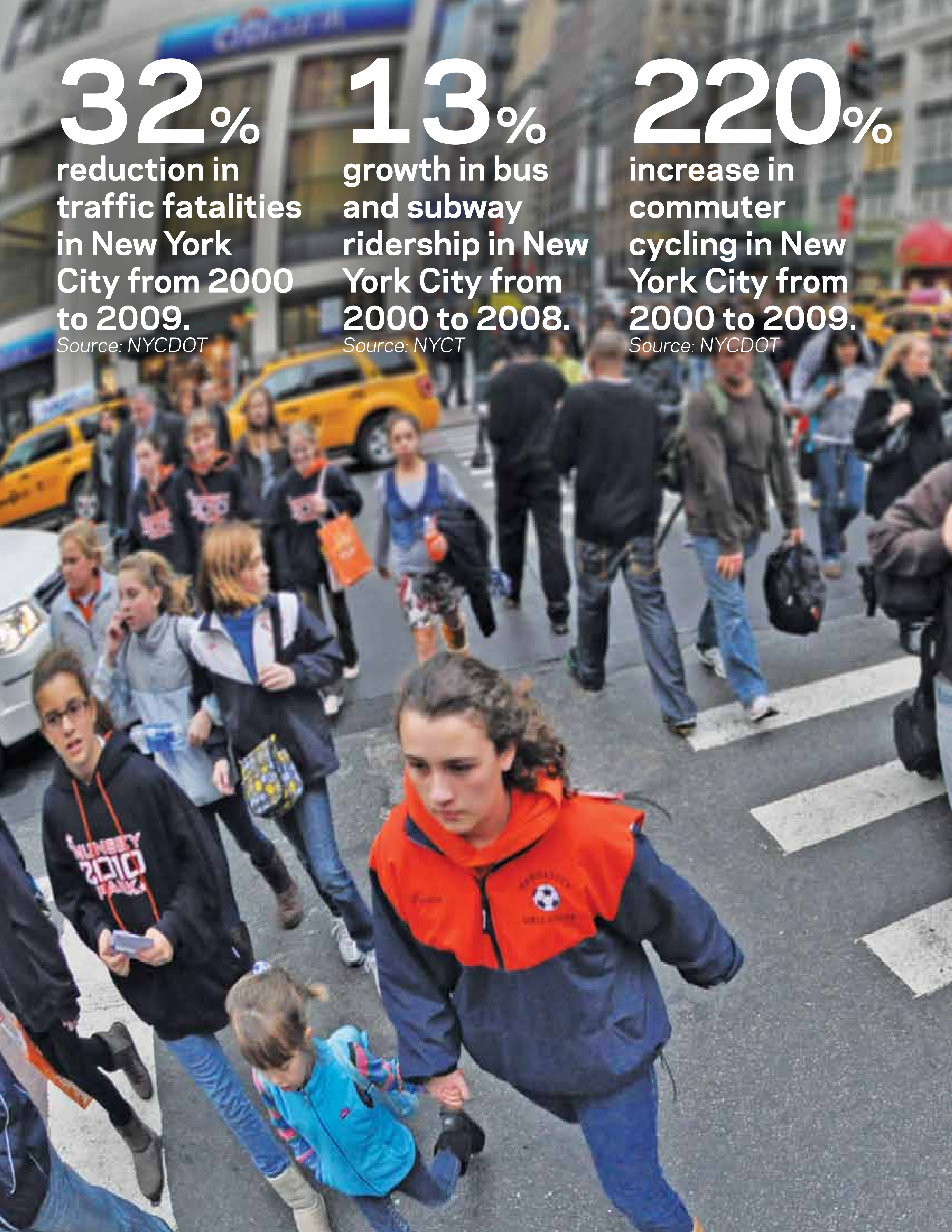
2009 Sustainable Streets Index

New York City Department of Transportation



32%
reduction in traffic fatalities in New York City from 2000 to 2009.
Source: NYCDOT

13%
growth in bus and subway ridership in New York City from 2000 to 2008.
Source: NYCT

220%
increase in commuter cycling in New York City from 2000 to 2009.
Source: NYCDOT

6% reduction in motor vehicle registrations in New York City from 2000 to 2008.
Source: NYSDMV

3% decline in citywide traffic volumes from 2000 to 2008.
Source: NYCDOT

13% increase in traffic speeds in the Manhattan central business district from fall 2007 to fall 2009.
Source: NYCDOT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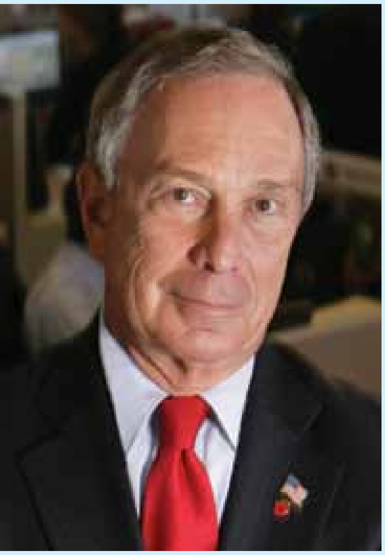


Dear Friends:

Our administration's aim in developing PlaNYC 2030 was to create a blueprint for modernizing and improving New York City's physical infrastructure. It included mechanisms for measuring our progress toward dozens of goals whose realization will create a better city for New Yorkers and ensure our capacity for economic growth in future decades.

In this regard, PlaNYC is much more than a new way of looking at city government. City agencies have long tracked their own work and efficiency, and that emphasis has intensified under our administration. The New York City Department of Transportation, for instance, closely measures pavement and bridge conditions, on-time performance of the Staten Island Ferry, response times to calls for repair and dozens of internal indicators.

Now we are much more intensively tracking the broader conditions that affect the city's long term well-being, in areas such as city-wide energy use and greenhouse gas emissions, and local air quality conditions. The NYCDOT's *Sustainable Streets Index* is a critical part of this effort. It provides the city's transportation system with an annual check-up so that we can see where and how to adjust the emphasis of city policy.

The first *Sustainable Streets Index* confirmed that our public transit systems had largely accommodated the growth in travel caused by New York City's dramatic population and economic expansion during the 1990s and 2000s. That finding reinforces PlaNYC's case that we must expand our public transit capacity if our city is to thrive in the future.

This second edition emphasizes the capabilities of the technological improvements that we are increasingly embedding into the fabric of the city itself. Specifically, the global positioning system devices that have been installed in medallion taxicabs beginning in 2007 are providing millions of records per month of traffic conditions in the Manhattan central business district. Because the data reflect actual trips in the city, and the number of records we receive is truly enormous, it far exceeds the accuracy of traffic measurements in the past, and we are thus able to compile the most comprehensive picture of traffic speeds ever developed for a large business district. Who knew, for example, that September 28 is the best traffic day of the year?

With this and the other measurements that DOT has developed for this *Index*, we have put the city's transportation system on an objective, performance-based footing. This is one more essential step to unlocking the potential for a greater, greener New York.

Sincerely,

Michael R Bloomberg

Michael R. Bloomberg
Mayor

Letter from the Commissioner

Dear New York City Council Members and fellow New Yorkers:

New York City is moving steadily toward a more sustainable transportation system that enhances safety, mobility and quality of life for residents, workers and visitors.

As documented in this report, over the last eight years more people are traveling by bus, subway and bike. Improvements in these networks have attracted people from automobile use, with the result that for the first time since record-keeping began, traffic volumes citywide have leveled off and even declined. The result is less congestion and better mobility.

In June 2008, Mayor Michael Bloomberg signed Intro 199, establishing Local Law 23. It established the *Sustainable Streets Index* as the primary mechanism by which the Department of Transportation tracks and documents improvements in New York City's transportation system.

Together with the NYCDOT's Sustainable Streets strategic plan, which sets and measures progress toward dozens of agency benchmarks, the *Sustainable Streets Index* marks the implementation of a performance-driven transportation policy in New York City, geared specifically toward attaining the sustainability, mobility, infrastructure and quality of life goals set forth in Mayor Bloomberg's PlaNYC 2030 initiative.

In addition to charting recent trends in Manhattan central business district traffic speeds based on data derived from global positioning systems in taxicabs, this second edition of the Sustainable Streets Index adds performance indicators for a dozen recent street and operational projects.

These projects reflect the full gamut of DOT priorities: safety; bus mobility, pedestrian and bicycle accommodation; congestion reduction and parking improvements. The profiles describe how DOT developed each project in consultation with stakeholders, and quantifies how each change in street design and operations have improved the safety and livability of these streets.

We will use the findings of the *Sustainable Streets Index* to continually update and fine-tune our policies and practices as we pursue our mission to provide New Yorkers with the best, safest big-city transportation system in the world.

Sincerely,

Janette Sadik-Khan
Commissioner

Executive Summary

From 2003 to 2007, rising levels of mass transit ridership and bicycle commuting accompanied population and job growth in New York City, while vehicle traffic levels were essentially unchanged. This was the first period since the Second World War that non-auto modes fully absorbed all growth in travel in the city, producing a period of fully transit-centered economic and population growth.

The trend toward a more transit-centered transportation system continued in 2008. Citywide, mass transit ridership increased at a healthy pace in 2008, while traffic levels showed the largest decline in at least 15 years. The pattern was similar for travel into the Manhattan Central Business District (CBD), south of 60th Street to the Battery. Transit ridership and bicycling commuting into the CBD increased, while traffic levels experienced the largest decline in over 30 years aside from the fall-off due to post-9/11 traffic restrictions.

These results for 2008, coming as the city entered the current recession, continue the shift toward sustainable modes of transportation that was seen during the preceding years of economic growth.

More recent data suggest that while transportation patterns were significantly affected by the recession in 2009, there is no evidence of a shift back toward increased auto use. Both mass transit ridership and traffic volumes at tolled bridges and tunnels declined in 2009, while bicycle commuting increased rapidly to reach a record high.

Declines in traffic in the CBD in 2008 and 2009 produced improvements in traffic speeds. Data from taxi Global Positioning Systems (GPS) readings show significant increases in traffic speeds in fall 2008 and spring 2009. The rate of improvement continued although at a lesser rate in fall 2009.

Key findings for traffic and transit trends are:

- Citywide traffic volumes declined 2.0% in 2008, and a total of 3.4% since 2003.
- Traffic entering the Manhattan CBD dropped 3.7% in 2008 and is down 6.9% since 2003.
- Citywide bus and subway ridership increased 3.2% in 2008, for a total increase of 12.3% since 2003.
- Cycling volumes into the Manhattan core increased 32% in 2008 and 26% in 2009, and have more than doubled since 2003.
- Daytime traffic speeds in the Manhattan CBD increased by 8% from fall 2007 to fall 2008, and an additional 4% from fall 2008 to fall 2009. In total, traffic speeds increased by 13% from fall 2007 to fall 2009.
- Between 8 a.m. and 6 p.m., Manhattan CBD traffic averaged 9.1 m.p.h. in the 12 months ending in October 2009.

Overall, these broad transportation performance indicators show a continued strengthening of sustainable modes of transportation, including bus, subway, bicycling and walking.

Moving from a broad macro perspective to a street-level view, performance indicators for DOT street design projects show that these projects are serving the larger goals of safety and sustainability. DOT street redesigns, including changes to traffic regulations, traffic signal operations and parking regulations and addition of bike, bus and pedestrian facilities, have reduced injuries from motor vehicle crashes, sped up bus service, reduced congestion and enhanced the ease and attractiveness of walking and cycling.

Key findings for project performance indicators for a dozen DOT projects completed by the end of 2008 are:

- 77% reduction in total crashes involving injuries at Park Avenue and E. 33rd Street from changes made to traffic patterns in the area.
- 45% reduction in vehicle delays at the Tillary and Adams Streets approach to the Brooklyn Bridge, from signal retimings and turn restrictions.
- 32% increase in ridership on the Fordham Road Select Bus Service (SBS) bus compared with the limited bus that it replaced.
- 19% increase in bus speeds on Fordham Road in the Bronx and 17% increase on 34th Street in Manhattan from the SBS program. The typical commuter on Fordham Road gains two days annually from the time savings.
- 18% reduction in average traffic speeds between 9 a.m. and noon along Skillman and 43rd Avenues in Sunnyside, Queens.
- 16% improvement in bus travel times during morning peak period along Victory Boulevard.
- Six percentage point improvement in weekday parking availability from the Greenwich Village PARK Smart pilot program.
- Five-fold increase in cycling on the new Jewel Avenue bike lane in Queens.
- 15,000 sq. ft. of new pedestrian plaza and bicycle lanes in the Bronx Hub.

Both citywide data and program indicators demonstrate that New York City's progress toward a safer and more sustainable transportation system has withstood the current recession. This progress also positions the city to accommodate renewed job growth and enhance New Yorkers' quality of life as the economy recovers.

Introduction

After the Second World War, car ownership and use increased rapidly across the country. To deal with growing traffic congestion, cities, counties and states instituted an array of measures to expand the traffic-handling capacity of streets and highways. Increases in traffic capacity were soon matched, however, by rising traffic levels.

These trends affected New York City as well as the rest of the United States. Between the late 1940s and the end of the Twentieth Century, the number of motor vehicles entering the Manhattan business district on an average weekday more than doubled. During the same period, bus and subway ridership fell sharply, while traffic congestion continued as a chronic problem in New York City as in other major U.S. urban areas.

Accounting for one-third of person trips in the city, the auto is important to mobility needs and the city's economy. To achieve safety and sustainability goals and accommodate a growing population and future job growth, however, the use of street space for cars needs to be balanced with the needs of other modes.

These goals are best accomplished by making sustainable, high-efficiency means of transportation—walking, cycling and mass transit—faster, safer, more convenient and more reliable. The City's progress in this regard can be seen in the citywide statistics showing that sustainable modes have accounted for all the growth in travel in New York City since 2003. The progress is also visible in double-digit ridership growth on expanded and enhanced bus service and new bike lanes; and in newly opened public plazas that quickly fill with people.

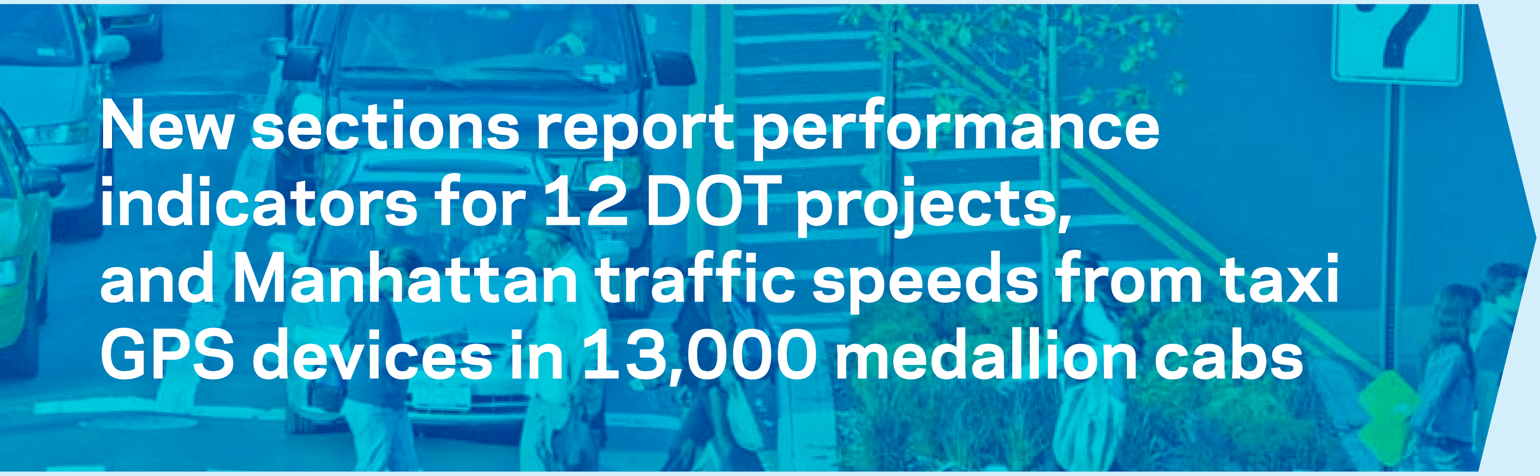
Designs for these initiatives are guided by the vision of PlaNYC, the City's sustainability plan for 2030, and NYCDOT's *Sustainable Streets* strategic plan. But vision is not enough. Changing the way streets operate must include a critically important process of testing and refinement of new designs. This report includes performance indicators for 12 projects

covering the gamut of DOT street initiatives—traffic safety and calming; congestion reduction; pedestrian, bus and bicycle enhancements; and parking and truck regulation. The results show each project's impacts on a range of performance metrics including safety, usage, traffic volumes and travel speeds. The profiles provide transparency about the agency's progress toward the vision of PlaNYC and *Sustainable Streets*, and an opportunity for DOT to share project experience with the public.

The project indicators are one of two new sections in this second annual *Sustainable Streets Index*. The other new section reports on traffic speeds in the Manhattan business district, utilizing a new, comprehensive source of traffic speed data. Traffic speeds are based on GPS (global positioning system) devices that have been installed in each of the 13,000 New York City medallion taxicabs.

This report also updates data on mobility and travel choices that was presented in last year's *Sustainable Streets Index*. This section brings together data on motor vehicle, transit, bicycle and ferry use, showing how travelers are changing the ways they travel in the face of population and employment growth that occurred through most of 2008 and changes in transportation systems and operations.

DOT has also collected baseline data for a new Citywide Traffic Index (CTI). The CTI will combine existing and new traffic data counts to more precisely capture changes in travel patterns in the city. The first CTI results will be published in the next report.



New sections report performance indicators for 12 DOT projects, and Manhattan traffic speeds from taxi GPS devices in 13,000 medallion cabs

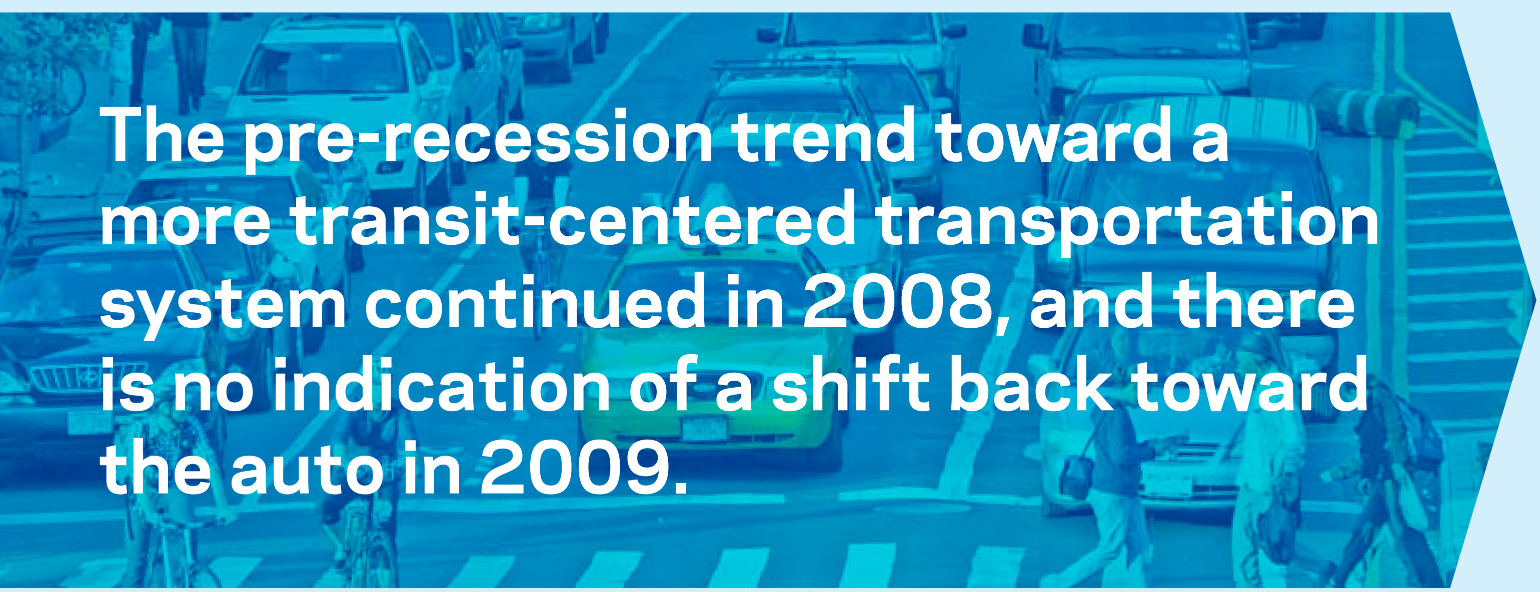
Traffic and Transit Trends

From 2003 to 2007, rising levels of mass transit ridership and bicycle commuting accompanied population and job growth in New York City, while vehicle traffic levels were essentially unchanged. The trend toward a more transit-centered transportation system continued in 2008. Bus and subway ridership increased by 3.2% in 2008, even with the onset of the recession, while citywide traffic levels declined by 2.0%. The rapid growth in cycling continued in 2008 with a 32% increase in commuter cycling into the Manhattan core compared with the previous year.

These results for 2008, coming as the city entered the current recession, continue the shift toward sustainable modes of transportation that was seen during the preceding years of economic growth. The continued growth of transit ridership and cycling, even as traffic volumes declined, indicates that the shift toward sustainable modes is not dependent on economic growth. Instead, this shift has been produced by the long-term investment in the transit infrastructure and rapid expansion of the bicycle network, both of which have attracted growing numbers of New Yorkers during the start of the recession as well as the earlier period.

More recent data suggest that while transportation patterns were significantly affected by the recession in 2009, there is no evidence of a shift back toward the auto. Transit ridership, which began to decline in early 2009, fell by 2.6% from 2008 to 2009. While comprehensive traffic data are not yet available for 2009, declines in traffic at tolled bridges and tunnels suggests that overall traffic levels fell at a rate not markedly different from the drop in transit ridership in 2009. Bicycle commuting continued to grow rapidly, with a 26% increase from 2008 to 2009.

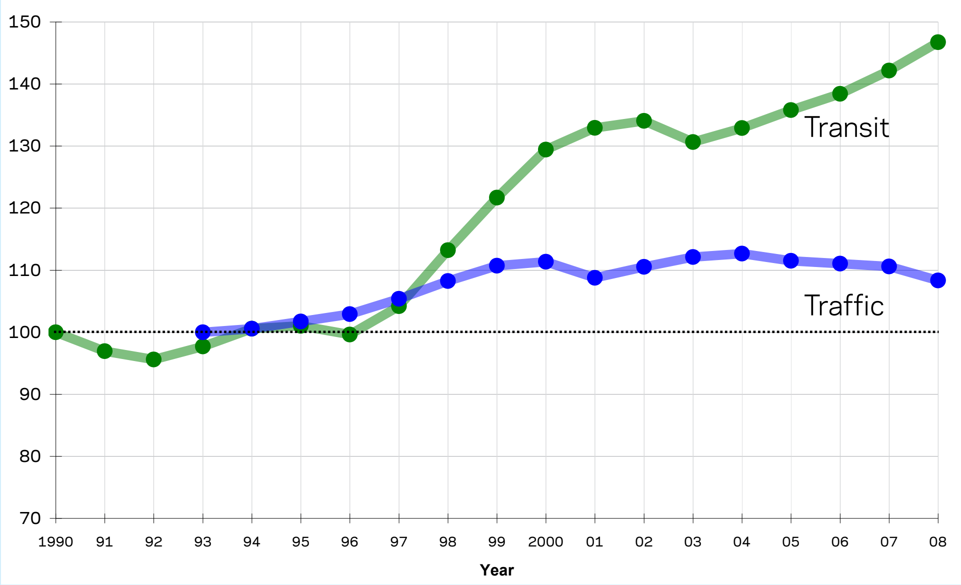
These results show that at a citywide level, regional transportation policy decisions made over the last three decades—to rebuild and expand the transit network, to build a quality cycling network, and to manage traffic demand by shifting as many drivers as possible to higher-performance modes—have had a measurable impact on the way New Yorkers choose to travel, through good and bad economic times.



The pre-recession trend toward a more transit-centered transportation system continued in 2008, and there is no indication of a shift back toward the auto in 2009.

