Context Sensitive Design Manual

Chatham County-Savannah Metropolitan Planning Commission

July 2007

Acknowledgements

Steering Committee

Chatham Urban Transportation Study / Metropolitan Planning Commission
Dennis Hutton, Mark Wilkes, Courtland Hyser, Jane Love, Wykoda Wang

Georgia Department of Transportation
Teresa Scott, Keith Melton, Andrew Hoenig, Butch Welch

Savannah Traffic
Mike Weiner

Preserving Savannah Neighborhoods
Beth Kinstler, Jack Knops, Ardis Wood

Savannah Tree Foundation
Bill Saxman, Dale Thorpe

City of Savannah Park and Tree Department
David White, Dennis Goldbaugh

SE Land Use Planning Commission
Dale Morgan

Georgia Department of Community Affairs
Steve Gavigan

Savannah Development Renewal Authority
Lise Sundrla

Pedestrian Advocates of the Coastal Empire (PACE)
John Bennett

Chatham County
Helen Stone (Commissioner) , Al Black, Al Bungard

Coordination

Metropolitan Planning Commission
Beth Reiter

City of Savannah
Peter Shonka

New Jersey DOT
Gary Toth

Glatting Jackson Team
Paul Moore, Avanish Pendharkar, Walter Kulash, Ian Lockwood

Table of Contents

1.0 Introduction **1**

2.0 Context Sensitive Solutions - State of the Practice **3**

3.0 The Design Manual Development Process **7**

4.0 The Inter-relationship Between Transportation, Land Use & Design **9**

5.0 Intent Of The Context Sensitive Design Guidelines **20**

6.0 Context Types In Savannah, Chatham County **21**

Landmark Historic Historic District
Neighborhood Historic District
Traditional Neighborhoods
Village Center

7.0 Context Based Roadway Functional Classification **23**

Arterials
Major and Minor Collectors
Main Streets
Neighborhood and Local Roads
Bicycle and Pedestrian Trails

8.0 Design Guidelines **25**

Transect vs. Functional Classification Matrix
Arterials
Major Collectors
Minor Collectors / Main Street
Local Street
Guidelines for Developing Canopy Streets

9.0 The Process For Context Sensitive Solutions **49**

10.0 Interim Amenity Solutions **51**

Appendix

A. Roadway Design Elements
B. Bicycle & Pedestrian Trails
C Guidelines For Connectivity And Built Form
D. Additional Sources and Reference Material Links

1.0 Introduction

In recent years, Savannah and Chatham County have undertaken a number of initiatives intended to shape growth and development in the region for the coming years. Among these efforts have been the Tricentennial Plan to guide regional growth and the Connecting Savannah study aimed at addressing east-west mobility issues and giving the region's citizens access to the transportation planning process. However, there remains sentiment in the community that not all of the transportation projects being built are serving to make the city and county a better place. Among these concerns are the impacts of recent projects on the region's renowned tree canopy.

In response to growing concerns with the loss of canopy trees and quality of life and environmental impacts of road construction projects, the Chatham Urban Transportation Study (CUTS) initiated a planning effort to develop a context sensitive design process for roadways known as the Transportation Amenities Program. The goals of this effort are consistent with the other area planning efforts, but are more focused on the design phase of transportation projects. In the form of a resolution undertaken by CUTS, a vision of the type of transportation systems desired for Savannah and Chatham County can be ascertained. The community's desired outcomes reflected in that resolution included:

- Trees, especially canopy trees, as an historic, essential element of Savannah and Chatham County
- Streets that include provisions for automobiles, bicycles, pedestrians and landscaping
- The provision for all of these uses as an integral part of the planning and design process

The challenge that this vision presents, however, is greater than one might initially imagine. Like most places in the United States, Chatham County has developed many (perhaps mostly) large, fast roads over its recent history. While the provision of bicycle and pedestrian facilities seems a universally supportable goal, these travel modes are particularly vulnerable to interactions with high speed automobile traffic. In fact, as the following table illustrates, the mixture of pedestrians with high speed automobile traffic can prove fatal.

Vehicle Speed	Percentage of Pedestrian Fatalities in accidents
15 Mph	3.5%
31 Mph	37.0%
44 mph	83.0%

Source: National Highway Traffic Safety Administration
Federal Highway Administration

Likewise, canopy trees are difficult to integrate with high speed automobile traffic. Once vehicle design speeds rise above 40mph, federal guidance calls for lateral separation of 10 feet from the traffic flow. State policies often call for even greater setbacks. These types of setbacks make any effective tree canopy design impossible.

If the future outlined in the CUTS resolution is to become a reality, there clearly must be a long-term, sustained effort to identify areas where bicycles, pedestrians and trees are a primary desire, and make sure that the transportation designs undertaken in such areas make these elements compatible. Many communities are finding that the long desired goal of providing unlimited, fast capacity for cars, is not always in the best interest of the community. In fact, some of the underlying assumptions (more lanes = more efficiency; faster traffic = higher capacity) are simply, technically untrue. The key to implementing CUTS' goals long term is to find the areas where a balance of vehicular mobility and community goals can be woven into the planning process in a technically sound way.

Process Change In Savannah and Chatham County

The first phase in identifying these places was the documentation and conservation of existing transportation amenities such as canopy roadways, palm lined causeways, historic road segments, scenic vistas, and existing community gateways which the community desires to preserve. These identified corridors are illustrated on the following page. The corridors with these amenities have been designated as constrained corridors in the MPO's Congestion Management System, the 2030 Long Range Transportation Plan, and the Tricentennial Plan. The designation stipulates that vehicular improvements to these corridors will be limited to management strategies such as signal timing, signal coordination, access management, turn lanes, intersection geometry improvements and the like. The intent is that the vehicular performance along these corridors will be balanced against community factors that, historically, have not been given much weight.

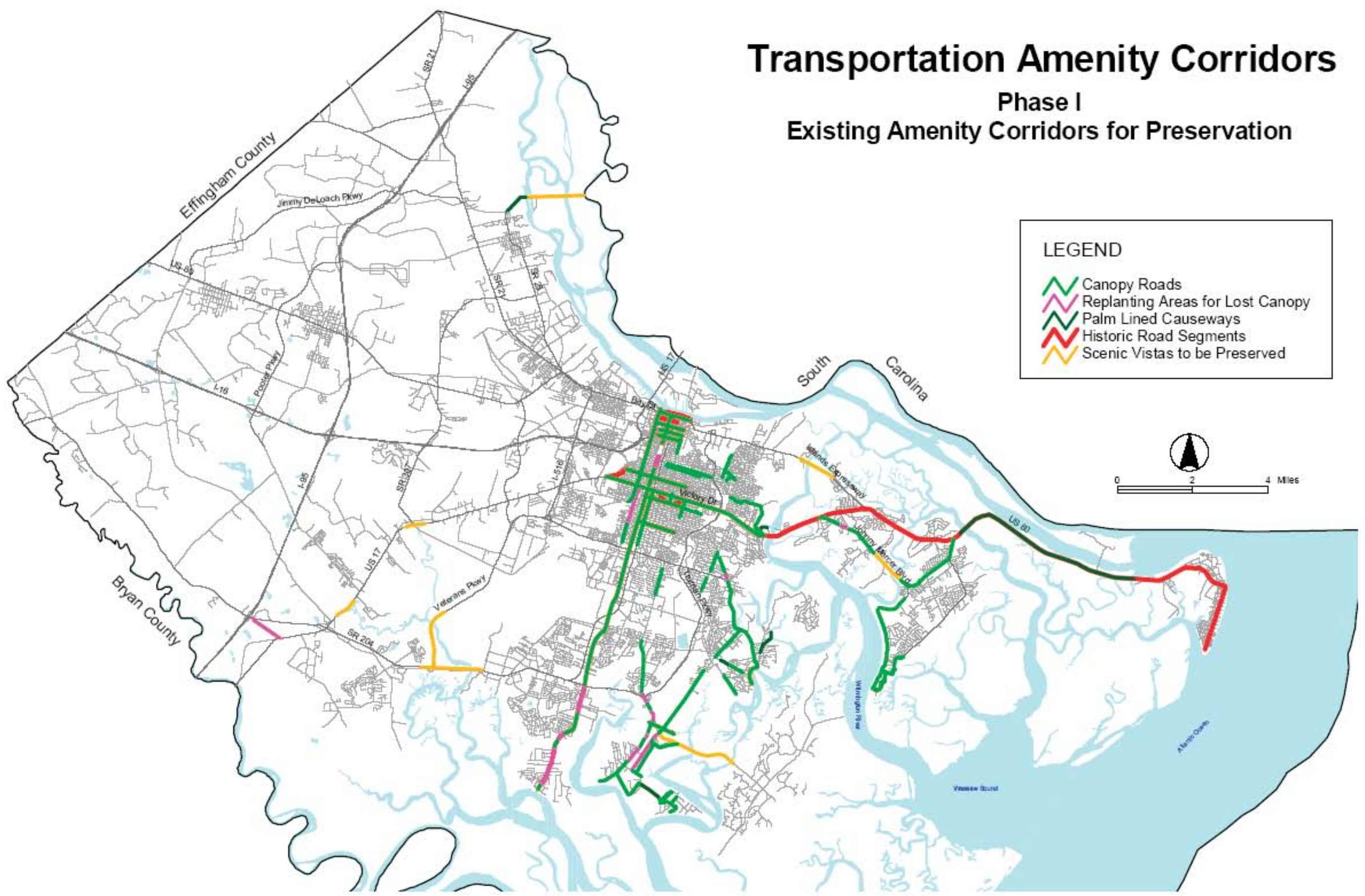
Phase Two of the program, which is the subject of this manual, involves the development of design guidelines and a design process that will incorporate desired transportation amenities into road construction projects. Toward that end, this design manual addresses many areas that might seem peripheral to CUTS' stated goals (roadway network, land use, etc.), but which in fact relate to how the pieces of a community fit together. Taken as a whole, the processes and guidelines can have the effect of pushing future projects closer to a balanced, livable system. All of the guidelines included in this document are consistent with American Association of State Highway and Transportation Officials (AASHTO) and Georgia Department of Transportation (GDOT) guidelines as well as local standards.

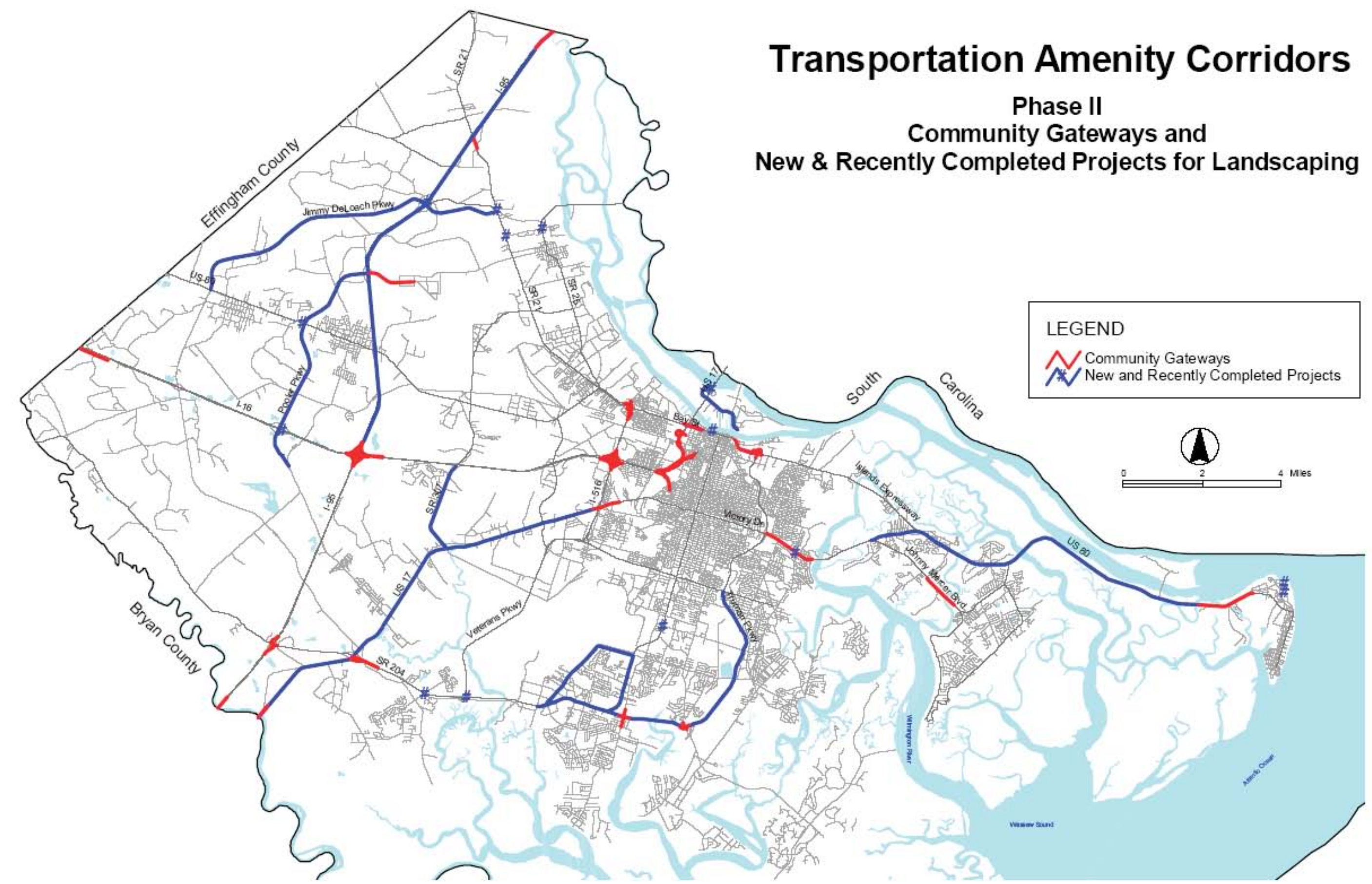
It is hoped that these guidelines will show sensitivity to Savannah and Chatham County's history and character by providing not only for automobiles, but for canopy trees, landscaping, pedestrian and bicycle facilities, as well as public transportation. The guidelines have been developed in such a way as to allow them to be adopted and codified into local ordinances.

