

# Feet First: Creating A More Walkable Charlotte

NCSITE Lunch and Learn  
September 14, 2006

*Everywhere you go, your trip begins and ends*



# Are you doing all you can do in your project planning and design to enhance pedestrian mobility?



*Our state continues to become more urban and streets have to be built for all users.*

# Pedestrians deserve the same attention and consideration as motorists when designing our streets.



## Presentation Overview

- **Charlotte Growth Strategy: Centers and Corridors**
- **Transportation Action Plan**
- **Pedestrian Program**
- **Pedestrian Related Guidelines, Programs and Facility Treatments**



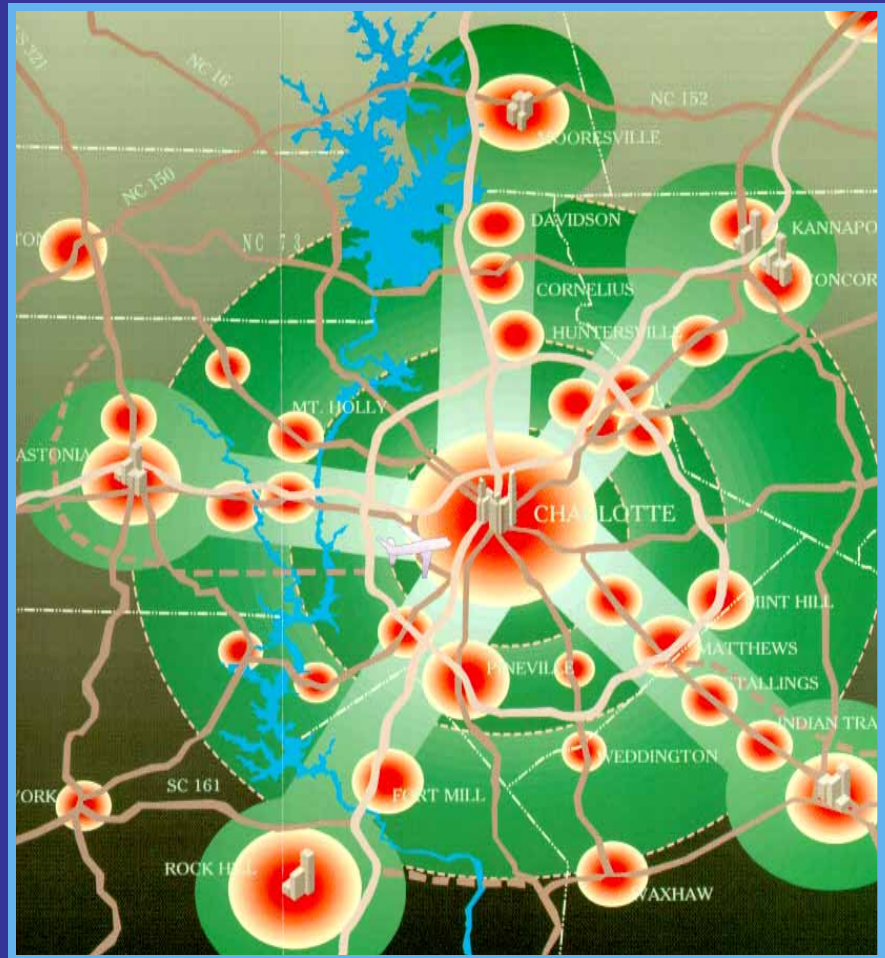
# Centers and Corridors

Adopted by Council in 1994

Long term growth management strategy

Five primary transportation and development corridors

Transforms unfocused development to compact mixed use development along corridors and in station areas



# Charlotte Initiatives

## **Charlotte's Future Vision**

*To be an urban community of choice for living, working and leisure.*



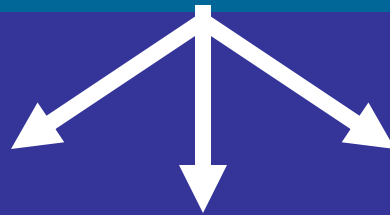
## **Centers and Corridors Growth Framework**

*Enhance livability while accommodating 350,000 new residents in Charlotte*



## **Transportation Action Plan**

*Comprehensive strategies to make Charlotte one of the premier cities in the nation for integrating land use and transportation choices*