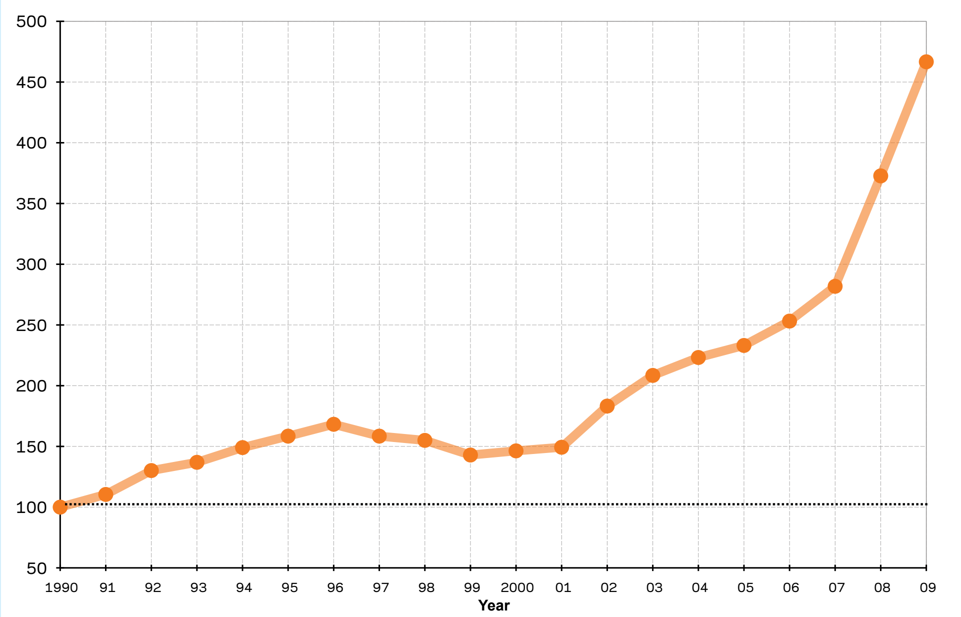
- 3.2% increase in bus and subway ridership in 2008
- 12.3% increase in bus and subway ridership since 2003
- 2.0% decline in weekday traffic volumes in 2008
- 3.4% decline in weekday traffic volumes since 2003

Citywide Transit and Traffic
(Traffic indexed to 1993/Transit indexed to 1990)



- 32% increase in bicycle commuting into the Manhattan core from 2007 to 2008
- Additional 26% increase in bicycle commuting from 2008 to 2009
- 126% increase in bicycle commuting since 2003

Bicycle Commuting *(Indexed to 1990)*



Citywide trends in traffic and transit were also seen for travel into the Manhattan Central Business District (CBD), the area from south of 60th Street to the Battery. Transit ridership into the CBD continued to grow in 2008, although at a slower rate than from 2003 to 2007. The only significant growth in CBD-bound transit ridership came from people crossing 60th Street. The number of transit riders crossing the Hudson and East Rivers into the CBD was practically unchanged in 2008 compared with 2007.

Traffic entering the CBD, which had declined from 2003 to 2007, fell by 3.7% in 2008. Prior to 2008, declines in CBD-bound traffic were concentrated at 60th Street. In 2008, however, traffic declined at both 60th Street (down 3.4%) and from Brooklyn (down 6.3%). These are the CBD points of entry with the most extensive mass transit alternatives. Traffic levels from Queens and New Jersey also fell, but only marginally.

Overall, traffic volumes into the CBD were nearly identical in 2008 as in 1990 while transit ridership into the CBD was 26% higher.

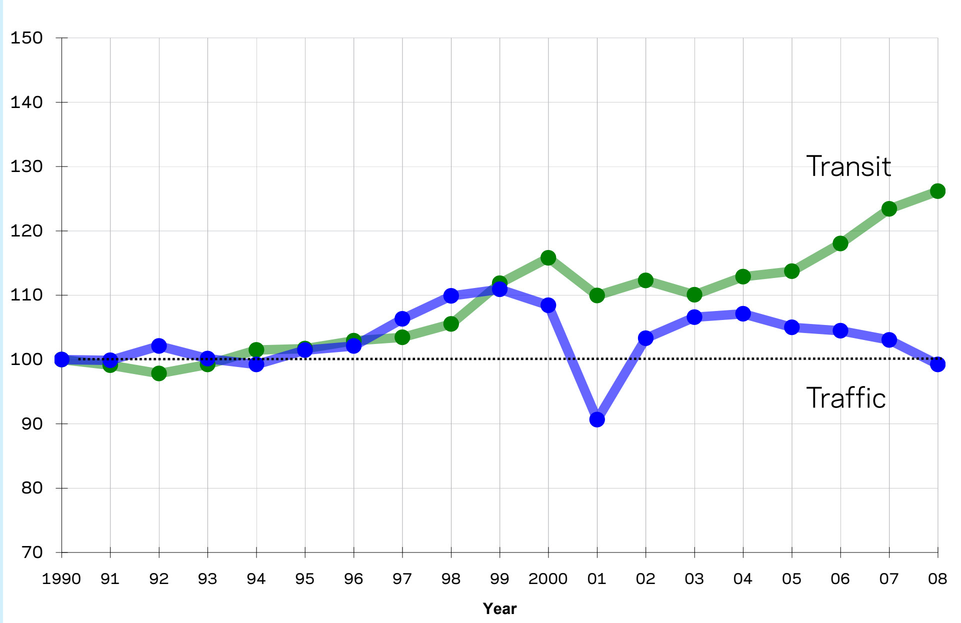
Traffic levels outside the CBD fell by 1.7% in 2008, the largest decline on record. Areas that had still been experiencing traffic growth in recent years, contrary to citywide trends (such as the Bronx-Westchester border) saw traffic decline in 2008.

Bus ridership is up 3.2% citywide, but ridership trends vary by borough. Between 2007 and 2008 there was a small increase in ridership on Staten Island and more significant increases in the Bronx and Queens. These are likely due to the improvements to service in these two boroughs. In the Bronx, patronage of the borough's highest ridership route—the Bx12—increased as a result of new Select Bus Service implemented in June 2008. The increase in Queens is likely the result of the MTA Bus Company's continued improvements to service on the formerly franchised lines.

The full impact of the recession remains to be seen. Next year's report, which will present complete data for 2009, will show how traffic and transit demand has changed since fall 2008.

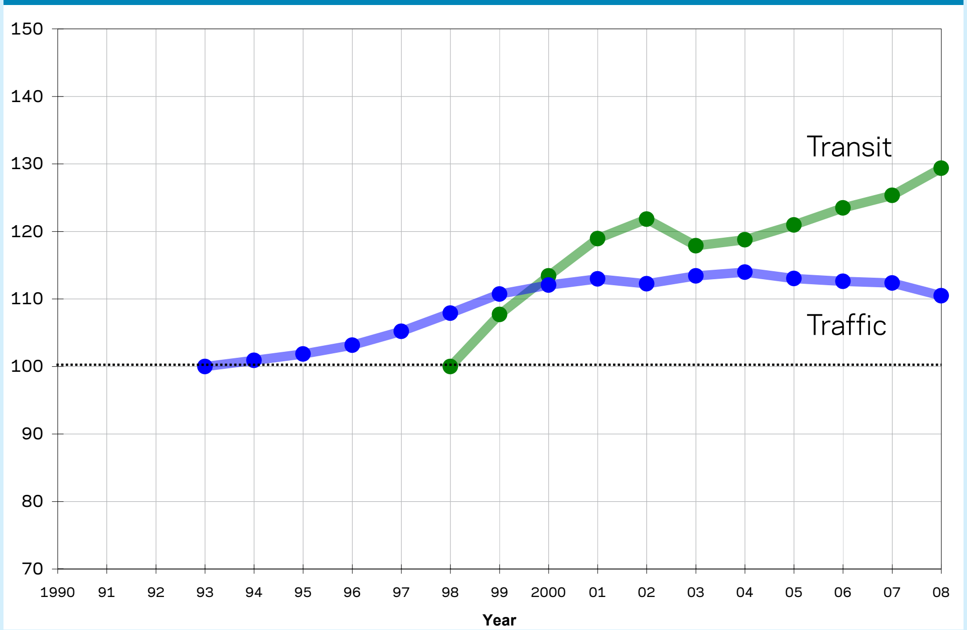
- **2.2% increase in transit (bus and subway) ridership in 2008.**
- **14.6% increase in transit ridership since 2003.**
- **3.7% decrease in traffic volumes into the CBD in 2008.**
- **6.9% decrease in traffic volumes since 2003.**

Transit and Traffic into the CBD *(Indexed to 1990)*



- **3.2% increase in bus ridership outside the CBD in 2008.**
- **9.7% increase in bus ridership outside the CBD since 2003.**
- **1.7% decrease in traffic volumes outside the CBD in 2008.**
- **2.6% decrease in traffic volumes since 2003.**

Transit and Traffic Outside the CBD
(Traffic indexed to 1993/Transit indexed to 1998)



Manhattan Traffic Speeds

In 2004, the New York City Taxi and Limousine Commission (TLC) began the Taxicab Passenger Enhancements Project (T-PEP) to enhance customer service for taxicab passengers through state of the art technology improvements to yellow medallion taxicabs. As a result of this initiative, all yellow taxicabs are now equipped with Global Positioning Systems (GPS), equipment to accept credit card payments and passenger information monitors. Installation of this equipment began in 2007 and was completed by December 2008.

The T-PEP system creates "electronic trip sheets" for each taxicab on a 24/7 basis. The electronic trip sheet records the time and location of trip origin and trip destination, time elapsed, distance traveled, and fare. The system records approximately 13 million trips per month. TLC shares this data with DOT for traffic analysis purposes. DOT is using aggregated trip sheet data to study travel patterns and analyze vehicle traffic speeds to support agency policymaking and operations. Usable amounts of data are available from fall 2007 to the present.

These taxi speed data are based on the distance and duration of the entire trip for customer-carrying taxi rides. Speeds reflect both time in motion and time spent stopped in traffic or at red lights. Results are for trips that start and end within a given geographic area, e.g., the Manhattan Central Business District (CBD) or Midtown Manhattan.

The taxi GPS dataset provides the first comprehensive view of network-wide traffic speeds in Manhattan. The data can be used to track shifts in traffic speeds across time (from year to year, from day to day, or from hour to hour within the typical day), and for trips in different geographic areas. Initial findings from the data are:

Year-to-year trends

- For weekday trips between 8 a.m. and 6 p.m., traffic speeds in the Manhattan CBD increased by 13% from fall 2007 to fall 2009. The larger portion of this increase occurred between fall 2007 and fall 2008, which showed an 8% increase in speeds. Speeds increased by an additional 4% from fall 2008 to fall 2009.
- For trips between 8 a.m. and 6 p.m. in Midtown Manhattan (23rd Street to 59th Street, river to river), speeds increased by 18% between fall 2007 and fall 2009.

Daytime average speeds

- Weekday speeds average 9.1 m.p.h. for CBD trips between 8 a.m. and 6 p.m., and 9.5 m.p.h. for CBD trips between 6 a.m. and 6 p.m., for the 12 months ending in October 2009.

Hour-to-hour trends

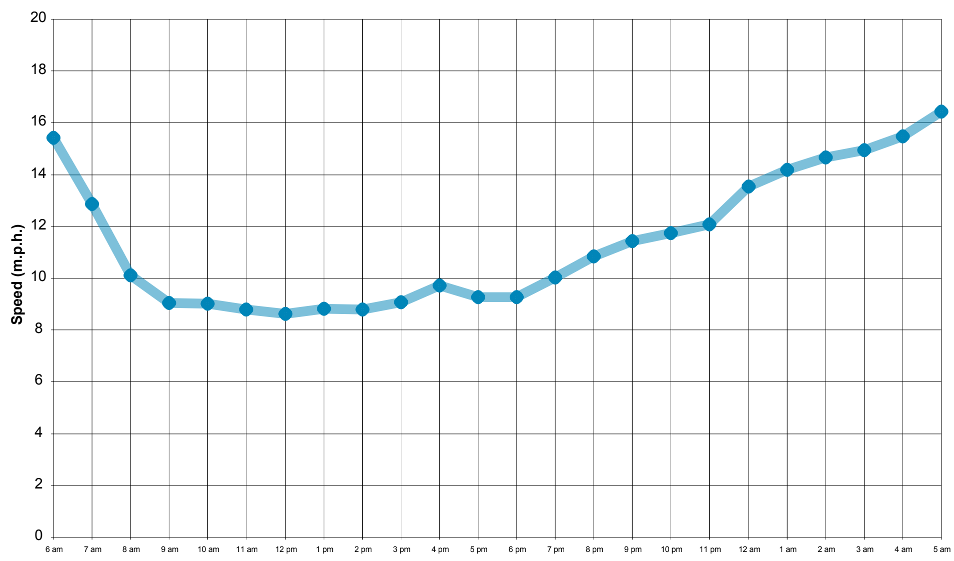
- Within the CBD, weekday traffic speeds peak at 16 m.p.h. for 5-6 a.m.
- Speeds decline quickly after 6 a.m., reaching 10 m.p.h. for 8-9 a.m.
- Speeds average 9-10 m.p.h. from 8 a.m. to 7 p.m. Notably, there is little difference in traffic speeds midday compared with the traditional morning and evening rush hours. The "flat" nature of the speed curve reflects the high level of commercial activity on Manhattan streets during the business day.
- After 7 p.m., speeds rise slowly toward the overnight peak.

Geographic patterns

- Within the Manhattan CBD, weekday speeds are slowest in the heart of Midtown (between Fifth and Ninth Avenues from 23rd to 59th Streets). Traffic moves faster in Lower Manhattan and in the "Valley" between Canal and 14th Streets.
- Within Midtown, traffic moves faster east of Fifth Avenue than west of Fifth Avenue.
- The only part of the CBD where taxi speeds do not increase significantly after midnight is the "Valley" between Canal and 14th Streets. This may be due to a high volume of trips to and from bars and restaurants in this area, and to the fact that the average midday and rush hour speeds are much closer to free-flow traffic speeds than those seen in Midtown and Lower Manhattan.

- CBD traffic is fastest in the early morning hours, reaching 16 m.p.h. from 5-6 a.m.
- CBD traffic speeds drop to about 9 m.p.h. from 8-9 a.m.
- Speeds average 9 m.p.h. from 9 a.m. to 4 p.m. and rise slightly from 4-7 p.m.
- Speeds increase after 7 p.m.

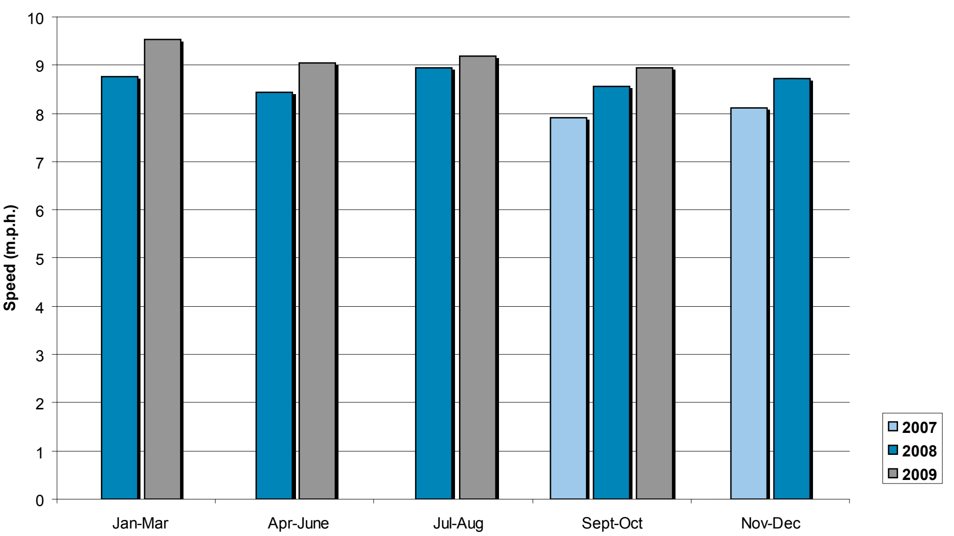
Weekday Taxi Speeds by Time of Day in CBD



Data for November 2008 to October 2009

- 8% increase in CBD traffic speeds from fall 2007 to fall 2008
- 4% increase in speeds from fall 2008 to fall 2009
- 7% increase in speeds from spring 2008 to spring 2009
- 3% increase in speeds from summer 2008 to summer 2009

Weekday Taxi Speeds from 8am-6pm



Manhattan Traffic Speeds Day By Day

JANUARY						
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31						

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30	31					

OCTOBER						
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25	26	27	28	29	30	31

NOVEMBER*						
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30						

MARCH

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29	30	31				

JUNE

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28	29	30				

SEPTEMBER

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20	21	22	23	24	25	26
27	28	29	30			

DECEMBER*

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14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

This calendar shows average daily speeds in the Manhattan Central Business District (south of 60th Street, river to river), 6 a.m. to 6 p.m.

Key:

The 25 fastest days (average speed between 13.73 m.p.h. and 11.80 m.p.h.). Most occur on major holidays or on Sundays in January or July.

The next 75 fastest days (average daily speed between 11.79 and 10.63 m.p.h.). Most occur on weekends, or immediately before or after holidays, especially early in the year.

Between the 100 fastest days and 100 slowest days are the 165 days with average daily speeds between 10.62 and 9.33 m.p.h. Most are weekdays, though most Saturdays in the last quarter of the year also fall into this group.

The next 75 slowest days (9.32 to 8.76 m.p.h.). Most are mid-week weekdays scattered throughout the year, with visible blocks in the spring and late in the year

The 25 slowest days (8.75 to 7.49 m.p.h.). Most occur in the latter part of the year and all are weekdays. The heaviest concentration is in late September during the United Nations General Assembly.

2009 Holidays

January	New Year's Day (1) Martin Luther King Jr. Day (19)
February	President's Day (16)
April	Easter Sunday (12)
May	Memorial Day (25)
July	Independence Day Observed (3)
September	Labor Day (7)
October	Columbus Day (12)
November*	Veteran's Day (11) Thanksgiving (27)
December*	Christmas Day (25)

The fastest weekday not affected by a holiday was Monday, September 28, which at 11.7 m.p.h. ranks overall as the 27th fastest day of the year. The slowest weekday was Thursday, November 13, which at 7.5 m.p.h. was also the slowest day of the year. The non-holiday weekday with the median speed was Friday, May 8, which at 9.50 m.p.h. ranks as the most average of average days for Manhattan CBD traffic.

* Note: Data are for January to October 2009 and November-December 2008.


Safety
1. Park Avenue Tunnel at 33rd Street
2. Jewel Avenue and 164th Street
3. Bridge Strike Mitigation *
Transit Mobility Improvements
4. Fordham Road SBS
5. 34th Street SBS
6. Victory Boulevard - Transit Signal Priority
Pedestrian, Bicycle and Traffic Calming
7. Bronx Hub Multi-Modal Improvements
8. Vanderbilt Avenue
9. Skillman and 43rd Avenues – Sunnyside Connector
Congestion Reduction
10. Tillary and Adams Streets – Downtown Brooklyn Gateway
11. Right Turn on Red **
Parking
12. PARK Smart
4
7
5
1
9
12
2
10
8
6
3 *
11 **
* Citywide
** Throughout Staten Island

Project Indicators

To fulfill provisions of Local Law 23 of 2008 (Intro 199), this section reports performance indicators for major roadway projects involving "changes in street operations, such as lane reapportionments, lane reconfigurations, significant adjustments in traffic and parking regulations and changes in traffic signal timing." The performance indicators are formulated to assess the effectiveness of DOT projects in encouraging more sustainable means of transportation.

This section reports on 12 major DOT projects that were implemented by the end of 2008. In each case, DOT collected before and after performance indicators. In line with project goals, the indicators measure safety, usage levels for motor vehicles, cyclists, pedestrians and bus riders and/or travel times through the project area.

The 12 projects selected for evaluation reflect the multimodal character of DOT's projects. They include safety; pedestrian, bus and bicycle enhancements; traffic calming; congestion reduction; and parking and truck regulation. The projects are distributed throughout the five boroughs, and reflect a range of conditions from the dense Manhattan core to streets in low-rise Queens and Staten Island neighborhoods.

The projects also illustrate a range of different design approaches. Projects like the Bronx Hub include "normalization" of intersections in which roadways converged at non-right angles. Lining up the approaches to meet at a right angle improves safety and reduces confusion for drivers, pedestrians and other users such as cyclists.

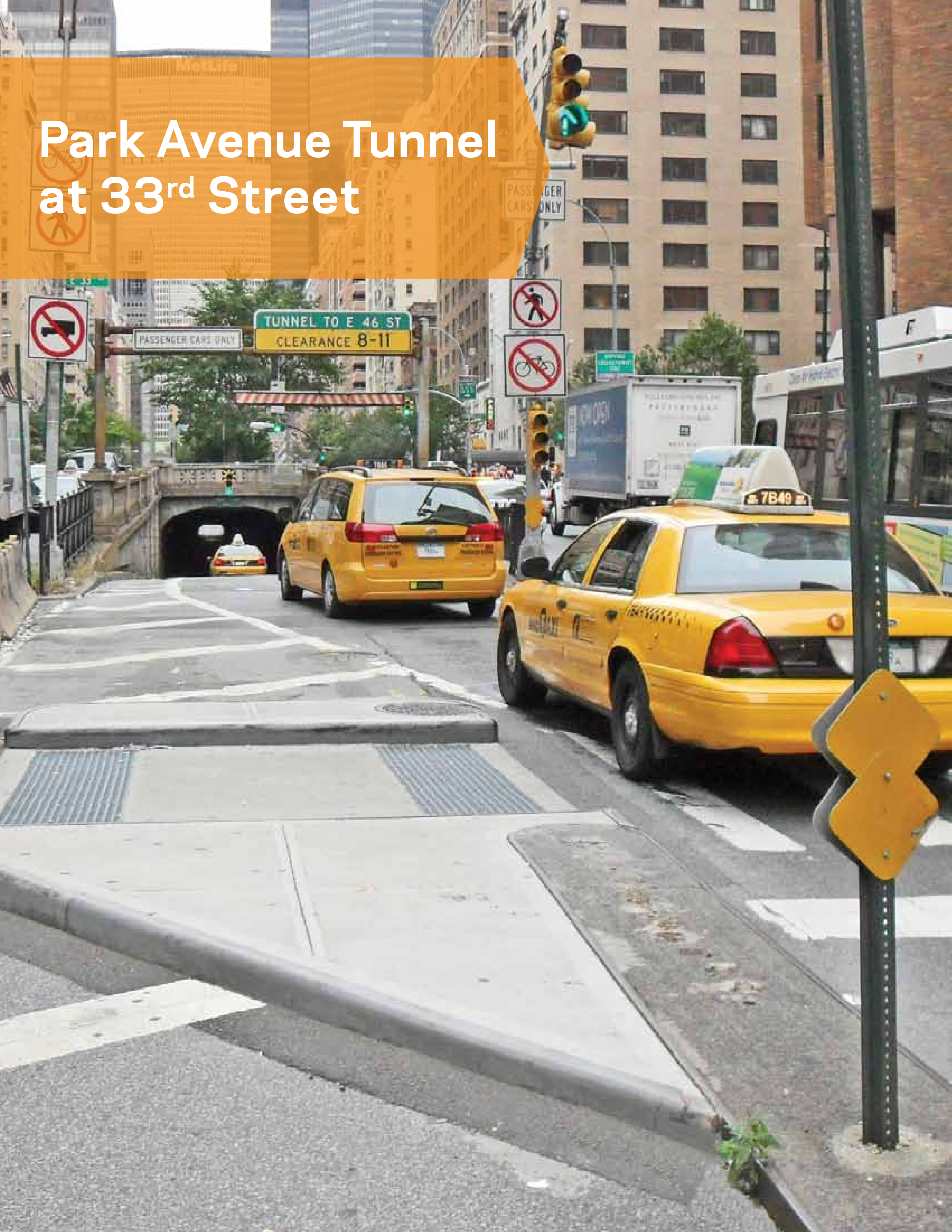
Other projects improve the operation of a street by modifying traffic signal timing or phasing. On Skillman Avenue in Sunnyside, Queens, DOT changed the progressions of the signals to discourage speeding. Signal changes can also increase the amount of time that pedestrians are given during the "Walk" signal, and give priority treatment to buses, as with transit signal priority on Victory Boulevard in Staten Island and the dedicated left turn signal for buses turning left from W. 34th Street onto Seventh Avenue.

Goals can often be accomplished simply by changing the thermoplastic markings that delineate travel lanes and crosswalks. Installation of bus lanes and bike lanes are examples of enhancing the network for these sustainable forms of transportation. Another approach is to alter parking regulations. In the PARK Smart pilot in Greenwich Village, DOT adjusted meter rates to encourage turnover of parking spaces, thus enabling more people to park in a given space for the purpose of shopping, going to medical appointments and the like.

These different strategies have proven effective singly, or more often, in combination. Highlights from the project performance indicators are:

- 77% reduction in total crashes involving injuries at Park Avenue and E. 33rd Street from changes made to traffic patterns in the area.
- 45% reduction in vehicle delays at the Tillary and Adams Streets approach to the Brooklyn Bridge, from signal retimings and turn restrictions.
- 32% increase in weekday ridership on the Fordham Road Select Bus Service (SBS) bus compared with the limited bus that it replaced.
- 19% increase in bus speeds on Fordham Road in the Bronx and 17% increase on 34th Street in Manhattan from the SBS program. The typical commuter on Fordham Road gains two days annually from the time savings.
- 18% reduction in average traffic speeds between 9 a.m. and noon along Skillman and 43rd Avenues in Sunnyside, Queens.
- 16% improvement in bus travel times during morning peak period along Victory Boulevard.
- Six percentage point improvement in weekday parking availability from the Greenwich Village PARK Smart pilot program.
- Five-fold increase in cycling on the new Jewel Avenue bike lane in Queens.
- 15,000 sq. ft. of new pedestrian plaza and bike lanes in the Bronx Hub.

