

# Charlotte's Pedestrian Safety Action Plan

May 2013



## EXECUTIVE SUMMARY

The Charlotte Department of Transportation is transforming the existing transportation network to create a more walkable community, and changing the character of roadways to allow safe and convenient pedestrian accommodation.

The ultimate goal of the Pedestrian Safety Action Plan is to reduce the citywide per capita rate of pedestrian crashes, injuries, and fatalities while encouraging walkability. The plan builds on existing efforts to improve the pedestrian environment. The aim of the plan is to increase safety and quality of life for all users of Charlotte’s streets.

The Pedestrian Safety Action Plan covers two main sections. The first section outlines Charlotte’s pedestrian crash analysis in detail over the last five years. The second provides details around the action plan, focusing on the 5 E’s: Engineering, Education, Encouragement, Enforcement, and Evaluation.

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## INTRODUCTION

The land development patterns of cities over the last 50 years, especially in fast growing southern cities like Charlotte, have been auto-oriented, with a sprawling land development pattern. This type of development pattern, which dominated much of the late 20th century, is inherently hostile to pedestrians.

The City of Charlotte understands that to have a robust transportation network, the system must be safe, comfortable and convenient for everyone – pedestrians, bicyclists, transit riders, as well as motorists. For the past decade, Charlotte has been a transportation leader, seeking to build a street network integrated with a sustainable land development pattern. Key land development and transportation elements that impact pedestrian safety include, traffic speeds, block sizes, traffic signal spacing, the arrangement of residential and commercial uses, opportunities to cross the street safely, sidewalks, on-street parking, bicycle facilities, and transit frequency. When these elements are done well, a walkable community can emerge with streets that are comfortable, safe and convenient for people.

Streets constitute the largest component of public space and play a major role in establishing the image of the community. Streets affect the health, vitality, quality of life, and economic welfare of a city. Providing a well-connected network of streets is essential for quality, walkable development.

The location and types of streets largely determines how much development can be supported. The design of a street is only one aspect of its effectiveness. How the street fits within the surrounding transportation network and supports adjacent development is important to its safety and walkability.



How Charlotte chooses to develop will greatly impact pedestrian safety and walkability in the coming decades.

A key part of the Charlotte Department of Transportation's (CDOT) mission is traffic and pedestrian safety. CDOT staff has a commitment to analyzing vehicle and pedestrian crashes and developing solutions to make the city's streets and highways safer. As Charlotte becomes a more walkable city, CDOT is working to provide safe, comfortable walking conditions in all parts of the community.

On average, 18,000 motor vehicle crashes occur on Charlotte streets every year. Of those, approximately 300 involve pedestrians. This document provides an in-depth evaluation of the pedestrian crashes within the City of Charlotte. Information presented in this Plan compares 2012 pedestrian fatalities to pedestrian crash trends over the previous five years.



Much of Charlotte's sprawling development pattern is characterized by a built environment where homes are separated from shops, services, leisure opportunities, work places, and civic and community buildings. The transportation system that evolved to serve this dispersed and pod-like pattern features wide thoroughfares, long distances between traffic signals, and large

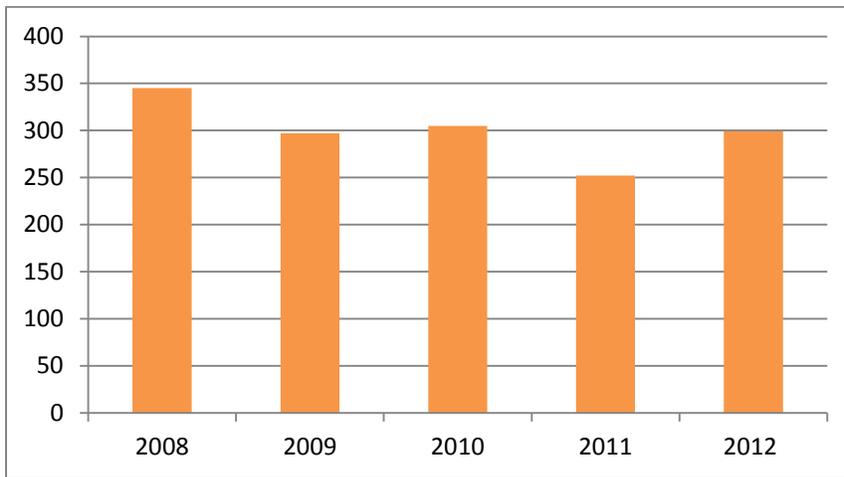
complex intersections.