**Connectivity  
Program**

**Roadway  
Projects**

**Sidewalk  
Program**

**Signal & Intersection  
Enhancements**

**Urban Street  
Design Guidelines**

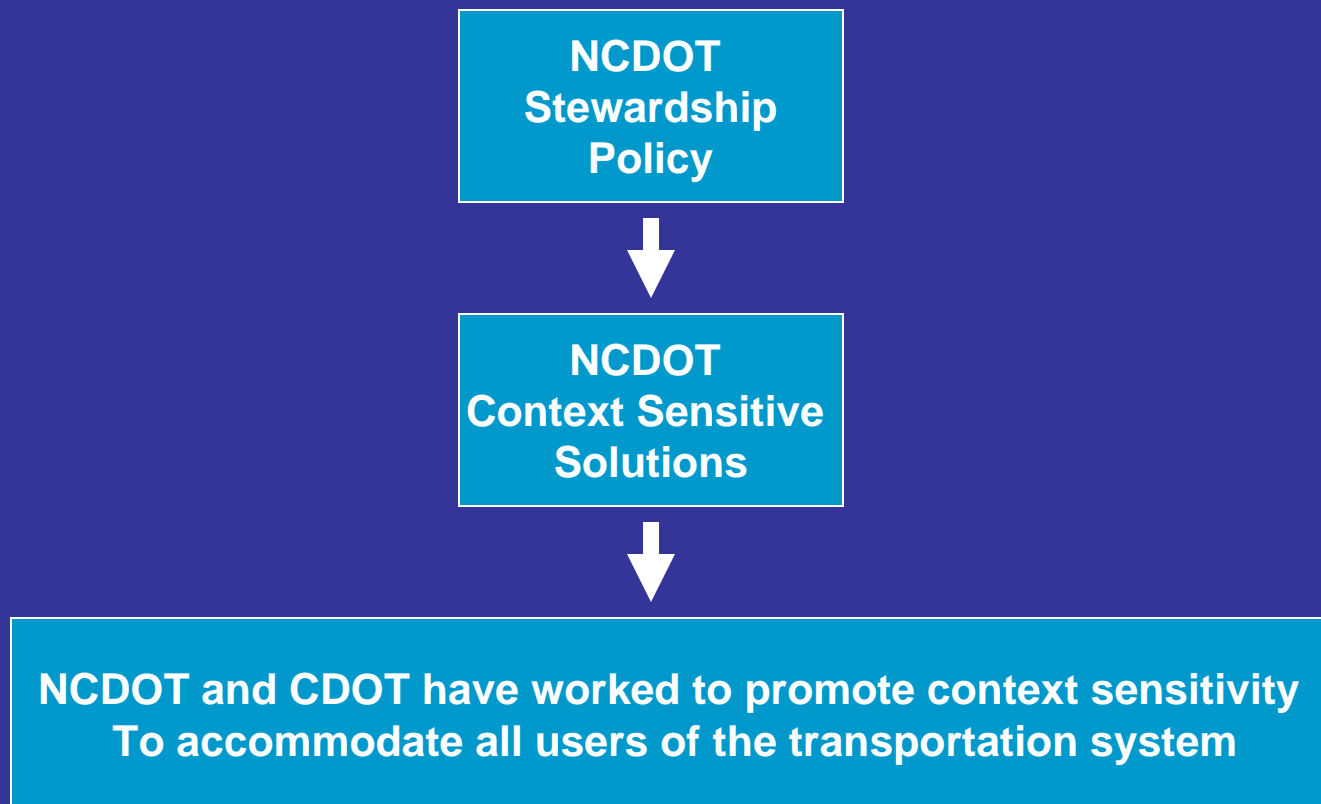
# Transportation Action Plan (TAP)

- First comprehensive city transportation plan.
- Describes the policies, objectives and implementation strategies to achieve the transportation goals.
- \$3.57 billion in capacity and maintenance (locally funded).
- Includes interagency cooperation and partnerships.



# Transportation Action Plan (TAP)

Policy 2.1.5 of TAP: The City will work with NCDOT to promote context sensitive streets that include transit, bicycle and pedestrian friendly design features as part of new or widened NCDOT street construction projects.



## Signature Intersection for Transit: South Blvd/Woodlawn

### Existing Conditions

- Sidewalks at back of curb
- Utility poles in sidewalk
- Lack of refuge medians
- Pedestrian LOS F



Critical connection between light rail station and residential areas.

## Signature Intersection for Transit: South Blvd/Woodlawn

- Wide sidewalks and planting strips
- Pedestrian refuge medians on all approaches
- Enhanced crosswalks (texture and color)
- Countdown pedestrian signals
- Bike lanes along Woodlawn Rd



*Construction cost estimate is \$4.5 Million  
(Split approx. 75% city and 25% NCDOT).*

# Pedestrian Program

## GOAL:

To promote a safe, comfortable, efficient and connected pedestrian system.



# Pedestrian Program

## PROGRAM COMPONENTS:

- **Sidewalk Program**
  - Sidewalk Installation Retrofits
  - Work with new development
  - Work with NCDOT
  
- **Sidewalk Maintenance**
  - Concrete Repair
  - Overgrown Vegetation
  
- **Signal Installation**
  - Accessible Pedestrian Signals
  - Countdown Pedestrian Signals



# Pedestrian Program

## PROGRAM COMPONENTS:

### ▪ ADA Issues

- Accessible ramp retrofits
- Surface, slope and accessible route issues
- Obstructions on sidewalks



### ▪ Street Crossing Evaluation and Treatment Installation

- Signalized locations and mid block
- Traffic calming measures
- Pedestrian LOS



### ▪ Pedestrian Awareness Issues

- Internet Information/Safety Campaigns

# Sidewalk Construction in Charlotte

- Capital Improvement Program (Sidewalk Program)
  - 1800 miles remain to be completed
- Roadway Projects (Local and State)
- Land Development (Subdivisions/Site Plans)
- Neighborhood Improvement Program
- Property Owner Assessment



# Pedestrian Related Guidelines and Programs

- Urban Street Design Guidelines
- Mid-Block Crossing Guidelines
- Pedestrian and Bicyclist Level of Service  
Methodology for Crossings at Signalized Intersections
- Connectivity Program
- Pedestrian Safety Program
- Pedestrian Awareness Campaigns



## Urban Street Design Guidelines

- Shorter blocks for more direct routes
- Wider sidewalks
- Wider Planting strips
- Street Trees
- Designing and retrofitting intersections to better accommodate pedestrians and cyclists
- Enhancing connectivity for all modes



## Mid-Block Crossing Guidelines

- Guidelines provide toolbox of treatments for pedestrian crossings.