However, this document alone cannot implement the types of fundamental changes that CUTS has envisioned. The type of history and character for which Savannah is internationally renowned does not happen by chance. All of the local municipalities will have to make a commitment to better projects; both in terms of policies and implementation. While admittedly a long and arduous process, the end result will be to keep all of Chatham County the special place it was always meant to be.

2030 Long Range Transportation Plan

The 2030 LRTP identified both constrained and new construction corridors. It is important that the community identify design guidelines to assure that both types of facilities are consistent with their context and with their community goals.





2.0 Context Sensitive Solutions - State of the Practice

Concepts and principles born out of a context sensitive solutions (CSS) approach help develop transportation projects that serve all users and are compatible with the surroundings through which they pass – the community and the environment. Based on a process that identifies issues and concerns expressed by stakeholders and the community, successful CSS are results of a collaborative, multidisciplinary and holistic approach to transportation planning and project development. It involves a process of balancing competing interests and needs related to various issues at the very early stage and developing a balanced set of objectives based on needs and conditions specific to each project and its context.

What is CSS?

CSS is a different way to approach the planning and design of transportation projects. It promotes flexibility in the application of design controls, guidelines and standards to design a facility that is safe for all users regardless of the mode of travel they choose. The CSS process cannot guarantee resolution of issues or even alleviate all contention. It can, however, help identify issues that need resolution by keeping community values foremost in the evaluation of alternative solutions. A successful CSS process builds consensus among various stakeholders to reach the best possible solution and promotes community ownership as a result.

Brief History of CSS

Context Sensitive Solutions (CSS) began in 1991, when Congress passed the Intermodal Surface Transportation Efficiency Act (ISTEA). This legislation emphasized that, in addition to being safe, projects should be sensitive to their surrounding environment, especially in scenic or historic areas. Then in 1995, when the National Highway System was enacted (23 USC 109(c)), the planning and design guidelines stated that designs may take into account: the constructed and natural environment of the area; impacts of the project upon environmental, scenic, aesthetic, historic, community and preservation interests; and access for other modes of transportation.

In 1997, the Federal Highway Administration (FHWA) published the “Flexibility in Highway Design” document which grew out of FHWA’s strategic objective of providing safe and community friendly transportation projects nationwide.

The next year, two events - the Maryland Department of Transportation’s national workshop on “Thinking Beyond the Pavement” and the subsequent selection of the states of Utah, Kentucky, Connecticut, Maryland and Minnesota for Context Sensitive Design (CSD) pilot projects by the FHWA and share the results, spurred the implementation of context sensitive solutions across the country.

The awareness of context sensitive design began to grow and more conferences and workshops began to highlight the importance of this process. The FHWA, in 2003, commissioned Project for Public Spaces (PPS) to create a website for context sensitive solutions as a resource to facilitate its integration in the project development process.

Since then, more publications have appeared and conferences and workshops have been conducted to enhance the understanding of CSS on transportation projects.

Techniques of applying CSS Principles in transportation planning (FHWA)

(Source: http://www.fhwa.dot.gov/planning/csstp/cssqa.htm)

The FHWA lists the following examples as possible techniques for applying CSS principles in transportation planning. Note that the realm of possibilities can extend beyond some of the techniques mentioned.

The community context audit

- This Pennsylvania Department of Transportation (PennDOT) process is a technique used to identify CSS in transportation planning as part of the overall Community Impact Assessment.
- The audit is performed early in the process as part of project identification in order to provide necessary documentation for supporting development of a project’s purpose and funding allocation.
- PennDOT uses this technique to incorporate the views of various stakeholders as part of a multi-disciplinary approach.
- This approach is intended as a guide for identifying various community characteristics that make each transportation project location unique to its residents, businesses, and the general public by considering the community’s history or heritage, present conditions, and anticipated future conditions.
- This approach is used to define the purpose and need of the proposed transportation improvements based on community goals and objectives and local plans for development

Scenario Planning

- Scenario planning is an analytical tool that provides transportation professionals with a framework for developing a shared future vision by analyzing various forces that affect growth (e.g., health, transportation, economic, environmental, and land-use).
- Scenario planning may be conducted at the Statewide or metropolitan levels to test various future alternatives that meet State and/or community needs.
- A defining characteristic of successful scenario planning is that it actively involves the public, business community, and elected officials on a broad scale, educating them about growth trends and trade-offs, and incorporating their values and feedback into future plans.

Placemaking

- The philosophy of “placemaking” centers on the belief that a public-participation process defining and responding to community conditions and needs from the outset is one of the most critical factors in achieving transportation design that is truly sensitive to its context.
- Placemaking begins with a thorough understanding of the dynamics, desires, and conditions within a community.

- Photographs can be utilized to make a systematic quantitative assessment of a community's visual quality through a visual preference survey. Other tools and techniques to assist with gaining a better understanding of a place include: mapping special places as an exercise with the community; creating a photographic inventory of important scenic resources, landscape features and community characteristics; comparing photographs of locations within the community over time to understand physical development; assessing change in the community; comparing development patterns; and visualizing a change that may impact community valued resources.
- Resources include current and historic photographs and aerial photographs, maps, photographic samples of public space in the community, and visual preference surveys.
- Also included is imagining the future through the use of visualization techniques (e.g., photo enhancements, artist renderings, three-dimensional animation, videos, and scaled models).

Efficient Transportation Decisionmaking Processes (ETDM):

The Florida DOT's (FDOT's) EDTM process links land-use, transportation, and environmental resource planning, and facilitates early and interactive involvement to produce better environmental outcomes. As a result, FDOT is improving context sensitivity and the quality of decisions and environmental investments.

For more information, go to http://www.dot.state.fl.us/emo/ETDM.htm

Geographic Information System (GIS) Applications:

GIS-based Environmental Information Management and Decision Support Systems (EIM&DDS) in planning can facilitate analysis and support decision making for:
- Project screening;
- Analyzing progress toward environmental goals and objectives;
- Comparing transportation plan alternatives and impacts; and
- Considering avoidance of sensitive resources such as archaeological sites, wetlands, and protected habitat areas.

Context Sensitive Solutions : Efforts Around the Country

Context Sensitive Design / Solutions can be generally categorized into two broad aspects
- The process: that involves stakeholder and public participation and the tools used to achieve the desired result that is borne out of a commonly accepted set of decisions.
- The product: that takes into account the physical context of the place where the context sensitive solutions are applied through flexibility in standards, aesthetic appeal or clearly "out of the box" design solutions.

"CSS is about "open, honest, early and continuous" communication and sharing of information and knowledge - not just professional knowledge, but the knowledge that communities and stakeholders bring to a project from their personal experience. CSS involves structuring a planning, design, and implementation process that is collaborative and creates consensus among stakeholders and the transportation agency. A multi-disciplinary approach to the project development process allows "the context" to be addressed from the point of view of more than just the transportation function. However, a well executed CSS process does not guarantee excellence in transportation design. The design "product" should reflect the well crafted combination of the CSS process element and the skilled early input of the designer."
(source: http://www.contextsensitivesolutions.org/content/topics/process/)

In the state of New Jersey, the Congestion Relief and Transportation Trust Fund Renewal Act signed into law in July 2000, requires the New Jersey Department of Transportation to have a context sensitive design program. It involves a commitment to a process that encourages transportation officials to collaborate with the community and stakeholders at the very early stages of a project. With formal training, engineers, project managers and community relations representatives, as well as consultants and community leaders have been trained in techniques to ensure good communication, consensus building and community participation, negotiation and conflict resolution – the tools necessary to ensure an effective process.

As a part of this process, residents must also develop a formal concept of what they want their towns to look like in five, ten and twenty years. NJDOT can then be a partner in fulfilling that vision and also explain any of its limitations on delivery of the project so local expectations can be realized. Such collaboration has resulted in creative transportation solutions that have stressed the importance of context and have responded through flexibility in design. Four key Principles of New Jersey's CSS program are:

Actively Seek Wide Public Involvement Early and Continuously
Develop Designs that Meet the Needs of Specific Sites
Work Collaboratively to engage a multidisciplinary team of professionals and public officials
Use the Flexibility Contained in the Current (FHWA)Design Guidelines

More recently the Georgia DOT has published an online version of their context sensitive design manual. It sets out the policy guidelines and procedures for communication strategy, interdisciplinary teamwork, design flexibility, environmental sensitivity and stakeholder involvement which GDOT project managers and design engineers can use to achieve successful context sensitive solutions. Its five principles of achieving CSS are based on the above and the overarching premise that a good process will lead to good solutions.

Many examples around the country highlight the fact that often it is the process that leads to a better product. Significant involvement of the public and continuous solicitation of input, interagency involvement and the tools and methods for making the interaction happen are key elements of the CSS process.

Carrying out a collaborative design process is a difficult task because of the number of players involved and the need to respond to varying opinions. This task is amplified when design decisions are required. In such a situation, a "charrette" is one of the many useful tools that helps to flush out issues and subsequently the design options in a limited time frame. The National Charrette Institute is a non-profit educational institution that helps people build community capacity for collaboration to create healthy community plans. They have an established process called the "dynamic planning process" that involves stakeholders and professionals and helps to build plans from conceptual stages to implementation.

U.S. Route 50, Virginia

(A case study that demonstrates the design response for a highway project as it passes through various contexts)

The Project: This project is a national demonstration project, funded under TEA21.The corridor of Route 50 under study begins in the village of Paris, Virginia and continues through Upperville, Middleburg, Aldie, and ends at Lenah.

Location: Loudoun-Fauquier Counties, Virginia

Context Setting: Rural

Road Classification: Minor arterial

Stakeholders: VDOT, the Virginia Department of Historic Resources and the Virginia Outdoor Foundation for 106 Coordination and Preservation Easement information

The Process:

The intent of the project is to employ traffic calming measures that will require drivers to comply with posted speed limits within the towns and along the intervening roadway segments.

Before a consultant team was hired for the project, a task force of interested citizens, local elected officials, a member of the Commonwealth Transportation Board and VDOT was formed. During the day informal meetings were held to introduce the consultants, the project concepts, and listen to those that choose to be heard. Through the 3- day period a list of potential stakeholders was developed. Members of the design team were available to meet with interested parties throughout the concept development portion of the project

Lessons Learned:

An important element of the CSD approach with this project was the willingness of the engineers to get away from a template mentality where often a typical section is designed and then uniformly applied to large areas of the corridor. The design team has been particularly sensitive to the need to look at design elements in the context of the existing resources so they enhance these resources, not overwhelm or detract from them. Having a design team that brings a full appreciation for the flexibility in the design guidelines has been very important along with the ability to research and bring for consideration successful design concepts from other states and countries.

Euclid Avenue, Lexington, Kentucky

(Road diet as a effective means of improving mobility and enhancing the multi-modal character of the corridor)

The Project: Euclid Avenue is a state maintained minor urban arterial that runs along the northern boundary of the University of Kentucky campus. The purpose of this project was improvement of mobility needs of the area due to congestion at some intersections along the corridor. The route serves local traffic and regional commuters, with mixed land uses of retail and housing. The project involved resurfacing and restriping an existing 4-lane road into a 3-lane road with bicycle lanes.

Location: Lexington, Kentucky

Context Setting: Urban

Road Classification: Urban Arterial

Stakeholders: Kentucky Transportation Cabinet, Lexington-Fayette Urban County Government (LFUCG), City Council and community members

The Process:

The initial plan to convert Kentucky Avenue from an existing 4-lane road to a 5-lane section without acquiring additional right-of-way met with significant opposition from the public. An alternative plan that took into consideration pedestrian and bicyclist needs featured a 3-lane road with bicycle lanes along the entire corridor. Use of a single corridor for all modes of transportation,(i.e., passenger cars, public transportation, bicyclists, and pedestrians) was the context sensitive solution. In order to promote proper use of bicycle lanes, an education campaign was launched as part of the project.

