

Sustainable Streets: 2013 and Beyond

New York City Department of Transportation



Sustainable Streets: 2013 and Beyond



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Acknowledgments

Letter from the Mayor

Dear Friends:



This progress report from the New York City Department of Transportation caps a remarkable period of progress and innovation. I want to thank and congratulate Commissioner Sadik-Khan and the entire DOT workforce for their untiring efforts to provide safe, attractive streets and to keep New Yorkers moving.

The city enjoyed rapid growth and development in the 2000s and has weathered the Great Recession better than much of our country. We have a bright, prosperous future ahead, in part because we have striven to manage growth in ways that improve our quality of life and reduce congestion. That is why our long-range plan for sustainable development, PlaNYC, called for new priorities in transportation, which the Department of Transportation has delivered.

New York cannot grow without becoming more efficient, and the good news is that public transit has accommodated most of our growth in travel over the past decade. We need to ensure that this trend continues, and that we continue to develop travel options that take maximum advantage of the city's density. Our Select Bus Service is speeding travel and attracting riders in all five boroughs, at relatively low cost. Local bike lanes and CitiBike stations expand the reach of public transit—bike parking demand is heavy at many subway stations, and about half of CitiBike users say they ride to or from a transit stop. A transportation system that offers more choices and allows New Yorkers to better tailor the means of travel to the trips they need to make creates a more efficient, attractive, and stronger city.

The economic case for safer, more attractive, and functional streetscapes could not be stronger, as the extensive documentation developed by DOT around its projects makes clear. Creating more attractive city streets adds value—retail rents in Times Square, for example, have more than doubled since we created major new public spaces there in 2009. DOT has shown that this is equally true in other areas where we have implemented better bus service, safe cycling networks, and new public spaces.

The innovations launched by DOT are now seen around the world. Chicago has fully adopted our design for protected bike lanes. Buenos Aires uses our techniques for making intersections safer and simpler. “Overnight” pedestrian plazas can be found in Philadelphia, Los Angeles, and Mexico City. If all the world's a stage, New York is certainly at its center. As this report makes clear, the Department of Transportation has helped position New York City as a global leader in the growing effort to create thriving, livable, and sustainable 21st century cities.

Sincerely,

A handwritten signature in black ink, reading "Michael R. Bloomberg". The signature is fluid and cursive, with the first name "Michael" being the most prominent.

Michael R. Bloomberg
Mayor

Commissioner's Introduction

Dear fellow New Yorkers:

It has been a unique honor to serve as the City's Transportation Commissioner for the past six and a half years. At the Department of Transportation, we have sustained and expanded the never-ending work to repair streets, sidewalks, bridges and ferries. We have also implemented extensive changes in City policy, remaking streets and intersections for greater safety, providing efficient right-of-way for buses and bicyclists, and treating streets as places whose design and appearance matter.

I want to offer my profound gratitude, admiration and respect for the men and women of the Department of Transportation who have brought these efforts and innovations to life, and made New York City a better place. From superstorm Sandy to CitiBike, from the Staten Island Ferry to the safest streets in the City's history, every division and unit within DOT has overcome tough challenges, delivered world-class projects and kept the City moving each and every day.

The innovative work we have done together has been widely acknowledged and acclaimed. One of the greatest testaments to our success is the large number of cities across the country and world adopting New York's designs for city streets, and our techniques for implementing changes quickly. Indeed, methods pioneered in the five boroughs are the foundation for a new urban street design guide issued by America's 15 largest cities.

Most importantly, New Yorkers themselves have embraced and adopted the policies and programs delivering safe streets, new public spaces, Select Bus and the bike lane network. They have made CitiBike their own, generating some of the world's highest bike share usage rates just a few months after the system's launch. Nothing happens in New York without vigorous conversation and some degree of contention, but all indicators, from the heavy use of new space and travel options to the number of applications and requests for projects and survey after survey of New Yorkers' views of our policies, shows very high support.

This book chronicles the implementation and the effects of these popular NYCDOT programs, and looks ahead to how they can be extended and strengthened in the future. We have made a tremendous start in forging a 21st Century streetscape and transportation system. If the past six years are any indication, New York's future is unquestionably bright.

Sincerely,



Janette Sadik-Khan
Commissioner



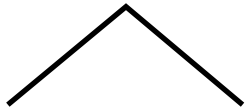


WRONG WAY

NO STOPPING ANYTIME

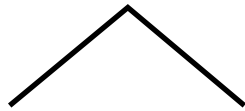
ONE WAY

Introduction



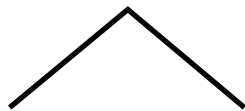
44

acres red painted
bus lanes since 2007



141

acres of bike
lanes since 2007



39

acres of road
repurposed for plazas,
public seating, refuge
islands, painted
extensions, medians,
and bulb outs since
2007

NYCDOT's 2008 Sustainable Streets Strategic Plan promised an innovative transportation policy that would deliver more varied and safer streets, improved mobility, more travel choices and progress on environmental sustainability. DOT's plan elaborated on Mayor Bloomberg's call in PlaNYC 2030 for a thriving, world-class 21st Century city based in part on more efficient transportation and a revitalized public realm.

DOT has not only delivered on this promise, it has created a new template for transportation policy that is being discussed and emulated across the world. During the past six years, NYC DOT has undertaken and implemented the most thorough rethinking and implementation of urban transportation priorities and streetscape design in a large American city in several generations.

Major achievements of this effort have been the reduction of annual traffic fatalities to the lowest levels ever seen in New York City, repurposing of extensive roadway area into public space, traffic calming features and additional room for pedestrians, creation of a new model of city bus service and large-scale expansion of bicycle transportation, as well as unprecedented levels of investment in the city's basic roadway, bridge and ferry infrastructure.

NYCDOT's initiatives have generated a heightened public conversation about street design and transportation policy. Ultimately, New Yorkers have embraced them with



tremendously positive responses. Demand for new public space and additional street safety improvements by elected officials and local stakeholders has filled project pipelines to overflowing. New public spaces are heavily used throughout the Five Boroughs, as is Select Bus Service wherever it has been implemented. Bicycle lanes are heavily used, with new routes in demand in many districts. Where professional pollsters have asked New Yorkers to weigh in on new DOT initiatives, from pedestrianizing Times Square to CitiBike, they have without exception responded with large majorities in the affirmative.

A major factor in winning public support has been DOT's innovative delivery of streetscape changes in the infrastructure equivalent of real time. Where traditional practice wades through years or even decades of planning studies and trial balloons which take the public completely out of the project development process, NYC DOT has pioneered the use of paint, planters and stone blocks to redefine street spaces virtually overnight. The proof of concept is not a computer model or engineering study, but real world performance that can be observed, debated, refined and adjusted before being built-out with permanent materials. This approach has changed urban street planning and practice forever, in both rich and poor cities. Today, one can find painted road-beds transformed into plazas or pedestrian safety areas in over a dozen U.S. cities, from Philadelphia to Los Angeles.

Addressing transportation, traffic safety and other challenges on New York City streets is a set of tasks with no beginning or end. In addition to chronicling the changes and successes of NYC transportation programs since the release of PlaNYC, this report looks ahead to future needs and issues. For example, as traffic fatalities and severe crashes become fewer in number, finding patterns that DOT can address with its programs becomes a greater challenge. Public demand for improvements like Select Bus routes, slow speed school and residential zones, public plazas, bicycle lanes and greater coverage for the CitiBike program are increasing. Infrastructure funding, including resources to replace temporarily defined street-space with permanent materials, is likely to be a persistent challenge, as the federal government continues its general retreat from its historic role as a major source of investment for roadways, bridges and mass transit, and as the City adds disaster resiliency to its already considerable list of priorities.

The Bloomberg Administration and NYC DOT have shown that updating and refocusing a large city's transportation policy is possible and need not to take decades to carry out. This report presents the methods, practices, designs and results from the street policies implemented in New York from 2007 to 2013. We believe these methods are highly replicable or adaptable to a wide variety of urban contexts around the world, and invite the reader to consider the content here in that vein.

In addition to the content presented in this document, DOT's accomplishments can be viewed online at nyc.gov/dot and, in map format, at sustainablestreets.info.

A high-angle, wide shot of a busy city intersection. In the background, a red steel truss bridge spans the street, with the words 'WILLIAMSBURG' visible on its side. Below the bridge, a multi-lane road is filled with traffic, including yellow taxis, a white van, and several cars. Pedestrians are walking on the sidewalks, and cyclists are riding on the street. A large, semi-transparent red triangle is superimposed over the center of the image, pointing downwards. The word 'Safety' is written in a white, serif font across the middle of this triangle. The scene is brightly lit, suggesting a sunny day.

Safety



Introduction

Public safety is the primary mission of government, and traffic safety on NYC streets is the over-arching mission of the New York City Department of Transportation. Improving safety performance permeates all of the work that the Department undertakes on City streets, highways, intersections and ferry infrastructure.

NYCDOT has established a remarkable record of success in traffic safety. The streets of America's largest city are dramatically safer than they were 20 and 10 years ago. From 1990 to 2012, annual fatalities involving all road users have dropped by 61%, and by 30% from 2001 to 2012. Most impressively, since 2004, the number of annual traffic deaths has been lower than 1910 levels, the first and previously lowest count on record. In 2011, the City experienced 246 traffic fatalities, an all-time record annual low.

DOT's challenge is to continue this success indefinitely, using all the analytical, engineering and regulatory tools at its disposal to deliver ever-safer streets.

In developing its 2008 Sustainable Streets strategic plan, the NYCDOT adopted clear goals for reducing traffic fatalities in New York, with the understanding that street design and other strategies can significantly affect the safety performance of a city street network. Cities and countries with strong, goal-oriented safety policies have increasingly assigned responsibility for such performance to the designers of the transportation system, rather than to its users.

Sustainable Streets set the goal of reducing annual traffic fatalities by 50% from 2007 to 2030. This provided New York City's street designers with clear annual targets—an average of a 3% annual drop in fatalities—that they strive to meet. Since 2007, DOT has embraced this mandate by undertaking the most ambitious and comprehensive set of traffic safety initiatives in the city's history, and in any large U.S. city. With hundreds of traffic calming projects, education campaigns, technological applications and stronger regulations such as lower speed limits, DOT has successfully reduced traffic fatalities to record low numbers.

One thousand New Yorkers are alive today who would not be if annual traffic fatalities had remained at the same levels seen in NYC a decade ago. Traffic risk per resident in New York City is lower than it has ever been before, even in the face of NYC's increasing population. At 3.1 fatalities per 100,000 in 2012, New Yorkers experience a fraction of the risk to residents of other big American cities, substantially lower than any of the next 20 largest U.S. cities.

Yet the costs of traffic crashes in NYC remain high. Most of those killed are in prime productive years and often have dependent family members. Traffic crashes are the third most frequent cause of death of New Yorkers ages 5 to 24, and second highest cause of injury deaths among adults over 45. Safety risks also tend to limit pedestrian trips for

Safer streets across New York City since 2007:

- **Implemented safety design on 137 street corridors and 113 intersections**
- **Installed 772 new traffic signals and 241 all way stop controls**
- **Implemented leading pedestrian intervals at 100 intersections to give pedestrians extra time and visibility when crossing the street.**
- **39 acres of road repurposed for plazas, public seating, refuge islands, painted extensions, medians, and bulb outs**
- **29 implemented or planned slow speed residential zones**
- **189 schools with reduced speed zones**
- **Added red light cameras at 50 intersections and new speed radar cameras at 20 locations**



High Crash Locations



Traffic Calming



Safe Routes to School



Slow School Zones



Residential Slow Zones



Safe Streets for Seniors



Bike Lane Network



Intersection Daylighting



Safe Routes to Transit



Public Campaigns



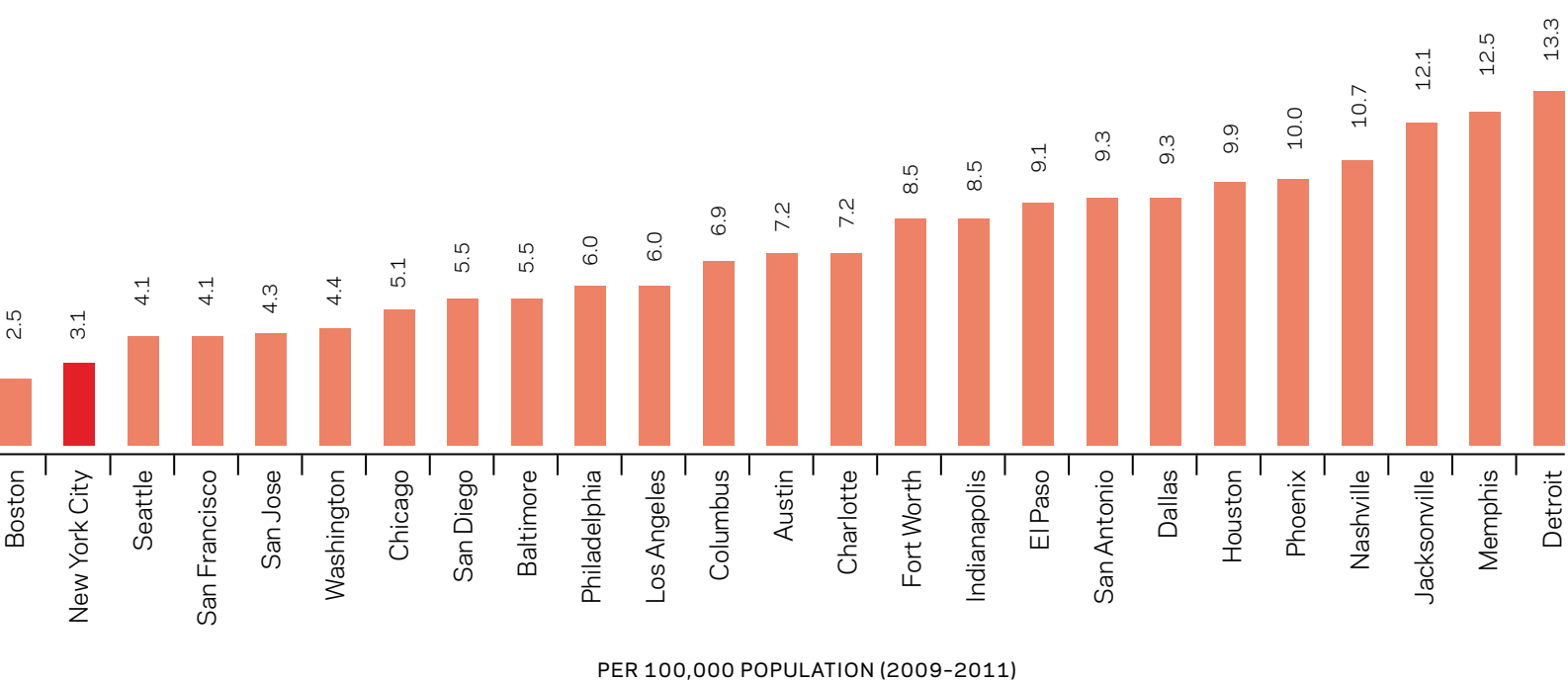
DOT Education

children and the elderly. On the other hand pedestrian-friendly streets promote walking and a higher likelihood of physical activity and healthy body-weight. They have also been linked to strong home values, a key factor in middle class retention.

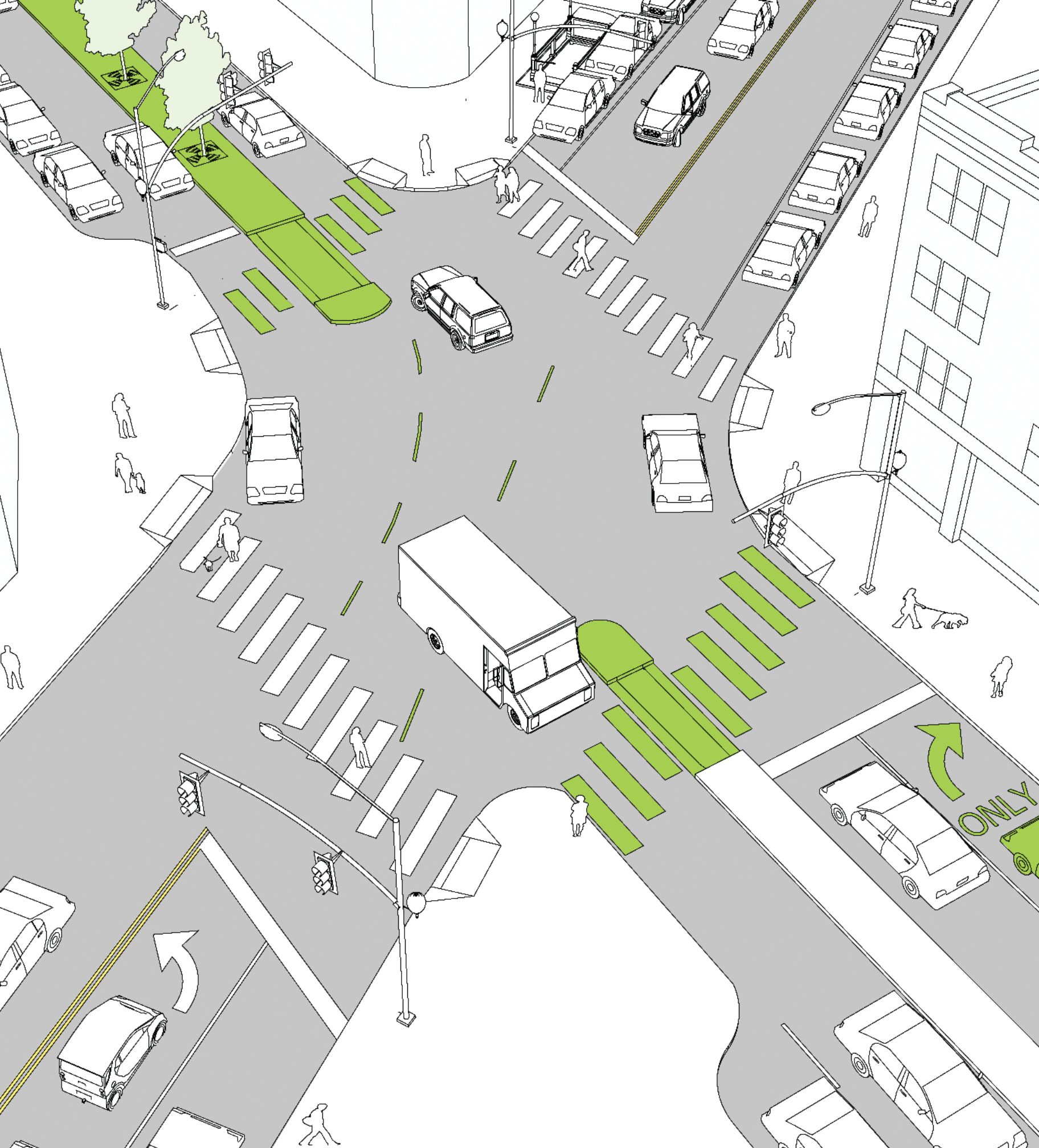
Improving street safety is critical to the transportation policies adopted in PlaNYC. In transportation, safety and sustainability go hand in hand. The City's policies to make

walking, cycling and transit use (which depends on walking) more widespread and attractive will only succeed as long as the environment for these activities is seen as safe by the public. As we chronicle throughout this report, New York is succeeding in these areas, in many cases dramatically so, but much work also remains. Continuing to meet the City's goal for progressively lower fatalities will require ongoing and steadfast commitment, analysis and innovation.

TRAFFIC FATALITY RATES OF 25 LARGEST US CITIES







Chapter 1

Designing Safe Streets

City streets are full of design cues that tell users what to do. Large, straight streets with wide lanes and minimal markings tell drivers that higher speeds are expected and hindrances to fast driving are not. Streets with proximity to high pedestrian activity and high-visibility crosswalks, sidewalks built out at corners, and markings that indicate the presence of buses and cyclists send a different message, not only to drivers but to all those who navigate the city streetscape. Street design can tell people outside of cars they are not welcome, or it can create a vibrant urban neighborhood, cultural district or place of commerce. When it comes to safety and how streets affect vehicle speeds and the interaction of vehicles, pedestrians and other street users, street design can literally make the difference between life and death. Designing safe streets for pedestrians and other vulnerable road users is critical for New York, where the large majority of street users and also most of the victims of traffic crashes are outside of motor vehicles.

In neighborhoods throughout the five boroughs, NYCDOT has undertaken street improvement projects meant to keep vehicle speeds within safe limits, to provide designs that increase the predictability of each type of street user and provide more and better-defined room for people on foot and using bicycles.

In total, NYCDOT has implemented 250 safety-focused street redesign projects, averaging 42 per year, since 2007. These elements are all defined in detail in NYC's official *Street Design Manual*, in its chapter on Street Geometry (see *Street Design Manual* in Infrastructure Section). Combining these features into plans that meet specific street conditions requires substantial traffic planning expertise. This work is carried out by NYCDOT's Traffic and Planning Division, which plans street geometry and is

At locations where major engineering changes have been made, fatalities have decreased by 34% since 2005

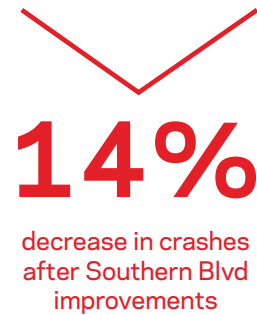
Standard features of NYCDOT safety projects:

- Intersection simplification
- Raised medians and or refuge islands
- Sidewalk extensions and widening
- Narrowing roadways with built or painted medians and wide parking lanes
- Bicycle network expansion
- Speed reducers
- High visibility markings and changes to signal timing

responsible for street markings, signage, traffic signals and speed reducers, and by DOT's Citywide Concrete program. The Traffic division also works with DOT's Capital Projects program to plan reconstruction projects that undertake more difficult and long-term projects such as moving curb-lines (to widen sidewalks or otherwise change street widths) that affect drainage and other assets below the street surface, to build these safety features into the permanent street infrastructure.

Street improvement projects with these features have worked. At locations where major engineering changes have been made, fatalities have decreased by 34% since 2005, twice as quickly as at all other locations. NYCDOT projects—ranging from the redesign of complex intersections to the implementation of pedestrian plazas and bus and bicycle lanes—have created tremendous safety benefits.





EXEMPLARY PROJECTS

The following descriptions show how DOT’s traffic experts combine street safety elements into create projects tailored to very specific conditions and issues in particular intersections and corridors on the streets of New York.



1 SOUTHERN BOULEVARD

Long crossing distances, vehicle pedestrian conflicts, traffic congestion and the complicated geometry of this South Bronx intersection made it particularly dangerous before 2010, when DOT implemented a thorough set of safety treatments. The junction of Southern Boulevard, Hunts Point Ave, and East 163rd Street created a five legged intersection at Cramers Square. The area has bus and subway stops that generate high pedestrian volumes. In response to community concerns about pedestrian safety and access, DOT conducted a public workshop and developed a plan to address dangerous conditions.

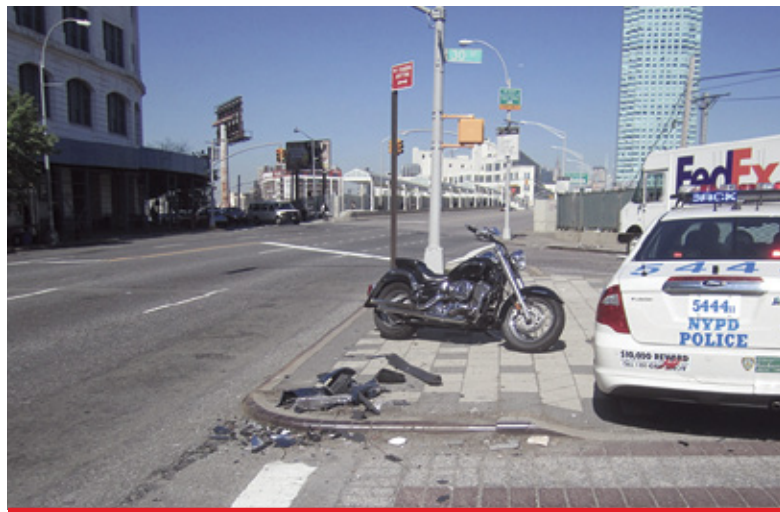
The project combined several traffic calming elements to improve safety, better connect pedestrian destinations, beautify the area, and reduce traffic congestion. In some

instances, pedestrians crossing distances were reduced by as much as 40 feet.

Following implementation, the number of crashes declined by 14% and travel speeds improved by 35% in the evening rush.

The work narrowed Southern Boulevard and installed painted medians, pedestrian refuge islands and left turn bays. The pedestrian plaza at Cramers Square was expanded, shortening pedestrian crossing distances. DOT simplified signal phasing and eliminated low volume turns in Cramers Square and converted Hoe Avenue to one way. The project demonstrates how signal timing changes and relatively inexpensive materials such as pavement markings and carefully placed concrete can significantly improve pedestrian access and safety.

Speeding decreased dramatically and safety was greatly improved as a result of the changes on East 180th Street



BEFORE: Thompson Avenue



AFTER: Thompson Avenue

2 EAST 180TH STREET

East 180th Street was the fifth highest crash location per mile in the Bronx, with 19 severe injuries or fatalities between 2004 and 2008. Extra wide travel lanes of 17 feet and low traffic volumes encouraged drivers to speed along the 1.2 mile corridor.

To calm traffic, DOT narrowed each of the moving lanes from 17 to 11 feet. The excess space allowed the creation of a 10 foot painted center median with 21 left turn bays and wide parking lanes. DOT also upgraded the crosswalks with high visibility markings.

The changes reduced speeding dramatically, with major improvement in safety performance. Only 1% of vehicles in the eastbound direction and 8% of vehicles in the westbound direction were found to be speeding after implementation, compared to 30% and 40% before. Pedestrian injuries fell by 67% after the improvements, from an average of 14.3 per year to 4.8 per year.

3 SKILLMAN, 43RD AND THOMPSON AVENUES

Two DOT projects made a high traffic area in Queens safer for pedestrians, cyclists, and drivers. They led to a 65% reduction in the number of crashes involving injuries to pedestrians and 49% reduction in crashes with injuries to motor vehicle occupants.

Skillman Avenue and 43rd Avenue were used by motorists as an alternative to Queens Boulevard, creating dangerous conditions for pedestrians. In 2009, DOT narrowed travel lanes, installed on-street bike lanes, and made signal modifications to give pedestrians more time to cross the

street. The improvements reduced average vehicle speed by 18% in the mornings.

Additional changes were made nearby, at the intersection of Skillman and Thompson, after a reckless driver killed a 16 year old boy and injured 5 other people, including 4 college students. The intersection was improved with left turn bans, and a slip street was closed and turned into a public plaza to reduce turning conflicts and provide additional space for pedestrians. New planters in the plaza helped beautify the intersection.



21%

decrease in crashes
after Delancey Street
improvements

4 DELANCEY STREET

In response to crash data and community calls for a safer street, DOT implemented comprehensive safety and traffic flow improvements for Delancey Street.

The upgrades included shortening many crosswalks along the corridor with neckdowns, clarifying and delineating travel lanes, improvements to traffic signal timing and a new plaza and streetscape treatments at the entrance to the Williamsburg Bridge. Nine months after the project, total crashes decreased by 21%. The busy street is a key east-west artery for Manhattan and serves Williamsburg Bridge traffic.

Projects such as those profiled here are identified and developed through continual analysis of safety performance on NYC streets, including screens for crash history, severity and causes. This analytic work is described in depth in Chapter 2 below.



BEFORE: Delancey Street



AFTER: Delancey Street

Crashes have fallen 60% since Safe Streets for Seniors was implemented in the Lower East Side

PROTECTING VULNERABLE STREET USERS

NYCDOT maintains safety programs designed specifically to improve the safety of groups with special vulnerability in traffic.



Pedestrian crossing distance significantly reduced on Fort George Avenue

SAFE STREETS FOR SENIORS

DOT launched Safe Streets for Seniors in 2008 to respond to the disproportionate number of New Yorkers over age 65 in the City's traffic fatality totals. Where people over 65 make up 12% of New York's population, seniors on foot represented 36% of traffic fatalities in 2012. Safe Streets for Seniors aims to counter this imbalance, and has succeeded in reducing the city-wide rate since 2008, with marked gain in some districts.

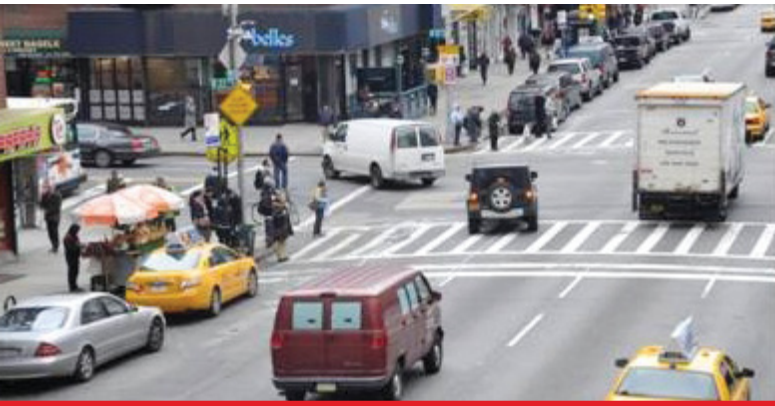
The effort began by combining demographic analysis with data on intersection and corridor crash histories to identify districts where senior pedestrians are most at risk on City streets. The initial analysis identified 25 areas throughout the five boroughs for priority street redesign and other work. Improvements in these areas included 154 new pedestrian

safety islands and new or expanded medians to shorten crossing distances and provide safe spaces for slower moving pedestrians. DOT extended curbs at 13 points for similar reasons. Another 16 roadway segments were narrowed with new markings, including painted medians, to calm traffic.

Senior pedestrian fatalities in the City are down since the program was launched. The 2012 level was 18% below that in 2008. Additionally, the crashes that lead to traffic fatalities are down significantly in many of the program's focus areas. Along Rutgers Slip in the Lower East Side, crashes leading to injuries are down by 42%, while all crashes have fallen 60% since implementation of Safe Streets for Seniors improvements. At Bowne Street in Flushing, injuries have fallen 43% since program implementation.

84%

decrease in pedestrian injuries at 7th Ave and W 23rd St



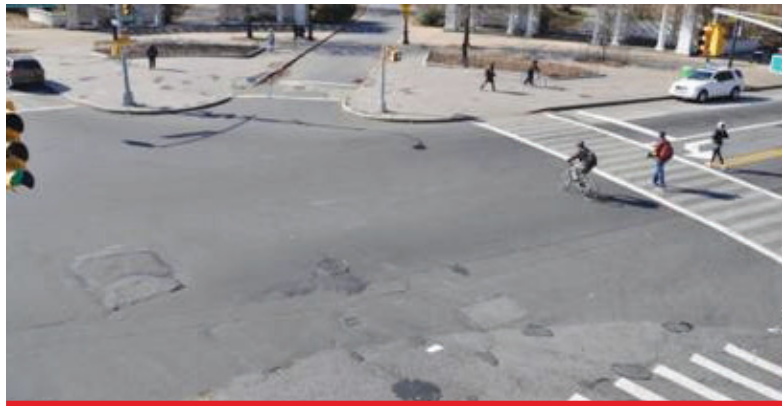
BEFORE: 23rd Street and 7th Avenue



AFTER: 23rd Street and 7th Avenue

17%

decline in injuries on W Fordham Road



BEFORE: Flatbush and Ocean Avenue



AFTER: Flatbush and Ocean Avenue

Project Examples

In the Fordham/University Heights senior pedestrian focus area, DOT closed a slip lane, extended curbs and added two pedestrian refuge islands in the junction of Sedgwick Avenue and West Fordham Road in 2010. Injuries at the intersections are down

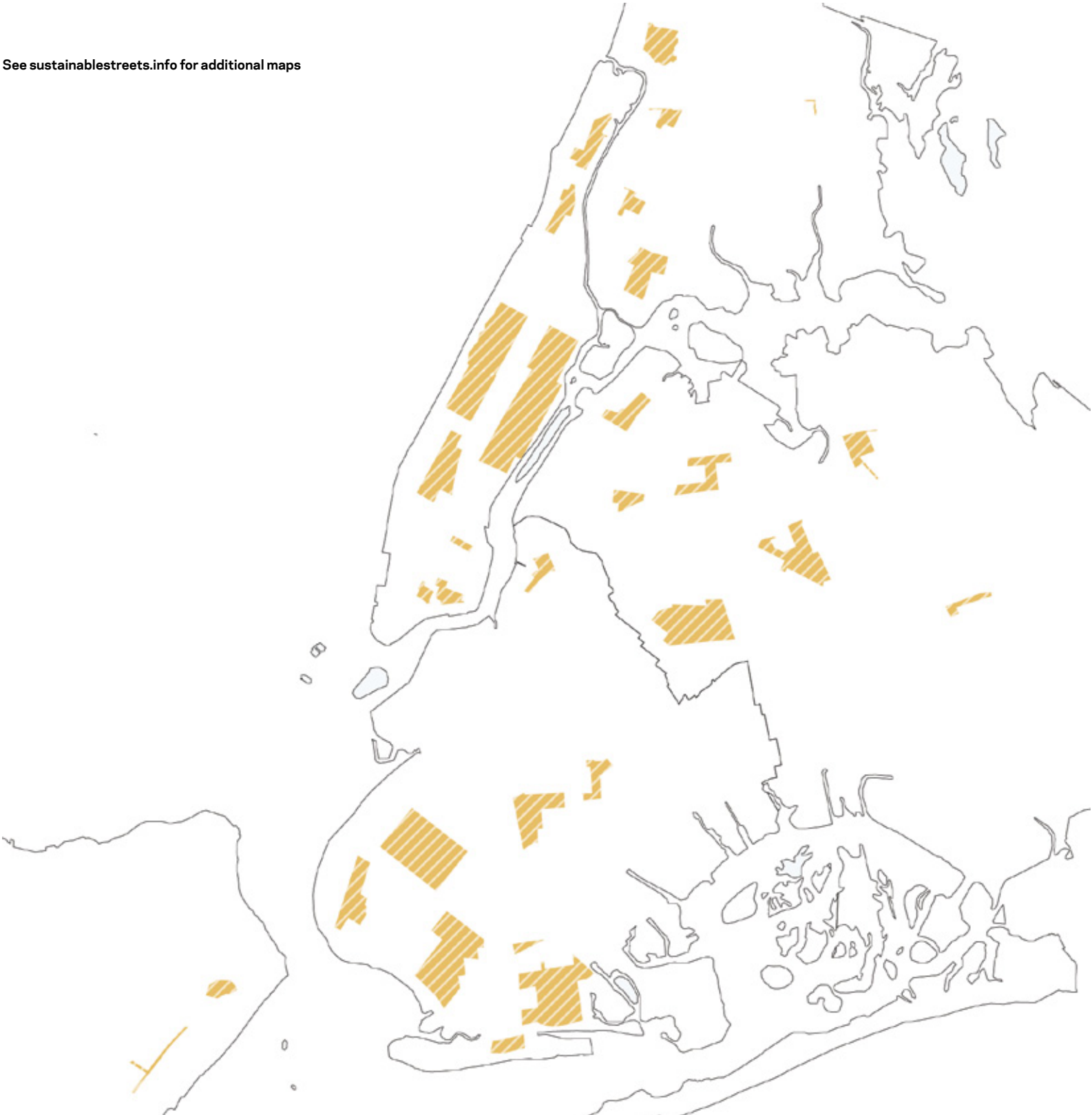
by 17% since the improvements. In 2011, DOT installed two pedestrian islands, separated left turns from mixed traffic, installed audible pedestrian signals and increased pedestrian time at crossing signals at 7th Avenue and West 23rd

Street in Chelsea. All injuries at the intersection have dropped 93% since the improvements, with pedestrian injuries down 84%. DOT expanded Safe Streets for Seniors in 2012 adding senior focus areas for pedestrian safety

improvements in Kingsbridge, Bronx, Manhattan Valley, East Harlem and the Upper East Side in Manhattan, Astoria, Forest Hills and Middle Village in Queens, Flatbush, Bay Ridge, Bath Beach and Kings Bay in Brooklyn and South Beach in Staten Island.

SAFE STREETS FOR SENIORS FOCUS AREAS

See sustainablestreets.info for additional maps



“Interventions to make the built environment safer can greatly reduce injuries to children as they walk to school”

—Charles DiMaggio, Columbia University

SAFE ROUTES TO SCHOOL



NYCDOT has also been a pioneer in improving safety around schools. DOT’s multifaceted approach seeks to protect children from speeding and aggressive driving through a combination of street design changes, new regulations, better enforcement, and innovative education programs.

DOT inaugurated the first Safe Routes to School effort in the United States in the Bronx in 1997, with parents and safety advocates. A citywide Safe Routes to School program began in 2002.

Major street work for Safe Routes to School occurs in cycles because of its capital-intensive nature, such as moving curbs and

realigning road-beds. Capital improvements—such as sidewalk extensions, pedestrian islands, raised medians and sidewalk widening projects at the 135 schools identified by DOT as top safety priorities are underway. Shorter-term safety improvements at these schools are complete. They include new traffic and pedestrian signals, the addition of exclusive pedestrian crossing time, speed humps, speed boards, high visibility crosswalks and new parking regulations. These design changes are strongly reinforced with speed regulation in school zones, described below in Chapter 2.

DOT has identified an additional group of 175 public, private and parochial elementary middle and high schools as Safe Routes to School priorities. Individualized planning studies are underway or complete for each school and short term improvements have started. The schools were selected after DOT staff evaluated conditions at the city’s 1,700 primary and secondary schools. The program includes partnership with parents, teachers and students

New York’s Safe Routes to School program has been highly successful. According to a Columbia University School of Public Health study published

in 2013, Safe Routes to School measures reduced child injury rates during peak times by 44%. The research looked at crash data encompassing 169,000 pedestrian injuries from 2001 to 2010 to assess the effectiveness of the program for children ages 5 through 19. “Interventions to make the built environment safer can greatly reduce injuries to children as they walk to school”, said the study’s lead author Charles DiMaggio, research director of Columbia’s Center for Injury Epidemiology and Prevention at Columbia.

City installation of speed bumps has accelerated dramatically

SPEED REDUCERS



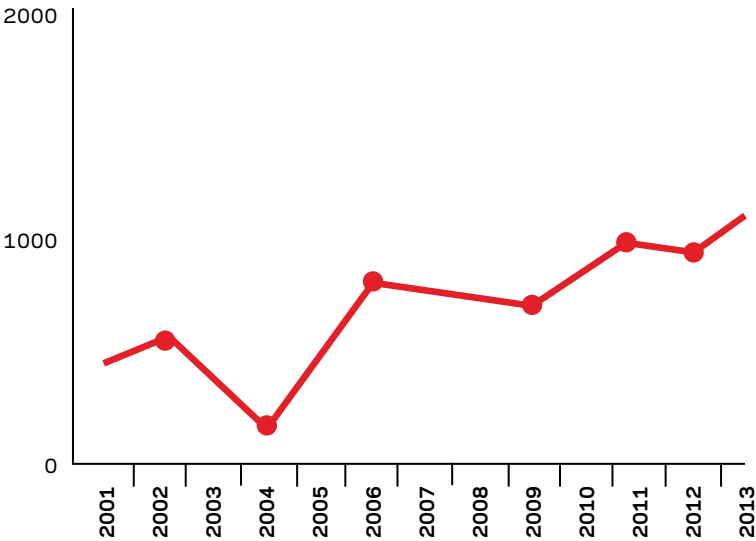
Speed bump installation

Speed bumps or speed reducers are a street safety feature designed to deter speeding that NYCDOT can deploy quickly and without otherwise redesigning a city street.

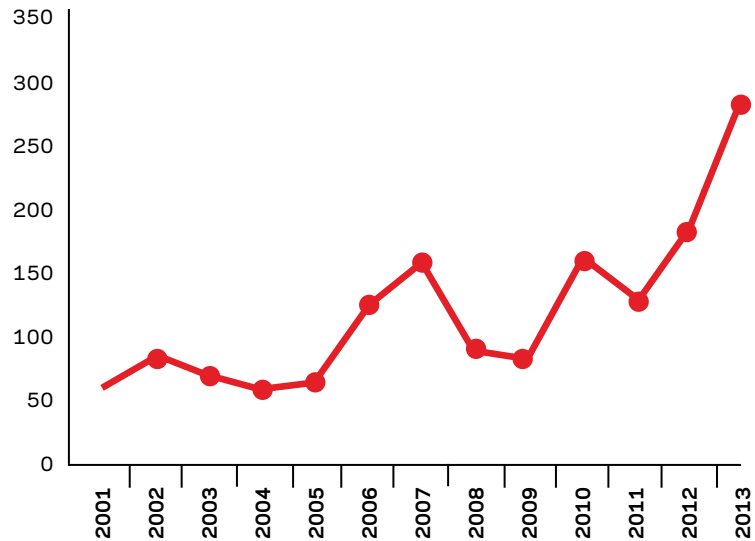
NYCDOT before/after studies found an average of 19% reduction in speeds where speed humps are in place. They have been shown to reduce crashes as well; DOT analysis has found that speed reducers reduce injury crashes by approximately 40%.