Although the City has made great strides providing a more robust transit system as well as walking and bicycling facilities, most of the community remains automobile dependent and inhospitable for walking. Pedestrians are exposed especially when crossing busy arterial streets to catch a bus or shop on the opposite side of the street from their home or workplace.

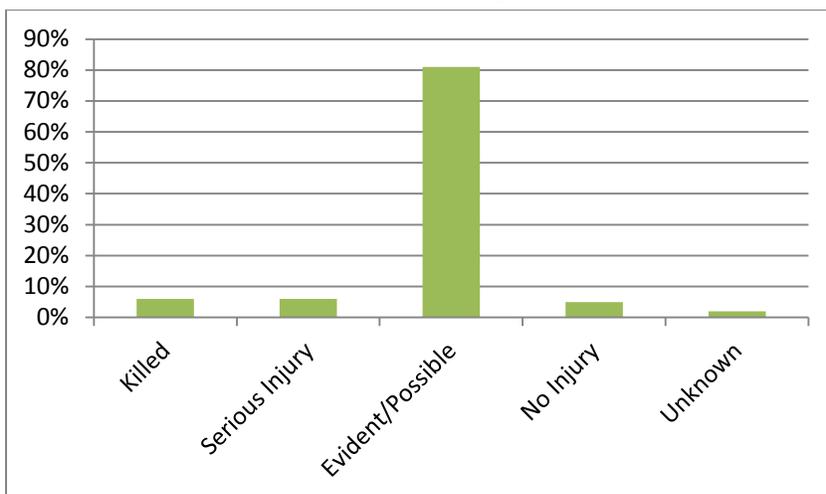
## CRASH ANALYSIS

Approximately 65 percent of motor vehicle crashes result in property damage without injury and 35 percent result in injury. Of the total injury crashes, less than 0.2 percent results in fatalities. Taking a more in-depth look at the pedestrian data, there are on average 300 pedestrian crashes each year. Of those pedestrian crashes, 93 percent involve injury and 7 percent result in no injury. Approximately 6 percent of the pedestrian injury crashes result in fatalities. Figure 1 shows the five-year trend in total numbers of pedestrian crashes in Charlotte. Figure 2 illustrates the 5-year totals by injury severity. Figure 3 shows the number of pedestrian fatalities in the last five years.

