The Economic Benefits of Sustainable Streets

New York City Department of Transportation

NEW YORK CITY DOT

Letter from the Commissioner

Dear Fellow New Yorkers:

Better streets mean better business. Attractive public space and better designed streets are not simply aesthetic or safety improvements. Better streets attract more people and more activity, thus strengthening both communities, the businesses that serve them and the city's economy as a whole.

In New York City DOT's 2008 *World Class Streets: Remaking New York City's Public Realm*, we noted that this business case for better streets has been argued in a number of cities, and documented to some extent.

DOT's new *The Economic Benefits of Sustainable Streets* is a landmark contribution to this field, presenting and explaining the most robust methodology yet developed for evaluating the economic effects of street improvements. It amplifies and extends DOT's 2012 *Measuring the Street* report, which offered a very strong set of results on the economic value of safety, parking, mobility and design improvements to city streets. The pages that follow document this methodology in great detail, making it useable by other cities and groups from public agencies to universities and business organizations.

During the past six years, the New York City Department of Transportation has emerged not only as a leader in transforming city streets into more welcoming and efficient spaces, but also in developing a comprehensive set of metrics to assess how street projects have advanced City's goals of safety, efficiency, greater travel choice and economic vitality. Our *Sustainable Street Index* report provides these measures for a variety of types of street projects each year, while numerous specific reports have presented detailed data and information on pedestrian safety, the effects of traffic and public space changes along Broadway, energy savings from new street lighting technology and the uses of new public space. *The Economic Benefits of Sustainable Streets* is DOT's latest contribution to the rapidly expanding understanding of city streets.

Additional examples in this report further confirm the findings presented in Measuring the Street. Street projects that improve safety and design and that welcome pedestrians, cyclists and transit riders see higher retail sales. For example, Brooklyn's Vanderbilt Avenue saw a doubling in retail sales in the three years following installation of bicycle lanes and a tree-lined median, significantly outperforming borough-wide and city-wide trends. At the intersection of Amsterdam and St. Nicholas Avenues in Harlem, where DOT simplified a difficult intersection with new public space and traffic pattern changes, stores in the area saw sales rise 48%, beating the Manhattan average for the same period and substantially outpacing performance on nearby streets.

The Economic Benefits of Sustainable Streets represents a major step forward in establishing the link between city streets and their myriad impacts on urban life and economics. Armed with this objective, quantitative data, cities can add street design to their economic development strategies and can build support from the business community as allies and advocates for these improvements.

New Yorkers have taken naturally to the public spaces and people-oriented streets that NYCDOT has created. Now DOT has clearly documented the substantial economic benefits of these improvements.

Sincerely,

Janette Sadik-Khan
Commissioner

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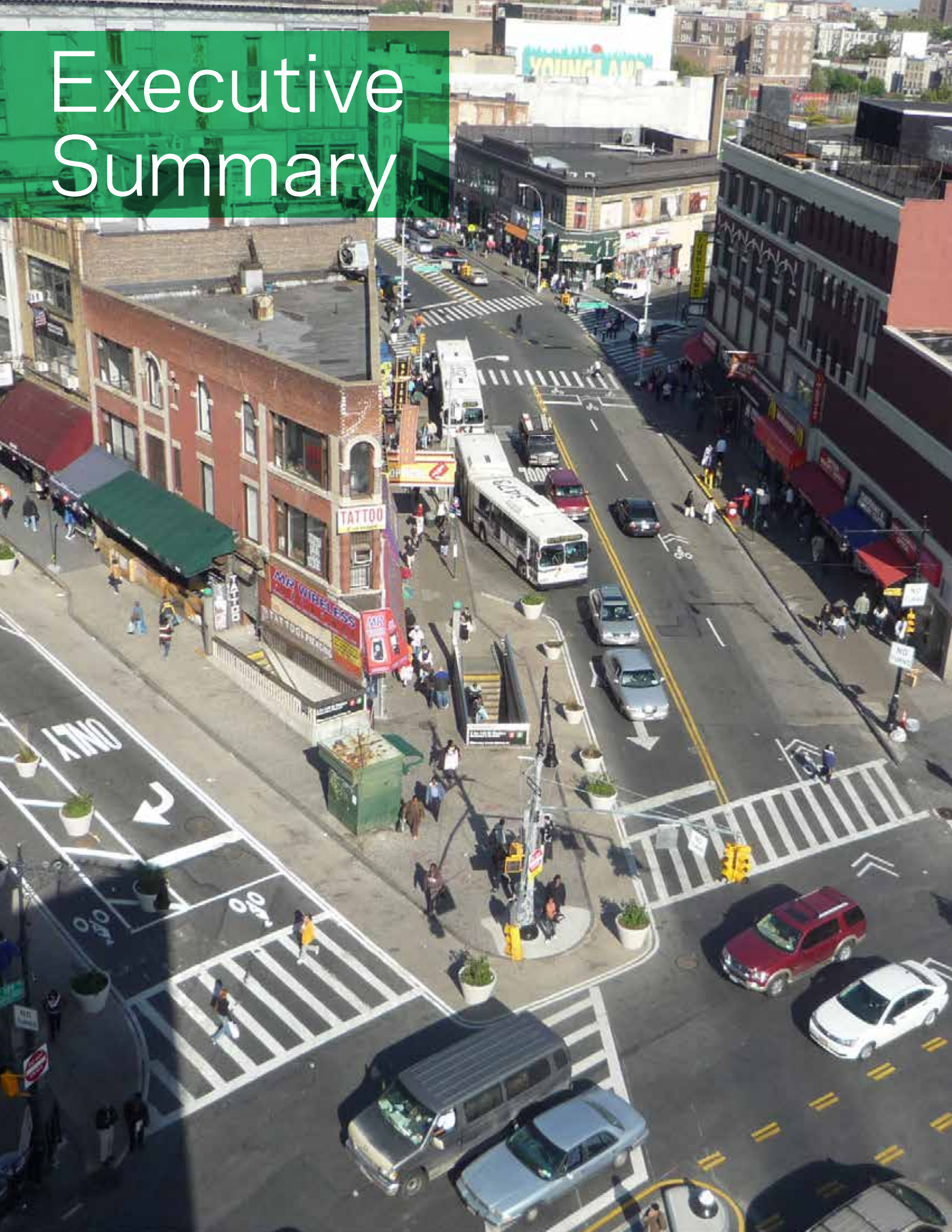
Executive Summary



Executive Summary

Solving urban challenges has become the key to addressing global challenges. New York City has been a leader in creating new models for sustainable urban development in recent years, most visibly with the transformation of the city's streets into more efficient and welcoming spaces that better accommodate all users. In tandem with these planning and engineering efforts, the New York City Department of Transportation (DOT) has developed a robust set of metrics to evaluate the outcomes of its projects with respect to the agency's policy goals, both in the service of continually improving project designs and because the public increasingly expects such data-driven decision-making from government.

These goals – including safety, access and mobility, environmental health and economic vitality – have been well documented in publications such as *Sustainable Streets*, *Measuring the Street* and the New York City *Street Design Manual*, and a trove of the resulting data has been published in reports including the annual *Sustainable Streets Index*. While DOT makes regular use of metrics on safety and mobility – the more traditional focus for measures of urban streets – the agency has only recently added data on local economic impacts to its set of standard project metrics.

Despite the critical importance of making the connection between transportation policy and economic health in light of ongoing economic and budgetary challenges, a review of current practices found no well-established, objective methodologies for evaluating the impact of street design improvements on neighborhood economies. Therefore, DOT set out to develop a new metric. Working with its consultant, DOT evaluated a number of potential measures of local economic vitality and found retail sales – specifically reported sales for street-level retail and restaurant/food service businesses – to provide the most direct and reliable indicator of the health of local businesses.

Through an iterative process with the New York City Department of Finance (DOF) – who receives New York City sales tax data from New York State, analyzes it and aggregates all results to preserve taxpayer privacy– the study team developed, tested and refined a consistent and replicable approach for analyzing sales tax data. Filters were applied to limit tax data to only relevant businesses in terms of industry category and physical storefront location; due to the nature of the tax returns, businesses included in the analysis tend to be locally-based "mom-and-pop stores" and independently operated franchises. Study areas were defined for the street improvement projects as well as for several comparison sites. The change in sales for locally-based businesses within the improvement sites before and after project implementation was compared to changes in the same period for the comparison sites as well as the respective borough as a whole. This methodology was applied to a range of projects including pedestrian plazas, bike paths, intersection redesigns and bus rapid transit.

These results provide convincing evidence that improved accessibility and a more welcoming street environment created by these projects generate increases in retail sales in the project areas. This does not mean that all projects will show economic benefits, just as not all projects improve the operations of a particular mode or improve all measures of safety. However, it is now possible to document the impacts of changes in street design on surrounding locally-owned retail businesses in a rigorous and compelling way, expanding the range of metrics that government agencies as well as communities have available to measure the effects of these projects.

Data on retail sales can now be used to help address the concerns of local residents and business owners about potential project impacts, replacing anecdote or personal experience with comprehensive data, and potentially activating the business community in support of appropriately designed projects. These kinds of empirical results can also allow cities to link street design more closely with economic development goals, just as cities are beginning to link street design with public health and environmental goals. Importantly, New York City's analysis shows that 21st-century streets can contribute to the economic vitality of neighborhoods across the full spectrum of income levels and geography, from major destination shopping districts to neighborhood main streets.

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Study Purpose & Background

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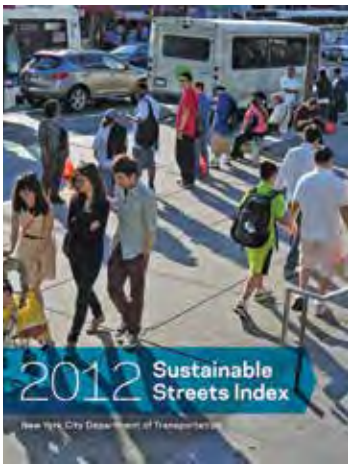
The Need for 21st-Century Street Metrics

In the 21st-Century, solving urban challenges has become the key to addressing global challenges: how can urban areas – where a majority of humanity now lives and an out-sized share of economic activity takes place – accommodate population growth and expand economic opportunity all while improving public health, environmental sustainability and quality of life? As a result, cities have become laboratories for developing, implementing and evaluating new solutions to these intertwined issues. New York City has been a leader in creating new models for sustainable urban development, from a five-borough economic development strategy to more energy-efficient buildings to numerous successful health initiatives.

One of the most visible elements of New York City's sustainable development agenda has been the transformation of the city's streets from unwelcoming, traffic-dominated corridors to safer, more attractive public spaces that better accommodate all users. Large arterials have been transformed into "complete streets" with dedicated lanes for bicyclists, landscaped pedestrian islands and more efficient curbside regulations; areas of underutilized roadway have been repurposed as new public spaces; congested bus routes have become higher-speed Select Bus Service; and green infrastructure has been integrated into the streetscape to better manage storm water while enhancing the public realm.

In parallel with these efforts to reimagine urban streets, the New York City Department of Transportation (DOT) has also sought to transform the way the agency measures the outcomes of its work and its overall progress in achieving policy goals. Following the release of Sustainable Streets, the agency's strategic plan, in 2008, DOT began releasing annual Sustainable Streets Index (SSI) reports that for the first time documented specific metrics at both the citywide and individual project level. The SSI reports document both citywide transportation trends such as transit and bicycle ridership, traffic volumes, and vehicle speeds within the Central Business District (CBD), as well as project-specific data including before-and-after changes in crashes, speeding, travel times, foot traffic and bus ridership and creation of new public space. More recently DOT released Measuring the Street, which illustrates how far the agency has come in systematizing the way it uses data to inform its design approach (and which includes initial results from this study).



Being able to measure and communicate the impacts of these types of policies and projects is critical for several reasons. There is increasing recognition among the public that transportation systems can have both positive and negative impacts on the urban environment they inhabit – that the relationship between the two is interactive, not unidirectional – and of the importance and power of transportation to shape the city. In this modern view, cities should plan their transportation systems to help spur the type of development and quality of life that they'd like to see rather than the traditional planning and engineering assumption that the context is "set" and has certain requirements that the transportation system needs to meet. The public is much more aware of these issues than in the past and expects to be involved in the planning and decision-making process; therefore it is important to communities that the potential effects of redesigned streets on their residents and businesses be anticipated. And although these stakeholders may support the broader view of streets on a general level, they can also be concerned with the potential negative impacts – such as reduced parking – of projects they may otherwise see favorably. Finally, the social and economic revitalization of urban centers means that the local impacts of transportation decisions are of vital interest not simply to local residents but to the city as a whole.

The ideal set of project metrics should cover outcomes spanning safety, moving people and goods, providing access to local land uses, and creation of economically vital, attractive and healthy spaces for movement, access and public space (Table 1). Because methods for measuring and evaluating the "direct" safety and mobility benefits of transportation projects – such as collection and analysis of traffic and crash data – have been developed over the past decade or more, DOT possesses a relatively strong set of these metrics. On the other hand, understanding the "indirect" benefits provided by more multi-functional street designs such as on public health, environmental quality and economic prosperity is a topic that has only recently received widespread attention in transportation and allied fields.

Table 1: Potential Metrics for Project Goals

Goal	Potential Metrics
Safety	▪ Crashes and injuries for motorists, pedestrians, and cyclists ▪ Traffic speeds
Access/ Mobility	▪ Volume of vehicles, bus passengers, bicycle riders and users of public space ▪ Efficiency in parking/loading ▪ Traffic speeds
Economic Vitality	▪ Number of businesses; employment ▪ Retail sales; visitor spending
Public Health	▪ Minutes of physical activity per day ▪ Rates of obesity, asthma, diabetes, etc.
Environmental Quality	▪ Air quality; water quality ▪ Urban heat island; energy use
Livability/ Quality of Life	▪ User satisfaction ▪ Public space usage

Given continuing economic and budgetary challenges as a result of the recent recession, making the connection between transportation policy and economic development, in particular, is critically important – and the current inability of cities to make that connection in a compelling way is a major weakness. After all, if implementing relatively straightforward improvements to city streets can, for example, increase patronage of local businesses, expand employment opportunities and spur reinvestment, then such projects can become not only a tool in cities' transportation toolkit but also a tool for economic development: a means of expanding opportunity within all types of neighborhoods and complementing other economic development initiatives. Doing so might also elevate the public conversation around this issue beyond conjecture or anecdotal evidence so that projects can be better evaluated based on their merits.

Streets and Economic Vitality

What is the connection between changes in street design or operation and the economic vitality of neighborhoods? The basic hypothesis is that changes in travel patterns, spending patterns and neighborhood desirability caused by changes in the street environment can impact businesses' and property owners' bottom lines, most directly by affecting retail sales but also by affecting, among other things, retail rents, office rents, and commercial property values.

If changes to a street lead to more or fewer potential customers making trips to that street or change the frequency or spending patterns of their trips, then local retail sales may be affected. For example, reducing vehicular throughput (by removing travel lanes) or curbside parking has the potential to reduce the number of potential customers who arrive by car by making it a less convenient option. On the other hand, improving access for other modes – by adding bike lanes or bike parking, improving bus service and connections to transit, widening sidewalks or making it easier to cross the street – could increase the customer base.

Once potential customers are already on-site, encouraging them to linger for greater duration by creating a more comfortable and enjoyable public realm could potentially result in their patronizing local businesses more than they otherwise would. Interventions that are often pursued by cities with this goal in mind include functional improvements such as providing benches, tables and chairs and wayfinding signage, reducing noise and increasing shade (or sun, depending on the weather); urban design enhancements such as distinctive paving, landscaping, pedestrian-scale street lighting and public art; and creating more activities for visitors through event programming and food concessions. Many of these improvements might also draw more customers by helping the space function more as a destination in its own right.

Making the connection between transportation policy and economic development is critically important, with improvements to city streets potentially contributing to economic opportunity.

It is important to note that total retail sales (cumulatively or per business) is the critical indicator for overall economic performance rather than number of visitors, frequency of visits or spending per visit. Fewer, higher-spending, customers could still result in higher overall sales, as could a shift in customers to more frequent trips where less is spent per trip. Therefore, while those types of data could be useful indicators of retail activity, by themselves they do not conclusively measure business vitality.

Beyond potential impacts on retail traffic, an improved street environment might also affect other economic outcomes in a less direct way, such as retail and office rents and property values, by changing the perceived desirability of a street or neighborhood. Least directly, changes in employment in terms of number of jobs or salaries might be expected as a function of the rising or falling fortunes of retail businesses. As described in the next section, some of these data sources are easier to obtain, analyze and draw conclusions from in a meaningful way than others.

Existing Research

Streets are a ubiquitous presence in cities, affecting all aspects of society. To the extent that all social goods and ills can be assigned a dollar value, there are wide-ranging economic consequences to how streets are designed and operated for government, businesses and residents, including:

- The relative number of jobs created by different kinds of construction projects;
- The impact of mobility (or a lack thereof) on freight and business costs;
- The (mostly externalized) costs of traffic crashes;
- The connection between the design of the public realm (e.g. active design) and savings in public health costs;
- The monetized benefits of the environmental services provided by a more sustainable streetscape;
- Higher property values associated with a higher quality public realm; and
- Household savings associated with lower vehicle ownership and usage resulting from transit-friendly and walkable communities.

