



Comprehensive Boston Harbor Water Transportation Study & Business Plans:

Best Practices

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1. Introduction

Boston Harbor Now (BHN) is coordinating a strategic planning study for water transportation, the *Comprehensive Boston Water Transportation Study and Business Plan* (the Comprehensive Plan). This work is being done on behalf of and with financial support from the Massachusetts Department of Transportation (MassDOT), the Massachusetts Port Authority (Massport), the Seaport Economic Council of the Executive Office of Housing and Economic Development (EOHED), Massachusetts Convention Center Authority (MCCA), the Barr Foundation, the Cabot Family Charitable Trust, Envoy Hotel, and Clippership Wharf. The aim of the work is to create the foundation for an expansion of the current water transportation system in Boston Harbor within a one- to five-year timeframe in order to accommodate current and future developments in the region and to enhance the use of the leisure and cultural amenities in Boston Harbor as well as providing an additional transit option for trips in the region.

This document is the third deliverable for the Comprehensive Plan. It focuses on the key characteristics of a ferry system that contribute to a successful service. This includes a critical review of the strength and weaknesses of comparable ferry services with identified best practices and lessons learned for system implementation, organization, and operations with examples from systems in the continental United States as well as several systems from other countries. Five ferry systems are profiled in short case studies at the end of this document.

The document is structured to present the summary of these key characteristics of successful ferry services with healthy ridership, revenues, overall financial stability, and expanded transportation access, among other factors. A separate document prepared for the *Water Transportation Strategy for the Boston Harbor Islands National and State Park* will outline best practices for serving island parks with ferries.

2. Best Practices

There is no single factor for successful ferry service. Each regional and local market has its own unique characteristics including weather, legislative guidelines, governmental organization, demographics, and density of ridership in addition to access to and competition from roads, buses, and trains.

Time and fare competitiveness is fundamental to attracting ridership and building a successful service. To do this, a service must be located in an area that has a large passenger base to draw from. With increased population density, there is greater potential ridership. Similarly since commuter customers traveling to work up to five days a week are more likely to use a service more frequently than leisure riders, locating a new ferry dock within a large commuter base is essential for increasing ridership potential. This is not to say that leisure riders would necessarily utilize the same route, but where possible, service scheduled to accommodate midday and evening ridership can support leisure passengers during the day outside of peak commuting hours.

System integration is another important facet of a successful service. The service should be easy to use as part of a regional network of other transportation options. If it is part of the public transit system, the branding should be recognizably consistent and fare collection should be integrated. There should also be intermodal connections, through location of terminal and synchronization of service, with other ferry services and other local transit options.

Sustainable funding is critical to the viability and sustainability of ferry service. It is particularly important for going from start-up to mature service by providing reliability for operators and users that the service will be maintained. Services with perennial funding deficits or without the funding for necessary maintenance and improvements are unlikely to persist.

Other key factors that will be considered as lessons or guidelines for future service implementation include:

- Service delivery model – what model are other services using and why;
- Type of service offered – what type of service is typical on successful routes;
- Operating characteristics to maximize efficiency – what is important to keep the schedule;
- Contribution to system resiliency – how can a new route meet multiple goals by serving as a daily transit solution and function as part of an emergency response or disaster recovery program;
- Environmental Practices – how can a system be more fuel efficient and use other conservation techniques and technology to reduce their emissions and their carbon footprint; and
- Measurable performance standards – what metrics do other system utilize as tools in order to convey their performance and ultimately measure success.

Ferry services can also be successful when they confer significant external benefits such as diverting car trips from roadways, improving local real estate values, and generally contributing to waterfront usage or re-development. These types of benefits will be considered during later stages of the Comprehensive Plan.

Comparable systems reviewed as part of this analysis are listed below in Table 1. They were chosen for their characteristics of location, ridership, service delivery type, and funding source.

Table 1: Key Information about Domestic Systems Reviewed

Ferry System	Annual Ridership	Number of Routes	Service Delivery Method	Funding Source
New York City Ferry (NY) (East River ferry only)	1,467,860	1 route with 8 stops ¹	Public/Private	Fares, local/state subsidy
New York Harbor (NY) Private Passenger Ferry Services	9,704,890	21 routes with 16 stops	Private/Public	Fares, local/bi-state subsidy
King County Marine Division (WA)	515,200	2 routes, both travelling to one hub terminal	Public	Fares, local property tax levy
Kitsap Transit (WA)	740,000	2 routes, both serving one hub terminal	Public	Fares, local subsidy
San Francisco Bay Ferry (CA)	2,091,300	4 routes	Public/Private	Fares, tolls, local subsidy
Golden Gate Ferry (CA)	2,540,000	3 routes	Public	Fares, tolls, local subsidy

In addition to the systems above, the following ferry systems were reviewed for best practices in transit system integration and service delivery methods: Sydney’s Harbour City Ferries in Australia, Istanbul Fast Ferries (iDO) in Turkey, Oslo’s Ruter in Norway, and Hong Kong ferry systems. It is notable that all these international systems are public/private partnerships with varying degrees of public assets used in service. Existing service in Boston Harbor operates under a similar partnership with the Massachusetts Bay Transportation Authority (MBTA) contracting with a private operator, Boston Harbor Cruises, on its three routes and the City of Salem doing the same. The MBTA owns the vessels operation on one of the routes and Salem owns their vessel.

