



Pedestrian Safety Action Plan



Allen County, Indiana
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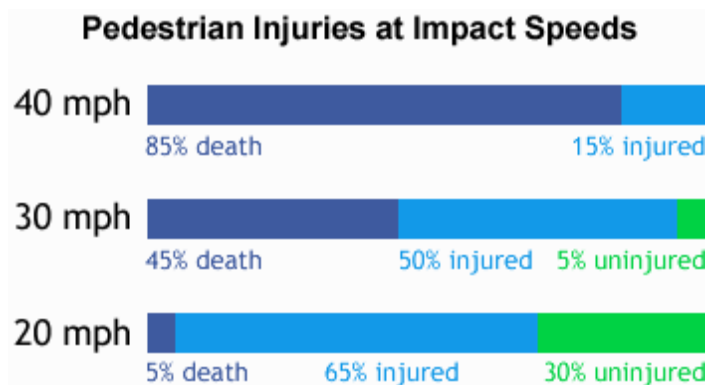
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Pedestrian Safety Action Plan

Over the three year time period spanning from 2006 through 2008 there were almost 35,000 recorded accidents involving motor vehicles, pedestrians, and bicyclists in Allen County. Accidents involving pedestrians accounted for about 1% of these. Fatalities for all accident types accounted for about 0.2% of the almost 35,000 accidents. Out of the 0.2% of total fatalities, 9% of them were pedestrian fatalities. These numbers are disproportionate when 99% of all accidents occurring in Allen County for these three years did not involve a pedestrian.

The nature of pedestrian accidents are usually much more severe than motor vehicle accidents. Since motor vehicles provide a significant amount of protection, people are less likely to be injured or killed when involved in an accident. From 2006 through 2008 about 19% of all motor vehicle accidents resulted in an injury or fatality. During this same time period nearly 82% of all pedestrian accidents resulted in an injury or fatality. As you can see from the graphic below, speeds in excess of just 20 mph produce a significant number of fatalities and injuries when there is an accident between a motor vehicle and a pedestrian. Since nearly every street throughout Allen County has speed limits that exceed 20 mph, pedestrian deaths and injuries can occur at almost any location.



The relationship between pedestrian injury severity and motor vehicle impact speeds.

http://www.saferoutesinfo.org/guide/engineering/slowing_down_traffic.cfm

Since it is unreasonable to decrease speed limits on a system wide basis to create a safer impact speed for pedestrians, transportation engineers and planners must consider factors that can reduce the frequency and severity of pedestrian accidents through a multitude of countermeasures and action steps. These countermeasures and action steps must identify engineering (including special design characteristics), educational, enforcement, and encouragement strategies that will provide short term and long term solutions.

The purpose of creating a Pedestrian Safety Action Plan (PSAP) for Allen County is to create a plan that will be implemented throughout the transportation planning process and beyond for purposes of producing realized pedestrian safety improvements that are tailored to specific problems in our area. The PSAP goal is specifically to reduce the frequency and severity of pedestrian crashes, fatalities, and injuries for all users by establishing a framework to identify practical and achievable strategies to improve pedestrian safety, prioritize improvements, and provide a means of development and implementation. To ensure a comprehensive approach, the plan will involve the four E's (Engineering, Education, Enforcement, and Encouragement) in identifying and implementing an effective PSAP. The following steps, as listed in the Federal Highway Administration's report titled "How to Develop a Pedestrian Safety Action Plan", will be incorporated into Allen County's PSAP:

- Define objectives.
- Identify Locations.
- Select countermeasures.
- Develop an implementation strategy.
- Institutionalize changes to planning and design standards.
- Consider land use, zoning and site design issues.
- Reinforce commitment.
- Evaluate results.

Several plans will be integrated into Allen County's PSAP. The "Bicycle-Pedestrian Transportation Plan" produced by NIRCC, the City of New Haven's "Comprehensive Trails and Pedestrian Walkways Master Plan", and Fort Wayne's "Walk Fort Wayne Plan". These plans provide insight to priorities throughout Allen County as well as identify key locations of pedestrian activity. Fort Wayne's "Bike Fort Wayne Plan", while its main focus is on bicycle infrastructure, will also complement Allen County's PSAP as it provides connectivity to pedestrian plans with on street bicycle facilities and multiuse trails.

NIRCC adopted the latest version of the Bicycle-Pedestrian Transportation Plan in 2009 which was included in the current long range transportation plan titled 2030-II Transportation Plan. The plan was developed by NIRCC in conjunction with the Northeastern Indiana Regional Bicycle and Pedestrian Forum. The Forum was made up of governmental parks, planning and highway agencies, advocacy groups, and special project organizations. The Forum was designed to develop and maintain the bicycle and pedestrian plan and had met from May of 2002 until August of 2007. Since 2007 NIRCC has relied on the Greenway Coalition for guidance as well as governmental and public input towards bicycle and pedestrian planning. The coalition is also made up of governmental parks, planning and highway agencies, advocacy groups, and special project organizations. The coalition has been meeting since April of 2005.

This comprehensive bicycle and pedestrian plan includes the identification of on street and off street facilities. A map of this can be seen in **Figure 1**. Portions of the plan identified as off street facilities, which include sidewalks and trails, were identified through a combined planning effort utilizing local plans from Aboite New Trails Inc., Greenway Consortium, Northwest Allen Trails, Little River Wetlands, the City of Fort Wayne, the City of New Haven, and other regional groups outside of Allen County.

Although the Bicycle-Pedestrian Transportation Plan identifies key pedestrian facilities whether proposed or existing, the sidewalk component of the plan is addressed as a general policy which can be seen in **Appendix A**. This sidewalk policy makes recommendations for pedestrian accommodations according to street classification and location.

New Haven has produced a plan titled The City of New Haven Comprehensive Trails and Pedestrian Walkways Master Plan. This plan addresses the safety concerns of the residents of New Haven, provides a connection with New Haven's existing parks and trails to the residential neighborhoods, and provides safe access to the downtown area, neighboring commercial areas, and schools. Public participation for this plan was primarily through Trail Advisory Committee meetings and public information forums. The Trail Advisory Committee consisted of the City Engineer, City Planner, Director of Parks and Recreation, and the Mayor.

Fort Wayne is currently working on the Walk Fort Wayne Plan. This will be a 10 year plan that will provide guidance on how and where to fill in sidewalk gaps along Fort Wayne's arterial and collector roadways through the use of new sidewalks and shared-use paths. The plan is still being drafted and will most likely be completed and adopted in the spring of 2010.

There are two teams, the Primary Team (the internal departmental work group) and the Advisory Team, involved with drafting the Walk Fort Wayne Plan with members of Fort Wayne's planning department as the project coordinators. The Primary Team is charged with developing the plan while the Advisory Team reviews, provides assistance, and offers input for the plan document. Members of these two teams as well as the scope of the Walk Fort Wayne Plan can be seen in **Appendix B**.

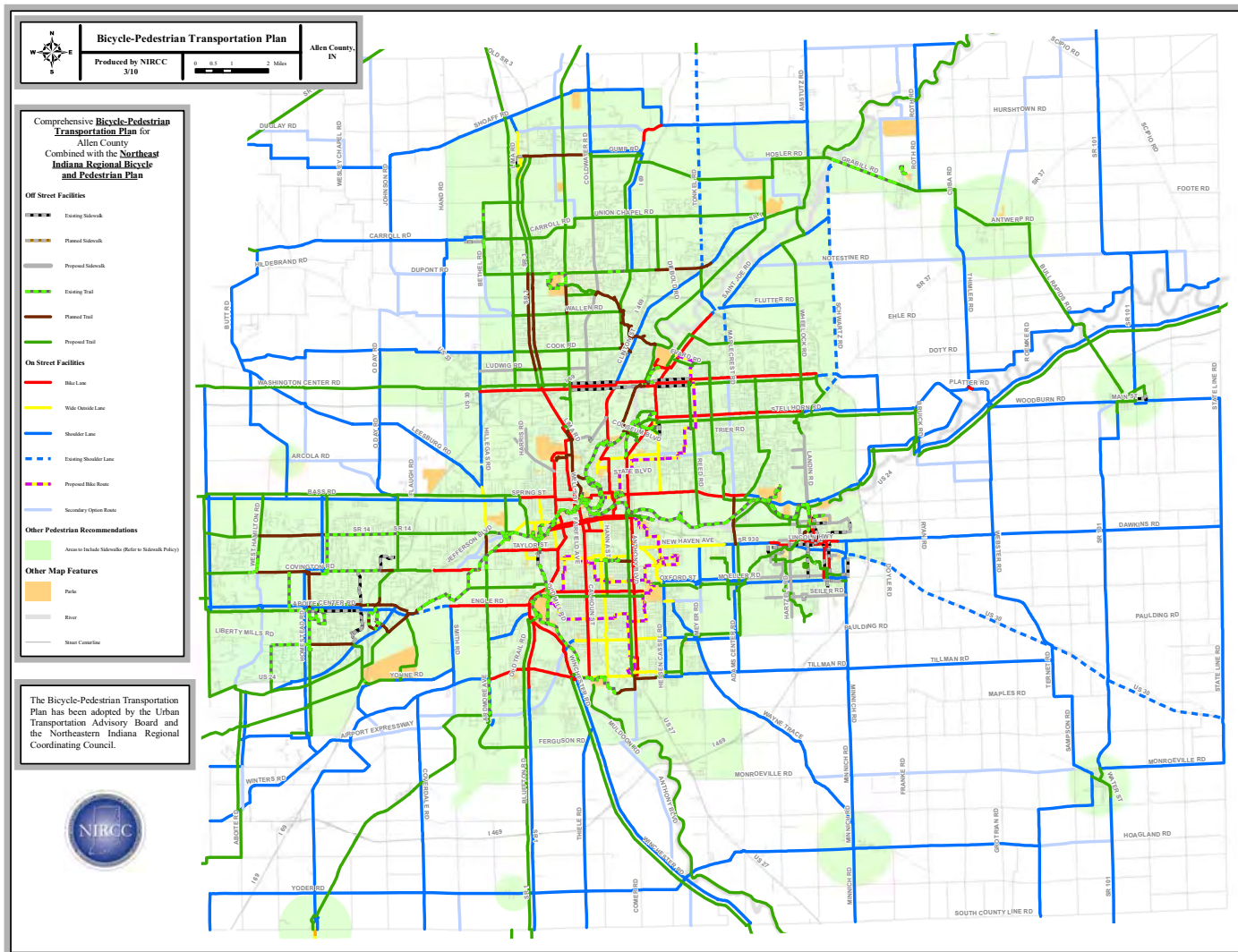


Figure 1

Step 1 Defining Objectives

To accomplish the goal of the pedestrian safety action plan there must be steps taken to measure the success of the plan as well as create a method for ensuring some sort of commitment to implement the plan. This can be done by creating a list of objectives that are measurable and provide a clear purpose for what they intend to achieve. It is important to define objectives that consider engineering, education, enforcement, and encouragement type solutions. This section will define a number of objectives that are unique and significant to the Allen County area. As the PSAP is implemented, more objectives may be defined and some may change. Results and impacts for these objectives can be viewed in **Appendix H** as they are implemented and measured for their effectiveness. The following objectives will be used to begin implementing the Allen County PSAP:

- **Objective 1: Reduce the 3 year average number of pedestrian accidents 25% by 2015.**
 - Currently, the three year average for the years 2006-2008 is 114 pedestrian accidents per year. A 25% decrease in pedestrian accidents would lower the current 3 year average to just about 85 pedestrian accidents per year.
- **Objective 2: Update the Access Standards Manual for Fort Wayne, New Haven, and Allen County with pedestrian safety recommendations by 2015.**
 - The primary objective of this manual is to establish guidelines for the location and design of driveways providing access from public streets and highways to developments on abutting properties. Currently there is very little consideration for pedestrian safety design recommendations along with these guidelines. An Access Standards Manual update has recently been initiated which will provide opportunity to add pedestrian safety recommendations.
- **Objective 3: Upgrade crosswalks throughout CBD's, downtown areas, and other business districts with longitudinal lines or piano key style crosswalk markings. Select at least one area identified in **Figure 5** every other year until all the areas identified have been completed.**
 - The purpose of upgrading crosswalks with the piano key style markings is to mitigate crashes at these conflict points by improving the awareness of the crossings to motorist. The current pavement markings are primarily transverse crosswalk lines which provide information for pedestrians as to where they can safely cross a roadway but do not provide enough visibility to create a distinctive awareness for motorists.
- **Objective 4: Upgrade traffic signals throughout CBD's, downtown areas, and other business districts with pedestrian countdown indicators. Select at least one area identified in **Figure 5** every other year until all the areas identified have been completed.**
 - The purpose of upgrading signals with pedestrian countdown indicators is to mitigate crashes at these conflict points by providing improved pedestrian information. The countdown indicators will provide pedestrians the amount of time remaining to safely cross the intersection. This will reduce the number of incidents where pedestrians become trapped in the intersection without adequate time to complete their crossing.
- **Objective 5: Use priority areas listed in "Step 2 – Identifying Locations" to identify 5 intersection projects for each category of countermeasures (simple, moderately complex, and complex) by 2015.**

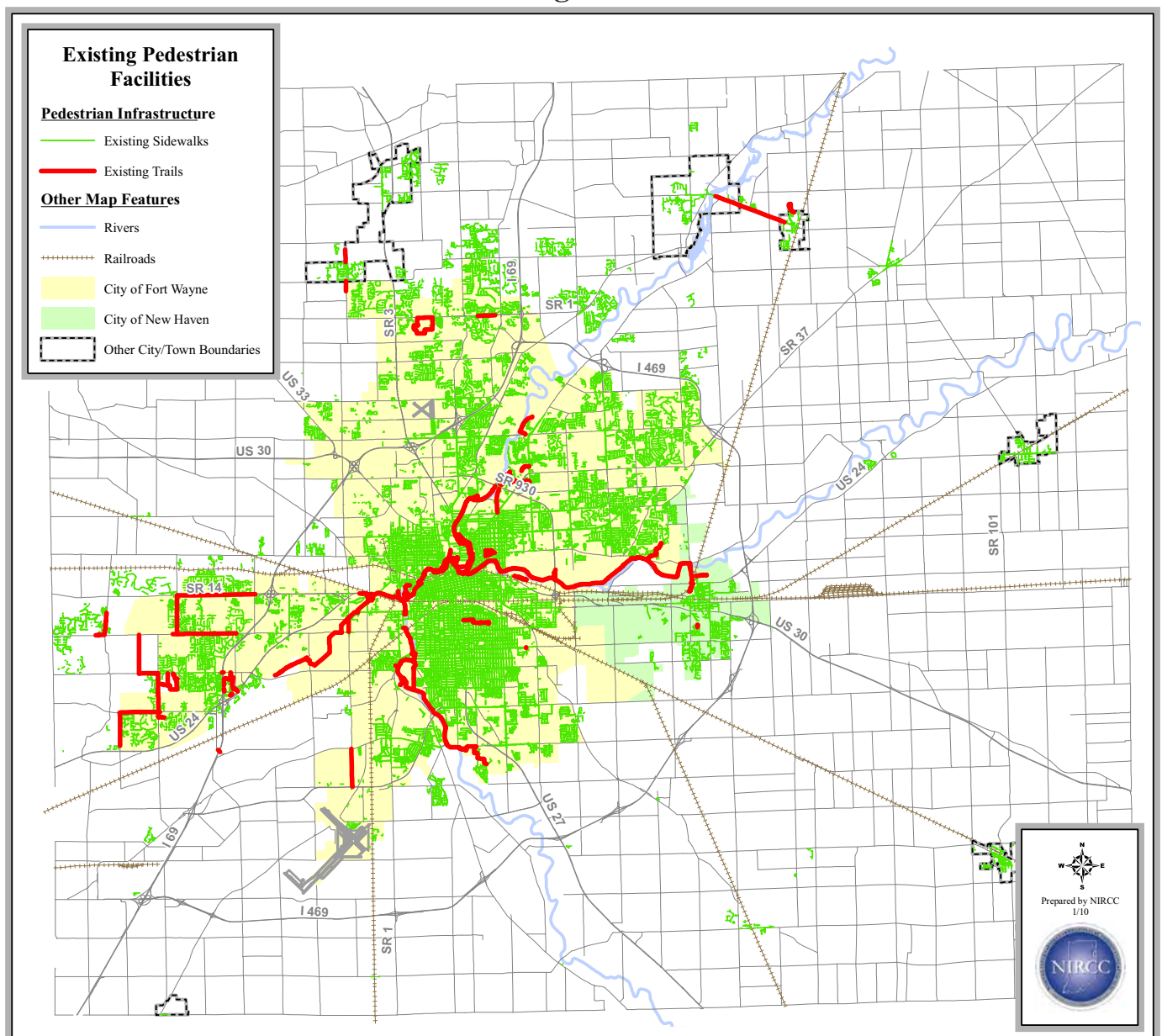
- Through survey information and crash data analysis, intersections are shown to create some of the most frequent and dangerous conflict points for pedestrians. Many of the pedestrian related accidents can be reduced with intersection type countermeasures.
- **Objective 6: Identify high priority or high usage transit stops and transit stops that need special consideration for ADA compliant treatments.**
 - Access to public transportation can greatly affect or limit people's quality of life. It is important to address safety issues related to public transportation since it is the only mode of transportation for some individuals or families.
- **Objective 7: Prioritize areas around schools for safety improvements. Appendix G will provide a map of projects and needs that will be continually updated and expanded.**
 - Schools throughout Allen County have a variety of geographical environments or policies that either limit or require students to walk to school. Prioritization for areas surrounding schools is necessary since not all of them are conducive to or even allow students to walk to them. Other schools require students to walk if their residence is within a specific distance from a particular school. These requirements vary depending on school location or district as well as the grade level for students. Priority should be given to the areas surrounding schools that do require walking and that may have large numbers of students that do so. Priority may also be given to schools open to changing their "no walking" policies as new infrastructure allows safe accommodations for walking trips. The types of problems associated with these areas may also affect the prioritization process.
- **Objective 8: Select at least 5 corridors for possible pedestrian safety improvements by 2015.**
 - Through survey information and crash data analysis there seem to be corridors that experience high numbers of pedestrian conflicts or accidents. These corridors reveal a high level of pedestrian usage throughout and while they may exhibit sufficient benefits from spot location type safety treatments a much higher benefit may be achieved from safety improvements made to the entire corridor.
- **Objective 9: Based on analysis using tools from "Step 2 – Identifying Locations", select 5 educational or encouragement type countermeasures for spot specific locations, corridors, or larger areas by 2015.**
 - A number of conflicts between motor vehicles and pedestrians result from the lack knowledge about the law or behaviors that produce unsafe actions. Also, the lack of pedestrian activity produces a lack of awareness for motorists. This lack of awareness creates behaviors that contribute to unsafe environments for pedestrians.

Step 2 Identifying Locations

Identifying locations for safety improvements can be accomplished in a variety of ways. The goal of this section is to produce methods and products of data analysis that will identify problem areas for spot locations, corridors, specific areas (i.e. neighborhoods, districts, and sub-areas), and system wide deficiencies. Many organizations and governmental entities already recognize specific areas and goals that pertain to the accessibility and safety of their pedestrian transportation systems. This section will help identify these which will produce tools for creating a prioritization method for pedestrian safety improvements.

NIRCC produces and maintains a large amount of data that is used to identify these types of locations. Examples of this data include a sidewalk and trail inventory for the entire Allen County area, traffic counts, locations of transit routes and stops, crash data, census data, intersection analysis data, and other various roadway characteristics. Other information utilized for identifying locations include maps that show land use types and patterns, schools, colleges and universities, parks, libraries, major destinations or attractions, etc.

Figure 2



One of the most important types of data for planning pedestrian safety improvements for the PSAP is knowing where pedestrian trips take place and what facilities currently exist. **Figure 2** displays NIRCC’s existing sidewalk and trail inventory. Every sidewalk in Allen County has been digitized using aerial photography and a trail database is maintained and updated on a regular basis. Information derived from this map includes locations where gaps exist in the sidewalk network, densities of development, points of conflict where sidewalks and trails cross streets and driveways, and areas where you would expect significant amounts of pedestrian trips since there is already a precedence of existing infrastructure. Taking this type of information and combining it with crash data, points of interest, demographic patterns, etc. helps identify site specific areas, corridors, large areas, or even system wide deficiencies in pedestrian infrastructure.

Throughout Allen County there are a number of developed or developing areas that serve a variety of pedestrian trips. Certain parts of Allen County produce more pedestrian trips than others. In **Figure 3** you can see the different city or town jurisdictions throughout Allen County. Each city and town represents an area where population density, population counts, and various types of development are concentrated. These jurisdictions have been included in the areas identified in **Figure 4**. **Figure 4** shows areas identified in **Appendix A** which

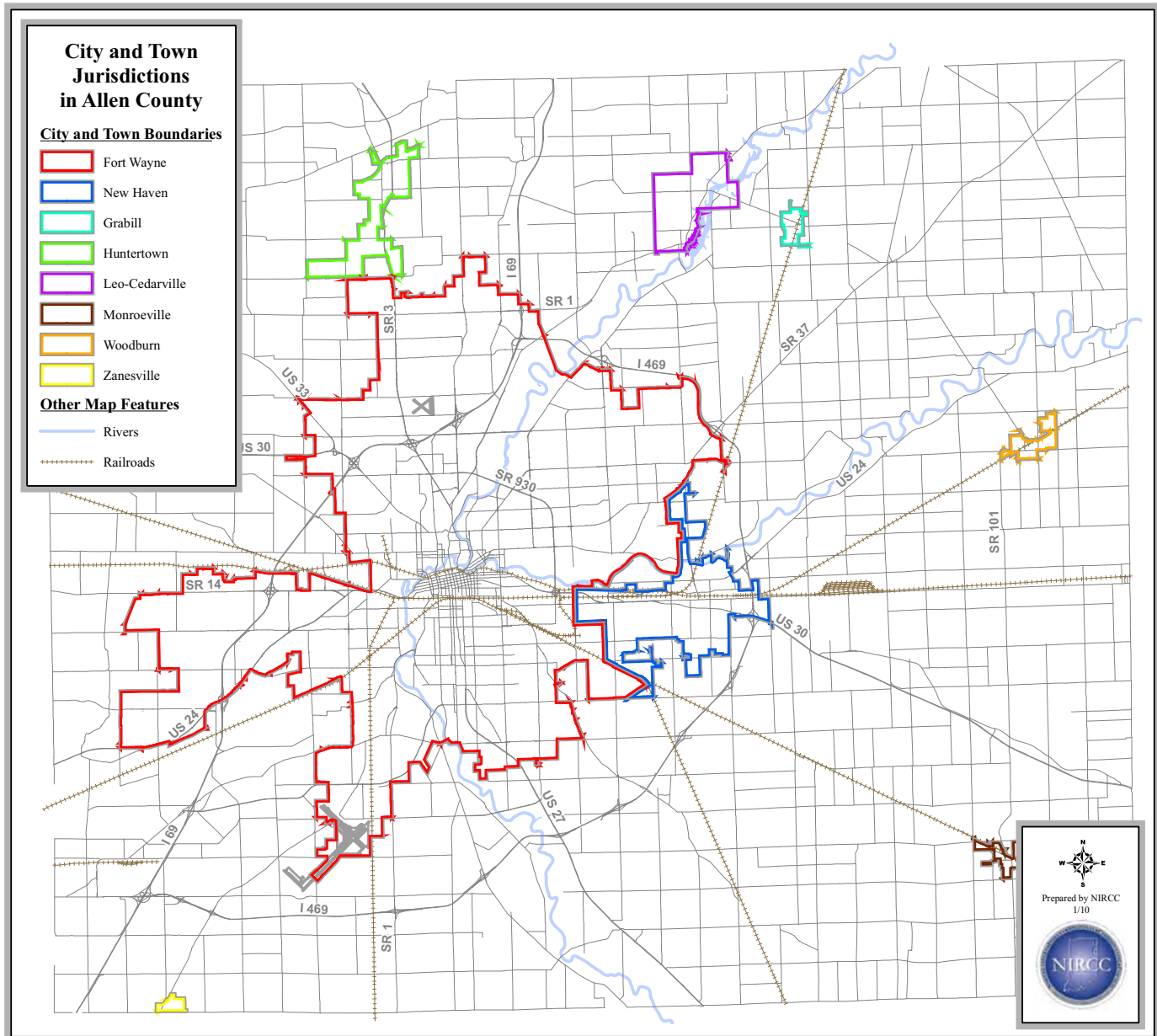


Figure 3

is taken from the sidewalk policy included with NIRCC’s Bicycle and Pedestrian Transportation Plan which is also included in the 2030-II Transportation Plan. These areas identified are a combination of jurisdictions from all the cities and towns within Allen County, the urban area, and various developing areas throughout the county. These areas are recommended for pedestrian improvements which also creates a need for pedestrian safety to be a priority.

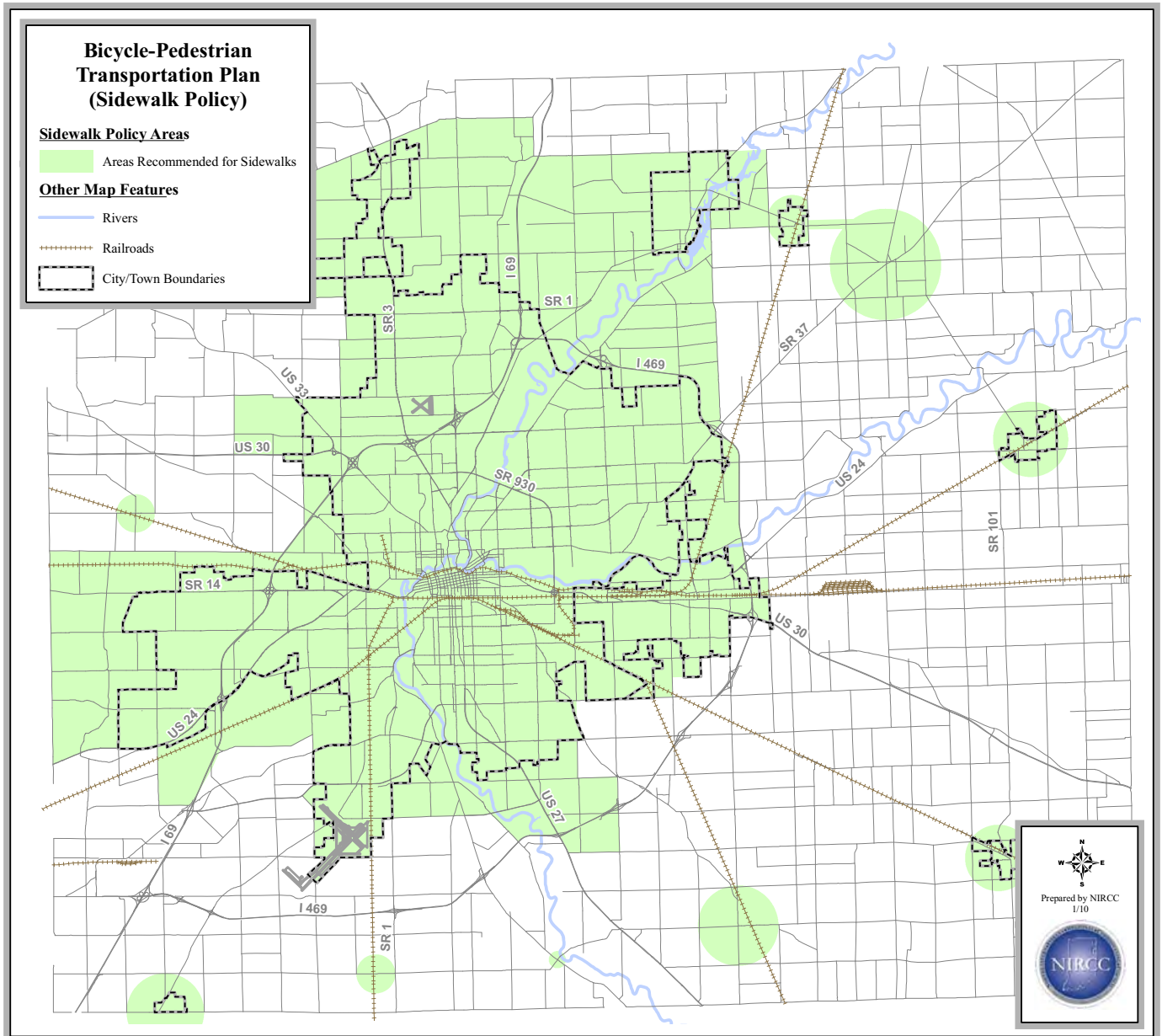


Figure 4

There are also specific areas that are identified as a priority for serving pedestrian trips. **Figure 5** shows geographic areas that not only depend on, but are heavily influenced by pedestrian safety and mobility. These areas include the Central Business District (CBD) located in downtown Fort Wayne and the CBDs or downtown areas of surrounding communities throughout Allen County. These areas consist of urban type design characteristics with closely situated commercial, retail, and service related development that is surrounded by dense residential development. The identified areas in each community act as major destinations for vehicles and pedestrians. Within each of these destinations conflicts between motorists and pedestrians are inevitable given the variety of uses provided in these areas. Pedestrian mobility is identified as a key factor for providing and maintaining the diverse development of each.

