Community Choices Tool

'Before'

Context Sensitive Street Design

'After'

ARC
Atlanta Regional Commission

Prepared by:
Urban Design Collaborative
December 2001

About Atlanta Regional Commission (ARC)
ARC is the regional planning and intergovernmental coordination agency for the 10-county area including Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry and Rockdale counties, as well as the City of Atlanta. For more than 50 years, ARC and its predecessor agencies have helped to focus the region's leadership, attention and resources on key issues of regional consequence.

ARC is dedicated to unifying the region's collective resources to prepare the metropolitan area for a prosperous future. It does so through professional planning initiatives, the provision of objective information and the involvement of the community in collaborative partnerships that:

- encourage healthy economic growth compatible with the environment,
- improve the region's quality of life, and
- foster leadership development.

Each year, ARC adopts a diverse program of work and a budget for the next calendar year. This includes the functional planning for areas of aging, community services, economic development, environmental planning, governmental services, job training, land use and public facilities, transportation planning and data gathering and analysis. With input from regional citizens, the Commission's 39-member Board sets regional policies intended to prepare the region for long-range sustainability, prosperity and quality of life.

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1. INTRODUCTION

1.1 What is Context Sensitive Street Design?

Context Sensitive Street Design (CSSD) is an approach to roadway planning, design and street operation, to meet regional transportation goals while enhancing neighborhoods and considering the adjacent uses of land. CSSD respects traditional street design objectives for safety, efficiency, capacity, and maintenance, while integrating community objectives and values relating to compatibility, livability, sense of place, urban design, cost and environmental impacts.

City of Atlanta, GA

- Community Values expressed in CSSD.
- CSSD complements urban design.
- CSSD blends with natural environment.

Context Sensitive Street Design is a term coined in the U.S. to promote and advocate a street design philosophy and practice prevalent in several European countries, Canada, and Australia. A Federal Highway Administration (FHWA) sponsored study panel summarized the European design philosophy as follows:

> *"…to develop a roadway that is designed for a specific purpose, implements an aesthetic approach to visually explain this concept, and addresses safety in a way that considers all users".*

The panel noted that the above philosophy permeates the European project development process, safety improvements, geometric design guidelines, public involvement, and environmental requirements- without compromising safety goals.

To accomplish the safety goals, the Europeans consider a range of innovative concepts, including roads that self-enforce speed limits, and promote alternative modes of transportation. This approach contrasts with the prevailing US philosophy and practice, in which wider roads are deemed safer, there is a heavier reliance on signs and road markings to communicate the intended message, and there is a lower tolerance of speed reduction, particularly in business districts and in community and retail centers.

The findings of the FHWA panel and other transportation experts echo the changing demands on, and expectations of streets of all types in the Atlanta Region, and in other urban areas across North America.

> *"People are searching for alternatives to driving in rush-hour traffic and increasingly they are choosing bikes, buses, trains, subways and other options".*
> *Roy Kienitz, Executive Director, Surface Transportation Policy Project*

With the exception of freeways and some major arterial roads, most roads are no longer considered as primarily traffic carrying facilities moving vehicles and goods as efficiently and safely as possible. Greater consideration is given to the requirements of all travel modes on local, collector and arterial streets. Furthermore, Context Sensitive Street Design considers not only access for alternative modes of transportation, such as bicycling, walking and transit, but also the environmental, scenic, aesthetic, historic, community, and preservation impacts of a street project.

Context Sensitive Street Design principles and concepts are applicable to the planning and design of new roads, road widening, and road rehabilitation projects.

1.2 How Can Context Sensitive Streets Help Create a More Livable Community?

Many communities in the Atlanta Region and across the U.S. realize that designing neighborhoods, sub-divisions, business districts and shopping centers around the automobile has diminished, not enhanced the quality of life. Some of the basic transportation elements that must be restored to improve community livability include:

- A connected network of sidewalks and bike routes,
- Safe, dependable and accessible travel options for community members who cannot afford a car or can't drive,
- Affordable transit that gets people to job centers, retail centers, and recreation facilities,
- Traffic management in neighborhoods, "main" streets, shopping centers and downtowns, that is compatible with bicycling and walking.

While the car offers us a high level of accessibility, people's ability to move and to reach destinations is often constrained by traffic congestion. An important factor in our decision to use other modes of transportation is based on how long one could be stuck in traffic on the highways and freeways. Walking and bicycling, on the other hand, offer many people cost-effective personal mobility, yet there are very few places that are easily accessible to non-motorized modes of travel. Many children can ride bikes in their neighborhoods, but visiting friends 1-2 miles away or riding to school is difficult or not safe, particularly if the trip involves crossing an arterial.

Most people opt not to walk or bike because the route to the store or park is indirect, does not have sidewalks and there are too many fast cars competing for the road space. Taking the bus can be equally frustrating. The bus stop is frequently too far from work or home, or the bus service is infrequent or slow, and few amenities are available. (Compare these travel conditions to the expectations, comfort features, and amenity options available for motorists: identified and paved path / travel lane, way-finding signs, carpeting, entertainment, music and news, climate control, many places to stop to refuel, and a even place to rest your beverage!)

These are only a few of the varying and valid transportation needs and objectives of a community that are typically considered in Context Sensitive Street Design (CSSD). Additionally, CSSD designers and planners must also take into account the role of the entire right-of-way as public space, and the role of the street in shaping the character, function and livability of adjacent land uses and neighborhoods.

What locations in the Atlanta Region are most suited for Context Sensitive Street Design?

In the Atlanta Region, both, local jurisdictions and regional transportation agencies, including the Georgia Department of Transportation have authority to implement Context Sensitive Street Design (CSSD) projects. CSSD Project locations should be selected to address transportation and livability concerns.

The Atlanta Regional Commission (ARC) Board adopted Regional Development Plan (RDP) policies in May 1999 that include a focus on managing growth in specific areas of the Atlanta region. These RDP policy areas include:

RDP Policy Areas:

- Town centers (historic centers of municipalities),
- Activity centers (major concentrations of office employment, shopping and residential),
- MARTA station areas (Transit Oriented Development / TOD),
- Major bus corridors.

Other Areas:

- local centers of community use and activity, including schools and parks, and shopping centers
- neighborhood serving commercial centers and/ or corridors-"main streets"
- neighborhood collector streets and local arterial streets that are also bus routes
- historic neighborhoods and / or commercial districts
- watershed of the Chattachoochee River and tributaries

The above RDP policy areas are places where the region is encouraging greater intensity of land uses and alternative, multi-modal transportation. Applying Context Sensitive Street Design in locations of regional significance would complement land use and development goals. Many of these RDP policy areas also overlap as areas for the Livable Centers Initiative (LCI) community planning and development program.

1.3 What Are Key Concepts that Guide Context Sensitive Street Design Projects?

A fundamental concern for Context Sensitive Street Design projects is balancing the space requirements among various users that must be accommodated in the urban/suburban, public right-of-way:

- Emphasize mobility of pedestrians, cyclists and vehicles (automobiles, trucks, buses).
- Assure that public transportation facilities accommodate needs of transit users, including: those who choose not to drive, cannot drive, cannot afford a car, and citizens with disabilities.
- Effective participation of citizens and transit users in transportation decision making.
- Land use / development patterns that encourage walking, biking, transit, in addition to driving.

1.3.1 Comprehensive Project Planning and Conceptual Design Process

In urban areas, greater emphasis must be given during the project planning and conceptual design process, to integrate the street project in the community, by addressing the public's concerns, particularly about traffic speed management and aesthetics.

This could mean:
- longer project sections to address corridor planning,
- consideration of speed transition zones,
- alternative conceptual design solutions and traffic management measures, and
- a longer project timeline.

Public involvement must be an integral part of the project planning and conceptual design process.

1.3.2 Build Partnerships Around Transportation: *Talk To Everyone / Create and Commit to a Vision*

Successful Context Sensitive Street Design Projects need community stakeholders, local agencies and state agencies to work together, collaborate in planning and decision making, and share the responsibility for construction and maintenance. If enough coordination and open discussion doesn't occur, particularly at the early stages of project

Northlake Livable Centers Workshop, Dekalb County, GA

conception, the result can be discontent all around. There are many private interests and government agencies that are involved in a new street or a street re-construction project, including:

- US Postal Service (if mail delivery is affected)
- State Historic Preservation Office
- Georgia Department of Transportation
- Georgia Regional Transportation Authority
- County Transit Agencies, including MARTA
- County officials and staff particularly land use, engineering and public works staff (if unincorporated or if county funds or services are used)
- City officials and staff (including police, fire, ambulance, garbage collection, utilities, public works, maintenance, parks, schools, and libraries as appropriate)
- Chambers of Commerce
- Main Street program or Downtown Development Authority
- Community Improvement Districts
- Business and property owners in the transportation corridor
- Atlanta Regional Commission (or other Redevelopment Commissions, Metropolitan Planning Organizations)
- Georgia Trust for Historic Preservation
- Neighborhood and/or Home-Owner Associations
- Community members that use the street
- Federal Highway Administration (FHWA) if Federal funds are used.
- Pedestrian and bike advocacy group, including Pedestrians Educating Drivers about Safety (PEDS) and Atlanta Bicycle Campaign.

For projects that involve federal funds, the need for public involvement is established in the Inter-modal Surface Transportation Efficiency Act (ISTEA), 1990, and the Transportation Efficiency Act (TEA 21),2000.

1.3.3 Make Public Rights-of-Way Accessible to All Users: *Americans with Disabilities Act*

Access to civic life by people with disabilities is a fundamental goal of the Americans with Disabilities Act (ADA 1990). Public rights-of-way are covered by the ADA under title II, sub-part A.

Title II of the ADA requires State and local governments to make their programs and services accessible to persons with disabilities. Both ADA Accessibility Guidelines (ADAAG) and Uniform Federal Accessibility Standard (UFAS) contain technical requirements for the construction of accessible exterior pedestrian routes that may be applied to the construction of public rights-of-way. In absence of a specific federal standard, public entities may also satisfy their obligation by complying with any applicable State or local law that establishes accessibility requirements for public rights-of-way that are equivalent to the level of access that would be achieved by complying with ADAAG or UFAS.

1.3.4 Flexible Application of Established Geometric Design Criteria: *American Association of State Highway and Transportation Officials (AASHTO) Guidelines*

AASHTO has released the 2001 Green Book: "A Policy on Geometric Design of Highway and Streets", which contains nationally accepted guidelines for designing the geometric elements of streets and highways with an new emphasis on bicycles, pedestrians and transit users throughout. Many jurisdictions adopt the AASHTO design elements as standards. Also available from AASHTO is the "Guide for the Development of the Bicycle (1999)" and forthcoming is the "Guide for the Planning, Design and Operation of Pedestrian Facilities".

Context Sensitive Street Design implies a flexible application of the established geometric criteria in designing roadways.

The intent of the Context Sensitive Street Design (CSSD) Tool is to complement, not replace the AASHTO Guidelines.

This CSSD Tool does not challenge or supercede the AASHTO recommendations, but should be used in conjunction as a springboard for the design of safe, multi-modal streets in the Atlanta Region and the State of Georgia.