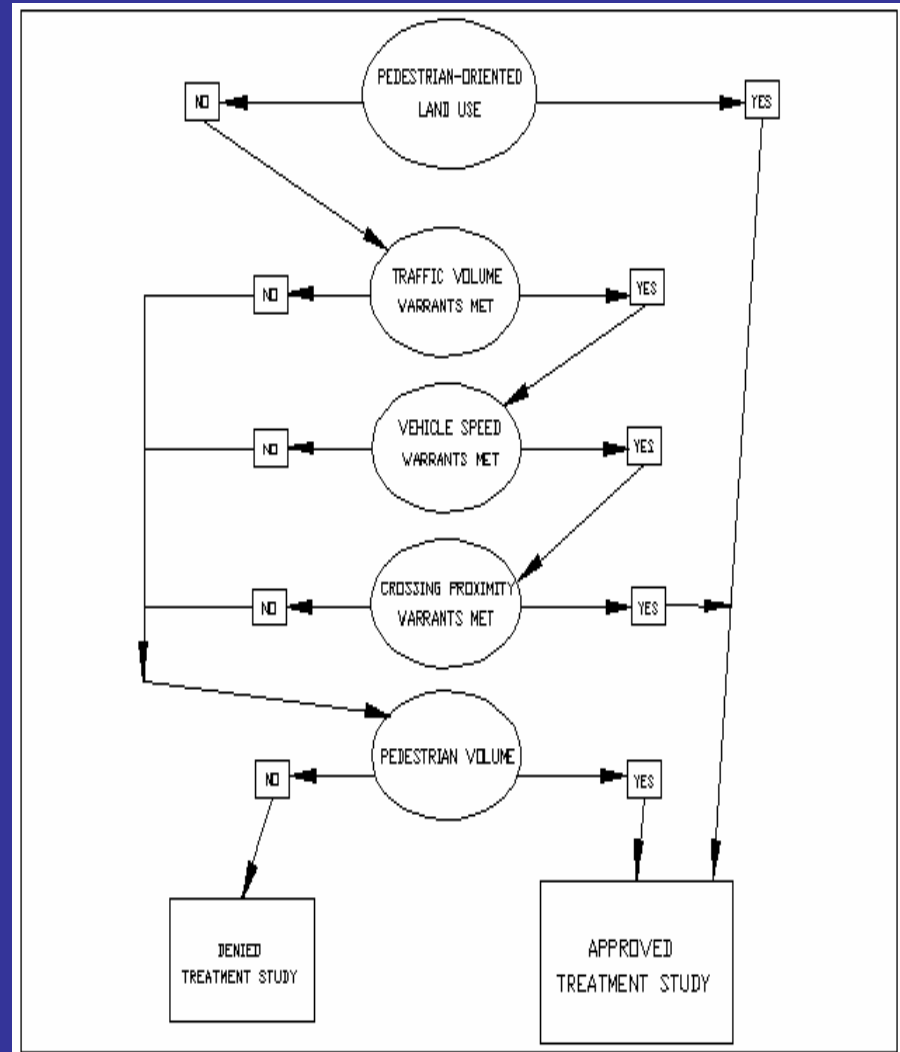
# Mid-Block Crossing Guidelines

## Basic Criteria

#1 Pedestrian-oriented land use

#2 Traffic Volumes  
Vehicle Speed  
Proximity to signals

#3 Pedestrian Volume



# Connectivity Program

Ability to connect origins and destinations through a series of non-motorized routes.



- Sidewalk Network
- Multi Use Paths
- Bike Lanes
- Connect Stub Streets

# Pedestrian and Traffic Safety Program

## Goals:

1. Identify and analyze collision data for the City of Charlotte
2. Develop and implement safety improvements for all transportation modes.
3. Conduct safety awareness campaigns to reduce collisions across all modes.
4. Implement and test new technologies to improve transportation safety



# Pedestrian Safety – Improvement Projects



University City Blvd and Suther Road crosswalk enhancement project.

# Safety – Testing



# Safety – Awareness Campaigns

**LAST YEAR 300 CHARLOTTEANS  
HIT THE ROAD.**



**WATCH OUT!  
FOR THAT CAR**  
Traffic Safety Advisory Committee



**IT'S NOT NICE  
TO HIT  
CHILDREN.**

It's back to school time. Time for drivers to be especially alert. There are thousands of kids waiting by the curbs of bus stops, or walking and crossing streets. So please, watch out for them, not just in school zones, but everywhere. Because the last thing you ever want to do is hit a kid.

**WATCH OUT!  
FOR THAT KID**  
Traffic Safety Advisory Committee



**JUST CROSSING  
THE STREET CAN  
LEAVE YOU  
FEELING RUN  
DOWN.**

Cars colliding with pedestrians is a major problem in Charlotte. So if you don't take the time to stop, look and listen before you cross the street, you could find yourself posing as a hood ornament. Please, do yourself a favor and watch out for that car.

**WATCH OUT!  
FOR THAT CAR**  
Traffic Safety Advisory Committee



**IT WON'T KILL  
YOU TO LOOK  
BEFORE YOU  
CROSS THE  
STREET.**

Most car collisions with pedestrians aren't the fault of the driver. So take the time to stop, look and listen before you cross the street. It'll cost you a few seconds, but not doing it could cost you your life.

**WATCH OUT!  
FOR THAT CAR**  
Traffic Safety Advisory Committee



# Safety - Awareness Campaigns

Keep your eyes  
open for visually  
impaired  
pedestrians.

**SPEED A LITTLE  
LOSE A LOT**  
Traffic Safety Advisory Committee



Metrolina Association For The Blind



Think of this  
as a stop sign.

**SPEED A LITTLE  
LOSE A LOT**  
Traffic Safety Advisory Committee



Metrolina Association For The Blind



# Pedestrian Facility Treatments

- Accessible Pedestrian Signals
- Countdown Pedestrian Signals
- In Pavement Lighting
- HAWK Signal Potential



# Accessible Pedestrian Signals

## Features

- Speech WALK indication
- Vibro-tactile WALK indication
- Raised tactile arrow
- Pushbutton locator tone
- Actuation indicator
- Pushbutton information message