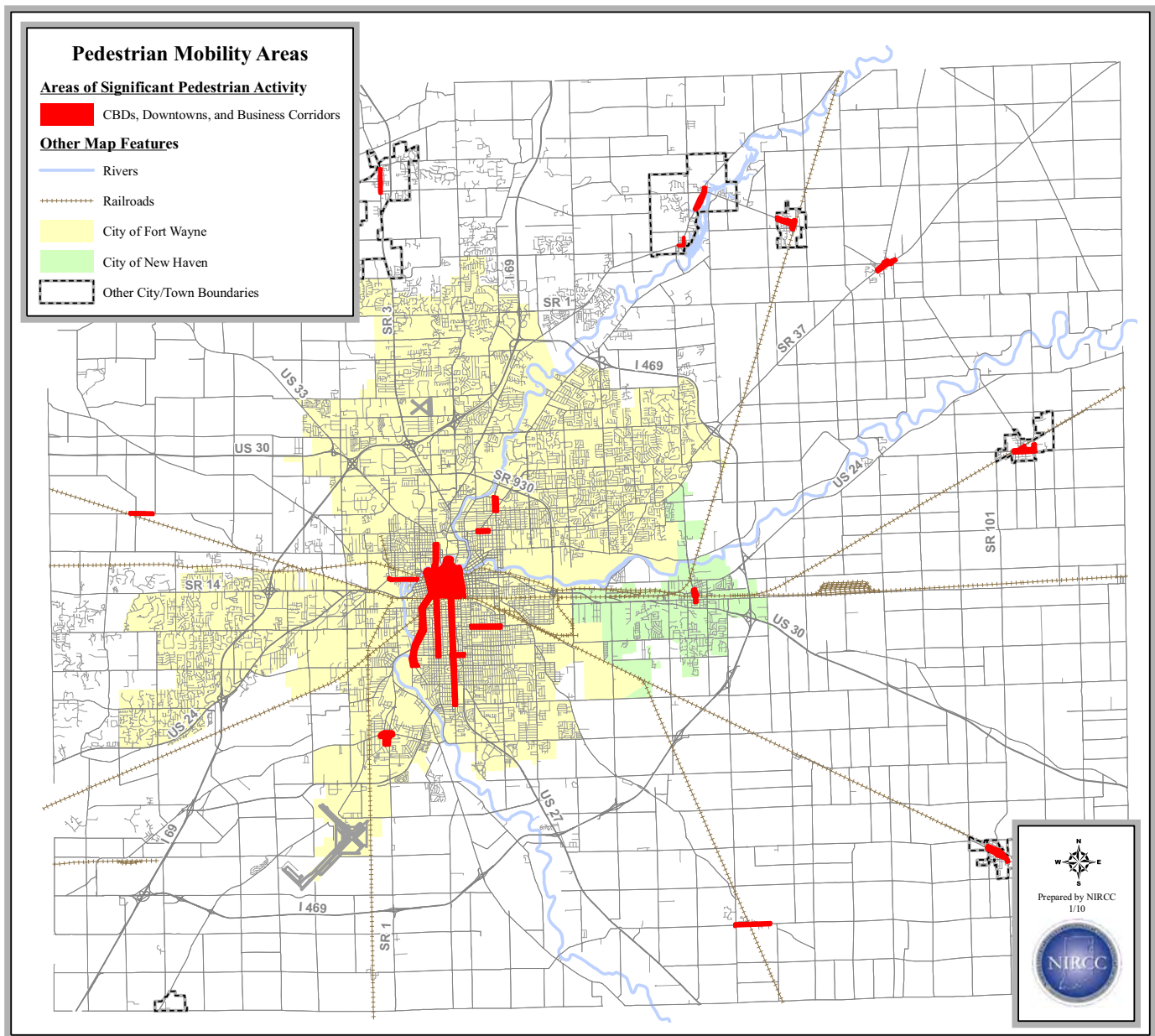


Figure 5

Figure 6 also displays geographic areas that serve a large number of pedestrian trips. These areas have been identified by Fort Wayne’s “Walk Fort Wayne Plan” as pedestrian generating areas. These areas have been identified through the use of survey information (see **Appendix C**), information gathered from public meetings, a geographic analysis of development clusters, and input from the Primary Team who is charged with developing the Walk Fort Wayne Plan. These areas represent significant destinations and attractions for pedestrian interaction. They have received the highest priority for filling in sidewalk gaps. Each area contains a combination of many types of desirably pedestrian facilities. These include but are not limited to schools, colleges, universities, medical facilities, community facilities, shopping centers, retirement communities, transit corridors, residential development, and service related facilities.

Another destination that attracts large numbers of pedestrians are parks and recreational areas. **Figure 7** shows the locations of park facilities throughout Allen County. These areas provide a significant amount of pedestrian related activities on a regular basis. Large numbers of pedestrian trips occur within and around these areas which often create motorist and pedestrian conflict points.

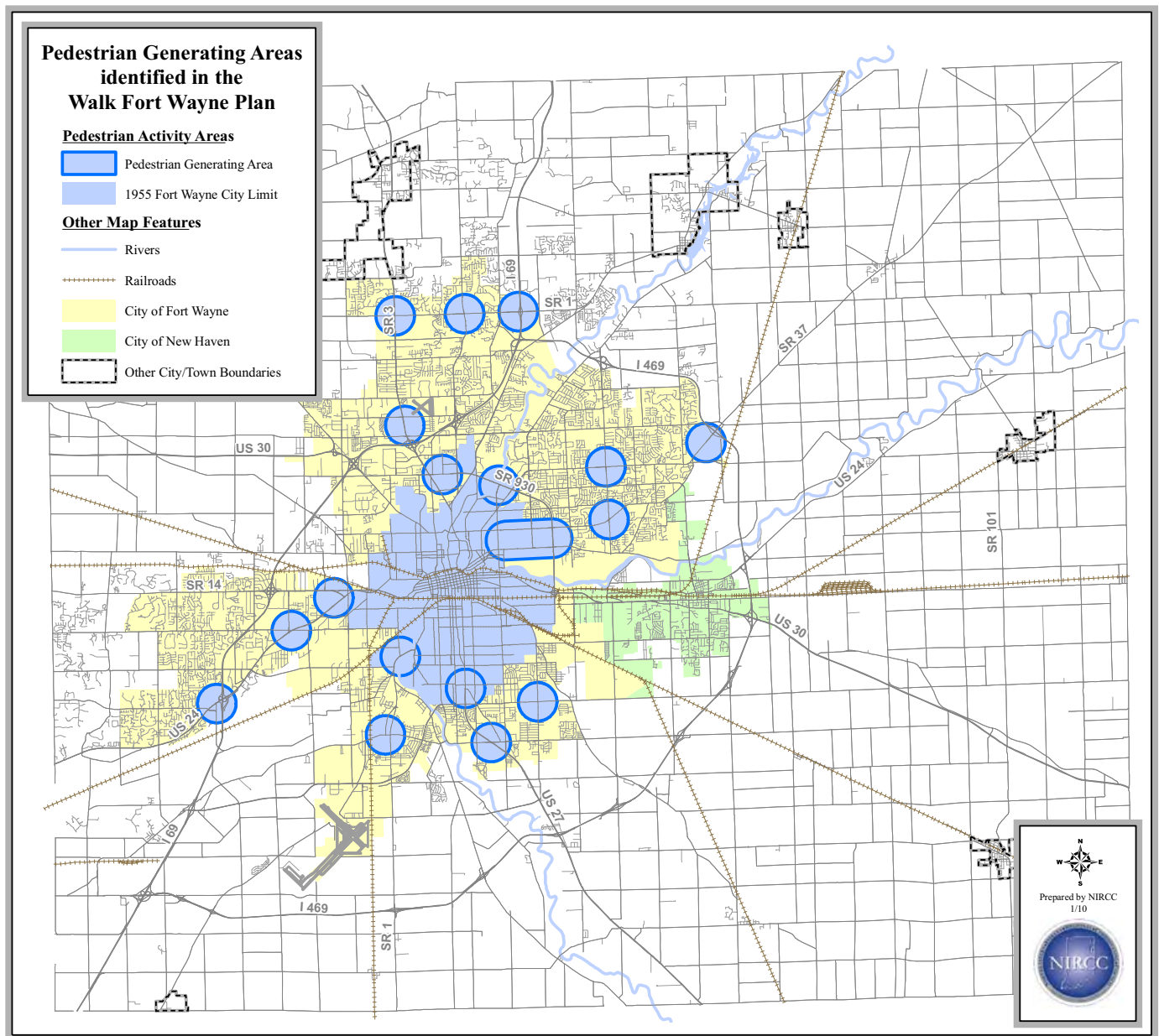


Figure 6

Areas around schools are recognized as high priorities for pedestrian safety improvements as well. **Figure 8** shows areas within a half mile radius of school locations throughout Allen County that may need pedestrian safety improvements to create safer walking environments for children and teenagers. Many schools within Fort Wayne, New Haven, and some of the cities and towns throughout Allen County require students to walk to school depending on the proximity of their residence. Crash data from 2006-2008 reveals that almost 80% of all pedestrian related accidents occurred within these half mile radius areas. This does not necessarily imply that school locations and students themselves are the source of all these pedestrian accidents. In fact, by taking a closer look at some of these areas, the age range may seem random. What this data does reveal though is that these may be areas that system wide deficiencies or area specific needs for pedestrian safety improvements may be warranted. The proximity to schools for these areas may provide reasons for them to have a higher priority than others if there is a direct impact to the safety of students who must walk to school.

Specific safety needs have already been identified through discussions with area schools and school districts. The City of Fort Wayne’s Walk Fort Wayne team and the Fort Wayne Greenways Manager met with schools and school districts to gather input on what kinds of safety improvements or pedestrian facilities are needed for

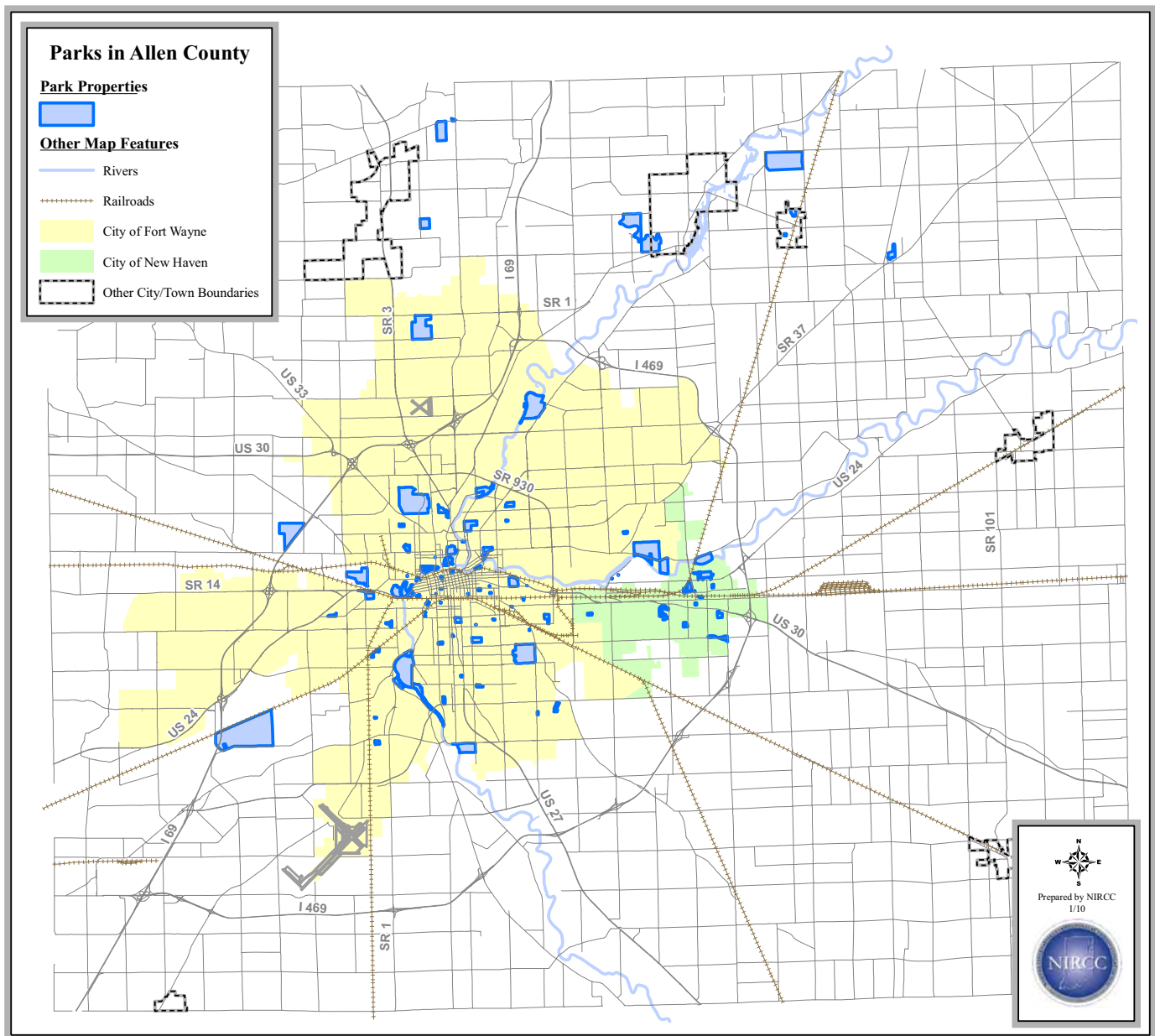


Figure 7

their areas. These needs are identified in the Walk Fort Wayne Plan under the “Safe Routes to School” section and have been included in **Appendix G** of this report. **Appendix G** provides a map that will be updated as more needs are identified and continued stakeholder involvement is accomplished. The map also provides a reference for projects that have been completed or are in progress.

Transit service areas are another high priority concern for pedestrian safety. Almost 60% of all pedestrian accidents occurred within 100 ft of a transit route or transit stop (see **Figure 9**) throughout Fort Wayne and New Haven for the 4 year period of 2005-2008. This does not mean that all these pedestrian accidents are related to transit service locations, but it does provide evidence that pedestrian safe facilities may be deficient around transit routes and stops. Since accessibility to transit service is an important component to pedestrian mobility and the quality of life for many people, the presence of pedestrian safe facilities in these areas are of high concern.

There are a number of points or areas that stand out as pedestrian conflict points. **Figure 10** shows a density map which utilizes NIRCC’s sidewalk inventory database. This map helps visualize areas that have a high

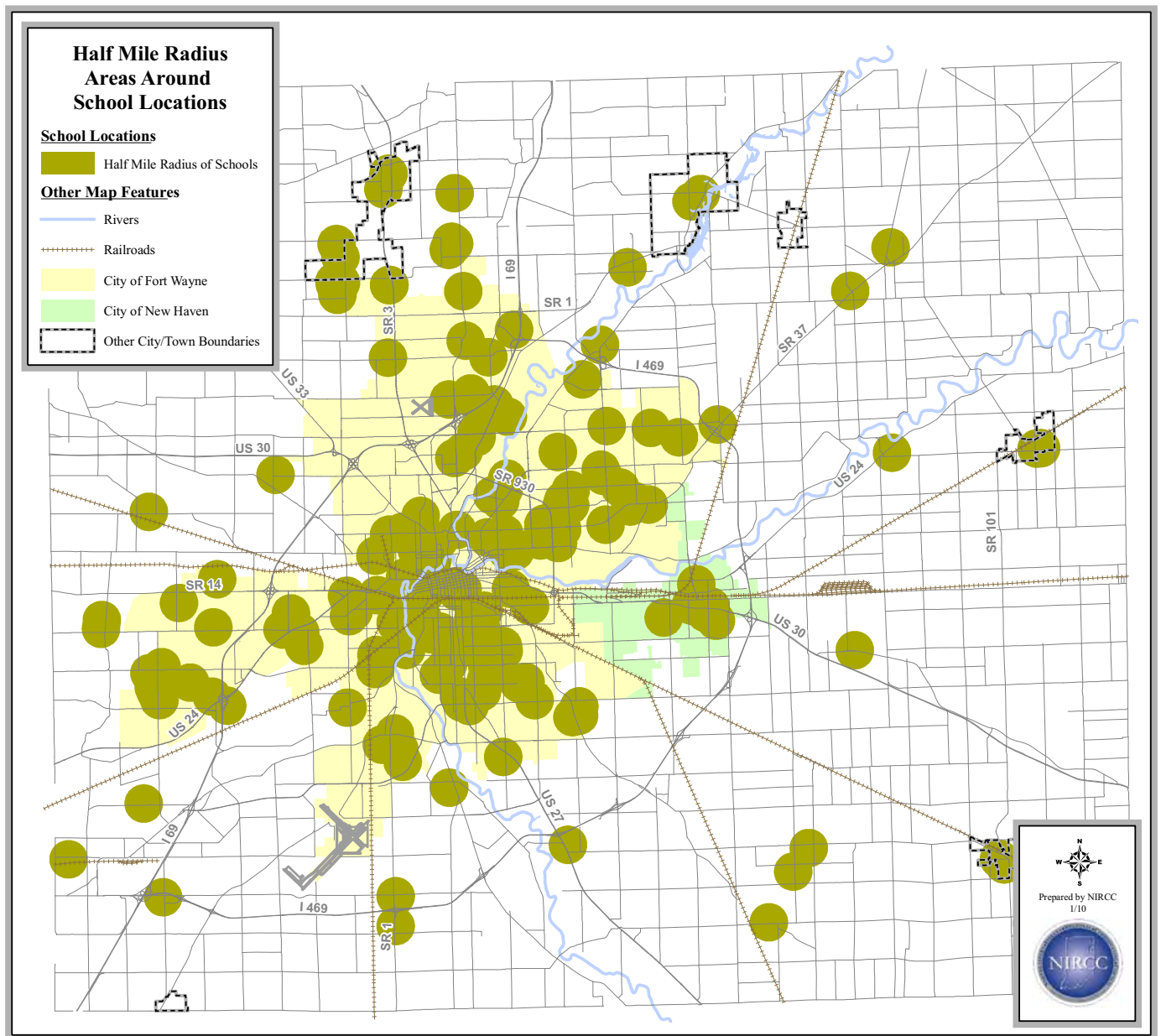


Figure 8

concentration of points where sidewalks or trails directly cross or intersect roadways or driveway entrances to major developments. Once these areas are combined with crash data or pedestrian activity areas, NIRCC will be able to identify potential improvements to enhance pedestrian mobility. Several specific intersection or crossing locations have already been identified. **Figure 11** provides a view of trail crossing locations that may need to be addressed with safety improvements. This map also shows trails that are planned in the near future. These planned trail corridors may be identified as needing enhanced pedestrian safety devices or facilities as well. The kinds of improvements for these types of facilities may include access management strategies, enhanced crosswalk treatments, pedestrian signals or countdown indicators, or even grade separated pedestrian crossings.

Figure 12 shows a map of all the signalized intersections throughout Allen County. Depending on areas identified as priority areas in this plan, many of these signal locations may need to be upgraded with enhanced crosswalk treatments or pedestrian countdown indicators. Also, if there are areas or corridors where traffic signals are spaced further apart than what is reasonable for pedestrians to cross at signalized intersections,

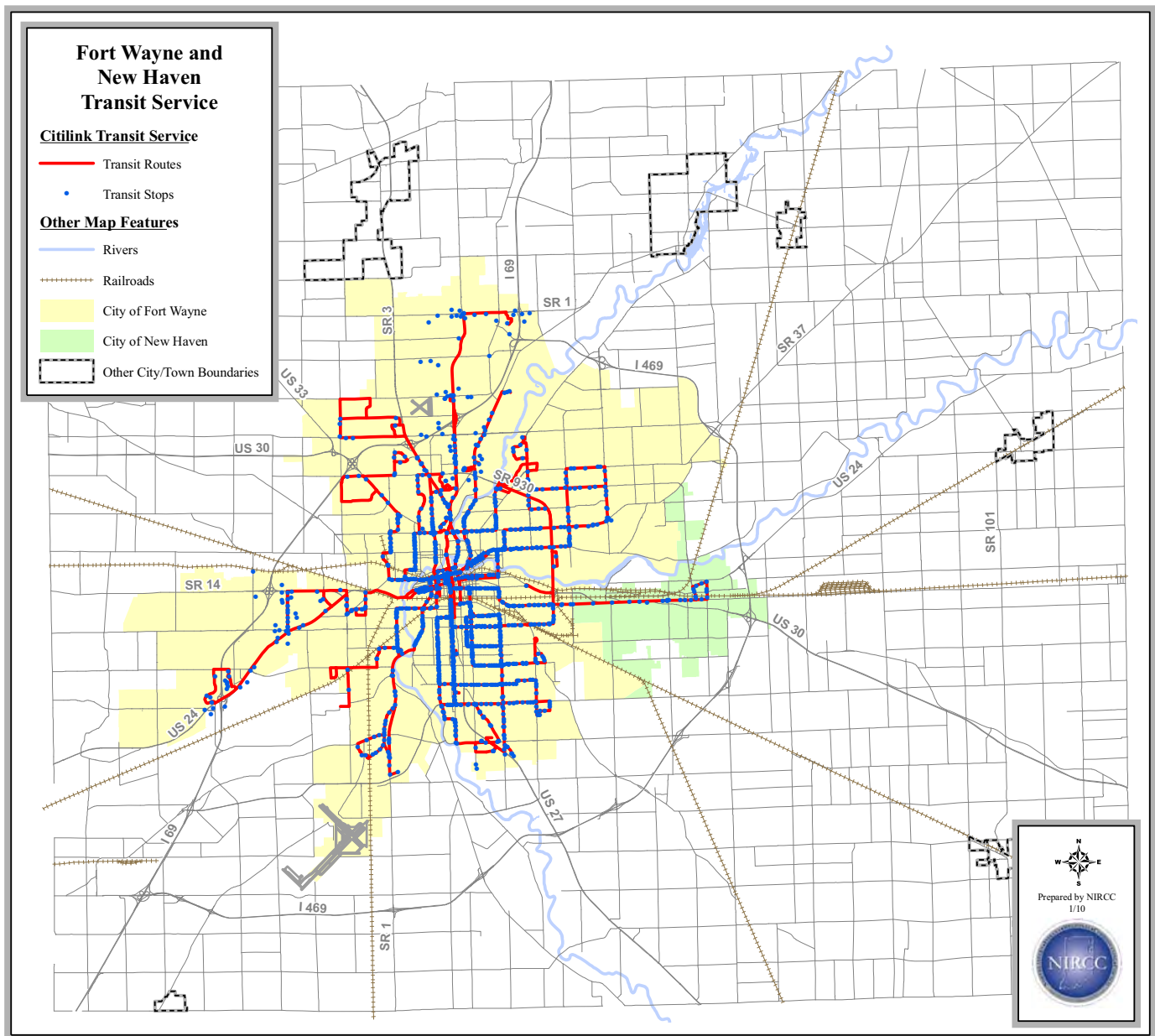


Figure 9

accommodations may need to be made to create a safer environment for pedestrians even if these accommodations may not achieve ideal conditions.

A significant factor that provides guidance for choosing potential safety improvement areas, locations, and even project types is crash data. NIRCC maintains a crash database that is updated yearly with every reported accident that occurs in Allen County. From this database NIRCC has mapped pedestrian accidents throughout the entire county. **Figure 13** provides a visual of the areas with the highest density of pedestrian accidents over a period of 2005 through 2008. This data is used in conjunction with many of the points and areas listed throughout this section to help determine where safety improvements need to be made.

Crash data is also used to select specific locations where there are high frequencies of pedestrian related accidents. More detailed density maps show intersections and midblock locations that have high numbers of pedestrian accidents. Corridors can be selected for analysis based on crash data as well. One example of a way that NIRCC determines if corridors are experiencing higher than expected pedestrian related accidents is shown in **Figure 14**. This map takes road segments of different lengths and divides the segment length by the total

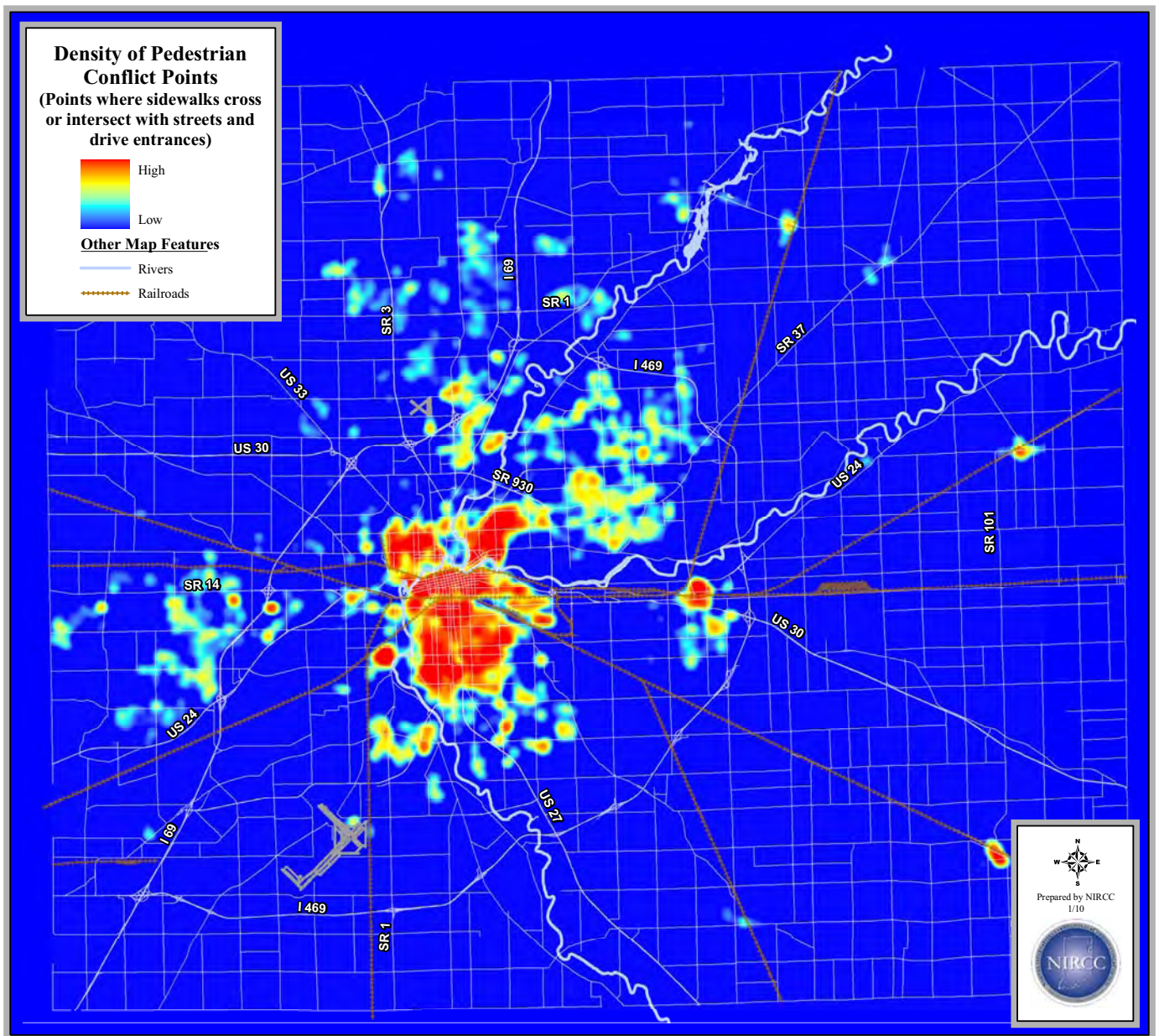


Figure 10

number of pedestrian accidents along that segment. This formula gives a sense of which corridors are experiencing higher densities of pedestrian accidents regardless of its length. Corridors can also be selected based on adding together the number of pedestrian accidents that occur on a roadway with the same name. **Appendix E** shows streets with at least 2 pedestrian accidents that have occurred throughout its entire length.

Other types of areas that should be considered when planning where pedestrian improvements should be implemented can be determined based on demographic data. Locations of elderly populations, low income populations, and areas with lower than average vehicle rates per household are a few examples of areas that may depend on pedestrian safety and mobility because of the inability to use automobiles for transportation purposes. **Figure 15** takes these three types of demographics and combines them so that the areas that have the highest density of all three demographic types are shown. **Figure 16** takes this a step further and factors in the pedestrian crash density from **Figure 13** to show areas that have these three types of demographics in common and have the highest frequencies of pedestrian related accidents.

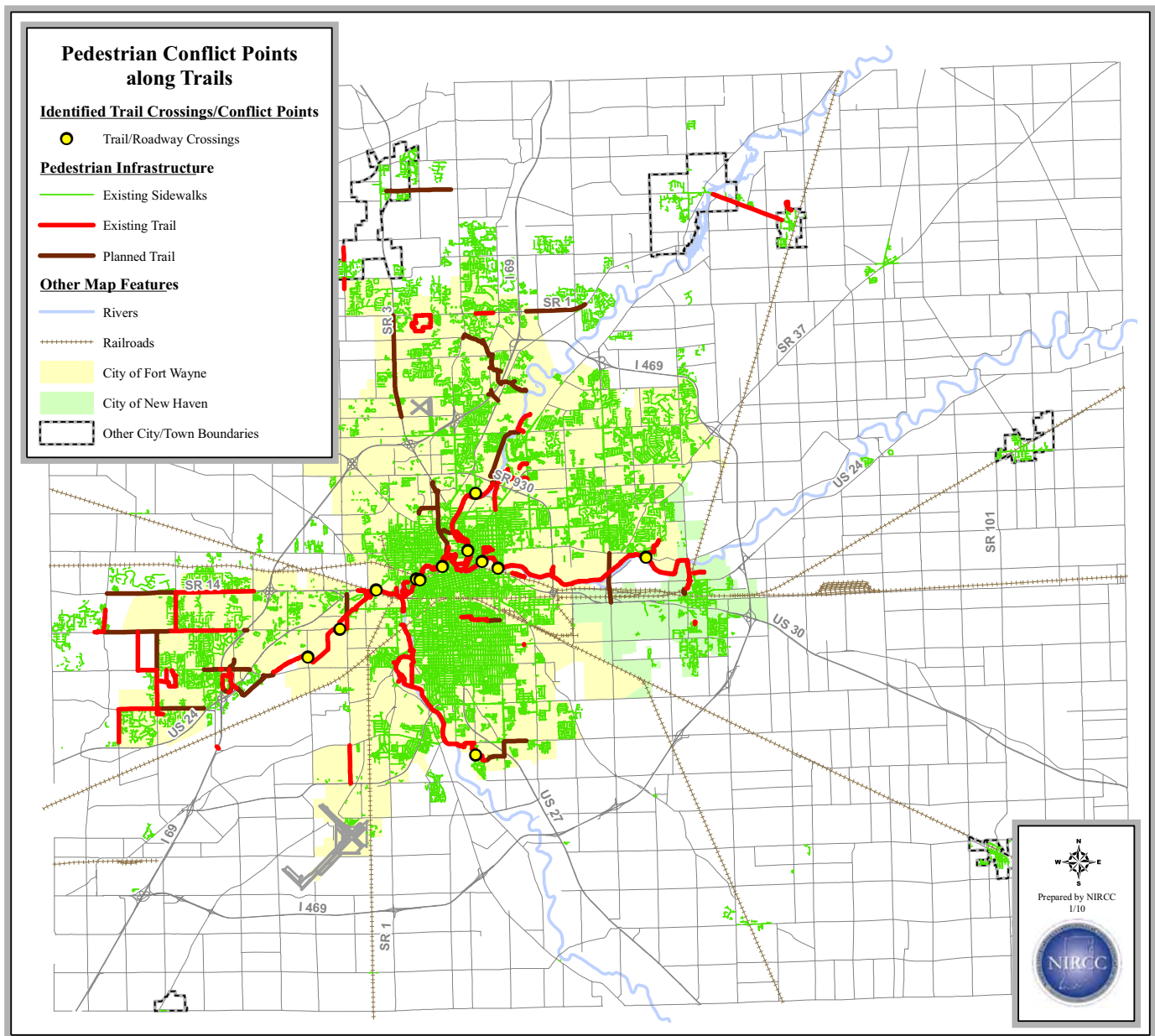


Figure 11

While crash data is a valuable tool for determining locations for these safety improvements, it is important to realize the limitations it possesses as well. A common variable that reduces the reliability of pedestrian related crash data is the fact that many accidents of this kind go unreported. Therefore, sometimes even a single accident or areas with low concentrations of pedestrian related accidents may be just as important to analyze as areas with high frequencies of pedestrian accidents. There may also be locations that experience very few pedestrian accidents, have conditions that are considered unsafe, yet facilitate a very high rate of pedestrian trips. Sometimes these areas go undetected because people are either familiar with the area and expect unsafe conditions or motorists are accustomed to encountering pedestrian traffic. As a result, pedestrian and motorist behavior in these environments may be such that both proceed in a cautious manner to avoid conflict. With a lack of pedestrian related accidents these areas may causes a false perception of a pedestrian friendly environment.