Lessons Learned:

The flexibility and open mindedness of the KyTC to consider alternative designs and implement concepts suggested by the public indicated to the public that their opinion is valued and is seriously considered and the level of trust increased.

LFUCG’s support to develop a pedestrian and bicycle-friendly corridor was essential to the project’s success

The road diet concept has worked very well by reducing speeds without increasing traffic congestion. The Case Study for this project can be found online at: http://www.contextsensitivesolutions.org/content/case_studies/kentucky_euclid/resources/kentucky_euclid_pdf/

New Jersey Future In Transportation Project: Route 31 in Hunterdon County, New Jersey

(A case study that demonstrates the benefits of building local network solutions to congestion and capacity problems)

The Project: Congestion on Route 31 in the Raritan Township / Flemington Borough area has been a growing concern for area residents, business owners and elected officials. Since 1987, NJDOT has studied a number of alternatives that included adding turn lanes at various intersections, grade-separating the Flemington circle and the Flemington “Bypass” – a 4 laned limited access highway from Route 202 to Route 31.

Location: Raritan Township / Flemington Borough in Hunterdon County, NJ

Context Setting: Suburban and Historic

Road Classification: New Jersey State Route

Stakeholders: NJDOT, Flemington Borough, Raritan Township, Hunterdon County, Flemington Raritan Business Association, FHWA

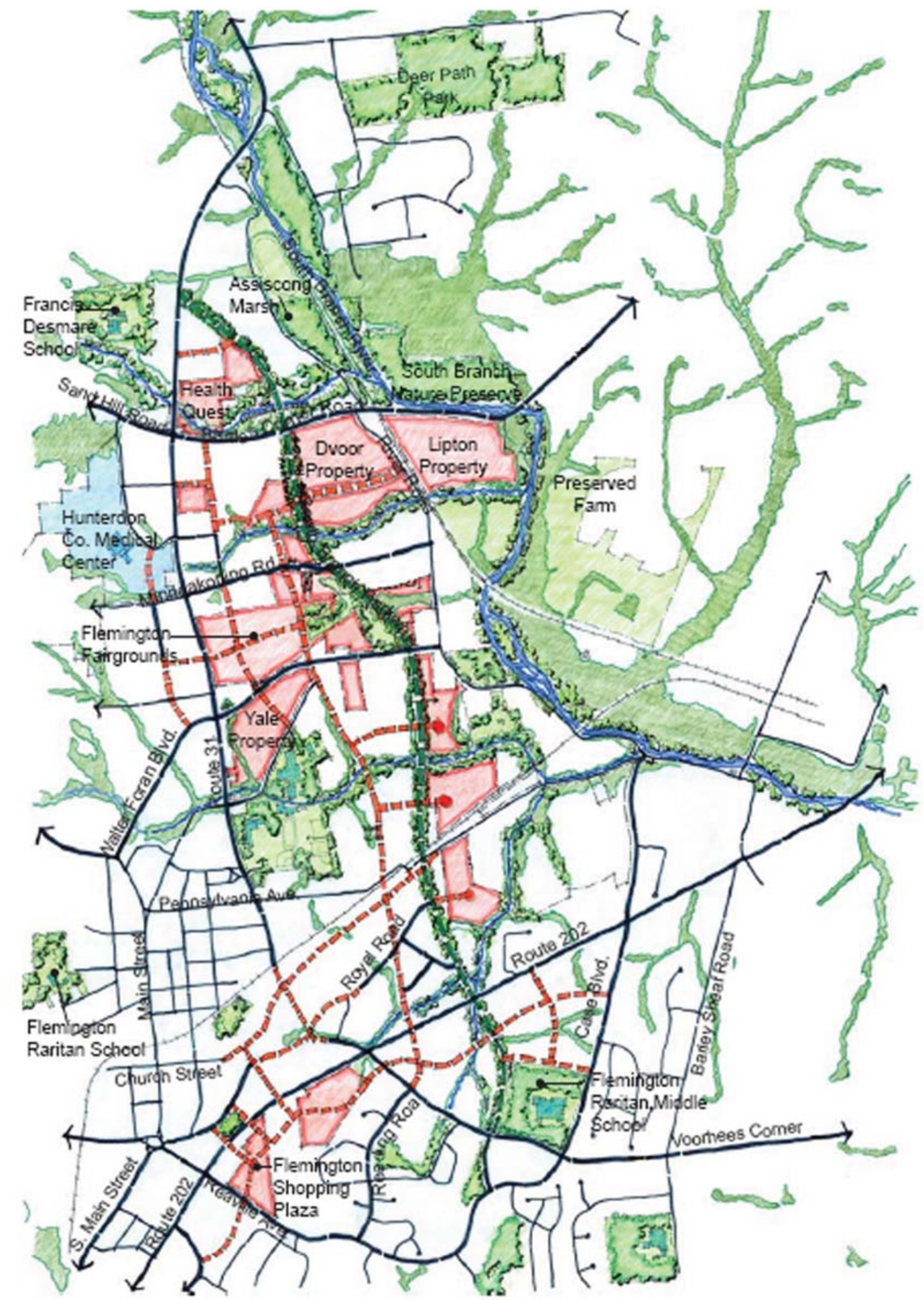
The Process:

Instead of trying to solve congestion on Route 31 by building a bypass, the New Jersey Department of Transportation (NJDOT) officials along with a team of consultants explored the possibility of enhancing the area’s transportation network. In doing so, they engaged stakeholders and local residents in a discussion about the existing transportation network and the future land use aspirations. At the same time, as local residents became aware of their cultural resources, the NJDOT, the consulting teams and the local stakeholders came up with the South Branch Parkway Framework Plan through a multi-day charrette process. The new system envisioned in this framework plan will include the “South Branch Parkway” and an enhanced street network to encourage pedestrian and bicycle movement throughout the area and increase connectivity. More direct routes between areas of housing, employment, and retail will also be provided. This process gave the residents a better way to relieve traffic while enhancing the area’s transportation network and preserving its natural, historic, and cultural resources.

Lessons Learned:

An important element of this process was the willingness of local residents and engineers to move away from the “standard road widening or the limited-access highway” type approach.

It was also imporant for NJDOT to understand the “wins” for all the concerned stakeholders and providing them with solutions that could help them get access to their properties and develop solutions that built into enhancing connectivity for local trips within the town.



New Jersey Route 31 Land Use & Transportation Framework Plan

3.0 The Design Manual Development Process

There are many design guidelines and manuals available both developed within Georgia and around the country. So why do we want to spend time developing another set of guidelines? Because the available guidelines do not fully or adequately address the unique needs of Savannah and Chatham County. While all of the other available guidance such as the AASHTO Manual or Georgia DOT's Plan Development Process and Context Sensitive Design Manual are important resources, the guidance they provide reflects a broader range of needs and values. We are interested in determining and documenting what design elements are important to consider within the context of Savannah and Chatham County.

In order to assure that those local values were reflected, we felt it was important that the technical process be locally driven. In order to accomplish this, a process of local involvement, workshops and one-on-one stakeholder discussions formed the basis of the development process. The following paragraphs describe this process and how it informed the ultimate development of the manual.

Stakeholder Workshops
Two major stakeholder workshops were undertaken during over the course of development of the manual.

Workshop #1
The first of these was three day workshop, the final day of which was a day long work session with local and agency stakeholders on July 27, 2006. This was an interactive session that involved both presentations by national experts such as Walter Kulash and Ian Lockwood, and work sessions dealing with the application of ideas to real Savannah and Chatham County problems. The following sessions were a part of the workshop:

- Definition of Context
- How Does Process Impact Design?
- Elements of Design
- Community Support and Implementation

We also had "case study" work sessions with the participants during which we selected a few projects or areas of local interest and explored how the principles we were discussing might be applied. Some of the details and lessons of these work sessions can be found throughout this manual. The three case studies undertaken were:

1. DeRenne Avenue (Page 11)
2. East President Street (Page 22)
3. Victory Drive (Page 24)

The workshop was adjourned with an agreement to reconvene at a second workshop to review draft materials as they come together.

Peer Work Session
In order to provide better insight into how the design process works in a real transportation agency, a design peer session was integrated into the first workshop featuring Gary Toth of New Jersey DOT. Gary has 30 years of experience within the New Jersey Department of Transportation (NJDOT), and is currently Director of Project Planning and Development, charged with generating a half a billion dollars of new starts for NJDOT on an annual basis. Gary is one of the originators of the NJDOT Task Force on Context Sensitive Design (CSD) which has been working to implement CSD "Thinking Beyond the Pavement" principles within NJDOT since to the City, County and State's design engineers who were part of our stakeholder group. Gary worked with the team and stakeholders on the second day, and during the full day stakeholder session, he gave a presentation entitled "Managing Process Change at NJDOT." As the workshop attendees broke into work tables to pursue the local case studies, Gary's experience proved to be a valuable resource to the stakeholders.

Workshop #2

The second workshop was a single day event meant to update and build upon the work of Workshop #1. This work session with local and agency stakeholders was held on October 20, 2006. Since some additional stakeholders who were not a part of the first workshop were in attendance, the session began with an introduction and review of the work done to date. This included a description of the CUTS transportation amenities program and the purpose of this project. There was a discussion about the unique aspects of the character of Savannah and Chatham County. The practical benefits and obstacles of these characteristics were discussed as well. For example, not only are trees an integral and aesthetically pleasing part of the community's character; they have a positive impact on safety, and they are difficult to implement of high speed roads. By framing the issues relative to measurable parameters, a discussion of the issues and needed actions was fostered. In particular, issues related to transportation design, such as vehicle speeds, pedestrian and vehicle conflicts and baseline standards were discussed. A review of the work sessions from workshop #1 was provided. This led to further discussions about the types of ideas and solutions generated in these sessions and their real applicability in Savannah and Chatham County.

Next, a discussion regarding some of the more technical design elements was begun. This included detailed discussion of the impact of speeds on vehicle capacity, the statistical safety of pedestrians in high speed vehicle environments, the need for a hierarchy of street functional classifications, and the role of streets (access, mobility or both). This led to a discussion of the need for a connected street network, such as the one that exists in downtown. Such a complete network is more effective than typical suburban forms. The discussion moved to community context and how streets can be matched to their context.

Finally, a series of work sessions were undertaken with the participants. The first was to undertake a review of the draft sections of the manual that had been developed. The participants made a number of suggestions that helped in the subsequent editing and completion of this manual. A second work session talked about the ideas of limiting the number of lanes on a given street. The technical consequences of road widening versus providing more network, as well as the implementation considerations were discussed. Issues such as right turn lanes, lane width, vehicle speeds and tree placement were all discussed. The unique aspect of these discussions is that they were held on a technical basis, but with a predominantly non-technical audience. This type of forum is beneficial in order to frame these technical issues in a more comprehensive context of community vision and goals.

Stakeholder Discussions

Before, between and after the workshops, a series of individual stakeholder discussions were undertaken. The intent of these sessions was to listen to the needs perceived by individuals and to generate ideas to make the manual more useful. The following sections describe those sessions.

Joe Palladi and Keith Melton, Mark Wikes participated by phone (Mr. Melton also participated in the workshop)
Georgia DOT

The meeting began with a discussion of GDOT's new online CSD manual. Mr. Palladi indicated that while the manual had been well received, challenges remained in having these policies translate into real designs. Among the obstacles seen by GDOT are cultural differences between agencies and departments, communication issues during the planning and design process, and misunderstanding of expectations and responsibilities:

1. Regarding cultural differences, Mr. Palladi indicated that ideas regarding flexible design standards were far from unanimous within the department and that those differences could be even greater between GDOT and outside agencies or stakeholders.
2. Communication issues arise due to the nature of the design process. As project planner hand a concept off to environmental planners and project designers, critical elements of the preceding decision-making process are often not communicated, opening the possibility for well-intentioned reversal of those decisions at a later date.
3. Often the designers do not consider larger community considerations (land use, revitalization, community character) to be an integral part of their charge. This makes the communication issues even more important.

Mr. Palladi illustrated on a diagram of the Department's Plan Development Process that ideally, the parties responsible for preliminary design would have some involvement at the planning phase, and the project planners would remain involved into the design phase. These ideas, while again not universally accepted within GDOT, might point out an area of the process that requires further attention. Mr. Palladi and Melton both stressed that addressing issues of maintenance responsibilities and costs were important.

Finally, Mr. Melton suggested that while certain key projects could benefit from greater attention to these issues by all parties, the identification of those projects is an open question. How these projects are identified and by whom must be a topic of discussion between GDOT and partner agencies and jurisdictions.

Al Bungard and Al Black
Chatham County

A meeting was held between Al Bungard and Al Black of Chatham County and Mark Wilkes and Paul Moore. At this meeting, the County was given a copy of the draft manual for review. A discussion was also held about the contents of the manual, the intent of the document and the County's philosophy about context sensitive design and its implementation. Mr. Bungard indicated that he was supportive of context sensitive design concepts and felt that they should be implemented where possible. He expressed some concerns about the potential for project delays, particularly where Georgia DOT was involved.