1.3.5 Design Innovation / Address Local Concerns: Think "Out of the Box"

The use of innovative designs to address local concerns and problems within the context of the community, is essential in applying Context Sensitive Street Design concepts. Differences in community size, population, safety goals, and design philosophy should be taken into consideration to expand the range of applicable street design concepts. Furthermore, historical development patterns, topography, and cultural norms may also contribute to unique design solutions.

An approach to innovation which has application for retrofitting existing roads, is to experiment with reversible changes to the street design and transportation management features, such as by using paint, traffic cones, bollards, and other low cost transportation facilities. The results of the "experiment" would be evaluated prior to implementing final improvements. A special fund could be established for communities to encourage local, innovative solutions to street design and traffic management.

1.3.6 Integrate Land Use and Transportation: Development Pattern is Pedestrian-Friendly and Transit Supportive

The attractiveness and success of pedestrian and transit modes are highly dependent on adjacent land uses, and urban design / development pattern. Pedestrian-friendly environments encourage walking and taking transit, and promote safety, through appropriate siting, design and interactive features of buildings along the transportation corridor.

Each new development project or transportation improvement provides an opportunity to improve the environment for pedestrians.

Context Sensitive Street Design implies that the urban design- the design of the ROADSIDE environ ment, is critical in influencing motorist behavior. The design of the pedestrian areas in public rights-of way, and the design of the fronting development both work together to alert motorist attention to the roadside, and thereby generate awareness of pedestrians, bikes, crossings and parking.

Refer to the Community Choices Tools:
- Transit Oriented Development Tool
- Traditional Neighborhood Development Tool

1.4 What Are Some Expected Outcomes of Context Sensitive Street Design ?

A. Creation of safe places and communities to walk and bike in the Atlanta region.

The Surface Transportation Policy Project (STPP) identified Atlanta as the 2nd most dangerous large metro area for pedestrians. STPP findings are based on amount of walking in an area and the number of pedestrian deaths for period 1997- 1998.

B. More people walking / biking / taking transit to work.

"According to the National Personal Transportation Survey, the number of trips (within large US metro politan regions) taken on foot dropped 42% in the last 20 years."
-Surface Transportation Policy Project

How Atlanta Residents Get to Work:

Took transit:	6.5%
Worked at home	2.2%
Walked:	1.6%
Drove alone/carpooled	89.5%
Bicycled:	.1%

-Surface Transportation Policy Project

C. Less Traffic Noise

Street noise from traffic is a major environmental concern in urban areas. Context Sensitive Street Design can help reduce street noise.

D. Sustainable Community

- Less urban land devoted to streets and off-street parking.
- Protected natural features and resources.
- Shade from street trees lower air temperature and help reduce energy costs.
- Less pavement and landscaping reduces and slows storm water run-off, and reduces soil erosion and flooding.

E. Enhanced Community Image and Local Identity

> *"We shape our communities, and then they shape us"*
> *-Winston Churchill*

Streets are one of the features of the built environment that serve multiple functions in our communities. They provide mechanisms for travel, opportunities for social interaction and physical activity, and serve as organizing elements of our built environment.

Streets that are not intrusive to neighborhoods and fit into the context of the community help create positive feelings about the community, potentially increase visitation and social interaction, expand opportunities for recreation, and assist with surveillance- keep "eyes on the street". Great streets, in addition to fostering community pride and sense of place, are incubators for small local business, promote diverse economic activity, and jump-start community revitalization efforts.

1.5 What is the Purpose of this Community Choices Tool?

The purpose of this Context Sensitive Street Design Tool is to provide communities with appropriate information to support the goals of the ARC Regional Transportation Plan (RTP). The RTP goals seek to promote community livability by balancing all modes of transportation. A related goal is to consider the function and character of surrounding land uses when making transportation decisions on a) collector and arterial streets of regional significance and b) on local, collector and arterial streets within the designated ARC Livable Centers planning areas.

This tool crosses traditional boundaries between transportation planning, street design and land use planning and development. Current street design practice is primarily focused on providing safe and efficient infrastructure for the automobile. This approach produces bland, identical highways and roads rather than livable streets that suit the special character and environmental features of a particular place, as well as necessary safety features. The "one size fits all" approach to street design is unresponsive and all too often in conflict with community values, including land use and design goals.

This tool includes the fundamental concepts and features of Context Sensitive Street Design to serve as a springboard for applying and implementing Context Sensitive Street Design projects. The Context Sensitive Street Design tool is not intended to be a technical guide.

Who Should Use This Tool?

The Context Sensitive Street Design Tool is intended for use by:

- Citizens involved in or interested in transportation, land use, and community development decisions.
- Elected officials and Planning Commissioners involved in transportation, land use and development decisions.
- Public Agency staff of local, regional and state jurisdictions involved in transportation, land use planning, infrastructure construction and maintenance and community development.

Atlanta, GA: multi-use PATH, Freedom Parkway, GA

2. ALTERNATIVE CONTEXT SENSITIVE STREET DESIGN STRATEGIES

2.1 Enhance Pedestrian and Bike Accessibility and Mobility

Provide safe, accessible, and convenient pedestrian and bicycling facilities and support and encourage increased levels of bicycling and walking.

2.1.1 Pedestrian Transportation

As the Atlanta Region population continues to grow, many communities strive to enhance livability by offering a diversity of transportation alternatives, including pedestrian facilities. Communities can improve the efficiency of the existing transportation system by creating pedestrian-friendly streets through traffic management and by incorporating street design elements that enhance the safety, security, comfort, and efficient mobility of pedestrians.

Pedestrian Transportation Facilities include:

- Sidewalk
- Off-Road Path and Trail
- Curbs and Curb Ramps
- Ramp and/or Stair Connection to adjacent property
- Traffic Control Devices; Pedestrian signal heads
- Pedestrian Bridge or Tunnel
- Mid-block Street Crossing with signage and crosswalk
- Pedestrian Refuge (In Street Median)
- Bus Stop; Shelter
- Landscaped Plaza or Pocket Park
- Weather protection features, including storefront awning, street tree and entry canopy
- Way-finding Sign; Street Identification Sign
- Benches, Trash Cans;
- Pedestrian Scale Street Lights
- Bollard, low fence, handrail
- Crosswalk; Marked, Raised and/or Material Enhanced
- Level driveway area

2. Alternative Strategies and Measures

Measures to Enhance PEDESTRIAN Accessibility and Mobility:

P1. CONNECTIVITY

Objectives:

- Grid of interconnected streets with sidewalks provide multiple, direct routes.
- Compact block patterns reduce out-of-direction travel.

Ways to accomplish:

- Link disconnected streets together.
- If insufficient right-of-way for new street connections, or for cul-de-sacs, provide a multi-use path for bike/ped access.

Orenco, Hillsboro , OR

P2. BALANCE PROPORTION

Objectives:

- The roadway travel width should not dominate the streetscape.
- The combined width of the pedestrian areas should be approximately equal to the roadway.

Ways to accomplish:

- Wide sidewalks, planted areas, curb extensions, on-street parking.
- Refine street design criteria and standards, reduce lane width/remove lanes if appropriate.

Berkeley, CA

P3. BUFFER

Objectives:

- In addition to the standard curb, provide a physical separation between traffic and peds.

Ways to accomplish:

- Street parking, street trees, plants, street light poles, bollards, vending boxes and carts; bike racks.

Berkeley, CA

P4. CROSSING

Objectives:

- Increase ability to cross street safely.
- Minimize out-of-way travel.

Ways to accomplish:

- Crosswalk(s) at intersection.
- Mid-block crosswalk(s).
- Pedestrian refuge in roadway wider than three travel lanes.
- Adjust signal timing to allow greater walk time.

San Francisco, CA

Measures to Enhance PEDESTRIAN Accessibility and Mobility:

P5. SOCIAL SPACE

Objective(s):

- Place to rest and/or interact with community members along pedestrian travel-way.

Ways to accomplish:

- Pedestrian plaza or Pocket park
- Seating (benches, movable chairs, low walls)
- Café with outdoor dining.

Boudler, CO

P6. SHELTER

Objective(s):

- Provide protection from rain and sun.
- Create a welcoming image.

Ways to accomplish:

- Awnings on building adjacent to sidewalk.
- Street trees along sidewalk.
- Covered building entrance: Embayment or projecting entrance canopy.
- Gazebos in parks and plazas.

Portland, OR

P7. STREET LIGHTING

Objective(s):

- Enhance public safety.
- Enhance feeling of personal security.

Ways to accomplish:

- Pedestrian scale / short light poles.
- Attractive fixtures.
- Effective, but non-obtrusive illumination of pedestrian travel way.

Amsterdam, Holland

P8. ACCESSIBLE

Objective(s):

- Continuous sidewalks that are fully accessible, including for children, elderly, disabled.
- Multi-use paths to destinations not conveniently served by sidewalks.

Ways to accomplish:

- ADA compliant curb ramps and site and building entrances.
- Maintain sidewalks/multi-use paths in condition amenable to travel by wheelchairs.

Orenco, Hillsboro , OR

2. Alternative Strategies and Measures

Measures to Enhance PEDESTRIAN Accessibility and Mobility:

P9. ARTICULATED BUILDING EDGE

Objective(s):

- Define the pedestrian space.

Ways to accomplish:

- Building facades with windows,
- Storefronts,
- Articulated walls,
- Defined entrances,
- Architectural features and
- Attractive materials.

Riverplace, Cobb County, GA

P10. FURNISHINGS

Objective(s):

- Provide pedestrian and bike amenities.
- Maintain a clear pedestrian travel way.

Ways to accomplish:

- Benches, Trash cans,
- Drinking fountains, News stands,
- Planters / Flower containers, “A” type signs,
- Bike racks and storage boxes.
- Way finding signs and maps.

Orenco Community Station, OR

P11. IMAGE / IDENTITY

Objective(s):

- Local identity, pride.
- Enhance image-welcoming, attractive.
- Identify historic or cultural event.

Ways to accomplish:

- Art or sculpture that invites public interaction.
- Historical marker.
- Murals on blank building walls.
- Visually appealing advertising.

Auburn Ave, Atlanta, GA

P12. WAY FINDING SIGNS

Objective(s):

- Identify pedestrian route, destinations.

Ways to accomplish:

- Signs,
- Information kiosks,
- Maps and Business Directory,
- Banners.

Seattle, WA

2.1.2: Bicycle Transportation

Bicycles are legally classified as vehicles, and are allowed on most public roads in Georgia with exceptions such as freeways. A **bikeway** is created when a street has the appropriate design treatment to accommodate bicyclists, based on motor vehicle traffic volumes and speed. The basic design treatments used to accommodate bicycle travel on the street are:

- shared roadway (B1-B3)
- shoulder bikeway (B4)
- bike lane (B5)
- multi-use path (B6)

Measures to Enhance BICYCLE Accessibility and Mobility:

B1. SHARE ROADWAY - TYPE 1

- Most suitable for residential streets with low travel speeds and traffic volumes.
- Bicyclists and motorists share the same travel lanes.
- A motorist will usually have to cross over onto the adjacent travel lane to pass a bicyclist. travel lanes for motorized vehicles and is open to bicycles, pedestrians, rollerbladers and skateboarders.