Speed reducers are key components of DOT’s school safety and residential slow zone programs, as well as being available on demand where appropriate by citizens, community boards and elected officials (guidelines for locations and requests are available at nyc.gov/dot). New Yorkers’ awareness of the speed bump program has increased significantly, driving requests to new highs. As a result of these needs and demands, the number of speed bumps on city streets today is at an all-time record.

SPEED BUMP STUDIES (FISCAL YEAR)



SPEED BUMPS INSTALLED (FISCAL YEAR)



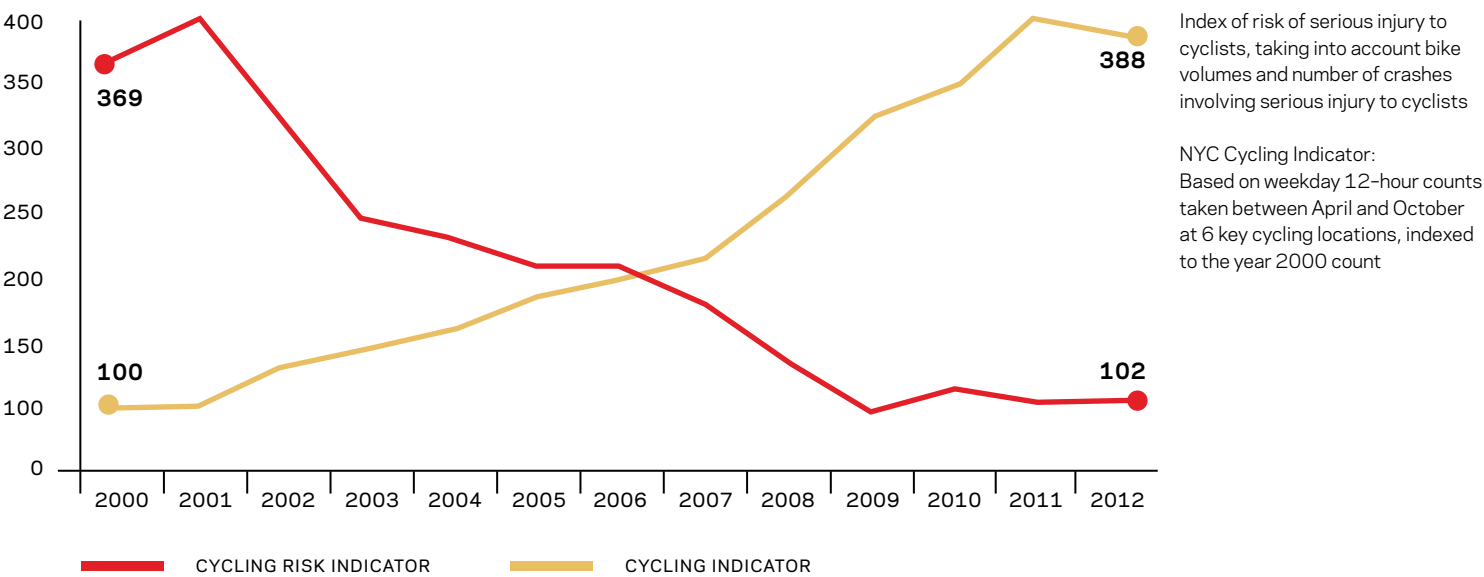


73%

decrease in risk of
serious cycling injuries
since 2000

CYCLING SAFETY

NYC CYCLING RISK INDICATOR



Mayor Bloomberg’s 2007 PlaNYC sustainability program called for an increase in bicycle transportation. Converting most would-be cyclists into actual bike users requires streets designed with cycling safety in mind. NYCDOT’s bicycle network program has been tremendously successful in this regard, encouraging a rapid increase in cycling from 2007 to 2012 without any corresponding rise in bicycling injury crashes. NYC’s expanded bicycle network also provided the foundation for the launch of CitiBike in 2013. CitiBike has created another major increase in NYC bicycle use along with a salutary safety record during its first season in operation.

Because cycling has increased significantly while cycling injuries have remained flat, the rate of crashes per cyclist and per mile pedaled has fallen dramatically from 2000 to the present. DOT calculates a 73% decline in the average risk of serious cycling injury over this time frame.

The City’s bike lane network itself is one prominent reason for this major gain in cycling safety. Corridor data from the City’s parking-protected bicycle lanes—pioneered on 9th Avenue in Manhattan in the Fall of 2007—show marked safety improvements in every case, even where an older design of bike lane was in place prior to implementation of the improved protected lane.

Bicycle lanes, either protected or more traditionally-designed, also have a general traffic calming and safety effect. Total traffic

Study after study around the world has found that greater bicycle use in a city, town or country coincides with a stronger cycling safety record



fatalities in the city have reached historic lows at the same time that the cycling network has reached its largest extent. Controlling for other factors, serious pedestrian crashes on streets with bike lanes are 40% less deadly as crashes on other streets. On Allerton Avenue in the Bronx, speeding declined 7% eastbound and 4% westbound after implementation of painted bike lanes. The installation of bike lanes usually involves a narrowing of the motor vehicle portion of the roadway and indicates to drivers that they need to watch for other road users. These changes lower vehicle speeds and increase driver attention.

In addition to safety created by innovative street designs, the large increase in cycling that the bicycle lane network has helped to propel has a feedback effect that increases cycling safety.

Study after study around the world has found that greater bicycle use in a city, town or country coincides with a stronger cycling safety record. A greater presence and visibility of cyclists on city streets habituates motorists, pedestrians and cyclists themselves to the presence of regular bicycle traffic. Interactions involving bicycles become a predictable part of the traffic norm, with better safety outcomes for all. The CitiBike program may be accelerating this effect. Though CitiBike has generated over 5 million bicycle trips in Manhattan and Brooklyn since its launch on May 27, reported injury accidents involving CitiBike riders are fewer than 30, with no fatalities. As of October 2013 city-wide bicycle fatalities are on track for a below-average annual total, with no cyclist fatalities within the bike share service area.

36%

decline in frequency
of injuries despite
growth in cycling

Parking protected
bike lanes save lives

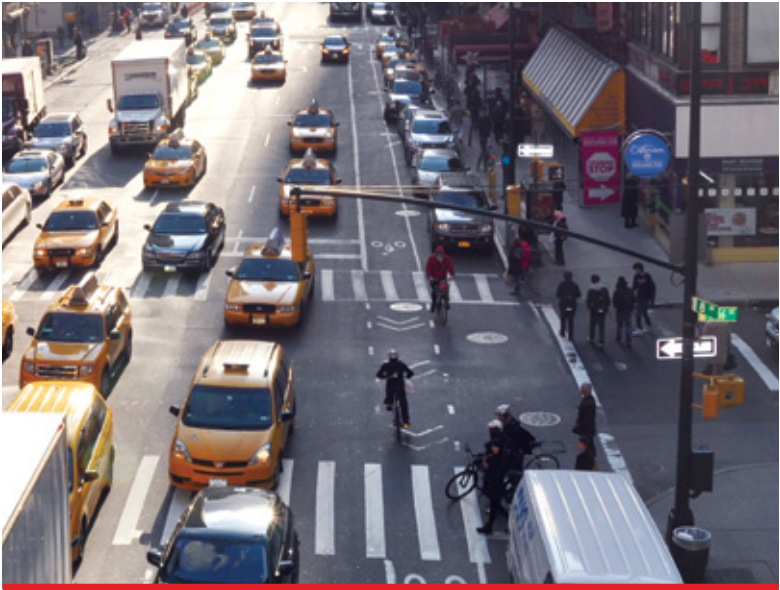
DOT's on-street protected bicycle paths, first implemented on Manhattan's 9th Avenue in 2007, improve safety by clearly organizing the different streams of traffic and giving each type of user dedicated space. The changed lane design also embodies significant traffic calming features, narrowing roadways with surplus capacity. They make intersections predictable and increase safe space for crossing pedestrians. The design gives cyclists secure routes through the heart of Manhattan.

In three years since implementation of the protected bike lane, 9th Avenue saw 43% fewer crashes with injuries than in the three years prior to the project. Cyclist volumes are up substantially, but injuries to cyclists are 36% less frequent than before the lane was installed.

Similar analysis for the 8th Avenue bike lane, implemented in 2008, shows total crashes down by 11% and crashes with injuries down by 20%.

Following implementation of protected bicycle lanes on Allen and Pike Streets in the Lower East Side of Manhattan, both motor vehicle and bicycle crashes declined by 35%.

Total crashes fell 22% after installation of a protected bike lane on First Avenue.



BEFORE: 8th Avenue and 56th Street



AFTER: 8th Avenue and 56th Street





Chapter 2

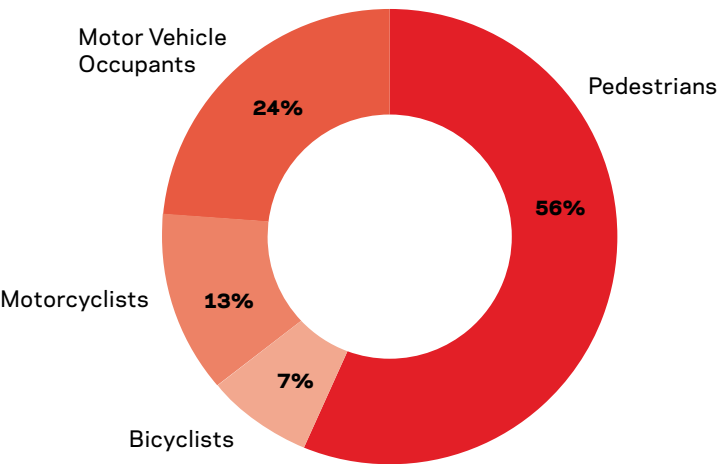
The Science of Safety

DOT’s concerted work to re-engineer streets with above-average crash histories, to meet community concerns about traffic safety and to meet its own strategic goal of reducing traffic fatalities each year relies on ongoing and painstaking analysis. NYCDOT collects and analyzes more information about the causes of traffic deaths and injuries than ever before, and applies the agency’s resources to develop site-specific responses to that information.

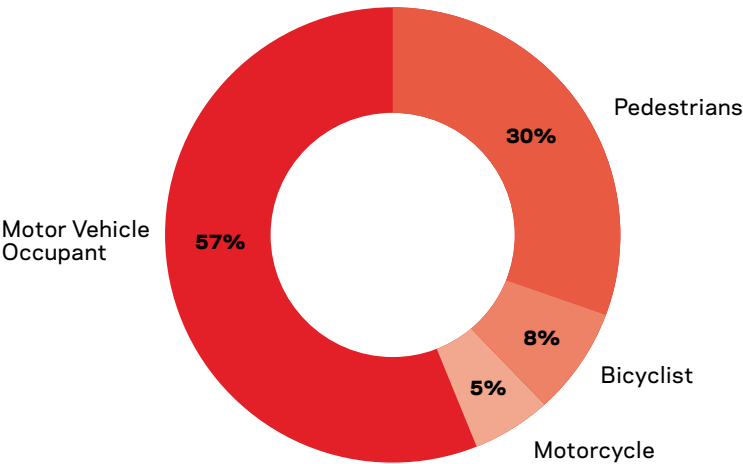
Data and design analysis have been key factors in DOT’s success in pushing traffic deaths to historic lows, and

drives safety policy and projects to an unprecedented degree. The main effort sustains ongoing analysis of the highest-crash corridors and intersections so those areas can be addressed by DOT’s traffic safety experts and engineers. This work also focuses resources on particular groups of at-risk pedestrians. The Safe Streets for Seniors and Safe Routes to Schools programs described in Chapter 1 are based on crash statistics that identify and address safety problems experienced by specific vulnerable groups.

TRAFFIC FATALITIES (2008-2012)



TRAFFIC INJURIES (2007-2012)



Data and design analysis have been key factors in DOT’s success in pushing traffic deaths to historic lows

A NEW ANALYTIC FOUNDATION

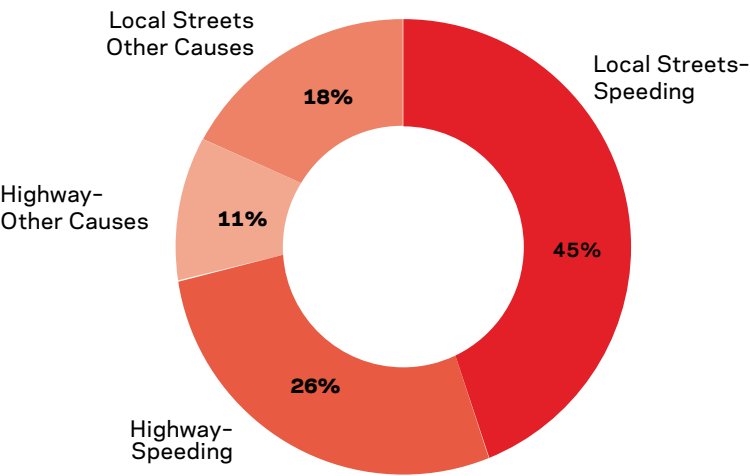
NYCDOT established a new basis for safety analysis with its seminal 2010 Pedestrian Safety Study & Action Plan. NYCDOT researchers examined dozens of factors and a wide variety of datasets from over 7,000 severe and fatal pedestrian crashes in New York City during 2002-2006 that could be associated with each pedestrian injury and with the number of injuries in given geographic areas. Variables with significant levels of correlation with pedestrian crashes were identified, then used to build a carefully designed statistical model. Experts from NY University, Rensselaer Polytechnic Institute and SUNY Buffalo supported the effort.

The state-of-the-art data statistical modeling techniques used attempted to control for pedestrian exposure to crashes, using factors like population, vehicle registrations, presence of traffic signals (generally located at higher-volume intersections) and transit usage. The study used two distinct approaches to modeling: crash frequency analysis and crash severity analysis. Crash frequency analysis aims to determine the causes of a high frequency crash location, while crash severity analysis aims to determine why some crashes resulted in a severe injury, while others resulted in a fatality.

The vast size and diversity of New York City’s street network and neighborhoods presented a robust opportunity for this advanced analysis, as crash rates could be compared across neighborhoods that differ by a wide variety of characteristics but contain very similar geometric dimensions and engineering treatments.

The Action Plan accompanying the pedestrian safety study summarized its findings, some of which are shown here. The analysis continues to inform DOT’s annual set of street improvement projects.

MOTOR VEHICLE OCCUPANT FATALITIES BY CAUSE AND LOCATION, 2012



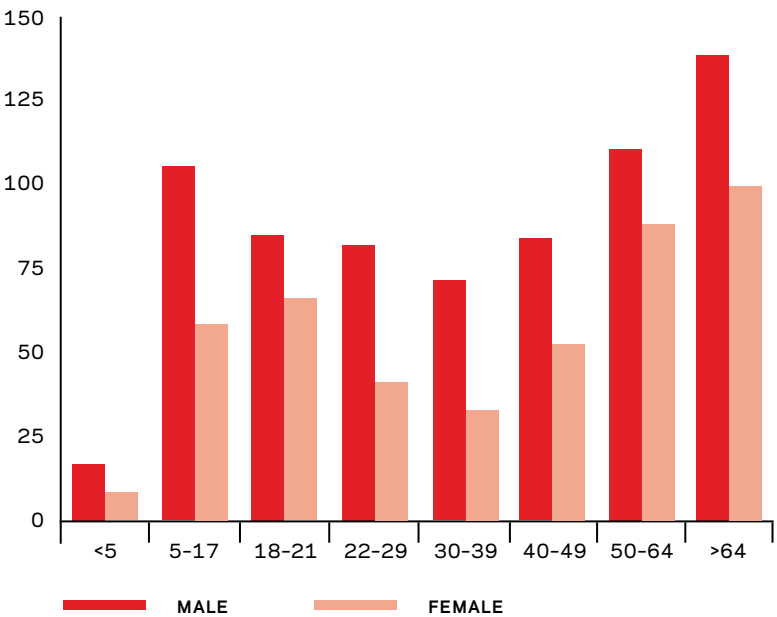
PEDESTRIAN ACTION AT TIME OF CRASH

PEDESTRIAN ACTION	SEVERE	FATAL	TOTAL	%TOTAL
CROSSING WITH SIGNAL	1,589	123	1,712	26.9%
CROSSING, NO SIGNAL OR SIDEWALK	1,338	168	1,506	23.6%
CROSSING AGAINST SIGNAL	1,155	146	1,301	20.4%
OTHER ACTIONS IN ROADWAY	399	83	482	7.6%
EMERGED FROM BEHIND PARKED VEHICLE	401	38	439	6.9%
CROSSING, NO SIGNAL, MARKED CROSSWALK	327	37	364	5.7%
NOT IN ROADWAY	204	30	234	3.7%
PLAYING IN ROADWAY	88	3	91	1.4%
GETTING ON/OFF VEHICLE	83	1	84	1.3%
WORKING IN ROADWAY	66	5	71	1.1%
ALONG HIGHWAY WITH TRAFFIC	41	6	47	0.7%
ALONG HIGHWAY AGAINST TRAFFIC	24	5	29	0.5%
CHILD GETTING ON/OFF SCHOOL BUS	8	1	9	0.1%

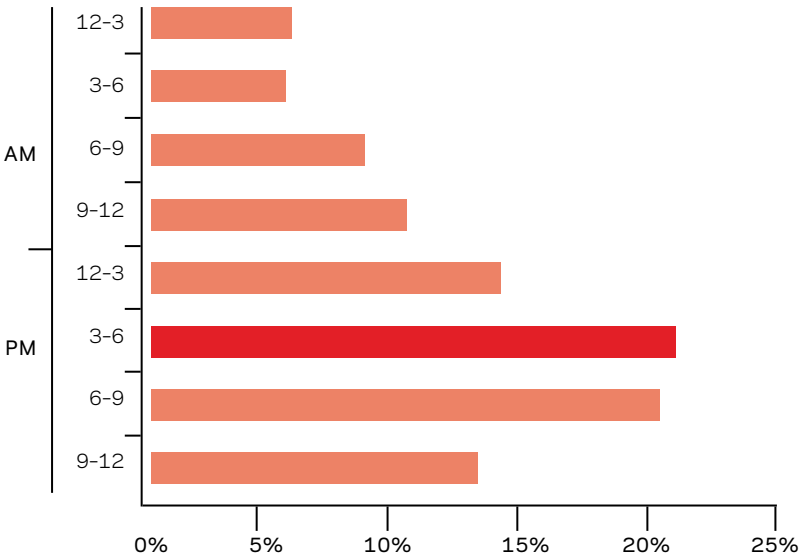
CONTRIBUTING FACTORS TO CRASHES

APPARENT FACTOR	CASES (n=7,354)	% OF TOTAL
DRIVER INATTENTION	2,647	36.0%
PEDESTRIAN'S ERROR/CONFUSION	1,578	21.5%
FAILURE TO YIELD RIGHT OF WAY	1,512	20.6%
UNSAFE SPEED	610	8.3%
BACKING UNSAFELY	506	6.9%
VIEW OBSTRUCTED/LIMITED	382	5.2%
ALCOHOL INVOLVEMENT	352	4.8%
TRAFFIC CONTROL DEVICES DISREGARDED	344	4.7%
OTHER (VEHICLE)	342	4.7%
AGGRESSIVE DRIVING/ROAD RAGE	280	3.8%
PAVEMENT SLIPPERY	277	3.8%
DRIVING EXPERIENCE	240	3.3%
GLARE	212	2.9%
PASSING OR LANE USAGE IMPROPERLY	119	1.6%
OUTSIDE CAR DISTRACTION	81	1.1%
REACTION TO OTHER UNINVOLVED VEHICLE	70	1.0%

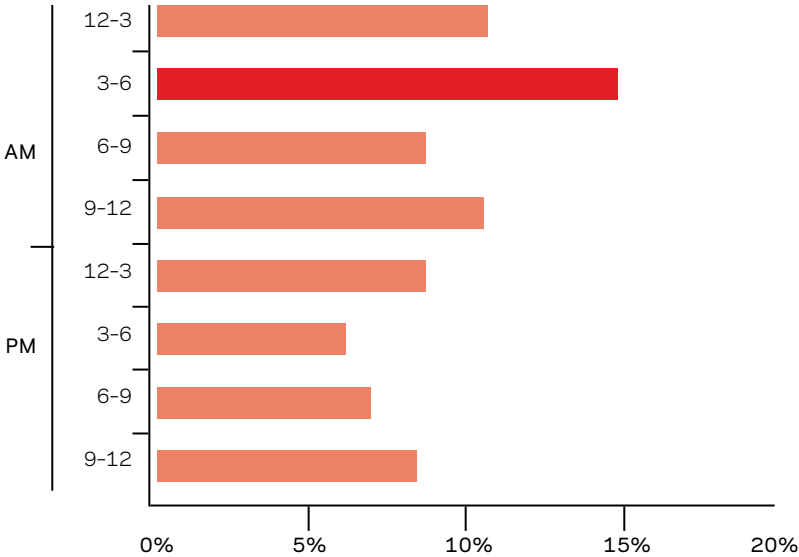
RATES OF PEDESTRIAN FATALITIES+SEVERE INJURIES PER 100K POPULATION



PEDESTRIAN KSI BY TIME OF DAY (2002-2006)



PEDESTRIAN KSI BY TIME OF DAY PERCENT FATAL (2002-2006)





ONLY



ONLY



DO NOT
ENTER

1888 JUNKCARS

PROJECT DEVELOPMENT



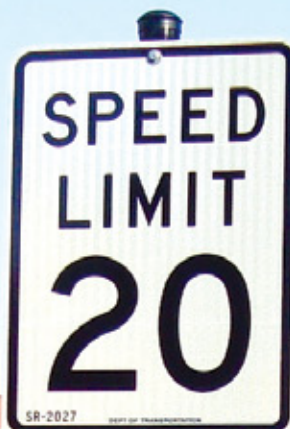
Most of DOT street improvement projects result directly from this ongoing analysis of safety conditions as well as input from elected officials and the public, especially those meant to protect pedestrians and cyclists. Following location identification, DOT undertakes field inspections and audit reports. A wide range of safety improvements are considered: signal timing changes, markings installations, turn restrictions, parking/loading and other sign installations, lane designations and concrete construction. Based on the appropriate improvement, data is ordered to analyze, support and verify the treatment. A design is then drafted and submitted for internal approvals and community review. This process could take between six months to a year, based on the complexity of the intersection or corridor and the proposed improvement.

BEFORE-AFTER TRACKING

Continued success in making New York City streets safer requires learning from experience to identify and implement the most effective approaches to street design. During the past six years, NYCDOT has dramatically stepped-up results tracking from changes in street design. DOT's annual Sustainable Streets Index and the 2012 Measuring the Street report are manifestations of this sustained work

Until NYCDOT began to systematically implement and evaluate street improvement projects, there was relatively little data available, locally or nationally, showing the effectiveness of projects that combined traffic engineering and the newer traffic calming techniques, particularly in large, dense urban street networks like that of NYC. As NYCDOT projects were completed, however, agency planners were able to systematically evaluate the effectiveness of each project on a broad range of evaluation metrics, including traffic safety.

Continual research and review feeds back into future project design and provides NYCDOT and the public with the opportunity to make highly informed choices about the future of the City's streetscape, especially in making our streets safer.



Chapter 3

Tools for Safe Streets

New York City complements street design changes and police traffic law enforcement with updated technology and regulations, and has substantially accelerated innovation in this regard over the past six years. From automated law enforcement to changes in parking rules to improve visibility in intersections, NYCDOT has continually expanded the range of traffic safety tools at its disposal.

SCHOOL SPEED ZONES

To complement long term construction and roadway realignment near schools, NYCDOT has dramatically increased its work to lower speed limits and signify the presence of students on foot around school zones with signs and street markings. This effort, combined with the Safe Routes to Schools program described in Chapter 1, comprises the most comprehensive and effective school safety program in the United States.

NYCDOT’s School Speed Zones use signage, regulation, flashing lights, high visibility street markings and, where appropriate, speed humps to slow drivers in areas around schools. Speed limits in the zones are as low as 15 miles per hour.

Since 2008, DOT has improved the street markings and signage around nearly 1,500 primary and secondary schools.

NYCDOT has approved 305 blocks around schools low speed limits, with 189 implemented with flashing lights and regulatory changes imposing 15 or 20mph speed limits. The 108 additional slow speed blocks are in the implementation pipeline, while analysis is underway for additional schools.



School Slow Zone

DOT and NYPD observations indicate that speeds have lessened in the first Neighborhood Slow Zone implemented

NEIGHBORHOOD SLOW ZONES



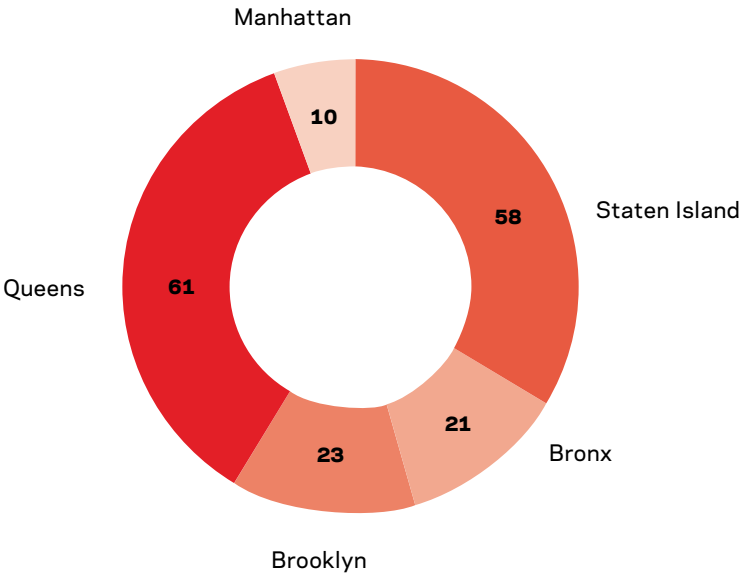
Inwood Neighborhood Slow Zone

Neighborhood Slow Zones is a community-driven program launched in 2011 that reduces the standard speed limit from 30 mph to 20 mph and adds traffic calming features in definable residential areas. Slow Zones also seek to enhance quality of life in residential neighborhoods by reducing cut-through traffic and traffic noise.

Neighborhood Slow Zones are established in small, self-contained areas that consist primarily of local streets. Gateways consisting of signs and markings announce the presence of a Slow Zone. The zone itself is a self-enforcing, reduced-speed area with speed humps, “20 MPH” street markings and other traffic calming treatments. Slow Zones are implemented in areas with low traffic volumes and minimal through traffic, where reducing the speed limit will not cause traffic congestion.

DOT creates Neighborhood Slow Zones in response to applications from communities. Following selection, DOT works with the community to devise a plan to install the Slow Zone. Slow Zones must be approved by the Community Board that contains the area

NEIGHBORHOOD SLOW ZONES APPLICATION TOTAL (2012-2013)



defined in the application, which must also demonstrate local support for establishing the zone. DOT does not approve zones that contain fire stations and hospitals or are traversed by truck routes.

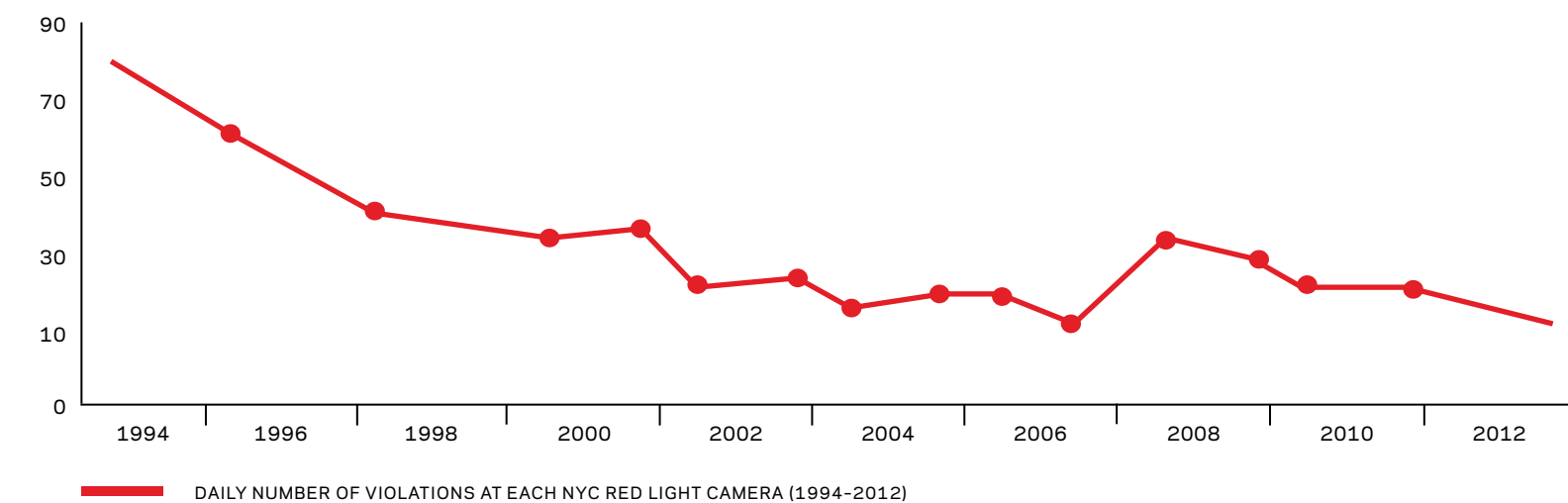
Like the demand for the speed reducer program described in Chapter 1, the extremely strong demand for Neighborhood Slow Zones that NYCDOT has experienced since the program’s inception indicates dramatic public support for traffic safety and control of speeding on City streets. 173 neighborhoods across the city applied to the program in the first two years.

Although the program is not yet old enough to have created a strong database, DOT and NYPD observations indicate that speeds have lessened in the first 20mph Neighborhood Slow Zone, implemented in the Claremont section of the Bronx in 2012. During 2013, DOT is implementing a further 13 Neighborhood Slow Zones. In London, the introduction of 20 mph zones was associated with a 42% reduction in injuries, as compared to untreated areas. In the UK, average speeds in 20 mph zones have been reduced by 9 mph.

As the number of red light cameras expanded, fewer drivers received automated violations for running red lights

RED LIGHT CAMERAS

ENFORCEMENT CAMERAS WORK TO REDUCE RED LIGHT RUNNING



Since the 1980s, NYCDOT has used red light cameras to help reduce red light running and improve safety. The program works to reduce crashes and their severity. DOT has successfully persuaded the NY State Legislature to expand the program several times. It is now at its greatest extent, but should be expanded further as the City seeks ever-safer streets.

Red light cameras have been an enormously effective traffic safety measure in New York. Since the program's inception in 1988, cameras have issued over 4 million violations. In 2011 alone, 821,483 violations were issued to passenger vehicles, buses, trucks and taxicabs running through red lights.

These citations have improved street safety: intersections where red light cameras were installed saw a 20% decline in all injuries, a 31% decrease in pedestrian injuries, and a 25% decrease in serious injuries over the three years after the cameras were installed. Red light running at intersections where the cameras are installed has declined by as much as 40% to 60%. Citywide, the number of

violations has also declined over time—fewer drivers are getting red light tickets as the cameras deter violations. Violations issued declined by 22% from 2010 to 2011. The City does not make red-light camera locations public in order to extend the cameras' deterrent effect beyond the small number of locations where they are installed.

The decline in NYC red light violations correlates with studies conducted by the Insurance Institute for Highway Safety a well-recognized research organization. Reviews by the Institute conclude that cameras reduce red light violations by 40–50 percent.

The NY State Legislature has extended the duration of the demonstration program six times since 1991, gradually increasing the number of intersections where the cameras can be installed. Today, New York has 190 red light cameras at 150 intersections, less than 2% of NYC's total of 12,000 signalized intersections. The advent and expansion of the program broadly coincides with the City's dramatic improvement in street safety since the mid-1990s.

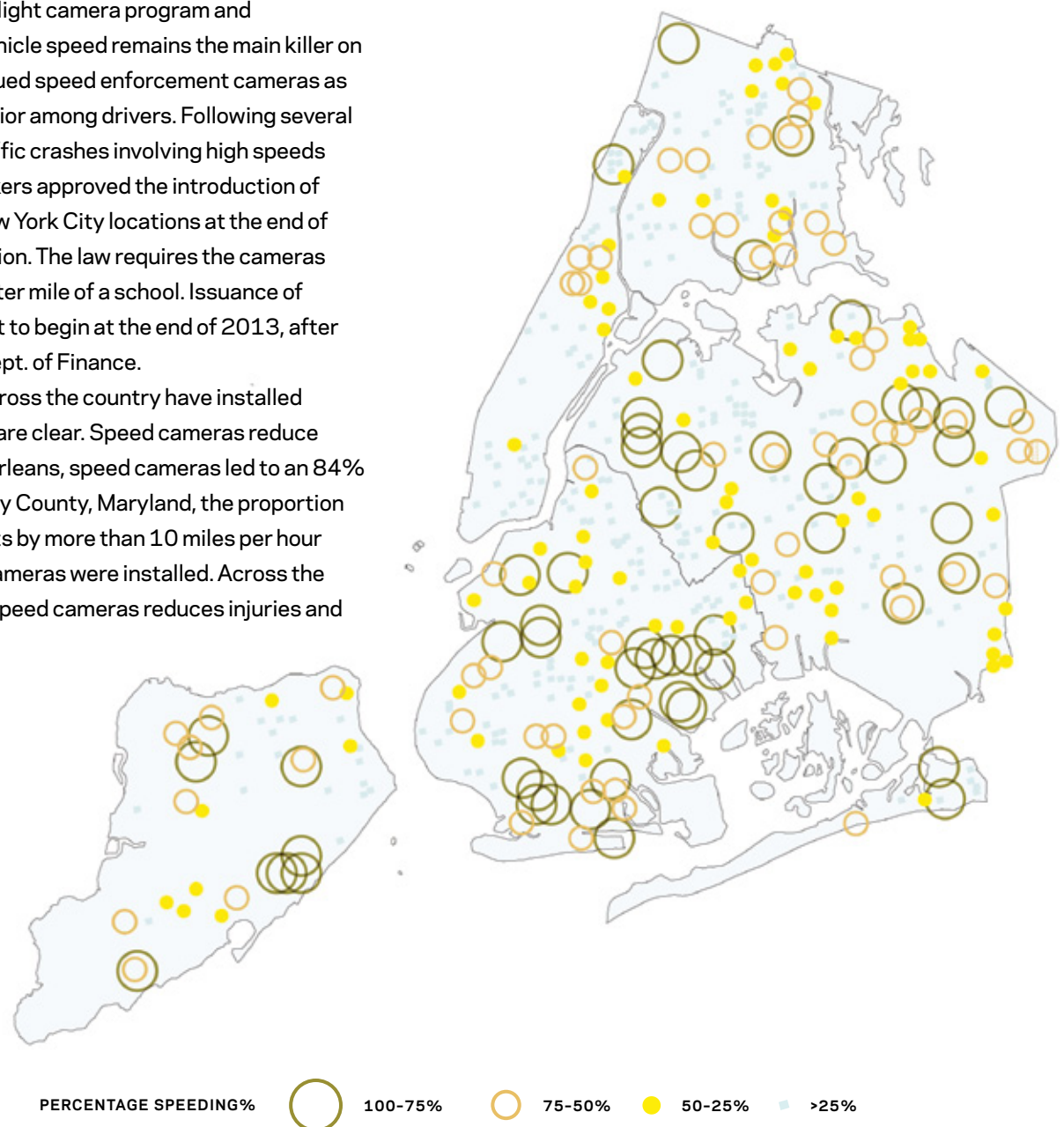
Across the United States, introduction of speed cameras has reduced injuries and fatalities by 40 to 45 percent

SPEED CAMERAS

Based on the success of its red light camera program and overwhelming evidence that vehicle speed remains the main killer on City streets, NYCDOT has pursued speed enforcement cameras as a way to encourage safer behavior among drivers. Following several terrible and well-publicized traffic crashes involving high speeds early in the year, Albany lawmakers approved the introduction of speed-radar cameras at 20 New York City locations at the end of the 2013 state legislative session. The law requires the cameras to be deployed within one-quarter mile of a school. Issuance of \$50 speeding summonses is set to begin at the end of 2013, after adoption of rules by the NYC Dept. of Finance.

Over 100 cities and towns across the country have installed speed cameras and the results are clear. Speed cameras reduce speeds and save lives. In New Orleans, speed cameras led to an 84% drop in speeding. In Montgomery County, Maryland, the proportion of drivers exceeding speed limits by more than 10 miles per hour declined by 70% after speed cameras were installed. Across the United States, introduction of speed cameras reduces injuries and fatalities by 40 to 45 percent.

LOCATIONS WITH DOCUMENTED SPEEDING WITH 1/4 MILE OF A SCHOOL



**DOT staff visited 4,000 businesses
prior to enforcement of the strengthened
commercial cyclist law**

COMMERCIAL CYCLIST ENFORCEMENT

Cyclists who make deliveries for businesses and restaurants, either directly or through a messenger service, are a fixture on New York City's streets. These hardworking men and women provide a valuable service for New Yorkers and the City's economy, and do so in an environmentally sustainable and congestion-beating manner. But if they fail to obey traffic rules or lack necessary bicycle safety equipment they pose danger to themselves and to others.

In response to community and elected official requests, DOT launched a comprehensive education and enforcement campaign in summer 2012 to educate businesses on requirements of the commercial cycling rules. While City law has long mandated that restaurants display posters about safe cycling, outfit bikes with lights and bells, provide helmets and safety vests to delivery cyclists, few were complying.

COMMERCIAL CYCLIST OUTREACH TO BUSINESS, BY BOROUGH

BOROUGH	STORES VISITED
MANHATTAN	2,891
BROOKLYN	547
QUEENS	370
BRONX	284
TOTAL	4,092

DOT launched the City's first-ever commercial cyclist outreach and enforcement unit, a six-person team of DOT inspectors to travel door-to-door to ensure that businesses comply with the law. Between summer 2012 and spring 2013, the inspectors visited over 4,000 businesses and then began enforcement in spring of 2013.

In addition, DOT held 36 educational forums reaching near 5,000 attendees, handing out helmets, bike bells, reflective vests, and sample ID tags for businesses and their employees.



Commissioner Sadik-Khan greets commercial cyclists with new reflective vests



City officials announce the commercial bicyclist safety effort.

DOT also partnered with the City Council to revise the commercial cycling law and make compliance simpler for businesses and less burdensome on delivery cyclists.

The education, enforcement and legislative effort had a noticeable effect on delivery cyclists' compliance with the law. Now cyclists across the City can now be seen wearing reflective vests with the name of the business they represent.

In addition to continually evaluating streets and intersections for conditions that may warrant additional traffic controls, NYC DOT is implementing several innovative signal program:

Signal timing helps improve mobility and safety by regulating traffic flow and speed, and giving pedestrians more time to cross. This has been widely used by DOT in neighborhoods throughout the city to improve safety.

Pedestrian countdown signals tell people on foot how many seconds they have to cross the street. DOT before/after analysis of pedestrian countdown signals installed at 1,800 intersections during 2011 and 2012 found that total crashes were reduced by 5%, and injuries to pedestrians also declined by 5%. DOT will have installed 8,000 of these signals representing two-thirds of City intersections by the end of 2015.

Leading pedestrian intervals show a walk sign for pedestrians before showing a green light for drivers. LPIs have been installed at 100 intersections citywide since 2007.

Accessible pedestrian signals help low vision and blind people cross the street by making noise when it is safe to cross. They have been installed at 53 intersections citywide.

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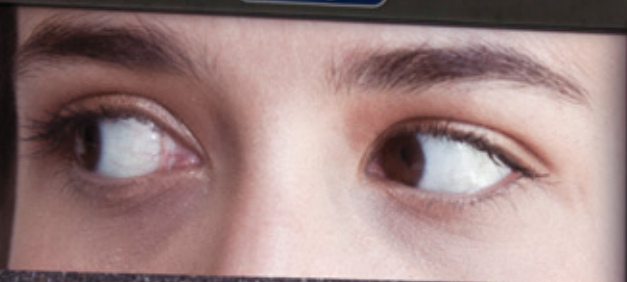
Overall, NYC DOT has installed new signals at 772 intersections and new 4-way stop controls at 241 intersections since 2007. Both treatments reduce right-angle crashes and improve pedestrian access.



“Daylighting” is the removal of curbside parking spaces at the approach to an intersection. It prevents parked vehicles from impeding the sight-lines of both pedestrians and drivers. Visual obstacles in busy intersections can lead to pedestrian-vehicle crashes.