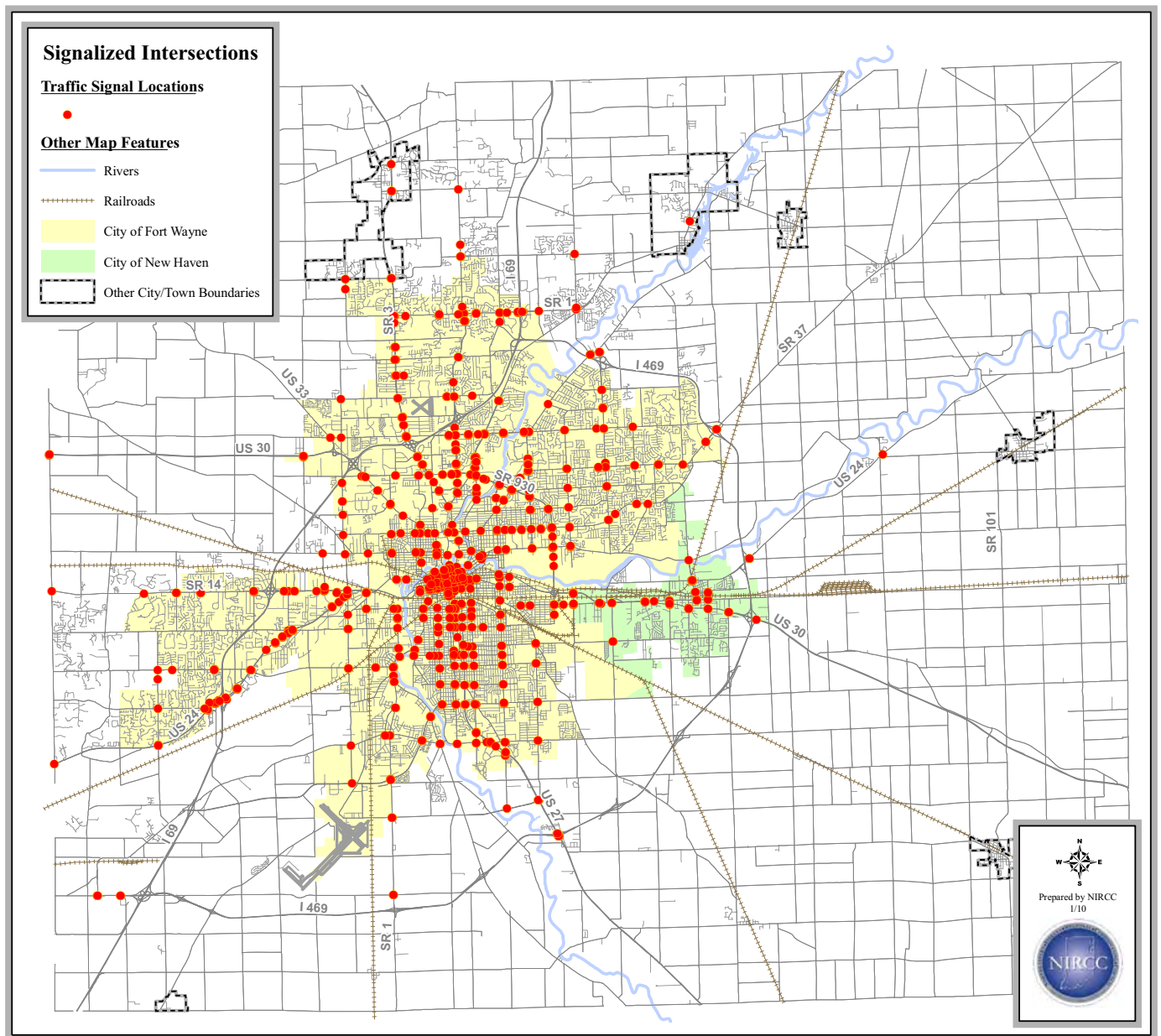


Figure 12

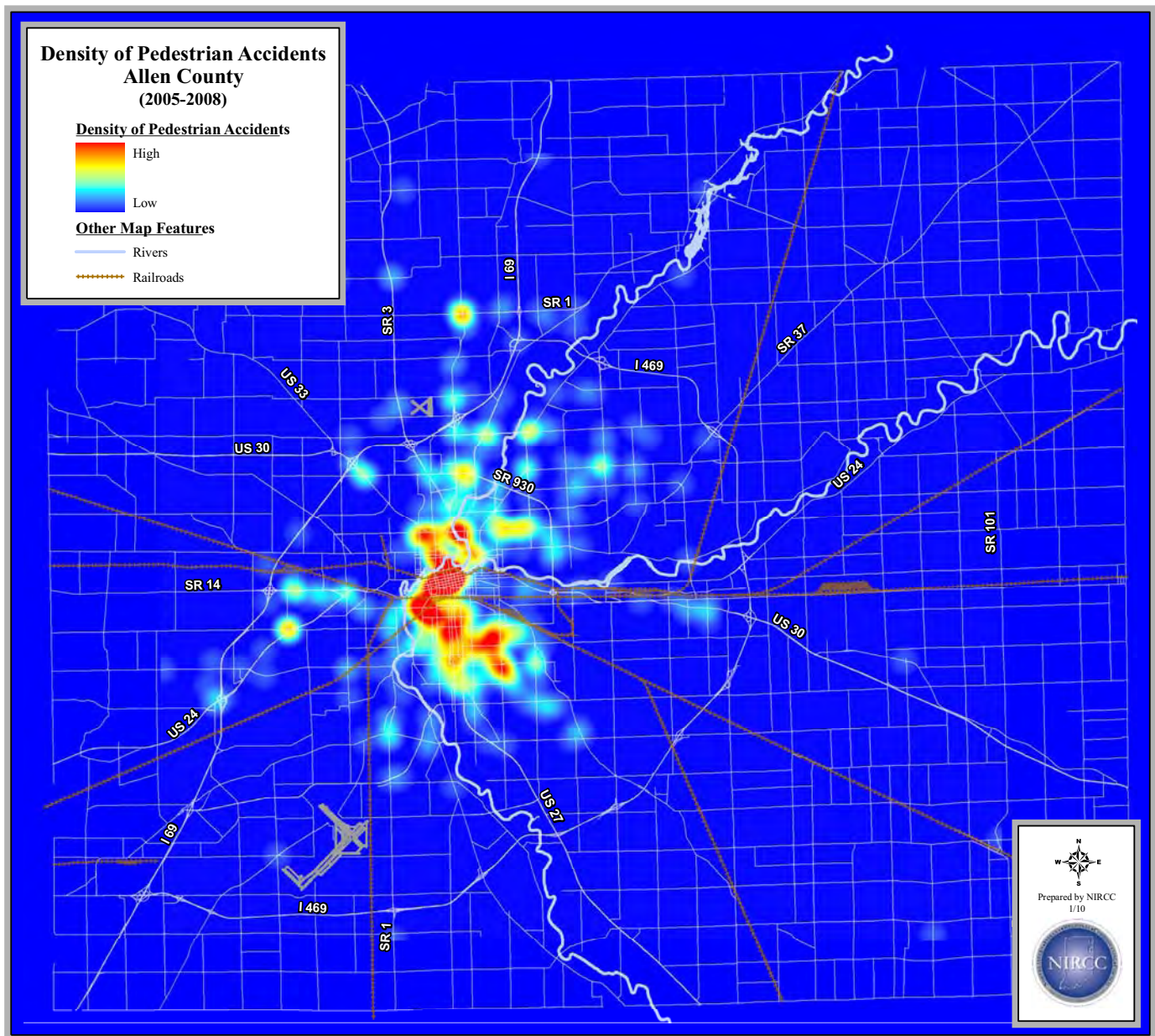


Figure 13

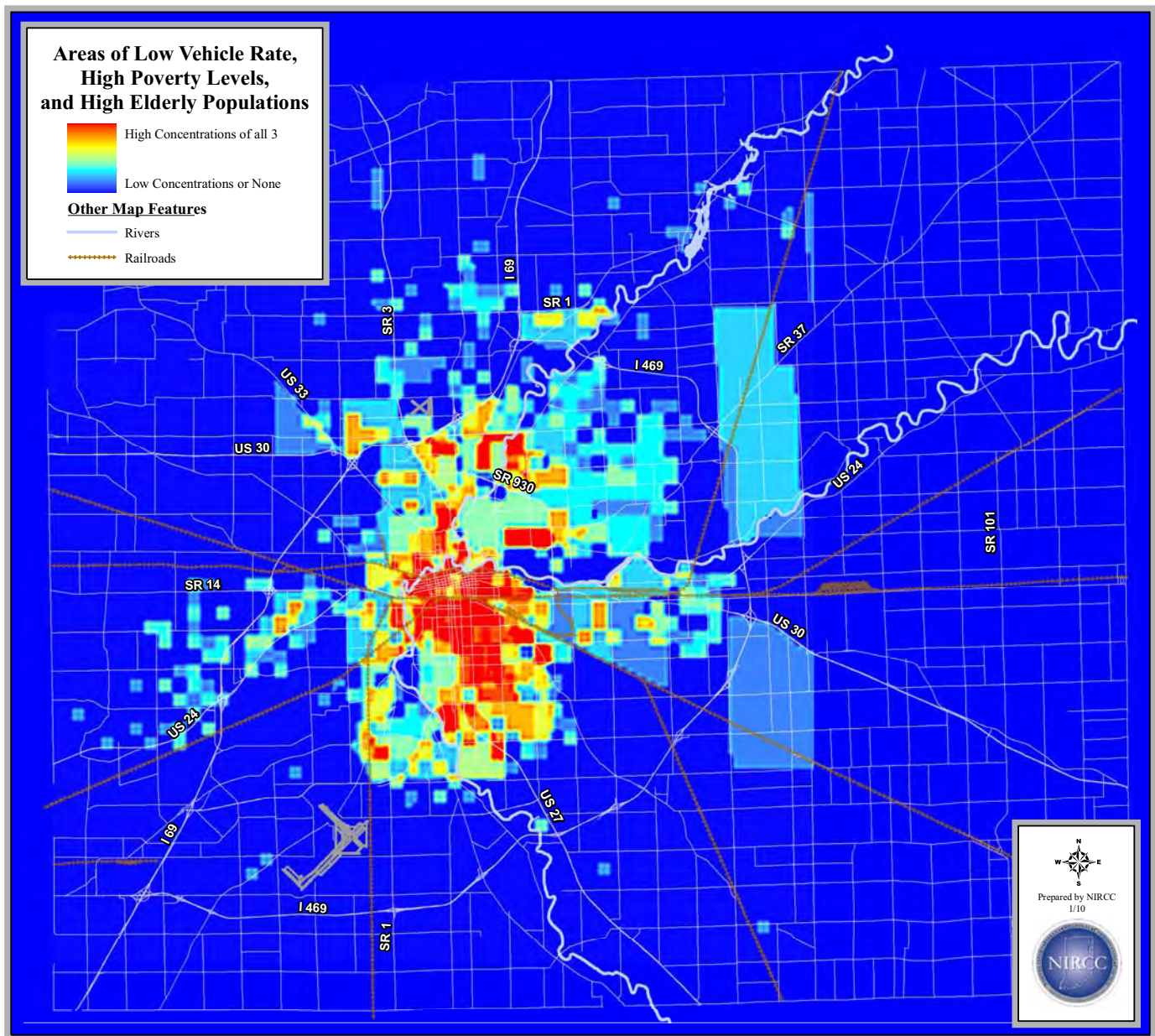


Figure 15

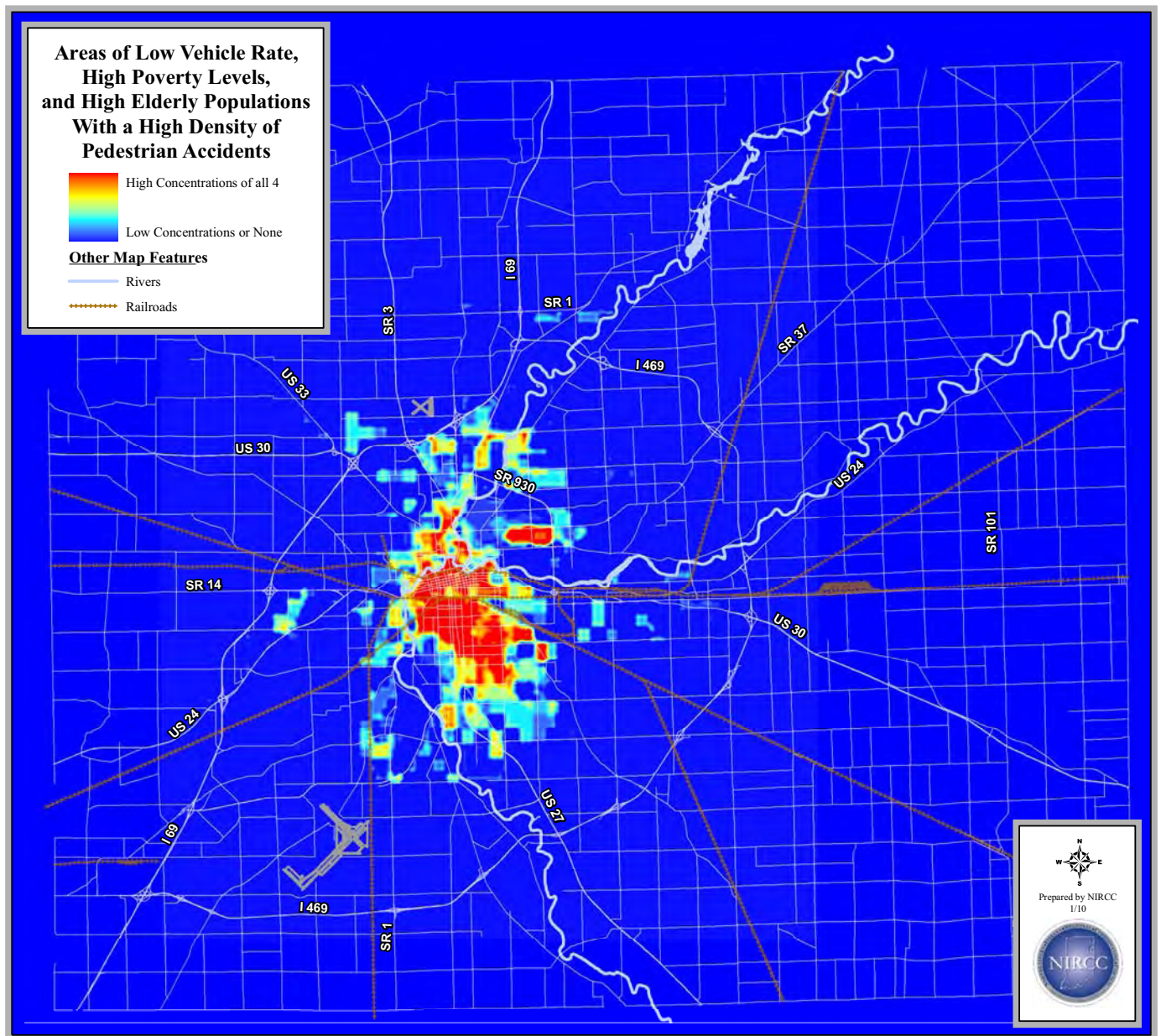


Figure 16

Step 3

Selecting Countermeasures

Selecting countermeasures for unsafe pedestrian conditions include a wide variety of project types and actions. A successful PSAP not only addresses infrastructure improvements, but includes a broad range of engineering, educational, enforcement, and encouragement type solutions. When selecting the appropriate countermeasures it is important to consider a variety of details about crash data, motorist and pedestrian behaviors, demographic patterns, transit service, roadway characteristics, and land use types. This section will identify several countermeasures that can be implemented for spot locations, corridors, specific areas (i.e. neighborhoods, districts, and sub-areas), and system wide improvements in the Allen County area.

In order to select the appropriate countermeasures to affectively create a safer pedestrian environment, it is necessary to understand the different types of solutions that accompany the Four Es (Engineering, Educational, Enforcement, and Encouragement) associated with pedestrian transportation improvements. There are numerous solutions, or countermeasures, that can accompany each of the Four Es. It is important to consider the variables that may cause a pedestrian safety problem before selecting a solution.

Engineering solutions are based on physical changes made to transportation infrastructure and involve some level of design, construction, and/or installation. Numerous variables impact the types of engineering solutions relevant to a safety problem. Once a problem has been identified these variables are used to implement a suitable solution. Data used to find this solution includes the following:

- Crash data (crash types, time of day, age, primary factor, etc.)
- Roadway characteristics (speed, traffic volumes, levels of service, traffic control types, sidewalk inventories, crosswalk locations, illumination, shoulder type, road width, etc.)
- Available right of way
- Locations of pedestrian generators
- Pedestrian counts
- Adjacent land use types
- Presence of specialized uses like transit.

Educational solutions involve educating pedestrians and motorists in ways that promote change in their behaviors or awareness of their actions. It is important to realize the types of problems associated with a lack of education and who the appropriate audience is for educational type solutions. The Federal Highway Administration's report titled "How to Develop a Pedestrian Safety Action Plan" gives several examples of pedestrian related problems that can benefit from educational solutions. They include the following:

- Pedestrians at an intersection don't appear to understand the newly-installed pedestrian signals and/or don't choose to activate them. The novelty of the signal requires some additional information on its meaning and use.
- Pedestrians do not think they have enough time to cross at a traffic signal.
- Drivers don't yield to pedestrians in crosswalks.
- Parents don't understand the need to supervise children under the age of 10 when they are walking.
- Children ages 10 to 18 don't know where or how to safely cross a street to get to school.
- Motorists are speeding in neighborhoods.
- Commuters in the downtown area aren't taking advantage of non-motorized modes of travel.
- Pedestrian crashes are occurring in an area with a concentration of bars due to pedestrian drinking and walking.
- Designers and engineers aren't using pedestrian-friendly design practices.

Enforcement solutions include ways that law enforcement can change or regulate pedestrian and motorist actions that create unsafe environments. It is important to understand behaviors that create these unsafe environments before determining the best enforcement solutions or programs. Examples of unsafe behaviors that drivers and pedestrians exhibit according to the Federal Highway Administration's report titled "How to Develop a Pedestrian Safety Action Plan" include the following:

Driver Behaviors

- Speeding, especially through residential streets and school zones. (Speed is directly related to crash severity and is also a likely factor in crash causation.)
- Failing to yield to pedestrians, especially in crosswalks. (The law requires drivers to yield or stop for pedestrians in crosswalks — it's a law that is often ignored.)
- Running red lights or STOP signs.
- Passing cars stopped for pedestrians crossing the street.
- Passing stopped school buses.
- Parking or stopping in crosswalks.
- Failing to yield to pedestrians when making right or left turns.
- Failing to yield to pedestrians on sidewalks when entering or leaving driveways or alleys.
- Driving while distracted.

Pedestrian Behaviors

- Crossing a street at an undesirable location.
- Not looking left, right and left again before crossing the street.
- Not continuing to look for traffic while crossing.
- Darting out between parked cars and trucks.
- Not stopping and looking any time before stepping in front of a vehicle or obstacle that is blocking the view of traffic.
- Wearing dark clothes when there is poor lighting.
- Not following the directions of traffic signals or crossing guards.
- Walking along a street with their back to traffic.

Encouragement solutions are ways to promote and increase walking type activities to help create a more walkable community. Once people are used to walking in their community they are more likely to continue to do so. With more people beginning to take a walking initiative, others will begin to do the same. As these numbers increase, motorists will begin to expect pedestrian traffic thus creating a safer walking environment for everyone. Also, these increased numbers will begin to create more support for future pedestrian improvements making the community more safe and walkable for all users.

Throughout "Step 2 - Identifying Locations" there are areas and locations identified that may benefit from multiple types of countermeasures. PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System sponsored by U.S. Department of Transportation Federal Highway Administration provides a valuable tool for selecting countermeasures based on the types of safety problems being encountered. Even though this guide discusses a large number of countermeasures, it is important not to limit pedestrian improvements based only on what is listed. The PEDSAFE guide offers a great resource for beginning to look at different types of countermeasures as well as providing other resources for guidance.

PEDSAFE lists 7 categories of countermeasures to consider while analyzing locations for pedestrian safety improvements. These categories include Pedestrian Facility Design, Roadway Design, Intersection Design,

Traffic Calming, Traffic Management, Signals and Signs, and Other Measures. Details about these categories and the countermeasures described for each can be found in **Appendix F**.

The PSAP for Allen County identified a number of areas and locations in the section titled “Step 2 - Identifying Locations” that, through further analysis, may identify several areas, corridors, or spot locations that can benefit from any number of countermeasure types. As NIRCC identifies projects they will be added to **Appendix G** where NIRCC will give details on the locations or areas identified and the appropriate countermeasures that have been selected or recommended.

Examples of spot location types of improvements that NIRCC may recommend include a variety of different countermeasures. The most common examples may include the following:

- Providing sidewalks or trails in locations.
- Providing grade separated pedestrian crossings or pedestrian bridges.
- Ensuring that curb ramps exist at high use locations.
- Providing marked crosswalks or crosswalk enhancements, pedestrian signals, traffic signals or traffic signal enhancements, or the appropriate signage for high use or dangerous locations.
- Implementing right-turn-on-red restrictions at intersections.
- Creating advanced stop lines to provide motorists a clearer view of pedestrians.
- Making improvements to high use transit stops.
- Making street lighting improvements.
- Making driveway improvements at locations where pedestrian usage is very high.
- Reducing curb radii.
- Constructing curb extensions, crossing islands, or raised medians.
- Applying specific paving treatments to create enhanced visibility.
- Utilizing law enforcement at specific locations.
- Implementing speed limit reductions for automobiles.

Pedestrian safety improvements made to specific corridors can use many of the same types of countermeasures used for spot locations. The difference is that these improvements may be carried out through entire corridors rather than utilized at one location. Examples of countermeasures NIRCC may recommend for corridor specific problem areas include the following:

- Providing sidewalks or trails along corridors.
- Ensuring that curb ramps exist along high use pedestrian corridors.
- Creating a walking environment by utilizing urban design elements and street furniture such as benches, bus shelters, trash receptacles, and water fountains throughout an identified corridor such as a downtown street or commercial corridor.
- Providing marked crosswalks or crosswalk enhancements, pedestrian signals, traffic signals or traffic signal enhancements, or the appropriate signage consistently throughout an identified corridor such as a downtown street, commercial corridor, or residential street.
- Implementing right-turn-on-red restrictions along corridors such as downtown streets, commercial corridors, or residential streets.
- Creating advanced stop lines along corridors to provide motorists a clearer view of pedestrians.
- Providing bike lanes along with sidewalks to create a multimodal type corridor causing motorists to be more aware of bicycle and pedestrian type movements.
- Reducing travel lanes where traffic analysis and intersection analysis warrants this type of improvement.

- Making improvements along transit routes or corridors that facilitate a high number of passenger pick-ups or drop-offs.
- Making street lighting improvements along corridors.
- Making driveway and access point improvements utilizing access management strategies.
- Reducing curb radii along corridors such as a downtown streets, commercial corridors, or residential streets as long as anticipated traffic patterns continue to operate without excessive impedance for turning movements.
- Constructing curb extensions, crossing islands, or raised medians along corridors such as a downtown streets, commercial corridors, or residential streets.
- Utilizing law enforcement or speed-monitoring trailers.
- Implementing speed limit reductions for automobiles along corridors such as downtown streets, commercial corridors, or residential streets.
- Making school zone improvements.
- Creating neighborhood identities by establishing gateway corridors.

Other pedestrian safety improvements may be made to specific areas such as neighborhoods, districts, and sub-areas or could be applied on a system wide basis. These types of improvements can be similar to spot location or corridor specific countermeasures except that these will be done on a much broader scale. These will be used to address common problems for large areas and create consistency in improvement types. The types of countermeasures NIRCC may recommend for system wide or specific area improvements include the following:

- Filling in gaps throughout sidewalk and trail networks. This may include creating connectivity for adjacent neighborhoods.
- Ensuring that curb ramps exist.
- Creating a walking environment by utilizing urban design elements and street furniture such as benches, bus shelters, trash receptacles, and water fountains, throughout areas such as downtown business districts or commercial districts.
- Providing marked crosswalks or crosswalk enhancements, pedestrian signals, traffic signals or traffic signal enhancements, or the appropriate signage consistently throughout areas such as downtown business districts, commercial districts, residential areas, or within jurisdictional boundaries.
- Implementing right-turn-on-red restrictions.
- Making improvements throughout transit service areas.
- Making street lighting improvements.
- Utilize access management strategies to improve safety.
- Making safety improvements in areas that surround schools or within school districts.
- Utilizing law enforcement or community based enforcement programs.
- Utilizing or creating educational programs, techniques, and campaigns to create public awareness, support, and behavioral changes in motorist and pedestrian behaviors.
- Creating or utilizing programs that will increase pedestrian usage throughout the community.

Step 4 Implementation Strategy

Developing implementation strategies for pedestrian improvements requires the consideration of several variables. For implementation to be successful, recommended pedestrian safety projects need to have public, private, governmental, and political support before resources can be allocated or given priority over other types of projects. Other variables that affect implementation strategies include funding availability, opportunity, location, importance, time sensitivity, and complexity.

As NIRCC identifies improvement needs throughout Allen County, prioritization may need to be addressed. First, projects need to be categorized to understand how resources can be allocated to achieve the most benefit. There are three main project categories for implementing the PSAP that projects need to be classified under. Projects may fall under simple solutions (short term/low cost), moderately complex solutions (somewhat time consuming/money intensive), or complex solutions (long term/expensive).

It is important to realize while planning these types of improvements that projects from each of these categories will produce various levels of success. Small improvements, or simple solutions, may not create the immediate results accomplished by a complex solution, but these smaller improvement types may be critical for creating support and momentum for larger projects later on. Many of these cost effective solutions may also begin to change pedestrian or motorist behaviors. As a number of these are implemented, they could even have higher impacts on pedestrian safety than many of the complex project types.

Moderately complex or complex solutions are improvements that may be expensive, require several phases, and take extended periods of time to complete. These projects may need to be prioritized by the amount of funding available and the urgency of the improvement. These improvement types may be long term goals that take more significant amounts of planning to achieve. As moderately complex or complex solutions get prioritized, simple solutions may be utilized as temporary improvements until a permanent solution can be made. As NIRCC continues to develop the PSAP and improvements are identified, projects will be categorized into these three types and prioritized accordingly. **Tables 1, 2, and 3** on the following pages provide a guide showing how countermeasures from “Step 3 - Selecting Countermeasures” may be categorized.

To be successful in implementing safety improvements, there has to be more than just a commitment to address safety problems as they arise. A shift from reactive to proactive measures must be encouraged in planners, engineers, and local decision makers. A commitment by local public agencies to place a priority on pedestrian safety must be made by requiring new developments, additions to existing developments, street improvements, and utility upgrades to consider their effects on pedestrian safety and ensure that the proper actions are taken to create a safe pedestrian environment. Implementing safety improvements along with other projects can create opportunities that may otherwise be extremely difficult to achieve.

The following strategies can help facilitate a successful implementation plan for creating a safer pedestrian environment:

- Create support for implementing safety improvements by involving the general public, the private sector (business owners and developers), governmental officials and agencies, and media sources.
- Implement improvements that can be completed immediately.
- Identify short term (simple solutions), medium range (moderately complex solutions), and long term (complex solutions) projects.
- Produce a prioritization process that incorporates multiple jurisdictional involvement and input.

- Produce funding sources for projects.
- Incorporate pedestrian safety projects with new developments, additions to existing developments, street improvements, and utility projects.

Table 1 Countermeasures recommended for spot specific improvements:

Providing sidewalks or trails where necessary.	Moderate/Complex
Providing grade separated pedestrian crossings or pedestrian bridges in locations where safe or practical alternatives do not exist.	Complex
Ensuring that curb ramps exist at significant or vital locations.	Moderate
Providing marked crosswalks or crosswalk enhancements, pedestrian signals, traffic signals or traffic signal enhancements, or the appropriate signage as needed.	Simple/Moderate/Complex
Implementing right-turn-on-red restrictions at specific intersections.	Simple
Creating advanced stop lines at specific locations to provide motorists a clearer view of pedestrians.	Simple
Making improvements to specific transit stops.	Moderate/Complex
Making street lighting improvements.	Moderate
Making driveway improvements at specific locations.	Moderate/Complex
Reducing curb radii at certain intersections.	Moderate
Constructing curb extensions, crossing islands, or raised medians.	Moderate/Complex
Applying specific paving treatments to create enhanced visibility at specific locations.	Moderate
Utilizing law enforcement at specific locations.	Simple
Implementing speed limit reductions for automobiles at specific locations.	Simple

Table 2 Countermeasures recommended for corridor specific problem areas:

Providing sidewalks or trails wherever gaps exist throughout entire corridors.	Complex
Ensuring that curb ramps exist throughout entire corridors.	Moderate
Creating a walking environment by utilizing urban design elements and street furniture such as benches, bus shelters, trash receptacles, and water fountains, throughout an identified corridor such as a downtown street or commercial corridor.	Moderate
Providing marked crosswalks or crosswalk enhancements, pedestrian signals, traffic signals or traffic signal enhancements, or the appropriate signage consistently throughout an identified corridor such as a downtown street, commercial corridor, or residential street.	Simple/Moderate/Complex
Implementing right-turn-on-red restrictions along specific corridors such as downtown streets, commercial corridors, or residential streets.	Simple
Creating advanced stop lines along corridors to provide motorists a clearer view of pedestrians.	Simple
Providing bike lanes along with sidewalks to create a multimodal type corridor causing motorists to be more aware of bicycle and pedestrian type movements.	Moderate/Complex
Reducing travel lanes where traffic analysis and intersection analysis warrants this type of improvement.	Complex
Making improvements along transit routes or corridors that facilitate a high number of passenger pick-ups or drop-offs.	Moderate/Complex
Making street lighting improvements along entire corridors.	Moderate
Making driveway and access point improvements utilizing access management strategies.	Moderate/Complex
Reducing curb radii along identified corridors such as a downtown streets, commercial corridors, or residential streets as long as anticipated traffic patterns continue to operate without excessive impedance for turning movements.	Moderate
Constructing curb extensions, crossing islands, or raised medians along identified corridors such as a downtown streets, commercial corridors, or residential streets.	Moderate/Complex
Utilizing law enforcement or speed-monitoring trailers.	Simple
Implementing speed limit reductions for automobiles along specific corridors such as downtown streets, commercial corridors, or residential streets.	Simple
Making school zone improvements.	Simple/Moderate
Creating neighborhood identities by establishing gateways on certain corridors.	Moderate/Complex

Table 3 Countermeasures recommended for system wide or specific area improvements:

Filling in gaps throughout sidewalk and trail networks. This may include creating connectivity for adjacent neighborhoods.	Complex
Ensuring that curb ramps exist throughout Allen County.	Moderate
Creating a walking environment by utilizing urban design elements and street furniture such as benches, bus shelters, trash receptacles, and water fountains, throughout an identified area such as a downtown business district or commercial district.	Moderate
Providing marked crosswalks or crosswalk enhancements, pedestrian signals, traffic signals or traffic signal enhancements, or the appropriate signage consistently throughout an identified area such as a downtown business district, commercial district, residential area, or an entire jurisdiction.	Simple/Moderate/Complex
Implementing right-turn-on-red restrictions throughout specific areas or districts.	Simple
Making improvements throughout transit service areas.	Moderate/Complex
Making street lighting improvements throughout specific areas or districts.	Moderate
Utilize access management strategies to improve safety throughout Allen County.	Moderate/Complex
Making safety improvements throughout areas that surround schools or school districts.	Moderate/Complex
Utilizing law enforcement or community based enforcement programs.	Simple
Utilizing or creating educational programs, techniques, and campaigns to create public awareness, support, and behavioral changes in motorist and pedestrian behaviors.	Simple
Creating or utilizing programs that will increase pedestrian usage throughout the community.	Simple

Step 5 Institutionalizing Changes to Planning and Design Standards

Institutionalizing changes to planning and design standards requires the incorporation of pedestrian safety improvements into design guidelines and traffic management practices so they become routine accommodations with every type of improvement or development. Development guidelines, planning documents, transportation plans, design manuals, emergency management practices, and maintenance plans or practices all need to include policies and guidelines that accommodate pedestrian safety. In the Federal Highway Administration’s report titled “How to Develop a Pedestrian Safety Action Plan”, Appendix F: Reference Guide and Plan Summaries provides a list of publications that address pedestrian policies and designs of this kind.