A substantial body of literature exists that attempts to attach dollar values to these myriad impacts, usually in isolation but sometimes in a holistic way. For the purposes of this study, DOT chose to focus on one specific economic metric: the commercial vitality of the neighborhoods surrounding particular streets. This metric is ideally suited to looking at the potential direct economic impacts on businesses resulting from the kinds of street designs that New York City has been increasingly rolling out over the past several years. Existing studies and data on this topic, however, are scarce and methodologies tend to be qualitative rather than quantitative.

The work to understand the impact of street design changes on local businesses has primarily been in the form of surveys of consumers, business owners, or both. Such surveys performed in different cities across North America have typically focused on dense urban retail areas with results demonstrating that a large proportion of visitors—possibly much larger than some business owners might think—arrive on foot, by bike or by public transit, with a minority arriving by car or taxi. They have also found that people who arrive on foot or by bike generally visit the area more often than those who use other methods of transportation and cumulatively spend more per capita at local businesses.[1, 2, 3, 4, 5, 6, 7] Shoppers often indicate that they would visit more often if additional enhancements were made to the street environment such as reducing the volume of traffic or calming traffic speeds, expanding space for pedestrians or adding bicycling infrastructure.[8, 9, 10, 11]

Urban businesses have been found to consider the streetscape an important factor in attracting customers or tenants.[12] Nevertheless, experience has shown that in many instances business owners are apprehensive of changes to streets that are perceived to benefit pedestrians and cyclists while reducing convenience for drivers based on a belief that providing easy access for motorists into their business district along with ample, nearby parking is critical to their store's success. As described above, results from surveys of shoppers in urban shopping districts suggest that this fear is in large part unfounded. Similarly, multiple surveys conducted in dense urban shopping areas indicate that after these types of changes are implemented businesses see improved performance and they often become vocal supporters of further enhancements to the public realm.[13, 14, 15, 16]

Existing studies and data are scarce and have primarily been in the form of surveys.

A key issue for quantitative studies is that the complexity of urban retail environments renders it challenging to isolate the impact of any one variable on economic performance. Many disparate factors contribute to the success of businesses both at the level of an individual store as well as in a district as a whole, from real estate development or demographic trends to changes in where jobs are located to the introduction of major new shopping or cultural destinations that create "spillover effects." Controlling for as many of these factors as possible is an important part of performing a rigorous quantitative study that attempts to link changes in street design (or any specific intervention) to changes in the economic vitality of a particular area.

1 Stantec Consulting, Ltd., *Vancouver Separated Bike Lane Business Impact Study*, Vancouver Economic Development Commission, 2011
2 Transportation Alternatives, *East Village Shoppers Study: A Snapshot of Travel and Spending Patterns of Residents and Visitors in the East Village*, October, 2012
3 The Clean Air Partnership, *Bike Lanes, On-Street Parking and Business: A Study of Bloor Street in Toronto's Annex Neighborhood*, 2009
4 Barr, Joseph et al, *Select Bus Service on Bx12 in New York City: Bus Rapid Transit (BRT) Partnership of New York City DOT and Metropolitan Transportation Authority New York City Transit*, Transportation Research Record 2145, Volume 3, August, 2010, pg. 40-48
5 Schaller, Bruce, *Curbing Cars: Shopping, Parking and Pedestrian Space in SoHo*, Transportation Alternatives, December, 2006
6 Clifton, Kelly J., Sara Morrissey & Chloe Ritter, *Business Cycles: Catering to the Bicycling Market*, TR News 280, May-June 2012, pg. 26-32
7 Accent Marketing & Research, *Town Centres Survey*: 2003-4, Transport for London, 2004
8 Schaller (2006)
9 The Clean Air Partnership (2009)
10 Peper, Paula J. et. al., New York City, *New York Municipal Forest Resource Analysis*, USDA Forest Service, 2007, pg. 59
11 Central London Partnership, *Quality Streets: Why good walking environments matter for London's economy*, Transport for London, 2003
12 Meisel, Drew, Bike Corrals: *Local Business Impacts, Benefits and Attitudes*, Portland State University School of Urban Studies and Planning, 2010
13 Drennen, Emily, *Economic Effects of Traffic Calming on Urban Small Business*, San Francisco State University Department of Public Administration, 2003
14 Hass-Klau, Carmen, *Impact of Pedestrianization & Traffic Calming on Retailing*, Transport Policy, Volume 1, Number 1, 1993, pg. 21-31
15 ECOTEC Research & Consulting, Ltd., *Economic Impact of the Public Realm: A Final Report to the East Midlands Development Agency*, Birmingham, UK, October, 2007
16 Hass-Klau, Carmen (1993)

Those quantitative studies that do exist suggest that when streets within urban shopping districts are pedestrianized or receive streetscape enhancements the results are often positive, with businesses seeing increases in both the number of shoppers and in revenues. Similarly, the value of real estate increases so property owners benefit along with the retail tenants. The design quality of a street appears to contribute to these outcomes on its own, regardless of other factors, and simply improving street design can have a major impact on market values.[17] In some cases changes manifest within the first few months to a year after a project is implemented but in other cases it may take longer.

Notably, a study was undertaken for the City of Vancouver in 2011 to evaluate the economic impacts of two separated two-way bike lanes that were constructed in Vancouver's downtown core on a trial basis in 2010.[18] The Vancouver Economic Development Commission, Vancouver Board of Trade, Downtown Vancouver Business Improvement Association, and Downtown Vancouver Association jointly hired Stantec Consulting, Ltd. to measure the business impacts of the separated bike lanes and to develop mitigation strategies for "hot spot" blocks that were identified as having negative business impacts. The study was comprehensive in that it examined retail sales, commercial vacancy rates, customer shopping patterns and office tenant opinions. However, the analysis of business impacts was based on self-reported data and, as the study notes, "[t]his information may have some response bias," "very little detailed sales data from businesses was received" and "the data that was collected indicated that the estimated loss in sales was not as high as reported in the surveys." Therefore, while Vancouver's study provides an important model for assessing the economic impact of changes in street design, it did not establish the objective, quantitative methodology that New York was seeking.

Objective, impartial third-party data is critical to making an economic case for projects.

Quantifying Local Business Sales

As described above, most of the existing data on the impacts of changes to street environments on local businesses is weakened by its qualitative nature or lack of comprehensiveness. Another major weakness of many of these studies is that they do not compare conditions both before and after a change is made, so it is impossible to know what, if anything, would have happened in the absence of the improvement being examined. Therefore, while well-documented and replicable methodologies existed to measure the gains in safety and mobility resulting from DOT's projects, no such suitable approaches existed to measure economic outcomes. The agency therefore set out to develop its own new metric "from scratch".

From January through October 2012, with existing agency resources as well as financial support from the Rockefeller Foundation, DOT worked with a consultant, Bennett Midland, LLC, to examine the range of potential data sources and analysis methodologies that might provide as granular, consistent and replicable an approach as possible (Table 2). While several other potential metrics showed promise, most notably commercial leasing and assessed property values, reported retail and restaurant/food service sales for locally-based businesses proved to be the most direct and reliable for several reasons:

17 Commission for Architecture and the Built Environment, *Paved with Gold: The Real Value of Good Street Design*, 2007

18 Stantec Consulting, Ltd. (2011)

Table 2: Economic Data Sources Considered for Analysis

Data Source	Selected for Analysis	Pros	Cons	Source Strength
Retail Sales Tax Filings	Yes (Full)	▪ Strong, direct indicator of business vitality ▪ Data available at the individual business level ▪ Good proxy for overall neighborhood economy	▪ Multiple variables affect retail sales ▪ Confidentiality limitations reduce data availability ▪ Privacy restrictions require significant data cleaning	Strong
Commercial Leases & Rents	Yes (Limited)	▪ Retail rents are strong indicator ▪ Good proxy for overall neighborhood economy	▪ Insufficient sample sizes ▪ Limited availability (3rd party firms) ▪ Historic data difficult to obtain	Moderate
City-Assessed Market Value	Yes (Limited)	▪ Moderate indicator ▪ Readily available data ▪ Data contains market value for most properties	▪ Obscure methodology ▪ Infrequently updated	Moderate
Real Estate Transactions & Market Sales	No	▪ Data includes sale price and date	▪ Insufficient sample size over short time period	Weak
Business Establishment Creation/Loss *Local	No	▪ Moderate indicator	▪ Poor availability of data due to time lag ▪ Insufficient sample size	Weak
Business Establishment Creation/Loss *Federal	No	▪ Moderate indicator	▪ Data not available at granular level	Weak
Employment	No	▪ Moderate indicator	▪ Data difficult to obtain at the neighborhood level	Weak
Building Permits	No	▪ Readily available data ▪ Large and multifaceted data source	▪ Weak indicator ▪ Data cleaning is too onerous for this type of study	Weak

- Because changes to the street environment can have immediate impacts on the travel patterns of shoppers using that street, sales figures at adjacent businesses represent one of the most direct ways of capturing any potential economic impacts created by such projects as compared to longer-term "ripple effects" on property values, leasing activity, business creation or loss and employment.
- Using a third-party data source, in this case aggregated New York State data provided by the NYC Department of Finance, avoids the potential for self-selection bias that is inherent in studies based on information volunteered by survey respondents.
- Because businesses generally file taxes quarterly, the data is available for short time periods.
- Because sales tax records include filing addresses, the data can be analyzed geographically and businesses included in the data tend to be locally owned or operated (i.e. their taxes are filed from their physical address).
- Most businesses classify themselves into a specific industry as part of their tax return, allowing the data to be organized by particular business types.
- Legal protections exist to provide analysts with granular data without revealing tax remitters' names or any other personally identifiable information.

Because urban economies are a complex system, changes in sales for individual businesses can be the result of many different factors; street design is just one. It is therefore important to use comparison sites as a way to control for variables unrelated to the street redesign project so as to isolate impacts attributable to the project. With that goal in mind, this study compared the selected project sites to comparable locations that did not receive improved street designs as well as to sales trends at the Borough level. The improvement sites would be expected to perform similarly to the non-improvement sites had no changes been made. By comparing them this analysis begins to isolate the effects of the street improvements.

This study also carefully examined results over time rather than at single "pre" and "post" points in time. This offers researchers the flexibility to examine changes in the sales data in the context of longer-term trends and to identify outlying data points that may merit closer examination. If a unique event affected sales, positively or negatively, the sales data covering a total of 12 to 16

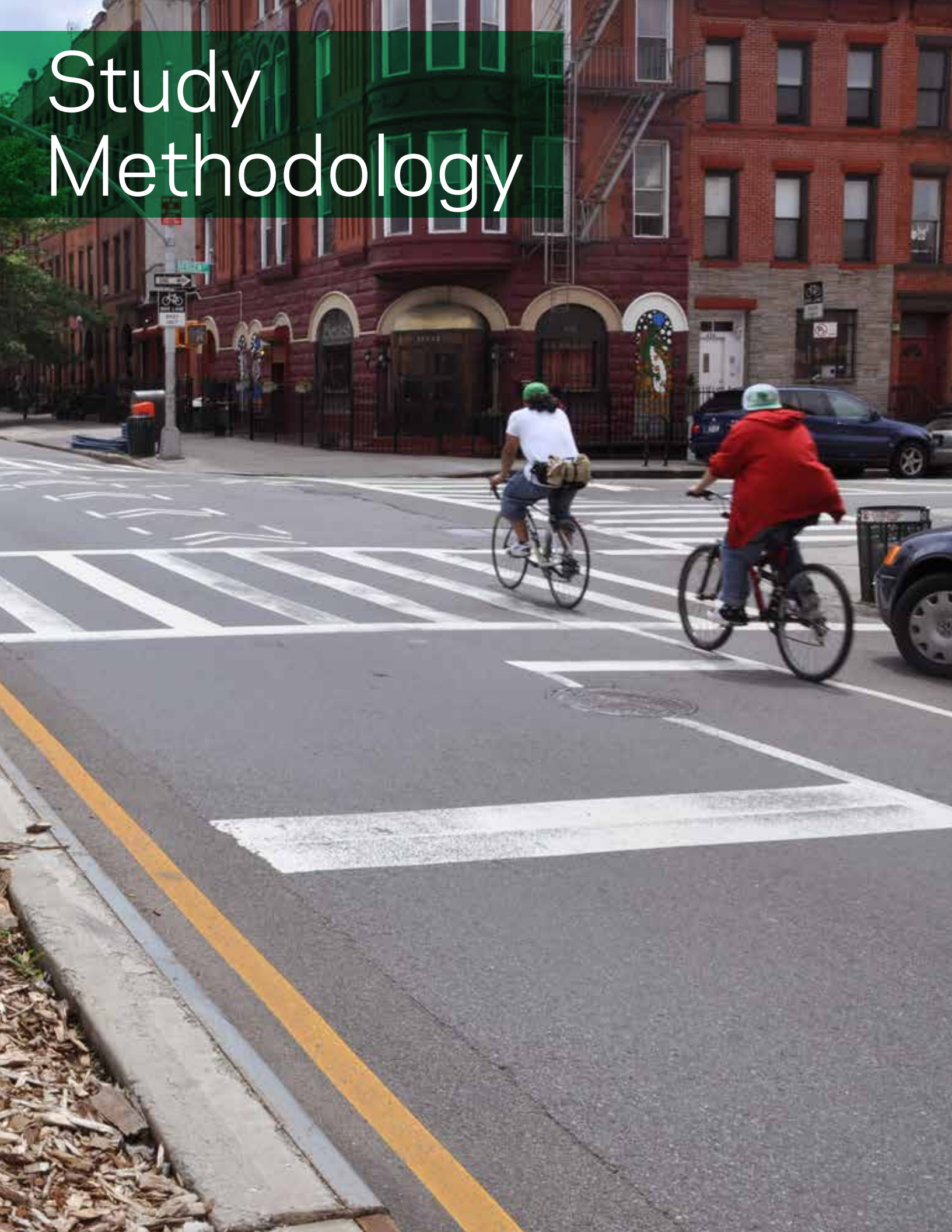
Because urban economies are a complex system, it is important to control for variables unrelated to the improvement project.

quarters (4 quarters in the baseline period and 8 to 12 quarters in the post-improvement period) would tend to reveal this anomaly. By analyzing data that is accurate, relevant and robust one can assess the likelihood that any changes in businesses' sales may stem from the street improvements rather than exogenous factors.

The end product of the methodology developed by New York is a robust portrait of retail sales that captures the economic activity of locally operated businesses. The use of data that provides high levels of detail, accuracy and relevance along with comparisons both across time and between sites yields a thorough analysis that comes closer to objectively assessing the impacts of individual projects than any currently available methods. This report is an opportunity to share this methodology and lessons learned with other municipalities, organizations and communities seeking to better understand and communicate to project stakeholders the full range of benefits that 21st-Century streets can provide. In fact, at least one study in another city has already utilized the methodology developed by New York.[19]

19 Rowe, Kyle, Bikenomics: Measuring the Economic Impact of Bicycle Facilities on Neighborhood Business Districts, College of Built Environments, University of Washington, July, 2013, pg 15

Study Methodology



Study Methodology

Overview of Data Source

All retail businesses in New York State are required to make regular sales tax filings and payments. This data set is managed by the New York State Department of Taxation and Finance and data for New York City is also provided (through a data sharing agreement) to the New York City Department of Finance (DOF). Sales tax filings – including total taxable sales volumes – are generally submitted quarterly, resulting in data that is updated on a frequent basis. Because the records also include a filing address the data can be analyzed by geography if the filing address is the same as the business location. (Addresses provided on tax returns may reflect the location of the taxpayer's preparer or representative rather than the location of the taxpayer, and for multi-location businesses the given address may not reflect activity at the reporting location.) Records also typically include a self-reported North American Industry Classification System (NAICS) industry code so that the data can be analyzed by business type. The quarterly changes in sales for specific businesses can then be aggregated to reveal the changes in sales on a block, along a corridor or within a wider geographic area as needed.