Prohibiting certain turns in busy intersections simplifies traffic patterns, giving drivers and pedestrians fewer points to check when proceeding. NYC DOT has installed 175 left turn bans citywide since 2007.

VanWagner



Walk safe. Cross smart.

Traffic injuries are
avoidable.
Mom was right.
Look before you cross
the street.



LOOK!

dot



BUS LANE
TAM - 11AM 2PM - 7PM MON - FRI
BUSES ONLY



Chapter 4

DOT's Public Conversation on Street Safety

Safety themes and improvements permeate DOT's goals, programs, projects and overall dialogue with New Yorkers. It's not an exaggeration to state that New Yorkers both inside and outside of government are pulling together to deliver safer streets. Elected officials, community groups and many other associations and stakeholders routinely approach the Department with ideas for improving street safety, and as we have documented in the chapters above, DOT's application-based safety programs such as slow speed zones and speed reducers are heavily subscribed. City Council legislation has codified major elements of DOT's safety improvement project development and analytic procedures, for example, mandating an update of the 2010 Pedestrian Safety and Action Plan every five years (Local Law 11 of 2008).

The status of the public dialogue over traffic safety augurs well for future gains. DOT's safety work with stakeholders in particular locations is strongly collaborative, and in recent years the agency has developed the communications capacity to help expand a culture of street safety to the general public.

41%

decrease in crashes at
Harlem River Park

PROJECT DEVELOPMENT THROUGH INPUT AND DIALOGUE

HARLEM RIVER PARK GATEWAYS

DOT was approached in 2008 by the Harlem Community Development Corporation and other stakeholders to discuss pedestrian access routes to the relatively new Harlem River Park. Although there were pedestrian overpasses to take park-goers across Harlem River Drive, the access points were adjacent to intersections and Harlem River bridge connections with heavy traffic and difficult to reach for many residents. DOT safety and traffic experts worked with

local groups and the NYC Parks Department to improve pedestrian access at East 135th Street and Madison Avenue, East 138th Street and 5th Avenue, East 139th Street and 5th Avenue and 142nd Street and 5th Avenue. The projects created over 2,400 square feet of new space for pedestrians and have shown strong results for all street users, reducing crashes with injuries to pedestrians by 10% and crashes with injuries to motor vehicle occupants by 48%.



BEFORE: Harlem River Park Gateway



AFTER: Harlem River Park Gateway

DOT created a robust set of opportunities for public participation in Jackson Heights

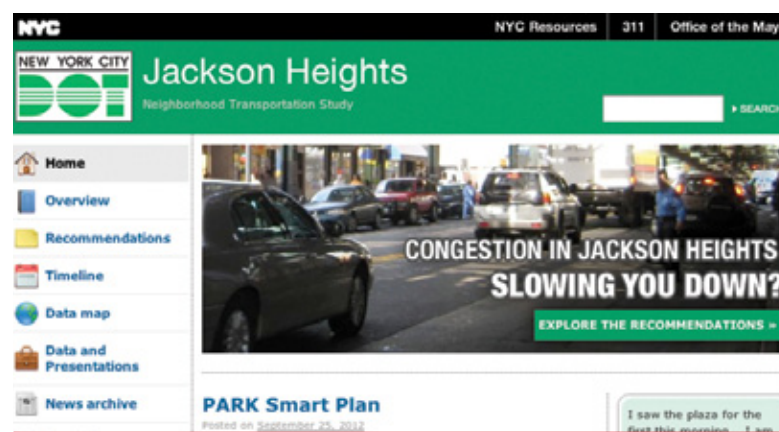
JACKSON HEIGHTS

In 2011, DOT carried out a comprehensive set of improvements in the heart of Jackson Heights, the culmination of a community-driven planning process that started in 2009. Local residents, business owners and elected and civic leaders had expressed a range of pressing transportation concerns and worked with DOT to guide the development of solutions. DOT created a robust set of opportunities for public participation, including community workshops, neighborhood walk-throughs, an innovative web portal that allowed DOT staff to receive and respond to comments at any time, and a Community Advisory Committee to facilitate ongoing involvement of key stakeholders.

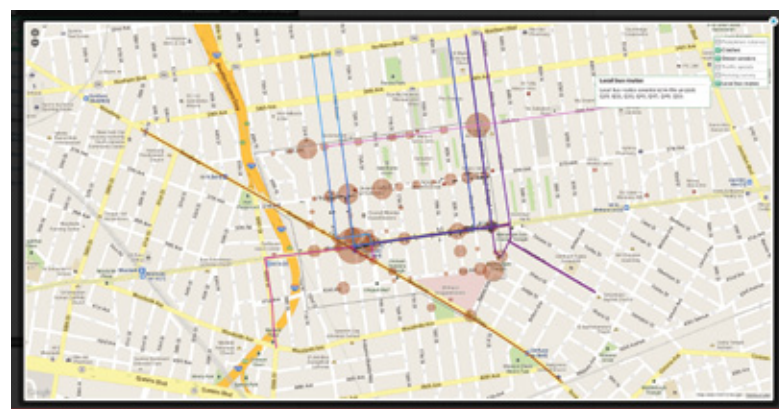
The project addressed traffic safety, as well as sidewalk crowding, vehicle congestion, parking availability, slow bus service and a lack of public open space. Focused on the

area where 73rd Street, 37th Road, Broadway and Roosevelt Avenue converge, the core improvements were carried out in the second half of 2011. Updated curb regulations were introduced in spring 2012, offering a better use of space for deliveries and customer parking. Further parking improvements were implemented in 2013 with the introduction of the variable-rate PARK Smart program.

There are fewer injury-causing crashes; problematic traffic bottlenecks have been eliminated; buses are faster and more efficient; and the 37th Road plaza is a popular gathering spot year-round, home to frequent public events and a boon to adjacent businesses. Safety performance in the area has improved markedly since implementation—total crashes with injuries have declined by 26%.



Online portal for participation in Jackson Heights



Online portal for participation in Jackson Heights

FOURTH AVENUE, BROOKLYN



Residents discuss 4th Avenue safety improvement in Park Slope

DOT has implemented major design changes to reduce speeding on 81 blocks of Brooklyn’s Fourth Avenue, with one more segment under consideration as of October, 2013. Overall, the project ranges for much of the length of Brooklyn, from Bay Ridge to the Barclay’s Center. The project is generally widening medians, narrowing pedestrian crossing distances and restricting some turns. Implementation began following intensive public dialogue and collaboration. Discussion in the corridor continues today.

In 2011, in partnership with a task force convened by the Brooklyn Borough President, DOT began holding community workshops for sections of Fourth Avenue to develop design ideas for improving safety and traffic operations. Safety on Fourth Avenue has long been a concern of DOT and the people who live and work along the corridor. In 2009, the NY Police Department’s 72nd Precinct requested a safety project along the Fourth Avenue corridor. Community Board 7 also approached DOT with requests



4th Avenue, after improvements

for safety improvements along the avenue in Sunset Park. All three segments of the project have been subject to an extensive dialogue and discussion. As in Jackson Heights, presentations, open houses, workshops, community board hearings, walk-throughs and an interactive on-line portal were part of the varied repertoire for discussing and developing an accepted action plan for the corridor. In Park Slope and Bay Ridge, DOT used a new tool that lets community members anonymously post notes on

street views of each intersection in the study area to suggest improvement ideas. Park Slope Council Member Brad Lander wrote that it “is one of the best examples of online interactive government I’ve seen.” DOT’s Safety Education division also engaged parents, teachers and students in meetings and workshops on the basics of safety design at a total of 35 public and private schools along the corridor.

PUBLIC CAMPAIGNS FOR TRAFFIC SAFETY

NYCDOT complements its street design projects and safety-oriented technology and regulations with clear, hard-hitting safety education campaigns. From traditional billboards to new apps and online portals, DOT has pioneered a variety of communication methods to explain the dangers of drunk driving, speeding and distraction to a wide audience.



Prior to 2007, the agency's capacity for public communication was limited. In the past five years, DOT has developed robust contracting capacity, funding streams, expertise to develop, review and select effective communications campaigns, including associated social media efforts to deliver a strong public message on behalf of safer streets.

BE THE MAN

DOT's "You the Man"/"Be the Man" anti-drunk driving campaign used research and focus group insights to develop messages targeted towards the New Yorkers most likely to drink and drive: young men ages 21–39. This age group was responsible for 63% of alcohol related deaths in 2008. This audience is aware that drinking and driving is wrong, but has become relatively immune to traditional government warnings, and many still fail to make a plan to get home safely at the end of a night out.

"Be the Man" lionizes the role of the designated driver from a peer-group point of view, and emphasizes practical steps to ensure a safe conclusion to a night out.

Rather than launch traditional television ads, the campaign sought its audience via media

that is present during nights out: smart-phones, radio spots, posters and coasters in bars and clubs and beer cups at Staten Island Yankees and Brooklyn Cyclones games. Promotions included an innovative phone app with a "find-a-ride" feature using the phone's GPS to identify the closest Taxi and Limousine Commission-registered car services and subway stations and free-ride-home MetroCards and taxi coupons distributed in a variety of holiday periods and during March Madness.

DOT tracking surveys showed that Be the Man was reaching its target audience. DOT found that the campaign was recognized more by 21 to 35 year olds than by other groups. One third of the 21–35 group were aware of the campaign, with highest acknowledgement in Staten Island.



One quarter of New Yorkers surveyed recognized the 2012 LOOK! campaign

LOOK



LOOK is NYCDOT's general traffic safety rubric, urging New Yorkers through a variety of media to take extra care to watch out for each other on City streets. The LOOK brand now has a wide range of applications, combining innovative street markings, taxi window decals, ads, and videos to send a life-saving message, reminding New Yorkers to be alert, whether on foot, bike or behind the wheel. 25,000 LOOK-themed backpacks have been distributed

to children who work with DOT Safety Education.

At over 100 selected street corners, distinctive street markings spell out "LOOK", with eyes looking in the direction of oncoming traffic.

Street markings are reinforced by ads created for TV, radio, outdoor, and internet that have so far generated over 130 million impressions. LOOK display ads have appeared on telephone kiosks, bus shelters, billboards and the backs of NYC Transit buses.

LOOK was launched in 2007 after a multi-agency study found that driver and cyclist inattention was the number one reason for bicycle and pedestrian crashes.

LOOK returned to the theme of cycling safety in 2012. 26,000 eye-catching, orange-and-white window stickers reading "LOOK! For Cyclists" were made available to the city's 13,000 yellow-taxi fleet. A video placed on Taxi TV called on New Yorkers to "Take out their boss/Take out a date/But

don't take out a cyclist'. Display ads anticipating the launch of CitiBike reminded New Yorkers of the cardinal traffic rules.

Pop up LOOK smartphone ads on distracted driving in popular apps such as Words With Friends and NYTimes mobile

Fully one quarter of New Yorkers acknowledged the 2012 LOOK campaign in a fall survey.



THAT'S WHY IT'S 30

DOT's research in 2009 showed that two-thirds of New Yorkers are uncertain what the City's standard speed limit is, and nearly 7 in 10 New Yorkers say that speeding is a safety problem in the city. To raise awareness of the speed limit and highlight the danger of excessive speed, DOT created an advertising campaign of pointed television and radio ads and hard-hitting public billboards.

The ads explain the reason why the standard city speed limit is 30mph: if a pedestrian is hit by a car traveling 40 m.p.h. or faster, there's a 70% chance that a struck pedestrian will be killed. At 30 m.p.h., there's an 80% chance that the pedestrian will live. Billboards were in Spanish and English.

Display and TV ads were further complemented with message cards with That's Why it's 30 themes

that were included in NY State Dept. of Motor Vehicle mailings for driver license renewals. DOT further reinforced the campaign theme with specially-programmed speedboards that produced varying imagery depending on speed of the vehicles.

In follow up surveys, That's Why it's 30 had the highest campaign identification and recall among New Yorkers of all of NYCDOT's

advertising efforts. 1 in 3 survey respondents said they had seen the ads and 2 of 3 viewers said the campaign caused them to understand that speeding is a serious issue. Over half of survey respondents who had seen the ads said they were less likely to drive 10mph over the speed limit.

Curbside Haikus generated a buzz about street safety issues



CURBSIDE HAIKUS

Generating talk on the street and a buzz in the press is one way to broadcast a stronger culture of safety on City streets. DOT succeeded in the winter of 2011/2012 with its Curbside Haiku campaign, whose set of twelve bright, eye-catching designs by artist John Morse was heavily covered and discussed around town. Each sign, which are still installed on City streets today, is accompanied by a haiku poem. The “Curbside Haiku” installation

encompassed 144 signs across the City to promote road safety. Each design and haiku delivers a safety message by focusing on a transportation mode. In many locations, the haikus were embedded in a QR code on the sign, readable with smartphone apps, making the safety messages interactive and fun to discover. In others, the signs are hung in pairs with the image and text from its accompanying haiku.

DON'T BE A JERK

DOT’s “Don’t Be A Jerk” bike safety campaign humorously highlighted the essential dos and don’ts of safe, responsible biking. DOT launched the effort as cycling numbers in the City skyrocketed. With more bikes on the road, smart cycling is even more crucial to making New York City’s streets safer for everyone using them.

The simple message of “Don’t Be A Jerk”: Always follow traffic laws by yielding to pedestrians, riding with traffic, and riding on the street not the sidewalk (unless you’re 12 or younger).

100,000 free bicycle helmets have been given away by NYCDOT to New Yorkers of all ages

FREE HELMET, LIGHT AND BELL PROGRAMS

DOT complements cycling safety message campaigns with promotional and practical programs about safe cycling equipment. Every fall, as daylight wanes, DOT staff promote use of bicycle lights by handing out a limited number of front and rear lights that clip easily to bike seatposts and handlebars. Each spring as cycling picks up in better weather, DOT also distributes free bells, reminding cyclists that being heard is preferable to being hurt. Both lights and bells are required on bicycles by law in New York City.

Bicycle helmets are required by law for children age 13 or younger and commercial cyclists.

The DOT has partnered with elected officials, other city agencies, and community groups to give away over 100,000 helmets to New Yorkers of all ages. DOT staff trained to properly fit bike helmets to New Yorkers of all ages run the helmet giveaway events. City Council funding allocations, totaling more than \$60,000, have significantly augmented the program.



DOT staff fits free helmets for members of the public

CITIBIKE: A PLATFORM FOR CYCLING SAFETY

The CitiBike system is itself a platform for messages about bicycling safely on NYC Streets. From the messages facing the rider on the handlebars of every CitiBike to similar notices in multiple languages on the kiosk screens at hundreds of stations, riding advice at the CitiBike website

and the discount helmet coupon sent to every annual subscriber, hundreds of thousands of New Yorkers and visitors are exposed to easy-to-understand rules of the road. Unsurprisingly, CitiBike has recorded an impressive safety record in its first five months, which have seen over 5 million rides.



Citi Bike handle bars remind riders to follow the rules of the road

The DOT's 5 Safety City facilities teach safe streets skills to 30,000 children and adults annually

SAFETY EDUCATION

DOT also conducts safety education and outreach programs for children, parents, educators, senior citizens and all New Yorkers. DOT's Division of Safety Education visits 600 schools and 100 senior centers a year. The unit works with kids and teachers to collect data on speeding and distracted driving and envision safer designs for streets. The DOT's five Safety City projects use a variety of education methods to teach children safety walking and biking habits. The facilities have mock versions of streets, so children can practice crossing the street safely in a variety of situations.

Safety Education targets special corridors where crashes are high and schools and Senior Centers are many. In 2011 we piloted this work on Adam Clayton Powell from 135th to 153rd street and continued the work in the 2011–

2012 school year using Manhattan Safety City as a base. Safety Educators worked with students in schools along the corridor to collect data about speeding, distracted driving and other safety conditions near school on ACP. Students requested a speed board which was put in place in May of 2011 to educate the community about the prevalence of speeding. When DOT presented plans for traffic calming and other measures, Safety Education staff worked at the tables. Meetings were held with principals and other administrators in schools and with Senior Centers to review the plans and many submitted letters in support of the changes. In 2012–2013, we focused the work from 135th to 117th streets. We worked with a total of 25 schools and 4 Senior Centers along this corridor.



Commissioner Sadik-Khan, City Councilmember James Vacca, and friends check traffic speeds

WORKZONE SAFETY

The U.S. Department of Transportation and the Federal Highway Administration present National Work Zone Awareness Week each spring, to bring national attention to motorist and worker safety in work zones and to call Albany's attention to potential NY State legislation that could lessen the problem of danger in work zones.

NYCDOT participates to raise driver awareness and decrease the number of persons, including members of DOT, killed and hurt in motor vehicle crashes in work zones. 7 NYCDOT workers have

died in work zone incidents in the last two decades, while 22 have been injured in work zone incidents since 2009. DOT places work zone safety ribbon magnets on all DOT vehicles and runs print, radio and outdoor ads to promote work zone safety in both New York City and in Albany.

NYCDOT favors state legislation to intensify penalties against drivers who are convicted of either killing or injuring construction workers in work zones. A proposed bill to serve as a deterrent to driving carelessly in a work zone was not acted upon by the State Legislature.

LEGISLATIVE CODIFICATION OF DOT SAFETY EFFORTS

One mark of the progress of the public dialogue on street safety is the amount of legislation the NYC City Council has approved to validate and ensure the continuation and longevity of NYCDOT's analytic and practical approaches to street safety. distraction to a wide audience.



Local Law 11 of 2008 requires DOT to identify the twenty highest crash locations based upon a ranking of the total number of crashes involving pedestrians, and to provide information on safety improvements that have been implemented at identified locations.

Local Law 23 of 2008 requires DOT to develop, monitor and report on a set of indicators that allow the agency to implement a performance driven transportation policy, geared toward achieving the sustainability, mobility, infrastructure and quality of life goals set forth in Mayor Bloomberg's PlaNYC 2030 initiative. DOT does this with its annual Sustainable Streets Index, which provides extensive before after information on implemented safety projects.

Local Law 12 of 2011 requires DOT to publish an update every 5 years of its 2010 Pedestrian Safety Study and Action Plan, identifying the causes, common factors and geographic distribution of pedestrian crashes in New York City.

Local Law 66 of 2011 requires DOT to report on traffic and safety related data for three years before and one year after a project that realigns a City roadway for four or more consecutive blocks, or 1,000 consecutive feet of street. DOT closely tracks the impact of its projects.



Looking Ahead

New York City must be relentless and innovative in seeking ways to continually improve its traffic safety performance. Gone are the days when concerted efforts in obviously dangerous corridors like the Queens Boulevard or Grand Concourse of the 1990s can quickly drive crash and fatality numbers down. As City streets have become markedly safer, clustering of crashes and injuries is less pronounced, and thus more difficult to address. With the targets of safety policy becoming more diffuse, broader strategies such as deploying higher numbers of automated enforcement devices such as red light and speed-radar cameras are likely to become more important. The State Legislature will need a stronger understanding of these facts and trends to become a full partner in driving down NYC crashes, injuries and fatalities. The next opportunity to further develop this understanding and partnership presents itself very soon—the City’s red light camera program must be legislatively renewed in 2014. Ideally, the Legislature would unfetter camera enforcement programs altogether and allow the City to determine the right size and applications for both red light and speed enforcement camera programs.

The diffusion of crash clusters notwithstanding, making large arterial streets safer remains the City’s largest safety challenge. Slow speed zones, speed humps and other improvements suited to smaller streets are highly popular and have quality of life as well as safety benefits, but larger projects similar to the recent realignments of Adam Clayton Powell Boulevard in Manhattan and Fourth Avenue in Brooklyn will have greater impact on the City’s overall safety performance. This fact may become even more pronounced as New York’s population continues to age. Such projects require extensive local support, explanation and outreach. The high receptivity and demand by New Yorkers for every type of street safety improvement program and feature augurs well for further improvements in this vein.

Steady erosion of the federal commitment to transportation may have impacts on safety programs that future City leaders will have to grapple with. In 2012, Congress eliminated the federal Safe Routes to Schools funding program, and it is unclear how NY State DOT, which administers Federal Highway Administration aid in New York, will regard ongoing funding requests from local safe routes to schools program’s like New York’s. U.S. traffic safety funding is also very constrained in its uses. NYCDOT’s safety ad campaigns would have a greater impact if they were able to be deployed and broadcast far more broadly, but FHWA safety funds are confined to hardware regardless of local safety needs, and in some degree distributed at the discretion of NY State. Broadening the uses of federal safety funds, and providing direct FHWA funding to large cities, as strongly advocated by the National Association of City Transportation Officials, would in small part make up for the declining amount (in both real and nominal terms) of federal transportation aid for safety and in other areas (see the Infrastructure section).

- **Remove state legislative restrictions on automated enforcement cameras that improve safety, including red light, speed, and bus lane cameras. Allow the Mayor and City Council to decide the appropriate scope of these programs.**
- **Focus additional resources on remaining high crash corridors, especially long, wide arterial streets where safety issues persist.**
- **Provide more city resources for programs and street treatments that are popular with New Yorkers, such as speed humps, Neighborhood Slow Zones, and other traffic calming techniques.**
- **Change federal law to allow direct federal highway aid to cities and a broadened use of federal safety funds.**



Mobility

Introduction


44

acres of painted
bus lanes since
2007


141

acres of new bike
lanes since 2007

New York's rapid population and economic growth during the 1990s and 2000s presented City government with major challenges. Prosperity and vitality are obviously desirable, but how to improve the City's basic systems, including transportation, while serving more people and activity? PlaNYC's answer was to take much greater advantage of the City's historic orientation to walking and public transit.

Although New York City's renaissance was in large measure built upon the reconstruction of the subway system beginning in the 1980s, there had been few City policies put in place to reinforce and support this investment. The Bloomberg Administration changed that, taking active steps such as rezoning targeted areas to direct growth rather than respond to it after the fact. In transportation, PlaNYC emphasized improved performance and efficiency from assets that had long gone overlooked, especially City streets and NYC's huge bus system.

New York's density makes it a natural walking and cycling city. These options are also strong complements to the City's public transit systems, provided people regard them as safe and convenient. NYCDOT's work to implement the transportation policies of PlaNYC have reinvented bus service, made bicycling a mainstream option for navigating the City and made pedestrians the focus of traffic planning and engineering. Delivering these results and implementing "complete streets" that safely and efficiently promote the travel of bus riders, cyclists, pedestrians and motorists has required numerous design and engineering innovations.

These are now well documented and are being increasingly adopted by cities across the United States and the world. One key to their success has been the ongoing update of traffic engineering and traffic management technology to ensure that street changes do not increase vehicular congestion. NYCDOT has shown that creating complete streets is not a zero sum exercise between different types of street users.

The development of better bus service, better cycling and walking conditions and the availability of CitiBikes, along with other options the Bloomberg Administration has created or promoted such as East River Ferry service and borough “green” taxis adds many new elements to the City’s already-rich menu of transportation options. People are increasingly embracing transportation choice and variety, from new intercity bus services to car-sharing companies.





Chapter 5

Better Bus Service

New York City's bus system offers tremendous potential for efficient and environmentally friendly movement of people. Buses serve 2.6 million riders each weekday citywide. But with an average speed of eight miles per hour, many routes are frustratingly slow. Improving bus speeds and customer experience is one of the quickest ways to build mass transit capacity in the city, especially in areas far from subway stops and in dire need of speedier transit options.

Since 2007, NYCDOT has worked closely with its partners at NYC Transit to unlock the potential of streets. A new model of bus service has laid the foundation for a citywide bus rapid transit network to supplement subway service.



50

hours saved
annually for each
SBS rider

SPEEDING BUSES IN A THRIVING CITY

In 2007, PlaNYC gave a clear mandate to vastly improve bus service to give New Yorkers more sustainable transit options and prepare for future population and economic growth. Mayor Bloomberg appointed top NYCDOT officials who embraced his vision and had experience in transit planning and management. New DOT management revamped bus rapid transit and instituted an extensive outreach processes to effectively engage communities along transit routes. New directors at the MTA and at NYCTransit were similarly committed to improving bus service—a strategic alliance developed between the agencies. Within months, bus projects started to move forward quickly.

The result was NYCDOT and NYC Transit's Select Bus Service (SBS) program, which improves speed, reliability, and customer experience for bus riders. SBS uses elements of bus rapid transit (BRT), a cost-effective approach to transit service that cities around the world have used to make

riding the bus more like riding rail transit. Off-board fare collection, designated bus lanes, safer, more attractive station areas, and signals that prioritize buses over other vehicles are combined along each route. Development of the service involved unprecedented collaboration with the MTA NYC Transit and intense partnership with local community boards and civic groups.

The first Select Bus Service started in 2008 along Fordham Road in the Bronx. Since then, five other routes have launched, including 34th Street and 1st and 2nd Avenues in Manhattan, Nostrand Avenue in Brooklyn, Webster Avenue in the Bronx, and Hylan Boulevard in Staten Island. A seventh route, along 125th Street in Harlem and travelling to LaGuardia, will begin in 2014.

By the end of 2013, these SBS routes will serve 215,000 bus riders daily and lay the groundwork for a more extensive five borough bus rapid transit network.



Community planning for Select Bus



98%

of riders satisfied
with Fordham Road
Select Bus Service

23%

decline in bus travel
times along 34th
Street

Fordham Road Bus Service

The Fordham Road-Pelham Parkway Bx12 Select Bus Service (SBS) replaced Bx12 Limited service from the Inwood neighborhood in Manhattan to Co-Op City in the Bronx in June 2008. New York City's first SBS route, the Bx12 SBS offers transfer opportunities to all of the subway lines and Metro-North lines in the Bronx as it travels east-west through the borough.

The project resulted in 20% improvement in travel times, with 98% of riders "satisfied" or "very satisfied" with the service. The new route experienced a 10% increase in ridership.

34th St Select Bus Service

The 34th SBS project improved traffic, transit speeds, pedestrian safety and curb access on a corridor that extends for two miles from the 34th Street Ferry Terminal on the East River to Twelfth Avenue. 34th Street is a key transit corridor, accommodating over 33,000 bus trips a day.

The 34th St SBS project has been implemented in phases. Bus lanes were implemented first in 2008, followed by more extensive sidewalk improvements.

Since initial improvements in 2008, bus travel times on 34th Street have declined 23% or by over 7½ minutes, and ridership is up over 12%.



10%

increased ridership
on the M15 Select
Bus

1st/2nd Avenues Select Bus Service

NYCDOT and MTA/NYC Transit launched Select Bus Service along First Avenue/Second Avenue SBS (M15 SBS) in October 2010 serving riders between South Ferry and 125th St. The project was implemented in phases—off board fare collection machines and red bus lanes were installed first, followed by transit signal priority and the construction of 12 bus bulbs along the corridor in 2013. This route was the first to have bus enforcement cameras to help keep lanes clear. A separated bicycle path was implemented concurrently along portions of the corridor greatly improving safety for all users.

This service has since increased ridership on the M15 by 10% and improved speeds by 15 to 18%. Further, as part of the project, offset and curbside bus lanes were paired with pedestrian and bicycling safety enhancements. For those sections with the full treatments, we've seen a 21% decline in traffic injuries.



Select Bus Service in the Bronx, Manhattan and Staten Island has improved local and express bus travel time and reliability, traffic flow at congested intersections, and enhanced safety for all corridor users



BEFORE: Webster and Tremont Ave.



AFTER: Webster and Tremont Ave.

Hylan Boulevard Select Bus Service

S79 SBS started in September 2012, connecting Hylan Boulevard, Richmond Avenue, and Bay Ridge, Brooklyn. The project improved local and express bus travel time and reliability, traffic flow at congested intersections, and safety for all corridor users. As part of the study, DOT and NYCT analyzed through and turning traffic on the corridor, surveyed parking activity, analyzed

transit ridership, surveyed local merchants and conducted extensive public outreach for feedback from stakeholders. The project corridor includes bus lanes in certain areas, including two miles of bus lanes to the Verrazano Bridge, extended medians, and transit signal priority. Travel times have improved by 12% since SBS was introduced.

Nostrand Avenue Select Bus Service

The Nostrand Avenue SBS project extends 9.3 miles across Brooklyn from Sheepshead Bay to Williamsburg and offers a cost-effective way to improve bus service for 44,000 daily riders. The project includes dedicated bus lanes, transit signal priority, construction of bus bulbs, and off-board fare collection. These improvements will reduce travel time and attract additional riders who currently avoid bus service due to slow speeds and a lack of reliability. The service started in November 2013.

Webster Avenue Select Bus Service

Webster Avenue is a major residential and commercial corridor in the Bronx, yet it has been underserved by transit, with most of the corridor a long walk from the subway. MTA and DOT identified this project due to high ridership on existing bus routes—serving 69,000 trips a day—and community support. After an extensive public engagement process, the project was implemented in June 2013.

Additional Bus Priority Projects

Elements of the bus rapid transit, such as painted bus lanes and traffic signals that speed buses through traffic, have also been used to improve bus service in selected corridors throughout the city including the ones listed below.

LaGuardia Airport Access:

DOT worked with the MTA to help plan the new Q70 bus. The new limited service speeds trips to the airport from Jackson Heights and Woodside commuter and subway stations by up to 40%.

Livingston Street:

Through the addition of upgraded bus lanes and signal changes, DOT and MTA improved bus speeds 12%–14% along this corridor in Downtown Brooklyn.

Jamaica:

DOT worked with MTA to improve and extend bus lanes along Archer and Jamaica Avenues, realign intersections, move bus stops and change parking to improve bus speeds and reliability.

Queensboro Bridge:

Operational changes on the Ed Koch Queensboro Bridge made travel between the boroughs quicker and more efficient. These included reconfiguring 60th Street to provide additional bus lanes and stops, and changing signal timing to reduce pedestrian and bus conflicts.

Utica Avenue:

DOT and NYC Transit are planning the addition of bus lanes from St Johns Ave to Church Ave, and the addition of signal changes including transit signal priority.



Q70 information on mta.info

15%

fewer obstructions
in bus lanes with
enforcement
cameras

Transit Signal Priority

Transit signal priority (TSP) gives precedence to buses at traffic lights. By keeping signals green or turning them green when buses approach, TSP speeds buses through traffic and improves travel time for riders. By allowing buses to move at a more consistent speed, TSP reduces times a bus has to stop and accelerate. In turn, fuel consumption and emissions reduction savings are achieved.

Transit signal priority is part of Select Bus Service routes, but the technology has the ability to be more widely used, and speed buses on routes throughout the city. In addition to SBS routes, NYCDOT has worked with the MTA NYC Transit to install TSP on three corridors with a goal of reaching at least 17 routes—including SBS—in all five boroughs. Along Victory Boulevard in Staten

Transit signal priority along Victory Blvd in Staten Island reduced travel time by 16% during the morning rush

Island, a TSP test on 300 buses successfully cut travel time by 16% during the morning peak and 11% during the evening peak. The program was funded by the US Department of Transportation and supported by the Staten Island Borough President's Transportation Task Force. In fall 2012, NYC Transit started a TSP pilot on 50 buses along the M15 Select Bus Service route on 1st and 2nd Aves.

Widespread application of TSP has the potential to greatly improve bus service throughout the five boroughs, with limited cost and physical infrastructure.

Bus Lane Enforcement Cameras

Enforcement of bus lanes is necessary to keep bus lanes clear and buses moving quickly. To supplement NYPD officers, the city sought state legislative approval for enforcement cameras.

In summer of 2010, New York City and the MTA were given authorization to begin operating a camera-based bus lane enforcement system. The legislation allows camera-based enforcement on specifically named Select Bus Service (SBS) corridors, six in total, and also names specific restrictions regarding the time, day of week, and methods of enforcement. Based on this authority, the City and

the MTA initiated implementation of a camera-based enforcement system beginning in November, 2010. 1st and 2nd Avenue was the first route to receive the cameras, with 34th St and Fordham Road and Hylan Boulevard following. The city is currently authorized to install them along Nostrand Ave and another unnamed route in Queens. People driving in bus lanes receive tickets of \$115.

The bus cameras have worked to keep buses moving. In bus lane segments where cameras were installed, bus lanes were obstructed 15% less than segments without cameras.

The brochure is now available in Spanish, Korean, and Chinese (Mandarin and Cantonese).

Bus Lane Enforcement

If you drive, park, or stand in a bus lane during hours of operation you face a fine ranging from \$115 to \$160. NYC enforces bus lanes in two ways:

Bus Lane Cameras: The City has installed cameras along bus lanes to catch violations. Signs are posted along restricted bus lanes to inform camera locations and remind drivers to keep up out of bus lanes, except for allowed right turns and passenger pick-up/drop-off.

Police Enforcement: NYPD regularly patrols bus lanes, and issues citations for moving and parking violations in bus lane violations.

For more information, visit:
 Para obtener más información visite:
 如需更多资讯，请访问：
 자세한 내용은 다음 사이트를 방문하십시오:
 Pour plus d'informations, visitez:
 Para obter mais informações, visite:

www.nyc.gov/brt

NYC 311 NYCDOT New York City Transit



SELECT BUS SERVICE PHASE II



NYCDOT identified dozens of potential bus rapid transit corridors, and with NYC Transit, selected 16 routes for implementation

Planning for Bus Rapid Transit

In 2009, once planning was underway for the initial five Select Bus Service projects, NYCDOT and MTA launched a citywide planning process to map out the next round of bus rapid transit routes. MTA and NYC Transit identified over 30 potential corridors for bus service improvements based on proximity to existing transit, potential population growth areas, subway and bus crowding, and difficult trips. The agencies then held seven workshops with over 300 people to solicit additional feedback. In the workshops, 74% of survey respondents said that they supported implementation of BRT in New York City. The agencies then narrowed the list down to 16 priority corridors.

30 BUS RAPID TRANSIT CORRIDORS

The Bronx

- Fordham Road
- Webster Ave/Third Ave
- South Bronx/East West Corridor (Hunts Point/Soundview)
- Bruckner Expressway
- Major Deegan Expressway

Brooklyn

- Nostrand Ave
- Utica Ave
- Southern Brooklyn East West Corridor
- Bushwick to Downtown Brooklyn
- Flatbush Ave
- Central Brooklyn East West Corridor
- Williamsburg East River Waterfront
- Gowanus Expressway

Manhattan

- 34th St
- 1st/2nd Ave
- 125th Street Crosstown Corridor
- Upper West Side/Upper East Side Crosstown Corridor
- 14th Street Crosstown Corridor
- West Side Corridor

Queens

- LaGuardia Airport/East Elmhurst
- Manhattan to Northern Blvd
- Hillside Avenue Corridor
- Jamaica to Flushing
- Woodhaven Blvd

Southeast Queens

- Middle Village
- Utopia/Fresh Meadows
- Long Island Expressway
- Long Island City East River waterfront

Staten Island

- Hylan Boulevard
- North Shore
- West Shore
- Staten Island Expressway

- IMPLEMENTED
- PLANNED BRT PHASE II
- OTHER POTENTIAL ROUTES

Community Advisory Committees are crucial to designing and planning Select Bus Service

Community Advisory Groups

Community boards, civic groups, and the public are heavily involved in the planning process for Select Bus Service routes. Each SBS route has involved dozens of meetings with stakeholders, along with walk-throughs and focused workshops to develop community based solutions to particular challenges along a route. Part of the public engagement process includes the creation of a Community Advisory Committee (or CACs) to allow a more detailed discussion of the proposal and address traffic, street design, commercial delivery and other issues along a corridor. CACs generally include representatives from community boards, elected officials offices, business associations, and civic groups.

The public process for the Webster Ave Select Bus Service in the Bronx led to a more aggressive

and better project. Members of the Community Advisory Committee brought up pedestrian safety concerns during meetings with the NYCDOT and NYCTransit, especially at the intersection of Webster and Tremont Avenues. These concerns reinforced DOT's data that showed this intersection as a high crash corridor in the Bronx. In response to community suggestions, DOT's transit and pedestrian safety groups worked together to redesign the Webster Tremont intersection to add additional pedestrian amenities including the addition of two pedestrian refuge islands, the closure of a slip lane, extension of the sidewalk to shorten crossing distances. Thanks to community involvement through the Community Advisory Committees, DOT was able to design a project that addressed transportation challenges in a more holistic way.



Community Advisory Committee

REGULATING INTERCITY BUSES

The intercity bus industry has grown significantly over the last fifteen years, becoming an increasingly popular option for people traveling into and out of New York City. While such buses provide good, efficient, intercity transportation, they can cause serious disruption to the local traffic network through increased congestion and abuse of the city's curbside spaces. NYCDOT had

attempted to limit the negative impacts of intercity buses by working closely with operators to designate locations where buses can pick up and drop off passengers. Unfortunately, this system was voluntary and NYCDOT had no authority to prevent intercity buses from pulling up to almost any curb space. Communities and elected officials, especially in Midtown, were increasingly

frustrated with sidewalk and traffic congestion that resulted from certain bus stops.

In 2012 and 2013, the city worked with state elected officials to pass legislation that would give the NYCDOT new powers to regulate the intercity bus industry. The law sponsored by New York Senator Martin Golden and Speaker Sheldon Silver granted the City of New York authority to

set up a permitting system for intercity bus operators. Through a formal online application process, NYCDOT now designates bus stops for all intercity buses, limiting disruptions to the local transportation network.



Megabus Northeast, LLC pick up stop at seventh avenue and 28th St



Eastern Coach Inc. Pick up stop at Seventh Avenue and 33rd St



Chapter 6

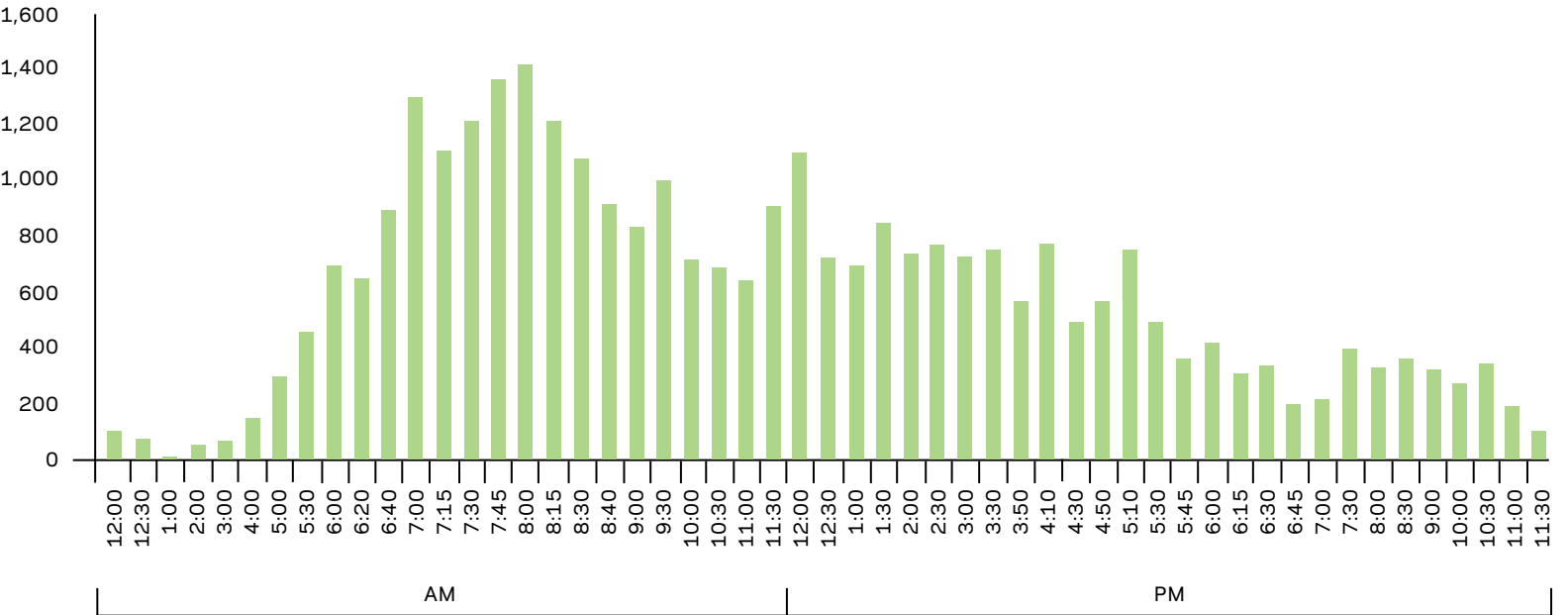
A City of Rivers and Islands

New York is a waterfront city and a city of islands. As a result, ferries have always played a critical role in moving people and goods around the five boroughs. Today, the Staten Island Ferry, which carries 22 million people annually between Manhattan and Staten Island, is the largest commuter ferry route in the country, and ridership continues to grow.

