is peculiar, as Boston has fully integrated the ferry with its existing transit system and offers frequent sailings at a relatively low cost.

An important lesson for New York is that even a perfect ferry system may have a hard time competing with rail. All of the stations in Boston are near a commuter rail line. And the commuter rail transports passengers to downtown Boston, while the ferry system transports passengers to Rowes Wharf, just outside the Central Business District neighborhood.

Existing Transportation Network

The City of Boston is located on a peninsula on the Atlantic Ocean. It is surrounded by water to its east (outer Boston Harbor), west (Charles River) and north (inner-Boston Harbor). Only to the south, The city abuts with adjacent cities.

The Massachusetts Bay Transportation Authority (MBTA) operates public transit services in Boston. Five fixed rail subway lines operate services that run to the center of the city in a spoke and hub distribution. Commuter rail systems provide regional service to the eastern third of the state. Commuter rail stations are located within the same towns as all of the towns with ferry service.[71]

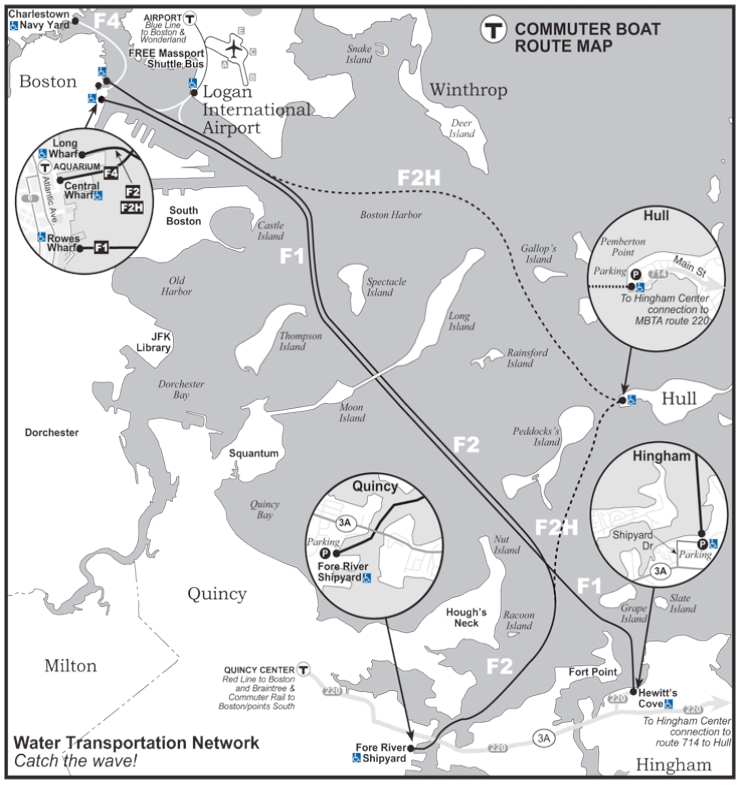

Figure 6: Boston Ferry Routes;
Source: Massachusetts Bay Transportation Authority

Extensive bus service is also provided throughout the city.[72] The MBTA's farebox recovery ratio in 2008 was 35%.[73]

Eleven automobile bridges

[71] Source: MBTA Wesite: http://www.mbta.com/schedules_and_maps/rail/; Accessed 5/27/10
[72] Information on available public transit from Massachusetts Bay Transportation Authority (http://www.mbta.com/) Accessed 4/16/10
[73] Source: National Transportation Database Website, Accessed 4/16/10

and tunnels connect Boston to neighboring cities to its north across the Charles River and the Boston Harbor.[74]

Background

Ferry service between Hingham and Quincy began in 1984 to mitigate traffic congestion while Massachusetts constructed the Southeast Expressway (I-93/ MA 3 / US -1).[75]

Operations[76]

Ferry service in Boston connects the south Boston suburbs of Quincy, Hingham and Hull to Long Wharf, Central Wharf or Rowes Wharf in Boston. The Boston Wharfs are all located within a short distance of each other. Service to Logan Airport with a connecting shuttle bus is available for Quincy and Hull passengers on selected sailings

In addition, inner harbor service connects the nearby Boston neighborhood of Charlestown to Central Wharf.

Long Warf and Central Warf are adjacent to the Blue Line subway. Rowes Wharf is a short walk to the Blue line (1/5 mile.)

Service from Hingham operates at headway intervals of 15-30 minutes, with a total of nine sailings during the AM peak. The 10-mile trip takes 35 minutes to reach Rowe's Wharf. Passengers pay $6 for a one-way fare, and $198 for a monthly pass. As is the case with all other monthly passes, fares are integrated with the MBTA system. This allows passengers to connect with a bus or train to reach their final destination.

Ferry vessels depart Quincy's Fore River Shipyard at headway intervals of twenty to thirty minutes. There are eight sailings during the AM peak. The nautical distance is 10.8-miles. Passengers reach Boston in 37 minutes. One-way fares are $6 per ride; monthly multi-MBTA mode passes cost $198.

Hull's ferry service operates at 50-70 minute headway intervals, with four departures during the AM peak. At a distance of 8.5 miles, passengers arrive in Boston in twenty minutes. A one-way ticket costs $6 and a monthly MBTA combined pass costs $198.

Service from the Charlestown Navy Yard operates at 15-minute headway intervals during the AM Peak (twelve sailings during this time.) The trip distance is one mile.

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[74] Source: Google Maps
[75] Elizabeth Ross, "Fed Up Drivers Switch to Ferries" *The Christian Science Monitor*, Boston, MA (11/20/1990)
[76] Data on headways, fares and connections compiled from MBTA Boats website (http://www.mbta.com/schedules_and_maps/boats/) Accessed 4/16/10

Passengers reach Boston in 10 minutes. Fares are the same as for the buses and subways. One-way fares are $1.70, and monthly fares are $59.

These routes accommodate 4,211 passengers on a daily basis. Of these, 3,403 take the Hingham, Quincy and Hull ferries and 808 take the Charlestown service.[77] Farebox revenues capture 50% of the cost of operating service.[78]

Operating Organization

The MBTA contracts private companies to provide ferry services. According to the Port Authorities Interagency Study on Ferry Service, this operating scenario results in contractors either charging a large rate upfront for a short period of time or requiring a long contract to cover the costs of acquiring the vessel. The study suggests that this model can give the contractor a potentially undesirable amount of leverage.

A way around this would be to have the City purchase a vessel and make it available for use by the contractor. This is the model for the Quincy to Boston route. While this is a solution, it requires the supervising agency to have staff expertise to make sure the right vessel is chosen and to supervise the procurement/ construction process.

Takeaways

Boston's ferry service, while limited in scope, adheres to excellent planning policy. Fares are linked to the MBTA's existing bus and subway service, ferry landings are at or close to a major subway line, and headway intervals are reasonably short.

Even with these conditions, ridership on these routes accounts for just .4% of MBTA ridership system-wide. It is surprising that even with the high degree of planning and integrative policy measures, riders haven't flooded the system. This may be because Boston's business district is centered around South Station and Downtown Crossing, which are more easily accessed by T Commuter Rail Service. Also, the Quincy landing is close to a stop on the MBTA's Red Line subway.

Given all this, and considering the ferry's 50% ($6) rate of subsidy, it's hard to identify the policy rational behind this service.

[77] Massachusetts Bay Transportation Authority, MBTA FY 2009 Annual Budget Book, Section 7, 91.
[78] PA NY/NJ "Interagency Study of Regional Private Ferry Services in the New York Metropolitan Area Study," 20

SEATTLE / WASHINGTON STATE FERRIES

The Washington State Ferry system serves communities surrounding the Puget Sound.

While the Washington State ferry system is expansive, only two routes directly serve commuters from Seattle's suburbs to the city proper CBD?. Most of its routes operate as an extension of the State highway system, rather than a transit alternative to on-road vehicles. Given the difference to the system envisioned for New York City, it is hard to draw too many lessons for New York.

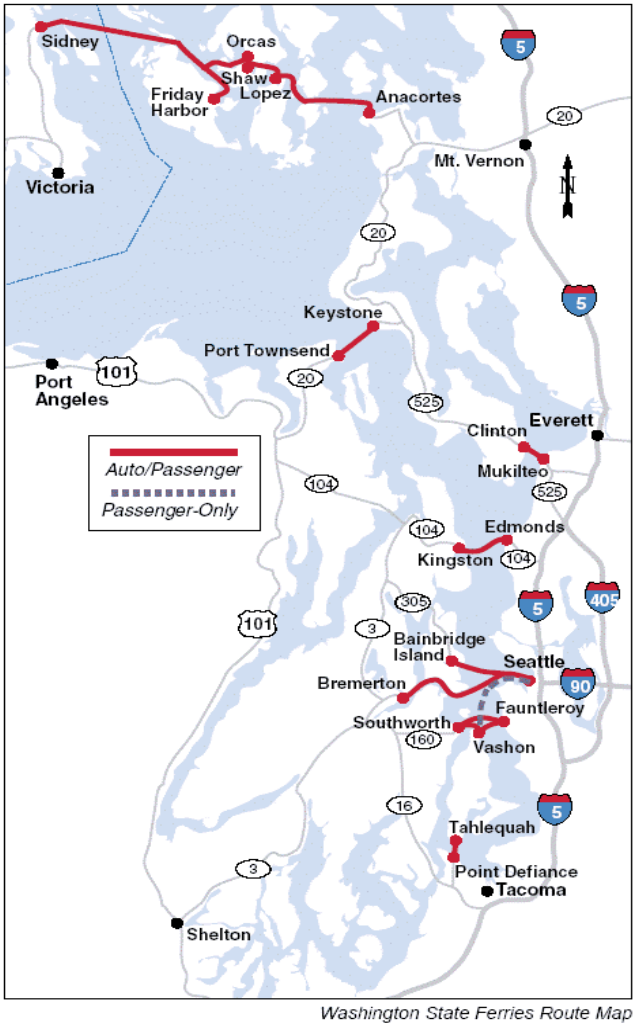

Figure 7: Washington State Ferries Map;
Source: Washington State Department of Transportation

Background and Existing Transportation Network

Ferry service to Seattle is operated by the Washington State Department of Transportation. This service comprises two of eleven ferry services crossing the Puget Sound.[79] The only bridge connecting Washington to the western banks of the Puget Sound is over twenty miles south of Seattle by Tacoma. Thus, the ferry serves as the nearest link across the Sound for many residents of Washington State and acts as the "bridge" between highways at opposite ends of the Sound. As a result, the Washington DOT's fleet is the largest of all automobile ferry systems in the United States and the third largest in the world.