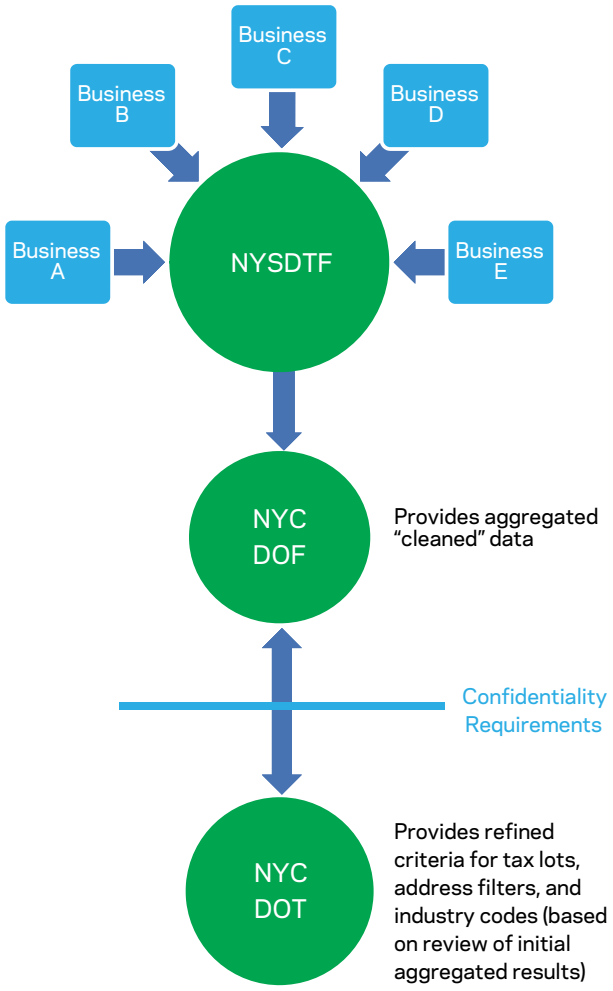
Earlier studies have used sales data, but only as provided voluntarily by retailers and rarely, if ever, collected comprehensively throughout a study area. By contrast, tax receipts for locally-based businesses are collected nearly universally and, insofar as sales are reported legally, tax receipt data reflects the actual volume of taxable sales generated by an individual business. Therefore, although requiring a significant amount of quality control, New York State sales tax filings, through publicly available data, provide a rich data set that acts as a strong measure of the vitality of local business establishments over time.

DOT and Bennett Midland worked with DOF to construct the retail sales data sets for this study. The study sites were defined as collections of tax lots, and DOF provided the project team with aggregated findings – total sales over time for all businesses combined – for each site. Importantly, a confidentiality agreement between the City and State disallows the sharing of disaggregated tax filing data with those outside of DOF; DOF may release only aggregated information. Therefore, the project team never had access to tax remitters' names or other information that could be used to identify them individually. Instead, the researchers worked collaboratively with DOF staff to develop queries, review the resulting aggregated results, identify areas of concern for further investigation by DOF, and apply refinements or additional filters to the queries as needed until the researchers had a high level of confidence in the data.

Selecting Improvement Sites

The first step of this type of study is clearly to select the projects for analysis. Because the purpose of the analysis is to assess impacts on local retail businesses, only projects in areas with a significant amount of such businesses would be appropriate for analysis. Projects located in primarily residential areas would not be suitable. (Residential property values may be a suitable "economic" measure for such projects.)

Several other project criteria were applied for the purposes of DOT's study. First, sites were selected to reflect the diversity of street improvements implemented across the city, including a cross section of plaza, "complete street" and Select Bus Service project types that included a variety of specific enhancements such as parking-protected bike lanes, widened sidewalks, trees and landscaping, pedestrian refuges and dedicated bus lanes. Second, only improvements constructed between 2006 and 2009 were chosen to ensure a sufficient volume of data pre- and post-implementation. (An additional set of projects implemented in 2010, some of which are included in the Case Studies section, were analyzed in a latter phase of work.) Finally, within the constraints of the previous criteria, geographic diversity was maximized to the extent possible in the portfolio of sites.



Selecting Comparison Sites

As described earlier, one goal of this study was to control for exogenous factors by comparing changes at the improvement sites to those at comparable areas which did not receive design improvements and to the larger context. Therefore, once project sites had been chosen the next step was to define each location's comparison areas. There were two categories:

1. Large areas, to control for economic trends that transcend particular neighborhoods.

2. Comparison sites, to isolate site-specific differences within similar contexts.

New York City's five boroughs (counties) were used as the large area comparisons for this study because they are sizeable enough (ranging from 470,000 to 2.5 million population) to capture high-level trends while also capturing the unique economic context of each borough. Data aggregated by borough was easy to obtain as borough/county information is included in all tax returns.

Two types of comparison sites were used for this initial study: "neighborhood" comparison sites based on similar retail mix within a neighborhood and "similar" comparison sites based not on geography but on shared physical characteristics of the streets. Neighborhood comparisons were identified as nearby streets with a similar – though not necessarily identical – level of business activity. Where possible, as many as four neighborhood comparisons were identified; however, because of their small size or surrounding land use environment, only one or two suitable comparisons were available for some improvements.

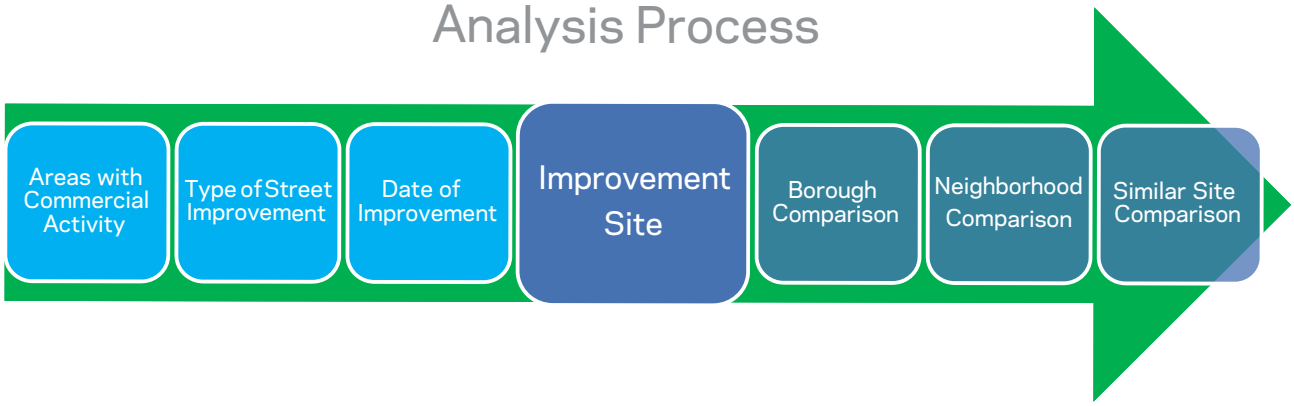
In addition to the neighborhood comparisons, a set of similar site comparisons was also developed and analyzed wherever possible. These areas are not close in proximity to the improvement site but share several similar "physical" characteristics such as street width and traffic flow; building stock; level and type of commercial activity; and proximity to public transportation. This extra level of comparison was included with the goal of controlling for neighborhood-level economic factors that might affect both the improvement sites and neighborhood comparisons. However, this component of the methodology was set aside as the characteristics of a "similar" site proved too difficult to apply universally. The neighborhood comparison approach was found to be most objective and replicable and will therefore be solely used by DOT going forward.

Bronx Hub Improvement Site at 149th Street and Melrose/Third Avenue

Comparison Site at 138th Street and Brook Avenue

Improvement Site	Comparison Sites
Bronx Hub/ Roberto Clemente Plaza	Courtlandt Ave (150th to 156th)
	138th St. (Alexander Ave. to St. Anns Ave.)
	3rd Ave. (151st to 156th)

Analysis Process

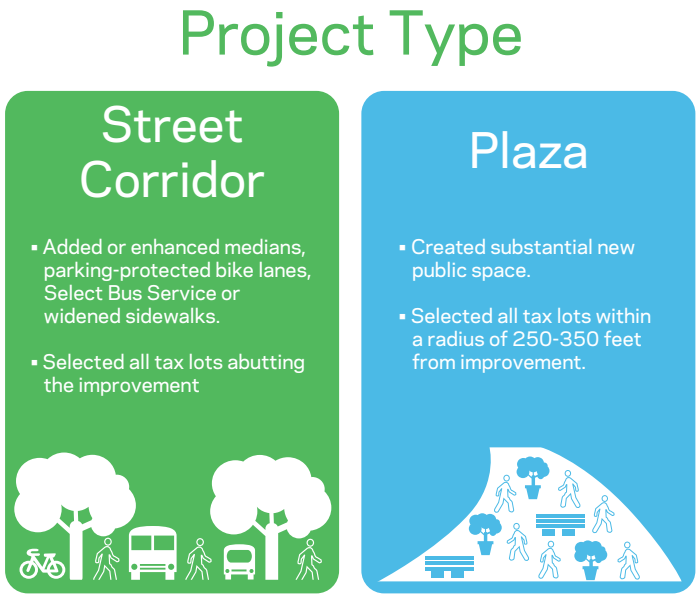


Mapping and Defining the Sites

Once the selection of project and comparison sites was finalized, the precise study areas were defined for each improvement site, neighborhood comparison, and similar site comparison using New York City tax lots. Each site was defined by a list of borough, block, and lot (BBL) designations that could be queried in the sales tax data. While business locations are identified by their address on State tax returns, DOF geocoded the latest address for each quarter in order to identify BBL, with zip code used to set the borough. A small number of addresses could not be geocoded as they lacked a valid zip code or address. Use of BBLs instead of addresses required one additional step for quality control: In the case of tax lots that front onto streets both within the study areas and outside of them (e.g. corner lots or large, full-block lots), the researchers had to work with DOF to ensure that only businesses with addresses on the street within the study area were included. As with all filters relating to the confidential, disaggregated source data, DOT provided the parameters while DOF performed the actual data queries and provided aggregated results.

To select the BBLs, each site was categorized as either a "plaza" or "street corridor" based on the type of improvement:

- For street corridor projects (including both "complete street" and Select Bus Service projects), which created improvements such as medians, protected bike lanes, bus rapid transit or landscaping along an entire stretch of street, the study area was defined as all tax lots directly abutting the improvement.
- For plaza sites, which involved the creation of substantial new public spaces within a centralized location, tax lots were selected within a radius of 250 feet (for small plazas) or 350 feet (for large plazas) from the improvement based on the reasonable assumption that because they serve as destinations in their own right, their impact reaches further than the shops immediately fronting them. By enlarging the study area this approach also helped ensure an adequate sample size in terms of both statistical confidence and meeting confidentiality requirements.



Generating Data Sets

The sets of tax blocks and lots, divided into individual improvement or comparison sites, were provided to DOF to develop aggregated data based on quarterly sales tax records. Tax records were used from businesses operating in two specific industries as defined by their NAICS codes: Retail Trade (NAICS Code 44-45) and Accommodation & Food Services (NAICS Code 72). Retail Trade includes grocery stores, clothing stores, florists, and other similar types of economic activity. Accommodation & Food Services includes bars, restaurants, and hotels. Not all returns have NAICS data available, although DOF records sometimes reflect corrections to invalid or missing NAICS.

These industry sectors were selected because they are likely to be the most affected—either positively or negatively—by the loss of parking or traffic lanes, improvements for pedestrians, additional public space, construction of parking-protected bike lanes and other new streetscape enhancements. Coffee shops and convenience stores in a dense urban setting, for instance, are ground-floor retail locations that depend on foot traffic for much of their business. If the loss of parking is a significant factor affecting sales, an evident decline in sales tax data for these types of businesses could be expected. Or, if a newly created pedestrian plaza encourages customers to linger and shop, an increase in sales might be seen. In sum, these industry sectors are well suited for assessing how street improvements affect local economic activity in New York City. Cities attempting to replicate this methodology should also consider including or excluding particular industry sectors or business types that are appropriate given the land use context.

Within the two broad sectors, specific NAICS types were removed from the data set: Non-store Retailers (454), which includes mail-order retailers, and Specialty Food Services (7223), which includes caterers, because neither depends on the physical presence of customers at their place of business; and Motor Vehicle and Parts Dealers (441) and Gasoline Stations (447). The business categories representing the largest percentage of remitters included Clothing Stores (14%), Full Service Restaurants (13%), and Limited Service Eating Places (11%). Other categories with large numbers of remitters across the study included Grocery Stores, Specialty Food Stores and Electronics and Appliance Stores.

Measurement Time Period

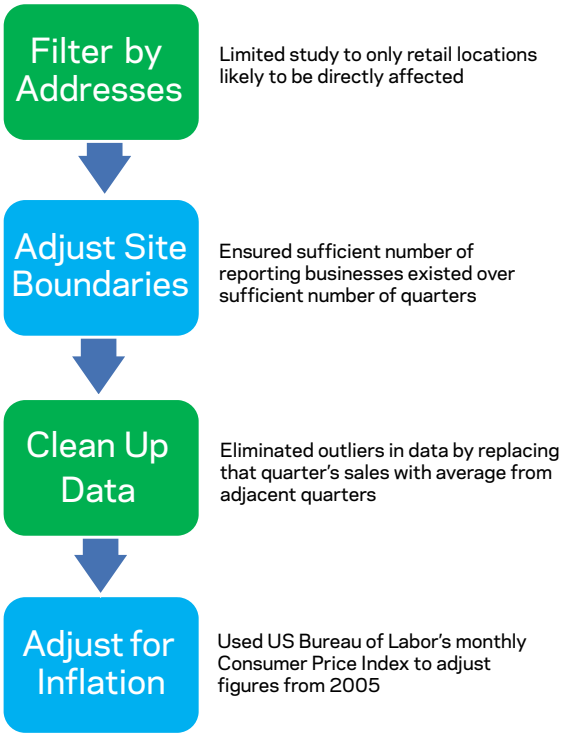
Based on the dates of project implementation, a baseline time period and a post-improvement period were defined for each improvement site (and its comparisons) using New York State fiscal quarters. The four quarters (i.e. year) just prior to the improvement make up the baseline period. While all twelve quarters in the three years after an improvement were used to contextualize the data and ensure its reliability, the post-improvement ("after") period was defined as the third year after the improvement was completed (i.e. the ninth through twelfth quarters) for the purpose of comparison to the "before" period.

This being the first time such a study had been undertaken, there was no specific guideline to use for how long any economic impacts of businesses might take to manifest. Three years was chosen for the initial study because at least twelve quarters of "after" data were available for all but one study site and because the researchers saw it as a conservative figure, probably erring on the high side. Detailed results from each site also identify sales changes at the one and two year points (i.e. quarters 1 through 4 and 5 through 8 following the improvement). Ultimately, results showed that business performance did not vary significantly between the second and third years. In other words, if the site performed well in the third year it was likely already performing well in the second year. Therefore, DOT believes that two years of post-improvement data is sufficient for analyses going forward. This has the additional benefit of allowing projects to be evaluated a year sooner.

Refining the Data Set

While the sales tax data is robust, it cannot be immediately used as is. Significant refinement or "cleaning" of the data beyond the simple inclusion/exclusion of NAICS codes discussed earlier is necessary to ensure that only relevant data is included in the analysis. Four steps were employed as part of this study: filtering addresses to exclude irrelevant businesses, visually confirming the dependability of the data, adjusting site boundaries to ensure an adequate sample size across all quarters, and smoothing data as needed where other filters do not eliminate outlier data points.

Filtering by address: Because the central hypothesis of this study was that changes in street design might change the travel and shopping patterns of potential customers to retail businesses, only businesses that have a true commercial presence at their address – addresses representing a real storefront – are relevant to the analysis and should be included. Other types of filing addresses located within the study areas, such as a store proprietor who files taxes from his or her home address or a holding company located in an office building, would only contaminate the results with sales data unrelated to the location. The data was filtered by creating criteria for excluding businesses not located on the ground floor. In order to identify and remove these records, the project team compiled a list of possible address identifiers that could indicate an upper-floor business, and DOF ran a string search to identify all addresses that contain these terms. They included:



"APT", "AP ", "RM", "ROOM", "SUITE", "STE", "0FL", "2FL", "3FL", "4FL" , "5FL", "6FL", "7FL", "8FL", "9FL" , " FL" , "FLOOR", "#"

After obtaining a list of the floor portion of business addresses that were returned in this search—without street or building number, to maintain confidentiality—the project team manually examined the results to re-include certain flagged addresses (e.g. FIRST FLOOR, 1ST FLOOR, 1 FL, #4, GROUND FLOOR, etc.) while eliminating the rest.

Importantly, the absence of businesses within the results whose tax remittals list their address as a location other than their physical storefront within the study area – a situation that applies to many chain stores – means that the businesses included in the final analysis tend to be locally-based businesses such as "mom-and-pop stores" and independently operated franchises.

Visually confirming data: To confirm the effectiveness of the address-filtering in eliminating as many inapplicable filings as possible, the researchers performed a manual check in several locations to ensure that the number of businesses included in the resulting data set matched on-the-ground reality. Visual counts of street-fronting retail businesses were conducted, primarily using the Street View feature of Google Maps, categorizing businesses as either most likely locally-based or most likely multi-location (chain store). The number of presumed locally-based businesses was compared to the number of businesses showing up in the sales tax data. The two counts were found to be very close (within 15%), giving the researchers a high degree of confidence that with very few exceptions the data represents only businesses reporting retail sales related to their physical presence on the affected streets.

Adjusting site boundaries: The initial comprehensive request to DOF sought to obtain data broken out into Retail Trade and Accommodation & Food Services ("A&FS") for every quarter between 2006 and 2011 across all sites. However, to ensure adequate aggregation of data over a sufficient number of quarters it was necessary to expand the study area boundaries for some sites which were smaller in size or had fewer businesses such that there were an adequate number of reporters across these categories within all fiscal quarters needed.