Time and Fare Competitiveness

Time competitiveness will be a key consideration for locating and implementing new ferry routes based on the ridership demand and forecasting of the Comprehensive Plan. Competitiveness with other modes will also impact the ultimate ridership of a new route. New ferry service is more likely to thrive in the overall transportation network when it provides a link that is not a current connection and when it can save users time, money, or both. As congestion continues to increase on roadways and transit systems, ferries can provide an alternative; however, a service’s impact on congestion is dependent on vessel size and the potential ridership of the areas being served.

The New York City Ferry (NYC Ferry) East River Service provides consistent and frequent ladder-style service, the best model to serve the geographic needs along the East River, at a fare that is comparable to the subway fare. The Kitsap Fast Ferry, with its Bremerton service implemented in July 2017, is a rapid service that cuts travel times in half relative to the existing service provided by Washington State Ferries. The fare structure was established to charge only a minor premium (\$2 more in each direction) for this time savings. San Francisco Bay Ferry provides a faster and more direct ride with an improved user experience than the predecessor services it replaced. While user experience alone cannot overcome a lack of time or cost savings, it does play a role in the decision of passengers to use the service.

¹ One of these stops is Governors Island, which has seasonal service only.

The privately-run and planned New York Harbor services that link New Jersey to Manhattan across the mouth of the Hudson River comprise a vast system that is more than four times larger than the NYC Ferry Service, though it has less than half the ridership of the Staten Island Ferry. This scheduled system – operated by New York Waterway, Billybey, Seastreak, and New York Water Taxi – covers its operating costs from the farebox. It is the only major commuter ferry system known to do so.² Fares vary but can be as high as \$675 for a 40-trip pass (\$16.88/ride) on the longer-distance Atlantic Highlands to Manhattan routes. Several factors contribute to the system’s financial sustainability: routes are mostly short with low-operating costs per passenger, there is a high density of residents and employment near piers; there are good upland transit connections, and there are significant time and reliability advantages over alternative transit options.³

Systems that are working well and experiencing growth have the competitive advantage of time or cost to offer to customers. These can be decisive factors for the success of a new service. In the case of Istanbul, like many waterfront cities, ferries have been a part of the transit fabric for over 100 years; however, the system is adapting to new transportation options and competition from other modes including a new train tunnel under the Bosphorus.

System Integration

Successful ferry services with high ridership are easy to use. The ferry system should be integrated into the overall transportation network of roadways and transit. System integration includes:

- Well-synchronized schedules and docks proximate to landside transit connections;
- Integration with the existing fare collection framework;
- Integration of branding and wayfinding signage; and
- Service information integrated into existing data and information systems including websites and smart phone applications.

It is extremely important that landside transit connections are in close proximity and provide synchronicity of service. In each of the service examples analyzed, the ferry terminal or docking location is located within a short distance of connections to bus, light rail, rail or subway service. Most of the domestic routes analyzed converge at ferry service hub that with connections to landside transit network.

The King County Water Taxi and Washington State Ferry terminal hub in Seattle is located within a three-minute walk of the transit tunnel with regularly scheduled bus and light-rail service. The connecting modes arrive frequently enough that schedule synchronization is not necessary. Both the San Francisco Ferry Terminal Building and the Staten Island Ferry terminal at Whitehall are located within transit hubs connecting to bus, subway, or train. The privately-run ferries linking New York and New Jersey enjoy good subway connections at the Manhattan piers and good commuter rail, subway, light rail, bus or park and rider connections on the New Jersey side. Good landside connections also characterize the spoke end

² The financial details of New York Water Taxi’s regular scheduled routes are unknown because private services do not report this data to the National Transit Database. Since it is the smallest operator of the four, we still conclude the privately-run system covers expenses from the farebox.

³ For details see Halcrow, Inc., 2010. *Interagency Study of Regional Private Passenger Ferry Services in the New York Metropolitan Area*. Report submitted to the PANYNJ.

of the Seattle-area systems with transit service at the Vashon Island terminal, Bremerton, and Bainbridge. The Kitsap Fast Ferry service to Bremerton has synchronized just-in-time bus service to either drop off or pick up ferry riders.

The international examples examined have the same type of synchronized service schedule and proximity to transit connections, including major bus and train transportation hubs, to ensure easy transfers and provide increased options for users. Proximity and access to pedestrian and bicycle routes was also a feature of all of the examples studied. This kind of transit and multi-modal integration provides passengers with options that enhance the flexibility and ease of access in the transition between modes.

Fare integration has two components: fare structure, which determines the prices set based on destination or route, and fare collection, how passengers pay for their ride. In Washington State, fare collection is fully integrated; however, the fares are structured differently for each mode – light-rail, bus, and ferry. The fares are controlled by the public agency responsible for the delivery of each of the services. Conversely, NYC Ferry service has a fare structure set up to replicate the pricing of the subway system, but a separate fare collection system has caused some confusion and led to criticism. In the Seattle region, multiple public transit agencies and authorities accept the same regional fare collection card (ORCA) across passenger ferry systems, light rail, and bus service over four counties. A similar integrated fare media is available in the San Francisco Bay Area with the Clipper card, which is accepted by all 27 area transit operators and in some parking lots.