It is also important to note that local criteria and guidelines for the installation and maintenance of pedestrian facilities is considered to help institutionalize pedestrian safety improvements. Many traffic control devices and pedestrian facilities are installed to minimum standards and fail to take into consideration the needs for the area they serve. In order to create local guidelines that would ensure the appropriate considerations are made when these types of facilities are planned, the Allen County PSAP will support and work with local public agencies to develop a set of local criteria and guidelines. Fort Wayne’s “Walk Fort Wayne Plan” discusses this specifically in one of their policies which can be seen on the following pages of this section.

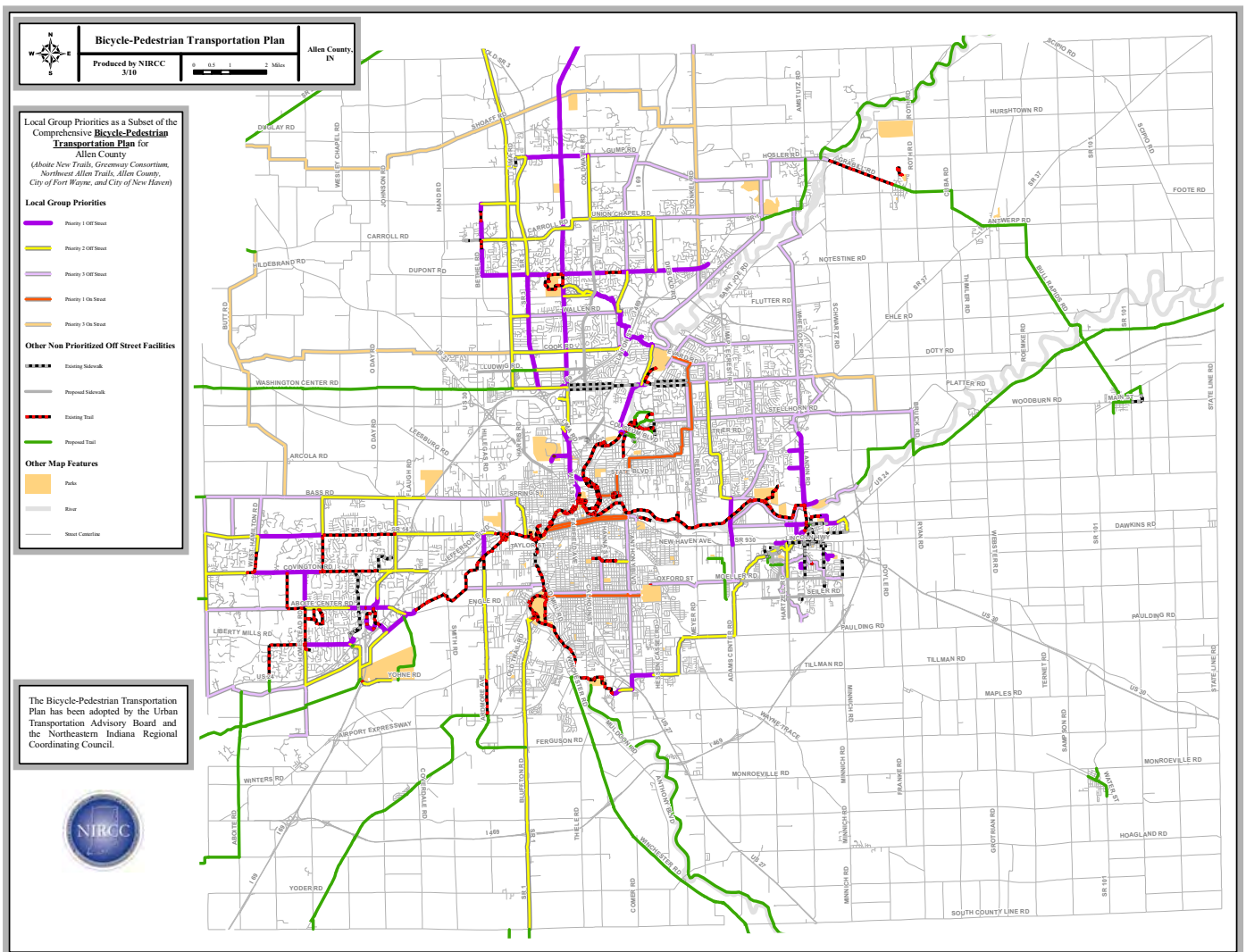


Figure 17

There are several plans in Allen County that recommend these types of policies and practices. NIRCC's Comprehensive Bicycle-Pedestrian Transportation Plan provides a recommendation policy for sidewalk improvements (**Appendix A**) to be included with new developments and road projects. It also provides a map (**Figure 1**) that recommends sidewalk, trail, and on-street bicycle accommodations throughout Allen County. This map and recommendation policy provides planners and highway officials with a tool to help coordinate bicycle and pedestrian improvements with present and future road projects and developments. The plan also provides a map (**Figure 17**) displaying a prioritized plan for advocacy groups and governmental agencies to develop trail and sidewalk projects independently as stand alone projects.

The Comprehensive Bicycle-Pedestrian Transportation Plan is also part of the 2030-II Transportation Plan and is contained in Chapter 6, "The Selected Plan". It can be viewed on the web at <http://www.nircc.com/user/image/2030-ii-chapt6.pdf>. Being incorporated into the 2030-II Transportation Plan ensures that these bicycle and pedestrian improvements are considered for all federal aid road projects and also creates more potential funding sources for implementing them.

The City of Fort Wayne's Planning and Policy Department has created draft policies that will be incorporated into the Walk Fort Wayne Plan and eventually amended to the Comprehensive Plan. A list of the Goals and Policies for this plan can be viewed in **Appendix D**. It is important to note that this plan is still in the draft stages of development. Specific policies and action steps this plan addresses that are related to institutionalizing changes into planning and design principles are as follows:

Policies from the City of Fort Wayne's "Walk Fort Wayne Plan" Network section:

- **Policy 3: Ensure that pedestrian facilities, such as sidewalks and other pedestrian safety facilities, are considered integral components in the design and development of all public street improvement projects.**

In the past, public streets and thoroughfares were often designed and constructed with the primary purpose of providing accommodation for automotive transportation. Shifting to a focus which encourages and promotes balancing the need for all forms and modes of transportation along public thoroughfares can only be accomplished through communication and coordinated planning in the design of all transportation projects.

Additionally, if all thoroughfares are designed and built to include pedestrian infrastructure, it expands the existing network and eventually will create a highly connected pedestrian system. Each new street improvement project that includes pedestrian facilities further connects Fort Wayne citizens to the destinations that they want/need to get to.

- **Action Step A:** Train city staff responsible for the review of city infrastructure projects, as well as staff issuing permits for private construction on the policies within this Plan.
- **Action Step B:** Stakeholders, such as representatives and staff from: City planning, urban design, neighborhood leaders, forestry and parks, street lighting, traffic management/safety, and traffic engineering should be consulted at the scoping, design, and final construction plan phases of a project to assure project alignment with the goals and policies within this Plan.
- **Action Step C:** Include identified stakeholders in all planning and project review routings of Board of Works sidewalk, utility, and street and roadway projects to assure project alignment with the goals and policies within this Plan.

- **Policy 5: Ensure that the design and construction of new transportation facilities anticipate and accommodate the future demand for pedestrian facilities (bridges, interchanges, intersections, etc.).**

In order to prevent future barriers to a connected pedestrian network, the design and construction of major transportation facilities should anticipate and accommodate pedestrian facilities, such as bridges, interchanges and intersections, even if connecting pedestrian infrastructure does not exist. This is especially important if the project is located in or near a Pedestrian Generating Area noted on the Connectivity Prioritization Map.

- **Policy 8: Ensure that appropriate pedestrian safety facilities are incorporated within street improvement projects, and at all intersections along major thoroughfares. Mid-block crossings should be provided in high pedestrian demand areas and where vehicle and pedestrian conflicts are minimal.**

Safety and ease of accessibility for pedestrian transportation is paramount to this pedestrian plan and will enhance its use and utility. While there are design guidelines available from the AASHTO and the Federal highway Administration, planning and design decisions should reflect local expectations for user safety and comfort.

Mid-block crossings in appropriate, safe locations of high pedestrian demand areas can be useful and beneficial to the entire transportation network. However, great care in their proper location and design is essential to their effective and safe use. The design of mid-block crossings should protect the pedestrian by using appropriate traffic control devices, such as refuge islands, lighting, striping, signs and signals.

- **Policy 10: Encourage and facilitate the incorporation of appropriate public transit access facilities at existing and anticipated high use transit stop locations and at new large scale developments, as warranted.**

As stated in Policy 9, public transit users need safe, easy access to transit stop locations. However, once pedestrians arrive at these locations, appropriate facilities, such as bus pads, shelters and lighting, are necessary to accommodate user safety and shelter from inclement weather conditions. Planning and coordination for such facilities can help to assure they are provided at high use locations and when new major developments are planned.

- **Action Step A:** Coordinate with Department of Planning Services, Fort Wayne Community Development Planning and Policy, Public Works, NIRCC and Citilink to identify high use transit stop locations to ensure that facilities are appropriately planned, designed and provided.

Policies from the City of Fort Wayne’s “Walk Fort Wayne Plan” Legislative section:

- **Policy 2: Develop and support adoption of a Complete Streets ordinance along with design standards that comply with Federal ADA standards, to ensure that all streets are built and maintained appropriately to accommodate pedestrians, bicyclists, motorists and transit users of all ages and abilities.**

Pedestrian infrastructure should be provided full consideration in the planning and development of transportation facilities, including its incorporation into state, regional, and local transportation plans and programs. A complete streets policy will provide for safer non-vehicular transportation, as well as a more user-friendly system.

- **Action Step A:** Gather input from the community and area stakeholders, including residential and commercial developers, to assist in the development of a Complete Streets Policy.
 - **Action Step B:** Coordinate with the Bike Fort Wayne Plan in the development and adoption of a Complete Streets ordinance.
 - **Action Step C:** Investigate best practices on how other communities have developed and implemented a Complete Streets ordinance.
- **Policy 3: Develop and adopt local criteria and guidelines for the installation and maintenance of pedestrian safety facilities, including appropriate traffic control devices, along the City's major thoroughfares where increased pedestrian safety is needed.**

Traffic control devices for roadway users, including pedestrians and bicyclists, increase safety and efficiency for all users. To reduce confusion and cost, the national Manual on Traffic Control Devices (MUTCD) was created and is the law governing all traffic control devices. The MUTCD is an ever-changing document that provides Standards that *must* be followed, Guidance that *should* be followed and Options that *may* be used in certain circumstances.

However, beyond the standards required in the manual, there is sometimes discretion on when, where and what type of traffic control device should be used. For example, (if not otherwise required in the MUTCD) a crosswalk location may either be marked with two parallel lines or marked with several wide “piano key” stripes. Both crosswalk scenarios are sending a message to the pedestrian that directs them where to cross the street, as well as, a message to the driver that indicates that pedestrians may be crossing in this location. Although, the “piano key” markings are often more visible to drivers than the parallel lines and can increase the safety for both the pedestrian and driver.

Often when the use and location of traffic control devices is left up to discretion, the results can vary depending on the funding source or engineer managing the project. This policy strives to set local minimum standards for when traffic control devices are discretionary and not specifically required by the MUTCD. By setting local minimum standards the City can better communicate and essentially increase the safety for all roadway users.

Another issue is the maintenance of traffic control devices. As time progresses, signs, signals and pavement markings will wear and become more difficult to recognize. This policy also aims to create local minimum standards and/or guidelines for when to repair or replace traffic control devices.

- **Action Step A:** Coordinate with Public Works, Department of Planning Services, Citilink, Fort Wayne Trails, Fort Wayne school systems, NIRCC and interest groups such as AARP and the Mayor's Senior Advisory Council to develop safe pedestrian facility standards and/or guidelines.
- **Action Step B:** Examine all existing marked crosswalk locations in the city and ensure alignment with developed standards and/or guidelines.
- **Action Step C:** Examine all intersections and appropriate locations along all major thoroughfares to ensure alignment with developed standards and/or guidelines. Examination of pedestrian safety facilities should start within the Pedestrian Generating Areas and public and private schools and work outward.

Other planning documents such as the Comprehensive Plan for Allen County (Plan-it Allen) and the New Haven Comprehensive Land Use and Strategic Economic Plan address the need for a multimodal transportation system and stress the importance of safe pedestrian mobility and connectivity throughout the community. To accomplish this, additional strategies need to be formulated to ensure that pedestrian improvements are not overlooked. NIRCC will continue to update this section with strategies for institutionalizing changes to planning and design standards throughout Allen County.

Step 6 Land Use, Zoning, and Site Design Issues

Land use patterns, zoning regulations, and access management standards all play an essential role in pedestrian safety. Some of the most challenging conflicts between motor vehicles and pedestrians are caused by land use patterns and poor site design. Poor driveway access management, site designs that do not provide pedestrian access, lack of connectivity, sprawling development, and poor access to transit facilities are common problems for pedestrian safety. There are multiple countermeasures directly associated with these types of issues that need to be addressed as part of the planning requirements for land use development.

A strategy for addressing these issues is to work with the appropriate departments and elected officials to implement land use, zoning, and site design regulations that encourage pedestrian trips and require pedestrian infrastructure with new developments. Too often pedestrian facilities are not required with new developments and access to transit facilities is not considered. Also, transportation improvements that are required with new developments, such as controlled intersections and access points, often lack pedestrian safe facilities.

NIRCC's Comprehensive Bicycle-Pedestrian Transportation Plan provides a recommendation policy for sidewalk improvements (**Appendix A**) to be included with new developments. NIRCC also coordinates updates to the Access Standards Manual. As part of the next update of the Access Standards Manual, pedestrian safe design recommendations may need to be addressed.

Fort Wayne and Allen County may need to update the proper zoning and subdivision control ordinances as well as any other related ordinances that may apply. One policy included in the Walk Fort Wayne Plan includes an action step that would work to modify these. Another policy addresses poor access to transit facilities. A list of the Goals and Policies for this plan can be viewed in **Appendix D**. The following policies addresses these issues.

Policy from the City of Fort Wayne's "Walk Fort Wayne Plan" Legislative section:

- **Policy 1: Encourage the development of regulations to require the incorporation of pedestrian facilities and connectivity within and between new development projects, as well as along all adjacent major thoroughfares.**

Not only should pedestrian needs be considered in all transportation projects, sidewalk infrastructure and amenities should also be integrated into development and site plans within the City of Fort. The incorporation of pedestrian facilities will not only provide accessibility and connectivity to existing and adjacent sidewalks, but will strengthen our entire pedestrian network.

- **Action Step A:** Create a study committee to review Chapter 155 (Subdivision Regulations) and Chapter 157 (Zoning and Sign Ordinance) of City Code and remove requirements for pedestrian facilities from these chapters and place requirement of pedestrian facilities into a separate section of City Code.

Policy from the City of Fort Wayne's "Walk Fort Wayne Plan" Network section:

- **Policy 9: Pedestrian facilities should be coordinated with public transit facilities to ensure that transit stop locations are safe and accessible to all pedestrians.**

All users of local public transit routes and stop locations must have safe and easy access to sidewalks and other connecting pedestrian facilities in order to reach desired destinations. Planning and designing sidewalks that connect to transit stop locations should be a reasonable priority.

Step 7 Commitment to the PSAP

For the Allen County PSAP to become successful there must be strategies that will ensure the commitment for an ongoing action plan. Listed below are a few strategies to begin the process of committing to and continuing this plan. Some of these strategies are from the Federal Highway Administration's report titled "How to Develop a Pedestrian Safety Action Plan". This is a work in progress and will be updated as NIRCC begins to implement the pedestrian safety action plan and present it to various governmental officials, departments, and members of the public.

- Update the plan on an annual basis.
- Provide ongoing internal training to ensure that designs do not inadvertently impact pedestrian mobility and safety.
- Provide ongoing external training to help the public focus on changes that will improve pedestrian safety.
- Have transportation agencies write Requests for Proposals (RFPs) that require appropriate pedestrian expertise.
- Institute an award system to acknowledge good projects that provide safer conditions for pedestrians.

Step 8 Evaluation of Results

This section is dedicated to evaluating results of projects related to the Allen County Pedestrian Safety Action Plan. As this plan is implemented, **Appendix H** will provide information or studies that demonstrate the resulting effectiveness of countermeasures produced or implemented from the PSAP. This section will also provide updates on the status of objectives listed in the section titled “Step 1 - Defining Objectives”.

Evaluation methods for varying types of countermeasures will differ depending on what the improvement or program is intended to achieve. It is important to find out several things from an evaluation. The obvious information that needs to be gathered by an evaluation is if the improvement or program created positive results by creating a safer pedestrian environment or directly reduced pedestrian crashes. Another portion of the evaluation should study the results an improvement had on vehicular traffic. Negative affects on vehicular traffic could create a new problem. Also, the evaluation needs to consider the opinions of the general public or stakeholders for a particular improvement to find out if the intended results were achieved.

There are a number of tools and techniques to evaluate projects or programs. The following lists some of these tools and techniques that may be used for this process:

- Comparisons of crash data
- Surveys
- Interviews
- Pedestrian counts
- Stakeholder meetings
- Traffic studies
- Corridor impact studies
- Sub-area analysis
- Before and after studies

Appendix A

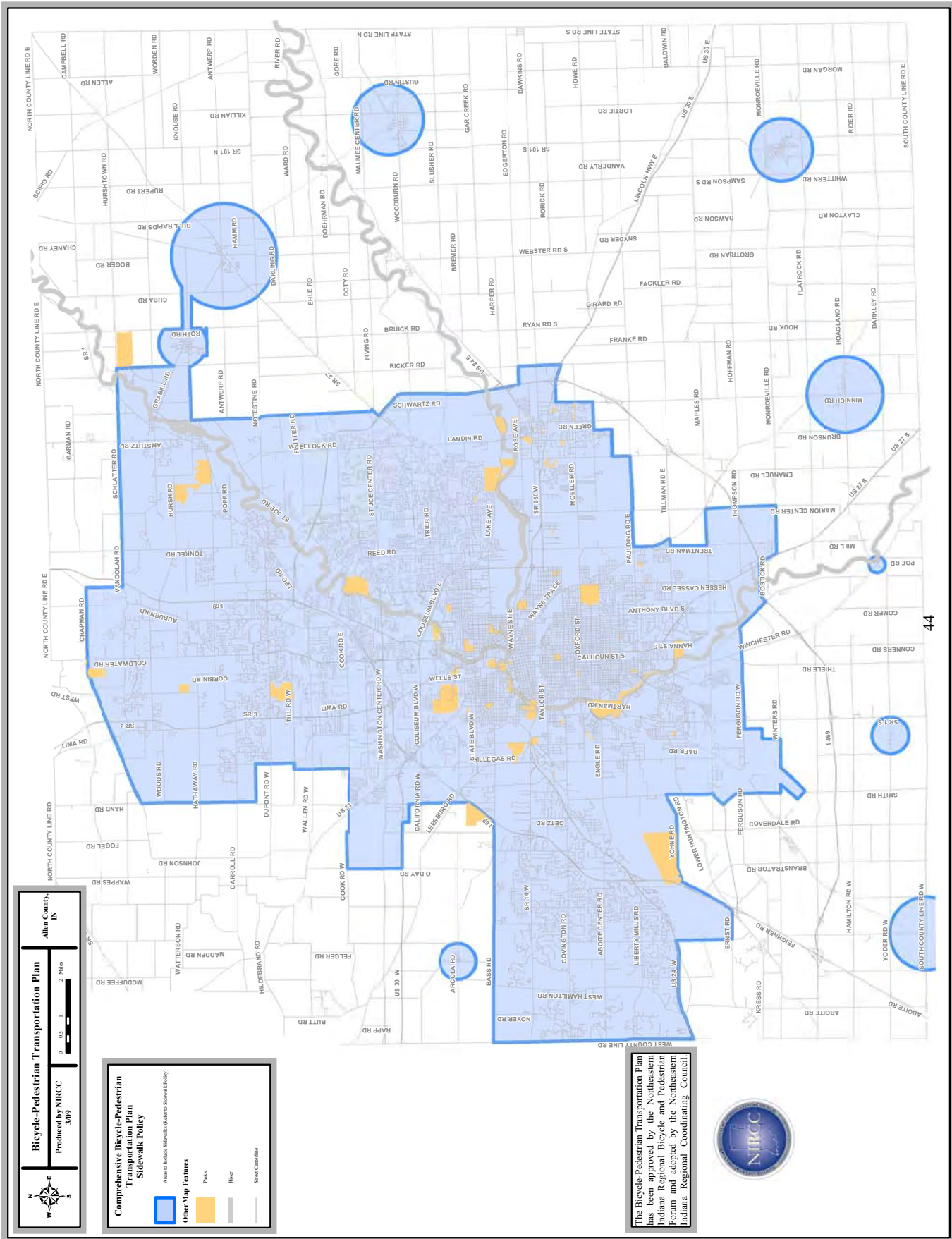
Sidewalk Recommendation Policy from the Bicycle-Pedestrian Transportation Plan

Sidewalk Recommendation Policy

1. In new developments sidewalks should be provided within the dedicated right-of-way of all perimeter and internal streets as recommended by this article unless an adopted plan exists recommending a multi-use trail. Sidewalks should not supersede the multi-use trail where recommended. Road projects should also include sidewalks within the right-of-way as recommended by this article unless an adopted plan exists recommending a multi-use trail. Sidewalks should not supersede the multi-use trail where recommended.
2. Apart from new developments, implementation of sidewalks along highways, city streets, and county roads should be provided on streets within the urbanized boundary, city boundaries, and areas around small towns (Figure 1) that meet the standards shown in Table 1. Aside from new developments, implementation of sidewalks along highways, city streets, and county roads outside the areas shown in Figure 1 should be provided according to identification from the most recent Bicycle and Pedestrian Transportation Plan.

Table 1 (Minimum Sidewalk recommendations in Allen County, IN)

<i>Federal Function Classification System</i>	<i>Recommended</i>	<i>Sides</i>	<i>Width (ft)</i>
Local & Residential	Yes	Both	5
Collector	Yes	Both	5
Rural Major Collector	Yes	Both	5
Minor Collector	Yes	Both	5
Minor Arterial	Yes	Both	5
Other Principal Arterial	Yes	Both	5
Other Freeway / Expressway	No	N/A	N/A
Interstate	No	N/A	N/A



3. Sidewalks should be provided within the dedicated right-of-way of all residential, office, commercial, retail, and private subdivision streets on both sides.
4. If residential, office, commercial, or retail development intersects an existing or planned Multi-Use Path, sidewalks should be provided for access.
5. Sidewalks should be provided along all industrial park streets on at least one side within the dedicated right-of-way.
6. A sidewalk connection should be provided if a gap in the sidewalk network exists between developments and there is no development within the gap.
7. Physical barriers or obstacles should not compromise network connectivity or public access.
8. Sidewalk surfacing should be of a character that is suitable for the expected use and should also be in harmony with the subdivision design.
9. Sidewalk locations and designs should make adequate provisions for culverts, drains, utilities, bridges, rights-of-way, driveways, and landscaping.
10. All sidewalks should be designed according to current AASHTO Standards.
11. All sidewalks should be designed according to ADA standards to allow disabled access.

Appendix B

Walk Fort Wayne Plan - Scope

Fort Wayne Comprehensive Sidewalk Connectivity Plan

What is it?

The Fort Wayne Comprehensive Sidewalk Connectivity Plan is a 10 year plan that will provide guidance on how and where to fill in sidewalk gaps along Fort Wayne’s arterial and collector roadways, through the use of new sidewalks and shared-use paths. The plan will prioritize pedestrian capital improvements within the city of Fort Wayne. Finally, the plan will assist with the drafting and passage of a “complete streets” ordinance through Common Council.

What’s the Objective?

- To implement recommendations from the Fort Wayne / Allen County Comprehensive Plan, *Plan-it Allen!*.
- To revisit recommendations from the Comprehensive Bicycle-Pedestrian Plan created by the Northeastern Indiana Regional Coordinating Council (NIRCC).
- To safely connect citizens to desired destinations through the use of sidewalk and shared-use path infrastructure, according to the Connectivity Prioritization Map.
- To make infrastructure, such as crosswalks and bus stops, accessible to all users where appropriate. (i.e. elderly, persons with disabilities, schools, etc.)
- To coordinate and interface with Citilink’s transit planning team.
- To establish goals and policies for sidewalk connectivity.
- To work with the Bike Master Plan project team to both coordinate efforts and to evaluate the initiation of a “complete streets” ordinance or policy.
- To incorporate a local Safe Routes to School Program into the plan.

Why?

The Fort Wayne and Allen County Comprehensive Plan encourages a balanced transportation system so that individuals may choose their transportation mode to travel to work, for pleasure, to school, etc. Currently, the City of Fort Wayne has gaps in its sidewalk infrastructure along major thoroughfares which limits pedestrian connectivity to desired destinations. City staff has heard through several public input sessions that there is a desire for pedestrian connectivity to major destinations and to be able to use alternative forms of transportation. Communities with well balanced transportation systems that serve a variety of users most often see increased economic development as businesses become more connected to the multiple modes of transportation. The plan will also improve the quality of life for Fort Wayne’s citizens, as well as improve air quality as more people are walking to destinations instead of driving in a motorized vehicle.

What is the Process?

- Timeframe - Draft Recommendations: 6 months
Completed Plan: 10-12 months
- Multi-disciplinary project team. The primary team will meet weekly and work on drafting recommendations, goals and policies, the Connectivity Prioritization Map and completing the plan. The secondary team will be advisory to the primary team and meet monthly or as needed.
- **Phase I – Establish scope, timeline and finalize teams – March 26th – April 20th.**
- **Phase II – Draft Recommendations – April thru September.**

Fort Wayne Comprehensive Sidewalk Connectivity Plan

- *Primary team* will create draft prioritization recommendations.
- *Secondary team* to review and approve draft prioritization recommendations.
- **Phase III – Establish goals and policies and complete first draft of plan – June thru November.**
 - *Primary team* will create draft.
 - *Secondary team* to review and approve draft.
- **Phase IV – Public outreach – End of May 2009 thru January 2010.**
 - *Primary team* will conduct public input session's mid-way through the process to obtain stakeholder input.
 - *Primary team* will review the final draft with stakeholders for any last minute changes.
- **Phase V – Adoption by Common Council and UTAB – February 2010.**

Who?

Primary Team:

- Kienan O'Rourke, Planning and Policy – Co-Project Coordinator
- Bruce Johnson, Planning and Policy – Co-Project Coordinator
- Pam Holocher and/or Sherese Fortriede, Planning and Policy
- Michele Yamanaka, GIS/Special Projects
- Matt Peters, Northeastern Indiana Regional Coordinating Council (NIRCC)
- Dawn Ritchie, Greenway and Trails
- Rebecca Karcher, Office of Housing and Neighborhood Services
- Tom Cain, Redevelopment
- Christian Beebe, Department of Planning Services

Secondary Team (Advisory):

- Dave Ross and/or Mario Trevino, Traffic Engineering
- Matt Land, City Utilities
- Lori Keys, Aboite New Trails
- Betsy Kachmer, Citilink
- Jim Deathe, Right-of-way
- (New Employee), Street Light Engineering
- Dan Avery, Northeastern Indiana Regional Coordinating Council (NIRCC)
- Palermo Galindo, Hispanic & Immigrant Liaison
- Liz Brown, City Council (at-large)
- Tom Didier, City Council (3rd district)
- (New Member), Mayor's Senior Advisory Committee
- David Nelson, League for the Blind and Disabled
- Donna Cusick, Allen County Council on Aging
- Curt Sylvester, AARP Indiana
- Kim Sabrosky, AEP – Indiana Michigan Power
- Matthew Kelley, Verizon
- Larry Graham, NIPSCO

Appendix C

Walk Fort Wayne Plan - Survey Results

**Comprehensive Sidewalk Connectivity Plan
Public Input – Survey Results
July 2009-October 2009**

Surveys were conducted using various methods. The following methods were used:

- Online (via the City’s main webpage)
- City Utilities Bill Stuffers
- Survey Boxes (City of Ft. Wayne ACPL branches, YMCA Central Branch, IVY Tech Community College, IPFW, Indiana Tech, Wellspring Community Center, Burmese Advocacy Center, the lobby of the City-County Building, and the Fort 4 Fitness Health Expo)

There were a total of **2464** surveys collected and tallied (as of 10-1-09).

- Number of Online surveys received: **290** (11.8%)
- Number of Utility Bill Stuffer surveys received: **1923** (78.0%)
- Number of Paper surveys received: **251** (10.2%)

76.7% of the surveys were filled out correctly, leaving **23.3%** being filled out either incorrectly or incompletely.

