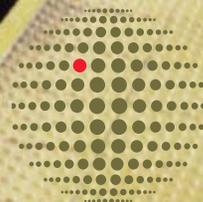


# Transportation Choices and the Future of the New York City Economy

2003 | 2004



**Partnership for New York City**

# INTRODUCTION

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The vitality of New York City's economy is highly dependent on a modern, efficient mass transportation system that connects the city's current and future centers of employment to the regional labor pool. The availability and adequacy of mass transit are major factors in business location decisions, driving demand for commercial real estate and dictating patterns in job growth. Despite their critical importance to business and economic development, major investment decisions on transportation projects are typically made without meaningful consultation with the business community or a careful assessment of long-term contributions of a given project to expansion of the city's economy.

The Partnership for New York City represents business leaders who are committed to economic development and job growth in the five boroughs. Future economic growth will require substantial investment in new and improved mass transportation that not only serves commuters but also links the city's various business districts to each other and to the airports. Even more important, improved rapid transit will open new areas for development in all boroughs and encourage the development of the city's underutilized waterfront. The result will be an expanded tax base and additional revenues to support further investment.

Regional transportation experts have suggested a menu of desirable transit investments, which could cost more than \$50 billion over the next 10 to 20 years. That amount does not include the money required to maintain the current transit system in a state of good repair. The most recent projections from the Metropolitan Transportation Authority suggest that it will be hard-pressed to secure the funding required to complete the projects that are considered important for the metropolitan region within that time frame.

Clearly, priorities must be set and choices must be made. One important component of the decision-making process should be an assessment of the relative economic development benefits of various projects. This requires an accepted methodology for quantifying and comparing transit and economic development benefits – a methodology that has rarely been employed up to this point.

To develop a standard that would enable decision makers to make choices on the basis of comparable data, the Partnership commissioned the Boston Consulting Group (BCG) and the University Transportation Research Center (UTRC) at the City University of New York. They were asked to examine a variety of mass transit projects and evaluate them based on their ramifications for the economy. To that end, BCG and UTRC have created a methodology for evaluating and weighing both the transportation and economic development benefits of transportation projects from the perspective of the private sector. These assessment tools are intended to help decision makers and the public evaluate the benefits of individual projects and clusters of projects.

In addition to developing analytical tools, BCG conducted interviews with major employers and real estate experts about seven transportation projects, most of which are proposed or in the conceptual stage and some of which are partially funded or under construction. The result of this six-month project is a new perspective on transportation planning – and, more important, some significant findings about how future projects might be planned to maximize their benefits for the local economy.

This study and its methodology should be the opening round of a discussion that leads to the development of a widely accepted model for estimating and weighing the transportation and the economic development benefits of transportation projects. This methodology may also be valuable in making the city's case for federal transit aid.

# Findings

- ▶ **New York City’s transportation investment decisions deserve greater scrutiny from a wider audience of stakeholders.** Transportation investment decisions deserve the same degree of analysis and public review as other land use and capital budget decisions. Decisions about capital investment in the city’s transportation system should not be left solely to industry experts, planners and transportation agencies, which tend to focus on the needs of existing passengers and demands on the current infrastructure. The application of standardized tools for measuring transportation and economic development benefits of proposed projects will allow for informed input from the broader community.
- ▶ **The value of transportation benefits of a rapid transit project, expressed in dollars, rarely justifies its capital cost.** Of the seven projects examined in this study, only one, the Lower Manhattan Transit Hub (a combination of the Fulton Transit Center and the permanent PATH station), could generate transportation benefits that exceed its capital costs. When economic development benefits are factored in, however, most transit projects generate a significant return on public investment.
- ▶ **Transportation hubs produce the greatest benefits.** Projects that strengthen transportation hubs are likely to yield the highest levels of transportation and economic development benefits for the city in this decade and decades to come for three reasons:
  - Hubs are magnets for workers and other travelers since multiple rapid transit lines converge there. The number of people who pass through a hub exceeds the carrying capacity of any one rapid transit line.
  - Business location decisions are often influenced by hubs. Employers know that a company’s proximity to a hub increases its access to regional labor pools. Hubs with the capacity to add new rapid transit lines have the potential to give nearby companies greater access to labor pools.
  - Jobs near hubs make commuting easier. Workers can exit the hub and walk to work or make an easy transfer to a transit line that takes them to their destination.
- ▶ **Of the seven projects examined in this study, four would clearly yield significant economic development benefits for New York City.**
  - Three projects would yield more than five times their capital cost in economic development benefits: the Lower Manhattan Hub, the extension of the No. 7 Subway line and the relocation of Pennsylvania Station to the Farley Post Office.
  - One project, East Side Access (LIRR to Grand Central Terminal), would yield one-and-a-half times its capital costs in economic development benefits.
- ▶ **Three projects have capital costs that, in their current configuration, exceed the value of their economic development benefits.**
  - Capital costs for the 2nd Avenue Subway, including debt service, exceed the value of economic development benefits by nearly \$2.7 billion, largely due to the 17 years it is expected to take to complete a full build-out of the line.
  - The capital costs of two projects - Access to the Region's Core (the Hudson River Tunnel to Midtown project) and the extension of the PATH system to Newark Liberty Airport - would likely exceed the economic development benefits either would generate for New York City. However, there would certainly be benefits for New Jersey that are not included in this analysis.

## Recommendations

- ▶ **Reconsider the full build-out of the proposed 2nd Avenue Subway and determine the economic development potential of building the project in phases.** The benefits of a phased approach to the 2nd Avenue project can only be fully evaluated in a comprehensive network analysis.<sup>1</sup> Such an analysis of each segment of the project would identify and assess the synergistic benefits generated when a particular segment is combined with East Side Access, the connections to the N and R Subway lines or the redevelopment strategy for Lower Manhattan.
  
- ▶ **Develop rapid transit projects that will accelerate economic development in emerging business districts in the boroughs beyond Manhattan.** The transportation projects discussed in this study are Manhattan-centric, reflecting the current focus of large transit investments. More attention to the mass transit needs of the other boroughs is needed. As the city seeks to diversify its economic base and encourage the development of emerging business districts in the other boroughs, investment in new transportation projects will likely be required. Among the possibilities:
  - Using existing rights-of-way for New Jersey Transit and the Long Island Rail Road to create an east-west express service from New Jersey could accelerate the development of Long Island City.
  - The “Super Shuttle” idea, which is not a subject of this study but has been advanced by Brookfield Properties, would improve access from downtown Brooklyn and Jamaica, Queens, to Lower Manhattan, giving downtown employers better access to the labor pool in Brooklyn, Queens and Long Island.
  
- ▶ **Build the proposed extension of the No. 7 Subway line because it will generate significant economic development benefits and is essential to the redevelopment of the Far West Side.** To turn this underutilized section of Manhattan into a vibrant center of commercial, residential and recreational activity, the neighborhood needs to be connected to the rest of the subway system, which can be accomplished by extending the No. 7 line west from Times Square.
  
- ▶ **Adopt the best practices from the intergovernmental planning and review processes in use on the Far West Side and in Lower Manhattan and apply those to all mass transit investment decisions.** Transportation planning should not be conducted in isolation from major development, redevelopment or rezoning efforts. The inclusion of transportation project review in the comprehensive plans for the Far West Side and Lower Manhattan is a model for maximizing the economic development benefits of transit investments.
  
- ▶ **Create a regional ferry system that would be managed by the Metropolitan Transportation Authority.** New York City will never realize the potential of its waterways to supplement rapid transit - at a fraction of the cost of underground subway lines - unless the responsibility for planning, financing and operating the ferry system serving the city rests with the Metropolitan Transportation Authority. It is critical to expand ferry routes available to visitors, suburban commuters and city residents. A truly intermodal public-private system would be best managed by the Metropolitan Transportation Authority.

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<sup>1</sup> See page 20, footnote 6, for a description of a network analysis.

## **ACKNOWLEDGMENTS**

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This study was prepared with input and advice from the Metropolitan Transportation Authority, New Jersey Transit, the Port Authority of New York and New Jersey, the New York City Department of Transportation, the Department of City Planning, the Office of the Deputy Mayor for Economic Development and Rebuilding and Stephen Berger, Chairman of Odyssey Investment Partners, LLC and former Executive Director of the Port Authority. This study was partially underwritten by a grant from the Robert Sterling Clark Foundation.

BCG's team was led by Sandy Apgar and included W. Edmund Busby, Ranu Dayal, Felix Danziger, Jerome Delhaye, Megan Findley and Jean Friedberg. UTRC's team was led by Robert Paaswell and Joseph Berechman and included Carolyn Clevenger, Todd Goldman and Ross Weiner. Rosemary Scanlon, former chief economist for the Port Authority, advised the two teams on assumptions and analysis. The Partnership's Research & Policy Department, which managed the project, is led by Ernest Tollerson and includes Joshua Chang, Jane Lynch, Ruth Melville, Patty Noonan and Jonathan Schwabish.

Members of the Advisory Committee were Charles Brecher, Executive Vice President and Director of Research, Citizens Budget Commission; Michael Lobdell, Managing Director, J.P. Morgan Chase & Co.; Daniel Powell, Associate Partner, McKinsey & Company, Inc.; and Rae Rosen, Senior Economist and Assistant Vice President, Federal Reserve Bank of New York.

## **PROJECTS EXAMINED AND THE BOUNDARIES OF THE STUDY**

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This study focuses on rapid transit options. It excludes vehicular projects such as the proposed West Street Tunnel project in Lower Manhattan, the proposed reconstruction of the Gowanus Expressway in Brooklyn and the Tappan Zee Bridge project in the northern suburbs. Freight-related proposals such as the Cross-Harbor Freight Tunnel require a different kind of analysis and were thus beyond the scope of this study.

The seven projects examined in this study are in varying stages of planning, which affects the quantity and quality of data available. All of the estimates of capital costs that appear in this study were given to UTRC and BCG by the transportation agencies and other sponsors of these projects. All costs and benefits are expressed in 2003 (present value) dollars.

In some cases, the information available on projects was limited and assumptions may not reflect final plans; as a result, these snapshots are by no means definitive. But they do provide a valuable starting point for further discussion and refinement of the tools.

It is also important to remember that these transportation proposals are not competitors in a zero-sum game. There are a number of sources of state and federal funds. For example, \$4.55 billion of the more than \$20 billion Washington plans to make available for the city's post-9/11 recovery has been earmarked for Lower Manhattan transportation projects. Other rapid transit projects are already eligible for - or have received - funds from other existing federal programs, including the Transportation Equity Act of the 21st Century, known as TEA-21.

Some of the rapid transit projects on the agenda of the city and the region, especially those that will restore

the mass transit infrastructure of Lower Manhattan, are already under way. All of the Lower Manhattan projects under construction or under discussion have been designed to improve, not simply replace, what was destroyed on 9/11.