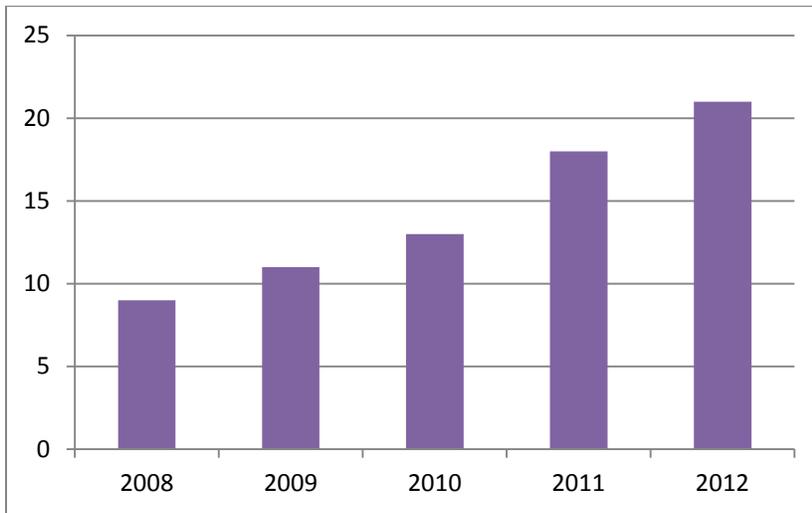
**FIGURE 1. CHARLOTTE'S FIVE-YEAR PEDESTRIAN CRASHES, 2008 – 2012**



**FIGURE 2. PEDESTRIAN INJURY SEVERITY, 2008 – 2012**



**FIGURE 3. PEDESTRIAN FATALITIES, 2008 – 2012**



Crash trends are reported by total numbers of crashes, injury and severity, and crash rates. Crash rates are calculated using the number of vehicle miles traveled or population as the base line. Figures 4 and 5 illustrate the crash rate for years 2008-2012 using vehicle miles traveled and population.

**The overall pedestrian crash rate based on vehicle miles traveled decreased from 2008 to 2011; however, the pedestrian fatality rate increased in the same time frame. Similarly, the overall total pedestrian crash rate based on population decreased from 2008 to 2011, but the fatality crash rate increased over the same period.**

**FIGURE 4. CRASH RATES PER VEHICLE MILES TRAVELED BY YEAR, 2008 – 2012**

Year	Total Pedestrian Crashes	Pedestrian Fatalities	Vehicle Miles Traveled	Pedestrian Crash Rate <sub>1</sub> Per Million Vehicle Miles	Pedestrian Fatality Crash Rate <sub>2</sub> Per Million Vehicle Miles
2008	345	9	22,051,666	15.65	0.41
2009	297	11	20,333,841	14.61	0.54
2010	305	13	19,717,761	15.47	0.66
2011	252	18	19,101,681	13.19	0.94
2012	299	21	19,552,898	15.29	1.07

Notes:

1 Pedestrian Crash rate = (total pedestrian crashes x 1,000,000)/vehicle miles traveled

2 Pedestrian Fatality rate = (total pedestrian fatalities x 1,000,000)/vehicle miles traveled

**FIGURE 5. CRASH RATES BY POPULATION PER YEAR, 2008 – 2012**

Year	Total Pedestrian Crashes	Pedestrian Fatalities	Population <sub>1</sub>	Pedestrian Crash Rate <sub>2</sub> Per 10,000 Persons	Pedestrian Fatality Crash Rate <sub>3</sub> Per 10,000 Persons
2008	345	9	674,752	5.11	0.13
2009	297	11	692,097	4.29	0.16
2010	305	13	731,424	4.17	0.18
2011	252	18	750,124	3.36	0.24
2012	299	21	772,627	3.87	0.27

Notes:

1 Population source: <http://charlottechamber.com/eco-dev/demographics-economic-profile/>

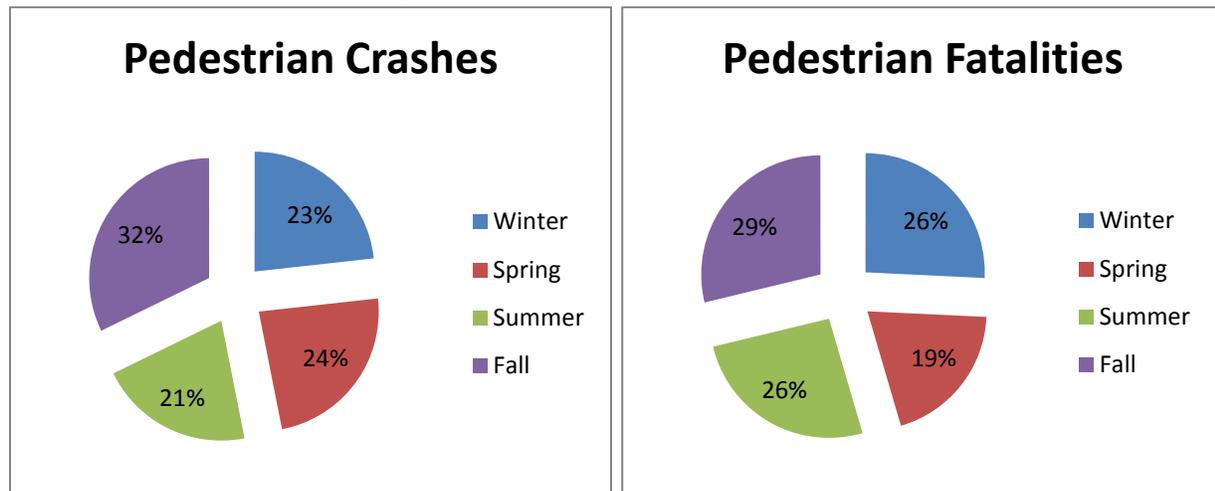
2 Pedestrian Crash rate = (total pedestrian crashes x 10,000)/population