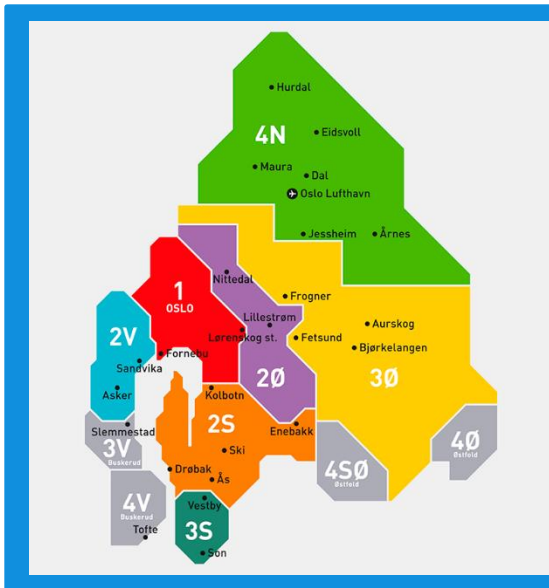


San Francisco, CA : Clipper Card Transit Providers List

In the Bay Area, the Clipper card allows users to pay fares on 27 different transit systems. The card holds cash value as well as passes that work on particular systems. They system also allows for differentiated discount pricing for youth, seniors and people with disabilities. The MBTA’s Automated Fare Collection (AFC) 2.0 will offer many of these features when it is rolled out in 2020.

Image source: www.clippercard.com

Integrated fare collection is available abroad on heavily-used systems. These include the Opal Card in Sydney, the Octopus Card in Hong Kong, the Istanbul Kart in Istanbul, and Travelcard in Oslo. In each of these systems, one fare collection device (card, coin, or ticket), can be used for different transportation modes. Hong Kong’s Octopus Card is particularly unique because the stored value card is accepted on most public transit modes and can also be used at convenience stores and supermarkets.



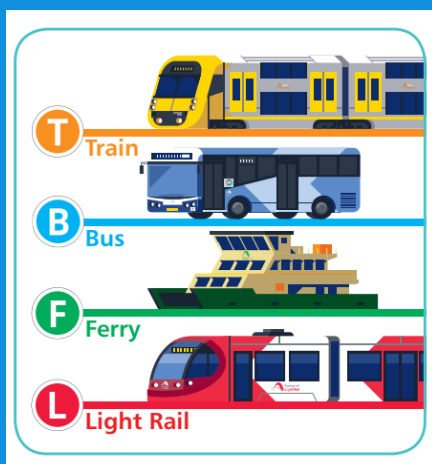
Oslo, Norway : Ruter Zone Map

Much like the MBTA’s Commuter Rail Zones in Greater Boston, there are fare zones for the entire public transit network of Oslo, Norway which includes Metro, tram, bus, ferry, and train services. The Ruter ferries are integrated into the zone-based fare system, allowing riders to easily calculate fares and track transfers between modes

Image source: www.ruter.no

Centralized and integrated system information helps first-time and leisure travelers as well as seasoned commuter passengers to make better use of a ferry system. Departure notifications, digital applications, and system trip planning tools all improve the ease of use for transit systems. Clear, integrated wayfinding and signage also aids both commuter and recreational riders. This seemingly simple strategy can often be difficult to implement when partner agencies have different branding protocols. Yet regardless of what the sign looks like and whether it shares integrated system branding, it must do the job of communicating where the ferry terminal is located and how to get there.

In Washington State, OneBusAway is a smart phone application for regional trip planning around the Puget Sound that factors in all modes including ferries. Its utility is limited though because the different agencies providing the service – Washington State Department of Transportation, King County, and Kitsap Transit Agency – do not always design routes or schedules that produce effective multi-modal trips. Additionally, each agency has its own branding for services. Sydney and Oslo’s trip planning technology and branding are both very cohesive, in part because they are managed by a single agency.



Sydney, Australia: Transport for NSW Mode Identification

The Sydney ferry system is part of comprehensive system-wide branding. Throughout the system, ferries are identified with an “F”, buses with a “B” and trains with a “T” on all transit maps and other signage.

Image source: www.opal.com

Sustainable Funding

Like most public transportation operations in the US, very few year-round passenger ferry operations are sustained entirely by operating revenue even when combining fares with some combination of advertising, charter/cruise, and concession revenue. The privately-run services between New Jersey and Manhattan are a unique case with a confluence of beneficial market characteristics including a dense, high-income base of commuters with a high willingness-to-pay, relatively low operating costs per passenger, and limited competitive alternative transit options.

Having sustainable funding, whether from the fare box or from additional sources, is crucial to signaling to users that they can rely on ferry service for their transportation needs. Without this sense of reliability, it is harder to entice riders to choose ferry service over their existing mode of transit, so a clear signal that a service is on solid financial footing is important to developing a consistent user base. As an industry standard, ferry service is not considered mature from the standpoint of the provider a new until up to five years after initial implementation, and until then, its financial model cannot be directly compared to those of mature services.