## OVERVIEW OF METHODOLOGY

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The Partnership sponsored this study as a first step in assessing the impact that rapid transit and related projects will have on economic development in the city over the next 50 years. To frame the issue, the Partnership commissioned BCG and UTRC to perform two tasks:

- ▶ Develop methodologies and models for evaluating the costs and benefits of proposed transportation projects now and over the future life of the investment (50 years); and
- ▶ Provide a first-cut analysis of seven planned transportation projects, using two lenses:
  - An estimate of the likely transportation benefits; and
  - An estimate of the potential impact of projects on job growth and economic development in New York City.

## Formula for the Transportation Benefits

UTRC's model calculated each project's transportation benefits by estimating the value of savings in personal travel time, waiting time, walking distances and times, changes in number of transfers and reduction of congestion and overcrowding. These values were then converted into dollars using federal guidelines for calculating the value of time adjusted for New York City wages and income. The model then computed the net present value of the project, taking into account the transportation benefits listed above and the capital cost, the debt service cost during construction, the operating and maintenance costs and the fare box revenue.

## Formula for the Economic Development Benefits

BCG calculated the value of economic development benefits by estimating appreciation in property values generated as a result of the transportation projects. These benefits - new commercial development, new residential development, value increases to existing residential development, incremental changes in jobs and income, and increases in sales and tourism - incorporate a core set of assumptions regarding development, market value of land, office space required per job, and proportion of units affected by each project.

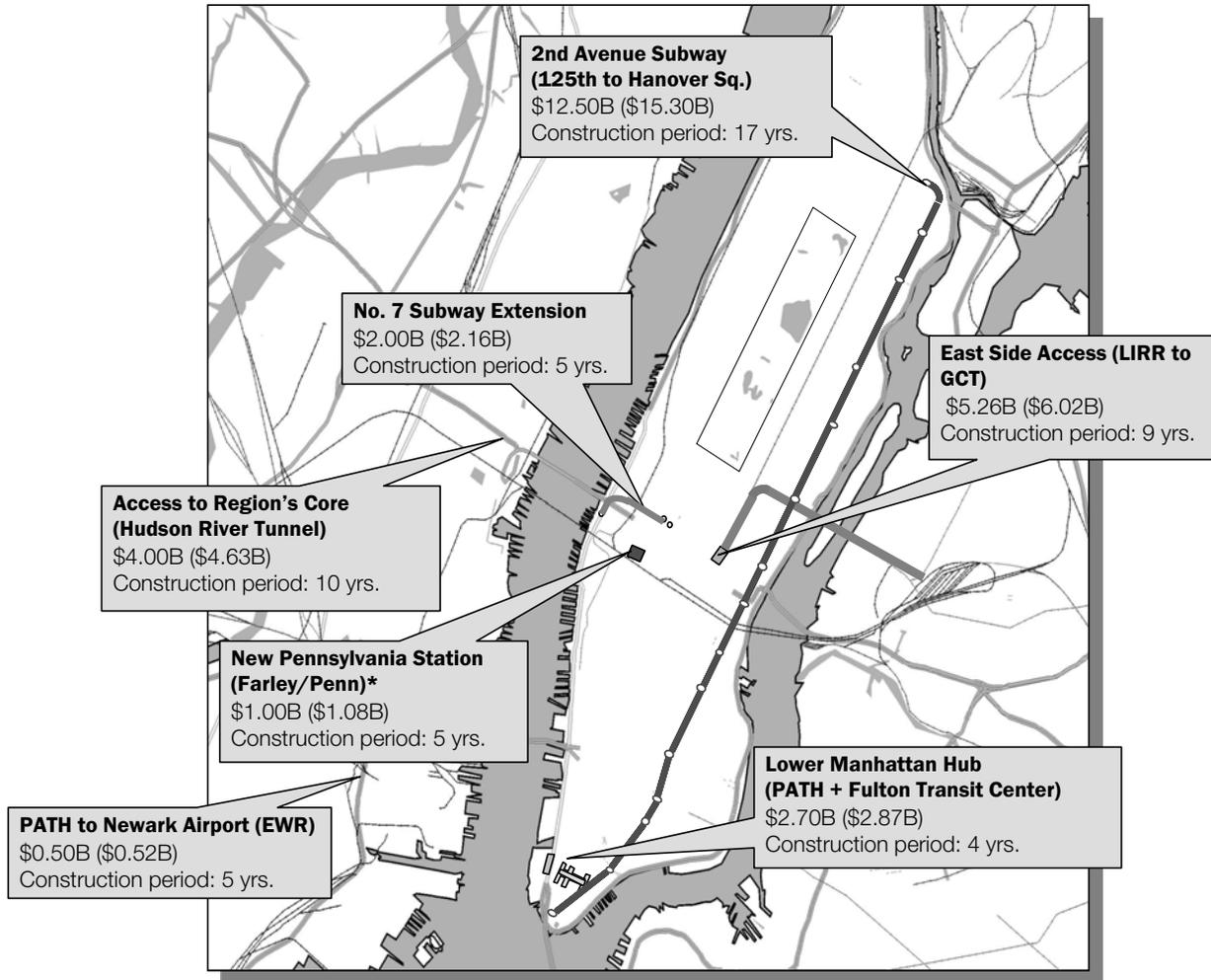
For the purposes of this study, the transportation and economic development benefits are expressed as dollars to illustrate the relative value of the projects. The discussion of the value of the benefits is separate and apart from how projects are financed, which typically takes the form of bonds, state and federal aid and money from other sources.<sup>2</sup>

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<sup>2</sup> For a full explanation of the methodology for calculating both sets of benefits, see the Methodology Appendix.

## SNAPSHOTS OF THE SEVEN PROJECTS

**Note:** The figures in the parentheses are the present value of capital costs, including debt service during the construction period. Subsequent mentions of capital costs refer to these present value figures.



**Sources of estimates:** See Methodology Appendix.

\* The new Pennsylvania Station will be named Daniel Patrick Moynihan Station.

# SNAPSHOTS OF THE SEVEN PROJECTS

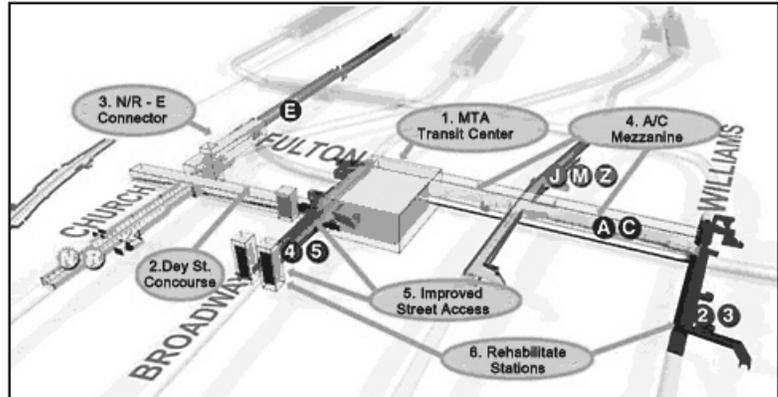
## Lower Manhattan Hub ('LM Hub')

### Sponsor

Port Authority and Metropolitan Transportation Authority

### Description

This project will connect the New Jersey PATH trains and the New York City subway system and is likely to feature a pedestrian walkway to the World Financial Center.



**Note:** The image above depicts the design for the MTA's Fulton Transit Center. The other element (not depicted here) of the Lower Manhattan Hub will be a station on the site of the former World Trade Center. The station will be designed by Santiago Calatrava.

### Capital Cost (PV)

\$2.87 billion

### Construction Duration

4 years

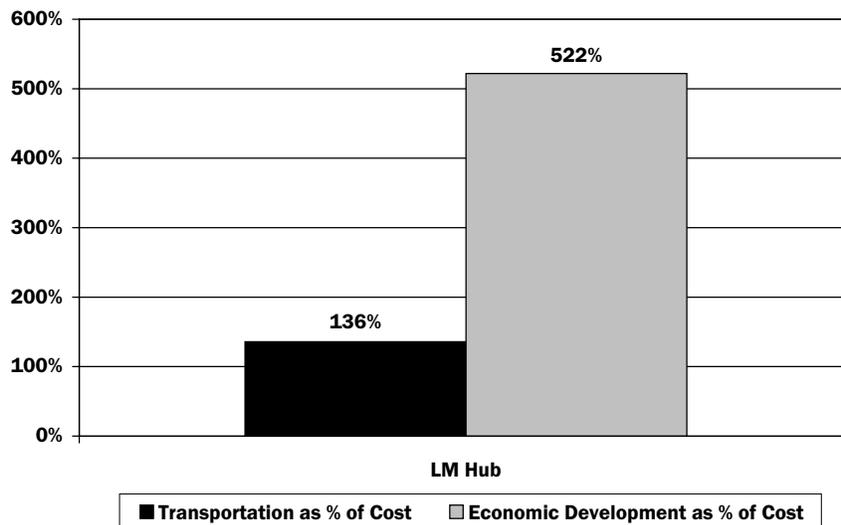
### Transportation Benefits (PV)

\$3.9 billion

### Economic Development Benefits (PV)

\$14.98 billion

Benefits as % of Costs



# SNAPSHOTS OF THE SEVEN PROJECTS

## 2nd Avenue Subway

### Sponsor

Metropolitan Transportation Authority

### Description

The 2nd Avenue Subway would be a new 8.5-mile line extending the length of Manhattan's East Side from 125th Street in Harlem to Hanover Square in Lower Manhattan. A spur would connect at 63rd Street and run along the N/R Subway line into Brooklyn.