Public transit in Seattle is provided by the Kings County Metro Transit and Sound Transit. Kings County Metro, a division of the Kings County Department of Transportation, operates 223 bus routes and serves 118 million passengers annually.[80] Sound Transit operates as a public authority and provides express bus, light rail and commuter rail service to Seattle.[81]

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[79] Washington State Ferries site (http://www.wsdot.wa.gov/ferries/schedule/) Accessed 4/17/10
[80] Kings County Metro site (http://metro.kingcounty.gov/) Accessed 4/17/10
[81] Sound Transit site (http://www.soundtransit.org/) Accessed 4/17/10

Operations[82]

The Washington State Department of Transportation operates two auto/commuter ferries to Pier 52 in Seattle. These services run to Bainbridge Island and Bremerton on the western banks of the Puget Sound across from Seattle.[83] The *Waterfront* streetcar line connects passengers to areas further inland.[84]

From Bainbridge Island, ferries make four trips during the AM peak, making a trip every 45-50 minutes. A one-way ticket costs $6.90, and a monthly pass costs $88.35. Ten ticket books are available for $55.20. The total population of Bainbridge Island is 20,000 people and the average household income is $108,000 annually.

The route between Bainbridge and Seattle is 8.7 miles. Run times between these cities average 35 minutes.

Ferries from Bremerton make three trips during the AM peak, departing at headway intervals of 60 to 85 minutes. One-way passes sell for $6.90. Monthly passes cost $88.35 and 10 ride passes are $55.20. 37,000 people live in Bremerton and the average household income there is $36,000.

The ferry route between Bremerton and Seattle is approximately 16 miles. Run times between the two cities take 60 minutes.

80% of revenues for ferry operations are derived from fares.[85]

The American Community Survey's 2006-2008 indicates that 6,195 of 111,405 workers in the Bremerton-Silverdale Metropolitan Statistical Area (MSA) commuted to work by ferry. This represents 5.5% of the total working population (this number does not include workers in the Seattle MSA). Of these, 2,764, or 27% of the working population of Bainbridge commuted to work by ferry and 754 people, or 5% of the working population of Bremerton, commuted by ferry.[86]

The average income for the Bremerton-Silverdale MSA is $59,136.[87]

In 2008, 65,000 passengers took Washington State ferries on an average weekday. Of these, 19,500, or 30% of its ridership, took the Bainbridge ferry. 7,800, or 12% of total WSF ridership, took the Bremerton ferry.[88]

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[82] Fare and Headway information obtained from Washington State Ferries site (http://www.wsdot.wa.gov/ferries/schedule/) Accessed 4/17/10
[83] Washington State Ferries site (http://www.wsdot.wa.gov/ferries/schedule/) Accessed 4/17/10
[84] Kings Country Metro (http://metro.kingcounty.gov/tops/wfsc/waterfront_streetcar.html) Accessed 4/17/10
[85] Source: National Transportation Database, Accessed 4/17/10
[86] Data compiled through the 3 Year, 2006-2008 American Community Survey on the US Census Bureau's website: (http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts=)
[87] Ibid.
[88] Ibid.

Takeaways

While Washington State is the largest system of automobile ferries in the US, its passenger/commuter ferry system represents a small portion of the Seattle working population. Of the 1,797,286 workers in the combined Seattle/Bremerton Metropolitan Statistical Area, only 3/10 of 1% commute to work by ferry. Washington has a robust network of ferries, but it serves mainly as an extension of the State Highway system, not as a major commuter passenger service.

Although 80% of the revenues are derived from farebox revenues, monthly commuters appear to enjoy significant cost-savings compared to those paying a one-way fare. One-way (passenger) service is $6.90, but a monthly pass costs just $88. The low monthly fare (especially when compared to fares in other systems) indicates that passenger service is partly subsidized, probably by the high volume of daily auto traffic on the eleven other lines throughout the State.

CHAPTER 3: RECENT ATTEMPTS TO EXPAND FERRY SERVICE IN NEW YORK CITY

Recent attempts to implement ferry service in the Rockaways and Yonkers exemplify the main reasons why publicly funded ferries have failed in New York City. First and foremost, both were subsidized through grants as opposed to long-term commitments. In addition, ridership was low and did not reach initial projections. Not only were the ridership numbers disappointing, but the systems also failed to capture a significant percent of the market of those traveling the same routes between the ferry's destination and its origin. Finally, both routes were long compared to the other routes studied in this paper and perhaps compared to door-to-door services when traveling by subway or express buses. Longer routes translate to higher capital and operating costs in terms of additional needed vessels, fuel costs and fewer sailings per hour (aka longer headway intervals.) While an expanded publicly funded ferry service may be feasible in New York City, these cases illustrate a number of challenges and hurdles such a service will need to overcome before it can become a reality.

I. THE ROCKAWAYS

In May 2008, New York Water Taxi began ferry service from the Rockaways in Southeast Queens to Pier 11 in Lower Manhattan. The service is heavily subsidized by New York City. Having failed to reach its target ridership, it will cease operations on June 30th of this year.

Existing Transit to the Rockaways[89]

The A train begins its route in the Rockaways and makes four stops in the neighborhood. The train then travels a circuitous route across Brooklyn before entering Lower Manhattan. Its path continues to Midtown and then north to Washington Heights.[90]

On Hopstop.com, a trip from Beach 125th Street at Rockaways Beach Blvd (a few blocks from the first A-train stop) to 42nd Street and 8th Avenue in Manhattan is estimated to take 92 minutes.[91] The trip to Wall Street @ Water Street near Pier 11 is estimated to take 89 minutes with walking time.[92]

[89] Route Information from subway map: http://www.mta.info/nyct/maps/submap.htm; Express Bus information from schedule found on MTA site: http://www.mta.info/nyct/service/bus/qnsche.htm; http://www.mta.info/metrocard/
[90] Source: NYCT Map (http://www.mta.info/nyct/maps/submap.htm) Accessed 4/25/10
[91] Source: Hopstop.com, Accessed 5/5/10
[92] Ibid, Accessed 5/5/10

	Population	Average Annual Income	Working Population Commuting to Lower Manhattan	Commute Mode to Manhattan
Western Rockaways	17,000	$59,000	12% (585 People)	Drove Alone =33% Carpooled = 9% Subway = 44% Bus = 9%
Central Rockaways	21,000	$34,000	8% (605 People)	Drove Alone = 26% Carpooled = 4% Subway = 64% Bus = 6%

Table 5: Population Characteristics of Rockaways Neighborhoods; Source: Appleseed Consultants

The MTA's base subway fare is $2.25. Monthly passes are available for $89. In addition, daily passes are available for $8.25, weekly passes for $27, and a 2-week pass costs $25.75.[93]

For Western Rockaways; commute mode to Manhattan: it totals 95%, whereas central Rockaways total up to 100%. Express bus service to Midtown Manhattan is available via the QM16 bus. This route stops at four locations in the Rockaways before running express to Manhattan. Travel times from its origin at Neoponsit/Rockaway Beach to 57th Street and Third Avenue run at 78 minutes. Express buses operate at 20-minute headways during the AM peak.

One-way base fare on the express bus is $5.50 during the AM peak and $2.75 off-peak. Free transfers to connecting service are allowed on this service. The MTA offers a 7-day express plus fare for $45, which also allows for a free transfer. Monthly options are not offered, so passengers taking the express bus pay $180.

Population Characteristics

The Western Rockaways is home to the neighborhoods of Rockaway Park, Belle Harbor/ Neponsit, Fort Tilden, Roxbury and Breezy Point. It has a population of 17,000 people and an average household income of $59,000. 41% of the working population commutes to Manhattan. 12% (585 people) commute to downtown and 12% (719 people) commute to midtown. Of the Manhattan commuters, 44% took the subway, 33% drove to work alone and 9% carpooled.[94]

The population of the Central Rockaways is less affluent than the Western Rockaways. Home to Rockaway Beach and Averne, this neighborhood has a population of 21,000. The average annual income is $34,000. The total number of

[93] Source: MTA New York City Transit, http://mta.info/metrocard/mcgtreng.htm#unlimited, Accessed 6/12/2010
[94] Appleseed, "Proposed Rockaway and Southeast Brooklyn Ferry Landing Sites: Demographics and Market Analysis," Prepared for the New York City Economic Development Corporation (9/27/06)

people in the labor force is 9,660. Of these, 2065, or 28% of the labor force commutes to Manhattan. 8%, or 605 people, commute to Lower Manhattan and 8%, 596 people, commute to Midtown. 64% of those working in Manhattan commuted by subway, 26% drove alone to work, 4% carpooled and 6% took the bus.[95]

Appleseed Ridership Study

Appleseed, a New York City-based consulting firm, conducted a ridership assessment for the City. While the assumed conditions of this analysis differed from the actual operations for the service that began in 2008, the report offers insights into the challenges faced by ferry service from the Rockaways.

Unlike the detailed surveying conducted by the Water Transportation Authority in San Francisco, Appleseed based it's model on "time-value" concepts developed in a 2001 study that estimates how people value their time when taking and waiting for public transit.[96] This, and other data are compared with the out-of pocket costs of driving and parking in Manhattan, gasoline, a one-way subway fare or express bus fare.

The analysis assumes a stop at Riis Landing and a stop at Pier 11, two trips in the AM and PM peaks that operate at one hour headways (this necessitates 2 vessels), a 149 passenger ship and a $12 one-way fare that is blended to include riders who pay full fare and those who purchase discounted monthly passes.

At this fare, Appleseed estimates it will capture 70-140 riders. At a fare of $4 and holding all other assumptions constant, the ridership is estimated to be 146-192.

A ridership assessment study conducted by Appleseed estimated that the majority of the ridership would arrive at the terminal by car. There is a small walk-on potential market of 486 people who live within a ½ mile radius of the ferry landing.

[95] Ibid.

[96] The study, "Public Transit Values of Time," by the Institute for Transport Studies finds that people perceive 1 minute in uncongested driving/subway service as 1 minute, 1 minute waiting for a train as 3 minutes, 1 minute walking to a train station as 2 minutes and 1.5 minutes driving in congested traffic as 1.5 minutes.

	149-passenger boats		99-passenger boats	
	Low capture	High capture	Low capture	High capture
Total annual revenue	$292,000	$584,000	$292,000	$396,000
Operating expenses				
1 boat	$1,137,782	$1,137,782	$910,450	$910,450
2 boats	$2,275,564	$2,275,564	$1,820,901	$1,820,901
Operating deficit				
1 boat	($845,782)	($553,782)	($618,450)	($514,450)
2 boats	($1,983,564)	($1,691,564)	($1,528,901)	($1,424,901)

	149-passenger boats		99-passenger boats	
	Low capture	High capture	Low capture	High capture
Total annual revenue	$419,078	$838,157	$419,078	$838,157
Operating expenses				
1 boat	$1,137,782	$1,137,782	$910,450	$910,450
2 boats	$2,275,564	$2,275,564	$1,820,901	$1,820,901
Operating deficit				
1 boat	($718,703)	($299,625)	($491,372)	($72,294)
2 boats	($1,856,485)	($1,437,407)	($1,401,823)	($982,744)

Table 6: Projected Operating Expenses for Different Ridership and Cost Scenarios; (Top Table: $4 one-way fare; Bottom Table: $12 one-way fare) Source: Appleseed Consultants

First half: at $12 per trip (one way) and the second half $4 per trip (one way) – please indicate

The tables above show revenue projections at the expected ridership levels. The top table shows annual revenues and projected operating deficit for a $12 one-way fare and the bottom table shows the annual expected revenue and operating deficit for a $4 one-way fare. Even with a high $24 round-trip cost, Rockaways service is expected to operate with a large operating deficit.