In the last several decades, a robust network of privately-operated ferry services has also been established in New York City. The services carry Yankee fans to the Bronx, commuters to New Jersey, tourists to the Statue of Liberty and Ellis Island, and beachgoers to the Rockaways. Over the past five

years, the city has worked to encourage and expand the use of our waterways for commuter and recreational transportation. In 2011, Mayor Bloomberg and the City Council released Vision 2020, the New York City Comprehensive Waterfront Plan which called for improving waterfront transportation and access to the waterfront. In addition to this long-term vision, the Mayor and Council also released the Waterfront Action Agenda, a series of 125 near term initiatives to make the most of our waterways. Expansion of ferries was a key element of both plans.

STATEN ISLAND FERRY 24-HOUR WEEKDAY RIDERSHIP, STATEN ISLAND TO MANHATTAN



FRIDAY JUNE 24, 2011



STATEN ISLAND FERRY

STATEN ISLAND FERRY ON TIME PERFORMANCE

% ON TIME	FY 2011	FY 2012	FY 2013
	91%	89%	89%

NYCDOT operates and maintains the nine Staten Island vessel fleet as well as the St. George Ferry Terminal on Staten Island, Whitehall Ferry Terminal in Manhattan, the City Island and Hart Island Facilities, and The Battery Maritime Building.

Service on the Staten Island Ferry is free and runs 24 hours a day, in 15 minute intervals during rush hours. It is the only non-vehicular transportation between Manhattan and Staten Island. The ride is a vital commuter service for millions of New Yorkers, but the 5-mile, 25 minute ride also provides a majestic view of New York Harbor for tourists from all over the world. Staten Island Ferry ridership

reached an all-time high in 2012, serving 22 million people, and ridership continues to grow. The agency has been successful at keeping service reliable despite declining city resources. Finding innovative ways to use state and federal resources, the agency has been able to plug holes in the city budget and keep boats running frequently and on-time. At the same time, it has kept on time performance steady and found ways to green the ferry fleet. Chapter 16 of the Infrastructure section below details agency’s efforts to make the Staten Island Ferry fleet one of the greenest in the nation.

EAST RIVER FERRY

Started in 2011, the East River Ferry commuter service has been wildly successful and offered a new transportation option for waterfront neighborhoods. The service, which connects Long Island City, Greenpoint, North and South Williamsburg and DUMBO with Downtown and Midtown Manhattan, has significantly outperformed the City’s original expectations. In May 2013, the service recorded its 2 millionth rider, more than twice the ridership that was projected for the full three-year pilot period that ends in the summer of 2014. Summer ridership increased 43% from the summer of 2011 to the summer of 2012. The East River Ferry has proven so popular that in May 2012, the City announced that larger boats—carrying as many as 399 passengers per trip—would be added to the East River Ferry fleet.

The city is working to find a long term operator for the ferry service to make it a permanent option for New Yorkers.

The East River Ferry is managed by the city’s Economic Development Corporation, but DOT plays an important role in siting ferry docks and improving access to the service. Safety improvements at the India Street pier in Greenpoint and traffic calming and pedestrian improvements on Old Fulton St in DUMBO and Brooklyn Heights ensured safe passage to ferry landings. The initial roll out of DOT’s CitiBike system included stations at four of the seven East River Ferry landings and the remaining three ferry landings will receive CitiBike stations in bike share’s next phase. Additionally, CityRacks have been placed at all ferry stops.

Left:
The launch of the Senator John J. Marchi vessel





Chapter 7

Streets for All:

Improving Choices for Short Trips

New York City is ideally suited to walking and cycling. The city's dense design means many trips are short. Of auto trips in New York, 10% are under one-half mile, 22% are under one mile and 56% are under three miles—distances that can easily be covered on foot or on a bike. Shifting even a small number of these trips to bicycles or walking results in significant benefits.

Cycling and walking have clear health and environmental benefits, and also create broad mobility gains. Making cycling viable and walking more attractive adds choice to the transportation menu, and can dramatically increase the utility and flexibility of public transportation for city dwellers. PlaNYC and *Sustainable Streets* laid out clear goals for bringing cycling into the transportation mainstream. A very strong emphasis on public health, traffic safety and an improved public realm by the Bloomberg Administration also put the pedestrian at the center of transportation and streetscape planning, constituting a comprehensive pro-walking strategy for the entire city.

New York City has made dramatic strides in creating modern, safe streets that are attractive for cycling and walking. At the core of this progress are programs to overhaul the design of streets so they are more balanced and inviting for all users. This work re-made dangerous intersections, opened new walking routes, helped pedestrians and cyclists orient themselves and created a cycling network that connects the city. Since 2007, NYCDOT has created over 350 miles of bike lanes and launched the largest and most heavily-used bike share system in the Western Hemisphere. To address a further barrier to bicycle transportation, DOT has added 16,000 bicycle parking racks to City streets, and begun to transform 12,000 old parking meter poles into additional bike parking.

With the City Council, DOT defined and enacted a ground-breaking office building bike parking program that DOT administers.

CAR JOURNEY LENGTHS, NYC

10%	10%	12%	15%	19%	34%
LESS THAN .5 MILES	3-5 MILES	.5-1 MILE	MORE THAN 1.0 MILES	5-10 MILES	1-3 MILES

The results have been staggering. Cycling has become much safer and attractive for people of all ages. The city reached its *Sustainable Streets* goal of doubling DOT bike counts on commuter routes from 2007 to 2012 in 2011, a year early. Until recently few children and older adults were seen riding bikes in New York. Now bike paths and protected bike lanes are enjoyed by families and cyclists of all ages and abilities. As described in depth in the Safety Section, there was a 73% decrease in the average risk of a serious injury while bicycling in New York between 2001 and 2011.

New plazas, pedestrian wayfinding maps, public seating and the broad range of safety and traffic calming improvements described in the chapters above on public safety have provided a broad improvement in the space and safety afforded to pedestrians. Innovative projects like Broadway Boulevard/Greenlight for Midtown, 6.5 Avenue and the remake of streets around Brooklyn's Grand Army Plaza have made walking routes more direct, generated new foot trips and improved safety.



63%

increase in bike
volumes on 9th
Avenue since 2007

CYCLING

Where it was a fairly intimidating place to bicycle just a few years ago, New York City has become the most bike-friendly big city in America. New Yorkers voted with their pedals for the increasingly interconnected bike lane network and the design innovation that created protected bike lanes on major avenues. CitiBike removed additional barriers for those who face problems storing or parking their own bikes, and has fully unlocked New York's potential as a cycling city.

New York City's density, interconnected street networks and flat terrain have always given it the potential to be an ideal bicycling city. PlaNYC and Sustainable Streets were both crystal clear in their intentions to finally leverage this latent advantage. The policies said clearly that city streets would become increasingly welcoming to bicycles—PlaNYC set the goal of adding 200 miles of new bike lanes within three fiscal years, while Sustainable Streets looked ahead to a doubling of documented bicycle volumes on key routes.

To help spur cycling, NYCDOT's strategy has been to develop bike lanes as a network that is useful for the trips New Yorkers need to make, rather than tucking disconnected bike lanes away in disparate areas. Much of the post-2006 network improvements were initially focused in the lower half of Manhattan and the northern half of Brooklyn where cycling rates were relatively high, where it was plausible that additional people would respond to improved cycling conditions. Tremendous increases in cycling volumes in these areas in 2007–2009 supported the strategy. DOT was subsequently able to expand the network on this basis of very strong usage and response. In more recent years, very strong additions have been made to the network across the City, including the South Bronx, Midtown Manhattan and Western Queens.

Design innovation has been a critical factor in making the cycling network attractive to more people. In 2007, NYCDOT pioneered the practice of protecting bike lanes by setting them off from



moving vehicle traffic with “floating” parking lanes that were no longer located along the physical curb. Manhattan's 9th Avenue saw the first of these projects, which also features a bicycle signal phase where cross-streets turned across the bike lane. The 9th Avenue approach quickly won acclaim—including the Institute for

In corridors like Kent Avenue
and Prospect Park West,
weekday bicycle use has tripled

INDIVIDUAL 2011 PROJECT GENERATED CYCLING GROWTH IN 2012

STREET	BEFORE	AFTER	CHANGE
W.29TH STREET	258	371	44%
W.30TH STREET	260	339	30%
FIRST AVENUE	583	1072	84%
SECOND AVENUE	842	1286	53%

Transportation Engineers’ Transportation Planning Council’s Best Program award in 2008—and was expanded to other streets and avenues.

The protected lanes helped fuel substantial growth in cycling. Bike volumes on 9th Avenue are 63% higher than before the new bike lane was implemented in 2007. Wide avenues, like 1st, 2nd, 8th and 9th Avenues in Manhattan that were previously inhospitable to bikes now have a steady flow of cyclists of all ages using the protected lanes. As of summer 2013, there were 30 miles of protected bicycle lanes in New York, with additional miles such as Vernon Boulevard along the East River in Queens still undergoing implementation.

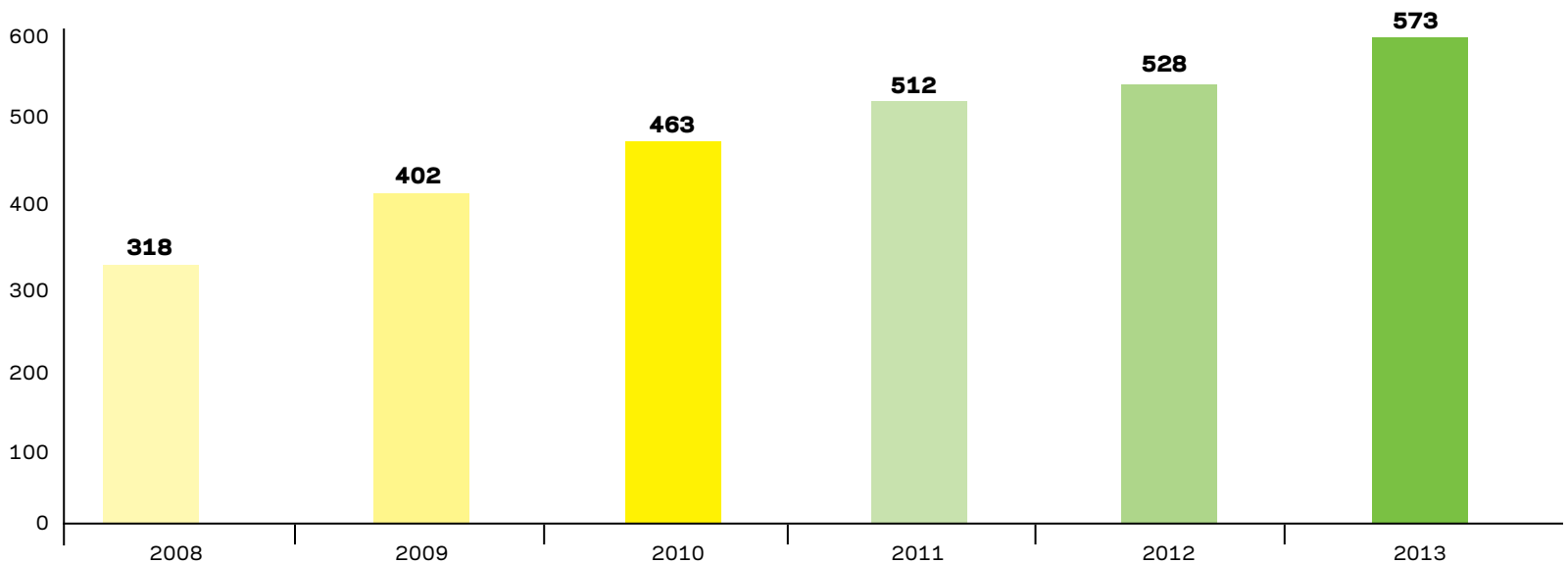
Additional bike-friendly design innovations are extensive. The protected design was adapted to two-way bikeways or interim greenways in “edge” environments such as waterfronts and park boundaries where the volumes of crossing traffic are low. In such corridors, like Kent Avenue and Prospect Park West in Brooklyn weekday bicycle use has grown by nearly 300%. DOT has also made extensive use of the buffered lane design (extra width for safety) that it pioneered as long ago as the 1990s, and has introduced short contra-flow bike lane and shared bike-pedestrian space segments to make key network connections. Extensive use of “bike boxes” gives cyclists more room at intersections.

In total, NYCDOT has added over 350 miles of new and enhanced bicycle routes from 2007 to 2013, and our steady pace of expansion continues. DOT reached its strategic goal of doubling bike commuting in five years, a year early. In 2013, the tremendous response of New Yorkers to Citi Bike calls for revisiting the City’s cycling targets, revising them substantially upward and harnessing them to bike-sharing expansion strategy.

The rapid expansion of bicycle lanes generated much discussion and media coverage, but public opinion polls have consistently shown very strong support for bicycle lanes and for the Citi Bike program. The latest poll, by the New York Times in August 2013, found 64% of New Yorkers backing expansion of bike lanes, with strong support from many backgrounds, boroughs and political leanings. Support for Citi Bike has registered in the mid-seventies.

DOT has also improved and simplified the realm of bicycle parking. Working with Cooper Hewitt Design Center and cycling groups, DOT launched a design competition for a new type of City-provided bike rack, and received over 200 submissions from around the world. The winning design is now seen throughout the city. Approximately 19,000 total City-provided racks have been installed to date. NYCDOT is now dramatically accelerating the provision of on-street bike parking facilities by converting old parking meter poles into

GROWTH OF NYC'S ON STREET CYCLING NETWORK



bicycle racks, targeting installation of 12,000 “meter racks” by 2015.

To add further to bike parking capacity, which is outstripped by demand in many places, DOT in 2012 launched an application-based program for bike “corrals” for businesses interested in accommodating cycling customers. The corrals are multi-bike-rack installations situated in parking lanes rather than sidewalks. Over 30 have been installed, with more to come. The program is designed to give community boards input in the installation location. In other areas, DOT, in coordination with our street furniture franchisee, Cemusa, has installed bicycle parking shelters. Each shelter contains stainless steel bike racks for

eight bikes. The design closely resembles the city’s bus shelter, using the same high-quality materials. Panels on the shelters display the annual NYC Cycling Map and other cycling materials. Under the current contract, 36 will be installed.

The city also worked with the City Council in 2009 on legislation that increases bike parking in private garages and office buildings. Under the new laws, garages that accommodate 100 or more motor vehicles are required to provide bicycle parking and office buildings must allow access or parking for bicycles upon request by a tenant. As a result, an ever-expanding set of large office buildings in the densest sections of the City now accommodate bicycle parking access.





23

capital projects
planned for the
14 mile Brooklyn
Waterfront
Greenway

ON-STREET PROTECTED BICYCLE PATHS IMPLEMENTED SINCE 2007:

1st Avenue: most of East 1st St to 124th St

2nd Avenue: 2nd St to 34th St, and 104th to 125th

Bruckner Blvd: Bryant Ave to Concrete Plant Park Greenway

Columbus Avenue: West 68th St to W110th

Grand Concourse: Cortland Ave to E Moshula Parkway

8th Avenue: Bank St to 56th St

9th Avenue: W 16th St to 59th St

Columbia Street & Atlantic Avenue Pier 6 to Congress St

Fort Hamilton Parkway: Park Circle to East 5th Street

St. Nicholas Avenue: Amsterdam Ave to West 163rd St

Prospect Park West: Grand Army Plaza to Bartell-Pritchard Sq

Broadway: Most of Columbus Circle to East 18th St

Flushing Ave: Williamsburg St West to Washington Ave

East 17th Street: Broadway to Park Ave South

Allen Street: Division Street to East Houston Street

Pike Street: South Street to Division Street

Kent Avenue: Clymer St to North 14th Street

Sands Street: Navy St to Jay St

Williamsburg Street West: Flushing Ave to Kent Ave

Delancey Street Median Bike Path: Suffolk St to Clinton St

Park Circle: Prospect Park Southwest to Ocean Parkway

Grand Street: Varick St to Chrystie St

Canal Street: Forsyth St to Chrystie St



BEFORE: Columbia Street



AFTER: Columbia Street



BIKE LANE EXPANSION



For more bike lane expansion maps, see sustainablestreets.info



BUILDINGS THAT ALLOW ACCESS FOR BICYCLISTS, MIDTOWN MANHATTAN





5

million trips in first
150 days since
Citi Bike launch

Annual members receive a “key to the City,”
allowing them to quickly unlock a Citi Bike



CITIBIKE

The launch of CitiBike on May 27, 2013 in the Manhattan Central Business District and adjacent parts of Brooklyn dramatically expanded the use of bicycles for basic transportation in the heart of the City. CitiBike has seen the most rapid uptake of subscriptions and usage of any bike share system in the world. As of mid-October 2013, just 150 days since the system’s launch, the 6,000 CitiBikes had generated nearly 5 million additional cycling trips—about 31,000 trips per day on average, within a relatively compact section of the city, with this average rising over 35,000 in August, September and October. Over 92,000 people have

subscribed as annual members of the system.

Within just a few months, New Yorkers have fully integrated CitiBike into the city’s transportation system. The initial network of 330 bike share stations was planned to create maximum utility within the service area, with stations scaled to match the surrounding areas and generally only 1,000 feet from other nearby stations. Some cities have spread bike share stations out and thus made bike share use less convenient than it could be. The tremendous user response to CitiBike indicates that DOT’s station network planning is on the right track. Without CitiBike, users

CITIBIKE RIDERSHIP OFF THE CHARTS

AUGUST 2013	RIDES/BIKE/DAY
NYC	5.96
PARIS	5.0
WASHINGTON	4.14
LONDON	3.64

would have taken the subway or walked, with some bike share trips replacing bus and car trips. Without the bike share system, Citi Bike riders would have:

Although bike share systems across the world often have unique characteristics in terms of scale, design, pricing and equipment, one way to compare systems is by usage, examining daily rides per installed bike. By this measure,

New York’s CitiBike is clearly one of the most successful and readily adopted bike share system in the world. New York’s built-out bike network, with 152 bike lane-miles within the initial bike share operating area, is certainly a big part of New Yorkers’ tremendous reception of CitiBike.

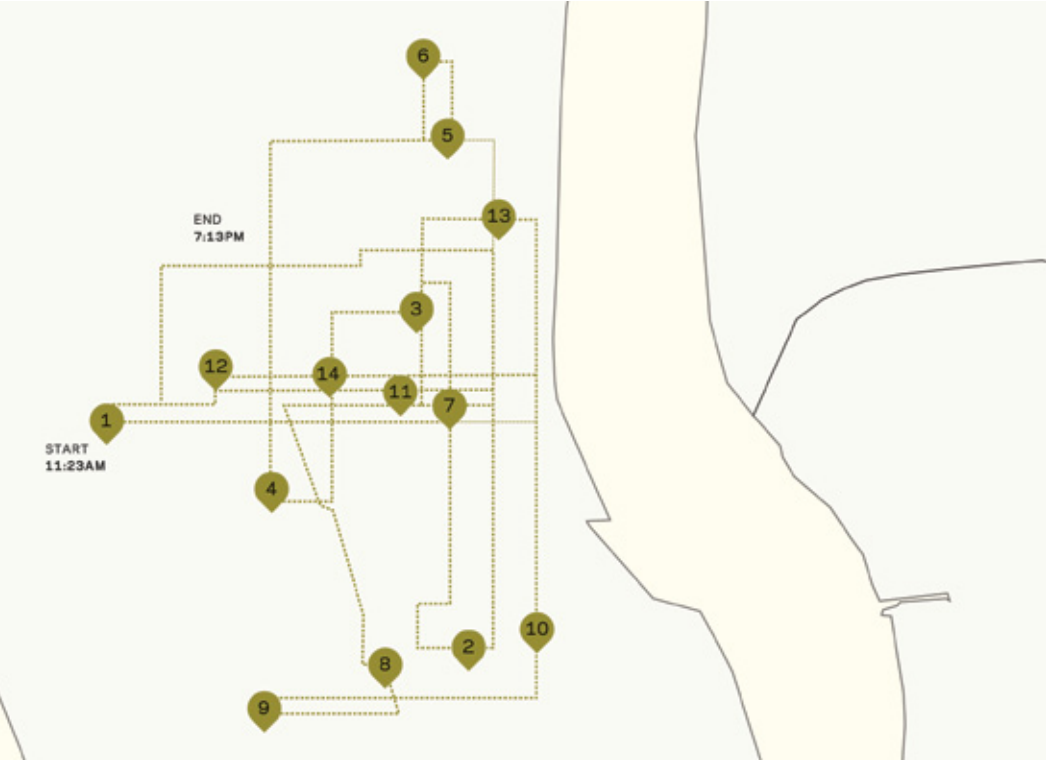
45% of CitiBike users said the system allowed them to travel to new places

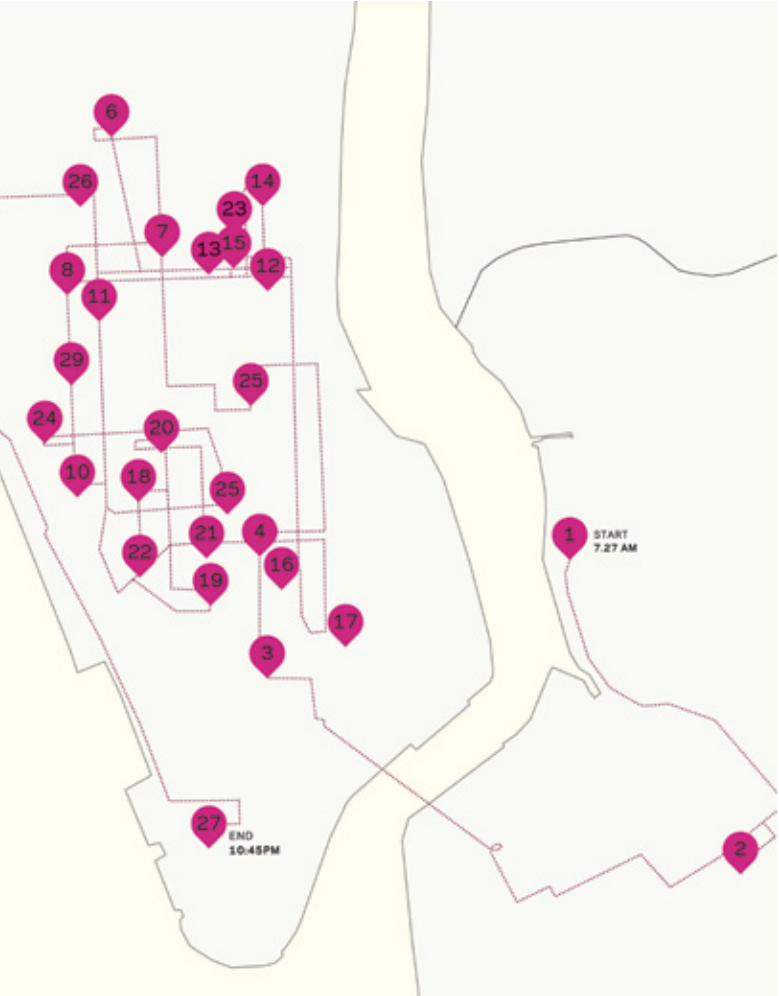
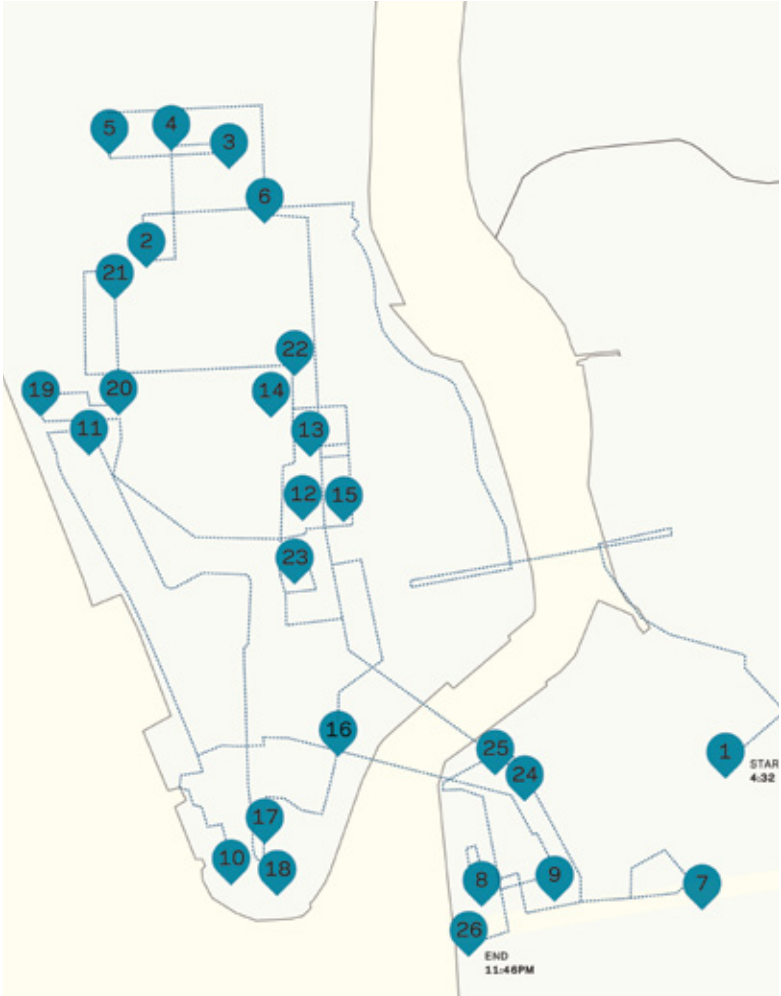
Daily average CitiBike ridership by month

A DOT survey of over 1,000 CitiBike users from August, 2013 confirms that New Yorkers have largely adopted the system for practical transportation. It found that 46% of CitiBike trips are for work purposes, including commuting, while 28% are for errands, personal business and shopping.

53% said that they combine CitiBike travel with other forms of transportation, with nearly one-third of all respondents saying they did this “most of the time.” The survey also indicated that virtually all CitiBike trips are new bike trips.

A DAY IN THE LIFE OF 4 CITIBIKES





Some CitiBikes are used dozens of times a day and travel the entire system territory

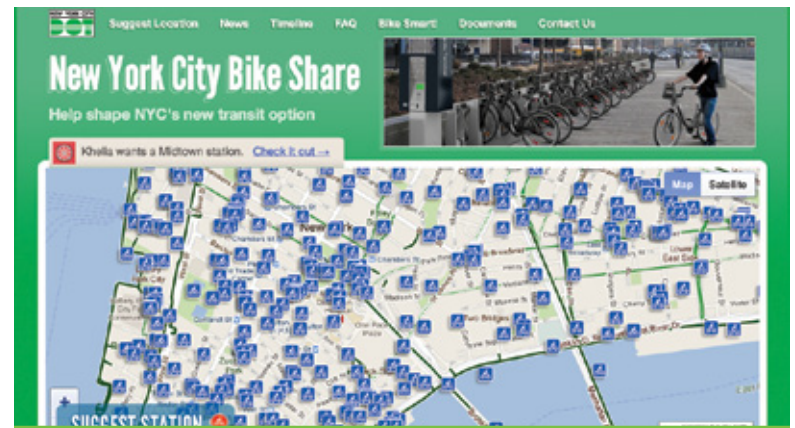
NYC Bike Share: Designed By New Yorkers



Community planning workshop to select station sites

Another key to Citi Bike's popularity is the deliberate, extensive 18-month planning process undertaken by NYCDOT and other stakeholders. Bike share lends itself to a collaborative local planning because it relies primarily on a dense network of stations rather than on the specific placement of any particular station. The planning process for Citi Bike sought and received heavy input from citizens from its inception. Beginning in September of 2011, immediately following the program's announcement, nearly 400 meetings and events were held with community boards, elected officials, civic groups and property owners to describe the program, discuss station siting and demonstrate how the system would work. NYCDOT staff conducted twenty-one field demonstrations of

bike share equipment to introduce the public to program and begin the planning process. Community planning workshops were held in each community board within the program area with the specific goal of educating about the program and eliciting feedback on where bike share stations should be placed, both generally in the New York City streetscape, and specifically on particular blocks and streets. Community members and participating community groups had the opportunity to ask questions and voice support for, or opposition to specific potential Citi Bike station locations. DOT launched a virtual planning tool to open another avenue into Citi Bike station planning. The nyc.gov/bikeshare web portal with its interactive "suggest-a-station"



DOT received 10,000 suggested station sites on its interactive map

feature garnered over 10,000 station suggestions and over 55,000 "supports" for those suggestions.

The process was inclusive and meant to draw in New Yorkers from a range of backgrounds and incomes. Bilingual meetings were held as a result of community board request. DOT worked with the NYC Housing Authority and resident advisors to help site stations near housing campuses. It also developed two discounted annual membership programs for low income New Yorkers. NYC Housing Authority and members of participating Community Development Credit Unions can receive 40% discounts on annual memberships.

After the meetings, workshops and demonstrations were completed, NYCDOT undertook the task of

synthesizing all of the feedback, suggestions and data. DOT used Geographic Information Systems (GIS) to create a predictive model outlining the size of stations for each neighborhood based on surrounding uses and transit. Using technical siting criteria, the information garnered from the public and the GIS demand model, DOT narrowed almost 3,000 potential station locations in the initial program area to just 331, which were presented back to the community boards and stakeholders as draft plans for additional rounds of feedback. DOT has worked closely with all stakeholders through Citi Bike launch as well as post-launch. In total 43% of the stations initially proposed in DOT's draft plan were moved due to additional community feedback and requests.



86%

increase in winter
cycling since 2008

BETTER DATA ON CYCLING

NYCDOT has greatly improved data collection and analysis to more accurately track the growth in cycling.

DOT conducts regular bicycle counts on all roadways crossing 50th Street in Manhattan, plus the Hudson River Greenways, the Staten Island Ferry at Whitehall, and the Queensboro, Williamsburg, Manhattan and Brooklyn Bridges. The counts began in 1980 and have been conducted annually since 1984.

In 2007, DOT added two cycling counts to track cycling ridership three times a year, in May, August and September. It also started tracking cycling over an 18-hour period (6 am–midnight) during these counts. Traditionally, counts were only done for the 12 hour period from 7am to 7pm.

DOT also began counting cyclists in winter months in 2008. Off-season cycling has seen

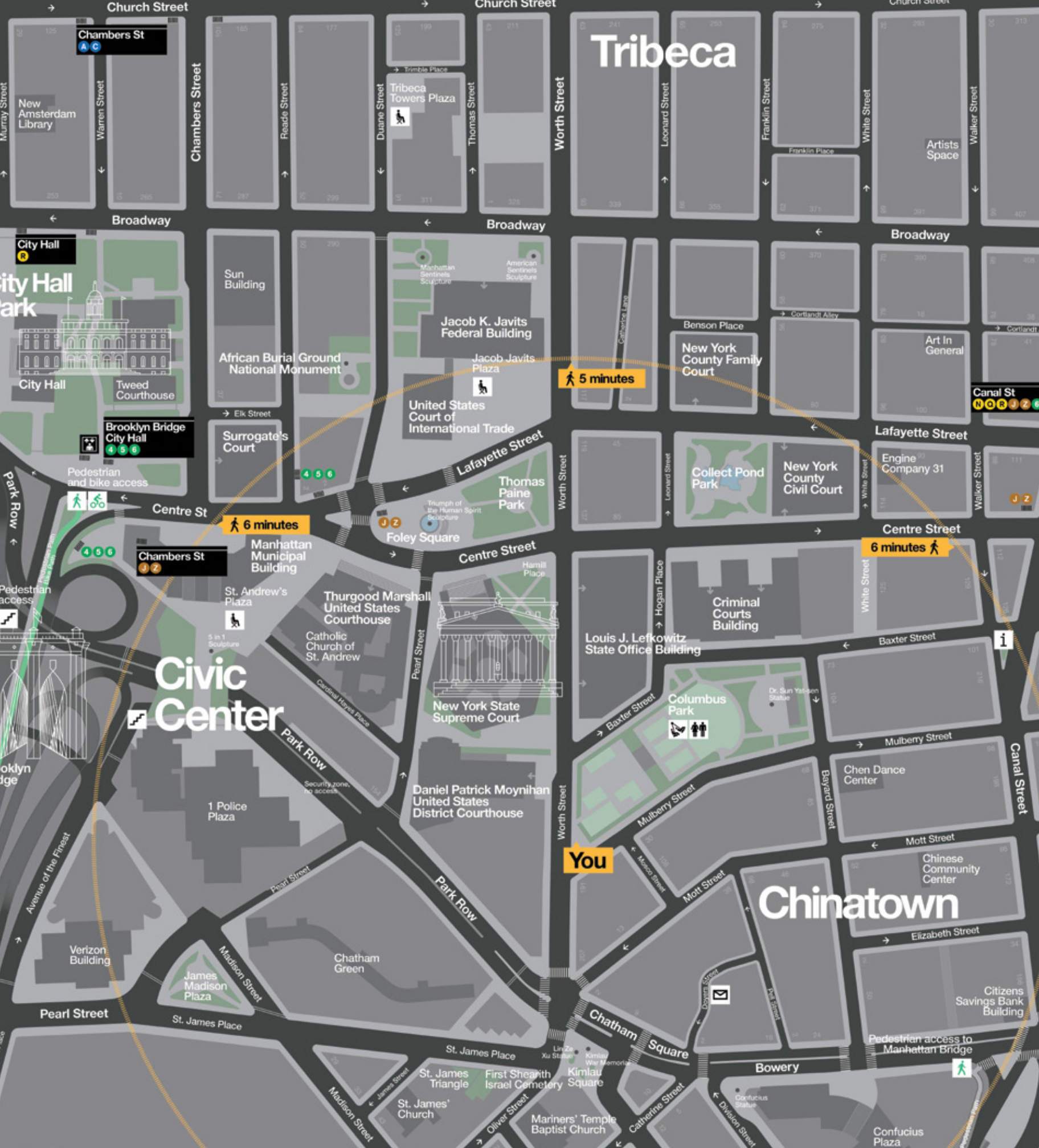
significant growth—indicating that more and more New Yorkers are cycling year round as part of their transportation routine.

Individual counts have also started to track results of specific projects. These numbers show that new bike paths result in more cycling.

The new tracking methods allow DOT to produce the agency's In-Season Cycling Indicator and the Cycling in the City report which explains the growth in cycling with simple charts and visuals. The updated numbers also provide more accurate data for regional transportation planning documents.

As of late 2013, DOT's bike counting methods are again under revision to account for the launch of CitiBike and the millions of new cycling trips the system has added to NYC bike lanes, pathways and streets.





Tribeca

Civic Center

Chinatown

You

5 minutes

6 minutes

6 minutes

Chambers St
A C
City Hall
City Hall Park
City Hall
Tweed Courthouse
Brooklyn Bridge City Hall
4 5 6
Pedestrian and bike access
Park Row
Pedestrian access
Brooklyn Bridge
Avenue of the Fleet
Verizon Building
James Madison Plaza
St. James Place
Pearl Street
Chatham Green
St. James' Church
First Shearith Israel Cemetery
Mariners' Temple Baptist Church
Kimlau Square
Confucius Plaza
Citizens Savings Bank Building
Elizabeth Street
Chen Dance Center
Mulberry Street
Baxter Street
Columbus Park
Louis J. Lefkowitz State Office Building
Criminal Courts Building
New York County Civil Court
Collect Pond Park
Engine Company 31
Lafayette Street
Centre Street
White Street
Walker Street
Artists Space
Franklin Place
Leonard Street
Worth Street
Thomas Paine Park
Foley Square
Thurgood Marshall United States Courthouse
Catholic Church of St. Andrew
St. Andrew's Plaza
Manhattan Municipal Building
Surrogate's Court
African Burial Ground National Monument
Sun Building
Jacob K. Javits Federal Building
Jacob Javits Plaza
United States Court of International Trade
American Sentinels Sculpture
Machuan Sentinels Sculpture
Triumph of the Human Spirit Sculpture
Pearl Street
Cardinal Hayes Place
1 Police Plaza
Daniel Patrick Moynihan United States District Courthouse
Chatham Square
Catherine Street
Division Street
Bowery
Confucius Statue
Pedestrian access to Manhattan Bridge
Canal St
N O R J Z
J Z
i

NYCDOT has found walking rates in New York City are on the rise—10% of New York City residents walk to work



WALKING

Streets that welcome people and encourage walking are a crucial element of a sustainable city. Streets made for people are inviting, safe, and easy to navigate. NYCDOT has used treatments outlined in the Safety and World Class Streets sections of this book, including traffic calming, intersection engineering, signal timing, public plazas and street seating as part of a comprehensive effort to make streets inviting and attractive for walking. Additionally, NYC has developed a number of key projects designed to foster easier walking connections, and to provide information to New Yorkers and visitors alike that many trips within the City can be easily and perhaps most conveniently and quickly accomplished on foot.

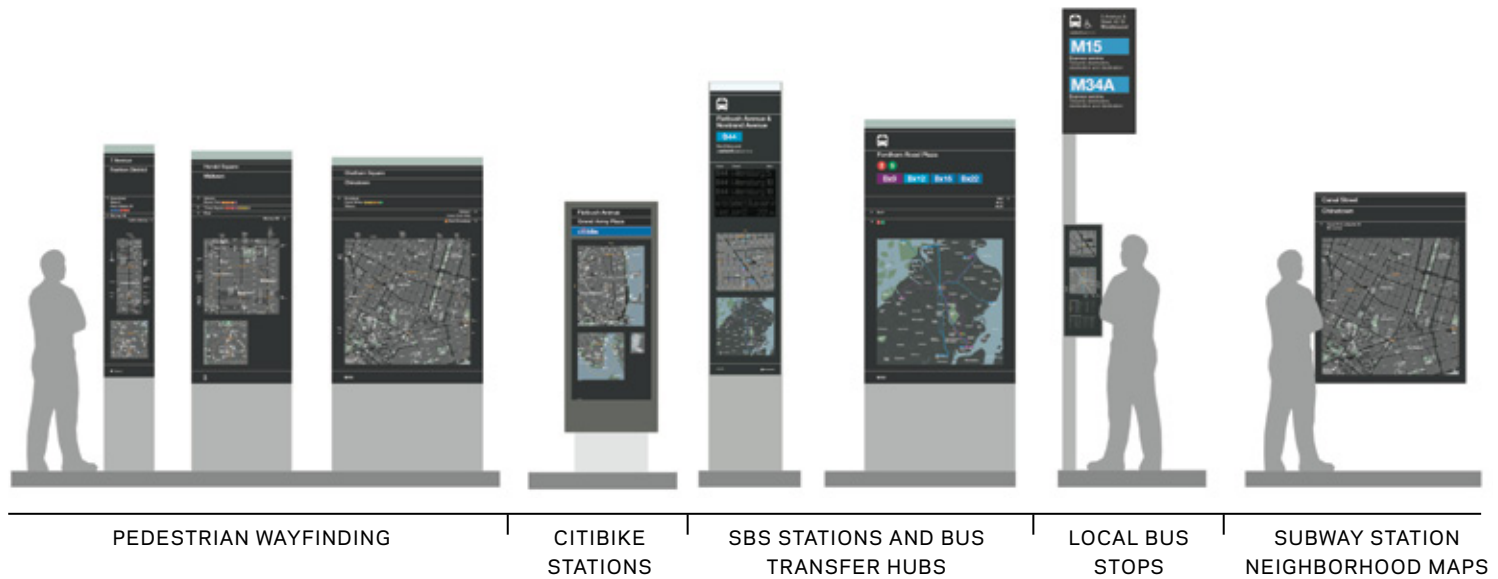
NYCDOT has found walking rates in New York City are on the rise. 10% of New York City residents walk to work (2005–2007), some of the highest rates in the country (The Green Dividend, NYCDOT, April 2010). The city's pedestrian volume index (see box, next page) tracks walking rates at locations throughout the city and tracks a 12.9% increase in walking since 2007. The growth in public transit usage highlighted earlier in this chapter also points to more walking in the city—nearly all subway or bus riders start or end their trips by walking.

More walking is good for health, mobility and the economic bottom line. Research in the United Kingdom has found a direct relationship between the way in which people travel around city centers and the amount of money they spend. The weekly expenditure of consumers who walk was 42% higher than those who drive. (Economic Value of Livability, Todd Littman, Victoria Transport Policy Institute, 2010). Real estate in areas with above average levels of walkability command a premium between \$4,000 and \$34,000 over houses in areas with average levels of walkability. (Walking the Walk: How Walkability Raises Home Values in US Cities, CEOs for Cities, 2009).

NYCDOT research also confirms that improvements in the walking and public space environment are good for business. The expanded public and pedestrian space near Union Square resulted in 49% fewer commercial vacancies (compared to 5% more borough-wide). Pedestrian plazas and walkability improvements in Pearl Street in Brooklyn resulted in a 172% increase in retail sales at locally-based businesses, compared to 18% borough-wide.

With these numbers in mind, NYCDOT has created innovative projects to encourage walking and build a safer, easier to navigate walking network.

