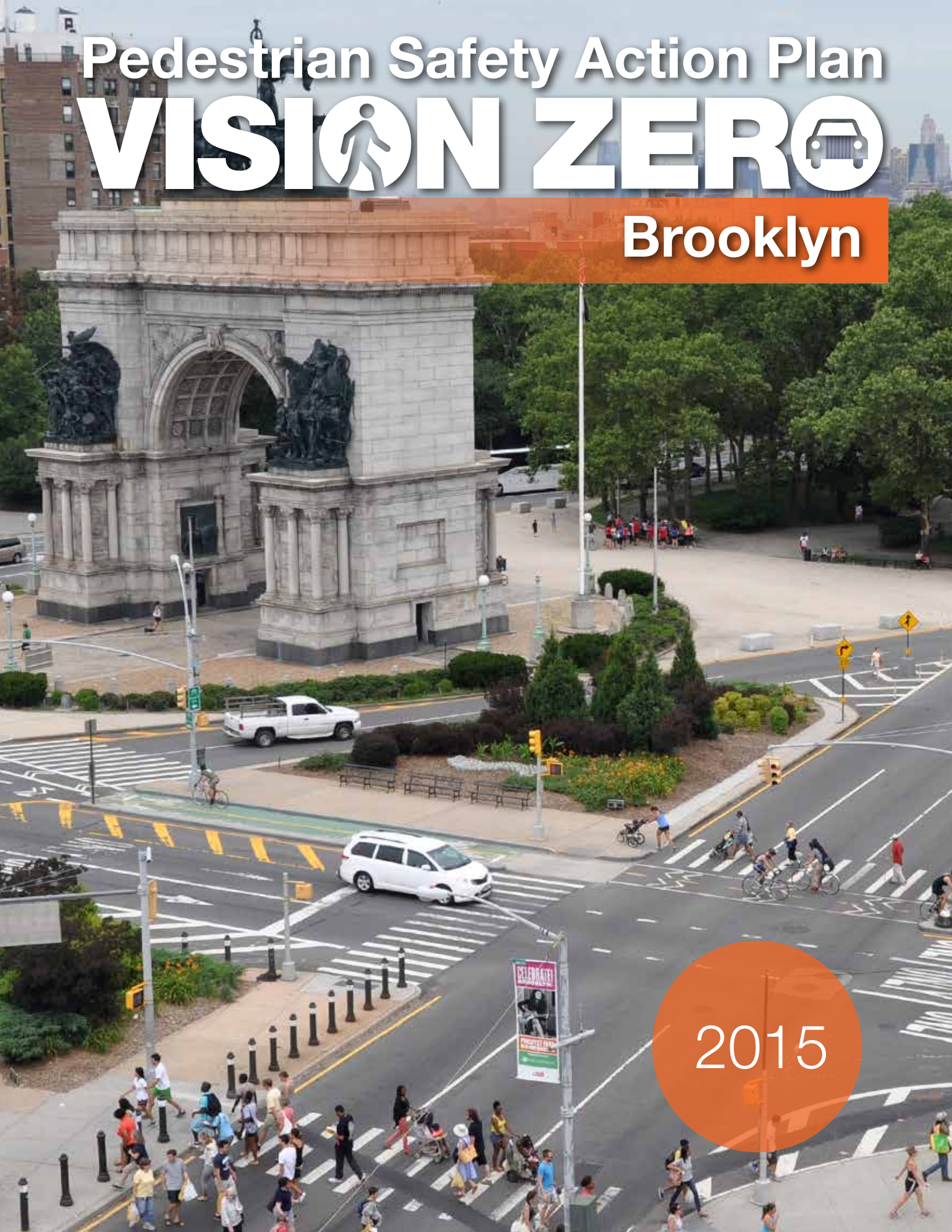


# Pedestrian Safety Action Plan

# VISION ZERO

Brooklyn



2015





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# Letter from the Mayor



Dear Friends,

Every life in New York City is precious. It is our responsibility, as residents, workers, and visitors of this great city, to save every life we can.

This administration made Vision Zero, and the elimination of traffic fatalities, a priority from day one. The fundamental message of Vision Zero is that death and injury on city streets is not acceptable, and that we will no longer regard severe crashes as inevitable. This is reflected in the Vision Zero Action Plan that set out directives for city agencies, including the New York City Department of Transportation, the New York Police Department, and the Taxi and Limousine Commission.

Traffic crashes can claim the lives of anyone in New York City. They kill people who drive and those who bike, but overwhelmingly, the deadly toll is highest for pedestrians. This Plan acknowledges this injustice toward pedestrians and the synergies that can be realized by improving pedestrian safety for overall traffic safety, well-being, and urban livability.

In close partnership with our community and advocacy groups and our families and friends of lost loved ones, we are dedicating ourselves to ending this epidemic. NYCDOT and NYPD representatives were out in our communities this past summer listening to us, preparing us for the changes that are taking place, and explaining how to be more conscious—and conscientious—street users. Meanwhile, we have been working to improve our collection and understanding of the data behind traffic fatalities, where the ‘hot spots’ are, and what can be done to erase them from the map. The Pedestrian Safety Action Plans help us do just that.

Our recent success in reducing the citywide speed limit to 25 MPH, redesigning intersections and corridors and increasing enforcement of the most dangerous driving behaviors are just some of the ways we are making our city’s streets safer. The Pedestrian Safety Action Plans are the next step in achieving Vision Zero in your community.

New Yorkers deserve to feel safe on their streets. Thank you for your input into this process, together we will save lives.

A handwritten signature in black ink that reads "Bill de Blasio". The signature is fluid and cursive, with the first and last names being more prominent.

Bill de Blasio  
Mayor





**SPEED  
LIMIT  
25**

**Atlantic Ave  
SLOW ZONE**

**P** Sunday  
Thursday  
Saturday  
Winter: Jan  
→  
**2** hour  
metered  
parking  
Rm - 7pm  
Except Sunday  
←



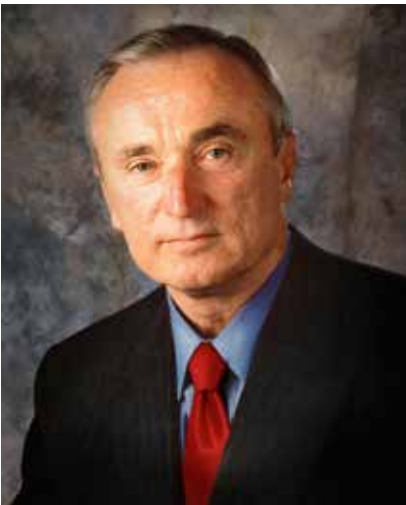


# Letter from the Commissioners



Dear fellow New Yorkers,

We are proud to bring you the Vision Zero Borough Pedestrian Safety Action Plans. These documents represent the highly detailed combination of DOT and NYPD crash data and analysis, over 10,000 online comments via the Vision Zero Public Input Map, and nine public pedestrian safety workshops across the five boroughs. These borough-specific plans outline our current progress and help define the next phase of Vision Zero.



The first year of Vision Zero in New York City proved successful; after two years of increases, the city experienced the lowest number of pedestrian fatalities since record keeping began in 1910. In 2014, the city lowered its speed limit to 25 MPH, completed over 50 major safety engineering projects, and expanded traffic enforcement dramatically, with speeding summons increasing 42% and failure-to-yield summons increasing 126%. DOT and NYPD partnered to form the Vision Zero Street Team, launching a series of two-phase, two-week campaigns focused on pedestrian safety. The first phase of the campaigns included distributing traffic safety literature to the public at collision-prone locations to promote traffic safety. These weeklong efforts to educate the public were then followed by a week of focused, safety-related enforcement to address persistent violations.

With the Borough Pedestrian Safety Action Plans, we will build on this success and continue to improve the way we monitor, design, and govern our streets. The Borough Priority Maps will serve as a guide for our agencies to systematically improve streets with the highest rates of pedestrian fatality and severe injury. By coordinating our planning, engineering, education, and enforcement efforts in these areas, DOT and NYPD can make significant progress toward the vision of eliminating pedestrian fatalities across the five boroughs.

Over the past 30 years, we have made tremendous progress in traffic safety. We have seen large decreases in the number of fatal crashes, including fatal pedestrian crashes. Motor vehicles, however, continue to seriously injure or kill a New Yorker about every two hours. Each of these tragedies compels us to come together and deliver a safer future for our city. There is plenty of work still ahead of us.

Polly Trottenberg  
DOT Commissioner

William Bratton  
NYPD Commissioner



# Executive Summary

## Brooklyn Borough Profile

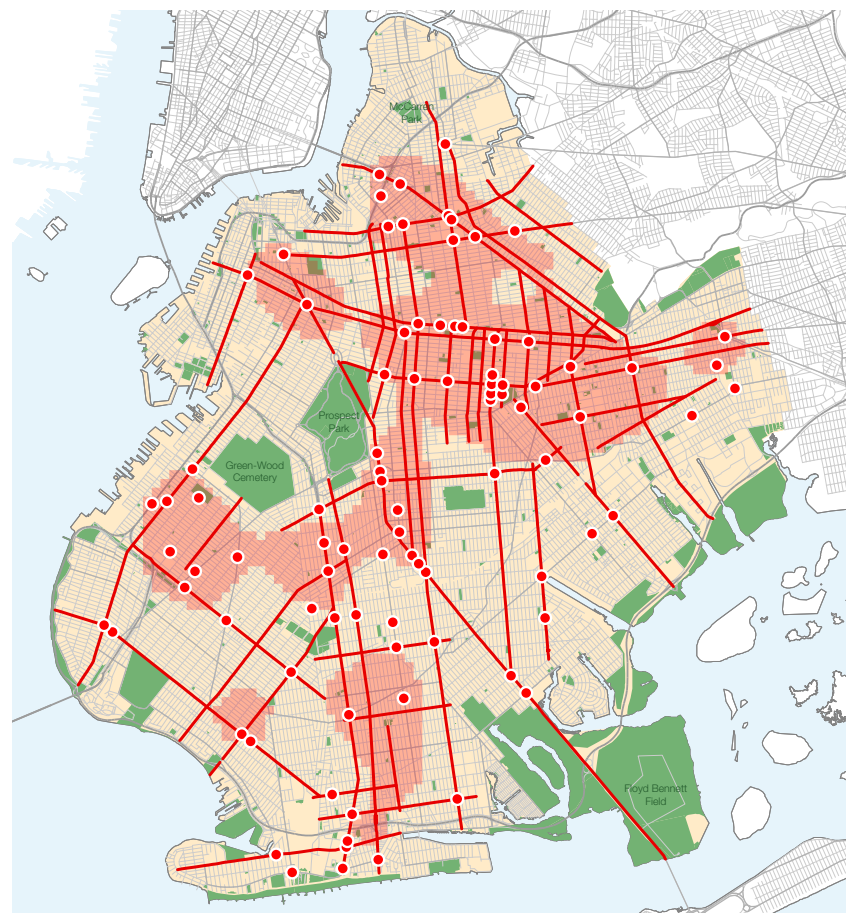
### Findings

- Pedestrian fatalities in Brooklyn have fallen by 49% in the past three decades
- An average of 46 pedestrians are killed in Brooklyn each year, the highest of any borough
- Yet, at 1.79 fatalities per 100,000 residents, Brooklyn has the second-lowest pedestrian fatality rate of the five boroughs
- **Where:** Pedestrian fatalities occur on local streets at a higher rate (36% vs 30%) in Brooklyn than the rest of NYC, particularly at local street intersections (23% vs 16%)
- **When:** 80% of Brooklyn pedestrian fatalities occur during off-peak (non-rush hour) periods
- **Who:** Seniors are 12% of Brooklyn's population but account for 36% of fatalities
- **What:** 73% of Brooklyn pedestrian fatalities involve a passenger vehicle
- **How:** 25% of Brooklyn pedestrian fatalities involve a hit-and-run crash

## Priority Corridors, Intersections, and Areas

	Share of Borough	Borough	% of Borough	Share of Ped KSI*	Total Ped KSI	% of Total Ped KSI	% of Total Ped Fatalities
Priority Corridors	49 corridors (142 miles)	1,510 miles	9%	1,113	2,220	50%	46%
Priority Intersections	91 intersections	10,725 intersections	1%	334	2,220	15%	11%
Priority Areas	17.7 sq miles	72 sq miles	25%	1,110	2,220	50%	40%
Combined Total	—	—	—	1,599	—	72%	61%

\*Ped KSI: Pedestrians Killed or Severely Injured



● Priority Intersections

— Priority Corridors

■ Priority Areas

Brooklyn Priority Map



# Community Dialogue and Input

- 4,764 Brooklyn pedestrian safety issues were shared and mapped digitally
- Most issues cited on the map involve either speeding (22%) or failure to yield (21%)
- 74% of workshop attendees viewed wide arterial streets as the most important areas for pedestrian safety improvements
- 45% of issues shared fall outside of the Priority Corridors, Intersections, and Areas

## Action Plan

### Engineering and Planning

- Implement at least 50 Vision Zero safety engineering improvements annually at Priority Corridors, Intersections, and Areas citywide, informed by community input at project locations
- Significantly expand exclusive pedestrian crossing time on all Brooklyn Priority Corridors by the end of 2017
- Add exclusive pedestrian crossing time to all feasible Brooklyn Priority Intersections by the end of 2017
- Modify signal timing to reduce off-peak speeding on all feasible Brooklyn Priority Corridors by the end of 2017
- Install expanded speed limit signage on all Brooklyn Priority Corridors in 2015
- Drive community input and engagement at Brooklyn Priority Corridors, Intersections, and Areas
- Install additional lighting under elevated trains and around other key transit stops
- Install 60 new speed bumps in Brooklyn annually
- Develop additional Neighborhood Slow Zones in Brooklyn Priority Areas
- Coordinate with MTA to ensure bus operations contribute to a safe pedestrian environment
- Expand a bicycle network in Brooklyn that improves safety for all road users
- Proactively design for pedestrian safety in high-growth areas in Brooklyn, including locations in the *Housing New York* plan

### Enforcement

- Implement the majority of speed cameras at Priority Corridors, Intersections, and Areas
- Focus enforcement and deploy dedicated resources to Brooklyn NYPD precincts that overlap substantially with Priority Areas
- Prioritize targeted enforcement at Brooklyn Priority Corridors, Intersections, and Areas annually

### Education and Awareness Campaigns

- Target child and senior safety education at Brooklyn Priority Corridors and Priority Areas
- Launch multilingual public information campaigns in Brooklyn Priority Areas
- Target Street Team outreach at Brooklyn Priority Corridors, Intersections, and Areas



# Why a Pedestrian Plan?

Pedestrian fatalities have grown as a share of all traffic fatalities

**Between 2007 and 2013 pedestrian fatalities grew from 51% of all traffic fatalities to 58%**

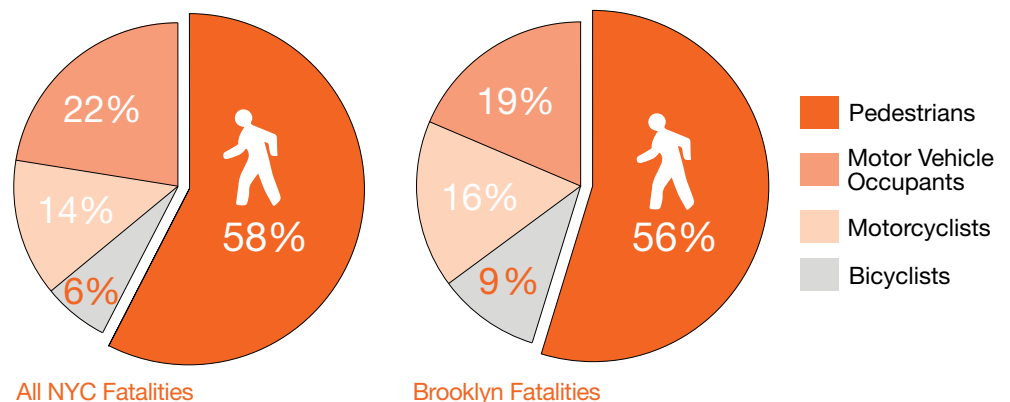
Vision Zero seeks to eliminate all deaths from traffic crashes regardless of whether on foot, bicycle, or inside a motor vehicle. This Borough Plan is one of 63 Vision Zero initiatives advancing that goal for all street users. Despite aggressive pedestrian-oriented street re-engineering between 2007 and 2013, citywide pedestrian fatalities have not declined. In fact, they increased in 2012 and 2013 while fatalities to other street users fell. Comparing the periods of 2005-2007 to 2011-2013, pedestrian fatalities actually rose by 2% while fatalities to all other users fell by 24%. At the same time, the pedestrian share of overall fatalities rose from 51% to 58%. Nationwide, pedestrians make up just 14% of all traffic fatalities.<sup>1</sup> In Brooklyn, pedestrians are 56% of all fatalities.