The Appleseed study also provides a pro-forma for the Rockaways ferry service (see next page.) It projects that the cost of fuel (at $2.33/gallon) will equal $451,438 of the $1,137,783 annual operating expenses, or 40%. If calculating the cost of fuel and considering the depreciation of the vessel, the fuel costs represent $291.25 of the $1,018 cost per vessel hour, or 28.6% of the total cost per hour.

The distance between the Rockaways and Pier 11 on Google Earth is estimated to equal 15.9 miles. This distance is much greater than the distances observed in most of the NJ-Manhattan, Boston, San Francisco or Seattle ferry systems.

Appendix A – Operating Expense Estimates

Operating Expense Estimate – One Boat (149-PAX)

Proposed Ferry Service from Rockaway - Riis Landing
Operating Cost Model for one 149-PAX Vessel

7/14/2006 10:41

Operating Expenses		Hourly Base: per hour per vessel	Hourly Base: annual equivalent	Annual Base: annual per vessel	Total: annual per vessel
Staffing					
Captain (1 per vessel)				$123,214	$123,214
Deckhand (2 per 149 PAX vessel)	$79,404			$79,404	$79,404
1/2 Ticket Agent				$23,274	$23,274
Wages Subtotal				*$225,892*	*$225,892*
Benefits/Fringe Factor	30.6%			$69,123	$69,123
Total Wages and Benefits				*$295,014*	*$295,014*
General & Administration	25.0%			$73,754	$73,754
Subtotal Staffing Expenses					***$368,768***
Operations					
Fuel (125 gallons/hour for 149 PAX Vessel)	$2.33	$291.25	$451,438		$451,438
Security		$15.00	$23,250		$23,250
Vessel Maintenance		$99.12	$153,630		$153,630
Insurance		$65.04	$100,820		$100,820
Terminal/Dock Maintenance (Riis Landing)		$11.48	$17,793		$17,793
Landing Fees		$14.25	$22,084		$22,084
Subtotal Operations Expenses					***$769,014***
Total Annual Expenses including Profit (per vessel)					**$1,137,782**
Total Expenses including Profit (per vessel per hour)					**$734**
Depreciation & Interest					
Depreciation & Interest (per 149 PAX Vessel)	1				$440,000
Total Annual Expenses plus Depreciation & Interest (per vessel)					**$1,577,782**
Total Expenses plus Depreciation & Interest (per vessel per hour)					**$1,018**
This model assumes:					
Hours of Operation per Year (Per Vessel)					1,550

(*) This analysis does not include a line item estimate for facility construction.

Table 7: Operating Expense Estimates;
Source: Appleseed Consultants

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008												
Total Riders					2196	4784	6325	5889	4231	3372	2597	2491
Passengers per Day					55	120	158	147	106	84	65	62
Average Ridership Per Month												**100**
2009												
Total Riders	2370	2195	2595	2622	2887	3715	5380	4887	4029	3018	2484	2393
Passengers per Day	56	52	62	62	69	88	128	116	96	72	59	57
Average Ridership Per Month												**77**
2010												
Total Riders	2206											
Passengers per Day	53											
Average Ridership Per Month												**53**

Table 8: Rockaways to Lower Manhattan Ridership by Month and Year
Source: NYC Economic Development Corporation

Operations[97]

Ferry service from the Rockaways originally operates from Riis Landing in Breezy Point to Pier 11, with a stop in-between at the Brooklyn Army Terminal. One vessel would make two trips, with one departure at 5:45 AM and another at 7:45 AM. Two return trips depart Pier 11 at 4:30 PM and 6:30 PM in the evening. The Journey time from the Rockaways to Lower Manhattan is one hour.

A one-way fare cost $6. 10-trip books are available for $60 and 40-trip books are available for $216. The cost of the ferry ride does not include transfers to existing MTA bus or subway service.

Ridership

The table above shows the actual ridership of Rockaways to Lower Manhattan from 2008-2010 based on data received by the New York City Economic Development Corporation. As we can see, the ridership is well below what was predicted by Appleseed. Moreover, the Appleseed report did not predict the significant drop-off that would occur during the winter months.

In February 2010, the Economic Development Corporation stated that the ferry was operating at a 30% farebox recovery ratio, and that the subsidy per passenger was running at $25 (per ride) partly due to low ridership levels.[98] The service was extended in March when the City Council allocated funds to keep service running through June 30th.[99]

[97] Umar Cheema, "New Ferry Service Will Begin Next Week," *The New York Times* (May 6, 2008)
[98] Nicholas Hishon, "City to Stop Rockaway Ferry in March," *Daily News*, (February 24, 2010)
[99] Source: Rockaway Ferry website (http://rockawayferry.com/) Accessed 4/20/10

II. YONKERS

Service between Haverstaw/Yonkers and Pier 11 in Lower Manhattan operated between May 2007 and December 2009.

Background[100]

It is important to understand the underlying narrative behind the implementation of ferry service from Yonkers to Lower Manhattan. While service between the Rockaways and Lower Manhattan has been discussed for decades, service between Yonkers and Lower Manhattan was not a regional priority prior to its implementation in 2007.

The City of Yonkers has undergone significant redevelopment during the 2000s and received State attention to develop new housing, improve its downtown, library and the Metro-North train station. Development of a pier on the Hudson River with commuter ferry service was expected to enhance planned residential condominiums on the waterfront.

The subsidy for ferry service from Yonkers was allocated as part of the $20 Billion appropriated by Congress following the September 11th attack on the World Trade Center through the Lower Manhattan Development Corporation.

Existing Transportation Options to Manhattan[101]

The City of Yonkers has a population of 196,086.[102] The Metro-North Railroad, near Getty Square, provides commuter rail service to Manhattan. Between 5:16 AM and 8:41 AM, thirteen trains travel from Yonkers to Grand Central Terminal. Trains departing Yonkers to GCT between 5:15 and 6:28 AM arrive at GCT in 25-31 minutes. Those departing after 6:28 take 34-36 minutes to arrive at GCT. Headway intervals during the AM peak average twenty minutes.

The Yonkers train station is located across the street from the ferry pier.[103]

A one-way peak fare from Yonkers to Pier 11 is $15. 10-ticket books are available for $85 and monthly passes cost $186. It is possible to purchase New York City Transit ticket service that can be added to the physical Metro-North ticket, but MNR riders do not receive a discount on New York City Transit's subways and buses. Yonkers passengers traveling to destinations away from Grand Central Terminal pay $275 in combined monthly costs.

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[100] Adapted from Interview with Robert Miller and Philip Plotch, Lower Manhattan Development Corporation (March 26, 2010)
[101] Headway and schedule information from MTA Metro-North website (http://www.mta.info/mnr/) and NJ Transit (http://www.njtransit.com/hp/hp_servlet.srv?hdnPageAction=HomePageTo) Accessed 4/25/10
[102] Source: Wikipedia, Accessed 4/25/10
[103] Source: Interview with Robert Miller and Philip Plotch, LMDC (March 26, 2010)

	Population	Average Annual Income	Working Population Commuting to Lower Manhattan	Commute Mode to Manhattan
Yonkers	196,000	$44,600	2500	Drove (Alone + Carpool) =53% Commuter Rail = 24% Subway = 16% Bus = 7%
Haverstraw Market Area	293,600 (Orange Co.) 33,800 (Haverstraw)	$68,000	1500	Drove (Alone + Carpool) = 68% Commuter Rail = 17% Subway = 0% Bus = 15%

Table 9: Population Characteristics for Yonkers to Lower Manhattan Target Market
Source: Louis Berger Consultants

The village of Haverstraw is located in Orange County. New Jersey Transit provides the nearest commuter rail service. It is located 9.7 miles away (a 17-minute drive).[104] Eight trips depart Spring Valley during the AM peak. After a transfer in Secaucus Junction, riders arrive at New York Penn station at an average of 79 minutes after departing Spring Valley. Headway intervals range from 13-25 minutes during this time.

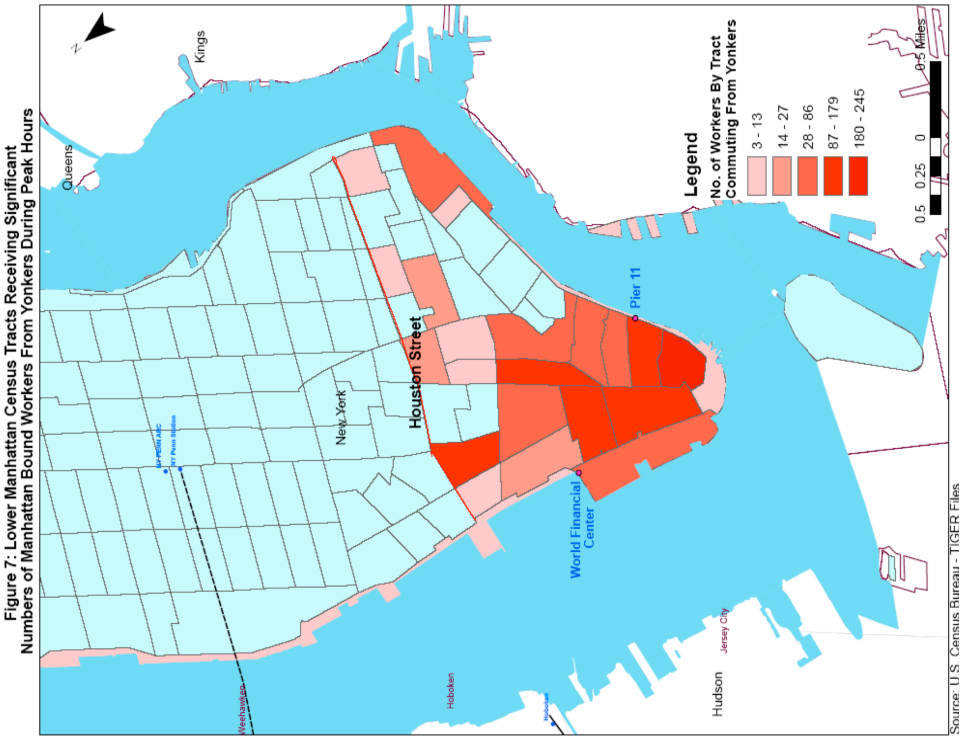
A one-way ticket from Spring Valley costs $8.25. Weekly tickets are available for $76.25 and monthly passes for $251. Passengers who take New York City transit from Penn Station pay the base $2.25 per ride or $89 for a monthly pass. For these passengers, the total out of pocket transportation costs per month is $340.

