

An Investment That's Paying Off:

The Economic and Fiscal Impact of the Development of Hudson Yards

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This report was prepared by Appleseed, a New York City-based consulting firm, founded in 1993, that provides economic research and analysis and economic development planning services to government, non-profit and corporate clients.



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The economic and fiscal impact of Hudson Yards: *Highlights*

Ten years ago, New York City placed a very large bet on the development of Hudson Yards. Three years into a fourteen-year construction program, weeks before the first office tenants move in and with the Metropolitan Transportation Authority (MTA) carrying thousands of riders each day to and from the new Hudson Yards subway station, the bet is beginning to pay off – in private investment, jobs, and new revenues for both the MTA and the City of New York. This report focuses on the 28-acre project that Related Companies and its partner Oxford Properties Group are developing atop the MTA's rail yards.

Economic impact of construction

- From 2012 through 2025, more than \$20 billion will be spent on the development of Hudson Yards – the largest private development project in New York City's history.
- Construction spending during this period will directly and indirectly support:
 - » More than 98,360 person-years of work in New York City, with more than \$10.6 billion in earnings (in 2018 dollars) – an average of nearly 7,030 FTE jobs each year, with nearly \$761 million in earnings; and
 - » \$25.6 billion in economic output in New York City.
- Hudson Yards has been a major contributor to the recovery of New York City's construction industry in the years following the recession. We estimate that construction work at Hudson Yards accounted for approximately 16 percent of the total increase in construction industry employment in New York City between 2011 and 2014.

Economic impact of operations

- When the project is fully built out and occupied, we estimate that companies doing business at Hudson Yards will directly employ 55,752 people (on an FTE basis), with earnings totaling nearly \$9.8 billion (in 2018 dollars) – an average of nearly \$175,000 per FTE.

- Taking into account the multiplier effect, we estimate that when the project is fully built out and occupied, ongoing operations at Hudson Yards will directly and indirectly account for:
 - » Approximately 123,303 FTE jobs, with earnings totaling more than \$15.9 billion (in 2018 dollars); and
 - » More than \$42.1 billion in annual output.
- When fully built out and occupied, we estimate that the operations of companies located at Hudson Yards will be directly contributing nearly \$18.9 billion annually (in 2018 dollars) to New York City's gross domestic product – about 2.5 percent of Citywide GDP, and an average of approximately \$338,130 per worker.

Impact on MTA revenues

- During the fourteen-year construction period, construction activity at Hudson Yards will generate MTA revenues totaling \$1.784 billion (in 2018 dollars) – more than enough to pay the entire cost of Phase Two of the Second Avenue subway.
- Upon completion, ongoing operations at Hudson Yards will generate approximately \$89 million (in 2018 dollars) in annual ground lease payments and dedicated MTA taxes. To put this in perspective, this revenue would each year be sufficient to:
 - » Completely renovate four subway stations; or
 - » Purchase 35 new R211 subway cars; or
 - » Replace approximately 3.6 miles of track and switches; or
 - » Purchase 136 new buses.
- In addition to these payments to the MTA, when completed and occupied, Hudson Yards will contribute more than \$68 million annually (in 2018 dollars) toward payment of debt service on the City's financing of extension of the MTA's 7 line through payments in lieu of taxes (PILOTs) to the City.



View of Hudson Yards, looking south from 34th Street

Impact on New York City tax revenues

During the construction period, construction activity at Hudson Yards will generate approximately \$237 million (in 2018 dollars) in New York City tax revenues, including income taxes paid by City residents employed on the projects and business taxes paid by contractors and suppliers.

- When the project is fully built out and occupied, ongoing operations of companies doing business at Hudson Yards will annually generate approximately \$477 million in New York City tax revenues (in 2018 dollars), sufficient to pay:
 - » The salaries of approximately 6,000 New York City firefighters; or
 - » more than 6,000 New York City public school teachers; or
 - » The operating budget of the New York City Department of Parks and Recreation; or
 - » The combined operating and capital budgets of the Department of Cultural Affairs.

Contributing to the development of West Midtown

- Beyond its direct impact on New York City's economy and its impact on MTA and New York City revenues, Hudson Yards has played and will play during the next decade a leading role in the transformation of the wider West Midtown area, by:
 - » Opening up transit access to the broader West Midtown area
 - » Connecting the thriving Chelsea and Clinton neighborhoods
 - » Creating a critical mass of high-quality office space and office-based businesses, thus helping to raise the visibility of the entire area and confirm its status as a major new business district
 - » Providing the housing, amenities, public open space and other resources needed to build a thriving community.



View of Hudson Yards from the High Line



Introduction

Hudson Yards, now under construction on the far west side of Midtown Manhattan, is the largest and most ambitious mixed-use development project in New York City's history. When completed in the middle of the next decade, the 17 million square-foot, \$20 billion project – most of which is being built atop two massive 10-acre platforms covering the Long Island Rail Road's west side train yard – will include:

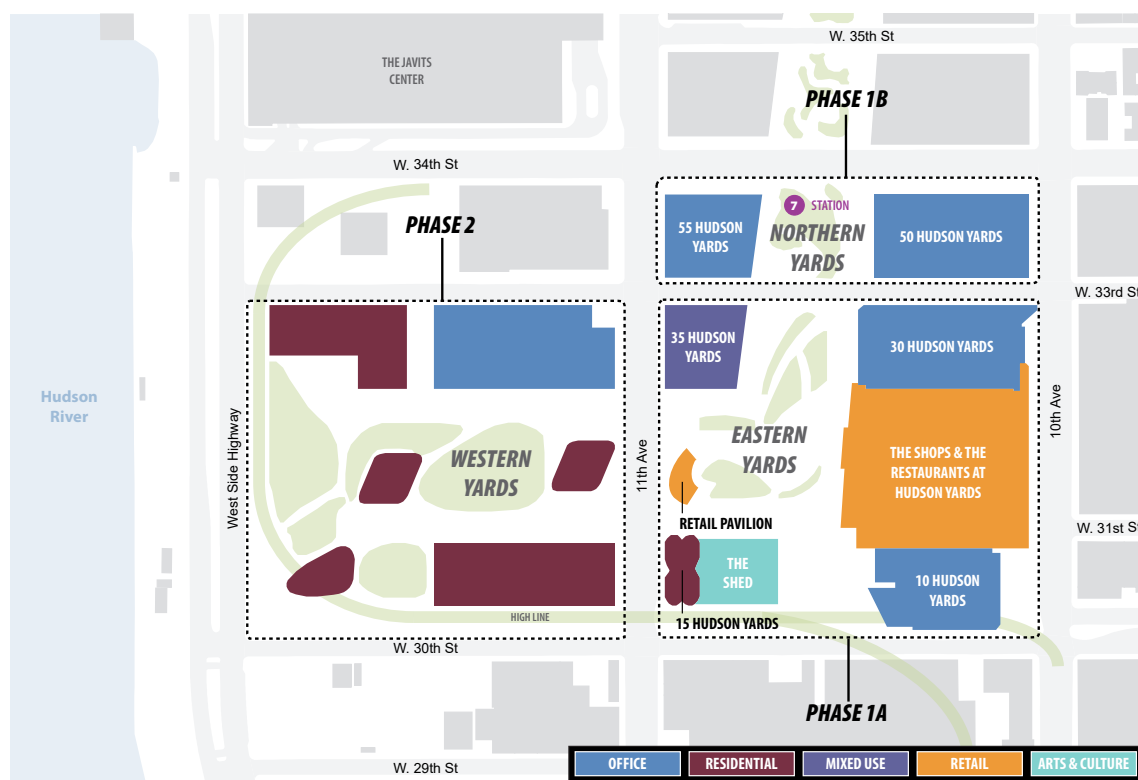
- 5 office buildings totaling approximately 10.4 million gross square feet
- 8 residential buildings totaling approximately 4.6 million gross square feet, with more than 3,900 rental and for-sale units
- A 1 million gross square-foot retail complex with more than 100 stores and restaurants, including a 250,000 square-foot Neiman Marcus store
- New York City's highest outdoor observation deck, reaching more than 1,100 feet above street level

- A 1,000 foot tall, 1 million gross square-foot mixed-use building, including 137 condominium apartments, a 200-room Equinox-branded hotel, a 60,000 square-foot Equinox health club, 175,000 square feet of office space, and 20,000 square feet of retail space
- The Shed, a 200,000 square-foot multi-purpose cultural facility
- A 750-seat public school
- 14 acres of public open space
- Up to 1,900 parking spaces

Figure 1 shows the location of the various major elements of the project.

