Making Safer Streets

November 2013

NEW YORK CITY DOT

New York City Department of Transportation
Introduction

Street Design and Traffic Safety

1 Make the Street Easy to Use
   Accommodate desire lines
   Minimize complexity for each user

2 Create Safety in Numbers
   Draw users together
   Create platoons of vehicles

3 Make the Invisible Visible
   Put people where they can see each other

4 Choose Quality Over Quantity
   Substitute two good lanes for three poor lanes
   Simplify complex intersections

5 Look Beyond the (Immediate) Problem
   Expand the focus area
Introduction

Over the past decade, New York City has seen a 30% decline in traffic fatalities, the lowest level since records were first kept in 1910, making New York City’s streets the safest of any big city in the United States.

NYCDOT is committed to continuing to improve the safety of our streets, with a goal of cutting traffic fatalities in half by 2030.

Making streets safer requires more than the traditional “3 Es” of engineering, education, and enforcement. It also requires working closely with local communities to collaboratively plan changes in how streets are designed and operated. And it requires learning from our successes to identify and implement the most effective approaches to street design.

This report focuses on how street redesigns can dramatically improve safety for all users.

This report highlights how signals, street geometry, markings, and signs can be used to make streets function better and more safely, and improve not only safety but also the attractiveness and usability of the street for pedestrians, drivers, and cyclists.

This detailed quantitative analysis is possible only because of the breadth of innovation that NYCDOT has brought to NYC streets, and the community support these changes have garnered. The City and its residents can use these results to continue to work collaboratively to make safer streets throughout the five boroughs.
In large part due to new street designs, the last decade has witnessed steady declines in the number of people killed or seriously injured in traffic crashes in NYC:

- 30% decline in fatalities since 2001. (See Figure 1)
- 29% decline in people killed or severely injured since 2001. (See Figure 2)
- 1,000 NYC lives have been saved by the decrease in traffic fatalities since 2001—including pedestrians, bicyclists, motorcyclists, drivers, and passengers

In 2010, NYCDOT released a comprehensive Pedestrian Safety Study & Action Plan. The plan identified the need to concentrate efforts along major corridors and at complex intersections where serious crashes are most prevalent.

Until NYCDOT began to systematically evaluate its re-engineering efforts, 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, agency planners were able to evaluate the effectiveness of each project on a broad range of metrics, including traffic safety. The agency thus began to build a base of experience with quantitative results specific to NYC. These results are shared with the public through NYCDOT’s Sustainable Streets Index report, which each year since 2009 has profiled a dozen major projects on a range of evaluation metrics including before and after crash histories.

This report builds on the approach of the Sustainable Streets Index, but with a broader set of projects, and focusing specifically on projects that have shown significant reductions in crashes that involve personal injuries. The resulting set of projects is quite diverse, ranging from complete street corridor and intersection redesigns to installation of targeted treatments.

Table 1 (p. 6) shows reductions in injury crashes for a large sample of NYCDOT projects. Crash reductions vary widely — from 12% to 88%, based on comparing crash levels for three years prior to implementation with two to three years of “after” data. The broad

The fundamental characteristic of the successful projects is that they create the opportunity for drivers, pedestrians, and cyclists to move through the street network simply and easily, minimizing the unexpected, the confusing, and the potential for surprises.
### Table 1: Reductions in crashes with injuries and/or fatalities