3 Pedestrian Fatality rate = (total pedestrian fatalities x 10,000)/population

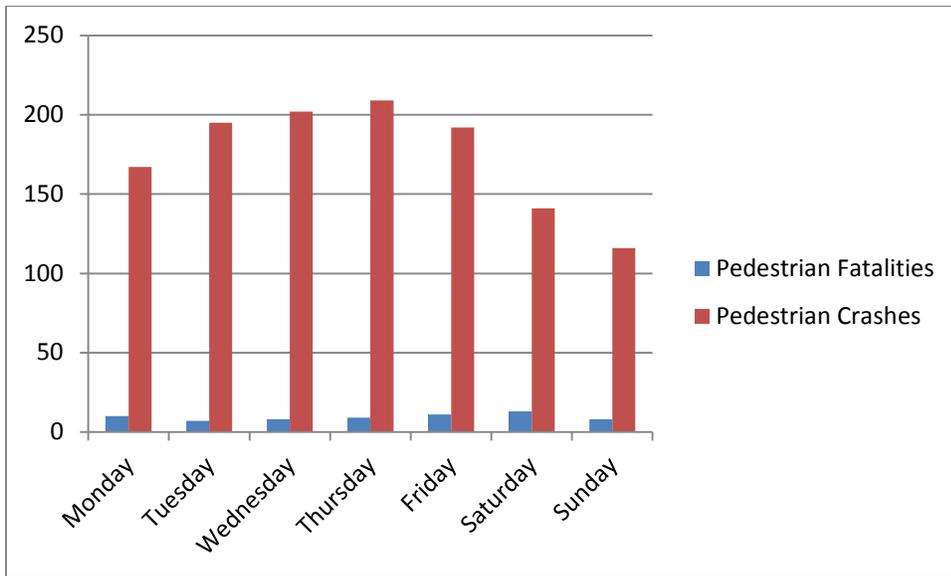
Time and Location

Crashes tend to fluctuate by month from year to year; however the fall months have the higher number of crashes, approximately 30 percent. Pedestrian fatalities in the five-year period follow similar trends. Day of week trends between total pedestrian crashes and pedestrian fatalities are similar.

**FIGURE 6. SEASON BREAKDOWN, YEAR 2008 – 2012**



**FIGURE 7. DAY OF WEEK PEDESTRIAN CRASHES, 2008 – 2012**



During the five-year study period, 59 percent of all pedestrian crashes occurred during daylight hours and 41 percent occurred at night. In comparison, 77 percent of the fatalities in the five-year study period happened at night and 23 percent during the day. Looking specifically at the 2012 fatalities, 62 percent occurred at night and 38 percent occurred during the day.

Pedestrian crashes can vary by location, but the majority occurs on thoroughfares.

Thoroughfares typically carry higher vehicle volumes and higher vehicle speeds. In the five-year study period, pedestrian crashes were represented as follows:

- 71 percent on thoroughfares
- 23 percent on local streets
- 6 percent on collector streets

**Thoroughfares represented 97 percent of the fatalities in a five-year period but in 2012, 100 percent occurred on thoroughfares.**

Pedestrian crashes can occur at intersections or mid-block. In the five-year study period, the majority of pedestrian crashes, 63 percent, occurred at intersections and 37 percent occurred mid-block. The trends for pedestrian fatalities in the five-year period are slightly different; approximately 55 percent have occurred mid-block and 45 percent at intersections.