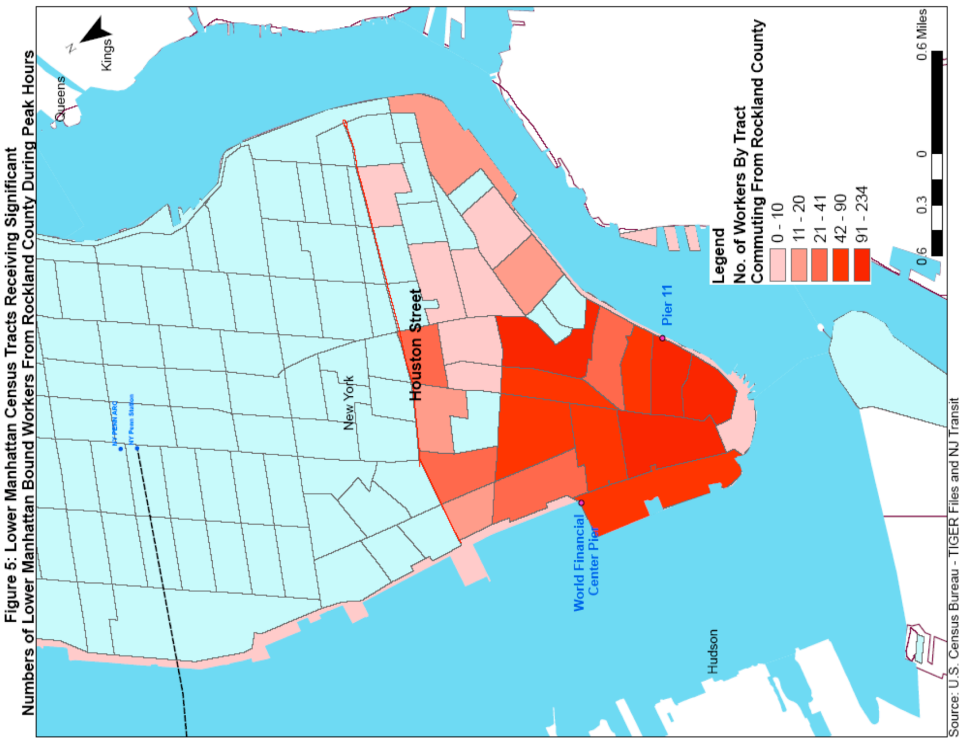
Population Characteristics

The City of Yonkers has a population of approximately 196,000. The median annual income is $44,600. A Draft Business Plan for the ferry service by the Louis Berger Group estimated that 2500 Yonkers residents commuted to jobs in Lower Manhattan.[105] The majority of these workers drove to work (53%). 24% took rail, 16% took the subway and 7% took the bus.[106]

Further analysis shows that Yonkers residents commute to a relatively dispersed area in Lower Manhattan, especially when compared to those commuting to Lower Manhattan from New Jersey. For the census' purposes, "Lower Manhattan" is defined as the area below Houston Street. This means that those taking the ferry to work destinations in Lower Manhattan may need to transfer to a bus or subway to reach their final destination.[107]

[104] Source: Google Maps
[105] The Louis Berger Group, "Ridership and Revenue Analysis for a Proposed Ferry Service to Lower Manhattan," Draft Report, submitted to the Lower Manhattan Development Corporation (June 2006)
[106] Ibid.
[107] Ibid.





Figures 8 + 9: Destination of Manhattan Bound Commuters from Yonkers and Haverstraw; Source: The Louis Berger Group

The market area for the Haverstraw station encompassed localities within a 15-minute drive of the ferry stop. Havestraw is located in Orange County. In 2000, the County's population was 293,600, with a median household income of $68,000. The town of Haverstraw had a population of 33,800 and a median household income of $53,800.

The market area contained a population of 1500 workers commuting to Lower Manhattan. 68% traveled by car, 17% by rail and 15% by bus. [108]

These commuters were slightly more concentrated in jobs near Pier 11 and the World Financial Center, but still less concentrated than New Jersey ferry commuters.

Planned Waterfront Developments

New residential development at the Yonkers and Haverstraw piers was expected to build ridership for the ferry service.

By 2007, 336 units of a planned 850-unit condo development were finished at Haverstraw. The price of the condos ranged from $336,000 to $1 Million.[109]

As mentioned earlier, the Yonkers waterfront was undergoing extensive redevelopment during this time. Ferry service was seen as a critical factor in fulfilling the cities waterfront development plans. A total of 1,000 residential units were planned along the waterfront. In 2008, 294 apartments near the Yonkers train station were 97% leased at the Hudson Park North tower.[110] 266 units in Hudson Park South came online in the spring of 2008.

Operations[111]

The service began operation in May 2007. Two ferries during the AM peak period ran from Haverstraw and four from Yonkers. Journey times are faster than the Rockaways service; riders reached the World Financial Center in 45 minutes and Pier 11 in 57 minutes. The trip is 18.4 nautical miles, much longer than most of the trips in the other systems studied.

A one-way ticket from Yonkers cost $12, and $15 from Haverstraw. A 10-ticket book from Yonkers cost $110 and a monthly pass is $400. From Haverstraw, a 10-ticket book costs $130 and a 40-ticket book is $450.

The ferry is located across a parking lot from the Yonkers Metro-North Station. Parking is shared between Metro-North and the ferry. Unlike other MNR parking

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[108] Ibid 11
[109] Ibid 12
[110] Elsa Brenner, "It Had the Setting, Now it Has the Housing," *The New York Times*, (March 9, 2008)
[111] Ticket cost, headway, parking lot information from interview with Robert Miller and Philip Plotch, LMDC (March 26, 2010)

Year	Fare	Daily Riders (H-LM/Y-LM)	Annual Revenue	Annual Cost	Annual Subsidy Required
2007	$525/$400	63/153	$1,133,849	$3,339,000	**$2,205,151**
2008	$525/$400	89/217	$1,603,063	$3,339,000	**$1,735,937**
2009	$525/$400	129/267*	$2,094,638	$3,339,000	**$1,244,362**

Table 10: Estimated Revenue Projections for Yonkers Ferry;
Source: The Louis Berger Group

facilities, ample parking exists at this lot for both ferry and rail passengers. Also, in the event that a passenger missed the last sailing from Pier 11 at 6:30, they could easily take a Metro-North train to their car in Yonkers.

Onboard passenger amenities included wireless internet, flat screen televisions and a café and bar selling food and drinks.[112]

Ridership Projections: Methodology and Predictions[113]

The Berger analysis predicted ridership using similar comparisons of costs vs. times savings as used by Appleseed to predict ridership between the Rockaways and Lower Manhattan. Berger analyzed the ridership trends of those taking the ferries from Monmouth County and forecasted ridership based on the incomes and work place destinations of the markets in Yonkers and Haverstraw.

The model also conservatively assumes that *everyone* driving to work in Lower Manhattan was reimbursed by their employer for the cost of parking. Thus, instead of having an $800 out of pocket expense to drive to work from Haverstraw, the out of pocket expense was assumed to be $400. Because of this assumption, Berger believed the actual ridership numbers may be higher, as it is unlikely that everyone who drove to Lower Manhattan had their entire cost of parking fully reimbursed.

The table above shows Berger's predicted ridership for the service level most resembling what was eventually put into operation. The assumed monthly fare is what was implemented in Yonkers and below the fare implemented for Haverstraw.

These costs assumed service would operate on 99-passenger vessels. Instead, the service operated on two 149-passenger vessels. Therefore, the actual costs and required subsidy are expected to be higher than what is assumed here.

[112] Elsa Brenner, "It Had the Setting, Now it Has the Housing," *The New York Times*, (March 9, 2008)
[113] The Louis Berger Group, "Ridership and Revenue Analysis for a Proposed Ferry Service to Lower Manhattan," Draft Report, submitted to the Lower Manhattan Development Corporation (June 2006)

Business Plan[114]

The full business plan was not made available for this report. What was learned about the business operations is described below.

Payment Schedule to New York Water Taxi – The following is New York Water Taxi's estimated total operational hours and operating expense. Expenditures are based on vessels berthing from the City of Yonkers pier, and 21 commuter days per month with the New York Stock Exchange holidays excluded.

a.) Yonkers to Battery Park City Terminal

Day Rate

Operating Hours: 10.5 at $750/hour
Mobilization Hours: 2.0 at $700/hour
Total Day Rate: **$9,275**

Total – (Yearly Operating Expense): **$2,337,300**

b.) Extended Service from the Village of Haverstraw, Rockland County, NY to Battery Park City Terminal

Day Rate

Operating Hours: 9.0 at $750/hour
Mobilization Hours: 2.0 at $700/hour
Total Day Rate: **$13,250**

Total – (Yearly Operating Expense): **$3,339,000**

Other details regarding the business assumptions inherent in the hourly rate were quoted at interviews: [115]

- NY Water Taxi's Operating Costs = $900-$1000 per hour.
- Fuel costs = $150 per hour (at $2.25/gallon).
- Docking fees = $25 at the WFC and $16 at Pier 11.
- Financing on vessels make up "about half" of NY Water Taxi's costs.

[114] Obtained from the Port Authority of NY/NJ
[115] Interview with Robert Miller and Philip M. Plotch, Lower Manhattan Redevelopment Corporation (March 5th, 2010)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007												
Total Riders					1615	1552	2272	2633	2295	2151	2196	1764
Passengers per day					77	74	108	125	109	102	105	84
Average Ridership Per Month												**87**
2008												
Total Riders	2003	1637	2039	2425	2451	3146	3650	3486	2870	3040	2223	2168
Passengers per Day	95	78	97	115	117	150	174	166	137	145	106	103
Average Ridership Per Month												**124**
2009												
Total Riders	1095	1547	2289	2464	1409	1704	1755	1742	1705	1734	1388	1482
Passengers per Day	52	74	109	117	67	81	84	83	81	83	66	71
Average Ridership Per Month												**81**

Table 11: Yonkers to Lower Manhattan Ridership Statistics;
Source: Port Authority of New York and New Jersey

Actual Ridership

The table above shows the actual ridership for the combined Yonkers/Haverstraw ferry service through December 2009, when service was cancelled.

A number of changes to the service during its run make it hard to draw too much from the ridership fluctuations observed in this graph. These changes include:

- To stimulate ridership, in May 2008 40-trip ticket books were decreased from $450 to $360 from Haverstraw and from $400 to $320 from Yonkers. Ridership in June skyrocketed, increasing to 150/day from 117 (a 28% increase).[116]

- In May 2009, the LMDC grant was depleted. Yonkers secured a grant from the Empire State Development Corporation to continue service from Yonkers. Service from Haverstraw was discontinued.[117]

- In the summer of 2009, the ESDC grant was combined with grants from the Yonkers development agencies. A stop was added at West 39th Street to serve those commuting to Midtown.[118]

- $50,000 was spent to market the new service in the summer of 2009.[119]

Even with these considerations, the assumptions of the Berger ridership study are demonstrably incorrect. Under the given ticket prices, Berger predicted a combined ridership of 216 in 2007. The actual ridership was 87. In 2008, Berger predicted

[116] Interview with Miller and Plotch (March 26, 2010)
[117] Ibid.
[118] Ibid.
[119] Patrick McGeehan, "Ferry between Manhattan and Yonkers is Set to Stop," *The New York Times*, Metro (December 23, 2009.)