This report assesses the economic impact of development of Hudson Yards, the project's ongoing contribution to the vitality of New York City's economy, and its impact on MTA and New York City revenues.

Figure 1: Location of Hudson Yards project components





Part One: The impact of construction

For purposes of this analysis we assume that construction will proceed in phases. Phase 1A, the Eastern Rail Yard, will be completed in 2019. Phase 1B, the block between 33rd and 34th Street (the site of 50 and 55 Hudson Yards) will be completed in 2020; and Phase 2, the Western Rail Yard between 11th and 12th Avenues, will be completed by 2025.

Total development costs for these three major components of the overall Hudson Yards project are expected (as detailed in Table 1) to total more than \$20.4 billion through the end of 2025. Not all project costs, however, are included in our analysis of the impact of construction and construction-related spending. The cost of land acquisition, for example, is usually considered a transfer that in itself does not directly generate any current economic activity.¹ Similarly, interest costs incurred during construction are not included in our analysis.

After taking into account these and other deductions, we estimate that over the life of the project, hard- and soft-cost construction spending included in this analysis will total more than \$17.0 billion (in 2018 dollars).²

1. In this case, most of the land on which the project is being developed is owned by the Metropolitan Transportation Authority. Payments by the developers to the MTA are included in our analysis of the project's impact on MTA revenues, which is presented in Part Three of the report.

2. For consistency and comparability, construction costs in Table 1 and the results of our analysis in Tables 2 through 5 are shown in 2018 dollars (roughly the midpoint for construction of all three phases) rather than in dollar values for the year in which construction occurs.

Direct impact on employment and earnings in construction and related industries

Using the IMPLAN input-output modeling system (an economic modeling tool commonly used in economic impact analyses), we estimate that from 2012 through 2025, this spending will directly support more than 51,000 person-years of employment³ in construction and related industries (such as architecture, engineering, legal services, banking, insurance and real estate services), with salaries and wages totaling nearly \$7.1 billion (in 2018 dollars).

This means that from 2012 through 2025, hard- and soft-cost spending on the development of Hudson Yards will have directly supported an average of 3,649 full-time-equivalent (FTE) jobs each year, including an average of 2,767 FTE jobs each year in construction, and 882 FTE jobs in related industries. Total wages and salaries paid to these workers will average \$505.1 million each year (in 2018 dollars), an average of about \$138,000 per FTE job.

Hudson Yards has during the past few years been a leading contributor to the recovery of construction employment in New York City. Based on data published by the New York State Department of Labor, we estimate that Hudson Yards accounted for approximately 16 percent of total growth in construction industry employment in New York City between 2011 and 2014 – a period during which Citywide construction employment grew from an annual average of approximately 107,800 (the low point of construction employment in the City in the years following the 2008 financial crisis) to approximately 124,200, nearly returning to the pre-recession peak of 2007-2008.

3. A person-year is equivalent to the time worked by one full-time employee over the course of one year. In addition to one person working full-time for a year, it could for example represent the work of two people, each of whom is employed full-time for six months; or two people who each work half-time for the full year.

Table 1: Development and construction costs, by Hudson Yards project component (in \$000s)

Hudson Yards project component	Estimated total development cost (in current-year dollars)	Total construction cost (after deductions, in 2018 constant dollars)
Eastern Rail Yard	\$9,816,931.9	\$8,900,823.0
50 and 55 Hudson Yards	\$4,354,000.7	\$2,806,587.8
Western Rail Yard	\$6,271,200.0	\$5,367,542.6
TOTAL	\$20,442,132.6	\$17,074,953.4

Indirect, induced and total impact in New York City

The impact of spending on construction at Hudson Yards is not, however, limited to its direct effect on employment and earnings. Using IMPLAN, we can also estimate the indirect and induced (or “multiplier”) effects of spending on construction and related services – the economic activity resulting from:

- Spending within New York City (for supplies, equipment, overhead costs, etc.) by contractors directly engaged in construction at Hudson Yards (the indirect effect); and
- Household spending within the City by workers in construction and related industries who are directly employed on the project, and by employees of contractors and vendors (the induced effect).

Taking into account these indirect and induced effects, we estimate that by the time Hudson Yards is fully built, the direct expenditure of nearly \$17.1 billion (in 2018 dollars) will have indirectly accounted for an additional:

- 47,279 person-years of employment in New York City, with wages and salaries totaling nearly \$3.6 billion (in 2018 dollars); and
- More than \$8.5 billion (in 2018 dollars) in City-wide economic output.

Combining these indirect and induced effects with the previously-cited estimate of the project's direct impact on employment and earnings in construction and related industries, we estimate that by the time Hudson Yards is fully built out, the direct expenditure of nearly \$17.1 billion (in 2018 dollars) will have directly and indirectly accounted for:

- More than 98,360 person-years of employment in New York City, with wages and salaries totaling more than \$10.6 billion (in 2018 dollars); and
- \$25.6 billion (in 2018 dollars) in City-wide economic output.

Tables 2 through 5 summarize the direct, indirect and induced and total impact of spending on construction (for both hard and soft costs) for the Eastern Rail Yard, 50 and 55 Hudson Yards, the Western Rail Yard, and for Hudson Yards as a whole.

Table 2: Impact of Eastern Rail Yard construction spending (jobs in person-years, wages, value added⁴ and output⁵ in millions of 2018 dollars)

	Jobs	Wages	Value Added	Output
Impact of hard costs				
Direct impact	20,626	\$3,138.0	\$3,782.4	\$7,205.3
Indirect effects	9,198	\$755.8	\$1,158.4	\$1,722.6
Induced effects	10,402	\$730.0	\$1,221.1	\$1,833.2
<i>Subtotal, hard costs impact</i>	<i>40,226</i>	<i>\$4,623.8</i>	<i>\$6,161.9</i>	<i>\$10,761.1</i>
Impact of soft costs				
Direct impact	6,199	\$625.9	\$1,284.7	\$1,695.5
Indirect effects	1,842	\$183.5	\$267.5	\$389.4
Induced effects	2,218	\$155.6	\$260.1	\$390.5
<i>Subtotal, soft costs impact</i>	<i>10,259</i>	<i>\$965.0</i>	<i>\$1,812.3</i>	<i>\$2,475.4</i>
Total impact				
Direct impact	26,825	\$3,764.0	\$5,067.0	\$8,900.8
Indirect effects	11,040	\$939.3	\$1,425.9	\$2,112.0
Induced effects	12,620	\$885.5	\$1,481.2	\$2,223.7
TOTAL	50,485	\$5,588.8	\$7,974.1	\$13,236.5

4. Value-added is the amount by which the value of a good or service is increased at a particular stage of production. This is the difference between the cost of the inputs used in producing a good or service and its price.

5. Output is a measure of final sales – in this case, the developers' direct purchase of construction and construction-related services and materials from their contractors and suppliers.

Table 3: Impact of 50 and 55 Hudson Yards construction spending (jobs in person-years, wages, value added and output in millions of 2018 dollars)

	Jobs	Wages	Value Added	Output
Impact of hard costs				
Direct impact	5,880	\$894.5	\$1,078.2	\$2,054.0
Indirect effects	2,622	\$215.5	\$330.2	\$491.0
Induced effects	2,965	\$208.1	\$348.1	\$522.6
<i>Subtotal, hard costs impact</i>	<i>11,467</i>	<i>\$1,318.1</i>	<i>\$1,756.5</i>	<i>\$3,067.6</i>
Impact of soft costs				
Direct impact	2,699	\$230.0	\$596.1	\$752.6
Indirect effects	701	\$64.0	\$96.4	\$142.4
Induced effects	811	\$56.9	\$95.1	\$142.7
<i>Subtotal, soft costs impact</i>	<i>4,211</i>	<i>\$350.9</i>	<i>\$787.6</i>	<i>\$1,037.8</i>
Total impact				
Direct impact	8,579	\$1,124.6	\$1,674.4	\$2,806.6
Indirect effects	3,323	\$279.5	\$426.6	\$633.5
Induced effects	3,776	\$265.0	\$443.1	\$665.3
TOTAL	15,678	\$1,669.0	\$2,544.1	\$4,105.4

Table 4: Impact of Western Rail Yard construction spending (jobs in person-years, wages, value added and output in millions of 2018 dollars)