**FIGURE 8. LOCATION OF PEDESTRIAN CRASHES**

Location	Pedestrian Crashes 2008 – 2012	Pedestrian Fatalities 2008 – 2012	Pedestrian Fatalities 2012
Thoroughfare	71%	96%	100%
Collector Street	6%	1%	
Local Street	23%	3%	
Intersection	63%	42%	65%
Mid-block	37%	58%	35%

Contributing Circumstances

The crash reports can include both driver and pedestrian contributing circumstances such as distracted driving, failure to yield the right-of-way, darting, alcohol and/or drugs, speeding, etc. Some combination of driver and pedestrian contributing circumstances were noted in the vast majority, 88 percent, of the 2012 fatal crashes. Only 12 percent of the 2012 fatal crashes contained no contributing circumstances. Alcohol and/or drugs were suspected in 17 percent of the crashes. Speeding was reported in 29 percent of the 2012 pedestrian fatality crashes. Speeding between 5 and 10 mph was noted in 18 percent of the crashes.

Crashes over the last year are consistent with historical trends with respect to time of day and location. It is not uncommon to see minor fluctuations year to year; however, the **fatality trends have remained consistent over the last five years and are similar to state-wide trends.**

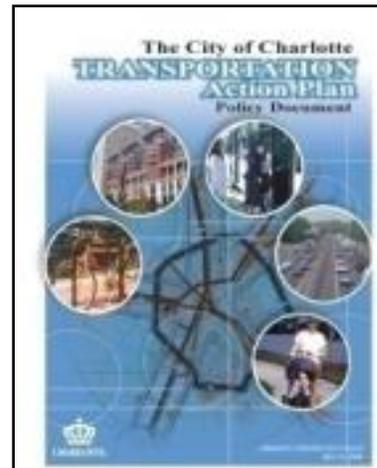
When a pedestrian fatality occurs, a field review is conducted and an analysis of the built environment completed. Pedestrian crash fatality rates increase significantly with vehicle speeds above 30 mph. While it is challenging to reduce travel speeds to 30 mph on all arterial and collector roadways, a general reduction in travel speeds allows drivers and pedestrians more time to react when a conflict occurs. Reduction in travel speeds enables the safe installation of midblock crossing features in a wider range of roadway settings.

## ACTION PLAN

As the City transitions toward a vibrant and walkable community, CDOT has many strategies to address pedestrian safety. These strategies include the 5 E's: engineering, education, encouragement, enforcement, and evaluation techniques to address challenges in the evolving built environment. Engineering strategies can range from low cost solutions like signs, pavement markings, and signals to larger Capital Improvement Program (CIP) projects to rebuild entire roadway corridors. Education, encouragement, and enforcement strategies involve greater collaboration with Charlotte-Mecklenburg Police Department (CMPD), Charlotte Area Transit System (CATS), Planning Department, North Carolina Department of Transportation (NCDOT), and many other stakeholders.

The City of Charlotte crafts policy, plans and projects with input from many partners internal and external to the organization. Plan, policy and implementation frameworks addressing standards for pedestrian safety are set forth in the: Center City Transportation Plan, the Transportation Action Plan, the Work Area Traffic Control Handbook (WATCH) Manual, Urban Street Design Guidelines, the Sidewalk Retrofit Policy, and City Ordinances.

This Action Plan is built upon existing policies, plans, process and practice. It provides recommendations for additional strategies to comprehensively address pedestrian safety issues. Utilizing national standards to address pedestrian safety, the following recommendations are grouped under different approaches for a comprehensive approach: engineering, education/encouragement, enforcement, and evaluation.