306 riders. With a smaller fare than expected by Berger, the actual ridership was 124.

Of course, the economic crisis in September 2008 and weakening economy throughout the earlier part of that year likely contributed to the weak ridership. How much of a factor is unknown, but Berger's forecasts projected 200% more riders in 2007, 250% more riders in 2008 and 400% more riders in 2009.

At peak ridership, the service was generating $50,000 in revenues and $200,000 in costs. This represents a farebox recovery ratio of 25%. By 2009, LMDC was operating the service at half the originally proposed fare with 1/3 of the expected riders. At the end of 2009, service was cancelled.

III. LESSONS LEARNED FROM THE ROCKAWAYS AND YONKERS FERRY SERVICE

The failure of the Rockaways and Yonkers ferry routes illustrate a number of reasons why expanded publicly funded ferry service has not succeeded in New York. In this section, we look at how the impacts of poor modeling, lack of indoor waiting facilities, long routes and failure to capture a significant portion of the market between the origin and commuting destination led to the cancellation of these ferry services.

Poor Modeling

What is most striking about the Yonkers and Rockaways service to Lower Manhattan is the failure to accurately predict the number of riders on each of the routes. Appleseed forecasted a fare of $4 would draw between 146-192 daily passengers to the Rockaway ferry. In reality, it drew 70-100 with a fare of $6. The Louis Berger Group predicted ridership would "ramp up" from 216 in 2007, to 306 in 2008 to 496 in 2009 for fares of $400 per month from Yonkers and $525 per month from Haverstraw. At the predicted fare levels, ridership averaged 87 in 2008 and 124 in 2009.

Both services modeled expected ridership by comparing the out of pocket costs of ferry service, transit, and driving costs with "time-value" costs. "Time value" theory places certain value on commuters time when accessing transit (walking to the subway/bus), waiting for transit, and traveling in transit or traveling by car. The Berger study does not specify what values it placed on these factors. Appleseed provides a detailed description of how they model they calculate the value of time to arrive at their estimations.[120]

Without accurate information about who will ride future ferry services, it is impossible to determine which routes should be funded and which routes should be ignored. If proven accurate over the next few years, the WTA's modeling and marketing schemes by Cambridge Systematics could serve as a useful tool to predict ridership on future lines. As an alternative, New Jersey Transit forecasts ferry ridership as a component of the NJ Transit Demand Forecasting Model.[121]

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[120] Appleseed's model of "time value" is derived from: M. Wardman, *Public Transport Values of Time*, Institute for Transport Studies, University of Leeds, Working Paper 564, December 2001. This research suggests, for example, that transit riders, on average, perceive one minute waiting for a train as feeling three times as long as one minute riding a train. Walking to the train is perceived as feeling twice as long as the actual time. And driving in congested traffic is perceived as taking 1.5 times as long as the actual time. The "time" spent accessing, waiting, and riding a train, bus, ferry or car is then multiplied by $23/hour (a figure identified by NYMTC to measure the "average" value of time for the average worker in the New York region) to identify the "perceived" cost of journey time for all modes.

[121] Cambridge Systematics, "South Amboy Ferry Research Study, Final Report," Prepared for the New Jersey Transit Corporation (March 2007) ES-1

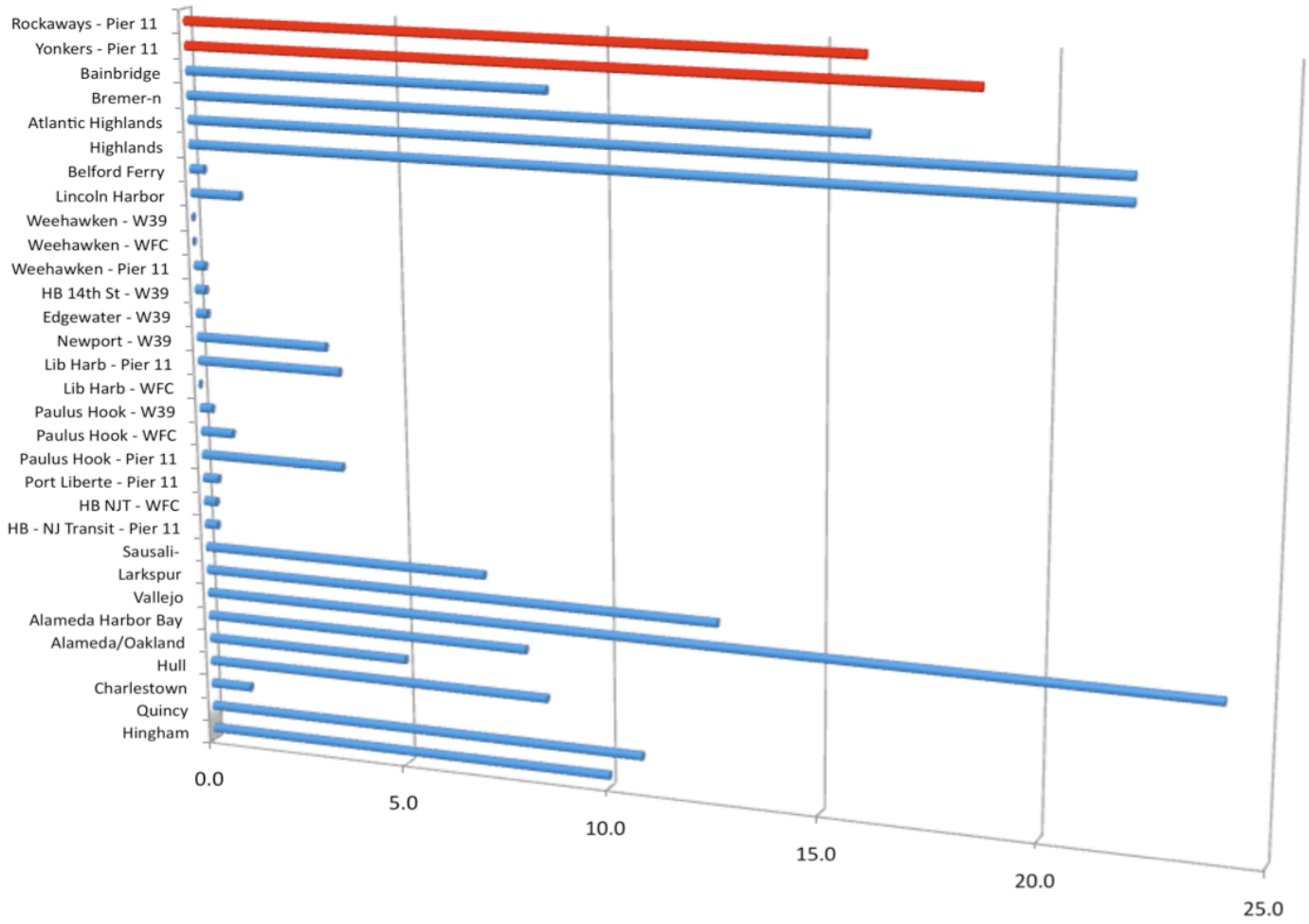

Table 11: Trip Lengths for All Ferry Routes in Report; Various Sources

All of these ferry terminals were constructed without enclosed structures to protect passengers from the elements. A partial enclosure may have been constructed at the Yonkers terminal, but this could not be confirmed.

Significant Deviations in Winter vs. Summer Ridership

Both the Yonkers and Rockaways ferry experienced significant deviations in ridership during the winter months compared to the summer. In 2007, the Yonkers ferry experienced a 10% deviation in ridership and a 20% deviation during 2008. The Rockaways ferry experienced an even greater deviation in ridership, with a 40% deviation in 2008 and a 32% deviation in 2009.

As discussed earlier, almost all of the New Jersey to Lower Manhattan ferries had fully enclosed terminals at the pier with amenities. Partly as a result of this, all of the New Jersey routes operated at relatively consistent ridership levels throughout the year. Most routes deviated by five to nine percent.

Long Routes

At distances of 18.4 miles from Yonkers and sixteen miles from the Rockaways, these routes are some of the longest examined in this report. With the exception of the Monmouth County ferries in New Jersey, the Vallejo ferry in California and the Bremerton ferry in Washington, all other ferry services have distances much shorter than these routes.

Detailed *pro-formas* were not made available for this report, but the Operating Expense Estimate provided by the New York City Economic Development Corporation estimated fuel costs make up 30-40% of the costs of operating the service. Longer trips result in more fuel used, which in turn result in higher costs. Without a sustained high ridership levels, these routes quickly turn into big money losers.

The other routes with a similar length are those in Monmouth County, New Jersey, Vallejo, California and Bremerton, Washington. Of these, the Monmouth ferries operate as a premium service to a wealthy clientele.

The Bremerton ferry serves a middle-income community. The average income in the Bremerton MSA is $59,136. But, as discussed earlier, the overall farebox recovery for the Washington State Ferries is 80%. Thus, Bremerton commuter passengers (who pay $88.30 for a monthly pass) may be benefitting from the higher costs charged to cars.

A long distance ferry currently operates from Vallejo, California. According to the 2008 American Community Survey, the average income in the Vallejo Urbanized Area (this includes Vallejo and neighboring towns) is $65,233. WETA expects that

this service, which attracts 2,300 people per day, will only recoup 45% of costs from farebox revenues.

While low-moderate income / long distance ferries exist, they are definitely the exception and not the norm. Their distance will certainly make them more costly for both passengers and their operators.

Despite One-Seat Ride Alternative, Yonkers to Lower Manhattan Failed to Capture a Significant Market Share

One reason that planners would expect a Yonkers to Lower Manhattan ferry service to thrive is that it would provide a one-seat ride alternative to those currently taking the Metro-North to Grand Central and then transferring to the Lexington Avenue subway. In addition to the time savings benefits of direct service between Yonkers and Lower Manhattan, passengers would not need to make a transfer to reach Lower Manhattan

If we assume that 60% of the ridership on the Yonkers/Haverstraw ferry came from Yonkers[122], the Yonkers ferry service attracted 52 people, or only 2% of the *entire Lower Manhattan* market in 2007. In 2008, it attracted 74 Yonkers residents living in Lower Manhattan, or 3% of the market. Considering the cost of the ferry was only $75 more than the cost of a combined monthly Metro-North and New York City Transit monthly pass, it's hard to understand why the route didn't attract a larger share of the market.