Orenco Community Station, OR

B2. SHARE ROADWAY - TYPE 2

- Allows an average size motor vehicle to pass a bicyclist without crossing over into the adjacent lane.
- Could be appropriate where shoulder bikeways or bike lanes are warranted but cannot be provided due to physical constraints, or on streets where traffic speed is around 20 mph.

Berkeley, CA

2. Alternative Strategies and Measures

Measures to Enhance BICYCLE Accessibility and Mobility:

B3. SHARE ROADWAY - TYPE 3

- Created by modifying local street operation to function as a through street for bicycles , while maintaining local access for automobiles.
- Traffic calming devices control traffic speeds and discourage through trips by automobiles.
- Traffic controls are needed to limit conflicts between automobiles and bicycles and give priority to through bicycle movement.

Reverse flow bike lane; Boulder, CO

B4. SHOULDER BIKE PATH

- Paved shoulders on rural, state highways could accommodate bicycle travel.
- Minimizes conflicts with faster moving motor vehicle traffic.

Source: www.fhwa.gov

B5. BIKE LANE

- A portion of the roadway is designated for bicyclists.
- Appropriate on urban arterial and collector streets.
- Bike lanes must be at least four feet wide and clearly marked and identified to direct motorist attention to their preferred use by bicyclists.
- May be appropriate on county and rural roads where there is existing or potential demand for bicycle travel.

Portland, OR

B6. MULTI-USE PATH

- Typically a two-way, paved facility, used by pedestrians, joggers, skaters and bicyclists.
- Separated from motor vehicle traffic by an open space or barrier.
- Either within the roadway right-of-way or within an independent right-of-way.
- Most suited in recreation corridors / linear greenways, as elements of a community open space and trail plan.
- May be appropriate in transportation corridors not well served by the street system.

Vancouver, WA

2.1.3: Overcoming Physical BARRIERS to Walking, Bicycling and Taking Transit:

(For regulatory barriers to CSSD, please see the Chapter 3 of this report).

Barrier:
FREEWAY, RIVER, CREEK, STEEP LAND
Ways to overcome:

- Construct new bridge to accommodate all travel modes.
- Retrofit existing bridges to incorporate bicycle and pedestrian facilities.
- If a new bike-pedestrian bridge is needed, locate it to be visible and accessible from the existing street network, and close to origin and/or destination properties (with high potential use), such as parks, schools, neighborhoods, employment and commercial centers.

Florida DOT Trail; Source: www.dot.state.fl.us

Barrier:
AT GRADE RAILROAD CROSSING
Ways to overcome:

- ADA compliant crossing; well maintained.
- Gated or signalized crossing.
- Incorporate lighting.
- Grade separate the crossing.

Barrier:
HEAVY VOLUMES MOTOR TRAFFIC
Ways to overcome:

- Incorporate well designed bicycle and pedestrian facilities to attract users.
- Transportation Demand Management
- Reduce traffic volumes and speeds to balance the operational preferences of bicyclists and pedestrians.

Barrier:
WIDE STREET, INAPPROPRIATE DESIGN
Ways to overcome:

- Incorporate pedestrian crossing treatments, including curb extensions and a pedestrian refuge in the roadway median.
- Modify traffic signal phase to increase walk time.
- Consider diverting some traffic to other routes and eliminating right-turn-only lanes.
- Develop an area-wide transportation management plan.

La Vista, Dekalb County, GA

Barrier:
INTERSECTION
Ways to overcome:

- Incorporate through bike lanes and curb extensions to reduce crossing width.
- Incorporate smaller radius at corners to reduce crossing width and vehicular speeds.
- Incorporate pedestrian or bicyclist activated traffic signal. (The signal does not have to be activated by the pedestrian, it could automatically give the pedestrian a walk signal with the green phase of the traffic signal.)

Intersection Design; Source: www.fhwa.gov

2.2 Enhance Bicycle and Pedestrian Access to Transit

First Impressions Count!

The public's first impression of bus transit and available services is the bus stop or approach to the bus stop from a side street or intersection. Project For Public Spaces, PPS, a New York based non-profit that advocates "placemaking", has conducted numerous observations and user surveys in public spaces, including transit stops. According to PPS: "Carefully placed stops and amenities introduced at and around bus stops help to improve peoples comfort, engender socialization, increase pedestrian activity and positively affect perceptions of safety and security. In addition, art, information and services contribute to a sense of community. Often small-scale design features and enhancements add significantly to the perception that a street, bus stop, or public space, is an important place in the community, encouraging more pedestrian activity and community use."

Context Sensitive Street Design increases opportunities for bus (and also rail) transit to become efficient, attractive transportation options. Some operational features preferred by bus transit operators may conflict with the needs of automobiles, cyclists or pedestrians. Such conflicts should be addressed and resolved during the planning and conceptual design phase of the Context Sensitive Street Design project.

Bikes and Buses make Great Partners!

Bikes on buses is a good public transportation policy and a good inter-modal marriage. At the origin of a trip, transit riders are generally willing to walk a few minutes a to catch the bus, typically 5-6 minutes in most communities. Based on an average walking speed of around 260 feet per minute, a majority of bus riders would consider walking up to a distance of 1/4 mile to the nearest bus stop, the service area of a commuter bus route. If bikes are allowed on buses, as is the practice in many communities across the US, bicyclists would ride further than 1/4 mile to a bus stop. This means potential new transit riders by extending the transit service area with a minor investment in installing and maintaining bike racks on buses. It follows that at the destination end of the trip, the streets are appropriately designed to accommodate bicycle operation and that adequate bike parking facilities are available.

To ensure the bicyclists' safety when utilizing bus bike racks, transit agencies can institute a simple one-time permit process and training program. For a nominal fee, bikers can attend a short class, demonstrating how to load, secure and remove bicycles from bus bike racks and receive a lifetime permit to take bikes on public transportation.

Undesirable bus stop placement.

Source: Project for Public Places

Well placed/designed bus stops encourage use and create a sense of community.

Transit contributes to a higher quality of life in the Atlanta Region in many ways:

- Efficient: Because transit transports more passengers per vehicle, it makes more efficient use of existing investments in the street system.
- Air quality: Fewer vehicle trips mean less congestion, less total travel time, and less impact on air quality.
- Place-making: Transit encourages pedestrian activity around transit stops, contributing to vitality, security and a sense of community.
- Jobs and economic development: Transit service can help lower cost by reducing the number of parking spaces and influence siting decisions by small business and major employers.
- Public safety: Transit-oriented development and vital, urban neighborhoods help encourage round-the-clock activity, creating a safer pedestrian environment and discouraging crime.
- Youth and Seniors: The quality of life for young and old can be enhanced by helping people with disabilities and teenagers access necessary services and recreational, educational and cultural activities.
- Community revitalization: Transit has demonstrated its ability to serve as a catalyst for reinvestment and encourage revitalization of older neighborhoods.
- Link jobs and housing: Transit can help more employees get to work without using a car.

See **Section 4.5** for detailed criteria of bus stop placement and design, including the topics:

- Closest Bus Stops
- Compatibility with Adjacent Land Uses
- Adequate Sight Distance
- Minimize Travel Time Delay
- Impact on Traffic Signal
- Pedestrian Linkage / Crossing
- Adequate Bus Maneuvering

2.3 Transportation Management / Traffic Calming

Traffic calming is a transportation management strategy that involves changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and / or cut through volumes, in the interest of street safety, livability, and other public purposes (1998 ITE Annual Conference). The purpose of traffic calming is to cause motorists to drive with more care, to drive more slowly or perhaps via another route.

WHY CALM TRAFFIC?

- To Reduce the Accident Rate
- To Re-route Cut Through Traffic using Neighborhood Streets
- To Slow Motorists Down in Neighborhoods and Activity Centers
- To Improve Neighborhood Security
- To Restore Neighborhood Character and Help Create Livable Streets

> *Officials in Seattle, WA estimate that their traffic circle program prevented 273 accidents over four years, saving $1.7 billion in property and casualty losses. (Source: STPP)*

Traffic Calming can be accomplished by a range of design measures or treatments, including:

- Traffic calming measures that address roadway-pedestrian-land use redefinition
- Traffic calming measures employed for speed reduction
- Traffic calming measures that improve roadway / circulation definition and safety

TRAFFIC CALMING FOR ARTERIAL AND COLLECTOR STREETS

Benefits of Multi-Modal Street Design

To assure regional mobility in the future, an extensive network of multi-modal streets will be needed. Multi-modal streets balance the needs of pedestrians, bicycles, cars, trucks, and transit vehicles in a way appropriate to the particular function and location of a road or street. Some streets may be designed to give more priority to cars and trucks, other designs may give priority to transit vehicles and pedestrians.

Some benefits of multi-modal street design for collector and arterial streets are:

- Preserves mobility by encouraging transportation facilities and development patterns that make walking, bicycling and busing competitive choices compared with driving.
- Encourages more efficient movement of people in roadways, rather than the addition of more vehicles.
- Increases the capacity of the existing street system.

Regional Street Corridors

Context Sensitive Street Design for Regional Arterial and Collector streets address a broader set of design considerations including:

- Principles on community livability
- The multi-modal street function
- The character of surrounding land uses.

The term “regional street corridor” refers to both the road right-of-way (ROW) and its interface with adjacent land uses. In a built up area, the street corridor includes the face-to-face building separation across a road, which includes property outside of the ROW. Narrow or wide, with low or high traffic volume, the best roads are the ones that create attractive public places and accommodate pedestrians, cyclists, transit, as well as cars and trucks.

Source: www,city.palo-alto.ca.us

The table below is a list of traffic calming measures for local streets approved by FHWA:

Table 2.3.1 Measures to Traffic Calm Streets:

Prewarnings: typically lines on the pavement with (rumble strips) or without punishment (lines and traffic signs)
Accomplishes: A clue to road design changes ahead.

Gates: typically different pavement color or structures that indicates transition between traffic environments, often augmented with signs and landscaping.
Accomplishes: Entering a different road design environment.

Narrowings: typically the available travelway width is reduced to narrower lane widths with the addition of islands, by eliminating one lane in two-lane roads or by using wider edge markings.
Accomplishes: Potential speed reduction.

Humps and tables: with varied profiles including circular, sinusoidal, dome shaped, or trapezoidal cross-sections and varied lengths upon the desired speed reduction.
Accomplishes: Speed reduction.

Raised Areas: typically a trapezoidal hump with extended length to allow for longer vehicles to have all wheels on them.
Accomplishes: Speed reduction for autos but not large vehicles.

Staggering: typically a lane is shifted over.
Accomplishes: Driver has to slow down to stay on lane.

Roundabouts: typically used as gates for speed reduction.
Accomplishes: Fewer accidents at intersections with stop signs; Change in street operation.

Chicanes: typically extensions of the curb at intersections to reduce approach lane widths.
Accomplishes: Reduction in pedestrian crossing distance; Improved Safety: Visibility of peds by motorists.