## **ENGINEERING**

### Current Key Treatments

- Repair, maintain, and construct sidewalks and accessible ramps
- Conduct field safety audits to examine vehicle speeds, sight distance, pedestrian crossing treatments, street lighting, and pedestrian exposure
- Regularly review existing intersections for geometric improvement opportunities such as curb extensions, tighter turning radii, countdown signals or high visibility crosswalk markings

- Implement traffic calming and safety approaches that may include: limiting or reducing the number of lanes, adding buffers to sidewalks, adding pedestrian refuge islands at transit stops and/or mid-block crossings, pedestrian hybrid beacons and road conversions
- Maintain pedestrian access during construction utilizing the Work Area Traffic Control Handbook (WATCH)
- Conduct development review and apply Subdivision Ordinance transportation requirements

The City has completed a number of engineering projects to enhance the pedestrian environment. The City started funding sidewalks in the early 1970s and has continued to add mileage since then. Between 2002 and 2012, the City completed 234 miles as part of 174 sidewalk projects using street bonds administered through the Pedestrian Program. The City’s goal has been to add approximately 10 miles of sidewalks annually through public projects and/or private development.

Currently, the City has 22 sidewalk projects underway, 16 of which are along thoroughfares and 6 along local and collector streets. The projects are in various phases of design, real estate, or construction. Over \$21 million is encumbered to complete the projects. With the completion of these projects, the Pedestrian Program will have exhausted all of its budgeted bond funding.



And though the City and developers have constructed many miles of sidewalk, there are still many miles of streets are currently deficient sidewalks. 605 miles of thoroughfares and 1414 miles of local and collector streets have some sidewalk built along them, but these figures do not assume the sidewalk is complete on either or both sides. **138 miles of thoroughfare streets and 1,534 miles of collector and local streets do not have any sidewalks.**

In addition to walking along the street, the City has certain policies and processes for the installation of crosswalks and curb ramps in order to cross the street. One of the biggest challenges is lack of crossing opportunities between signalized intersections where signals are



spaced over  $\frac{1}{4}$  mile apart on thoroughfares. Crossing can be difficult depending on many factors including vehicle speeds, gaps in traffic to cross, street crossing distance and sight distance. The land use development patterns also determine where people need to cross. CDOT is completing a study to evaluate where additional signals would assist pedestrians and bicyclists in crossing thoroughfares. The City

has started installing pedestrian refuge islands with various projects and other crossing devices such as pedestrian beacon signals. The City is currently funding 8 pedestrian refuge islands for construction over the next 12 months and has identified an additional 17 locations. This list continues to grow as the staff receives citizen requests.

### Recommended Engineering Treatments

Though the City has completed a number of successful engineering projects, there are many more improvements needed to make the community more walkable. Those efforts include the following:

- Update existing ordinances to ensure new development and/or redevelopment addresses substandard sidewalk along thoroughfares
- Dedicate funding annually for mid-block crossings through the Traffic Safety CIP program
- Address landscape maintenance to reduce obstruction of sidewalks
- Collaborate with Landscape Management, Solid Waste, and Code Enforcement to update ordinances;
- Partner with Landscape Management, Code Enforcement, Charlotte-Mecklenburg Schools, other government agencies, and private property owners to seek additional opportunities to maintain vegetation free sidewalk edges;
- Identify locations where pedestrians travel more than  $\frac{1}{4}$  mile from existing crossings and install new pedestrian crossing treatments to encourage safer street crossings

- Apply existing policies and ordinances consistently to create land-uses and transportation networks that support and complement each other to create a more walkable environment

## ***EDUCATION AND ENCOURAGEMENT***

### Current Key Treatments

The City has completed a number of successful campaign efforts over the last decade. In the late 90's, the CMPD established a Traffic Safety Advisory Committee. That group raised public awareness of transportation safety issues through large advertisement campaigns. Over a nine-year period, the campaign costs were about \$1.7 million. The campaigns were ceased mainly due to the large expense of advertising.