A variety of local, state, and federal transportation and economic development funding and partnership programs can be tapped to help with capital investments; however, subsidizing ongoing operation and maintenance typically falls to local tax payers. Grant programs like Federal Highway Administration's Ferry Boat Program and the U.S. Department of Transportation's Transportation Investment Generating Economic Recovery (TIGER) are generally applicable to capital spending only and are awarded through competition. Ferry programs may not compete well on their own against transit services with higher ridership. Collaboration with other transit operators and municipalities can be critical to improving competitiveness. Formula programs, like the Federal Transit Administration's Urbanized Area Funding 5307, are allocated based primarily on route miles and population. They also may not be available to a new service for three years. In some regions, dedicated state or local funding options are available for ferry services after securing legislative appropriation or voter approval. General tax funds may also support ferry service, but most jurisdictions are balancing limited local revenue with a high demand for other government services. In the Pacific Northwest, King County Water Taxi is funded by legislated property tax, and Kitsap Fast Ferries are funded by a voter approved sales tax. To cultivate willingness for local tax measures, the ferry providers and advocates may consider engaging communities and stakeholders early and meaningfully in the development and planning process.

In certain circumstances, a private employer, business, or real estate developer has been willing to underwrite a portion of the operating costs for passenger ferry service in exchange for the guarantee of a certain level of service or number of boardings or where an employer's "shuttle" services might provide off-hour service at reduced costs. The Water Emergency Transit Authority (WETA), who operates the San Francisco Bay ferry, and Google ran a pilot program in 2014 to serve the Google campus near Redwood City. A private firm in Seattle is also interested in this type of arrangement. To date, neither of these public/private partnerships has led to long-term service, though a new terminal at and service to Redwood City is planned for 2022. In New York, a private ferry is operated on behalf of Goldman Sachs with the sole purpose of transporting its employees from one side of the Hudson River to the other between office locations. This service is operated by NY Waterways which operates another route on the Hudson. Partially because the service lands at a public facility, it is open to the public, for a fare. There is landing fee charged to the operator of the services, but it is low enough to be considered a form of

subsidy. Although there is not yet a long-lasting example of an employer-sponsored service, as the challenges of increasing roadway congestion and the pressure to remain competitive in attracting highly skilled workers grow, waterborne transit will continue to be pursued as a way for employers located in urban cores to offer an attractive commuting option to employees

Assessment of a new route should include the development of a business plan that addresses both the near-term capital and operating costs of building a start-up service and growing it into a mature service with sustainable, long-term funding streams. The business planning process should include a sensitivity analysis for varying inflation rates as well as ridership and fare revenue realization. Cash flow requirements will be very different at start-up, where capital investment in new infrastructure is high and initial ridership may be low. In the development of a business plan it is important to develop a funding portfolio that incorporates adequate and appropriate revenue sources. In highly urbanized areas where land based travel times are long, the speed and ease of passenger ferry service may support relatively high fares. Conversely, when there are other competitive modes, passengers are less willing to pay a fare premium.

Service Delivery Model

Service delivery models define how ferry services will be organized and managed to serve passengers. Different models for service delivery include varying levels of involvement by a public transit agency or a quasi-public agency such as an economic development council or transit district. There are three basic models for service delivery: direct agency delivery, public/private partnerships, and private contract provision.

Direct agency delivery of service offers the most control over operations and the least risk of coordination challenges, but it also represents the greatest amount of work and the most risk of public criticism and political fallout. This option also requires the greatest amount of infrastructure development and commitment of time and public resources by the agency. Examples of direct agency delivery of service include King County Marine Division (WA), Washington State Ferries (WA), Kitsap Fast Ferries (WA), Staten Island Ferry (NY), and Golden Gate Ferry (CA).

Public/private partnerships allow the agency to remain engaged while purchasing specialized services. This option attempts to take advantage of existing skills and experience within the agency and supplement it with external contracts. Public/private partnerships require additional coordination and there is a greater risk of conflicting interests; however, this option is attractive as an initial implementation option that can be modified in the future.

Public/private partnership contracts can be organized in several ways. A public agency may own and maintain vessels and own or lease facilities while a private contractor crews and operates vessels and facilities. Alternatively, a public agency may own or lease facilities while a private contractor owns or leases the vessels, operates and maintains vessels and facilities, and contracts crew.

This contracting model is by far the most commonly implemented service delivery model. In Boston, the MBTA has a public/private partnership with Boston Harbor Cruises. Other domestic examples include NYC Ferry operated by Hornblower and the San Francisco Bay Ferry's contracting relationship with Blue and Gold Fleet. All of the international examples examined contract operations out to a private entity. For

some services, this is a relatively new system organization. Sydney transferred its ferry operations to a private company in 2012, and Hong Kong recently made the shift as well. Among the examples, the most prevalent differentiating characteristic is whether the public agency owns the vessels.

Privately owned and operated service delivery is provided exclusively by a private operator. Unlike public or quasi-public ferry service providers, privately owned and operated ferry services are ineligible for federal grants for capital improvements or for local funding subsidies. This option is therefore much less common since private ferry operators must recover all capital and operating costs through fares. Blue and Gold Fleet provided commuter service between San Francisco and Tiburon, but since this service has not been profitable, the Golden Gate Ferry Board has authorized moving forward with a new partnership to continue providing this commuter service.