Steve Gavigan *(Mr. Gavigan also participated in the workshop)*
Georgia Department of Community Affairs

In a telephone interview Mr. Gavigan expressed an interest in and ideas about how landscaping could become a more integral part of roadway designs. For example, while recognizing some of the safety concerns often cited by engineers regarding trees in street medians, Mr. Gavigan suggested that various low-scale native plants could provide a vertical landscape element and provide no safety hazards to motorists. He suggested plant materials such as the saw palmetto shrub could even provide a "cushion" around street trees to protect wayward motorists. He was interested in exploring details such as the allowable tree canopy to be included in transportation projects.

He suggested that a difference should be recognized between new road construction and projects on existing road facilities. Related to that is the replacement of existing trees, which Mr. Gavigan does not believe is happening. By way of example he cited Stevenson Avenue which was supposed to have been 4 lanes plus a landscaped median, but was built as a 5 lane section with a center turn lane. More public awareness of the processes that lead to these decisions would also be welcome.

Joyce Murlless
Wilderness Southeast

In a telephone interview, Ms. Murlless expressed excitement and optimism that the MPC was undertaking this process. She is concerned that the Georgia DOT and the County do not always give broad community concerns due consideration. She had particular concerns regarding the previous work and future plans for the Truman Parkway (in particular the Whitfield Avenue area) and the Whitfield Avenue/Diamond Parkway area.

David White *(Mr. White also participated in the workshop)*
Savannah Park and Tree

In a telephone interview, Mr. White expressed an interest in the design and treatment of the Phase V Truman Parkway design and construction across the marsh.

Peter Shonka
City of Savannah

Mark Wilkes and Paul Moore had a brief meeting with Peter Shonka, the City Engineer, and walked him through the components of the draft manual. The primary outcome of this meeting was a commitment by Peter to review the manual from the City's perspective.

Peter Shonka and Mike Weiner
City of Savannah

A telephone interview was held between City of Savannah staff, the MPC and the consultant to discuss the City's review of the draft manual. This discussion largely revolved around specific dimensions and the pros and cons of various approaches were discussed.

4.0 The Inter-relationship between Transportation, Land Use and Design

While this manual is specifically about creating better transportation projects, the concepts of transportation, land use, and design are interrelated. Understanding this interaction is necessary to evaluate potential solutions to traffic problems and to avoid the impacts and environmental degradation that often accompany growth. Furthermore, recognition of this interaction allows policy makers, developers, and citizens to evaluate transportation investments in terms of broader community goals, rather than simply vehicle movement.

This section provides a brief introduction to transportation terminology and concepts, and describes the direct relationships between transportation, land use, and design. Important definitions and concepts related to the subjects of transportation, land use, and design are discussed. Each concept is integral to understanding how transportation, land use, and design principles interact with one another. These ideas are then applied to the four major corridor types present in Chatham County. General recommendations are made regarding how best to ensure optimal integration of these principles for future transportation investments, given various contextual and design parameters.

The original plan of Savannah is a great testament to the fact that cities were once planned according to the proven principles that allowed for growth, change, and evolution over time. Well connected streets, convertible buildings, abundant open space and the presence of trees are all basic principles that can be successfully applied to any community, regardless of scale. Such a planning philosophy is a forward-looking, proactive process that can adapt as people, markets, or tastes change over time. In contrast to Savannah's early planning successes, highway systems of the past half-century were planned primarily in reaction to urban growth. This reactive approach is prevalent not just locally, but across the country.

In recent years, it has become standard practice to return to the fundamental building principles with an understanding of the implications on travel and transportation infrastructure. Likewise, regional transportation plans are now being generated to help direct growth to optimal target areas. For example, the 2030 Long Range Transportation Plan makes an effort to concentrate transportation investments in areas where growth is desired. This is a proactive approach to transportation and land use planning, and represents the best available method of preserving Savannah and Chatham County's rich context and the natural environment while maintaining an efficient circulation system.

Savannah/Chatham County's Tricentennial Comprehensive Plan and Metropolitan Planning Organization 2030 Long Range Transportation Plan outline the transportation and land use vision for the region. This context sensitive design manual is intended to support the goals and objectives of these plans and to articulate design ideals pertaining to livable transportation.

Although the scope of the field of transportation planning is large, several distinct terms and concepts are critical to understanding the role of transportation in regional planning. These concepts are described below, beginning with basic definitions and progressing to emerging trends and practices.

The Corridor

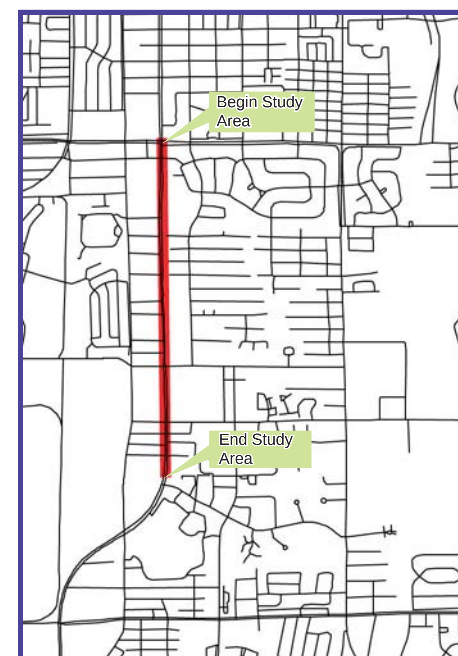
The corridor is the basic element of transportation planning. Most transportation projects are undertaken on a "corridor" basis. In essence, a corridor is the general path of travel between two endpoints. The endpoints are usually represented by major activity centers (central business districts, shopping districts, employment centers, etc.), political boundaries (municipal boundaries), natural features (rivers, ocean, etc.), or intersections of major transportation facilities. Along the length of the corridor between these endpoints, there are usually additional employment areas, shopping centers, residential developments, and institutional uses, each of which generates their own share of travel on the corridor.

Corridors are generally composed of a single roadway or several parallel transportation facilities. Each roadway itself is defined primarily by its cartway and right-of-way. The cartway is the paved surface of the roadway, while the right-of-way is the legal "boundary" of the roadway facility. Within the right-of-way are the cartway, sidewalks, landscaping, drainage facilities, utilities, street lamps, and, often, a "reserve" area for the future expansion of the cartway.

It is important to understand that whereas problem definition for transportation projects is often done on a corridor basis, solutions could lie in either of three areas

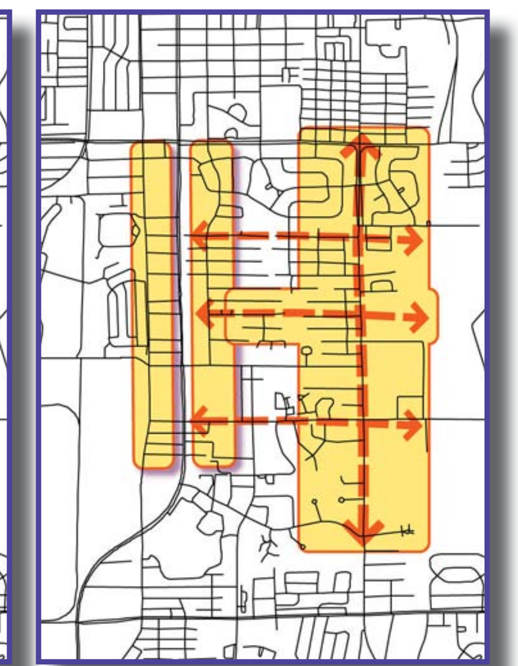
- On the corridor or the right-of-way itself where the range of options could include adding or removing lanes, signals, etc. or doing what it takes to improve the travel conditions on the corridor.
- The solutions could be nested in modifying the edges of the corridor (the sensory realm), through land use changes, access management and controls, street edge treatments and design.
- Solutions that are outside the immediate context of the corridor like enhancements or the creation of parallel corridors and developing street networks that can eventually help alleviate conditions on the main corridor.

Three approaches to transportation corridor projects



Study area definition and solutions within the defined study area

Corridor solutions nested in Land Use decisions



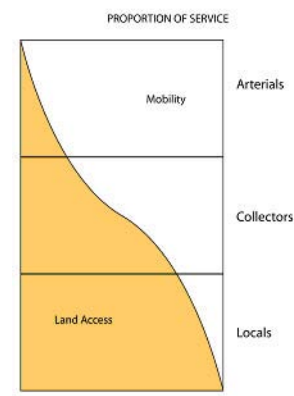
Corridor solutions outside the immediate study area - network development and land use restructuring

Typically, proposed solutions to perceived travel problems are limited to the first category. This phenomenon can be attributed to any number of systematic or habitual limitations. Transportation engineers may believe land use is "not their business." Agency staff may believe that "we can't spend money outside the designated corridor." These positions, while prevalent, can often preclude a full exploration of options that may prove cheaper, more effective and more beneficial to the community as a whole. It behooves a community to identify these early process obstacles and assure that they do not inhibit the opportunity to engage in an evaluation of the full range of options.

Access and Mobility

"A Policy on Geometric Design of Highways and Streets" (The "Green Book") by the American Association of State Highway and Transportation Officials (AASHTO) provides the technical basis for much of modern street design in practice. This document is routinely cited as the basis for legal arguments and defense and, as such, is an important resource for design engineers. It can also provide a wealth of interesting lessons to non-engineers. Among those lessons is the role of a street in providing access and mobility to a community.

The Green Book tells us that "the two major considerations in classifying highway and street networks functionally are access and mobility. The conflict between serving through movement and providing access necessitates the differences and gradations in the various functional types" What this essentially means is that, n order for a community's transportation system to function correctly, a network and a hierarchy of streets are needed to fulfill the various functions of access to land uses and longer range mobility of users. This idea of the difference between street types and the access and mobility roles of each are described simply in the accompanying graphic. When any one street is asked to perform all of the mobility and access functions of the system, the Green Book tells us conflicts and congestion can be expected to occur.



Unfortunately, this is precisely the mistake we make most often throughout the United States. We have created arterial streets that we expect to carry vehicles on long mobility based trips, with driveways to accommodate access based trips, and no supporting network so that every type of trip in-between must also occur on the arterial. Providing a system or network of streets across the functional spectrum has numerous benefits. By allowing the primary access and mobility functions to occur on separate facilities, less space is needed on arterial corridors. Connected streets provide options for drivers that forestall calls for road widenings. This allows for a planned and functional hierarchy of streets that enhances both mobility and wayfinding. This type of connected network, also makes other, non-automobile modes such as walking or transit much more viable. We need look no further than Savannah's Landmark Historic District for a demonstration of these principles in action.

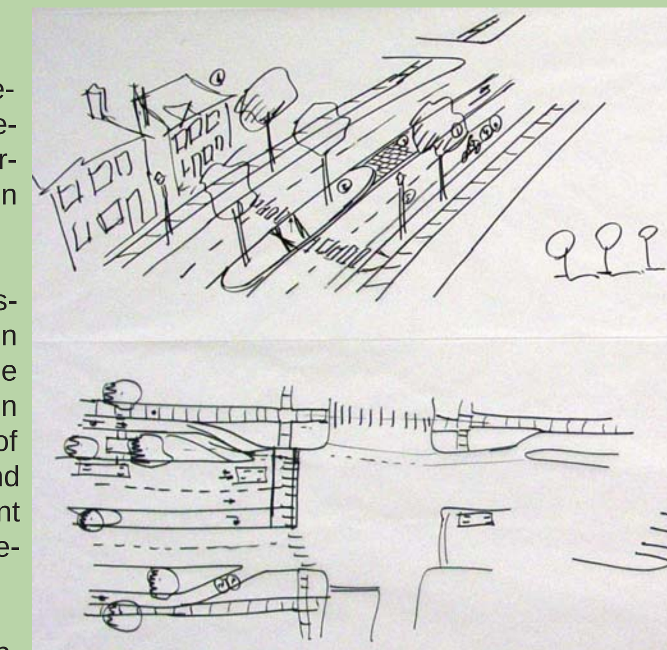
Origins and Destinations

Every corridor within a community will serve some mix of local, mid-range, and through traffic. The specific proportions of this mix are dependant on the distribution of origins and destinations in and around the corridor and the degree of network available to serve trips. We have discussed the role of the network and its hierarchy, but how do origins and destinations influence corridors? An origin represents a use that can be thought of as a "home-base" for trips. In many cases, these can be thought of as residential locations such as houses, apartments, and condominiums, where most people begin and end their days. Hotels and campgrounds might also be thought of as origins because they represent additional locations where people "reside," at least on a temporary basis. Destinations are places that "attract" people during the course of a day, such as offices, shops, restaurants, entertainment venues, cultural and recreational facilities, and schools. Up until the mid-twentieth century, most destinations were clustered in central areas so as to be accessible to the greatest number of people by requiring the least amount of total travel. As we evolved into a fully-mobile society, however, origins and destinations have become scattered and hence reliant on a more dispersed transportation network. While this type of mobility provide innumerable benefits, we also know that it can overburden street networks that are not properly planned or designed.