Key Trends

- Schools (K-8) was rated as the highest priority destination
- Work/Employment Centers was rated as the lowest priority destination
- Stellhorn Rd and Maplecrest Rd was the top rated intersection in need of crosswalks and or pedestrian signals
- Main purpose for using sidewalks was “Traveling to a destination” closely followed by “Exercise”
- Main reason people chose “Other” was listed as SAFETY
- Lake Avenue was the top rated roadway identified in the Northeast Quadrant
- Coliseum Blvd was the top rated roadway identified in the Northwest Quadrant
- Lafayette St was the top rated roadway identified in the Southeast Quadrant
- Jefferson Blvd was the top rated roadway identified in the Southwest Quadrant
- Reed Rd was identified as the most important roadway not listed on the survey in need of sidewalk connectivity
- Largest response was from the age group 40-59
- The Northeast Quadrant had the highest number of responses with 23% coming from the 46815 and 46835 zip codes
- 42 responses from the Burmese Advocacy Center; however more research needs to be gathered
- 0 responses from the Hispanic community; additional outreach to take place

Survey Results by Question

(2464 Results)

1. Please place the corresponding letter for each of the following destinations in one of the three categories for importance of having sidewalks.

- A. Community Facilities & Major Attractions
- B. Government Offices & Human Services Agencies
- C. Libraries
- D. Medical/Health Centers
- E. Public Transit Stops
- F. Schools (K-8)
- G. Schools (HS, Colleges & Universities)
- H. Shopping Centers/Areas
- I. Work/Employment Centers

Most important Need	%	Moderate Need	%	Least important Need	%
(F) Schools (K-8)	55	(C) Libraries	37	(I) Work/Employment Centers	40
(G) Schools (HS & Up)	39	(E) Public Transit Stops	33	(B) Gov't Offices & Human Service Agencies	36
(D) Medical/Health Centers	28	(D) Medical/Health Centers	28	(H) Shopping Centers/Areas	36
				(A) Community Facilities & Major Attractions	26

2. Please identify no more than three (3) major roadway intersections where pedestrian crosswalks (i.e. painted lines) and/or signals are needed.

Top Five (5) Intersections

- Stelhorn Rd & Maplecrest Rd
- Coliseum Blvd & Coldwater Rd
- Dupont Rd & Coldwater Rd
- Coliseum Blvd & N. Anthony Blvd
- St. Joe Center Rd & Maplecrest Rd

3. Please place a check mark (✓) next to your purpose for using sidewalks.

Traveling to a destination	67%
Exercise	67%
Recreation	45%
Other	12%

4. For each of the following quadrant sets that you are familiar with, please place a check mark (✓) next to the roadway you feel is most in need of sidewalks.

Northeast Quad	%	Northwest Quad	%	Southeast Quad	%	Southwest Quad	%
Stelhorn Rd	13%	Lima Rd/ SR 3	8%	Wayne Trace	4%	Covington Rd	10%
St. Joe Center Rd	13%	Clinton St	9%	Hessen Cassel Rd	6%	Ardmore Avenue	8%
Maysville Rd	5%	Coldwater Rd	11%	Lafayette St	10%	Airport Expressway	2%
Trier Rd	7%	Cook Rd	4%	Paulding Rd	7%	Jefferson Blvd/US 24	15%
Maplecrest Rd	12%	Coliseum Blvd	15%	Tillman Rd	7%	Illinois Rd/SR 14	11%
Lake Avenue	16%	Dupont Rd	11%	Decatur Rd	4%	Bluffton Rd	12%

5. If there are sidewalk gaps along the City's major roadways not listed above, that you feel need to be addressed, please identify those below.

Top Five (5) Roadways

- Reed Rd
- Parnell Avenue
- State Blvd
- Aboite Center Rd
- Liberty Mills Rd

6. Age Range:

Under 18	1%
18-39	22%
40-59	43%
60 & up	27%

7. Zip Codes:

Zip Codes	Total	%
46802	47	1.91%
46803	19	0.77%
46804	179	7.26%
46805	186	7.55%
46806	79	3.21%
46807	126	5.11%
46808	121	4.91%
46809	78	3.17%
46812	1	0.04%
46814	50	2.03%
46815	323	13.11%
46816	66	2.68%
46818	56	2.27%
46819	54	2.19%
46825	168	6.82%
46828	1	0.04%
46835	268	10.88%
46845	108	4.38%
46774	3	0.12%
33715	1	0.04%
46748	2	0.08%
46765	1	0.04%
46705	1	0.04%

Appendix D

Walk Fort Wayne Plan - Goals, Policies, and Action Steps (Legislative and Network)

SECTION NEEDS UPDATED WHEN THE PLAN IS COMPLETE

Comprehensive Sidewalk Connectivity Plan

Network

Draft 1/27/10

Goal:

Provide the community with an interconnected pedestrian network along all major thoroughfares that is safe, accessible and comfortable for a diverse group of users.

Policies and Action Steps:

Policy 1:

Ensure pedestrian connectivity by utilizing the Connectivity Prioritization Map as part of the design process of all right-of-way construction or improvement projects.

Policy 2:

Planning and prioritization of new pedestrian facilities should focus on segments of major thoroughfares that are closest to pedestrian destination areas according to the Connectivity Prioritization Map within this Plan.

Policy 3:

Ensure that pedestrian facilities, such as sidewalks and pedestrian safety facilities, are considered integral components in the design and development of all public street improvement projects.

Action Step A:

Train city staff responsible for the review of city infrastructure projects, as well as staff issuing permits for private construction on the sidewalk policies within this Plan.

Action Step B:

Stakeholders, such as representatives and staff from: City planning, urban design, neighborhood leaders, forestry and parks, street lighting, traffic management/safety, and traffic engineering should be consulted at the scope-setting, design, and final construction plan phases of a project to assure project alignment with the goals and policies within this Plan.

Action Step C:

Include identified stakeholders in all planning and project review routings of Board of Works sidewalk, utility, and street and roadway projects to assure project alignment with the goals and policies within this Plan.

Policy 4:

Ensure that the design and construction of new transportation facilities anticipate the future demand for pedestrian facilities (bridges, interchanges, intersections, etc.).

Policy 5:

Ensure that the minimum standards for sidewalk construction are consistently applied to all public street improvement projects.

Action Step A:

Work with the Board of Works staff to develop specific criteria for waivers of minimum standards, such as low pedestrian demand to be adopted by the Board of Works.

Comprehensive Sidewalk Connectivity Plan**Network**
Draft 1/27/10**Policy 6:**

New pedestrian facilities along urban designed major thoroughfares (where there are no street trees) should maintain the City's standard of a 5' minimum buffer between the vehicle travel lane and the pedestrian facility. In areas with existing street trees or where new plantings are required or planned, appropriate construction methods to guide tree roots to avoid damage to adjacent infrastructure, or a wider 6' minimum buffer, should be used in compliance with standards established by the Division of Parks and Recreation.

Action Step A:

Include the Division of Parks and Recreation in all planning and project review routings of Board of Works sidewalk, utility, and street and roadway projects to support implementation of this Plan.

Action Step B:

Provide adjacent trees with favorable soil conditions or other devices or techniques to encourage deep root growth that will be less likely to disturb adjacent pavements or infrastructure.

Policy 7:

Ensure that appropriate safety facilities, such as crosswalks, signs and signals, lighting improvements or other traffic calming devices are incorporated within street improvement projects, and at all intersections along major thoroughfares to maintain or improve pedestrian safety. Mid-block crossings should be provided in high pedestrian demand areas and where vehicle and pedestrian conflicts are minimal. The design of mid-block crossings should protect the pedestrian by using appropriate traffic control devices, such as refuge islands, lighting, striping, signs and signals.

Policy 8:

Pedestrian Facilities should be coordinated with public transit facilities to ensure that transit stop locations are safe and accessible to all pedestrians.

Policy 9:

Encourage the community to pursue private, not-for-profit, philanthropic and governmental funding resources to assist with the implementation of this Plan.

Action Step A:

Encourage cooperative relationships between government, not-for-profit agencies, and the private sector to develop potential funding sources.

Action Step B:

Inform and educate local schools and school districts on the federal "*Safe Routes to School*" program and the potential availability of grant funding.

Action Step C:

Coordinate and assist with area schools and school districts to ensure "*Safe Routes to School*" funding applications are properly submitted and include all required and appropriate material.

Comprehensive Sidewalk Connectivity Plan**Network**

Draft 1/27/10

Policy 10:

Develop various funding strategies to build and improve new and existing pedestrian facilities.

Action Step A:

Ensure that this Plan's priority improvements are included within the City's Capital Improvement Program (CIP).

Action Step B:

Encourage and foster public/private funding partnerships to promote the implementation of the Comprehensive Sidewalk Connectivity Plan.

Policy 11:

Encourage the exploration and development of safe alternatives to traditional sidewalk development along non-urbanized major thoroughfares, such as wide shoulder lanes, in areas where there is low pedestrian demand and/or infrastructure limitations.

Action Step A:

Investigate best practices on how other communities have implemented and are using safe alternatives to traditional sidewalk development.

Comprehensive Sidewalk Connectivity Plan

Legislative

Draft 1/11/10

Goal:

To encourage and support legislation and policy adoption that enables the implementation of the Comprehensive Sidewalk Connectivity Plan.

Policies and Action Steps

Policy 1:

Collaborate with public utility providers to determine the most appropriate locations for new pedestrian and utility infrastructure, and to balance the need for new pedestrian infrastructure with the cost of relocating existing utility infrastructure.

Policy 2:

Encourage Allen County, including all incorporated areas throughout Allen County, and the Northeastern Indiana Regional Coordinating Council (NIRCC) to develop a county-wide pedestrian plan in coordination with the goals and policies of this Plan.

Policy 3:

Encourage the update of existing development regulations to require the incorporation of pedestrian facilities and connectivity within and between new development projects, as well as along all adjacent major thoroughfares.

Action Step A:

Create a study committee to review Chapter 155 (Subdivision Regulations) and Chapter 157 (Zoning and Sign Ordinance) of City Code and recommend deletions, additions and modifications to ensure alignment with the goals and policies within this Plan.

Policy 4:

Encourage and support education and public awareness initiatives that promote pedestrian safety and accessibility which are tailored to specific audiences.

Action Step A:

Collaborate with City Public Information staff, area school districts, the Safety Village and other outreach entities to promote the Comprehensive Sidewalk Connectivity Plan.

Action Step B:

Include the Comprehensive Sidewalk Connectivity Plan on the City's website to promote public awareness.

Policy 5: (from Bike Fort Wayne Plan)

Develop and support adoption of a Complete Streets Policy along with design standards that comply with Federal ADA standards, to ensure that all streets are built and maintained appropriately to accommodate pedestrians, bicyclists and transit users.

Action Step A:

Gather input from the community and area stakeholders, including residential and commercial developers, to assist in the development of a Complete Streets Policy.

Comprehensive Sidewalk Connectivity Plan

Legislative

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Action Step B:

Coordinate with the Bike Fort Wayne Plan in the development and adoption of a Complete Streets Policy.

Action Step C:

Investigate best practices on how other communities have developed and implemented a Complete Streets Policy

Appendix E

Allen County Streets with at least 2 Pedestrian Accidents

STREET NAME	NUMBER OF PEDESTRIAN CRASHES 2007-2009	NUMBER OF INJURIES 2007-2009	NUMBER OF FATALITIES 2007-2009
STATE BLVD	20	17	0
LAFAYETTE ST	14	11	0
CALHOUN ST	12	11	0
WASHINGTON BLVD	11	9	0
ANTHONY BLVD	10	10	0
BROADWAY	9	7	0
CLINTON ST	9	8	0
CREIGHTON AVE	7	7	0
FAIRFIELD AVE	7	7	0
HANNA ST	7	7	0
JEFFERSON BLVD	7	6	0
WELLS ST	7	7	0
MCKINNIE AVE	6	5	0
WAYNE ST	6	5	0
COLDWATER RD	5	4	0
COLISEUM BLVD	5	4	0
PONTIAC ST	5	3	0
SHERMAN BLVD	5	4	0
TAYLOR ST	5	5	0
HARRISON ST	4	4	0
HOBSON RD	4	4	0
OXFORD ST	4	4	0
PARNELL AVE	4	4	0
REED ST	4	4	0
ST JOE BLVD	4	4	0
ST JOE RD	4	3	1
SUPERIOR ST	4	3	0
TENNESSEE AVE	4	4	0
WEBSTER ST	4	3	0
BOWSER AVE	3	3	0
CRESCENT AVE	3	3	0
FOX AVE	3	3	0
GAYWOOD DR	3	3	0
GREEN RD	3	2	0
PLAZA DR	3	2	0
RUDISILL BLVD	3	3	0
SPY RUN AVE	3	3	0
SR 3	3	0	1
ABBOTT ST	2	0	0
BERRY ST	2	2	0
BLUFFTON RD	2	2	0
CAREW ST	2	1	0
DEWALD ST	2	2	0
ENGLE RD	2	2	0
FOURTH ST	2	2	0
GETZ RD	2	2	0
HESSEN CASSEL RD	2	2	0
HIGH ST	2	2	0
HOME AVE	2	2	0
I 69	2	1	1
I 69 RAMP A	2	0	0
LOWER HUNTINGTON RD	2	2	0
MAIN ST	2	2	0
MANFORD ST	2	1	0
PACKARD AVE	2	2	0
SENATE AVE	2	2	0
SPRING ST	2	2	0
ST JOE CENTER RD	2	2	1
STELLHORN RD	2	2	0
THOMPSON AVE	2	2	0
WASHINGTON CENTER RD	2	2	0
WAYNE TRACE	2	1	0
WILDWOOD AVE	2	2	0

Appendix F

**Pedestrian Safety Countermeasures from
PEDSAFE: The Pedestrian Safety Guide and Countermeasure Selection System
FHWA**

PEDSAFE: The Pedestrian Safety Guide and Countermeasure Selection System

<http://www.walkinginfo.org/pedsafe/index.cfm>

Pedestrian Facility Design:

Walkways are the portion of the public right-of-way that provide a separated area for people traveling on foot. Walkways that are safe, accessible, and aesthetically pleasing attract pedestrians. People walk for many reasons: to go to a neighbor's house, to run errands, for school, or to get to a business meeting. People also walk for recreation and health benefits or for the enjoyment of being outside. Some pedestrians must walk to transit or other destinations if they wish to travel independently. It is a public responsibility to provide a safe, secure, and comfortable system for all people who walk.

Sidewalks and Walkways: Sidewalks and walkways are “pedestrian lanes” that provide people with space to travel within the public right-of-way that is separated from roadway vehicles. They also provide places for children to walk, run, skate, ride bikes, and play. Sidewalks are associated with significant reductions in pedestrian collisions with motor vehicles.¹ Such facilities also improve mobility for pedestrians and provide access for all types of pedestrian travel: to and from home, work, parks, schools, shopping areas, transit stops, etc. Walkways should be part of every new and renovated facility and every effort should be made to retrofit streets that currently do not have sidewalks.

While sidewalks are typically made of concrete, less expensive walkways may be constructed of asphalt, crushed stone, or other materials if they are properly maintained and accessible (firm, stable, and slip-resistant). In more rural areas, in particular, a “side path” made of one of these materials may be suitable. Both FHWA and the Institute of Transportation Engineers (ITE) recommend a minimum width of 1.5 m (5 ft) for a sidewalk or walkway, which allows two people to pass comfortably or to walk side-by-side. Wider sidewalks should be installed near schools, at transit stops, in downtown areas, or anywhere high concentrations of pedestrians exist. Sidewalks should be continuous along both sides of a street and sidewalks should be fully accessible to all pedestrians, including those in wheelchairs.^{2,3}

A buffer zone of 1.2 to 1.8 m (4 to 6 ft) is desirable and should be provided to separate pedestrians from the street. The buffer zone will vary according to the street type. In downtown or commercial districts, a street furniture zone is usually appropriate. Parked cars and/or bicycle lanes can provide an acceptable buffer zone. In more suburban or rural areas, a landscape strip is generally most suitable. Careful planning of sidewalks and walkways is important in a neighborhood or area in order to provide adequate safety and mobility. For example, there should be a flat sidewalk provided in areas where driveways slope to the roadway.

Curb Ramps: Curb ramps provide access between the sidewalk and roadway for people using wheelchairs, strollers, walkers, crutches, handcarts, bicycles, and also for pedestrians with mobility impairments who have trouble stepping up and down high curbs. Curb ramps must be installed at all intersections and midblock locations where pedestrian crossings exist, as mandated by federal legislation (1973 Rehabilitation Act and ADA1990). Curb ramps must have a slope of no more than 1:12 (must not exceed 25.4 mm/0.3 m (1 in/ft) or a maximum grade of 8.33 percent), and a maximum slope on any side flares of 1:10. More information on the specifications for curb ramps can be found in the *Draft Guidelines for Accessible Public Rights of Way*.⁴

Where feasible, separate curb ramps for each crosswalk at an intersection should be provided rather than having a single ramp at a corner for both crosswalks. This provides improved orientation for visually impaired pedestrians. Similarly, tactile warnings will alert pedestrians to the sidewalk/street edge. All newly constructed and altered roadway projects must include curb ramps. In addition, all agencies should upgrade existing facilities.

They can begin by conducting audits of their pedestrian facilities to make sure transit services, schools, public buildings, and parks, etc. are accessible to pedestrians who use wheelchairs.

While curb ramps are needed for use on all types of streets, priority locations are in downtown areas and on streets near transit stops, schools, parks, medical facilities, shopping areas, and near residences with people who use wheelchairs.

Marked Crosswalks and Enhancements: Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help designate right-of-way for motorists to yield to pedestrians. Crosswalks are often installed at signalized intersections and other selected locations. Various crosswalk marking patterns are given in the MUTCD.⁵ Marked crosswalks are desirable at some high pedestrian volume locations (often in conjunction with other measures) to guide pedestrians along a preferred walking path. In some cases, they can be raised and should often be installed in conjunction with other enhancements that physically reinforce crosswalks and reduce vehicle speeds. It is also sometimes useful to supplement crosswalk markings with warning signs for motorists. At some locations, signs can get “lost” in visual clutter, so care must be taken in placement.

Pedestrians are sensitive to out-of-the-way travel, and reasonable accommodation should be made to make crossings both convenient and safe at locations with adequate visibility.

Recommended guidelines and priorities for crosswalk installation at controlled locations are given in Appendix D. These guidelines are based on a major study of 1,000 marked crosswalks and 1,000 unmarked crossings in 30 U.S. cities. Recommendations are also given for providing other pedestrian crossing enhancements at uncontrolled locations with and without a marked crosswalk.

Transit Stop Treatments: Good public transportation is as important to the quality of a community as good roads. Well-designed transit routes and accessible stops are essential to a usable system.

Bus stops should be located at intervals that are convenient for passengers. The stops should be designed to provide safe and convenient access and should be comfortable places for people to wait. Adequate bus stop signing, lighting, a bus shelter with seating, trash receptacles, and bicycle parking are also desirable features. Bus stops should be highly visible locations that pedestrians can reach easily by means of accessible travel routes. Therefore, a complete sidewalk system is essential to support a public transportation system. Convenient crossings are also important.

Proper placement of bus stops is key to user safety. For example, placing the bus stops on the near side of intersections or crosswalks may block the pedestrians’ view of approaching traffic, and the approaching drivers’ view of pedestrians. Approaching motorists may be unable to stop in time when a pedestrian steps from in front of a stopped bus into the traffic lanes at the intersection.

Far-side bus stops generally encourage pedestrians to cross behind the bus. Relocating the bus stop to the far side of the intersection can improve pedestrian safety since it eliminates the sight-distance restriction caused by the bus. Placing bus stops at the far side of intersections can also improve motor vehicle operation.

The bus stop location should be fully accessible to pedestrians in wheelchairs, should have paved connections to sidewalks where landscape buffers exist, and should not block pedestrian travel on the sidewalk. Adequate room should exist to operate wheelchair lifts. Yet, it is also useful to install curb ramps at bus stops so that a passenger can board from the street if bus-lift deployment is blocked. Additional information on making bus stops accessible can be found in Chapter 3 of *Accessible Rights-of-Way: A Design Guide*.

Roadway Lighting Improvements: Good quality and placement of lighting can enhance an environment as well as increase comfort and safety. Pedestrians often assume that motorists can see them at night; they are deceived by their own ability to see the oncoming headlights. Without sufficient overhead lighting, motorists may not be able to see pedestrians in time to stop.

In commercial areas with nighttime pedestrian activity, streetlights and building lights can enhance the ambiance of the area and the visibility of pedestrians by motorists. It is best to place streetlights along both sides of arterial streets and to provide a consistent level of lighting along a road way. Nighttime pedestrian crossing areas may be supplemented with brighter or additional lighting. This includes lighting pedestrian crosswalks and approaches to the crosswalks.

In commercial areas or in downtown areas, specialty pedestrian-level lighting may be placed over the sidewalks to improve pedestrian comfort, security, and safety. Mercury vapor, incandescent, or less expensive high-pressure sodium lighting is often preferred as pedestrian-level lighting. Low-pressure sodium lights are low energy, but have a high level of color distortion.

Pedestrian Overpasses/Underpasses: Pedestrian overpasses and underpasses allow for the uninterrupted flow of pedestrian movement separate from the vehicle traffic. However, they should be a measure of last resort, and it is usually more appropriate to use traffic-calming measures or install a pedestrian-activated signal that is accessible to all pedestrians. This is also an extremely high-cost and visually intrusive measure.

Such a facility must accommodate all persons, as required by the ADA. More information on the specifications for accessing overpasses and underpasses can be found in the *Draft Guidelines for Accessible Public Rights of Way*.⁴ These measures include ramps or elevators. Extensive ramping will accommodate wheelchairs and bicyclists, but results in long crossing distances and steep slopes that discourage use.

Studies have shown that many pedestrians will not use an overpass or underpass if they can cross at street level in about the same amount of time.^{8,9} Overpasses work best when the topography allows for a structure without ramps (e.g., overpass over a sunken freeway). Underpasses work best when designed to feel open and accessible. Grade separation is most feasible and appropriate in extreme cases where pedestrians must cross roadways such as freeways and high-speed, high-volume arterials.

Street Furniture/Walking Environment: Sidewalks should be continuous and should be part of a system that provides access to goods, services, transit, and homes. Well-designed walking environments are enhanced by urban design elements and street furniture, such as benches, bus shelters, trash receptacles, and water fountains.

Sidewalks and walkways should be kept clear of poles, signposts, newspaper racks, and other obstacles that could block the path, obscure a driver's view or pedestrian visibility, or become a tripping hazard. Benches, water fountains, bicycle parking racks, and other street furniture should be carefully placed to create an unobstructed path for pedestrians. More information on the requirements for street furniture can be found in the *Draft Guidelines for Accessible Public Rights of Way*.⁴ Such areas must also be properly maintained and kept clear of debris, overgrown landscaping, tripping hazards, or areas where water accumulates. Snow removal is also important for maintaining pedestrian safety and mobility. In most areas, local ordinances give property owners the responsibility of removing snow within 12 to 48 hours after a storm.

Walking areas should also be interesting for pedestrians and provide a secure environment. Storefronts should exist at street level and walking areas should be well lit and have good sightlines.

Roadway Design:

Design and operational elements of the roadway affect the ability of pedestrians to safely and easily cross streets. A geometric element such as street width affects the time needed to cross the street, whereas an operational parameter like traffic direction (one-way vs. two-way) affects the number of potential conflicts between motorists and crossing pedestrians.

Bicycle Lanes: Bike lanes indicate a preferential or exclusive space for bicycle travel along an arterial street. Bike lanes have been found to provide more consistent separation between bicyclists and passing motorists. Marking bicycle lanes can also benefit pedestrians—as turning motorists slow and yield more to bicyclists, they will also be doing so for pedestrians.

Bike lanes are typically designated by striping and/or signing. Colored pavement (e.g., blue or red surfaces) is also used in some locations, although it is not yet an accepted MUTCD standard. If the addition of bike lanes results in fewer motor vehicle lanes, safety may be enhanced for pedestrians crossing the street. Bicycle lanes also provide a buffer between motor vehicle traffic and pedestrians when sidewalks are immediately adjacent to the curb. On high-speed, high-volume roads, it may be more appropriate to provide a multi-use path to physically separate both bicyclists and pedestrians from motor vehicle traffic. However, the application of this treatment requires that care be taken to minimize the conflicts between bicyclists and pedestrians.

Roadway Narrowing: Roadway narrowing can be achieved in several different ways:

- a. Lane widths can be reduced (to 3.0 or 3.4 m [10 or 11 ft]) and excess asphalt striped with a bicycle lane or shoulder.
- b. Travel lanes can be removed (see #10).
- c. On-street parking lanes can be added.
- d. Curbs can be moved to narrow the cross section and extend the width of sidewalks and landscape areas.

This can reduce vehicle speeds along a roadway section and enhance movement and safety for pedestrians. Bicycle travel will also be enhanced and bicyclist safety improved when bicycle lanes are added.

Lane Reduction: Some roads have more travel lanes than necessary and are difficult to cross because of their width. Reducing the number of lanes on a multi-lane roadway can reduce crossing distances for pedestrians and may slow vehicle speeds. A traffic analysis should be done to determine whether the number of lanes on a roadway (many of which were built without such an analysis) is appropriate. Level-of-service analysis for intersections should not dictate the design for the entire length of roadway. For example, a four-lane undivided road can be converted to one through lane in each direction, with a center left-turn lane or with a raised median, and turn pockets and bicycle lanes on both sides of the roadway. Turning pockets may be needed only at specific locations.

Depending on conditions, it may also be possible to add on-street parking while allowing for bicycle lanes on both sides of the street—instead of a center turn lane. If no sidewalks exist along the roadway, these should be

added. If sidewalks exist, and there is adequate room, a landscaped buffer is desirable to separate pedestrians from the travel lane.

A typical three-lane configuration consisting of two travel lanes and a two-way left-turn lane (TWLTL) also has advantages for motorists. Through traffic can maintain a fairly constant speed, while left-turning drivers can exit the traffic stream and wait in the TWLTL. However, TWLTLs can also create problems for opposing left-turn vehicles and may be used as acceleration lanes by some motorists. Designs that incorporate raised medians and left-turn bays may offer a better solution.

Driveway Improvements: Several driveway designs may cause safety and access problems for pedestrians, including excessively wide and/or sloped driveways, driveways with large turning radii, multiple adjacent driveways, driveways that are not well defined, and driveways where motorist attention is focused on finding a gap in congested traffic. In addition, driveways without a level sidewalk landing may not comply with ADA standards. Refer to Chapter 5 in *Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide* for further guidance.¹

Examples of driveway improvements include narrowing or closing driveways, tightening turning radii, converting driveways to right-in only or right-out only movements, and providing median dividers on wide driveways.

When driveways cross sidewalks, it is necessary to maintain a sidewalk level across the driveway of no more than 2 percent sideslope (see sketch). This is more usable for all pedestrians, especially those in wheelchairs, and makes it clear to motorists that they must watch for pedestrians. It is important to minimize large signs and bushes at driveways to improve the visibility between motorists and pedestrians. The sidewalk material (usually concrete) should be maintained across the driveway as well.

Raised Medians: Medians are raised barriers in the center portion of the street or roadway that can serve as a place of refuge for pedestrians who cross a street midblock or at an intersection location. They may provide space for trees and other landscaping that, in turn, can help change the character of a street and reduce speeds. They also have benefits for motorist safety when they replace center turn lanes. Desired turning movements need to be carefully provided so that motorists are not forced to travel on inappropriate routes, such as residential streets, or make unsafe U-turns.

Continuous medians may not be the most appropriate treatment in every situation. In some cases, separating opposing traffic flow and eliminating left-turn friction can increase traffic speeds by decreasing the perceived friction of the roadway. They may also take up space that can be better used for wider sidewalks, bicycle lanes, landscaping buffer strips, or on-street parking and may cause problems for emergency vehicles. In some environments, medians can be constructed in sections, creating an intermittent rather than continuous median. Another good alternative device for two-, three- or four-lane roads is the crossing island, which provides a crossing refuge for pedestrians and, in some designs, aids in decreasing vehicle speeds.

Raised medians are most useful on high-volume, high-speed roads, and they should be designed to provide tactile cues for pedestrians with visual impairments to indicate the border between the pedestrian refuge area and the motorized vehicle roadway. Examples of good and bad designs for raised median crossings can be found in Chapter 8 of *Designing Sidewalks and Trails for Access: Part II of II: Best Practices Design Guide*.¹

One-Way/Two-Way Street Conversions: One-way streets can simplify crossings for pedestrians, who must look for traffic in only one direction. While studies have shown that conversion of two-way streets to one-way generally reduces pedestrian crashes, one-way streets tend to have higher speeds, which creates new problems.

If a street is converted to one-way, it should be evaluated to see if additional changes should be made, especially if the street or lanes are overly wide. Also, traffic circulation in the surrounding area must be carefully considered before conversion to one-way streets.

As a system, one-way streets can increase travel distances of motorists and bicyclists and can create confusion, especially for non-local residents. One-way streets operate best in pairs, separated by no more than 0.4 km (0.25 mi). Conversion costs can be quite high to build cross-overs where the one-way streets convert back to two-way streets, and to rebuild traffic signals and revise striping, signing, and parking meters.

One-way streets work best in downtown or very heavily congested areas. One-way streets can offer improved signal timing and accommodate odd-spaced signals; however, signal timing for arterials that cross a one-way street pair is difficult.

Conversions can go the other way as well: some places are returning one-way streets back to two-way to allow better local access to businesses and homes and to slow traffic. Two-way streets tend to be slower due to “friction,” especially on residential streets without a marked center line, and they may also eliminate the potential for multiple-threat crashes that exists on multi-lane, one-way streets.

Curb Radius Reduction: One of the common pedestrian crash types involves a pedestrian who is struck by a right-turning vehicle at an intersection. A wide curb radius typically results in high-speed turning movements by motorists. Reconstructing the turning radius to a tighter turn will reduce turning speeds, shorten the crossing distance for pedestrians, and also improve sight distance between pedestrians and motorists.

Nearby land uses and types of road users should be considered when designing an intersection so that curb radii are sized appropriately. If a curb radius is made too small, large trucks or buses may ride over the curb, placing pedestrians in danger.

Where there is a parking and/or bicycle lane, curb radii can be even tighter, because the vehicles will have more room to negotiate the turn. Curb radii can, in fact, be tighter than any modern guide would allow: older cities in the Northeast and in Europe frequently have radii of 0.6 to 1.5 m (2 to 5 ft) without suffering any detrimental effects.

More typically, in new construction, the appropriate turning radius is about 4.6 m (15 ft) and about 7.6 m (25 ft) for arterial streets with a substantial volume of turning buses and/or trucks. Tighter turning radii are particularly important where streets intersect at a skew. While the corner characterized by an acute angle may require a slightly larger radius to accommodate the turn moves, the corner with an obtuse angle should be kept very tight, to prevent high-speed turns.