	Jobs	Wages	Value Added	Output
Impact of hard costs				
Direct impact	12,232	\$1,852.9	\$2,137.0	\$4,361.8
Indirect effects	7,856	\$573.4	\$901.0	\$1,333.5
Induced effects	6,501	\$456.2	\$763.1	\$1,145.7
<i>Subtotal, hard costs impact</i>	<i>26,589</i>	<i>\$2,882.6</i>	<i>\$3,801.1</i>	<i>\$6,841.0</i>
Impact of soft costs				
Direct impact	3,449	\$330.0	\$782.6	\$1,005.7
Indirect effects	991	\$97.4	\$143.7	\$209.8
Induced effects	1,172	\$82.2	\$137.4	\$206.3
<i>Subtotal, soft costs impact</i>	<i>5,612</i>	<i>\$509.6</i>	<i>\$1,063.6</i>	<i>\$1,421.8</i>
Total impact				
Direct impact	15,681	\$2,182.9	\$2,919.5	\$5,367.5
Indirect effects	8,847	\$670.8	\$1,044.7	\$1,543.3
Induced effects	7,673	\$538.4	\$900.5	\$1,352.0
TOTAL	32,201	\$3,392.2	\$4,864.7	\$8,262.8

Table 5: Combined impact of Hudson Yards construction spending (jobs in person-years, wages, value added and output in millions of 2018 dollars)

	Jobs	Wages	Value Added	Output
Impact of hard costs				
Direct impact	38,738	\$5,885.5	\$6,997.5	\$13,621.1
Indirect effects	19,676	\$1,544.7	\$2,389.6	\$3,547.1
Induced effects	19,868	\$1,394.3	\$2,332.3	\$3,501.5
<i>Subtotal, hard costs impact</i>	<i>78,282</i>	<i>\$8,824.5</i>	<i>\$11,719.5</i>	<i>\$20,669.8</i>
Impact of soft costs				
Direct impact	12,347	\$1,186.0	\$2,663.4	\$3,453.9
Indirect effects	3,534	\$344.9	\$507.6	\$741.6
Induced effects	4,201	\$294.6	\$492.5	\$739.5
<i>Subtotal, soft costs impact</i>	<i>20,082</i>	<i>\$1,825.5</i>	<i>\$3,663.5</i>	<i>\$4,935.0</i>
Total impact				
Direct impact	51,085	\$7,071.5	\$9,661.0	\$17,075.0
Indirect effects	23,210	\$1,889.6	\$2,897.2	\$4,288.8
Induced effects	24,069	\$1,688.9	\$2,824.8	\$4,241.1
TOTAL	98,364	\$10,650.0	\$15,383.0	\$25,604.8

The Hudson Yards construction supply chain: New York City and beyond

As noted above in Table 5, we estimate that from 2012 through 2025, spending on construction at Hudson Yards will indirectly generate nearly \$4.3 billion (in 2018 dollars) in economic output in New York City – an average of about \$306 million each year. Most of this indirect impact reflects Hudson Yards contractors' purchases of goods and services from suppliers in New York City.

The construction of 10 Hudson Yards, now nearing completion, offers numerous examples of purchases of goods and services from local companies, several of which are listed in Table 6.

Table 6: Purchases of materials and services from New York City suppliers: selected examples from 10 Hudson Yards and construction of the platform

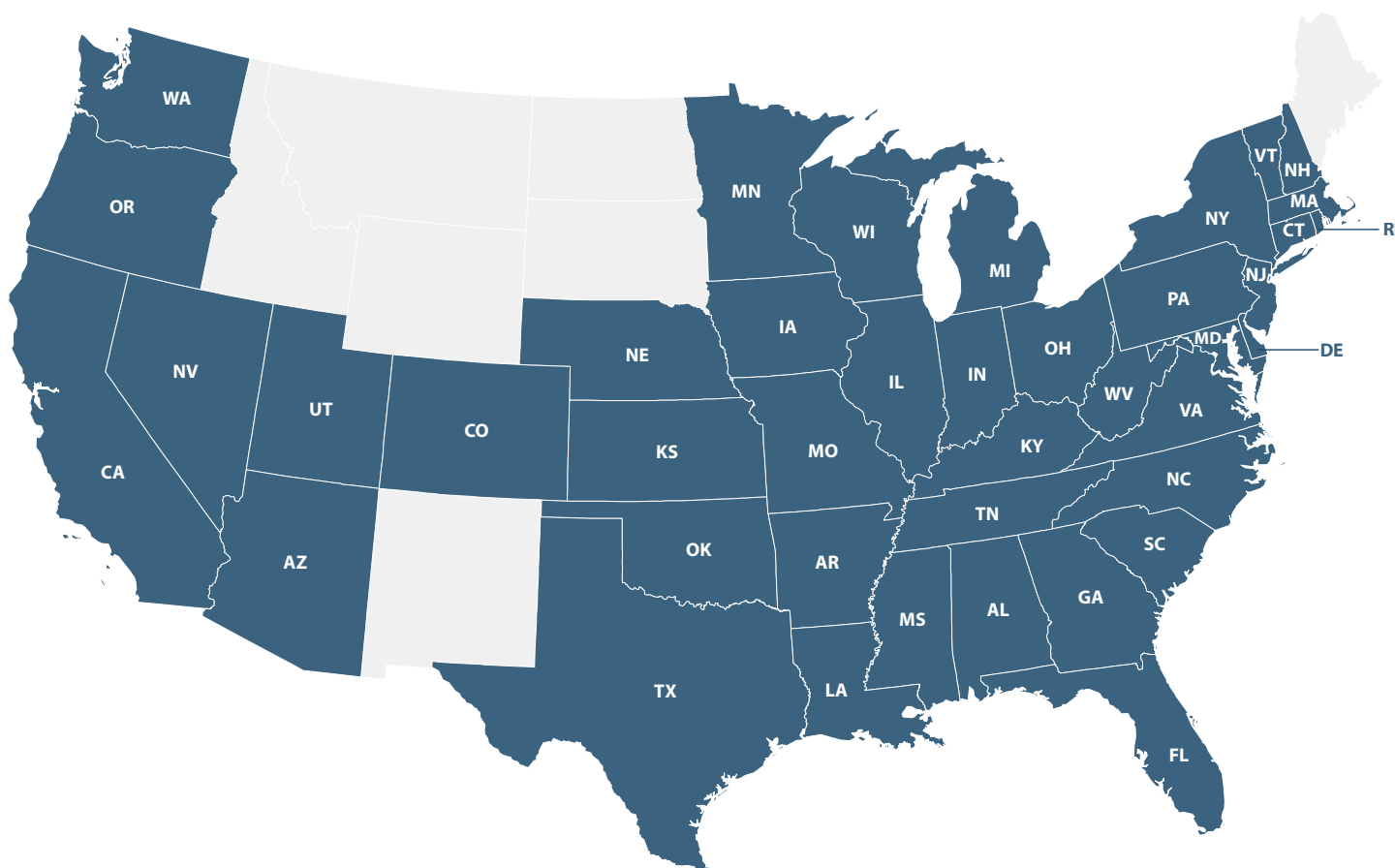
Company	Location	Products and/or services provided
New York Concrete	Staten Island	Excavation, concrete products and services
New York Sand and Stone	Brooklyn	Crushed stone and sand
LaFarge	Brooklyn	Cement, supplied from LaFarge's Brooklyn terminal
Port Morris Tile and Marble	Bronx	Ceramic tile, marble and stone installation
FCV Sewer and Water	Bronx	Plumbing services
CFS Steel	Bronx	Reinforcing bars
Sal-Vio Construction	Bronx	Masonry
Eagle One Roofing	Queens	Roofing, sheet metal and waterproofing
LIF Industries	Queens/Long Island	Customized fireproof doors, framing

While this report focuses primarily on Hudson Yards' impact in New York City, the Hudson Yards supply chain extends to other communities throughout the New York metropolitan region and to other states as well. As figure 2 shows, materials used in the construction on the Eastern Rail Yards have to date been procured from vendors in 41 states. Examples include:

While the economic impact of Hudson Yards may be concentrated primarily in New York City, many other communities in many other states have benefitted as well.

- Foam insulation and other insulation products from Buffalo, New York
- Precast concrete slabs from Cranbury, New Jersey
- Aluminum curtain wall components from Cresson, Pennsylvania
- Structural steel from Lynchburg, Virginia
- Steel pipe from Dewey, Oklahoma

Figure 2: Current US Sources of Materials for Eastern Rail Yards—selected examples





Part Two: The impact of operations

As new buildings are completed and occupied, Hudson Yards will transition from being a major construction project to being a vibrant new mixed-use neighborhood, and a major center of business and employment. This part of the report examines the impact of ongoing operations at Hudson Yards, including the operations of:

- Office, retail and restaurant tenant businesses;
- The Hudson Yards Observation Deck;
- The Equinox-branded hotel and fitness club;
- Residential buildings; and
- A new public school.