Data smoothing: Some sites displayed unusual "spikes," i.e. large jumps or drops in sales that appeared and disappeared within the space of three or fewer consecutive quarters. Since these spikes were not grounded in any evident trend and were clear outliers in the context of the rest of the data, the spikes were eliminated by replacing that quarter's sales with an average of the preceding and following quarter. Three spikes were removed in this manner from among 28 total fiscal quarters.

Accounting for Inflation

As the last step prior to generating final results, all values used in the study were adjusted to account for inflation. All figures expressed in this report are in the equivalent of January, 2005 dollars. This was done using the U.S. Bureau of Labor's monthly Consumer Price Index, with the middle month of each New York State fiscal quarter used to set the adjustment.

Interpreting the Results

Once the preceding steps were completed and results tabulated, the results were examined in a stepwise manner to determine whether the street improvement project may have played a role in the outcomes. First, the results for the improvement site were examined in isolation so as to compare the sales trends before and after the project was implemented. These results were then compared to the borough (or equivalent large area comparison) for a very blunt assessment of whether the improvement site outperformed or underperformed the borough as a whole. Third and most importantly, the results for the improvement site were compared to those of the comparison sites. This study's methodology does not ultimately prove causality between the street improvement projects and any resulting economic changes. However, for those locations that had positive results as compared to their borough and their comparison sites, it is reasonable to conclude that their gain in retail sales can at least in part be attributed to changes stemming from the higher quality street environment.

Lessons Learned

Because this effort consisted of the development of a new methodology without the aid of significant existing guidance, decisions had to be made during the process, as new conditions or constraints came to light, to adjust the approach so as to improve the accuracy and reliability of the data and the relevance of the results. Key lessons learned as part of this process are provided below.

1. The geographic information in the sales tax data cannot be used as is. Additional work is needed to isolate bricks-and-mortar businesses located on the street that would be directly affected by street-level changes, such as filtering out businesses filing returns from upper floors.

2. Small sites can be analyzed, but extra care is necessary in defining the improvement area. Because it is impossible to filter out all spurious or irrelevant data, the smaller the sample size, the more the data can be influenced by potential outliers. A balance must be struck between defining study areas that meet the spirit of the hypothesis being tested (in this case, measuring the area of influence of different kinds of improved street designs) and establishing an adequate sample size.

3. The specific industry sectors in the New York study – Retail Trade (NAICS Code 44-45) and Accommodation & Food Services (NAICS Code 72) – were seen as most appropriate given the land use context and existing retail mix of the studied locations. However, these are not set in stone and New York or other cities should consider customizing the industries based on the locations being studied. For example, New York excluded auto-based businesses – Gas Stations, Motor Vehicle and Parts Dealers, etc. – from its initial analysis because there were few such businesses located in the study areas and the initial hypothesis was that they would not be affected by the street changes. Going forward, however, they will likely be included to capture the possibility that their commerce could be affected by different street configurations just like any other business.

4. Depending on the sample size for a particular study area, the data for some locations will be strongly affected by the presence or absence of one or two large retailers. It is therefore important to have a certain amount of on-the-ground knowledge of any major turnover in businesses at these sites and whether it is independent of (not attributable to) the improvements being studied. In locations primarily comprised of large retail tenants, the data may be too erratic to be usable due to dramatic swings in the data resulting from store openings and closures or the businesses filing their taxes from inconsistent locations.

5. Following from the above point, sites that are characterized by a heavy overall turnover in retailers during the study period (whether large or small businesses) are poor candidates for study due to the inconsistencies in sales tax filings that result from this turnover. Sites with steady business establishment trends – whether stable, steadily growing, or steadily declining – will generally provide higher quality analyses.

6. Determining "similar" sites (sites with similar physical qualities and retail conditions to the improvement site, but not nearby) for comparison proved too challenging as there were too many confounding factors. If a more rigorous methodology could be developed to identify such similar site comparisons for each improvement site then it would be a worthwhile approach in the future as it could help control for neighborhood-level economic conditions affecting both the improvement sites and neighborhood comparisons but not showing up in the large area (e.g. borough) comparisons.

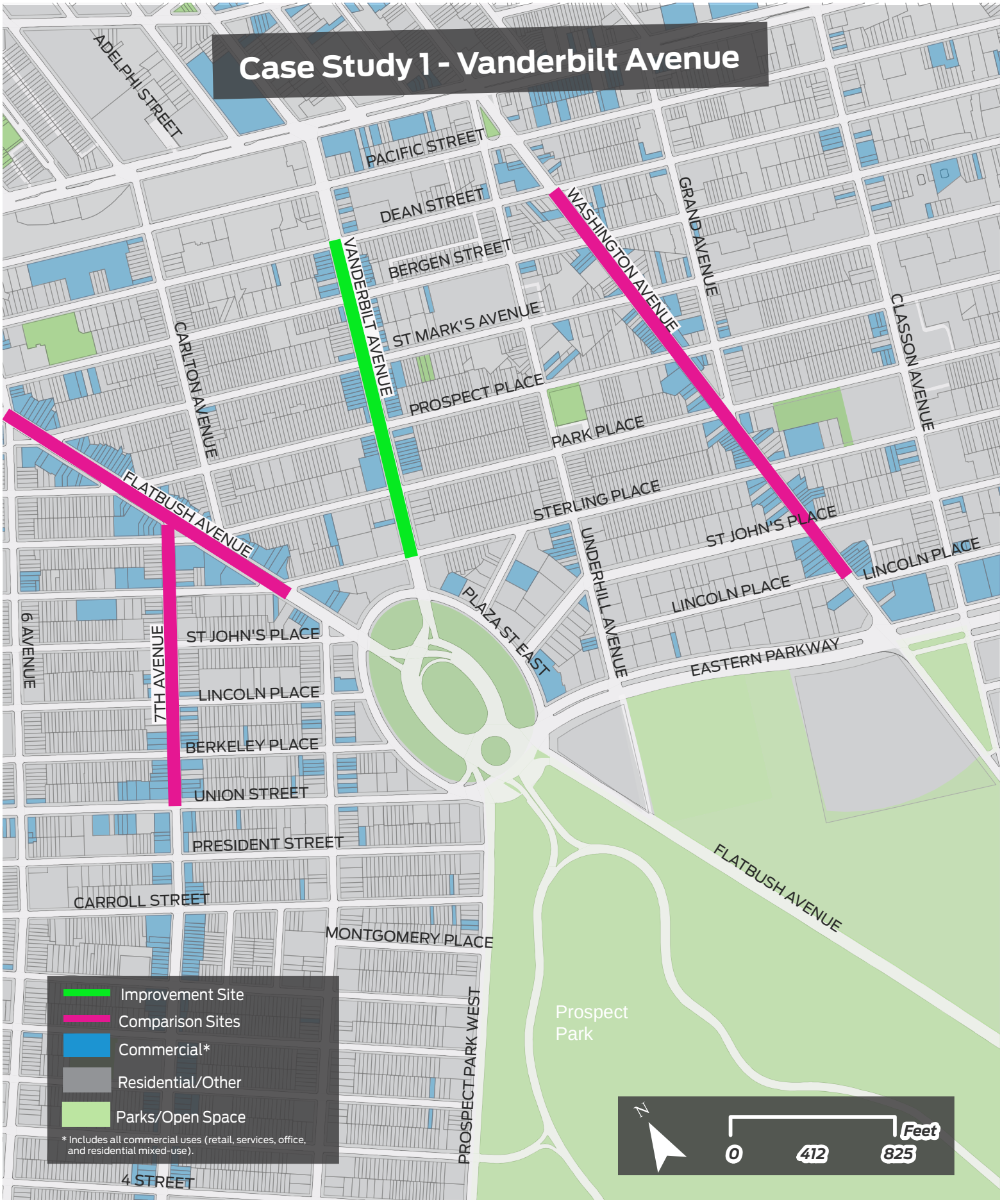
7. Steady positive or negative trends in sales following implementation of the improvement project can generally be seen by the second year – and, in some cases, within a year. Based on the experience of this study, three years of post-implementation data may not be necessary; two is likely adequate. This differed from expectations: Following street design changes, the project team expected that positive impacts would take time to reveal themselves as visitors gradually adjusted their behavior, but that negative changes would manifest fairly quickly because any potential reduction in convenience to existing customers would be immediate. For example, if parking spaces or travel lanes were critical to the success of a particular business community and these were removed or reconfigured in the course of a design change, then those businesses would feel the negative impact right away. However, the results suggest that positive and negative changes in the behavior of both current and new customers both occur fairly soon following the street changes.

In summary, while those outside of New York City will need to customize certain aspects of this approach to replicate it – based, for example, on the format and availability of sales tax data or how comparison sites are identified – the methodology should be readily adaptable to any city where sales taxes are collected and the data is available.

Project Case Studies

The following seven case studies illustrate the variety of projects that DOT looked at and the way in which the resulting data on local business impacts were used alongside the agency's other, more traditional metrics of safety and mobility. They are grouped into two general categories, Corridors and Plazas, based on their analysis type, yet they illustrate a range of techniques used to address specific conditions at each location.

Project	Borough	Type
Vanderbilt Avenue (Plaza Street to Dean Street)	Brooklyn	Corridor
Saint Nicholas Avenue/Amsterdam Avenue	Manhattan	Plaza
Bronx Hub	Bronx	Plaza
Willoughby Plaza	Brooklyn	Plaza
Columbus Avenue (77thStreet to 96th Street)	Manhattan	Corridor
Fordham Road Select Bus Service	Bronx	Corridor
Ninth Avenue (23rd Street to 31st Street)	Manhattan	Corridor


Case Study 1 - Vanderbilt Avenue
ADELPHI STREET
PACIFIC STREET
DEAN STREET
BERGEN STREET
VANDERBILT AVENUE
WASHINGTON AVENUE
GRAND AVENUE
CLASSON AVENUE
CARLTON AVENUE
ST MARK'S AVENUE
PROSPECT PLACE
PARK PLACE
STERLING PLACE
ST JOHN'S PLACE
LINCOLN PLACE
FLATBUSH AVENUE
UNDERHILL AVENUE
PLAZA ST EAST
EASTERN PARKWAY
6 AVENUE
7TH AVENUE
BERKELEY PLACE
UNION STREET
PRESIDENT STREET
CARROLL STREET
MONTGOMERY PLACE
PROSPECT PARK WEST
4 STREET
Prospect Park
Improvement Site
Comparison Sites
Commercial*
Residential/Other
Parks/Open Space
* Includes all commercial uses (retail, services, office, and residential mixed-use).
N
0
412
825
Feet

Case Study 1: Vanderbilt Avenue (Plaza Street to Dean Street), Brooklyn

Implemented: 7/1/2008 – 7/31/2008

Context:

Vanderbilt Avenue, in the Prospect Heights neighborhood of Brooklyn, is home to an eclectic mix of shops, restaurants and bars. Its 60'-62' profile included two moving lanes as well as a parking lane in each direction prior to recent changes by DOT.

In 2006, DOT implemented a traffic calming road diet by modifying the profile to include one moving lane, a parking lane in each direction, and a flush center median with left turn bays at intersections. This change resulted in a dramatic reduction in the number of speeding vehicles and helped to increase turning vehicle and pedestrian safety. At the same time, new cyclists began using the corridor and pedestrian traffic was increasing as Prospect Heights was becoming a more desirable neighborhood, with real estate prices increasing and more vacant storefronts becoming active. As the corridor grew in popularity it became clear that there was opportunity to further improve the quality of the street to better accommodate the growing pedestrian and bicycle traffic. In 2008, DOT set out to meet these growing user populations with an upgrade that included dedicated space for cyclists, landscaped pedestrian safety islands and medians, new parking regulations tailored to meet demand and clearly marked moving and turning lanes.

Project Goals:

1. Create dedicated cycling space
2. Improve pedestrian safety and comfort
3. Further calm traffic
4. Improve streetscape to support residents and local businesses

Approach:

- **Cycling Infrastructure** – A dedicated bicycle lane was created to clarify a safe space for cyclists.
- **Pedestrian Safety/Comfort** – Pedestrian safety islands were installed where left turn bays were not required, allowing safer two-phase crossing.
- **Traffic Calming** – A full-length, tree-lined median was installed on one block to visually narrow the roadway.
- **Streetscape** – Simple striping was replaced with raised medians and trees were planted in safety islands and medians to create a more inviting and pedestrian-scale environment that encourages people to stay and stroll.
- **Curbside Management** – Parking regulations were changed to encourage customer turnover and designate space for deliveries to local business.

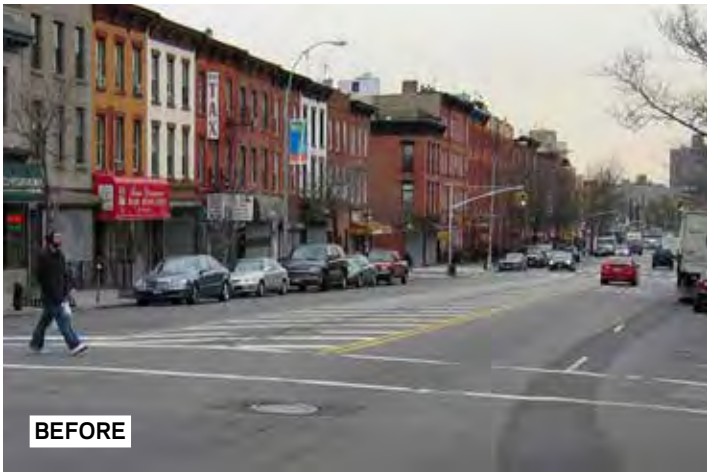
Results:

Data from the Vanderbilt Avenue improvement site shows a sustained, dramatic trend of increasing economic performance. The faster pace of increases on Vanderbilt compared with comparison sites and the borough as a whole indicates that the street improvements contributed to this fast-paced growth in retail activity. The upward trend in combined sales began prior to the construction period and continued at a similar pace afterward. By the third year following the 2008 implementation, sales were more than double the baseline value.

Vanderbilt Avenue performed significantly better than two of its similar site comparisons and Brooklyn as a whole. While the economy of this neighborhood was already on the upswing, it is reasonable to conclude that the improved safety, shortened crossings, and new landscaping all combined to increase foot and bicycle traffic and enhance the sense of place, creating a virtuous cycle of retail development that was greater than it otherwise would have been. In addition, the jump in sales seen for the improvement site in 2007 (the baseline period) could be partly a result of the earlier traffic calming improvements implemented in 2006.

Improvement Site	Comparison Sites
Vanderbilt Av. (Sterling to Dean)	Flatbush (Sterling to Bergen)
	7th Ave. (Union to Flatbush)
	Washington (Dean to Lincoln)

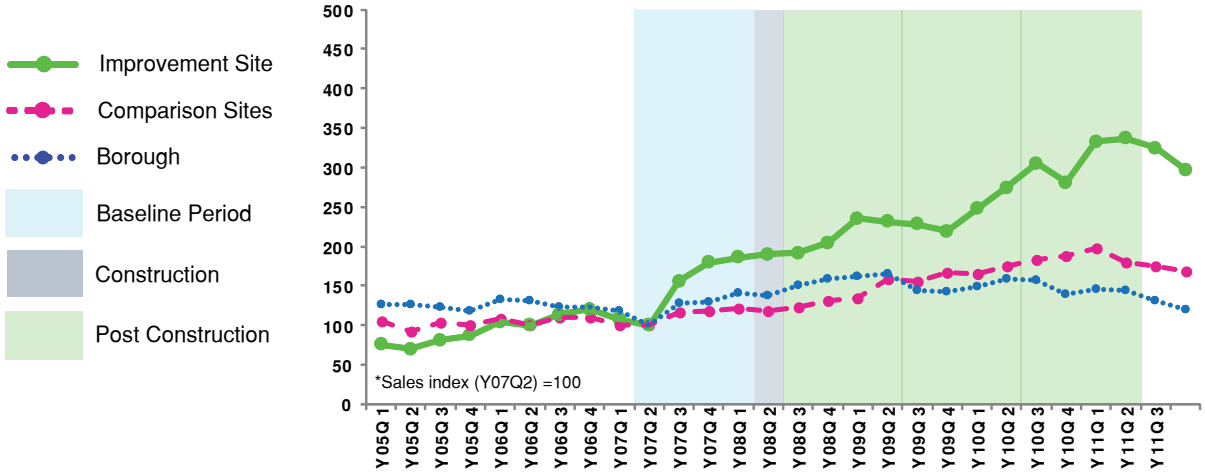
Area	Baseline Quarterly Sales	Δ Sales Post-Improvement		
Improvement Site		1st Year	2nd Year	3rd Year
Vanderbilt	$ 894,673	39%	56%	102%
Borough				
Brooklyn	$ 982,413,239	27%	19%	18%
Neighborhood Comparisons				
Average	$ 1,713,174	19%	46%	64%
Flatbush	$ 2,191,880	27%	32%	51%
7th Ave	$ 2,176,027	12%	35%	21%
Washington	$ 771,616	19%	70%	120%