Improved Right-Turn Slip-Lane Design: Intersections should be designed to accommodate safe pedestrian crossings using tight curb radii, shorter crossing distances, and other tools as described in this application. While right-turn slip lanes are generally a negative facility from the pedestrian perspective due to the emphasis on easy and fast motor vehicle travel, they can be designed to be less problematic. At many arterial street intersections, pedestrians have difficulty crossing due to right-turn movements and wide crossing distances. Well-designed right-turn slip lanes provide pedestrian crossing islands within the intersection and a right-turn lane that is designed to optimize the right-turning motorist’s view of the pedestrian and of vehicles to his or her left. Pedestrians are able to cross the right-turn lane and wait on the refuge island for their walk signal.

The problem for pedestrians is that many slip lanes are designed for unimpeded vehicular movement. The design of corner islands, lane width, and curb radii of right-turn slip lanes should discourage high-speed turns,

while accommodating large trucks and buses. The triangular “porkchop” corner island that results should have the “tail” pointing to approaching traffic. Since the traffic signal is timed based on a shorter crossing, the pedestrian crossing time has a much smaller influence on the timing of the signal. This design has an additional advantage for the pedestrian; the crosswalk is located in an area where the driver is still looking ahead. Older designs place the crosswalk too far down, where the driver is already looking left for a break in the traffic.

Channelized right turn-lanes remain a challenge for visually-impaired pedestrians. First, there are difficulties associated with knowing where the crosswalk is located or knowing where to cross. Second, it is difficult for a pedestrian who is visually-impaired to know when a vehicle has yielded right-of way. While accessible pedestrian signals can help with these issues, more research is currently underway through the National Cooperative Highway Research Program (NCHRP) to further explore the problem and develop potential solutions. Refer to NCHRP Project 3-78, Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities (at www4.trb.org/trb/crp.nsf/NCHRP+projects) for the latest status report.

Intersection Design:

There are several countermeasures that are specifically aimed at improving intersection safety and mobility, including many of those described in the sections on roadway design and traffic calming.

Roundabouts: A roundabout is a circular intersection that eliminates some of the conflict traffic, such as left turns, that causes crashes at traditional intersections. Traffic maneuvers around the circle in a counterclockwise direction, and then turns right onto the desired street. All traffic yields to motorists in the roundabout and left-turn movements are eliminated. Unlike a signalized intersection, vehicles generally flow and merge through the roundabout from each approaching street without having to stop.

Roundabouts need to accommodate pedestrians and bicyclists. It is important that automobile traffic yields to pedestrians crossing the roundabout. Splitter islands at the approaches slow vehicles and allow pedestrians to cross one direction of travel at a time. Single-lane approaches can be designed to keep speeds down to safer levels and allow pedestrians to cross. Multilane approaches can create multiple threats for pedestrians and are not recommended.

Wayfinding and gap selection cues need to be adequately addressed in the design of roundabouts so that roundabouts are not a barrier to pedestrians with vision impairments. One possible solution is the use of accessible pedestrian signals placed on sidewalks and splitter islands to indicate both where to cross and when to cross. More research is currently underway through the National Cooperative Highway Research Program (NCHRP) to further explore the problem and develop potential solutions. Refer to NCHRP Project 3-78, Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities (at www4.trb.org/trb/crp.nsf/NCHRP+projects) for the latest status report.

Bicyclists also may be disadvantaged by roundabout design. Unless the road is narrow (one lane in each direction), speeds are slow, and traffic very light, bicyclists may not be able to share the road comfortably. Marking bicycle lanes through the roundabout has not been shown to be safer. In larger roundabouts, an off-road bicycle path may be necessary to allow cyclists to use the pedestrian route. This is inconvenient and takes longer but it will improve safety. Refer to the FHWA report *Roundabouts, An Informational Guide* (online at <http://www.tfhrc.gov/safety/00068.htm>) for more information related to the design of facilities for both pedestrians and bicyclists.¹

Modified T-Intersections: This design treatment is intended for certain T-intersections on lower-volume streets in residential areas where there is a need to reduce the speeds of through traffic. It involves a gradual curb

extension or bulb at the top of the T, such that vehicles are deflected slightly as they pass straight through the intersection (see diagram). This type of design can help to discourage cut-through traffic in a neighborhood and can reduce speeds at the intersection. If not properly designed, it can create confusion regarding priority of movement. Consider a mini-circle before installing this treatment.

Intersection Median Barriers: This shortened version of a raised curb median extends through the intersection to prevent cross-street through movements and left turning movements to cross-streets from the main street.

This treatment can benefit pedestrians who need to cross any leg of the intersection, but restricts vehicle entry into and out of neighborhoods and can therefore greatly reduce cut-through traffic. However, since this treatment can dramatically influence traffic patterns and have potentially negative consequences caused by shifting traffic, it should be used cautiously. Crossing islands can provide benefits to pedestrians if that is the desire. This is also a traffic management technique.

Cut-throughs must be incorporated into the design for pedestrian and bicyclist use.

Traffic Calming:

Traffic calming is a way to design streets, using physical measures, to encourage people to drive more slowly. It creates physical and visual cues that induce drivers to travel at slower speeds. Traffic calming is self-enforcing. The design of the roadway results in the desired effect, without relying on compliance with traffic control devices such as signals, signs, and without enforcement. While elements such as landscaping and lighting do not force a change in driver behavior, they can provide the visual cues that encourage people to drive more slowly.

The reason traffic calming is such a powerful and compelling tool is that it has proven to be so effective. Some of the effects of traffic calming, such as fewer and less severe crashes, are clearly measurable. Others, such as supporting community livability, are less tangible, but equally important.

Experience throughout Europe, Australia, and North America has shown that traffic calming, if done correctly, reduces traffic speeds, the number and severity of crashes, and noise level. Research on traffic-calming projects in the United States supports their effectiveness at decreasing automobile speeds, reducing the numbers of crashes, and reducing noise levels for specific contexts. Looking at a sample of various speed studies shows that typical speed reductions of 5 to 20 percent at the 85th percentile speed can be realized by the use of traffic-calming measures—including speed tables, mini-circles, speed humps, and other standard traffic-calming devices.¹ Use of several of the traffic-calming measures have also resulted in substantial reductions in motor vehicle crashes. For example, the implementation of traffic mini-circles in Seattle has resulted in a reduction of approximately 80 percent of intersection accidents.¹

Curb Extensions: Curb extensions—also known as bulb-outs or neckdowns—extend the sidewalk or curb line out into the parking lane, which reduces the effective street width. Curb extensions significantly improve pedestrian crossings by reducing the pedestrian crossing distance, visually and physically narrowing the roadway, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street.

Curb extensions placed at an intersection essentially prevent motorists from parking in or too close to a crosswalk or from blocking a curb ramp or crosswalk. Motor vehicles parked too close to corners present a threat to pedestrian safety, since they block sightlines, obscure visibility of pedestrians and other vehicles, and make

turning particularly difficult for emergency vehicles and trucks. Motorists are encouraged to travel more slowly at intersections or midblock locations with curb extensions, as the restricted street width sends a visual cue to motorists. Turning speeds at intersections can be reduced with curb extensions (curb radii should be as tight as is practicable). Curb extensions also provide additional space for curb ramps and for level sidewalks where existing space is limited.

Curb extensions are only appropriate where there is an on-street parking lane. Curb extensions must not extend into travel lanes, bicycle lanes, or shoulders (curb extensions should not extend more than 1.8 m (6 ft) from the curb). The turning needs of larger vehicles, such as school buses, need to be considered in curb extension design.

Chokers: Chokers are curb extensions that narrow a street by widening the sidewalks or planting strips, effectively creating a pinch point along the street. Chokers can be created by bringing both curbs in, or they can be done by more dramatically widening one side at a midblock location. They can also be used at intersections, creating a gateway effect when entering a street.

Chokers can have a dramatic effect by reducing a two-lane street to one lane at the choker point (or two narrow lanes), requiring motorists to yield to each other or slow down. In order for this to function effectively, the width of the travelway cannot be wide enough for two cars to pass: 4.9 m (16 ft) is generally effective (and will allow emergency vehicles to pass unimpeded). This kind of design is usually only appropriate for low-volume, low-speed streets.

Crossing Islands: Crossing islands—also known as center islands, refuge islands, pedestrian islands, or median slow points—are raised islands placed in the center of the street at intersections or midblock to help protect crossing pedestrians from motor vehicles. Center crossing islands allow pedestrians to deal with only one direction of traffic at a time, and they enable them to stop partway across the street and wait for an adequate gap in traffic before crossing the second half of the street. Where midblock or intersection crosswalks are installed at uncontrolled locations (i.e., where no traffic signals or stop signs exist), crossing islands should be considered as a supplement to the crosswalk. They are also appropriate at signalized crossings. If there is enough width, center crossing islands and curb extensions can be used together to create a highly improved pedestrian crossing. Detectable warnings are needed at cut-throughs to identify the pedestrian refuge area.

This kind of facility has been demonstrated to significantly decrease the percentage of pedestrian crashes.² The factors contributing to pedestrian safety include reduced conflicts, reduced vehicle speeds approaching the island (the approach can be designed to force a greater slowing of cars, depending on how dramatic the curvature is), greater attention called to the existence of a pedestrian crossing, opportunities for additional signs in the middle of the road, and reduced exposure time for pedestrians.

Curb extensions may be built in conjunction with center crossing islands where there is on-street parking. Care should be taken to maintain bicycle access. Bicycle lanes (or shoulders, or whatever space is being used for bicycle travel) must not be eliminated or squeezed in order to create the curb extensions or islands.

Chicanes: Chicanes create a horizontal diversion of traffic and can be gentler or more restrictive depending on the design.

Diverting the Path of Travel

Shifting a travel lane has an effect on speeds as long as the taper is not so gradual that motorists can maintain speeds. For traffic calming, the taper lengths may be as much as half of what is suggested in traditional highway engineering.

Shifts in travelways can be created by shifting parking from one side to the other (if there is only space for one side of parking) or by building landscaped islands (islands can also effectively supplement the parking shift).

Diversion Plus Restriction (Angled Slow Points)

Diverting the path of travel plus restricting the lanes (as described under Chokers) usually consists of a series of curb extensions, narrowing the street to two narrow lanes or one lane at selected points and forcing motorists to slow down to maneuver between them. Such treatments are intended for use only on residential streets with low traffic volumes.

If there is no restriction (i.e., the number of lanes is maintained), chicanes can be created on streets with higher volumes, such as collectors or minor arterials.

Mini-Circles: Mini-circles are raised circular islands constructed in the center of residential street intersections (generally not intended for use where one or both streets are arterial streets). They reduce vehicle speeds by forcing motorists to maneuver around them. Mini-circles have been found to reduce motor vehicle crashes by an average of 90 percent in Seattle, WA.³ Drivers making left turns are directed to go on the far side of the circle (see diagram at right) prior to making the turn. Signs should be installed directing motorists to proceed around the right side of the circle before passing through or making a left turn. Mini-circles are commonly landscaped (bushes, flowers, or grass), most often at locations where the neighborhood has agreed to maintain the plants. In locations where landscaping is not feasible, traffic circles can be enhanced through specific pavement materials.

Mini-circles are an intersection improvement as well as a traffic-calming device and can take the place of a signal or four-way stop sign. Many unwarranted four-way stop signs are installed because of the demand for action by the community.

Mini-circles must be properly designed to slow vehicles and benefit pedestrians and bicyclists. Right-turning vehicles are not controlled at an intersection with a mini-circle, potentially putting pedestrians and bicyclists at risk.

Therefore, tight curb radii should complement this treatment to discourage high-speed right-turn maneuvers. The occasional larger vehicle going through an intersection with a traffic circle (e.g., a fire truck or moving van) can be accommodated by creating a mountable curb in the outer portion of the circle.

Speed Humps: Speed humps are paved (usually asphalt) and approximately 75 to 100 mm (3 to 4 in) high at their center, and extend the full width of the street with height tapering near the drain gutter to allow unimpeded bicycle travel. Speed humps should not be confused with the speed “bump” that is often found in mall parking lots. There are several designs for speed humps. The traditional 3.7-m (12-ft) hump has a design speed of 24 to 32 km/h (15 to 20 mi/h), a 4.3-m (14-ft) hump a few miles per hour higher, and a 6.7-m (22-ft) table has a design speed of 40 to 48 km/h (25 to 30 mi/h). The longer humps are much gentler for larger vehicles.

Speed Table: A “speed table” is a term used to describe a very long and broad speed hump, or a flat-topped speed hump, where sometimes a pedestrian crossing is provided in the flat portion of the speed table (see [Raised Pedestrian Crossings](#)). The speed table can either be parabolic, making it more like a speed hump, or trapezoidal, which is used more frequently in Europe. Speed tables can be used in combination with curb extensions where parking exists.

Raised Intersections: A raised intersection is essentially a speed table (see photograph to the right) for the entire intersection. Construction involves providing ramps on each vehicle approach, which elevates the entire intersection to the level of the sidewalk. They can be built with a variety of materials, including asphalt, concrete, stamped concrete, or pavers. The crosswalks on each approach are also elevated as part of the treatment to enable pedestrians to cross the road at the same level as the sidewalk, eliminating the need for curb ramps. Use detectable warnings to mark the boundary between the sidewalk and the street.

Raised Pedestrian Crossings: A raised pedestrian crossing is also essentially a speed table, with a flat portion the width of a crosswalk, usually 3.0 to 4.6 m (10 to 15 ft). Raised intersections and crosswalks encourage motorists to yield. On one street in Cambridge, MA, motorists yielding to pedestrians crossing at the raised devices went from approximately 10 percent before installation of the project to 55 percent after installation.⁴

Gateways: A gateway is a physical or geometric landmark that indicates a change in environment from a higher speed arterial or collector road to a lower speed residential or commercial district. They often place a higher emphasis on aesthetics and are frequently used to identify neighborhood and commercial areas within a larger urban setting. Gateways may be a combination of street narrowing, medians, signing, archways, roundabouts, or other identifiable feature. Gateways should send a clear message to motorists that they have reached a specific place and must reduce speeds. This can help achieve the goal of meeting expectations and preparing motorists for a different driving environment. Gateways are only an introduction and slower speeds are not likely to be maintained unless the entire area has been redesigned or other traffic-calming features are used.

Landscaping: The careful use of landscaping along a street can provide separation between motorists and pedestrians, reduce the visual width of the roadway (which can help to reduce vehicle speeds), and provide a more pleasant street environment for all. This can include a variety of trees, bushes, and/or flowerpots, which can be planted in the buffer area between the sidewalk or walkway and the street.

The most significant issue with any landscaping scheme is ongoing maintenance. Some communities have managed effectively by creating homeowners associations to pay for landscape maintenance or through the volunteer efforts of neighbors. Others have found them to be unreliable and budget for public maintenance instead. Consider adding irrigation systems in areas with extensive planting.

Choosing appropriate plants, providing adequate space for maturation, and preparing the ground can help ensure that they survive with minimal maintenance, and don't buckle the sidewalks as they mature. The following guidelines should be considered: plants should be adapted to the local climate and fit the character of the surrounding area—they should survive without protection or intensive irrigation; and plant's growth patterns should not obscure signs or pedestrians' and motorists' views of each other.

Specific Paving Treatments: Paving materials are important to the function and look of a street, both in the road and on the sidewalk. Occasionally, paving materials in and of themselves act as a traffic-calming device (e.g., when the street is paved in brick or cobblestone). However, some of these materials may be noisy and unfriendly to bicyclists, pedestrians, wheelchairs, or snowplow blades. In particular, cobblestones should not be used in the expected pedestrian or bicycle path, although they may be used as aesthetic elements in a streetscape design. Smooth travel surfaces are best for all pedestrians.

The pedestrian walkway material should be firm, planar, and slip-resistant. Concrete is the preferred walking surface. A different look can be achieved by using stamped concrete or concrete pavers, which are available in a variety of colors and shapes; however, jointed surfaces may induce vibration, which can be painful to some pedestrians. They can also be used on the top of raised devices.

It is important to ensure crosswalk visibility. High visibility markings are often best. Textured crosswalks should be marked with reflective lines since these types of crosswalks are not as visible, especially at night or on rainy days.

Colored paving can often enhance the function of portions of the roadway, such as a colored bicycle lane. This can create the perception of street narrowing, in addition to enhancing the travel facility for bicyclists.

Serpentine Design: Serpentine design refers to the use of a winding street pattern with built-in visual enhancements through a neighborhood, which allow for through movement while forcing vehicles to slow. The opportunities for significant landscaping can be used to create a park-like atmosphere.

Such designs are usually implemented with construction of a new neighborhood street or during reconstruction of an existing street corridor. This type of design can be more expensive than other traffic-calming options and needs to be coordinated with driveway access.

Woonerf: “Woonerf” (“Street for living”) is a Dutch term for a common space created to be shared by pedestrians, bicyclists, and low-speed motor vehicles. They are typically narrow streets without curbs and sidewalks, and vehicles are slowed by placing trees, planters, parking areas, and other obstacles in the street. Motorists become the intruders and must travel at very low speeds below 16 km/h (10 mi/h). This makes a street available for public use that is essentially only intended for local residents. A woonerf identification sign is placed at each street entrance.

Consideration must be given to provide access by fire trucks, sanitation vehicles and other service vehicles (school buses and street sweepers), if needed.

Traffic Management:

Although they are sometimes lumped together, traffic management and traffic calming are different tools and address different problems. Traffic management includes the use of traditional traffic control devices to manage volumes and routes of traffic. Traffic calming deals with what happens to traffic once it is on a street. For example, limiting access to a street (e.g., diverting traffic from entering a street on one end) may reduce the amount of traffic on that street, but will do nothing to affect the speed of the traffic that travels on that street or others. Traffic management and traffic calming are often complementary, and a plan to retrofit an area often includes a variety of tools.

Communities should think about the broader context of traffic. If there is too much traffic on any one street, it may be that there is too much traffic altogether. A more significant plan to reduce overall traffic volumes would be appropriate—encouraging and providing for alternate modes of travel by developing pedestrian and bicycling networks, implementing Transportation Demand Management, enhancing transit systems, improving land-use planning, etc. Comprehensive traffic reduction or mitigation strategies are important; however, these are beyond the scope of this guide. Resources that provide guidance on these issues are included in the reference section.

Traffic calming and traffic management should be assessed from an areawide perspective. The problem should not just be shifted from one street to another. Although implementation usually occurs in stages, an overall plan can be developed up-front, involving a larger neighborhood or area of the city.

Diverters: A diverter is an island built at a residential street intersection that prevents certain through and/or turning movements. Diverters affect people living in the neighborhood more than any one else. Therefore, diverters should be considered only when less restrictive measures are not appropriate.

Four types of diverters are: diagonal, star, forced turn, and truncated. A diagonal diverter breaks up cut-through movements and forces right or left turns in certain directions. A star diverter consists of a star-shaped island placed at the intersection, which forces right turns from each approach. A truncated diagonal diverter is a diverter with one end open to allow additional turning movements. Other types of island diverters can be placed on one or more approach legs to prevent through and left-turn movements and force vehicles to turn right.

As with other traffic management tools, diverters must be used in conjunction with other traffic management tools within the neighborhood street network. Any of these diverters can be designed for bicycle and pedestrian access.

Full Street Closure: A full street closure is accomplished by installing a physical barrier that blocks a street to motor vehicle traffic and provides some means for vehicles to turn around. Full street closures should be used only in the rarest of circumstances. Neighborhoods with cul-de-sac streets require extensive out-of-the-way travel, which is not a mere convenience issue, but has serious implications for impacts on other streets. All traffic is forced to travel on feeder streets, which has negative consequences for the people who live on those streets and forces higher levels of control at critical intersections.

If a street closure is done, it should always allow for the free through movement of all pedestrians, including wheelchair users, and bicyclists. Emergency vehicles should also be able to access the street; this can be done with a type of barrier or gate that is electronically operated, permitting only large vehicles to traverse it. Examples are mountable curbs or an accessway with a raised element in the center that a low vehicle would hit, though those treatments may not be able to stop pickups or sport utility vehicles. This is usually only appropriate for places with no snow (otherwise the device would be covered with snow and the accessway could not be cleared).

Partial Street Closure: A partial street closure uses a semi-diverter to physically close or block one direction of motor vehicle travel into or out of an intersection; it could also involve blocking one direction of a two-way street. Partial street closures at the entrance to a neighborhood or area should consider the traffic flow pattern of the surrounding streets as well. The design of this measure should allow for easy access by bicyclists and all pedestrians.

A partial closure provides better emergency access than a full closure. Since this design also allows motorists to easily violate the prohibitions, police enforcement may be required. If the partial closure only eliminates an entrance to a street, a turnaround is not needed; closing an exit will generally require a turnaround.

Pedestrian Streets/Malls: There are two types of pedestrian streets/malls: (1) those that eliminate motor vehicle traffic (deliveries permitted during off-peak hours) and; (2) those that allow some motor vehicle traffic at very low speeds. The second type can be thought of as a pedestrian street that allows some motor vehicles, as opposed to a motor vehicle street that allows some pedestrians.

Pedestrian streets have been successful in places that are thriving and have high volumes of pedestrians. Examples of successful pedestrian streets include Church Street in Burlington, VT; Downtown Crossing in Boston, MA; Maiden Lane in San Francisco, CA; Occidental Street in Seattle, WA; Third Street Promenade in Santa Monica, CA; and, Fremont Street in Las Vegas, NV.

Another option is to create a part-time pedestrian street, as is done, for example, in the French Quarter in New Orleans, LA, which uses removable barriers to close the street to motorists at night.

Signals and Signs:

Traffic control devices are often used by traffic engineers to improve safety and access for pedestrians. In addition to [marked crosswalks](#), several other devices are available.

Traffic Signals: Traffic signals create gaps in the traffic flow, allowing pedestrians to cross the street. They should allow adequate crossing time for pedestrians and an adequate clearance interval based upon a maximum walking speed of 1.2 m/s (4.0 ft/s). In areas where there is a heavy concentration of the elderly or children, a lower speed of less than 1.1 m/s (3.5 ft/s) should be used in determining pedestrian clearance time. Signals are particularly important at high-use, mid-block crossings on higher speed roads, multi-lane roads, or at highly congested intersections. National warrants from the Manual on Uniform Traffic Control Devices are based on the number of pedestrians and vehicles crossing the intersection, among other factors.¹ However, judgment must also be used on a case-by-case basis. For example, a requirement for installing a traffic signal is that there are a certain number of pedestrians present. If a new facility is being built—a park or recreational path, for example—there will be a new demand, and the signal could be installed in conjunction with the new facility based on projected crossing demand. There may also be latent demand if a destination is not currently accessible, but could become so with new facilities or redesign.

In downtown areas, signals are often closely spaced, sometimes every block. Timed sequencing of signals may reduce the amount of time allotted per cycle for pedestrian crossing to unsafe lengths. Signals are usually spaced farther apart in suburban or outlying areas, but similar considerations for pedestrian phasing should be made. When high pedestrian traffic exists during a majority of the day, fixed-time signals should be used to consistently allow crossing opportunities. Pedestrian actuation should only be used when pedestrian crossings are intermittent and should be made accessible to all pedestrians, including those with disabilities.

Pedestrian Signals: Pedestrian signal indications should be used at traffic signals wherever warranted, according to the MUTCD. The use of WALK/DON'T WALK pedestrian signal indications at signal locations are important in many cases, including when vehicle signals are not visible to pedestrians, when signal timing is complex (e.g., there is a dedicated left-turn signal for motorists), at established school zone crossings, when an exclusive pedestrian interval is provided, and for wide streets where pedestrian clearance information is considered helpful.¹

The international pedestrian symbol signal is preferable and is recommended in the MUTCD. Existing WALK and DON'T WALK messages may remain for the rest of their useful life but should not be used for new installations.¹ Pedestrian signals should be clearly visible to the pedestrian at all times when in the crosswalk or waiting on the far side of the street. Larger pedestrian signals can be beneficial in some circumstances (e.g., where the streets are wide). Signals may be supplemented with audible or other messages to make crossing information accessible for all pedestrians, including those with vision impairments. The decision to install audible pedestrian signals should consider the noise impact on the surrounding area. Much more extensive information on the use of accessible pedestrian signals (APS) and the types of APS technologies now available is provided online at www.walkinginfo.org/aps.

Pedestrian Signal Timing: There are several types of signal timing for pedestrian signals, including concurrent, exclusive, “leading pedestrian interval” (LPI), and all-red interval. In general, shorter cycle lengths and longer walk intervals provide better service to pedestrians and encourage better signal compliance. For optimal pedestrian service, fixed-time signal operation usually works best. Pedestrian pushbuttons may be installed at locations where pedestrians are expected intermittently. Quick response to the pushbutton or feedback to the pedestrian should be programmed into the system. When used, pushbuttons should be well-signed and within reach and operable from a flat surface for pedestrians in wheelchairs and with visual disabilities. They should be conveniently placed in the area where pedestrians wait to cross. Section 4E.09 within the MUTCD provides detailed guidance for the placement of push buttons to ensure accessibility.¹

In addition to concurrent pedestrian signal timing (where motorists may turn left or right across pedestrians’ paths after yielding to pedestrians), exclusive pedestrian intervals (see [Traffic Signal Enhancements](#)) stop traffic in all directions. Exclusive pedestrian timing has been shown to reduce pedestrian crashes by 50 percent in some downtown locations with heavy pedestrian volumes and low vehicle speeds and volumes.² With concurrent signals, pedestrians usually have more crossing opportunities and have to wait less. Unless a system is willing to take more time from vehicular phases, pedestrians will often have to wait a long time for an exclusive signal. This is not very pedestrian-friendly, and many pedestrians will simply choose to ignore the signal and cross if and when there is a gap in traffic, negating the potential safety benefits of the exclusive signal.³ Exclusive pedestrian phases do introduce a problem for pedestrians with visual impairments, as the audible cues associated with surging parallel traffic streams are no longer present, which makes it difficult to know when to begin crossing.

A simple, useful change is the LPI. An LPI gives pedestrians an advance walk signal before the motorists get a green light, giving the pedestrian several seconds to start in the crosswalk where there is a concurrent signal. This makes pedestrians more visible to motorists and motorists more likely to yield to them. This advance crossing phase approach has been used successfully in several places, such as New York City, for two decades and studies have demonstrated reduced conflicts for pedestrians.⁴ The advance pedestrian phase is particularly effective where there is a two-lane turning movement. To be useful to pedestrians with vision impairments, an LPI needs to be accompanied by an audible signal to indicate the WALK interval.

There are some situations where an exclusive pedestrian phase may be preferable to an LPI. Exclusive phases are desirable where there are high-volume turning movements that conflict with the pedestrians crossing.

Traffic Signal Enhancements: A variety of traffic signal enhancements that can benefit pedestrians and bicyclists are available. These include automatic pedestrian detectors, providing larger traffic signals to ensure visibility, placing signals so that motorists waiting at a red light can’t see the other signals and anticipate the green, and installing countdown signals to provide pedestrians with information about the amount of time remaining in a crossing interval.

Countdown signals may be designed to begin counting down at the beginning of the walk phase or at the beginning of the clearance (flashing DON’T WALK) interval.

Since pedestrian pushbutton devices are not activated by about one-half of pedestrians (even fewer activate them where there are sufficient motor vehicle gaps), new “intelligent” microwave or infrared pedestrian detectors are now being installed and tested in some U.S. cities. These automatically activate the red traffic and WALK signals when pedestrians are detected. Detectors can also be used to extend the crossing time for slower moving pedestrians in the crosswalk. Automatic pedestrian detectors have been found to improve pedestrian signal

compliance and also reduce pedestrian conflicts with motor vehicles. However, they are still considered experimental and their reliability may vary under different environmental conditions.⁵

More information on some of these technologies is available online at www.walkinginfo.org/pedsmart. This web site was developed in 1999 and includes information on several types of smart technologies, the problems they may address, and the vendors of the devices. Locations where many of the devices were installed at that time are also included as case studies.

Right-Turn-on-Red Restrictions: A permissible Right Turn on Red (RTOR) was introduced in the 1970s as a fuel-saving measure and has sometimes had detrimental effects on pedestrians. While the law requires motorists to come to a full stop and yield to cross-street traffic and pedestrians prior to turning right on red, many motorists do not fully comply with the regulations, especially at intersections with wide turning radii. Motorists are so intent on looking for traffic approaching on their left that they may not be alert to pedestrians approaching on their right. In addition, motorists usually pull up into the crosswalk to wait for a gap in traffic, blocking pedestrian crossing movements. In some instances, motorists simply do not come to a full stop.

One concern that comes up when RTOR is prohibited is that this may lead to higher right-turn-on-green conflicts when there are concurrent signals. The use of the leading pedestrian interval (LPI) can usually best address this issue (see [Pedestrian Signal Timing](#)). Where pedestrian volumes are very high, exclusive pedestrian signals should be considered.

Prohibiting RTOR should be considered where and/or when there are high pedestrian volumes. This can be done with a simple sign posting, although there are some options that are more effective than a standard sign. For example, one option is a larger 762-mm by 914-mm (30-in by 36-in) NO TURN ON RED sign, which is more conspicuous. For areas where a right-turn-on-red restriction is needed during certain times, time-of-day restrictions may be appropriate. A variable-message NO TURN ON RED sign is also an option.⁶

Advanced Stop Lines: At signalized intersections and midblock crossings, the vehicle stop line can be moved farther back from the pedestrian crosswalk for an improved factor of safety and for improved visibility of pedestrians. In some places, the stop line has been moved back by 4.6 to 9.1 m (15 to 30 ft) relative to the marked crosswalk with considerable safety benefits for pedestrians. One study found that use of a “Stop Here For Pedestrians” sign alone reduced conflicts between drivers and pedestrians by 67 percent. With the addition of an advanced stop line, this type of conflict was reduced by 90 percent compared to baseline levels.⁷

The advanced stop lines allow pedestrians and drivers to have a clearer view of each other and more time in which to assess each other’s intentions. The effectiveness of this tool depends upon whether motorists are likely to obey the stop line, which varies from place to place.

Advanced stop lines are also applicable for non-signalized crosswalks on multi-lane roads to ensure that drivers in all lanes have a clear view of a crossing pedestrian.

Signing: Signs can provide important information that can improve road safety. By letting people know what to expect, there is a greater chance that they will react and behave appropriately. For example, giving motorists advance warning of an upcoming pedestrian crossing or that they are entering a traffic-calmed area will alert them to modify their speed. Sign use and movement should be done judiciously, as overuse breeds noncompliance and disrespect. Too many signs may also create visual clutter and signs can get lost.

Regulatory signs, such as STOP, YIELD, or turn restrictions require certain driver actions and can be enforced. Warning signs can provide helpful information, especially to motorists and pedestrians unfamiliar with an

area. Some examples of signs that affect pedestrians include pedestrian warning signs, motorist warning signs, NO TURN ON RED signs, and guide signs.