Islands: typically raised elements along the centerline of the roadway to shelter pedestrians and ease street crossing.
Accomplishes: Pedestrian refuges; Constricted pavement / potential speed reduction.

Cushions: Typically square humps in each travel lane.
Accomplishes: Potential speed reduction.

Landscaping and plantings: typically use of vegetation as gates, as a means to visually reduce lane widths or as methods to enforce other traffic calming components.
Accomplishes: Enhanced image, identity; Driver attention on the roadside; slows traffic.

Pavement textures and colors: typically use of stones or pavers to visually separate roadway elements, and use of colors to enforce concepts to mark transitions between roadway environments.
Accomplishes: Focuses driver attention on ped. crossings; Clearly identifies pedestrian path.

Raised and Landscaped Median

Street Narrowing

Round About

Source: An Improved Traffic Environment, Denmark Ministry of Transport

2.4: Pedestrian-Friendly, Transit Supportive Development

This measure complements the goals of Context Sensitive Street Design, because pedestrian-friendly and transit supportive development supports increased mobility, particularly by transit, walking and bicycling.

Transit Supportive Development
Transit supportive development is a land use planning, urban design and development strategy for insuring future mobility and livability by supporting increasing transit use, walking and bicycling. The fundamental principles of transit supportive development are:

- Place moderate and high density housing and employment within convenient walk of transit.
- Mix residential and employment uses with shopping opportunities and public facilities.
- Provide multiple and direct street connections to transit stops and shopping.
- Design for pedestrians and bicyclists, without excluding the auto.
- Establish a regional network of designated transit corridors with high quality transit service
- Within designated transit corridors, create and promote opportunities for a variety of development types or districts corresponding to a defined level of transit service.

The Irvington, Mixed Use Development; Portland , OR

In many cases current development projects could become transit supportive with minor modifications. In other cases, market forces will need to be encouraged to produce transit supportive development.

In its most basic form transit supportive development has the following characteristics:

Density: A fundamental characteristic of transit supportive development is density, or the concentration of homes and/or jobs within walking distance of transit services. Generally, higher densities support higher levels of transit service. Increasing the concentration of homes and jobs along transit routes and station areas typically results in increased transit ridership.

Land Use: Two land use characteristics are critical in transit supportive development.

- First, mixed land use allows access to a range of activities within easy walking distance of a person's place of arrival. Providing a mix of land uses reduces the need to make separate trips to various places, which is harder to do by transit, walking or bicycling. By mixing land uses around transit stops, transit use, walking and bicycling are encouraged.

- Second, transit supportive land use patterns concentrate jobs in major employment nodes, linked to other employment nodes by the region's high capacity transit system.

Design: The design of transit supportive development supports pedestrian environments which encourage transit use, walking and bicycling, in addition to automobile use. A majority of streets in transit supportive development districts are designed to be multi-modal , and on some streets, priority is given to the pedestrian.

Note: For specifics on transit supportive development, please refer to the following Community Choices Tool:

TRANSIT ORIENTED DEVELOPMENT

2.5 Do Nothing

"Do Nothing" is an alternative transportation strategy. If this strategy is applied locally, it could imply that either the transportation system accommodates the diversity of community needs, or that the political will to address those needs is lacking. A "Do Nothing" strategy also means the decision was made following a public outreach and citizen involvement effort to seek opinions and ideas from a broad cross section of the community.

In the Atlanta Region, "Do Nothing" is a poor community choice, as concerns about traffic and livability are shared by every type of community, in central cities, inner neighborhoods, small towns and suburban enclaves.

3. WHAT TO CONSIDER

3.1 Public Involvement: Designing an Effective Public Involvement Program

Developing an effective public involvement program is a strategic effort that requires assembling a selection of techniques to meet the needs of a given transportation plan, program, or project.

The following steps form one approach to systematically setting up and implementing a public involvement program for a specific plan, program, or project.

1. Set goals and objectives for your public involvement program.

2. Identify the people to be reached, on an ongoing basis the identification needs to be updated.

3. Develop a general approach or set of general strategies that are keyed to the goals and objectives of the involvement program and the characteristics of the target audiences.

4. Flesh out the approach with specific techniques.

5. Assure that proposed strategies and techniques aid decision-making to close the loop.

Note: There is no “one size fits all” approach to public involvement. Each project’s unique challenges should be reflected in a process that meets the needs of the target audience.

(Source: FHWA: Public Involvement Techniques for Transportation Decision-Making)

A Citizen’s Approach:

- Reach out and connect with our neighbors;
- Define traffic issues / concern as a coalition;
- Come together on a consensus solution;
- Seek partnerships with area businesses;
- Educate yourself on the transportation planning process, issues and options.

Northlake Livable Centers Workshop; Dekalb, CO, GA

3.2 Comprehensive Plan

The Comprehensive Plan (Comp. Plan) establishes policies and land use designations to achieve and support statewide and ARC Livable Communities planning goals. When considering CSSD in your community, the Comp. Plan is the place to start. The Comp. Plan enshrines the collective, community vision, and establishes development goals, objectives and policies, to guide the physical form, shape, and feel of your community.

The first step is to evaluate the Comp. Plan to determine if current goals, objectives and policies encourage and support CSSD in your community. If some Comp. Plan provisions are obstacles to creating context sensitive streets, a Comp. Plan change may be in the best interest of your community, to remove the obstacles and include policies that are supportive of CSSD.

Once a determination has been made to change the Comp. Plan, alternative strategies should be considered, including the following:

Specific Development Plan:
Policy would allow public agency to work with land owners, developers, stakeholders and affected public agencies to develop specific area development plans, including conceptual design plans for CSSD projects. Under this policy, an incentive to the private sector could include streamlined approval for development projects that comply with the adopted Specific Development Plan.

Transportation-efficient Development Pattern:
Policy would encourage commercial and residential development patterns that encourage pedestrian, bike and transit travel.

Transportation Management:
Policy would establish a process for developing and implementing neighborhood-wide transportation management plans, including safe pedestrian and bike routes to schools, traffic calming and "green", water-quality friendly streets.

Local Street Plans:
Policy would encourage a broader range of local and neighborhood collector street types than are currently allowed. "Skinny" street and other street designs could result in several benefits to the community, including:

- Reduction in construction and maintenance costs
- Reduction in the negative environmental impacts of street construction
- More efficient land use
- Improved traffic safety
- Improved neighborhood character

Pedestrian Corridors and Districts:
Policy would allow designation of pedestrian corridors and pedestrian districts in the community.

Implementing Ordinances / Regulations:
Are Zoning Ordinances & Development Standards that implement the Comp Plan Barriers or Opportunities for CSSD?

Once your community has identified and established CSSD objectives and policies, the next step is to conduct a "code audit". The purpose of the audit is to review the existing zoning ordinance(s), development standards, and Public Works civil and street design standards to determine which ones support and which ones impede the construction of context sensitive streets in your community. This study could be performed by staff or consultant, and assisted by an Advisory Committee, including representatives from public and private sectors, and neighborhoods.

Regulatory amendments and refinements may be needed to assure construction of context sensitive streets in your community. A regulatory amendment strategy that could be considered is to replace current, prescriptive street design standards, with Design Guidelines or Performance Criteria, to stimulate creative and context sensitive local street design in your community.

3.3 Administrative Issues

Administrative issues are likely to be encountered during the planning and implementation phase of CSSD projects, and typically revolve around project funding, and the planning & design process.

Funding:
In addition to the general funds, CSSD projects could qualify for funding from several other sources, including System Development Charges (SDC), Local Improvement District, Tax Increment Financing, (local); ARC Livable Cities Initiative, GRTA, STIP (regional), GDOT, (state; TEA 21/ enhancement funds, Scenic By-way Program (Federal). Another approach to fund transportation innovation is to seek demonstration funds from Federal, State and Regional agencies.

Process:
At the local level, the process of planning, defining and designing CSSD projects can become contentious, as state agencies, professional, advisory and advocacy groups seek to influence local decisions about community design. Issues that could surface early in the process could revolve around standards for the design of local and neighborhood collector streets, in particular, the roadway pavement width. Typical street width issues range from livability concerns, to operation of emergency and other large vehicles. This suggests both, a meticulously conceived public planning process, in which the project goals and expectations are clearly defined at the outset, and training staff relative to conflict resolution and communication with diverse interest groups.

3.4 Supportive Legislation

Some states have enacted laws to support CSSD. If your community is interested in pursuing regional, state and federal provisions to provide the legal framework for CSSD projects contact your Metropolitan Planning Organization.

3.5 Cost Considerations

The cost of implementing CSSD will vary. Although funding for aesthetics may be required early in the project planning process, investing more time planning and envisioning projects with communities ultimately reduces the cost of redesigning and re-engineering a street project. More importantly, by spending more time with communities when projects are designed, the chances of projects requiring re-design later are reduced.

4. STEPS TO SUCCESS

4.1 Create and Commit to a Vision

To assure a successful CSSD project it is advisable to first craft an official community vision that identifies Context Sensitive Street Design as a key objective of community development. The community vision is typically a narrative and illustrative plan that expresses the long-term vision for land use and transportation. A related next step is to impart official status to the vision plan, such as by adopting it as a policy in the Comp. Plan., or adopting by resolution as a separate Strategic Plan. Regardless of the approach, the vision must be developed with input from a broad cross section of community members, from the start to the end of the visioning process.

Once a vision is adopted, the next task is to identify ways and means to accomplish the vision.
The following steps outline the kinds of strategic activities that could be undertaken to commit to and accomplish a community vision to create a " Main Street":

- Adopt the vision as a policy in the Comprehensive Plan and in the Transportation Plan.
- Adopt appropriate codes and design standards to help accomplish the vision.
- Establish and maintain agency contacts
- For state or Federally funded highway projects, participate in the Statewide Transportation Improvement Plan (STIP) to advocate that the projects get included.
- Stay informed on state and regional agency plans, including GDOT and GRTA.

Source: "Main Street…when a highway runs through it. A handbook for Oregon Communities." Transportation and Growth Management (TGM) Program, Oregon DLCD and ODOT.

4.2 Revise Current Street Design Standards

In most communities, local street design standards may need to be modified to encourage the construction of Context Sensitive Streets.

Most local jurisdictions have adopted one shoe fits all sizes approach to local street design. For example, many communities require residential streets that are 32, 36 and even 40 feet wide. In many residential settings, streets can be as narrow as 26 feet wide without sacrificing emergency access, on-street parking or vehicular and pedestrian safety.

Even narrower access streets or shared driveways can be used when only a few homes need to be served. However, since developers often have little flexibility to construct streets narrower than prescribed by Public Works, revisions to current local street standards are often needed to promote more widespread use of narrower streets that better fit the context of residential land use.

The following images illustrate some benefits of revising street design to integrate land use and transportation.