## The challenge of an aging city



Additionally, the baby-boom generation has begun to hit retirement age and New York City will soon experience a rapid growth of its senior citizen population. The city's seniors walk much more than those elsewhere in the United States, and their pedestrian fatality rate is four times that of younger New Yorkers. Without a focused strategy on pedestrian safety to address this need, New York City could potentially see an alarming rise in pedestrian fatalities.

Fatalities by Mode: Brooklyn Compared to NYC, 2011-2013 Average, Rounded



	Pedestrian	Bicyclists	Motorcyclists	Motor Vehicle Occupants	Total
All NYC	157	17	37	61	272
Brooklyn	46	8	14	15	83

**Most  
pedestrian and  
cyclist fatalities  
and severe  
injuries occur  
in the same  
areas of NYC**



**Since 2007,  
fatalities of  
vulnerable road  
users increased  
by 1%, while  
fatalities of  
motor vehicle  
occupants fell  
by 37%**



## Pedestrian focus improves safety for all users

Street design based around pedestrian safety is also proven to make travel safer for other street users, including bicyclists and motor vehicle occupants. Slower vehicle speeds, less chaotic, better organized traffic, and narrower vehicle lanes make streets safer (and easier to use) for cyclists. A pedestrian oriented project on Delancey Street in Manhattan contributed to a 20% reduction in injuries to cyclists. Similarly, projects and programs aimed at improving safety for pedestrians often improve motor vehicle safety as well. The pedestrian focused re-design of the Madison Square/Flatiron area contributed to a 46% reduction in injuries among motor vehicle occupants. Furthermore, there is significant overlap between the high-crash locations for pedestrian and cyclists. The areas of New York City that accounted for 71% of pedestrians killed or severely injured (KSI) also accounted for 66% of cyclist KSI. Safety interventions at these locations can address safety concerns for both groups of street users.

## A comprehensive strategy addressing all modes

New York City will need to go beyond the actions in this plan to address all traffic fatalities, particularly for vulnerable road users: the pedestrians, bicyclists, and motorcyclists that use the streets without the protection of a closed vehicle. These vulnerable road users account for the vast majority (78%) of New York City's traffic fatalities. Again, comparing 2005-2007 to 2011-2013, vulnerable road user fatalities increased by 1%, while fatalities of motor vehicles occupants fell by 37%. In other words, the entire decline in traffic fatalities between 2007 and 2013 came from reductions in fatalities of drivers and passengers inside motor vehicles.

For bicyclists, DOT will work with the New York City Department of Health and NYPD in 2015 to develop a comprehensive update to its 2006 Bicyclist Fatality and Serious Injuries study, highlighting current issues in cyclist safety in New York City and developing new recommendations. DOT is aggressively seeking to increase the amount of cycling in the city by expanding the bike network where it can generate the most ridership and expanding its Citi Bike bike sharing program. More cyclists using city streets has been shown to have a "safety in numbers" effect; while cycling in New York City has approximately quadrupled since 2000, serious injuries have remained low, representing a 75% decrease in the average risk of a serious injury. Also, DOT will release their first motorcyclist safety study in 2015, which will analyze New York City motorcycle crashes and will also put forward a safety action plan. Finally, New Yorkers with disabilities are also pedestrians. As DOT designs safer streets for all vulnerable users, the agency will continue to work with advocacy groups and members of the disabled community to ensure that the City continues to address the needs of New Yorkers with disabilities. A safer city is a more accessible City.



# About This Plan

**This strategic pedestrian safety plan for Brooklyn is one of five borough-level plans created to advance the goals laid out in the 2014 Vision Zero Action Plan**

Beginning with a borough wide community dialogue and input process, DOT and NYPD worked with community members to identify local pedestrian safety issues. By re-engineering these high-crash streets and intersections, employing strategic enforcement practices, and stepping up education efforts, DOT and NYPD can effectively change the way we perceive city streets and deter the most dangerous behaviors, such as speeding and failure to yield to pedestrians.

This Brooklyn Pedestrian Safety Action Plan is one of a set of five documents, each of which analyzes the unique conditions of one New York City borough and recommends actions to address the borough's specific challenges to pedestrian safety. This plan pinpoints the conditions and characteristics of Brooklyn's pedestrian fatalities and severe injuries; it also identifies corridors, intersections, and areas that disproportionately account for Brooklyn's pedestrian fatalities and severe injuries and strategically prioritizes them for safety interventions. Finally, the Brooklyn Pedestrian Safety Action Plan recommends a series of actions to alter the physical and behavioral conditions on Brooklyn's streets that lead to pedestrian fatality and injury.

## A Five Borough Approach



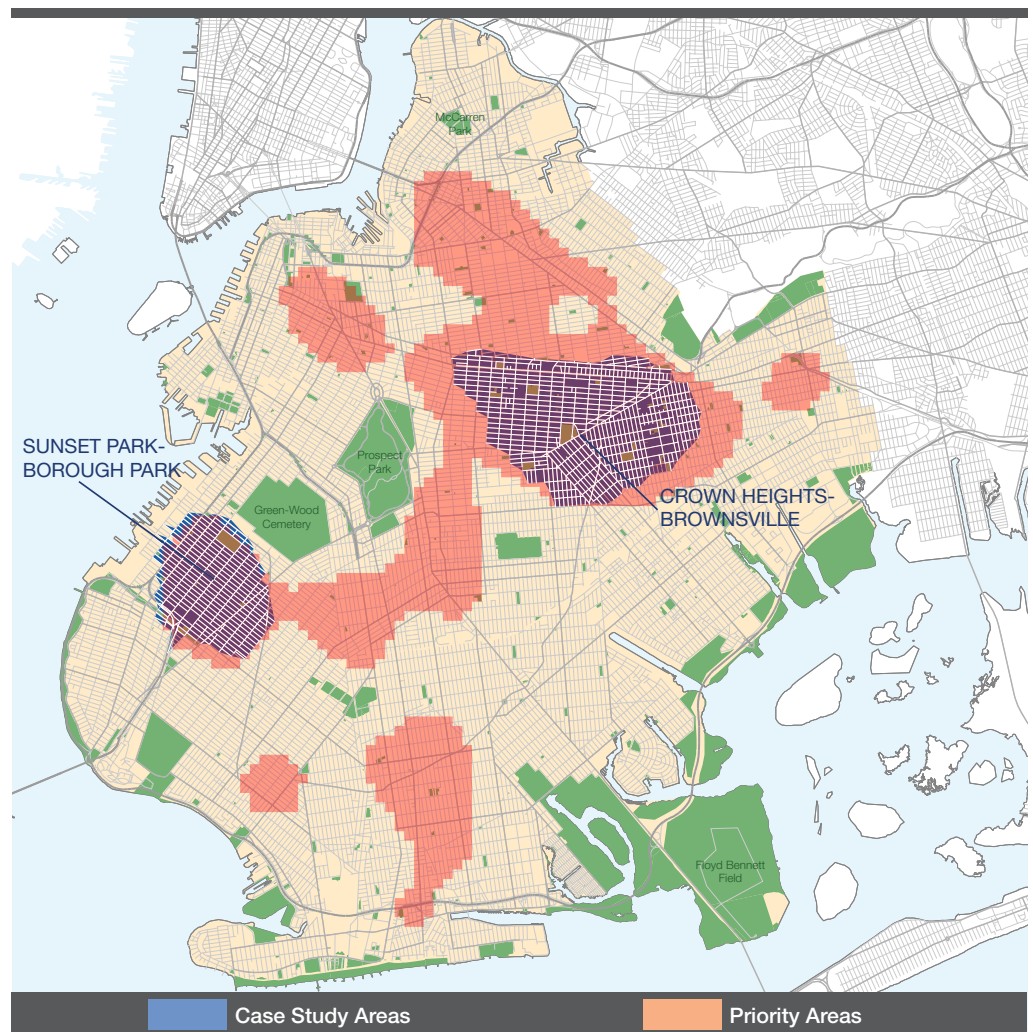
In each borough, heat maps were created to highlight locations with the highest density of pedestrian fatalities and severe injuries. These maps were then used to create borough Priority Maps. Both maps were built on borough crash data, rather than citywide data. Since each borough has a different overall number and density of pedestrian crashes, each borough map is drawn at a different scale. For example, the “red” we observe in the Staten Island maps represents far fewer crashes than the “red” in the Manhattan maps. DOT and NYPD are tasked with addressing road safety for all residents in all boroughs, so creating five separate action plans was the most practical way to develop a robust set of focused, effective actions for each borough.

# Case Studies

Three case studies have been selected to represent particular communities that are identified as pedestrian safety priority locations in Brooklyn. They enable a more localized look at data, issues, and recommendations that may be difficult to contextualize on a borough-wide level. These case studies will be visited in Section 2 and Section 3 of this plan. The locations (shown in the map below) are:

- Crown Heights-Brownsville
- Sunset Park-Borough Park

The case studies also explore location-specific comments received from community members via the Vision Zero Public Input Map and Pedestrian Safety Workshops.







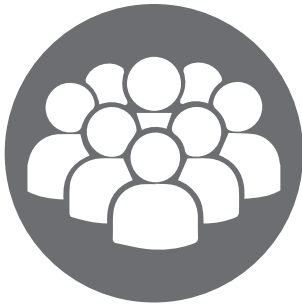
# Brooklyn Borough Profile



**Brooklyn is the most populous borough**



From Coney Island to Greenpoint, Red Hook to Flatbush, pedestrian life is essential to Brooklyn. Each day, Brooklyn's 2.6 million residents—or nearly one-third of the city's population—make many millions of walking trips to commute, visit friends and family, and shop within their neighborhoods.



**Brooklyn is the second densest borough**

Brooklyn was initially a cross-river, urban rival to Manhattan and was incorporated as an independent city in 1834. When it was consolidated into Greater New York in 1898, Brooklyn was a mature city, the third largest in the nation. This early build-out and high density (36,000 persons per square mile, second only to Manhattan) posed considerable challenges to 20th century highway building and thus it has relatively few miles of highway per person. Brooklyn has no cross-borough highways, as plans for the Cross-Brooklyn Expressway and the extension of the Prospect Expressway were never enacted. This, and the robust subway network, drives Brooklyn's high transit usage (61%, the highest of any New York City borough) but, along with the highly gridded street network, also puts more vehicles on pedestrian-heavy streets throughout the borough. As a result, much of the borough's automotive traffic takes place on the streets where people live and shop, and, accordingly, a greater share of the pedestrian fatalities and injuries in Brooklyn take place on local streets as compared to all of New York City.



**Brooklyn has the highest transit usage of all the boroughs**

Like Manhattan, Brooklyn was mainly developed when narrow, gridded streets were standard, sized to pedestrian traffic, horses, and streetcars rather than multiple lanes of automotive traffic. These grids create “normal” and small right angle intersections, which are conducive to pedestrian safety. However, many of Brooklyn's major arteries cross these grids at irregular angles, resulting in large intersections that pose challenges for safe and comfortable pedestrian travel. Many of these wider, higher-speed arterial streets, such as Flatbush Avenue, Atlantic Avenue, and Kings Highway, are the legacy of a network of rural roads built during the borough's earliest settlement. In a contemporary setting, arterial streets carry large volumes of both vehicles and pedestrians and account for well over half of all pedestrian fatalities and severe injuries throughout Brooklyn.

Brooklyn is a borough of great diversity; it has the city's second lowest median income but large and growing populations of wealth in its northern neighborhoods. Brooklyn also has the largest Black community in the city and very large immigrant communities in neighborhoods such as Sunset Park, Bensonhurst, Flatbush, Crown Heights, and Bushwick.





**On average,  
one pedestrian  
is killed or  
severely injured  
in Brooklyn  
every day**

**Brooklyn  
pedestrian  
fatalities have  
decreased by  
49% over the  
past 30 years**

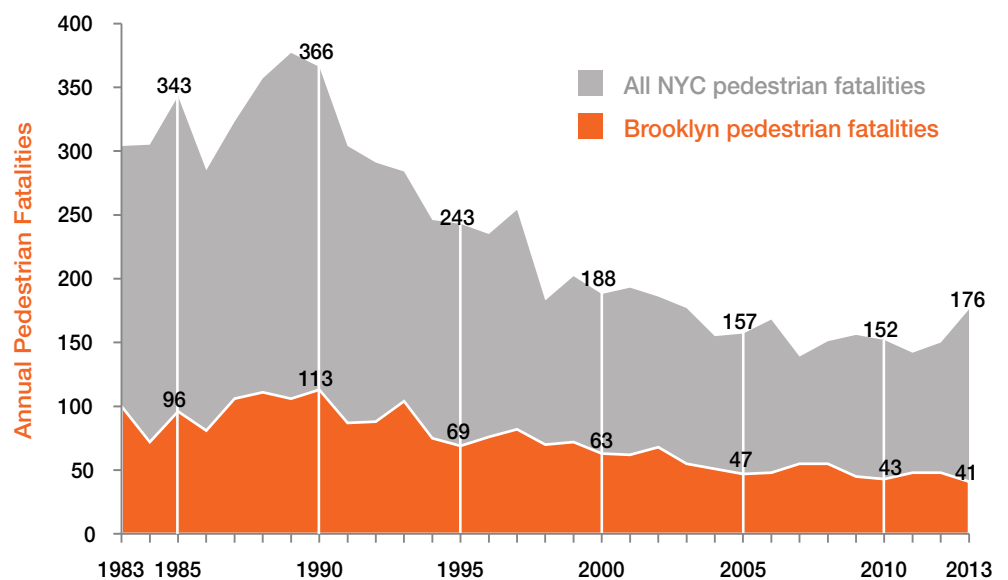
## Brooklyn Pedestrian Safety Findings

The Brooklyn Borough Profile combines demographic data with crash and fatality data to provide an overview and contextual narrative for Brooklyn. Demographic information was collected from the US Census Bureau. Crash and fatality data used throughout this report is based on 2011-2013 fatality data (NYPD/NYCDOT) and 2009-2013 Killed or Severely Injured (KSI) data (DMV/NYS DOT).<sup>2</sup> Estimates of pedestrian activity are based on transit ridership, which is generally proportional.

Overall, Brooklyn has the most pedestrian fatalities of any borough, averaging 46 per year. While the number of Brooklyn pedestrian fatalities has declined 49% over the past 30 years, pedestrians continue to constitute more than half of all the borough's traffic fatalities.<sup>3</sup> On average, one pedestrian is killed or severely injured in Brooklyn every day.

Although Brooklyn has the most fatalities of any borough, it is also the most populous of the five boroughs. Brooklyn accounts for 29% of the city's total fatalities, but also 31% of its total population. Thus, the rate of pedestrian fatalities per capita is slightly lower in Brooklyn than New York City as a whole (1.79 versus 1.88 fatalities per 100,000 residents).

