

# BROAD STREET LINE EXTENSION FEASIBILITY STUDY EXECUTIVE SUMMARY

## PREPARED FOR

City of Philadelphia

Delaware Valley Regional Planning Commission (DVRPC)

Philadelphia Industrial Development Corporation (PIDC)

Southeastern Pennsylvania Transportation Authority (SEPTA)



Delaware Valley Regional Planning Commission



PREPARED BY Parsons Brinckerhoff September 2008





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These organizations include:

Center City District

City of Philadelphia:

- Planning Commission
- Commerce Department
- Office of Transportation and Utilities

Commonwealth of Pennsylvania

Delaware River Port Authority

Delaware Valley Regional Planning Commission

Federal Transit Administration

Liberty Property Trust

Pennsylvania Department of Transportation

Philadelphia City Council

Philadelphia Industrial Development Corporation

Port Authority Transit Corporation

Southeastern Pennsylvania Transportation Authority

Sports Complex Special Services District

## **Consultant Team**

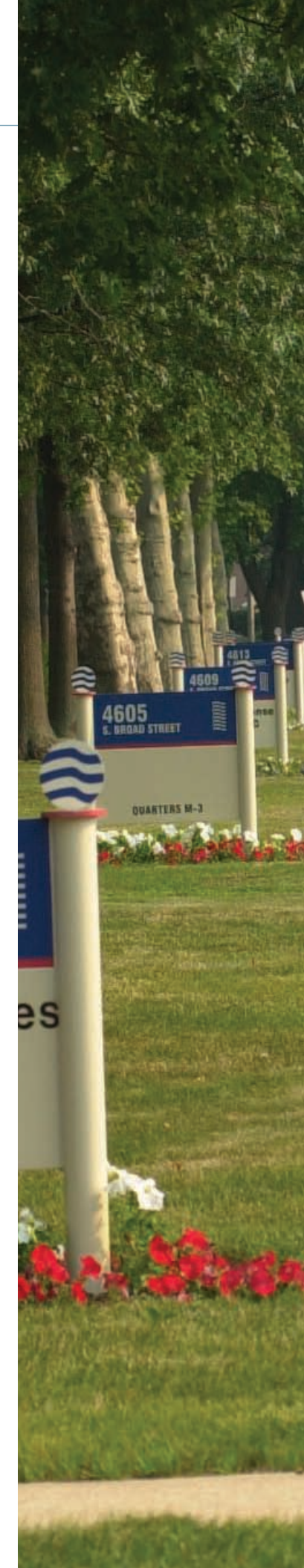
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# EXECUTIVE SUMMARY

In 1966, the City of Philadelphia commissioned a study to examine the feasibility of extending the Broad Street Subway Line beyond the newly planned terminus in the then-emerging sports complex at Pattison Avenue, into the Philadelphia Naval Yard, an active military base employing tens of thousands. That 1966 study found the project to be technically feasible with some minor challenges; however, with U.S. military engagements abroad and the Cold War, the decision was made not to build the \$14.5-million extension (\$96 million in 2008 dollars). In 2007, funded with a grant from the Delaware Valley Regional Planning Commission, this Broad Street Line Extension Feasibility Study was commissioned to revisit and evaluate the feasibility of construction and to estimate capital costs, ridership, and economic benefit of extending the subway by way of two stations into The Navy Yard.

Now, The Navy Yard, located midway between New York and the District of Columbia along Interstate 95 and approximately 3.5 miles south of Philadelphia's bustling Center City, is an emerging regional employment center managed on behalf of the City of Philadelphia by the Philadelphia Industrial Development Corporation (PIDC). Encompassing 1,000 acres, an area as large as Center City Philadelphia, the site hosts more than 7,000 employees and 80 companies in more than 5.5 million occupied square feet of industrial, R&D and office space. The Navy Yard's 2004 Master Plan outlines future growth to more than 15 million SF of occupied space, 30,000 employees, and thousands of residents in six neighborhood districts

Exhibit A. Broad Street Line Extension Study Area



(see Exhibit A) to create a vibrant 24-hour, live-work-play community. The Navy Yard is currently served by a transit shuttle service from the Pattison Avenue Station operated by the Southeastern Pennsylvania Transportation Authority (SEPTA) with funding from Navy Yard businesses. However, to achieve the full development potential of The Navy Yard—with sustainable principles and rising energy costs in mind—The Navy Yard requires better transit accessibility.