WALKNYC WAYFINDING SYSTEM FAMILY OF ELEMENTS



Pedestrian Volume Index

NYCDOT's developed a Pedestrian Volume Index to track walking rates throughout the city and to help the city accommodate and encourage growth in walking. It also provides necessary data for DOT projects and programs, regional planning documents, and grant applications. Data collection began in 2007 and has been included in the Mayor's Management Report since 2008. The counts are conducted twice a year, in May and September, and taken at

114 locations, including 100 on street locations (primarily retail corridors), 13 East River and Harlem River bridge locations, and the Hudson River Greenway. After the data is collected, DOT indexes 50 of the locations to 2007 numbers to show growth or declines in pedestrian volumes over time.

Pedestrian and public life surveys

In addition to the citywide counts, NYCDOT has done a series of intercept studies to get a better understanding of how and why people are traveling to commercial corridors. DOT staff conducted intercept surveys at nine locations for various projects between December 2008 and November 2010. While each survey was completed for different types of DOT projects, all the surveys were designed to better understand people's behavior. The surveys were

conducted in areas with a high concentration of shopping and during peak shopping times on weekdays and weekends. For all nine surveys, respondents were asked how they got to their destination (mode) and their reason for making the trip (purpose). The study results show the importance of walking in the city, and underscore how improvements to the walking network and pedestrian environment can benefit local businesses.

WalkNYC provides user-friendly maps including walking times to nearby destinations

WAYFINDING: WHY NOT WALK?

New York has provided ubiquitous directional signage for drivers for decades. However, few signs are oriented toward pedestrians, despite walking being the universal mode of urban travel. Pedestrian wayfinding is a navigational tool to guide residents and visitors in planning walking routes and connections to transit and other modes of travel.

Wayfinding is not simply a system that helps tourists find major landmarks. Instead, it offers a host of interconnected benefits to the life and economy of the city. Research has shown that even residents of New York do not know places as well as they think. By increasing people's real knowledge of New York City, and providing information at key locations so that it is available to people on the go, a wayfinding system can encourage people to explore their city, revealing hidden shopping streets, local attractions parks and walking routes.

DOT has developed "WalkNYC", a standard wayfinding system, to encourage residents and visitors to walk more and to explore

Many People are lost in NYC, a DOT survey find:

13% of locals are not familiar with area in which they were surveyed

48% of visitors could not give directions to a local landmark

27% of visitors can't name the borough they are in

24% of visitors did not know how to get to their next destination

33% of visitors did not know which way north was

areas of the City that may be new to them. The attractive signs provide user-friendly maps and information, including walking times, the location of other forms of transportation, building addresses, area attractions and public facilities. The design of the signs and maps has been



Pedestrian wayfinding, Canal Street

widely acclaimed. A recent review proclaimed the system a "Feat of Design, Data and Diligence" [Mashable, Oct. 24 2013]. The design draws text and color from ubiquitous NYC Subway signage, adopting a look already familiar to users of transportation in City, and extends it. The initial roll out of wayfinding signs and maps in 2013 included Chinatown, the 34th Street/Herald Square area and Garment District in Midtown,

Prospect and Crown Heights and Long Island City, with the goal to expand to neighborhoods across the city.

The WalkNYC maps have also been incorporated into the Citi Bike station design, and will be found in additional parts of the City as the bike share program expands. DOT is also working with the Metropolitan Transportation Authority (MTA) to develop a Select Bus Service (SBS) wayfinding signage in transit stops.

6 1/2 AVENUE

DOT created a new pedestrian avenue in the heart of Midtown called 6 1/2 Avenue to encourage more New Yorkers to walk and to decongest busy avenues. The route takes advantage of existing plazas at the bases of buildings between 51st and 57th Streets and 6th and 7th Avenues, known as Privately Owned Public Spaces (or POPS), and includes the addition of new crosswalks, signage, and traffic interventions.

The POPS that comprise 6 1/2 Avenue were created between 1984 and 1990 and include commercial, hotel and residential buildings, with public spaces ranging from open plazas and atria to wide lobbies and enclosed corridors.

In 2011, Manhattan’s Community Board 5 requested that DOT study the possibility of pedestrian crosswalks to link these disconnected spaces. A

DOT analysis found up to 1,200 pedestrians an hour already crossing 51st Street alone at midblock without the benefit of crosswalks, passing from between parked trucks and other vehicles.

The new crossings shorten trips eliminating the need for pedestrians to travel back and forth to the main avenues to reach midblock locations, without affecting traffic. At each crossing the sidewalks were extended using

crushed gravel and furnished with benches in some locations, further establishing them as pedestrian areas. Adjacent property owners will clean the newly enlarged pedestrian areas, with the businesses maintaining planters and benches.





Chapter 8

Vehicles and Parking



All of the bicycle and pedestrian improvements mentioned above haven't come at the expense of drivers. Traffic volumes are down and traffic speeds are up in the Manhattan central business district, a reflection of a growing trend toward other forms of transportation.

In fact, the economic and population growth in New York City over the past decade has largely been accommodated on the city's transit system, not via private automobile. While use of our transit system into the central business district grew by 11% since 2003, traffic growth has declined. There has been a 6.5% decline in traffic entering the central business district since 2003. This trend has even accelerated in recent years—in 2011, there was a 1.8% decrease in citywide weekday traffic volumes and a growth of transit use by 2.5% in 2011 and 1.8% in 2012.

But that doesn't mean roads and highways in New York aren't congested. Many key arteries, including cross town routes, the East River and Hudson River crossings, and highways throughout the five boroughs, remain over capacity. This traffic is bad for our economy, our environment, our health, and our quality of life.

MIDTOWN IN MOTION

In 2011, DOT implemented an innovative congestion management program called Midtown in Motion to reduce congestion by adjusting traffic signals in real time. The system uses 100 microwave sensors, 32 traffic video cameras and E-ZPass readers at 23 intersections to measure traffic volumes, congestion and record vehicle travel times in the approximately 110-square block area bound by Second to Sixth Avenues and 42nd to 57th streets. The combined data is transmitted wirelessly to the City's Traffic Management Center in Long Island City, allowing engineers to quickly

identify congestion choke points as they occur and remotely adjust Midtown traffic signal patterns to clear traffic jams. The real-time traffic flow information is available to motorists and to app developers for use on PDAs and smart phones.

Earlier generations of traffic signals could only be reliably set to preset signal patterns based on the time of day, leaving limited ability to respond to crashes, construction, and special events that cause backups. Midtown in Motion allows Department of Transportation engineers to conduct real-time analysis and change signal patterns at the touch of a button, helping

to alleviate congestion before it worsens.

Depending on the traffic situation, traffic lights are adjusted to provide a more even distribution of traffic entering Midtown so that already congested areas do not become oversaturated, or priority can be given to clearing isolated backups resulting from breakdowns, fender-benders or double-parked vehicles. On the avenues, engineers can switch more easily between a simultaneous signal pattern, where all the signals on the avenue turn green or red at the same time, and a traffic signal progression, which lets

vehicles traveling at the speed limit encounter green lights as they drive along a corridor. The system lets engineers use the more effective pattern based on measured traffic conditions.

Preliminary results of the first phase of Midtown in Motion showed a 10% improvement in travel times along the avenues of the 110-block service area, which marks a considerable improvement to traffic in the heart of Manhattan's Central Business District. In September 2013, DOT doubled the Midtown in Motion service area to cover 1st to 9th Avenues from 42nd to 57th Streets.

BROOKLYN BRIDGE RAMPS

DOT widened access ramps to and from the Brooklyn Bridge to accommodate two traffic lanes and simplify traffic patterns. The project eased notorious traffic bottlenecks for many of the 120,000 vehicles that cross the bridge daily. By 2014, three ramps, connecting the exit from the bridge's Manhattan-bound

lanes with the FDR Drive, will be expanded from one to two lanes, easing backups that often extend across the bridge. These changes expand capacity and enhance safety and are part of a \$508 million project to repaint the Brooklyn Bridge and rehabilitate its approach ramps.

HOYT AVE RFK BRIDGE

The RFK Bridge touches down into the bustling heart of Astoria with connections to the Grand Central Parkway and local streets. This crossroads serves subway and La Guardia Airport bus passengers, as well as locals moving to and from various neighborhood destinations. DOT shortened crosswalks, tweaked traffic patterns, modified

signal timing and phasing, added green elements, and created new public space in an area that sees hundreds of pedestrians a day. This resulted in a 51% improvement in travel times northbound and 26% southbound. The project reduced queuing, simplified traffic patterns and made the area safer for all users.

NYCDOT converted 13,000 meters to muni meters resulting in \$9.1 million savings annually

PARKING

Curbside space is a valuable commodity in New York City and NYCDOT has implemented innovative solutions to simplify and modernize parking and increase turnover at parking spaces, making it more likely that drivers can find spots when they want them.

SIMPLIFYING PAYMENT AND THE SEARCH FOR PARKING

Online real time parking information and pay-by-phone technology are two ways DOT has used technology to make it easier for New Yorkers to park. A pilot program in the Bronx allows motorists to pay for metered parking via a smartphone app, the internet or by telephone for 264 spaces along 18 block faces, as well as at the Department's Belmont Municipal Parking Field. This system eases parking in New York City and comes with no additional fees for drivers or changes to parking rates. The technology also warns motorists when their time is about to expire via e-mail or text messages, and

allow them to pay for additional time easily and quickly, up to the posted time limit.

The parking availability pilot uses innovative sensors embedded in the roadway to produce a real-time parking availability map viewable on the internet, smartphones and tablet devices. After reviewing the map before starting their trips or working with a passenger, motorists can head directly toward blocks with available spaces, reducing the time needed to hunt for spaces and the associated congestion as drivers circle for parking.



Pay-by-phone allows drivers to pay for parking with smartphones

PARK SMART

NYCDOT's PARK Smart program makes parking easier while reducing congestion. The first Park SMART program in Greenwich Village included portions of Sixth and Seventh Avenues and all meters on streets between these avenues. It was made permanent in 2009. The meter rate was increased from noon to 4 pm when demand for parking was greatest, and not changed at all other times that meters are in effect.

The PARK smart program has increased turnover at parking spots, accommodating 20% more parkers during peak periods.

Parking space occupancy declined from 77% to 71% on Tuesdays and from 75% to 69% on Fridays from 12pm to 4pm

Motorists were parking for a shorter amount of time; the frequency of those who parked for less than hour increased by 12%. This improves turnover and benefits local businesses.

Based on this success, additional programs were started in Park Slope, Boerum Hill, Upper East Side and Jackson Heights. Overall, the ParkSMART program has increased turnover at parking spots, accommodating 20% more parkers during peak periods.



New technology lets you pay for parking with a smartphone

JACKSON HEIGHTS NEIGHBORHOOD TRANSPORTATION IMPROVEMENTS

Jackson Heights, Queens is a diverse and vibrant neighborhood in Northern Queens, containing historic areas, residential streets and a destination shopping and dining district with a considerable amount of vehicular and pedestrian activity. Local residents and merchants asked DOT to explore changes to help create safer, less congested streets and better transit access for this vibrant community.

In 2009, DOT started a community driven planning process, funded in part by Congressman Joseph Crowley. The study was a model of DOT's

inclusive approach to neighborhood transportation studies as guided by PlaNYC. Local residents, business owners and civic leaders worked with DOT to identify their most pressing concerns and guide the development of solutions. DOT created a range of opportunities for public participation, including community workshops, neighborhood walk-throughs, an innovative web portal that allowed DOT staff to receive and respond to comments at any time, and a Community Advisory Committee to facilitate ongoing involvement of key stakeholders.

The project addressed traffic

safety, sidewalk crowding, vehicle congestion, parking availability, slow bus service and a lack of public open spaces. Focused on the area where 73rd Street, 37th Road, Broadway and Roosevelt Avenue converge, the core improvements were carried out in the second half of 2011. Updated curb regulations were introduced in spring 2012, offering a better use of space for deliveries and customer parking. Further parking improvements were implemented in 2013 with the introduction of the variable-rate PARK Smart program.

The project also resulted in a popular plaza. 37th Road between

73rd Street and 74th Street was closed to traffic to provide additional open space in this dense, international neighborhood. The plaza brings pedestrian-scale lighting, new surfaces, and amenities to support the plazas daily activities and cultural and seasonal events.

As a result of the changes, there are fewer injury-causing crashes; problematic traffic bottlenecks have been eliminated; buses are faster and more efficient; and the 37th Road plaza is a popular gathering spot year-round, home to frequent public events and a boon to adjacent businesses.



Jackson Heights Diversity Plaza



Jackson Heights Diversity Plaza



20%

decrease in peak-hour
truck traffic on
residential Grand
Avenue

OFF-HOUR TRUCK DELIVERY—MIDTOWN

Truck deliveries made during busy times of day can exacerbate already congested streets and increase costs for businesses and the consumers that buy their produces. DOT worked with Rensselaer Polytechnic Institute (RPI) to implement an Off-Hour Truck Delivery Pilot program, which ran from late 2009 through 2010. Twenty participants agreed to shift their delivery windows to between 7 pm and 6 am. Receivers found that fewer deliveries during normal business hours allowed them to

focus more on their customers and that their staff was more productive because they waited around less for deliveries that were tied up in traffic. Carriers found that their trucks could make more deliveries in the same amount of time; they saved money on fuel costs and could use a smaller fleet by balancing daytime and nighttime deliveries, and that legal parking was more readily available. Their drivers reported feeling safer and less stressed.

MASPETH BYPASS

Trucks are critical to the economic life of the city, especially in industrial areas like the Maspeth Industrial Business Zone (IBZ) in Queens. However, the IBZ is adjacent to residential neighborhoods where heavy truck traffic impairs quality of life. In Maspeth, DOT redesigned streets and legal truck routes in Maspeth to direct trucks away from residential streets while maintaining truck access to important industries

Prior to 2011, Grand and Flushing Avenues were designated as through truck routes between the Queens-Midtown Expressway/ Long Island Expressway (I-495) and the Brooklyn line. While this routing provided a connection from I-495 to the IBZs along Newtown Creek, it channeled regional truck traffic through the heart of residential Maspeth. In response to requests from the community and

elected officials, DOT assessed alternative routes that could be less disruptive to residents while serving the needs of truckers and local businesses, and led an in-depth outreach program with all stakeholder groups.

The resulting plan shifts truck traffic from Grand and Flushing Avenues to a preferred bypass route that connects to the LIE without passing through residential Maspeth. DOT also made changes to the street network to ensure that the Maspeth Bypass was as direct and convenient as possible so that truckers would make the switch. DOT reconfigured the multi-legged intersection of Maspeth Avenue and Maurice Avenue to safely accommodate truck through movements and turns, and converted several streets to one-way operation.



NO STANDING
EXCEPT
FOR LOADING
UNLOADING
10AM - 7PM
EXCEPT BUSSES

Pay at the
Garage



Looking Ahead

Demand is growing for the changes outlined in this chapter. Communities all over the city are clamoring for bike share, bus improvement projects, and safer and more expansive walking routes. A changing climate and continued population and economic growth will create an even greater sense of urgency for these projects going forward. Future leaders will have to respond.

This will challenge government to accelerate the pace of implementation and expand the breadth and scope of mobility projects. Bike share systems will need to be deployed in new neighborhoods and the blossoming bike lane network will need to extend to all reaches of the city, including eastern sections of Queens and southern Brooklyn. The second phase of Select Bus Service projects, such as those along Woodhaven Boulevard in Queens, through central Brooklyn and across Manhattan, will need to be completed. Eventually, transportation officials will have to experiment with new street designs that are part of bus rapid transit in other cities, such as physically separated bus lanes and transit-only ways. A variety of treatments should also come to large state-managed highways to provide additional express bus routes.

A faster pace of project implementation will require bold ideas and new approaches. Expansion of programs at a time of dwindling city, state, and federal resources means that new revenue will be needed, and discussions about congestion pricing or East River tolls are certain to be part of the conversation. In 2008, a congestion pricing plan to charge vehicles entering the central business district won popular and City Council support in the New York City but died at the hands of the State Legislature. The proposal would have raised hundreds of millions annually for the transit system and bridge and road repair, resources desperately needed to expand mobility options in the city. A year later, a similar proposal to toll the East River Bridges again died

at the hands of the State. The MTA's next multi-billion dollar construction program provides the legislature with an opportunity to change its stance on the proposal. City leaders may also decide to pursue other new financing ideas, such as taxing large development projects or creating broad districts where zoning bonuses result in transit and public realm enhancements.

Additional attention to resiliency post Hurricane Sandy may bring a new perspective to revenue discussions. The storm was wake-up call that the region needs to protect its transportation assets, and build a stronger, more resilient network. Such fortification will require a significant investment both at the city and state levels.

Specific zones for the city are also ripe for courageous ideas. The pedestrian environment near Penn Station is abysmal, and is only likely to get worse as the Hudson Yards development increases the number of people who frequent the area. Closure of certain streets for pedestrians or creating designated transit ways (along 33rd or 31st street, for example) could help accommodate an influx of residents and visitors.

The city's waterfront will also have to be transformed and given additional resources. The Brooklyn Waterfront Greenway and Manhattan's East Side greenway will need to be completed, and planning for better use of Queens waterfront for bike mobility will have to begin.

Technology will also provide new opportunities to enhance mobility. Paying for parking meters and tracking parking space availability on smart phones, changing signals in real time in response to fluctuating traffic patterns, and automating signals on bus routes to speed buses are other opportunities that will bring substantial benefits. Using technology and sensors to better enforce against overweight trucks and help keep trucks on designated routes could also produce mobility gains.

- Expand bike share and bike lane network to new communities
- Build on Manhattan bike network with additional Midtown bike lanes
- Implement congestion pricing or East River Bridge tolls and consider other financing mechanisms to fill transportation funding shortfalls
- Complete next round of Select Bus Service projects and experiment with more ambitious street designs like physically separated bus lanes and bus only streets
- Complete Brooklyn waterfront greenway and expand through Queens
- Improve streetscapes and prioritize the pedestrian experiences near Penn Station and Grand Central
- Use real time information to manage congestion and improve bus speeds
- Allow drivers to remotely track parking availability and pay for parking using smart phones
- Leverage technology and curb regulations to make off-hour deliveries a standard practice for freight receivers





World Class Streets

Introduction



72%

of New Yorkers support
DOT's public plazas



39

acres of road
repurposed for
plazas, public seating,
and traffic calming

World Class Streets are hallmarks of diverse, vibrant and thriving cities. The best cities in the world have both famous boulevards or squares, and also hundreds of local streets, sidewalks and plazas that are treated not primarily as thoroughfares for travel, but as places that reflect and celebrate a city's energy, art, and culture.

In a 2008 report, urban design experts engaged by NYCDOT called New York a "city without seats," noting that without public seating in attractive, accessible public spaces, it is impossible to define city streets as places.

The 2007 PlaNYC report had acknowledged that New York City had largely discounted its streets as public space during the 20th Century, allowing traditional traffic engineering to crowd out all other considerations. PlaNYC's vision for a thriving, attractive 21st Century called on New York to "re-imagine the public realm" and stated the ambitious goal of opening new public plazas in every community and of ensuring that all New Yorkers live within a 10 minute walk of open space.

NYC DOT developed specific action plans to reinvent the public realm in both its *Sustainable Streets* strategic plan and the more detailed *World Class Streets: Remaking New York City's Public Realm*, published in 2008 in collaboration with Denmark's Gehl Architects. These strategy documents and action plans elaborated on the problems of treating streets exclusively as corridors for motor vehicles, and on the huge potential for high quality of public life inherent in New York's dense historic form.

World class streets programs were the cradle of NYCDOT's signature innovation during the Bloomberg Administration—changing City streets in real time. Instead of wading through years of planning studies and trial balloons, NYCDOT uses paint, stone blocks and planters to transform the function and use of city streets virtually overnight. In addition to capital construction plazas that can take 5–6 years to implement, with its real-time approach, DOT delivered acres of new, instantly usable public space to New Yorkers, delivering on the promise of PlaNYC in tangible, practical ways. The proof of concept for the new projects was not a computer model, but real world performance. If some feature of a space or new traffic and parking patterns did not work, it was not difficult to change.

Attractive public space and better designed streets are not simply aesthetic improvements. The business case for better streets has been clearly established and documented in cities around the world, and indeed had been embraced by NYC business improvement districts earlier than by City government. Streets that help create and strengthen communities and businesses increase foot traffic, raise

the value of many locations and enable the city to grow economically. These same effects were evident in New York City as well over the past six years. New Yorkers have taken naturally to the public spaces and people-oriented streets that NYCDOT has created, and DOT has clearly documented the economic benefits of this attraction. Better streets mean better business.

The PlaNYC update in 2012 found that 76% of New Yorkers lived within ten minutes of open space, up from 70% in 2007. DOT's efforts to repurpose street space has been crucial to this progress, but there is no shortage of work and opportunity looking into the future. New Yorkers in every community across the five boroughs want world class streets. Far more applications come into the plaza construction program each year than can be accommodated. Enthusiasm and participation in the Weekend Walks and Urban Art programs continues to rise. Opinion surveys asking about existing plazas, like the high-profile examples along Broadway in Midtown Manhattan, return super-majorities in favor. New Yorkers instinctively understand city streets as places.



Above: Dumpster pools at Summer Streets, 2010

Right: Park Avenue Tunnel, Voice Tunnel, Rafael Lozano-Hemmer





Chapter 9

Plazas, Public Space and Public Seating

In the 20th century, city streets were designed primarily to move motor vehicle traffic—a policy which attracted increasing numbers of vehicles, with negative effects on the overall quality of the City’s streetscape and quality of life. But New York’s streets can accommodate many users, not only cars. The City’s dense, active neighborhoods already encourage walking, making the addition of more pedestrian space a benefit to everyone.

NYCDOT initiatives since 2006 have ranged from the temporary use of street space for public events to permanent reclamation of underutilized asphalt for public plazas. Beginning in 2008, DOT’s Summer Streets program has transformed Park Avenue into a boulevard dedicated to strolling, cycling, skating and more for three Saturday mornings in August. At the other end of the spectrum, Willoughby Plaza in Downtown Brooklyn became the first of the DOT Plaza Program’s spaces originally created with temporary materials to be redesigned and set in stone through permanent capital construction. Elements included extended concrete sidewalks, underground utility work and new tree plantings.

In addition to open space, NYCDOT also responded to PlaNYC’s call to “re-imagine the public realm” with new public seating options. By adding seating, both in and out of plazas, DOT has encouraged New Yorkers to use sidewalks as civic space to be enjoyed. Seating has the added benefit of increasing foot traffic, providing a needed resource for the elderly and very young, and engendering feelings of ownership and community.

NYC DOT’s plazas and new seating create vibrant, social pedestrian spaces for communities across the city.

The effort is a key part of the City’s effort to ensure that all New Yorkers live within a 10-minute walk of quality open space. Streets make up approximately 26.6% of the City’s land area and yet, outside of New York’s excellent parks, there had been few places to sit, rest, socialize and enjoy public life. DOT’s public space programs work to change that through innovative design and partnerships.

DOT and its partners create public plazas that are active local destinations and can serve as a gathering place for community events and celebrations. New public spaces and plazas are in demand all across the city, and where DOT has created them, they are extremely well-used. A recent poll conducted by the *New York Times* revealed that 72% of New Yorkers approve of the creation of pedestrian plazas throughout the city. In fact, plazas enjoy high, constant levels support across incomes, ages, races and genders in New York (NYT poll 8/16/13). Two methods of creating plazas have been developed and established in NYC; a quick-moving temporary materials program and a longer-term capital construction program. Both are oversubscribed with proposals from groups around the city.

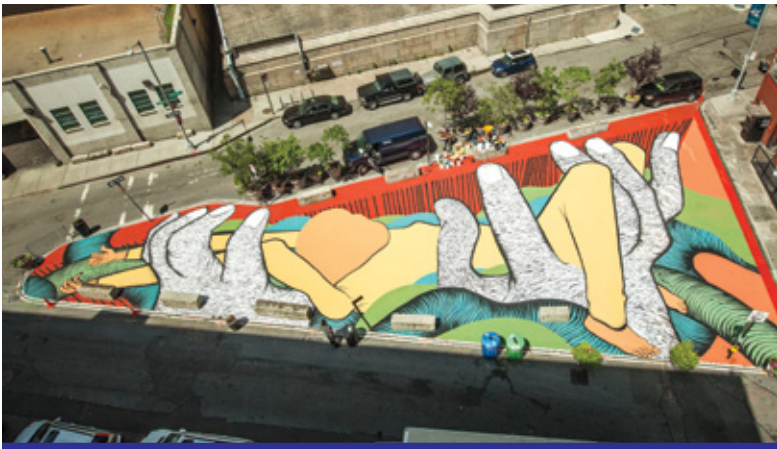
Since 2007, DOT has created over 59 new public places from what had been active vehicular lanes on streets, adding over 26 acres of pedestrian-space amid some of the busiest and most valuable real estate on Earth. With other street treatments like pedestrian refuge islands, a total of 39 acres street space has been reclaimed. 750 benches of seats have been added to the NYC streetscape. Additionally, more space in the City’s flagship parks has been dedicated to pedestrians and cyclists, and Weekend Walks temporary pedestrian streets have occurred in dozens of neighborhoods.

PLAZA TYPES

NYCDOT pursues two major methods for implementing new public spaces in New York City. “Overnight” plazas created with operational materials such as paint and planters are one of NYCDOT’s major, signature innovations. They transform New York’s street by improving pedestrian safety and increasing accessibility.



Fowler Square, Fort Greene



Pearl Street Triangle, PST, David Ellis

TEMPORARY MATERIALS PLAZAS

While capital projects can take years to plan and implement, NYC DOT’s temporary plaza program can bring open space to neighborhoods in nearly real-time. By simply adding crushed gravel or paint, new markings and signage, planters, tables and chairs and artwork, DOT has succeeded in transforming asphalt into space for people, enlivening neighborhoods

all over the city. This method is a quick and cost effective way to test the capacity of maintenance partners, build local support and study real benefits and impacts, not just models, of modifications to traffic and public use. Over time, successful temporary plazas can enter the capital project pipeline to be built out with permanent materials.

CAPITAL PLAZAS

Capital program plazas are longer term and permanent. NYCDOT’s Public Plaza Program solicits applications for new plazas to directly enter the capital project pipeline, for completion several years after a successful application. Frequently, while a capital project is in development, a temporary materials version of the plaza is implemented. Capital plazas often involve major

construction, including subsurface infrastructure upgrades or relocation as well as aesthetic elements. Capital plazas often level out the roadbed at sidewalk grade, better connecting public and pedestrian spaces. Uniform pavers or concrete may be used across the entire space, and permanent fixtures such as seating and trees are generally integral to designs.

**DOT has created 59 new
public plazas since 2007**

81%
of people surveyed
had a positive opinion
of Times Square Plaza



St Nicholas and Amsterdam Avenues



Columbus Ave between 75th and 76th Street

A third, ancillary type of public or open space is often created by DOT as a result of safety improvements to roadways. When undertaking reconfigurations of streets, DOT often adds or increases the size of pedestrian islands or adds painted sidewalk extensions. Where there is room, public seating and other street furniture can also be added to these spaces.

DOT partnered with the Columbus Ave Business Improvement District to design and improve the streetscape along Columbus Ave. The project includes a new landscaped area, six CityBenches, 26 in-ground solar powered LED lights, a new solar-powered trash compactor, DOT's repurposed parking meter bicycle racks, enlarged and newly planted tree beds along the curb, and Manhattan's first next-generation bioswale. Overall, the design helps enliven a once uninviting block and provides some great new amenities for Columbus Avenue.



750

benches installed
since 2012

SEATING AND THE STREET SEATS PROGRAM



City Bench

A key part of bringing social and economic vibrancy to city streets is having places for visitors and residents to sit. New public space in New York City is popular in part because New York has long represented the contradiction of being a walking city with no place to sit down. When pedestrians are unable to find public seating, they will often resort to finding alternative seating which may be dangerous or obstruct the flow of other pedestrians. Having places to sit creates a vibrant streetscape for retailers, increases walking and transit use, and is a welcome relief for seniors and parents with younger kids. Through the City Bench and Street Seats programs, NYC DOT is working to remedy this problem throughout the streetscape, not only in places where there are opportunities to develop public plazas.

The Street Seats program offers chic seasonal, outdoor public space and seating where sidewalk seating is not available. During warm-weather months, when demand to spend time outdoors is highest, Street Seats can temporarily replace a few parking spots

in a neighborhood providing an area for eating, reading, working, socializing, or taking a rest. Street Seats also help to beautify the streetscape with attractive wooden platforms and topiary. Like plazas, Street Seats are requested and maintained by local businesses adjacent to the seating.

The CityBench program is another initiative to increase the amount of public seating on New York City's streets. DOT is installing attractive and durable benches around the city, particularly at bus stops, retail corridors, and in areas with high concentrations of senior citizens. As with many other innovative DOT programs, CityBench is largely request based. Local business or community groups can request a CityBench from the DOT. If technical criteria are met and adjacent business do not have objections, a bench will be installed in short order.

As of 2013, we have installed over 700 benches and are on track to install 1,500 newly-designed City Benches across the city by 2015.



Pearl Street pop-up cafe

172%

increase in retail at
DUMBO sales stores
adjacent to plaza

ECONOMIC VALUE OF PUBLIC SPACE



Broadway at Union Square

The idea that more welcoming streets can lead to better business is not just an aesthetic or marketing concept. Detailed studies around the world show that investments in a lively and attractive realm pay off in real terms.

A Transport for London study of that city's West End found that consumers who walk spend more than those who drive or take transit. That same area has had a tremendous experience with record sales during holiday weekends over the past few years when Oxford and Regent Streets were closed to vehicles and opened to pedestrians. These kinds of findings have been mirrored from Glasgow to Shanghai.

In New York, one real estate company [J. Liff Co.] has found that real estate demand and value is higher in areas where DOT has significantly improved the public realm by adding public space, like the Flatiron District at Broadway and 5th Avenue and the Meatpacking district on Manhattan's West Side. Studies of the value of proximity of park space in New York, including recent work by the CBRE group also confirms these types of economic benefits. In Brooklyn's DUMBO district, tax receipts show that retail sales in stores adjacent to a new plaza increased 172% in the three years after the plaza was implemented, over twice the growth seen in other parts of the same area [Measuring the Street, NYCDOT]. Similar findings regarding the signature public spaces that NYCDOT created along Broadway in 2008, 2009 and 2010 are detailed in the next chapter.

COMMUNITY PARTICIPATION AND PARTNERSHIPS



Marcy Plaza, Bedford Stuyvesant: Permanent plaza ribbon cutting. Artist: Ellen Harvy



25th St Plaza

Every public plaza created in a former roadbed has a partner in a business improvement district, merchants association or local development corporation that has done its own calculus of the benefits of generating more foot traffic and attracting people with public seating and attractive surroundings. Even for temporary plazas, DOT must have maintenance partners.

Recent DOT plazas have been created through the application-based NYC Public Plaza Program for capital construction plazas, which has become a national model for community based planning. This focuses new initiatives into places where people want them, dramatically reducing project negotiation and development times, which in turn keeps implementation in reasonable time scales. Here again, the private sector shows that it values attractive urban space and public seating. Demand for the plazas through this program has been very strong, with applications outstripping awards by 2 to 1.

Through the Public Plaza Program, business improvement districts or non-profits across the city suggest sites for plazas. Winning applicants partner with DOT to design the plaza. Through public workshops, DOT and its partners draft a vision for each plaza that complements the architecture, culture, and history of the surrounding neighborhood. DOT tailors community outreach to suit the scope, size, complexity and magnitude of potential impacts of each project. The process is iterative, as DOT often adjusts and modifies the project based on community feedback. A plaza is then built with city funds, either as a temporary plaza with DOT paint, gravel and plantings, or as a more extensive, longer term capital street construction project by the Department of Design and Construction. After the plaza is built, the non-profit partner is responsible for maintenance, cleaning, and the management of plaza concessions, events and programs.

“Corona Plaza ...has immediately become a magnet for people looking for a safe place to relax, eat, read, play and even enjoy a game of dominoes”
—Queens Economic Development Corporation



Corona Plaza

CORONA PLAZA

Corona is located in central Queens, adjacent to Flushing Meadows Corona Park. As one of the most ethnically diverse communities in the U.S. according to Census data, Corona Plaza area is a bustling commercial hub that includes the 103rd Street station on the 7 line and Q33 bus, a public library, and a newly constructed elementary school. A large number of ethnic foods available in and around the plaza make the space a recognized destination. To support these activities, DOT closed the service road to through traffic to provide 13,000

square feet of public open space. The space, now known locally as “La Placita” uses NYC DOT’s signature mix of crushed gravel, new seating and tables, umbrellas, bike racks and greenery. Queens Economic Development Corporation partnered with other organizations, including the Flushing Willets Point Corona Local Development Corporation, Corona Community Action Network and the Queens Museum to schedule seasonal activities and events that benefit the local community.



Willoughby Plaza

WILLOUGHBY PLAZA

Willoughby Plaza in Brooklyn is an excellent example of a temporary to capital plaza construction. The site is located in the heart of Downtown Brooklyn, a bustling mixed use neighborhood in New York’s third largest business district. In 2004 the Economic Development Corporation and the Department of City Planning drafted the Downtown Revitalization Plan which recommended a series of zoning map text changes, new public open spaces and other actions. This set the stage for more intense development in the area, which in turn lead to higher

pedestrian volumes on Willoughby Street. DOT created a temporary plaza in the spring of 2006 to help address the increases in pedestrian traffic and provide a place for visitors and shoppers to rest. The temporary plaza allowed DOT, local businesses and community groups to experience and observe the impacts of the plaza in real time. Once it was clear that the change had benefitted the area, DOT initiated the site’s reconstruction to create a permanent, capital plaza working with Downtown Brooklyn Partnership.

Improvements to Grand Army Plaza defined major new pedestrian areas, reduced crossing distances and added crosswalks and bike lanes

GRAND ARMY PLAZA



Grand Army Plaza before

DOT has worked for years with the community groups and civic organizations to develop a better design for Brooklyn's most iconic and busy traffic circle, Grand Army Plaza. The design of the circle and large traffic and pedestrian volumes made the area extremely dangerous for pedestrians traveling to Prospect Park and the Brooklyn Public Library and discouraged visitors to the fountain, making the area more prone to crime.

From 1999 to 2006, DOT made modest improvements to the traffic circle, including a larger pedestrian island and reducing auto access to Prospect Park. But residents still felt more needed to be done. Over the next five years, a civic coalition—working collaboratively with government agencies—created a plan for the

area. DOT used the community plan as a guidepost for real projects on the street. In 2007, this included concrete islands to reduce crossing distances, new crosswalks, new bike paths, beautification elements and longer crossing time for pedestrians. In 2011, DOT made additional improvements including a two way bike path on Plaza Street, gravel treatments on the southern side of the plaza and additional beautification. A pedestrian wayfinding program was added in 2013.

The result of the multi-year community based planning effort is a safer, more welcoming intersection and a model for civic and government partnership for livable streets. Safety has improved and the area is more accessible and vibrant.



SUMMER STREETS



Summer Streets is an annual celebration of New York City's most valuable public space and resource—our streets. Streets can be long-term temporarily transformed into pedestrian space, as discussed earlier in this chapter, and others can be modified for short-term activities and events. This short-term modification is a valuable way to get the general public to think about streets as part of the public realm, not just for cars.

On three consecutive Saturdays mornings in the summer, nearly seven miles of NYC's streets are opened for people to play, walk, bike, and breathe. Summer Streets provides space for healthy recreation and encourages New Yorkers to use more sustainable forms of transportation. In 2013, more than 300,000 people took advantage of the open streets.

The event is part bike tour, part walking tour, part art exhibition, part block party—a great time for exercise, people watching, or just enjoying summer mornings. Summer Streets extends from the Brooklyn Bridge to Central Park, along Park Avenue and connecting streets, allowing participants to plan a trip as long or short as they wish. All activities at Summer Streets are free of charge, and designed for people of all ages and ability levels.

WEEKEND WALKS



City streets do not have to be used for the same purposes at every time of day or week. Each year, NYCDOT partners with community groups to present Weekend Walks—neighborhood events on multi-block stretch of commercial streets temporarily closed to vehicles and open to walking and other activities. These multi-day events take place in all five boroughs from May through October. As with many other DOT initiatives, Weekend Walks are application based and completely community driven.

Weekend Walks highlight local culture and cultural institutions and often feature music, arts and crafts, classes and youth programming. They promote healthy, safe recreation and bring in potential customers for local businesses. In 2013, the fifth season of Weekend Walks, NYCDOT co-hosted 272 days of weekend walks across the five boroughs.



ONE WAY
DEPT. OF TRANSPORTATION

SPRING ST

LAFAYETTE
STREET



NO PARKING
FOR THE FOLLOWING DATES:
AUGUST 2ND - 3RD
AUGUST 16TH - 17TH
AUGUST 18TH - 19TH
ALL VEHICLES
WILL BE TOWED

BROUGHT TO YOU BY
NYC
Environmental
Protection
nyc water
STAY HYDRATED WITH DELICIOUS NYC WATER



Chapter 10

Broadway

Between 2008 and 2010, NYCDOT undertook the most extensive revision of traffic patterns in Manhattan since the mid-20th Century, when the City changed most major avenues from two-way traffic to one-way. In 2009, major public plazas were added in Times and Herald Squares, and Broadway was closed to through-traffic at those locations. Vehicular traffic is able to serve destinations along Broadway, but the route is no longer a thoroughfare. As a result, DOT and the business improvement districts that manage streetscapes and public space in Midtown Manhattan have been able to devote more room along the route to pedestrians, public seating, cycling and special events.

In many respects, the changes along Broadway constitute an exceptionally visible microcosm of NYCDOT's overall street improvement program, encompassing new public

space, safety improvements, better traffic flow, a better balance among street users and a strengthening of the local economy. The transformation of Broadway, beginning in 2008 with the Broadway Boulevard and Madison Square projects, followed by 2009's major initiative encompassing both Times and Herald Squares, and extending to Union Square in 2010, has exhibited striking improvements in all of these dimensions. But the result of the changes that is perhaps best known and appreciated is the creation of signature public spaces in the heart of New York City—the major expansion of pedestrian plazas in Times, Herald and Madison Squares. In 2013, NYC DOT broke ground for the permanent establishment and construction of the Times Square plazas. The blocks between 42nd and 44th Street in the former roadbed of Broadway are scheduled to be completed during the first quarter of 2014.

2008 TEST CASES



BROADWAY BOULEVARD

Broadway’s unique diagonal course through the Midtown street grid creates the particular intersections and shapes that make up well-known spaces such as Madison and Times Squares. The traffic tie-ups that these three-way junctions engendered also meant that portions of Broadway saw relatively less traffic than other Midtown avenues. That was the case in the mid-2000s in between Times and Herald Squares. In July and August 2008, NYCDOT applied its “overnight plaza” approach to the then-unique setting of linear traffic lanes not needed for vehicular movement along the seven-block stretch of Broadway between 35th to 42nd Streets. The project featured a protected bicycle lane along the western curb, defined by “floating” vehicle parking and public

seating in plazas that were defined with rapidly-deployed planters and epoxy gravel surfaces. Vehicular lanes were reduced from four to two.

The project spanned three business improvement districts, the 34th Street Partnership, the Fashion Center BID and the Times Square Alliance. Each organization has taken a hand in maintaining its parts of Broadway Boulevard.

Like other plaza projects, the new public seating quickly drew a heavy base of users, which persisted into the winter months. The project initially created over 22,000 feet of new public space. A 2013 redesign of the bicycle lane through this area, which sees even less traffic since the closures to traffic of Times and Herald Squares in 2009, added even more space to the public and pedestrian areas.



42,000

square feet of new
public space in
Madison Square

MADISON SQUARE



Madison Square from the Flatiron building

In August and September, 2008, NYC DOT reconfigured the intersection of Broadway, Fifth Avenue and 23rd Street, creating major new public spaces and dramatically simplifying one

of Manhattan's most difficult-to-navigate intersections for pedestrians and motorists alike.

At the project's center, a significant new plaza in the shape of the Flatiron Building offers over

The Flatiron BID marks the inauguration of the Madison Square Plazas as an important milestone in the district's development

16,000 square feet of space from which to view one of the world's most photographed landmarks. On Broadway between 22nd and 23rd streets, two lanes of Broadway adjacent to the Flatiron Building were made into a plaza furnished with seating and tables. Several other pedestrian spaces were created, enhanced or enlarged using former roadbed. Pedestrian areas are protected by 170 planters weighing 600 or 1,000 pounds and also 43 granite blocks. Altogether, the project created over 42,000 square feet of new public space.

Southbound traffic from Broadway and Fifth Avenue formerly made several splits, crossing 23rd Street in four different streams. The plan eliminates two of those streams, reducing seven combined lanes crossing 23rd Street to just five lanes, improving safety and convenience for those traveling. Traffic volumes were low enough to reduce Broadway to one lane where it crosses Fifth Avenue.

New north-south crosswalks were installed on 23rd Street, and

existing crosswalks made shorter and more direct. For bicyclists, the new, high-visibility bicycle lanes on both Broadway and Fifth Avenue filled gaps in the area's network.