Case Study: DeRenne Avenue

The first local case selected for study by the stakeholders at the July workshop was the proposed DeRenne Avenue widening project. This project is currently awaiting initiation of the corridor concept design phase.

As group work began, there was a good deal of discussion about the viability of the neighborhoods on either side of DeRenne Avenue. While most of the properties along DeRenne Avenue are commercial in nature, there are single family neighborhoods some of which front DeRenne, some of which are just behind these commercial uses. There was some sentiment among table participants that further widening of DeRenne would detract from the character of the area.



Concept sketches from the DeRenne Avenue brainstorming session

It was decided among table participants that two approaches to addressing this situation might make sense. One is to specifically quantify and evaluate the need for a widening project. This would mean not just documenting expected future traffic volumes, but outlining the larger range of benefits and costs of widening vs. not widening.

The second approach, on which the table participants spent the most time, was to develop alternatives to widening. Specifically, alternatives that supported the development of more effective road network to help separate the regional mobility function of DeRenne from the access function provided by all of the driveways along the street. This involved moving most of the driveways and access functions away from DeRenne over time. By creating new network, parallel capacity and a real hierarchy of streets, it is likely that a widening of DeRenne could be forestalled or even avoided.

Origin - single family residential areas and neighborhoods

Destination - Town Centers

Trip Types

The “function” of a corridor can be described by analyzing the types of trips it supports. Trip types can be characterized by the degree to which they are about mobility or access as follows: internal trips, external trips, and internal/external trips. These trip types are defined by their interaction with the boundaries of the “study area,” a specified portion of a town or region which typically includes all or part of the target corridor.

Internal: Internal trips have both their origins and destinations within the study area. In other words, an internal trip is one that is entirely contained within the study area and never crosses its boundaries. These are sometimes referred to as “local” trips, and are shorter “access-based” trips.

External: External trips are the opposite of internal trips. In other words, neither the origin nor the destination of an external trip is contained within the study area. As a result, external trips are simply “passing through” the study area, generally on main thoroughfares. These are sometimes referred to as either “through” trips or “external” trips. They are longer trips and could be classified as “mobility-based”.

Internal/External: The third category of trips has either its origin or destination, but not both, within the study area. For example, a resident of a neighboring county (not in the study area) who travels to an office complex within the study area engages in an internal/external trip. Likewise, a resident of a subdivision within the study area who travels to an entertainment destination across town engages in an internal/external trip. These trips involve a mix of mobility and access needs.

It is easy to see how the interests of these trip makers are different. Someone making an internal trip is traveling only a short distance, so effective access to a destination is important. Someone making an external trip, on the other hand, might be more interested in the speed with which he can “pass through” the study area to his final destination. It is difficult, if not impossible, for any one facility to effectively serve the disparate needs. Later sections of this manual will discuss how a hierarchy of streets can help to handle all of these trip types more effectively.

Mode Split

Mode split addresses the degree to which different modes of travel, that is, automobiles, transit, bicycles, and walking, are used to make trips. In corridors where environmental concerns and traffi c congestion are signifi cant, a common goal is often to adjust the mode split in favor of transit, bicycles, and walking. The strategy for achieving this entails increasing the attractiveness of “alternate modes” (non automobile), by increasing transit service, creating bicycle lanes, completing the sidewalk network, or decreasing the attractiveness of driving, usually by raising parking fees or tolls.

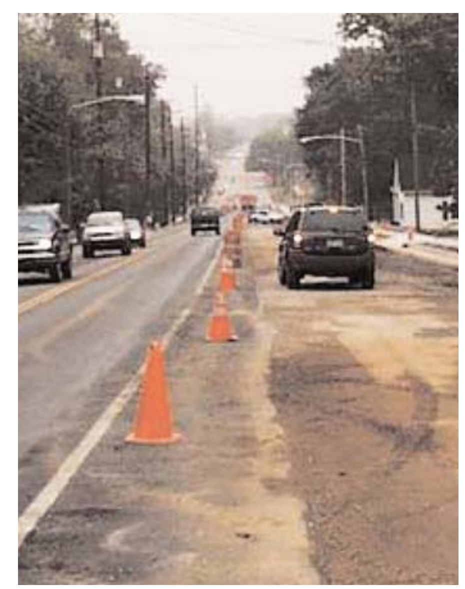
The most appropriate method of adjusting mode split is best selected by fi rst determining the targeted trip type. For internal trips of a local nature, such as that between stores in a commercial area, enhancements to sidewalk facilities or improvements to pedestrian crossings can succeed in removing very short trips from the roadways. For longer internal trips, such as those between two non-adjacent major destinations within the same study area, small transit shuttles or circulators would be more appropriate. Bicycle lanes often capture trips between home and local commercial establishments, i.e., distances that are too far to walk but that do not really require a car. For internal/external and external trips, longer-distance transit services are often e ployed such as buses, light rail systems, or other forms of transit service.

Capacity

Capacity is a measure of the total number of elements (vehicles or people) that can be carried by a certain transportation mode in a given period of time. This measure is mostly used when referring to automobiles or transit, though it is also relevant with regards to heavily-used multi-use trails and bicycle and pedestrian facilities.

Vehicular capacity has two main categories: roadway capacity and parking capacity. Roadway capacity is typically the largest constraint of a regional transportation system, as the demand for automobile travel has quickly outstripped the available capacity on American roadways. While building more and more roadway capacity has been the preferred solution to traffi c congestion for several decades now, limited overall available space, together with community concerns, now often require the exploration of alternatives to the expansion of roadway capacity. Shifting the mode split, getting people out of cars, to “free” capacity rather than “creating” capacity is the most common of these alternative methods.

Parking capacity is an additional constraint because it addresses the number of vehicles that can be accommodated at the destination. Parking capacity limitations can be addressed in the same ways as roadway capacity, i.e., expansion or mode shift. Expansion deals with the provision of additional parking spaces, whether in a garage, on a lot, and/or along the street. Mode shifting measures, such as sidewalk and bicycle lane improvements, reduce the need for parking spaces.



Roadway widening -
Increasing vehicle capacity

Sidewalk improvements -
Can “free” roadway capacity

On-street parking -
One component of total capacity

Vehicular Level-of-Service

Vehicular roadway capacity, the most common measure of roadway conditions, is a key factor in determining roadway level of service. The level of service of a roadway is an assessment of the relationship between total roadway capacity and the volume of vehicles using the roadway at a given time, usually the peak morning and evening rush hours. Level of service is measured on a scale of A through F, with A being the best (unconstrained) condition and F being the worst (congested) condition.

In urban areas, level of service D is often regarded as the minimum acceptable vehicular level of service. Some lightly developed fringe and rural areas might strive for LOS C.

Most regions utilize vehicle LOS as the primary determinant of transportation needs and solutions. It is important to bear in mind, however, that vehicular level-of-service focuses solely on the comfort of vehicular travel on a corridor. This metric does not take into account community character, pedestrian safety or any other factors that might be important to an individual community. Often, a good vehicular level-of-service is inversely related to the quality of travel for non-motorized travel. An analysis focused solely on vehicular level-of-service tends to produce investments that cater solely to vehicular travel, such as widening and grade separation. Broadening the tools of analysis to include other community considerations is one important step towards developing a multi-modal transportation network.

Vehicular Level of Service

LOS A - Free Flow: Users unaffected by others in the traffic system.

LOS B - Stable Flow: Slight decline in the freedom to maneuver from “LOS A.”

LOS C - Stable Flow: Operation of the vehicle becomes significantly affected by the interaction of others in the traffic system.

LOS D - Approaching Unstable Flow: High volumes of traffic, speeds adversely affected, and freedom to maneuver is severely restricted.

LOS E - Unstable Flow: Operating conditions are at, or very near capacity. All speeds are low and the freedom to maneuver is extremely impaired.

LOS F - Exceeding Capacity Point at which arrival flows exceed discharge flows causing queuing delays. Stoppages may occur for long periods of time because of the downstream congestion. Travel times are also substantially increased.

Speed vs. Capacity

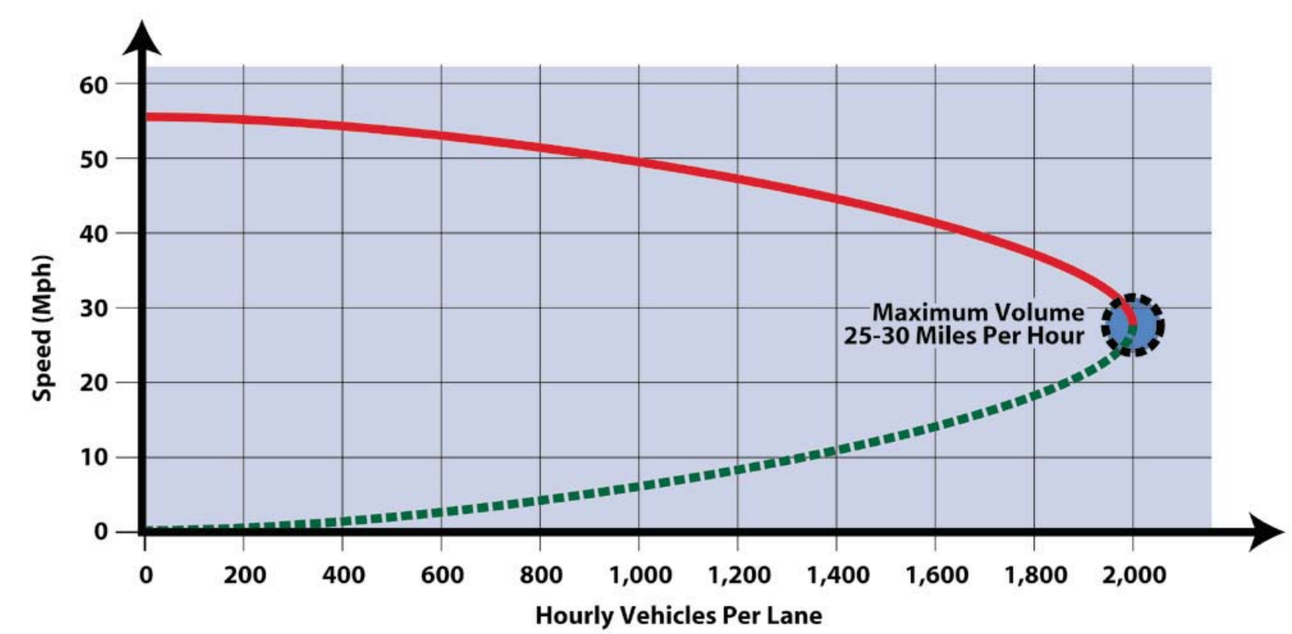
Contrary to common intuition, an increase in vehicle speed does not necessarily indicate an increase in capacity or an improvement in level of service. Similarly, a decrease in speed does not indicate a decrease in capacity. This is explained by the following truths about vehicular travel flow:

a. The Highway Capacity Manual produced by the Transportation Research Board postulates that, under most circumstances, the hourly flow of vehicles per lane is maximized at a speed of 25-30 MPH. At higher speeds, the number of vehicles that can be carried in a lane per hour goes down, due to the natural inclination of motorists to increase spacing between vehicles which offsets the potential capacity advantages of higher speeds.

b. For multi-lane roads, higher speeds dictate a larger gradient in the different flow speeds per lane. This gradient leads to many “weaving” movements as motorists struggle to find the fastest lane, decreasing the overall capacity of the roadway. The more lanes there are, the greater the effect of weaving on capacity per lane.

c. Intersections are the main determinants of capacity and level-of-service. Implementing coordinated signal systems and maintaining steady flows are simpler to accomplish at lower rather than higher speeds.

Assuring that discussions of “speed” and “capacity” remain separate is imperative in achieving context-sensitive design. By doing so, we may find that it is possible to build a high capacity, moderate speed arterial that can accommodate a tree canopy, bike lanes, cross-walks or other amenities that may benefit the community.



Building a complete network of streets with a well-planned hierarchy is always the best option. Sometimes, however, we are forced to make decisions regarding the retrofit of communities for whom reality has overtaken initial planning assumptions. Issues such as property rights, neighborhood "cut throughs" and relative costs can all make the creation of effective network a daunting task. The following are some tools that might be used in retrofit areas where the creation of a full network might be a challenging or long term proposition.

Tools for Collector and Local Streets - Traffic Calming

Given that reductions in vehicular speed do not necessarily dictate lower capacities, traffic-calming programs are becoming very commonplace as a means to re-create safe, slow neighborhood and commercial streets. Generally, the purpose of traffic calming is to control the speed of traffic while not restricting mobility.