According to the traffic analysis in this study, the primary access to The Navy Yard will be severely congested as the study area's traffic reaches critical levels of build-out. An extension of the subway can ameliorate this congestion and add capacity for more than 40% more commercial development and 500% more residential units, through the sustainable strategy of connecting The Navy Yard to the region's transportation hub. This new sustainable development would utilize existing infrastructure in the center of the metropolitan area rather than build new infrastructure on undeveloped land on the remote edges of the region.

The Broad Street Line Extension Feasibility Study confirms the feasibility of constructing the 1.5-mile tunneled subway extension into The Navy Yard with two new stations supporting greater residential and commercial uses in a transit supportive manner at a cost of approximately \$370 million (in 2008 dollars). The study demonstrates the strong ridership, development potential, and economic benefit for the City of Philadelphia and the Commonwealth of Pennsylvania.

## The Subway Extension

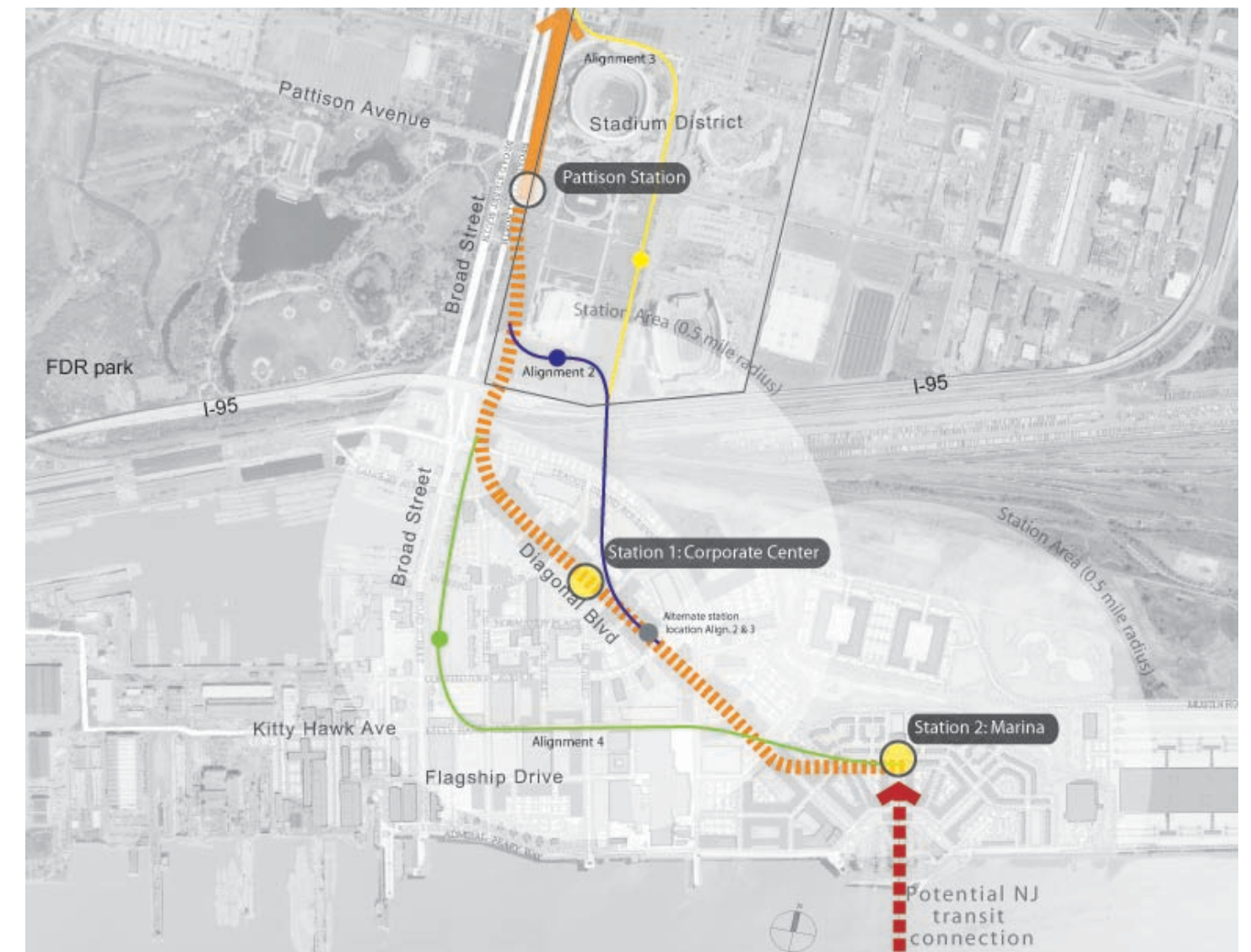
The study team and a Steering Committee comprised of regional experts and stakeholders examined the **Broad Street Line subway extension** (preferred alignment pictured in Exhibit B) with trains arriving at current Broad Street Line levels of operation, including trains arriving every 7 minutes. Along its 1.5-mile route, the plan adds two new stations between Pattison Station and the Delaware River Waterfront: one station will be in The Navy Yard Corporate Center, which is under development by Liberty Property Trust/Synterra Partners; the other would be a Marina station along the South Delaware River Waterfront with the potential for a subway tunnel to South Jersey, providing additional regional connectivity.