Pedestrian Fatalities, 1983-2013



**Brooklyn's pedestrian fatality rate is slightly below the NYC average**

Pedestrian Fatalities, 2011-2013, Rounded

Borough	Average Annual Fatalities	Percent Pedestrian Fatalities	Pedestrian Fatality Rate/100,000
Bronx	27	54%	1.91
Brooklyn	46	56%	1.79
Manhattan	34	73%	2.10
Queens	43	54%	1.92
Staten Island	7	48%	1.41
All NYC	157	58%	1.88





**Arterials  
comprise 14%  
of Brooklyn's  
streets but  
60% of its  
pedestrian KSI  
crashes**

## Where?

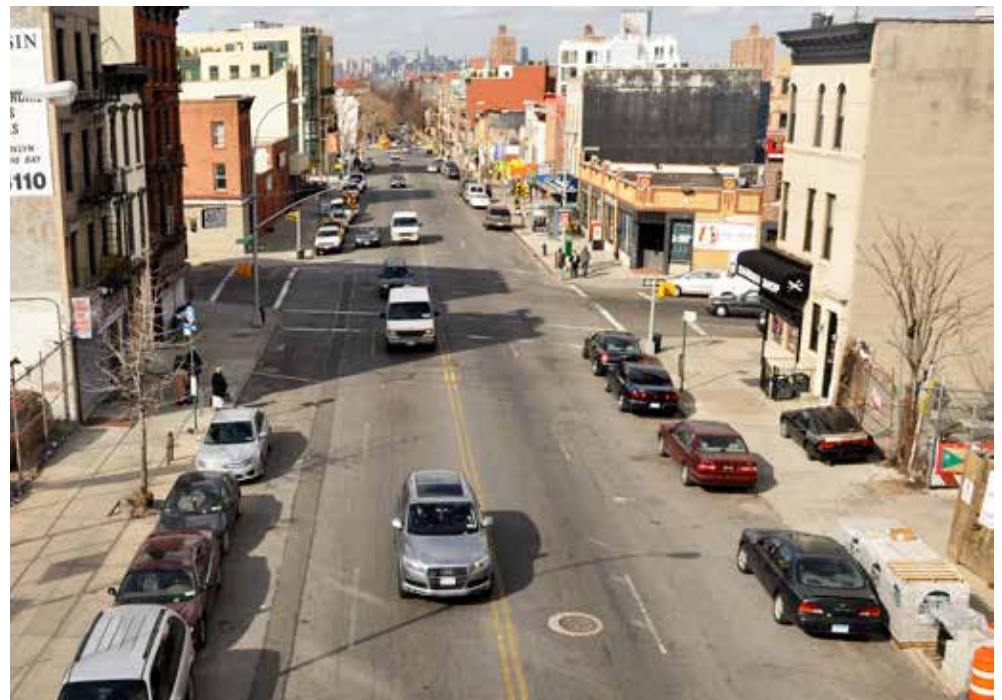
### Neighborhoods

As compared to other boroughs, pedestrian crashes tend to be evenly distributed across Brooklyn. The heat map on the facing page indicates which areas have higher concentrations of crashes resulting in pedestrian fatalities and severe injuries. Orange and red areas—such as Sunset Park, Crown Heights, Brownsville, South Williamsburg, and Bushwick—had a higher density of pedestrian KSI between 2009 and 2013 relative to blue areas.

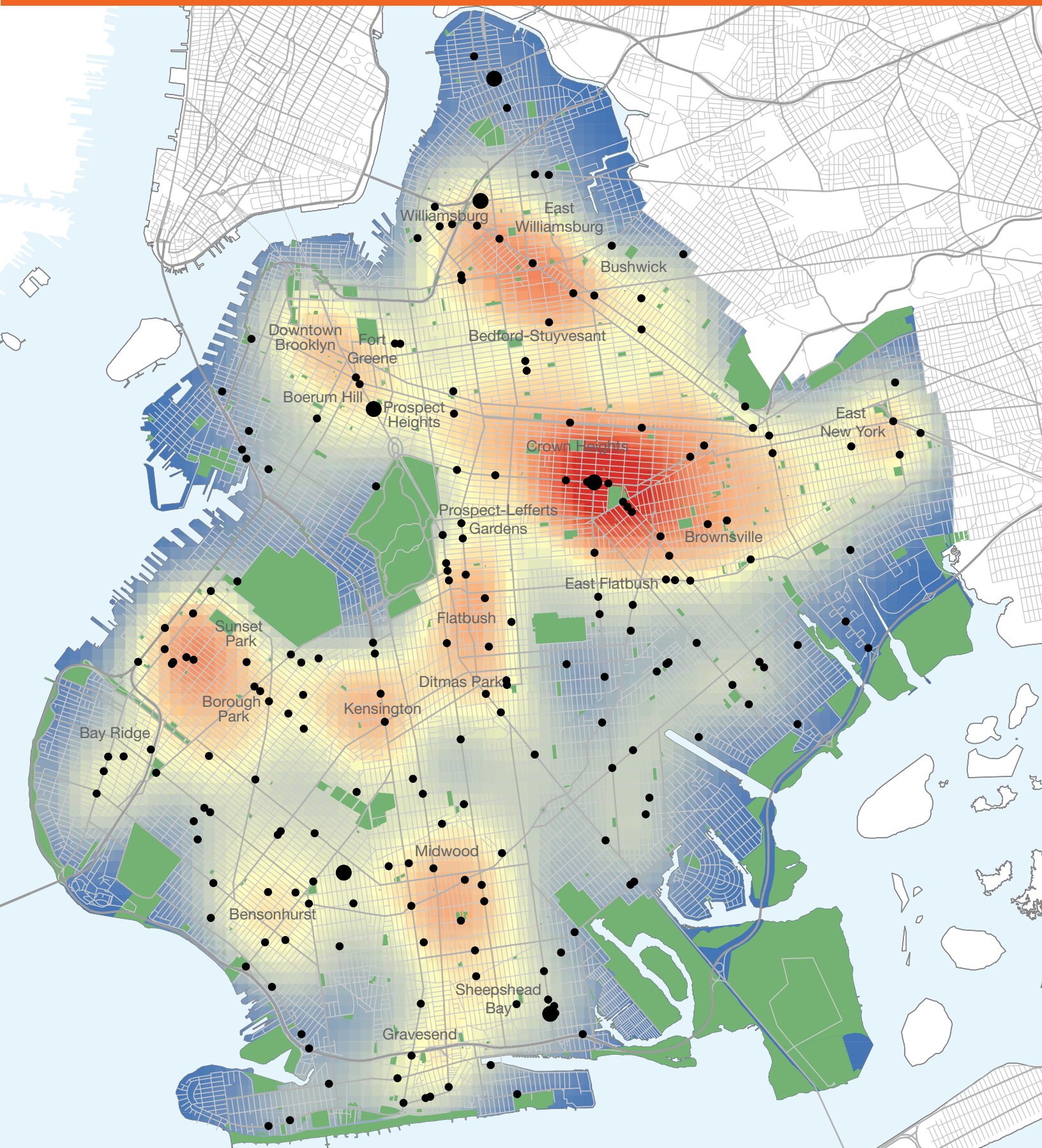
### Arterial Streets

Though comprising just 14% of Brooklyn's total street network, 60% of Brooklyn's fatalities occur on arterial roadways. Atlantic Avenue, Ocean Avenue, Myrtle Avenue, Rockaway Parkway, 4th Avenue, and 86th Street are all examples of arterials in Brooklyn. Compared to local streets, arterials are typically wider, carry higher volumes of both vehicles and pedestrians, accommodate faster speeds, and have more complex traffic patterns. As a result, arterial streets tend to create particularly high-crash pedestrian environments and can be challenging to improve.

However, many safety improvements can be made. Achieving slower speeds by reducing speed limits and increasing enforcement reduces the risk of injury. Larger-scale engineering projects can provide pedestrians with shorter crossing distances and safer routes to cross the street, while more effectively managing all traffic movements.



# Brooklyn Heat Map and Pedestrian Fatalities



Approximate pedestrian KSI per sq mile per year:



Fatalities (2009-2013):



## Pedestrian Killed or Severely Injured Kernel Density

A smoothing technique for spatial data where the expected density is calculated for every location on the map with the underlying principal that closer KSI are more heavily weighted than farther KSI. Each location is then assigned a color based on the expected density of KSI, with red showing the highest density of KSI and blue showing the lowest. It is useful for identifying and presenting hotspots.

Severe injury data: NYSDOT/NYDMV Accident Database

Fatality data: NYSDOT/NYPD Reconciled Fatality Database



**36% of  
Brooklyn's  
pedestrian  
fatalities  
occur on  
local streets**

**20%**

**of Brooklyn  
pedestrian  
weekday fatalities  
occur during rush  
hour periods**

## Local Streets

Thirty-six percent (36%) of Brooklyn's pedestrian fatalities occur on local streets (lower speed, residential roads). In addition, 23% of pedestrian fatalities occur at the intersection of two or more local streets, compared with 16% for all of New York City. This discrepancy may derive from the borough's more even distribution of traffic across local streets due to the absence of large cross-borough highways.

These intersections pose a special challenge: they are typically normal, right-angle intersections that lack a clear opportunity for re-engineering. For this reason, local streets may require traffic calming at a more neighborhood scale, focused on reducing speeds and changing behavior throughout an area, rather than a problematic intersection.



Adelphi Street at Willoughby Street in Fort Greene is a typical local street intersection.

## When?

### Off-Peak

Just 20% of Brooklyn pedestrian weekday fatalities occur during peak times (rush hour), although 40% of Brooklyn's pedestrian travel occurs during rush hour. This discrepancy may be related to rush-hour (7–10am and 4–7pm) congestion, which constrains vehicle speeds, as well as the “safety in numbers” phenomenon, whereby motorists make safer choices in the presence of higher volumes of pedestrians.



**18% of  
Brooklyn's  
pedestrian  
fatalities occur  
from 12-6am**

**Seniors make  
up 12% of  
Brooklyn's  
population  
but 36% of  
its pedestrian  
fatalities**



## Overnight

Eighteen percent (18%) of Brooklyn's pedestrian fatalities occur between 12am and 6am. This is especially striking considering that less than 5% of pedestrian activity takes place during these hours. Although street lighting in Brooklyn is generally robust, pedestrians are still less visible during these hours. Most importantly, low overnight traffic volumes allow vehicles to accelerate rapidly and reach high speeds.

## Weekends

During weekends, travel is likely to be more evenly distributed throughout the day and across neighborhoods, and residents are more likely to take modes other than public transit to reach their destinations. Thirty-three percent (33%) of Brooklyn's pedestrian fatalities occur during the weekend (defined as 7:00pm on Friday through 11:59pm on Sunday), about what would be expected if fatalities were distributed evenly throughout the course of a week.

Alcohol may be an important factor in traffic crashes on the weekends. Although less than 10% of pedestrian fatalities in Brooklyn involve driving while intoxicated (DWI), on weekends these fatalities appear to occur twice as often. Weekends make up about 30% of the week, but account for nearly 60% of New York City pedestrian DWI fatalities.

Off-peak signal timing modifications can help to keep speeds lower when there are fewer vehicles on the road; targeted enforcement can also be deployed during periods with a higher incidence of intoxicated driving. Education can also be an important tool in teaching drivers and pedestrians about the greater dangers during off-peak and overnight periods.

## Who?

### Seniors

Seniors (aged 65 and older) represent just 12% of Brooklyn's population but 36% of its pedestrian fatalities. Seniors often require more time and protection when crossing the road than younger pedestrians, and they are also more susceptible to fatal and severe injuries when struck by a vehicle. Through its Safe Streets for Seniors initiative, DOT visits senior centers and community boards to get local feedback on senior pedestrian issues. DOT also implements mitigation measures to improve safety for seniors and other pedestrians, such as extending pedestrian crossing times to accommodate slower walking speeds and making engineering improvements to create safer pedestrian crossings.





**Pedestrian crashes are the second-highest cause of injury and death for school-age children in Brooklyn**



**of Brooklyn's pedestrian fatalities involve passenger vehicles**

## School-Age Children

Though they account for 16% of Brooklyn's population, school-age children (aged 5–17 years) represent just 7% of the borough's pedestrian fatalities. However, school-age children are more likely to be severely injured or killed when involved in a crash, and pedestrian crashes are the second-highest cause of injury death for this age group.

Vision Zero means creating streets that are safe for even the most vulnerable road users, including seniors and children. While seniors and children benefit in general from DOT's broad efforts to engineer safer streets, DOT also specifically engages with these populations through special safety education programs.

What?

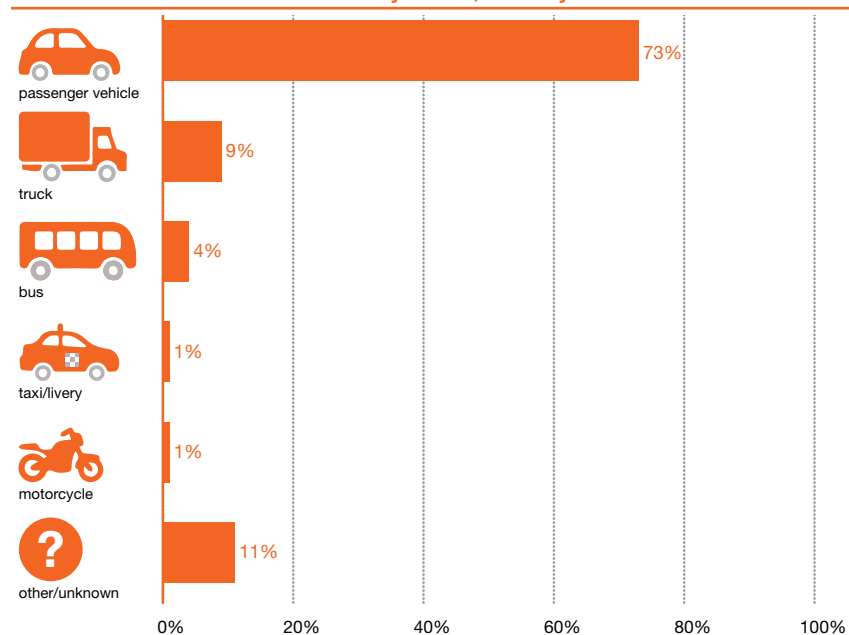
## Passenger Vehicles

Nearly three-quarters of Brooklyn's pedestrian fatalities are the result of a crash with a passenger vehicle—the cars, SUVs, and minivans driven by ordinary New Yorkers. Not only do these vehicles outnumber other vehicles on the road by a wide margin, but their drivers are subject to limited regulation and oversight compared with the professional drivers of trucks, buses, and taxi/livery vehicles.

## Trucks

Less than one in ten pedestrian fatalities in Brooklyn involves a truck, a lower rate than New York City as a whole. Nonetheless, trucks pose special safety concerns for pedestrians due to their larger weight and size, which increases the force and severity of crashes and reduces the visibility of pedestrians from the driver's seat.

Percent of Pedestrian Fatalities by Mode, Brooklyn



65%

**of Brooklyn's pedestrian fatalities involve dangerous driver choices**

**Hit and runs occur in 25% of pedestrian fatalities in Brooklyn**

## How?

### Dangerous Driver Choices

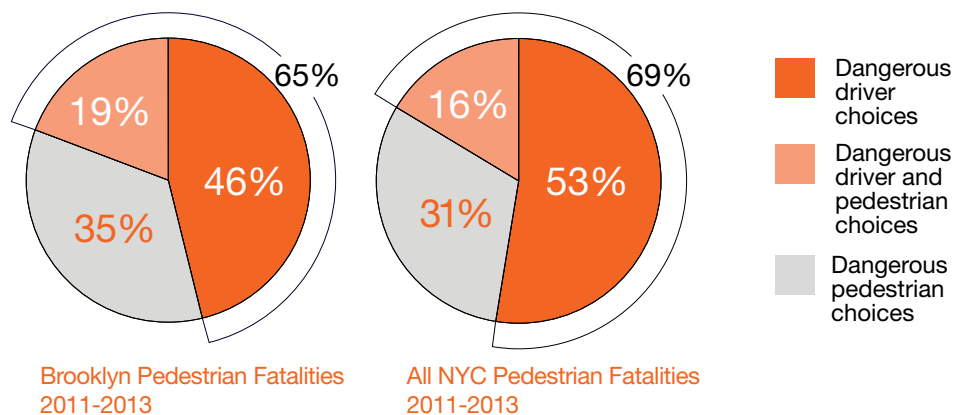
Dangerous driver choices are the primary cause or a contributing factor in 65% of Brooklyn's pedestrian fatalities. These driver choices—including speeding, failing to yield to pedestrians, red-light running, distracted driving, and driving under the influence—primarily occur when the pedestrian is following the law (crossing with the signal, in a crosswalk at an unsignalized intersection, walking on the sidewalk, etc.).