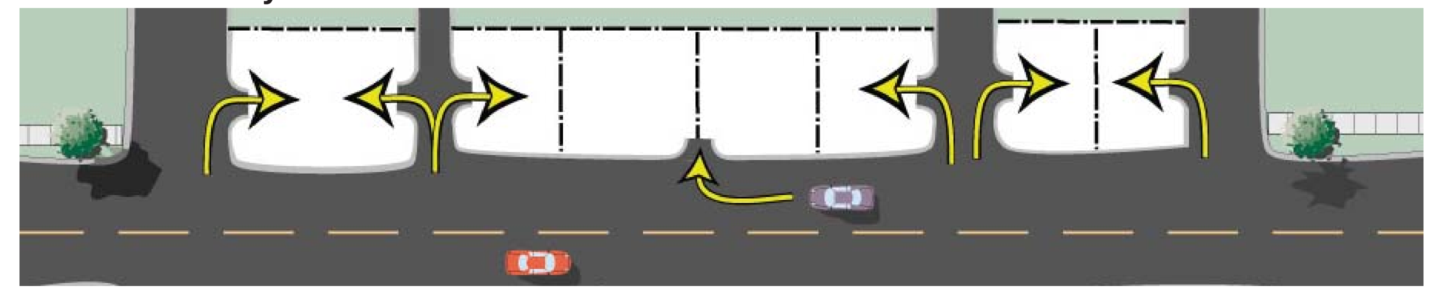
Traffic calming is a comprehensive set of design elements that reinforce the appropriate driving behavior. The appropriate traffic calming techniques and roadway design speed are dependent on the context. Generally, traffic calming techniques generally fall into three categories: narrowing the street; deflecting the vehicle path vertically; and deflecting the vehicle path horizontally. In addition to these changes to the cartway, changes to the pedestrian realm and to the visual field can also slow drives. 'Visual Friction', elements that create a sense of enclosure or elements that break up views, serve to slow drivers. Landscaping and building placement can be used in conjunction with, or independent of, physical changes to the cartway to slow travel speeds. The purpose of traffic calming is to retrofit existing streets for slower traffic speeds. Where new streets are to be built, however, they can be planned for slow speeds at the outset. The general principles are the same as for traffic calming, with an emphasis on narrow street widths.

The handbook - "Streets and Sidewalks, People and Cars: The Citizens' Guide to Traffic Calming" is written specifically for residents who want to create safer neighborhood streets. This hands-on guide written by Dan Burden and published by Walkable Communities, Inc. gives citizens the tools they need to evaluate and improve the safety of their neighborhood residential and commercial streets.
(http://www.walkable.org/order.htm)

Tools for Arterial Streets - Access Management

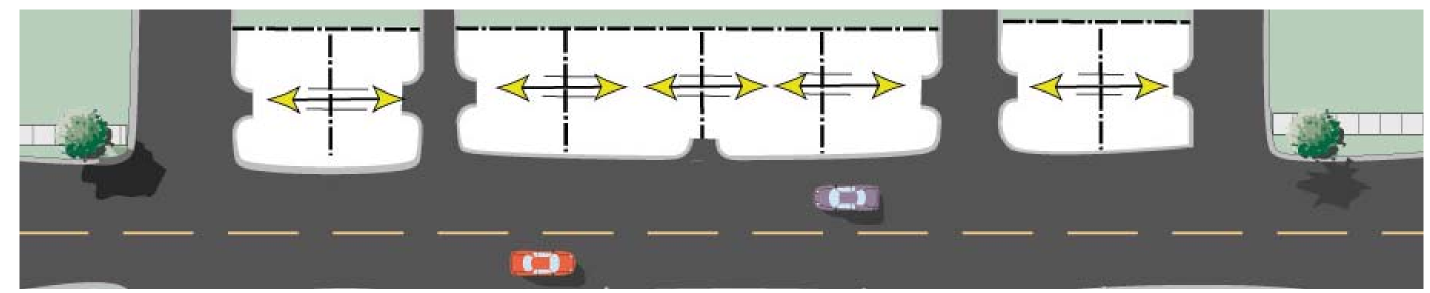
Access management is one of the tools recommended in this handbook to manage transportation and land use. Access management is defined as a process that provides or manages access between development and surrounding roadways. As development occurs along highly traveled commercial roadways, certain policies and guidelines need to be in place to manage access within the corridor.

Shared Driveways



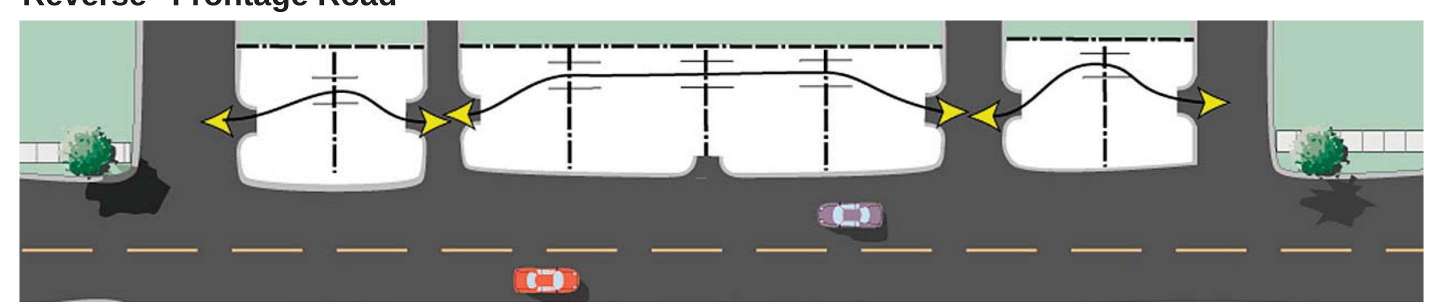
The concept of shared driveways encourages access along the side street for corner parcels and joint access driveways when side street access is not available.

Cross-Access Connections



Cross-access connections allow motorists to complete short trips between adjacent uses without having to return to the primary arterial. Connections are provided through aisles and alleys that connect adjacent parcels and parking lots to one another. By minimizing the number of vehicles turning off and onto the arterial, through traffic is able to flow in a more efficient manner. In addition, cross-access connections that are coordinated and well planned may begin to form a second parallel roadway.

Reverse "Frontage Road"



Reverse "frontage road" provides cross access easements in the rear of the parcels, creating a second parallel roadway. Wherever possible, access is provided from the side street instead of the primary arterial. By encouraging driveway access from the side street, the number of "friction points" along the primary arterial is drastically reduced.

Land Use

Land use refers to the types of activities that take place within a given area. Land use controls are a major part of most city and county development codes. The distribution of land uses influences the number of trips made, the length of trips, and the mode of travel. The following are specific types of land uses that have varying effects on the transportation system.

Residential

Residential land uses refer to homes, apartments, condominiums, townhouses, and sometimes, hotels. In other words, residential districts usually contain many trip origins within their boundaries, and few, if any, destinations. Trip generation refers to the number of times that people arrive at and leave from certain locations during the course of a specific time period. In terms of residential development, a subdivision of single family homes will generate more trips than a small cluster of apartment buildings-given the same number of living units, due to the larger family size (and hence more trip needs) of larger living spaces. For purely residential districts, very few internal trips are observed, as almost all destinations are located outside the district.

Commercial

Commercial districts contain stores, restaurants, offices, banks, and other places of business. Each of these uses generates a different number of trips per day (or per peak period), so the total number of trips attracted to the district depends on the specific allotment of uses at the site. Commercial districts mainly contain destinations.

Industrial

Industrial districts also consist almost exclusively of employment-based destinations. Notable exceptions are restaurant/retail establishments located in industrial districts specifically to serve the large concentration of employment and "undesirable" businesses (i.e., adult entertainment establishments) which are often limited to industrial zones.

Other

Other land uses include institutional uses, civic uses, recreational uses (i.e., parks and ball fields), and conservation areas. These are less prevalent than residential, commercial, and industrial districts, and are often mixed in with these other uses. For example, schools ("institutional") are often intermingled with residential areas, while government buildings ("civic") are often located in central business districts. Many recreational areas border or are integrated with commercial or residential districts, but conservation areas are, in general, spatially separate from the main areas of activity because of their large sizes and characteristic natural qualities.

Mixed-Use

Mixed-use areas are exactly what the name implies, areas where two or more major types of uses are intermingled with each other. The most common mixed-use district contains both residential and commercial development, since these are generally very compatible uses. In fact, up until the onset of zoning codes in the early twentieth century, most cities developed in this manner, as is evident in older North American cities such as New York, Boston, Philadelphia, and New Orleans. Most small towns also developed in this manner, as limited transportation systems dictated that commercial and residential development needed to be as close together as possible.

Nearly all newer cities are now actively encouraging downtown residential development to create mixed-use environments that are freer from crimes often associated with lack of people on the sidewalks after the close of the business day. Today, mixed-use development is also very prevalent in smaller-scale projects such as new "town centers," which generally contain a mixture of office, retail, and residential uses. The most common configuration of mixed-use buildings consists of retail on the ground floor and offices and apartments above.

The transportation benefits of this type of development are numerous and are based generally on the drastic reduction of trip distance between origins and destinations, which are mixed together rather than spread apart in separate designated districts.

River Street's mixed use development (above) and City Market (left) are attractions for residents and visitors

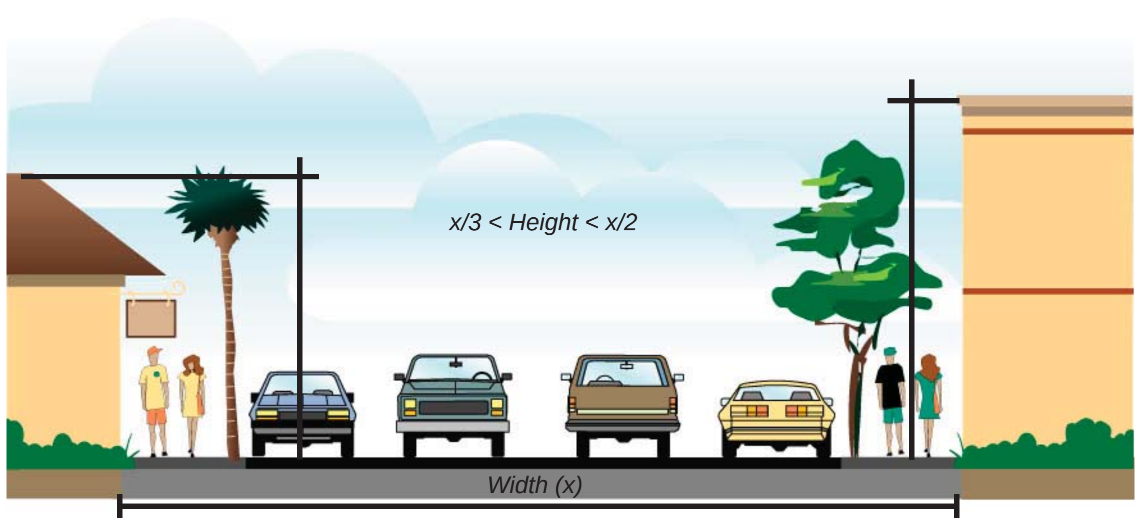
Design is also integral to travel choice within a corridor. Design consists of specific fields such as urban design, town design, and site design, but their general principles and their effects on transportation are consistent. While there are many design elements and concepts that are involved in the creation of buildings and development sites, the specific elements that are described below have direct effects on transportation.

Scale

Scale refers to the size and orientation of buildings with respect to their users. More useful than the terms large-scale and small-scale are the parallel terms automobile-scale and pedestrian scale.

Automobile-scale refers to the condition where buildings are sized and oriented in a manner that caters to passing motorists. Such buildings are generally large and loosely spaced. While appropriate for motorists viewing them at speeds of 30-50 MPH, they create an unpleasant environment for people on foot moving at much slower speeds.

Pedestrian-scale refers to development that is built to be viewed and accessed by people traveling at very low speeds, i.e., on foot. Generally, buildings are small (or have varied facades) and close together, meaning that the pedestrian's view is constantly changing. Moreover, pedestrian-scale development is more clustered than automobile-scale development, so more buildings are accessible within a given walking distance.



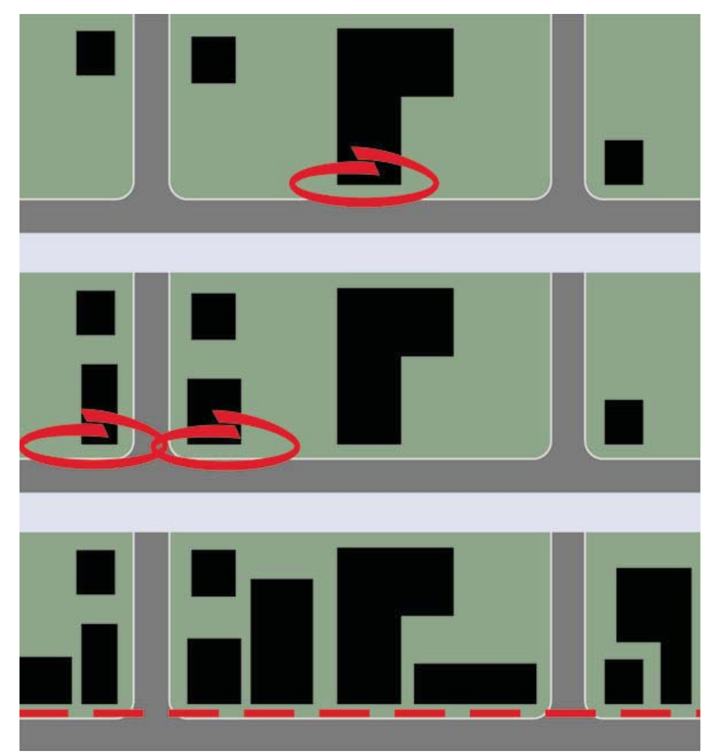
The pedestrian scale height to width ratio falls between 1:3 and 1:2 as measured from the building fronts or the "wall" of trees

Setback

Setback is another design element that has significant implications for travel behavior. Large setbacks are often indicative of automobile-scale development, as street-front space is reserved for parking and/or landscaping. Such large setbacks are inconvenient for pedestrians, since the total walking distance between buildings increases as setbacks increase. In pedestrian-scale developments, there are usually no (or very small) setbacks, with each building right up to the sidewalk. This is the optimal condition for pedestrians because the distance between the storefronts and the main walking corridor is minimized.