CDOT currently:

- Supports the ***Watch for Me NC***, a collaborative NCDOT and Institute for Transportation Research and Education (ITRE) safety awareness campaign  
<http://www.watchformenc.org/>
- Collaborates with the City's Planning Department on Area Plans to implement City vision of developing safe, accessible and efficient transportation systems for pedestrians
- Partners with the Mecklenburg Health Department Safe Routes to School program to promote children walking to school safely
- Supports efforts by NCDOT and ITRE to develop bicycle/pedestrian safety curriculum for Kindergarten through 5<sup>th</sup> grade students to be used statewide and disseminated through school systems



### Recommended

- Re-establish funding and partnerships with CMPD and NCDOT for on-going annual public awareness campaigns to improve driver and pedestrian compliance with existing traffic laws utilizing videos, Public Service Announcements, and other media;

- Partner with Charlotte Area Transit Systems (CATS) to focus outreach in higher pedestrian crash areas, allowing transit riders to influence how safety messages are tailored for the community of outreach interest
- Participate with **Watch for Me NC** state campaign to produce safety messages in different languages, disseminating the information through local grassroots organizations, media and other public agencies can have a greater impact at the community level
- Develop driver education curriculum with Mecklenburg County Health Department and Charlotte Mecklenburg Schools to include a component on pedestrian safety for the drivers' education program
- Utilize mass media to educate drivers, pedestrians and transit riders to reset expectations of acceptable behavior – promoting safety as everyone's responsibility

## ***ENFORCEMENT***

CDOT and CMPD operated a red light enforcement program known as SafeLight from 1998 to 2006. Citations were issued when a vehicle was caught on camera running a red light. That program was suspended by City Council in 2006 due to law suits in other NC cities that challenged the program operating cost.

CDOT routinely collaborates with CMPD on a number of enforcement issues that relate to speeding traffic. CDOT uses crash analysis, trend identification, and citizen requests to target areas.

### Current Key Treatments

- Install dynamic speed signs (as shown in photo), primarily in school zones to reinforce variable speed limits
- Enforce speed limits and ticket drivers that do not yield to pedestrians in marked crosswalks (CMPD)
- Analyze annual traffic crash and fatality data in partnership with CMPD



### Recommended

- Enhance training for CMPD to learn current industry trends and information related to pedestrian safety

- Develop a targeted enforcement campaign similar to Highway Safety Research Center's program for Raleigh, Durham, Duke University and UNC Chapel Hill conducted in August 2012

## ***EVALUATION***

Evaluation is a key component of this process built into the engineering, education, encouragement, and enforcement efforts. An overall evaluation of efforts is updated each year in the annual CDOT Business Report Card and every 5 years in the Transportation Action Plan, enabling CDOT to adjust efforts and best practices to address pedestrian safety needs. CDOT produces an annual Safety Report to summarize collisions within the City limits. The goals of the report are to raise awareness of locations with an elevated crash rate and support ranking/prioritization needs of many transportation related programs.

## CRASH DATA SOURCE

CDOT is responsible for crash data compilation and analysis of collisions that occur on city streets, including city and state-maintained roadways. The data excludes interstates such as I-77, I-85, and I-485. The crash data is used to develop projects and programs to address documented collision patterns with the ultimate goal of reducing crashes and injuries in Charlotte. CDOT uses several methods to identify and rank high crash locations. The High Accident Location (HAL) list ranks intersections based on a rate developed from numbers of collisions and intersection traffic volumes. The HAL currently has 87 ranked intersections and is updated annually. The Intersection Safety Warrants list identifies locations where specific types of crash patterns such as frontal impact, pedestrian, bicycle, night-time, etc. indicate potential candidate projects for safety treatments. CDOT updates the Intersection Safety Warrants list every two years. In addition, CDOT routinely analyzes specific locations when safety issues are identified by citizens, City Council, media, and staff.

CDOT's crash data comes from an electronic database populated by crash reports entered by the Charlotte-Mecklenburg Police Department (CMPD). CDOT receives the raw data from CMPD and processes the information to locate the crash site and verify the accuracy of many variables including the crash type. Data reported in this paper is collected within the City of Charlotte limits. The data provided includes complete calendar years 2008 through 2012.