The new traffic pattern also simplified the M2, M3 and M5 bus routes, which no longer turn off of Fifth Avenue to pick up and discharge passengers.

As in other sites around New York, the new public spaces filled with people even before construction had finished, and remain highly popular. In late 2008, the Flatiron Business Improvement District surveyed the public about the plazas and intersection changes. The basic approval rating of respondents broke down like this: Like – 84%; Dislike – 7%; No opinion – 9%. The overwhelming support found in surveys by the BID increased over time. Approval in 2010 was 89.4%, and in 2012 stood at 90.4%. The BID marks the inauguration of the Madison Square plazas in 2008 as an important milestone in the Flatiron District's development.

70% said the Times Square plazas had a positive impact on the theatre-going experience

GREEN LIGHT FOR MIDTOWN

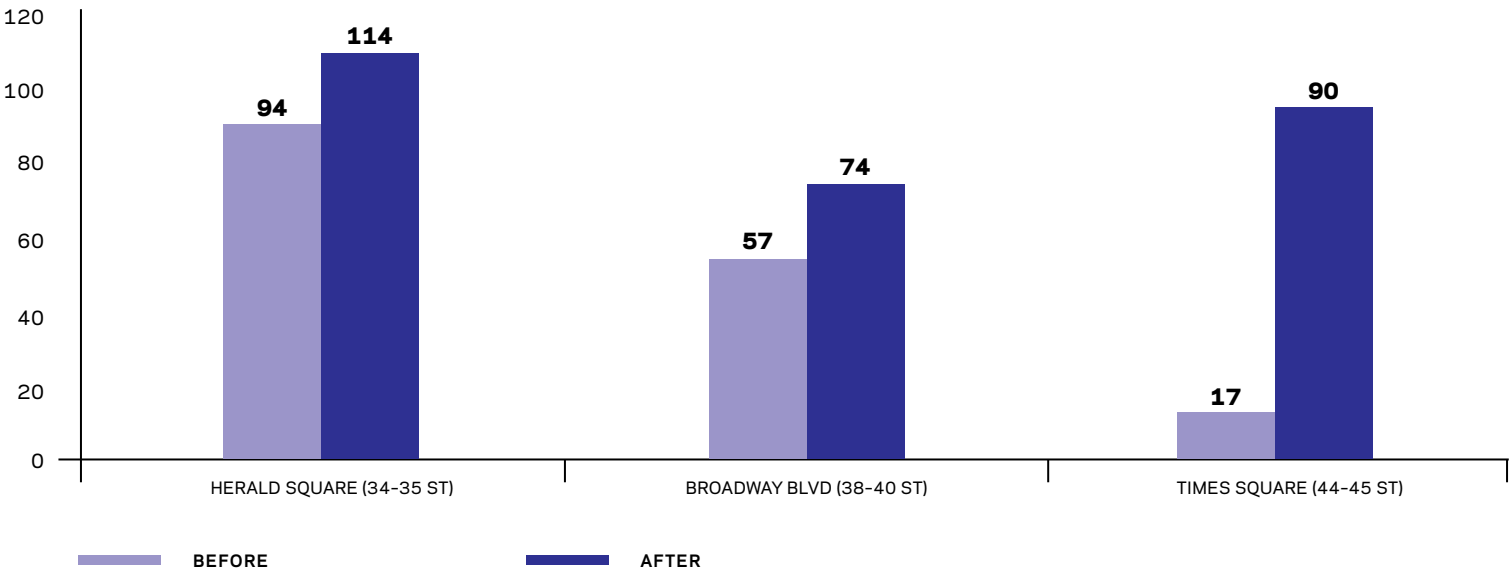
Businesses and BIDS had urged for years that pedestrian space be expanded in Times and Herald Squares, and small incremental steps had been taken in this direction.

In contrast, the 2009 transformation of Times and Herald Squares and connecting segments of Broadway, known as the Green Light for Midtown project, addressed the core of the Broadway corridor, and implemented the most dramatic streetscape changes of the Bloomberg Administration. It took advantage of Broadway’s disruptive and diagonal path across the rectangular midtown street grid to simultaneously improve mobility and safety and provide much more public and pedestrian space in the Midtown core along the corridors from Columbus Circle to 42nd Street and from 35th Street to 26th Street. Most notably, it closed Broadway to vehicle traffic through both Times and Herald Squares, creating new signature public places in the heart of New York City.

The traffic complexity caused by Broadway’s diagonal path at junctions with major avenues and cross streets caused congestion and contributed to higher crash rates compared to other Manhattan avenue intersections. By removing the Broadway leg from these intersections, the project addressed mobility and safety issues with the added benefit of creating world-class destinations equal to Broadway’s reputation. Removing Broadway from the traffic system allowed for an 8% and 66% increase in green signal for 7th and 6th Avenues respectively at Times and Herald Squares.

Dozens of coordinated traffic changes were implemented from Columbus Circle to Madison Square in tandem with the Times and Herald Square closures to improve safety and enhance traffic conditions. Changes ranged from roadway geometry alterations to traffic signal timing adjustments, crosswalk shortenings and parking regulation changes.

AVERAGE STATIONARY POPULATION (PERSONS OBSERVED)





PUBLIC PERCEPTION

Even before the new public plazas had been laid out in Times and Herald Squares, the new spaces filled with people. The Times Square Alliance set out inexpensive lawn furniture for a short period before the plaza seating could be deployed, and it became the talk of the town.

Whether with temporary or present-day furniture, the Times

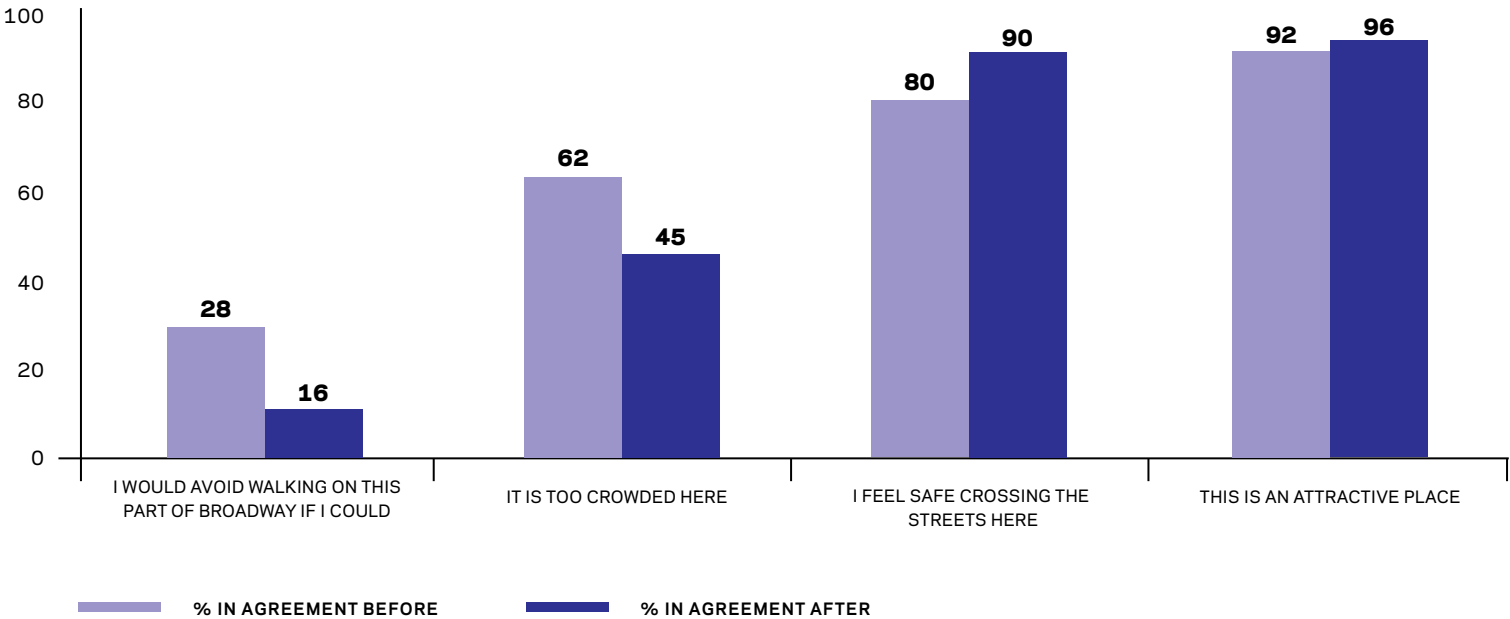
and Herald Square plazas became instant hits. A Quinnipiac University poll conducted in July 2009, close on the heels of the profound changes created by Green Light for Midtown, found that 48% of New Yorkers thought it was a good idea to close the major squares to vehicles and give more space to pedestrians, compared to 35 percent who didn't. A Times Square

Alliance survey in November 2009 found opinion among respondents was 81% favoring the Times Square pedestrian plaza, with 37% indicating a "very positive" opinion. The survey also found that 74% of New York City residents agreed that "Times Square had improved dramatically over the last year."

DOT surveys of people along Broadway before and after the

implementation of Green Light for Midtown found a marked improvement in perceptions of the area: In NY Times poll from August, 2013, 77% of Manhattan residents said they supported the Bloomberg Administration's pedestrian plaza initiatives.

CHANGING PERCEPTIONS OF BROADWAY: SURVEY RESULTS



Surveys indicated clear support among New Yorkers and local businesses for changes in Times Square



Herald Square

EVALUATION

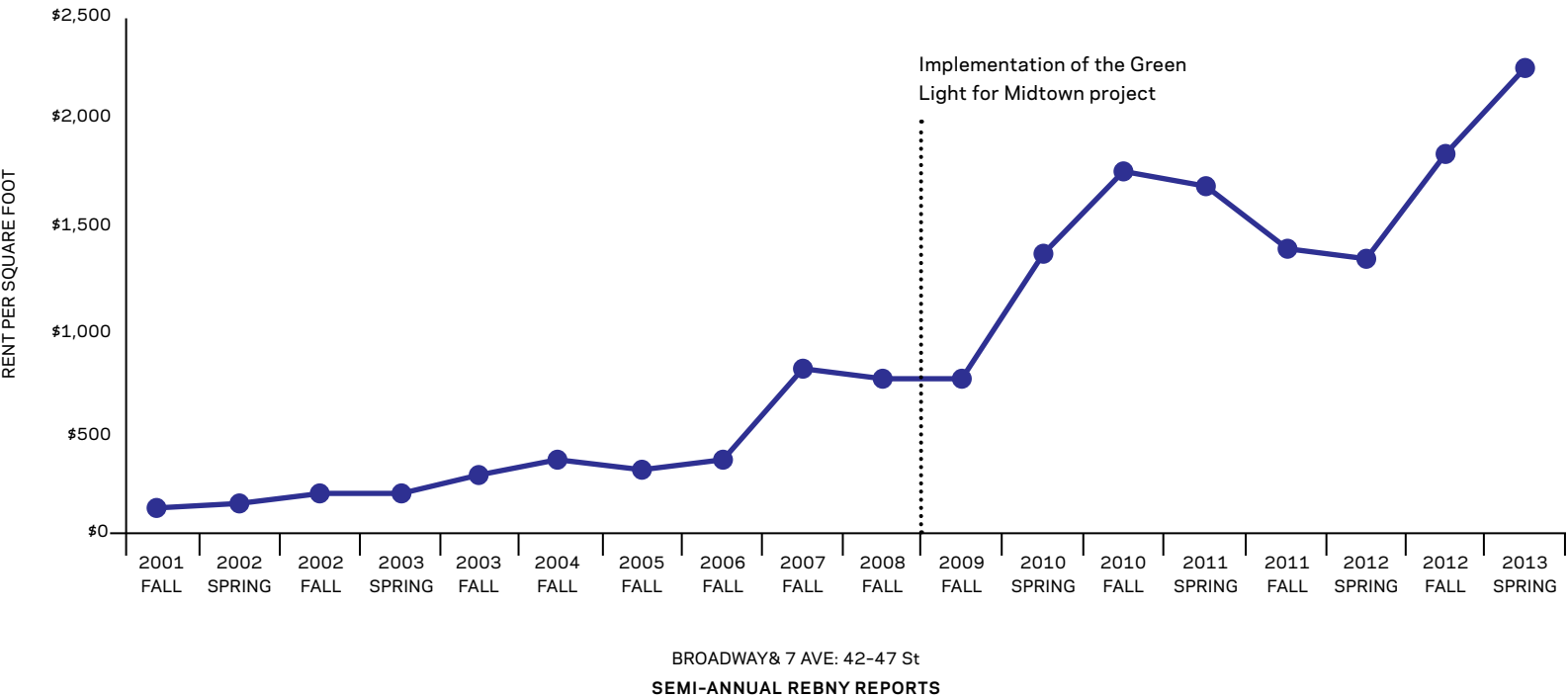
The Green Light for Midtown changes were made with an explicit public declaration that they were pilots, with a definite six-month evaluation window and subsequent decision-making about their permanence. In December 2009, NYCDOT reported results of the evaluation to Mayor Bloomberg. Mayor Bloomberg announced in

February 2010 that these results warranted making the Green Light for Midtown changes permanent. The Mayor noted the project's dramatic safety improvements and said that "Surveys indicate clear support among New Yorkers and local businesses for the project, and the increased foot traffic has been good for business."

Key findings of the six-month evaluation were:

- The number of pedestrians in Times Square increased by 11% and in Herald Square by 6% following implementation.
- 80% fewer pedestrians were walking in the street in Times Square following implementation. Injuries to motorists and vehicle passengers in the project area declined by 63%.
- Pedestrian injuries were down 35%.
- Travel times improved by 15% on 6th Avenue and by 4% on 7th Avenue the project was implemented.
- Injuries to motorists and vehicle passengers in the project area declined by 63%.
- Pedestrian injuries were down 35%.
- Taxi GPS data showed a greater improvement in northbound travel speeds in West Midtown than in East Midtown—17% vs 8%—from Fall 2008 to Fall 2009. Southbound speeds declined by 2% in West Midtown vs. a 3% improvement in East Midtown.

AVERAGE ASKING RENT: TIMES SQUARE



ECONOMIC BENEFITS

The economic benefits of the plazas and more convenient and safer walking conditions were only just beginning to be realized. 2009 surveys had shown an 84% increase in people spending time (as opposed to hurrying through) in Herald and Times Squares, eating, taking photos or reading.

42% of people surveyed said they shopped in the area more frequently since Green Light for Midtown had been implemented. 26% of people working near Times Square said they go out for lunch more frequently, and 70% of theater-goers said the pedestrian plazas had enhanced their experience of the district.

Real Estate Board of New York research shows that retail rents have nearly tripled in Times Square since the Fall of 2008, the greatest change for any retail area that the Board tracks. Additionally, a robust set of new flagship stores has opened right alongside the Times Square plaza

area since 2009, including Nike, Disney, Forever 21, Aeropostale, American Eagle and others. In 2011, Cushman & Wakefield for the first time listed Times Square as one of the top ten retail locations on the planet.

72%

surveyed in 2011
said they preferred
the new configuration

2010: EXTENSION TO UNION SQUARE



East 17th Street and Broadway

DOT completed the transformation of Broadway's diagonal route through Midtown in 2010 by extending reduction of traffic lanes from Madison Square to 17th Street and building out additional public and pedestrian space on the north side of Union Square. The Broadway/17th Street intersection was simplified, and crossing distances for pedestrians shortened and made more visible. Broadway's protected bikeway was extended south around the Square to 14th Street. The Union Square Partnership took on public space maintenance and worked extensively with DOT on the plan.

The project saw results similar to other Broadway segments—overall traffic speeds improved, but illegal speeding fell by 14%. Crashes causing injury fell by 24%. 74% of people surveyed in the area in 2011 said they preferred the new configuration. In the two years following the project, the area saw 49% fewer commercial vacancies, compared to a 5% increase across the entire borough of Manhattan.

THE RECONSTRUCTION OF TIMES SQUARE

As in other areas, capital reconstruction is following DOT's "overnight" changes along Broadway. Working closely with the Times Square Alliance and others, the city in 2010 hired the world-renowned Snohetta Architects to create the permanent design for the expanded Times Square.



Pavers being installed as part of Times Square reconstruction project

The reconstruction got underway in late 2012 and is currently laying the new plaza surfaces on the southern-most blocks of Times Square. The entire reconstruction of is expected to be complete in 2016, providing a world class public space in the Crossroads of the World.



Chapter 11

Design in the Public Realm

Well designed and complete streets reflect an urban growth and improvement strategy not only by making streets accessible and safer, but also attractive places to be that are economically vibrant. PlaNYC called for re-conceptualizing the city's streets and sidewalks as public spaces that can foster the connections that create vibrant communities. Since 2007, NYC DOT has embraced this concept of livable, modern, and attractive streets. The agency's temporary art installations inspire visual interest and our award winning bus shelters, newsstands, and bicycle racks make public space more attractive and vibrant. New benches along sidewalks and temporary street seating programs have made the city not only more appealing but also more comfortable, especially for the very young and old.



Bird
by Will Ryman

actual and fabricated steel nails
March 24, 2013 - April 21, 2013

NYC DOT may be the only city or state DOT in the country with an assistant commissioner and program staff for public art

URBAN ART

NYCDOT may be the only city or state DOT in the country with an assistant commissioner and program staff for public art. The unit runs a variety of programs that allow NYC artists to propose use of public space—street surfaces, facades, jersey barriers—as a broad canvass for all kinds of public art.

Art is integral to DOT's goal of world class streets and the agency's strategy for changing how people use and experience the public right of way in the City. DOT's Urban Art program enlivens the urban landscape with unexpected temporary art installations on DOT properties. Artists help to transform the landscape from ordinary to extraordinary with temporary, unexpected interventions, colorful murals, dynamic light projections, and thought-provoking sculptures. Public plazas, fences, jersey barriers, footbridges, and sidewalks serve as canvases for temporary art in all five boroughs.

DOT's Urban Art initiatives rely on partnerships with community organizations and the creativity of artists to present site-responsive artwork. DOT has presented over 100 inspiring projects since the Urban Art program was created in October 2008. The goals of the unit are to create attractive corridors and activate public space.

In street intercept surveys at DOT Urban Art installations, 83% of respondents had positive feedback, in addition, 60% expressed interest in revisiting the artwork.

Street intercept surveys at DOT Urban Art installations found that sculptures, murals, and lighting design and projections were the most popular, and plazas and sidewalks were preferred sites.

Left: Flatiron Plaza, *Bird*, Will Ryman

Following spread:

Plan Ahead, Magda Sayeg, Brooklyn

Container Series, Victoria Munro, Staten Island



West Farms Square Plaza, *For Closure*, Gabriela Salazar



4th Avenue Median, *Unparallel Way*, Emily Weiskopf





STREET FURNITURE



Bus shelter, Manhattan

In order to improve the aesthetic quality of the city's streetscape, DOT has worked to unify the look and feel the city's street furniture. This includes bus shelters, seating, bicycle parking and pedestrian navigation signs that are attractive and have a consistent scale, context and material. This coordination brings modern design to city streets.

In July 2005, after an extensive competitive bid process, DOT awarded a franchise to Cemusa, a Spanish street furniture company, to design, manufacture, install and maintain bus shelters, newsstands, and protected bicycle parking at no cost to the City. In exchange, the City will allow Cemusa to sell advertising space on the structures within clearly defined limits. Cemusa partnered with Grimshaw Architects to create sleek, elegant structures made from high-quality materials to withstand the rigors of New York City's sidewalks.

This award-winning family of designs guided future projects, including the design for street benches and totems and maps used in a new pedestrian wayfinding program.

BUS SHELTERS

Over three million riders use New York City local and commuters buses every weekday. Giving these people safe, comfortable places to wait encourages transit use and is an essential element of a sustainable city.

The look and feel of the city's 3,300 bus shelters is not only important for the comfort of transit riders, but also the overall design and aesthetic quality of streets. DOT controls the placement of the shelters, and manages the franchise agreement with a private company, Cemusa, who maintains and installs the units. The DOT worked with Cemusa, the MTA to replace every bus shelter and

install an additional 200 (3,500 bus shelters total).

DOT worked closely with community leaders to identify the best locations for additional shelters to ensure that new locations best serve each community and the riding public. For the first time ever, all of the bus shelters offer seating, especially important for the elderly and disabled. The City is also exploring exciting new technologies like Bluetooth, LCD screens and real-time bus arrival information. Shelters come in four sizes—regular, narrow, short and double—so there is an appropriate shelter for every neighborhood and bus route.

NEWSSTANDS

NYC has a long history of sidewalk newsstands dating back more than 100 years. They are a fixture on New York City streets and provide simple and efficient ways for people to buy newspapers, drinks, and snacks. Since 2007, in an effort to bring a more modern feel to the newsstands, DOT has

replaced every existing newsstand at no cost to newsstand operators. Cemusa maintains the exterior of all newsstands including regular cleaning and graffiti removal. The new design is sleek and modern, and in scale with other street furniture.

The design of NYC DOT's wayfinding maps and signs has been widely acclaimed

BICYCLE PARKING AND CITIBIKE



NYC's standard bike parking structure

DOT has also worked with Cemusa to install bicycle parking structures that resemble the bus shelter and use the same high-quality materials. 20 have been installed with a goal of 36 citywide. Each shelter contains stainless steel bike racks for eight bikes. The ad panels are used to display the annual NYC Cycling Map and the "Look" Public Service Campaign. These structures will do more than just provide parking—they send a message that the City encourages cycling.

These structures also complement DOT's existing City Racks sidewalk bicycle rack

program, City Rack. Working with Cooper Hewitt Design Center and cycling groups, DOT launched a design competition for a new type of City-provided bike rack, and received over 200 submissions from around the world. The winning design is now seen throughout the city. Approximately 19,000 total City-provided racks have been installed to date (see Mobility, Chapter 6—Streets for All: Improving Choices for Short Trips).

CitiBike stations were also designed to reflect the bicycle parking, bus shelters, and newsstands, bringing a consistent design narration to city streets.

WAYFINDING



Pedestrian wayfinding, Brooklyn

The DOT's "WalkNYC" wayfinding system also reflects a coordinated design approach. The system encourages residents and visitors to walk more and to explore areas of the City that may be new to them. The attractive signs provide user-friendly maps and information, including walking distances, the location of other forms of transportation, building addresses, area attractions and public facilities.

The design of the signs and maps has been widely acclaimed

using stainless steel and glass and keeping in scale with other street furniture. A recent review proclaimed the system a "Feat of Design, Data and Diligence" [Mashable, Oct. 24 2013]. The initial roll out of wayfinding signs and maps in 2013 included Chinatown, the 34th Street/ Herald Square area and Garment District in Midtown, Prospect and Crown Heights and Long Island City, with the goal to expand to neighborhoods across the city.



Looking Ahead

NYCDOT's programs to foster a world-class public realm have a strong future ahead of them. The application basis for public plazas, Weekend Walks, CityBench and Street Seats, as well as the maintenance partner requirement for plazas, ensure that these features or programs are only implemented where there is local interest and strong support. This is also the reason for requiring community board approval for Street Seats installations. As this section has detailed, the application process for plazas is heavily oversubscribed, pointing to the popularity and demand for additional public space in the City. Applications are also very strong for the Weekend Walks and CityBench programs. Additionally, the creation of the Neighborhood Plaza Partnership non-profit organization will ensure that successful plaza applications can be made from any corner of the city, providing assistance for communities and local organizations that may need it.

The ongoing development of both "overnight" and capital pipeline plazas has created an essentially new category within the City's capital budget, that agency and elected officials should be mindful of. The current reconstruction of Times Square, for example, points toward additional capital projects along the length of Broadway in Midtown, particularly at Herald, Madison and Union Squares. Assembling funding and moving major undertakings such as these ahead requires concerted effort and attention. It is possible that work in these areas could come from district benefit funds established in connection with major development projects, as is currently contemplated for the East Midtown rezoning. That initiative is also spurring a wealth of ideas for improving the public realm around Grand Central Terminal and Park Avenue, including pedestrianizing part of Vanderbilt Avenue.

A logical next step for August's highly popular Summer Streets program is to extend it to more hours and more days.

DOT's success car-free Central Park summer pilot during 2013 also points the way to permanent car-free park loop roadways.

Any major pedestrianization projects on the scale of Broadway will likely be led by local business and community initiatives. One strong candidate is Lower Manhattan. Before 2001, parts of Nassau and Fulton Street were pedestrian-only for parts of the day. These could be restored, and with increased security concerns in the Financial District and World Trade Center area, the City could consider creating a wider pedestrian precinct on additional smaller streets, with freight delivery access during specific off-peak windows. Shared streets—pedestrian streets with very slow vehicle access, could complement or be central to such an initiative.

- **Expand application based programs—public plazas, Weekend Walks, CityBench and Street Seats**
- **Continue to transform more temporary plazas into more permanent reconstruction projects**
- **Expand Summer Streets to more hours and more days**
- **Pilot closure of Central and Prospect Parks to cars year round**
- **Expand Urban Art program**



Infrastructure

Introduction



\$6.0

billion invested
since 2007 in DOT
capital projects

The success of New York depends on its infrastructure. Safe and well maintained roads, bridges and rails allow New York City's economy and industry to thrive and its residents to have a high quality of life. Greening the city's infrastructure is also crucial to meet the city's goal of reducing greenhouse gas emissions from operations 30% by 2017.

Since 2007, NYCDOT has invested a record resources into the maintenance and upkeep of transportation infrastructure. Despite the high visibility of public plazas and bike lanes, the majority of DOT's resources are used for road and bridge repair and reconstruction projects. NYC DOT is responsible for over 6,000 miles of roadway and nearly 800 bridges along with the 24/7 operation of the Staten Island Ferry. We have more than 12,000 signalized intersections and over 300,000 streetlights.

NYC DOT has invested \$6.0 billion over the past six years in capital projects, including \$3.1 billion for bridges, over \$2.1 billion in street reconstruction and repaving, \$430 million for lighting and traffic signals, and over \$110 million for the Staten Island Ferry.

DOT's 2008 Strategic Plan called for maintaining and modernizing the city's infrastructure and ensuring it is ready for the demands of this century and next. These goals include making roads smooth, saving money with timely bridge upkeep, using more sustainable materials in streets and cleaner fuels in our cars, trucks and ferries, and reducing the size of DOT's vehicle fleet.





Roosevelt Island Bridge

Since 2007, DOT has made progress on all of these fronts while making environmental stewardship a hallmark of its operations. Over 73% of city streets are in a state of good repair versus 66% in 2008, and DOT has increased the use of recycled asphalt. The number of bridges in poor condition has declined to record lows. DOT is implementing energy efficient street lights throughout the city with plans to upgrade all street and highway lights to LEDs by 2017. The Staten Island Ferry is one of the greenest in the nation and future upgrades will bring even more environmental benefits.

Chapter 12

21st Century Streets

Keeping city streets in good condition is vital to safe and efficient travel and is an essential function of DOT. The agency’s street infrastructure projects range from pothole repair to milling and repaving to full reconstruction of the street. Every year DOT lays millions of cubic yards of asphalt and repairs hundreds of thousands of potholes.

PlaNYC set ambitious goals for resurfacing at least 1,000 lane-miles of city streets per year. Through increased investment, the city has made progress towards improving street conditions. The city committed additional resources to resurfacing over the past six years, totaling over \$997 million since 2007. The improvement in street conditions reflects this investment. This funding has been used to resurface over 6,500 lane miles of streets. The percentage of our streets in a state of good repair increased from 66% in fiscal year 2008 to over 73% in fiscal year 2012.

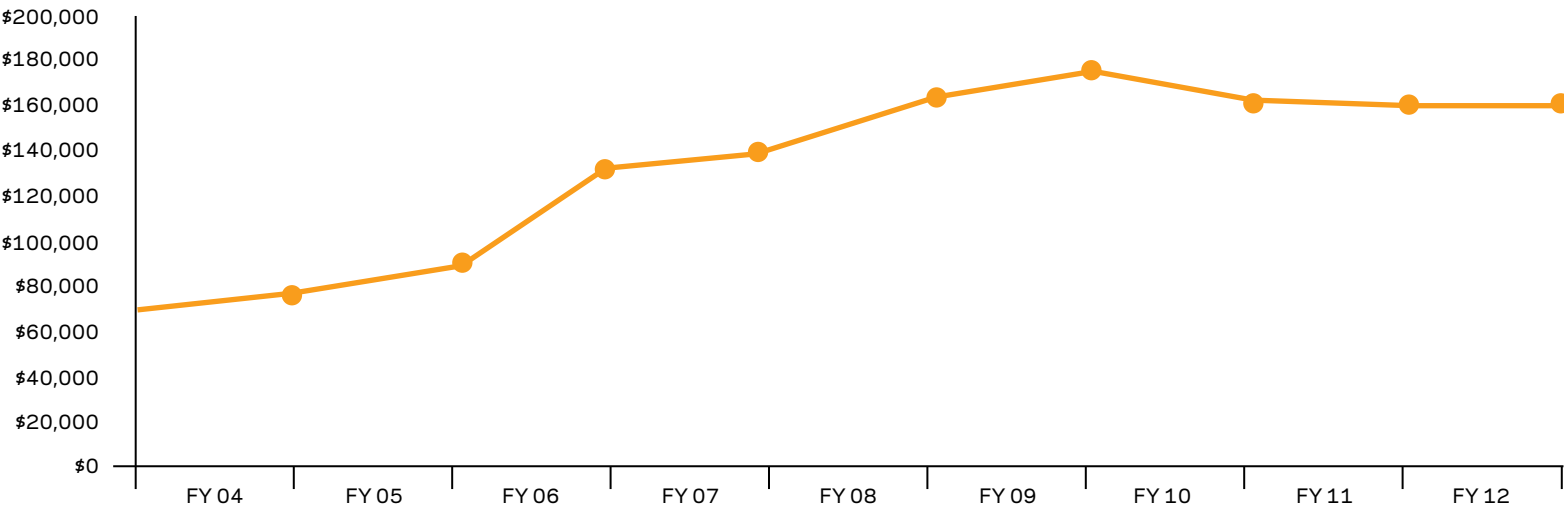
NYC LANE MILES RESURFACED, BY FISCAL YEAR

FISCAL YEAR	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
TOTAL	924.91	964.15	1,006.75	828.85	1,003.98	1,007.64

Even devastating events haven’t stopped DOT from continuing to make progress in street conditions. Hurricane Sandy hit the city in October 2012, and the percentage of streets in good condition dropped only slightly the following fiscal year, to 70%, despite extensive damage to the street system.

The harsh winter of 2010 also battered city streets, and the number of pothole complaints increased. Mayor Bloomberg responded with an additional \$2 million allocation to DOT for pothole repair. During the first quarter of 2011, DOT crews filled 50% more potholes than the prior year—an additional 40,000 potholes were repaired.

SPENDING ON ROAD RESURFACING





FIRST AVENUE

DOT used an innovative, thin-asphalt overlay atop the notoriously uneven concrete road at a fraction of the cost of a complete rebuilding to repair First Avenue. The \$7 million project to repair the avenue from 72nd to 125th provides a smooth surface for pedestrians—including 48,000 runners at the NYC marathon—and makes it safer and more accessible for 60,000 daily bus, vehicle and bike riders. Select Bus Service was launched in 2010 and the street has been redesigned curb-to-curb in phases from Houston Street, adding high-visibility bus lanes for the M15 SBS, pedestrian refuge islands and parking-protected bike paths.



BEFORE: First Avenue



AFTER: First Avenue

Each year, New York City DOT’s recycled asphalt program saves 174,000 tons of milled asphalt from going to landfills, reduces the amount of oil used in asphalt production by 840,000 barrels and eliminates 321,000 trucks trips

GREEN ASPHALT

NYC DOT requires approximately one million tons of asphalt annually to keep its 6,000 miles of streets smooth. The agency is the national leader in producing recycled asphalt in a cost effective and environmentally sound manner.

Asphalt is a combination of hard rock and petroleum-based asphalt cement. During resurfacing, some of pavement is removed and can be recycled to make new street surfaces. The recycling process reduces the amount of new pavement manufactured, which in turn, reduces greenhouse gas emissions and truck trips.

DOT’s 2008 Strategic Plan set goals to increase the use of reclaimed asphalt pavement (called RAP), to 50% for in-house production and 25% for contractors. In-house asphalt production averaged 40% RAP in 2012. For vendor content, DOT averages 31% recycled asphalt.

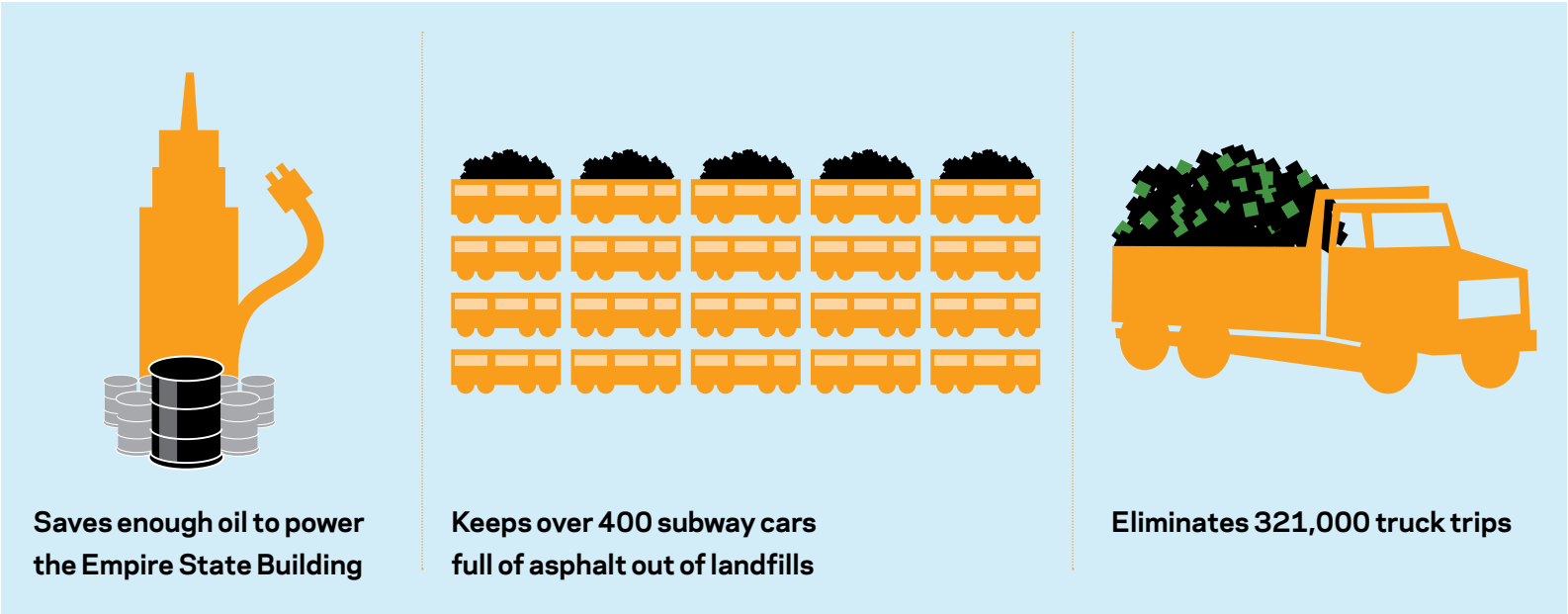
The only other large American city using more than 20% recycled content in its paving material is Los Angeles. DOT’s recycled asphalt

pavement saves us 174,000 tons of milled asphalt from landfilling a year, avoids 840,000 barrels of oil annually used to produce new asphalt cement, and eliminates 321,000 truck trips.

Recycled asphalt is good for the environment and saves the city money. In fact, DOT-produced asphalt proved so efficient at the Hamilton Avenue plant in Brooklyn—delivering savings of \$10 million a year—that DOT moved to acquire a second asphalt plant at the Harper Street asphalt plant in Queens.

The acquisition of the Harper Street facility also allowed the agency to close the Hamilton Avenue plant for modernization. After a renovation of the Hamilton Avenue asphalt plant is complete in late 2013, the upgraded facility will allow NYC DOT’s use of RAP to increase to 50%.

DOT is piloting the use of 100% recycled asphalt in Staten Island along Richmond Avenue and Jewel Ave in Queens. Initial tests showed additional cost savings and environmental benefits.



22,000

gallons of annual fuel
savings from new
paving equipment

GREEN PAVING EQUIPMENT

DOT has dramatically reduced the environmental impact of the equipment it uses to pave the streets. New “electric screeds” offer the City’s greatest fleet-based savings in greenhouse gas emissions and help it meet air quality goals outlined in PlaNYC.

Paving machines operate with two basic parts—the tractor that stores and prepares asphalt and a “screed” that trails behind to lay asphalt at the correct thickness and angle. The screeds must stay heated for proper application of asphalt. Traditionally, DOT had used diesel fired screeds. With a \$1.14 million grant from the American Recovery and Reinvestment Act, DOT was able to retire these units

early to replace them with more modern, electric screeds. The new electric screeds allow better quality and temperature control, require less maintenance and cleaning, and also lay out a better “mat” of asphalt during the paving process. They are also healthier for DOT staff since they remove fumes and pollutants.

The change eliminates over 460,000 lbs. of CO₂ and 125,000 lbs. of particulates per year, roughly equivalent to the emissions produced by 40 cars driven 10,000 miles. It provides an annual fuel savings of about 22,000 gallons worth about \$90,000. Over the 10-year expected life of the equipment, 3,235 metric tons of greenhouse gases will be reduced.

**New paving equipment eliminates
460,000 pounds of carbon dioxide and
125,000 pounds of particulates a year**



Paving machine with electric screed



Hamilton Plant

The City has installed 5,700 bioswales since 2011

PERMEABLE PAVEMENT AND BIOSWALES

Incorporating sustainable elements into streets is another way to improve the city's environmental performance. The New York City sewer system is old, and during heavy rainstorms wastewater and stormwater combine and flow directly into the city's water bodies, polluting them. The city set a goal to reduce these "combined sewer overflow" (or CSO) events and increase the use of green infrastructure to 10% of impervious surface in combined sewer watershed areas. Streets managed by DOT encompass about 28% of the land in New York City—the agency plays an important role in siting green infrastructure.

Bioswales, stormwater greenstreets, and permeable pavement absorb stormwater during rain storms and help prevent combined sewer overflow events and street flooding. Bioswales and greenstreets use landscaped elements that help to beautify and calm streets. In the past few years, DOT has collaborated with DEP and other city agencies to approve over 5,700 bioswales and over 200 stormwater greenstreets.

DOT has also experimented with the use of permeable pavement as a more flexible alternative to bioswales, which generally require large areas. Our initial screenings show that although permeable pavement has limits—streets above subways and with underground utilities are not good conduits, for example—it performs well in low-density areas where ponding is an issue.

In the winter of 2012, DOT maintenance crews installed precast permeable concrete slabs on the corners of Hollis Avenue & 209th Street and Linden Boulevard & 204th Street in Queens to respond to persistent flooding conditions. After installation, stormwater now infiltrates into the ground. Standing water is absorbed within



Bioswales use planted areas to reduce drainage

a matter of hours. The agency is also using permeable pavement in College Point, Queens after the award of an EPA Green Infrastructure Grant through the New York State Environmental Facilities Corporation.

In 2013, local law codified DOT's interest in exploring permeable pavement. The city is now required to study and issue a report in spring 2016 detailing its experience with permeable materials in streets and sidewalks.