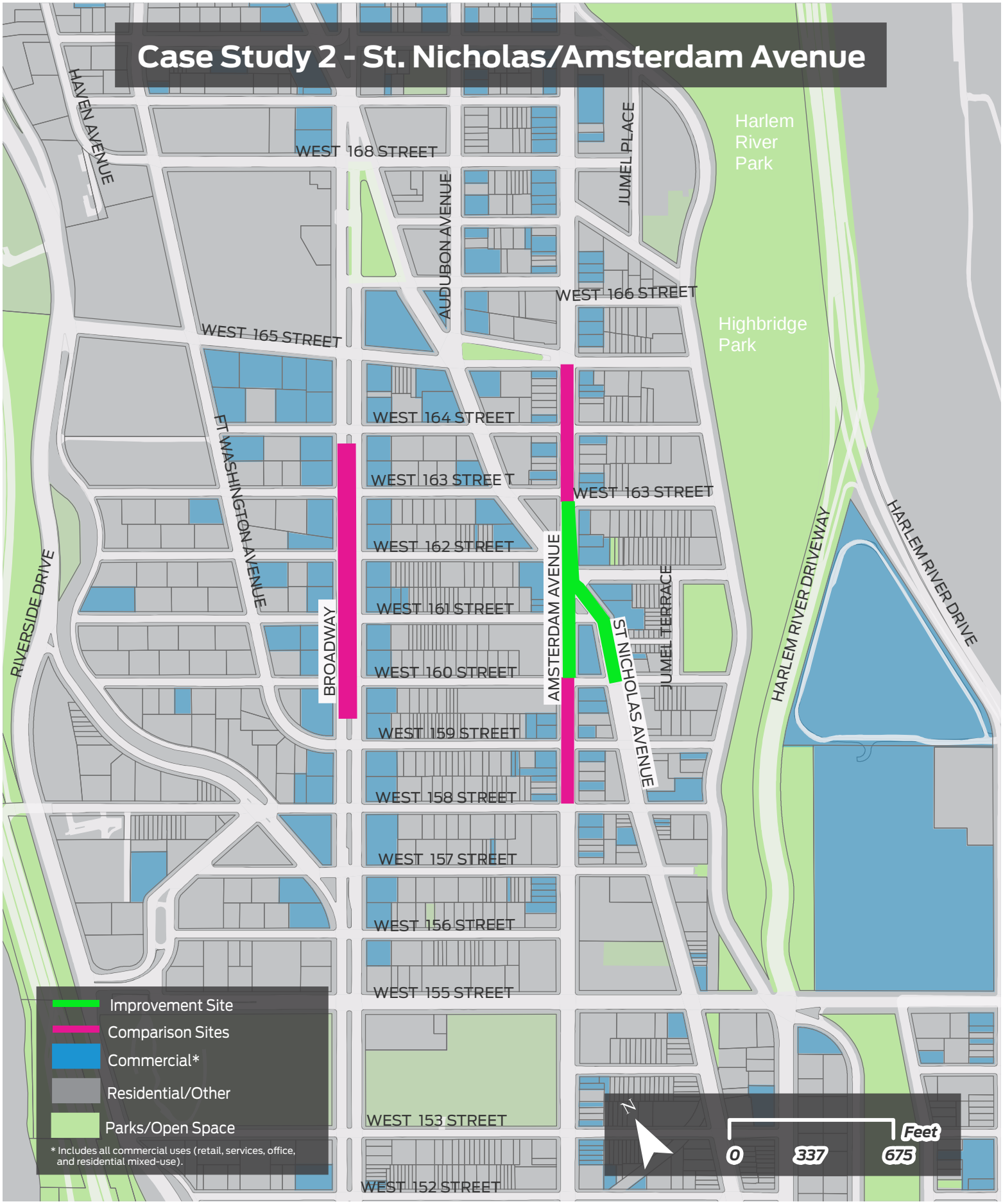


Summary:

An earlier traffic calming project set the stage for further improvements. Pedestrian refuges at intersections, tree lined medians, dedicated bike lanes and streetscape and curbside management upgrades all combined to support the growing retail environment along the Vanderbilt Avenue corridor. The improvement site outperformed all the neighborhood comparison sites and the borough.

Combined Sales : Improvement Sites vs. Comparisons Sites - Vanderbilt Avenue




Case Study 2 - St. Nicholas/Amsterdam Avenue
HAVEN AVENUE
WEST 168 STREET
AUDUBON AVENUE
JUMEL PLACE
Harlem River Park
WEST 166 STREET
Highbridge Park
WEST 165 STREET
WEST 164 STREET
FT WASHINGTON AVENUE
WEST 163 STREET
WEST 163 STREET
WEST 162 STREET
RIVERSIDE DRIVE
BROADWAY
WEST 161 STREET
AMSTERDAM AVENUE
JUMEL TERRACE
HARLEM RIVER DRIVEWAY
HARLEM RIVER DRIVE
ST NICHOLAS AVENUE
WEST 160 STREET
WEST 159 STREET
WEST 158 STREET
WEST 157 STREET
WEST 156 STREET
WEST 155 STREET
WEST 153 STREET
WEST 152 STREET
Improvement Site
Comparison Sites
Commercial*
Residential/Other
Parks/Open Space
* Includes all commercial uses (retail, services, office, and residential mixed-use).
N
0
337
675
Feet

Case Study 2: St. Nicholas Avenue/Amsterdam Avenue, Manhattan

Implemented: 9/1/2010 – 12/6/2010

Context:

In fall 2010 DOT implemented a safety project at the skewed intersection of St. Nicholas Avenue, Amsterdam Avenue, and W. 162nd Street in Manhattan. The project set out to address a number of pedestrian and mobility issues. Where these three streets meet there were underutilized expanses of roadway that encouraged high speed turns and created long crosswalks for pedestrians (the shortest measured 100'). The intersection generates significant pedestrian traffic as the result of subway and bus connections, supermarkets and drug stores and a nearby school. The complicated nature of the intersection created confusion and conflicts resulting in a high level of traffic collisions and injuries between 2006 and 2009 (the period before the changes were installed).

Project Goals:

1. Promote safer walking conditions
2. Provide safer walking routes to buses and subways
3. Create shorter, more direct crosswalks
4. Maintain travel times and bus route connectivity
5. Maintain parking and improve loading for local businesses
6. Improve existing bicycle facilities
7. Enhance green space and provide seating areas

Approach:

- **Directional Changes** – The segments of St. Nicholas Avenue approaching the intersection were changed from two-way to one-way. The segment of W. 161st Street between St. Nicholas and Amsterdam avenues was also changed to one-way. These changes helped simplify the intersection and eliminate several vehicle/vehicle and vehicle/pedestrian conflict points.
- **Public Space** – Significant portions of the roadbed were converted to pedestrian space with landscaping and seating through the introduction of raised concrete triangles and safety islands. Pedestrian crossings were also shortened.
- **Curbside Management** – Back-in angled parking was introduced along St. Nicholas Avenue on either side of Amsterdam Avenue. The closing of a lane in one direction created additional space for parking that was previously unavailable. Commercial loading zones were also installed so that local businesses could more easily find space for delivery trucks.
- **Bicycle Infrastructure** – The existing bike lane on St. Nicholas Avenue was upgraded and several sections became completely protected and separate from traffic.

Results:

The improvement site outperformed both comparison sites and the borough, showing a 48% increase in retail sales as compared to a 39% improvement for the borough during the same period. This project was selected for study due to its unique nature as a hyper-local retail hub. Most businesses along the project site directly serve the surrounding community and do not generally serve a regional clientele. Similarly, local residents are seeing a direct impact on their daily lives as pedestrian and vehicle safety have improved, pedestrian volumes have increased, and the new plaza and aesthetic elements provide space to relax and enhance the general streetscape of the district.

Improvement Site	Comparison Sites
St. Nicholas Avenue (W. 163rd Street to W. 160th Street) / Amsterdam Avenue (W. 161st Street to W. 163rd Street)	Broadway (W. 160th Street to W. 163rd Street)
	Amsterdam Avenue (W. 158th Street to W. 160th Street / W. 163rd Street to W. 165th Street)

Combined Sales by Quarter for St. Nicholas Ave/Amsterdam Ave site

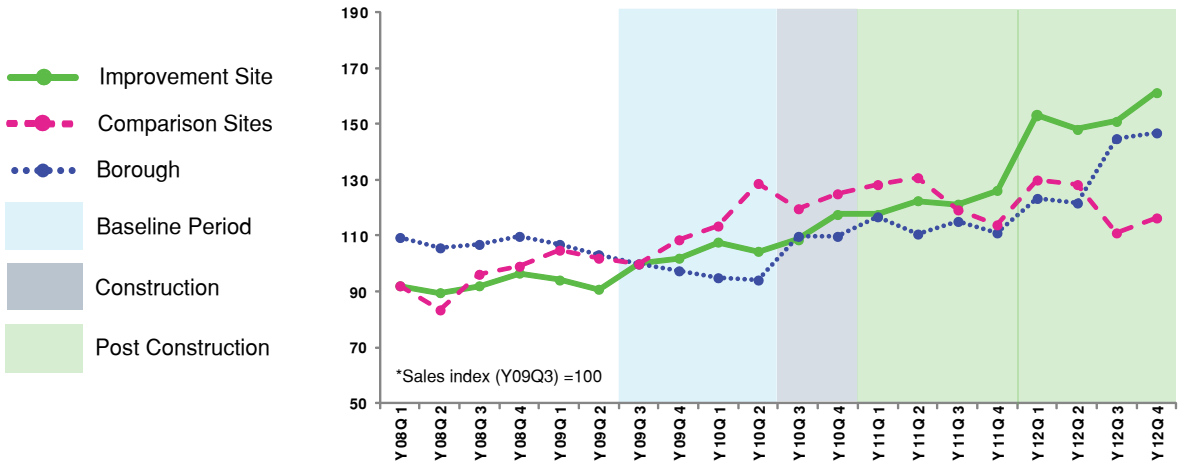
Area	Baseline Quarterly Sales	Δ Sales Post-Improvement	
Improvement Site		1st Year	2nd Year
St. Nick/Amsterdam	$ 706,940	+18%	+48%
Borough			
Manhattan	$ 3,962,683,573	+17%	+39%
Neighborhood Comparisons			
Average	$ 601,716	9%	7%
Broadway	$ 896,680	+13%	+22%
Amsterdam	$ 306,752	+4%	- 9%

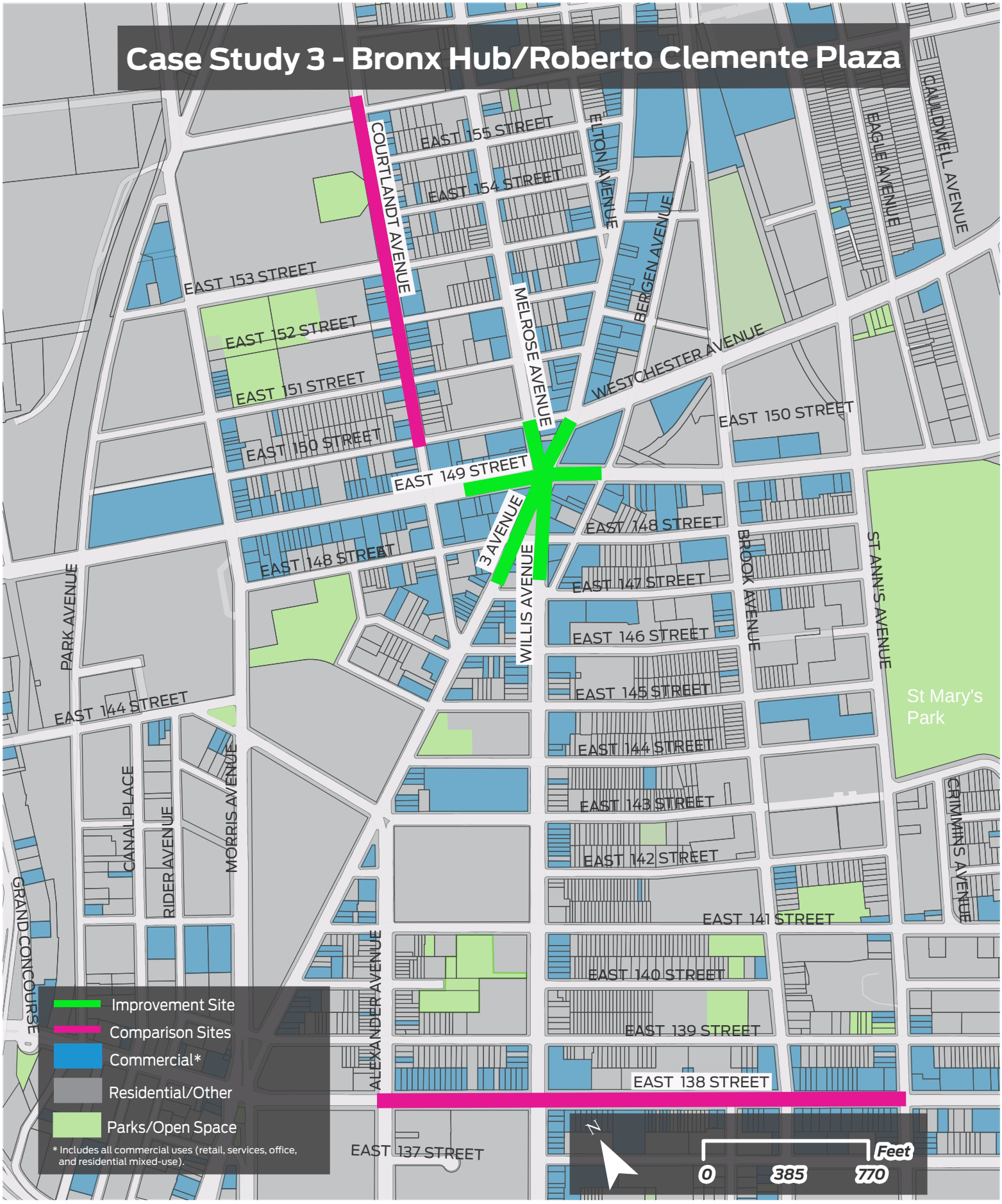
Table: Combined Sales Before and After Construction

Summary:

This busy and confusing intersection was reconfigured by reducing complicated traffic patterns, adding pedestrian and bicycling space and improving parking and loading operations. A high quality public space inviting people to linger replaced excess traffic lanes while offering safer pedestrian routes to transit. The area saw a 48% increase in sales tax revenues in the second year following the changes, and it outperformed the two comparison areas and the borough.

Combined Sales : Improvement Sites vs. Comparisons Sites - St. Nicholas/Amsterdam Ave




Case Study 3 - Bronx Hub/Roberto Clemente Plaza
COURTLANDT AVENUE
EAST 155 STREET
ELTON AVENUE
EAST 154 STREET
BERGEN AVENUE
EAGLE AVENUE
CAULDWELL AVENUE
EAST 153 STREET
MELROSE AVENUE
EAST 152 STREET
WESTCHESTER AVENUE
EAST 151 STREET
EAST 150 STREET
EAST 150 STREET
EAST 149 STREET
3 AVENUE
EAST 148 STREET
EAST 148 STREET
BROOK AVENUE
ST ANN'S AVENUE
EAST 147 STREET
WILLIS AVENUE
PARK AVENUE
EAST 146 STREET
EAST 145 STREET
St Mary's Park
EAST 144 STREET
EAST 144 STREET
EAST 143 STREET
CANAL PLACE
RIDER AVENUE
MORRIS AVENUE
CRIMMINS AVENUE
EAST 142 STREET
GRAND CONCOURSE
EAST 141 STREET
ALEXANDER AVENUE
EAST 140 STREET
EAST 139 STREET
EAST 138 STREET
EAST 137 STREET
Improvement Site
Comparison Sites
Commercial*
Residential/Other
Parks/Open Space
* Includes all commercial uses (retail, services, office, and residential mixed-use).
N
0
385
770
Feet

Case Study 3: Bronx Hub, the Bronx

Implemented: 8/1/2008 – 9/30/2008

Context:

The St. Nicholas/Amsterdam Avenue case study illustrated problems that often arise at confusing, multi-legged intersections. Similarly, the Bronx Hub, at the confluence of Willis Avenue, 3rd Avenue, Melrose Avenue and W. 149th Street, had multiple traffic mobility and safety issues. The Hub is also a major transportation node with several subway and bus line connections. Many of the pedestrians traveling though the Hub are transferring from one mode to another, requiring clear paths for access and space for people waiting for a bus. Along with these commuting pedestrians, the area is also a major retail destination for the surrounding communities.

The intersection suffered from complex vehicular movements and diffuse pedestrian patterns. Transit connections were dispersed over the area requiring large crowds to pass through it in all directions while sidewalk space was inadequate for movement or waiting for buses. There was also limited bicycle infrastructure and a lack of greenery or shade trees. The chaotic nature of the space created heavy vehicular-pedestrian conflicts and discouraged people from visiting the area for anything longer than was absolutely necessary.