The City is working to create a culture of safety through education and public information campaigns that are changing the citywide dialogue on traffic injuries and fatalities. However, street design and traffic enforcement that directly encourage safer choices (or discourage dangerous choices) are also key to reaching Vision Zero. Street design can help to lower vehicle speeds, eliminate conflicts between pedestrians and vehicles, reduce unpredictable traffic movements, and guide road users toward more responsible choices. More visible, targeted, and consistent enforcement reminds street users of the laws of the road and provides a powerful disincentive to risk-taking.

### Hit and Runs

Brooklyn is second only to the Bronx, and slightly higher than the City overall, in its share of hit-and-run pedestrian fatalities (25%). Historically, if a driver involved in a crash was intoxicated, they had strong incentives to flee the crash scene; the penalties for hit and run were less severe than those for driving while intoxicated. However, in September 2014, the New York City Council passed the Justice for Hit and Run Victims Act (Local Law 50 of 2014), new legislation that imposes fines up to \$10,000 for drivers who cause physical injury and flee the scene of a crash.

#### Driver & Pedestrian Choices, Brooklyn compared to NYC







# Priority Corridors, Intersections, and Areas

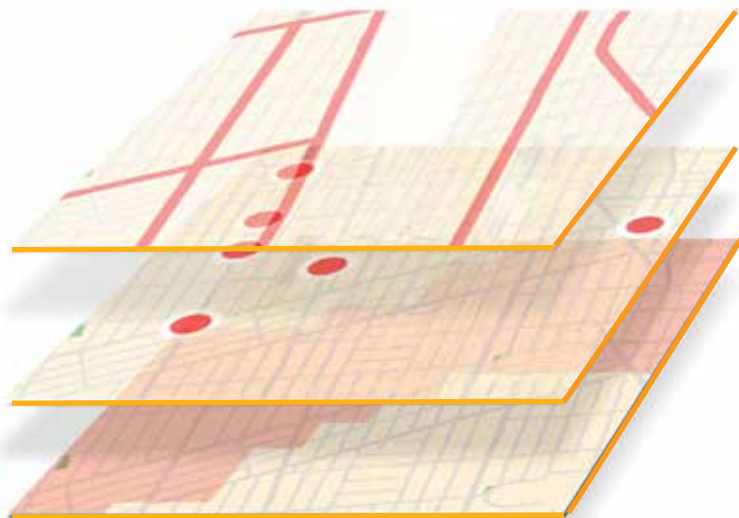
## 2.

Brooklyn has more than 1,500 miles of roadway and nearly 11,000 intersections. Since resources are always finite, it is necessary for New York City to focus its safety efforts on a reasonable number of high-crash locations that demonstrate a need for focused interventions. Using pedestrian KSI data from the last five available years (2009-2013), DOT developed a process for selecting Priority Corridors, Priority Intersections, and Priority Areas. These locations account for 61% of Brooklyn's total pedestrian fatalities.

Pedestrian KSI data was employed in this analysis for two reasons. First, a pedestrian who has been severely injured typically departs the crash scene in an ambulance and often experiences life-changing injuries (e.g., loss of mobility, brain function, limbs). A comprehensive street safety program must address these types of pedestrian injuries as well, not just fatalities. Second, severe injuries are more numerous and less randomly dispersed than traffic fatalities. Thus, severe injuries are more useful and reliable in terms of ranking one corridor, intersection, or area.

61%

**of Brooklyn's  
pedestrian  
fatalities occur on  
Priority Corridors,  
at Priority  
Intersections, or in  
Priority Areas**



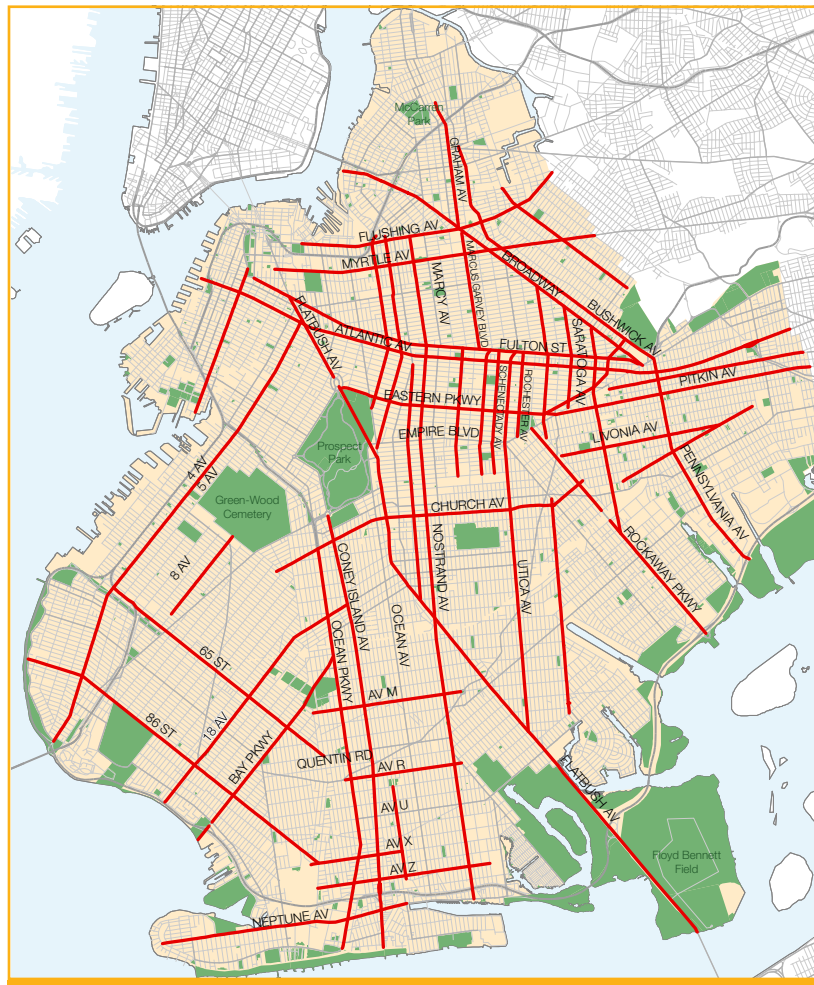


## Priority Corridors

Prioritizing corridors (streets measuring at least one-mile in length) reflects the fact that pedestrian KSI crashes are concentrated on particular streets (60% of Brooklyn pedestrian fatalities are on arterials), and that strings of intersections along certain streets often exhibit similar safety concerns and should be considered together. In addition, an intersection-only analysis would not account for the large share (29%) of Brooklyn pedestrian fatalities that occurs midblock.

To determine the Priority Corridors, all corridors in Brooklyn were ranked on a pedestrian KSI per-mile basis. Corridors were selected from the top of this list until the cumulative number of pedestrian KSI reached half of the borough's total. Together, Brooklyn's 49 Priority Corridors constitute 9% of Brooklyn's total street network but account for 50% of the borough's total pedestrian KSI. See appendix for a complete list of the Priority Corridors.

**50% of  
Brooklyn's  
pedestrian  
KSI occur on  
just 9% of the  
borough's total  
street mileage**



Priority Corridors





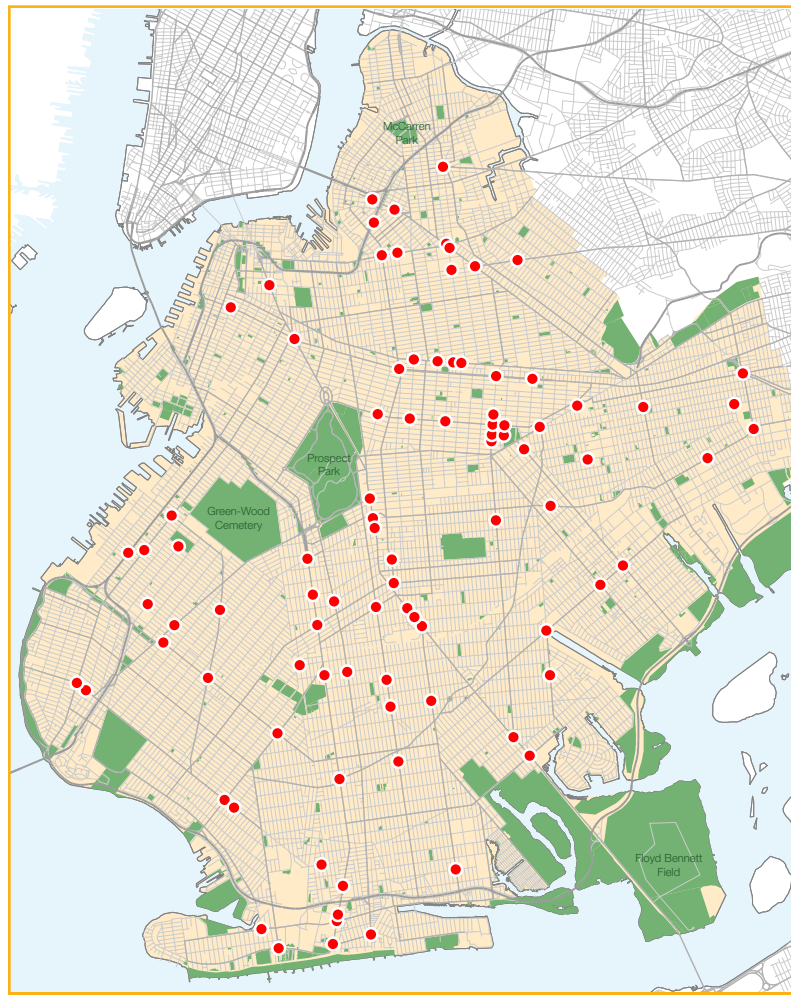


## Priority Intersections

In order to identify which of Brooklyn's nearly 11,000 intersections have the highest need and greatest potential safety gains, DOT used an approach similar to the Priority Corridor process. DOT selected the intersections with the highest number of pedestrian KSI that cumulatively account for 15% of the borough's total pedestrian KSI. This is a lower share than that used for corridors because crashes resulting in pedestrian KSI are spread out widely among nearly 1,500 intersections. Not only would such a large number of intersections be impractical to address in the scope of one plan, but at the vast majority of these intersections, only one pedestrian KSI occurs in the data, which may not indicate a systematic need for intervention.

This methodology yielded 91 Priority Intersections with a minimum of three pedestrian KSI in the five-year data. Together, these intersections account for 15% of Brooklyn's pedestrian KSI but represent just 1% of all its intersections. See appendix for a complete list of the Priority Intersections.

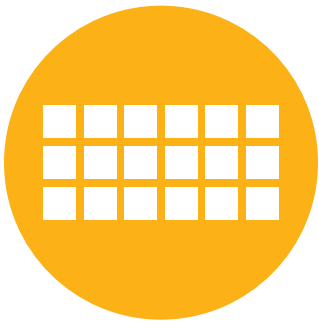
**15% of  
Brooklyn's  
KSI occurred  
at only 1% of  
the borough's  
intersections**



Priority Intersections







**There are 18 square miles of Priority Areas in Brooklyn**

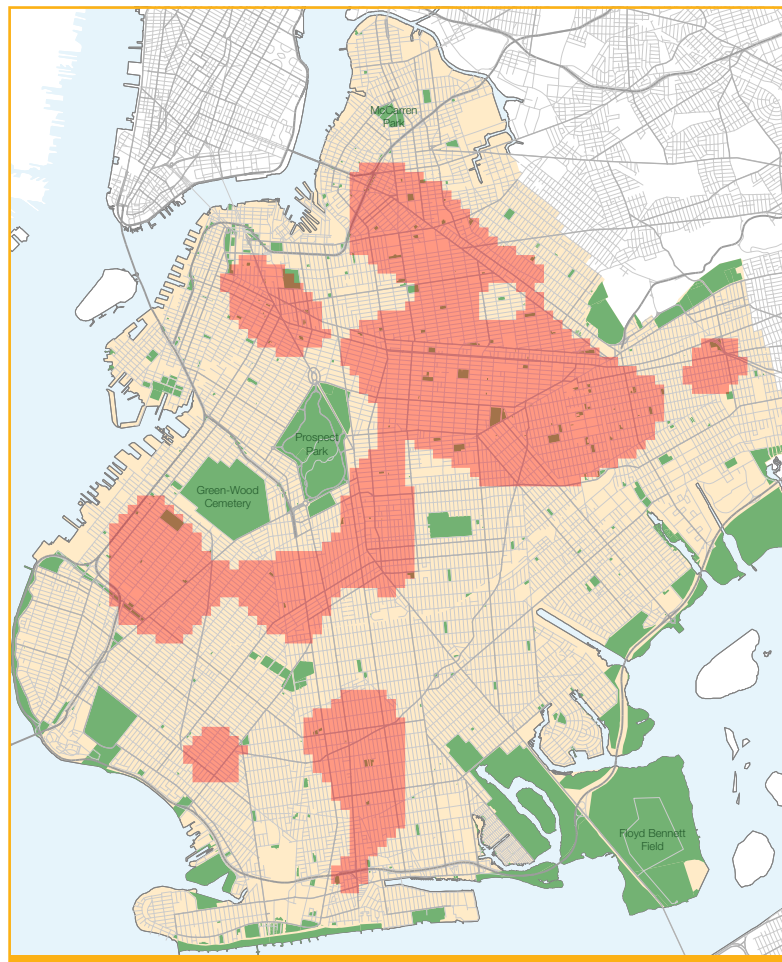


**of Brooklyn's pedestrian KSI occur in just 25% of the borough's total land area**

## Priority Areas

Some of the safety issues throughout Brooklyn occur systematically at an area-wide level and are not confined to a single intersection or street. To account for these areas, the pedestrian KSI crash dataset was transformed into a kernel density map—or heat map—which indicates where the density of these crashes is highest. The Priority Areas were determined by identifying the “hottest” areas on the map that, when combined, account for half of all of pedestrian KSI in the borough.

In total there are 18 square miles of Priority Areas. Although these contain 50% of all pedestrian KSI in Brooklyn, they constitute just 25% of the borough's land area.



Priority Areas

The combined map of Priority Corridors, Intersections, and Areas covers 72% of pedestrian KSI in Brooklyn, and shows where DOT and NYPD interventions are needed most. This map will serve as a guide to where engineering, enforcement, and education measures will be most effective at reducing pedestrian fatalities and severe injuries.

# Brooklyn Priority Map

	Share of Borough	Borough	% of Borough	Share of Ped KSI*	Total Ped KSI	% of Total Ped KSI	% of Total Ped Fatalities
Priority Corridors	49 corridors (142 miles)	1,510 miles	9%	1,113	2,220	50%	46%
Priority Intersections	91 intersections	10,725 intersections	1%	334	2,220	15%	11%
Priority Areas	17.7 sq miles	72 sq miles	25%	1,110	2,220	50%	40%
Combined Total	—	—	—	1,599	—	72%	61%



Priority  
Corridors



Priority  
Intersections



Priority  
Areas



NYPD  
Precincts

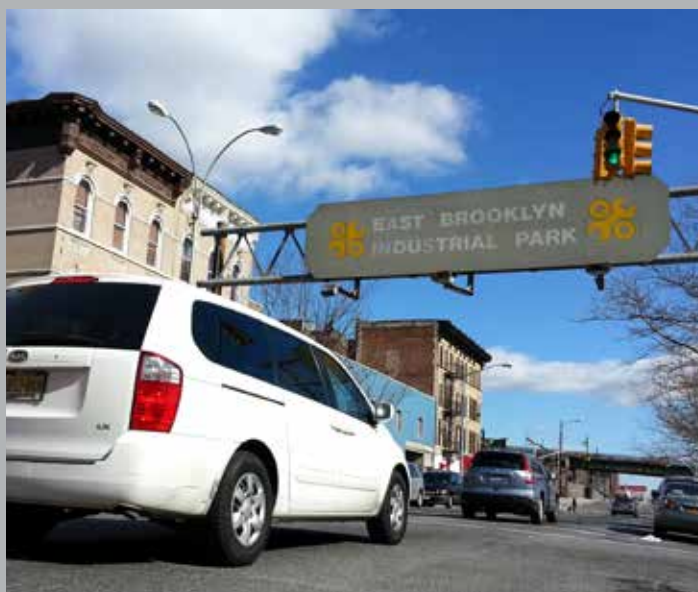




# CASE STUDY: Crown Heights-Brownsville

One of the areas with the greatest concentrations of pedestrian KSI (see Heat Map, page 5), Crown Heights-Brownsville witnessed 2,055 pedestrian crashes between 2009 and 2013, which led to 17 fatalities and 262 severe injuries.