Over 100 devices installed

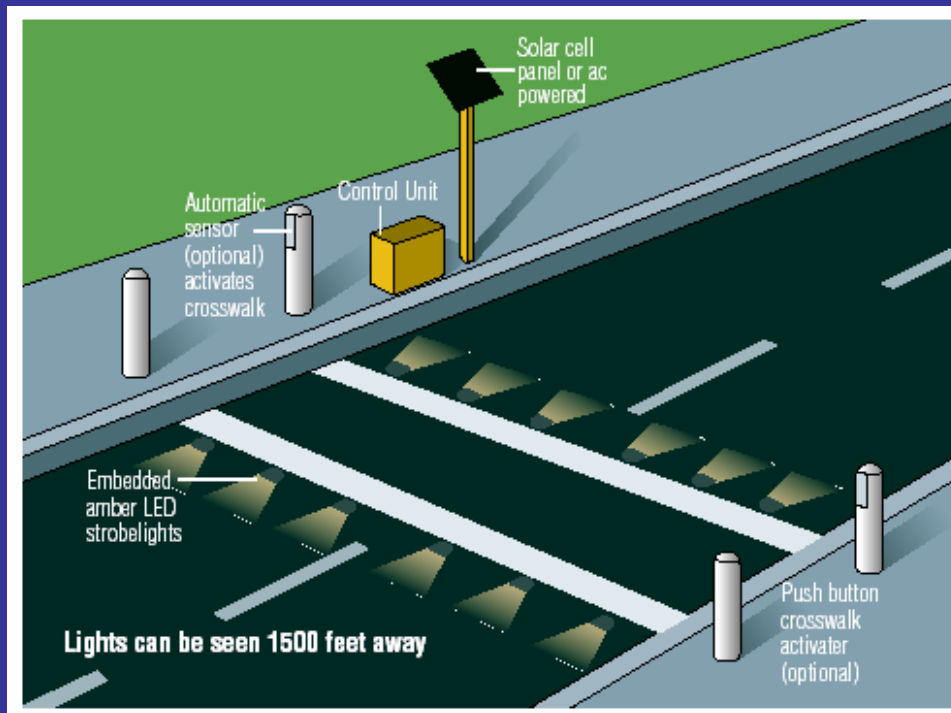
# Countdown Pedestrian Signals

- Retrofitting Central Business District.
- Installing as funding allows at major intersections citywide.
- Installing at major intersections along light rail corridor through rail project funds.
- Working with NCDOT to install at NCDOT/City intersections.



## In-Pavement Lighting

- Raises level of driver awareness of pedestrians crossing street during day and night
- Designed for locations where a traffic signal is not needed (ie: mid block crossings with high pedestrian traffic)



Basic Cost:  
\$15,000 equipment  
\$30,000 installation

## In-Pavement Lighting

- One of the first systems installed in North Carolina
- Decision to test based on work with Mid-Block Guidelines
- Criteria based on:
  - Pedestrian Volume
  - High Peak Traffic  
(4000 AM and 4000 PM)
  - Pedestrian Crashes



# HAWK Signal

CDOT is reviewing potential locations to test the HAWK signal



HAWK Signal in City of Tucson, AZ

# CDOT Pedestrian & Bicycle LOS Methodology



## Background

- South Corridor light rail station area plans
- Assess infrastructure's ability to support increased travel
- Intensified land uses means more travel in station areas
- Objective to manage LOS for motorists and maintain or improve LOS for pedestrians and bicyclists
- Problem - how can pedestrian & bicycle LOS be measured?

# Background

- Highway Capacity Manual - LOS measure based on delay
- Technique must recognize the tradeoffs between capacity increases for motorists and impacts on pedestrians & bicyclists
- Comfort and Safety should be the measure of LOS
- Other sources:
  - **FHWA Pedestrian Facilities Users Guide**
  - **ITE Traffic Control Devices Handbook**
  - **FDOT Point LOS Report**
  - **Portland Pedestrian Design Guide**

## What is the Methodology?

- Diagnostic tool designed to help balance competing needs of pedestrians, bicyclists and motorists
  - Results compared with traffic LOS and weighed according to user priorities
- Assessment of key design features effecting pedestrian and bicyclist **comfort and safety** crossing signalized intersections
- Measure of the degree that key features enhance or reduce **comfort and safety**

## How is it being used?

- Criteria in selection of capital improvement projects
- Transportation Impact Studies
- Transportation Action Plan
- Charlotte's Street Design Guidelines

# Street Design Guidelines

## (Pedestrian LOS Objectives)

<u>Local</u>				
Local: <b>A</b>	Main: <b>A</b>	Avenue: <b>B</b>	Boulevard: <b>B</b>	Parkway: <b>D</b>
<u>MAIN</u>				
Local: <b>A</b>	Main: <b>A</b>	Avenue: <b>B</b>	Boulevard: <b>B</b>	
<u>Avenue</u>				
Local: <b>B</b>	Main: <b>B</b>	Avenue: <b>B</b>	Boulevard: <b>B</b>	Parkway: <b>D</b>
<u>Boulevard</u>				
Local: <b>B</b>	Main: <b>B</b>	Avenue: <b>B</b>	Boulevard: <b>C</b>	Parkway: <b>D</b>
<u>Parkway</u>				
Local: <b>D</b>	Avenue: <b>D</b>	Boulevard: <b>D</b>	Boulevard: <b>D</b>	Parkway: <b>D</b>

## The Methodology

- Applies only to the crossings of signalized intersections
- LOS determined for individual intersection approaches
- LOS determined for the overall intersection
- Excel spreadsheet

# Pedestrian LOS

Comfort & Safety most influenced by:  
*Crossing Distance & Conflicts with Turning Vehicles*

Key Intersection Features (in order of importance)