<table>
<thead>
<tr>
<th>Year</th>
<th>Borough</th>
<th>Project</th>
<th>Reduction in crashes with injuries</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 2007 | Bx      | 9th St, Prospect Park West to Hamilton Ave: 4-to-3 conversion with bike lanes | -19% | 369
| 2007 | Bx      | Southern Blvd, Boston Rd to Grand Army Plaza: bike lanes | -28% | 369
| 2007 | Mn      | 9th Ave, W 14th St to W 16th St: pedestrian plaza, network redesign | -46% | 369
| 2007 | Mn      | 9th Ave, W 16th St to W 23rd St: bike path | -52% | 369
| 2007 | Qn      | Jewett Ave, 164th St to Main St: 4-to-2 conversion with bike lanes and median | -37% | 369
| 2008 | Bs      | Vanderbilt Ave, Atlantic Ave to Grand Army Plaza: bike lanes and pedestrian safety islands | -15% | 369
| 2008 | Bx      | Brooklyn Bridge, Intersection of 3rd Ave, Willis Ave, Melrose Ave, and E 149th St: pedestrian plaza, network redesign with pedestrian safety islands | -17% | 369
| 2008 | Bx      | Lafayette Ave, Underhill Ave to Neeman Ave: 4-to-3 conversion with pedestrian safety islands | -24% | 369
| 2008 | Ms      | 8th Ave, Bank St to W 23rd St: bike path | -20% | 369
| 2008 | Mn      | 9th Ave, W 31st St to W 23rd St: bike path | -44% | 369
| 2008 | Mn      | Broadway, W 42nd St to W 35th St: bike path, pedestrian plazas | -32% | 369
| 2008 | Ms      | Madison Square, Intersection of Broadway, 6th Ave and 23rd St: pedestrian plazas, network redesign | -34% | 369
| 2008 | Mn      | Park Ave & E 33rd St: network redesign with pedestrian safety islands | -86% | 369
| 2008 | Mn      | Park Ave & E 40th St: network redesign with pedestrian safety islands | -57% | 369
| 2008 | Qn      | Boone St, Northern Blvd to Sanford Ave: 3-to-2 conversion with pedestrian safety islands | -23% | 369
| 2009 | Bk      | Gerritsen Ave, Whitney Ave to Nostrand Ave: 4-to-3 conversion, wide parking lanes & pedestrian safety islands | -40% | 369
| 2009 | Bk      | Park Circle: network redesign with pedestrian safety islands | -27% | 369
| 2009 | Bx      | Allerton Ave, Boston Rd to E. Gun Hill Rd: 4-to-3 conversion with bike lanes and pedestrian safety islands | -26% | 369
| 2009 | Ms      | Allen & Pk St: bike path, pedestrian plazas, network redesign | -18% | 369
| 2009 | Mn      | Green Light for Midtown, Broadway from W 59th St to W 26th St: pedestrian plazas and network redesign | -24% | 369
| 2009 | Qn      | Jackson Ave & Pulaski Br: network redesign with pedestrian safety islands | -63% | 369
| 2010 | Bx      | West 6th St, 65th St to 68th St: 4-to-3 conversion with wide parking lanes and islands | -31% | 369
| 2010 | Bx      | Claces Square, Intersection of 163rd St, Southern Blvd and Hunts Point Ave: network redesign with pedestrian plaza and islands | -24% | 369
| 2010 | Bx      | Randall Ave/Leggatt Ave/Tiffany St: 4-to-3 conversion with bike lanes | -23% | 369
| 2010 | Bx      | Southern Blvd, Westchester Ave to E 142nd St: 4-to-3 conversion with wide parking lanes and pedestrian safety islands | -20% | 369
| 2010 | Mn      | 1st Ave, E 1st St to E 33rd St: bike path and select bus service | -12% | 369
| 2010 | Mn      | Broadway, E 23rd St to E 17th St & Park Ave, E 17th St to E 14th St: network redesign with plaza | -24% | 369
| 2010 | Mn      | Central Park West and W 81st St: loading pedestrian interval | -18% | 369
| 2010 | Mn      | Water & Whitehall St: network redesign with pedestrian plazas | -20% | 369
| 2010 | Qn      | Hoyt Ave at RFK Bridge: network redesign and pedestrian enhancements | -33% | 369
| 2010 | Qn      | Hoyt Ave South and 239th St: new signal and crosswalks | -42% | 369
| 2011 | Bx      | Myrtle Ave, Flatbush Ave to Wyckoff Ave: off-peak signal timing | -52% | 369
| 2011 | Bx      | Grand Concourse, E 140th St to Mosholu Parkway: off-peak signal timing | -14% | 369
| 2011 | Bx      | Macombs Rd, University Ave to Jerome Ave: 4-to-3 conversion with wide parking lanes, islands and intersection redesigns | -41% | 369
| 2011 | Mn      | 7th Ave and W 23rd St: intersection redesign | -63% | 369
| 2011 | Mn      | Columbus Ave, W 66th St to W 77th St: bike path | -25% | 369
| 2011 | Mn      | Madison Ave and E 135th St: intersection redesign | -18% | 369
| 2011 | Qn      | Bowne St, Northern Blvd to Sanford Ave: pedestrian island and median extension | -19% | 369

*only two years of after data available

SOURCE: NYC DOT AIS/TAMS Crash Database

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### New York City Cycling Risk

**Index of risk of serious injury to cyclists, taking into account bike volumes and number of crashes involving serious injury to cyclists**