In addition to the impact of operations at Hudson Yards, we also highlight the impact of off-site spending by out-of-town visitors to the Observation Deck.

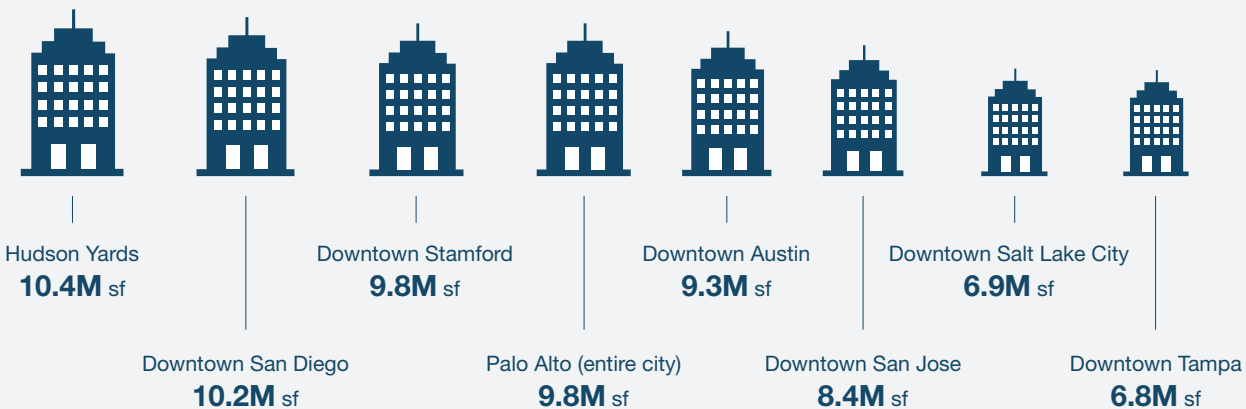
The impact of office tenant operations

Between 2016 and 2025, Hudson Yards is scheduled to complete construction of approximately 10.4 million rentable square feet of new office space – a total greater than the total supply of office space in downtown Stamford, Connecticut, or downtown San Diego, California.

Assuming that office tenants will occupy this new space at a ratio of 210 rentable square feet per worker⁶, and using an estimated vacancy rate of five percent when all new office space is fully built out and occupied, we estimate that office tenants at Hudson Yards will directly employ approximately 49,529 full-time-equivalent (FTE) workers.

6. Because the newest office buildings (typically with open floor plans) allow tenants to use space more flexibly and more efficiently, the ratio of square footage to the number of people employed is gradually declining, from a traditional average of 250 square feet per worker in Manhattan toward 200 square feet or less. (Some of the tenants moving into 10 Hudson Yards in 2016 are planning on well under 200 square feet per worker.) For purposes of this analysis, we assume (probably conservatively) an average of 210 square feet per employee.

When completed, Hudson Yards will have more office space than the entire downtown area of many American cities





Office lobby of 10 Hudson Yards



Office lobby of 30 Hudson Yards

In order to estimate the economic impact of office tenant operations, some assumptions must be made about the mix of tenant businesses by industry. For purposes of this analysis, we define this mix as follows:

- For space that has already been leased or for which occupants have otherwise been identified, the mix reflects the industries in which these companies do business and the square footage they will occupy.
- For space that has not yet been leased, or for which tenants have not yet been publicly identified, we assume a mix that reflects the distribution of employment in office-based industries in Manhattan.

The resulting industry mix is shown in Table 7.

Table 7: Industry mix of office tenants at Hudson Yards

Industry/Tenant	Rentable sq. ft.	%
Leased office space		
Time Warner	1,420,000	32.3%
Coach	715,000	16.2%
Wells Fargo	501,000	11.4%
L'Oréal	410,000	9.3%
KKR	345,000	7.8%
Related	260,000	5.9%
BCG	195,000	4.4%
Equinox	150,000	3.4%
SAP	145,000	3.3%
Boies Schiller	85,000	1.9%
Intersection	67,000	1.5%
Vayner Media	65,000	1.5%
Oxford	45,000	1.0%
<i>Subtotal, leased office space</i>	<i>4,403,000</i>	
Other office space		
Media and information	1,223,400	20.3%
Finance and insurance	1,212,000	20.1%
Real estate	162,000	2.7%
Legal services	471,300	7.8%
Accounting	336,600	5.6%
A & E	202,000	3.4%
Computer systems	408,700	6.8%
Consulting	341,400	5.7%
Advertising	404,000	6.7%
Mgmt. of companies	461,000	7.7%
Other services	803,300	13.3%
<i>Subtotal, other office space</i>	<i>6,025,700</i>	
TOTAL	10,428,700	

The industry mix shown in Table 7 includes many of New York City's highest-value, highest-paying industries. In 2014, companies in these industries paid their Manhattan-based workers a weighted average of approximately \$150,600.

Using IMPLAN, we can estimate the direct, indirect and induced impact of Hudson Yards office tenants on employment, earnings, value added and output in New York City. As shown below in Table 8, we estimate that when fully built out and occupied, Hudson Yards office tenants will directly account for:

- 49,529 FTE jobs, with nearly \$9.5 billion in earnings (in 2018 dollars);
- \$18.4 billion in value-added; and
- More than \$26.1 billion in output.

When indirect and induced effects are added, we estimate that when fully built out and occupied, Hudson Yards office tenants will directly and indirectly account for:

- 115,209 FTE jobs in New York City, with nearly \$15.5 billion in wages (in 2018 dollars);
- More than \$28.6 billion in value-added; and
- \$41.1 billion in City-wide economic output.

The data on direct earnings, value-added and output presented in Table 8 reflect the high-value, high-wage character of Hudson Yards office tenants, with average earnings of \$191,000 per FTE (in 2018 dollars), and average value-added per FTE (in effect, each full-time worker's annual contribution to the City's gross domestic product) of \$371,700. In part as a result of their purchases of goods and services from other companies in New York City and in part due to their relatively high earnings per worker, the multiplier effects of these companies' operations are particularly strong; for every FTE they employ directly, we estimate that Hudson Yards office tenants will indirectly support an average of 1.31 FTE jobs with other employers in New York City.

This means (as shown below) that for every 10 people that Hudson Yards office tenants will employ directly, they will indirectly support 13 FTE jobs with other employers in the City.

When fully built out and occupied, office, retail, hotel and other businesses at Hudson Yards will:



directly employ **55,752** (FTE's)



indirectly support **67,551** FTE jobs elsewhere in NYC

Table 8: Impact of Hudson Yards office tenant operations (jobs in FTE, wages, value added and output in millions of 2018 dollars)

	Jobs	Wages	Value Added	Output
Direct impact	49,529	\$9,466.6	\$18,410.1	\$26,119.5
Indirect effects	30,178	\$3,504.0	\$6,074.6	\$8,739.1
Induced effects	35,502	\$2,491.0	\$4,164.3	\$6,252.7
TOTAL	115,209	\$15,461.7	\$28,648.9	\$41,111.3

Employment attributable to Hudson Yards tenant companies and “net new jobs”

The jobs cited in Table 8 represent the total number of jobs directly and indirectly attributable to the on-site operations of the companies that will be doing business at Hudson Yards after all of the buildings being developed are completed and occupied. In the first instance, not all of this employment will represent “net new jobs” in New York City; many companies in the first wave of Hudson Yards office tenants will have moved from other locations in New York City.

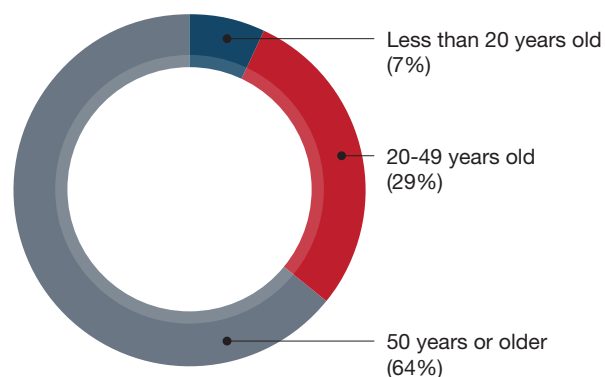
Over time, however, the development of new office space at Hudson Yards will make a significant contribution to the growth of office-based employment in New York City. As they move to Hudson Yards, tenant companies will free up space at their existing locations. These existing locations range from the relatively new, high-quality space at Columbus Circle that Time Warner will be vacating, to older buildings throughout Midtown and elsewhere in the City – many of which will either be used to provide lower-cost, Class B space, or be converted to residential use. The development of Hudson Yards will thus free up space that will be needed to accommodate the continued growth of employment in some of New York’s most vibrant industries.