1. Crossing distance
2. Signal features (phasing)
3. Corner radius
4. Right Turns on Red
5. Crosswalk treatment

# Pedestrian LOS Key Features

## 1. Crossing Distance

*Rating based on:*

- Number travel lanes to cross
- Refuge islands

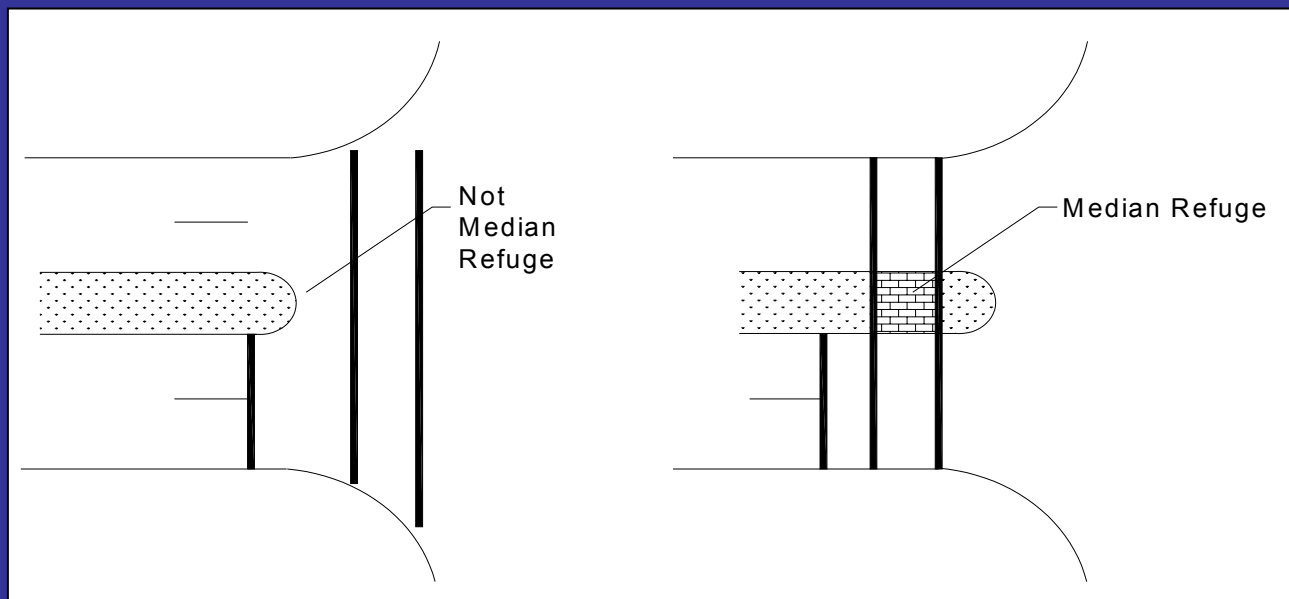
*LOS enhanced by:*

- *Fewer travel lanes*
- *Refuge islands*

# 1. Crossing Distance

# lanes crossed	(Points)		
	<u>No Median</u> (<4')	<u>Median</u> (<6')	<u>Median</u> (6'+)
2 lanes	60	60	60
3 lanes	55	55	55
4 lanes	45	45	48
5 lanes	34	36	40
6 lanes	23	26	32
7 lanes	12	15	24
8 lanes	0	6	16
9 lanes	-12	-4	8
10 lanes	-24	-15	0

# Median Refuge ?



# Pedestrian LOS Key Features

## 2. Signal Phasing

*Rating based on:*

- How well conflicts are managed
- Level of information provided to pedestrians

*LOS enhanced by:*

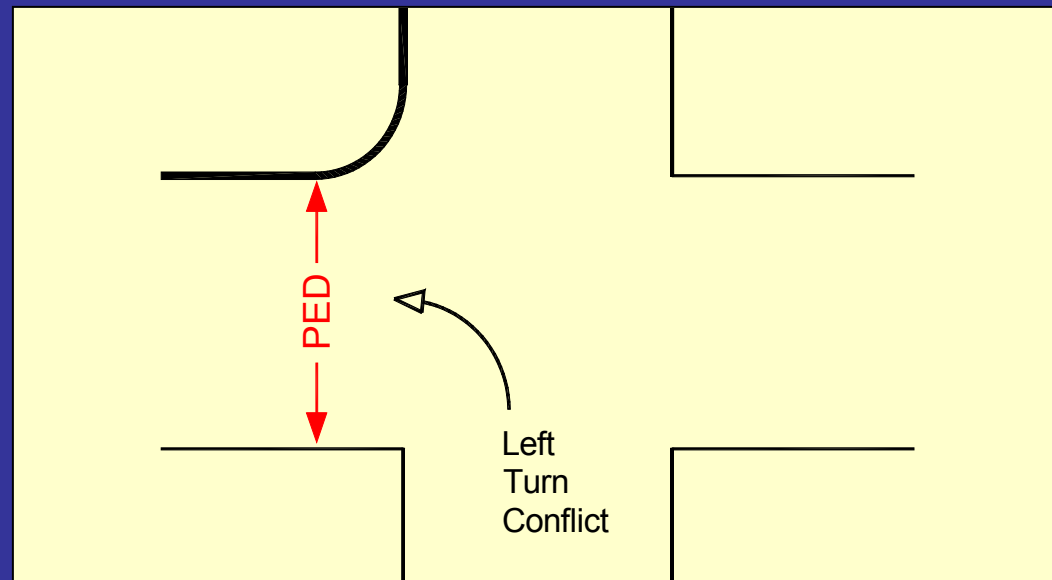
*- Phases that minimize turning conflicts*

# Pedestrian LOS Key Features

## 2. Signal Phasing

### A. Left turns into pedestrian path

- Unprotected
- Protected
- Combination
- Pedestrian Signals

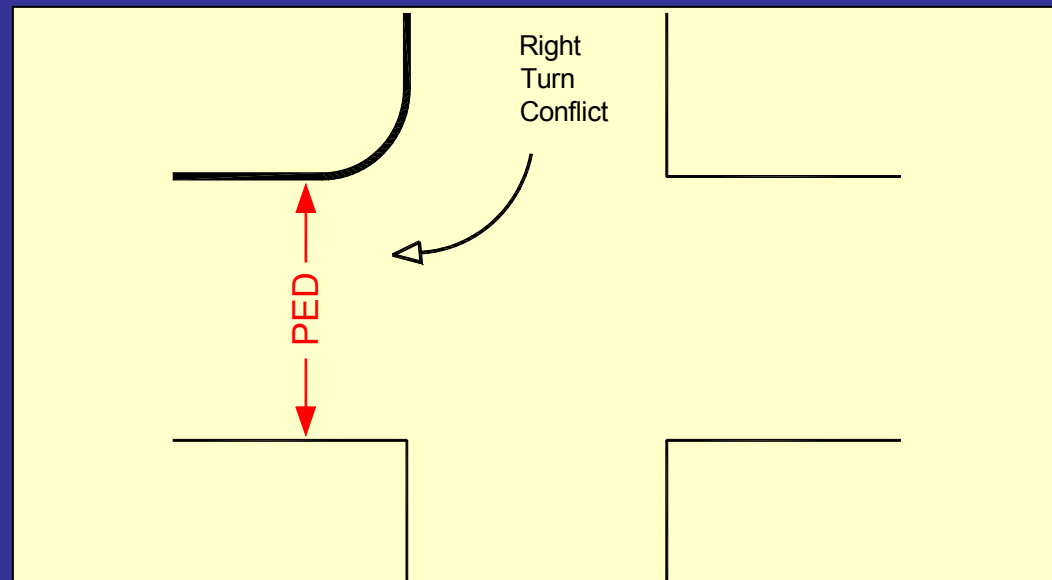


# Pedestrian LOS Key Features

## 2. Signal Phasing

### B. Right turns into pedestrian path

- Unprotected
- Protected
- Combination
- Pedestrian Signals



# Pedestrian LOS Key Features

## 2. Signal Phasing

### **C. Pedestrian Phase**

- Raised Hand/Walking Person Display
- Countdown Display
- LEADING Pedestrian Interval
- Walking speed