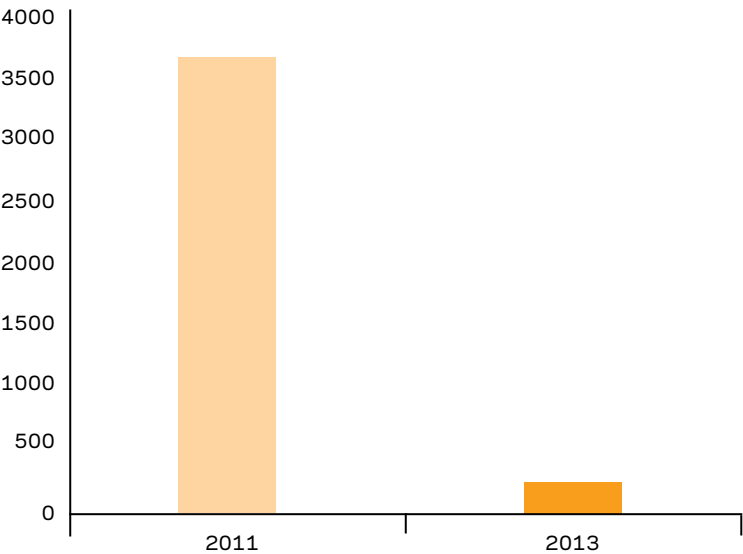


DOT has repaired
2,196,483 potholes
since 2007

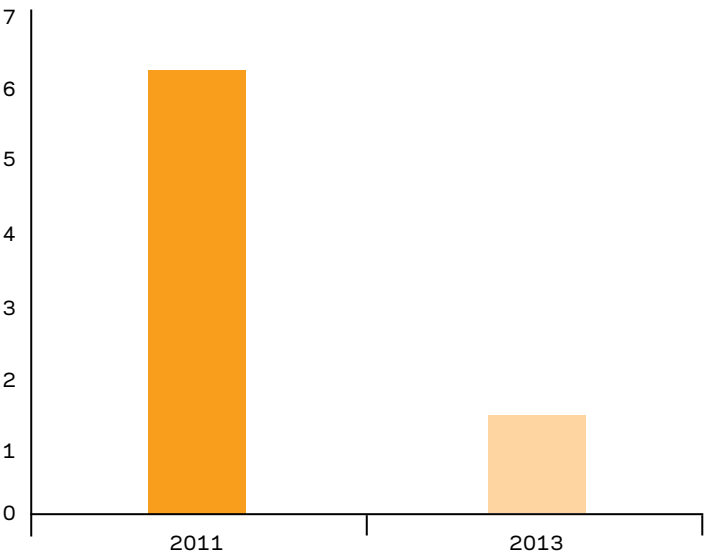
PROGRESS ON POTHOLES

Fixing potholes on New York City's 6,000 miles of streets is a never-ending job. DOT repairs hundreds of thousands of potholes every year, and during the summer, fixes up to 4,000 potholes a day. Through a streamlined process and increased investment, the agency has made strides in reducing the time it takes to respond to pothole complaints, helping keep streets safe and smooth for New Yorkers.

OPEN POTHOLE COMPLAINTS



RESPONSE TIME TO POTHOLE COMPLAINTS (DAYS)



The Daily Pothole makes street repair work accessible to the public at thedailypothole.tumblr.com

THE DAILY POTHOLE

The Daily Pothole tumblr page allows New Yorkers to follow DOT's hardworking men and women as they mill, pave, and smooth city streets. Immediately after its launch in 2011, The Daily Pothole was heralded as a funny, inventive way to show nuts and bolts infrastructure work that keeps New York's transportation system working. Planetizen ranked The Daily Pothole one of the Top Ten Websites of 2011 and Complex.com named it one of the best 100 Tumblrs of all time. As of July 2013, the Tumblr had 16,447 followers.



Warmy the asphalt plug is the Daily Pothole's mascot

The Daily POTHOLE MILL & PAVE



A publication of New York City DOT



Follow us as we work to make New York City's streets smooth.
1,845,114 square yards resurfaced since July 1, 2013 (9/13/2013)



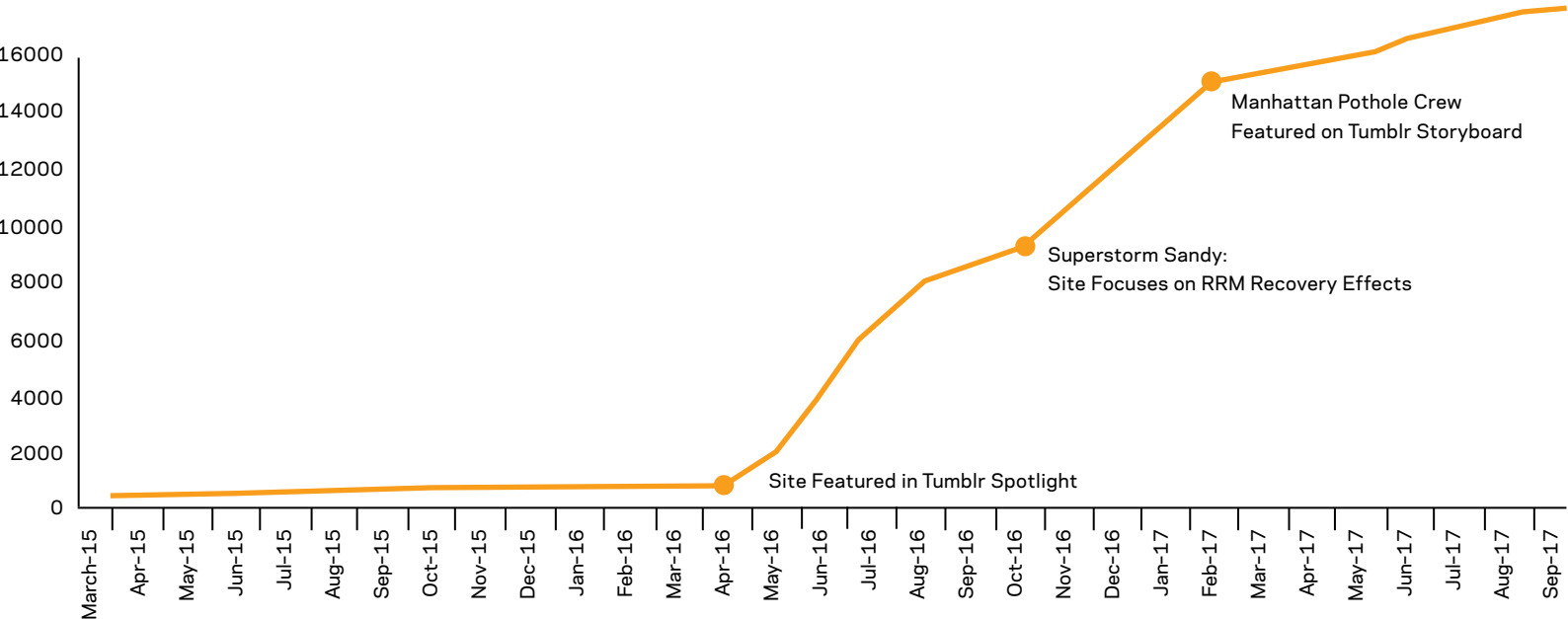
[Report a Pothole](#)



[Check Your Street's Condition](#)

The Daily Pothole Tumblr

THE DAILY POTHOLE SUBSCRIBERS



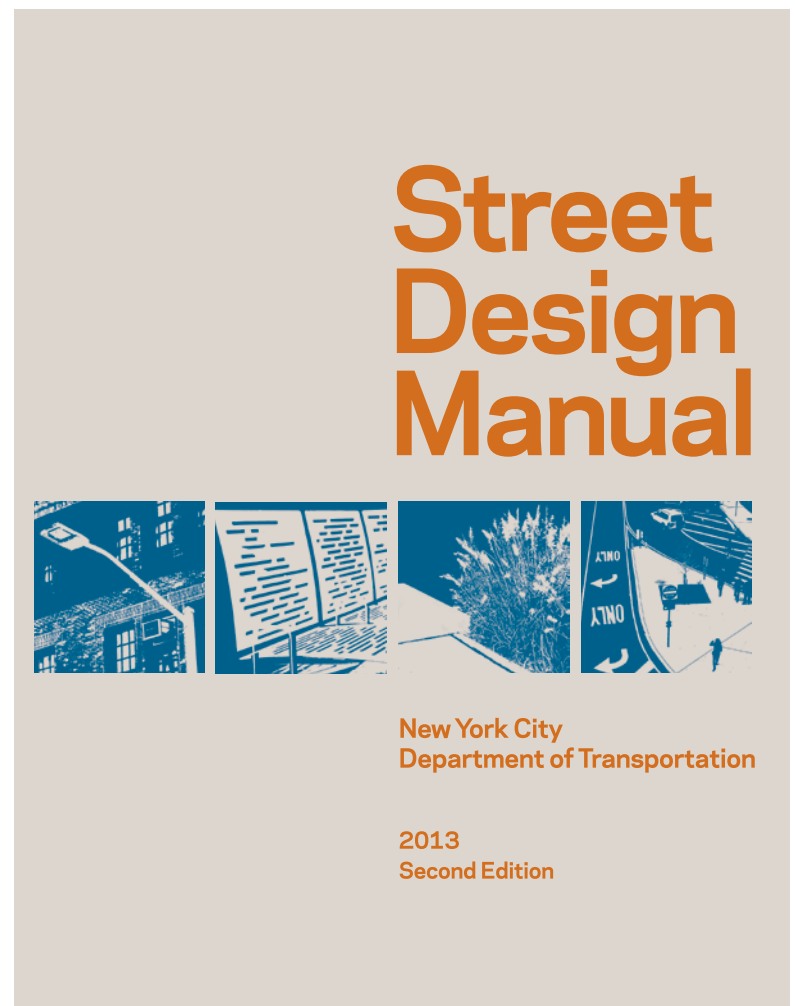
STREET DESIGN MANUAL

The New York City Street Design Manual is the city's comprehensive resource for street design standards, guidelines, and policies. It draws from a wide range of resources and experience to present a coherent set of choices for street design. These comprise everything from ubiquitous features, such as standard sidewalk concrete and street lights, to newer design elements like pedestrian safety islands, bus bulbs, and protected bicycle lanes.

The Manual's first edition, published in 2009, has been a tremendous success, with rapid integration into the city's DNA. City agencies and private developers now work from a common, comprehensive playbook. A standard reference text for DOT staff, the Manual has been incorporated into the agency's internal design-review processes and is required reading for all design and engineering consultants. The Manual is also cited in the Mayor Bloomberg's Executive Order encouraging active design strategies for streets and buildings.

The Manual is a living document. DOT updated the first edition a year after its publication, and the second edition, released in fall 2013, reflects further evolving practices and aspirations. Future editions will continue to document the changes that come as the city keeps turning its goals into best practices. They will also promote still more innovations to make our streets safer, smarter, and stronger as local economic and social assets.

The following agencies participated in the developing the Manual: Departments of Design and Construction, City Planning, Parks and Recreation, and Environmental Protection, and Buildings, as well as the Economic Development Corporation, the Landmarks Preservation Commission, the Public Design Commission, and the Mayor's Office.



STREET WORKS MANUAL

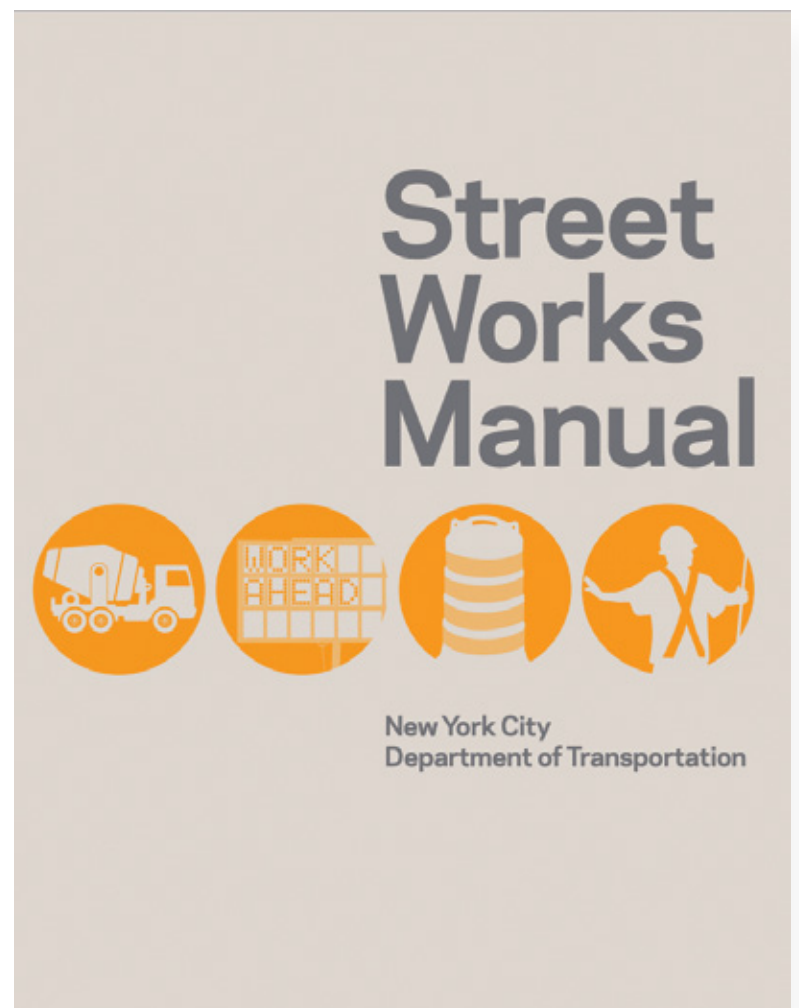
City streets are New York's basic circulatory system, serving huge numbers of daily foot, bus and auto trips, as well as facilitating the millions of large and small goods deliveries that keep our economy running. Our streets are also the conduits for the increasingly complex set of public utilities needed for daily life in the 21st Century—water, electricity, gas, steam and telecommunications of every kind.

At times these multiple functions conflict—nearly every New Yorker seems to have a story about a work crew digging up a freshly surfaced city street.

Though better coordination of paving and sub-surface work seems elementary, it has been elusive owing to sheer scales of both our street system and the utility networks buried beneath them.

The New York City Street Works Manual represents a major step in solving this problem. NYC DOT and the city's major utility companies produced new policies set forth in the Manual and a series of agreements about data-sharing and consultation on work on both roadways and below the street surfaces. These have gone a long way to protect the public's investment in better street surfaces. New information applications are facilitating the coordination of vast and complex work schedules across the city.

In the same vein, the release of the Manual in 2012 also marked the adoption of new, business-friendly technology improvements in NYC DOT's issuance of permits to contractors who need to undertake work in or under city streets. All-electronic permitting saves time and money for the utility and construction industries, while reducing costs and saving taxpayer dollars.





The Sheridan/Hunts Point Land Use and Transportation Study recommends turning the Sheridan Expressway into a boulevard lined with new housing, retail, and offices

SHERIDAN EXPRESSWAY



Proposed redesign for Sheridan Expressway at West Farms Rd, Bronx

DOT worked with City Planning, the Economic Development Corporation, and local stakeholders to undertake the 'Sheridan-Hunts Point Land Use and Transportation Study' starting in 2010. After a \$1.5 million federal TIGER II award from US Department of Transportation, the agencies evaluated ways to address community concerns over land use, waterfront access, transportation and economic development, and take advantage of emerging opportunities for new housing and retail. The study sought ways to mitigate an over saturation of infrastructure in the Hunts Point neighborhood of the South Bronx.

The recommendations built off prior state and community based studies that addressed local transportation problems and proposed improved access to new parks along the Bronx River. The final recommendations were to turn the 1.25 mile highway into a boulevard, improve pedestrian crossings and safety, and encourage additional housing, offices and retail.

The completion of the study sets the stage for the transportation project development process, which will require environmental review and preliminary design. The City will pursue a cooperative agreement to advance the project with the State, which owns the expressway.



Chapter 13

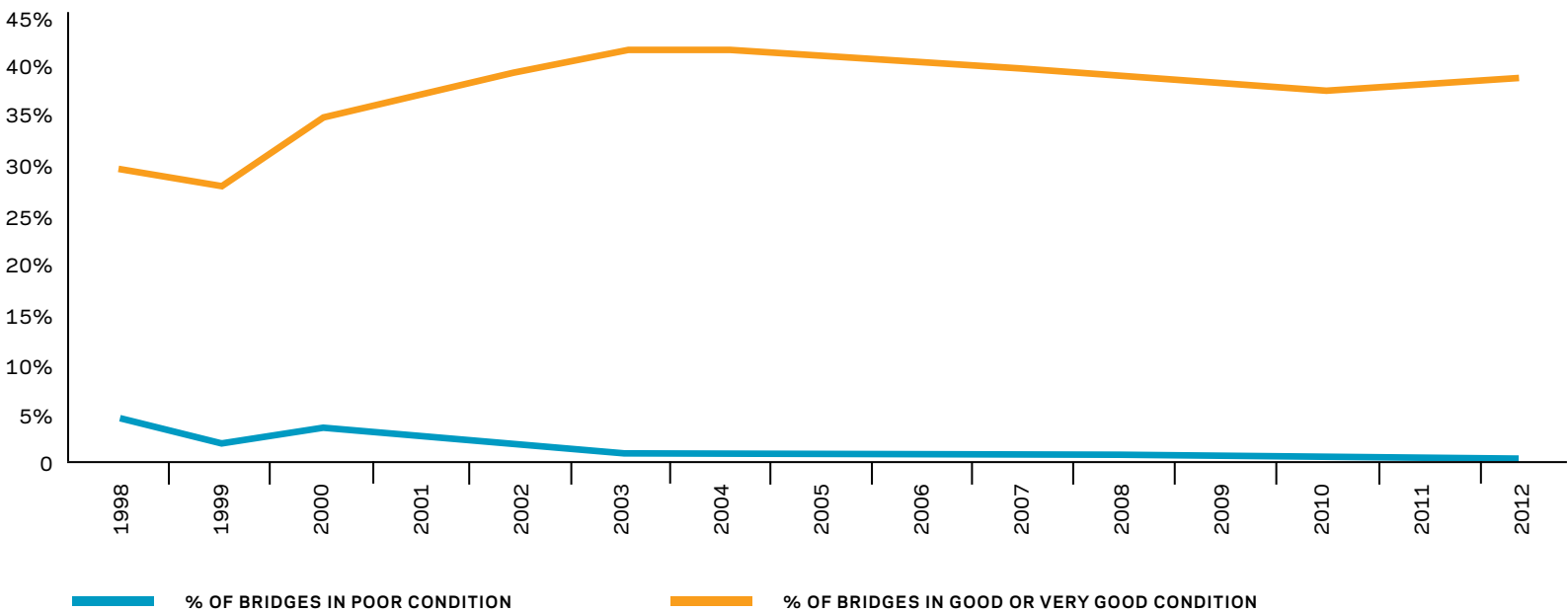
A City of Bridges

DOT has committed \$3.1 billion to repair the city's bridges since 2007

DOT has committed \$3.1 billion for the city's bridge program since 2007 and instituted internal controls to use dollars more efficiently. The investment has paid off. 66 bridges, including the Brooklyn Bridge, Willis Avenue Bridge, and the ramps at St. George Ferry Terminal, have been rehabilitated or replaced creating a smoother and safer ride for motorists. Once the Brooklyn Bridge rehabilitation is complete, all the city's bridges will be restored to a state of good repair—a new record.

DOT is responsible for 788 bridges and tunnels throughout New York City. Keeping these bridges safe and in a state of good repair is vital to safe and efficient movement of goods. Over the next ten years, the city has committed \$4.3 billion to this goal. Over 70 bridges that would otherwise fall into “poor” condition are funded for reconstruction. However, funding challenges over the long-term remain (see Looking Ahead section).

NYC BRIDGE CONDITIONS



To ensure the best communication with local residents about the Brooklyn Bridge reconstruction project, DOT hired a full time community liason, set up a working group with key stakeholders, and developed a mailing list of over 1,000 people

EAST RIVER BRIDGES

The East River Bridges are iconic, landmark symbols for New Yorkers and tourists who walk, bike and drive over them every day. Over the past few decades, over \$1 billion has been invested to keep the East River Bridges safe for the millions of people that use the bridges annually. This investment was strengthened under the leadership of Mayor Bloomberg.



Brooklyn Bridge



DOT worker fixing Brooklyn Bridge

BROOKLYN BRIDGE

More than 120,000 vehicles, 4,000 pedestrians and 3,100 bicyclists cross the Brooklyn Bridge every day. The agency is undertaking a \$500 million overhaul of the bridge to keep it safe, attractive and well maintained for all users. This project includes upgrading existing roadway pavement, rehabilitating historic arch blocks, railings, and masonry structures, restriping and expanding capacity at on and off ramps, and increasing the overhead clearance at the York Street arch over the BQE, which is currently lower than industry standards. In addition, the DOT project includes seismic retrofitting at the Franklin Square arch over Pearl Street. On all the bridge approach structures on both the Manhattan and Brooklyn sides, the existing deck will be removed by lifting out sections and replacing them panel by panel with precast concrete-filled steel grid deck panels. The bridge is also being painted to prevent steel corrosion and improve aesthetics.

Brooklyn Bridge Working Group:

The rehabilitation of the Brooklyn Bridge is a large infrastructure project in a dense urban area. To lessen the impacts of the project on its Manhattan and Brooklyn neighbors, NYC DOT employed construction equipment innovations such as smaller jackhammers, sound proofing blankets, and to the extent possible, doing work during the day. To ensure the best communication with local residents, the agency hired a full time community liaison, set up a working group with key stakeholders, and developed a mailing list of over 1,000 people.



Manhattan Bridge

MANHATTAN BRIDGE

Nearly a billion dollars has been invested in the Manhattan Bridge over the past few decades for reconstruction and repair. The latest \$149 million contract began in January 2010 and builds on the investment in the historic bridge.

It includes the total replacement of all 628 bridge suspenders, main cable re-wrapping, replacement and upgrade of the necklace lighting, and installation of maintenance platforms at the bridge towers. Previous

phases of the rehabilitation have strengthened the bridge, reconstructed the roadways, the subway tracks, and the walkway, and developed a new bikeway on the north side.

224%

increase in cycling
daily over the
Williamsburg Bridge
since 2007

WILLIAMSBURG BRIDGE

Ongoing maintenance of the Williamsburg Bridge builds on previous reconstruction and repair projects and ensures the crossing will remain in good condition for future generations. The bridge is one of the busiest in the city, carrying over 150,000 motorists, nearly 100,000 transit riders, and

over 5,000 cyclists on weekdays.

The most recent \$173 million project includes rehabilitating the tower bearings, the truss system, and the steel structure of all the bridge's eight towers. Architectural work includes the restoration of decorative lights and the Brooklyn granite stone monument. Work

inside the anchorage houses on both the Manhattan and Brooklyn sides includes the construction of new stairs, ventilation and lighting. The project also includes the installation of an Intelligent Transportation System (ITS).

Previously, over \$500 million was spent to fix deterioration due

to deferred maintenance and the effects of age and weather, and increased traffic. The investment rehabilitated the main cables, reconstructed the roadways and completely rebuilt the walkway, bikeway and subway tracks.

ED KOCH QUEENSBORO BRIDGE

The Ed Koch Queensboro Bridge is the busiest crossing of the East River bridges, carrying 221,920 motorists, 11,980 bus passengers and 4,342 cyclists and 1,591 pedestrians every day. Ongoing work to keep the bridge in good condition includes drainage improvements on the main

bridge and Queens approach, new overhead signs and lighting, and cleaning and repairing the bridge structure.

The current projects build on the \$300 million invested in recent decades to reconstruct ramps and roadways and rehabilitate the bridge bearings.



Ed Koch Queensboro Bridge



\$14.3

million in federal stimulus
funding for the Wards
Island pedestrian bridge

HARLEM RIVER BRIDGES

WARDS ISLAND BRIDGE



Willis Avenue Bridge Under Wards Island Bridge

In early 2012, NYCDOT completed a \$1.5 million rehabilitation of the Wards Island pedestrian bridge including bridge deck renovations, a new electrical system, and better lighting and security. The project was funded by the American Investment and Reinvestment and Recovery Act and allowed a better experience for pedestrians using the bridge to travel between East 103rd Street in Manhattan and Wards Island.



3rd Avenue Bridge

THIRD AVENUE BRIDGE

DOT completely replaced the Third Avenue Bridge in 2004, part of a \$118 million project to improve mobility for traffic between Manhattan and the Bronx. The new bridge span was the first one to be floated into New York Harbor after being constructed in Alabama.

WILLIS AVENUE BRIDGE

In 2011, NYCDOT completely replaced the Willis Ave Bridge, which connects East 124th Street in Manhattan to Willis Avenue in the Bronx, as part of a \$612 project. The 350 foot swing span of the new bridge, which opens on a pivot to let marine traffic pass, was constructed in Coeymans, New York, and travelled by barge to its Harlem River home. The span's 135-nautical mile journey down the Hudson River, through New York Bay, and up the East River included passage underneath 14 bridges.

The new bridge features a direct connection from the FDR to the northbound Major Deegan Expressway in the Bronx. It has wider lanes than the old bridge, and a combined pedestrian/ bicycle pathway along its north side. The project is ongoing, as DOT completes reconstruction work on surrounding ramps and approaches.



Willis Avenue Bridge

145TH STREET BRIDGE

As part of \$70 million project, the bridge was entirely closed to traffic in November 2006 and the center swing span was removed. In February 2007, when the preparatory work was complete, the new 145th Street Bridge was floated up the Harlem River to its final destination. The reconstructed bridge includes a new swing span, new machinery and electrical system, a new approach roadway and spans, railing, fencing, lighting, and signals. A new Operator's House has been centered and installed.



145th Street Bridge

DOT's reconstruction project on seven Belt Parkway Bridges will improve safety and reliability for 150,000 drivers a day

BELT PARKWAY BRIDGES

The New York City Department of Transportation began the reconstruction of seven bridges and over the Belt Parkway in 2009. In total, the projects will cost nearly a billion dollars and improve safety and reliability for 150,000 drivers who use the Belt every day. The Fresh Creek Basin, Rockaway Parkway, Paerdegat Basin, Gerritsen Inlet, Mill Basin, Nostrand Avenue and the Bay Ridge Avenue Bridges are all original structures built starting in 1939. In 2009, a construction contract began for three—the Belt Parkway over Fresh Creek Basin, Rockaway Parkway, and Paerdegat Basin. Additionally, in order to mitigate wetland impacts, an offsite project at Floyd Bennett Field within the Gateway National Recreational Area (GNRA) was started in March 2011.

Reconstruction of these bridges will improve safety and visibility. Lanes and the bike path will be wider, safety shoulders and median barriers will be constructed, and the roadways will be realigned to improve sight distances. NYCDOT anticipates that these improvements will reduce the current accident rate on this section of the Belt Parkway and improve highway drainage.



New Paerdegat Basin Bridge in Canarsie.

One of seven bridge projects along the Belt Parkway.

Widespread use of sophisticated sensors helps enforce against overweight trucks and protects bridges facilities

WIRING BRIDGES TO IMPROVE UPKEEP



Monitoring the dynamic behavior of the Brooklyn Bridge



Strain gauge monitoring of beam on the Brooklyn Bridge

DOT has used technology to more efficiently detect problems on our bridges. GPS, laser scanning, ultrasonic testing, and fiber optics have all been used on the East River Bridges in order to track tiny movements of the bridge structures resulting from vehicles, weather, river activity and seismic movements. The data has allowed DOT to more effectively monitor and maintain our bridges. For example, measurements from these scans confirmed that the torsion in the middle of the Manhattan Bridge declined.

DOT is also using weigh in motion sensors on the Alexander Hamilton Bridge to collect data about the impact of overweight trucks on bridge conditions. As truck weight increases, damage to bridge structures accelerates exponentially, stressing bridge roadways and structures, so better data about and enforcement against overweight trucks is a vital component of any bridge maintenance program.

The sensors, installed in the roadbed of the bridge in 2013, weigh each truck that travels over it. Data is then transferred electronically to DOT staff for analysis and used to develop assessments of the number of overweight trucks, and the impacts of those trucks on the bridge structure. Widespread use of the sensors has the potential to help improve enforcement against overweight trucks and protect city facilities from the disproportionate damage they cause.



FEDERAL STIMULUS FUNDING

New York City received \$1.1 billion for transportation projects from the American Recovery and Reinvestment Act in 2009, including \$261 million for NYC DOT. The allocation was the largest to any city in the country and allowed the city to create or preserve approximately 32,000 jobs. New York was able to take maximum advantage of the opportunity because of its sophisticated project development process and expertise in federal transportation law. Existing funding for stimulus projects allowed 25 other projects to proceed, projects that would have languished due to the economic downturn. Examples include the reconstruction of Eastern Parkway in Brooklyn and East Houston Street in Manhattan and construction of the Hunts Point Greenway in the Bronx. Six NYC DOT projects received direct stimulus funding.

Rehabilitation of Saint George Ferry Terminal Ramps

At \$175 million, the project at the St George Ferry Terminal was the largest stimulus project in New York State. The Terminal is Staten Island’s transit hub linking 70,000 daily commuters with the Staten Island Railroad, 20 New York City Transit bus lines, 3 parking facilities and the Bay Street and Richmond Terrace bikeway.

The project consists of the rehabilitation of 8 ramps and was completed using the Design Build approach, a modern method of project delivery in which the city enters into a single contract with one entity for both design and construction services. This permits construction to begin while design continues in close coordination, enabling the construction to be completed in less than 3 years under strict cost control. Replacement of the ramps will reduce long term expenditures for the city.

Total Project Cost: \$175 million
Direct Stimulus Funding: \$175 million

Rehabilitation of the Brooklyn Bridge

This project includes rehabilitating ramps and repainting the bridge to improve traffic conditions for 100,000 vehicles and 4,000 pedestrians and 2,600 bicyclists who cross the Brooklyn Bridge every day.

Total Project Cost: \$500 million
Direct Stimulus Funding: \$30 million

Upgrades to the Ward’s Island Pedestrian Bridge

The project improved pedestrian access to Ward’s Island from East Harlem through a complete mechanical and electrical rehabilitation, including replacing the complete tower drive machinery, providing a new reinforced concrete deck, and a new drainage system. The project was done in tandem with a \$100 million upgrade to Ward’s Island recreational facilities, including construction of Icahn Stadium and dozens of new ball fields. The project improved pedestrian safety and durability and extended the useful life of the existing bridge.

Total Project Cost: \$14.3 million
Direct Stimulus Funding: \$14.3 million

Rehabilitation of 12 Roadway Bridges

Rehabilitation of deteriorated components of 12 bridges throughout the City extended their useful life by 10 years. Rehabilitation work addressed concrete abutments, piers and columns, bearing replacements, resurfacing steel repairs and waterproofing.

Total Project Cost: \$9.7 million
Direct Stimulus Funding: \$9.7 million

\$261
million stimulus
allocation to NYC DOT
for transportation
projects

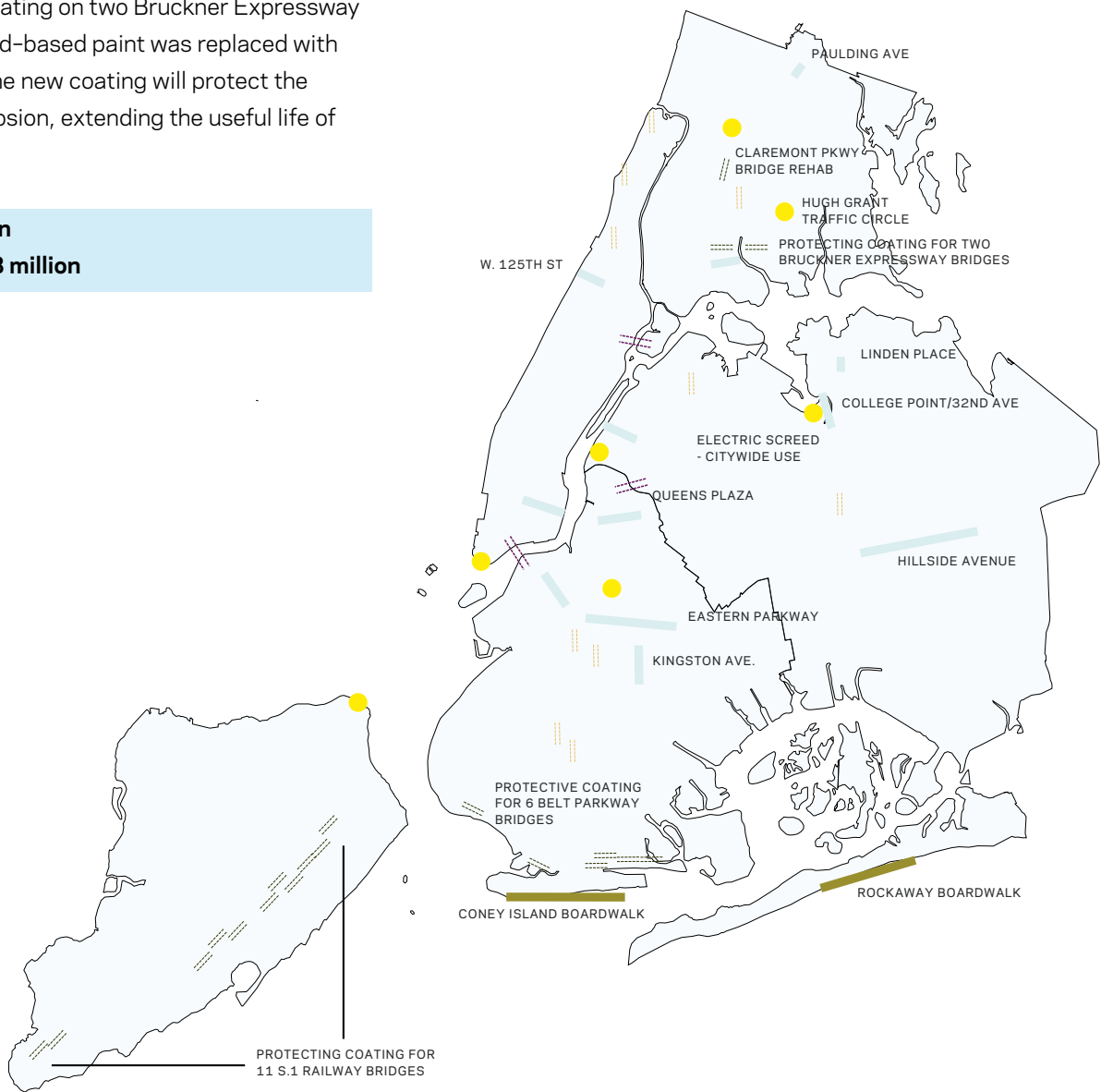
The stimulus allocation was the largest to any city in the country and allowed New York City to create or preserve 32,000 jobs

Replacement of Protective Coating on Two Bruckner Expressway Bridges

Replacement of the protective coating on two Bruckner Expressway Bridges over the Bronx River. Lead-based paint was replaced with a lead-free protective coating. The new coating will protect the structural steel from further corrosion, extending the useful life of the structures by 20 years.

Total Project Cost: \$8.8 million
Direct Stimulus Funding: \$8.8 million

FEDERAL STIMULUS FUNDING FOR DOT PROJECTS





Chapter 14

Built-in-Efficiency: Lighting, Signage, Ferries and Vehicles

Sustainable Streets promised that NYCDOT would lead by example, and strive to become a national model for efficient, environmentally sound infrastructure management. As detailed in the chapters above, DOT has risen to this challenge in its street maintenance and bridge maintenance programs.

The agency has also brought a new approach to lights, signs, fuels and its fleet. It has become a leader in the use of energy efficient street and traffic signal lighting, saving millions of dollars in electricity costs and reducing greenhouse gas emissions. Clean fuels for our ferries and agency fleet, along with our car sharing program, have brought significant environmental benefits and are poised to generate additional gains going forward.

\$14

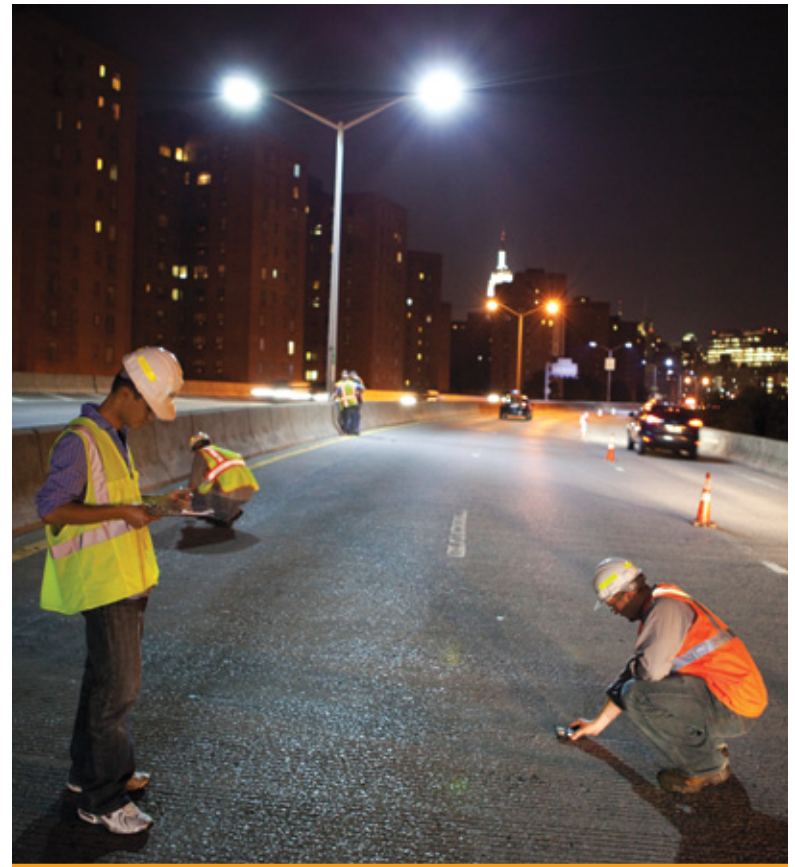
million in annual savings
from conversion to
LED's

LIGHTING

The city has over 300,000 street lights and 12,000 signalized intersections. Keeping streets bright and safe for travel and city life require a substantial amount of electricity. Since 2007, the city has been converting to energy efficient models to reduce energy costs and lessen the city's greenhouse gas emissions. Upgrading traffic and street lights to light-emitting diodes (LEDs) will help the city reach its 30% energy reduction goal in city buildings and operations by 2017, a goal outlined in PlaNYC.

LED upgrades came to traffic lights at DOT's signalized intersections in 2009, producing an annual energy savings of 81%. By the end of 2014, all of DOT's highways and some of our streets will have LED lights. This will save approximately \$2.2 million annually in energy and maintenance costs. Additionally, Far Rockaway and the Staten Island boardwalk will get LED lights as part of the Sandy recovery program.

By 2017, 250,000 streetlights will be converted, completing the largest LED retrofit in the United States. In total, this will save approximately \$6 million in energy and \$8 million in maintenance a year for a total of \$14 million. Compared to the current standard high-pressure sodium lights currently on streets, which last six years, LEDs can last up to 20 years before needing replacement, potentially producing up to an 80 percent savings on maintenance.



DOT employees checking light levels on the FDR Drive as part of the agency's LED pilot program.

DOT has removed 50,000 unnecessary and redundant signs from New York City streets

CLEARER AND MORE ATTRACTIVE SIGNAGE



New commercial vehicles parking signs (right) replaced older signs (left).

Clearly explaining the many laws, rules, and regulations to drivers on the streets of New York is no easy task. The quantity and content of NYC street signage has provided material for many late night comedians, and been the source of confusion for residents and tourists alike.

DOT has worked diligently to reduce sign clutter and make parking and street signs easier to understand. In 2013, Commissioner Sadik-Khan and City Council members announced newly designed and simplified parking regulation signs in Midtown's

commercial parking areas. The initial rollout replaces 6,300 parking regulation signs of varying colors, typefaces, font sizes and sometimes confusing phrasing with streamlined and standardized two-color signs that are phrased and formatted for easier readability. The simplified signs are located throughout Manhattan's paid commercial parking areas, running generally from 60th Street downtown to 14th Street and from Second to Ninth Avenues, with additional areas in the Upper East Side, Lower Manhattan and the Financial District.

The 6,300 signs that DOT will replace in Midtown and Lower Manhattan include 3,300 commercial parking signs and 3,000 other signs for nighttime and weekend parking for the general public, hotel and taxi stands, street cleaning and no standing areas. The new signs reduce the number of characters needed to explain the rules from 250 to about 140, making the sign appear less visually cluttered while reducing five-foot-high signs by about a foot. The new design also places the day of the regulation before the hours of the regulation, eliminating abbreviations and retaining all necessary parking information while making it easier to read. The signs were designed working with Pentagram Design, which has also worked with DOT on its safety campaigns.

DOT has also reduced the number of signs on city streets. Excessive signage distracts drivers from essential control signs, such as stops signs and one-way signs, and clutters streets. Signs also lose effectiveness over time as they blend into the built environment.

DOT has removed over 50,000 signs that are redundant or unnecessary on NYC's streets. These include snow route and bump ahead signs, along with signs to recycle and curb your dog. When the initiative is complete, 60,000 signs will be removed, making streets safer, directions clearer and reducing maintenance costs for DOT.





million riders use the
Staten Island Ferry
annually

FERRIES

DOT owns and operates the Staten Island Ferry and works with other public agencies and private operators to promote use of the city's waterways for transportation. The Staten Island Ferry carries over 22 million passengers annually on a 5.2-mile run between the St. George Terminal in Staten Island and the Whitehall Terminal in Lower Manhattan. The Ferry runs 24 hours a day, 365 days a year. The Staten Island Ferry is the most reliable form of mass transit, with an on-time performance of over 96 percent. On a typical weekday, five boats make 109 trips, carrying approximately 70,000 passengers.

GREENING THE STATEN ISLAND FERRY

In 2010, the Staten Island Ferry converted to ultra-low sulfur fuel, delivering significant environmental benefits. We have experimented with biodiesel, installed diesel oxidation catalysts on all of our large ferries, and embarked on a partnership with the Port Authority to reduce emissions as an offset for its dredging projects. These upgrades include installation of after-treatment systems on the two small ferries and mechanical upgrades on the balance of the fleet.