In fact, the Louis Berger model assumed that the Yonkers portion of the ferry would capture 29% of the Yonkers to Lower Manhattan market and 12% of the Haverstraw to Lower Manhattan market.[123]

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The failure of the Rockaways and Yonkers service to Lower Manhattan illustrates a number of issues with implementing new ferry service in New York City. Both failed to correctly forecast the number of riders who would use the service. Similarly, both experienced significant ridership decreases during the winter months – this is likely the result of the lack of indoor waiting facilities at the terminals. The two routes were longer than most of the routes studied in this paper which led to higher gas and other operating expenses as well as capital costs. Finally, neither of the ferries came close to capturing a significant portion of the market expected to be served by the ferry service.

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[122] This is a rough assumptions based on a ridership of 67 in May 2009, the month after the stop at Haverstraw was eliminated. In April, the last month of combined Yonkers/Haverstraw service, the ridership was 117. If we assume ridership stayed the same between April and May, Yonkers ridership would have made up 60% of the total ridership.

[123] The Louis Berger Group, "Ridership and Revenue Analysis for a Proposed Ferry Service to Lower Manhattan," Draft Report, submitted to the Lower Manhattan Development Corporation (June 2006) 27

CHAPTER 4: CHALLENGES TO EXPANDED FERRY SERVICE AND RECOMMENDATIONS

What would it take to create a robust system of publicly subsidized ferries in New York? This chapter attempts to answer such a question by identifying some of the major challenges to implementing ferry service in New York and proposing a financing and business plan for a route using a Tax Increment Financing (TIF) scheme.

I. CHALLENGES IDENTIFIED

Existing Public? Transit Infrastructure

While New York's extensive transit infrastructure is a major asset for residents and the New York's economy, it is a deterrent to implementing new ferry service. The ferry systems in San Francisco, Washington and the New Jersey Hudson coast were developed because these cities lacked solid options to connect residents to destinations across major bodies of water.

In San Francisco, the BART crosses the Bay from the east, but people living north of San Francisco in Marin County only have the option of taking buses across the congested Golden Gate Bridge. In Washington State, the only bridge connecting Puget Sound to the western part of the state is located 20 miles south of Seattle. And the Hudson Coast has far fewer public transit options to Manhattan compared to the boroughs of Queens, Brooklyn and the Bronx.

This is not the case in New York City. Seventeen subway tunnels connect Manhattan to four of its boroughs and nine bridges and tunnels connect automobile traffic from these boroughs to Manhattan. In Boston, where there are a number of land and bridge/tunnel options to the Central Business District[124], ferry service began to mitigate traffic congestion during the construction of the Southeast expressway during the 1980s.

New York has a Highly Efficient Transit Network

Not only does New York's transportation network already get people where they want to go, it does so at a very low cost compared to all of the other networks studied. Boston's fare recovery ratio is 32%. The fare recovery for major cities in the US is much lower. For example: Washington DC (38%), Chicago is 41%.[125]

[124] These include: Seaport Boulevard Bridge, the Charlestown Bridge, Route 3 Bridge, Zakim Bridge, Monseignuer O'Brien Highway Bridge (MA Route 28), Massachusetts 3A Bridge, Massachusetts Avenue Bridge, Boston University Bridge, MA Route 20 Bridge, North Arsenal Street Bridge, Eliot Bridge, JFK Street Bridge, John W. Weeks Bridge, Western Avenue Bridge (Source: Google Earth, Accessed 6/12/10)
[125] National Transportation Database, 2008

The Rockaways ferry service was operating at a 15-30% fare recovery and the Yonkers ferry, at its peak, was operating at a 25% fare recovery. While this might be acceptable for new services in other cities, in New York it is seen as an inefficient use of scarce resources.

When planning San Francisco's ferry service, the WTA predicted fare recovery ratios between 29% and 57%. Because these services intended to get people out of their cars, they were able to market the new ferry service as an environmental improvement, ultimately creating new taxes to support the system. By contrast, service from the Rockaways or Yonkers is simply improving transportation options for a slice of the population. But what is the larger policy goal? Why should the Rockaways and Yonkers get great service and the rest of the city be cramped into subways and slow bus service? Shouldn't these resources be allocated to allow for the broadest possible benefit?

The Success of Private Ferries from New Jersey to Manhattan

The continued operation of the services between New Jersey and Manhattan have led many to believe that ferry service that cannot succeed without a public subsidy is probably not in the public's interest. This has led people to overlook the many advantages that the New Jersey ferries have over other similar transit options throughout the world.

First, the New Jersey ferries enjoy an advantage in that they travel shorter distances than ferry systems in other parts of the country. 12 of the 18 ferries studied in this report are under four miles in distance, 6 are under three miles and five are under 2 miles in distance. In comparison, the shortest route part of San Francisco's system is 5 miles. Other San Francisco routes run at 8, 24, 12, 7, and 12.6 miles in length. Boston routes are 10, 10.8, 1, and 8.5 miles in length (the 1-mile route costs $1.70 one-way.)

New York City's Economic Development Corporation's operating cost model estimates that fuel costs equal 30-40% of a ferry's operating cost. Given this, we can assume that the average fuel cost per customer in New Jersey is much lower than what is spent in Boston and San Francisco.

II. A LONG-TERM STRATEGY TO EXPAND FERRY SERVICE

A long-term strategy to expand ferry service would pair a residential development strategy at the waterfront with a value capture or Tax Increment Finance (TIF) plan that pays for ongoing capital investments and operations subsidy of ferry routes. TIF plans tax a percent of the increased land values that arise through public investments, such as public transportation. [126]

TIFs have been widely used in California and Chicago.[127] The State of Maryland recently adopted a Transportation Oriented Development law that expanded the use of TIFs to finance transportation capital projects.[128] A TIF will also be used to pay off bonds, financing the expansion of the No. 7 train to Hudson Yards on Manhattan's far west side.[129]

Argument for TIF Financing

A large body of research has demonstrated the positive economic impacts to residential land values as a result of public transit proximity.[130] Apartments developed within ¼ of a mile of the Pleasant Hill BART station in (what city) rented for 10% more per square foot than those located farther away from the station. Two-bedroom apartments within ¼ mile from BART stations rented for 16% more than those in adjacent neighborhoods that were farther away from BART. Another study found that the median home price near a light rail station connecting Philadelphia to suburban New Jersey was 10% more expensive than in other census tracts.[131] These are just a few examples of hundreds that could be cited by planners to justify a TIF on residential development near new ferry service.

In addition, new development and zoning changes often create costs for public transit that is later absorbed by the general public. For example, the Environmental Impact Study for the Greenpoint/Williamsburg (Brooklyn) rezoning estimates significant impacts to trains and stations as a result of new development allowed by the rezoning.[132] Instead of expecting the New York City's Metropolitan Transportation Authority to pick up the costs of new developments,

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[126] Source: Wikipedia
[127] Source: Larry Marks, "The Evolving Use of TIF" *Review* (Summer 2005)
(www.cdfa.net/cdfa/cdfaweb.nsf/.../$FILE/evolving_**tif**.pdf)
Chicago, Neigborhood Capital Budget Group (http://www.ncbg.org/tifs/tifs.htm) Accessed 5/5/10
[128] Council of Development Finance Agencies
(http://www.cdfa.net/cdfa/cdfaweb.nsf/ord.html?open&tag=TIF%20Case%20Studies&start=26&count=25)
[129] Source: Wikipedia
[130] See Robert Cervero, "Transit-Based Housing in the San Francisco Bay Area: Market Profiles and Rent Premiums, " *Transportation Quarterly*, Vol. 50, No. 3, pp. 33 – 47, 1996; Dean H. Gatzlaff and Marc T. Smith, "The Impact of the Miami Metrorail on the Value of Residences Near Station Locations," Land Economics, Vol. 69, No. 1, Vladimir Bajic, "The Effects of a New Subway Line on Housing Prices in Metropolitan Toronto," Urban Studies, Vol. 20, 1983. pp. 54- 66, 1993; Also, "The Effect of Rail Transit on Property Values: A Summary of Studies," Parsons Brinckerhoff (Feb 27, 2001)
[131] Roderick B. Diaz, "Impacts of Rail Transit on Property Values," Booz Allen and Hamilton Inc (2003) Found at: www.reconnectingamerica.org/public/show/bestpractice162
[132] New York City Department of City Planning, "Greenpoint/Williamsburg Environmental Impact Statement," *Transit and Pedestrians*, (2003) 17-33; The EIS estimates that 1,897 new trips will be created during the AM peak at the Greenpoint Avenue stop on the G train. This will result in Brooklyn Bound G trains running at 91% of capacity as opposed to 83% capacity

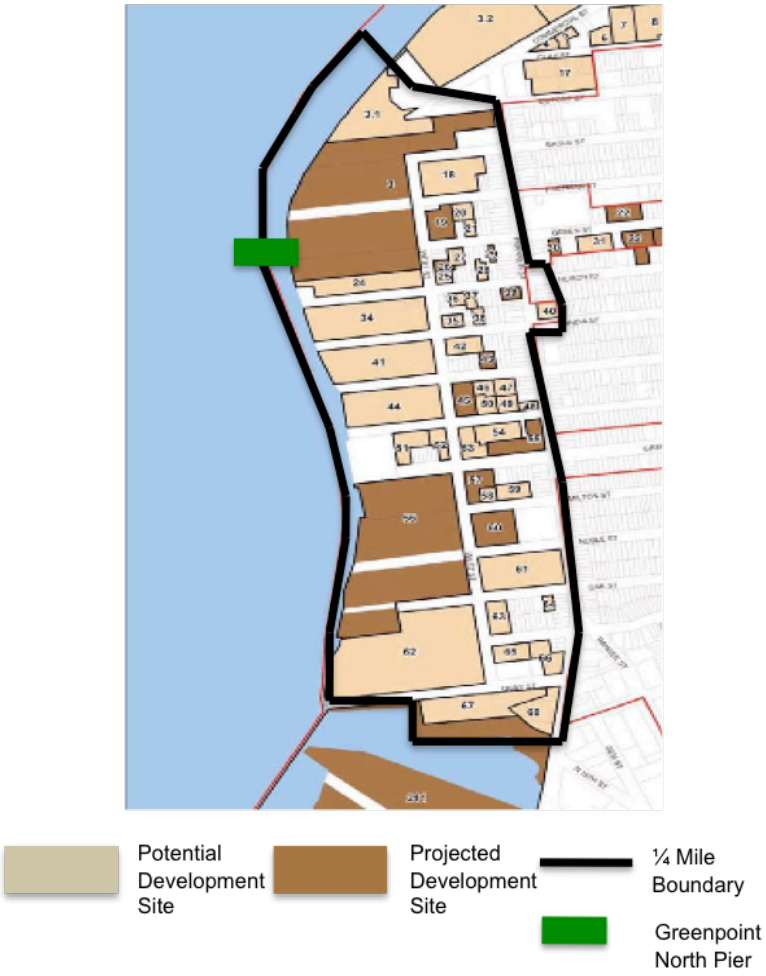

Figure 10: Proposed TIF District in Greenpoint; Map adapted from NYC Department of City Planning Environmental Impact Study (2003)

a TIF scheme would require beneficiaries of new trains to contribute to its ongoing operation.