Park Avenue Tunnel at 33rd Street



Purpose

- Improve pedestrian safety
- Make intersection more predictable for pedestrians and drivers

Outreach

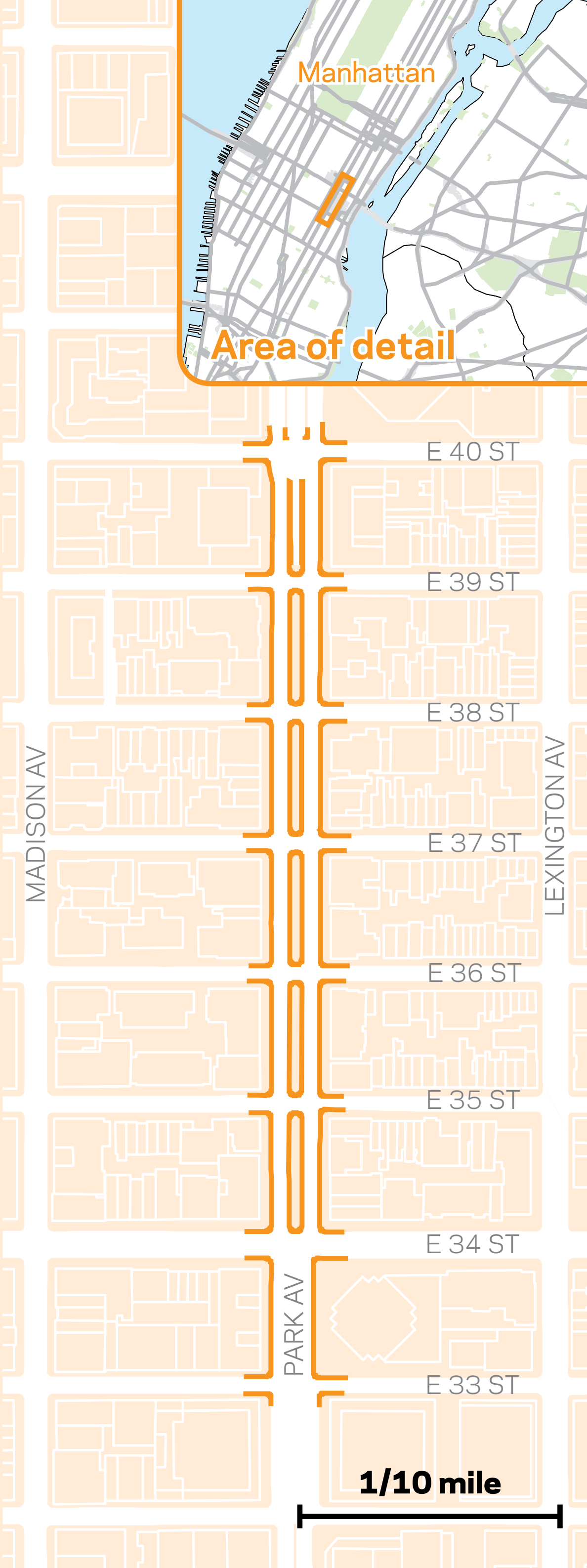
- Shared plans for new design with elected officials and City agencies
- Discussed new plans with 34th Street Partnership and Grand Central Partnership in April 2008
- DOT presented plans to Manhattan's Community Boards 5 and 6 in May 2008

Approach

- Converted two-way Park Avenue tunnel to one-way, northbound only
- Provided pedestrian islands in crosswalk; extended curbs
- Redistributed southbound traffic onto surrounding streets

Results

- 77% reduction in total crashes involving injuries at Park Avenue and E. 33rd Street
- 50% reduction in the number of pedestrians crossing against the signal at E. 33rd Street
- 25% of motorists shifted route or mode
- Southbound travel times increased marginally



Park Avenue is a major north-south roadway with high volumes of pedestrians and motor vehicles, especially in Midtown. While most of the roadway is at grade, there is a tunnel between E. 33rd and E. 40th Streets, which leads to the viaduct that carries traffic around Grand Central Terminal between E. 40th and E. 46th Streets.

Park Avenue Tunnel at E. 33rd Street

In the past, the intersection of Park Avenue and E. 33rd Street consistently experienced a high number of crashes, directly attributable to its location at the terminus of the Park Avenue Tunnel. In addition, there have been a number of fatalities at this location. Beginning in 1999, DOT implemented several safety measures including improved signage, barriers and flexible delineators to separate the northbound and southbound lanes at the E. 33rd Street tunnel entrance and exit. These changes improved safety and reduced the number of crashes, but pedestrian accidents at this location continued to be among the highest in the city.

The continuing problems at this intersection led DOT to reevaluate the intersection and focus on the basic problem of visibility for southbound drivers exiting the tunnel. As drivers emerged from the tunnel, the change in light and grade severely limited their ability to see pedestrians and motor vehicles at E. 33rd Street. The changing light and grade also made it difficult for these drivers to merge with vehicles traveling on the surface Park Avenue lanes.

Safety for pedestrians crossing Park Avenue at E. 33rd Street was affected both by drivers' lack of visibility and by the complexity of the traffic pattern with traffic merging from the tunnel and surface streets. Pedestrians' difficulty with navigating the intersection was compounded by the limited refuge space where the traffic direction changes in the middle of the crosswalk.

DOT developed a plan built around addressing southbound drivers' limited visibility and the length of the pedestrian crossing distance. The plan included making the tunnel one-way northbound (thus removing the southbound vehicles from the tunnel) and reducing the pedestrian crossing distances with refuge islands and curb extensions. Eliminating the southbound traffic exiting the tunnel at E. 33rd Street and increasing pedestrian refuge islands in crosswalks was intended to make the intersection safer for all users.

In April and May 2008, DOT met with elected officials, members of the 34th Street Partnership and the Grand Central Partnership as well as Community Board 5 (CB5) and Community Board 6 (CB6). A resolution in support of the plan was adopted by CB5. CB6 committee members agreed that they did not need to take a position on the project because it was mostly in CB5's district.

To measure the impact of these changes on vehicles and pedestrians, DOT conducted analysis of data collected before and after implementation. This included pedestrian counts, including counting the number of people who crossed the street against the traffic signal. Travel speeds and vehicle volumes were also collected to measure the impacts on motor vehicle movements on this corridor. DOT also analyzed the number of crashes involving injuries at the main intersection.

These changes improved safety on this corridor. The total number of crashes involving injuries at Park Avenue and E.33rd Street decreased by 77% from an average of 10.3 per year during the three years prior to implementation to an annual rate of 2.4 since the project was completed. This decline represents a statistically significant reduction in crashes from the 10 year trend (for crash analysis methodology, see page 72).

In the three years prior to implementation there was an average of seven crashes per year involving injuries to pedestrians. Since the project was completed, that number has been reduced to an annual rate of 1.6 crashes, a statistically significant reduction.

A 10 ft wide refuge island was installed on the south side of E. 33rd Street at Park Avenue to provide safer environment for pedestrians.

The curb extension on the southeast corner shortens the crossing distances and aligns the curbs to make for a safer crossing.

77% reduction in total crashes involving injuries at Park Avenue and E. 33rd Street.

The number of pedestrians crossing against the signal at E. 33rd Street decreased by 50%. Pedestrians have regularly been observed using the pedestrian refuges. Illegal pedestrian crossings did increase during all time periods at 40th Street.

Improvements to intersection safety came with a marginal impact on travel time. Southbound travel times between E. 40th and E. 33st Streets increased by approximately 20 seconds during the morning peak period and 50 seconds during the evening periods. These delays led to increased queuing of vehicles on the elevated viaduct, which is separate from the main roadway and does not affect traffic on the crosstown streets.

Overall, there was a 19% reduction in traffic volumes on the southbound at-grade Park Avenue viaduct, indicating that about one-fifth of motorists switched to a different avenue or changed to a different mode. The rate of diversions was highest during the late afternoon and evening. The primary diversion routes are Fifth and Lexington Avenues, both of which saw increases in vehicle volumes. Fifth Avenue saw a 15% increase, or an additional 192 vehicles per hour, during 4-6 p.m., from an average of 1,248 vehicles per hour in the spring to 1,440 in fall 2008. The largest increase on Lexington Avenue occurred during the noon-2 p.m. period with an additional 90 vehicles per hour. This is a 9% increase from 1,005 vehicles per hour on average in the spring to an average of 1,095 vehicles per hour in the fall.

Park Avenue Travel Times

	Southbound Park Avenue from E. 40th Street to E. 33st Street		
	Before	**After**	**Change**
7-10 a.m.	02:21	02:40	+0:19
12-2 p.m.	02:25	02:46	+0:21
4-6 p.m.	02:16	02:42	+0:26
6-8 p.m.	02:01	02:52	+0:51

* All After times are based on three month averages.

Crashes with Injuries at Park Avenue and E. 33rd Street

	Before* (three previous years)			After
Total Crashes with Injuries	9	13	9	2.4
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	3	5	2	0.8
Pedestrians	7	6	8	1.6
Bicyclists	0	2	0	0.0

* Before columns show the crash history for each of the three years immediately prior to project implementation. After column shows number of crashes since implementation (through November 2009) at annual rate. See page 72 for further information on crash data source and analysis methodology. The sum of the three specific categories may not equal "Total Crashes with Injuries" because some crashes involved injuries in multiple categories.

Southbound Park Avenue Traffic Volumes Viaduct at E. 40th Street (average vehicles per hour)

	Before	After	% Change
7-10 a.m.	748	641	-14%
12-2 p.m.	902	744	-18%
4-6 p.m.	967	803	-17%
6-8 p.m.	1,123	859	-24%

Before data collected in April and May 2008. After data is an average of volumes collected in September and October 2008. Volumes shown in vehicles per hour.

Southbound Fifth Avenue Traffic Volumes E. 39th Street to E. 35th Street (average vehicles per hour)

	Before	After	% Change
7-10 a.m.	1,364	1,400	3%
12-2 p.m.	1,323	1,348	2%
4-6 p.m.	1,248	1,440	15%
6-8 p.m.	1,583	1,609	2%

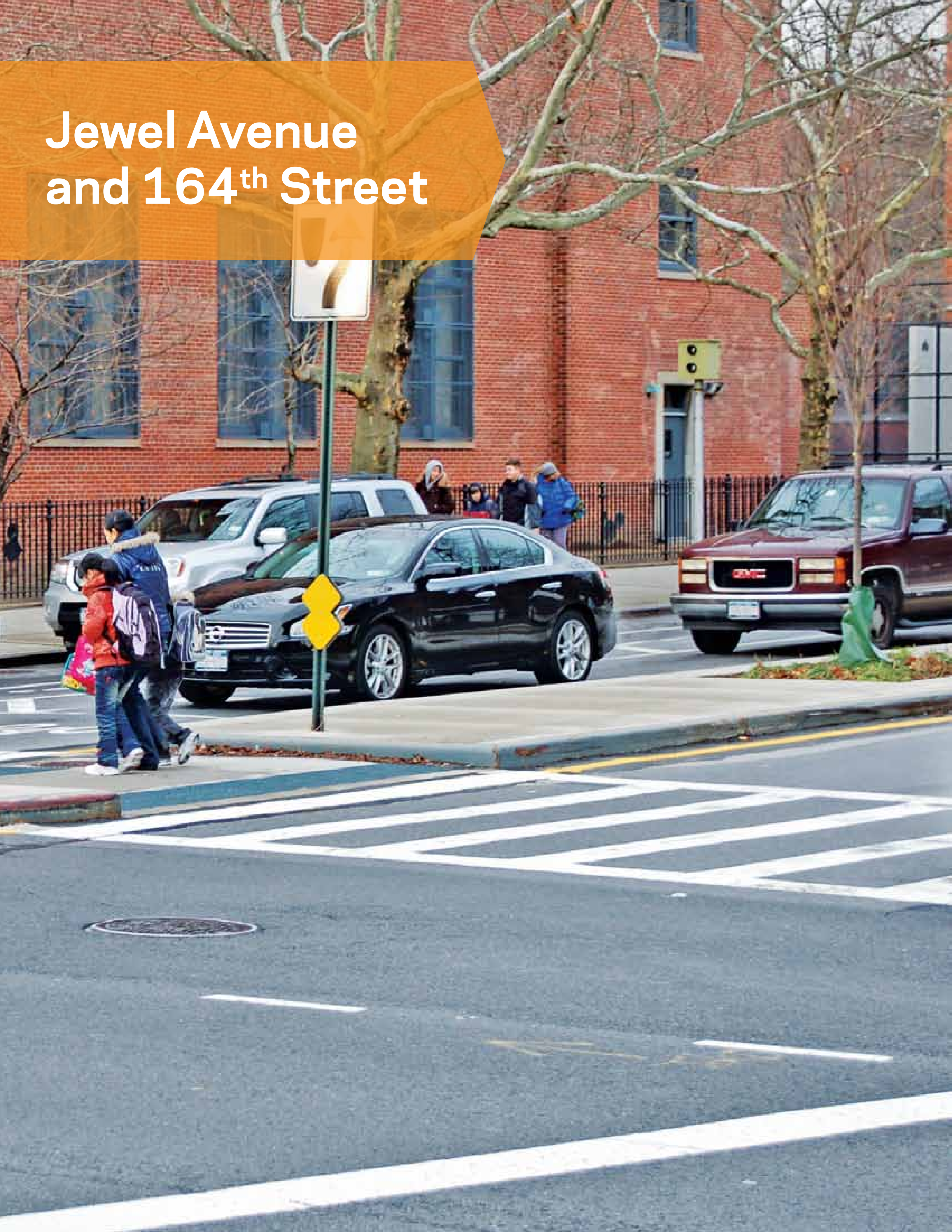
Before data collected in April and May 2008. After data is an average of volumes collected in September and October 2008. Volumes shown in vehicles per hour.

Southbound Lexington Avenue Traffic Volumes E. 39th Street to E. 35th Street (average vehicles per hour)

	Before	After	% Change
7-10 a.m.	1,242	1,288	4%
12-2 p.m.	1,005	1,095	9%
4-6 p.m.	1,075	1,107	3%
6-8 p.m.	1,236	1,330	8%

Before data collected in April and May 2008. After data is an average of volumes collected in September and October 2008. Volumes shown in vehicles per hour.

Jewel Avenue and 164th Street



Purpose

- Improve pedestrian safety near public school crossing
- Reduce excessive vehicle speeds
- Expand bicycle network

Outreach

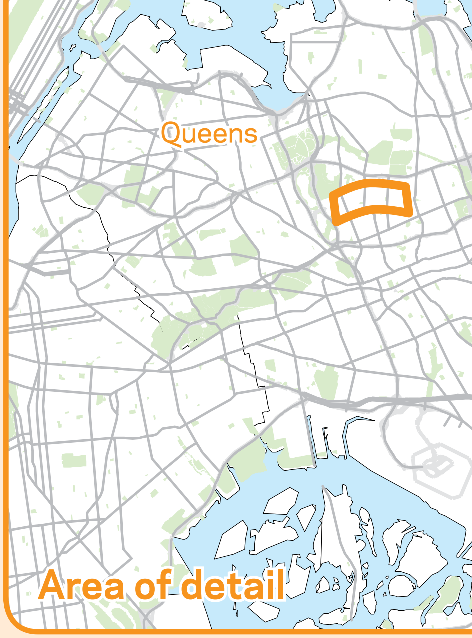
- DOT studied potential safety improvements for the area in fall 2006 in response to community concerns
- DOT presented proposed changes to Community Board 8's transportation committee and the entire board in June 2007; same plans presented to elected officials in August 2007
- Implemented the traffic calming and one-way conversion in late summer 2007; raised medians completed June 2008 and landscaped in summer 2008

Approach

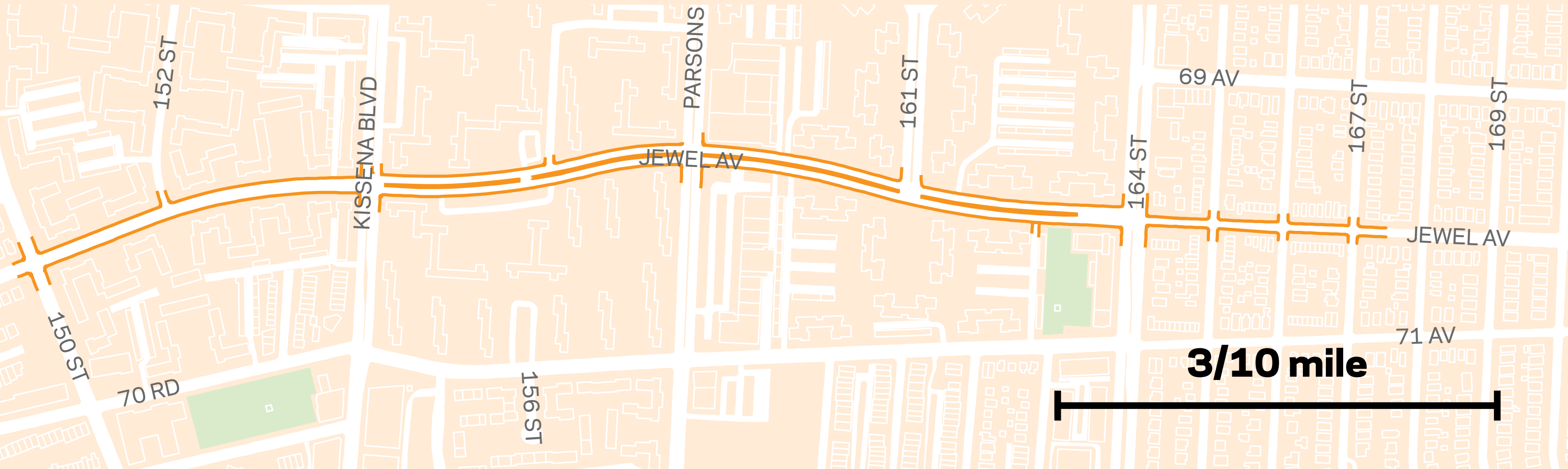
- Increased pedestrian crossing time
- Widened and landscape median on Jewel Avenue
- Simplified intersection of Jewel Avenue and 164th Street
- Replaced one vehicle travel lane on Jewel Avenue with a buffered bike lane

Results

- 91% of vehicles observed during the morning peak on Jewel Avenue were traveling at or below the speed limit
- Greened the corridor
- Fewer lanes have not caused congestion
- Five-fold increase in bike volumes



Jewel Avenue is an important east-west arterial that connects the central Queens neighborhoods of Fresh Meadows and Kew Garden Hills with Forest Hills. Most of the neighboring land uses are residential with some small retail strips and community facilities like a library and a school. Jewel Avenue carries the Q64 and QM4 bus routes.



In fall 2006, local residents, elected officials and the staff and parents of P.S. 200 approached DOT regarding safety concerns at the intersection of Jewel Avenue and 164th Street. Their primary concerns included crossing conditions and vehicle speeds during school hours. In December 2006, while DOT was evaluating the intersection, a teacher was struck and killed at this location.

Based upon the evaluation and input from these groups, DOT identified a number of street design elements that affected safety at this intersection. These included the length of crossing distances for pedestrians; wide travel lanes that contributed to vehicle speeding and poor yielding behavior by motorists; numerous potential conflicts between turning vehicles and pedestrians crossing the street; and misaligned lanes as eastbound vehicles on Jewel Avenue cross 164th Street.

Based on these issues, DOT developed a traffic calming treatment and one-way conversion. These plans were presented to Community Board 8 (CB8) and its transportation committee in June 2007 and to elected officials in August 2007. DOT worked with these stakeholders on the details on the safety improvements and informed CB8 and the elected officials in advance of implementation.

The final plan was designed to increase safety and calm traffic by simplifying the intersection, increasing crossing times provided to pedestrians, creating a pedestrian refuge and eliminating lanes to decrease speeding. Implementation began with changes to the signal timing in spring 2007 followed by the installation of bike lanes and the one way conversion late summer 2007. DOT began construction of the raised median in January 2008 and completed the project in June 2008. The Department of Parks and Recreation landscaped the new median in late summer 2008.

The total number of daily vehicles for a weekday was almost unchanged in the eastbound lane. The morning volumes decreased by 5%, and the afternoon peak hour saw a 2% increase. Across the entire day there was a 4% increase in eastbound traffic.

There was a small decrease in westbound vehicle volumes on Jewel Avenue west of 164th Street. This is likely the result of the new traffic pattern that prohibits westbound traffic on Jewel Avenue east of 164th Street. The main difference occurred during the morning peak; between 7 and 10 a.m. westbound traffic was reduced by 26%. During the afternoon peak westbound traffic was 8% lower.

The reduced lane may have the additional benefit of keeping drivers below the speed limit. On eastbound Jewel Avenue, the same side of the street as P.S. 200, 93% of vehicles were traveling below the speed limit between 8 and 8:30 am and the average speed of all vehicles was 23 m.p.h.

The intersection had two crashes involving injury in each of the three years prior to implementation; and an annual rate of 1.6 crashes since the changes were completed. This change is not statistically significant based on roughly one year of data (for crash analysis methodology, see page 72).

This project also improved the connectivity of bicycle facilities in Queens, especially to parks and greenways. The number of cyclists counted on Jewel Avenue during DOT's annual bicycle count increased from 20 bicyclists per day before implementation to 112 per day one year after implementation, a five-fold increase.

The landscaped median offers a wider area for pedestrians and shortens the crossing distances.

Crashes with Injuries at Jewel Avenue and 164th Street

	Before* (three previous years)			After
Total Crashes with Injuries	2	2	2	1.6
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	0	1	0	0.8
Pedestrians	1	1	1	0.8
Bicyclists	1	0	1	0.0

* Before columns show the crash history for each of the three years immediately prior to project implementation. After column shows number of crashes since implementation (through November 2009) at annual rate. See page 72 for further information on crash data source and analysis methodology. The sum of the three specific categories may not equal "Total Crashes with Injuries" because some crashes involved injuries in multiple categories.

Buffered bike lanes replaced vehicle travel lanes on Jewel Avenue.

Eastbound Jewel Avenue Traffic Volumes Parsons Boulevard to 164th Street (average vehicles per hour)

	Before	After	%Change
7-10 a.m.	252	239	-5%
3-6 p.m.	429	437	2%
Daily	237	248	5%

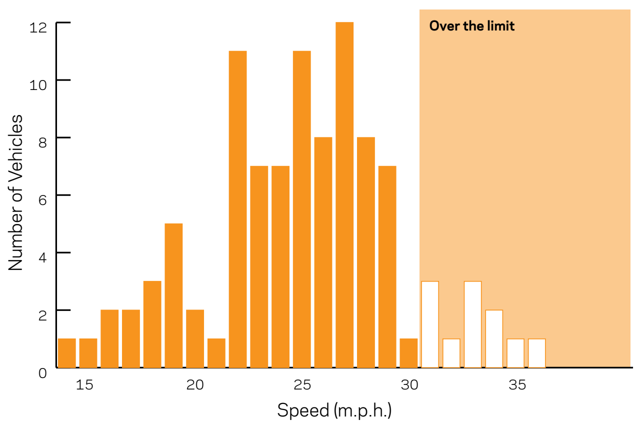
Before data collected in January 2007. After data collected in October 2009. Daily represents volumes between 5 a.m. and 12 a.m. Volumes shown in average vehicles per hour.

Westbound Jewel Avenue Traffic Volumes 164th Street to Parsons Boulevard (average vehicles per hour)

	Before	After	%Change
7-10 a.m.	403	297	-26%
3-6 p.m.	312	287	-8%
Daily	233	201	-14%

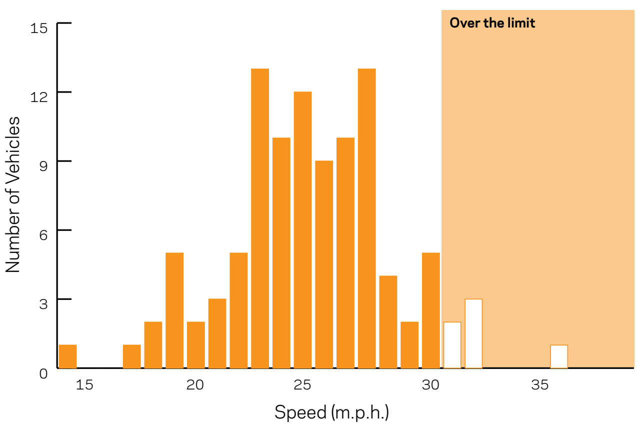
Before data collected in January 2007. After data collected in October 2009. Daily represents volumes between 5 a.m. and 12 a.m. Volumes shown in average vehicles per hour.