Advance pedestrian warning signs should be used where pedestrian crossings may not be expected by motorists, especially if there are many motorists who are unfamiliar with the area. A new fluorescent yellow/green color is approved for pedestrian, bicycle, and school warning signs (Section 2A.11 of the MUTCD).¹ This bright color attracts the attention of drivers because it is unique.

All signs should be periodically checked to make sure that they are in good condition, free from graffiti, reflective at night, and continue to serve a purpose. In unusual cases, signs may be used to prohibit pedestrian crossings at an undesirable location and re-route them to a safer crossing location, or warn pedestrians of unexpected driver maneuvers. It is preferable to create safe crossings where there are clear pedestrian destinations. If unexpected driving maneuvers occur at what is an otherwise legal pedestrian crossing, an evaluation should be done to find ways to remedy or prevent the unsafe motorist maneuvers.

Other Measures:

In addition to the more traditional engineering treatments described in the other countermeasure categories, there are several other countermeasures that should be considered under specific circumstances. For example, crossings in the vicinity of a school warrant consideration of the recommendations related to school zone improvements. The countermeasures described in this section include:

School Zone Improvements: A variety of roadway improvements may be used to enhance the safety or mobility of children in school zones. The use of well-trained adult crossing guards has been found to be one of the most effective measures for assisting children in crossing streets safely.¹ Sidewalks or separated walkways and paths are essential for a safe trip from home to school on foot or by bike. Adult crossing guards require training and monitoring and should be equipped with a bright and reflective safety vest and a STOP paddle. Police enforcement in school zones may be needed in situations where drivers are speeding or not yielding to children in crosswalks.

Other helpful measures include parking prohibitions near intersections and crosswalks near schools; increased child supervision at crossings; and the use of signs and markings, such as the school advance warning sign (which can be fluorescent yellow/green) and SPEED LIMIT 25 MPH WHEN FLASHING. Schools should develop “safe routes to school” plans and work with local agencies to identify and correct problem areas. Marked crosswalks can help guide children to the best routes to school. School administrators and parent-teacher organizations need to educate students and parents about school safety and access to and from school. Education, enforcement, and well-designed roads must all be in place to encourage motorists to drive appropriately.

One of the biggest safety hazards around schools is parents or caretakers dropping off and picking up their children. There are two immediate solutions: (1) there needs to be a clearly marked area where parents are permitted to drop off and pick up their children, and (2) drop-off/pick-up regulations must be provided to parents on the first day of school. Drop-off areas must be located away from where children on foot cross streets or access the school. Parent drop-off zones must also be separated from bus drop-off zones. If parents can be trained to do it right at the start of the school year, they are likely to continue good behavior throughout the year.

For a longer term solution, it is preferable to create an environment where children can walk or bicycle safely to school, provided they live within a suitable distance. One concept that has been successful in some communities is the concept of a “walking bus,” where an adult accompanies children to school, starting at one location and

picking children up along the way. Soon, a fairly sizeable group of children are walking in a regular formation, two by two, under the supervision of a responsible adult, who is mindful of street crossings. The presence of such groups affects drivers' behavior, as they tend to be more watchful of children walking. Parents take turns accompanying the "walking school bus" in ways that fit their schedules.

Neighborhood Identity: Many neighborhoods or business districts want to be recognized for their unique character. This can enhance the walking environment and sense of community.

Examples of treatments include gateways, traffic calming, welcome signs, flower planters, banners, decorative street lighting, unique street name signs, and other details. Neighborhood identity treatments rarely provide any direct traffic improvements, but they help develop interest in enhancing the community.

Speed-Monitoring Trailer: Speed-monitoring trailers—sign boards on trailers that display the speed of passing vehicles—are used by police departments and transportation agencies as educational tools that can enhance enforcement efforts directed at speed compliance. Speed radar trailers are best used in residential areas and may be used in conjunction with Neighborhood Speed Watch or other neighborhood safety education programs. They can help raise residents' awareness of how they themselves are often those speeding, not just "outsiders." Speed trailers are not substitutes for permanent actions, such as traffic-calming treatments, to address neighborhood speeding issues.

Speed-monitoring trailers can be used at several locations and should have occasional police monitoring and enforcement to maintain driver respect.

On-Street Parking Enhancements: On-street parking can be both a benefit and a detriment to pedestrians. On-street parking does increase positive "friction" along a street and can narrow the effective crossing width, both of which encourage slower speeds; parking can also provide a buffer between moving motor vehicle traffic and pedestrians along a sidewalk. In addition, businesses reliant on on-street parking as opposed to parking lots are more geared toward pedestrian access. This attention can foster a more vibrant pedestrian commercial environment.

On the other hand, parking creates a visual barrier between motor vehicle traffic and crossing pedestrians, especially children and people using wheelchairs. Therefore, where there is parking, curb extensions should be built where pedestrians cross. Parking needs to be removed on the approaches to crosswalks.

At least 6 m (20 ft) of parking should be removed on the approach to a marked or unmarked crosswalk and about 6 m of parking should be removed downstream from the crosswalk. Some agencies require that parking be removed 9 to 15 m (30 to 50 ft) from intersections for pedestrian safety reasons. Well-designed curb extensions can reduce these distances and maximize the number of on-street parking spaces.

Pedestrian/Driver Education: Providing education, outreach, and training is a key strategy in increasing pedestrian and motorist awareness and behavior. While efforts most certainly provide information, the primary goal of an educational strategy is to motivate people to alter their behavior and reduce reckless actions. To implement the strategy, an integrated, multidisciplinary approach that links hard policies (e.g., changes in infrastructure) and soft policies (e.g., public relations campaigns) and addresses both pedestrians and drivers has the greatest chance of success.

There are several broad approaches to education that can be conducted with moderate resources. They include 1) highlighting pedestrian features when introducing new infrastructure; 2) conducting internal campaigns within the organization to build staff support for pedestrian safety programs; 3) incorporating pedestrian safety

messages into public relations efforts; 4) developing relationships with sister state agencies and statewide consumer groups; and 5) marketing alternative travel modes.

There are three specific types of educational campaigns – public awareness, targeted campaigns, and individual campaigns. Public awareness campaigns are a great example of a vehicle used to garner public support. An effective campaign can “lay the groundwork” for subsequent pedestrian safety initiatives and can increase the likelihood of their success. Campaigns to target groups are usually aimed at changing behavior patterns in specific groups of people (e.g., motorists, elderly, school children). Since changing behavior in these groups can be a long and arduous task, these campaigns tend to be ongoing efforts aimed at long-term results. Individual campaigns differ from campaigns at target groups because the audience is reached through an intermediary. Intervention occurs at an individual level through safety guards, doctors and other authority figures. Using these different approaches in concert reaches a broader audience and increases the likelihood of long-term success in changing attitudes and behaviors.

Police Enforcement: Police enforcement is a primary component in preserving pedestrian right-of-way and maintaining a safe environment for all modes of travel. Well-publicized enforcement campaigns are often effective in deterring careless and reckless driving and encouraging drivers to share the roadway with pedestrians and bicyclists when combined with strategically installed traffic control devices and public education programs. Most importantly, by enforcing the traffic code, police forces implant a sense of right and wrong in the general public and lend credibility to traffic safety educational programs and traffic control devices.

Over the years, police departments around the country have consistently enforced traffic laws pertaining to driving under the influence, speeding, and running red lights. They have developed effective and socially accepted methods for measuring this behavior and apprehending offenders. However, enforcement of right of way laws has proven more difficult, as police forces have focused attention on more objective violations and/or not provided appropriate training to police officers. Good enforcement requires enforcing traditional traffic laws as well as ensuring equal protection for drivers as well as pedestrians and bicyclists.

There are a number of actions that municipalities can use to implement enforcement campaigns designed to protect pedestrians. These include increased police presence around school zones, residential neighborhoods, and other areas with high pedestrian activity; “pedestrian stings” involving police officers in civilian clothing; and high profile, hard hitting mass media campaigns to sign-post change and help set the public agenda. Some enforcement campaigns require special legislation to provide a legal basis for stricter crosswalk codes or right of way changes while other campaigns operate under existing ordinances.

Appendix G

Projects Identified for Pedestrian Safety Improvements

Piano Key Style Pavement Marking Improvement

Submitted to: Highway Safety Advisory Committee

February 8, 2010

Problem Statement

The Central Business District (CBD) within the City of Fort Wayne is comprised of 0.75 square miles that is defined by the land area south of Superior Street, west of Clay Street, east of Van Buren Avenue, and north of Baker Street (see Appendix A). Within this geographical area, NIRCC estimates that the pedestrian traffic is more frequent per square mile than in any other area in the City of Fort Wayne. According to NIRCC's employment data from the 2000 US Census, there are 19,709 employees within the Fort Wayne CBD. Residents employed within the CBD as well as other residents utilize public crosswalks to access businesses, restaurants, housing, retail stores, churches, library, governmental agencies, entertainment venues, hotels, parking garages and lots, schools, exercise facilities, seasonal festivals, and a variety of other uses.

Conflicts with motorists within the CBD are inevitable given the variety of uses within the CBD and the volume of traffic. This project is being proposed to mitigate crashes at these conflict points by improving the awareness of the crossings to motorist. The current pavement markings primarily provide information for pedestrians as to where they can safely cross a roadway but do not provide a distinctive awareness for motorists.

In the past three years 292 pedestrians have been struck by vehicles within Allen County. During this same time period, 35 (12%) of the 292 crashes occurred within the CBD. The intent of this project is to reduce this frequency of crashes and lower the severity by providing better information to pedestrians when crossing roadways.

Project Proposal

This project was submitted to the Northeastern Indiana Regional Coordinating Council for review and consideration for Federal HSIP funding by the City of Fort Wayne. The project was reviewed by staff to determine the overall cost and ensure locations chosen were consistent with the priorities identified in the Pedestrian Safety Action Plan. The proposed project would include the upgrade of pavement markings at all identified intersections within the CBD to a "piano key" style consistent with Indiana Department of Transportation design standards. The project would provide improvements to a total of 127 intersections within the CBD. A listing of the intersections and quantity estimates are provided in Appendix B. The City of Fort Wayne has already begun to upgrade crosswalks with the "piano key" style pavement markings in the past year while reconstructing a number of roadways under locally funding projects. Additionally the City of Fort Wayne has received American Recovery and Reinvestment Act (ARRA) funds to resurface four roadways (Washington Blvd, Jefferson Blvd, Berry St, and Wayne Street) which will include the piano key style pavement markings. Not all approaches will be addressed through the ARRA project but will be complete as part of this project.

The City of Fort Wayne has committed to replacing all crosswalk pavement markings under their jurisdiction in the future as funding becomes available. Projects will be done according the priority areas identified by the PSAP and other pedestrian plans. The City of Fort Wayne is seeking HSIP funds to complete the remaining intersections within the CBD as the first priority area. The proposed project will include upgrades at INDOT controlled intersection on Clinton St and Lafayette Street. The Fort Wayne INDOT District office has approved this and has provided support for this improvement on their portion of these roadways.

Planning Support

The Allen County Pedestrian Safety Action Plan, (PSAP) was created to address deficiencies and improvements throughout the county relating specifically to pedestrian safety. Unlike NIRCC's Bicycle-Pedestrian Transportation Plan that identifies specific corridor improvements such as trails, sidewalks, bike lanes, shoulder lanes, wide curb lanes, and bike routes throughout the Metropolitan Planning Area, Allen County and Northeast Indiana Region, the PSAP focuses on the pedestrian safety. The PSAP utilized similar planning principles, resources and processes as the Bicycle-Pedestrian Transportation Plan.

Additional planning support was incorporated into the development of the PSAP a cooperative effort of multi-discipline professionals and interest groups. NIRCC incorporated planning objectives that were derived from input by officials of the City of Fort Wayne, representatives of Fort Wayne City Council, local trail groups, local transit provider, traffic engineering department, Fort Wayne city utilities, land use planners, school districts, Allen County Council on Aging, and League for the Blind and Disabled.

The proposed improvement is consistent with the PSAP objectives to improve safety at crossings through upgrades. The plan also identifies the CBD as a priority area for this type improvement.

Project Cost

The proposed cost for this project is \$264,000 which will include all material and labor. Construction engineering costs are estimated to be 12.5 percent of the total which will require an additional \$33,000 making the total cost \$297,000. No preliminary engineering or right of way will be required for the project. The project will be let under the standard INDOT process.

Roadway Safety Audit

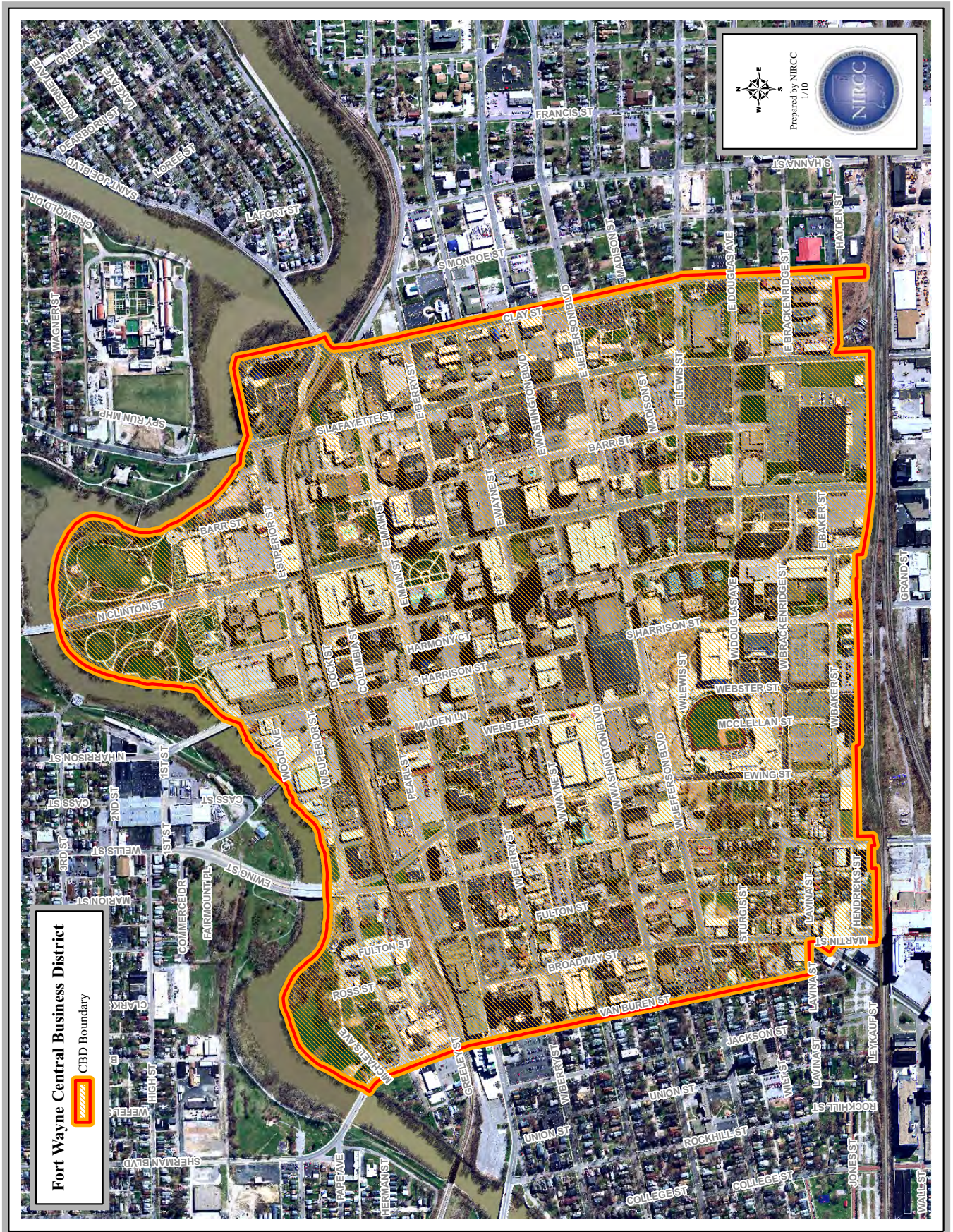
A typical roadway safety audit was not completed as part of the review for HSIP funds for this project. An audit was not feasible given the amount of locations proposed for improvement. NIRCC solicited input from three independent sources to ensure that the project meets the objectives and that the location selected was justifiable. NIRCC also confirm that the proposed improvement was included as an acceptable safety improvement countermeasure that meets INDOT design standards. The responses from the three reviewing agencies selected by NIRCC have been included in Appendix C.

Post Construction Analysis

NIRCC maintains crash data for the area identified for this project. A post crash evaluation will be submitted three years following the improvement to determine the impact on safety. This report will be forwarded to the roadway owner, Indiana Department of Transportation, and Federal Highway Administration. NIRCC will also ensure that The City of Fort Wayne maintains pavement markings after they are installed.

APPENDIX A

Aerial of CBD



APPENDIX B

Piano Key Style Pavement Marking Locations				
1	Clinton & Superior		65	Berry & Clay
2	Clinton & Main		66	Wayne & VanBuren
3	Clinton & Berry		67	Wayne & Broadway
4	Clinton & Wayne		68	Wayne & Fulton
5	Clinton & Washington		69	Wayne & Fairfield
6	Clinton & Jefferson		70	Wayne & Ewing
7	Clinton & Lewis		71	Wayne & Webster
8	Clinton & Douglas		72	Wayne & Harrison
9	Clinton & Brackenridge		73	Wayne & Calhoun
10	Clinton & Baker		74	Wayne & Barr
11	Lafayette & Superior		75	Wayne & Clay
12	Lafayette & Columbia		76	VanBuren & Wilt
13	Lafayette & Main		77	VanBuren & Lavina
14	Lafayette & Berry		78	Broadway & Sturgis
15	Lafayette & Wayne		79	Broadway & Wilt
16	Lafayette & Washington		80	Broadway & Brackenridge
17	Lafayette & Jefferson		81	Broadway & Lavina
18	Lafayette & Madison		82	Fairfield & Pearl
19	Lafayette & Lewis		83	Fairfield & Brackenridge
20	Lafayette & Douglas		84	Fairfield & Lavina
21	Lafayette & Brackenridge		85	Fairfield & Baker
22	Washington & VanBuren		86	Ewing & Pearl
23	Washington & Broadway		87	Ewing & Brackenridge
24	Washington & Fulton		88	Ewing & Baker
25	Washington & Fairfield		89	Webster & Douglas
26	Washington & Ewing		90	Webster & Brackenridge
27	Washington & Webster		91	Webster & Baker
28	Washington & Harrison		92	Harrison & The Landing
29	Washington & Calhoun		93	Harrison & Pearl
30	Washington & Barr		94	Harrison & Douglas
31	Washington & Clay		95	Harrison & Brackenridge
32	Jefferson & VanBuren		96	Harrison & Baker
33	Jefferson & Broadway		97	Calhoun & The Landing
34	Jefferson & Fulton		98	Calhoun & Lewis
35	Jefferson & Fairfield		99	Calhoun & Douglas
36	Jefferson & Ewing		100	Calhoun & Brackenridge
37	Jefferson & Webster		101	Calhoun & Baker
38	Jefferson & Harrison		102	Barr & Madison
39	Jefferson & Calhoun		103	Barr & Lewis
40	Jefferson & Barr		104	Barr & Douglas
41	Jefferson & Clay		105	Clay & Columbia
42	Superior & VanBuren		106	Clay & Madison
43	Superior & Ewing		107	Clay & Lewis
44	Superior & Harrison		108	Clay & Douglas
45	Superior & Calhoun		109	Clay & Brackenridge
46	Superior & Barr		110	Fulton & Sturgis
47	Main & VanBuren		111	Brackenridge & McClellan
48	Main & Broadway		112	Baker & McClellan
49	Main & Fulton		113	Superior & Ewing
50	Main & Fairfield		114	Superior & Wells
51	Main & Ewing		115	Pearl & Maiden Ln
52	Main & Harrison		116	Main & Webster
53	Main & Calhoun		117	Main & Maiden Ln
54	Main & Barr		118	Berry & Maiden Ln
55	Main & Clay		119	Main & Court
56	Berry & VanBuren		120	Broadway & Martin
57	Berry & Broadway		121	Superior & Webster
58	Berry & Fulton		122	Fulton & Brackenridge
59	Berry & Fairfield		123	Hendricks & Fairfield
60	Berry & Ewing		124	Superior & Ross
61	Berry & Webster		125	Superior & Fulton
62	Berry & Harrison		126	Barr & Anthis Sch.
63	Berry & Calhoun		127	Clinton & Headwaters
64	Berry & Barr			

Quantity Estimates			
	Length (ft.)	Total Cost / Ft.	Total Cost
New Crosswalk	39,838	\$5.00	\$199,190.00
Removal of Existing Markings	18,717	\$1.10	\$20,588.70
Removal of Existing Stop Bar	3,651	\$5.00	\$18,255.00
New Stop Bar	5,075	\$5.00	\$25,375.00
			\$263,408.70

APPENDIX C

CITY OF NEW HAVEN

815 LINCOLN HWY EAST
P.O. Box 570



NEW HAVEN, INDIANA 46774

January 28, 2010

Northeast Indiana Regional Coordinating Council
One East Main Street, City-County Bldg. Room 830
Fort Wayne, IN 46802

Attention: Jerry Foust
Senior Transportation Planner

RE: L.E.D. Pedestrian (count down signal type)

Dear Jerry,

The City of New Haven has one traffic signal equipped with an L.E.D. Pedestrian countdown signal type head located at the intersection on Lincoln Highway East and Broadway. This facility has been in place since 2007. The City feels that this offers pedestrians increased awareness of pedestrian clearance time.

I would recommend the use of this style of pedestrian crossing head where there is a high vehicular traffic count and a high pedestrian crossing demand.

Respectfully submitted,

Keith Schlegel
Director of Engineering
City of New Haven

cc: File

my docs/keith/01-28-10 Jerry Foust ltrs.doc

Allen County Highway

One West Superior Street - Room 211 Fort Wayne, Indiana 46802
Phone: 260-449-7369 Fax: 260-449-7594

February 4, 2010

Jerry Foust
Senior Transportation Planner
Northeastern Indiana Regional Coordinating Council
City-County Building, Room 830
One East Main Street
Fort Wayne, IN 46802

Subject: "Piano Key"-style crosswalk markings proposed for the Fort Wayne CBD

Dear Mr. Foust,

As requested by the Northeastern Indiana Regional Coordinating Council, the Allen County Highway Department has reviewed the proposal to install "piano key"-style pavement markings at crosswalks within the Fort Wayne Central Business District. Our department is using this type of crosswalk marking at some county crosswalks and has found them to be beneficial to the safety of crosswalk users. The Allen County Highway Department supports the proposal to use this style of pavement marking at crosswalks throughout the Fort Wayne Central Business District.

Sincerely,



Michael L. Thornson, PE
Allen County Highway Engineer

Cc: Bill Hartman, ACHD Executive Director
Mike Eckert, ACHD Manager of Technical Services
file



CITY OF FORT WAYNE

THOMAS C. HENRY, MAYOR

January 26, 2010

Northeastern Indiana Regional Coordinating Council
Room 830
City-County Building
Fort Wayne, IN 46802

To Whom It May Concern:

The Division of Community Development has been very involved with, and has a great interest in all forms of safe, efficient pedestrian and multi-modal transportation, not only in the downtown Central Business District, but throughout the community. We have been asked to review the “piano key” crosswalk and “countdown pedestrian indicator” project in Fort Wayne’s Central Business District, to be funded with HSIP funds.

Our Division is in support of this initiative, as piano key markings will create a better awareness for motorists approaching downtown intersections, and the countdown indicators will improve safety for pedestrians attempting cross busy downtown streets. With nearly 20,000 downtown employees, combined with heavy traffic counts within less than one square mile, there are many potential points of conflict. A significant number of pedestrian crashes occur within the Central Business District, and any such efforts to reduce this is critical for downtown safety. Our Division also supports traffic and pedestrian safety features that meet the needs of disabled pedestrians, including visually impaired pedestrians. As such, we would support countdown pedestrian indicators that are both visual as well as audio activated.

Thank you for your consideration of HSIP funding for the “piano key” crosswalk and “countdown pedestrian indicator” projects in downtown Fort Wayne.

Sincerely,

John Urbahns, Director
Division of Community Development
City of Fort Wayne

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One Main St. • Fort Wayne, Indiana • 46802-1804 • www.cityoffortwayne.org

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Pedestrian Indications with Countdown Indicators

Submitted to: Highway Safety Advisory Committee

February 8, 2010

Problem Statement

The Central Business District (CBD) within the City of Fort Wayne is comprised of 0.75 square miles that is defined by the land area south of Superior Street, west of Clay Street, east of Van Buren Avenue, and north of Baker Street (see Appendix A). Within this geographical area, NIRCC estimates that the pedestrian traffic is more frequent per square mile than in any other area in the City of Fort Wayne. According to NIRCC's employment data from the 2000 US Census, there are 19,709 employees within the Fort Wayne CBD. Residents employed within the CBD as well as other residents utilize public crosswalks to access businesses, restaurants, housing, retail stores, churches, library, governmental agencies, entertainment venues, hotels, parking garages and lots, schools, exercise facilities, seasonal festivals, and a variety of other uses.

Conflicts with motorists within the CBD are inevitable given the variety of uses within the CBD and the volume of traffic. This project is being proposed to mitigate crashes at these conflict points by providing the improved pedestrian information. The improvement will provide pedestrians the amount of time remaining to safely cross the intersection. The project would include removal of the existing walk or no walk indicators with those that provide the remaining number of seconds to clear the intersection.

In the past three years 292 pedestrians have been struck by vehicles within Allen County. During this same time period, 35 (12%) of the 292 crashes occurred within the CBD. The intent of this project is to reduce this frequency of crashes and lower the severity by providing better information to pedestrians when crossing roadways.

Project Proposal

This project was submitted to the Northeastern Indiana Regional Coordinating Council for review and consideration for Federal HSIP funding by the City of Fort Wayne. The project was reviewed by staff to determine the overall cost and ensure locations chosen were consistent with the priorities identified in the Pedestrian Safety Action Plan. The proposed project would include the upgrade of pedestrian indicators to countdown pedestrian indicators at 59 intersections. Three intersections within the CBD have been completely upgraded with countdown indicators and 2 others have been partially completed. The project would include the purchase and installation of 332 new countdown pedestrian indicators to upgrade all of the remaining signals. A map and listing of the locations identified to be upgraded have been included in Appendix B. The City of Fort Wayne will include upgrades at INDOT controlled intersection on Clinton St and Lafayette Street. The Fort Wayne INDOT District office has approved this and has provided support for this improvement on their portion of these roadways.

The current crosswalk indicators located within the CBD inform pedestrians when they are permitted or restricted from crossing a roadway. The proposed indicators will provide this basic information and in addition will inform the pedestrian of the amount of time remaining to safely cross the roadway. The proposed project will afford the City of Fort Wayne the ability to replace all pedestrian indicators within the CBD.

Planning Support

The Allen County Pedestrian Safety Action Plan, (PSAP) was created to address deficiencies and improvements throughout the county relating specifically to pedestrian safety. Unlike NIRCC's Bicycle-Pedestrian Transportation Plan that identifies specific corridor improvements such as trails, sidewalks, bike lanes, shoulder lanes, wide curb lanes, and bike routes throughout the Metropolitan Planning Area, Allen County and Northeast Indiana Region, the PSAP focuses on the pedestrian safety. The PSAP utilized similar planning principles, resources and processes as the Bicycle-Pedestrian Transportation Plan.

Additional planning support was incorporated into the development of the PSAP a cooperative effort of multi-discipline professionals and interest groups. NIRCC incorporated planning objectives that were derived from input by officials of the City of Fort Wayne, representatives of Fort Wayne City Council, local trail groups, local transit provider, traffic engineering department, Fort Wayne city utilities, land use planners, school districts, Allen County Council on Aging, and League for the Blind and Disabled. The proposed improvement is consistent with the PSAP objectives to improve safety at crossings through upgrades. The plan also identifies the CBD as a priority area for this type improvement.

Project Cost

The proposed cost for this project is \$109,600 of which \$99,600 will obtain all the equipment needed at a unit cost for materials estimated at \$300 each. The project will be completed in two phases and the labor cost will be completed by the City of Fort Wayne. The first phase is planned to begin in fiscal year 2011 which will include all of the locations west of Calhoun Street. Phase two will follow the first phase that will complete all the remaining intersections.

Roadway Safety Audit

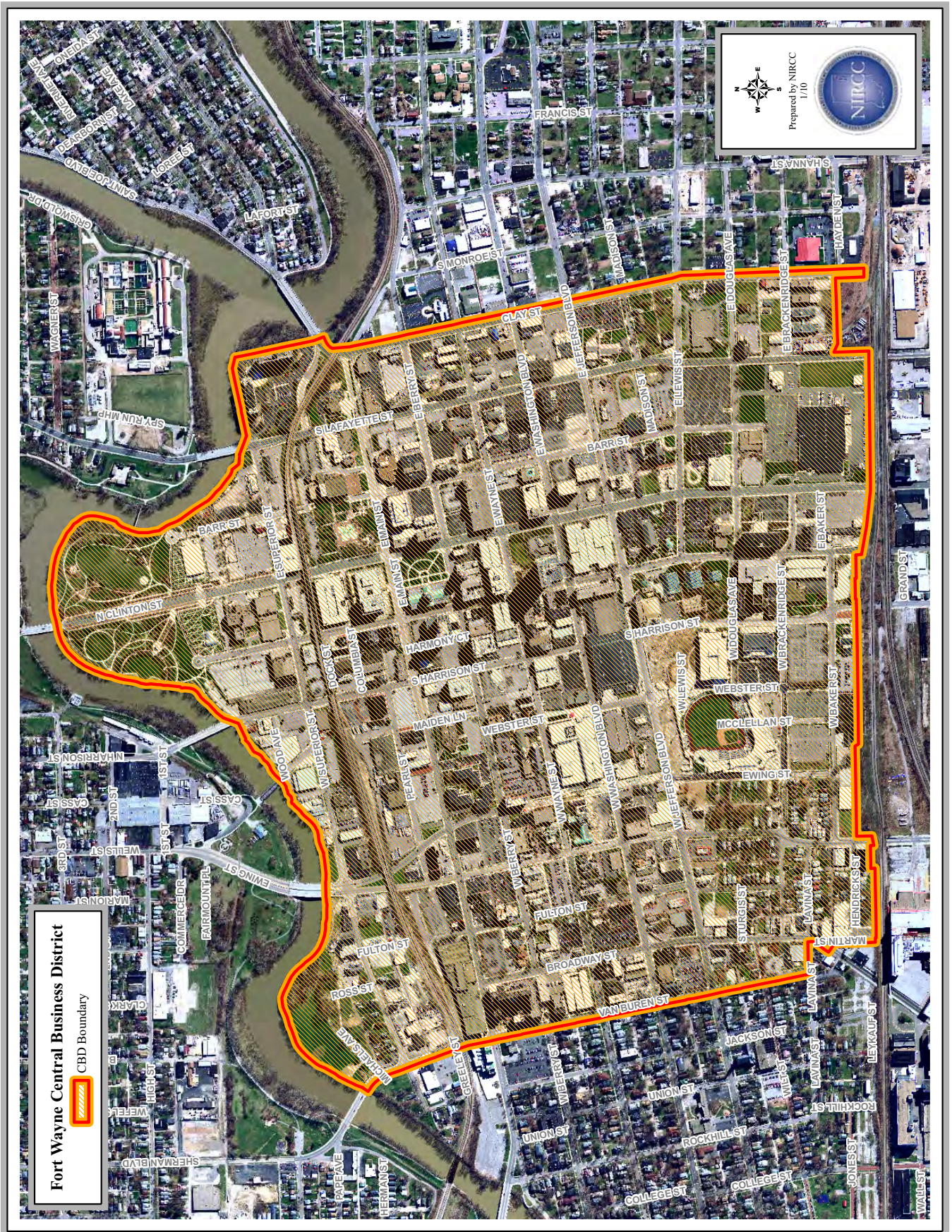
A typical roadway safety audit was not completed as part of the review for HSIP funds for this project. An audit was not feasible given the amount of locations proposed for improvement. NIRCC solicited input from three independent sources to ensure that the project meets the objectives and that the location selected was justifiable. NIRCC also confirm that the proposed improvement was included as an acceptable safety improvement countermeasure that meets INDOT design standards. The responses from the three reviewing agencies selected by NIRCC have been included in Appendix C.