Moreover, the needs of the City’s high-value, office-based industries cannot be defined solely in terms of the volume of space they occupy. To adapt to changing technologies, changing ways of doing business and changes in how employees work, many of the high-value companies that drive the City’s economy are looking (or when their current leases expire will be looking) for newer, higher-quality, technologically more advanced and more efficient space. They may not always be able to find it. As Figure 3 shows, data obtained from CoStar indicate:

- Less than 7 percent of Manhattan’s office space is in buildings that are less than 20 years old;
- Nearly 29 percent is in buildings between 20 and 49 years old; and
- More than 64 percent is in buildings that are at least 50 years old.

The development of Hudson Yards is one of New York’s most important responses to this demand for new office space. Putting the project’s contribution to meeting this need in perspective – the 10.4 million square feet of high-quality office space scheduled for completion at Hudson Yards between 2016 and 2025 is equivalent to more than 29 percent of Manhattan’s current supply of office space in buildings less than 20 years old.

Figure 3: Manhattan office space by age of building, 2015



Source: CoStar, Appleseed calculations

Impact of retail, restaurant and entertainment facility operations

In addition to office jobs described above, Hudson Yards will provide a diverse array of employment opportunities in retail, restaurants, services, entertainment and culture.

Retail and restaurant operations

The Shops & Restaurants at Hudson Yards (also known as 20 Hudson Yards), scheduled for completion in 2018, will be a seven-level, 658,000 rentable-square-foot retail destination, with more than 100 shops and restaurants. Tenants will include a Neiman Marcus anchor store, along with many of the world’s leading fashion and lifestyle brands, and restaurants created by some of New York’s leading chefs. Based on estimated average annual gross sales of \$1,850 per square foot, we estimate that in 2019, gross sales by these retailers and restaurants will total approximately \$1.2 billion.

Using IMPLAN, we estimate (as shown below in Table 9) that retail and restaurant operations at 20 Hudson Yards will directly support:

- 5,244 FTE jobs, with nearly \$238.8 million in earnings (in 2018 dollars);⁶
- \$372.2 million in value-added; and
- Nearly \$517.0 million in output.

6. This analysis was completed before the New York State legislature approved an increase in the minimum wage in New York City, effective at the end of 2018. The higher minimum wage is likely to increase the aggregate earnings of Hudson Yards retail and restaurant workers beyond the \$238.8 million cited here.



View of Hudson Yards from the High Line

The Observation Deck operations

Growth in the number of visitors to New York City from elsewhere in the U.S. and around the world has been a major contributor to the growth and diversification of the City's economy during the past decade. Sustaining this growth will depend in part on the continued development of the types of attractions that draw visitors to New York, and encourage them to spend more time (and money) in the City.

Along with offices, shops and restaurants, Hudson Yards will be the site of a major new visitor attraction:

- The Hudson Yards Observation Deck, occupying the 88th and 89th floors of 30 Hudson Yards and including an exterior "prow" extending from the 88th floor that will support what will be – at 1,135 feet – New York City's highest outdoor observation platform. The 89th floor will include a restaurant and event space.

Based on operating cost estimates for the Observation Deck, we estimate (as shown in Table 9) that when fully built out its operations will directly account for:

- 326 FTE jobs, with \$9.8 million in earnings (in 2018 dollars);
- \$13.7 million in value-added; and
- Nearly \$23.6 million in output.

In addition to the impact of its operations, the Hudson Yards Observation Deck will contribute to the vitality of New York City's economy through off-site spending by visitors it helps attract to New York. This additional impact is discussed below.

Summing up: the impact of retail, restaurant and entertainment facility operations

Taking into account the ongoing operations of Hudson Yards' retail and restaurant tenants and the Observation Deck, we estimate (as shown in Table 9) that these operations will directly account for:

- 5,570 FTE jobs, with \$248.6 million in earnings (in 2018 dollars);
- Nearly \$386.0 million in value-added; and
- Nearly \$540.6 million in output.

Taking into account the multiplier effect, we estimate that the operations of this facility will directly and indirectly account for:

- 7,186 FTE jobs in New York City, with nearly \$381.9 million in earnings (in 2018 dollars);
- Nearly \$610.3 million in value-added; and
- Nearly \$873.8 million in City-wide economic output.

Table 9: Impact of the operations of 20 Hudson Yards retail and restaurants and the Observation Deck (jobs in FTE, wages, value added and output in thousands of 2018 dollars)

	Jobs	Wages	Value Added	Output
Impact of retail operations				
Direct impact	4,161	\$198,080.6	\$324,387.1	\$440,501.4
Indirect effects	643	\$61,492.1	\$104,755.7	\$153,852.3
Induced effects	685	\$48,124.7	\$80,521.3	\$120,876.6
<i>Subtotal, retail operations impact</i>	<i>5,490</i>	<i>\$307,697.3</i>	<i>\$509,664.1</i>	<i>\$715,230.4</i>
Impact of restaurant operations				
Direct impact	1,083	\$40,703.0	\$47,847.6	\$76,463.5
Indirect effects	87	\$8,806.5	\$14,171.4	\$21,287.0
Induced effects	130	\$9,110.8	\$15,247.0	\$22,887.3
<i>Subtotal, restaurant operations impact</i>	<i>1,300</i>	<i>\$58,620.3</i>	<i>\$77,265.9</i>	<i>\$120,637.8</i>
Impact of Observation Deck operations				
Direct impact	326	\$9,848.6	\$13,728.4	\$23,592.3
Indirect effects	36	\$3,297.3	\$5,612.8	\$8,245.1
Induced effects	34	\$2,406.7	\$4,028.2	\$6,046.6
<i>Subtotal, observation deck operations impact</i>	<i>397</i>	<i>\$15,552.7</i>	<i>\$23,369.4</i>	<i>\$37,884.0</i>
Total impact				
Direct impact	5,570	\$248,632.1	\$385,963.0	\$540,557.2
Indirect effects	767	\$73,596.0	\$124,539.9	\$183,384.5
Induced effects	850	\$59,642.2	\$99,796.5	\$149,810.5
TOTAL	7,186	\$381,870.3	\$610,299.5	\$873,752.1

Impact of hotel and fitness club operations

Among the buildings being constructed over the Eastern Rail Yard is 35 Hudson Yards, a 1.04 million square-foot mixed-use building that will include 137 condominium apartments, 150,000 square feet of office space, a 200-room Equinox-branded hotel, a 60,000 square-foot Equinox fitness club, Equinox headquarters and associated retail and restaurant space. The impact of the businesses occupying the office-space component at 35 Hudson Yards was included in the preceding analysis of the impact of ongoing operations of Hudson Yards office tenants; and the impact of the residential space will be considered in the analysis of the impact of residential building operations that follows. Here we focus on the impact of ongoing operations of the hotel and health club.

Based on internal estimates of the Equinox-branded hotel and health club employment, we estimate (as shown in Table 10) that these facilities will directly account for:

- 342 FTE jobs, with \$16.3 million in earnings (in 2018 dollars);
- Nearly \$25.1 million in value-added; and
- \$36.3 million in output.

Taking into account the multiplier effect, we estimate that the operations of these facilities will directly and indirectly account for:

- 438 FTE jobs in New York City, with \$23.9 million in earnings (in 2018 dollars);
- \$37.6 million in value-added; and
- \$55.2 million in City-wide economic output.