Vehicle Speeds on Eastbound Jewel Avenue



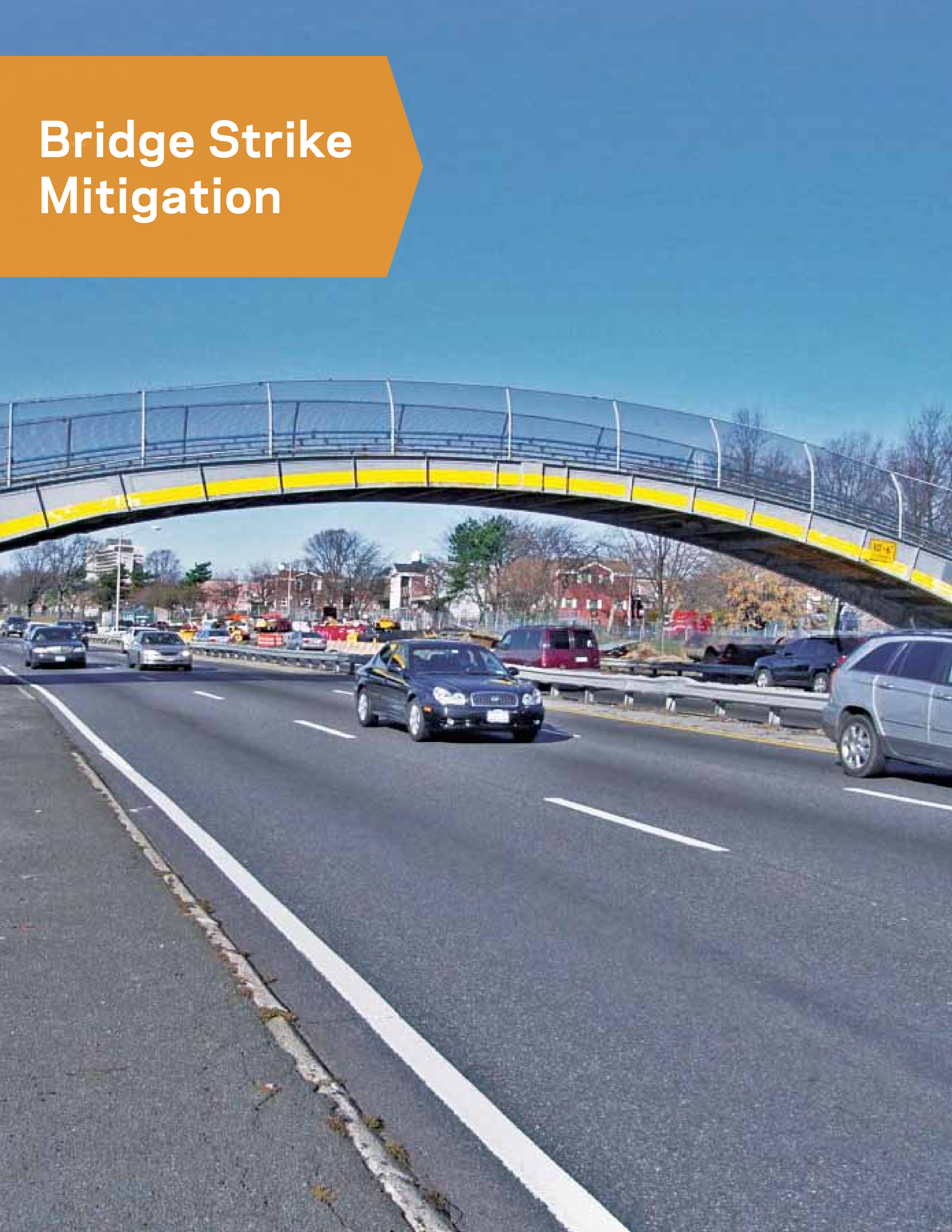
Data collected between 8-8:30 a.m. on a weekday in fall 2009

Vehicle Speeds on Westbound Jewel Avenue



Data collected between 8-8:30 a.m. on a weekday in fall 2009

Bridge Strike Mitigation



Purpose

- Reduce the number of bridge strikes
- Improve public safety for all motorists
- Reduce traffic congestion and delays that result from bridge strikes

Outreach

- DOT Truck Summit in June 2008 attended by more than 125 trucking industry stakeholders; bridge strikes were identified as a prominent issue
- Continued communication with the New York State Motor Truck Association

Approach

- Identified locations for new warning signage based on reported bridge strike data
- Developed attention-grabbing warning message to inform drivers to exit safely before hitting the bridge
- Installed bridge reflective covering treatment of retro-reflective material
- Developed survey for truck drivers to be administered by NYPD after bridge strikes to evaluate contributing factors

1. **Hutchinson River Parkway: Westchester Avenue**
2. **Franklin D. Roosevelt (FDR) Drive: E. 60th and 61st Streets**
3. **Brooklyn-Queens Expressway (BQE): Brooklyn Bridge**
4. **Belt Parkway: 17th Avenue Bridge**

Results

- Bridge strikes declined at two of three locations; small increase at one location although less than the citywide increase in reported bridge strikes
- Pilot identified the need to pursue additional technology improvements and education programs to keep trucks off of parkways

Bridge strikes are a public safety problem; they create congestion and traffic delays on our already congested transportation system and threaten the structural integrity of our infrastructure. New York City has 313 bridges with posted vertical clearances of less than 14 feet, more than half of which are maintained by DOT.

Bridge Strike Mitigation

There are 313 "low" bridges over roadways, with vertical clearances of less than 14 feet, in New York City. Signs showing the vertical clearance are posted at each of these bridges to warn truck and bus drivers of the potential hazard. Despite these warnings, there were more than 309 reported incidents where trucks struck bridges (bridge strikes) or stopped just short of striking a bridge between 2006 and 2009, including 76 in 2009.

Bridge strikes create traffic congestion while the vehicle is cleared from the roadway, reduce traffic safety for all drivers and cause physical damage to bridges which can necessitate repairs. DOT is considering different approaches to reducing bridge strikes. Improved signs and markings are among several approaches to this problem.

DOT identified frequent bridge strike locations based on reported data compiled by the New York State Department of Transportation (NYSDOT) Integrated Incident Management System Database. Three pilot locations were selected based on the available data: FDR Drive at E. 60th Street in Manhattan, Hutchinson River Parkway at Westchester Avenue in the Bronx, and the Belt Parkway at the 17th Avenue Pedestrian Bridge in Brooklyn. The bridge treatments were installed in March 2008 on the FDR Drive and in August 2008 on the Belt Parkway and the Hutchinson River Parkway.

Two of the three pilot locations showed reductions in bridge strikes since installation. Bridge strike incidents at the FDR Drive location decreased by 56% and incidents at the Belt Parkway location decreased by 30%. The Westchester Avenue Bridge over the Hutchinson River Parkway, which has a direct connection to the Whitestone Bridge and is close to the I-95 corridor, showed a 7% increase in strikes.

One additional pilot location, the eastbound Brooklyn-Queens Expressway (BQE) at the Brooklyn Bridge, was selected because of visible damage from repeated incidents even through the state database did not show any reportable strikes. There were no incidents reported at the BQE location between when the treatment was installed in August 2008 and December 2009.

Overall, these findings indicate that the reflective treatment is a promising strategy for reducing bridge strikes at frequent strike locations, although the number of bridges and time period involved in this test can not yield a definitive conclusion. DOT is currently planning installations at other frequent strike locations.

No bridge strikes have been reported at this location since the treatment was installed on the Brooklyn Bridge overpass.

Retro-reflective material installed on Westchester Avenue bridge over the northbound Hutchinson River Parkway.

Improved signage and visual cues like retro-reflective bridge treatments are just a few of DOT's efforts to reduce bridge strikes.

Interviews of truck drivers involved in bridge strikes have identified the need for a larger education and outreach effort. To that end, DOT and its partners are pursuing a broad educational campaign to improve driver awareness of this hazard. This includes providing bridge clearance and truck route data to mapping and Global Positioning Systems (GPS) navigation providers, using height and weight detection technologies and Intelligent Transportation System (ITS) signs to complement existing signs and markings.

To further reduce the frequency of bridge strikes on all bridges citywide, a number of additional initiatives were implemented in 2008 and 2009. These include coordination with online mapping companies to improve availability of truck specific information, improving truck route signs and advance vertical clearance signs, and working more closely with the trucking industry to educate truck drivers about traffic rules and truck routes in New York City.

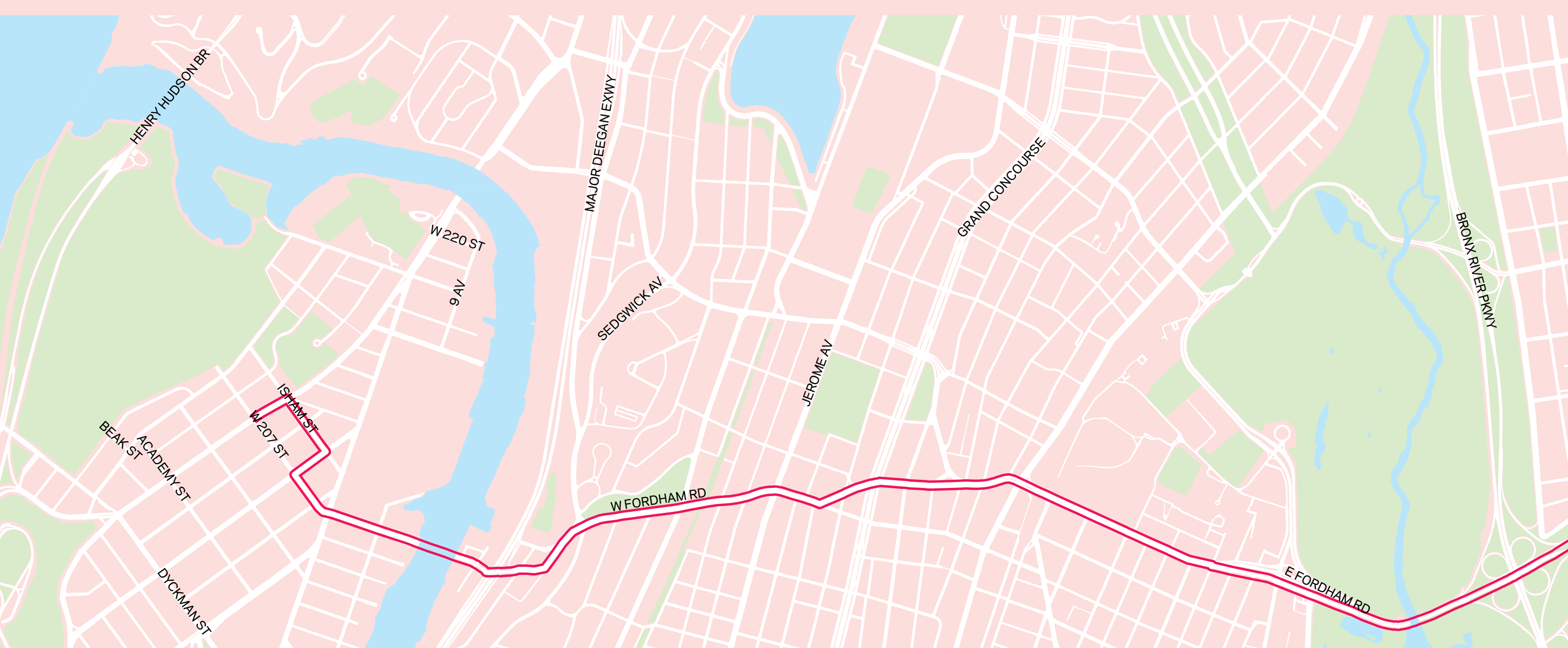
Bridge strikes at the E. 60th/ 61st Street overpass on the FDR Drive are down 56% since the treatment was installed, the greatest reduction of any pilot location.

Annualized Incidents Per Year

	Before	After	% Change
FDR Drive at E 60/61 St †	2.7	1.2	-56%
HRP at Westchester ††	6.8	7.2	+7%
Belt Parkway at 17 Ave Bridge ††	2.3	1.6	-30%

† Bridge treatment installed March 2008
†† Bridge treatment installed August 2008

Fordham Road Select Bus Service



Purpose

- Improve speed and reliability for bus riders
- Make bus service more attractive to customers
- Demonstrate feasibility and benefits of Select Bus Service (SBS) on a major transportation corridor

Outreach

- NYC Bus Rapid Transit (BRT) study undertaken by City, State and New York City Transit (NYCT) in 2004 included three rounds of borough-level briefings on BRT needs and potential corridors and two rounds of public workshops in each borough
- Fordham Road selected as one of five pilot locations
- DOT met at least twice with each of the six community boards crossed by this corridor
- DOT worked with the Fordham Road Business Improvement District (BID) to address issues related to curbside parking and deliveries

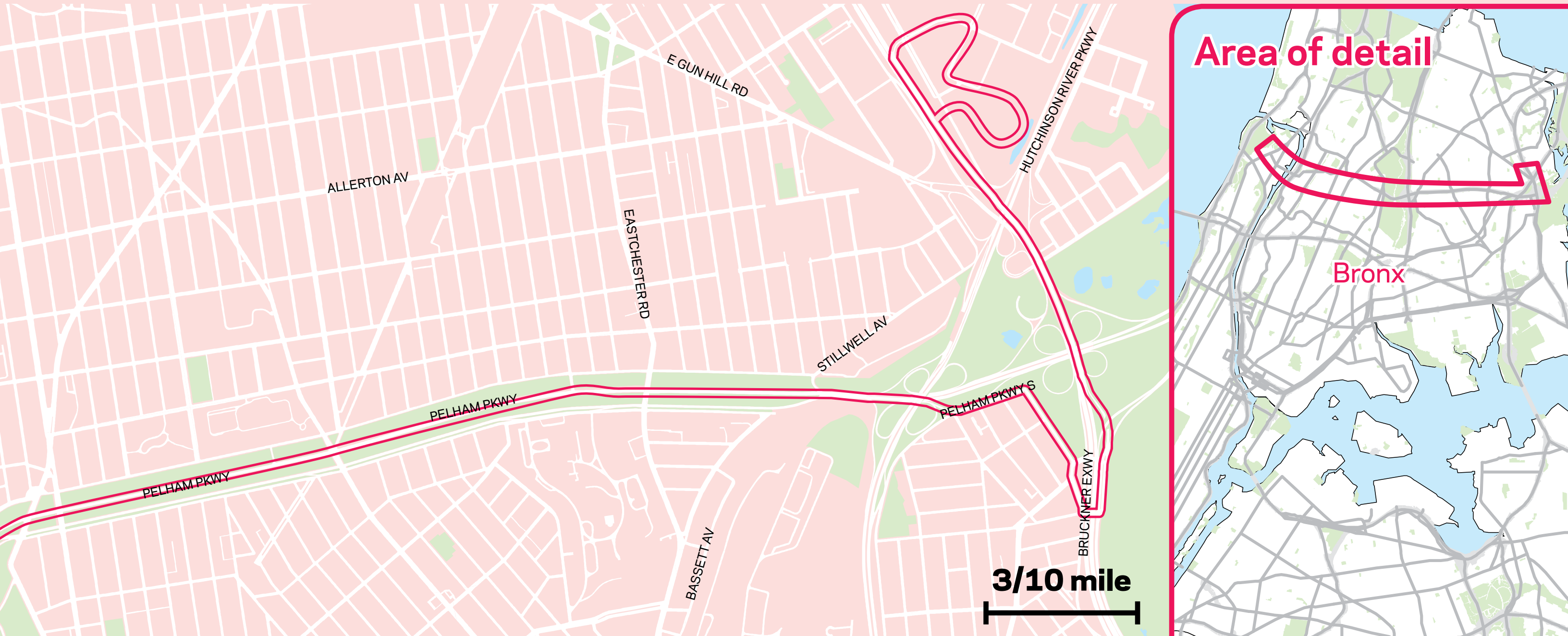
Approach

- DOT installed dedicated bus lanes in both directions on Fordham Road; bus lanes will also be installed during the future reconstruction of Pelham Parkway
- DOT re-timed traffic signals and implemented Transit Signal Priority (TSP), which provides buses with extended green lights or green lights as buses approach key intersections board
- NYCT implemented off-board fare collection
- DOT introduced midday "delivery windows" on retail sections of Fordham Road

Results

- 19% reduction in travel time along the corridor
- 32% increase in weekday ridership over the Limited Service bus it replaced
- 98% of bus customers surveyed described themselves as "satisfied" or "very satisfied" with the new service
- Demonstrated feasibility and benefits of SBS

The Bx12 Select Bus Service runs along Fordham Road between Co-Op City and the Inwood neighborhood of upper Manhattan. This busy east-west route is home to regional destinations like Fordham University, the Bronx Zoo, and the New York Botanical Garden as well as the Fordham Road Business District, one of the busiest commercial centers in the Bronx. The roadway is also key for transportation connectivity—it passes seven subway stations serving eight lines and two MTA Metro-North commuter stations, as well as intersecting several major highways.



Most major roads and all subway lines in the Bronx are oriented north-south to facilitate travel to the commercial hub of Manhattan. As a result, major east-west roads in the Bronx such as Fordham Road and Pelham Parkway are heavily used for travel across the borough and experience significant levels of congestion. Congestion along the Fordham Road retail corridor, combined with heavy ridership, created problems of reliability and speed of the Bx12 bus route. Most notable were long dwell times at stations and delays from congestion and traffic signals. Before Select Bus Service (SBS) service the Bx12 traveled at approximately 8 m.p.h.

Fordham Road and Pelham Parkway thus became a focus of the joint NYCBRT study undertaken by DOT, MTA New York City Transit (NYCT) and New York State Department of Transportation (NYSDOT), which began in 2004. During the course of the NYCBRT study, these agencies met with the borough boards in each borough twice, and held two rounds of public workshops during corridor selection process. The outcome of these consultations and the agencies' evaluations of potential corridors from throughout the city was the selection of Fordham Road as one of five initial BRT pilot corridors.

Following the selection of the five corridors, DOT and NYCT met twice with each of the six community boards along the corridor to discuss the project and receive feedback on plans for the new service. DOT and NYCT also worked closely with the Fordham Road Business Improvement District (BID) and individual businesses to address delivery and curbside parking needs.

The final plan became the first implementation of the City's BRT program, which has been branded as Select Bus Service (SBS). The Fordham Road SBS combines DOT and NYCT actions to improve bus speeds and reliability and passenger comfort and convenience.

The key features implemented by DOT were dedicated bus lanes and Transit Signal Priority (TSP). DOT also installed dedicated curbside bus lanes along Fordham Road using new, high visibility treatments including terra cotta colored lane markings and extra large signs over the roadway. DOT also re-timed traffic signals along the route to improve overall traffic flow and deployed TSP to reduce the amount of time that buses spend at red lights. The TSP technology uses radio signals from the bus to inform the traffic signal controller that a bus is approaching. While maintaining safe operation for all traffic and pedestrians, the traffic signal controller can modify the signal to stay green longer or make the light turn green quicker. Once the bus has passed through the intersection the instructions to provide the bus priority are cancelled.

NYCT deployed off-board fare collection for the first time in New York City. Passengers dip their MetroCard or pay with coins using machines installed at the bus stations and obtain a ticket, and can then board in the front or rear door. Roving fare inspectors patrol the route to conduct random ticket checks and issue summonses to passengers who have not paid.

DOT also created two-hour "delivery windows" in the bus lanes to permit commercial deliveries in the late morning and early afternoon. Delivery windows were set up in consultation with the BID and local businesses. DOT also added metered parking on side streets in the Belmont section to replace parking restricted due to the bus lane.

Fordham Road SBS features the first use of off-board fare collection in New York City.

Bx 12 SBS Ridership

	Type	Weekday*	Saturday	Sunday
Before	**Local**	19,688	18,398	23,023
	Limited	24,999	11,491	0**
	Total	44,687	29,889	23,023
After	**Local**	16,756	11,577	8,935
	SBS	33,006	22,298	16,436
	Total	49,762	33,875	25,371
% Change	**Local**	-15%	-37%	-61%
	SBS	32%	94%	N/A
	Total	11%	13%	10%

* Average weekday ridership and revenue is adjusted to account for the number of school days and to allow for a comparison between years. Actual average weekday ridership was 44,175 for October 2007 and 48,510 for October 2008.
** There was no Sunday Limited service prior to SBS implementation

The bus lanes, off-board fare collection and signal work led to a 19% reduction in bus travel times, a reduction of 11 minutes.

DOT and NYCT deployed specially trained teams of Customer Ambassadors at SBS stations during the first month of service to help explain pre-boarding fare collection and answer riders' questions.

Project evaluation focused on bus travel times, bus ridership and bus customer opinions of the changes. The combination of bus lanes, off-board fare collection and signal work led to a 19% reduction in bus travel times along the entire corridor, a reduction of 11 minutes. The average Bx12 commuter saves about two days annually in total travel time as a result of the project. The greatest improvements came in reduced dwell time at stations (40% reduction) and at traffic signals (38% reduction). Although "In Motion" time did not decrease, the benefit of the bus lane shows in the reduction in time spent at red lights, as buses are able to reach the intersection quickly, rather than waiting through multiple light cycles.

At the same time that bus ridership in the Bronx was declining, ridership on the Bx12 increased overall, and many riders switched from the local service to the new SBS. Average weekday ridership on the Bx12 (including local, limited and SBS) increased 11% from 44,687 to 49,762. Weekend ridership showed a similar increase. On weekdays, ridership on the new SBS was 32% higher as compared with Limited service it replaced.

Bus riders were highly enthusiastic about SBS. In a market research survey conducted by NYCT after the SBS implementation, 98% of riders surveyed said they were either "satisfied" or "very satisfied" with the new service.

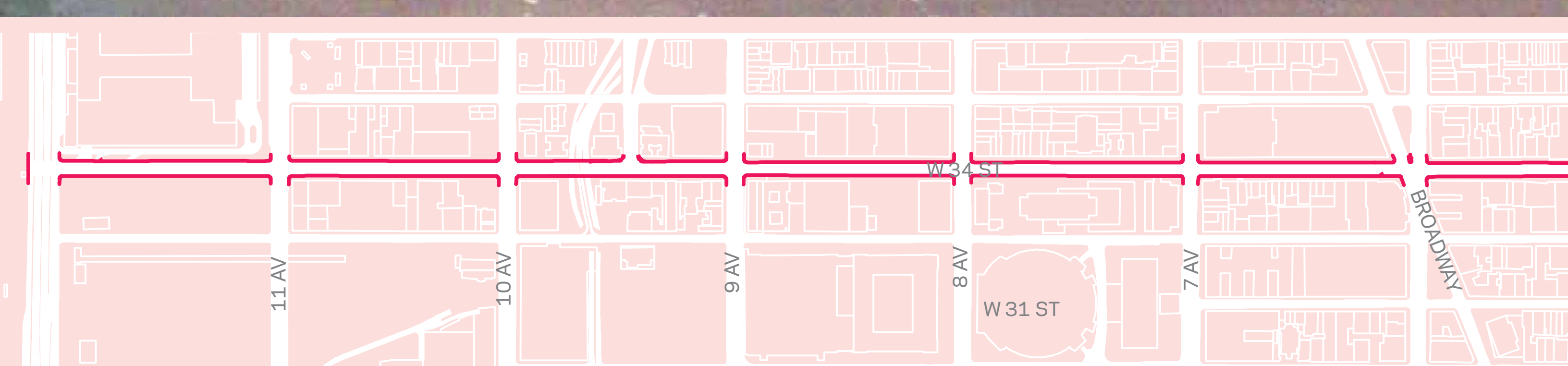
Bx 12 Time Delays

	Before	After	Time	% Change
In Motion	28:30	28:22	-00:08	0%
Dwell Time	15:51	09:34	-06:17	40%
Time at red lights	12:02	07:29	-04:33	38%
Other Delays	01:31	01:19	-00:12	13%
Total	57:54	46:44	-11:10	19%

Project implemented in June 2008

Off-board fare collection and entry through rear doors decreased dwell time by 40%.