Above: 'After' street desgn changes (photo simulation)
Below: Before streetscape improvements

'After', La Vista Ave, Dekalb County, GA; Source: Janice Kelley/UDC

'Before', La Vista Ave,Dekalb County, GA

4.3 Traffic Calm a Street

The following is an outline process for developing, implementing, and evaluating the results of a traffic calming plan for a single street or street segment:

- Meet with residents from the street to discuss the nature of the problem and potential solutions. A residents committee would be struck to work with City staff.
- Residents committee and local government staff meet to design a preliminary traffic calming plan.
- Survey residents for their opinion on the preliminary traffic calming plan (either a vote or a request for comments back).
- Report to elected officials for approval and funding authority.
- Inform the residents of elected officials action, next steps and timetable.
- Permanently implement the traffic calming measures.
- After six months, measure the traffic impacts of the calming measures including the i mpacts on neighboring streets to ensure traffic (above an acceptable amount) has not been diverted.
- Adjust calming measures if justified based on traffic impacts.
- The local government could define an acceptable level of traffic diversion onto neighboring streets, monitor actual diversion levels and take corrective action if the acceptable levels are exceeded.

Source: City of Vancouver, BC.

4.4 Neighborhood Wide Traffic Calming

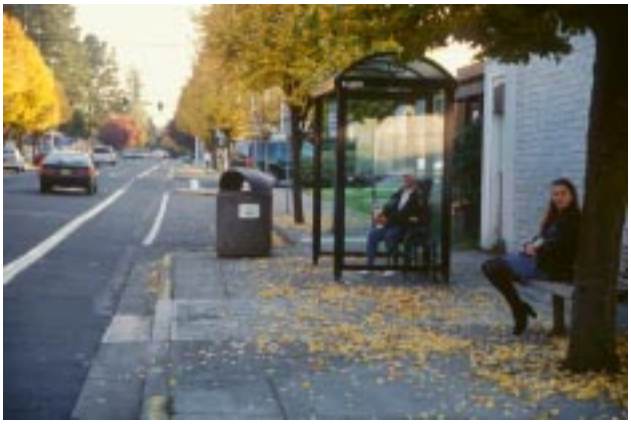
The following is an outline process for developing, implementing and evaluating the results of a neighborhood wide traffic calming plan

- Meet with residents in the neighborhood to discuss the nature of the problem and potential solutions. A residents committee would be struck to work with local government staff.
- The residents committee and staff design a traffic plan.
- Sponsor an open house to provide informa tion on the plan.
- Survey the impacted residents for their opinion.
- Meet with residents committee to discuss survey results and revisions (if necessary) to the plan.
- Survey again the abutting residents for their opinion of the changed plan.
- Report to elected officials for approval and funding authority.
- Inform residents of elected officials action, next steps and timetable.
- Implement a six-month trial of the plan.
- Measure the traffic impacts of the calming measures including the impacts on neighboring streets to ensure traffic (above an acceptable amount) has not been diverted.
- Survey again the impacted residents for their opinion on the installed temporary calming measures.
- Report to elected officials on the trial (if the trial includes diversionary measures).
- Implement the plan on a permanent basis.

Source: City of Vancouver, BC

4.5 Evaluate Bus Stops: Place bus stops to benefit both, transit users and transit operators.

If there is existing or planned public transit in your community, chances are many of the bus stops in your community could be enhanced for both, transit users and operators. The following are some general and specific features to include in the evaluation of bus stops.



Beaverton, OR

CLOSET BUS STOPS

High Ridership Area: Approximately 750 feet

- Commercial districts
- Shopping centers
- Office / Employment Centers
- Medium to High density housing

Medium Ridership Area: Approximately 1,000 feet

- Low density scattered residential / sub-divisions
- Transfer points in low density areas

Low Ridership Area: Approx. 1/4 mile / 1320 feet

COMPATIBILITY WITH ADJACENT LAND USES

Land uses sensitive to vehicle impacts-fumes, noise:

- Bedrooms, classrooms or care facilities fronting bus stops

Land uses that support or complement bus stops:

- Cafes and convenience stores
- Banks, offices and retail, high density housing
- Public Buildings: i.e., library, post office.

ADEQUATE SIGHT DISTANCE

- Do trees or poles obscure sight lines to bus stop by motorists, cyclists, peds. and bus operators?
- Is the bus stop located in section of uncurved and flat roadway?

MINIMIZE TRAVEL TIME DELAY

- Assess impacts of projected auto volumes on pedestrians, cyclists and transit patrons.
- Minimize queuing and associated delays be cause of bus stop placement
- Consider mitigation in the event of substantial negative impacts (physical improvements, signal modification to assist transit operations)

IMPACT ON TRAFFIC SIGNAL

- Occurrences in which bus blocks queuing traffic or undergoes delays due to signal operations.
- Is there adequate protection to pedestrians getting to and from the bus stop?
- Assess need for special signal techniques (queue jump; bus priority; exclusive or specialized lane use)
- Sign and mark bus specific signalized movements (right turn only except bus)
- Adequate pedestrian walk signal phase

PEDESTRIAN LINKAGE / CROSSING

- Distance from safe pedestrian crossing, marked or unmarked.
- Availability of curb ramps (All round trip transit patrons will have to cross a street at least once-either to catch the bus to get to the destination)

ADEQUATE BUS MANEUVERING

- Can the bus maneuver efficiently?
- Lane width, curve radii, curb designated for bus zone, parking lane.

Source: Tri-Met, Portland, OR

4.6 Develop and Implement a Bike (and Pedestrian) Element of the Local Transportation Plan

Begin by inventorying the existing street network, noting pavement width and geometrics, traffic conditions, and appropriateness for bicycle and pedestrian travel. Consider alternative routes. Directional signage is very important to assure continuity in travel.

Consider bicycle lanes when available road space can be marked for exclusive or preferred use by bicyclists, and to provide for more predictable movements by motorists and bicyclists. Bicycle lanes are predominantly one-way and carry traffic in the same direction as adjacent vehicular traffic. Bicycle lane width can range from 4-6 feet, depending on available road space and traffic volume. Consider off-road bike and pedestrian paths to reduce out of way travel, and/or to access to recreation facilities.

Consider Designating Pedestrian Districts:
Within designated centers and transit corridors, pedestrian districts could be designated to become the primary focus of capital improvements, supportive public policy and regulations. Potential pedestrian districts could include areas with:

- Existing pedestrian circulation patterns
- Existing transit corridors with high levels of ridership
- Historic areas
- Potential for people to walk to the area from nearby residences

Pay particular attention to design of intersections, to minimize the chance of conflicts with vehicles; develop design guidelines for street intersections.

Request funding for bike and pedestrian projects.

4.7 Make Pedestrian-Friendly / Transit Supportive Development a Priority

Achieving greater regional mobility through transit supportive development will require that Atlanta area citizens support regional and local governments, the development community and agencies, in the integration of land use and transportation planning. Actions will be needed on all levels and in all sectors of the region. Key actions include:

- Citizen participation in planning for transit supportive development throughout the region.
- Cooperative efforts between the public and private sector to identify economic opportunities for transit supportive development and ways of encouraging and promoting such development. These will include outreach efforts and incentives.
- Regional planning, coordinated with local government and transit agencies, to designate and plan transit corridors.
- Local government planning actions to revise comprehensive plan designations, zoning districts, and other development regulations to better require and promote transit supportive development.

For more information related to this topic, see the related tools:
“Transit Oriented Development Implementation”
“Traditional Neighborhood Development Implementation”.

4.8 Establish Safe Routes to School

On October 6, 1999, Governor Davis signed AB 1475 (Soto) which created a new traffic safety program in California. The goal of AB 1475 is to demonstrate and evaluate the effectiveness of a "Safe Routes to School" program. This new act became effective January 1, 2001 and will remain in effect until January 1, 2002, unless a later enacted statute deletes or extends that date.

Q: How do "safe routes to school" programs differ from "walk your child to school" programs?
A: "Safe routes to school" programs focus specifically on the routes. Such programs are designed to choose the safest routes from children's homes to their school. They can also help point out route problems that local agencies can — and should — fix.

Q: What kinds of problems do safe route to school programs focus on?
A: They look at conditions like high traffic speeds, amount of truck and bus traffic, lack of sidewalks, poor sidewalk condition, "pedestrian-unfriendly" intersections (particularly at major streets), and other similar problems. Anything that would keep kids from safely going from home to school is targeted by the program.

Q: What kinds of solutions do communities use?
A: Consider these examples from the Portland (OR) program:

- The Traffic Calming Program (TCP) uses a variety of engineering tools to reduce speed, decrease traffic volumes, and/or improve safety around Portland area elementary schools. TCP most commonly uses curb extensions, speed bumps and slow points for school safety projects.
- Curb extensions increase pedestrian visibility at crossing locations by widening the sidewalk and/or the parking strip. They reduce pedestrians crossing distance. Finally, they visually narrow the roadway, helping slow traffic.
- Speed bumps are used to force vehicles to move slowly through the school zone. These bumps are designed to provide a comfortable ride for vehicles that travel at or below the posted speed limit, they do not require the removal of parking and pose little discomfort for bicyclists.
- Slow points are small islands in the middle of the street that allow pedestrians to cross half the street, stop in the middle, then cross the other half. They also prevent vehicles from passing other vehicles that are turning."
- Portland also takes advantage of Oregon's "Fines double in school zone" law by increasing speed enforcement near schools.

Q: Can Safe Routes to School programs achieve results?
A: Yes they can. In Copenhagen, where their program has been in place for some years now, the Safe Routes to School program's traffic calming improvements produced an 85% reduction in child-pedestrian-motor vehicle crashes.
(Source: NATIONAL CENTER FOR BICYCLING AND WALKING www.bikefed.org)

Source: www.sustrans.org

5. Lessons Learned

5. LESSONS LEARNED

This chapter presents a brief overview of some lessons learned locally, from around the US and foreign countries.

5.1 Georgia

While examples of CSSD are to be found in virtually all towns and neighborhoods built before WW2, this tradition of building livable streets has been forgotten. CSSD offers an opportunity, not only to learn from the past but also to experiment and innovate locally and to learn from recent practice.

Example of design problem in Georgia.
Source: GRTA Citizen's Report

Freedom Parkway, Atlanta, GA
The design was modified to address neighborhood goals, including accomodating a bike-pedestrian trail. (PATH)

Missed Opportunity! Hwy 41, Cobb County, GA
The design of Hwy 41 and the bridge at the Chattahoochee National Rec. Area forces bicyclists into the path of fast traffic.

Five Points Intersection, Atlanta,GA
Some turn movements for vehicles are prohibited at the Five Points intersection in downtown Atlanta, making it safer for pedestrians.

5.2 Other US Department of Transportations (DOT) and Local Governments

The Federal Highway Administration has identified the following seven states as “pilot states” implementing Context Sensitive Street Design:

Connecticut: The Connecticut Department of Transportation has promoted context sensitive design through statewide awareness training, training courses for its managers, and development of an ongoing training course for engineers through collaboration with the University of Connecticut’s Engineering Department.

Kentucky - The Kentucky Transportation Cabinet has held extensive training workshops in context sensitive design. These workshops are geared toward all participants in the project development phases.

Maryland - The Maryland Department of Transportation, State Highway Administration has developed a “Thinking Beyond the Pavement” strategic plan to guide implementation, conducted charettes to identify project development process strengths, designed a project evaluation instrument, and established teams to review and implement project improvement strategies.