View of Hudson Yards Plaza, 15 Hudson Yards and 35 Hudson Yards

Table 10: Impact of 35 Hudson Yards hotel and health club operations (jobs in FTE, wages, value added and output in thousands of 2018 dollars)

	Jobs	Wages	Value Added	Output
Impact of hotel operations				
Direct impact	192	\$12,236.5	\$19,186.6	\$26,934.3
Indirect effects	28	\$2,621.1	\$3,978.8	\$6,182.1
Induced effects	39	\$2,747.4	\$4,597.2	\$6,901.1
<i>Subtotal, hotel operations impact</i>	259	\$17,605.0	\$27,762.6	\$40,017.5
Impact of health club operations				
Direct impact	150	\$4,104.0	\$5,911.7	\$9,381.9
Indirect effects	14	\$1,256.8	\$2,313.2	\$3,340.0
Induced effects	14	\$981.4	\$1,642.6	\$2,465.6
<i>Subtotal, health club operations impact</i>	178	\$6,342.3	\$9,867.4	\$15,187.4
Total impact				
Direct impact	342	\$16,340.6	\$25,098.3	\$36,316.2
Indirect effects	43	\$3,878.0	\$6,292.0	\$9,522.1
Induced effects	53	\$3,728.8	\$6,239.7	\$9,366.6
TOTAL	438	\$23,947.3	\$37,630.1	\$55,204.9



View from upper level floor of 15 Hudson Yards

Impact of residential building operations

Phase 1 residential development at Hudson Yards will include:

- 15 Hudson Yards, a 390-unit building scheduled to be completed in 2018; and
- 35 Hudson Yards, a mixed-use building with approximately 137 residential units, scheduled to be completed in 2019.

Phase 2 will include seven residential buildings (assumed to include four for-sale and three rental buildings) with a total of 3,394 units that are scheduled to be constructed over the Western Rail Yard, with scheduled completion dates ranging from mid-2019 through the end of 2025.

Assuming that residential buildings will employ one FTE worker per 20,000 gross square feet of building space, we estimate (as shown in Table 11) that residential building operations and maintenance will directly support:

- 256 FTE jobs, with nearly \$18.3 million in earnings (in 2018 dollars);
- Nearly \$27.4 million in value-added; and
- \$43.6 million in output.

Taking into account the multiplier effect, we estimate that residential building operations and maintenance will directly and indirectly account for:

- 403 FTE jobs in New York City, with \$29.7 million in earnings (in 2018 dollars);
- Nearly \$45.2 million in value-added; and
- Nearly \$70.3 million in City-wide economic output.

The residential development on the Western Rail Yards will also include a new public school, which we estimate will directly employ 55 people and, through its indirect and induced effects, will support 12 additional FTE jobs elsewhere in New York City.

Table 11: Impact of Hudson Yards residential building operations (jobs in FTE, wages, value added and output in thousands of 2018 dollars)

	Jobs	Wages	Value Added	Output
Direct impact	256	\$18,264.8	\$27,382.6	\$43,614.1
Indirect effects	78	\$6,589.0	\$9,669.5	\$14,476.4
Induced effects	69	\$4,849.2	\$8,103.2	\$12,168.2
TOTAL	403	\$29,703.0	\$45,155.3	\$70,258.7



View of Hudson Yards Plaza

Summing up: The impact of ongoing operations at Hudson Yards

Taking into account the ongoing operations of Hudson Yards' office, retail and restaurant tenants, the Observation Deck, residential buildings and a new public school, we estimate that when Hudson Yards is fully built out and occupied it will directly account for:

- Approximately 55,752 FTE jobs, with earnings totaling nearly \$9.8 billion (in 2018 dollars);
- Nearly \$18.9 billion in value-added; and
- More than \$26.7 billion in output.

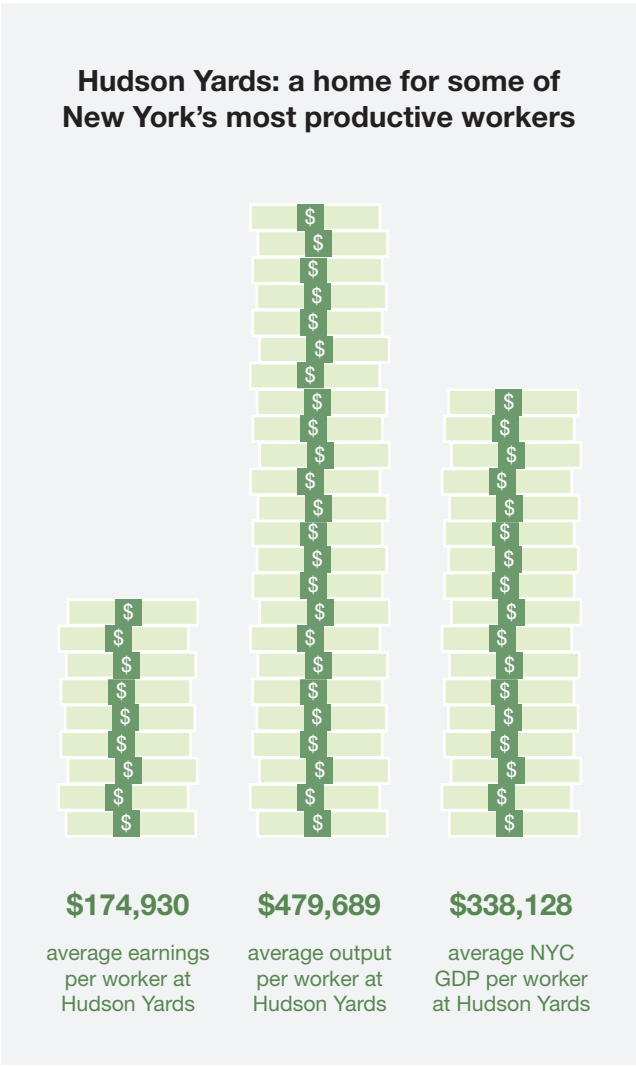
Taking into account indirect and induced effects, we estimate that operations at Hudson Yards directly and indirectly account for:

- Approximately 123,303 FTE jobs, with earnings totaling more than \$15.9 billion (in 2018 dollars);
- More than \$29.3 billion in value-added; and
- More than \$42.1 billion in output.

Table 12: Total operational impact of Hudson Yards (jobs in FTE, wages, value added and output in billions of 2018 dollars)

	Jobs	Wages	Value Added	Output
Direct impact	55,752	\$9,752.7	\$18,851.3	\$26,743.6
Indirect effects	31,069	\$3,588.4	\$6,215.6	\$8,947.3
Induced effects	36,482	\$2,559.8	\$4,279.4	\$6,425.5
TOTAL	123,303	\$15,900.9	\$29,346.2	\$42,116.4

The nearly \$18.9 billion in direct value-added cited in Table 12 is in effect the “gross domestic product” (GDP) of Hudson Yards when fully built out and occupied (measured in 2018 dollars). This translates into an average GDP per worker across all of the companies doing business at Hudson Yards of nearly \$338,130. If measured instead in 2013 dollars, the GDP of Hudson Yards would total more than \$17.1 billion – larger than the GDP of Iceland (\$15.3 billion), and about 2.5 percent of New York City’s GDP as of 2013.



Top: View of 55 Hudson Yards
Bottom: Entrance to 55 Hudson Yards

The impact of off-site visitor spending

In addition to the impact of its ongoing operations, the Hudson Yards Observation Deck will contribute to New York City's economy through off-site spending by visitors that this facility helps attract to the City.

Based on market studies prepared for Related and Oxford, we assume that in its first full year of operation the Observation Deck will attract approximately 1.5 million visitors. For this analysis, we further assume that 80 percent of those who visit the Observation Deck will come from outside New York City.

Based on these assumptions, and using visitor spending data from NYC & Company (discounted to take into account spending that takes place at the venue or elsewhere at Hudson Yards), we estimate that when the Observation Deck is completed and fully operational, incremental off-site spending by out-of-town visitors to this facility will total approximately \$30.6 million (in 2018 dollars).

Using IMPLAN, we estimate (as shown below in Table 13) that incremental off-site visitor spending will directly and indirectly generate:

- 315 FTE jobs, with earnings totaling nearly \$19.2 million (in 2018 dollars);
- Nearly \$27.4 million in value-added; and
- More than \$40.4 million in output.



Table 13: Impact of off-site visitor spending (jobs in FTE, wages, value added and output in millions of 2018 dollars)

	Jobs	Wages	Value Added	Output
Direct impact	238	\$12,927.5	\$17,313.0	\$25,315.7
Indirect effects	34	\$3,144.8	\$4,911.2	\$7,367.4
Induced effects	44	\$3,081.7	\$5,151.8	\$7,735.4
TOTAL	315	\$19,153.9	\$27,376.0	\$40,418.4



Part Three: Impact on MTA and New York City revenues

During both construction and its ongoing operations, Hudson Yards will be a significant source of revenue for the Metropolitan Transportation Authority and for New York City.