34th Street Select Bus Service



Purpose

- Improve travel times for bus riders
- Develop 34th Street as a transit corridor
- Test new Bus Rapid Transit (BRT) technology and treatments for possible use citywide

Outreach

- DOT invited all Manhattan community boards to an open house in January 2008
- Concept plan developed in winter 2008 and finalized in spring 2008 after DOT presentations to Community Boards 4, 5 and 6
- DOT sponsored an open house on the 34th Street design plans with DOT staff available to answer questions in April 2008

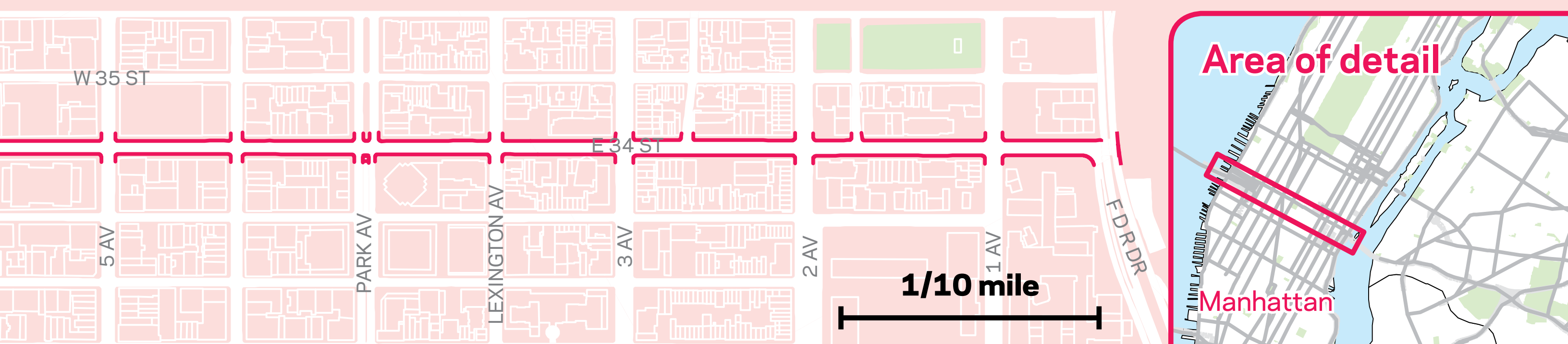
Approach

- Dedicated bus lane in both directions
- Widened lanes and reduced overall number of lanes from six to five
- Installed new markings and signs to create enhanced bus lanes
- Installed left-turn signal priority for buses at Seventh Avenue
- Tested "soft barriers" designed to maintain integrity of the bus lanes

Results

- Improved speed of M34 bus by 17% from First Avenue to Eleventh Avenue
- Time waiting at traffic lights decreased by 29%
- Showed "soft barriers" reduced the number of moving vehicles in the lane, but did not prevent vehicles from parking in the bus lane

34th Street is a major crosstown bus route serving some of the most popular destinations in the city including Penn Station, Madison Square Garden, NYU Medical Center, the Empire State Building, Herald Square and the Javits Center. These attractions and connections contribute to the high volumes of people and vehicles that travel to, and along, this street every day.



More than 30,000 people ride buses on 34th Street each weekday. About 17,300 ride a local bus—either the M34 that traverses 34th Street river to river or the M16, which travels along 34th Street between Tenth Avenue and the FDR Service Road. Another 15,000 riders use express buses that serve Midtown from Brooklyn, Queens, Staten Island and New Jersey. These buses primarily serve neighborhoods that lack direct subway access and thus provide important connectivity between outer borough neighborhoods and Manhattan jobs.

Manhattan crosstown buses are among the slowest bus routes in New York City. Midtown buses travel on average of about 4.5 m.p.h.[1]. Prior to installing the 34th Street project, buses were delayed by: general traffic congestion, vehicles parked at the curb, the large number of pedestrians, and the relatively narrow lanes that reduced the effective vehicle-carrying capacity of each lane. The resulting congestion made bus service unreliable and therefore decreased the attractiveness of transit. Improving bus speeds is important to enhancing mobility along this important corridor.

The 34th Street bus project added new and improved bus lanes along 34th Street from First Avenue to Eleventh Avenue. These lanes are painted red and have high visibility overhead signage. The road was restriped to allow wider lanes and new left-turn lanes, and some vehicular turns were prohibited to improve pedestrian safety. MTA New York City Transit (NYCT) removed a stop and streamlined the bus schedule. DOT also tested soft barriers to help protect the bus lane and is piloting left turn signal priority and video enforcement for taxis along the corridor.

This project is part of a larger program of bus improvement initiatives that include the joint DOT / NYCT Select Bus Service (SBS) program, which is New York City's initial implementation of Bus Rapid Transit (BRT). The success of these projects is based in part on managing roadway capacity more efficiently by dedicating street space to this high performance mode.

Beginning in January 2008, DOT held public meetings to discuss these plans with the community boards and elected officials who serve the corridor and with the 34th Street Partnership. Two community boards passed resolutions in favor of the plan and suggestions made by community leaders were incorporated into the final plan. The 34th Street Partnership was also very supportive of the project. In addition, DOT held an open house in April 2008 to provide the public with an opportunity to ask questions, provide feedback and obtain information on the project. In April 2008, plans were also presented to the larger public at a special event on BRT with the advocacy community. Cumulatively, these meetings and the feedback they generated helped to guide DOT's final designs for 34th Street.

DOT and NYCT conducted a survey of the running time of the M34 in April 2008 and again in May 2009 to measure the impact of these changes on bus travel times. Observations recorded overall running times for the entire route and tracked delays due to traffic lights, passengers boarding, obstructions in the lane and other delays. DOT monitored the number of vehicles driving and parking in the bus lanes both before and after the soft barriers were installed.

[1] Data source: New York City Transit

The soft barriers decreased unauthorized vehicle travel in the bus lane by 57% but did not prevent vehicle parking in bus lane..

M34 Time Delays: First Avenue-Eleventh Avenue

Delays	Before	After	% Change
Average in Motion Time	11:11	08:52	-21%
Average Dwell Time	10:30	09:49	-6%
Average Signal Time	07:01	05:01	-29%
Average Other Delays	01:00	00:57	-4%
Total Running Time	29:42	24:39	-17%

Project implemented in September 2008. Time shown in minutes, seconds. Before data collected in April 2008. After data collected in May 2009

The M34's speed improved by 17% between First and Eleventh Avenues

Travel times on the M34 bus route improved after implementation, mainly due to faster bus speeds within the bus lane and decreased time spent at traffic lights. The dedicated lanes allow buses to pass the queues of vehicles waiting at red lights, leading to a 29% decrease in delays at traffic lights. While the bus was in motion, its speed increased by 26%, from 9.1 m.p.h. to 11.5 m.p.h.

The deployment of soft barriers (raised red dots) decreased unauthorized vehicle travel in bus lanes but did not prevent vehicles from standing and parking in the bus lane, highlighting the importance of enforcement to keep the lanes clear. The soft barrier pilot was designed in part to test the durability of the dots during winter weather conditions. By the end of the winter, more than 95% of the dots had disappeared, primarily due to snow plowing.

Overall, this project showed that a wide, dedicated bus lane can substantially increase bus speeds, even with some blockage of the lane by vehicles, pedestrians and others. Implementation of additional improvements, such as taxi video enforcement and off-board fare collection, will provide further improvements.

DOT and NYCT are working to bring more substantial bus improvements to 34th Street with a two-way protected Transitway. NYCDOT has selected the Transitway as the Locally Preferred Alternative for the 34th Street corridor. This project will speed local and express buses even further on 34th Street, while significantly expanding pedestrian space and accommodating new growth along the corridor.

Bicycles, pedi-cabs and pedestrians in the bus lane still present challenges to improving bus speeds.

Victory Boulevard: Transit Signal Priority

Purpose

- Improve travel times for bus riders and make transit a more attractive option
- Reduce traffic congestion and improve intersection operation
- Reduce fuel consumption and vehicle emissions
- Test Transit Signal Priority (TSP) in New York City

Outreach

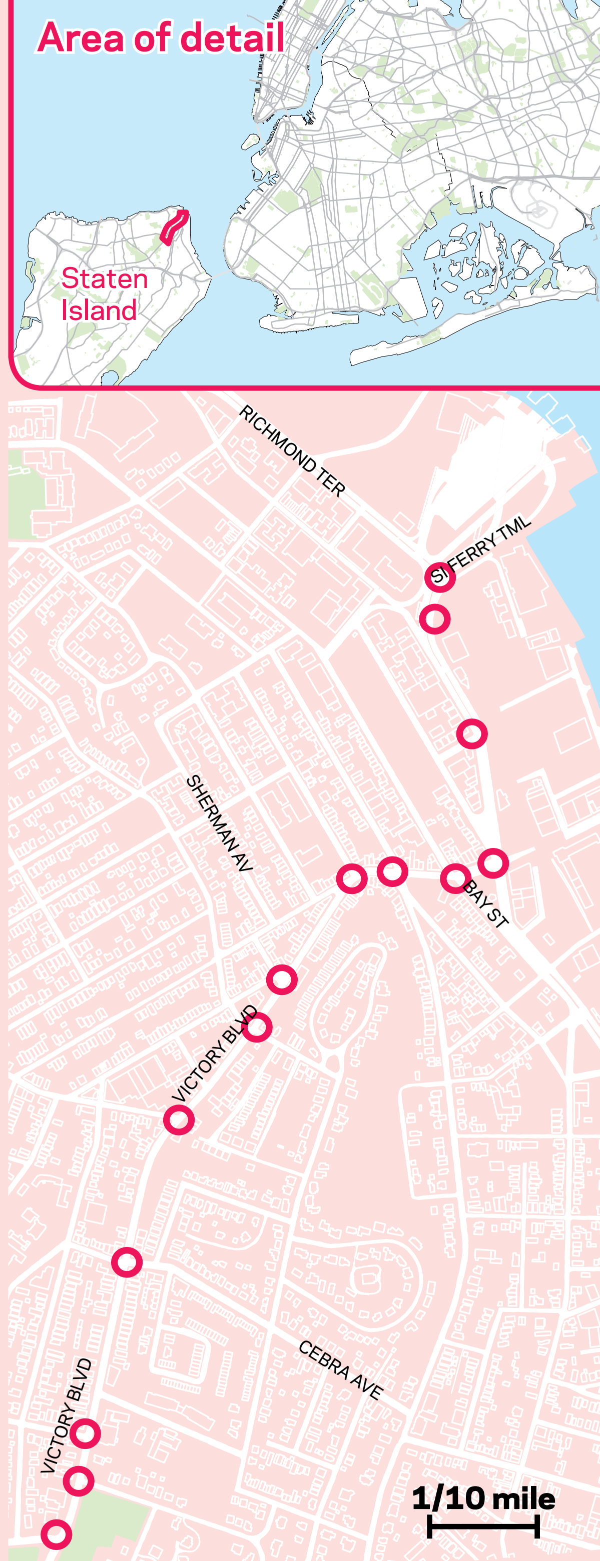
- Victory Boulevard selected as a pilot location for TSP in order to make transit improvements in Staten Island
- Developed with the Mayor's Staten Island Transportation Task Force

Approach

- New York City Transit (NYCT) equipped 300 buses with TSP emitters mounted on dashboard
- DOT installed TSP optical detectors in traffic signals at 14 intersections along the corridor
- DOT and NYCT developed new software capabilities for TSP equipment

Results

- Improved bus travel times by 16% during the morning peak and 11% during the evening peak
- Extra "green time" for buses along Victory Boulevard caused little or no queuing on side streets



Victory Boulevard is a major arterial roadway on Staten Island that runs south and west from Bay Street, St. George in the northeastern part of the island. Victory Boulevard has a mix of residential and commercial uses that make it both an important transportation route and a popular destination. The road is a major bus route, serving both local and express buses. The Transit Signal Priority (TSP) section is the 1.25 miles from Forest Avenue to Bay Street and along Bay Street to St. George Ferry Terminal.

Victory Boulevard: Transit Signal Priority

The Victory Boulevard corridor provides an important connection to the St. George Ferry Terminal for North Shore and Mid-Island communities. A heavily traveled bus corridor, Victory Boulevard is used by 10 bus routes between Forest Avenue and Bay Street. An additional seven bus routes travel on the Transit Signal Priority (TSP) section of Bay Street. Victory Boulevard in this area has one traffic lane in each direction and a lane of parking along the curb; the parking lane is used as a bus only lane during peak hours (in-bound in the morning and out-bound in the evening). The high volume of general traffic as well as buses, and narrowness of the street, slows bus service, particularly during rush hour.

The project was developed collaboratively by DOT and MTA New York City Transit (NYCT). The objectives for this demonstration project were to develop, design and deploy a TSP system as the basis for a larger-scale citywide deployment of TSP. The project was funded by the Federal Transit Administration under the Staten Island-Brooklyn Mobility Program.

The pilot was discussed by the Mayor's Staten Island Transportation Task Force. Since there were no changes to the physical roadway, the street network or parking regulations, the pilot was not officially presented to the community board.

TSP systems use technology aboard buses and at key intersections to detect when buses are approaching a traffic signal and, in specified situations, either extends the green phase or returns early to green with the objective of reducing the amount of time the bus spends at red lights. To accomplish this, 300 buses that operate on local routes serving the ferry terminal were equipped with TSP bus emitters, and the 14 key intersections along the corridor were equipped with TSP detectors connected to the traffic signal controller. The TSP system is activated when a TSP detector receives a request from a bus prompting the controller to extend green time or return early to green, provided that there is no ongoing pedestrian phase at the time. The lengthened green signal provides the bus additional time to pass through the intersection without stopping at a red signal.

The evaluation involved collection of bus travel times and traffic volumes along the corridor. The traffic volumes increased considerably between the "Before" and "After" periods, yet reductions in delay and speed improvements were achieved using TSP

TSP bus emitters were installed in 300 NYCT buses that serve the ferry terminal.

Optical detectors mounted on the traffic signal mast arms at 14 intersections along the study area receive requests form approaching buses.

The Victory Boulevard project demonstrated the effectiveness of Transit Signal Priority to safely speed buses along a heavily-used transit corridor.

without compromising pedestrian safety. Overall travel times improved by 16% during the morning peak hour and by 11% in the evening peak period. Although side street delay increased slightly, the overall corridor vehicle delay decreased.

Analysis of the NYPD crash data shows that there were no significant changes in the number of crashes involving injuries at the intersections where TSP was implemented.

This demonstration project showed the effectiveness of TSP in safely speeding buses along a heavily-used transit corridor. A larger TSP program is under development that will bring similar benefits to additional bus routes throughout the city, including Select Bus Service (SBS) routes that are currently under development.

Crashes with Injuries along Victory Boulevard and Bay Street

	Before* (three previous years)			After
Total Crashes with Injuries	14	29	23	22.2
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	7	15	15	14.3
Pedestrians	7	13	6	7.4
Bicyclists	0	1	2	0.9

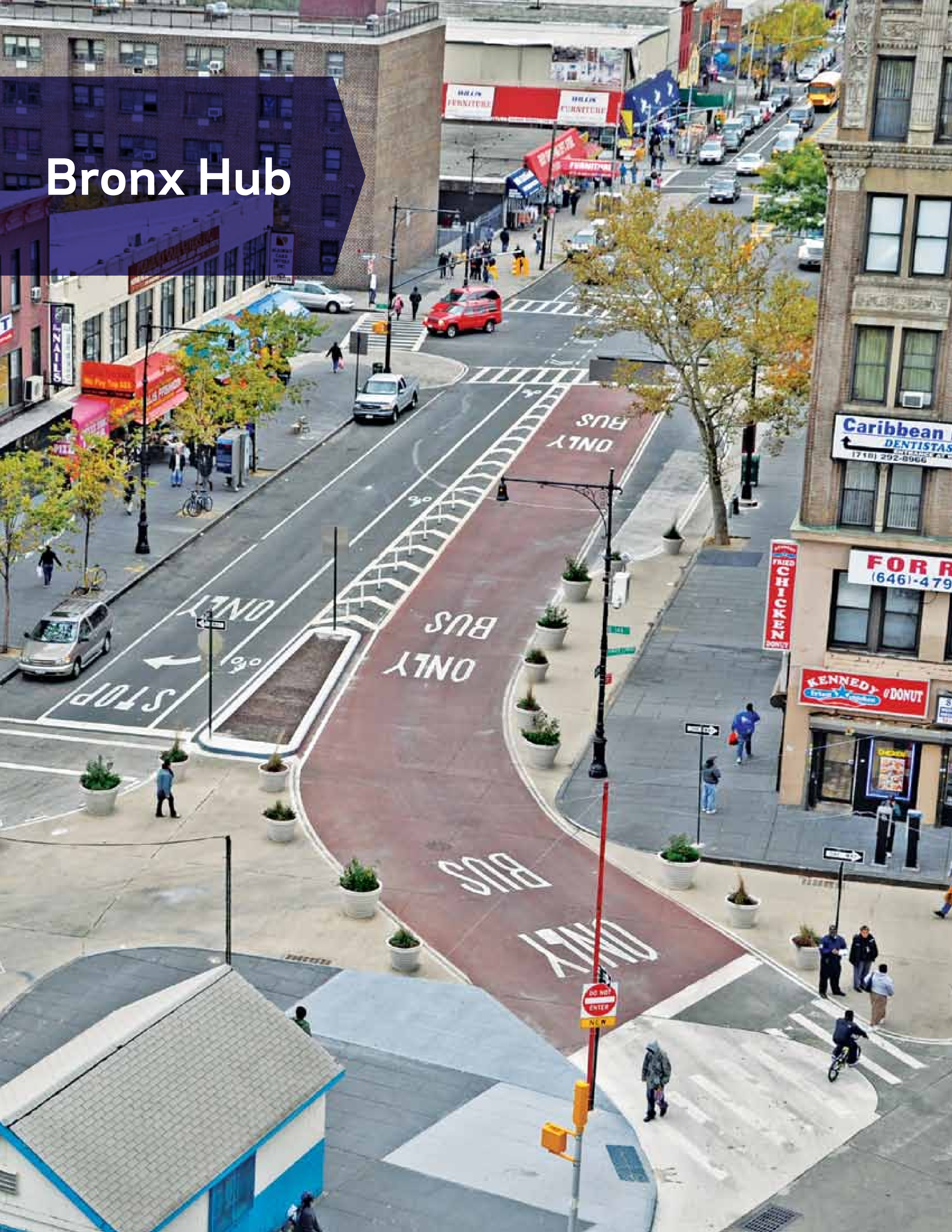
* Before columns show the crash history for each of the three years immediately prior to project implementation. After column shows number of crashes since implementation (through November 2009) at annual rate. See page 72 for further information on crash data source and analysis methodology. The sum of the three specific categories may not equal "Total Crashes with Injuries" because some crashes involved injuries in multiple categories.

Victory Boulevard: Transit Signal Priority Travel Time

	Before	After 1	After 2	% Change
Morning Peak: To Ferry	11:48	11:00	9:54	-16%
Evening Peak: From Ferry	12:00	11:38	10:42	-11%

After 1 shows time w/ signal optimization. After 2 shows both signal optimization and Active TSP. Project implemented in September 2007.

Bronx Hub



FURNITURE
NAILS
STOP
ONLY
BUS
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BUS
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BUS
ONLY
Caribbean
DENTISTAS
(718) 292-8966
FRIED CHICKEN
KENNEDY DONUT
DO NOT ENTER

Purpose

- Make major shopping and transit hub safer and more pedestrian friendly
- Simplify complex traffic intersection
- Enhance public space and expand space for bus transfers
- Expand bicycle network

Outreach

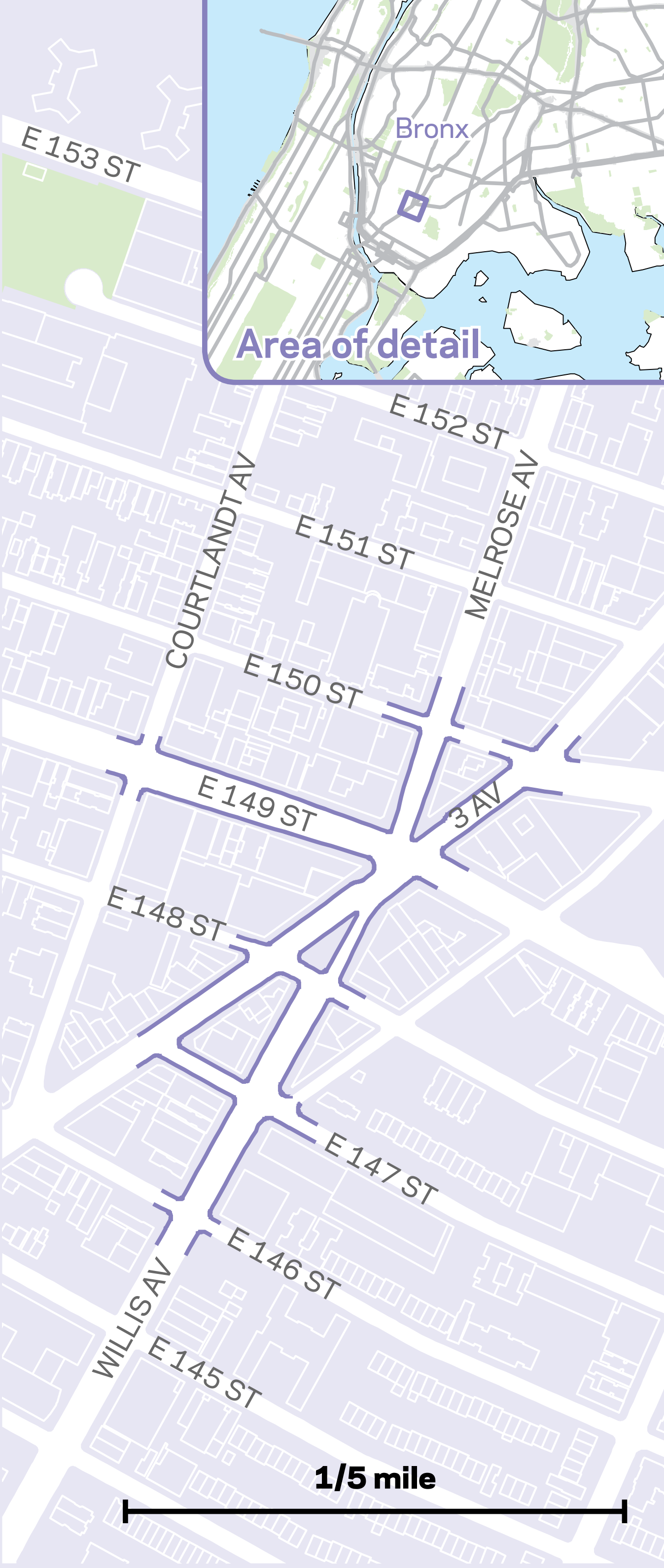
- DOT presented plans for redesign of intersection with proposal for expanded Roberto Clemente Plaza to Community Board 1
- Worked with South Bronx Overall Economic Development and Third Avenue Business Improvement District (BID) to become plaza maintenance partners
- DOT adjusted elements of the plan based on community feedback regarding parking and deliveries

Approach

- Eliminated certain turning movements to reduce conflicts and simplify intersection
- Adjusted signal timing to have fewer phases and thus shorter waits for pedestrians to cross
- Created plaza space, extended curbs and created pedestrian refuge islands; provided additional space for transit riders making transfers or waiting for buses
- Installed new bike lanes

Results

- Increased overall space for pedestrians by 15,000 square feet, including 6,800 square feet in Roberto Clemente Plaza
- Total number of crashes involving injuries lower than any of the 10 prior years
- 10% increase in the number of vehicles being processed through the Hub intersection
- Travel times along the key north-south corridors through the Hub fluctuated



The Bronx Hub is formed by the intersection of Third Avenue, E. 149th Street, Willis Avenue and Melrose Avenue in the South Bronx. It is a vibrant retail and cultural center for the surrounding neighborhoods of Melrose and Mott Haven. The area is served by the #2 and #5 subway trains and eight bus lines (Bx2, 4, 15, 19,21,41, and 55), and as such, is a major transfer point between the bus and subway.

The Bronx Hub project arose from community desires for a more pedestrian-friendly setting, local leaders' desire to support the revitalization of the area's retail and cultural activities and DOT analyses of safety and operational issues. DOT conducted a study of the area, which started in summer 2007. Based on this study and the earlier community input, DOT developed a plan that was presented to Community Board 1. The board was receptive and made suggestions to improve parking and accommodate delivery vehicles. DOT also met with the South Bronx Overall Economic Development Corporation and the Third Avenue BID in spring 2008. Both groups became key partners in finalizing the plan and supporting the local maintenance program. Project construction began in August 2008. The changes were fully operational in September 2008.

The final plan was designed to better accommodate high pedestrian volumes, improve safety for all users, reduce congestion through the intersection and enhance the experience of transit riders transferring between buses and subways.

Most of the changes in the project area were made at the main Hub intersection of E. 149th Street at Third, Willis and Melrose Avenues. DOT converted Willis Avenue between E. 148th and E. 149th Streets into a pedestrian plaza. Traffic on the approaches with lower vehicle volumes were diverted away from the intersection—southbound Melrose Avenue redirected onto westbound E. 149th Street and northbound Willis Avenue redirected onto eastbound E. 148th Streets, with the exception of buses which were provided with a dedicated lane onto northbound Third Avenue. Courtlandt Avenue south of E. 149th Street was changed to southbound operation to accommodate the southbound vehicles on Melrose Avenue that are now diverted onto E. 149th Street.

In addition, the signal phase modifications shortened the length of time pedestrians have to wait for the signal to change. Pedestrians were also provided refuges on E. 149th Street both east and west of Third Avenue and curb extensions at various locations. The bicycle network was improved with the addition of more than five miles of new bike lanes on Courtlandt, Melrose, Third and Willis Avenues. Overall, the project converted 15,000 square feet of space from roadway to pedestrian and bike use, including 6,800 square feet for the Roberto Clemente Plaza.

DOT gathered information on traffic conditions, volumes and speeds prior to construction and repeated the data collection after the project was completed to analyze the impacts. DOT also examined crash data from the New York City Police Department for the period before and after project implementation.

The new turning restrictions, revised signal timing and simplification of traffic patterns enabled the intersection to process vehicles more efficiently. As a result, the total number of vehicles passing through the Hub intersection increased by 10%.