The population of this area is mostly black or African-American (roughly eight out of ten residents). Moreover, local median income falls well below the borough's as a whole.



2,055



**Total crashes involving pedestrians between 2009-2013**

**These crashes resulted in 279 pedestrian KSI:**

262  
severe  
injuries



17  
fatalities



57%



**of all traffic fatalities were pedestrians**



## Community Input

### Failure to Yield @ Fulton & Kingston:

"Lots of pedestrians crossing from south to north Fulton because of subway. Even with the right of way, pedestrians practically have to force cars turning in from the side street right into Fulton to slow down."

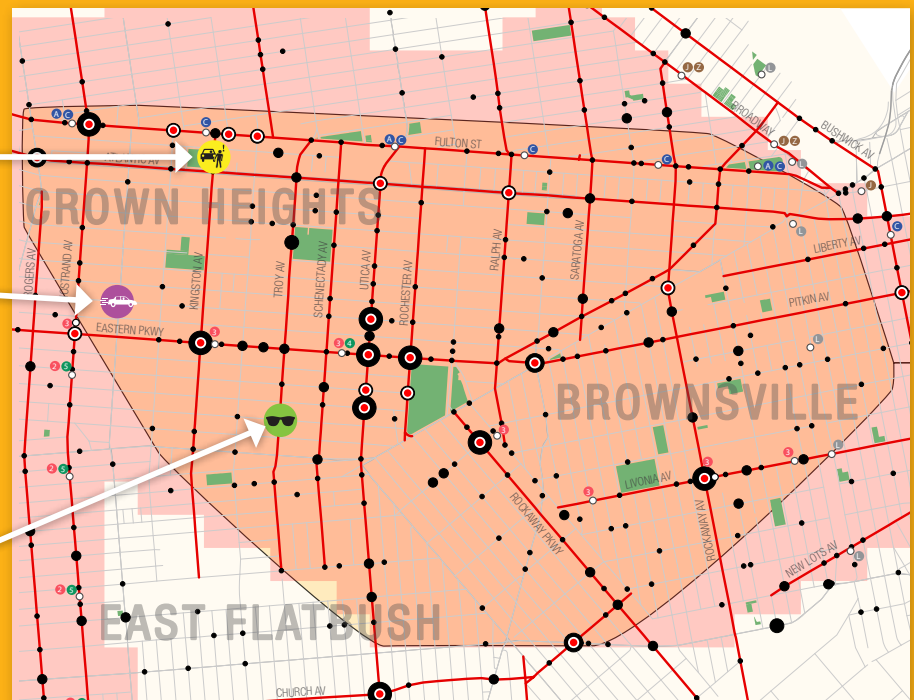
### Speeding @ St. John's & New York:

"Cars and trucks SPEED down New York Avenue at 40 miles per hour to make the green light from Eastern to New York Avenue. Our children cannot play safely on the sidewalks because cars RACE down New York Avenue."

### Poor Visibility @ Troy & Crown:

"Traffic from Utica speeding to 'make the light' until Troy. Speed bumps are necessary on Crown between Schenectady and Troy, particularly due to the hill in middle of the block which limits visibility ahead."

## Crown Heights-Brownsville Case Study Area



Priority  
Corridors

Priority  
Intersections



Priority  
Areas



Subway  
Stations



Pedestrian  
KSI



Black outline represents the approximate boundary of the case study area.



# CASE STUDY: Crown Heights-Brownsville

## Pedestrian Safety

Though served by nine subway lines, several bus routes, and the Long Island Railroad, vast portions of the Crown-Heights Brownsville study area lack proximate access to public transportation. Nevertheless, low income and a corresponding low rate of car ownership translates to a high rate of transit usage among area residents and, in turn, a high volume of pedestrian trips.

Crown Heights-Brownsville sits at the convergence of several disjointed street grids that meet at skewed intersections. Moreover, the prevalence of extraordinarily wide arterial streets across the neighborhood—many of which, including Eastern Parkway, Schenectady Avenue, and Rockaway Parkway, DOT has prioritized for safety improvements and increased enforcement—often encourages motorists to speed through the area.



## Community Dialogue and Input

Atlantic Avenue, a high-crash arterial boulevard that cuts through the heart of Crown Heights and Brownsville, has long been in the cross-hairs of Brooklyn residents and community groups for major safety improvements. In fact, for eight months, residents and advocacy organizations campaigned for improved safety along this corridor. City officials and DOT took these demands to heart, and, on March 27th, at a town hall meeting hosted by Councilmember Laurie Cumbo at Medgar Evers College in Crown Heights, DOT Commissioner Polly Trottenberg announced the designation of Atlantic Avenue as the City's first Arterial Slow Zone. Further, in identifying Atlantic Avenue as a Vision Zero Priority Corridor, DOT will continue to focus on engineering, enforcement, and education activities to slow speeding vehicles and improve pedestrian safety along the avenue.



Councilmember Laurie Cumbo and residents campaigning for a safer Atlantic Ave.

## DOT Safety Improvements

Community members have long reported speeding as a major problem throughout the Crown Heights-Brownsville area. DOT recently implemented the Brownsville Neighborhood Slow Zone (described in more detail on the facing page) to discourage speeding on local streets, as well as the Eastern Parkway and Atlantic Avenue Arterial Slow Zones to deter speeding on these wide arterials. DOT will consider similar treatments at other locations throughout the area to prevent dangerous motorist behavior and improve pedestrian safety.

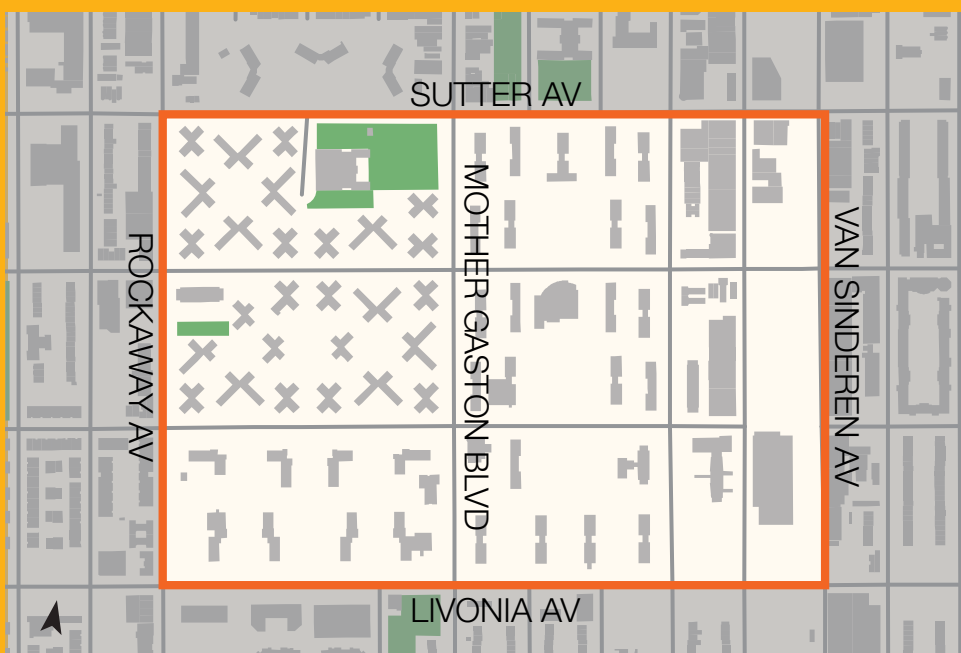
**Neighborhood  
Slow Zones  
have reduced  
crashes  
with injuries  
by 14%**

*“We can’t wait for  
another child to  
be the face of ...  
Vision Zero.”*

—Councilmember  
Laurie Cumbo



Brownsville Neighborhood Slow Zone gateway signage



Brownsville Neighborhood Slow Zone

## Brownsville Neighborhood Slow Zone

In response to an application from the Brownsville Partnership and Brooklyn Community Board 16, DOT implemented the Brownsville Neighborhood Slow Zone in August 2014.

Designed to enhance safety on residential streets, the Brownsville Neighborhood Slow Zone reduced speed limits to 20 miles per hour and added additional speed bumps throughout a one-quarter-square-mile area that is home to daycares, schools, senior centers, and large housing complexes. Prior to implementation, high levels of speeding were reported across the area, particularly on Mother Gaston Boulevard.

Neighborhood Slow Zones in New York City have successfully reduced speeds on residential streets by 10–15% and produced a 14% decline in crashes with injuries.





# Community Dialogue and Input



Achieving Vision Zero, and truly making New York City's streets safe for all users, hinges upon an active dialogue between the public and the City. While DOT utilized quantitative crash data to determine Brooklyn's highest-priority corridors, intersections, and geographic areas, qualitative feedback from community members deeply enriches DOT's understanding of these priority locations. Feedback collected online and via public workshops produced a geographic database of community safety concerns that will allow DOT to design high-quality Vision Zero safety projects that incorporate local knowledge of pedestrian issues.

DOT took a proactive and innovative approach to community engagement to yield a robust dataset of local expertise. This section details the public outreach activities DOT conducted to gather feedback from Brooklyn residents.



# Vision Zero Public Input Map

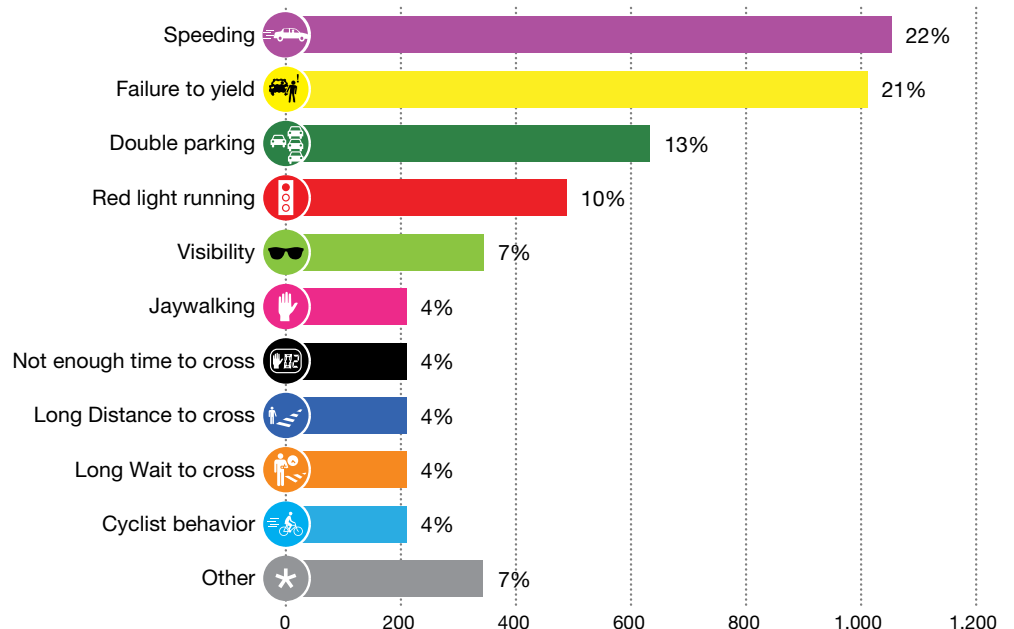
Brooklyn residents shared almost 4,800 pedestrian safety issues

The interactive, online Vision Zero Public Input Map offered New Yorkers the opportunity to identify pedestrian safety issues at any time, from anywhere (even mobile devices). To report a pedestrian safety issue, users panned across a map of New York City and zoomed to an intersection of concern. Clicking on the intersection caused a Google Street View image of the selected intersection to appear. Users then chose one of ten safety issue icons, dragged it to the precise location where the issue occurs, and provided comments detailing their issue (see figure below). Other users could then share additional comments about, or voice their agreement with, existing comments.



43%

of issues shared on the website focus on speeding and failure to yield to pedestrians



The breakdown of issues by category logged on the Vision Zero website closely reflected that of the issues recorded at the Pedestrian Safety Workshops.

## Website Findings

At the close of the three-month online comment period (May–July 2014), location-specific issues collected at the Pedestrian Safety Workshops were geocoded and added to the online map, producing a unified geographic database of residents' pedestrian safety concerns (see the Brooklyn Community Input map, page 31). In total, users shared 4,764 issues at 1,984 unique locations (representing nearly 20% of intersections) across Brooklyn—an average of 2.4 issues per location. Moreover, Brooklyn residents not only engaged with DOT on these issues but with each other as well: users commented on others' issues 1,077 times and gave clicks of support 3,938 times.

Website users identified aggressive driving behaviors (speeding and failure to yield) along with double parking most frequently. Website users shared issues pertaining to street-crossings (not enough time, long distance, and long wait to cross) with the lowest frequency.

**Brooklyn residents commented on about 20% of all Brooklyn's intersections**





## Public Events

From March through June 2014, DOT, NYPD, elected officials, and civic organizations hosted seven official Vision Zero public events across Brooklyn. In the form of participatory workshops and town hall meetings, these events were designed to gather local pedestrian safety concerns, launch an ongoing dialogue about street safety in Brooklyn, and instill the message that pedestrian fatalities are preventable and not the inevitable feature of city life they are often perceived to be.

### Town Halls

To kick off Vision Zero outreach in Brooklyn, the office of City Council Speaker Melissa Mark-Viverito and Borough President Eric Adams hosted a town hall meeting on April 1st at Borough Hall in Downtown Brooklyn. Before an overflowing forum of nearly 300 attendees, a panel consisting of DOT Commissioner Polly Trottenberg, City Council Transportation Chair Ydanis Rodriguez, Public Advocate Letitia James, and several Brooklyn Councilmembers passionately addressed the urgent need to improve pedestrian safety in Brooklyn. Audience members were then invited to address the panel. Topics ranged from emotional appeals from Brooklynites who have lost loved ones in traffic crashes to policy changes, such as safety interventions along high-crash corridors and increased enforcement of parking on sidewalks. Four similar meetings were hosted by Brooklyn Councilmembers Laurie Cumbo, Brad Lander, and Carlos Menchaca.



Spanish public outreach flyer used to advertise the workshops



120+

**participants  
attended public  
workshops  
in Brooklyn**

## Pedestrian Safety Workshops

Concurrent with the town hall meetings, DOT hosted two public workshops in Brooklyn, which drew more than 120 participants. Both workshops were designed to address borough-wide safety concerns as well as concerns in particular locations within Brooklyn.

The two workshops were held in geographically dispersed locations—Plymouth Church in Brooklyn Heights and Brooklyn College in Flatbush—in order to attract the widest possible audience. DOT also worked with 55 elected officials, community boards, and civic groups to promote the workshops to a broad range of constituencies across the borough.



Discussion of pedestrian safety concerns at Plymouth Church



## Workshop Format

At tables of approximately eight people—including two DOT staff members and one NYPD officer—a DOT facilitator made a brief presentation on Vision Zero safety strategies then led a group discussion around pedestrian safety issues in Brooklyn. Next, participants visited a mapping station, where, using ten distinct stickers (which corresponded to the ten issue icons on the Vision Zero Public Input Map), they pinpointed the precise locations where pedestrian safety issues occur around Brooklyn (see page 35). Participants then recorded these issues and locations on worksheets, which DOT staff collected at the conclusion of the workshop. Finally, participants completed a survey designed to gather both general and specific pedestrian safety concerns and to evaluate DOT's public outreach strategies.