For two additional points of reference, the study team also examined two low-cost, bus options: **Current Bus** service at 20-minute intervals equal to today's shuttle service and **Enhanced Bus** service at 7-minute frequencies to meet all subway arrivals and departures.

## Engineering Feasibility

The study demonstrates that it's feasible to construct an extension of the Broad Street subway with some minor engineering challenges. The preliminary alignment and conceptual engineering for the tunnel design account for the high water table, soil conditions, and existing and future subsurface structures (i.e. utilities and building foundations). In addition, construction of the preferred alignment is greatly simplified once in The Navy Yard by excavating a U-shaped channel for more than 75% of the alignment along the grand Diagonal Boulevard in the Corporate Center and into the Marina. The channel is closed by constructing the roadway on top. This construction method, known as cut-and-cover, reduces the need for expensive tunnel boring.

Exhibit B. Broad Street Line Extension + Original Conceptual Alignments



# EXECUTIVE SUMMARY

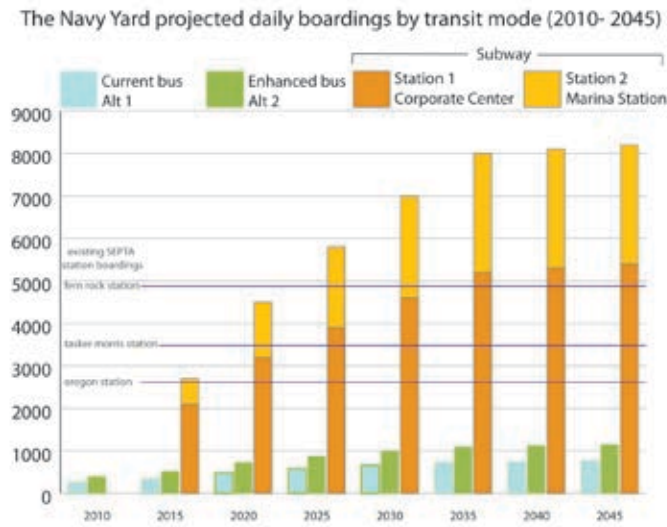
## Capital and Operating Expenses

The Broad Street Line Extension Feasibility Study estimated the cost to construct the entire 1.5-mile subway extension at approximately \$370 million (2008 dollars). This investment, although significantly greater than the current bus and enhanced bus options, at \$8 million and \$14 million, respectively, proves to be a significantly more cost effective on a per rider basis. In addition, this investment will leverage private investment and spur development that generates employment and tax benefits to the city and state. In a similar trend to capital costs, operating expenses are initially higher for the subway extension, but prove to yield a better return on investment. Annual operating costs are estimated at \$5.0 million for the subway extension, \$3.5 million for the Enhanced Bus, and \$1.4 million for the current bus option (at full build out of The Navy Yard).

## Ridership

According to modeling efforts conducted by the study team, the subway extension's daily boardings are substantially greater than those of either the current bus or enhanced bus because of the more intense development pattern supported by heavy rail. At The Navy Yard's full build-out, ridership is estimated at more than 8,000 boardings between the two stations. The number of boardings is in line with existing stations on the Broad Street Line. Exhibit C represent those riders entering the system at The Navy Yard.

Exhibit C. Projected Daily Boardings



## Cost Effectiveness

Due to the substantially greater ridership generated by the subway extension over the other alternatives, the subway proves to be the most cost effective transit alternative over time, measured in terms of annualized capital and operating costs per rider and the farebox recovery ratio.

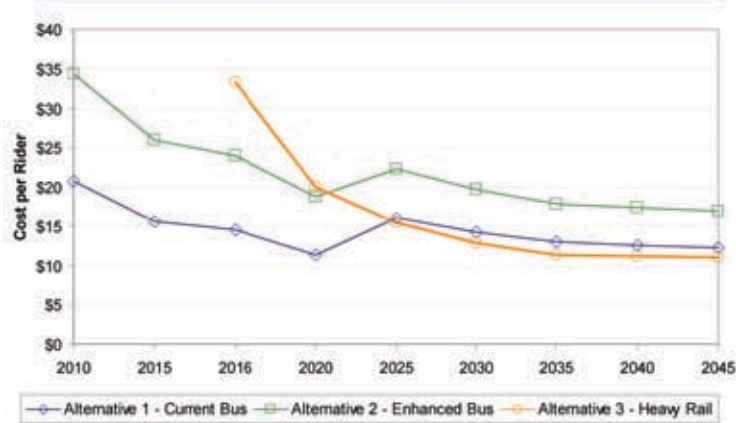
### Cost per rider

Exhibit D illustrates that once in operation the subway's cost per rider equals and outperforms the cost effectiveness of operating a fleet of buses serving The Navy Yard's transit needs.

### Farebox Recovery

The study also found that the subway farebox revenue capture (ratio of farebox revenue to total operating expenses) is estimated to be between 57 and 70 percent after 10 years of operation, (an average of 43 percent over the 35 year timeframe) far outpacing the farebox capture for the bus alternatives at maximum 20 percent. Although operating expenses are slightly greater for the subway, the farebox revenue generated is expected to cover the majority of those expenses, and therefore requiring less need for an operating subsidy.