### Capital Cost (PV)

\$15.30 billion

### Construction Duration

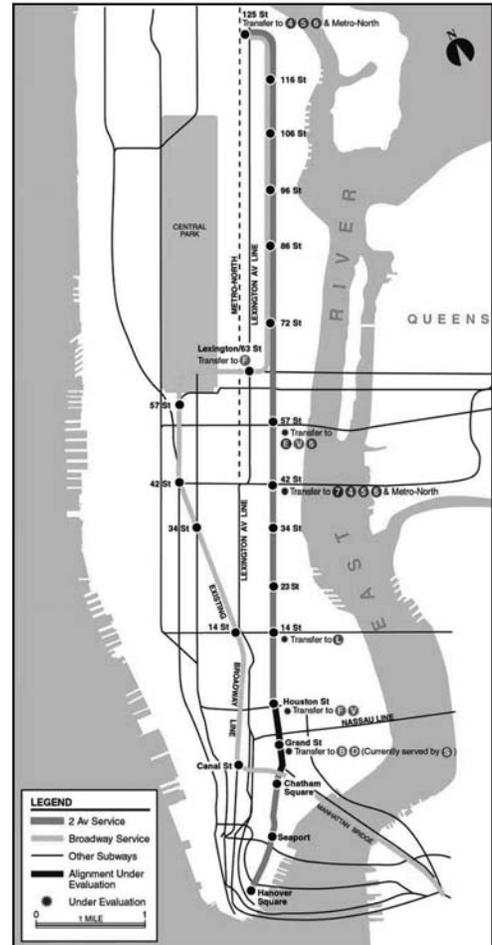
17 Years

### Transportation Benefits (PV)

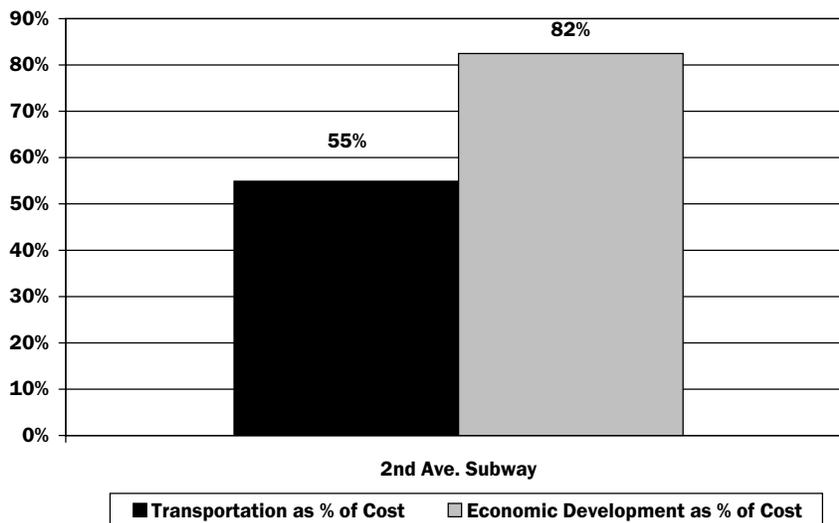
\$8.4 billion

### Economic Development Benefits (PV)

\$12.62 billion



Benefits as % of Costs



# SNAPSHOTS OF THE SEVEN PROJECTS

## Number 7 Subway Extension

### Sponsor

Metropolitan Transportation Authority

### Description

The No. 7 Subway would be extended from its current terminus in Times Square, west to 11th Avenue and then south to 33rd Street.

### Capital Cost (PV)

\$2.16 billion

### Construction Duration

5 years

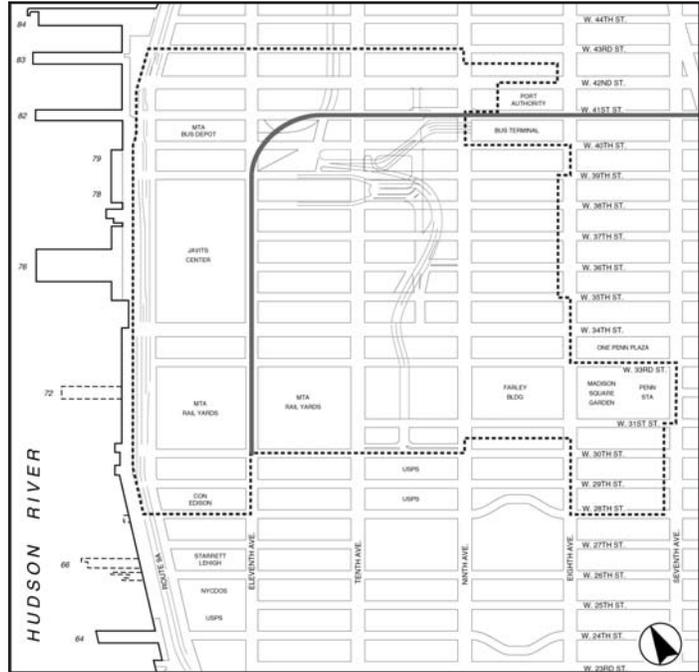
### Transportation Benefits (PV)

\$1.4 billion

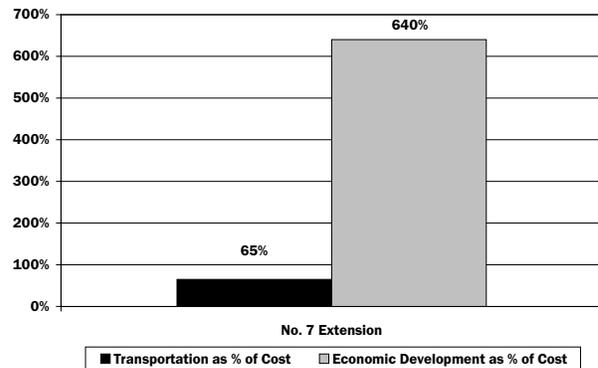
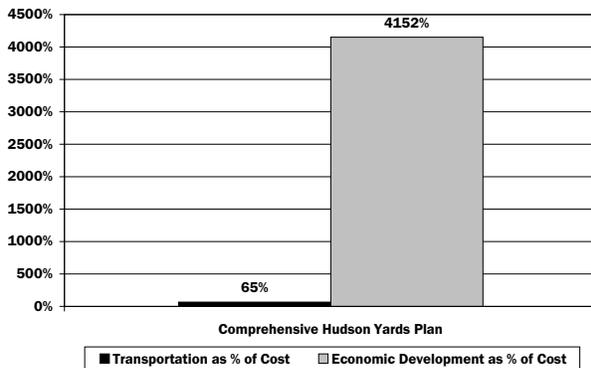
### Economic Development Benefits (PV)

According to a study by Economics Research Associates and Cushman & Wakefield, the full, 40-year build-out of Hudson Yards, which includes rezoning the Far West Side, the expansion of the Jacob Javits Conventions Center and other improvements, would create 28 million

square feet of office space on the Far West Side. The economic development generated from these improvements would be \$89.68 billion. BCG estimates that the economic development impact of the extension of the No. 7 alone would be \$13.83 billion.



Benefits as % of Costs



## SNAPSHOTS OF THE SEVEN PROJECTS

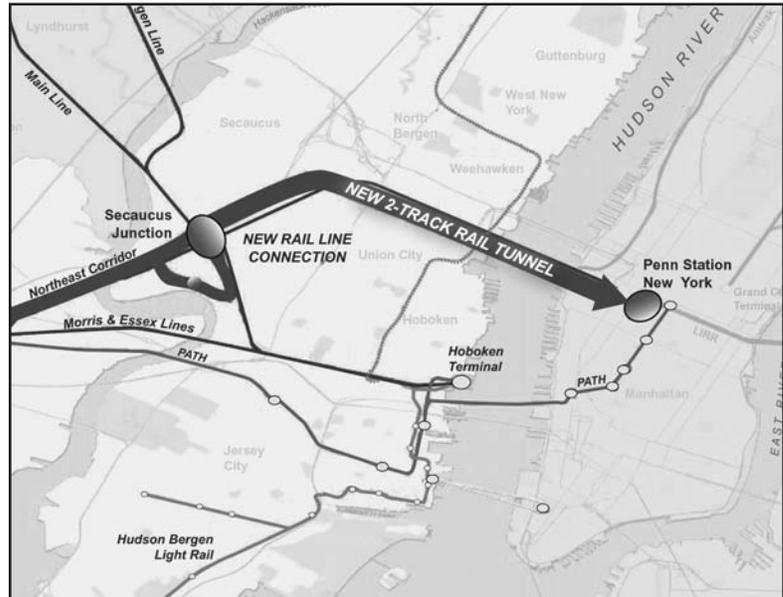
### Access to the Region's Core (Hudson River Tunnel)

#### Sponsor

New Jersey Transit

#### Description

A new passenger rail tunnel under the Hudson River would serve Midtown and expand connections between New Jersey and Manhattan. The Hudson Tunnel would make it possible for more commuters from central New Jersey to reach Midtown in a shorter time. It would also open the possibility of making connections to Grand Central and Sunnyside, Queens.



\* **Note:** Benefits for New York City only.

#### Capital Cost (PV)

\$4.63 billion

#### Transportation Benefits (PV)\*

\$2.2 billion

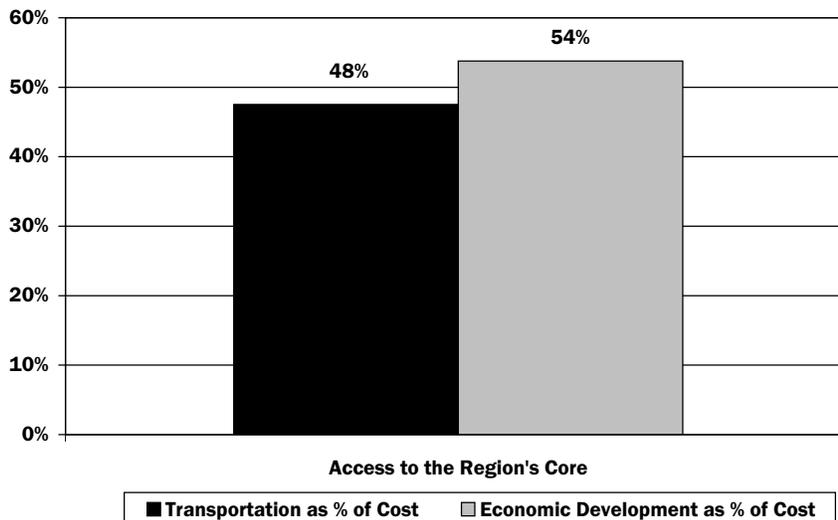
#### Construction Duration

10 years

#### Economic Development Benefits (PV)\*

\$2.49 billion

Benefits as % of Costs



## SNAPSHOTS OF THE SEVEN PROJECTS

### East Side Access (Long Island Rail Road to Grand Central Terminal)

#### Sponsor

Metropolitan Transportation Authority

#### Description

This project would link the Long Island Rail Road via the 63rd Street Tunnel to Grand Central Terminal.