**58% of workshop attendees think speed and red light cameras should be used more to combat aggressive driving**



Workshop attendee logs safety issues at Plymouth Church

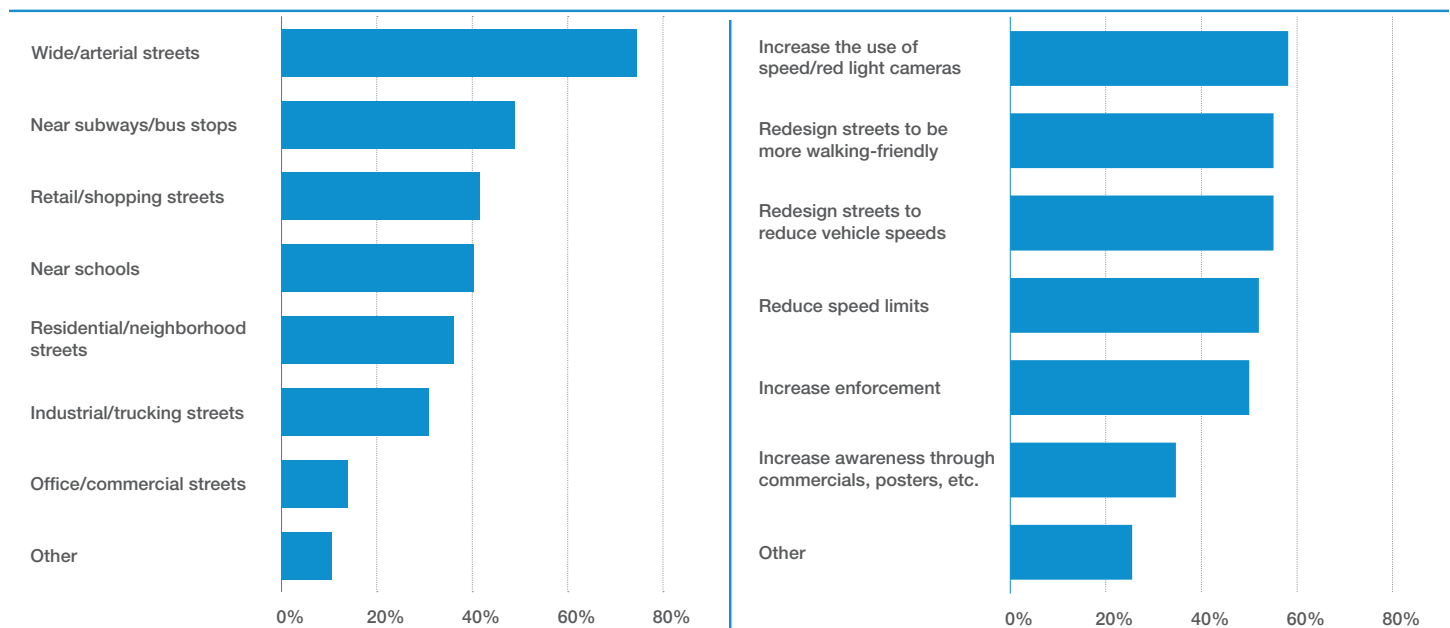
74%

**of workshop attendees view arterial streets as one of the most important areas for pedestrian safety improvements**

## Workshop Findings

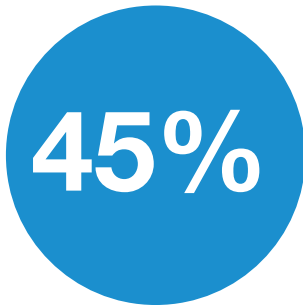
Feedback from the group discussions, worksheets, and surveys shows that aggressive driving behaviors, such as speeding and failure to yield, are the issues of greatest concern to Brooklyn residents. Over 80% of participants rated these issues as problematic, and over 50% said they were “major problems” in Brooklyn.

Attendees stressed the importance of a wide array of measures to help combat these dangerous behaviors, including increased use of speeding and red light cameras (58%), street redesigns (55%), and reduced speed limits (52%), particularly on busy arterial streets such as Flatbush and Atlantic Avenues.



Types of locations and interventions workshop attendees would like DOT/NYPD to focus on in Brooklyn, by frequency.





**45%**  
**of shared  
issues fall  
outside  
of Priority  
Corridors,  
Intersections,  
and Areas**

## Community Input Influencing Design

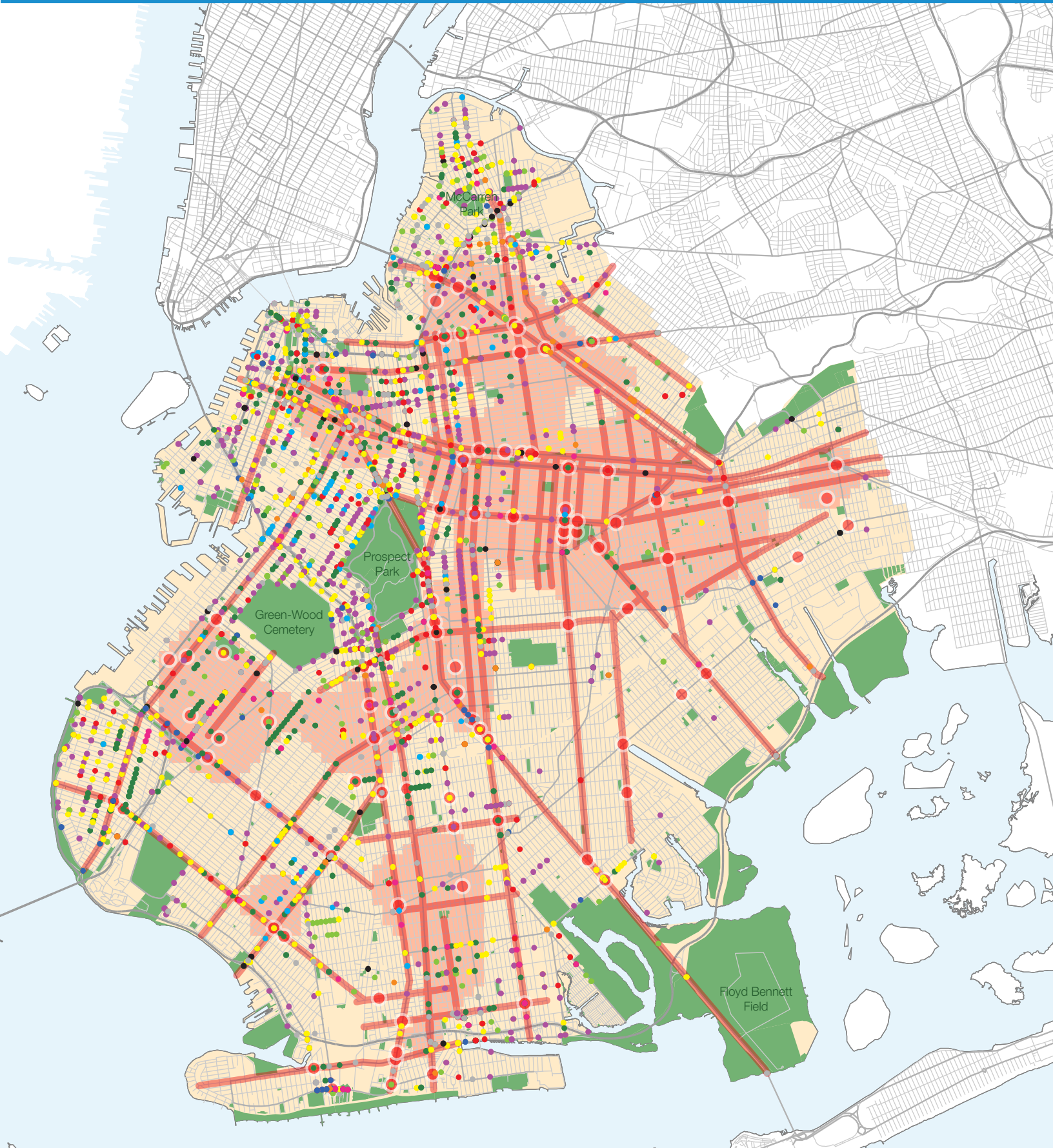
In late summer 2014, following the completion of the final workshop and the closure of the online Vision Zero Public Input Map, DOT compiled all community feedback, pedestrian safety worksheets, participant surveys, completed maps, and issues shared on the Vision Zero website. This information is being maintained and analyzed to support future public outreach, education, enforcement, and engineering. It will also be referenced in the following section of this Plan.

The Community Input Map, combined with the Brooklyn Priority Map laid out in Section 2, forms a geographically specific knowledge base of both quantitative pedestrian crash data and qualitative community feedback. This allows DOT to integrate local knowledge into Vision Zero project planning in order to foster a proactive, responsive project planning process at the borough's highest-crash locations. A composite priority map for Brooklyn is shown on the facing page. This map will serve as the basis of DOT's Brooklyn Pedestrian Safety Action Plan.

As the map reveals, the locations with the most public input and high pedestrian-KSI-crash density do not always overlap. There are several factors influencing the likelihood of particular communities throughout Brooklyn to log issues, from the strength of local outreach and advocacy groups, to the location of workshops, to language and internet connectivity barriers.

It is vital to the success of Vision Zero in Brooklyn that all communities across the borough are given an equal opportunity to share their pedestrian safety concerns. As such, DOT will redouble its outreach efforts to communities with low levels of existing feedback, especially those in high pedestrian-crash areas. Also, DOT and NYPD will ensure that traffic engineering, enforcement, and education work will be conducted in the areas with the highest need, not just those with the loudest voices.

# Brooklyn Community Input Map



- |                            |                          |                                   |                          |
|----------------------------|--------------------------|-----------------------------------|--------------------------|
| ● Not enough time to cross | ● Jaywalking             | ● Failure to yield to pedestrians | ● Priority Intersections |
| ● Double parking           | ● Poor visibility        | ● Cyclist behavior                | ● Priority Corridors     |
| ● Long wait to cross       | ● Speeding               | ● Other                           | ● Priority Areas         |
| ● Red light running        | ● Long distance to cross |                                   |                          |



# CASE STUDY: Sunset Park-Borough Park

As evidenced by the heat map on page 5, Sunset Park-Borough Park has among the densest concentrations of pedestrian KSI crashes in Brooklyn. In this area alone, 955 pedestrian crashes occurred between 2009 and 2013, resulting in 115 severe injuries and 12 fatalities.

Half of the area's residents were born outside the United States, hailing predominantly from Latin America and China, and about three-quarters speak a language other than English at home.



955



**Total crashes involving pedestrians between 2009-2013**

**These crashes resulted in 127 pedestrian KSI:**

115  
severe injuries

12  
fatalities

80%



**of all traffic fatalities were pedestrians**



## Community Input

### Red Light Running @ 4th & 55th:

"I see cars running red lights along 4th Ave (in the 40s/50s) all the time. Some don't even try to hide it - will stop, look, and run the light - in the middle of the day!"

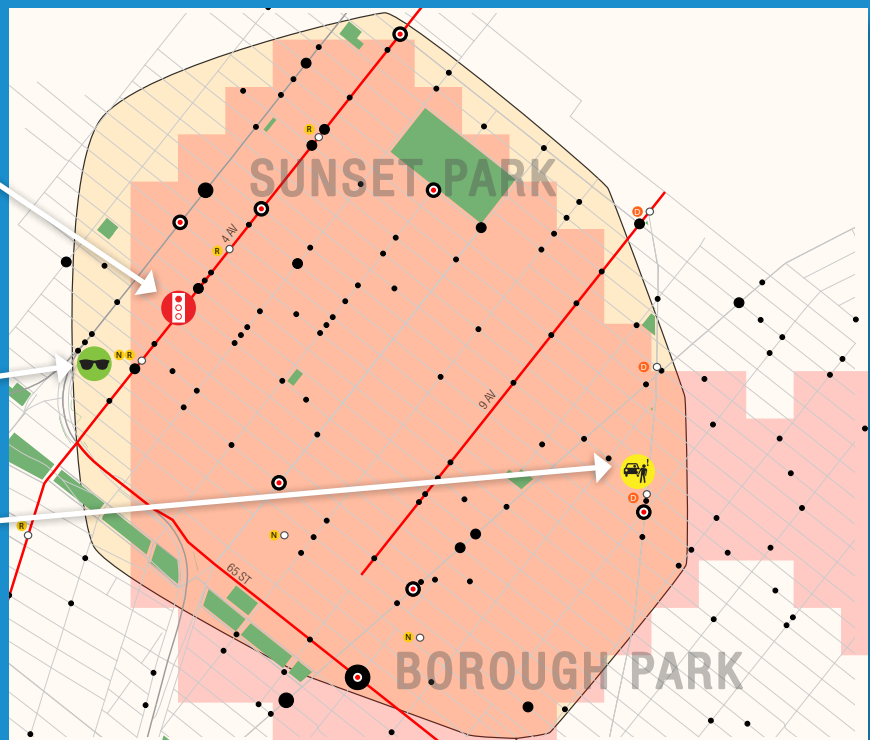
### Poor Visibility @ 60th & 3rd:

"I live on the block and see at least one accident a month. There are four lanes underneath the BQE and 60th Street is two-way traffic. It's very hard to see traffic and especially dangerous if someone runs a red light."

### Failure to Yield @ New Utrecht & 50th:

"Intersection of New Utrecht Avenue northbound with 12th Avenue is a shallow turn (> 90 degrees), resulting in fast drivers taking the turn and bullying pedestrians. The problem is compounded by a 6-way intersection with poor visibility and crosswalks often blocked by vehicles."

## Sunset Park-Borough Park Case Study Area



Priority  
Corridors



Priority  
Intersections



Priority  
Areas



Subway  
Stations



Pedestrian  
KSI



Black outline represents the approximate boundary of the case study area.



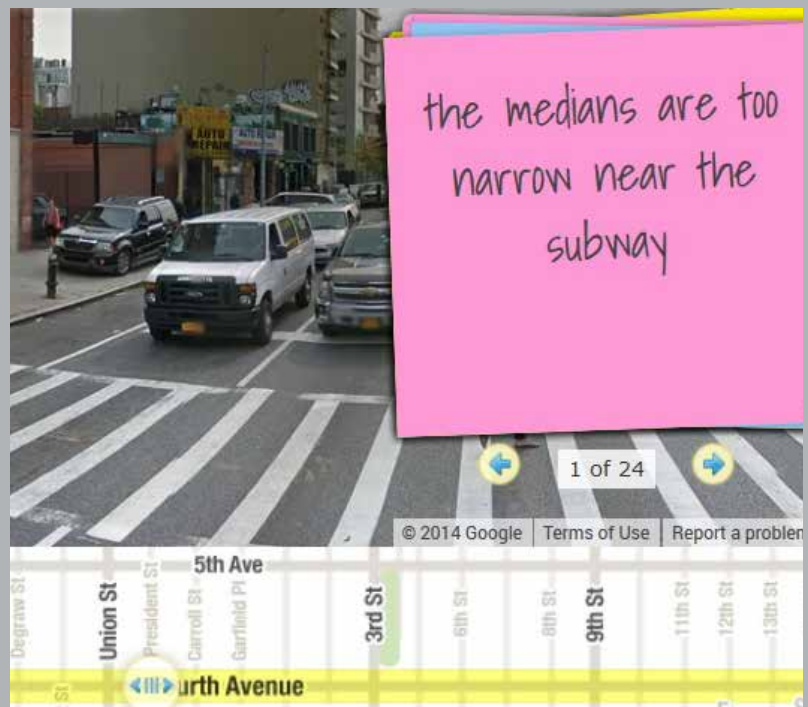
# CASE STUDY: Sunset Park-Borough Park

## Pedestrian Safety

Residents of Sunset Park-Borough Park are more likely than the average Brooklynite to commute by transit or on foot. Laid out on a largely conventional street grid, and served by three subway lines and five bus routes, the area is highly conducive to transit usage and walking. However, a number of local conditions create challenges to safe pedestrian mobility throughout the area. For instance, several extremely wide, busy arterial streets, which have been identified as high pedestrian crash corridors, are difficult for pedestrians to cross, while the elevated Gowanus Expressway and D-train tracks limit visibility between pedestrians and oncoming traffic on 3rd and New Utrecht Avenues. The expressway creates particularly unsafe conditions for the high volume of pedestrians walking between the area's residential neighborhoods to the east and the various employment centers on and near the waterfront.