# Pedestrian LOS Key Features

## 3. Corner Radii

*Rating based on:*

- Effect on turning speeds
- Increased walking distance

*LOS enhanced by:*

- *Smaller radii*

# Pedestrian LOS Key Features

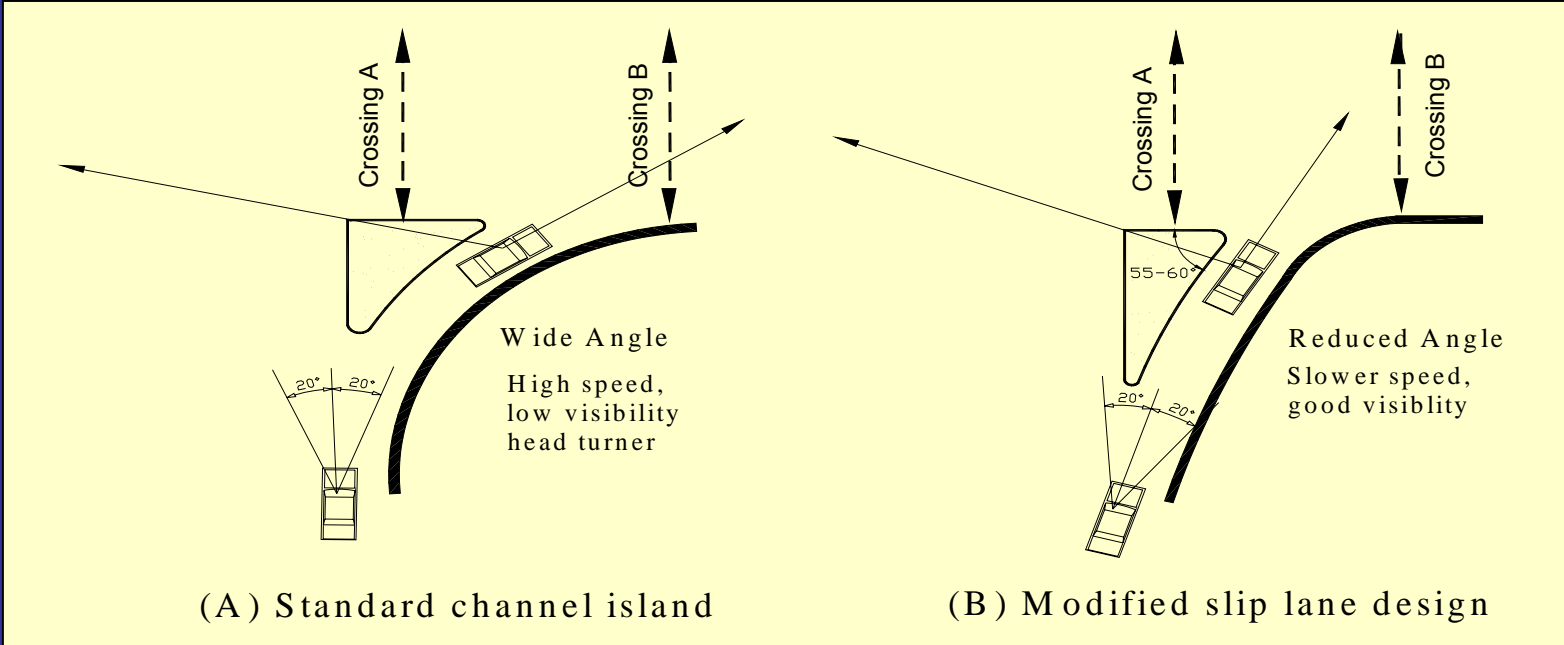
## 3. Corner Radii

### Standard Radius

- |   |                                                       |     |
|---|-------------------------------------------------------|-----|
| ■ | $\leq 20'$                                            | 10  |
| ■ | $> 20'$ and $\leq 30'$                                | 5   |
| ■ | $> 30'$ and $\leq 40'$                                | 0   |
| ■ | $> 40'$ and $\leq 60'$ (or equivalent compound curve) | -5  |
| ■ | $> 60'$ (or equivalent compound curve)                | -10 |