The value added by investments in public transportation combined with the current costs associated with increased development make a strong case for implementing a Tax-Increment Financing scheme to fund future ferry routes.

A TIF Financing Scheme Applied to Projected Development in Greenpoint / Williamsburg

Implementing a 10 or 20-cent TIF on the *projected* development within ¼ of a mile of two piers in Greenpoint and Williamsburg rezoned in 2004 could raise up to $400,000-$800,000 per year.

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as would be the case if no rezoning occurred. The Bedford Avenue L train would experience the second highest increase in trips due to the rezoning. 961 trips will be created.[132] This will result in L-train cars running at 102% of capacity during the AM peak as opposed to 97% capacity with no action.

The pictures below show an area ¼ of a mile from the Northside Pier in Williamsburg (below) and the Greenpoint North pier (next page.)

As depicted in the key, properties in beige represent those that the New York City Department of City Planning identified as having "potential" for development under the rezoning. The properties in brown are those that are "projected" to be developed under the planned rezoning.

The table on the next page shows the total projected development allowed by the proposed rezoning by lot. Each lot number corresponds to the number listed on this map. These projections are conservative as they only consider the projected development, not the potential development proposed. Where a lots development is a "potential" and not "expected," the cell next to the lot number is empty.

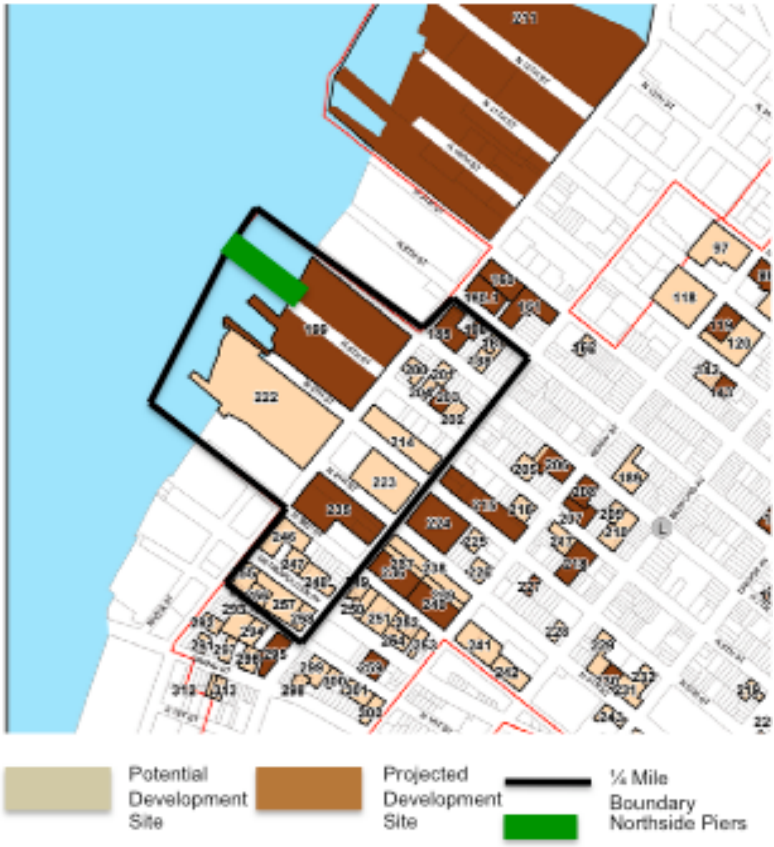

Figure 11: Proposed TIF District in Williamsburg; Adapted from NYC Department of City Planning Environmental Impact Study (2003)

Greenpoint			Williamsburg	
Lot Number	Expected Development ($Ft.^2$)		Lot Number	Expected Development ($Ft.^2$)
3			160	58,500
3.1	2,350,000		160.1	36,000
18			161	51,750
19	42,750		185	57,166
20			186	10,000
21			187	
24			188	
25			199	1,194,630
26	16,500		200	
27			201	
28			202	
29	2,640		203	18,000
34			204	
35			211	
36			214	
37			222	
38			223	
39	12,254		235	208,100
40			246	
41			247	
42			248	
43	14,982		255	
44			256	
51			257	
52			258	
Development by Neighborhood ($Ft.^2$)	2,439,126			1,634,146
Total Projected Development ($Ft.^2$)	**4,073,272**			

Table 13: Expected Development in Proposed TIF District; Source: NYC Department of City Planning Greenpoint/Williamsburg Rezoning, Chapter 1

Total projected Development	Percent Actual Development	Development $Ft.^2$ at Percent Actual Development	Revenue Raised with $.1 / $Ft.^2$ TIF	Revenue Raised with $.2 / $Ft.^2$ TIF	Cost for a 500 Ft^2. Apartment at $.1/ $Ft.^2$ TIF	Cost for a 500 Ft^2. Apartment at $.2/ $Ft.^2$ TIF
4,073,272	100.00%	4,073,272	$407,327	$814,654	$50.00	$100.00
	50.00%	2,036,636	$203,664	$407,327		
	25.00%	1,018,318	$101,832	$203,664		
	10.00%	407,327	$40,733	$81,465		

Table 14: Potential Revenues from Williamsburg and Greenpoint TIF District

Revenue

The table above shows the potential revenue raised by implementing a 10-cent tax per square foot of development in the ¼ mile of new development by two Brooklyn piers in the Greenpoint / Williamsburg rezoning areas.

To introduce a further level of conservatism, I added projections of how much would be raised if only a percent of the projected development occurred. If 100% of expected development occurs, $407,327 could be collected using a 10-cent TIF. With 25% of development, $101,832 could be collected. At a 20-cent TIF, a maximum of $814,654 could be raised at 100% development or $203,664 at 25% development.

Using the New York City Economic Development Corporation's operating expense estimates from their study analyzing the potential cost for a service to the Rockaways, we can estimate the number of riders needed between Williamsburg/ Greenpoint to make a service like this feasible. These estimates were made for a service between the Rockaways and Lower Manhattan, but were based on hourly operating assumptions. The costs per hour are similar to those quoted to me by officials from the Lower Manhattan Development Corporation, so they are within reason as baselines for a Greenpoint/Williamsburg ferry service.

Total Cost	Subsidy	Total Cost After Subsidy	Hours per year	Operations Cost per Hour	Ticket Price	Number of Passengers Needed per Hour	Number of Roundtrip Passengers Needed per Day
$1,577,782	$407,327	$1,170,455	1550	$755.13	$6	126	378
$1,577,782	$203,664	$1,374,118	1550	$886.53	$6	148	443
$1,577,782	$101,832	$1,475,950	1550	$952.23	$6	159	476
$1,577,782	$40,733	$1,537,049	1550	$991.64	$6	165	496

Total Cost	Subsidy	Total Cost After Subsidy	Hours per year	Operations Cost per Hour	Ticket Price	Number of Passengers Needed per Hour	Number of Roundtrip Passengers Needed per Day
$1,577,782	$814,654	$763,128	1550	$492.34	$6	82	246
$1,577,782	$407,327	$1,170,455	1550	$755.13	$6	126	378
$1,577,782	$203,664	$1,374,118	1550	$886.53	$6	148	443
$1,577,782	$81,465	$1,496,317	1550	$965.37	$6	161	483

Table 15 (Top): Business Plan for 10 Cent TIF per Square Foot;
Table 16 (Bottom): Business Plan for 20 Cent TIF per Square Foot

The chart above shows the number of passengers needed to sustain ferry service between Greenpoint/ Williamsburg and Pier 11 in Lower Manhattan. The model starts with the total annual costs expected by the City to operate a 149-passenger ferry from the Rockaways to Lower Manhattan.

The subsidy from the TIF is then subtracted from the annual operating costs. This total operating cost is then divided by 1550, the hours of expected operation for the ferry service. 1550 hours allows for operations during 6.2 hours of the day, 3.1 hours during the AM and PM rush periods. The hourly rate is then divided by a proposed $6 ticket price, similar to what is currently being charged to service from the far Rockaways. At this level of service, we can now determine the number of passengers needed per hour and number of total roundtrip passengers per day.

New York Water Taxi currently runs one ferry between Long Island City, East 34th Street, Williambsburg, Dumbo and Pier 11. Even with all these stops, the boat travels from Long Island City to Wall Street in 33 minutes. Given this, it is possible that this ferry service would be able to run two loops between Greenpoint, Williamsburg and Pier 11 in one hour. Further analysis will be needed to determine if this is possible.

Given that a Williamsburg/Greenpoint ferry will be serving a largely affluent clientele, a TIF financing scheme is justifiable in that it will tax the rich to provide services for the rich.

The Edge in Brooklyn is a waterside condo development directly adjacent to the proposed ferry stop at the Northside Piers. It's website currently lists 67

apartments for purchase. The apartments range in size from 490 square feet to 2530 square feet. The average size of an apartment is 1126 square feet. Prices range from $390,000 to $2,735,000. The average price is $1,077,805.[133]

Under a 10-cent TIF per square foot, the average person who purchases an apartment after May 5th, 2010 would pay $112.26 per year. If we conservatively estimate that continued ferry operation would increase the average value of their apartment by 5%, they ferry would enhance the value of their $1,077,805 apartment by $53,890. In this scenario, the TIF paid per year represents 2/10 of 1% of the assumed enhancement added by the new ferry service. If someone owned their apartment for 20 years, they would have contributed 4% of the cost of financing the $53,890 of value added from the ferry service.

Under a 20-cent TIF per square foot, the average person purchasing an apartment after May 5th 2010 would pay $224.52 per year. At a 5% assumed enhancement to their property is still $53,890. In this scenario, the TIF paid per year represents 2/5 of 1% of the assumed enhancement added by the new ferry service. If someone owned their apartment for 20 years, they would have contributed 8% of the cost of financing the $53,890 of value added from the ferry service.

[133] http://www.williamsburgedge.com/availability, Accessed 5/5/10

III. SHORT TERM RECOMMENDATIONS

Survey Existing and Potential Riders of Ferry Service

San Francisco spent significant sums of money and time identifying the local market for ferry service based on interviews with existing and potential ferry riders. Even with these studies, the primary motivations of those identified as potential users were fairly straightforward. For those living north of San Francisco who currently commute by car or bus, the message will focus on time savings. Commuters living in Alameda and Contra Costa Counties, where BART service offers a faster and less expensive commute, the marketing will focus on improving everyday quality of life.

The new routes identified by WTA are just beginning service this year. It is possible that San Francisco has done as poor a job predicting ridership as their counterparts did in New York City.

Surveys could take the form of citywide telephone surveys, or of specific neighborhoods, or of subway riders where ferry service may improve commute times. Finally, a survey could analyze ridership of people who currently take ferry service from the Rockaways to Lower Manhattan. This service will be in operation through June 30th.