Minnesota - The Minnesota Department of Transportation is incorporating context sensitive design into all aspects of transportation project development—planning, design, construction, and operations. Through new policies, extensive research, and training programs, Minnesota has developed many implementation resources, including the use of visualization technologies to support CSD.

Utah - The Utah Department of Transportation is developing a comprehensive approach to implementation of context sensitive design. Focused on community outreach and project development, Utah’s initiative includes assessment of stakeholder attitudes and internal practices, an implementation and staff training plan, and post-implementation assessment.

New Jersey - The New Jersey Department of Transportation has implemented a training program for highway engineers and other transportation professionals, along with stakeholders in New Jersey host communities, to ensure Context Sensitive Design awareness. This program emphasizes the use of effective public involvement techniques, implementation of design flexibility, and introducing the concept and importance of “Placemaking.”

Vermont - The Vermont Agency of Transportation, in partnership with the Vermont Arts Council and the Village of Danville, VT, has embarked on a multi-year CSD pilot project to integrate artistic enhancements in the redevelopment of a portion of US 2 through the village center. The goal of the project is to provide a safe, attractive, and comfortable pedestrian environment in the village while respecting the form and function of the setting, and enhancing the aesthetic appreciation of the historic, rural townscape, and still provide for the mobility needs of this NHS facility.

5.3 International Experience

Street with Streamlet; Source: An Improved Traffic Environment, Denmark Ministry of Transport

The following are excerpts from the FHWA report: "Geometric Design Practices for European Roads," available from www.fhwa.gov.

Released in June 2001, the report summarizes procedures and practices in roadway geometric design and content sensitive design of 5 European countries: Sweden, Denmark, the Netherlands, England and Germany.

"In the European countries visited, the general philosophy for roadway design and project development is to develop a transportation program and system that enhances community values and integrates roadways into communities and the environment. This philosophy permeates their project development process, safety improvements, roadway design concepts, geometric design guidelines, public involvement and environmental commitments."

"All countries have very high safety goals (ranging from zero fatalities to reductions of more than 40 percent in all crashes.)"

"A common practice in all five countries visited was the longer period of time devoted to the planning process and the consideration of longer sections, typically entire corridors."

"Early public involvement is considered a significant means for decreasing project times and resolving potential conflicts in early stages of the project. "

"Another concept that could benefit the United States is the concept of self-explaining, self-enforcing roads. Such roads are designed for a specific purpose or function and they address safety in an efficient way for all users by implementing an aesthetic approach to explain the road function and enforce speeds. This is the ultimate goal of a roadway design, since roadways designed this way meet driver's expectations rather than surprise them. Reliance on the roadway design to transmit its operating speed is integral to this concept and conflicting messages should be avoided."

"The higher reliance in the United States on traffic signs to convey the desired operating speeds may create additional problems, since often there are conflicting messages between the traffic signs and the roadway image."

"Traffic calming is most effective done on a neighborhood wide or area-wide basis and not just at spot locations."

6. WHERE TO GET MORE INFORMATION

6.1 Bibliography

"10 Steps to Safer Routes to School", City of Portland

Better Site Design Fact Sheet: Narrower Residential Streets*,* Storm-Water Center

Bus Stop Guidelines, Tri-met, Portland, Oregon

Context Sensitive Design, New Jersey Department of Transportation

Context Sensitive Highway Design*,* Scenic America

Creating Livable Streets*,* METRO Regional Services, Portland, Or

CSD: Thinking Beyond the Pavement, Federal Highway Administration

Easing the Burden*,* Surface Transportation Policy Project

Flexibility in Highway Design, Federal Highway Administration

Geometric Design Practices for European Roads*,* Federal Highway Administration

House Bill 1147, Bicycle and Pedestrian Access 2001*,* State of Maryland

An Improved Traffic Environment, Denmark Ministry of Transportation

Maryland Transportation Performance Goals Act*,* Chesapeake Bay Foundation

Mean Streets 2000*,* Surface Transportation Policy Project

Neighborhood Commercial District Regulations*,* City of Atlanta Department of Planning, Development and Neighborhood Conservation

Neighborhood Traffic Calming Plans – Priorities & Process*,* City of Vancouver BC

NJDOT Bicycle Compatible Roadways and Bikeways / Planning and Design Guidelines*,* New Jersey Department of Transportation

Our Approach to Traffic Calming*,* Robert A. White and Stevens and Associates

Pedestrian Facilities Guidebook, prepared by OTAK for the Washington State Department of Transportation

Planning and Design for Transit Handbook*,* Tri-Met, Portland, Oregon

Planning and Design for Transit, Tri-Met, Portland, Oregon

Regional Road Corridor Design Guidelines*,* City of Ottawa, Canada

Safe Routes to School, National Center for Bicycling and Walking

Traffic Calming – An Overview, Glatting Jackson Kercher Anglin Lopez Rineart, Inc.

Traffic Calming and Safety, SHN Consulting

Traffic Calming State of the Practice*,* Institute of Traffic Engineers

Traffic Calming Summit, Portland Department of Transportation

Trends, Implications and Strategies for Balanced Growth in the Atlanta Region, SMARTRAQ

6. Where to Get More Information

6.2 Contacts / Web Sites

American Planning Association, Best Development Practices: www.planning.org

Atlanta Bicycle Campaign: atlantabike.org

Bicycling Info: www.bicyclinginfo.org

City of Portland, OR*,* Traffic Calming: www.trans.ci.portland.or.us

Congress for New Urbanism*,* A Street Design Manual for Livable Communities (in progress), www.cnu.org

CSD: Thinking Beyond the Pavement*:* www.fhwa.dot.gov/csd/

Federal Highway Administration: www.fhwa.dot.gov

Institute of Traffic Engineers*,* Traffic Calming Library, www.ite.org

League of American Bicyclists: www.bikesleague.org

Maryland Bicycle and Pedestrian Committee: www.ohbike.org/mbpac/

National Center for Bicycling and Walking: www.bikefed.org

National Main Street Center: www.mainst.org

PEDS (Pedestrians Educating Drivers on Safety): www.peds.org

Scenic America*:* www.scenic.org

Smart Growth Network*:* www.smartgrowth.org

Southface Energy Institute*,* Walkable Community Design Guidelines, www.southface.org

Surface Transportation Policy Project: www.transact.org

Transportation Alternatives*:* www.transalt.org

Transportation for Livable Communities Network: www.tlcnetwork.org

Transportation Research Board: www.nationalacademies.org

UK Department of the Environment, Transport and the Regions: Traffic Calming Bibliography, www.roads.detr.gov.uk

Victoria Transport Policy Institute**,** Pedestrian and Bicycle Planning: A Guide to Best Practices, www.vtpi.org

Walkable Communities**:** www.walkable.org

APPENDIX

A.1 Case Study: Streets in a new, mixed-use, transit oriented development

Orenco, Hillsboro, OR

STREET NETWORK / DESIGN REQUIREMENTS
Orenco Station Community, Hillsboro,OR

Purpose:
Development within Station Community Planning Areas shall provide for pedestrians and motorists of all ages and abilities, rights, privileges, safety, mobility and access. Walking and bicycling shall be encouraged by land use layout and design. New intersections shall be designed (and existing intersections redesigned) to provide equal service to autos, pedestrians and bikes. Landscaping and site design should be oriented to those choosing to make a trip by walking, bike or transit.

The purpose of street network requirements and design standards is to:

- Improve livability through street designs that improve safety, mitigate noise and pollution from vehicular traffic, and create a sense of identity.

- Provide for improved pedestrian and bike travel within SCPA's

- Encourage street networks and maximum connectivity of streets.

- The light rail station should be a physical and visual focus of the street / circulation network.

- Ensure safe, convenient and comfortable access to rail and bus transit from housing, jobs, shopping and community uses.

- Encourage pedestrian and bike access to public parks and other community uses, from housing, employment, and transit.

- Encourage multi-family units in new housing developments to orient to streets and other public spaces, as opposed to orienting buildings to parking lots.

- Encourage innovative site designs for detached and attached housing.
- Improve potential for pedestrian oriented housing design, by providing for vehicle access from rear of lot.

- Provide for traffic calming in existing and new residential districts, by establishing street designs that discourage speeding.

- Provide for street designs that complement the character and identity of culturally and historically significant properties and conservation districts.

- Provide opportunity for social interaction and additional green space in SCPA's.

- Encourage transit ridership through a cohesive development pattern in which public streets and other public spaces link (physically and visually) development districts within SCPA's, as opposed to streets which separate districts and land uses.

<u>Street Network Design Requirements</u>

- Continuously linked pedestrian ways and sidewalks
- Pedestrianized intersections
- Traffic signals placed for optimum visibility for pedestrian, bike, and auto travel modes.
- Illumination of intersections to provide clear visibility of pedestrians
- Simplified median crossings
- Mitigate potential hazard from backing on to street from angled parking and driveways.
- Coordinate access to provide for safe and convenient pedestrian and vehicle circulation.
- Landscaping, architectural or other design features that enhance views and vistas.
- Road layout and design that encourages walking and bicycling (over driving) for trips up to 3,900'.
- Block perimeter: Range __ feet to _ feet

Street Types and Standards

Divided Minor Arterial or Major Collector

Type "MA/MC-3LD" streets shall have two **16 ft**. pavement surfaces on either side of a **12 ft** landscaped median, centered within a **74** ft. Right-Of-Way. Each pavement surface shall include a 10 foot auto lane and a 6 foot bike lane. **5** feet wide sidewalks are located along both property lines, and separated from the pavement by **3' 6"** wide planting areas and standard **6 "** curbs. **6 ft** wide parallel parking area is provided both sides, adjacent to the bike lane. A minimum 5 feet PUE may be required on both sides of the street.

Station Community Minor Collector

Type "SCMC/2LD" divided boulevard shall have two **16 ft**. pavement surfaces on either side of a **10 ft** minimum landscaped median, centered within a **80** ft. minimum Right-Of-Way. Each pavement surface shall include a 10 foot auto lane and a 6 foot bike lane. **6 ft** wide parallel parking area is provided both sides, adjacent to the bike lane. **12' 6"** wide combination sidewalk and tree planting areas are located along both property lines, and separated from the pavement by standard **6 "** curbs. A minimum 5 feet PUE may be required on both sides of the street.

Type "SCC/2LB" streets shall have a **34** ft. pavement surface including gutter, centered within a **52** ft. Right-Of-Way. (Two travel lanes @ 11 ft each and two bike lanes @ 6 ft each.) **5** ft wide sidewalks are located along property lines, and separated from the pavement by **3.5** ft. wide planting areas and standard 6 inch curbs. A minimum 5 feet public utility easement may be required on both sides of the street.

Type "SCC/2LP" streets shall have a **34** ft. pavement surface including gutter, centered within a **52** ft. Right-Of-Way. (Two travel lanes @ 10 ft each and a two parking lanes @ 7 ft. each). **5** ft wide sidewalks are located along property lines, and separated from the pavement by **3.5 ft**. wide planting areas and standard 6 inch curbs. A minimum 5 feet PUE may be required on both sides of the street.