Impact on MTA revenues

The development of Hudson Yards will generate revenues for the MTA in several ways.

Ground lease payments during and after construction

Both during and after construction, Hudson Yards is obligated to make ground lease payments to the MTA for both the Eastern and Western Yards. While these payments are partially abated during the first few years of construction, the amounts that will be paid to the MTA over the course of the fourteen-year construction period are substantial. We estimate that by the time construction over the Western Rail Yard is completed in 2025, the developers will have paid approximately \$497.7 million in ground rent (in 2018 dollars).

When construction is completed, the developers will continue to make annual ground lease payments to the MTA for both the Eastern and Western Rail Yards. When the project is completed and occupied, we estimate that ground lease payments will total approximately \$51.5 million annually (in 2018 dollars), and will increase periodically thereafter.⁷

Under the terms of their agreement with the MTA, the developers have the option of converting their ground leases for the Eastern and Western Rail Yards into fee ownership, at a price that reflects the discounted value of the stream of ground rent payments over the life of the lease.

7. Annual ground rent payments for both the Eastern and Western Rail Yards are increased by 10 percent at five-year intervals. We estimate that the net present value of annual ground rent payable to the MTA over the life of the lease would total more than \$1 billion.

District improvement bonuses and transfer of Eastern Rail Yard development rights

The rezoning that created the Hudson Yards Special District was designed to generate the revenues needed to finance infrastructure improvements that the City saw as essential to the redevelopment of West Midtown. In order to build at the densities needed to make new construction economically feasible, developers are required to make payments to the Hudson Yards District Improvement Fund. Through 2014 about 84 percent of these “district improvement bonus (DIB)” payments have been used to help fund the extension of the Number 7 line to Hudson Yards, with the remainder being used to finance parks and other public improvements.

In exchange for increased density at 50 and 55 Hudson Yards, the developers have paid or will pay more than \$115.7 million (in 2018 dollars) in DIB payments to the Hudson Yards Improvement Corporation, of which we estimate that \$97.2 million has been allocated to the extension of the Number 7 line.

In addition to obtaining the right to build at higher density in exchange for DIB payments, City policy allows developers to increase density through the transfer of development rights from the MTA-owned rail yards to other sites within the district. Hudson Yards has paid or will pay the Hudson Yards Infrastructure Corporation (HYIC) (and through HYIC, the MTA) \$375.6 million for transfer of development rights from the Eastern Rail Yard to 50 and 55 Hudson Yards; and is planning to spend another \$30.0 million for the purchase of additional development rights.

MTA dedicated taxes generated during construction

Spending on construction at Hudson Yards will generate tax revenues that under New York State law are dedicated to the MTA. Here we highlight three such taxes.

- We estimate that MTA payroll mobility taxes paid by Hudson Yards contractors and suppliers based on the wages and salaries of their employees who are working on the project will cumulatively total approximately \$36.1 million.

- “Payments in lieu of sales taxes” will be made to the MTA, in place of sales taxes that in private projects would normally be due on purchases of construction materials and other goods and services. Through 2025, we estimate that these payments will total approximately \$355.1 million.
- The financing of buildings being developed at Hudson Yards will similarly generate “payments in lieu of mortgage recording taxes (PILOMRTs)” for the MTA. We estimate that the financing of buildings being constructed on the Eastern Rail Yard, at 50 and 55 Hudson Yards, and on the Western Rail Yard will generate a total of \$280.4 million in PILOMRT payments.

Payments in lieu of taxes

Under the rules that govern the Hudson Yards Special District, commercial properties are exempted from regular New York City real property taxes. Instead they make payments in lieu of taxes (PILOTs) to the New York City Industrial Development Agency, which transfers these payments to HYIC. As noted above, about 84 percent of HYIC’s revenues are used to pay debt service on the bonds that were issued to finance construction of the Number 7 line extension.

Based on the PILOT rate now in effect for 10 Hudson Yards and assuming that this rate escalates at 3 percent annually, we estimate that when completed and occupied Hudson Yards office properties and tenants will be providing a total of \$81.3 annually in PILOTs, of which approximately \$68.3 million will be used to support the Number 7 line.

MTA dedicated taxes generated by ongoing operations

As with construction, ongoing operations at Hudson Yards will generate several types of tax revenues dedicated to the MTA. Assuming that statutory provisions governing MTA dedicated taxes remain as they are in 2015, we estimate that in 2025 dedicated MTA tax revenues derived from ongoing operations at Hudson Yards will total approximately \$37.8 million.

Summing up

As summarized below, we estimate that:

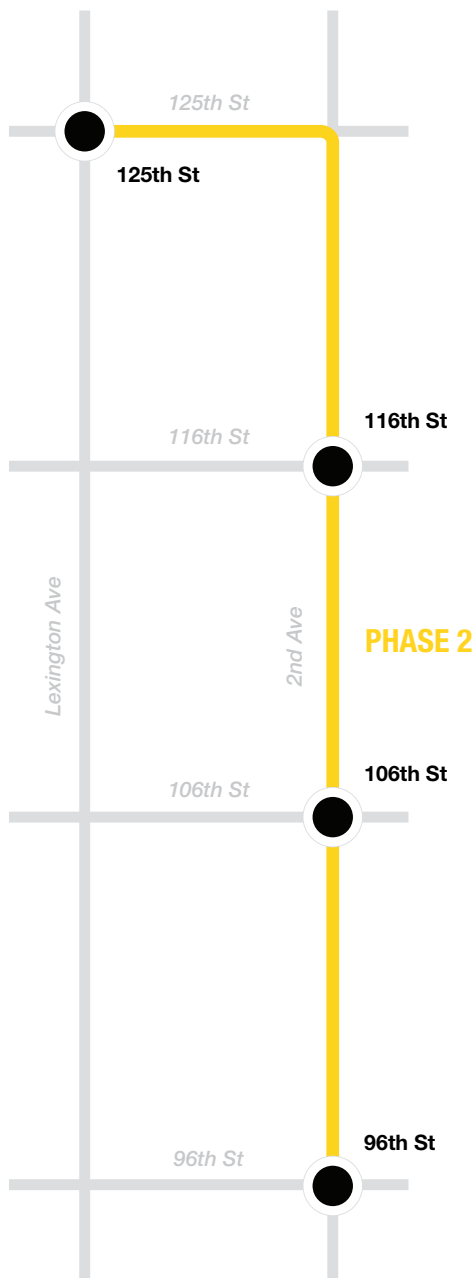
- During the fourteen-year construction period, Hudson Yards will generate MTA revenues totaling \$1.784 billion (in 2018 dollars); and
- When the complex is fully built and occupied, ongoing operations at Hudson Yards will generate approximately \$89.3 million (in 2018 dollars) in annual ground lease payments and dedicated taxes to the MTA, and approximately \$68.3 million in PILOTs that support payment of debt service on the Number 7 line.

Table 14: MTA revenues generated from the development and operation of Hudson Yards (in millions of 2018 dollars)

Type of revenue	Amount
MTA revenues during construction, 2012-2025	
Ground lease payments	\$497.7
DIB payments (MTA share)	\$97.3
Transfer of development rights	\$405.6
MTA payroll mobility tax	\$37.0
Payment in lieu of sales taxes	\$355.1
Payments in lieu of mortgage recording taxes	\$280.4
Reimbursement of MTA expenses related to development over the rail yards	\$111.4
Total, MTA revenues during construction	\$1,784.4
Annual MTA revenues from operations (as of 2026)	
Ground lease payments	\$51.5
MTA dedicated tax revenues	\$37.9
Total, MTA revenues from operations	\$89.4

To put Hudson Yards' impact on MTA revenues in perspective, we can estimate what these revenues could buy. For example:

- The \$1.784 billion in revenues (in 2018 dollars) that the MTA will receive during the development and construction of Hudson Yards would be more than enough to pay the full cost of Phase 2 of the Second Avenue Subway, which will extend the new line from 96th Street and Second Avenue to 125th Street and Lexington Avenue. (In the MTA's current five-year capital plan, Phase 2 is estimated to cost \$1.595 billion).



The \$1.78 billion paid to the MTA during the development and construction of Hudson Yards would be more than enough to pay for the second phase of the Second Avenue Subway.

- The \$89.3 million in annual revenues (in 2018 dollars) that Hudson Yards would provide to the MTA in 2026 would be sufficient to:
 - » Completely renovate four subway stations; or
 - » Purchase 35 new R211 subway cars; or
 - » Replace approximately 3.6 miles of track and switches; or
 - » Purchase 136 new buses.