In instances where strip corridors are redeveloped as pedestrian-oriented districts, new buildings are often constructed in a manner that creates a desirable consistent street frontage by minimizing setback.

Evolution of the pedestrian friendly street-side retail



The first pedestrian friendly buildings are "stepping stones" in a street still dominated by vehicles. The walking experience improves, owing to the occasional "oasis" along the sidewalk.

More pedestrian-friendly development begins to form a continuous street front. Walking becomes interesting.

Finally a solid pedestrian-friendly zone evolves. People come just to walk and enjoy the scene. This is helpful for businesses as increase in foot traffic helps increase in sales.

Travel is influenced by both land use and design, each of which has implications not only on the quantity of traffic, but the quality of trips and of the community. The following sections assess the relationships between transportation and land use and between transportation and design.

Transportation and Land Use

The organization and distribution of land uses are the primary determinants of travel demand. While a reactive transportation plan simply accepts the distribution of origins and destinations as given and directs transportation investment to serve them, a proactive transportation plan examines the effects of better organizing these origins and destinations. Savannah and Chatham County, via the Tricentennial Plan, have already begun the task of assessing the optimum arrangement of land uses that might help to reduce the demand for scarce transportation resources. A similar assessment of the types of transportation systems might best serve this vision is in order.

Land Use Impacts on Traffic and Travel

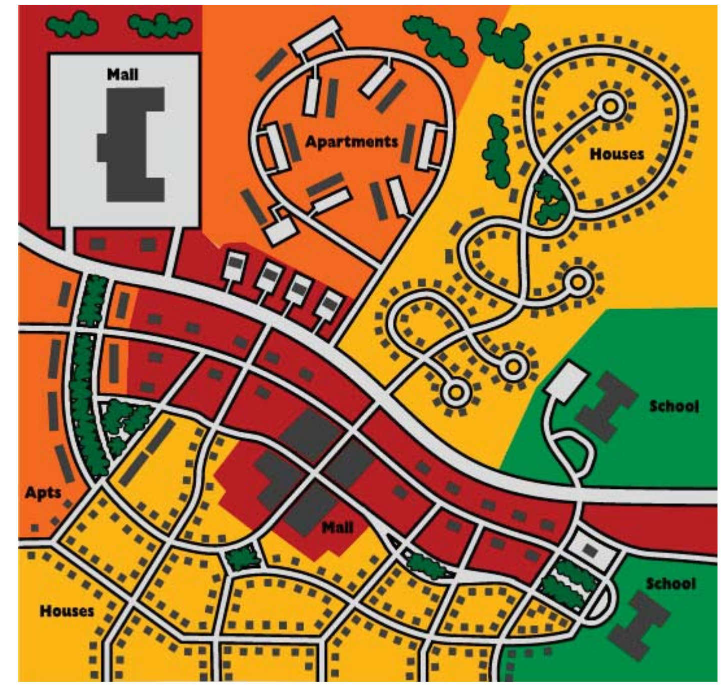
While the organization of land use can help reduce overall trip length (especially in mixed use environments) it also has direct implications on the physical form of the roadway system. When land uses are functionally and physically separated, there is still a need for travel between them. Historically, these separate land uses have been connected via major thoroughfares with a limited degree of interconnected supporting network. As we have discussed, this has typically meant all drivers must use the same roadway for shuttling between adjacent land uses or for regional trips to, through, and out of a given community. The “Green Book” tells us, and our experience confirms, that this creates traffic friction, conflicts and congestion along the corridor that usually leads to the call to widen the roadway.

Our planning practices adopt this model by “assigning” all trips, local and regional, to the main roadway. The predictable result of this type of trip assignment is a system of wide, heavily traveled main roadways. The region has already endorsed a mix of uses in their regional planning. Shouldn’t we also expect a mix of streets to include an interconnected local street network with densities matching adjacent land uses? The presence of multiple route options between different uses prevents any one thoroughfare from shouldering an unreasonable burden. Local trips are distributed throughout the roadway network, leaving the main regional thoroughfare to carry external and internal/external trips, without the traffic friction otherwise caused by short internal trips.

The key element of these two scenarios is the organization of land. In other words, the form of the land is as important as the use. Land policies that not only encourage groupings of land use to shorten trips, but that require form-based elements related to proper hierarchy of access and mobility can serve to create more livable, viable, and functional corridors.

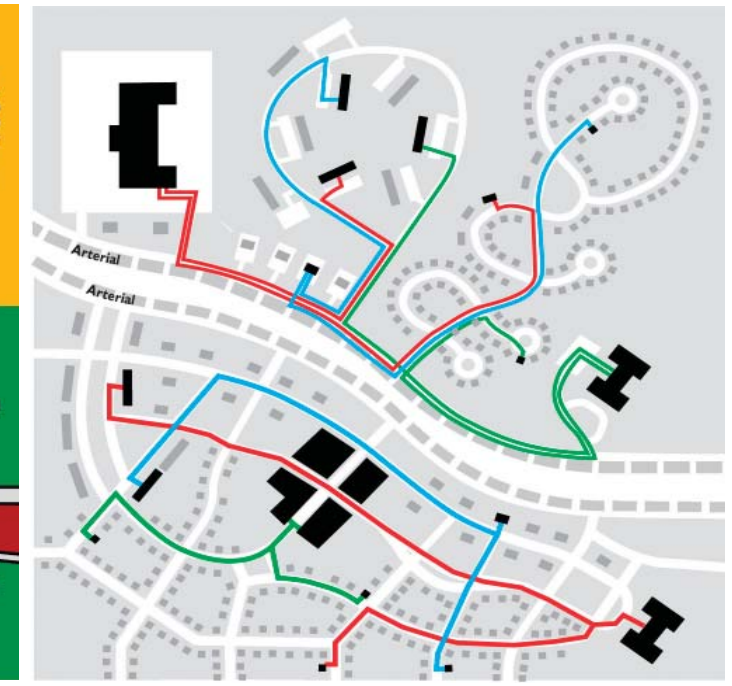
Impacts on Non-Automobile Modes

The organization of land use also has considerable implications on bicycle and pedestrian viability. Clearly, when land uses are mixed and tightly woven, walking, biking, and transit become more viable options. However the hierarchy of streets is important even in single use settings. Pedestrians or bicyclists faced with managing the mix of high speed regional driving trips and driveways providing access functions on arterial corridors are likely to become discouraged, or worse, feel unsafe. How all of these elements relate to the design of transportation systems is the subject of the next section.



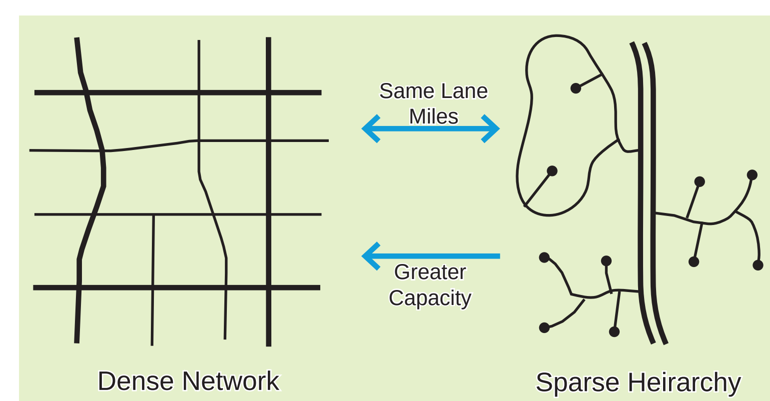
Top:
- ***Sparse road network***
- ***Separation of uses***

Bottom:
- ***Roadway network with multiple connections***
- ***Proximity of uses***
- ***Public spaces link community***



Top:
- ***Promotes vehicular travel***
- ***Long trip lengths***
- ***Trips concentrated on one major roadway***

Bottom:
- ***Promotes walking and biking***
- ***Shorter trip lengths***
- ***Dispersion of trips on multiple roadways***



Benefits of the network

Primary Interrelationships: Transportation and Design

The transportation implications of design are very similar in magnitude to those of land use. All of the good work that a community may do to develop good land use policy and provide a connected hierarchy of streets can be for naught if the design of those streets is mismatched to their context. Suburban solutions such as high speed arterials, grade separated intersections or loop ramps are out of place in an urban environment and will destroy the character and functionality of an urban community. Likewise, urban solutions such as on-street parking, street trees, or streetscape treatments may be just as out of place or even unsafe in suburban environments. Issues such as scale, setback and design speed all have considerable effects on travel patterns, safety, and character.

Traffic and Travel

While the mere presence of a street has the primary effect on travel along it, the design of the street also impacts the characteristics of that travel. The travel implications of design are at least threefold:

a. Corridor Widths - The compactness associated with small, well connected blocks results in origins and destinations are closer together, shortening overall trip lengths. The access benefits of such a network mean that all lanes do not have to be accommodated in a single arterial.

b. Traffic Volume - Convenient pedestrian connections between origins and destinations can reduce the total number of automobile trips by shifting the mode split.

c. Vehicle Speeds - Smaller scales in activity centers have the desirable side effect of decreasing vehicular speeds and hence reinforcing pedestrian oriented areas as safe and pleasant walking environments. A pedestrian-scale rather than automobile scale arrangement of storefronts leads to motorists' perception that buildings are passing by more rapidly, often leading to a reduction in speed. So the overall effect of pedestrian-scale design on travel patterns is that traffic is lighter, slower, and more acceptable for areas of high pedestrian and bicycle activity.

Mode Split

Pedestrian-scale design is targeted at exactly what its name implies, pedestrians. For a given amount of development, an increase in pedestrian travel implies a decrease in automobile travel. Because the very objective of designing at a pedestrian scale is to attract pedestrians, such design has very significant traffic benefits.

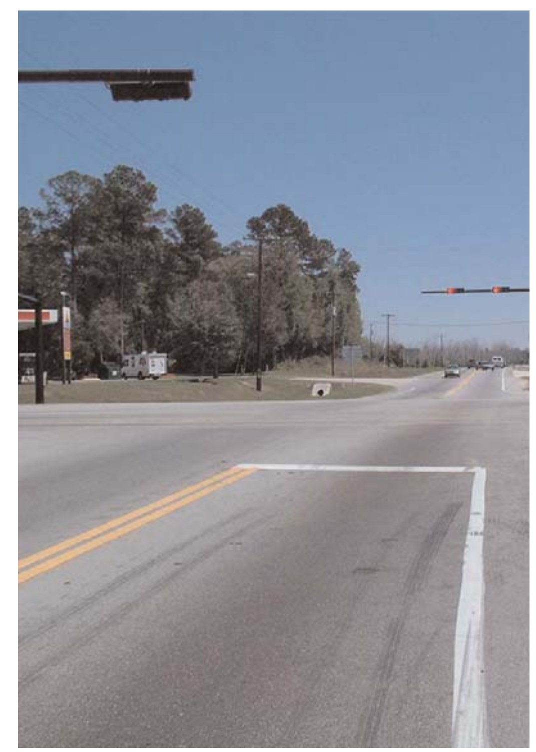
Pedestrian-scale design also increases the mode share of transit. The reason for this is that every transit rider is a pedestrian at the beginning and end of his trip. Therefore, improvements to the pedestrian environment at these locations will increase the attractiveness of using transit.

Parking

The creation of a good pedestrian environment can generate a "park-once" environment, meaning that patrons to local establishments have the propensity to park once and subsequently walk between all their destinations. The impacts on overall parking requirements are profound. In park-once districts, each specific use does not need its own separate parking supply because it is accepted that a large portion of the patron base is made up of "walk-up" (as opposed to "drive-up") customers. For example, imagine a trip "chain" that includes a visit to the drug store, a restaurant, and the post office. In the model where land uses are widely separated, three separate parking spaces are needed to accommodate this single person because the walk between the drug store, restaurant, and post office is lengthy and/or unpleasant. In contrast, in a park-once district, only a single parking space is needed to serve this particular customer.