**NYC In-Season Cycling Indicator:**


**Cycling Risk Indicator:**

- **In-Season Cycling Indicator**

**SOURCE:** Bicyclist Fatalities: NYC DOT/NYPD Traffic Fatality Database as of mid-October 2013

**Bicyclist Severe Injuries:** NYC DOT SIMS/ALIS Crash Database (Type A injuries reported in crashes involving bicycles)

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By looking across this diverse set of projects, it is possible to start to draw conclusions about what approaches are most successful in improving traffic safety. The fundamental characteristic of the successful projects, whether large or small, is that they create the opportunity for all users — drivers, pedestrians, and cyclists — to move through the street network simply and easily, providing clear paths that get them where they want to go, minimizing the unexpected, the confusing, and the potential for surprises. By addressing issues of complexity, confusion, lack of visibility of vulnerable street users, and excessive vehicular speeds which are most likely to cause death or severe injury, the projects highlighted in the study reduce the risk of crashes.

In tackling these issues, safety projects also make streets into attractive places where people are comfortable and want to be. Safety measures thus also fundamentally serve the mobility, quality of life, and economic well-being of everyone, as well as the specific goal of traffic safety.
Making safer streets always requires traffic engineering expertise and judgment, and some aspects such as turning radii and traffic signal timing are quite technical in nature. However, key concepts to designing safer streets are actually quite simple and common-sense driven. The remaining sections of this report highlight five key ways to design safer streets. Each section includes a drawing that highlights the effect on street operations, provides examples of projects and crash reduction results where the approach was a key part of the design, and identifies traffic engineering and traffic calming treatments that are often used to put the concept into reality on the streets of the city.

These concepts, summarized below, represent a distillation of NYCDOT’s experience with street design projects that have proven most effective in reducing crashes:

- **Make the street easy to use** by accommodating desire lines and minimizing the complexity of driving, walking, and biking, thus reducing crash risk by providing a direct, simple way to move through the street network.

- **Create safety in numbers**, which makes vulnerable street users such as pedestrians and cyclists more visible. The same design principle, applied to arterial streets when traffic is light, reduces the opportunity for excessive speeds.

- **Make the invisible visible** by putting users where they can see each other.

- **Choose quality over quantity** so that roadway and intersection geometries serve the first three design principles.

- **Look beyond the (immediate) problem** by expanding the focus area if solutions at a particular location can’t be addressed in isolation.
**Make the Street Easy to Use**

Difficulty and complexity increase risks on busy city streets. Streets that are easy to use reduce that risk and make for a safer, more attractive experience.

**Accommodate Desire Lines**

Making a street easy to use starts with understanding what people want to do. A street should accommodate desire lines—how people actually want to move through a space. Users should be provided with a simple and clear path, with minimized complexity and without needing to go out of their way. Pathways for each movement and user can be clearly marked. Conflicting movements such as between pedestrians and vehicles can be separated, each given its own space and/or time for movement.

**BEFORE**

- Long indirect crosswalks
- Undefined lanes for drivers
- Long waits for green or walk because multiple legs of traffic each have a signal phase

**AFTER**

- Shorter pedestrian crossings
- Lane designations show clear path for drivers
- Shorter waits with low volume legs removed from main intersection

**Street Treatments often used with this strategy:**

1. **Delayed Turning**
   - Allows through vehicles to move while holding turning vehicles, giving pedestrians a head start or a conflict free crossing

2. **Restrict Turns**
   - Remove difficult turns that cause conflicts and create opportunities for additional improvements

3. **Extend Medians**
   - Lengthen/widen existing medians to tighten up intersection

4. **Eliminate Movements**
   - Reduce number of movements entering a complicated intersection

5. **Lane Designation**
   - Clarifies who belongs where

6. **Create Right Angle Intersections**
   - Slows vehicles turning into pedestrian crossings and shortens crossing distances

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**MANHATTAN: 7th Ave & W 23rd St**

- Injury crashes down by 25%
- Treatments: 1, 2, 5

**QUEENS: Jackson Ave & Pulaski Br**

- Injury crashes down by 68%
- Treatments: 1, 3, 4, 5, 7

**MANHATTAN: Madison Ave & E 135th St**

- Injury crashes down by 63%
- Treatments: 1, 2, 3, 4, 5, 6, 7
Make the Street Easy to Use

Minimize Complexity for Each User

Complex intersections create difficulty for users and have a greater risk of crashes. Through design, complexity and the potential for conflict can be reduced. Well designed merges and transitions, signalized intersections, medians, clear lane assignments, and designated facilities for bicyclists all reduce complexity.