#### Capital Cost (PV)

\$6.02 billion

#### Construction Duration

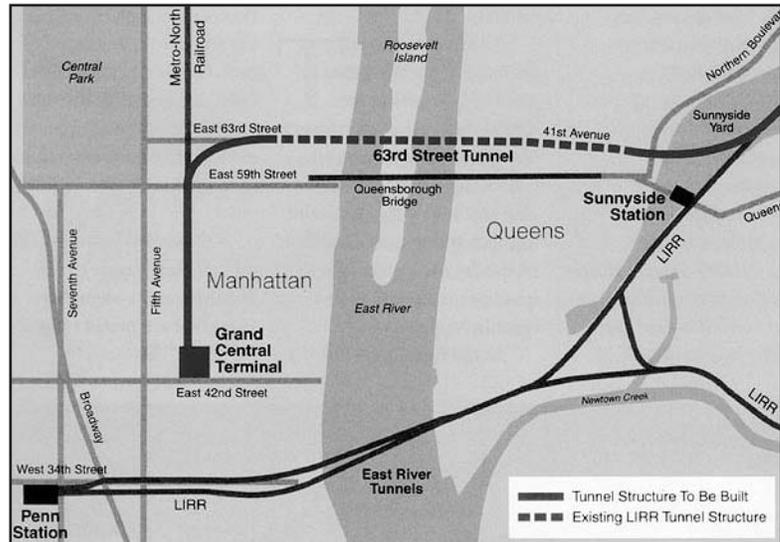
9 years

#### Transportation Benefits (PV)

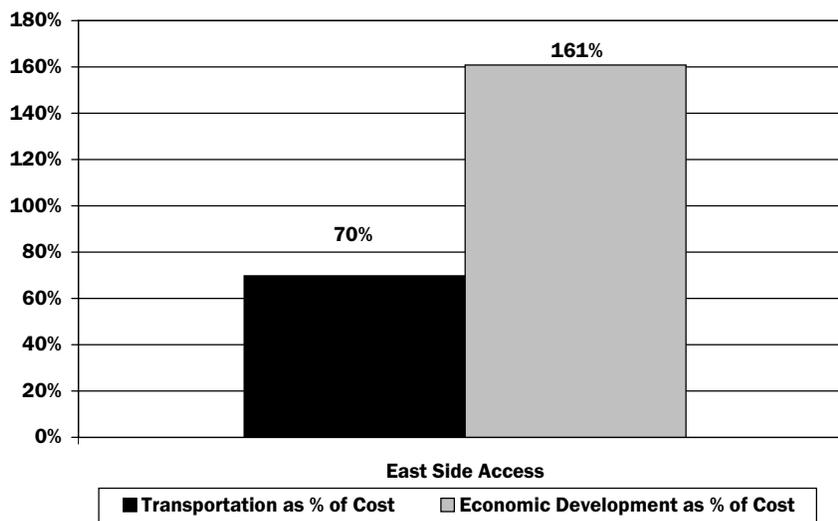
\$4.2 billion

#### Economic Development Benefits (PV)

\$9.68 billion



Benefits as % of Costs



## SNAPSHOTS OF THE SEVEN PROJECTS

### New Pennsylvania Station (‘Farley/Penn’)

#### Sponsor

Amtrak and Empire State Development Corporation

#### Description

This project will create Daniel Patrick Moynihan Station, a new portal for Amtrak, New Jersey Transit and Long Island Rail Road passengers in the Farley Post Office, and is well along in planning and financing commitments.



#### Capital Cost (PV)

\$1.08 billion

#### Construction Duration

5 years

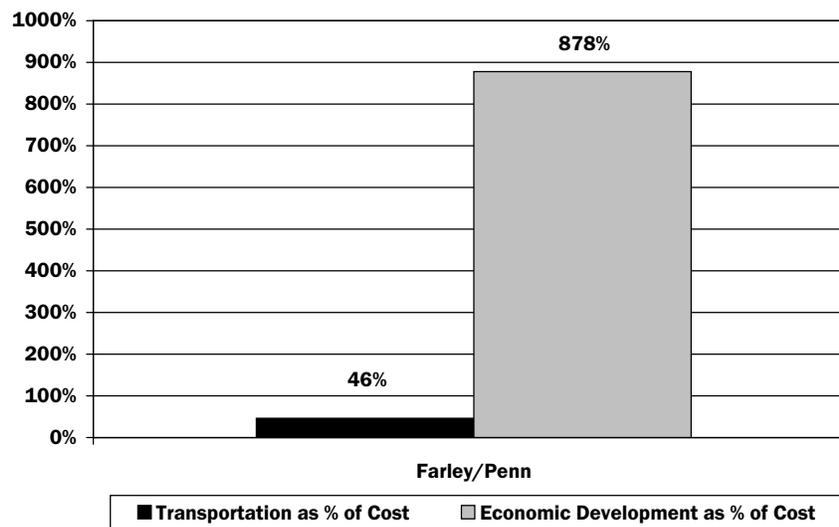
#### Transportation Benefits (PV)

\$0.5 billion

#### Economic Development Benefits (PV)

\$9.48 billion

Benefits as % of Costs



## SNAPSHOTS OF THE SEVEN PROJECTS

### PATH to Newark Liberty Airport (‘PATH to EWR’)\*

#### Sponsor

Port Authority

#### Description

Extending the PATH commuter train system from Downtown Newark to AirTrain at Newark Liberty Airport would offer easier access from Lower Manhattan to Newark airport.

#### Capital Cost (PV)

\$0.52 billion

#### Construction Duration

5 years

#### Transportation Benefits (PV)

\$0.2 billion

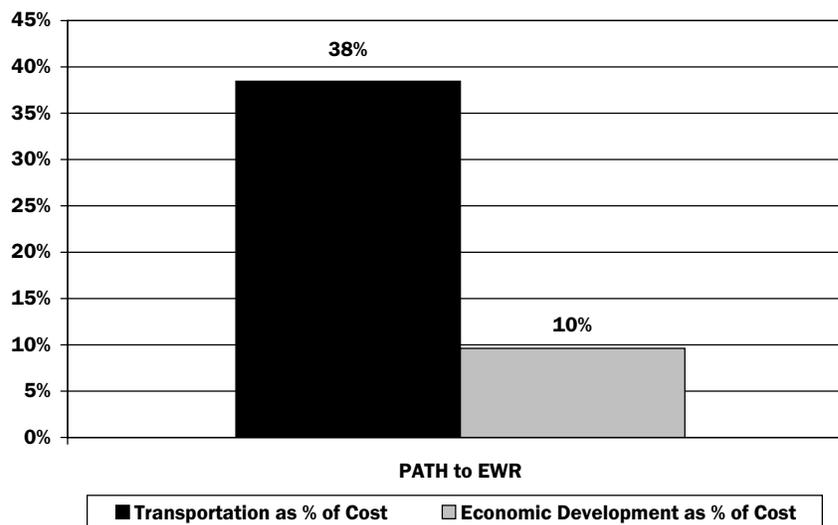
#### Economic Development Benefits (PV)

\$0.05 billion



\* **Note:** Project in very early stage of planning

#### Benefits as % of Costs



# Estimated Transportation Benefits

The transportation benefits resulting from investment in new transit projects were calculated to show both the direct and indirect value of savings to commuters and other passengers in walking and waiting time, in-vehicle travel time and the reduction of overcrowding. Calculations are based on standard assumptions widely accepted by the federal government and the academic community; see Methodology Appendix for details. These benefits are estimated for the year of project completion (i.e., for the first year the project becomes operational), and on the total value of those savings over 50 years, measured in present value.

The present value dollar figures in Table 1 and Figure 1 illustrate the wide range of transportation benefits that could result from individual projects - depending on their location and purpose. Clustering projects would, in all likelihood, yield cumulative benefits that would exceed those created by any single project. Determining the value of these synergies requires a network analysis that is beyond the scope of this study.

**Table 1. Summary of Potential Transportation Benefits**

*Includes ridership and savings in personal travel time and congestion relief*

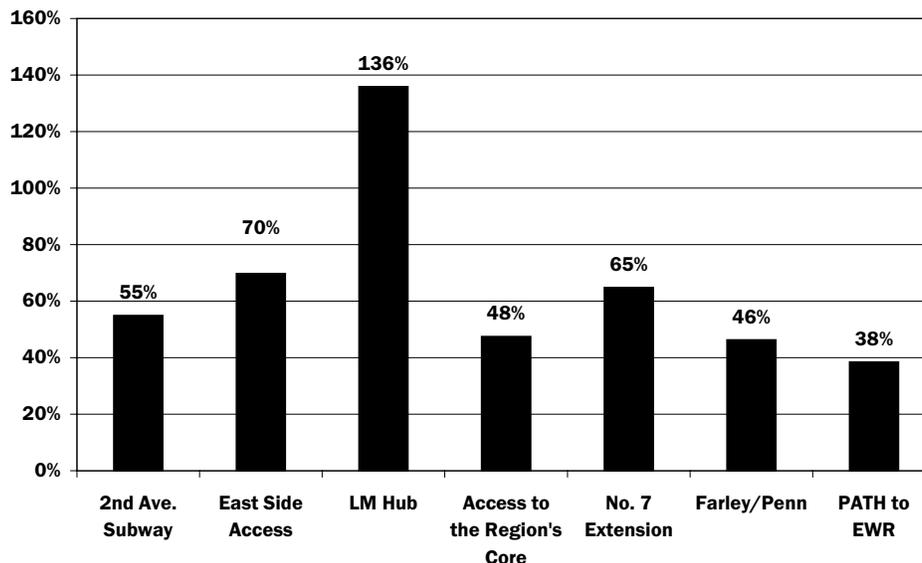
	<b>Annual Benefits*</b>	<b>Expected Completion (Year)</b>	<b>Total Benefits**</b>
<b>2nd Ave. Subway</b>	<b>\$970.8 m.</b>	<b>2020</b>	<b>\$8.4 b.</b>
<b>East Side Access</b>	<b>\$337.0 m.</b>	<b>2012</b>	<b>\$4.2 b.</b>
<b>LM Hub (PATH + Fulton T.C.)</b>	<b>\$243.0 m.</b>	<b>2007</b>	<b>\$3.9 b.</b>
<b>Access to the Region's Core</b>	<b>\$202.1 m.</b>	<b>2013</b>	<b>\$2.2 b.</b>
<b>No. 7 Extension</b>	<b>\$87.1 m.</b>	<b>2008</b>	<b>\$1.4 b.</b>
<b>Farley/Penn</b>	<b>\$35.3 m.</b>	<b>2008</b>	<b>\$0.5 b.</b>
<b>PATH to EWR</b>	<b>\$10.6 m.</b>	<b>2008</b>	<b>\$0.2 b.</b>

\* Benefits begin to flow in the year the project is complete and in use.

\*\* Present Value, for 50-year lifespan of project.

Source: UTRC

**Figure 1.  
Transportation Benefits as % of Costs**



## Estimated Economic Development Benefits

To forecast the economic development benefits that could flow from each project, BCG produced estimates for the low, medium and high levels of commercial, residential and retail development that could be directly encouraged or enabled by investment in rapid transit projects. The analysis took into account job levels, incomes and tax flows, among other elements. Table 2a below presents the economic development benefits.

**Table 2a. Summary of Potential Economic Development Benefits**

*Includes job growth, commercial development and residential development*

<b>(in billions)</b>	<b>Low*</b>	<b>Medium*</b>	<b>High*</b>
<b>2nd Ave. Subway</b>	<b>\$11.13</b>	<b>\$12.62</b>	<b>\$14.12</b>
<b>East Side Access</b>	<b>\$7.20</b>	<b>\$9.68</b>	<b>\$12.16</b>
<b>LM Hub (PATH + Fulton T.C.)</b>	<b>\$12.02</b>	<b>\$14.98</b>	<b>\$17.93</b>
<b>Access to the Region's Core</b>	<b>\$0.90</b>	<b>\$2.49</b>	<b>\$4.08</b>
<b>Farley/Penn</b>	<b>\$6.32</b>	<b>\$9.48</b>	<b>\$12.64</b>
<b>PATH to EWR</b>	<b>\$0.05</b>	<b>\$0.05</b>	<b>\$0.05</b>

\* Present Value, for 50-year lifespan of project.