Travel times along the key north-south corridors through the Hub decreased on some routes and increased on others. Due to the creation of the plaza along one block of Willis Avenue, travel times for southbound trips on Third Avenue and Willis Avenue from E. 151st Street to E. 146th Street increased by 11 seconds. Northbound trips on these avenues between E. 146th Street and E. 150th Street, increased by 51 seconds, from 1 minute, 35 seconds to 2 minutes, 26 seconds. On the other hand, the southbound route away from the Hub along Willis Avenue took less time; the average weekday

Construction of two new pedestrian refuge islands on E. 149th Street, reduced a 60 foot crosswalk into two 25 foot sections.

Willis Avenue, north of E. 147th Street features a dedicated bus lane painted red, a new bike lane and one vehicle travel lane that is diverted right at E. 148th Street. This allows Willis Avenue to become a plaza.

The Bronx Hub project converted 15,000 square feet of space from roadway to pedestrian and bike use.

morning trip from E. 146th Street to E. 135th Street now took 3 minutes, 17 seconds which is 27 seconds quicker than before.

The annualized crash rate after implementation was lower than the number of crashes in any of the 10 prior years, although the change was not statistically significant based on roughly one year of "after" data (for crash analysis methodology, see page 72).

The Bronx Hub is a vibrant and important retail and transportation center that is now easier to navigate and more pedestrian friendly. This project gave more space to more efficient modes of transportation; these results show that these types of improvements produce benefits for non-motorized users while not significantly disrupting the flow of traffic.

Bronx Hub Travel Times

	Before	After	Time Change	% Change
Northbound on Willis Avenue	1:35	2:26	0:51	53%
Southbound on Third Avenue	2:34	2:44	0:11	7%
Southbound on Willis Avenue	3:44	3:17	-0:27	-12%

All data for Time Period: weekdays 7-10 a.m. Before data collected October 2007. After data collected fall 2008.

Crashes with Injuries at the Bronx Hub Intersection - Third and Melrose Avenues at E. 149th Street

	Before* (three previous years)			After
Total Crashes with Injuries	11	12	10	8.8
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	6	4	6	4.0
Pedestrians	6	6	4	5.6
Bicyclists	0	2	0	0.0

* Before columns show the crash history for each of the three years immediately prior to project implementation. After column shows number of crashes since implementation (through November 2009) at annual rate. See page 72 for further information on crash data source and analysis methodology. The sum of the three specific categories may not equal "Total Crashes with Injuries" because some crashes involved injuries in multiple categories.

Curb extensions that were installed at four locations helped reduce crossing distances by up to 20 feet.

Vanderbilt Avenue

Purpose

- Expand traffic calming efforts that began in 2006
- Improve pedestrian safety
- Improve bicycle infrastructure and expand bicycle network

Outreach

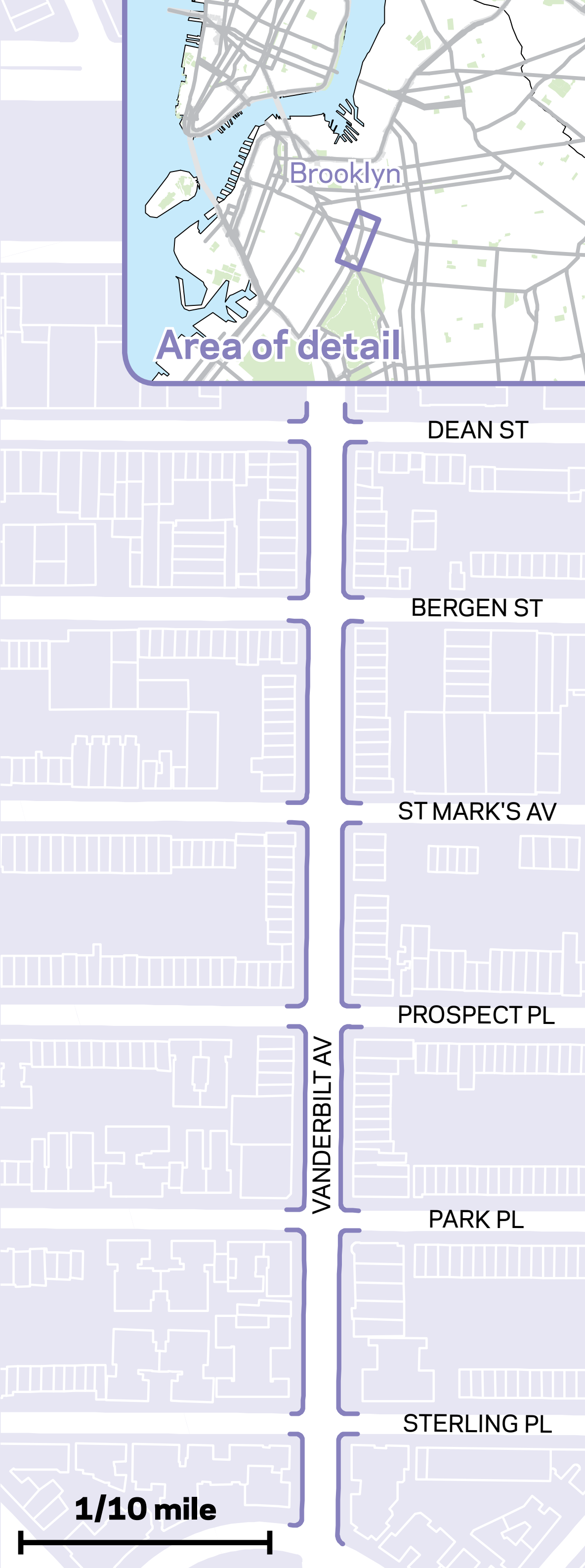
- Presented plans to Community Board 8 and local elected officials
- The proposal received a positive response

Approach

- Installed bike lane after repaving Vanderbilt Avenue
- Built raised island/medians with landscaping
- Changed parking regulations to complement other improvements

Results

- Bicycle ridership increased by almost 80%
- Greened corridor; improved pedestrian environment
- Crashes involving injuries fell below pre-2006 average



This section of Vanderbilt Avenue is a wide, north-south street that connects Atlantic Avenue to Grand Army Plaza in the Prospect Heights section of Brooklyn. It has been a commercial corridor for the neighborhood with basic amenities and the addition of more restaurants, shops and other small businesses in recent years makes it an active pedestrian street.

Brooklyn's Vanderbilt Avenue is a growing commercial corridor with significant pedestrian activity. In order to make the street a safer and more welcoming place for pedestrians, DOT instituted a traffic calming scheme in spring 2006 which reduced speeds significantly without affecting traffic volumes. Prior to the redesign the average speed was 34 m.p.h. The average speed decreased to 28 m.p.h. after the traffic calming. Eliminating a travel lane will often decrease the speeding associated with passing other vehicles. There were small fluctuations in traffic volumes after the changes.

In order to build on the success of the 2006 traffic calming efforts, DOT proposed further improvements in spring 2008 aimed at enhancing the streetscape and pedestrian environment and providing a dedicated space for cyclists.

DOT made a presentation to Brooklyn's Community Board 8 in April 2008 for replacing the painted medians with concrete islands/medians and adding a striped bike lane. The proposal was received positively. Also present at that meeting were members of the local New York Police Department (NYPD) precinct and City and State elected officials.

Prior to the 2006 improvements Vanderbilt had two travel lanes in each direction and curbside parking. After the traffic calming project, the curbside parking remained but now there was only one travel lane in each direction separated by a painted median and left turn bays. The 2008 project decreased the width of the travel lanes and the center buffer to make space for a five foot bike lane. The new bike lanes provide important links to the bike network, namely the bike lanes on Dean and Bergen Streets, around Grand Army Plaza and in Prospect Park.

Another important element of the 2008 project was to make the center buffers a more permanent feature. A raised concrete median was constructed between Prospect Place and St. Marks Avenue. Refuge islands were built on the south side of Park Place and Dean Street and the north side of Bergen Street.

DOT also changed the parking regulations along four blocks of Vanderbilt Avenue; on three blocks the parking restrictions were removed during the morning and along one block evening parking restrictions were upgraded to 24-hour restrictions.

To assess the 2008 project DOT analyzed data from the NYPD on the number of crashes involving injuries along the study area (Vanderbilt Avenue from Dean Street to Sterling Place) and collected data on the number of cyclists using the new lanes.

The newly designed Vanderbilt Avenue accommodates all users and has not impacted congestion.

Crashes with Injuries along Vanderbilt Avenue Dean Street to Sterling Place

	Before			After		
Year	2004	2005	2006	2007	2008	2009
Total Crashes with Injuries	10	7	2	1	2	2
Number of Crashes with Injuries to:						
Motor Vehicle Occupants	8	4	0	0	2	2
Pedestrians	2	2	1	1	0	0
Bicyclists	1	1	1	0	0	0

The initial traffic calming was implemented in May 2006. The data for each year was collected from June of the prior year to May of the year indicated, e.g. 2004 is data from June 2003 through May 2004. The sum of the three specific categories may not equal "Total Crashes with Injuries" because some crashes involved injuries in multiple categories. See page 72 for further information on crash data source and analysis methodology.

80% increase in cyclists using Vanderbilt Avenue after bike lane was installed.

Following the installation of the new bike lanes there was an 80% increase in the number of cyclists. There were 558 cyclists observed along Vanderbilt Avenue prior to the installation of the new bike lane. In the same time period a year later 1,004 cyclists were observed using the newly installed bike lane. This increase is likely the result of providing a dedicated space for cyclists. A less measurable but equally important benefit that comes with the new bike lanes is the improved connections it provides for cyclists moving throughout Brooklyn.

Crash rates showed an unusually high level of variation prior to the 2006 traffic calming, ranging as high as 21 in 2000 and 10 in 2003. From 2007 to 2009, crash rates were below the pre-2006 average. (for crash analysis methodology, see page 72)

The benefits of an increase in bicyclists and improved environment came without reducing the street's ability to carry traffic. This project has recreated a section of the street network to better serve all users.

Northbound Vanderbilt Avenue Traffic Volumes
Park Place to Dean Street

	Before	After	% Change
7-10 a.m.	790	773	-2%
4-7 p.m.	390	357	-9%
Daily	390	376	-4%

Before data collected in 2005. After data collected in 2007 following installation of the painted median. Daily represents volumes between 5 a.m. and 12 a.m. Volumes shown in average vehicles per hour.

Southbound Vanderbilt Avenue Traffic Volumes
Dean Street to Park Place

	Before	After	%Change
7-10 a.m.	447	470	5%
4-7 p.m.	883	803	-9%
Daily	488	497	2%

Before data collected in 2005. After data collected in 2007 following installation of the painted median. Daily represents volumes between 5 a.m. and 12 a.m. Volumes shown in average vehicles per hour.

Refuge islands and a landscaped median improve the environment for this retail and pedestrian corridor.

Skillman and 43rd Avenues: Sunnyside Connector

Purpose

- Reduce traffic speeds
- Improve pedestrian safety
- Expand bicycle network connections

Outreach

- DOT presented plans to Community Board 2 in April 2008 and received feedback

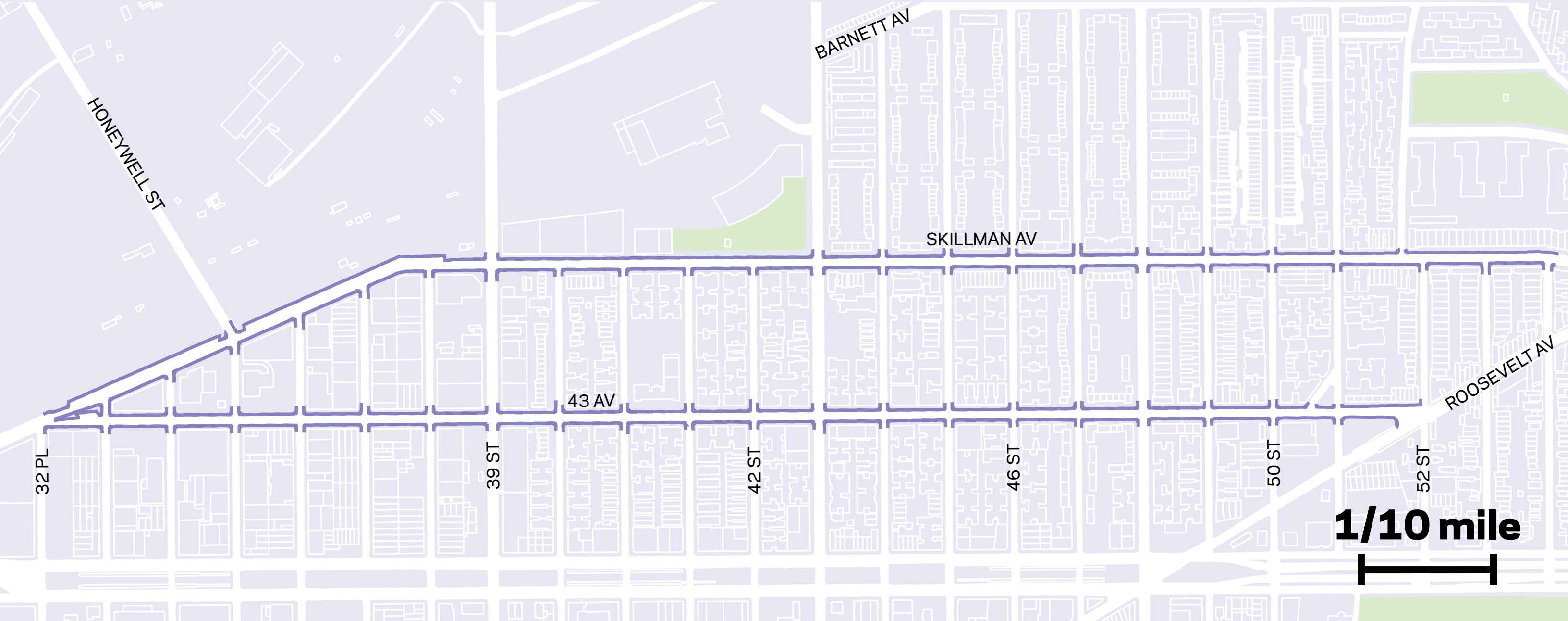
Approach

- Adjusted traffic signal progressions
- Installed on-street bike lanes and signs

Results

- Average speeds reduced by 18% between 9 a.m. and noon
- 65% reduction in the number of crashes involving injuries to pedestrians; 49% reduction in crashes with injuries to motor vehicle occupants
- Bicycle connectivity improved; added five miles to the bicycle network
- Responded to community concerns about traffic speeds

Skillman and 43rd Avenues, parallel routes to Queens Boulevard in Sunnyside and Woodside, Queens, are wide, straight roadways where many vehicles traveled above the 30 m.p.h. speed limit. Both are lined with a diversity of uses including residences, retail commerce, schools and parks. High vehicle speeds along the corridors put pedestrians and cyclists at risk, and the community was concerned about the effect speeding was having on safety along the corridor.



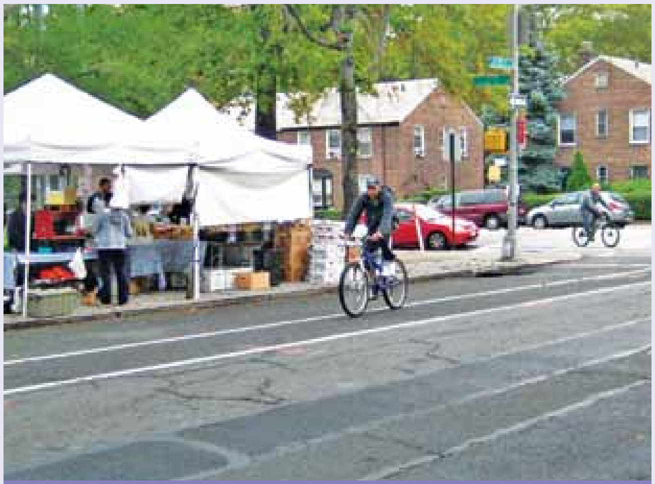
Skillman and 43rd Avenues are used by motorists as a less congested alternative to Queens Boulevard, even though these streets are much more like "community streets" than thoroughfares. Both are wide roads which led to speeding.

In order to address this problem DOT proposed traffic calming measures. DOT informed Community Board 2 (CB2) of planned changes to street operations by letter in February 2008 and in a presentation to CB2 in April 2008, and answered questions and received feedback.

DOT made adjustments to the traffic signal progressions, narrowed the travel lanes and installed on-street bike lanes. This program was implemented in two phases: first with signal modifications, and then with the addition of bike lanes and street signs. These actions were intended to reduce vehicle speeds, provide pedestrians with more signal time to cross the street and improve bicycle connectivity through Queens.

In March 2008 DOT adjusted the traffic signals along the corridor by timing the progressions (the rate at which signals turn green in succession) for vehicles traveling below the speed limit. In May 2008 the bike lane segments were installed, completing a continuous five-mile link from Flushing Meadows Corona Park to Manhattan via the Queensboro Bridge.

The changes made to these roadways achieved reductions in the speeds of motor vehicles at most times of the day while not impacting the overall traffic capacity. Because DOT adjusted the signal progression before installing the bike lanes, the results from each change could be measured separately. The results from the signal modifications were clear. Speeds were lower at four of five locations on Skillman Avenue and all four locations on 43rd Avenue. The subsequent addition of bike lanes helped to reduce speeds even further. The



Cyclists use new bike lanes along Skillman Avenue in Sunnyside.

Crashes with Injuries along Skillman and 43rd Avenues between 32nd Place and 52nd Street

	Before* (three previous years)			After
Total Crashes with Injuries	46	43	33	22.6
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	28	28	19	12.7
Pedestrians	15	12	9	4.2
Bicyclists	3	5	5	5.6

* Before columns show the crash history for each of the three years immediately prior to project implementation. After column shows number of crashes since implementation (through November 2009) at annual rate. See page 72 for further information on crash data source and analysis methodology. The sum of the three specific categories may not equal "Total Crashes with Injuries" because some crashes involved injuries in multiple categories.

Adjustments to signal timing and installation of striped bike lanes have reduced average speeds by 18% between 9 a.m. and noon.

most recent data shows average speeds at some locations decreased by more than 20%, which meant vehicles were driving on average 10 m.p.h. slower by fall 2008.

The total number of crashes involving injuries showed a statistically significant reduction from an average of 40 per year in the three prior years to an annual rate of 22.6 since project implementation The number of crashes involving injuries to pedestrians and motor vehicle occupants also decreased to a statistically significant degree (for crash analysis methodology, see page 72).

By formalizing an already well used bicycle route with striping and signs, including a direct route to the Queensboro Bridge, the connectivity to the larger bicycle network was improved and the route was made safer for cyclists. The project also assisted in calming traffic, specifically through speed reductions achieved from signal timing modifications. Both actions combined to improve the corridor and address community concerns.

Skillman Avenue Average Morning Traffic Speeds (in m.p.h.)

	Before	After 1	After 2
33rd Street to 32nd Street	32.6	31.8	30.7
39th Street to 38th Street	26.9	27.9	25.6
43rd Street to 42nd Street	30.9	24.5	23.3
47th Street to 46th Street	30.2	22.4	19.4
52nd Street to 51st Street	26.3	24.8	24.4

Before speed data collected in March 2008; traffic signals adjusted the end of March 2008, bike lanes installed in June 2008. After 1 collected in April 2008 following traffic signal adjustment; After 2 collected August 2008 following bike lane installation. All data collected weekdays between 9 a.m. and noon.

43rd Avenue Average Morning Traffic Speeds (in m.p.h.)

	Before	After 1	After 2
35th Street to 36th Street	27.6	23.0	21.9
39th Place to 40th Street	28.1	24.1	22.0
44th Street to 45th Street	28.0	21.7	22.5
48th Street to 49th Street	27.1	24.5	22.8

Before speed data collected in March 2008; traffic signals adjusted the end of March 2008, bike lanes installed in June 2008. After 1 collected in April 2008 following traffic signal adjustment; After 2 collected August 2008 following bike lane installation. All data collected weekdays between 9 a.m. and noon.

Westbound Skillman Avenue Traffic Volumes (average vehicles per hour)

Location	Time	Before	After	% Change
52nd Street to 51st Street	7 - 10 a.m.	435	531	22%
	12 - 2 p.m.	319	352	10%
	4 - 7 p.m.	371	439	18%
47th Street to 46th Street	7 - 10 a.m.	467	500	7%
	12 - 2 p.m.	314	319	2%
	4 - 7 p.m.	321	355	10%
43rd Street to 42nd Street	7 - 10 a.m.	620	728	17%
	12 - 2 p.m.	382	433	13%
	4 - 7 p.m.	393	466	19%
Average	7 - 10 a.m.	508	586	15%
	12 - 2 p.m.	339	368	9%
	4 - 7 p.m.	362	420	16%

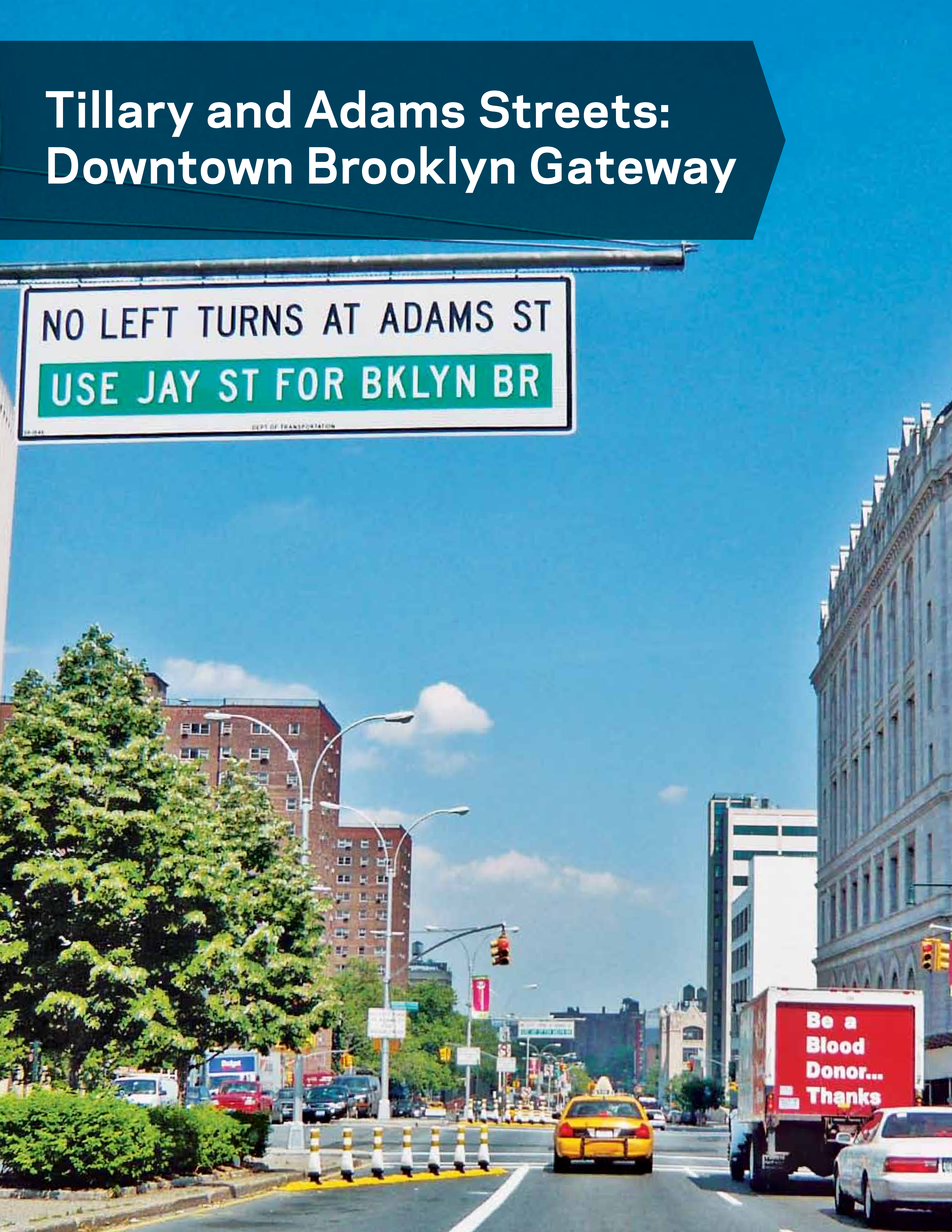
Before data collected in July 2007. After data collected in May 2008. Volumes shown in average vehicles per hour.

Eastbound 43rd Avenue Traffic Volumes (average vehicles per hour)

Location	Time	Before	After	% Change
39th Place to 40th Street	7 - 10 a.m.	298	315	6%
	12 - 2 p.m.	405	383	-5%
	4 - 7 p.m.	629	660	5%
44th Street to 45th Street	7 - 10 a.m.	293	294	0%
	12 - 2 p.m.	385	363	-6%
	4 - 7 p.m.	653	627	-4%
48th Street to 49th Street	7 - 10 a.m.	294	345	17%
	12 - 2 p.m.	415	437	5%
	4 - 7 p.m.	689	683	-1%
Average	7 - 10 a.m.	295	318	8%
	12 - 2 p.m.	402	394	-2%
	4 - 7 p.m.	657	657	0%

Before data collected in July 2007. After data collected in May 2008. Volumes shown in average vehicles per hour.