While other real estate development projects have made capital contributions to and produced ongoing revenues for the Metropolitan Transportation Authority, no project in New York City's history has contributed or will contribute as much to the MTA as will Hudson Yards.

\$89.4M in additional annual revenues for the MTA would:



completely renovate **4** subway stations

or



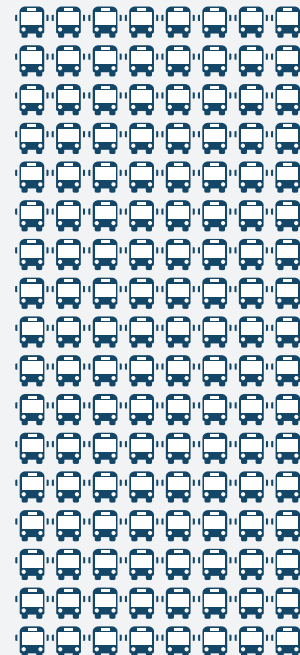
purchase **35** new subway cars

or



replace **3.6** miles of track and switches

or



purchase **136** new buses

Impact on New York City revenues

Hudson Yards will also be a significant contributor to New York City revenues, both during construction and through its ongoing operations.

Revenues related to construction

During construction, Hudson Yards will generate several types of revenue for New York City. We estimate that from 2012 through 2025:

- New York City personal income taxes paid on the earnings of workers directly employed in the development and construction of Hudson Yards will total approximately \$181.3 million (in 2018 dollars); and
- New York City business taxes paid by contractors and other firms directly engaged in development and construction of Hudson Yards will total approximately \$55.9 million.

We thus estimate that between 2012 and 2022, construction of Hudson Yards will directly generate approximately \$237.2 million in New York City tax revenues.

Annual revenues from ongoing operations

When completed and fully operational, Hudson Yards will similarly generate substantial revenues for New York City. We estimate that in 2025:

- New York City personal income taxes paid on the earnings of City residents working at Hudson Yards will total approximately \$243.8 million (in 2018 dollars).
- New York City corporation, banking and incorporated business taxes paid by companies located at Hudson Yards will total approximately \$120.3 million.
- New York City sales taxes paid on retail and restaurant sales at Hudson Yards (including the Observation Deck) will total nearly \$56.4 million.
- Commercial rent taxes paid by commercial tenants at Hudson Yards will total more than \$49.3 million.
- Hotel taxes (including sales taxes) paid by hotel guests at Hudson Yards will total approximately \$7.5 million.

We thus estimate that as of 2025, New York City personal income, business, sales, commercial rent and hotel taxes will directly generate approximately \$477.3 million in City tax revenues (in 2018 dollars).

As with MTA revenues, the significance of these revenues can be gauged by highlighting what they could buy. We estimate that the \$477.3 million in annual City tax revenues generated from Hudson Yards could pay:

- The salaries of approximately 6,000 New York City firefighters; or
- The salaries of more than 6,000 New York City public school teachers; or
- The operating budget of the New York City Department of Parks and Recreation; or
- The combined operating and capital budgets of the Department of Cultural Affairs.

Beyond its direct impact on New York City's economy and its impact on MTA and New York City revenues, Hudson Yards has played and will play during the next decade a leading role in the transformation of the wider West Midtown area. This is so for several reasons.



Part Four: Contributing to the redevelopment of West Midtown

Providing transit access

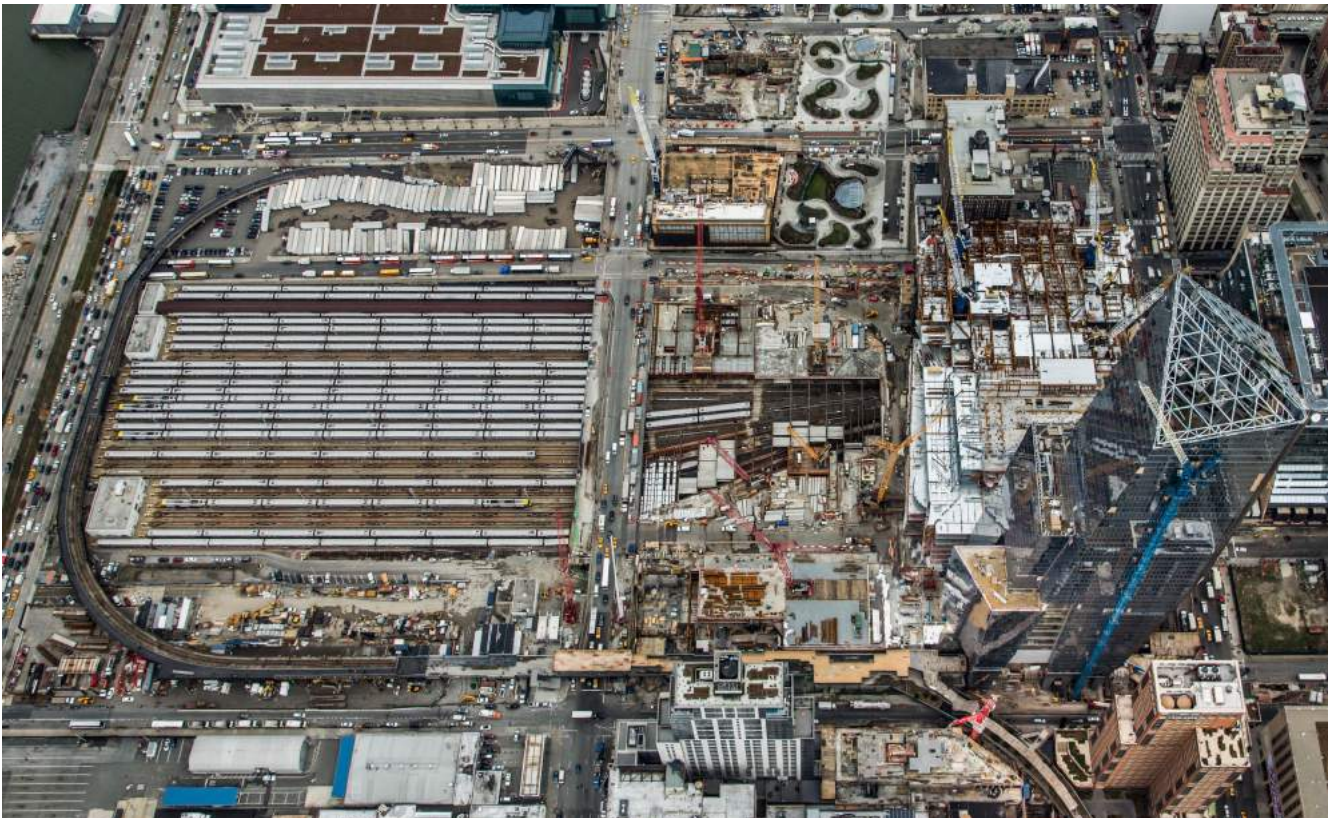
The development of Hudson Yards and the extension of the Number 7 line are inextricably intertwined. Development on the scale that is now occurring at Hudson Yards would not be possible without easy access to mass transit. Conversely, the extension of the 7 train probably would not have been feasible without the infusion of financial resources that Hudson Yards is providing. The promise of direct transit access – which on September 13, 2015 became a reality – has been a critical factor in attracting private investment not just to Hudson Yards, but to the surrounding area as well.

A critical mass of commerce

The prospect of development of more than 10 million square feet of office space – and the developers' success in attracting high-value, high-profile tenants – has been an essential ingredient in raising the visibility of the entire area, and its status as a major new business district.

Building a community

Hudson Yards will provide an array of amenities and community resources that will help make not just the Eastern and Western Rail Yards but the surrounding area as well a more attractive place to live, work, do business and invest. These resources include high-quality retail, restaurants and services, 14 acres of open space, a major new cultural center and a 750-seat public school.



Development of Hudson Yards will also help knit together the neighborhoods of Manhattan's West Side in a way they have not been previously. With the completion of the third segment of the High Line and its connection to Hudson Park & Boulevard, the West Side will now have a continuous connection from the West Village to Hell's Kitchen.

Ten years ago, New York City placed a very large bet on the development of Hudson Yards. Three years into a fourteen-year construction program, a few weeks before the first office tenants move in and with MTA New York City Transit carrying thousands of riders each day to and from the new Hudson Yards subway station, the bet is beginning to pay off.

Figure 4: New development on Manhattan's far West Side