It will be important to identify the price-point that commuters are willing to pay for ferries compared to the bus or subway. The survey should identify the impact of headway interval length. While headway intervals do not appear to impact service in other cities, New York is unique in the wide range of public transit available at frequent headway intervals. It is possible that New Yorkers are more sensitive to frequency of service than people living in other cities.

Further analysis would also consult with agencies and consulting firms that have expertise in forecasting ferry ridership. This could include discussions with the consulting firm that produced the ridership modeling for San Francisco. This company also conducted the survey of passengers taking the South Amboy ferry service for New Jersey Transit.

Pursue Short Distance Routes

With a few exceptions, the routes in existence nationally are relatively short. Fuel costs can represent 30-40% of a ferry services budget; so increased distances will increase the marginal costs for operations.

Long distance routes work better if paired with short-distance routes with high farebox recovery ratios. An example of this can be seen in San Francisco, where the WETA will take over a 24-mile route between Vallejo and San Francisco. It will also be operating a number of shorter distance ferries. The Washington State Ferries operate a 16-mile ferry between Bremerton and Seattle, but this is part of a

statewide network serving 65,000 passengers daily. If New York wants to operate routes that are far from their final destination, it needs to make these routes part of a larger network or be prepared to heavily subsidize their operations.

Short distance trips can reduce capital costs and and allow operators to offer the convenience of frequent service. The New Jersey routes are short enough that the same vessel can make one trip several times over an hour.

Develop Routes for Commuters with a Disposable Income

Ferry routes should be developed for those willing to pay for a premium commute. The San Francisco marketing study explicitly states that WETA is not targeting existing BART commuters. The rational for this is not explained, but it is possible that their market research concluded that most public transit commuters either couldn't afford or were not willing to pay for an enhanced commute.

In Monmouth County, Manhattan-bound commuters have the choice of taking a New Jersey Transit train to Manhattan, but a large plurality choose the ferry to reduce trip times.

This and other evidence suggests the market for ferry service in New York will be limited to those willing to pay for a better commute. New Yorkers already have good commute options – ferry routes will improve on these options, but they have not drawn a high number of middle-income commuters when a good rail connection is available.

An argument can be made for the positive policy benefits of this approach. After decades of the middle and upper-middle classes fleeing to the suburbs, these populations have begun to move back to the cities. Cities can attract and retain these populations by accommodating the premium they place on their time and their quality of life.

Planning services for a premium population means that subsidies will need to be drawn from the wealthy, as opposed to the general population.

Construct Indoor Terminals or Experiment with Seasonal Service

The significant ridership shifts during the winter months for both the Yonkers and the Rockaways service compared to the New Jersey ferry routes suggest that routes without indoor terminals will experience large ridership decreases during the winter months. Ridership on the Yonkers and Rockaways service declined by 20-40% during the winter, but ridership for New Jersey's routes declined only 5-9%. San Francisco's WETA has recognized the importance of enclosed facilities and is planning to construct new facilities as part of its long-term strategy.

If this is cost-prohibitive, a seasonal service running from April through October could also be explored. This may have the impact of limiting ridership.

Connect New Ferry Service to Broader Issues

Making the connection between new ferry service and established policy goals will strengthen the public argument for ferry service. In San Francisco, the WTA's 2003 Final Operating Plan made a case for a regional ferry system's importance as both a security measure in the even of an earthquake or terrorist attack. Given the national focus on security and the emerging focus of climate change, their message echoed with the public.

In New York, ferry advocates could tout the economic development benefits, or make the case that ferry service is needed to address system-wide congestion.

Start Small to Pursue Ambitious Long-Term Goals

San Francisco's Water Transportation Authority was created in 1999 to study the possible consolidation of existing ferry service and to study new routes. This small step led to the creation of what is now the Water Emergency Transportation Authority, which will operate several new ferry routes in the Bay Area. The San Francisco case study shows how starting small can lead to the realization of big policy goals in the long-term.

III. FERRY CORRIDORS FOR FURTHER ANALYSIS

The corridors described below were selected for further exploration. All would serve a population willing to pay for a premium commute and are short in distance.

In addition to the transportation benefits for those taking ferries from these routes, all would add redundant services and relieve crowding on subway lines experiencing peak hour congestion. In fact, most would draw from some of the most crowded subway lines in the city (4, 5, 6, L, 7).

Brooklyn/Queens East River Service

Potential Stops: Queens West, Hunter's Point, Greenpoint, Northside Piers, Shaefer's Landing

The East River waterfront of Brooklyn and Queens experienced significant residential development during the 1990s and 2000s and will be a key neighborhood to accommodate New York City's growth in future decades. Development has been built for high-income earners who may be willing to pay for a premium commute. Service could also serve those commuting to businesses on Water Street, which is a 5-10 minute walk from the 4,5 trains.

In nautical miles, Queens West's developments are 4.3 miles from Pier 11. They are 1.2 miles from the East 34th Street ferry terminal. Not only is this location directly adjacent to the NYU Medical Facility and blocks from the city-sponsored East River Science Park, ferry routes here could be served by Bus Rapid Transit, which the City will soon implement on East 34th Street. The city's plans calls for a grade separated bus lane that will speed bus service across town by 35%.

East Side of Manhattan

Potential Stops: Carl Schurz Park (86th Street), United Nations, Con Edison Waterside Site, East 34th Street ferry terminal, Roosevelt Island.

The East Side of Manhattan is home to an affluent population that is currently underserved by existing rail options given its density. Residents of East End Avenue walk at least ½ a mile to the 86th Street Station of the Lexington Avenue subway. Even when the Second Avenue Subway is built, these residents will walk at least 2/5 of a mile to the nearest subway station. Furthermore, the new subway will only make stops at 96th, 86th, 72nd and 63rd Streets, leaving a large catchment area of the neighborhood without convenient access to the new subway.

The demand for improved service to Lower Manhattan can be seen by the popularity of a taxi stand at York Avenue and East 79th Street. Four passengers at a

time pay $6 each way for service to Wall Street.[134] If these commuters are diverted to ferry service, this route could have positive environmental benefits.

Service from the Upper East Side could also connect to the former Con Edison Waterside site, which was rezoned in 2008 to allow for 6 Million Square feet of residential, commercial and retail over 9.2 acres in-between the UN and the East 34th Street ferry terminal. Opportunities may also exist to add a stop at Roosevelt Island, where new residential been developed in recent years.

From Carl Schurz Park at 86th Street, Pier 11 is 6.5 miles by sea. It is 8.5 miles from the World Financial Center.

West Side of Manhattan

Possible Stops: Riverside South, West 42nd Street, Hudson Yards, West Chelsea

The West Side of Manhattan has experienced or is expected to experience significant residential development in future years. Recently, residential units have been developed at Riverside South and in Hell's Kitchen. The City has also upzoned the Hudson Yards between 28th and 42nd Streets and the High Line District between Tenth and Eleventh Avenue from West 16th to West 30th Street.

Given the scale of potential for new development on the West Side, new ferry service could be an attractive option for its residents.

Staten Island

Possible Routes: St. George to Midtown, Others TBD

Unlike the rest of New York City, Staten Island is not connected to the central business districts by rail. In addition, Staten Island's population grew at 9.8% between 2000 and 2008, a rate that far outpaced the rest of the other four boroughs.

Given the lack of transportation options, new ferry service from Staten Island would create a one-seat ride to West 39th Street, or connect those commuting to East Midtown via East 34th Street. Existing ferry service from Whitehall Streets allows west-Midtown commuters to transfer directly to the 1 train and the R/W train. Those commuting to East Midtown walk ¼ of a mile to the 4,5 trains at Bowling Green. New service would have citywide benefits of reducing congestion on the packed Lexington Avenue express trains.

During interviews, one transportation professional suggested a route from Staten Island might be fully supported by farebox revenues. New service could depart

[134] Michael M. Grynbaum, "Stand that Blazed Cab-Sharing Path Has Etiquette All Its Own," *The New York Times*, (June 18, 2009)

from the Saint George Terminal or from another location in Staten Island to attract a park and sail ridership.

At a distance of 9.5 miles, a ferry service from St. George to East 34th Street would be longer than many of the routes examined here, but nowhere near as long as the trips from Yonkers to Lower Manhattan or the Rockaways to Lower Manhattan. In addition, new Staten Island service may accommodate those currently taking either a two or three-seat ride to reach work.

Of course, further market research and analysis will be needed, but a route from Staten Island is an obvious choice for new service given its large population and its limited connectivity options to Midtown.

IV. CONCLUSION

This paper sought to understand why publicly funded ferry service has failed to succeed in New York City. Expanded ferry service has received support from the Speaker of the City Council and, to a lesser extent, from the Mayor's Office. Given Manhattan's geography as an island and the current pressures on New York City's existing transportation network, the development of new ferry service seems a logical way to spur waterfront development and provide new transit options.

As we have seen, the development of a subsidized ferry service in New York will face significant challenges. The existing network of ferries between New Jersey and Manhattan is 100% private and enjoys a number of advantages over recently attempted publicly funded routes in the Rockaways and Yonkers. The NJ lines are shorter in length, serve a wealthier clientele and enjoy enclosed, weather protected facilities. Furthermore, the New Jersey ferries generally provide the fastest and easiest routes to Manhattan's Central Business Districts, while the Rockaways and Yonkers ferries compete with a world-class subway and commuter rail network. While the New York ferries may offer a less crowded commute, they do not offer the benefits and convenience that the New Jersey ferries do.

The experience of other cities with urban ferry systems does not provide a clear path forward for New York. San Francisco's example offers a blueprint on how to create a consolidated system of ferry networks, but the system itself is, as of now, untested. In addition, in San Francisco a number of key factors may explain its regional advantage when it comes to maintaining the ferry services. These include its geography, the limited number of bridge and tunnel connections to its central business district (compared to New York), and the region's history of localities subsidizing ferry service serve as regional advantages. Boston's ferries began during a major highway reconstruction in the 1980s and it's unclear why they remain in operation. And Seattle's system is made possible because the State of Washington never bridged most of the Puget Sound. The Seattle portion of the larger statewide network appears to be financially supported by the large statewide ferry service serving passengers and cars.

In the final Chapter, based on the small amount of financial information available this paper offers suggestions for future ferry routes for a New York ferry system and proposes a funding scheme for a Williamsburg/Greenpoint ferry.

While the reality of expanded ferry service in New York has been disappointing so far, its promise is still compelling. New land for residential development is in abundance near the waterfront. If New York City's population does indeed increase by one million by 2030, new forms of transit will be needed. Ferry services that serve and are subsidized by an upper middle class could be a component of serving future transit demands and a means of attracting and retaining these residents in the long-term. However, until this residential development takes place on or near

the city's waterfront, the demand for ferry travel will not be sufficient to justify broad regional ferry services in New York City.

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