Private ferry operators are not necessarily required to build the necessary dock infrastructure for services though. In Massachusetts, two private ferry companies serve Provincetown where the ferry dock was built with public funds.

Type of Service Offered

Ferry service types vary depending on the needs of a region or community and scheduled service responds to the optimal route type to serve that demand. Variations may include hours of service and seasonality as well as route configurations. Demand for ferry service is often highest during peak commuting periods, but some routes support demand throughout the day. In New York, the service runs more frequently during morning and evening peaks to meet the commuter demand for service, but there is sufficient sustained demand throughout the day and into the evening to support ferry service. In Seattle, the King County Marine Division provides expanded service on one route in the summer months with high tourist demand.

Many ferry routes offer point-to-point service by crossing large water bodies directly. In many cases, making an additional stop is inefficient for a quick commute and eliminates the time savings. To be time competitive with other transit modes, the Kitsap Fast Ferry is a point-to-point route with no stops. Alternatively, some routes serve as connector with multiple stops. The NYC Ferry makes multiple stops along the East River route; passengers can board and disembark along the way at any ferry dock location.

Operating Characteristics to Maximize Efficiency

Optimizing operations can improve transit time and reduce fuel consumption, and for commuter ferry service, decreasing travel time will increase time competitiveness with other transit modes and make ferry transportation more attractive for potential passengers. Operating boats at top speed can decrease fuel efficiency so streamlining systems can allow for more fuel-efficient cruising at steady speeds while meeting the published schedule. Some efficient operational considerations include siting facilities, improving how the crew interacts with the docks and passengers, and designing docks for passenger throughput and queuing as well as the boats themselves.

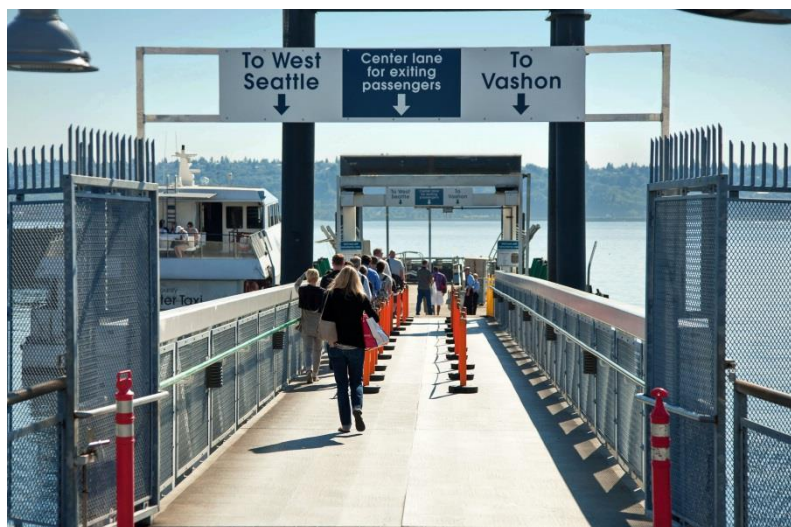
Improve facility location: Locating terminal facilities to allow vessels to reach cruising speeds quickly is one way to increase efficiency. Whenever possible, ferry terminals should be sited to locations with long slow down zones or with environmental hazards or sensitive areas that would require operation at lower

speeds. The Golden Gate Ferry is restricted to lower speeds when approaching the Larkspur Terminal due to the narrow channel and sensitive areas.

Minimize crew activity at the dock: Minimizing the time spent by the crew in securing the vessel can be achieved through designing the tie-up infrastructure to be easily handled by the crew. One example of this is the use of hydraulic ramps that are built into the float operated by the crew. King County Marine Division has designed specialized ramps for new vessels that fit the boarding stations and can be easily reached by crew.

Reduce the amount of time for fare collection: Mobile ticketing applications, handheld card readers, and ticket vending machines can eliminate the need for crew to handle cash as passenger board, thus reducing the time at the dock.

Queue passengers efficiently: To minimize loading time and stay on schedule, locate passenger queuing areas as close to the end of the pier as is safely possible and provide adequate ingress and egress width. Seattle has developed clear signage for queuing and capacity for riders proximate to vessel docking as shown in the photo of Pier 50 below.



Increase the throughput of passengers: Bow-loading vessels provide wide ingress and egress of passengers when boarding and disembarking the vessels. Having multiple boarding doors for egress can increase the passenger throughput and decrease the required dwell time for loading and disembarking passengers. The NYC Ferry fleet includes bow loading vessels for more efficient boarding. The King County Marine Division vessels have two boarding stations to move more passengers when loading and unloading the vessel.

A set of performance measurements that takes these operational considerations into account can be used to monitor the effect of efficient design over time.

Contribution to System Resiliency

In urban regions divided by large bodies of water, water transportation can be a critical component of emergency response. If bridges or roadways become inaccessible, ferries can transport emergency

responders to locations in need of assistance and can transport people to safety. This function was been demonstrated in New York City during the September 11, 2001 attacks on the World Trade Center and during the massive Northeast Blackout power failure in August of 2003. In the San Francisco Bay Area, WETA was created to provide transportation service during emergencies that affect the regional transportation system. They maintain an Emergency Water Transportation System Management Plan for emergency response.