DOT commenced a design process for the conversion of our boats to liquified natural gas which would essentially eliminate the emission of sulfur dioxide, nitrogen dioxide and particulate, while reducing CO₂ discharge by 25–30% and costs by 35–40%. By summer 2014, we will have retrofitted at least one boat to run on the liquefied natural gas, further making the harbor cleaner and Staten Island Ferry the greenest fleet in the country.

On a typical weekday the
Staten Island Ferry carries
70,000 passengers

THE NEXT GENERATION OF STATEN ISLAND FERRY BOATS

DOT has begun a design process for construction of a new class of ferry boats to serve the next generation of Staten Island ferry riders. The boats will replace three Barberi boats that are at the end of their useful lives. A design firm was selected in March 2013 to design the boats. After design is complete, NYCDOT will seek resources to

procure them at an estimated cost of \$300 million for three boats. Delivery of the first boat is scheduled for 2018. The new boats will have cycloidal propulsion systems to allow it to quickly change thrust and direction, improving maneuverability in choppy water and high winds.

GREENING PRIVATE FERRIES

DOT partnered with the New York State Energy and Research Development Agency and city agencies to repower and retrofit private ferries in the NY Waterway and BillieBey fleets. As part of the program, 9 boats were repowered

and 34 received diesel oxidation catalysts. One Sea Streak boat was also repowered using a grant from the United States Environmental Protection Agency. The change resulted in fuel and emissions savings.

DOT operates eleven plug-in electric vehicles and 15 all-electric vehicles and equipment

VEHICLE FLEET

DOT has worked to reduce the size of its car fleet, and green the fuels used in its cars, trucks, and operational machinery.

CLEAN FUELS

DOT is working to reduce emissions through the use of cleaner fuels as mandated by PlaNYC and Local Law. In 2013, DOT bought the first ever diesel hybrid bucket truck, nine are now used on New York City streets. DOT operates eleven plug-in electric vehicles (Chevy Volts) and 15 all-electric vehicles and equipment. They include cars, forklifts, mini utility vehicles, an aerial lift, and two shop sweepers. The agency utilizes ultra-low sulfur diesel fuel for diesel powered vehicles (and ferries—as outlined earlier in this chapter), and has begun using biodiesel fuel in certain vehicles. Biodiesel is a non-toxic, biodegradable fuel that has less greenhouse gas emissions. Between fiscal year 2012 and 2013, the agency increased its use of biodiesel fuel by 50% while lowering its total fuel consumption by 15%.

HUNTS POINT CLEAN TRUCKS PROGRAM

HUNTS POINT CLEAN TRUCK PROGRAM EMISSIONS REDUCTIONS

ANNUAL	NO (TONS/YEAR)	PM _{2.5} (TONS/YEAR)	HC (TONS/YEAR)	CO (TONS/YEAR)	CO ₂ (TONS/YEAR)
PERCENT REDUCED (%)	88.5%	97.5%	86.4%	80.2%	22.9
AMOUNT REDUCED PER YEAR	94.6	5.1	6.5	32	2631

The Hunts Point Clean Trucks Program is an environmental initiative led by NYCDOT to promote sustainable transportation and a cleaner environment in the South Bronx. The agency works with truck owners serving the Hunts Point and Port Morris communities and offers attractive rebate incentives for the purchase of advanced transportation technologies and alternative fuels such as new diesel, hybrid electric, compressed natural gas, and battery electric vehicles. The rebates are available through a federal grant managed by NYCDOT. Rebate incentives are also available for truck scrappage and the installation of exhaust retrofit technologies. The program started in summer 2011 and has resulted in substantial pollution reduction benefits. As of summer 2013, there were over 200 private delivery vehicles in the program, bought with over 3.5 million in federal funds.

CAR SHARING



Working with Zipcar, DOT launched a car share pilot in 2010 to reduce the agency's fleet size, help combat global warming, and lessen the agency's parking footprint in Lower Manhattan. During the pilot, DOT removed 50 vehicles from its fleet and provided car sharing access to 350 employees. Given the successful

pilot, DOT renewed its contract and now is working to expand use of car sharing.

Based on this success, the program expanded, to 420 DOT staff with access to Zipcar in 2013. The employees used car shares for hundreds of trips a month and allowed DOT to reduce its standing car fleet.

DOT's car sharing pilot program:

- **Removed 25% of DOT vehicles from Lower Manhattan**
- **Reduced DOT parking impact in Lower Manhattan by 14% weekdays and 68% weekends**
- **Reduced DOT's miles traveled by 11%**



Looking Ahead

Continued progress on the infrastructure maintenance outlined above will require a substantial investment.

The agency's bridge reconstruction program for the next ten years totals \$4.3 billion. Over 70 bridges that would otherwise fall into "poor" condition are slated to be reconstructed over this time, including the Unionport Bridge in the Bronx and Roosevelt Avenue over the Van Wyck Expressway in Queens. Analysis of bridge conditions shows growing needs going forward, as more of our bridges age. Maintenance costs increase as bridges get older, so repairing bridges on time will save public funds in the long run.

The design process for three new Staten Island Ferry boats is underway to service the next generation of Staten Island Ferry riders. Procurement of those boats will cost \$300 million and require government resources—so far federal funding has not been secured.

An additional \$2.4 billion in city funds is programmed for street reconstruction and repaving, allocations that are necessary for the safe movement of buses, trucks, cars, and bicycles. PlaNYC's analysis showed that the City needs to resurface at least 900 lane miles per year in order to return the city's streets to a state of good repair, so anything less than this will have consequences in terms of safety, mobility and vehicle maintenance.

Sustaining these investment levels will be challenging. The needs above are in addition to those of the MTA, which runs subways, commuter trains and buses, and has a multi-billion dollar hole in its next capital construction program, and come at a time of eroding federal transportation aid. As a percentage of U.S. GDP, investment in infrastructure today is half what it was in 1960, according to the National Association of City Transportation Officials. The United States is investing approximately two percent of GDP on infrastructure; Europe and China are investing approximately five percent and nine percent. Growth in India, China, Brazil and other surging

economies is being fueled by investment in urban transportation systems while the U.S. lags behind.

But the region will have no option but to find revenue necessary. Ignoring vital bridge, road, and transit maintenance would have disastrous consequences on the region's mobility and economic vitality, as evidenced by the deterioration of the NYC subway system in the 70s and 80s. Deferring maintenance will also lead to higher costs in the long run.

New sources of revenue will be necessary, such as East River Bridge tolls or a congestion charging program that levies fees on drivers coming in Manhattan's central business district. (see Mobility Looking Ahead section).

The agency will also have to find ways to preserve its current investments, and reduce maintenance costs. Despite progress to protect recently repaved streets from construction work, streets are frequently torn up in New York or not repaired to adequate standards after construction. The Street Works Manual attempts to address this. Greater knowledge of and use of this document could help protect the city's street and bridge investments. The agency will also have to find new and innovative ways to communicate with New Yorkers about the core maintenance work it undertakes. The model set by The Daily Pothole could be expanded to other areas, and help make a case for the new revenue programs.

Realigning transportation infrastructure to better reflect the needs of the surrounding community could produce cost savings and offset previously inflicted impacts of large infrastructure projects. Turning the Sheridan Expressway in the South Bronx into a boulevard, as proposed by the city's Sheridan/Hunts Point Land Use and Transportation Study, would improve access to new parks along the Bronx River, greatly enhance safety, and provide new development opportunities. As vacant city land becomes scarcer, proposals to deck over other highways, like the Brooklyn Queens Expressway in Williamsburg or through Cobble Hill, could provide new opportunities for parks and housing.

NYC's commitment to the use of sustainable materials will produce environmental and economical benefits for the city, both in the short and long term. The agency is working towards using even higher percentage of recycled content in asphalt, warm mix asphalt technology and testing 100% recycled asphalt. The use of permeable pavement and bioswales has grown significantly, and may grow more once the durability of materials is further tested over the long term in a variety of street and sidewalk locations. The city's conversion to energy and cost efficient LED lights, which will be fully completed by 2017, means it is on track to become the first big city to have all of its street and park lights converted, producing savings over a longer period of time.

In addition to the bus, ferry, and bike projects outlined in the Mobility section, the Bloomberg Administration has also endorsed a number of larger scale transit expansion projects that are necessary for the region to grow and prosper. These include the a new Amtrak Gateway project which seeks to add intercity rail capacity to New York City and bringing MTA's Metro-North to Penn Station. The projects have higher price tags than new bus rapid transit or bike routes, but will be vital to the future of the city.

- **Continue to improve bridge and street conditions**
- **Better protect street and bridge repair investments and more widely publicize the Street Works Manual**
- **Consider new revenue streams like congestion pricing to pay for infrastructure needs**
- **Secure funding for the new generation of Staten Island Ferry boats**
- **Realign infrastructure to better reflect the needs of the surrounding communities, including transforming the Sheridan Expressway into a boulevard with housing, retail, and offices**
- **Expand use of recycled asphalt, permeable pavement, bioswales, and clean fuels**
- **Complete conversion of street lights to LEDs by 2017**
- **Expand car sharing**



A photograph of three construction workers in safety gear. Two workers in orange high-visibility vests and hard hats are shaking hands. A third worker in a dark jacket and beanie stands between them, smiling. The background shows a construction site with trees and a building. A semi-transparent blue rectangle is overlaid on the center of the image, containing the word 'Resiliency' in white text.

Resiliency

Introduction



226,000

commuters crossed
the East River using
temporary transit
services after the storm

When Hurricane Sandy roared into New York on October 29, 2012, it drove the waters around our city right up to, and then over, our doorsteps. Forty-three people died in the deluge and untold numbers were injured. Along the shoreline the storm surge engulfed buildings and destroyed communities. It flooded roads, subway stations, and electrical facilities, paralyzing transportation networks.

After the storm receded, New York was a changed city. Homes and businesses were wiped out. The transportation system was in disrepair. And New Yorkers felt more vulnerable to the effects of global climate change.

As the city recovered, it became clear that addressing immediate damage from the storm was not sufficient. It was critical that the city develop longer term strategies for future storms, building on lessons learned during Sandy, and redouble the effort to address climate change that began with PlaNYC.

Starting in December 2012, Mayor Bloomberg brought together city agencies to develop A Stronger, More Resilient New York, a \$30 billion program to protect and strengthen the city. The program includes almost twenty transportation initiatives to fortify New York's transportation network, and outlines a strategy for rapid response to future emergencies.

This chapter illustrates NYCDOT's response to Sandy, and lists the transportation initiatives that will help protect and strengthen the city going forward.



Chapter 15

Impact of Sandy and the City's Response

During Sandy, many highways, roads, railroads, and airports flooded. At the same time, all six East River subway tunnels connecting Brooklyn and Manhattan were knocked out of service by flooding. The Steinway Tunnel that carries the 7 train between Queens and Manhattan, the G train tunnel under Newtown Creek, the Long Island Railroad and Amtrak tunnels under the East River and the PATH and Amtrak tunnels under the Hudson River were all effected. Major damage occurred to the South Ferry subway station in Lower Manhattan, as well as to the subway viaduct connecting Howard Beach, Broad Channel, and the Rockaways. Service also was disrupted on the Staten Island Ferry, the East River Ferry, and private ferries. Exacerbating flooding was the loss of electrical power, which made it difficult to pump out tunnels, clean up damaged subway stations, and begin restoring service. The difficulty in “dewatering” the tunnels further increased the damage from Sandy, as sensitive mechanical, electrical, and electronic equipment soaked in corrosive salt water. In addition to subway tunnels, flooding closed three vehicular tunnels into and out of Manhattan, interrupting the commutes of 217,000 vehicles, and over 500 miles of roads suffered significant damage.

Under Mayor Bloomberg’s leadership, relief and recovery efforts kicked in immediately. NYCDOT worked to open bridges and tunnels, repair streets and streetlights, and reopen the Staten Island Ferry. NYCDOT bridge engineers inspected, cleared and reopened the four East River bridges by 10 a.m. the day after the storm. DOT reopened long sections of the FDR within 24 hours, restoring this vital north-south link. Staten Island Ferry service resumed within 72 hours of the storm thanks to over 100 DOT staff who worked throughout the storm to protect boats and facilities.

Over the course of the recovery, DOT replaced over 3,800

traffic signals and over 400 street lights and removed 156,949 cubic yards of debris. With assistance from Army Corps of Engineers and DEP, DOT reopened all City-managed tunnels, with some 15 million gallons of water pumped from the Battery Park Underpass alone.

Although major bridges reopened as soon as winds dissipated and portions of the transportation network not directly flooded experienced little damage, the subway and over 500 miles of roads suffered significant damage. The subway system remained out of service in the days after the storm, even as crews worked around the clock to restore service. This led to substantial gridlock on roads and bridges into Manhattan as people tried to return to work by car. The commuting challenges led officials to implement temporary measures to manage travel and congestion.

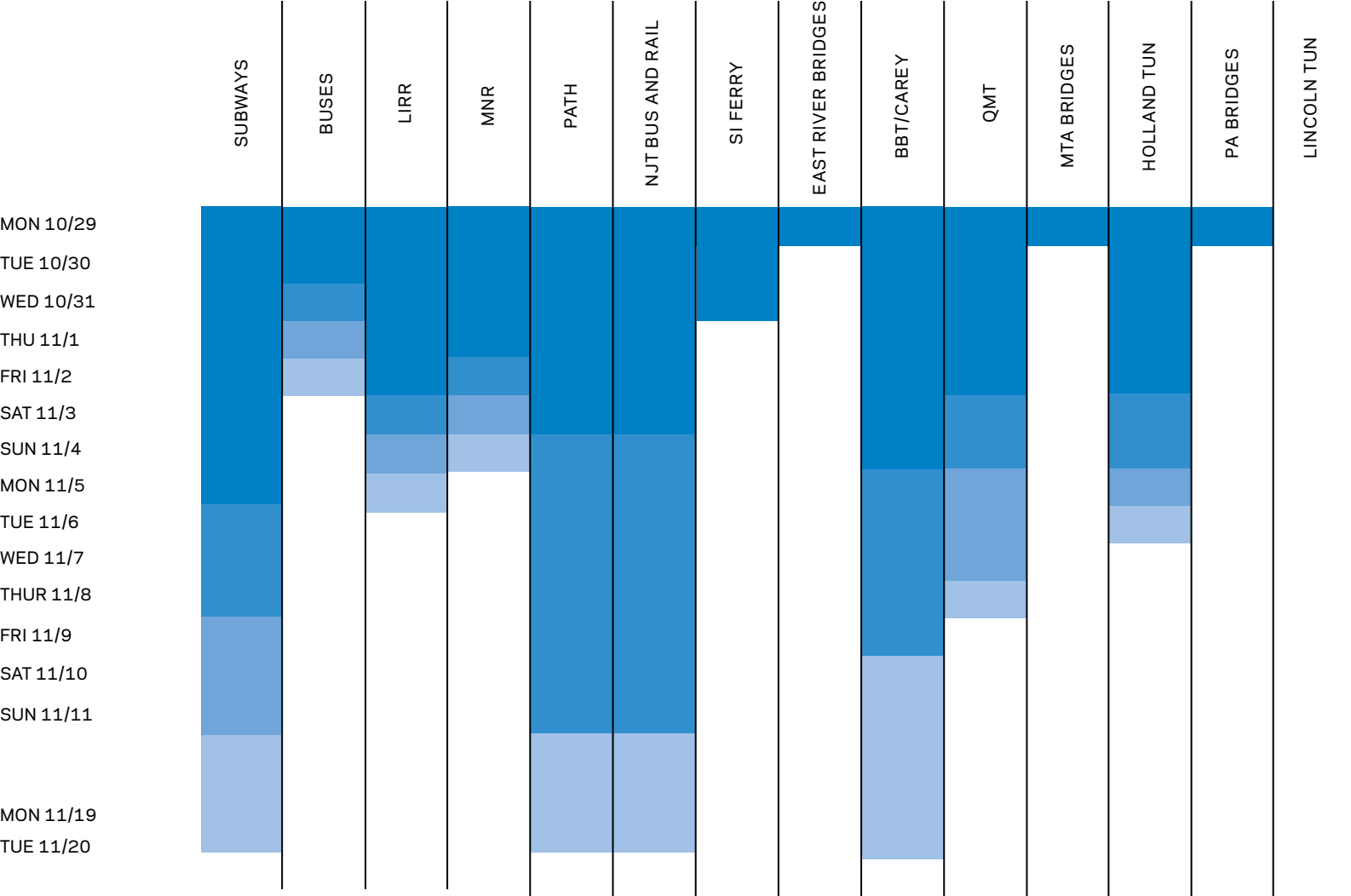
These measures included restrictions on single-occupant vehicles using bridges and tunnels across the Hudson and East Rivers, increased East River ferry service, and the successful “bus bridges” —an above-ground replacement for the subways that sent hundreds of buses back and forth on the bridges between Brooklyn and Manhattan. These measures enabled over 226,000 commuters to cross the East River—almost triple the number able to cross before they were in place.

One week after Sandy struck, many subway lines had been fully or partially restored, but some elements of the system remained closed much longer, with repairs projected to take months and even years.

Overall, Sandy caused over \$19 billion in damage in New York City, including \$800 million to infrastructure managed by DOT. Over \$700 million in damages to streets, signals, bridges, and facilities, including the DOT’s headquarters in Lower Manhattan, and over \$30 million in damage to the Staten Island Ferry and its facilities.

NYCDOT bridge engineers inspected, cleared and reopened the four East River bridges by 10 a.m. the day after Hurricane Sandy.

TRANSPORTATION OUTAGES AFTER THE STORM: BRIDGES PROVED THE REGIONS MOST RESILIENT





DOT'S ROLE IN MAYOR BLOOMBERG'S PLAN FOR A STRONGER AND MORE RESILIENT NEW YORK



DOT trucks removing debris in the Rockaways

1. Integrate climate resiliency features into future capital projects:

Using storm water management to increase resiliency, where appropriate tools implemented will include bioswales, raising street grades, and bulkheads.

2. Elevate traffic signals and provide backup electrical power:

Over the next three years, controllers will be raised at approximately 500 vulnerable intersections. In addition, power inverters will be installed in 500 NYPD vehicles to provide backup power should grid power be lost.

3. Protect NYCDOT tunnels in Lower Manhattan from flooding:

Flood protection measure such as installing floodgates and raising tunnel entrances and ventilation structures for the Battery Park and the West Street Underpasses will be considered for implementation.

4. Install watertight barriers to protect movable bridge machinery:

NYCDOT will install watertight barriers to protect the bridges' mechanical equipment from flood damage and to ensure that the 25 of the City's bridges function properly.

5. Protect Staten Island Ferry and private ferry terminals from climate change-related threats:

Using Federal Transit Administration Emergency Relief funds NYCDOT and NYCEDC will construct improvements to floating infrastructure, loading gangways, pilings and piers at Whitehall and Saint George Ferry terminals and other ferry landings. In addition, waterproofing and relocating certain equipment will be initiated.

6. Plan for temporary transit services in the event of subway system suspensions:

NYCDOT working with transportation partners will develop and enforce temporary transportation services such a bus bridges, bus lanes and ferry service based on identifying potential threats. Increased access to LIRR and Metro-North will be investigated.

7. Identify critical transportation network elements and improve transportation responses to major events through regular resiliency planning exercises:

NYCDOT working with transportation agencies will identify the services and elements that need to be available during different events. Identifying crucial elements allows agencies to prioritize investment and improve operational responses.

8. Develop standard plans for implementing High-Occupancy Vehicle (HOV) requirements:

In order to address potential gridlock following both manmade and natural events when the subway system is down, NYCDOT, NYPD, NYC OEM are working together to formalize any exemptions to HOV requirements, including under which conditions the requirements would be implemented

9. Plan for and install new pedestrian and bicycle facilities to improve connectivity to key transportation hubs:

After Hurricane Sandy, NYC DOT removed 156,949 cubic yards of debris.



Bus transporting passengers to the Staten Island Ferry after the storm

NYCDOT and NYPD will deploy temporary pedestrian and bike capacity during an emergency situation and will procure and store the materials needed. NYCDOT will work with CitiBike to explore expansion into areas that are vulnerable to weather related transportation interruptions.

10. Construct new ferry landings to support private ferry service:
NYCEDC will work to expand the network of interim ferry landings and will work with NYCDOT to deploy four new permanent ferry landings which will be designed to be mobile so in an extreme situation they can be relocated to provide transit service where needed.

11. Deploy the Staten Island Ferry’s Austen Class vessels on the East River and during transportation disruptions:
NYCDOT will develop operational plans for different scenarios in order to supplement East River Ferry service, the Austen class vessels will be used due to their large capacity.

SIGNALS AND STREET LIGHTS REPAIRED POST-SANDY		
	TRAFFIC SIGNALS FIXED	STREET LIGHTS FIXED
STATEN ISLAND	38	90
BROOKLYN	1,645	205
QUEENS	1,339	123
BRONX	77	—
MANHATTAN	727	—
CITYWIDE	3826	418

12. Expand the city’s Select Bus Service network and bus priority on arterial highways:
Over the next five years, NYCDOT will work with the MTA to implement four additional bus routes. An additional 12 routes will be launched and include 15 miles of bus priority projects on limited access highways.

Chapter 16

Restoring Mobility after the Storm

On a normal day, the subway carries about 80 percent of the people crossing the East River into Manhattan. Following Sandy, however, with subway service across the river entirely shut down for a number of days, many people tried to commute by car. As a result, gridlock took over many parts of the city including the East River crossings and major

highways and through routes. During, this period, average highway speeds dropped by as much as 71 percent relative to speeds on normal weekdays. It quickly became clear that the transportation network simply was not designed to handle the spike in drivers attempting to enter the central business district south of 60th Street.



Bus Bridge replaces “R” train between Brooklyn and Manhattan

In the days following Hurricane Sandy, transportation and power outages affected 8.5 million public transit riders, 4.2 million drivers, and 1 million air passengers.

BUS BRIDGES

In the days following Hurricane Sandy, transportation and power outages affected 8.5 million public transit riders, 4.2 million drivers, and 1 million air passengers.

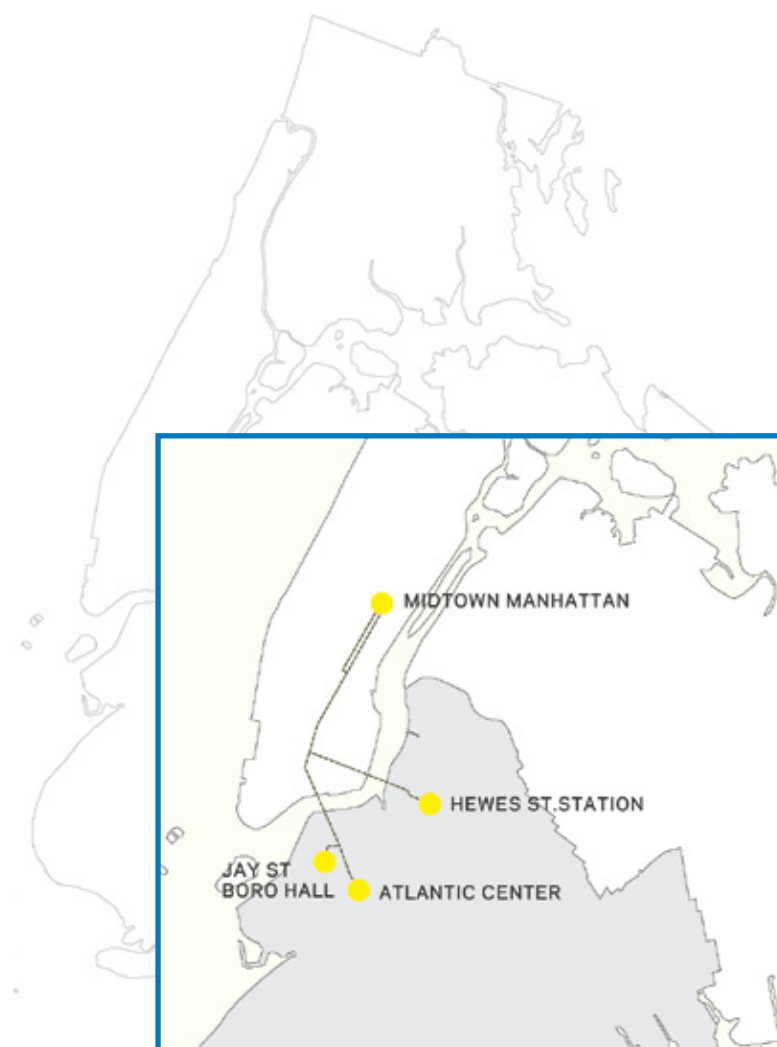
In response, the NYCDOT worked with the Metropolitan Transportation Authority (MTA) and NYPD to institute a series of measures to limit the number of cars coming into Manhattan. First, cars entering Manhattan's central business district were required to have three or more occupants, including those crossing the East River Bridges. Second, the NYPD, NYCDOT, implemented three new temporary, high-capacity, point-to-point bus routes (which quickly became known as "bus bridges"), Bus bridges connected Downtown Brooklyn and Williamsburg with Midtown Manhattan, using 300 buses that the MTA diverted from other routes. As part of this, the lower level of the Manhattan Bridge was turned into a bus only route. Third, the East River Ferry service pattern was modified to increase capacity and provide faster service along routes with the highest demand, taking advantage of the

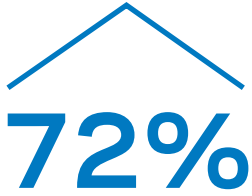
infrastructure already in place and the vessels on hand.

While no bus service can match the capacity of multiple subway trunk lines, the post-Sandy bus bridges served much of the demand. The morning of Friday November 2nd, 74,000 people crossed the Manhattan Bridge by bus, foot, bike and private vehicle—over three times the 22,000 figure on Wednesday October 31st, when neither the bus bridge nor HOV3+ rules were in effect. On a typical weekday morning, the Manhattan Bridge serves 87,000 Manhattan-bound commuters, 87% of whom are subway passengers. The combination of the bus bridge and HOV3+ rules, in conjunction with increased pedestrian and bike traffic, boosted the Manhattan Bridge's non-subway capacity by over 670%.

These measures accomplished their desired goal, moving over 226,000 commuters across the East River—almost triple the number able to cross before these measures were in place. The bus bridge is a template in case of subway outages in the future.

TEMPORARY BUS BRIDGES AFTER THE STORM




 A graphic featuring a blue outline of a house roof above the large blue text "72%".

72%

hours after the storm,
Staten Island Ferry
service resumed



Flooding at South Ferry subway station after the storm

NEW AND EXPANDED FERRY SERVICE

Ferries have played crucial roles in emergencies, climate events and times of crisis in New York City. In a waterfront city, ferries can be quickly deployed to evacuate people and can provide redundant transportation service when subways aren't functioning and bridges and tunnels are closed. The importance of ferries was reinforced after Sandy.

NYCDOT operates the Staten Island Ferry, a crucial link between Staten Island and Manhattan. Thanks to the hard work of NYCDOT staff during the storm service resumed just 72 hours after the

storm despite damage to the Whitehall and St George ferry terminals. After the return of service on 11/1, ridership on the East River Ferry surged to 2.5 times the level of a typical weekday morning.

Other ferry services are managed by the city's Economic Development Corporation, but DOT plays an important role in siting ferry docks and improving access to the service. EDC and DOT implemented temporary ferries to provide transportation services for areas hardest hit by the storm, including services to Great Kills and the Rockaways.

Great Kills Ferry

One of the services was a temporary ferry from Great Kills, Staten Island to Manhattan. It launched on November 25th 2013 using Federal Emergency Management Agency funds and ran for eight weeks.

While the temporary service offered a new transportation option for the weeks immediately following the storm, ridership never reached anticipated levels, and waned significantly in its final weeks. On average, only 114 riders used the service in each direction each day, or roughly 19 passengers per boat.

Rockaway Ferry

Helping to assist thousands impacted by Hurricane Sandy in the Rockaways, Mayor Bloomberg, New York City Economic Development Corporation and Seastreak provided a temporary ferry service between the Rockaways and Manhattan starting on November 12, 2013. Originally slated to run through July, the service was extended through Labor Day and then again until January 2014. The service provided alternative transportation due to the closure of the A train to the Rockaways and R train tunnel between Manhattan and Brooklyn. Both lines experience damage after the storm.

On Friday November 2, the number of people riding over the East River Bridges by bike more than doubled from 3,500 to 7,800.

Protecting the fleet

The heroic service of DOT's Ferry Division during Hurricane Sandy prevented damage to six ferryboats during the storm. As winds reached over 80mph and a record breaking tidal surge took over New York harbor, 90 ship-board crew and 60 additional staff on the ferry docks stopped the boats from striking the ferry slips and each other. The ferryboat crews adjusted mooring lines as the tide rose. Captains worked boat engines the entire night making sure the ferries stayed in position between the piers and did not come in contact with the piers or the associated pilings. At one point, an Austen class boat's stern line came lose, and the boat made contact with the Senator John J. Marchi, which was moored nearby. DOT Ferry staff placed make-shift fenders in between the two vessels

to minimize the potential for damage as the vessels came together. As the storm progressed and the storm surge escalated, water engulfed both the Whitehall and St George Ferry Terminals. DOT staff had to move to the upper floors to stay safe.

The professionalism and dedication and long hours put in by DOT's captains, crews and shore staff ensured that almost \$200 million worth of custom-built ferryboats were kept safe and secure during the hurricane. After the storm, ferry staff worked around the clock to repair electrical systems and remove debris to the St. George and Whitehall terminals*. Despite \$30 million in damage to ferry terminals, the Staten Island Ferry was up and running 72 hours after the storm.



Commissioner Sadik-Khan on first Staten Island Ferry to run 72 hours post-Sandy

Bicycles

The city's substantial improvement to the bike network provided much needed transportation capacity in the days after the storm. On a typical weekday, 3,500 people enter Manhattan by bike using one of the

four East River Bridges. On Friday November 2nd, the total swelled to 7,800. Unfortunately, the storm did damage CitiBike equipment that was in storage in the Brooklyn Navy Yard prior to the program's start.



Bicycling rates swelled after the storm

NYCDOT used Twitter, The Daily Pothole, and Facebook to communicate with New Yorkers after the storm.

USING SOCIAL MEDIA IN EMERGENCY SITUATIONS

In the days after Superstorm Sandy, NYCDOT used social media to communicate with the public about the recovery.

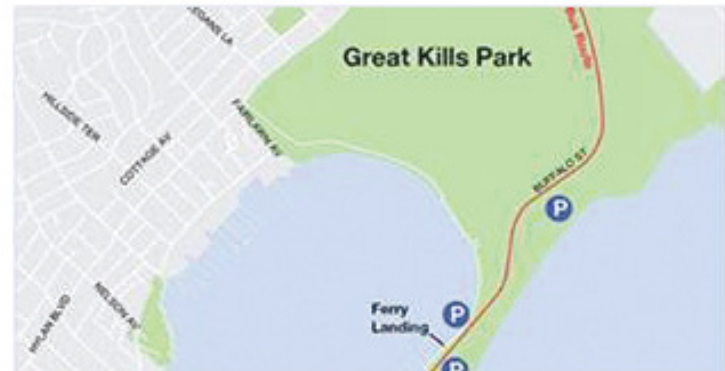
The Daily Pothole tumblr, which documents NYCDOT street maintenance crews, was temporarily transformed into a Sandy recovery page, documenting clean-up efforts in affected areas. DOT's roadway repair, street lighting, and emergency response crews focused on clearing the streets of debris and fixing traffic signals and stop signs to help communities get moving again.

The number of Daily Pothole subscribers increased by 50% after the storm, to nearly 15,000, as New Yorkers found the frequent updates to contain useful information about the status of recovery efforts. NYCDOT's twitter and Facebook following also increased after the storm.

The post Sandy experience with the Daily Pothole shows how government and its citizenry can benefit from flexible communication strategies like tumblr during emergencies.



Temporary commuter ferry service from Great Kills begins Monday, November 26! Learn more and check the schedule: <http://www.nyc.gov/html/dot/html/ferrybus/greatkills.shtml>



NYC DOT - Ferries - Great Kills Ferry, Staten Island
www.nyc.gov

Mayor Michael R. Bloomberg and Commissioner Janette Sadik-Khan have announced a request for bids for a new, temporary ferry service from Great Kills, Staten Island to Manhattan. The new service is designed to bring immediate relief to, and ease the commutes of, neighborhoods that

NYCDOT Posted information about the Great Kills Ferry on Facebook

The Daily POT-HOLE
SANDY RECOVERY





Looking Ahead

For years environmental experts have been projecting the possible catastrophic effects of increasingly volatile and extreme weather conditions on New York, but it wasn't until Hurricane Sandy hit that the region experienced the magnitude of these impacts first hand.

The storm generated a sense of urgency around long-term resiliency and sustainability. The city pledged to redouble environmental efforts outlined in PlaNYC to reduce greenhouse gases that contribute to climate change. It also set in motion plans, procedures, and projects to adapt infrastructure and improve government response to future events.

In the immediate aftermath of the storm, NYCDOT worked closely with other agencies to restore basic operations and assess the extent of the damage to the City's transportation assets. The city's use of bus bridges, for example, proved that transit and roadway networks can be adapted quickly to emergency situations. The experience gave transportation officials a template for future events and helped them refine a list of objectives to keep people moving in emergency situations. These included immediately restricting single-occupant traffic as soon as long-term subway outages are confirmed, creating temporary bus routes to replace inoperative links of the transit network and adding capacity on existing bus routes with disaster-induced demand spikes, and exploiting redundant capacity in modes like ferries to scale up temporary service in disconnected areas. The spike in bicycle riding after the storm also prompted NYCDOT to evaluate additional bike facilities over the East River Bridges.

As vehicular tunnels and subway lines returned to service

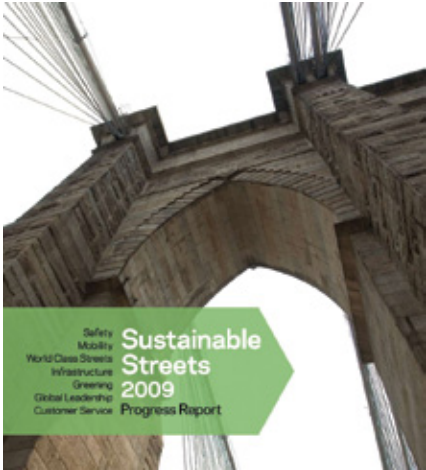
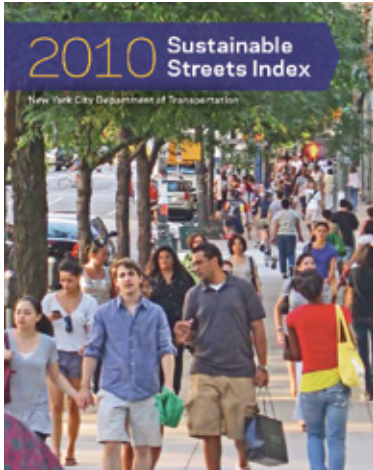
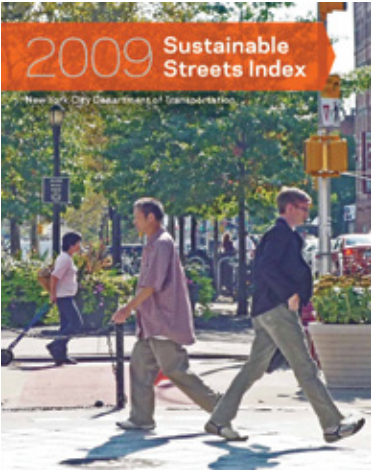
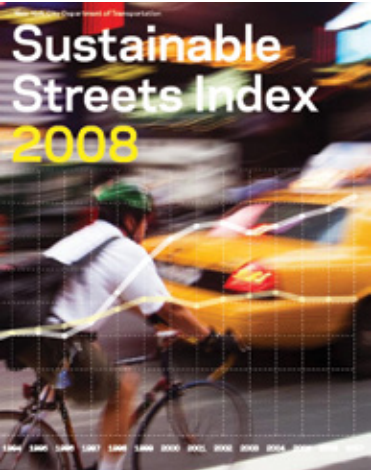
in the weeks following the storm, New York City's transportation network started to return to normal operations. However, many streets in the most vulnerable coastal areas remained severely damaged by the force of the storm. Creeping corrosion necessitated repairs long after the actual floodwaters had subsided. In many locations, merely restoring agency assets (roadways, bridges, ferries, traffic controls) to its pre-Sandy condition is not enough. The transportation system needs to be made more resilient in the face of storm surge, more intense precipitation, warmer temperatures, and stronger winds.

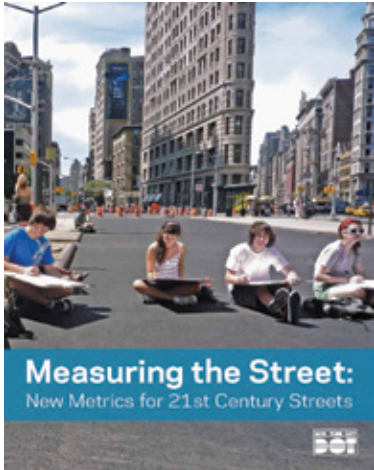
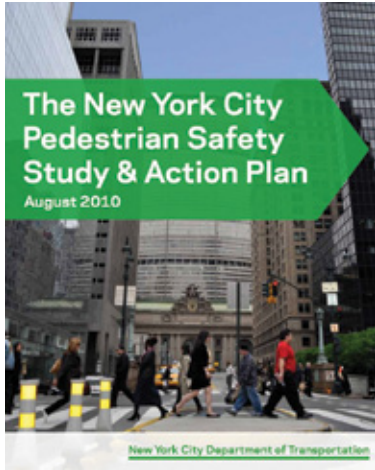
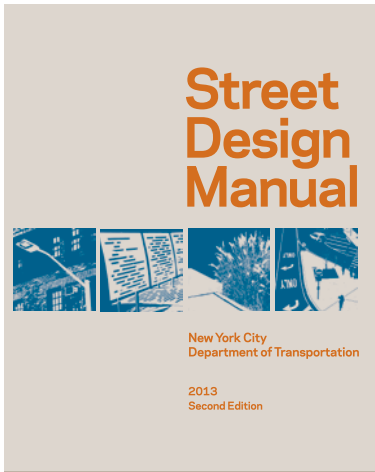
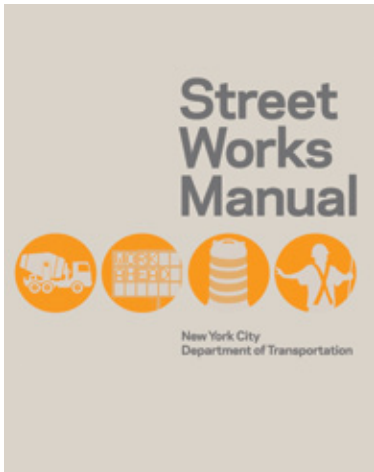
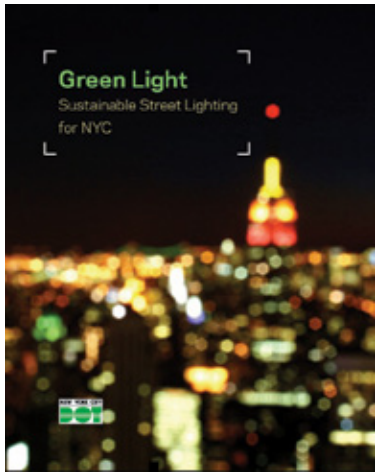
Through the Mayor's Special Initiative for Rebuilding and Resilience (SIRR), NYCDOT and its partner agencies identified innovative ways to rebuild smarter and stronger. *A Stronger, More Resilient New York* outlined 18 transportation initiatives central to the City's resiliency goals. In many areas, the challenge is not merely the protection of a physical asset, but ensuring that transportation network has the redundancy and flexibility to handle unforeseen outages. Continued expansion of bus rapid transit, for instance, not only benefits regular commuters, it also broadens the transit network in ways that can better serve demands when a subway line is out of service. The report also called for larger transit expansion projects for added redundancy, including Amtrak's Gateway project into Penn Station.

All of these initiatives, most especially coastal protection, will require ongoing collaboration among city and state agencies. And they will require sustained, long-term investment during a time of uncertain and shrinking funding for transportation infrastructure.

NYCDOT Publications

Since 2007, NYCDOT has published more material stating agency goals, describing programs and documenting transportation trends and project outcomes than ever before. These are some of DOT's major publications. They and others are available at nyc.gov/dot.







Acknowledgments

The remarkable accomplishments of the New York City Department of Transportation from 2007 to 2013 were top-to-bottom efforts, involving every division of the Department and thousands of individuals. Thank you to all the men and women of the NYC DOT.

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