## Community Dialogue and Input

The 4th Avenue Project—which spans the length of the avenue in Park Slope, Sunset Park, and Bay Ridge—involved an extensive and innovative outreach effort. DOT developed a custom web map that allowed users to scroll across the corridor and comment on specific locations, using Google StreetView as a reference. Because of the success of this public input system, the Vision Zero Community Input process took these same innovative technologies, and extended their scope from a single corridor to all of Brooklyn and the whole of New York City.



The 4th Avenue input map served as inspiration for the Vision Zero input map.

## 4th Avenue Street Improvement Project

Pedestrian injuries declined by 29% after implementation



4th Avenue at 45th Street (before)



4th Avenue at 45th Street (after)

pedestrian  
injuries  
**↓29%**

### DOT Safety Improvements

Acknowledging the existing pedestrian safety issues in Sunset Park, DOT has recently completed a major street improvement project along 4th Avenue. This project, described in detail below, is indicative of the strategies DOT can employ to address other pedestrian safety issues in the area.

4th Avenue in Sunset Park is a very wide (87 feet), two-way arterial street that carries high vehicular and pedestrian volumes. It provides access to transit as well as goods and services.

To better organize traffic and improve pedestrian safety along this high pedestrian crash corridor, DOT reduced the number of through lanes from six to four (two in each direction), installed wide parking lanes, added a four-foot buffer on both sides of the raised median, and banned select low-volume left turns.

Since project implementation in 2012, pedestrian injuries along 4th Avenue in Sunset Park have declined by 29%, and the share of motorists driving above the speed limit has dropped by 38%, while travel times along the Avenue have remained relatively constant. There have been zero fatalities since implementation.





# Borough Action Plan

# 4.

Based on the crash findings, prioritization, and community input presented previously in this report, DOT and NYPD have developed a comprehensive set of actions to be implemented in Brooklyn. These actions, and the findings that informed their creation, will be reviewed every three years from the release of this plan.

DOT and NYPD use a three-pronged approach to pedestrian safety, including Engineering and Planning actions, Enforcement actions, and Education and Marketing actions. These proposed actions are vital tools in achieving Vision Zero in Brooklyn and across New York City.

DOT and NYPD worked closely together, as well as consulting other city agencies, to formulate these actions. Moving forward, the implementation of the proposed actions will require continuing and strengthening these partnerships. This will enable all aspects of pedestrian safety to continue to improve.



# Engineering and Planning

## **Implement at least 50 Vision Zero safety engineering improvements at Priority Corridors, Intersections, and Areas citywide, informed by community input at project locations**

The *Vision Zero Action Plan* calls for safety engineering improvements citywide at 50 intersections and corridors annually. Starting with the 2015 construction season, DOT will set the goal of building all 50 Vision Zero safety engineering improvements annually at the Priority Corridors, Intersections, and Areas defined in all five Borough Pedestrian Safety Action Plans. This will ensure a laser focus on the chronically high-crash locations where pedestrians are killed and severely injured, where DOT interventions will have a maximum impact. The safety engineering improvements will be informed by Borough Plan outreach findings, and, as always, DOT and NYPD will work with communities to shape and develop better safety projects. Lastly, since Vision Zero ultimately means eliminating fatalities for all road users, safety engineering improvements will also include safety-focused bicycle, transit, and motor vehicle projects.

## **Significantly expand exclusive pedestrian crossing time on all Brooklyn Priority Corridors by the end of 2017**



High-crash corridors for pedestrians tend to be on wide arterial streets with higher speeds and aggressively turning vehicles. DOT will address these issues by installing Leading Pedestrian Intervals (LPIs) at every feasible school crosswalk on all Brooklyn Priority Corridors. The LPI is a proven method of reducing pedestrian-vehicle conflicts at high pedestrian crash locations; it is a signal timing treatment that provides pedestrian-only walk time before vehicles, including turning vehicles, receive the green light.

## **Add exclusive pedestrian crossing time to all feasible Brooklyn Priority Intersections by the end of 2017**

DOT will install LPIs at every feasible Brooklyn Priority Intersection by the end of 2017. As noted previously, the LPI is a signal timing treatment that provides pedestrian-only walk time before vehicles receive the green light.

## **Modify signal timing to reduce off-peak speeding on all feasible Brooklyn Priority Corridors by the end of 2017**

At off-peak times, congestion is diminished and vehicle speeds are higher, increasing the risk for pedestrian crashes as well as increasing the severity of those crashes. To better control speeds, DOT will modify off-peak signal timing on all feasible Brooklyn Priority Corridors by 2017.

# Brooklyn Priority Map



Priority  
Corridors

Priority  
Intersections

Priority  
Areas

NYPD  
Precincts





### **Install expanded speed limit signage on all Brooklyn Priority Corridors in 2015**

Effective November 7th, the speed limit on all unsigned streets in New York City was reduced to 25 MPH. However, streets that are signed for 30 MPH (or higher) will be evaluated on a case-by-case basis and switched to 25 MPH where feasible. DOT will evaluate all signage on Brooklyn Priority Corridors in 2015 and convert these to 25 MPH where feasible. In addition, signage will be expanded so the speed limit will be posted at a higher frequency along Brooklyn Priority Corridors. This will help to increase compliance with the speed limit, better educate the public about the new citywide speed limit, and make NYPD enforcement simpler and less ambiguous.

### **Drive community input and engagement at Brooklyn Priority Corridors, Intersections, and Areas**

As discussed earlier in this plan, areas in Brooklyn that have the highest incidence of pedestrian fatalities and severe injuries are not always the loudest voices providing input for transportation improvements. DOT commits to reaching out to these sections of Brooklyn and soliciting ground-level input from community members. This dialogue will take many forms, including full-fledged planning workshops and charrettes; streamlined, mobile meetings at places where community members already gather (libraries, community centers, parks, etc.); community walk-throughs; and direct communication with elected officials and community leaders in Priority Areas. To further facilitate and institutionalize this effort, DOT will hire a dedicated staff member in their Brooklyn office. This staff member will be assigned to neighborhoods that have historically been less engaged with the planning process.

### **Install additional lighting under elevated trains and around other key transit stops**

Streets located under elevated trains are typically high crash in New York City and have long been identified by residents and city officials as dark and shadowed. These conditions create visibility challenges for both pedestrians and vehicles. This problem is more acute in Brooklyn, where much of the subway network is elevated. The *Vision Zero Action Plan* called for street lighting to be enhanced at 1,000 intersections. In addition to these enhancements currently in progress, DOT will identify new locations focused on elevated train stops and other key transit locations and will pursue the additional funding necessary for implementation.



### **Install 60 new speed bumps in Brooklyn annually**

DOT will also continue its extensive citywide speed bump program, installing at least 250 bumps annually. However, due to its highly gridded street network (more opportunities for cut through traffic) and its higher rate of pedestrian fatalities on local streets, Brooklyn calls for a special focus on speed bumps. DOT will install at least 60 new speed bumps in Brooklyn each year, continuing to follow their established engineering standards and to consult with the local community.

### **Develop additional Neighborhood Slow Zones in Brooklyn Priority Areas**



While DOT will continue to implement Neighborhood Slow Zones to address crashes on local streets throughout New York City, Brooklyn calls for a special focus on this treatment. In Brooklyn, crashes on local streets occur at a higher rate than the rest of New York City, and crashes are spread more evenly throughout the borough. DOT will encourage communities in Priority Areas to apply for more Neighborhood Slow Zones, helping to reduce speeds and crashes in neighborhoods that are particularly prone to severe pedestrian injuries and fatalities.

### **Coordinate with MTA to ensure bus operations contribute to a safe pedestrian environment**

The MTA operates the largest bus system in the United States, with more than twice as many daily riders than the next leading system.<sup>4</sup> Buses are an extremely important part of the city's transportation network and vehicle mix in Brooklyn, constantly operating around and interacting with pedestrians (both riders and non-riders), cyclists and other road users. DOT will work closely with the MTA to provide for a safe, efficient, and effective transportation network that coexists with pedestrians and other modes, focusing on routes and stops at and around Priority Corridors and Priority Intersections, ensuring that facilities are designed and located to maximize pedestrian safety.



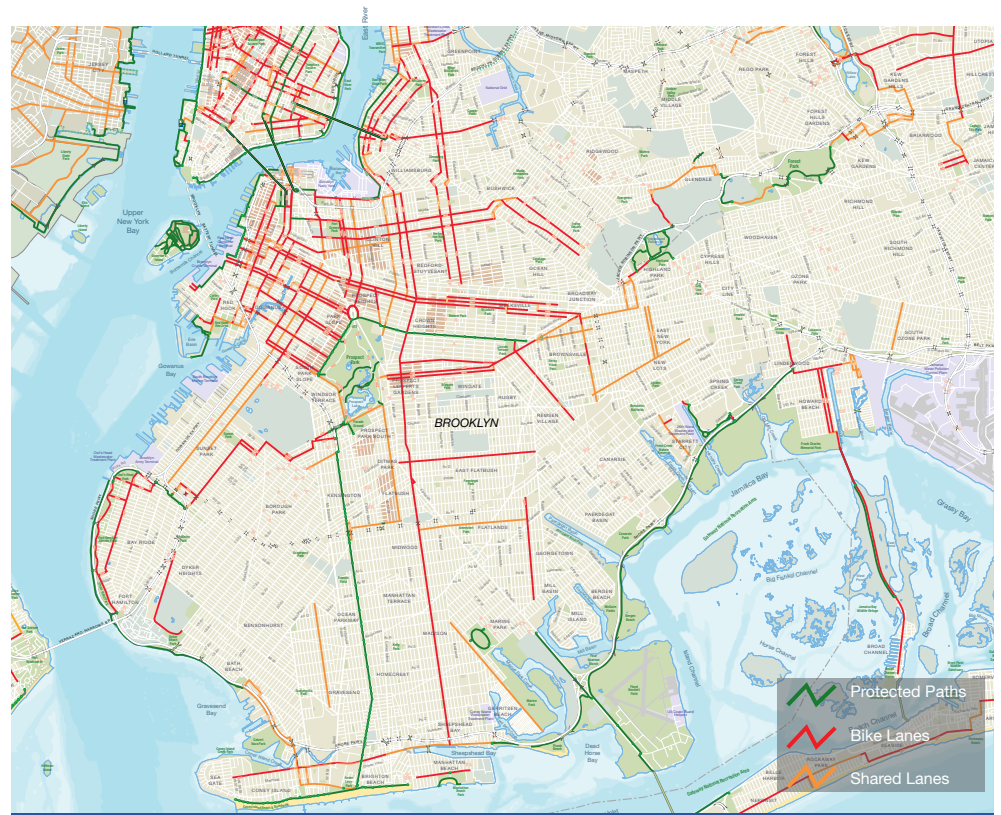


Pedestrian injuries declined 22% on New York City streets with protected bicycle lanes, like this one on Kent Avenue.

## Expand a bicycle network in Brooklyn that improves safety for all road users

Vision Zero's focus on vulnerable users—those most likely to be severely injured and killed in event of a crash—is an opportunity for a coordinated, complete streets approach to bicycle and pedestrian planning. Although there has been a marked downward trend in cyclist risk in New York in the past ten years, there were still 52 bicyclist fatalities in the city between 2011 and 2013, including 23 in Brooklyn. While this plan identifies priority corridors, intersections, and areas for pedestrian safety improvements, these locations also account for 63% of cyclist KSI in Brooklyn, and can represent priorities for bicycle safety as well.

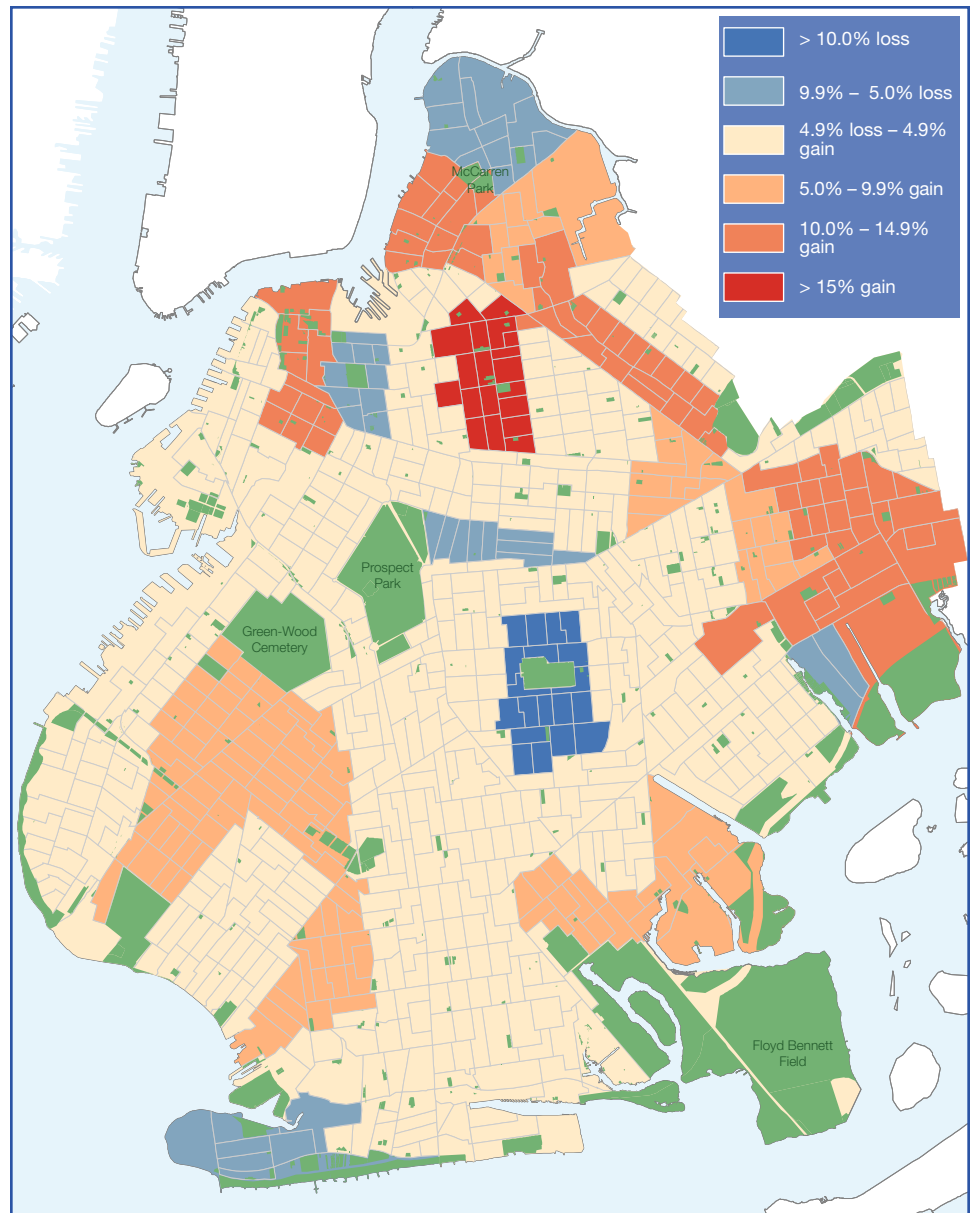
Pedestrian and bicycle planning share many of the same fundamental strategies to increase safety. Both groups benefit from reductions in speeds, efforts to enforce the traffic laws that make streets safe, and comprehensive engineering solutions that better organize traffic flow and reduce conflicts. In addition, well-designed bicycle lanes perform an important traffic calming function by right-sizing streets to the needed capacity and may also include pedestrian refuges that shorten crossing distances. A recent study found that pedestrian injuries declined 22% on New York City streets with protected bicycle lanes. That is why DOT will work closely with communities in Brooklyn to expand a bicycle network that improves safety for all road users, including constructing an additional 5 lane miles of protected bike lanes per year.