Village Minor Collector

Type "SCMC/V" streets shall have a **34** ft. pavement surface including gutter, centered within a **60** ft. Right-Of-Way. (Two travel lanes @ 10 ft each and two parking lanes @ 7ft. each) **5** ft wide sidewalks are located along property lines, and separated from the pavement by **7.5 ft**. wide planting areas and standard 6 inch curbs. A minimum 5 feet PUE may be required on both sides of the street.

Station Community Local

Type "SCL/P2" streets shall have a **34** ft. pavement surface , centered within a **52** ft. Right-Of-Way. (Two travel lanes @ 10 ft each and two parking lanes @ 7ft. each) **5** ft wide sidewalks are located along property lines, and separated from the pavement by **3.5 ft**. wide planting areas and standard 6 inch curbs. A minimum 5 feet PUE may be required.

Type "SCL/P1" streets shall have a **27** ft. pavement surface , centered within a **45** ft. Right-Of-Way. (Two travel lanes @ 10 ft each and one parking lane @ 7ft.) **5** ft wide sidewalks are located along property lines, and separated from the pavement by **3.5 ft**. wide planting areas and standard 6 inch curbs. A minimum 5 feet PUE may be required on both sides of the street.

Station Community Local / Multi-Use

Type "SCL/MU" streets shall have a **34 ft** wide maximum pavement surface which drains to the center, within a **40** ft. Right-Of-Way or Private Tract. The paved area shall include a minimum 18ft clear travel way between one foot wide OHSD Type mountable curbs. The remaining surface may be used for parking, street trees or landscaping in planters. 3 ft wide shoulders, finished with an ADA approved surface material, shall be located on both sides of the paved surface. The 3 ft wide shoulders must widen to 5 feet every 200 ft.
A minimum 5 feet PUE may be required on both sides of the street.

Station Community Alley

Type "SCA" public alleyway shall have a **16** ft. pavement surface which drains at the center, within a **20** ft. Right-Of-Way. Pavement shall be contained within **one** foot wide OHSD Type mountable curbs.

Orenco, Hillsboro, OR

A.2 Case Study: Retrofitting "Main Street"

Source: www.fhwa.gov

EAST MAIN STREET RECONSTRUCTION
Westminster, MD

The following case study is an excerpt from the Federal Highway Administration's report: "Flexibility in Highway Design".

BACKGROUND/PURPOSE
East Main Street has changed little since Jeb Stuart's cavalry pursued the 1 st Delaware down its dusty way on June 29, 1863, in a prelude to Gettysburg.

Pavement has covered the dust, sidewalks have replaced boardwalks, and utility lines have taken the measure of the maturing trees. In 1990, Westminster had more than doubled its population, to 13,582. At the perimeters, shopping malls beckoned.

The very age that had made downtown Westminster a National Register Historic District was slowly eroding its attractions. Rains lingered in puddles, because there was no storm drainage. Countless repavings had raised the street's center, resulting in slanted parking spaces that caught car doors on curbs. Porches, stoops, and utility poles encroached onto narrow, cracked, and caved in sidewalks. Vacant stores and office spaces attested to the decline.

After more than a year of planning and design, the Maryland State Highway Administration's consultants completed their drawings for East Main Street's revitalization in October 1990. In May 1991, the city had three new city council members, and the administration and public balked at a 12.2 m wide (40ft) roadway of two 3.6m (1Zft) travel lanes and two 2.4m (8ft) parking lanes. That scheme would have removed 42 trees, some dating back to the last century. The old roadway was 10.4 m to 11.9 m (34 ft to 39 ft) wide. The new sidewalks would have an average width of 1.5 m (5 ft), as cramped as the old ones.

ACTIONS TAKEN TO RESOLVE ISSUES
In March 1991, the Maryland DOT appointed a 10 member committee to come up with ideas, and the State sent designers to help this task force realize their ideas. By December 1992, after numerous sessions and hearings, the new plan was complete. The State paid for the extra design work, which amounted to $199,523. Construction began in April 1993 and, in December 1994, the 1.5km long (.93mile) project was open to traffic.

The desire to avoid removing 42 trees had been foremost, thus the total pavement width was reduced from 12.2 m (40 ft) to 11.0 m to 11.6 m (36 ft to 38 ft). In addition, to give trees breathing room, sections of curbing were extended 1.8 m (6 ft) into the parking lane of the roadway. In all, 34 of the 42 mature trees were saved, and 104 trees were added. Metal grates around each tree space keep the soil porous. The city paid the $36,000 planting and landscaping costs.

Sidewalks were widened from 1.5 m to 3.0 m (5 ft to 10 ft), and in some areas where there had been no sidewalks, there were now 1.2m to 1.5m (4 ft to 5 ft) walkways. There are 11 pedestrian friendly areas with landscaping. Existing telephones and mailboxes remained. Concrete pavers that look like brick add variety to these areas and crosswalks; they also echo the brick of the many historic buildings. Concrete curbstone provides a continuity of texture.

Brick-like concrete pavers, textured pedestrian crossings, trees, and low plantings provide a park-like flavor. Metal tree grates keep soil soft and porous, enhancing growth.

Traffic lanes were reduced in width from 3.6 m (12 ft) to 3.4 m and 3.0 m (11 ft and 10 ft), and transportation staffers feel they could have been as narrow as 2.9 m (9.5 ft), because traffic moves slowly. Often, inches are crucial to tree growth. The speed limit is 40 kph (25 mph), designed for 48 kph (30 mph). Parking lanes remain 2.4 m (8 ft) wide, and each space is marked with a "T" to make more efficient use of the space available. The designated spaces

make up for an 11percent loss of parking space, the equivalent of 19 onstreet spaces, used for existing and proposed tree planting. The original design, however, would have required the loss of 35 spaces, a 20 percent loss.

Important to Westminster's heritage, "street furniture," such as boot scrapers, hitching posts, and entranceways, was conserved. Archaeological digs during the construction phase unearthed a boundary marker, vault, coal chute, and well, items which can be preserved.

Source: www.fhwa.gov

LESSONS LEARNED

Not all goals were accomplished. Utility lines did not go underground, because the cost would have been $3 million plus added costs for new individual connections. Another route would have been the placement of utility lines above ground, although in the rear of buildings. Utility poles are now fewer but lamer.

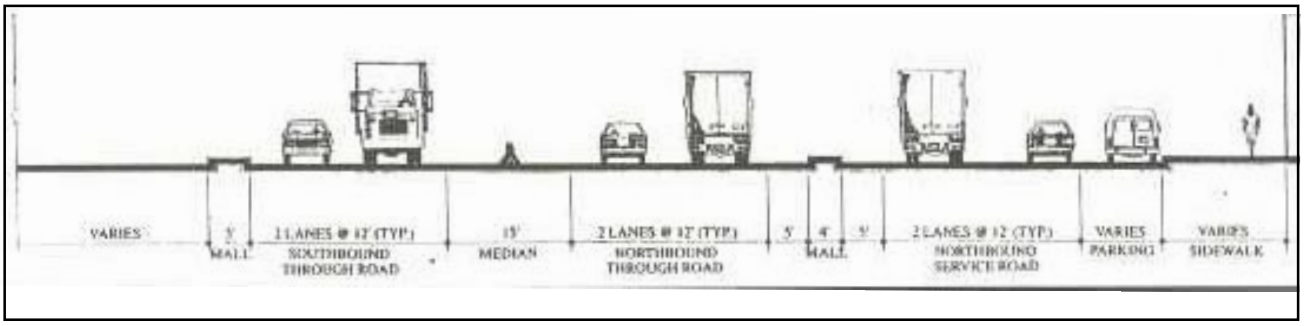
The cost of removing overhead utilities for 1.5 km (.93 miles) would have matched the $3 million road reconstruction cost. Utility poles were moved to avoid tree canopies, and thus the trimming of limbs.

In all, the city and State learned that citizen involvement at the beginning saves time and that the dollar cost for improved design was $199,523in a project that totaled $3,150,828. Realtors estimate that, because of the increased demand for downtown retail and office space, the added cost of the project will be made up in 4 years' revenues to the city. Current and future street improvement projects will involve residents and designers at initial stages and, as the construction takes place, flyers will tell people what is going to be done, when, and where.

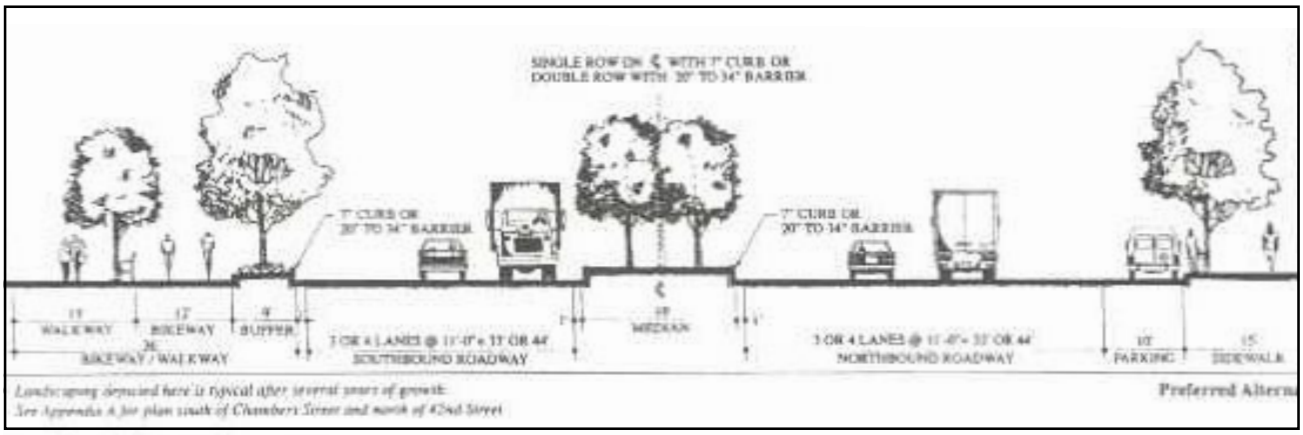
EAST MAIN STREET RECONSTRUCTION AT A GLANCE:

Setting:	Historic downtown in a small city
Length:	1.5 km (.93 miles)
Daily Traffic Volume:	14, 100 (1990); 15,000 (1996 est.); 22,000 (2010 est.)
Trucks:	6%
Type of Road:	Urban collector
Design Cost:	$199,523
Total Cost:	$3, 150,828
Key Design Features:	Staggered curbing, textured walkways, and pedestrian-friendly areas
Debit::	Utilities Above Ground
Similar Projects:	Carbondale, IL Frederick, MO Falls Church, VA

A.3 Case Study: Arterial Street



'Before' cross section, Rte 9 (source: www.fhwa.gov)



'After' cross section, Rte 9 (source: www.fhwa.gov)

ROUTE 9 RECONSTRUCTION
Borough of Manhattan, New York, NY

The following case study is an excerpt from the Federal Highway Administration's report: "Flexibility in Highway Design."