Source: BCG and Partnership for New York City

In the case of the No. 7 line, the city has studied the project's potential economic development benefits in the context of its comprehensive plans for the Hudson Yards area. The Bloomberg Administration is planning many improvements, including extending the No. 7 Subway line west to 11th Avenue. These improvements, when taken together, are expected to result in the development of 28 million square feet of commercial space over a 40-year period, as well as residential and retail space. When these projections are factored in, the overall economic development benefits for Hudson Yards could be \$89.68 billion as shown in Table 2b below.

**Table 2b. Summary of Potential Economic Development Benefits**

*Includes job growth, commercial development and residential development*

<b>(in billions)</b>	<b>Low*</b>	<b>Medium*</b>	<b>High*</b>
<b>Comprehensive Hudson Yards Plan</b>	<b>\$51.75</b>	<b>\$89.68</b>	<b>\$127.60</b>
<b>No. 7 Extension</b>	<b>\$10.67</b>	<b>\$13.83</b>	<b>\$16.99</b>

\* Present Value, for 50-year lifespan of project.

Source: Office of the Deputy Mayor for Economic Development and Rebuilding, New York City, BCG and Partnership for New York City

Four of the seven projects could generate substantial job growth and economic development, and could be built within the current decade. They are:

- The extension of the No. 7 Subway line;
- Relocation of Pennsylvania Station to the Farley building;
- Running LIRR trains into Grand Central (East Side Access); and
- Creation of the Lower Manhattan Hub (PATH terminal and the MTA’s Fulton Transit Center).

While some projects score lower as drivers of job creation and economic development, they score well in transportation benefits by reducing congestion and improving convenience.<sup>4</sup> Transportation and economic development benefits are presented side by side for six projects in Table 3a below. The Economic Development Benefits column presents the medium, or midrange, estimate of these benefits.<sup>5</sup>

**Table 3a. Relative Value of Projects to the New York City Economy**

<b>(in billions)</b>	<b>Capital Cost*</b>	<b>Construction Duration</b>	<b>Economic Development Benefits**</b>	<b>Transportation Benefits**</b>
<b>2nd Ave. Subway</b>	<b>\$15.30</b>	<b>17</b>	<b>\$12.62</b>	<b>\$8.40</b>
<b>East Side Access</b>	<b>\$6.02</b>	<b>9</b>	<b>\$9.68</b>	<b>\$4.20</b>
<b>LM Hub (PATH + Fulton T.C.)</b>	<b>\$2.87</b>	<b>4</b>	<b>\$14.98</b>	<b>\$3.90</b>
<b>Access to the Region's Core</b>	<b>\$4.63</b>	<b>10</b>	<b>\$2.49</b>	<b>\$2.20</b>
<b>Farley/Penn</b>	<b>\$1.08</b>	<b>5</b>	<b>\$9.48</b>	<b>\$0.50</b>
<b>PATH to EWR</b>	<b>\$0.52</b>	<b>5</b>	<b>\$0.05</b>	<b>\$0.20</b>

\* Present Value of capital costs, including debt service during the construction period.

\*\* Present Value, for 50-year lifespan of project.

Source: BCG and Partnership for New York City

Table 3b on the following page compares the economic development and transportation benefits that would flow from the proposed comprehensive plan for the Far West Side to the same set of benefits that would be generated by one transit project alone, extending the No. 7 Subway line to the Far West Side. As the table shows, a comprehensive plan that makes a transportation project an integral part of rezoning, redevelopment and other improvements is likely to yield a higher level of benefits than those that would flow from a stand-alone rapid transit project.

4 It should be noted that the PATH extension to Newark is still at an early stage of analysis, and that estimates for both transportation and economic development benefits could change with more developed data generally found in an environmental impact statement.

5 The transportation and economic development benefits cannot be added together since they were calculated using different methodologies and the calculation of their benefits may overlap to a degree.

**Table 3b. Relative Value of Projects to the New York City Economy**

(in billions)	Capital Cost*	Construction Duration	Economic Development Benefits**	Transportation Benefits**
<b>Comprehensive Hudson Yards Plan</b>	<b>\$2.16</b>	<b>approx. 40</b>	<b>\$89.68</b>	<b>\$1.40</b>
<b>No. 7 Extension</b>	<b>\$2.16</b>	<b>5</b>	<b>\$13.83</b>	<b>\$1.40</b>

\* Present Value of capital costs for the No. 7 Subway line extension only, including debt service during the construction period.

\*\* Present Value, for 50-year lifespan of project.

Source: Office of the Deputy Mayor for Economic Development and Rebuilding, New York City, BCG and Partnership for New York City

## The Value of Expanding New York’s Ferry Routes

During the course of BCG’s interviews for this study, business leaders expressed a great deal of interest in creating an integrated network of ferries that would serve residents and commuters. In particular, chief executives in Lower Manhattan are acutely aware of the value of ferries in the aftermath of 9/11. Even after the PATH service to Lower Manhattan resumes, these business leaders expect that segments of the Lower Manhattan workforce will want to have the option of using ferries. Moreover, workers in Manhattan, especially those in Lower Manhattan, perceive ferry services to be a reliable form of transportation during an emergency, as evidenced by the demand for ferry service during the August 14<sup>th</sup> blackout.

While this study did not analyze the transportation or economic development benefits of ferries, BCG examined best practices for ferry systems in the United States and overseas and reached the following conclusions:

- ▶ While ferries cannot handle the volume of passengers served by a subway line, ferries are a valuable niche service that can fill some significant gaps in the transportation network. For example, high-speed ferry service could make it easier for commuters from the northern suburbs to reach Lower Manhattan.
- ▶ Thousands of new riders could take advantage of ferry routes that served the northern suburbs, Long Island, the five boroughs and travelers headed to or from the city’s airports.
- ▶ An expansion of ferry routes for commuters, city residents and visitors could boost the value of the city’s waterfront property, encourage economic activity and accelerate the redevelopment of neighborhoods in Brooklyn and Queens. Property values and economic activity in the Hudson County waterfront community of Weehawken rose in part as a result of ferry service that began in 1986.
- ▶ An increase in ferry options that cater to visitors and residents interested in leisure-time activities would create new opportunities to promote the city as a tourist destination and as a global city that is getting easier to negotiate.
- ▶ In light of 9/11 and the August 14th blackout, businesses consider ferries an important part of their disaster recovery planning. People migrate to water-borne transportation during emergencies when other modes of transportation are temporarily out of service. By expanding the network of ferry routes, New York City can increase the resilience of its overall transportation system.

## NEXT STEPS FOR NEW YORK: RECOMMENDATIONS FOR FURTHER RESEARCH

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- ▶ **LMDC and EDC should utilize and refine the methodology developed in this study to assess the economic development benefits of various proposals for providing access to JFK and the Long Island labor market.** The Lower Manhattan Development Corporation (LMDC) and the New York City Economic Development Corporation (EDC) have jointly issued a Request for Proposals to study alternatives for providing access from Lower Manhattan to Kennedy Airport. Several of these options may also provide access to the Long Island workforce for firms located in Lower Manhattan. At least one of the proposals being studied, the so-called "Super Shuttle" proposal advanced by Brookfield Properties, would also increase service from Downtown Brooklyn to Lower Manhattan. LMDC and EDC should employ the methodology developed in this study to evaluate the economic development potential of the various proposals under review.
- ▶ **Transportation and economic development agencies should jointly sponsor a network analysis.** A network analysis<sup>6</sup> would demonstrate the distribution and magnitude of transportation and economic development benefits that could flow from clusters of related projects. A network analysis would also identify unmet transportation needs in the city and region. The following projects would be candidates for a regional network analysis:
  - **Examine the potential benefits of building a segment of the 2nd Avenue Subway. A segment from either 125th Street or 86th Street to 63rd Street would connect to the N and R Subway lines.** If clustered with the East Side Access project, there might be synergistic benefits for Midtown East. Such an analysis could also ascertain how a segment of the 2nd Avenue Subway might reinforce efforts to redevelop commercial, retail and residential space in Lower Manhattan.
  - **Examine the feasibility of looping the No. 7 Subway line back to Daniel Patrick Moynihan Station.** As currently configured, the No. 7 Subway line would be extended from Times Square west to 11th Avenue and then south to 33rd Street. If the project looped back to the new Pennsylvania Station, it would likely have significantly greater economic development and transportation benefits. The extension of the No. 7 Subway line to the new Pennsylvania Station and Access to the Region's Core should be analyzed as a cluster for potentially significant economic development benefits.
- ▶ **Research additional ways to relieve congestion on the Lexington Avenue Subway line.** Any review of plans for the 2nd Avenue Subway, or a northern segment of it, should assess the degree to which light rail, bus rapid transit and ferries could increase the accessibility of Lower Manhattan and reduce congestion on the overcrowded Lexington Avenue Subway lines.
- ▶ **Reach consensus on an integrated methodology for evaluating transportation benefits and economic development benefits.** Decision makers should employ methodologies that incorporate both economic development benefits and transportation benefits to yield one comprehensive measure of a project's potential benefits. Both sets of benefits can be normalized to generate a common scale in order to make decisions about the relative value of proposed projects. The normalization

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<sup>6</sup> In the transportation literature, the term "network analysis" refers to the assessment of travel times and traffic volumes over the various links (routes) of a network (e.g. the subway network). Transportation investments, which affect the network structure and capacity, will bring about changes in these travel times and volumes. Subsequent to network analysis it is possible to analyze negative externalities, such as pollution from automobile traffic, changes in passenger safety or the distribution of transportation and economic development benefits to different populations.

tool employed by UTRC, but not reported here, is a Goal Achievement Matrix (GAM), which effectively merges both sets of benefits onto one comprehensive scale. This normalization tool should help inform the public discourse and decision making process for transportation alternatives.

- ▶ **Include universities, hospitals and medical research institutions in the transportation planning process.** Transportation planning agencies should consult with New York's major universities and medical institutions, which are among the city's largest employers, about unmet transportation needs. Issues identified by these institutions during interviews related to this study include the need for:
  - Improved rail and bus connections from New Jersey and Westchester to northern Manhattan;
  - More flexible, frequent bus loops on both the Upper West Side and Far East Side; and
  - Improved east-west transportation, particularly along such major cross-town arteries as 34th Street, 59th Street and 125th Street.

# METHODOLOGY APPENDIX

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## I. Transportation Benefits

UTRC estimated transportation benefits for the seven projects discussed in the text. For each project, UTRC identified all benefits associated with each project and estimated the scale of the benefits based mainly on four components, including changes in travel time; changes in waiting times and walking distances to/from the station; changes in the number of transfers a passenger must make; and changes in congestion and overcrowding (including on other lines). UTRC also calculated the annual operating and maintenance costs as well as fare box revenues for each project (see Table A-1). It is important to reiterate that these benefits were calculated for each individual project and not for any particular grouping of projects. Certain groupings of projects would generate a different stream of benefits, as riders would be able to connect and transport themselves along different paths if projects were built concurrently.