Brooklyn Detail from 2014 New York City Bike Map

## Proactively design for pedestrian safety in high-growth areas in Brooklyn, including locations in the *Housing New York* plan

In his 2014 housing plan—entitled *Housing New York: A Five-Borough, Ten-Year Plan*—Mayor de Blasio has laid out actions to spur affordable housing by increasing density, rezoning neighborhoods, redeveloping underutilized land, adaptively reusing buildings and space, and a host of other tools. Since these new housing locations will often be on vacant and underused sites, they may lack sufficient pedestrian safety infrastructure, and pedestrian activity (and pedestrian crashes) may presently be low.



Brooklyn Population Growth, 2000-2010



The City will be proactive and will develop pedestrian safety enhancements around housing development locations. DOT will work with the Department of Housing Preservation and Development (HPD), the Department of City Planning (DCP), the School Construction Authority (SCA) and the Mayor's Office to ensure that housing plan projects incorporate the highest-quality, modern standards in pedestrian safety. Development at these locations is an opportunity for New York City to develop streets that are even safer than the status quo.

A model for this collaborative work in a Priority Area is the Sustainable Communities East New York Initiative, where the City is working with community partners to develop a new mixed-use, middle-income development to support the vitality and livability of East New York and Cypress Hills.



Pitkin Ave rendering, Sustainable Communities East New York Initiative

# Enforcement

The *Vision Zero Action Plan* calls upon NYPD and DOT to develop a data-driven, citywide strategy for the enforcement of traffic safety violations. This plan will guide that strategy in Brooklyn.



## **Implement the majority of speed camera at Priority Corridors, Intersections, and Areas**

The New York State Legislature recently approved the use of speed cameras at 140 total locations near schools in all five boroughs. In Brooklyn, DOT will deploy those cameras by schools in and around Priority Corridors, Intersections, and Areas, unless a higher-crash location is also feasible. As always, speed cameras will only be deployed in accordance with their enabling legislation.

## **Focus enforcement and deploy dedicated resources to Brooklyn NYPD precincts that overlap substantially with Priority Areas**

Just as NYPD regularly targets chronically high-crime areas, NYPD will take the same tightly focused approach to chronically high-crash areas. NYPD will focus traffic enforcement at precincts in Priority Areas and provide additional dedicated resources to handle this stepped-up enforcement.

## **Prioritize targeted enforcement at all Brooklyn Priority Corridors, Intersections, and Areas annually**

- Prioritize enforcement on all 142 miles of Brooklyn Priority Corridors.
- Prioritize enforcement at all 91 Brooklyn Priority Intersections.
- Prioritize enforcement within all 18 square miles of Brooklyn Priority Areas.

To further inform enforcement efforts, DOT will provide detailed crash analyses of Brooklyn Priority Corridors, Intersections, and Areas to NYPD precincts. Enforcement will focus tightly on infractions that are particularly threatening to pedestrians, such as speeding and failure to yield.

Similar to crime data, effective evaluation of enforcement data must be conducted geographically (i.e., by street, intersection, or address). Currently, NYPD tracks and monitors activity at “Collision Prone Locations,” which are established using accumulated collision data. On the local level, each precinct conducts extensive analysis and mapping of their enforcement efforts in regards to collision reduction, particularly at Collision Prone Locations. These efforts are further scrutinized at the Department’s TrafficStat forums, wherein the precincts’ Executive Officers and Traffic Safety Teams are called upon to provide in-depth analysis of their traffic safety programs and enforcement efforts. In 2015, the NYPD plans to launch a major technological upgrade to its traffic analysis capabilities which will allow a more in-depth review, tracking, and accounting of collisions and enforcement in Brooklyn’s Priority Corridors, Intersections, and Areas.



# Education and Awareness Campaigns



## Target child and senior safety education at Brooklyn Priority Corridors and Priority Areas

The *Vision Zero Action Plan* calls for DOT to make effective, age-appropriate safety curricula available to schools throughout the City. This Borough Action Plan will guide that strategy in Brooklyn; DOT's Safety Education team will focus their programs at or near Priority Corridors, Intersections, and Areas with a high incidence of child pedestrian injury. Safety educators will work with schools to deliver comprehensive lessons to all members of the school community. All Vision Zero outreach and education to senior citizens will also be conducted within the Priority Areas and/or near Priority Corridors. In addition, hands-on safety demonstrations such as car safety seat checks, free helmet fittings and giveaways, anti-DWI information sessions, and Saturday table seminars will be made available through Brooklyn councilmembers and community groups.

## Launch multilingual public information campaigns in Brooklyn Priority Areas

Brooklyn is home to a large foreign-born population (39%) that is linguistically diverse. DOT will deploy Vision Zero outdoor campaigns (including paid placement on billboards, buses, and subway stations) in Priority Areas using Spanish, Chinese, Russian, and other languages as needed to reach Brooklynites.



## Target Street Team outreach at Brooklyn Priority Corridors, Intersections, and Areas

As directed by the *Vision Zero Action Plan*, NYPD and DOT have been conducting intensive street-level outreach on safety issues and traffic laws. This Brooklyn Pedestrian Safety Action Plan will further guide those efforts, as all future street-level outreach in Brooklyn will be conducted along Priority Corridors, at Priority Intersections, or within Priority Areas. Locations will be further prioritized based on pedestrian volumes (for efficient outreach) and by historically problematic locations identified by local communities.

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## ENDNOTES

- <sup>1</sup> National Highway Traffic Safety Administration, Traffic Safety Facts, 2012 Data.  
<http://www-nrd.nhtsa.dot.gov/Pubs/811888.pdf>
- <sup>2</sup> Data sources accessed 12-01-2014, killed or severely injured data includes only crashed that can be mapped
- <sup>3</sup> 49% decline in fatalities based on change in 3-year averages (1985-2013).
- <sup>4</sup> American Public Transportation Association, Quarterly Ridership Statistics, Third Quarter 2014.  
<http://www.apta.com/resources/statistics/Pages/ridershipreport.aspx>

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# Appendix A

## Brooklyn

### Priority Corridors

DOT identified **49 Priority Corridors** encompassing **50% of Brooklyn's total pedestrian KSI** and representing **142 miles (9%) of Brooklyn's total street network**:

Street Name	From	To	Ped Fatalities (2009-2013)	Ped KSI (2009-2013)	Miles	Ped KSI per mile (2009-2013)
Flatbush Av <i>[north leg]</i>	Fulton St	Grand Army Plz	4	23	1.1	20.8
Eastern Pkwy <i>[west leg]</i>	Grand Army Plz	Ralph Av	7	49	2.5	19.9
Utica Av	Fulton St	Av S	7	64	4.6	13.9
Ocean Pkwy	Prospect Exwy	Surf Av	8	64	4.9	13.2
Rockaway Pkwy <i>[north leg]</i>	E New York Av	Ditmas Av	5	17	1.4	12.4
Myrtle Av	Duffield St	Wyckoff Av	2	43	3.9	11.1
Av M	Dahill Rd	E 34 St	1	19	1.8	10.6
Rochester Av	Fulton St	E New York Av	1	11	1.0	10.5
Marcus Garvey Blvd	Broadway	Fulton St	1	15	1.4	10.4
Rockaway Pkwy <i>[south leg]</i>	Belt Pkwy	Av D	2	19	1.8	10.3
4 Av	Flatbush Av	Belt Pkwy	6	60	6.0	10.1
Bay Pkwy	Shore Pkwy	Ocean Pkwy	3	25	2.7	9.3
9 Av	37 St	61 St	1	11	1.2	9.3
Eastern Pkwy Ex <i>[east leg]</i>	Ralph Av	Bushwick Av	2	13	1.4	9.3
Church Av	37 St	E 98 St	2	36	4.0	9.0
Pitkin Av	Eastern Pkwy Ex	Ruby St	2	29	3.2	9.0
New Lots Av	Hegeman Av	Logan St	0	16	1.8	8.9
86 St	Shore Rd	Av X	2	38	4.3	8.8
Livonia Av	E 98 St	New Lots Av	2	17	1.9	8.8
Bushwick Av	Maspeth Av	Jamaica Av	3	32	3.6	8.8
Schenectady Av	Fulton St	Winthrop St	0	13	1.5	8.8
Fulton St	Adams St	Broadway	0	42	4.9	8.7
Ralph Av <i>[north leg]</i>	Broadway	E 98 St	1	16	1.9	8.6
Av Z	Shell Rd	Coyle St	3	18	2.1	8.6
Flushing Av	N Elliot Pl	Onderdonk Av	1	28	3.3	8.6

# Appendix A (Cont'd)

## Brooklyn

### Priority Corridors

Street Name	From	To	Ped Fatalities (2009-2013)	Ped KSI (2009-2013)	Miles	Ped KSI per mile (2009-2013)
Av R	E 5 St	Gerritsen Av	1	12	1.4	8.5
Flatbush Av <i>[south leg]</i>	Grand Army Plz	Marine Pkwy Br	8	68	8.0	8.5
Atlantic Av	Furman St	Eldert La	4	64	7.6	8.5
Nostrand Av	Flushing Av	Emmons Av	7	68	8.0	8.5
Broadway	Kent Av	E New York Av	6	36	4.4	8.2
Franklin Av	Wallabout St	Washington Av	1	21	2.6	8.1
Ralph Av <i>[south leg]</i>	Av T	Remsen Av	0	21	2.6	8.1
E 15 St	Av S	Sheepshead Bay Rd	1	9	1.1	8.0
Pennsylvania Av	Bushwick Av	Belt Pkwy	4	22	2.8	8.0
Classon Av	Kent Av	Washington Av	2	17	2.1	8.0
18 Av	Coney Island Av	Shore Pkwy	4	26	3.3	7.9
Troy Av	Fulton St	Winthrop St	2	12	1.5	7.9
Kingston Av	Fulton St	Winthrop St	0	12	1.5	7.8
Knickerbocker Av	Johnson Av	Moffat St	1	15	1.9	7.8
Rogers Av	Dean St	Farragut Rd	2	22	2.8	7.8
65 St	4 Av	Av P	1	25	3.2	7.7
Coney Island Av	Park Cir	Brightwater Ct	3	42	5.5	7.7
Court St	Montague St	Bryant St	2	14	1.8	7.6
Rockaway Av	Broadway	Rockaway Pkwy	1	19	2.5	7.5
Saratoga Av	Broadway	E New York Av	0	9	1.2	7.3
Av X	E 15 St	Boynton Pl	1	8	1.1	7.2
Liberty Av	Mother Gaston Blvd	Drew St	1	17	2.4	7.2
Graham Av	Flushing Av	Driggs Av	0	11	1.6	7.0
Neptune Av	W 14 St	West End Av	2	21	3.0	7.0

\*Nearest cross street, corridor ends at dead-end.



# Appendix B

## Brooklyn

### Priority Intersections

DOT identified **91 Priority Intersections** in Brooklyn, which cumulatively encompass **15% of the borough's total pedestrian KSI** and approximately **1% of all its intersections**.\*

Intersection	Ped KSI (2009-2013)	Ped Fatalities (2009-2013)
Utica Av & Eastern Pkwy	8	2
Kingston Av & Eastern Pkwy	7	0
Ocean Pkwy & Kings Hwy	7	1
Ralph Av & Paerdegat Av S & Flatlands Av	6	0
Graham Av & Flushing Av & Broadway	6	0
Utica Av & Church Av	6	1
10 Av & 65 St	6	0
Nostrand Av & Av Z	6	2
Atlantic Av & Court St	5	0
Parkside Av & Flatbush Av	5	1
86 St & Bay Pkwy	5	0
Nostrand Av & Fulton St	5	0
Utica Av & St John's Pl	5	0
Rutland Rd & Rockaway Pkwy	5	1
Rockaway Av & Livonia Av	5	1
Utica Av & Carroll St	5	0
Rochester Av & Eastern Pkwy	5	1
Liberty Av & Wells St & Euclid Av	5	1
18 Av & Ocean Pkwy	4	1
Av U & Flatbush Av	4	0
Franklin Av & Eastern Pkwy	4	1
Atlantic Av & Bedford Av	4	0
Linden Blvd & Church Av & E 93 St	4	0
Atlantic Av & Flatbush Av	4	0

Intersection	Ped KSI (2009-2013)	Ped Fatalities (2009-2013)
W Brighton Av & Ocean Pkwy & Brighton Beach Av	4	1
65 St & Bay Pkwy	4	0
Nostrand Av & Lee Av & Flushing Av	4	0
Pitkin Av & E New York Av & Howard Av	4	0
Ocean Pkwy & Church Av	4	1
Dorchester Rd & Coney Island Av	4	0
Myrtle Av & Marcus Garvey Blvd	4	0
Flatbush Av & Church Av	3	0
Ralph Av & Atlantic Av	3	1
86 St & 4 Av	3	0
Flatbush Av & Glenwood Rd	3	1
Rockaway Pkwy & Flatlands Av	3	0
Nostrand Av & Eastern Pkwy	3	1
Hillel Pl & Nostrand Av & Flatbush Av	3	0
Ocean Pkwy & Cortelyou Rd	3	0
Myrtle Av & Gold St & Flatbush Av Ex	3	0
Myrtle Av & Broadway & Jefferson St	3	1
20 Av & Mc Donald Av & Av I	3	0
Neptune Av & Ocean Pkwy	3	0
Fulton St & Brooklyn Av	3	0
Coney Island Av & Av J	3	0

\*To select a set of Priority Intersections that account for approximately 15% of pedestrian KSI, a "tiebreaker" system was necessary. To break the tie amongst intersections with three pedestrian KSI, a cut-off at four pedestrian injuries was used. Intersections that had three pedestrian KSI and four or more pedestrian injuries were included; intersections with less pedestrian injuries were excluded.

# Appendix B (Cont'd)

## Brooklyn

### Priority Intersections

Intersection	Ped KSI (2009-2013)	Ped Fatalities (2009-2013)
Brighton Beach Av & Coney Island Av	3	0
West Av & Ocean Pkwy	3	0
Linden Blvd & Ashford St	3	0
39 St & 4 Av	3	1
Quentin Rd & Ocean Av	3	1
Sutter Av & Fountain Av	3	0
Utica Av & Atlantic Av	3	0
Albany Av & Fulton St	3	0
60 St & Ft Hamilton Pkwy	3	0
Ocean Pkwy & Av J	3	0
President St & Utica Av	3	0
7 Av & 60 St	3	0
Farragut Rd & Rogers Av & Flatbush Av	3	0
Ocean Av & Foster Av	3	0
Havemeyer St & Broadway	3	0
Remsen Av & Flatlands Av	3	0
Pitkin Av & Pennsylvania Av	3	0
86 St & 5 Av	3	0
50 St & 4 Av	3	0
Ocean Av & Av M	3	0
Ralph Av & Av L	3	0
Fulton St & Throop Av	3	0
Sumner Pl & Broadway & Marcus Garvey Blvd	3	0
Ocean Pkwy & Av Z	3	0
Ocean Av & Av K	3	0

Intersection	Ped KSI (2009-2013)	Ped Fatalities (2009-2013)
Flushing Av & Bedford Av	3	1
Linden Blvd & Flatbush Av	3	0
Nostrand Av & Av M	3	0
Beverly Rd & Bedford Av	3	0
Rockaway Av & Prospect Pl & E New York Av	3	0
12 Av & 50 St & New Utrecht Av	3	0
New Utrecht Av & 65 St	3	0
Bedford Av & Av D	3	0
Myrtle Av & De Kalb Av & Central Av	3	0
W 1 St & Av X	3	0
Stillwell Av & Surf Av	3	0
Lee Av & Williamsburg St E & Keap St	3	0
Humboldt St & Metropolitan Av & Maspeth Av	3	1
Flatbush Av & Utica Av & Av S	3	0
Hooper St & Broadway	3	1
W 17 St & Neptune Av & Cropsey Av	3	0
53 St & 3 Av	3	0
Rochester Av & President St	3	0
Linden Blvd & Euclid Av	3	0
6 Av & 44 St	3	0
23 Av & 86 St	3	1

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