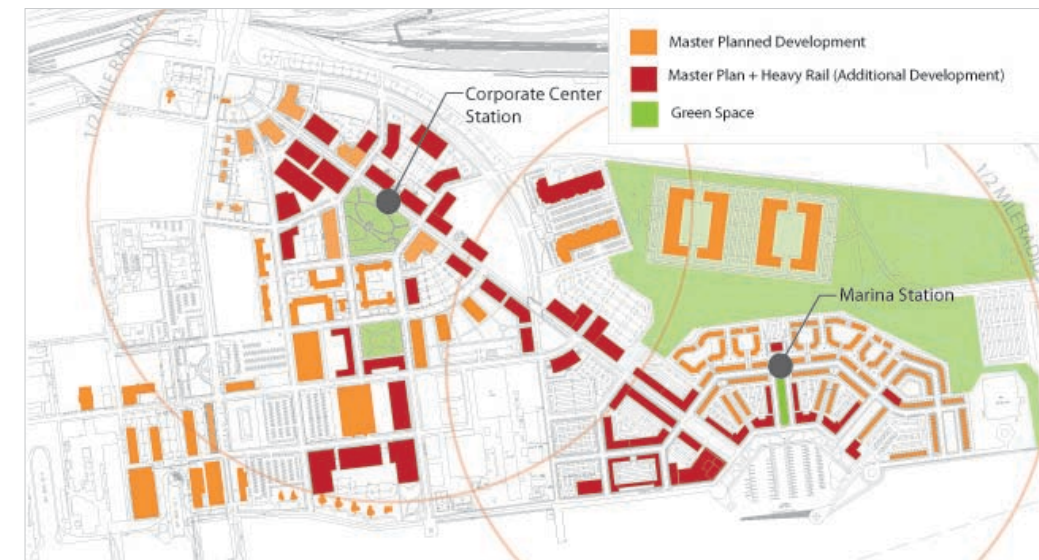
Exhibit D. Cost Per Rider



## Development Impacts

The greatest benefits are derived from the subway's impact on land values and potential for development. The study explored two growth scenarios, each influenced by either of the bus alternatives or the subway expansion into The Navy Yard. The Broad Street subway extension is projected to support greater densities and produce a positive net benefit to property values within a short proximity of its stations. These impacts, illustrated in Exhibit E, show the additional commercial and residential development possible around each subway station. The Master Plan + Heavy Rail scenario represents more than \$4.6 billion in economic impact from development and \$390 million directly from constructing the subway to the City of Philadelphia. The economic benefits derived from subway extension are expected to be \$1.7 billion more than with current bus service. Due to a multiplier effect, these impacts are greater at the state level. The Broad Street Line Extension will leverage, catalyze, and greatly enhance the development potential of the entire Navy Yard, generating investment, employment, and tax rateables for the city and state.

Exhibit E. Development Impacts and Scenarios



## Next Steps

The Broad Street Line Extension Feasibility Study has been undertaken to identify the feasibility, cost, and benefits of improved rail and bus transit access to The Navy Yard. Normally for a project with a significant capital cost, such as the extension of the Broad Street Line, the use of federal resources would be preferred. However, in addition to the traditional New Starts Process, this study looked at innovative approaches for financing major transit investments as an alternative to the unpredictable and lengthy federal New Starts funding process.

Innovative funding mechanisms, such as those used to fund the combined transit and real estate development projects like the Hudson Yards in Manhattan, NY or NorthPoint in Cambridge, MA projects could also be pursued to provide greater flexibility

than New Starts funding. With these mechanisms, capital is raised by leveraging revenue streams derived from the development surrounding the station. Revenue streams can include development right payments, private contributions, and tax revenue (i.e. Tax Increment Financing or Special Assessment Districts).

Public-private partnerships (PPP) provide an opportunity to share some of the risks of development of the transit facility with the private sector and expedite the project delivery for a fee. Put together, innovative financing and public-private partnerships can save money and avoid cost creep during planning and construction, a common occurrence for large infrastructure projects.

In order to bring this project to fruition, the region's leadership will work together to establish an aggressive implementation schedule to evaluate the funds and value capture mechanisms available and to define the potential applicability of a public-private partnership. The end result of this process will help The Navy Yard fulfill its full development potential, benefiting not only the immediate site but the region as a whole.

The Navy Yard has successfully transitioned from a military property to a growing center of mixed use development and employment for the region. In its next phase, The Navy Yard can fulfill sustainable development principles for the region by building at the core, maximize the value of future and existing infrastructure investments, and catalyze transformative growth through an investment in transit.