**Table A-1. Annual Costs and Revenues**

(in millions)	Annual Operating and Maintenance Costs	Annual Fare Box Revenues
<b>2nd Ave. Subway</b>	<b>\$348.6</b>	<b>\$319.1</b>
<b>East Side Access</b>	<b>\$546.5</b>	<b>\$174.0</b>
<b>LM Hub (PATH + Fulton T.C.)</b>	<b>\$76.7</b>	<b>\$99.3</b>
<b>Access to the Region's Core</b>	<b>\$88.5</b>	<b>\$212.1</b>
<b>No. 7 Extension</b>	<b>\$59.0</b>	<b>\$35.9</b>
<b>Farley/Penn</b>	<b>\$294.9</b>	<b>\$0.0</b>
<b>PATH to EWR</b>	<b>\$87.2</b>	<b>\$7.5</b>

Source: UTRC

UTRC relied on published ridership forecasts from the Metropolitan Transportation Authority, New Jersey Transit, the Port Authority of New York and New Jersey and others to estimate the number of passengers who would benefit each day. Passengers who would benefit directly and indirectly from each project were further categorized according to whether they would benefit at all times or only during peak hours.

The factors were then converted to annual economic benefits. Using federally established guidelines (adjusted for New York City wages and income) to convert the time savings to dollars, multipliers were established at \$24 per hour in-vehicle and \$32 per hour out-vehicle. Finally, for reduced overcrowding, the researchers assumed 5 minutes of productive work time savings.

Additional internal and external benefits were identified by the team for certain projects. For instance, while the proposed extension of the No. 7 Subway would benefit more than 66,000 daily riders through reduced travel and wait times, the Farley/Penn project would reduce platform access time for more than 78,000 passengers. In other projects, such as Access to the Region's Core, more people would be likely to shift from cars to rail due to better service.

To better understand UTRC's analysis, it may be useful to look at an example. The Lower Manhattan Hub groups the creation of the permanent PATH terminal at the World Trade Center site, the reworking of the Fulton subway station, and a pedestrian concourse between the Fulton Station and PATH terminal into one.

The project will provide benefits to several different categories of users, detailed in the table below.

- ▶ Passengers entering or exiting the Fulton Station will save about two minutes each due to wider staircases and more direct platform connections.
- ▶ Passengers will save about two minutes each in transfer times at the Fulton Station.
- ▶ Pedestrians will save about ten minutes each between the Fulton Station and PATH terminal.
- ▶ Exiting the PATH terminal will be made easier with the improved passageways.

Combining these numbers, converting to hours and multiplying by an annual hours multiplier from the Metropolitan Transportation Authority yields the results in the following table. Over a period of 50 years, the total dollar figure reaches the \$3.9 billion present value figure found in the text.

**Table A-2. Transportation Benefits for No. 7 Extension**

Description	Weekday Average	Benefit		Time of Benefit	Multipliers			Time Saved (person-)	Value (\$M/yr)
		Description	Minutes		Daily	Annual <sup>1</sup>	Time		
Passengers boarding/alighting at Fulton Station	115,320 Full Weekday	Reduced street/Platform walk time	2	24h	1	295.1	\$32.40	1,134,230	\$36.80
Passengers transferring at Fulton Station	109,680 Full Weekday	Reduced walking time for transfer	2	24h	1	295.1	\$32.40	1,078,758	\$35.00
Users of the Underground Concourse	55,330 Full Weekday	Reduced walking time	10	24h	1	295.1	\$32.40	2,720,992	\$88.20
Other PATH terminal users	79,500 Full Weekday	Reduced walking time	2	24h	1	295.1	\$32.40	781,923	\$25.30
Through riders on the 2/3 trains	17,500 AM Peak Hour	Reduced congestion-related delays	0.5	Peak Pd.	4	261.0	\$24.30	152,250	\$3.70
Through riders on the 4/5 trains	25,000 AM Peak Hour	Reduced congestion-related delays	0.5	Peak Pd.	4	261.0	\$24.30	217,500	\$5.30
<b>Total</b>								<b>6,085,653</b>	<b>\$194.20</b>

**PLUS Benefits from Reduced Overcrowding**

Half of passengers using Fulton Station	15,177 AM Peak Hour	Productivity Improvement	5	Peak Pd.	4	261.0	\$32.40		\$42.80
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<sup>1</sup> Two sets of multipliers appear in this column. The first, 295.1, comes from MTA NYC Transit data and divides the average number of annual trips by the total number of weekday trips (2002 data). The second, 261.0, is the number of weekdays in a typical calendar year.

## II. Economic Development Benefits

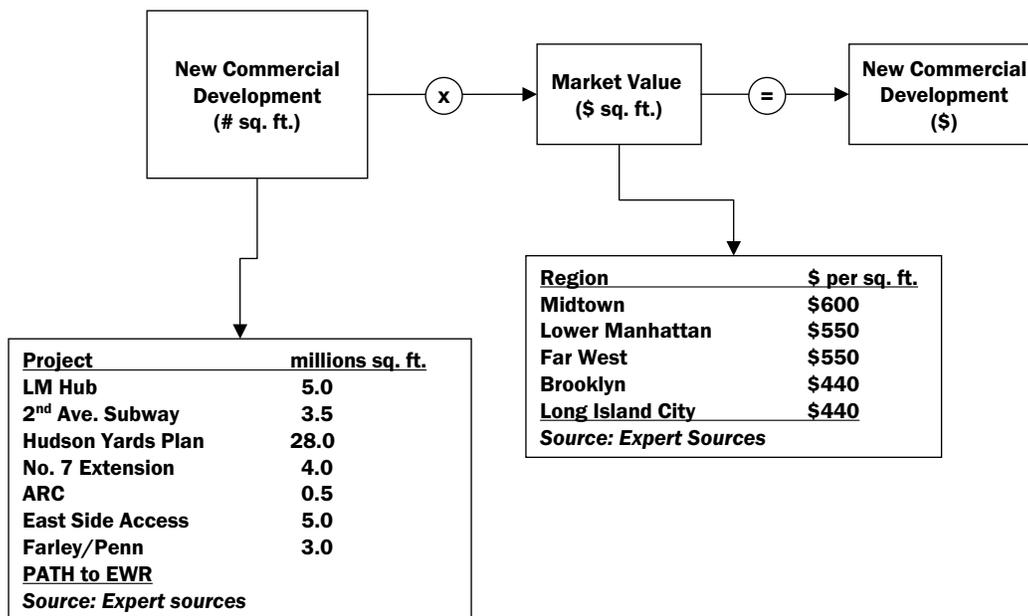
BCG based its calculations on a core set of assumptions to produce five different components. These separate components were then added together to yield the total economic development benefits found in the

text and figures. The assumptions are presented below, followed by the five components in equations (1) through (5).

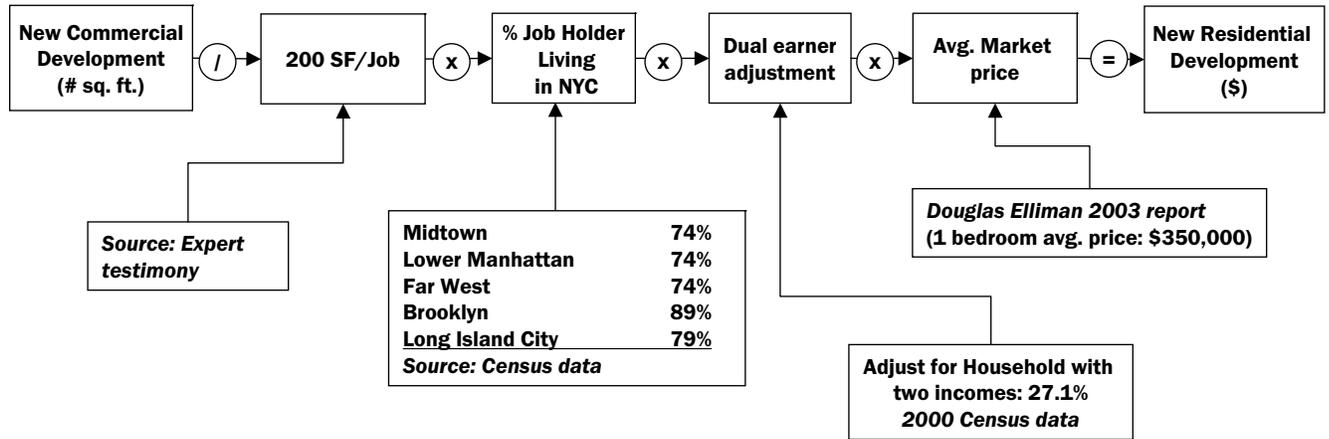
- ▶ Residential Property was valued at \$350,000 per unit;<sup>7</sup>
- ▶ Commercial Space (average sale price) values;<sup>8</sup>
  - Midtown: \$600 sq. ft.
  - Far West: \$550 sq. ft.
  - Lower Manhattan: \$550 sq. ft.
  - Brooklyn: \$440 sq. ft.
  - Long Island City: \$440 sq. ft.
- ▶ Income levels were based on borough averages from the Bureau of Labor Statistics;
- ▶ Average (borough) retail spending was based on 2000 Census data;
- ▶ Office jobs required 200 sq. ft. of space;
- ▶ Expected increase in residential real estate values (for all projects) was 10%.

As with the UTRC estimates, BCG calculated the present value of projects over a 50-year lifespan with a 5 percent discount rate. BCG assumed that the current distribution of population and income would remain as it is today.