BEFORE
- No defined lanes
- Long unbroken crossings
- No facilities for cyclists
- Sidewalks end before reaching crosswalk

AFTER
- Median or pedestrian islands allow safer crossing and connection to crosswalk
- Lane designation markings and signage directs users
- Bike facility designates space for cyclists

Street Treatments often used with this strategy:

1 Clear Merges and Transitions
   By improving alignments and clearly marking merges driving is simplified

2 Lane Designation
   Clarifies who belongs where

3 Bicycle paths and lanes
   Clearly designates the bicycle right of way

4 Signals and Controls
   Adding control to an intersection for all users eliminates confusion

5 Pedestrian Safety Islands
   Pedestrians wait midway through crossing the street. Shortens distance to cross at one time. Adds visual cues to presence of pedestrians. Beautifies corridor

6 Crosswalks
   Add crosswalks where pedestrians want to cross

Queens:
- Hoyt Ave South & 29th St
  Injury crashes down by 42%
  Treatments: 1, 2, 4, 6

- Vernon Blvd & 36th Ave
  Injury crashes down by 19%
  Treatments: 2, 3, 4, 5, 6

Brooklyn:
- Park Circle
  Injury crashes down by 27%
  Treatments: 1, 2, 3, 4, 5, 6
Create Safety in Numbers

Draw Users Together
Perhaps the simplest way to improve safety for more vulnerable users is to increase their presence on the street. Encouraging these users toward a specific location makes their presence more predictable to drivers. Creating facilities that draws users is key to increasing these volumes.

BEFORE
- Long indirect crosswalks lead to jaywalking
- No defined spaces for cyclists
- Undefined lane destination for drivers increases unpredictably

AFTER
- Direct crosswalks reduce jaywalking
- Hi-visibility crosswalks protect pedestrians at intersection
- Bike lane attracts and organizes cyclists
- Safety islands draw pedestrians to safe crossings
- Clear lane designation for all users
- New pedestrian amenities

Make Safer Streets

BEFORE
- Long indirect crosswalks lead to jaywalking
- No defined spaces for cyclists
- Undefined lane destination for drivers increases unpredictably

AFTER
- Direct crosswalks reduce jaywalking
- Hi-visibility crosswalks protect pedestrians at intersection
- Bike lane attracts and organizes cyclists
- Safety islands draw pedestrians to safe crossings
- Clear lane designation for all users
- New pedestrian amenities

Street Treatments often used with this strategy:

1. Midblock Crosswalks
   Provide midblock crossing close to desire lines

2. Pedestrian Ramps and Safety Islands
   Provide access and waiting areas for pedestrians

3. Bicycle Facilities
   Makes cyclists feel comfortable and increases awareness and predictability

4. Pedestrian Plazas
   Draws pedestrians to specific zones and alerts drivers that pedestrians are present

Create Safety in Numbers: Results

MANHATTAN: Columbus Ave, W 96th St to W 77th St
Injury crashes down by 25%
Treatments: 2, 4

MANHATTAN: Water St & Whitehall St
Injury crashes down by 20%
Treatments: 3

BROOKLYN: Vanderbilt Ave, Atlantic Ave to Grand Army Plaza
Injury crashes down by 15%
Treatments: 2, 4

MANHATTAN: 6 1/2 Ave
Pedestrian/vehicle conflicts have been reduced to 5% vs. 95% in the before condition
Treatments: 1, 2, 3, 4

MANHATTAN: Water St & Whitehall St
Injury crashes down by 20%
Treatments: 3

MANHATTAN: 6 1/2 Ave
Pedestrian/vehicle conflicts have been reduced to 5% vs. 95% in the before condition
Treatments: 1, 2, 3, 4

MANHATTAN: Vanderbilt Ave, Atlantic Ave to Grand Army Plaza
Injury crashes down by 15%
Treatments: 2, 4
Create Safety in Numbers

Create platoons of vehicles

信号计时和相位可以与街道设计相结合，以进一步实现增加车辆数量以创造更安全街道的概念。计时可以用来创建车辆的群体，不仅鼓励行驶的车流作为一个群体，而且创造清晰的间隙，供行人和自行车穿过街道。

BEFORE
- 车辆随机分布
- 超速和变道在车辆之间更容易发生
- 行人和左转车辆冲突
- 摩托车和公共汽车在不均匀分布的车辆之间
- 街道感觉混乱和不可预测

AFTER
- 群车之间的间隔
- 转弯车辆等待群体的行人
- 车流有序和组群
- 绿色波段跳跃允许车辆得到先头

Street Treatments often used with this strategy:

1. **Green Waves**
   - 保持驾驶者在车辆的夹层中以一致的速度行驶

2. **Leading Pedestrian Intervals**
   - 给群体的行人一个先头

3. **Off-Peak Signal Timing**
   - 减少超速的机会

4. **Leading Bus Interval**
   - 给公共汽车一个机会

5. **Left Turn Phases**
   - 分隔转弯的交通和行人

BROOKLYN:
Myrtle Ave, Flatbush Ave to Wycoff Ave
Injury crashes down by 32%
Treatments: 1, 3

MANHATTAN:
Central Park West and W 81st St
Injury crashes down by 18%
Treatment: 2

BRONX:
Grand Concourse, E 140th St to Mosholu Pkwy
Injury crashes down by 14%
Treatments: 1, 3, 5

Injury crashes down by 14%
Treatments: 1, 3, 5
Make the Invisible Visible

What you can’t see can, in fact, hurt you. The mutual visibility of pedestrian, drivers, and cyclists is key to ensuring safe passage through an intersection where their paths cross.

Put people where they can see each other
Street design can greatly enhance visibility of all users. People should be moved into positions where they can see one another. Visual cues can call attention to the potential presence of user, or to slow drivers as they navigate a non-typical streetscape. When all else fails the invisible movement can be investigated for elimination.

BEFORE
- Sight lines for turning vehicles is impeded by parked cars
- Bicyclists and pedestrians who have right of way are not fully visible
- Not predictable whether traffic will turn or continue straight
- Street can feel overwhelming

AFTER
- Bikers and turning vehicles share curbside lanes to increase visibility and predictability
- Daylighting with extensions increases visibility for pedestrians
- Street feels manageable and predictable

Street Treatments often used with this strategy:

1. Mixing Zones
   Increases visibility between drivers, cyclists, and pedestrians

2. Daylighting
   Improves visibility between drivers and pedestrians in the crosswalk

3. Curb Extensions
   Brings pedestrians into sightline of drivers, shortens crossing distances

4. Pedestrian Safety Islands
   Pedestrians wait midway through crossing the street. Shortens distance to cross at one time. Adds visual cues to presence of pedestrians. Beautifies corridor

5. Leading Pedestrian Interval
   Pedestrian walk signal proceeds green for turning movement to give peds a head start

6. Eliminate Unsafe Movements
   When it is clear that a specific action is causing a majority of accidents, efforts should be made to eliminate the movement.

MANHATTAN: Park Ave & E 33rd St
Injury crashes down by 14%
Treatments: 2, 3, 4, 6

MANHATTAN: Allen and Pike Sts, Houston St to South St
Injury crashes down by 88%
Treatments: 2, 3, 4, 6

MANHATTAN: 1st Ave, E 1st St to E 33rd St
Injury crashes down by 36%
Treatments: 1, 2, 3, 4, 5
Choose Quality Over Quantity

New York City streets have many demands placed on them. These demands evolve over time. If the street is not updated to serve current needs, chaotic conditions can prevail. By clearly marking what part of the street should serve each use, and prioritizing the most important uses, streets can work better and be safer.

**Substitute two good lanes for three poor lanes**
Travel lanes are only truly effective when they can function without disruption. In many cases, a road with numerous undesignated lanes can get congested due to double parking and/or turning occurring in what is supposed to be a through lane. By designating space for other roadway actions, the through lanes, while reduced, can function more efficiently.

**BEFORE**
- Drivers constantly change lanes to get around left turns and double-parked cars
- Difficult to drive
- Congested and unpredictable
- Leads to rear-end and left turn crashes

**AFTER**
- Through lanes are clear of turning and stopped vehicles
- Easier to drive
- Better traffic flow
- Easier to anticipate drivers’ movements
- Safer

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**Street Treatments often used with this strategy:**

1. **Dedicated left turn lanes**
   - Relieves pressure drivers may feel to make the turn too quickly or too soon

2. **Wide parking lane**
   - Keeps double-parked cars from blocking the adjacent lane as well as allowing bike riders to travel outside traffic flow

3. **Pedestrian Safety Islands**
   - Pedestrians wait midway through crossing the street. Shortens distance to cross at one time. Adds visual cues to presence of pedestrians. Beautifies corridor

4. **Bike lanes**
   - Designates space for cyclists

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**Making Safer Streets**

**BEFORE**

**AFTER**

Choosing Quantity over Quality: Results

**BROOKLYN:**
Gerritsen Ave, Whitney Ave to Nostrand Ave
Injury crashes down by 20%
Treatments: 1, 2, 3

**BRONX:**
Randall Ave/Leggett Ave/Tiffany St
Injury crashes down by 23%
Treatments: 1, 4

**BRONX:**
Southern Blvd, Westchester Ave to E 142nd St
Injury crashes down by 20%
Treatments: 1, 2, 3

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New York City Department of Transportation
Choose Quality Over Quantity

Simplify complex intersections
There are many complex intersections throughout the city where streets meet at odd angles, particularly in the outer boroughs where neighborhood grids converge. These intersections often have approaches that can be diverted or completely removed, thus creating standard right-angle geometry and adding time for remaining movements.