Ferry systems that are part of a city or region's emergency response and disaster recovery planning may be eligible for additional sources of funding.

Environmental Practices

Implementing sustainable environmental practices for shoreside and vessel operations is a best practice for ferry providers. While operators must comply with a variety of environmental regulations, there are opportunities to leverage alternative fuels, vessel design, and general business practices that can further improve environmental sustainability.

The use of alternative fuels for ferries and hybrid diesel-electric systems are being explored by ferry operators around the world. Some operators have been designing and installing liquefied natural gas (LNG) propulsion systems retrofitted into large passenger and vehicle ferries. Although LNG ferries have significantly lower emissions, the size of the fuel tanks and complexity of the associated fuel management system make its use on small, high-speed passenger-only ferries challenging. Biodiesel has also been tested by ferry operators with mixed results. While the test ferries were able to operate successfully, the lubricity characteristics of biodiesel required other fuel additives be used to reduce maintenance costs. Biodiesel can also be more expensive than traditional fuels. King County Marine Division chose to phase in a 10-percent biodiesel blend in 2015. Ultra-low sulfur diesel can reduce the sulfur content and other pollutants in the air emissions from the ferries, but ultra-low sulfur fuel does not have the same lubrication properties as low sulfur fuel, which can cause maintenance issues. Generally, these challenges have been overcome and the use of ultra-low sulfur diesel is expected to expand. San Francisco Bay Ferry has added two new ultra-low sulfur diesel vessels to their fleet.

To reduce adverse environmental impacts, vessels can be modified or constructed to minimize energy use, air emissions, discharges to water, use of hazardous materials and environmental contaminants, waste, and scrap. During construction, vessel manufacturers can also maximize the use of recycled and recyclable, rapidly renewable, and regional materials. By being aware of the energy effect during construction, materials can be selected that balance cost with environmental benefit, durability, and maintainability. Examples include the use of recycled steel and aluminum, high solid/low volatile organic compound paints, and flooring materials and interior finishes made of recycled materials.

Before designing modifications that improve the environmental friendliness of new or existing vessels, the operator should assess the power required to support ferry operations, and optimizing vessel performance to minimize environmental impacts while meeting the required power.

While vessel design and fuels are the main focus in moving toward environmental sustainability, shoreside policies can also improve environmental practices for ferry operators. The Passenger Vessel Association (PVA) Waters program encourages green business practices and provides tools for operators to implement including improving recycling opportunities, going paperless as an organization, and

purchasing more energy efficient appliances. King County Marine Division is a member of this program and has implemented a number of recommendations by improving recycling and the use of LED lighting and Energy Star rated equipment in their terminal improvement projects.

Measurable Performance Standards

Performance metrics that monitor performance over time can provide information on how operations are working and which operational modifications should be considered to continuously improve the quality and effectiveness of ferry service. Examples of common performance metrics include:

On-time performance: Documenting when a vessel departs in relation to the published sailing schedule is a simple measure of on-time performance. On-time performance metrics vary by operator. The Staten Island Ferry is required to report any sailing that departs five minutes after the published sailing time to the Mayor of New York City.

Trip reliability: Monitoring missed or canceled trips tracks the reliability of ferry service. When ferry service has a stronger track record than other modes of travel, publically sharing this data reinforces the value of opting for a ferry over a potentially congested driving trip with variable travel times.

Fuel consumption: Tracking fuel usage can indicate if adjustments should be made to transit speeds or other aspects of vessel operations adjustments to stabilize or reduce fuel consumption.

Vessel availability: The availability of vessels that can be brought into service when other vessels require planned or unplanned maintenance is critical and should be assessed regularly.

Operating cost per passenger: This is a common financial metric used to determine how cost effective a service is when compared to historic trends, other modes, or other transit agencies.

External Benefits

Ferry service can provide a variety of external benefits to the users of the transportation system as a whole in addition to economic development impacts and other regional benefits. Ferry passengers may benefit from travel time savings, increased safety (relative to driving), and an improved travel experience, particularly if they are avoiding congestion. As part of a larger transit system, ferries improve connectivity and expand choice.

Monetizing and capturing the external benefits may be more challenging. New ferry service can support new development, which has been seen in both commercial and residential areas around New York City ferry docks along both the East and Hudson Rivers. Ferry services that provide emergency response capacity as in San Francisco are further contributing to regional benefits. Finally, where ferries provide access to recreational opportunities and support tourism, they further bolster the regional economy.

3. Case Study Profiles

A summary profile of five domestic ferry service analyzed provides a snapshot of existing service characteristics with the number of routes and type of service, vessel infrastructure serving that route, service delivery method, and basic ridership and revenue statistics. Each profile also includes a brief history, and highlights the key lessons about system integration, funding, and other best practices.