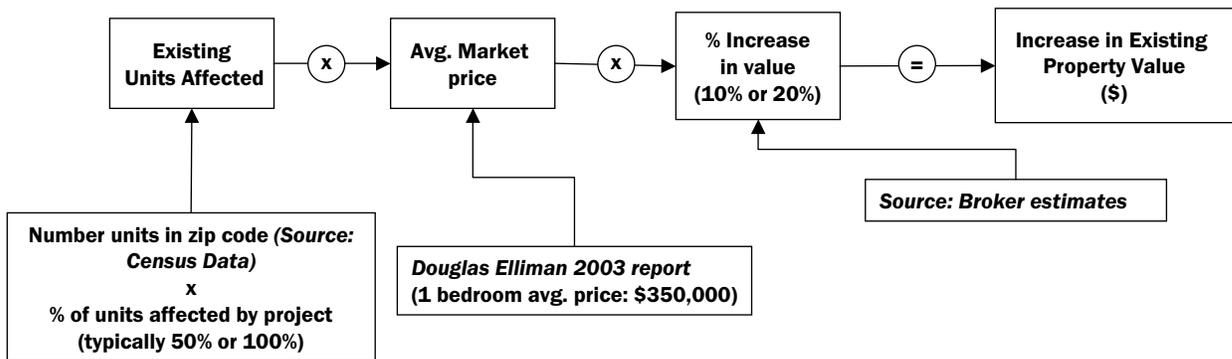
**Equation (1): New Commercial Development**



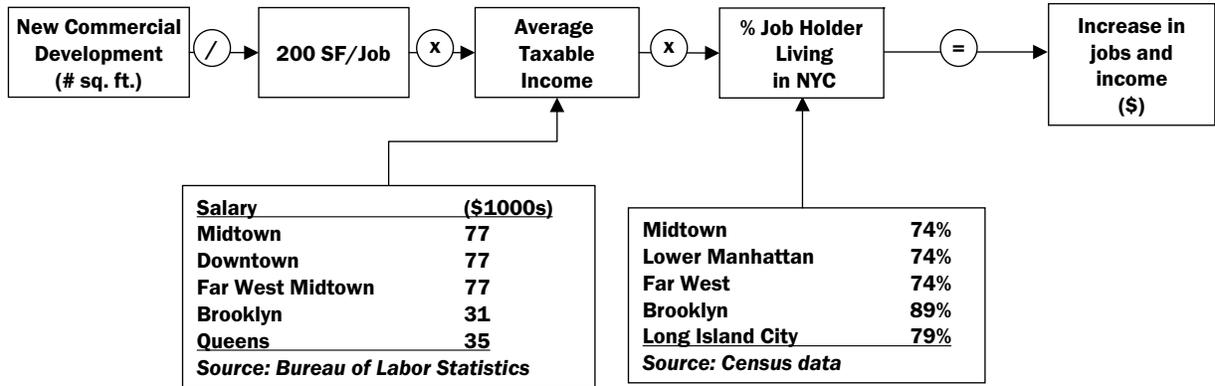
**Equation (2): New Residential Development**



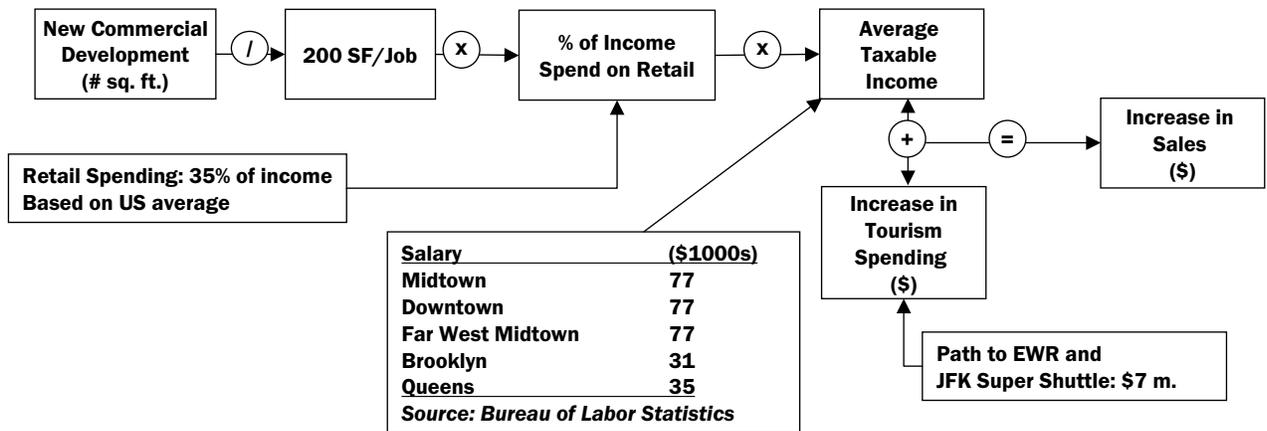
**Equation (3): Increase in Existing Residential Property Values**



**Equation (4): Increase in Jobs and Income**



**Equation (5): Increase in Sales and Tourism**



# Sensitivity Analysis

The Partnership's Research & Policy staff performed a set of sensitivity analyses based on the BCG core calculations. BCG first took each of the seven projects and calculated the benefits using low, medium and high levels of new office space development. The different office development assumptions for each project are shown in Table A-3, based on BCG and Partnership calculations; the estimates using the medium level are those found in the main text. Economic development benefits were also calculated using 250 sq. ft. for office space requirements instead of 200 sq. ft. and are shown in Table A-4, which is based on Partnership calculations.

**Table A-3. Sensitivity Analysis**  
*(200 sq. ft. (office job) and \$550 per sq. ft. in LM and Far West Side; \$600 per sq. ft. in Midtown)*

Economic Impact	Existing	Increase			Unit Value (\$)	Tax Benefits			Estimate PV of Econ. Dev.		
		Low	Medium	High		Low	Medium	High	Low	Medium	High
<b>LM Hub</b>											
<b>New Development</b>											
Office		4.00	5.00	6.00	550	365.51	456.89	548.27	778.23	972.79	1,167.35
Residential		10,724.96	13,406.20	16,087.44	350,000	105.96	132.45	158.94	1,327.85	1,659.82	1,991.78
<b>Existing Development</b>											
Residential	7,563.00	10.00%	10.00%	10.00%	350,000	38.76	38.76	38.76	207.40	207.40	207.40
<b>Jobs / Income</b>		14,705.00	18,381.25	22,057.49	77,000	127.23	159.03	190.84	6,567.87	8,209.84	9,851.81
<b>Retail / Sales</b>		544.57	680.71	816.85		118.47	142.28	166.09	3,140.83	3,926.04	4,711.25
<b>Total</b>						<b>755.92</b>	<b>929.41</b>	<b>1,102.90</b>	<b>12,022.19</b>	<b>14,975.89</b>	<b>17,929.58</b>
<b>Expenses</b>						-255.07	-318.83	-382.60			
<b>Total</b>						<b>500.86</b>	<b>610.58</b>	<b>720.30</b>			
<b>2nd Ave. Subway</b>											
<b>New Development</b>											
Office		3.00	3.50	4.00	600	274.89	320.70	366.52	652.33	761.05	869.77
Residential		8,043.72	9,384.34	10,724.96	350,000	79.69	92.97	106.25	1,020.28	1,190.33	1,360.38
<b>Existing Development</b>											
Residential	147,899.00	10.00%	10.00%	10.00%	350,000	0.00	0.00	0.00	2,150.93	2,150.93	2,150.93
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	95.68	111.63	127.58	4,939.44	5,762.68	6,585.92
<b>Retail / Sales</b>		408.43	476.50	544.57		71.64	83.58	95.52	2,362.10	2,755.78	3,149.46
<b>Total</b>						<b>521.90</b>	<b>608.88</b>	<b>695.86</b>	<b>11,125.08</b>	<b>12,620.77</b>	<b>14,116.47</b>
<b>Expenses</b>						-191.83	-223.80	-255.77			
<b>Total</b>						<b>330.07</b>	<b>385.08</b>	<b>440.09</b>			
<b>Comprehensive Hudson Yards Plan</b>											
<b>New Development</b>											
Office		16.00	28.00	40.00	550	1,562.52	2,734.42	3,906.31	3,348.63	5,860.11	8,371.58
Residential		42,899.85	75,074.73	107,249.62	350,000	452.96	792.68	1,132.39	5,713.58	9,998.77	14,283.96
<b>Existing Development</b>											
Residential	33,419.50	10.00%	10.00%	10.00%	350,000	11.27	11.27	11.27	1,185.49	1,185.49	1,185.49
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	543.88	951.80	1,359.71	28,077.01	49,134.77	70,192.53
<b>Retail / Sales</b>		2,178.28	3,811.98	5,445.69		407.22	712.64	1,018.05	13,426.74	23,496.80	33,566.86
<b>Total</b>						<b>2,977.85</b>	<b>5,202.79</b>	<b>7,427.73</b>	<b>51,751.46</b>	<b>89,675.94</b>	<b>127,600.42</b>
<b>Expenses</b>						-1,090.39	-1,908.18	-2,725.97			
<b>Total</b>						<b>1,887.46</b>	<b>3,294.61</b>	<b>4,701.76</b>			
<b>No. 7 Subway Extension</b>											
<b>New Development</b>											
Office		3.00	4.00	5.00	550	292.97	390.63	488.29	627.87	837.16	1,046.45
Residential		8,043.72	10,724.96	13,406.20	350,000	84.93	113.24	141.55	1,071.30	1,428.40	1,785.49
<b>Existing Development</b>											
Residential	33,419.50	10.00%	10.00%	10.00%	350,000	11.27	11.27	11.27	1,185.49	1,185.49	1,185.49
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	101.98	135.97	169.96	5,264.44	7,019.25	8,774.07
<b>Retail / Sales</b>		408.43	544.57	680.71		76.35	101.81	127.26	2,517.51	3,356.69	4,195.86
<b>Total</b>						<b>567.50</b>	<b>752.91</b>	<b>938.33</b>	<b>10,666.61</b>	<b>13,826.98</b>	<b>16,987.35</b>
<b>Expenses</b>						-204.45	-272.60	-340.75			
<b>Total</b>						<b>363.06</b>	<b>480.32</b>	<b>597.58</b>			

**Table A-3. Sensitivity Analysis [cont.]**  
*(200 sq. ft. (office job) and \$550 per sq. ft. in LM and Far West Side; \$600 per sq. ft. in Midtown)*