Project Goals:

1. Simplify and clarify intersection operation to improve safety for all users
2. Provide additional public space to enhance transit passenger experience and encourage "staying" activities, not just getting from Point A to Point B
3. Reduce congestion (both automotive and pedestrian) by simplifying and eliminating unnecessary movements
4. Improve bus and subway transfer access
5. Introduce new bike routes and bike-to-transit connections
6. Create shorter pedestrian crossings and new connections along pedestrian desire lines

Approach:

- **Traffic Pattern Changes** – Willis Avenue was closed to vehicles between E. 148th Street and 3rd Avenue, eliminating one approach from the multi-pronged intersection, helping to normalize signal operation and opening up space for pedestrian uses. In addition, the southbound Melrose Avenue approach was forced to turn right onto E. 149th Street, further reducing the travel lanes entering the intersection.
- **Signals Operation** –Removing Willis and Melrose avenues from the intersection operation allowed the elimination of one of three traffic signal cycles, simplifying the operation of the intersection and providing more green time for vehicles and pedestrians.
- **Public Space** – Greater room to maneuver and space to wait for buses in comfort improved the pedestrian environment and invites people to stay. Planters and trees help to enhance the streetscape.
- **Bicycle Infrastructure** – A network of new bike lanes provides safe access in and out of the area

Results:

Unlike the Saint Nicholas Avenue/Amsterdam Avenue project area, which has a neighborhood-oriented economy, the Bronx Hub has a much more regional draw. People travel to the area to shop and commuters transferring from bus to subway also patronize this retail destination. The site outperformed the borough and two of the three neighborhood comparison sites (the third comparison site experienced an unusual jump in sales in the first quarter of FY 2011 which also affected the average for all comparison sites, as seen in the chart below). The Hub saw a 50% increase in sales by the third year after implementation, during which period the Bronx as a whole saw a 18% increase, all while area injuries were reduced and vehicle travel times and volumes were maintained.

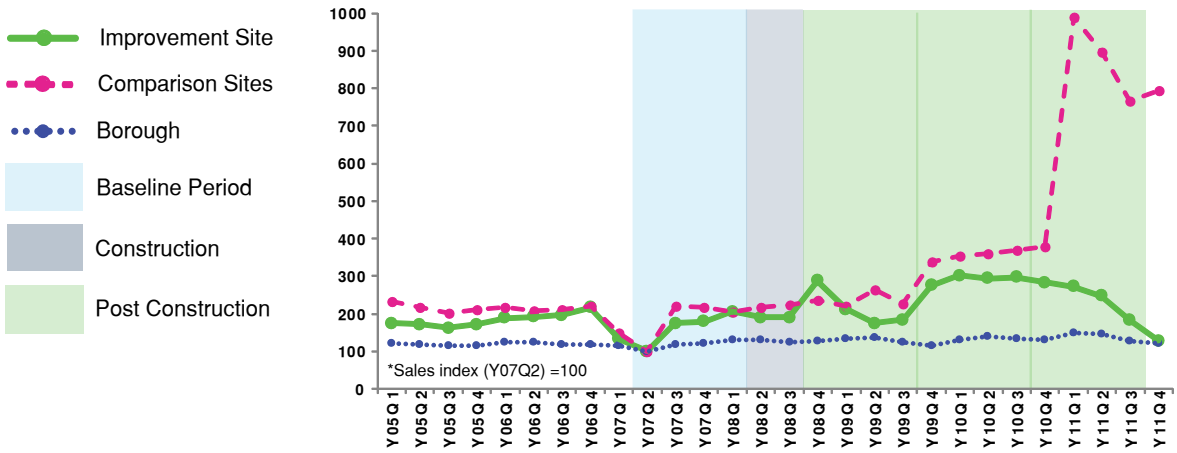
Improvement Site	Comparison Sites
Bronx Hub	Courtlandt Avenue (E. 150th Street to E. 156th Street)
	E. 138th Street (Alexander Avenue to St. Ann's Avenue)
	3rd Avenue (E. 151st Street to E. 156th Street)

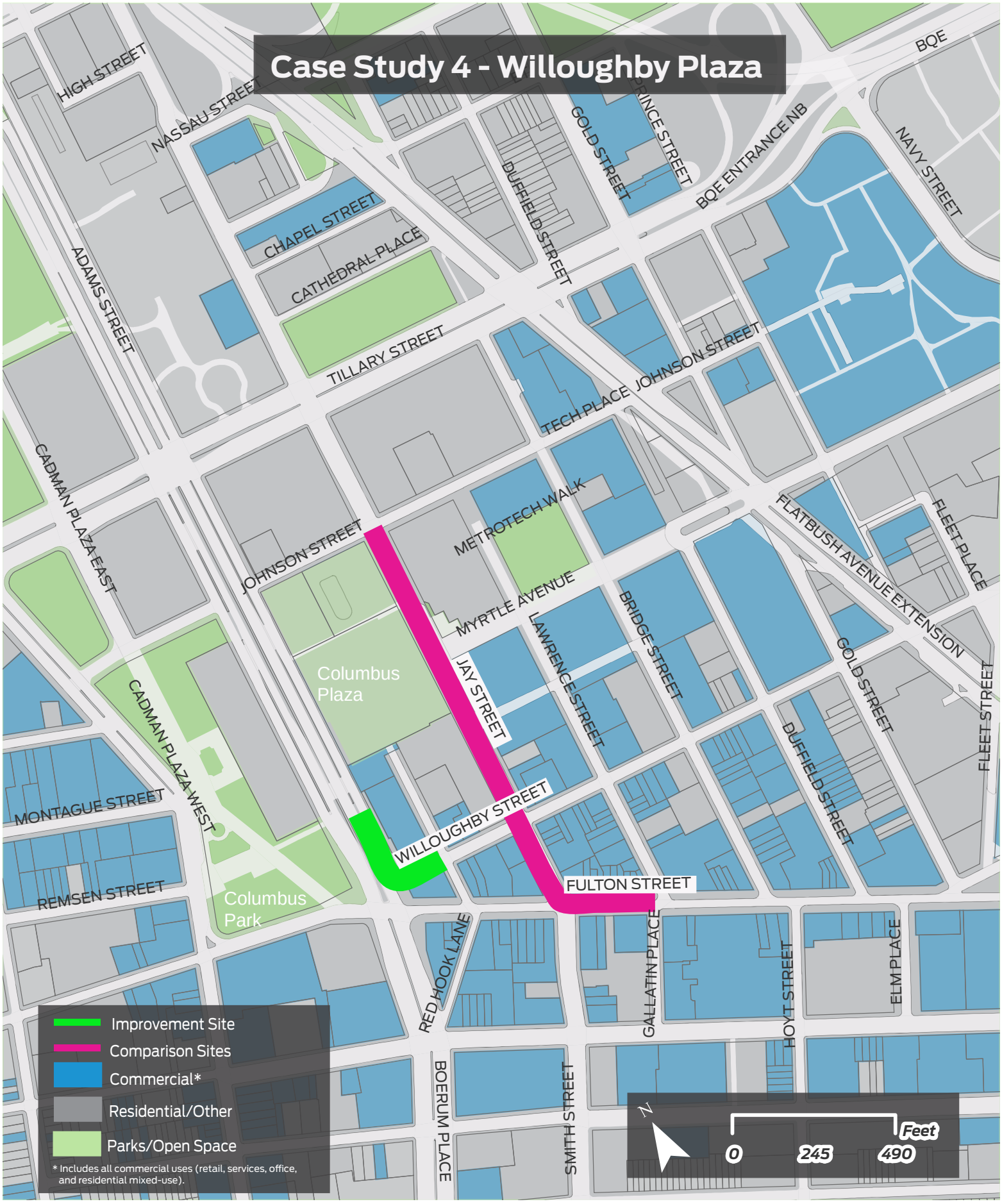
Area / Improvement Site	Baseline Quarterly Sales	Δ Sales Post-Improvement		
		1st Year	2nd Year	3rd Year
Bronx Hub	$ 4,721,163	30%	77%	50%
Borough				
Bronx	$ 374,373,474	11%	10%	18%
Neighborhood Comparisons				
Average	$ 1,245,141	24%	63%	179%
138th St.	$ 1,149,312	22%	33%	14%
3rd Ave	$ 2,197,114	32%	135%	505%
Courtland	$ 388,998	19%	20%	19%

Summary:

A chaotic space at the intersection of five major roads in the South Bronx with high volumes of pedestrians, cars, bus and subway riders and shoppers, the Bronx Hub required significant yet delicate interventions to improve the function, safety and quality of the space. One section of 3rd Avenue was closed to traffic opening up space for pedestrians to wait for buses and move through the Hub. Simplifying the signals also allowed traffic to move more smoothly reducing congestion and giving more crossing time for pedestrians. Thanks to the changes the Hub saw improved retail performance and outperformed two neighborhood comparison areas and the borough overall. One comparison site, 3rd Avenue, performed much better than Bronx Hub, but that appears to be due to a single retailer.

Combined Sales : Improvement Sites vs. Comparisons Sites - Bronx Hub/Roberto Clemente Plaza




Case Study 4 - Willoughby Plaza
HIGH STREET
NASSAU STREET
CHAPEL STREET
CATHEDRAL PLACE
ADAMS STREET
TILLARY STREET
DUFFIELD STREET
GOLD STREET
PRINCE STREET
BQE ENTRANCE NB
BQE
NAVY STREET
JOHNSON STREET
TECH PLACE
CADMAN PLAZA EAST
METROTECH WALK
JOHNSON STREET
MYRTLE AVENUE
FLATBUSH AVENUE EXTENSION
FLEET PLACE
Columbus Plaza
JAY STREET
LAWRENCE STREET
BRIDGE STREET
GOLD STREET
DUFFIELD STREET
FLEET STREET
CADMAN PLAZA WEST
MONTAGUE STREET
WILLOUGHBY STREET
FULTON STREET
REMSEN STREET
Columbus Park
RED HOOK LANE
GALLATIN PLACE
HOYT STREET
ELM PLACE
BOERUM PLACE
SMITH STREET
Improvement Site
Comparison Sites
Commercial*
Residential/Other
Parks/Open Space
* Includes all commercial uses (retail, services, office, and residential mixed-use).
N
0
245
490
Feet

Case Study 4: Willoughby Plaza, Brooklyn

Implemented: 4/3/2006 – 5/10/2006

Context:

Willoughby Street in Downtown Brooklyn was closed to motorized traffic between Adams and Pearl Streets along with a portion of the Adams Street service road in 2006. Within this space a pedestrian plaza was created to enhance the heavily trafficked pedestrian corridor, which at the time of its planning saw 2,600 pedestrians pass through it during the peak hour. The area was already a busy connection between Brooklyn's civic and retail centers, and with new residential construction and growing demand for office space in the neighborhood there was a need for a place to linger, eat lunch outside or take a moment to rest in the shade of planted trees between appointments or shopping. The plaza was created with temporary materials including seating, tables, planters and granite blocks. Six years later the space was upgraded using more permanent materials, with the street space merged with the sidewalk to create one large plaza with trees, new lighting, pedestrian wayfinding signage, seating and public art displays.

Project Goals:

1. Improve pedestrian safety
2. Address lack of quality pedestrian space in vicinity
3. Provide space to sit, eat and relax in proximity to local shopping and offices

Approach:

- **Public Space and Traffic Pattern Changes** – The plaza was created with temporary materials by closing an underutilized road segment to vehicles. Because this was also one of the earliest temporary plazas created in the city, many of the materials used were experimental.

Results:

Following implementation, pedestrian volumes increased by about 18%. Although combined sales at Willoughby Plaza dropped sharply in the first year following the improvement, they quickly rebounded and finished 47% higher than the baseline in the third year. By year three, the improvement site significantly outperformed both the borough and its two neighborhood comparisons. The seasonality of the sales data can clearly be seen, with the site experiencing seasonal peaks consistently in the 3rd quarter. . Additionally, the retail environment surrounding the site has noticeably changed since project implementation, with several New York City-based as well as national chains opening locations directly fronting onto the plaza.

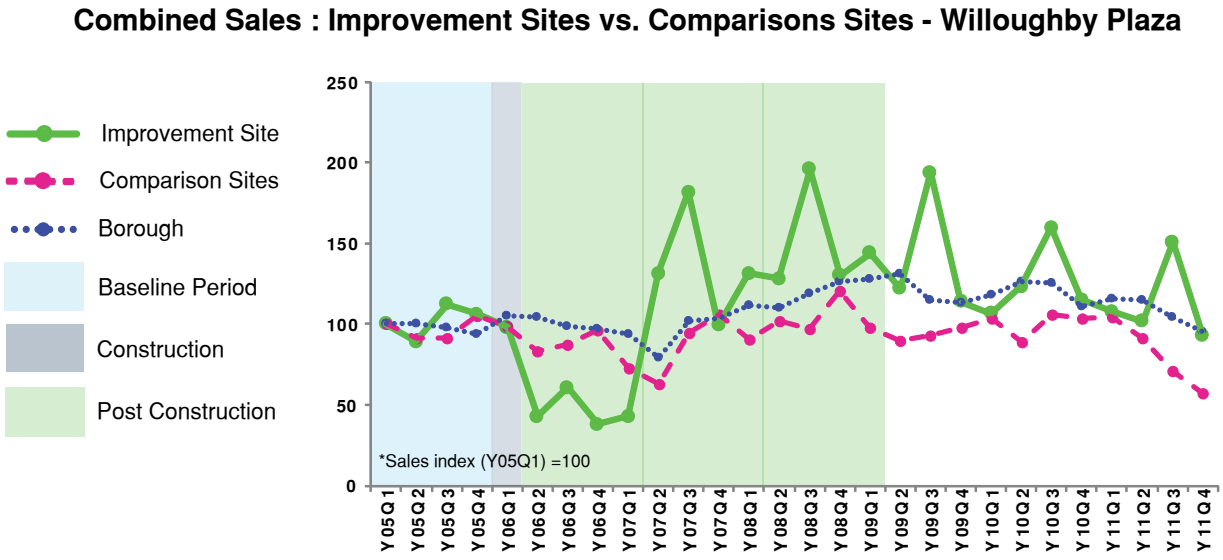
Improvement Site	Comparison Sites
Willoughby Plaza	Fulton Street (Lawrence Street to Jay Street)
	Jay Street (east side) (Fulton Mall to Metrotech Road)

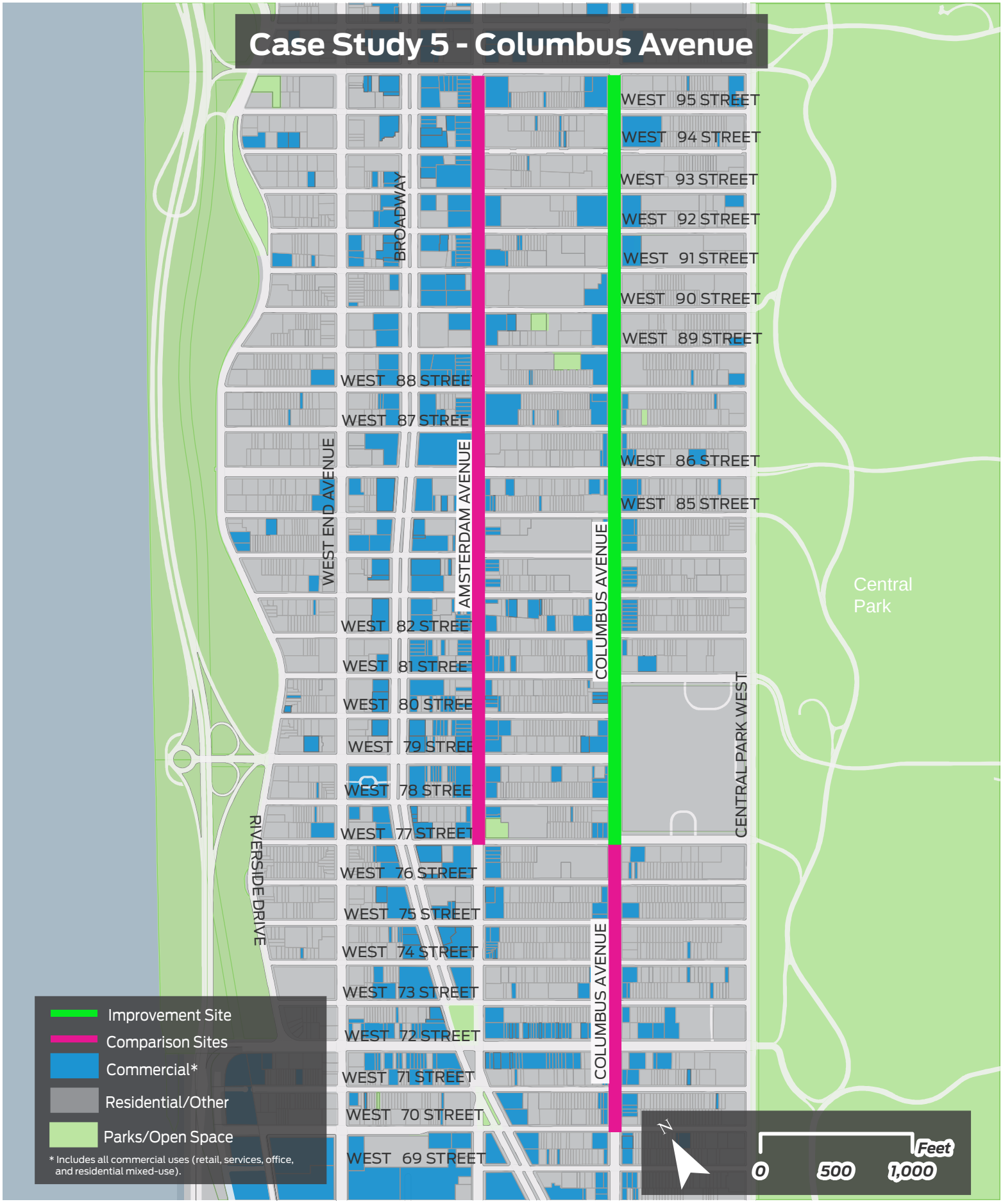
Willoughby Plaza – Combined Sales

Area	Baseline Quarterly Sales	Δ Sales Post-Improvement		
Improvement Site		1st Year	2nd Year	3rd Year
Willoughby	$ 9,544,084	-55%	33%	47%
Borough				
Brooklyn	$ 970,542,050	1%	1%	24%
Neighborhood Comparisons				
Average	$ 1,623,496	-12%	-9%	8%
Fulton Mall	$ 1,353,670	-18%	-12%	12%
Willoughby-Fulton	$ 1,893,321	-7%	-6%	4%

Summary:

Through simple techniques such as closing the street to traffic, introducing tables, chairs and umbrellas and a few planters and granite blocks to define the space, a new place was created for Downtown Brooklyn. The area around Willoughby Plaza, while experiencing significant seasonal swings in retail sales, performed very well following its creation in 2006. The study area easily outperforms the two local comparison sites and the borough of Brooklyn. Even in the next three years following the study period it continues to outperform.