# Pedestrian LOS Key Features

## Channel Island (in place of standard radius)



# Pedestrian LOS Key Features

## 3. Corner Radii

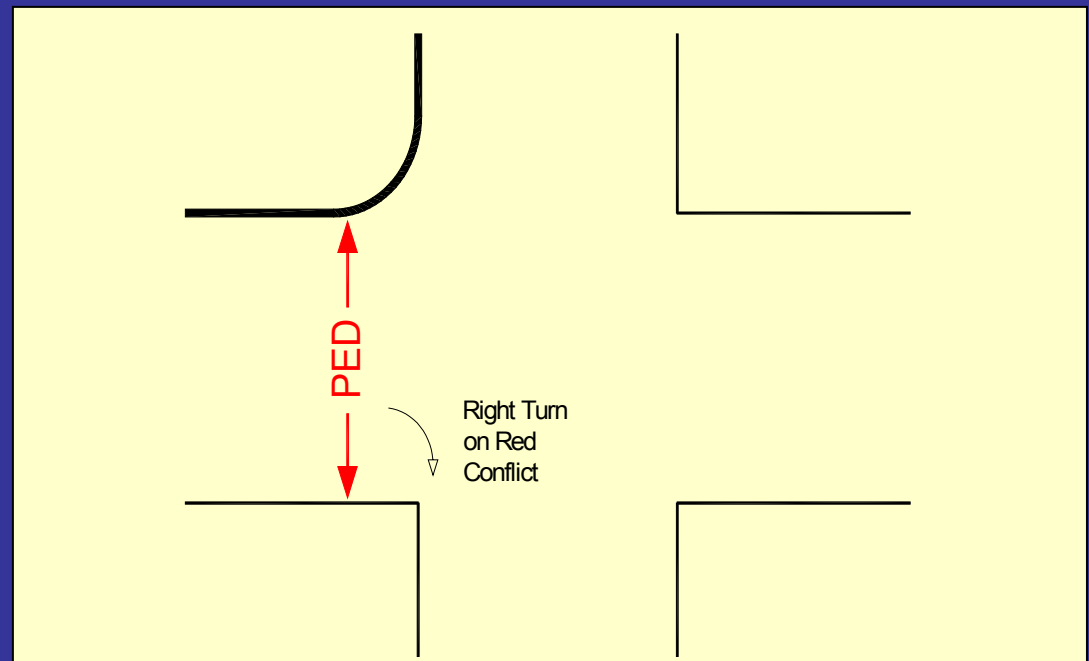
### Channel Island

- Curbed Island Design (type A or **type B**)
- Traffic Control
  - Free flow
  - Yield/Green Ball
  - **Protected (Green Arrow only)**