Economic Impact	Existing	Increase			Unit Value (\$)	Tax Benefits			Estimate PV of Econ. Dev.		
		Low	Medium	High		Low	Medium	High	Low	Medium	High
<b>Access to the Region's Core</b>											
<b>New Development</b>											
Office		0.00	0.50	1.00	600.00	0.00	48.83	97.66	0.00	114.16	228.32
Residential		0.00	1,340.62	2,681.24	0.00	0.00	14.15	28.31	0.00	178.55	357.10
<b>Existing Development</b>											
Residential	180,448.10	10.00%	10.00%	10.00%	170,000	0.00	1.79	3.57	904.09	904.09	904.09
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	0.00	17.00	33.99	0.00	877.41	1,754.81
<b>Retail / Sales</b>		0.00	68.07	136.14		0.00	12.73	25.45	0.00	419.59	839.17
<b>Total</b>						<b>0.00</b>	<b>94.49</b>	<b>188.98</b>	<b>904.09</b>	<b>2,493.79</b>	<b>4,083.49</b>
Expenses						0.00	-34.07	-68.15			
<b>Total</b>						<b>0.00</b>	<b>60.42</b>	<b>120.83</b>			
<b>East Side Access</b>											
<b>New Development</b>											
Office		4.00	5.00	6.00	440	196.32	269.69	343.06	669.73	867.60	1,065.47
Residential		11,577.30	14,365.08	17,152.86	350,000	122.24	151.67	181.11	1,541.91	1,913.20	2,284.49
<b>Existing Development</b>											
Residential	5,025.50	10.00%	10.00%	10.00%	350,000	64.71	64.71	64.71	107.98	107.98	107.98
<b>Jobs / Income</b>		0.00	0.00	0.00	35,000	65.56	90.75	115.94	3,384.22	4,684.65	5,985.08
<b>Retail / Sales</b>		243.23	341.70	440.17		49.08	67.94	86.81	1,499.22	2,106.21	2,713.20
<b>Total</b>						<b>497.91</b>	<b>644.76</b>	<b>791.62</b>	<b>7,203.06</b>	<b>9,679.65</b>	<b>12,156.23</b>
Expenses						-294.26	-365.12	-435.98			
<b>Total</b>						<b>203.65</b>	<b>279.64</b>	<b>355.64</b>			
<b>Farley/Penn</b>											
<b>New Development</b>											
Office		2.00	3.00	4.00	550	195.32	292.97	390.63	418.58	627.87	837.16
Residential		5,362.48	8,043.72	10,724.96	350,000	56.62	84.93	113.24	714.20	1,071.30	1,428.40
<b>Existing Development</b>											
Residential	0.00	10.00%	10.00%	10.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	67.99	101.98	135.97	3,509.63	5,264.44	7,019.25
<b>Retail / Sales</b>		272.28	408.43	544.57		50.90	76.35	101.81	1,678.34	2,517.51	3,356.69
<b>Total</b>						<b>370.82</b>	<b>556.23</b>	<b>741.65</b>	<b>6,320.75</b>	<b>9,481.12</b>	<b>12,641.49</b>
Expenses						-136.30	-204.45	-272.60			
<b>Total</b>						<b>234.52</b>	<b>351.79</b>	<b>469.05</b>			
<b>PATH to Newark Liberty</b>											
<b>New Development</b>											
Office		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Existing Development</b>											
Residential	0.00	10.00%	10.00%	10.00%	350,000	0.00	0.00	0.00	0.00	0.00	0.00
<b>Jobs / Income</b>		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Retail / Sales</b>		0.00	0.00	0.00		4.05	4.05	4.05	52.51	52.51	52.51
<b>Total</b>						<b>4.05</b>	<b>4.05</b>	<b>4.05</b>	<b>52.51</b>	<b>52.51</b>	<b>52.51</b>
Expenses						0.00	0.00	0.00			
<b>Total</b>						<b>4.05</b>	<b>4.05</b>	<b>4.05</b>			

**Table A-4. Sensitivity Analysis**  
 (250 sq. ft. (office job) and \$550 per sq. ft. in LM and  
 Far West Side; \$600 per sq. ft. in Midtown)

Economic Impact	Existing	Increase			Unit Value (\$)	Tax Benefits			Estimate PV of Econ. Dev.		
		Low	Medium	High		Low	Medium	High	Low	Medium	High
<b>LM Hub</b>											
<b>New Development</b>											
Office		4.00	5.00	6.00	550	365.51	456.89	548.27	778.23	972.79	1,167.35
Residential		8,579.97	10,724.96	12,869.95	350,000	84.77	105.96	127.15	1,062.28	1,327.85	1,593.42
<b>Existing Development</b>											
Residential	7,563.00	10.00%	10.00%	10.00%	350,000	38.76	38.76	38.76	207.40	207.40	207.40
<b>Jobs / Income</b>		11,764.00	14,705.00	17,646.00	77,000	101.78	127.23	152.67	5,254.30	6,567.87	7,881.45
<b>Retail / Sales</b>		435.66	544.57	653.48		99.41	118.47	137.52	2,512.66	3,140.83	3,769.00
<b>Total</b>						<b>690.23</b>	<b>847.30</b>	<b>1,004.37</b>	<b>9,814.88</b>	<b>12,216.75</b>	<b>14,618.62</b>
<b>Expenses</b>						-204.05	-255.07	-306.08			
<b>Total</b>						486.18	592.23	698.29			
<b>2nd Ave. Subway</b>											
<b>New Development</b>											
Office		3.00	3.50	4.00	600	274.89	320.70	366.52	652.33	761.05	869.77
Residential		6,434.98	7,507.47	8,579.97	350,000	63.75	74.37	85.00	816.23	952.26	1,088.30
<b>Existing Development</b>											
Residential	147,899.00	10.00%	10.00%	10.00%	350,000	0.00	0.00	0.00	2,150.93	2,150.93	2,150.93
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	76.55	89.30	102.06	3,951.55	4,610.15	5,268.74
<b>Retail / Sales</b>		326.74	381.20	435.66		57.31	66.86	76.42	1,889.68	2,204.62	2,519.57
<b>Total</b>						<b>472.49</b>	<b>551.24</b>	<b>629.99</b>	<b>9,460.72</b>	<b>10,679.02</b>	<b>11,897.31</b>
<b>Expenses</b>						-153.46	-179.04	-204.61			
<b>Total</b>						319.03	372.21	425.38			
<b>Comprehensive Hudson Yards Plan</b>											
<b>New Development</b>											
Office		16.00	28.00	40.00	550	1,562.52	2,734.42	3,906.31	3,348.63	5,860.11	8,371.58
Residential		34,319.88	60,059.78	85,799.69	350,000	362.37	634.14	905.92	4,570.87	7,999.02	11,427.17
<b>Existing Development</b>											
Residential	33,419.50	10.00%	10.00%	10.00%	350,000	11.27	11.27	11.27	1,185.49	1,185.49	1,185.49
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	435.11	761.44	1,087.77	22,461.61	39,307.82	56,154.02
<b>Retail / Sales</b>		1,742.62	3,049.59	4,356.55		325.78	570.11	814.44	10,741.40	18,797.44	26,853.49
<b>Total</b>						<b>2,697.04</b>	<b>4,711.37</b>	<b>6,725.70</b>	<b>42,307.99</b>	<b>73,149.87</b>	<b>103,991.75</b>
<b>Expenses</b>						-872.31	-1,526.54	-2,180.78			
<b>Total</b>						1,824.73	3,184.83	4,544.92			
<b>No. 7 Subway Extension</b>											
<b>New Development</b>											
Office		3.00	4.00	5.00	550	292.97	390.63	488.29	627.87	837.16	1,046.45
Residential		6,434.98	8,579.97	10,724.96	350,000	67.94	90.59	113.24	857.04	1,142.72	1,428.40
<b>Existing Development</b>											
Residential	33,419.50	10.00%	10.00%	10.00%	350,000	11.27	11.27	11.27	1,185.49	1,185.49	1,185.49
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	81.58	108.78	135.97	4,211.55	5,615.40	7,019.25
<b>Retail / Sales</b>		326.74	435.66	544.57		61.08	81.44	101.81	2,014.01	2,685.35	3,356.69
<b>Total</b>						<b>514.85</b>	<b>682.71</b>	<b>850.57</b>	<b>8,895.96</b>	<b>11,466.11</b>	<b>14,036.27</b>
<b>Expenses</b>						-163.56	-218.08	-272.60			
<b>Total</b>						351.29	464.63	577.98			

**Table A-4. Sensitivity Analysis [cont.]**  
*(250 sq. ft. (office job) and \$550 per sq. ft. in LM and Far West Side; \$600 per sq. ft. in Midtown)*

Economic Impact	Existing	Increase			Unit Value (\$)	Tax Benefits			Estimate PV of Econ. Dev.		
		Low	Medium	High		Low	Medium	High	Low	Medium	High
<b>Access to the Region's Core</b>											
<b>New Development</b>											
Office		0.00	0.50	1.00	600.00	0.00	48.83	97.66	0.00	114.16	228.32
Residential		0.00	1,072.50	2,144.99	0.00	0.00	11.32	22.65	0.00	142.84	285.68
<b>Existing Development</b>	180,448.10										
Residential		10.00%	10.00%	10.00%	170,000	0.00	1.43	2.86	904.09	904.09	904.09
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	0.00	13.60	27.19	0.00	701.93	1,403.85
<b>Retail / Sales</b>		0.00	54.46	108.91		0.00	10.18	20.36	0.00	335.67	671.34
<b>Total</b>						<b>0.00</b>	<b>85.36</b>	<b>170.72</b>	<b>904.09</b>	<b>2,198.69</b>	<b>3,493.28</b>
Expenses						0.00	-27.26	-54.52			
<b>Total</b>						<b>0.00</b>	<b>58.10</b>	<b>116.20</b>			
<b>East Side Access</b>											
<b>New Development</b>											
Office		4.00	5.00	6.00	440	196.32	269.69	343.06	669.73	867.60	1,065.47
Residential		9,261.84	11,492.06	13,722.29	350,000	97.79	121.34	144.89	1,233.53	1,530.56	1,827.59
<b>Existing Development</b>	5,025.50										
Residential		10.00%	10.00%	10.00%	350,000	64.71	64.71	64.71	107.98	107.98	107.98
<b>Jobs / Income</b>		0.00	0.00	0.00	35,000	52.44	72.60	92.75	2,707.37	3,747.72	4,788.07
<b>Retail / Sales</b>		194.58	273.36	352.14		39.27	54.36	69.44	1,199.38	1,684.97	2,170.56
<b>Total</b>						<b>450.53</b>	<b>582.69</b>	<b>714.85</b>	<b>5,917.99</b>	<b>7,938.84</b>	<b>9,959.68</b>
Expenses						-235.41	-292.09	-348.78			
<b>Total</b>						<b>215.12</b>	<b>290.59</b>	<b>366.07</b>			
<b>Farley/Penn</b>											
<b>New Development</b>											
Office		2.00	3.00	4.00	550	195.32	292.97	390.63	418.58	627.87	837.16
Residential		4,289.98	6,434.98	8,579.97	350,000	45.30	67.94	90.59	571.36	857.04	1,142.72
<b>Existing Development</b>	0.00										
Residential		10.00%	10.00%	10.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Jobs / Income</b>		0.00	0.00	0.00	77,000	54.39	81.58	108.78	2,807.70	4,211.55	5,615.40
<b>Retail / Sales</b>		217.83	326.74	435.66		40.72	61.08	81.44	1,342.67	2,014.01	2,685.35
<b>Total</b>						<b>335.72</b>	<b>503.58</b>	<b>671.44</b>	<b>5,140.31</b>	<b>7,710.47</b>	<b>10,280.63</b>
Expenses						-109.04	-163.56	-218.08			
<b>Total</b>						<b>226.68</b>	<b>340.02</b>	<b>453.37</b>			
<b>PATH to Newark Liberty</b>											
<b>New Development</b>											
Office		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Existing Development</b>	0.00										
Residential		10.00%	10.00%	10.00%	350,000	0.00	0.00	0.00	0.00	0.00	0.00
<b>Jobs / Income</b>		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Retail / Sales</b>		0.00	0.00	0.00		4.05	4.05	4.05	52.51	52.51	52.51
<b>Total</b>						<b>4.05</b>	<b>4.05</b>	<b>4.05</b>	<b>52.51</b>	<b>52.51</b>	<b>52.51</b>
Expenses						0.00	0.00	0.00			
<b>Total</b>						<b>4.05</b>	<b>4.05</b>	<b>4.05</b>			

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