Post Construction Analysis

NIRCC maintains crash data for the entire area of this project. A post crash evaluation will be submitted three years following the improvement to determine the impact on safety. This report will be forwarded to the roadway owner, Indiana Department of Transportation, and Federal Highway Administration. NIRCC will also ensure that The City of Fort Wayne maintains equipment purchased for this project after it is installed.

APPENDIX A

Aerial of CBD



APPENDIX B

CBD Signalized Intersections

	Major Street	Minor Street	Signalized?	Number of Approaches	Number of Pedestrian Indications		Comments
					CITY	INDOT	
1	Clinton	& Superior	Yes	4		8	
2	Clinton	& Main	Yes	4		8	
3	Clinton	& Berry	Yes	4		8	
4	Clinton	& Wayne	Yes	4		8	
5	Clinton	& Washington	Yes	4		8	
6	Clinton	& Jefferson	Yes	4		8	
7	Clinton	& Lewis	Yes	4		8	
8	Clinton	& Douglas	Yes	4		8	
9	Lafayette	& Superior	Yes	4		8	
10	Lafayette	& Main	Yes	4		8	
11	Lafayette	& Berry	Yes	4		8	
12	Lafayette	& Wayne	Yes	4		8	
13	Lafayette	& Washington	Yes	4		8	
14	Lafayette	& Jefferson	Yes	4		8	
15	Lafayette	& Lewis	Yes	4		8	
16	Washington	& Van Buren	Yes	4	8		
17	Washington	& Broadway	Yes	4	8		
18	Washington	& Fairfield	Yes	4	8		
19	Washington	& Ewing	Yes	4	8		
20	Washington	& Webster	Yes	3	6		
21	Washington	& Harrison	Yes	3	6		
22	Washington	& Calhoun	Yes	4	4		Half completed
23	Washington	& Barr	Yes	4	8		
24	Washington	& Clay	Yes	4	8		
25	Jefferson	& Van Buren	Yes	4	8		
26	Jefferson	& Broadway	Yes	4	8		
27	Jefferson	& Fairfield	Yes	4	8		
28	Jefferson	& Ewing	Yes	4	8		
29	Jefferson	& Webster	Yes	3	0		Completed
30	Jefferson	& Harrison	Yes	3	6		
31	Jefferson	& Calhoun	Yes	4	8		
32	Jefferson	& Barr	Yes	4	8		
33	Jefferson	& Clay	Yes	4	8		
34	Superior	& Ewing	Yes	4	8		
35	Superior	& Harrison	Yes	4	8		
36	Superior	& Calhoun	Yes	4	8		
37	Main	& Van Buren	Yes	4	8		
38	Main	& Broadway	Yes	3	6		
39	Main	& Fairfield	Yes	4	8		
40	Main	& Ewing	Yes	4	8		
41	Main	& Harrison	Yes	4	8		
42	Main	& Calhoun	Yes	4	0		Completed
43	Main	& Clay	Yes	3	6		
44	Berry	& Broadway	Yes	3	6		
45	Berry	& Fairfield	Yes	4	8		
46	Berry	& Ewing	Yes	4	8		
47	Berry	& Harrison	Yes	4	8		
48	Berry	& Calhoun	Yes	4	4		Half completed
49	Berry	& Barr	Yes	4	8		
50	Berry	& Clay	Yes	4	8		
51	Wayne	& Broadway	Yes	4	8		
52	Wayne	& Fairfield	Yes	4	8		
53	Wayne	& Ewing	Yes	4	8		
54	Wayne	& Harrison	Yes	4	8		
55	Wayne	& Calhoun	Yes	4	0		Completed
56	Wayne	& Barr	Yes	4	8		
57	Wayne	& Clay	Yes	4	8		
58	Harrison	& Douglas	Yes	4	8		
59	Harrison	& Brackenridge	Yes	4	8		
60	Harrison	& Baker	Yes	4	8		
61	Calhoun	& Douglas	Yes	4	8		
62	Calhoun	& Brackenridge	Yes	4	8		
Total number of pedestrian indications to be replaced					332	120	452

APPENDIX C

CITY OF NEW HAVEN

815 LINCOLN HWY EAST
P.O. Box 570



January 28, 2010

NEW HAVEN, INDIANA 46774

Northeastern Indiana Regional Coordinating Council
One East Main Street, City-County Bldg. Room 830
Fort Wayne, IN 46802

Attention: Jerry Foust
Senior Transportation Planner

RE: Crosswalk Pavement Markings

Dear Jerry,

The City of New Haven has adopted a policy in approximately the year 2000, to mark pedestrian crosswalks by utilizing 12" to 24" wide longitudinal lines spaced 12" to 24" apart (piano key style).

The City feels that this increases visibility to motorist offering additional safety to pedestrians. If non-intersection pedestrian crossings are marked, warning signs should be installed and adequate visibility should be provided by parking prohibitions.

Respectfully Submitted,

Keith Schlegel
Director of Engineering
City of New Haven

cc: File

my docs/keith/01-28-10 Jerry Foust ltrs.doc

Allen County Highway

One West Superior Street - Room 211 Fort Wayne, Indiana 46802
Phone: 260-449-7369 Fax: 260-449-7594

February 4, 2010

Jerry Foust
Senior Transportation Planner
Northeastern Indiana Regional Coordinating Council
City-County Building, Room 830
One East Main Street
Fort Wayne, IN 46802

Subject: Pedestrian Countdown Indicators proposed for the Fort Wayne CBD

Dear Mr. Foust,

As requested by the Northeastern Indiana Regional Coordinating Council, the Allen County Highway Department has reviewed the proposal to install pedestrian countdown indicators at all signalized intersections within the Fort Wayne Central Business District. It is our opinion that this device would positively impact pedestrian safety under traffic conditions typical of the CBD and we support the proposal to install the device at signalized intersections throughout that area.

Sincerely,



Michael L. Thomson, PE
Allen County Highway Engineer

Cc: Bill Hartman, ACHD Executive Director
Mike Eckert, ACHD Manager of Technical Services
file

North Division	2234 Carroll Road	Fort Wayne, Indiana 46818	260-449-4781	Fax: 260-449-4786
South Division	8317 East Tillman Road	Fort Wayne, Indiana 46816	260-449-4791	Fax: 260-449-4793



CITY OF FORT WAYNE

THOMAS C. HENRY, MAYOR

January 26, 2010

Northeastern Indiana Regional Coordinating Council
Room 830
City-County Building
Fort Wayne, IN 46802

To Whom It May Concern:

The Division of Community Development has been very involved with, and has a great interest in all forms of safe, efficient pedestrian and multi-modal transportation, not only in the downtown Central Business District, but throughout the community. We have been asked to review the "piano key" crosswalk and "countdown pedestrian indicator" project in Fort Wayne's Central Business District, to be funded with HSIP funds.

Our Division is in support of this initiative, as piano key markings will create a better awareness for motorists approaching downtown intersections, and the countdown indicators will improve safety for pedestrians attempting cross busy downtown streets. With nearly 20,000 downtown employees, combined with heavy traffic counts within less than one square mile, there are many potential points of conflict. A significant number of pedestrian crashes occur within the Central Business District, and any such efforts to reduce this is critical for downtown safety. Our Division also supports traffic and pedestrian safety features that meet the needs of disabled pedestrians, including visually impaired pedestrians. As such, we would support countdown pedestrian indicators that are both visual as well as audio activated.

Thank you for your consideration of HSIP funding for the "piano key" crosswalk and "countdown pedestrian indicator" projects in downtown Fort Wayne.

Sincerely,

A handwritten signature in black ink, appearing to read "John Urbahns".

John Urbahns, Director
Division of Community Development
City of Fort Wayne

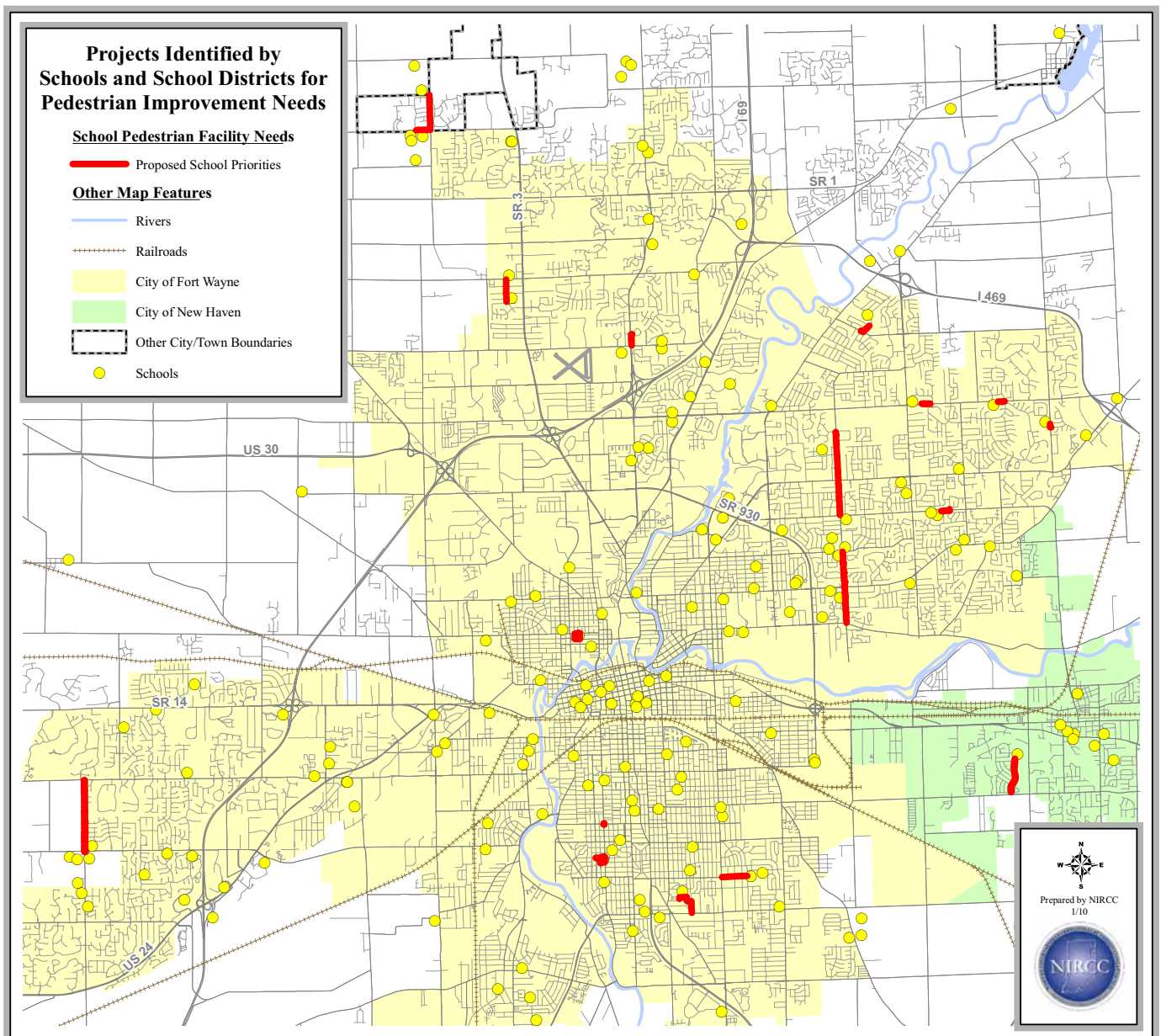
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Pedestrian Needs Identified by Schools and School Districts

Safety programs throughout the country have been created to target safety concerns and needs with regards to schools and the safety of their students. Efforts are being made to identify these safety needs in Allen County as well. Specific safety needs have already been identified through discussions with area schools and school districts. The City of Fort Wayne’s Walk Fort Wayne team and the Fort Wayne Greenways Manager met with schools and school districts during the summer and fall of 2009 to gather input on what kinds of safety improvements or pedestrian facilities are needed for their areas. These needs are identified in the Walk Fort Wayne Plan under the “Safe Routes to School” section and have been included in the map below as well as the corresponding table on the next page. The proposed projects or needs include new sidewalks, new trails, crosswalks, sidewalk repair needs, and locations where crossing guards are needed. As NIRCC and other local groups and governmental agencies identify pedestrian safety needs or priorities around schools they will be added to the map below.



Pedestrian Needs Identified by Schools and School Districts

School District	Project/Need	Status	Schools Effected
EACS	New Sidewalk	Proposed	Meadowbrook Elementary
EACS	New Sidewalk	Proposed	Village Elementary/Village Woods Middle School
FW Catholic	Sidewalk Repair	Proposed	Most Precious Blood
FW Catholic	Crossing Guard	Proposed	Most Precious Blood
FW Catholic	Crossing Guard	Proposed	St. John the Baptist
FW Catholic	Sidewalk Repair	Proposed	St. John the Baptist
FWCS	New Sidewalk	Proposed	Arlington Elementary
FWCS	New Sidewalk	Proposed	Croninger Elementary
FWCS	Crosswalk	Proposed	Croninger Elementary
FWCS	New Sidewalk	Proposed	Harris Elementary/Glenwood Park Elementary/St. Charles Borromeo/Lane Middle School/Snider High School
FWCS	Crosswalk	Proposed	Jefferson Middle School
FWCS	New Sidewalk	Proposed	Jefferson Middle School
FWCS	New Sidewalk	Proposed	Northrop High School
FWCS	New Sidewalk	Proposed	Scott Elementary
FWCS	New Sidewalk	Proposed	Shambaugh Elementary
FWCS	Crosswalk	Proposed	Shambaugh Elementary
FWCS	New Sidewalk	Proposed	St. Joe Central Elementary
FWCS	New Sidewalk	Proposed	Washington Center Elementary
FWCS/FW Catholic	New Sidewalk/Trail	Proposed	Glenwood Park Elementary/St. Charles Borromeo/Lane Middle School/Snider High School
NACS	New Trail	Proposed	Eel River Elementary/Hickory Center Elementary/Carroll High School/Carroll High Freshman Campus/Carroll Middle School
NACS	New Sidewalk	Proposed	Eel River Elementary/Hickory Center Elementary/Carroll High School/Carroll High Freshman Campus/Carroll Middle School
SACS/FW Catholic	New Sidewalk/Trail	Proposed	St. Elizabeth Ann Seton/Aboite Elementary/Homestead High School/Summit Middle School/Woodside Middle School
SACS/FW Catholic	Crosswalk	Proposed	St. Elizabeth Ann Seton/Aboite Elementary/Homestead High School/Summit Middle School/Woodside Middle School

Appendix H

Evaluation Results for Pedestrian Safety Improvements

Objective 1

Reduce the 3 year average number of pedestrian accidents 25% by 2015: Currently, the three year average for the years 2006-2008 is 114 pedestrian accidents per year. A 25% decrease in pedestrian accidents would lower the current 3 year average to just about 85 pedestrian accidents per year.

The goal of Objective 1 is to reduce pedestrian crashes by 25% by the year 2015. The base data being used to analyze the effectiveness of the Pedestrian Safety Action Plan and local efforts to make Allen County a pedestrian safe environment is pedestrian crash data averaged for a three year period. The average number of pedestrian accidents from 2006 through 2008 is 114. **Figure 1 and 2** of this section provides charts that measure the decrease or increase of pedestrian related accidents each year.

Figure 1 shows the total average number of pedestrian accidents and provides a breakdown of private property accidents versus pedestrian accidents along public roadways. These numbers are important to track as well as the total number since some countermeasures may affect these different types of pedestrian accidents in different ways. As you can see there is already a decrease in the number of pedestrian accidents of about 8.5% from the 2006-2008 data to the 2007-2009 data. It is evident that a change in priorities in recent years throughout Allen County for pedestrian type improvements has already begun to create a safer pedestrian environment.

Figure 1
Average number of pedestrian crashes per year in Allen County averaged over a 3 year period

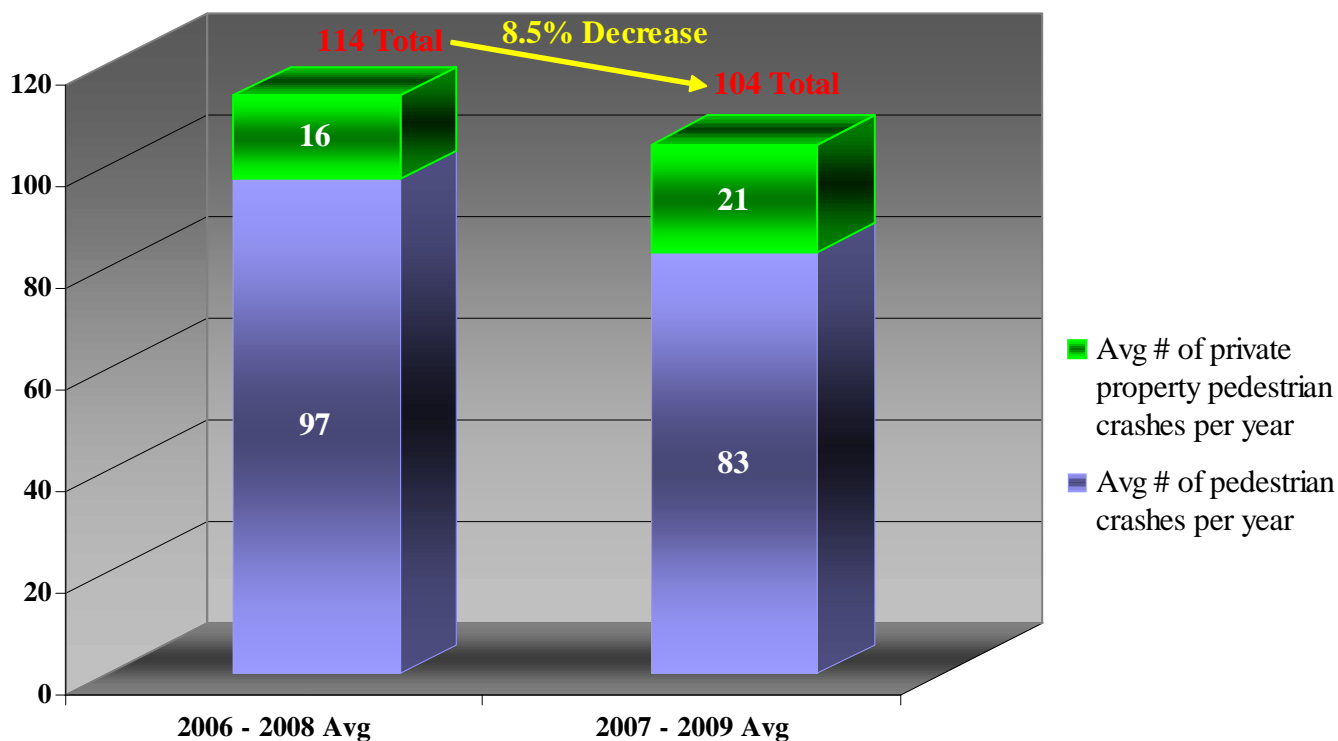
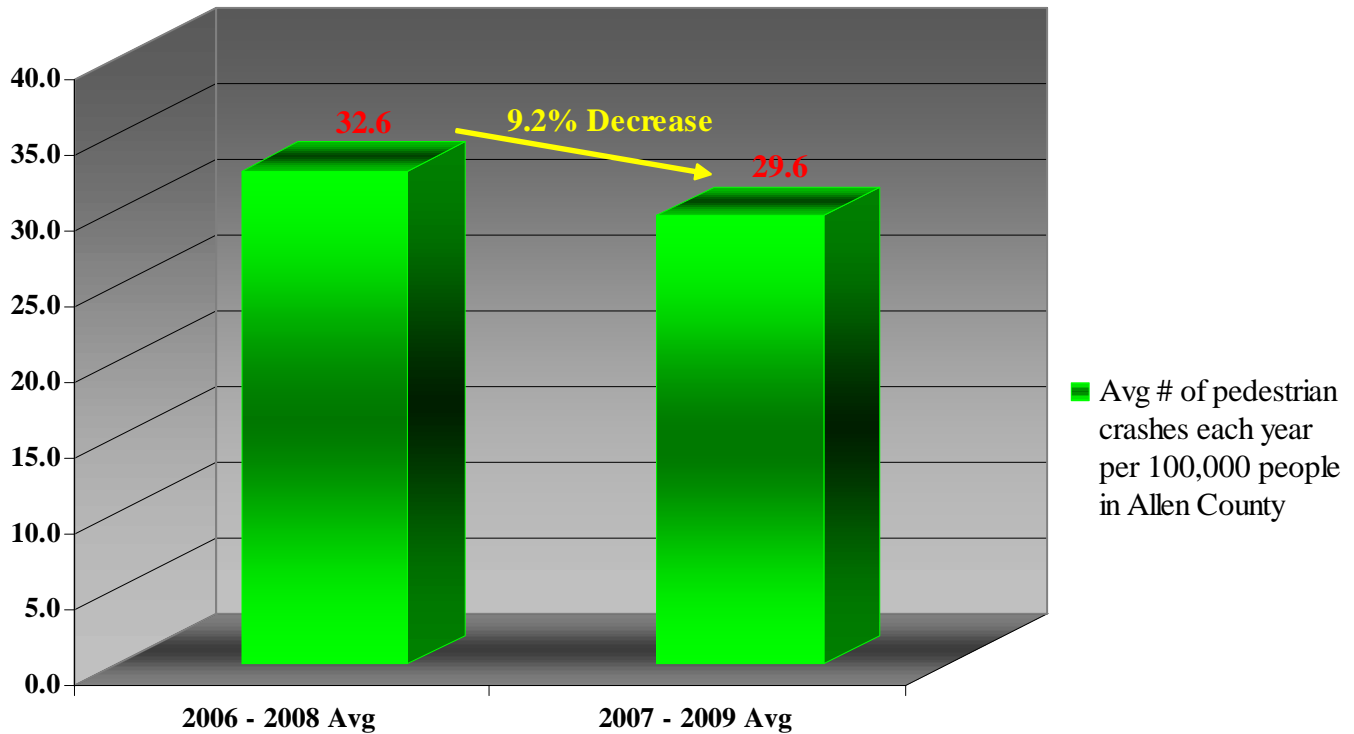


Figure 2 provides another way that pedestrian accidents can be measured. This chart takes population estimates and averages them for the same three year period that the pedestrian crash data is averaged for and creates a weighted value, or rate, that is dependent on how much the population changes. The population data used to figure these statistics comes from the annual estimates of resident population by county that the U.S. Census

Bureau publishes each year. The three year average population for Allen County was higher from 2007-2009 but since the frequency of accidents decreased between these two time periods the result was that there was a higher percentage decrease of pedestrian accidents than was shown in **Figure 1** that is only based on frequency.

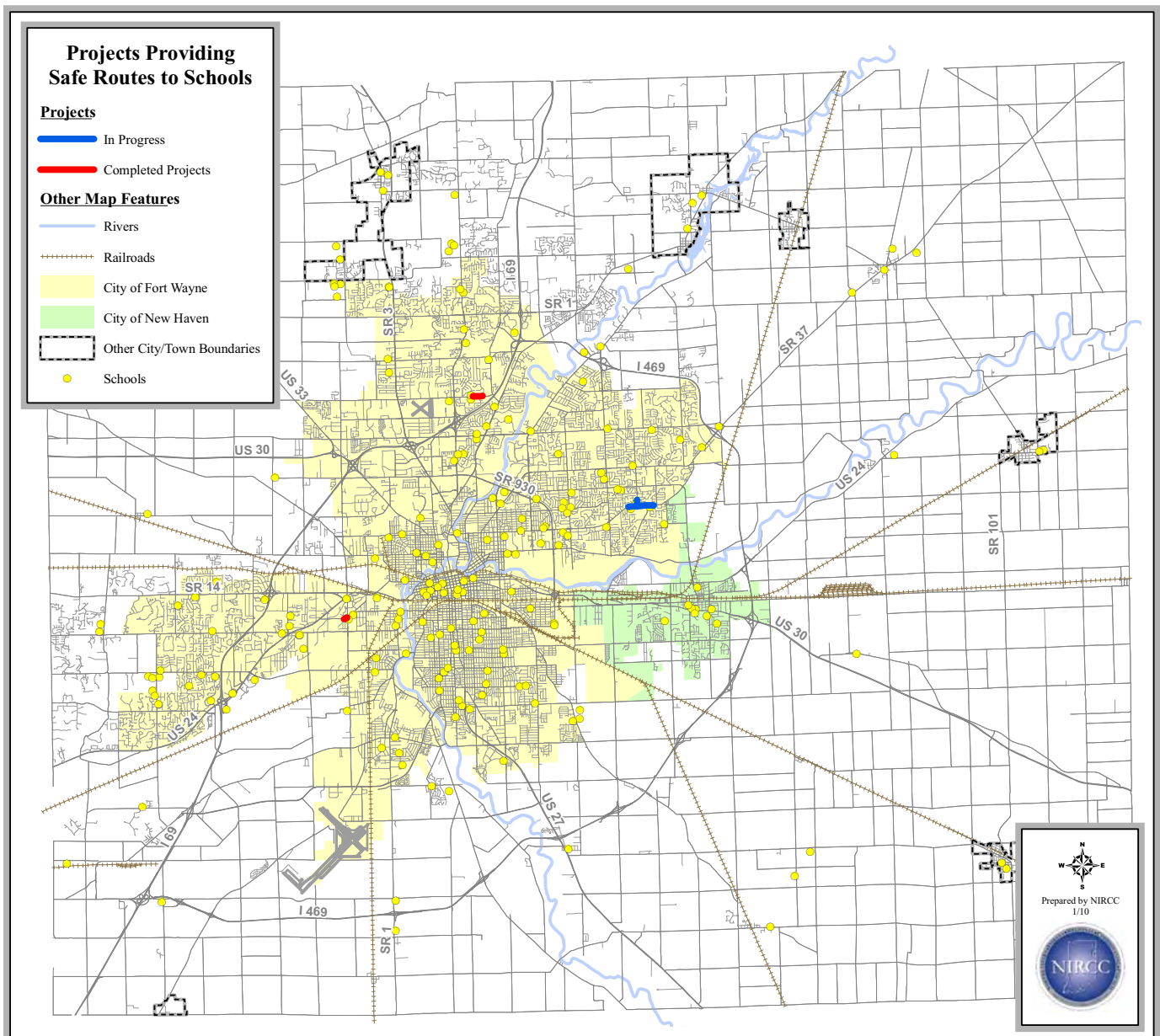
Figure 2
Average number of pedestrian crashes per year per 100,000 people in Allen County averaged over a 3 year period



Objective 7

Prioritize areas around schools for safety improvements: Schools throughout Allen County have a variety of geographical environments or policies that either limit or require students to walk to school. Prioritization for areas surrounding schools is necessary since not all of them are conducive to or even allow students to walk to them. Other schools require students to walk if their residence is within a specific distance from a particular school. These requirements vary depending on school location or district as well as the grade level for students. Priority should be given to the areas surrounding schools that do require walking and that may have large numbers of students that do so. Priority may also be given to schools open to changing their “no walking” policies as new infrastructure allows safe accommodations for walking trips. The types of problems associated with these areas may also affect the prioritization process.

Safety programs throughout the country have been created to target safety concerns and needs with regards to schools and the safety of their students. Efforts are being made to identify these safety needs in Allen County as well. Specific safety needs have already been identified through discussions with area schools and school districts (see map in **Appendix G** under the “Pedestrian Needs Identified by Schools and School Districts”



section). The City of Fort Wayne's Walk Fort Wayne team and the Fort Wayne Greenways Manager met with schools and school districts during the summer and fall of 2009 to gather input on what kinds of safety improvements or pedestrian facilities are needed for their areas. These needs are also identified in the Walk Fort Wayne Plan under the "Safe Routes to School" section. The map on the previous page shows the progress that has already been accomplished through the Safe Routes to School program administered by INDOT and local efforts as well. This map will be updated as more projects progress or have been completed. The table below lists the projects shown on the map.

Projects Providing Safe Routes to Schools

School District	Project/Need	Status	Schools Effected
FWCS	New Sidewalk	Complete	Lincoln Elementary/Shawnee Middle School
FWCS	New Sidewalk	Complete	Lindley Elementary/Portage Middle School
FWCS/FW Lutheran/Private	New Sidewalk	In Progress	Blackhawk Middle School/St. Peter School/Blackhawk Christian School

References

Zegeer, Charles V., Laura Sandt, Margaret Scully, Michael Ronkin, Mike Cynecki, and Peter Lagerwey, *How to Develop a Pedestrian Safety Action Plan*, Federal Highway Administration and National Highway Traffic Safety Administration, May 2008. Available online at <http://www.walkinginfo.org>.

Harkey, David L., and C.V. Zegeer, *PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System*, Federal Highway Administration, Washington D.C., September 2004. Available online at <http://www.walkinginfo.org>.

Northeastern Indiana Regional Coordinating Council, *Comprehensive Bicycle-Pedestrian Transportation Plan*, July 2009. Available online at <http://nircc.com>.

Northeastern Indiana Regional Coordinating Council, *2030-II Transportation Plan*, April 2009. Available online at <http://nircc.com>.

New Haven, City of, *Comprehensive Trails and Pedestrian Walkways Master Plan*, October 2002.

Fort Wayne, City of, *Draft Walk Fort Wayne Plan*, Planning and Policy Department, Division of Community Development, draft version January 2010.

Pedestrian and Bicycle Information Center (PBIC), *Slowing Down Traffic*, SRTS Guide. Available online at <http://www.saferoutesinfo.org>.