# Pedestrian LOS Key Features

## 4. Right Turns on Red

- Allowed
- Prohibited

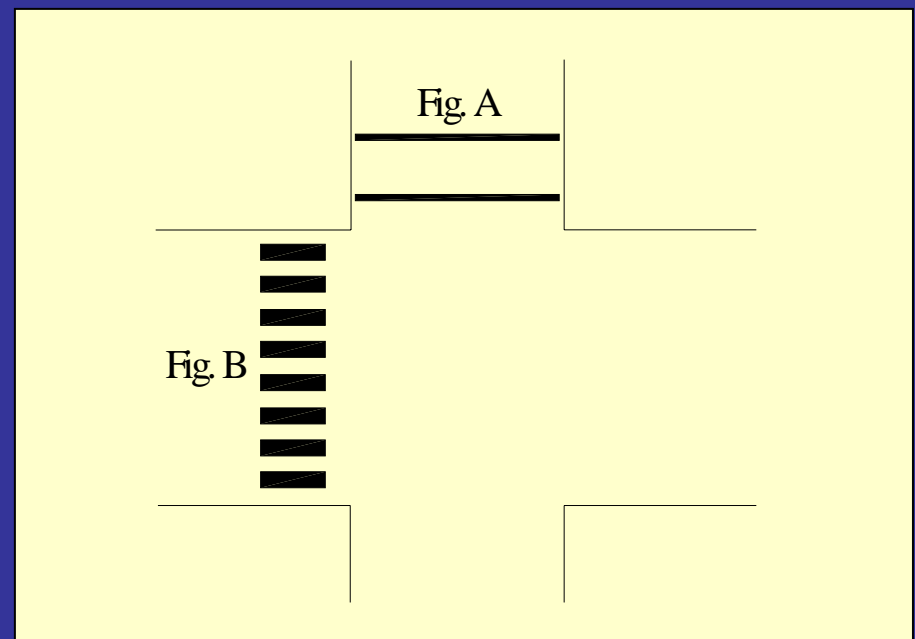


# Pedestrian LOS Key Features

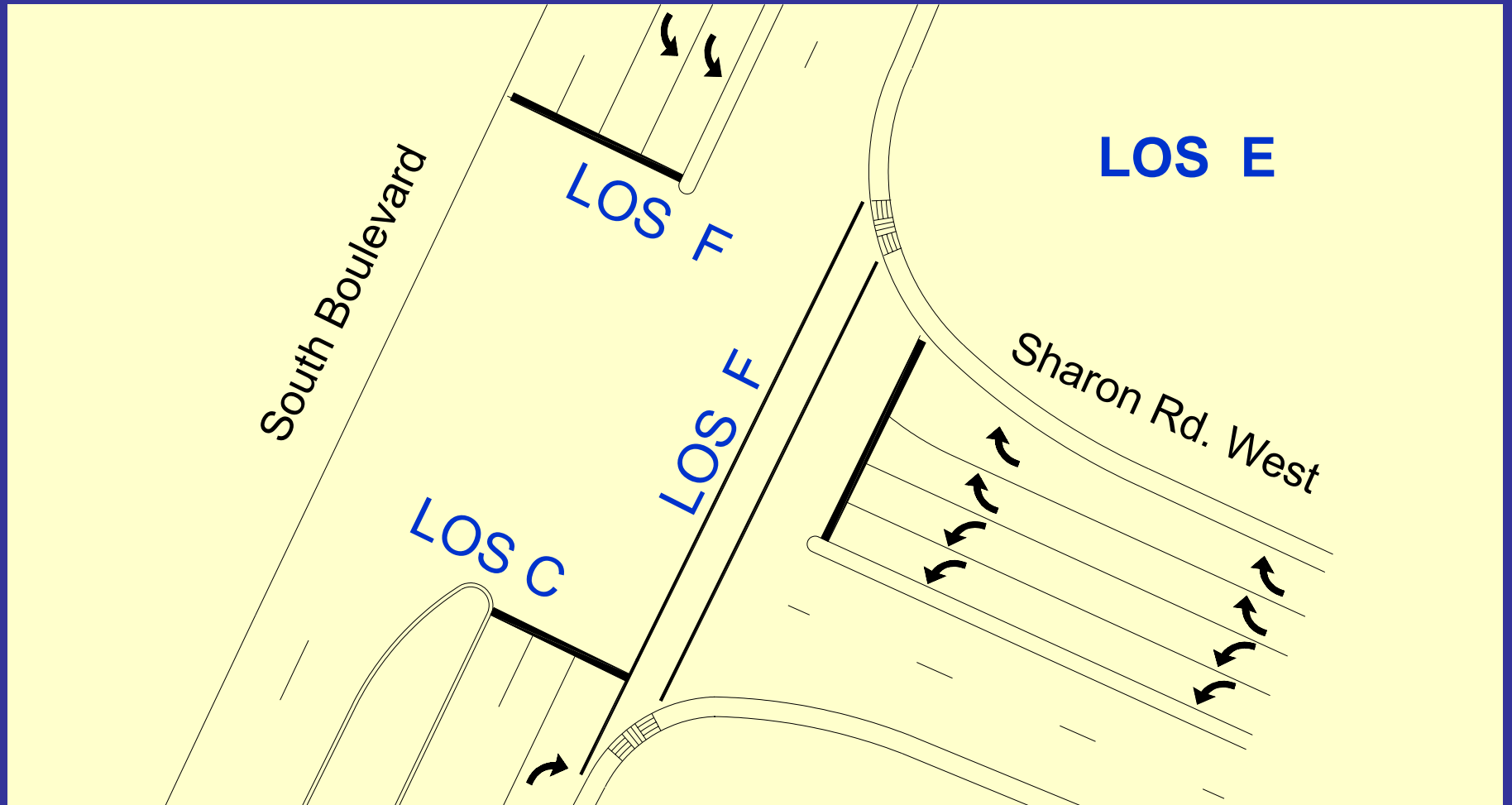
## 5. Crosswalk Treatment

*Rating based on:*  
Visibility to pedestrians & motorists

- Transverse markings
- Ladder markings
- Textured/Colored



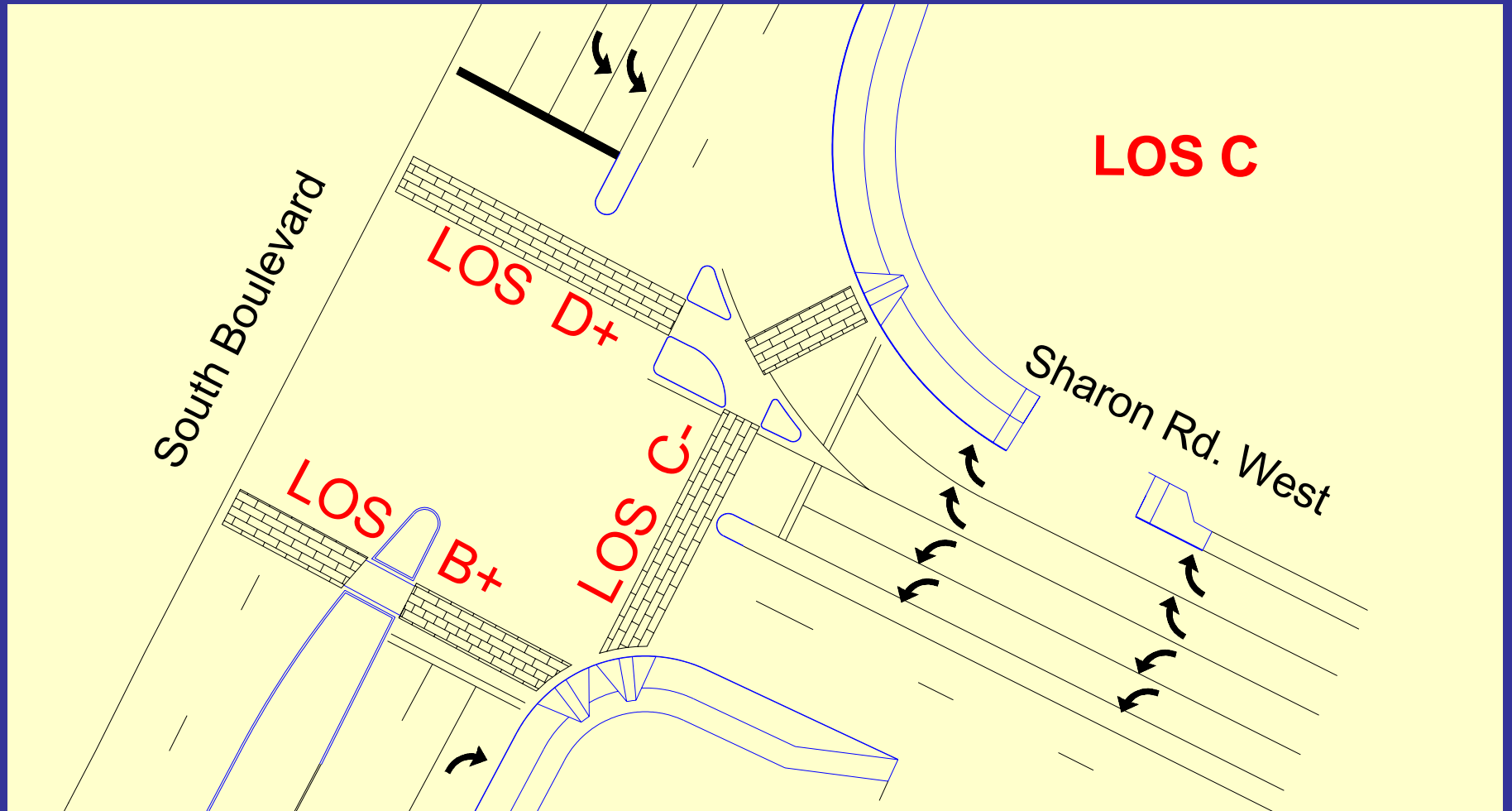
# Example Intersection: BEFORE



## Intersection Changes

- Corner pedestrian refuge island
- Pedestrian signals added (countdown)
- Crosswalks added (enhanced)
- Corner radius reduced

# Example Intersection: AFTER



## Pedestrian LOS Summary

Enhanced by:

1. Shorter crossing distances, refuge islands
2. Signal phasing that reduces conflicts with turning vehicles
3. Pedestrian signals (countdown, leading intervals)
4. Smaller corner radii
5. Prohibiting right turns on red movement
6. Crosswalk treatment

# Bicycle LOS

Comfort & Safety most influenced by: *Separation from Autos and Conflicts with Turning Vehicles*

Key Intersection Features Rated:

1. Where bikes travel within the street
2. Signal features (phasing & timing)
3. Speed of adjacent traffic
4. Right turn vehicle conflicts
5. Crossing distance
6. Right Turns on Red

# Bicycle LOS

Enhanced by:

1. Bike lanes or wide outside lanes
2. Signal phasing that reduces conflicts with motor vehicles
3. Slower speed limit
4. Bicycle/motor vehicle placement within street that reduces right turning conflicts
5. Shorter intersection crossing distance
6. Prohibiting right turns on red movement

# Questions?