Tillary and Adams Streets: Downtown Brooklyn Gateway



Purpose

- Reduce congestion at this busy intersection
- Improve safety for pedestrians, cyclists and motorists
- First step in a larger plan to make this a true gateway to Brooklyn

Outreach

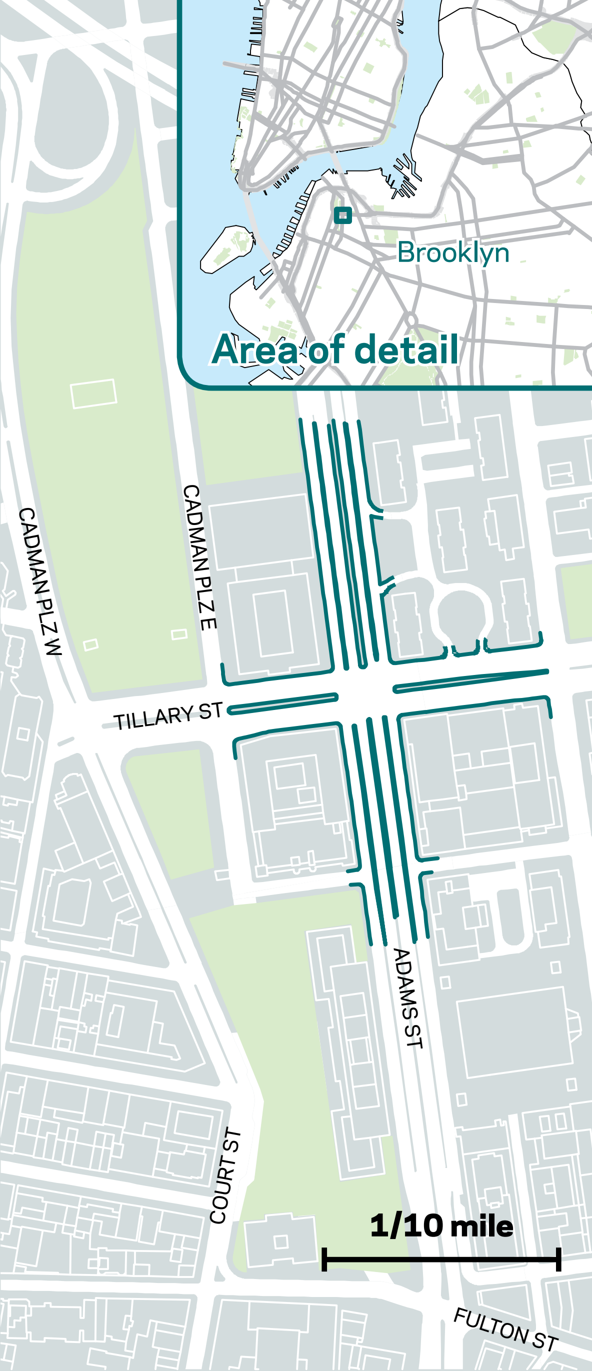
- DOT presented plans to the Community Board 2's transportation committee in April 2008; received feedback that was incorporated into the plan
- The project was implemented in June 2008 as a six-month pilot
- The community board supported making the pilot permanent after DOT presented traffic impacts in December 2008
- DOT continues to consult with the community as a conceptual plan is developed for future capital construction at the intersection

Approach

- Prohibited some left turns (northbound and eastbound)
- Reduced signal phases from five to four
- Installed new signs and markings
- Rerouted northbound and eastbound traffic to underutilized, nearby streets

Results

- Vehicle delays were reduced by 45% during both morning and evening peak hours
- Eastbound volumes decreased by 26% during morning peak and by 19% during evening peak hour
- Left-turn prohibitions at Adams and Tillary had little impact on the surrounding streets



The intersection of Tillary and Adams Streets is a key gateway to downtown Brooklyn. It has been a focus of DOT's efforts to ease traffic congestion in downtown Brooklyn while also creating a more welcoming place for cyclists and pedestrians. This project focused on safety and congestion concerns at this heavily traveled intersection, while DOT develops plans for a larger transformation of the road network for the entire area.

The basic goal of this project was to simplify this congested and confusing intersection. By prohibiting turning movements, the number of conflicts between vehicles and vehicles, and vehicles and pedestrians was decreased. This allowed more cars to move through the intersection, which decreases delays caused by the queues that form behind left-turning vehicles. It also makes the intersection safer for pedestrians. Two left turn movements were eliminated: northbound vehicles on Adams Street (Brooklyn Bridge Bound) were prohibited from turning west onto Tillary Street and eastbound vehicles on Tillary Street were prohibited from turning north onto Adams Street toward the Brooklyn Bridge.

DOT also modified the signal timing. Southbound left turns off the Brooklyn Bridge and northbound right turns from Adams Street to Tillary Street were given additional "green time" to reduce congestion. The community had concerns that prohibiting left turns onto Adams Street Brooklyn Bridge Approach would increase congestion on the surrounding road network, so eastbound vehicles were permitted to make U-turns at the Tillary and Jay Streets intersection. Five signal phases were reduced to four which allowed for additional crossing time on the west, south and north crosswalks.

Finally, to complement these changes DOT installed signs and striping to notify drivers of the new traffic pattern, specifically to alert northbound vehicles on the mainline Adams Street roadway that the slip ramp to the service road at Fulton Street is the last place to exit for vehicles not intending to cross the Brooklyn Bridge.

The changes to roadway operations created safer and more accommodating movements for pedestrians, cyclists and motorists alike.

The pilot project reduced vehicle delays at this intersection without producing significant changes to the surrounding street network. The post-implementation data showed that prohibiting the specific left turns allowed more vehicles to move through the intersection while decreasing the overall congestion. Vehicle delays at the Tillary and Adams Streets intersection were reduced by 45% during both morning and evening peak hours. During the morning peak, total delays reduced by 46 seconds.

Flexible delineators installed in left lane on northbound Adams Street to prevent left turns onto westbound Tillary Street.

Vehicle delays were reduced by 45% at the Tillary and Adams Streets intersection while overall congestion was reduced at the same time.

In the evening peak, the total delay decreased by 1 minute, 2 seconds. Operations at the other intersections in the study area were also improved.

The number of pedestrians who moved through the intersection in the peak hours was about the same. Crash rates were about the same in the first year after implementation as before.

These improvements are just the beginning of a more comprehensive transformation of this gateway to downtown Brooklyn that DOT is planning along with many stakeholders from the community. At a planning charrette held in January 2009, participants from the community provided feedback that DOT incorporated into a conceptual plan that was shown to the public in June 2009. DOT continues work with the community in designing a new plan for capital construction at this intersection for 2012.

Tillary and Adams Streets Travel Delays

	Before	After	%Change
8-9 a.m.	01:46	01:00	-43%
5-6 p.m.	02:13	01:11	-47%
Total	03:59	02:12	-45%

Before data collected in June 2008. After data collected in October 2008.
Times shown in minutes, seconds.

Traffic Volumes: Weekday Evening Peak Hour

	Before	After	%Change
Adams Street SB	1241	1567	26%
Tillary Street WB	479	665	39%
Adams Street NB	797	881	11%
Tillary Street EB	721	583	-19%

Before data collected in June 2008. After data collected following implementation in October 2008

Traffic Volumes: Weekday Morning Peak Hour

	Before	After	%Change
Adams Street SB	1194	1296	9%
Tillary Street WB	485	618	27%
Adams Street NB	776	790	2%
Tillary Street EB	709	531	-25%

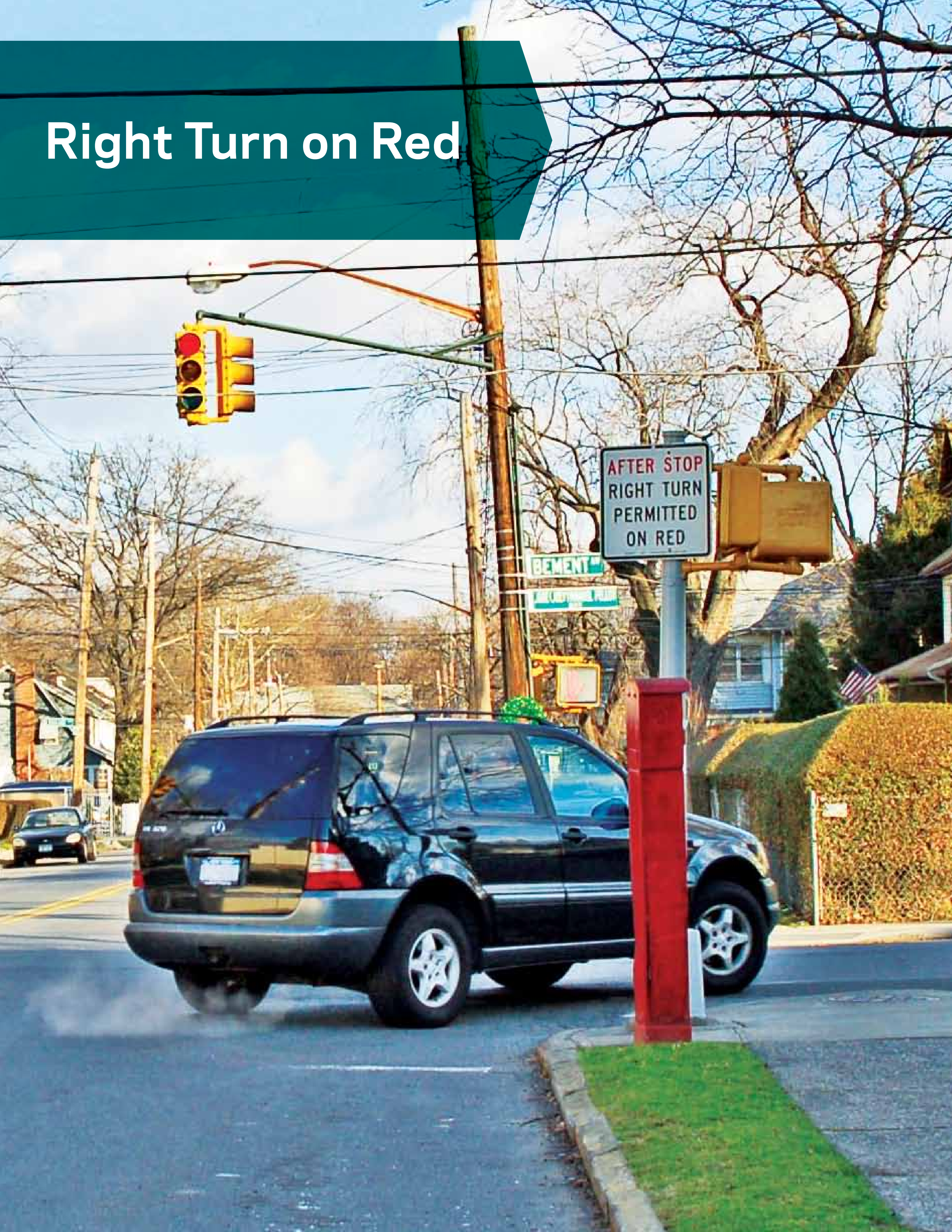
Before data collected in June 2008. After data collected following implementation in October 2008

Crashes with Injuries at Tillary and Adams Streets

	Before* (three previous years)			After
Total Crashes with Injuries	18	13	23	18.4
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	14	10	20	15.5
Pedestrians	2	1	1	1.4
Bicyclists	2	2	2	1.4

* Before columns show the crash history for each of the three years immediately prior to project implementation. After column shows number of crashes since implementation (through November 2009) at annual rate. See page 72 for further information on crash data source and analysis methodology. The sum of the three specific categories may not equal "Total Crashes with Injuries" because some crashes involved injuries in multiple categories.

Right Turn on Red



Purpose

- Improve travel time by reducing delay at red lights, without compromising safety
- Reduce congestion by decreasing approach delays
- Lower fuel consumption and emissions from cars idling at signals

Outreach

- Responded to a desire that community members and elected officials had expressed for many years
- Discussed by the Mayor's Staten Island Transportation Task Force
- Provided frequent updates as part of the Task Force process between 2006 and 2008

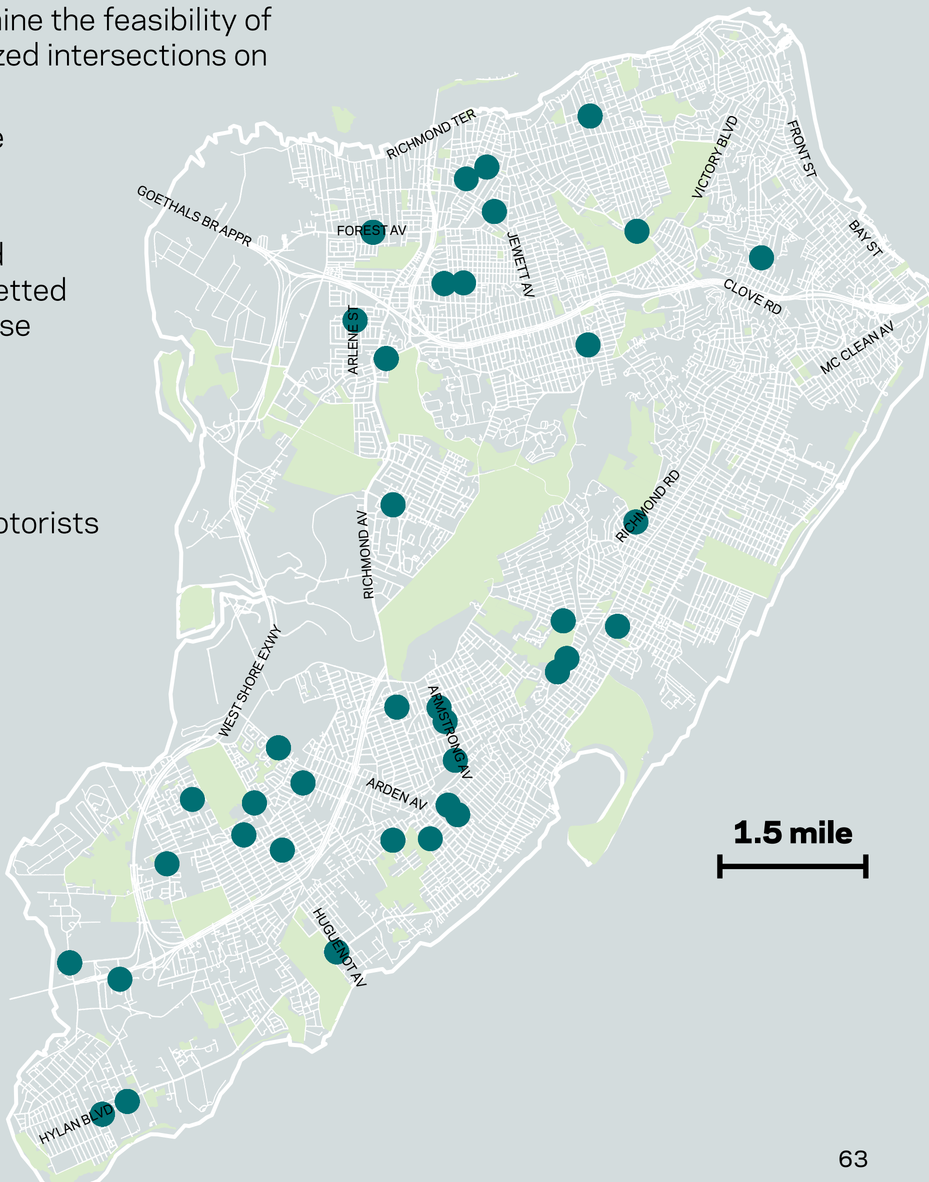
Approach

- Conducted extensive analysis to examine the feasibility of Right Turn on Red (RTOR) at all signalized intersections on Staten Island
- Designed comprehensive, quantitative methodology to ensure safety and operational feasibility
- Two-tiered screening process ensured that every intersection was properly vetted and identified without having an adverse operation or safety risk

Results

- Reduction in delays at red lights for motorists making a right turn
- Accident rates not affected

The practice of allowing right turns on red lights (RTOR) was adopted by localities across the nation in the 1970s, but are not generally allowed in the five boroughs of New York City. DOT conducted a rigorous study to identify specific intersections on Staten Island where RTOR could safely be allowed to help reduce motorist delay at red lights.



Right Turn on Red

Unlike many North American cities, Right Turns on Red (RTOR) are severely restricted in New York City. Within the five boroughs, this movement is permitted only where posted and has been most prevalent in Staten Island, where lower traffic and pedestrian volumes allow for the safe movement of both vehicles and pedestrians. This project, one of the major initiatives implemented as part of the Mayor's Staten Island Transportation Task Force program, built upon strong support and interest by elected officials and Staten Island residents looking for opportunities to improve traffic flow throughout the borough.

Prior to the initiation of the study in 2006, 134 of the boroughs 501 signalized intersections permitted a RTOR, typically on a single approach. This borough-wide study developed an analytical process to identify locations where RTOR could be permitted. By applying a comprehensive strategy to evaluate and install RTOR, it was believed that these improvements would allow for improved intersection capacity, lower approach delays and reduced fuel consumption, while ensuring the safety of pedestrians crossing the street.

Primary concerns in allowing RTOR include the potential adverse impacts this movement could have on pedestrian safety, especially at locations where pedestrian volumes are substantial, as well as at school crosswalks, senior centers and high volume shopping areas. There are also concerns regarding non-compliance or the failure of drivers to come to a complete stop prior to executing their turn. Finally the magnitude of conflicting traffic volumes may not allow for the safe execution of RTOR due to insufficient gaps in the intersecting traffic flow.

Beginning in fall 2006, DOT began conducting a thorough engineering study to evaluate all the signalized intersections and individual approaches where RTOR should be permitted.

The overall study was built around a two-tiered review process that would qualify an intersection to be considered as a potential RTOR location. The initial assessment considered surrounding land uses, accident history, roadway geometries and the presence of a school crosswalk or signal phasing that allowed for leading pedestrian intervals or an

New signs were installed at the 56 approaches on Staten Island where RTOR is now allowed.

Crashes with Injuries Intersections allowing Right Turn on Red

	Before* (three previous years)			After
Total Crashes with Injuries	22	33	38	26.2
Number of Crashes with Injuries to:				
Motor Vehicle Occupants	17	31	32	19.1
Pedestrians	5	2	5	6.5
Bicyclists	0	0	1	1.1

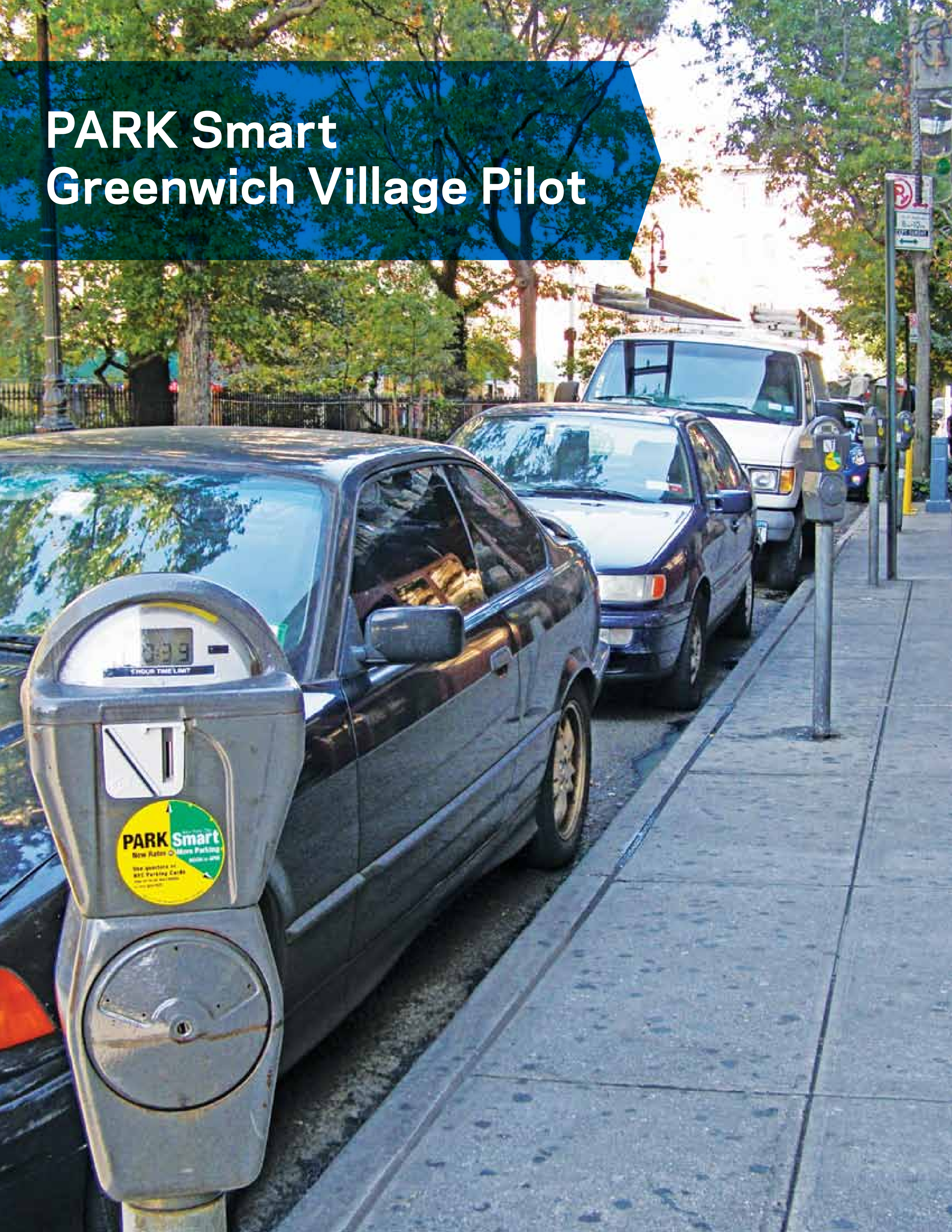
* Before columns show the crash history for each of the three years immediately prior to project implementation. After column shows number of crashes since implementation (through November 2009) at annual rate. See page 72 for further information on crash data source and analysis methodology. The sum of the three specific categories may not equal "Total Crashes with Injuries" because some crashes involved injuries in multiple categories.

Allowing Right Turn on Red responds to community requests, improves intersection capacity and reduces delays and fuel consumption.

exclusive pedestrian phase. This eliminated 235 intersections and 890 approaches. The remaining 296 intersections and 1,075 approaches underwent a second screening analysis that examined the operational and engineering characteristics of each location. This included a more detailed review of accident histories, pedestrian volumes, operational constraints, sight distances and frequency of gaps in the traffic stream. This process removed an additional 258 intersections. Upon completing the two-rounds of screening, 56 approaches at 38 intersections were selected as intersections where RTOR was implemented. Most of the new RTOR movements involved turns from a major onto a minor street.