NYC Ferry (East River only)⁶

Routes:	1 (8 stops)
Vessels:	4
Type of Service Offered:	Ladder
Service Delivery Model:	Public/Private
Ridership:	1,467,860 ⁷
Annual Operating Budget:	\$8.5M
Operating Cost per Passenger:	\$5.79 (approximate)
Funding Source:	Fares, Local/State Subsidy



Service Overview:

Based on the *Citywide Ferry Study*, a comprehensive ferry feasibility study prepared in 2010, New York City Economic Development Corporation (NYCEDC) contracted with a private operator, Billybey Ferry Company, to begin the pilot East River Ferry service in 2011. The pilot service included seven stops along one route and continues to operate today.⁸ After Hurricane Sandy, NYCEDC began service to Rockaway and Red Hook. Following the high demand, economic growth, and updated census data, NYCEDC updated the *Citywide Ferry Study* in 2013 to determine if new ferry routes would be viable. Based on the findings of the updated feasibility study and political will, NYCEDC contracted with the private operator, Hornblower, to expand ferry service in summer 2017 and assume the East River Ferry operations. The new service includes one route with seven year-round stops and another planned route with five stops.

System Integration:

Fares are consistent with subway fares, which is the most comparable competing transit mode. Fares are not integrated with other regional fare systems, and do not allow for transfers. Tickets can be purchased online through a phone app or in-person from a ticket agent or vending machine. Each of the seven year-round landings on the route has connections to bus, train, and bike-share.

Funding:

Federal and state grants as well as local funds have been used for capital projects including vessel acquisition and terminal facility improvements. Operating costs are covered through fares and local subsidies.

⁶ Photo by NYC Ferry

⁷ This ridership and budget data comes from [East River Ferry Ridership Hits All Time High in 2016, NYCEDC, December 29, 2016](#) and does not include data from 2017 when the service expanded.

⁸ [Ferry Policy & Planning in New York City, Considerations for a Five-Borough Ferry System](#)

San Francisco Bay Ferry⁹

Routes:	4
Vessels:	11
Type of Service Offered:	Point-to-point, Ladder
Service Delivery Model:	Public/Private
Ridership:	2,091,300
Annual Operating Budget:	\$25.5M
Operating Cost per Passenger:	\$12.20 (approximate)
Funding Source:	Fares, Local Subsidy



Service Overview:

Ferry service in the San Francisco Bay Area is a critical component of congestion relief and emergency response. Ferries have provided a vital regional connection in this area when land-based transit has broken down during natural and man-made disasters. The State Legislature created the Water Transportation Authority (WTA) in 1999 to prepare an Implementation and Operations Plan (IOP) for the region. As a result, local ferry service was consolidated into one regional system. Since 2008, the San Francisco Bay Area Water Emergency Transportation Authority (WETA) has managed all public ferry services in the San Francisco Bay Area with the exception of the Golden Gate Ferry.

WETA contracts daily operations and maintenance to a private operator, Blue & Gold Fleet, and is overseen by a Board of Directors comprised of appointed members. The Board oversees policy development, performance monitoring metrics, and service expansion guidelines for the San Francisco Bay Area Ferry. WETA partners with other regional transit agencies on emergency management through their Emergency Response Plan and through transfer agreements to other modes.

System Integration:

Fares are integrated with the Clipper card, which provides a discount over the paper ticket price and tracks transfers from other modes. Clipper card can also be used on all major Bay Area transit operators and at some parking locations. Tickets for WETA can also be purchased by route at a ticket booth or onboard the ferry. Transportation connections at Pier 41 and San Francisco Ferry Terminal include bus, BART, trolleys, light rail, and connecting ferries.

Funding:

Operating funds come from fares, toll revenue, sales tax and State Transit Assistance (STA) funds. Additionally, WETA receives funding for capital improvements through federal, state, regional and local resources. Federal funding comes from formula grant funds and the Capital Investment Grant Funds (Section 5309). State funding comes from bond sales and formula funds. Local match funds for formula grants, toll revenue, sales taxes, and incentive programs for improving ridership, productivity, and emissions reductions fund the difference.

⁹ Photo by San Francisco Bay Ferry

Golden Gate Ferry¹⁰

Routes:	3
Vessels:	7
Type of Service Offered:	Point-to-point
Service Delivery Model:	Public
Ridership:	2,540,000
Annual Operating Budget:	\$30.2M
Operating Cost per Passenger:	\$11.90 (approximate)
Funding Source:	Fares, Local Subsidy



Service Overview:

As mitigation for traffic congestion on the Golden Gate Corridor, the Golden Gate Bridge and Highway Transportation District (GGBHTD) was created to increase regional public transit. The 19-member Board of Directors consists of representatives from counties within the district and oversees GGBHTD policy making and establishes fare policies on a five-year cycle. The GGBHTD does not have authority to levy taxes, and must rely primarily on tolls and fares for operating revenue. The GGBHTD also receives local operating grants from counties served in the district.¹¹ As part of the Metropolitan Transportation Commission (MTC) and to be eligible for federal funding, the GGBHTD must adopt a Short-Range Transit Plan (SRTP) every two years that they use to identify and report performance metrics.

The Golden Gate Ferry began operating two commuter ferry routes in the 1970's that continue today. The Golden Gate Ferry also provides a special event service to Giants baseball games. Recently, the private operator Blue and Gold Fleet requested that GGBHTD assume their failing commute service between Tiburon and San Francisco since it was no longer profitable. The GGBHTD Board has determined that this route does provide traffic congestion relief but is not profitable.