BACKGROUND/PURPOSE

After more than 20 years of planning and design efforts, the reconstruction of what was formerly known as the West Side Highway has now begun. The project proposes to reconstruct State Route 9A from Battery Place to 59th Street along the western edge of Manhattan. This 5 mile section of roadway lies at the southern end of New York State Route 9A, which begins at the Brooklyn Battery Tunnel and extends northward for approximately 76 km (47.5 miles), until it merges with U.S. Route 9 in Peekskille, NY in northern Westchester County. Commonly known as West Street, Eleventh Avenue, Twelfth Avenue, the West Side Highway, or the Miller Highway, this portion of State Route 9A plays a vital role in the regional transportation system of the New York metropolitan area.

Previously, this portion of Route 9A comprised the West Side Highway, an elevated limited access roadway originally constructed in the 1930's between the Battery and 72nd Street, and a service road and local service street beneath the elevated roadway terminating at 59th Street. After the collapse of a portion of the elevated roadway in the early 1970's, and in recognition of its overall deteriorated condition, the entire section of highway from the Battery to 59th Street was closed to traffic in 1974. The elevated structure was subsequently demolished in the late 1970's, and the existing atgrade roadway was repaved to serve as an interim roadway until a permanent replacement for the West Side Highway could be constructed.

Appendix

A proposal originally conceived in the early 1970's for the construction of a six to eight lane interstate freeway facility known as Westway, which would have been partly elevated and partly depressed below grade, was withdrawn in 1985. The Westway funds were redistributed to several transportation projects in the city of New York, one of which was for the reconstruction of the interim roadway and its improvement into a permanent facility. The primary purpose of the Route 9A reconstruction project is to address the numerous problems and deficiencies associated with the continued use of the interim roadway and to accommodate some of the traffic that was diverted to other streets in the area when the elevated roadway closed.

The Route 9A facility serves a variety of regional, arterial, and local transportation activities and needs. It is an important interconnection between the Brooklyn Battery Tunnel, the Franklin D. Roosevelt (FDR) Drive and the East River Bridges via the Battery Park underpass, the Holland Tunnel, the Lincoln Tunnel, and the West Side Highway/Henry Hudson Parkway, which provides access to the George Washington Bridge, the Cross Bronx Expressway, and points north.

The roadway is a major north south artery in Manhattan's street grid that serves through movements to and from the borough. It is also a local street that provides vehicular and pedestrian access to the activities, businesses, and residences that line its rightofway. The roadway also serves important intermodal functions by providing access to three Hudson River ferries, passenger liner terminals, excursion ships, and a heliport, and by serving as the terminus point for five crosstown bus lines.

The existing traffic volumes on the roadway reflect Route 9As importance in the region's transportation system. Route 9A serves regional, arterial, local, and intermodal transportation functions. Average daily twoway traffic volumes range from 69,000 to 81,000 vehicles. With the closure and demolition of the elevated West Side Highway, the New York City DOT estimates that as many as 10,000 vehicles per day have diverted to Manhattan's other north south routes, further taxing the capacity of these already congested roadways. At a number of the key intersections along existing Route 9A during peak travel hours, traffic volumes approach or exceed theoretical roadway capacity. At these times, vehicular travel speeds on several segments of the existing roadway have been observed to drop to less than 3 mph (normal walking speed). Clearly, the existing "interim" facility is in need of substantial improvement.

ENVIRONMENTAL AND DESIGN ISSUES AND CONSTRAINTS

In 1987, the city of New York and New York State established a joint West Side Task Force in an attempt to reach a consensus on what action should be taken to replace the deficient interim highway. The task force ultimately developed the concept of creating an atgrade sixlane urban boulevard as the most appropriate solution to the identified problems. The primary goals, objectives, and design principles developed by the Task Force formed the basis for the subsequent Environmental Impact Statement (EIS) and project planning and design phases of the Route 9A project.

The project encompassed the full gamut of issues and concerns associated with providing major improvements to an existing transportation facility in an established urban area. In addition to issues that are typically encountered in major improvement projects, such as potential impact on adjacent land uses (including parks and historic structures) and air quality and noise effects, a number of other considerations were addressed during the project planning and design process. These included the following:

The degree to which traffic using the facility would intrude into adjacent residential and commercial neighborhoods. The appropriate size of the median area. The accommodation of pedestrian movements across the highway from the existing developments on the east side to the planned linear park along the Hudson River waterfront. Separation of bicycle and pedestrian traffic. Access to commercial activities. The design of street light standards.

ACTIONS TAKEN TO RESOLVE ISSUES AND CONSTRAINTS

The alternative ultimately selected through the EIS process is a basic sixlane urban boulevard with three travel lanes provided on either side of a raised, Functional Classification: Principal urban arterial street

Design Traffic Volumes:	20-year projection from completion of project construction
Design Speed :	40 mph
Level of Service Sight:	D (desirable)
Distance:	Crest -275-ft; Sag -Riding comfort controls
Grades :	7% maximum, 5% desirable
Alignment:	573-ft minimum radius
Cross Slope:	2% (planar)
Superelevation:	4% maximum
Vertical Clearance:	14.5-ft minimum
Lane Width :	11-ft through lane
	11-ft left-turn lane
	1-ft offsets to curb or barrier
Number of Lanes:	6 to 8 with turning and acceleration lanes as necessary
Medians :	19-ft for mainline at-grade sections (face of curb to face of curb)
	4.5-ft minimum for depressed, elevated, and constricted sections
Curbs :	East side -7-in curb, Median -7-in curb and/or 20-in to 34-in barrier
	West side -7-in curb and/or 20-in to 34-in barrier
	Pedestrian ramps at all crosswalks
Shoulders:	None, except 2-ft eft and 6-ft right on structure at Canal Street and in
	depressed section at 34th and 42nd Streets, Parking lane east side
Drainage:	1O-year storm -surface and closed system
	50-year storm -depressed roadway
Border and Sidewalks:	15-ft -east side sidewalk, 8-ft where constricted
	15-ft -west side walkway, 8-ft where constricted
	9-ft -buffer area west side of roadway
Parking Lanes:	10-ft east side, commercial areas; 8-ft residential areas
Bikeway:	12-ft mainline; 8-ft min. where constricted
Street Lighting:	Roadway- 1.0 fc (see note)
	Depressed -5.0 fc
	Tunnels -50/5 fc, day; 5.0 fc, night
Horizontal Clearance:	2-ft from face of curb to fixed objects

Note: fc = footcandle

The facility will have 3.3m (11ft) travel lanes with .30m (1ft) offsets from the .50m to .85m (20in to 34in) barrier curb. The high barrier curb has been crash tested by FHWA Region 15 staff to a speed of 70 kph (45 mph) and is similar to that used on the Washington, DC area parkway system. The curb was selected as an alternative to the use of shoulders, which are preferred in the AASHTO Green Book for a facility of this functional classification and design speed.
The new facility uses a design speed of 65 kph (40 mph) and will have a posted speed limit of 55 kph (35 mph), even though the project's functional classification as a principal urban arterial street would have allowed for a much higher design speed to be used.

Appendix

Detailed Traffic Analysis
The traffic analysis performed as part of the EIS process was very detailed, and ultimately covered almost all of Manhattan. This analysis determined that virtually none of the users of the highway were traveling over its complete length, but rather using it to gain access to the eastwest street system on the island. The road thus operates, both today and in the future, as essentially a collector distributor system between the Brooklyn Battery Tunnel on the south and the elevated Henry Hudson Parkway on the north.

To prevent the intrusion of through traffic into adjacent residential areas, a number of the originally proposed median openings will be closed, allowing only right turn in and right turn out movements between the northbound boulevard travel lanes and the east west street system.

Pedestrian Movements
Pedestrian movements back and forth across the highway were examined extensively. Indeed, one of the major design elements of the project is the integration of the highway improvements with the pedestrian crossings to the planned Hudson River Waterfront Park. In addition, a small existing city park at 23rd Street will be greatly expanded (ultimately to encompass more than a full city block) both as a new urban amenity and to provide improved traffic operations in this area.

An associated feature is the use of a “bulbout” design along the east side of the highway at all intersections to better delineate the curb parking areas and to help minimize the pedestrian crossing distances across the travel lanes. These designs will be closely coordinated with the pedestrian crossing points on the landscaped median.

Separation of Pedestrian and Bicycle Traffic
In this part of Manhattan, as in many urban areas, there are significant conflicts between pedestrians and bicyclists. A design element incorporated to alleviate this conflict along the river side of the boulevard is the provision of a separate 4.9m wide (16ft) bikeway for use by bicyclists and rollerbladers (both recreational and commuter) and a parallel 4.6mwide (15ft) pedestrian pathway-promenade.

The Street Light Design Issue
As the design concept moved into the formal preliminary and final design phases, a major issue that was successfully resolved concerned the design of the street lights along the project. The design of the standard New York State Department of Transportation (NYSDOT)/city of New York steel street light pole was deemed by community representatives to be out of keeping with the overall urban boulevard concept.

After some additional research, it was discovered that the light poles that were being used in the privately developed Battery Park West (a mixed use office/retail/residential development) were replicas of a design originally found throughout the city of New York in the early part of this century. This replica design is being incorporated along the length of the project.

Other Notable Design Elements
No formal design exceptions were requested for this project by the New York State DOT. All the design elements are within AASHTO allowable ranges. Some of the special elements that have been incorporated into the final design of the project include the following:

Compatibility with the Hudson River Park Conservancy in terms of paving materials, dimensions of paving and planting strips, plant materials, and other elements.
Reuse of existing granite paving blocks found along the waterfront area as edge treatments between the separate bicycle and pedestrian paths.
Use of mixed plant materials (grass, shrubs, and trees) in the median area, as opposed to use of all trees or all grass, to better reflect the character of the adjacent land uses along each segment of the highway.

LESSONS LEARNED

This project has the potential for widespread application across the Nation as an illustration of the manner in which a collaborative, multidisciplinary planning and design process, incorporating a high level of continuous public involvement, can result in the creation of a world class street design.

It also illustrates how detailed investigations of travel demand and traffic movement patterns can result in a dramatic change in the scale of the proposed improvement, from a six to eight lane elevated urban freeway to a sixlane urban boulevard with a design speed of 65 kph (40 mph).

STATE ROUTE 9A AT A GLANCE

Setting:	Midtown Manhattan, New York, NY
Length:	8.2 km (5.1 miles)
Traffic Volume:	At 59th Street -northern project limits 3,600 vehicles per hour (1988 AM peak hour, peak direction) 3, 750 vehicles per hour (1998 AM peak hour, peak direction) 3,900 vehicles per hour (2018 AM peak hour, peak direction)
Design Speed:	65 kph (40 mph)
Type of Road:	6- to 8-lane, median-divided urban principal arterial street
Design Cost:	$18 million (1994 estimate)
Construction Cost:	$380 million (1994 estimate), including engineering design, construction supervision, right-of-way, and inflation
Key Design Features:	Use of lowered design speed to mitigate right-of-way impact and to reflect urban character of surrounding development; use of high barrier curbs along both sides of center-landscaped median and along road way edge with riverside linear park; treatment of pedestrian crossing areas; provision of separate pathways for bicyclists and pedestrians.
Debits:	None reported
Similar Projects:	West Main Street, Westminster, MD Carson Street, Torrance, CA