The intersections where RTOR is allowed have not seen significant changes in the overall number of crashes, nor in the number of crashes involving injuries to pedestrians. (for crash analysis methodology, see page 72)

PARK Smart Greenwich Village Pilot



Purpose

- Pilot an innovative parking management program with community support
- Increase the availability of curbside, metered parking
- Reduce double-parking, traffic and pollution caused by drivers searching for an available parking space

Outreach

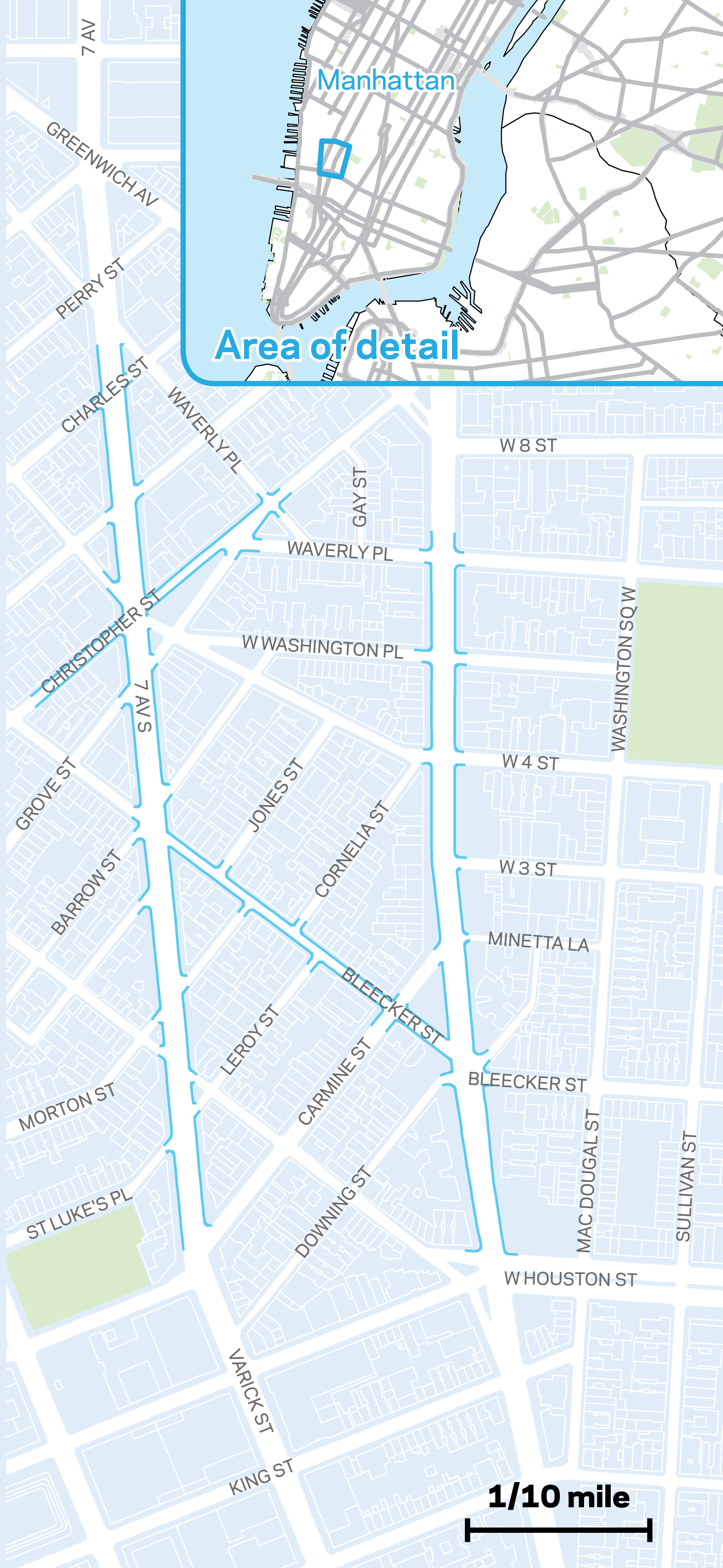
- Engaged Community Board 2 (CB2) and local merchant group in the development of a pilot program
- Shared the results of parking study of the area with CB2 and local business leaders to gain their support
- Community board supported pilot and based on results, supported making the program permanent and expanding the boundaries

Approach

- Increased parking meter rates during the peak period (noon to 4 p.m.)
- Conducted outreach with local merchants to inform them and their customers of the new rate
- Collected data at one-month and six-month stages to monitor the impact of the program

Results

- PARK Smart meters show an increase in the number of available parking spaces as compared with pre-implementation levels
- Parking space occupancy declined from 77% to 71% on Tuesdays and from 75% to 69% on Fridays while the peak rate is in effect
- Motorists were parking for somewhat shorter periods



Greenwich Village is a vibrant neighborhood with a diverse mix of uses. The main north-south roadways of Seventh Avenue and Avenue of the Americas are lined with restaurants and shops while the side streets are more residential. As in many similar neighborhoods, the demand for parking is often so high, however, that drivers have trouble finding a space near their destination.

DOT has 89,000 on-street and off-street metered spaces in New York City, most of which are in commercial and shopping areas located throughout the five boroughs. Metering of parking spaces is designed to encourage turnover of parked vehicles and provide the opportunity for different shoppers use the same parking spot over the course of the day. The demand for parking is often so high, however, that drivers have trouble finding a space near their destination. The result can be that drivers circle the block to find an available space, creating unnecessary traffic congestion and air pollution. Out of frustration at the lack of available parking, drivers may be discouraged from patronizing local businesses. Moreover, when parking spaces are not available, drivers may double park and block traffic. These conditions also make bus service slower and less reliable, thus making buses less attractive to potential riders.

In order to address these issues, DOT developed the PARK Smart program, which consists of six peak-rate parking pilots in neighborhoods around the city. The goals of PARK Smart are to increase the availability of parking spaces in commercial areas, thereby improving traffic flow and safety by reducing double parking and cruising. To achieve this, the price of on-street metered parking is set based on the level of demand for parking, particularly during the afternoon peak hours when parking demand is heaviest.

Each PARK Smart pilot is developed based on interest from community boards and merchant representatives. Throughout the project, implementation is carried out in close consultation between DOT and these groups. Outreach and media attention are important in notifying drivers and the community of the new rates and policies. DOT also conducts an extensive evaluation of the pilot, collecting data on parking occupancy, turnover and traffic volumes, and surveys drivers, merchants and shoppers. The public engagement and data collection programs are funded by a grant from the United States Department of Transportation Value Pricing Pilot Program.

For the first PARK Smart pilot, in Greenwich Village, DOT met with Manhattan Community Board 2 (CB2) and the local Chamber of Commerce in spring 2008. These groups expressed interest in developing a pilot in Greenwich Village. DOT conducted a study of the area and presented the results to the transportation committee of CB2. DOT and CB2 devised the boundaries of the pilot, hours of operation and rate in a collaborative process. In July 2008 the transportation committee and full community board adopted a resolution in support of the final plan. Prior to implementation, DOT staff visited businesses in the area to explain the program. The pilot began in October 2008.

The pilot area covered portions of Seventh Avenue from Charles to Houston Streets and Sixth Avenue from W. 4th to Houston Street and included all meters on streets between these avenues. The rate was increased when demand for parking is greatest (noon to 4 p.m.) from $1/hour to $2/hour. The rate remained at the pre-existing rate of $1/hour at all other times that meters are in effect. The pilot ran for six months from October 2008 to March 2009.

PARK Smart increases the availability of curbside parking by raising parking meter rates during the peak period.

Weekday parking availability improved six percentage points as a result of the PARK Smart pilot in Greenwich Village.

Under the PARK Smart rate structure, the number of available parking spaces increased compared with pre-implementation levels. This is due to the higher rate of turnover at spots in the PARK Smart area. Parking space occupancy improved from 77% to 71% on Tuesdays and from 75% to 69% on Fridays during the noon to 4 p.m. period (while the peak rate is in effect). Occupancies were only slightly changed on Saturdays, with occupancies at PARK Smart meters increasing from 67% to 71%, reaching an occupancy rate comparable to the weekday level.

Overall, motorists were parking for a somewhat shorter amount of time. The proportion of vehicles parked for less than one hour increased from 48% to 60%, while the proportion of vehicles parked for more than one hour decreased from 52% to 40%.

In June 2009, DOT returned to CB2 to discuss making the program permanent, and any changes that might be appropriate. CB2 adopted a resolution in support of making the program permanent, expanding the boundaries north to 14th Street, and making the rate structure consistent with a citywide increase in parking meter rates. The permanent rates in Greenwich Village are $3/hour during the noon to 4 p.m. peak and $2/hour at all other times that meters are in effect.

A second PARK Smart pilot began in Park Slope, Brooklyn, in May 2009. Results of this pilot will be discussed in a future report.

Average Occupancy at PARK Smart Meters

	Before Noon			Noon to 4 p.m.			After 4 p.m.		
	Base	One Mo.	Six Mo.	Base	One Mo.	Six Mo.	Base	One Mo.	Six Mo.
Tues.	61%	56%	58%	77%	66%	71%	66%	60%	61%
Fri.	57%	71%	63%	75%	71%	69%	70%	75%	68%
Sat.	41%	N/A	37%	67%	N/A	71%	78%	N/A	81%

Base data collected in September 2008. One-month snapshot collected in November 2008. Six month data collected in March 2009.

Appendix: Traffic and Transit Trends

Citywide trends
(All data in thousands)

Year	New York City population	New York City employment	Citywide traffic *	Transit ridership **
1990	7,336	3,564		5,206
1991	7,375	3,373		5,047
1992	7,429	3,280		4,977
1993	7,506	3,289	4,066	5,086
1994	7,570	3,320	4,089	5,236
1995	7,633	3,337	4,137	5,259
1996	7,698	3,367	4,186	5,187
1997	7,773	3,440	4,286	5,424
1998	7,858	3,527	4,401	5,893
1999	7,948	3,619	4,503	6,335
2000	8,018	3,718	4,528	6,737
2001	8,071	3,689	4,423	6,921
2002	8,094	3,581	4,495	6,979
2003	8,144	3,531	4,559	6,801
2004	8,184	3,549	4,581	6,919
2005	8,214	3,602	4,534	7,069
2006	8,251	3,666	4,516	7,205
2007	8,275	3,745	4,497	7,401
2008	8,364	3,790	4,405	7,638

* Sum of all daily weekday traffic volumes at Borough and City boundaries
** Sum of average daily boardings on NYCT subways and buses, MTA Bus local routes, and privately operated local buses

Travel into the CBD
(All data in thousands)

Year	Ferry ridership in NYC	Daily vehicles entering the CBD	Daily transit riders entering the CBD	CBD commuter cycling*
1990	87	760	2,174	3.3
1991	84	759	2,154	3.6
1992	81	776	2,127	4.3
1993	81	761	2,157	4.5
1994	82	754	2,206	4.9
1995	82	771	2,210	5.2
1996	84	776	2,237	5.6
1997	84	808	2,249	5.2
1998	85	835	2,294	5.1
1999	103	843	2,431	4.7
2000	85	824	2,517	4.8
2001		689	2,390	4.9
2002	129	785	2,441	6.0
2003	119	810	2,392	6.9
2004	102	814	2,454	7.4
2005	100	798	2,472	7.7
2006	97	794	2,566	8.4
2007	101	783	2,683	9.3
2008	105	754	2,743	12.3

* This figure is for cyclists entering and leaving the Manhattan core at the East River bridges, Hudson River Greenway at 50th Street, and on the Staten Island Ferry, weekdays from 7 a.m. to 7 p.m. The values for 1990 until 2006 are based on a three year rolling average; the value for 2007 is the average of 3 counts taken in May, August and September of that year; the value for 2008 is the average of 10 counts taken between April and October.

Daily vehicle traffic into the CBD, by sector of entry
(All data in thousands)

Year	New Jersey	60th Street	Queens	Brooklyn
1990	101	349	104	206
1991	98	357	104	200
1992	101	382	108	185
1993	102	370	107	182
1994	104	358	107	185
1995	104	361	117	189
1996	100	375	119	182
1997	101	377	131	199
1998	102	389	138	206
1999	112	393	135	203
2000	105	387	131	201
2001	60	369	127	133
2002	97	377	133	178
2003	103	383	139	185
2004	102	384	133	195
2005	101	377	133	187
2006	103	364	141	186
2007	102	353	136	192
2008	101	341	132	180

Daily transit riders into the CBD, by sector of entry
(All data in thousands)

Year	New Jersey	60th Street	Queens	Brooklyn
1990	264	754	521	598
1991	257	764	522	579
1992	250	747	503	594
1993	254	755	515	601
1994	272	790	521	593
1995	269	800	525	587
1996	283	799	525	601
1997	299	785	534	601
1998	292	795	552	624
1999	312	866	571	645
2000	332	877	596	682
2001	325	843	553	668
2002	335	869	559	645
2003	333	857	526	647
2004	350	864	535	674
2005	356	876	553	656
2006	372	911	557	695
2007	390	926	597	738
2008	388	977	596*	746

* The data used to compile this list comes from the NYMTC Hub Bound report. Past years have been updated to reflect corrections. Queens bus ridership increases reflects increases in Q60 and Q101 ridership as reported by MTA Bus Co.

Travel outside the CBD
(All data in thousands)

Year	Daily vehicle traffic outside the CBD *	Daily bus ridership **
1990		
1991		
1992		
1993	3,305	
1994	3,335	
1995	3,366	
1996	3,410	
1997	3,478	
1998	3,566	1,749
1999	3,660	1,883
2000	3,704	1,983
2001	3,734	2,080
2002	3,710	2,131
2003	3,749	2,062
2004	3,767	2,077
2005	3,736	2,115
2006	3,722	2,160
2007	3,714	2,192
2008	3,651	2,262

* Sum of all daily traffic volumes at borough and city boundaries, excluding volumes at points entering the Manhattan CBD
** Sum of all average daily boardings on local bus routes operated by NYCT, MTA Bus Company, and private operators. During years for which complete data are only available for NYCT local routes (2002-05), private and MTA Bus local route data are estimates

Daily vehicle traffic outside the CBD, two-way vehicle volumes at borough or city boundaries *(All data in thousands)*

Year	Nassau-Queens	The Bronx-Manhattan	The Bronx-Queens *	Verrazano Narrows Bridge
1990		540		
1991				
1992		537	272	183
1993	892	542	266	178
1994	897	526	274	181
1995	893	522	277	185
1996	896	531	273	185
1997	907	547	272	183
1998	920	560	286	195
1999	947	563	291	195
2000	940	579	295	203
2001	947	569	294	219
2002	944	552	300	212
2003	969	550	299	206
2004	966	552	312	206
2005	959	561	297	194
2006	935	557	309	207
2007	952	558	304	201
2008	952	539	309	204

* Sum of two-way daily traffic on the Throgs Neck, Bronx-Whitestone, and Triboro Bridge (Bronx toll plaza only)

Daily bus ridership outside the CBD, by borough*
(All data in thousands)

Year	Upper Manhattan **	The Bronx	Queens	Brooklyn	Staten Island
1990					
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998	96	453	515	602	83
1999	109	483	556	648	89
2000	116	505	589	680	93
2001	122	528	614	721	96
2002	128	535	623	749	96
2003	126	515	599	728	93
2004	131	523	593	737	93
2005	132	529	620	741	94
2006	130	543	647	744	96
2007	130	545	685	736	97
2008	130	567	725	740	100

* Average daily boardings on NYCT, MTA Bus, and private local bus routes **Includes data only from routes that operate exclusively north of 60th Street in Manhattan

Daily vehicle traffic outside the CBD, two-way vehicle volumes at borough or city boundaries *(All data in thousands)*

Year	George Washington Bridge	Westchester-The Bronx	Staten Island-New Jersey	Queens-Brooklyn
1990	273			
1991				
1992	268		145	
1993	261	506	141	519
1994	260	516	144	537
1995	266	532	144	547
1996	275	548	147	554
1997	282	555	152	580
1998	297	566	157	587
1999	318	584	167	595
2000	318	591	165	614
2001	309	607	177	612
2002	311	620	179	592
2003	319	620	175	612
2004	315	627	174	615
2005	304	633	172	615
2006	312	625	176	601
2007	291	636	170	601
2008	293	599	166	590

Methodological Notes for Crash Data

Crash (accident) data reported in the Project Indicators section is derived from accident reports filed with NYPD. Accident reports are primarily completed by police officers at the scene although they may also be filed by private citizens, generally those involved in the accident. Information from crash reports is entered into an NYPD database. The NYPD database includes the location, time, and number of injuries in all crashes reported to the NYPD. No distinctions of severity are made among the reported injuries. "Non-reportable" crashes, which by definition involve no personal injuries and property damage of less than $1,000, are not included in the NYPD database. There is also no distinction between intersection and midblock crashes, so data on all the crashes along a corridor may include midblock crashes on the adjacent perpendicular blocks, thereby slightly overestimating the total number of crashes on the corridor. Before-and-after analyses of NYPD crash data is considered reliable since the same methodology is used for all data.

The tables in the Project Indicators section show the number of crashes in each of the three years prior to project implementation and after implementation. The "after" data is generally for 12 to 18 months, up through November 2009. "After" data is reported at an annual rate.

In analyzing crash data, DOT took account of the annual variability in crashes over the 10 years prior to project implementation, and trends in the number of crashes citywide. The result of the analysis shows whether differences between the pre- and post-implementation crash rates are statistically significant, using a 90% level of confidence. The text notes where statistically significant changes occur.

The analysis of crash data comprises an initial assessment of project impacts. A more definitive analysis requires several years of post-implementation data to determine whether a significant change in the crash rate occurred after implementation. Note that in many cases, the post-implementation rate based on about one year of data is not statistically significant, but would be statistically significant if the post-implementation crash rate is sustained over several years.

List of Abbreviations

BID	Business Improvement District
BRT	Bus Rapid Transit
CBD	Central Business District (Manhattan south of 60th Street, river to river)
GPS	Global Positioning System
MTA	Metropolitan Transportation Authority
NYCT	New York City Transit
NYCDOT	New York City Department of Transportation
NYMTC	New York Metropolitan Transportation Council
NYPD	New York City Police Department
NYSDMV	New York State Department of Motor Vehicles
NYSDOT	New York State Department of Transportation
SBS	Select Bus Service
TLC	New York City Taxi and Limousine Commission
TSP	Transit Signal Priority
USDOT	United States Department of Transportation

New York City Department of Transportation

Janette Sadik-Khan
Commissioner

Bruce Schaller
Deputy Commissioner
Planning and Sustainability

This report was developed by the New York City Department of Transportation's Division of Planning and Sustainability. Deputy Commissioner Bruce Schaller directed the project team which consisted of Michael Amabile, Tom Maguire, Mike Marsico, Catherine Matera and David Stein. Design by Ben Killen and David Moidel of DOT Creative Services.

In addition, the following DOT officials and staff members provided content and input in the creation of this document:

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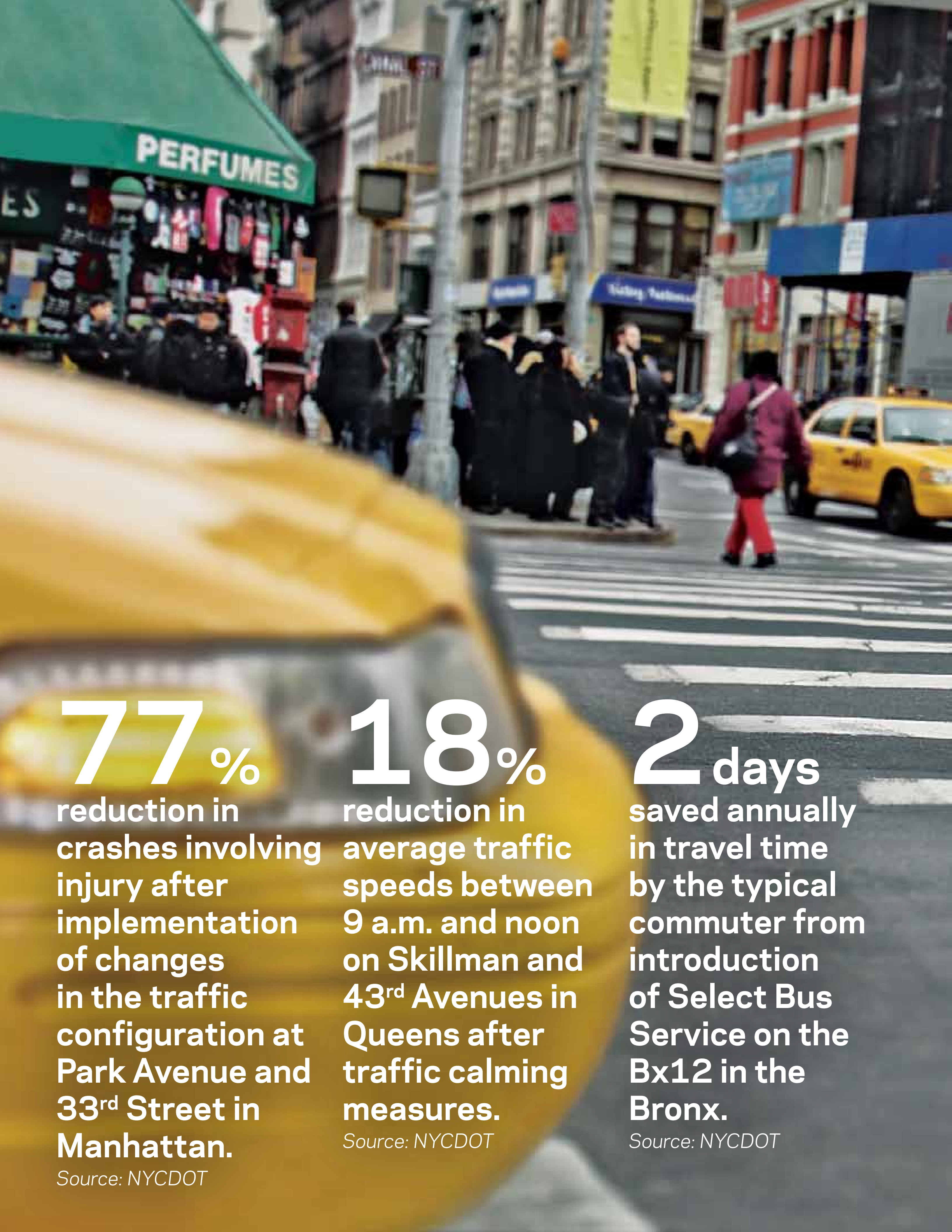


77%
reduction in crashes involving injury after implementation of changes in the traffic configuration at Park Avenue and 33rd Street in Manhattan.
Source: NYCDOT

18%
reduction in average traffic speeds between 9 a.m. and noon on Skillman and 43rd Avenues in Queens after traffic calming measures.
Source: NYCDOT

2 days
saved annually in travel time by the typical commuter from introduction of Select Bus Service on the Bx12 in the Bronx.
Source: NYCDOT

15k

square feet of new plaza space created in the Bronx Hub, a busy commercial area and bus and subway transfer point.

Source: NYCDOT

80%

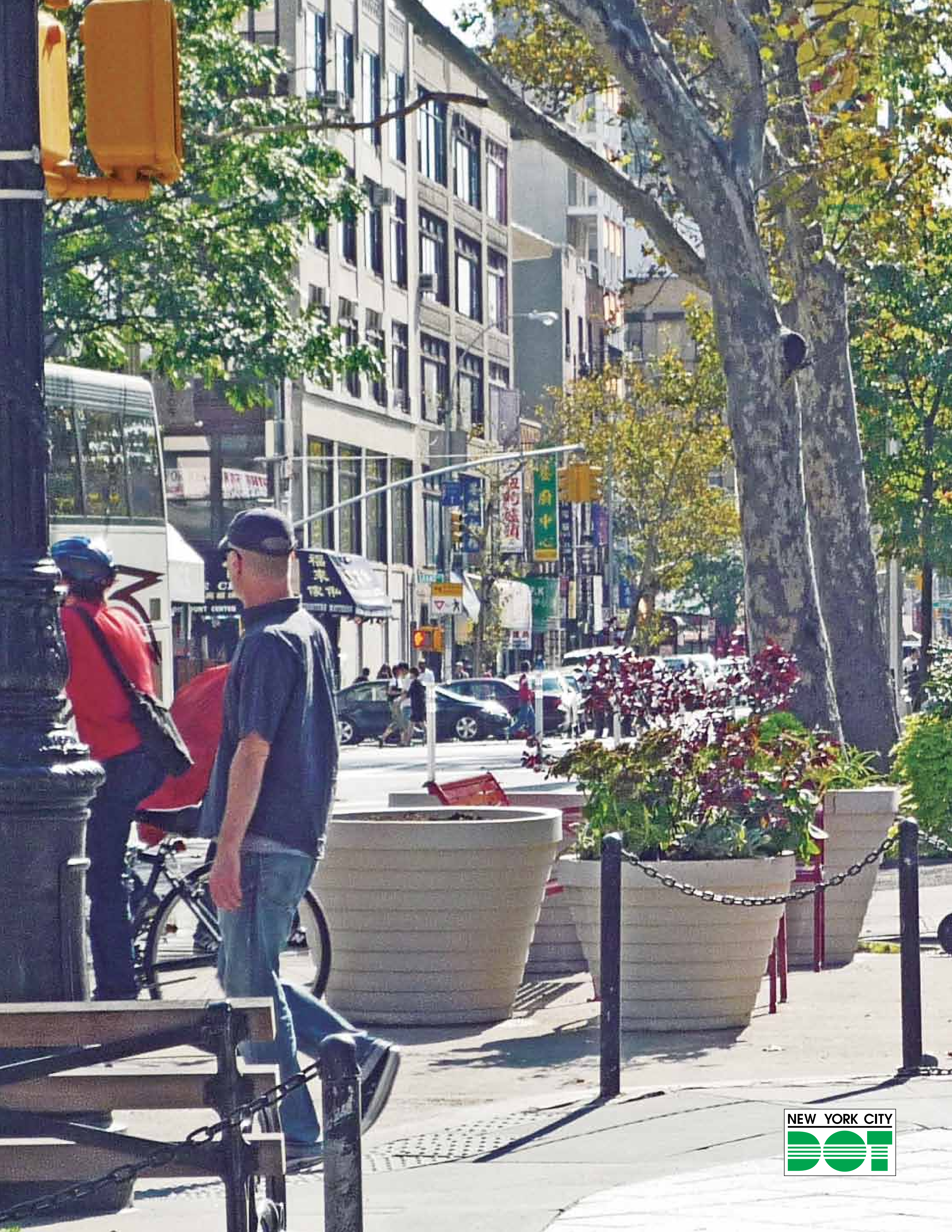
increase in cycling on Vanderbilt Avenue in Brooklyn after traffic calming and bike lanes implemented.

Source: NYCDOT

45%

reduction in vehicle delays at the Tillary and Adams Street intersection near the Brooklyn Bridge after operational and safety changes

Source: NYCDOT



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