Case Study 5 - Columbus Avenue
WEST 95 STREET
WEST 94 STREET
WEST 93 STREET
WEST 92 STREET
WEST 91 STREET
WEST 90 STREET
WEST 89 STREET
WEST 88 STREET
WEST 87 STREET
WEST 86 STREET
WEST 85 STREET
WEST 82 STREET
WEST 81 STREET
WEST 80 STREET
WEST 79 STREET
WEST 78 STREET
WEST 77 STREET
WEST 76 STREET
WEST 75 STREET
WEST 74 STREET
WEST 73 STREET
WEST 72 STREET
WEST 71 STREET
WEST 70 STREET
WEST 69 STREET
BROADWAY
WEST END AVENUE
AMSTERDAM AVENUE
COLUMBUS AVENUE
COLUMBUS AVENUE
CENTRAL PARK WEST
RIVERSIDE DRIVE
Central Park
Improvement Site
Comparison Sites
Commercial*
Residential/Other
Parks/Open Space
* Includes all commercial uses (retail, services, office, and residential mixed-use).
N
0
500
1,000
Feet

Case Study 5: Columbus Avenue (W. 96th Street to W. 77th Street), Manhattan

Implementation: 8/16/10 – 10/14/10

Context:

Columbus Avenue between W. 96th Street and W. 77th Street is a one-way road, 60' in width, which had three wide travel lanes, curbside parking lanes on both sides, and no bicycle infrastructure. Between 2004 and 2008 there were 251 injuries and one fatality. The community board requested a proposal from DOT to understand potential design options for improving the conditions for pedestrians and bicyclists along the corridor.

Goals:

1. Enhance street safety for all users
2. Improve bicycle network connectivity
3. Decrease pedestrian crossing distances
4. Maintain vehicle traffic capacity

Approach:

- **Cross-section Modifications** – Travel lanes were narrowed to create room for a parking-protected bike lane. On-street parking and all three travel lanes were maintained.
- **Mixing Zones** – Mixing zones were added at one-way cross streets where motorists and bicyclists share a curbside lane, with vehicles using the lane to make left turns and cyclists using it to either turn or travel through. The mixing zone increases visibility and predictability between users.
- **Bicycle Signals** – Dedicated vehicular turn lanes and separate bicycle signal phases were added at busy cross-town streets, reducing bicycle/vehicle turning conflicts.
- **Pedestrian Safety/Comfort** – Landscaped pedestrian safety islands were added to reduce crossing distances and enhance the corridor's aesthetics.

Results:

While the Columbus Avenue project site didn't outperform sales growth in Manhattan as a whole, it did grow substantially when compared to similar nearby sites in each quarter. Most importantly, the portion of Columbus Avenue that received street upgrades significantly outperformed an untouched section of Columbus Avenue directly south of the project area. Where no changes were made, retail sales on Columbus only grew by 9%. Similar growth could have been expected for the project site, however the reduced injuries, decreased speeding, increased bicycle volumes, improved streetscape and enhanced accessibility for all users helped to improve sales by 20%.

Improvement Site	Comparison Sites
Columbus Avenue (W. 77th Street to W. 96th Street)	Amsterdam Avenue (W. 77th Street to W. 96th Street)
	Columbus Avenue (W. 70th Street to W. 77th Street)

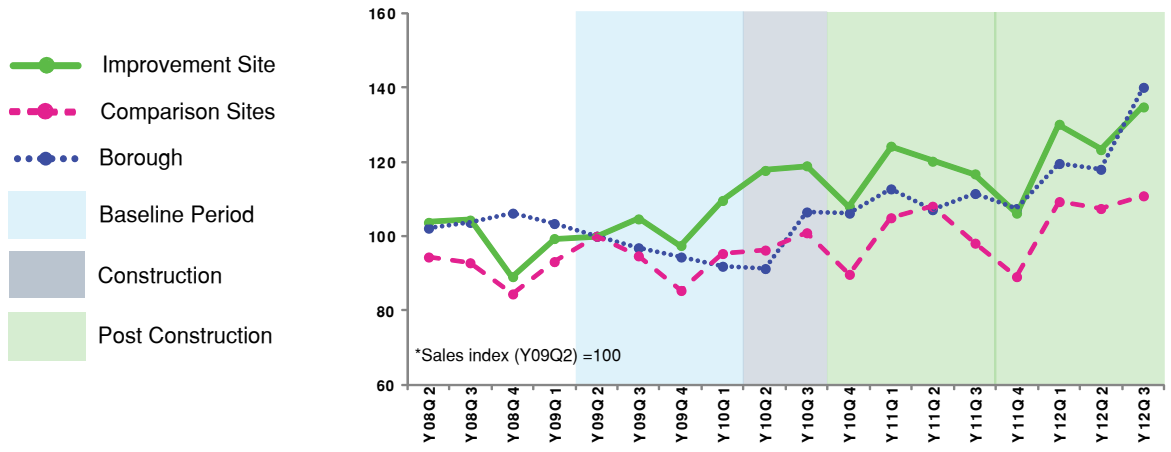
Combined Sales Before and After Construction

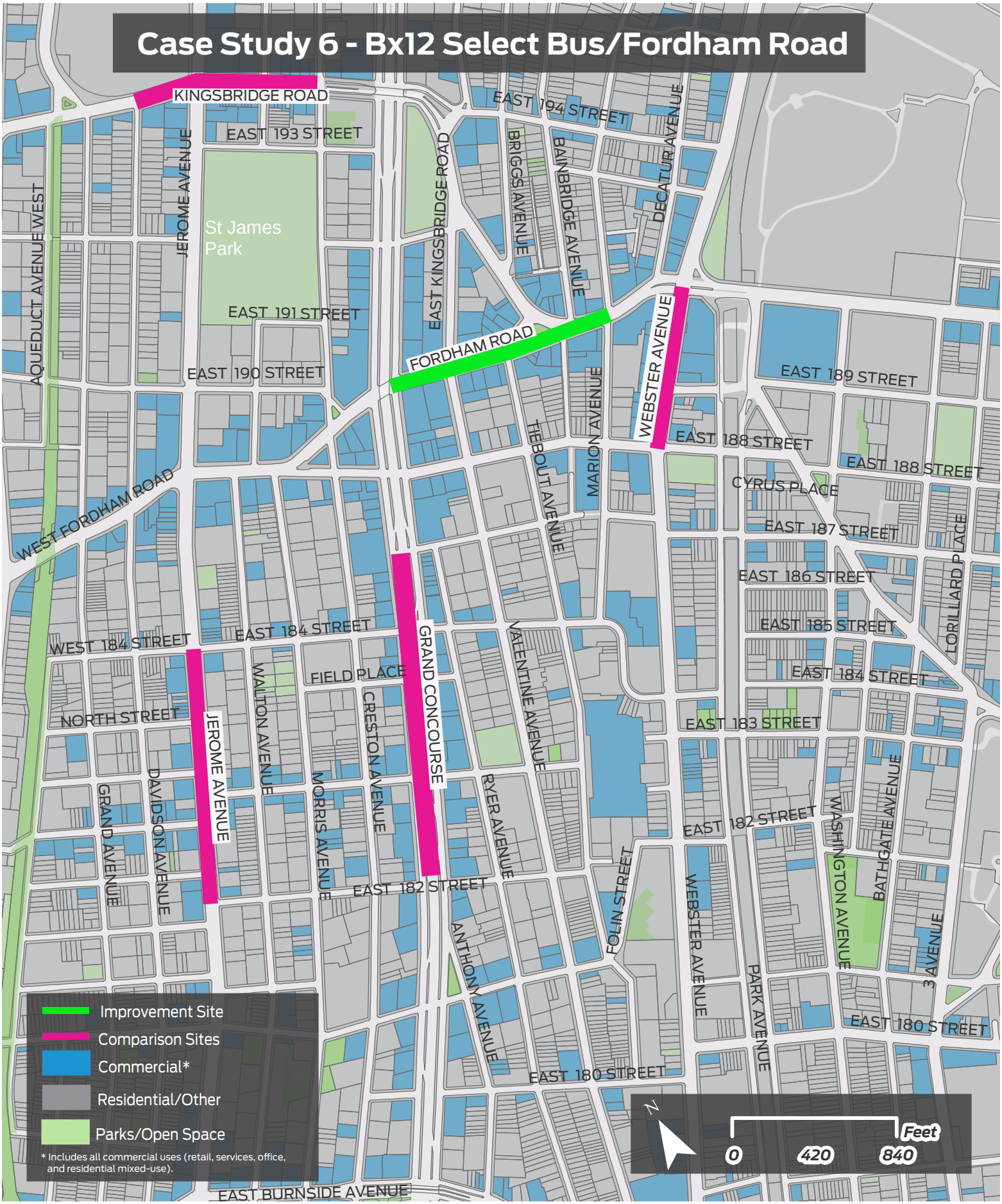
Area	Baseline Quarterly Sales	Δ Sales Post-Improvement	
Improvement Site		1st Year	2nd Year
Columbus Ave (77-96)	$ 17,476,299	+14%	+20%
Borough			
Manhattan	$ 4,054,385,966	+14%	+27%
Neighborhood Comparisons			
Average	$ 19,275,711	7%	11%
Amsterdam (77-96)	$ 25,129,981	+7%	+12%
Columbus (70-77)	$ 13,421,440	+7%	+9%

Summary:

A comprehensive approach to the design of this segment of Columbus Avenue improved it for all users. By creating a parking-protected bike lane, room was created for pedestrian safety islands, tree plantings and improved turning conditions for drivers. The study area outperforms nearby comparison areas, both of which improved during this time, yet falls behind the borough of Manhattan in the final quarter of the study period.

Combined Sales : Improvement Sites vs. Comparisons Sites - Columbus Avenue




Case Study 6 - Bx12 Select Bus/Fordham Road
KINGSBRIDGE ROAD
EAST 193 STREET
EAST 194 STREET
JEROME AVENUE
St James Park
AQUEDUCT AVENUE WEST
EAST KINGSBRIDGE ROAD
BRIGGS AVENUE
BAINBRIDGE AVENUE
DECATUR AVENUE
EAST 191 STREET
FORDHAM ROAD
EAST 190 STREET
WEBSTER AVENUE
EAST 189 STREET
TIEBOUT AVENUE
MARION AVENUE
EAST 188 STREET
EAST 188 STREET
CYRUS PLACE
WEST FORDHAM ROAD
EAST 187 STREET
LORILLARD PLACE
EAST 186 STREET
EAST 185 STREET
WEST 184 STREET
EAST 184 STREET
GRAND CONCOURSE
VALENTINE AVENUE
FIELD PLACE
WALTON AVENUE
CRESTON AVENUE
NORTH STREET
JEROME AVENUE
EAST 184 STREET
EAST 183 STREET
GRAND AVENUE
DAVIDSON AVENUE
MORRIS AVENUE
RYER AVENUE
EAST 182 STREET
WASHINGTON AVENUE
BATHGATE AVENUE
EAST 182 STREET
FOLIN STREET
WEBSTER AVENUE
PARK AVENUE
3 AVENUE
ANTHONY AVENUE
EAST 180 STREET
EAST 180 STREET
EAST BURNSIDE AVENUE
Improvement Site
Comparison Sites
Commercial*
Residential/Other
Parks/Open Space
* Includes all commercial uses (retail, services, office, and residential mixed-use).
N
0
420
840
Feet

Case Study 6: Fordham Road Select Bus Service, the Bronx

Implemented: 4/1/2008 – 6/30/2008

Context:

The Fordham Road-Pelham Parkway Bx12 Select Bus Service (SBS) replaced Bx12 Limited service from the Inwood neighborhood in Manhattan to Co-Op City in the Bronx in June 2008. New York City's first SBS route, the Bx12 SBS offers transfer opportunities to all of the subway lines and Metro-North lines in the Bronx as it travels east-west through the borough. After an extensive planning process, the Fordham Road corridor was selected as the first route in the SBS network, due in part to the strong north/south subway connectivity but limited east/west options

This study primarily analyzed economic performance across an entire improvement site, but in this case, due to the size of the corridor, the analysis focused on a five block segment between two busy north/south avenues representing a dense retail corridor and including two SBS stops.

Project Goals:

1. Increase bus ridership and provide more satisfying transit experience
2. Reduce length of travel time along route
3. Improve east/west travel and transit connections

Approach:

- **Enhanced Bus Service** – Off-board fare collection, transit signal priority, entry/exit from all doors, and larger, low- floor buses with unique branding all helped to improve the bus rider's overall experience while improving travel times and connectivity.
- **Curbside Management** – Dedicated curb-side bus lanes were introduced with high visibility red paint. Overhead signage and parking regulations further delineate the space while also allowing loading and parking activity at off-peak hours.

Results:

The Fordham Road Select Bus Service (SBS) site performed strongly in the business sales analysis. Sales rose steadily in each of the three years following construction. The site, a commercially active section of Fordham Road, performed well, with business sales increasing by 71% in the third year compared to the baseline. This easily outperforms the borough and three out of four neighborhood comparisons. There was a decline in sales during the baseline period along with a decline at the end of the 3 year period, but the corridor saw overall improved performance in the sales of local businesses. The positive results are in spite of the fact that parking was removed during the peak periods – a major concern of local businesses prior to implementation.