**BEFORE**
- Large, multi leg intersection competes for signal time
- Long indirect crosswalks
- Pedestrians crossing along unprotected desire lines
- No separation between vehicle movements

**AFTER**
- Restricted turns
- Some traffic approaches removed from main intersection with dividers or islands
- Simplified signal timing
- New shorter crossings that accommodate desire lines
- New plaza space for pedestrians to enjoy and to enhance the local district.

Choosing Quantity over Quality: Results

- **MANHATTAN:**
  - Madison Square
    - Injury crashes down by 34%
    - Treatments: 1, 4, 5
  - Herald Square
    - Injury crashes down by 25%
    - Treatments: 1, 2, 3, 4, 5
  - Times Square
    - Injury crashes down by 20%
    - Treatments: 1, 2, 3, 4, 5

- **BRONX:**
  - Bronx Hub
    - Injury crashes down by 17%
    - Treatments: 1, 2, 3, 4, 5

Street Treatments often used with this strategy:
1. **Network Change**
   - Redirect an approach of traffic to other parts of the local street network or forced turns at main intersection
2. **Turn Bans**
   - Relocate high conflict turns to lower demand intersections
3. **Removal of Low Volume Approach**
   - Completely remove approach from intersection
4. **Square Off Intersection**
   - Sharpen radii, reshape approaches to enter on better angle
5. **Public Space Creation**
   - Turn underutilized roadbed into public amenity
**Look Beyond the Problem**

**Expand the focus area**

Sometimes, even with careful analysis, it can be difficult to identify any solution to a particular problem location. Expanding a project area to include its local street network can unlock new possibilities. Looking beyond the intersection or corridor can help further improve the main project area. Intersection problems can often be addressed with corridor redesigns that reassess which movements need to be accommodated at which intersection.

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**BEFORE**
- Large, complex intersection is difficult to navigate
- Long waits because each traffic leg needs a signal phase
- Poor connectivity along corridors leading to main intersection

**AFTER**
- Minimize presence of legs with lower volumes
- Corridors leading into intersection are matched to volume they carry
- Turn bans at intersection accommodated elsewhere in local network

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**Street Treatments often used with this strategy:**

1. **Network Change**
   - Redirect a leg of traffic to other parts of the local street network

2. **Turn Bans**
   - Relocate high conflict turns to lower demand intersections

3. **Signal Progression Changes**
   - Modify progression of signals on corridors heading into intersection to meter flow

4. **Road Diet**
   - Examine roadways leading to project area to ensure they are to scale with local neighborhood network

5. **Lane Designations and Signal Phasing**
   - Clarifies who belongs where and when each movement can operate

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**Look Beyond the Problem: Results**

**MANHATTAN:**
9th Ave, W 15th to W 14th St
Injury crashes down by 46%
Treatments: 1, 2, 3, 5

**QUEENS:**
Hoyt Ave/Astoria Blvd/33rd St/31st St
Injury crashes down by 33%
Treatments: 2, 5

**MANHATTAN:**
Broadway, E 23rd to E 17th St & Park Ave, E 17th to E 14th St
Injury crashes down by 24%
Treatments: 1, 2, 4

**BRONX:**
Southern Blvd/ Hunts Point Ave/163rd Street
Injury crashes down by 24%
Treatments: 1, 2, 4, 5
This report was developed by the New York City Department of Transportation’s Division of Traffic and Planning. Deputy Commissioner Bruce Schaller directed the report team which consisted of Assistant Commissioner Ryan Russo, Joshua Benson, Sean Quinn, Matthew Roe, and Seth Hostetter. Graphic design and production by Pure+Applied.

Projects listed in this report were developed, designed, and implemented by various individuals and divisions across the DOT as well as in collaboration with other city and state agencies. Additionally, each project had the input and support of citizens, elected officials, and community boards. The final results can be considered a true team effort.