System Integration:

Fares are integrated with the Clipper card, which provides a discount over the paper ticket price and tracks transfers from other modes. Clipper card can also be used on all major Bay Area transit operators and at some parking locations. Tickets can also be purchased online or in-person at a ticket vending machine. The GGBHTD partners with most regional transit agencies to offer transfers between transit services.

Each ferry terminal connects to adjacent transit or is located within walking distance of amenities like the Giants ballpark. At the San Francisco Terminal, passengers can connect to bus, BART or other ferries. Other terminal locations have connecting bus service. Additionally, GGBHTD owns a park and ride area adjacent to the Larkspur Ferry Terminal offering over 2,000 parking spaces.

Funding:

Operations are funded through bridge tolls, fares and operating grants from local jurisdictions served by GGBHTD. Operations for special event service are funded exclusively by fares.¹² Capital projects are funded through federal and state grants as well as bonds.

¹⁰ Photo of M.V. Del Monte from goldengateferry.org

¹¹ [Comprehensive Annual Financial Report, FY Ended June 30, 2016 and 2015](#)

¹² [Short-Range Transit Plan, Fiscal Years 2016/17-2025/26](#)

Kitsap Transit¹³

Routes:	3
Vessels:	4
Type of Service Offered:	Point-to-point
Service Delivery Model:	Public, Public/private
Ridership:	740,000 (est.) ¹⁴
Annual Operating Budget:	\$6.2M (est.)
Operating Cost per Passenger:	\$8.38 (approximate)
Funding Source:	Fares, Local Subsidy



Service Overview:

Kitsap Fast Ferry is a public service and Kitsap Foot Ferry is a public/private partnership. In 2003, Kitsap Transit acquired the long-time privately-owned intra-county passenger ferry service between Bremerton and the county seat in Port Orchard. In 2017, Kitsap Transit resumed the cross-sound passenger-only service between Bremerton and Seattle that had been operated by Washington State Ferries until 2003. Two additional cross sound routes will be added over the next three years. All passenger ferry routes offer significant travel time savings over alternative transportation options.

Kitsap Transit passed a ballot measure in the fall of 2016 to levy a county-wide sales tax to subsidize fare revenues in order to cover the cost of passenger ferry service. Federal grants have been awarded to Kitsap Transit for vessel and dock construction for the local ferry service. A private bond issuance will fund construction of vessels and terminals for the cross-sound service.

System Integration:

Fares are integrated with the ORCA card, which is accepted on Kitsap Transit, Pierce Transit, King County Metro Transit, Community Transit, Sound Transit, Everett Transit and the Washington State Ferries. Using the ORCA card on Kitsap Transit does not provide a discount on one-way fares but does offer discounted monthly pass options and tracks a 2-hour transfer window once fare is paid. Fares can also be paid in cash or with tokens.

Kitsap Transit has aligned the existing bus schedule to connect passengers in Kitsap County to the Fast Ferry. The downtown Seattle terminal provides passengers with bus, street car, and light rail connections.

Funding:

Kitsap Fast Ferry receives a portion of the local sales tax to support operating costs. Capital assets have been acquired through issuing bonds.

¹³ Photo by Kitsap Transit

¹⁴ Projected annualized ridership. Kitsap Transit launched its first Fast Ferry route in July 2017, and annual ridership is not yet available.

King County Marine Division

Routes:	2
Vessels:	3
Type of Service Offered:	Point-to-point
Service Delivery Model:	Public
Ridership:	515,200
Annual Operating Budget:	\$5.5M
Operating Cost per Passenger:	\$10.68 (approximate)
Funding Source:	Fares, Local Subsidy



Service Overview:

The King County Marine Division (KCMD, formerly the King County Ferry District) assumed passenger-only ferry service on two routes beginning in 2008. KCMD receives operating funds from fares and a portion of the property tax. As a Ferry District, King County levied a portion of property tax funds to subsidize ferry operations. After the Ferry District absolved in 2015, KCMD was authorized by the Washington State Legislature and adopted by County Council as the owner and operator of the two ferry routes. This resulted in a reduced portion of the property tax and subsequently reduced sustainable funding for operations.

KCMD has been successful in obtaining federal grants to support improvements to capital infrastructure.

System Integration:

Fares are integrated with the ORCA card, which is accepted on Kitsap Transit, Pierce Transit, King County Metro Transit, Community Transit, Sound Transit, Everett Transit and the Washington State Ferries. Using the ORCA card provides a discount over cash and paper tickets and tracks a 2-hour transfer window once fare is paid. Fares can also be paid in cash or purchased at a ticket vending machine.

Funding:

Service is funded through the farebox and local property tax levy.

Credits

Project Coordination

- Boston Harbor Now



Study Sponsors

- MassDOT
- Massport
- National Park Service
- Seaport Economic Council (Executive Office of Housing and Economic Development)
- Massachusetts Convention Center Authority
- The Barr Foundation
- Cabot Family Charitable Trust
- Envoy Hotel
- Clippership Wharf



Consultant Team

- Steer Davies Gleave
- KPFF
- Moffatt and Nichol
- Elliott Bay Design Group
- Progressions
- Norris and Norris