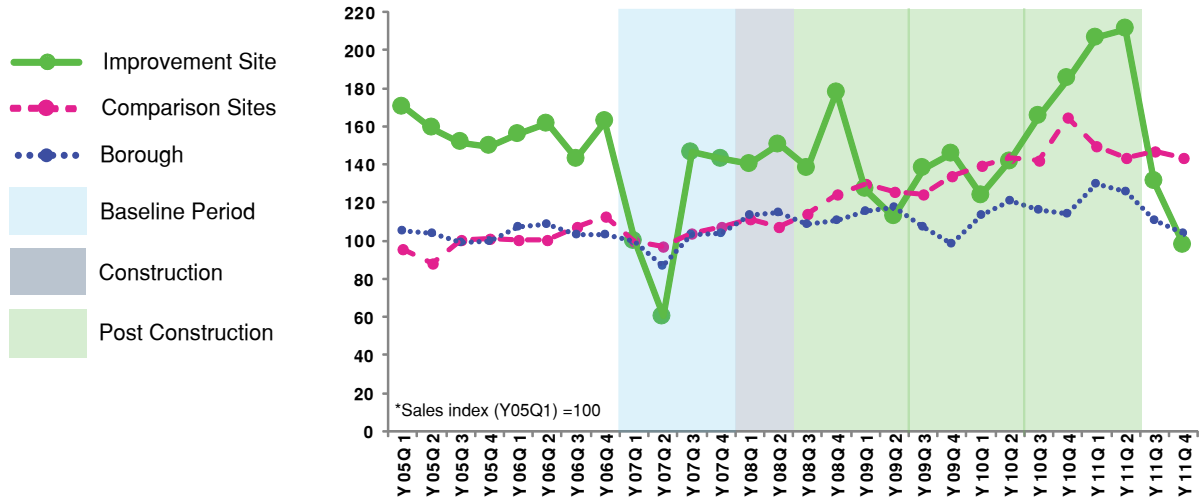
Improvement Site	Comparison Sites
Fordham Road (Grand Concourse to Webster Avenue)	Kingsbridge Road (Creston Avenue to Davidson Avenue)
	Grand Concourse (182nd Street to 187th Street)
	Jerome Avenue (182nd Street to 184th Street)
	Webster Avenue (188th Street to Fordham Road)

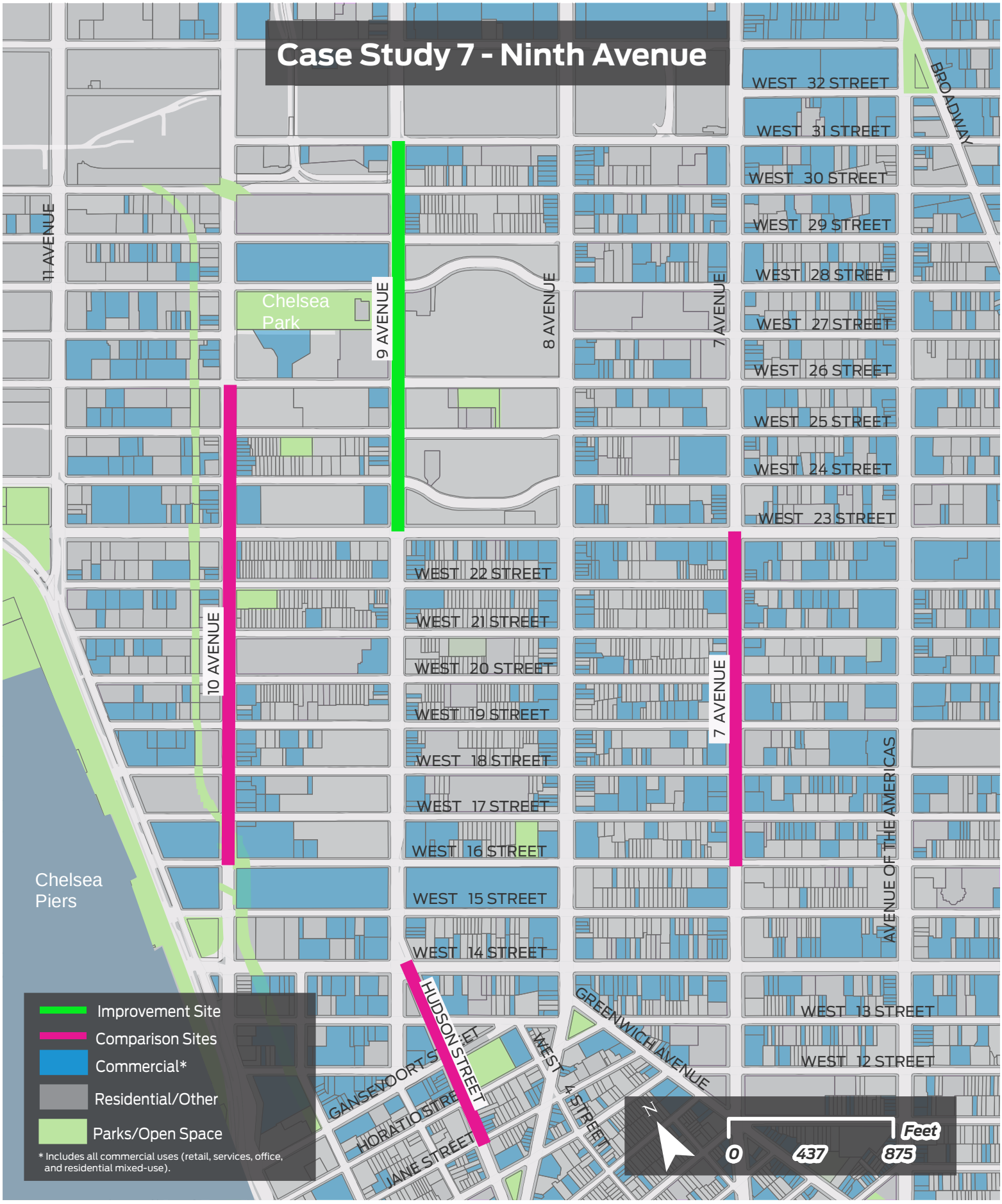
Area / Improvement Site	Baseline Quarterly Sales	Δ Sales Post-Improvement 1st Year	2nd Year	3rd Year
Bx12	$ 7,439,735	24%	22%	71%
Borough				
Bronx	$ 362,097,700	15%	12%	23%
Neighborhood Comparisons				
Average	$ 1,328,357	16%	25%	38%
Kingsbridge	$ 2,735,121	-24%	-36%	-34%
Grand Concourse	$ 661,370	22%	43%	51%
Jerome	$ 504,943	46%	71%	96%
Webster	$ 1,411,994	21%	24%	39%

Summary:

The Fordham Road SBS improvements helped this segment of Fordham Road experience higher levels of economic activity than other similar comparison areas during the study period through adoption of Bus Rapid Transit and associated street improvements, improving the experience for bus users and pedestrians.

Combined Sales : Improvement Sites vs. Comparisons Sites - Bx12 Select Bus/Fordham Road




Case Study 7 - Ninth Avenue
WEST 32 STREET
WEST 31 STREET
WEST 30 STREET
WEST 29 STREET
WEST 28 STREET
WEST 27 STREET
WEST 26 STREET
WEST 25 STREET
WEST 24 STREET
WEST 23 STREET
WEST 22 STREET
WEST 21 STREET
WEST 20 STREET
WEST 19 STREET
WEST 18 STREET
WEST 17 STREET
WEST 16 STREET
WEST 15 STREET
WEST 14 STREET
WEST 13 STREET
WEST 12 STREET
BROADWAY
11 AVENUE
9 AVENUE
8 AVENUE
7 AVENUE
10 AVENUE
AVENUE OF THE AMERICAS
Chelsea Park
Chelsea Piers
HUDSON STREET
GREENWICH AVENUE
GANSEVOORT STREET
HORATIO STREET
JANE STREET
WEST 4 STREET
Improvement Site
Comparison Sites
Commercial*
Residential/Other
Parks/Open Space
* Includes all commercial uses (retail, services, office, and residential mixed-use).
N
0
437
875
Feet

Case Study 7: Ninth Avenue (W. 23rd Street to W. 31st Street), Manhattan

Implemented: 7/31/2008 – 10/30/2008

Context:

Ninth Avenue is a major southbound thoroughfare in Manhattan. The corridor passes through the neighborhoods of Chelsea and Midtown South on the west side of Manhattan, and is a one way road with four travel lanes and curbside parking on both sides. The combination of travel and parking lanes created a 70'-wide roadway putting pedestrians at risk when trying to cross. Improvements to this segment of Ninth Avenue extended the existing bicycle network following earlier changes between W. 14th Street and W. 23rd Street completed in 2007.

Goals:

1. Create safe and comfortable experience for all users
2. Higher quality experiences for cyclists of all levels
3. Secure and pleasant pedestrian experience
4. Provide clear and safe space for turning vehicles

Approach:

- **Cross-section Modifications** – Installed a parking-protected bike lane and left turn lanes by repurposing one travel lane. On-street parking was maintained and left turn lanes were added at westbound streets.
- **Bicycle Signals** – Dedicated vehicular turn lanes and separate bicycle signal phases were added at all cross streets, reducing bicycle/vehicle turning conflicts.
- **Pedestrian Safety/Comfort** – Landscaped pedestrian safety islands were added to reduce crossing distances and enhance the corridor's aesthetics.

Results:

Economic performance along this corridor increased steadily during the three years following the completion of the improvement. Importantly, this trend was not already underway during the baseline period. During both the second and third years following improvements, sales along the corridor easily outpaced both the borough and all comparison sites. Additionally, the number of businesses reporting sales data increased during the study period, suggesting that new businesses may have entered the area and contributed to the increase in sales. The benefits to local businesses were complemented by a greener streetscape, shorter crossings and a reduction in injuries.

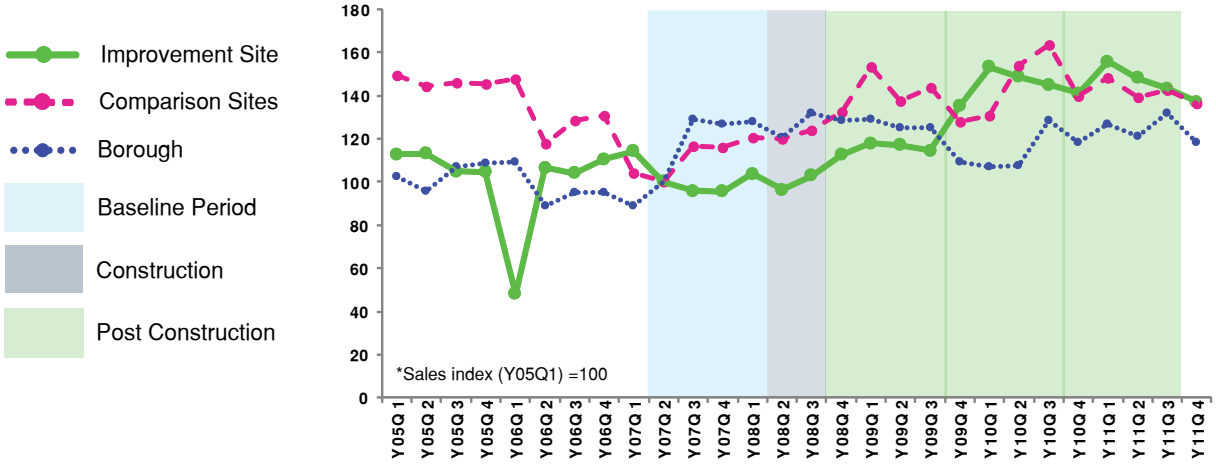
Improvement Site	Comparison Sites
Ninth Avenue (W. 23rd Street to W. 31st Street)	Seventh Avenue (W. 16th Street to W. 23rd Street)
	Tenth Avenue (W. 16th Street to W. 26th Street)
	Hudson Street (Jane Street to W. 14th Street)

Area	Baseline Quarterly Sales	Δ Sales Post-Improvement		
Improvement Site		1st Year	2nd Year	3rd Year
9th (23-31)	$ 3,284,342	17%	47%	49%
Borough				
Manhattan	$ 5,215,280,268	5%	-7%	3%
Neighborhood Comparisons				
Average	$ 4,748,430	25%	27%	26%
8th (24-28)	$ 1,217,927	15%	15%	13%
7th (16-23)	$ 8,719,988	23%	23%	20%
10th (16-26)	$ 4,307,375	37%	43%	44%

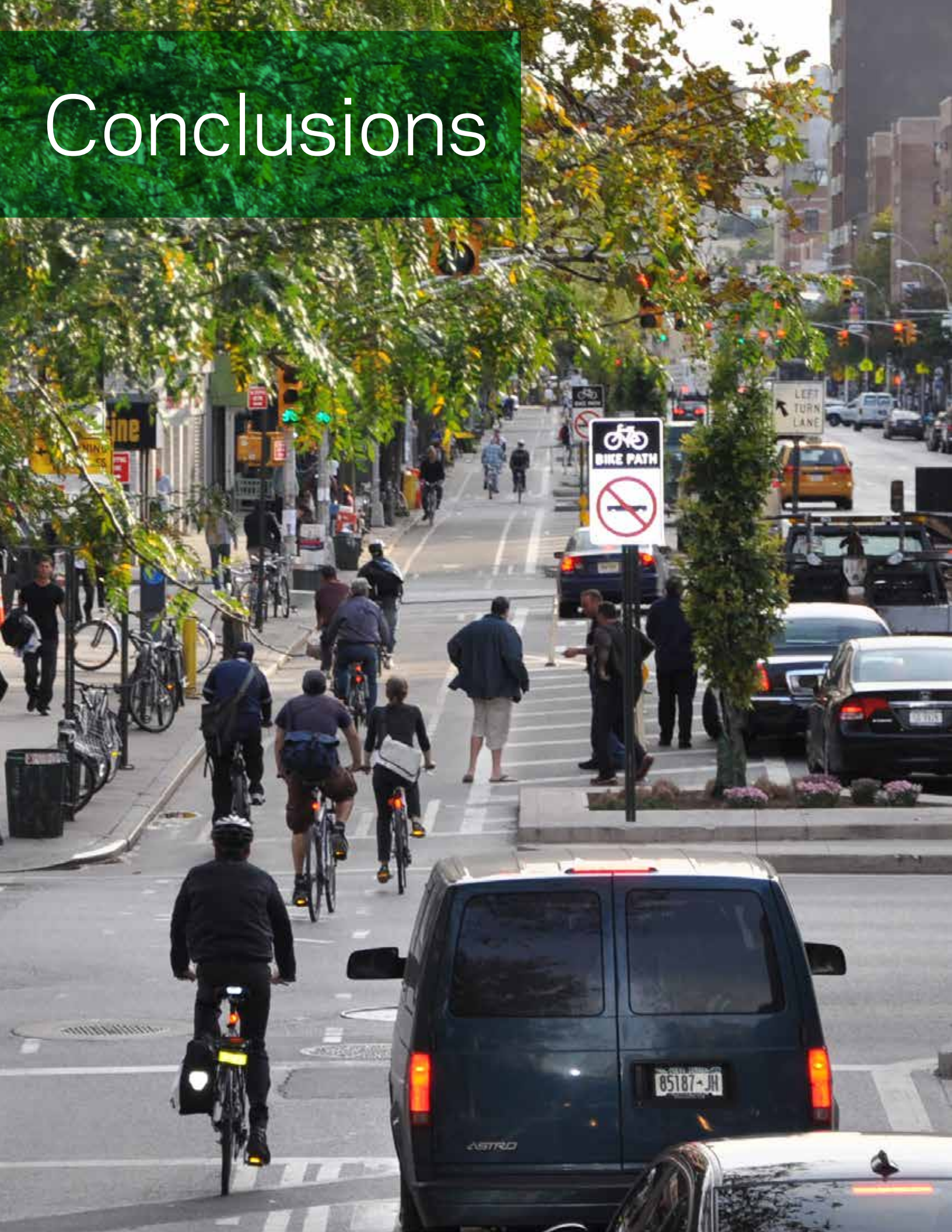
Summary:

Providing another example of the success of a Complete Street approach to street improvements, this segment of Ninth Avenue experienced economic success above and beyond the borough and all comparison sites. Parking protected bike lanes, enhanced streetscape, pedestrian safety and improved traffic flow were all achieved along this corridor, and economic vitality was also improved.

Combined Sales : Improvement Sites vs. Comparisons Sites - Ninth Avenue



Conclusions



Conclusions

Based on New York City DOT and Bennett Midland's study, it is now possible to document the impacts of changes to the street environment on surrounding locally-based retail businesses in a rigorous and compelling way, expanding the range of metrics that government agencies as well as communities have at their disposal to measure the success of these projects. This does not mean that all projects will show economic benefits, just as not all projects improve the operations of a particular mode or improve all measures of safety.

Being able to demonstrate the potential economic benefits of better-designed streets can be a powerful tool for several critical reasons:

- Data on business impacts can now be used for project evaluation (identifying project impacts), joining other metrics that transportation agencies such as DOT have been publishing. It can help address the concerns of local residents and business owners about the impact of projects on businesses, replacing anecdote or personal experience with comprehensive data.

- By providing a broader understanding of potential project benefits, the data has the potential to activate the business community in support of appropriately designed and effective street improvement projects.

- Empirical results allow cities to link street design more closely with economic development, just as cities are beginning to link street design with public health (through the Active Design movement) and environmental health.

Contingent on a proper methodology – appropriate project and comparison site definitions; reliable and properly cleaned tax filing data – this type of study can provide a powerful, quantitative picture of the relationship between changes in street design and local retail sales, something that has been absent from the toolbox of transportation agencies. Pairing before-and-after retail data with quantitative or qualitative data on the actual shopping patterns of street users (e.g. the number of trips, trip mode and amount spent by retail patrons), such as through an intercept surveys of shoppers, could create an even stronger causal link and therefore an even more compelling explanation of this relationship. Undertaking such studies across several different neighborhood types and project types is therefore recommended as an area for further research that could further strengthen the state of the practice.

It is important to note that based on the analysis presented here, the contribution that 21st-Century streets can make to local economies applies just as much to lower-income neighborhoods with "mom & pop" retail as to glitzier areas with sky-high rents. Better streets provide benefits to businesses in all types of neighborhoods, from the central business district to modest retail strips in residential areas. This insight can help policymakers and designers integrate the measures described in this report into the toolbox for local economic development, capturing more spending in neighborhoods, and growing jobs.

Planning, budgeting and engineering decisions are only as good as the data they are based on. In order to continually refine and enhance the strategies they employ, cities must gain a clearer understanding of the efficacy and value of their projects by measuring the full range of outcomes. It is clear that rolling out safer, more inviting and sustainable streets is rarely detrimental to local businesses and in the great majority of cases can be a boon to them. New York City DOT believes that this study offers a significant contribution in the U.S. and around the world to the advancement of a 21st-Century approach to urban street design that recognizes the full range of not only transportation benefits but also economic development benefits that can be provided.

Works Cited

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