An example of an unattractive pedestrian-hostile urban highway

Pedestrian friendly arterial with store-fronts and on-street parking



Walk up retail and other uses promotes the "park once" idea

Isolated convenience store on a highway lends itself hostage to automobile users

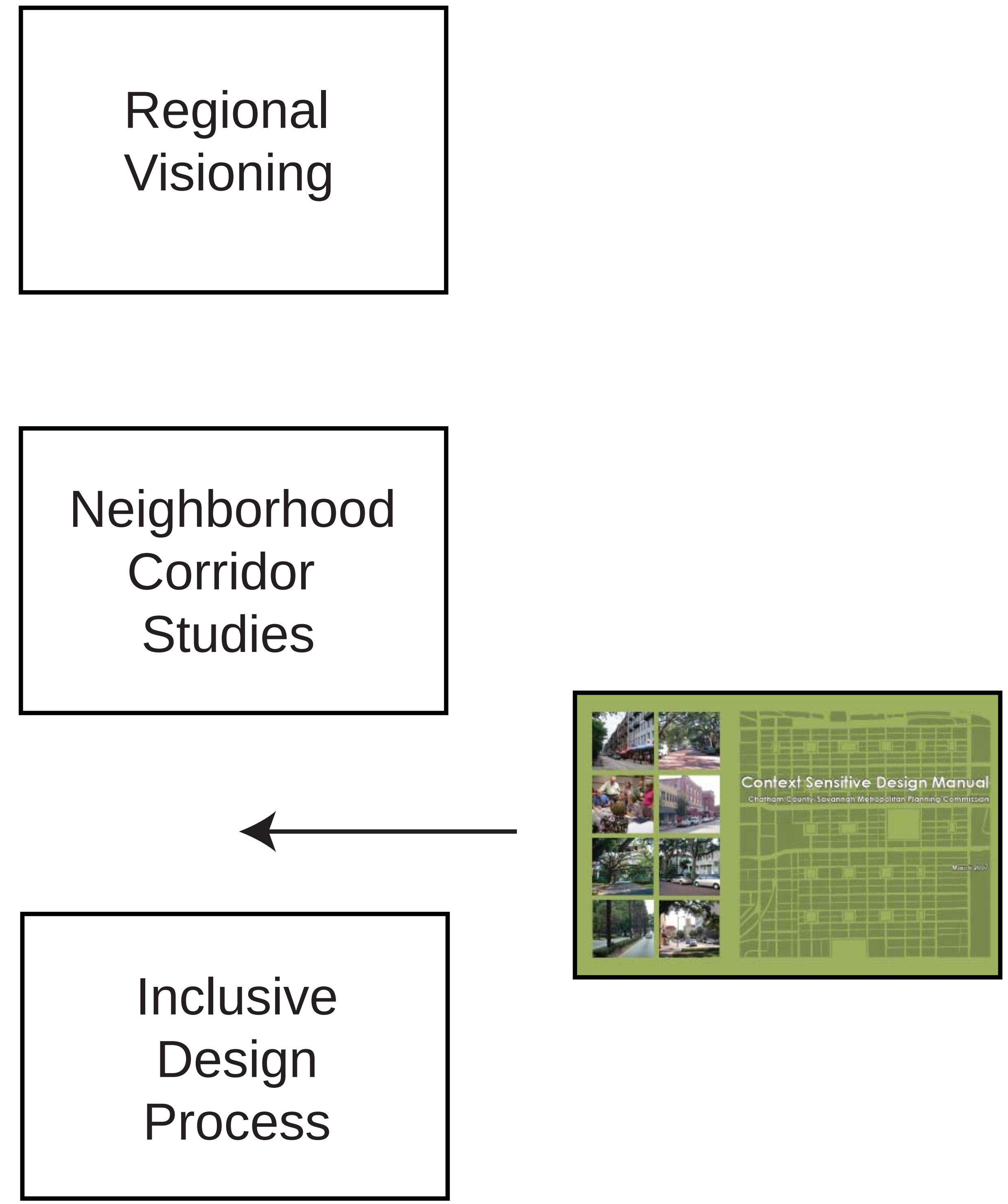
5.0 Intent of the Context Sensitive Design Guidelines

This manual is not meant to be, nor could it be, the solution to all of the region's transportation problems. Rather, it is intended to be one component of a larger planning process to which the region has committed. This process began with the development of a regional vision. The Tricentennial Plan discussed innovative concepts such as character-based land use, constrained corridors and the use of "guiding principles" to build consensus around questions that might arise in the future. The Connecting Savannah process built upon these concepts in expanding the vision of the region's future to the transportation systems.

As projects identified in the 2030 regional transportation plan move into concept phases detailed study of corridors or neighborhoods that consider and evaluate a full range of alternatives would be the logical next step. The factors used to evaluate these alternatives should be comprehensive and should include consideration of all of the elements identified in the previous plans and in CUTS' amenities resolution that make Savannah and Chatham County unique. Involving the community and the neighborhoods in the development and evaluation of these solutions will be vital.

It is at this stage where this manual can be of great use. The translation from vision to design in one that often results in information gaps and misunderstandings. This is an opportunity to proactively articulate the City and County's standards, rather than responding to standards developed by others. The community cross sections on the following pages are meant to represent the consensus vision of how the City and County would like the streets to look, feel and function.

This resource manual of physical dimensions, street typologies, land forms and their interrelationships, can help a parties – technical and non-technical – communicate in a common, visual language. Citizens can point to a cross-section that represents their vision of a street in its context. Designers can respond to the physical dimensions associated with that section. The hope is that these models can provide clarity of communication as projects move from one phase to the next.



6.0 Context Types in Chatham County - Savannah

In the context sensitive design workshop conducted at the Chatham County – Savannah MPC in July 2006, the steering committee identified a possible range of contexts that this design manual needs to address. Whereas the contexts identified in this manual are not set in stone, they help to provide a guide to local officials, designers and elected representatives in understanding the unique characteristics of each area. This idea of identifying the context of an area is very consistent with the Tricentennial Plan's concept of character-based future land use. In the same way that land use should be based on an area's character, the transportation systems should reflect that character as well. Ideally as a project is identified, context definition by itself needs to be a process where some of the most crucial characteristics are highlighted and recognized by the community in understanding the unique characteristics of each area.

Some of the criteria for identifying the contexts for this manual were the history of the place, its built character as reflected by the general built form, architecture and built pattern, the street network and blocks pattern, built density and street character and character of the natural environment. Based on this understanding of Chatham County and the city of Savannah, the following contexts were identified.

Landmark Historic District

The landmark historic district is a unique place within Savannah that is of vital importance as the engine of the community's tourism, cultural, and hospitality industries. The district has a unique urban setting which includes architecturally significant buildings that relate to squares and parks. It is an area whose design has been consciously preserved according to a fixed plan that has economic, cultural, historical and architectural underpinnings. When transportation facilities interface with such a contextually charged place, the primary role of the facility - to move automobiles – needs to be responsive to all the other roles that the context embodies. The road thus becomes a facilitator and plays a support function for all activities other than merely the through movement of the automobile. Issues such as vehicle speeds, one-way vs. two-way vehicle flows, curb-cuts and street widths are likely to impact the character and historical integrity of this district.

Neighborhood Historic District

The neighborhood historic district context is comprised of the close-in, mostly residential neighborhoods of Savannah with traditional development patterns developed between 1890 and 1930. Organized around the streetcar and the early automobile era, these neighborhoods are characterized by medium to large lot residential land uses with corner stores and tree canopies on edges of streets or in medians. Rectangular blocks with a well defined street grid are also key characteristics of this context type. Transportation projects developed within this context must respond to the residential interface and street character. Traffic calmed streets, on-street parking, amenities for bicyclists and pedestrians, and reinforcement of the unique tree canopy will all likely be key elements of streets built or retrofitted within this context type.

Traditional Neighborhood

This context refers to the characteristics of some of the very early suburbs of Savannah that were planned to include varying sizes and types of houses, ranging from magnificent brick mansions to relatively small craftsmen style cottages. Gordonston Park perhaps is a good example of such a context. While some older neighborhoods typify these characteristics, they may also be present in newer Traditional Neighborhood Development (TND) type neighborhoods. Whereas the rectilinear street grid may or may not be as well defined as in the Landmark historic or the Neighborhood historic districts, local street networks are maintained through these neighborhoods. Transportation projects developed as a part of this context need to recognize the residential interface and street character. Traffic calmed streets, on-street parking, amenities for bicyclists and pedestrians, and reinforcement of the unique tree canopy will all likely be key elements of streets built or retrofitted within this context type.

Village Center

While not currently a prevalent context type in Chatham County, the village center context has been developed to describe an idea of how a future suburban community might possibly evolve. In keeping with the ideals of sustainable design, a village center is the hub of a suburban community. Often comprising of the "main street" the village center is the suburban equivalent of a main street in Downtown Savannah with street-fronting mixed use development, pedestrian amenities and facilities that provide and opportunity for other modes of transport to safely interact with automobiles on the roadway facility. These areas often evolve as typical strip commercial development re-emerges in a more urban form. Examples from around the southeast include Vickery in Cumming, Georgia and I'On in Mount Pleasant, South Carolina.

Suburban Communities

Suburban communities are characterized primarily by low density and often single family residential neighborhoods. Perhaps the key identifying characteristics are the distinctly lower built density than what is seen in all the preceding contexts and wide arterial roads and multi-lane highways that carry the bulk of traffic volume. Shopping centers, malls and business parks along arterial road corridors also are a part of this context type. The large arterial roads are directly attributed to the absence of a connected, heirarchical street network and the presence of large parking lots. Poor walkability compounded by a lack of pedestrian safety make these arterial corridors key candidates for change through a variety of transportation solutions that would likely integrate land use and built form changes along with enhancements of street network resulting in better connectivity.

Gated Communities

Gated communities are characterized by predominantly residential land uses. The 'controlled access' feature of these communities limits local connectivity and increases the pressure on arterials and collectors that service them. 'Controlled access' and the desire to keep through traffic out of these communities sometimes gives rise to neighborhood road safety issues. These include speeding on local neighborhood roads and traffic signal and sign violations that directly impact safety for pedestrians, bikes and other modes. Transportation projects for these areas can address two key areas - the importance of local connectivity and neighborhood safety through traffic calming techniques.

Conserved or Scenic Corridors

Savannah's unique character is reflected in its canopy roads, palm lined causeways, historic road segments, scenic vistas and existing community gateways. The Chatham County – Savannah MPC has identified many of these amenity coridors in their Long Range Transportation Plan. The plan recognizes the need to set aside funds for transportation amenities for these corridors to assure that solutions developed for issues in these corridors respect area context and could likely include pedestrian amenities, bicycle facilities, restoration of tree canopy, etc. The plan also recognizes that transportation improvements to these corridors will be limited to transportation management strategies to avoid impacts to tree canopies and other historic resources. It recommended that the community continue to evaluate whether other corridors should be added to this list as a part of ongoing planning efforts.

Rural or Undeveloped Corridors

Most often found outside city limits, the rural or undeveloped corridor context could represent farmland and undeveloped natural terrain. Arterials and collectors, often developed from old farm roads, play an important role in this context and, if properly planned, can frame potential future development or facilitate regional connectivity without sacrificing the character of the rural setting. When built, these corridors are likely to form barriers within the rural context because of higher speeds and possibly wider roadway cross sections. Providing for off line bike-ped trails where appropriate and safe crossings across these rural highways is important is maintaining connectivity for other modes.

Mapping Context

During the workshop, the team went through a brief, demonstrative exercise in the mapping of context. We worked with some of the stakeholders to discuss what current contexts are generally in place in Savannah. Long term, however, the development of a context map should be a community exercise that not only maps what contexts exist now, but what contexts the community aspires to. For example, an area of strip commercial development that might now be characterized as a suburban community may aspire to redevelop into a village center. Such community desires are important in making decisions on transportation investment.

Case Study: East President Street

The second case studied was the proposed new development along the river on the east side of the landmark historic district. This area is currently industrial in character, but is to be redeveloped in a manner reflective of the character of the adjacent historic district. The challenge put to the table participants was to find a way to keep assure that the character of the streets would match the character of the development.

The group began with an aerial map of the existing area and a site plan of the proposed redevelopment. Two issues began to emerge. One was that, while the new area recreated the grid and square pattern of the historic district, the streets did not connect well into the existing network. The second was that the design of President Street was too wide and fast to feel like an integrated part of the community and, in fact, it had been set off as separate. As it turns out, these two issues seem to be related. The lack of connected street network to help disperse the traffic load assures that cars will be funneled from the terminus of Truman Parkway straight into town along President Street. The sketches created by the group suggest ways that the connected grid might be re-established and allow some of the vehicular burden along President Street to better shared.

The work at the table helped to suggest that the context of an area may be defined not only in terms of the area's current state, but may be descriptive of the community's aspirations for the future.

7.0 Context Based Roadway Functional Classification System

The transportation, land use, and design characteristics of a corridor will differ according to the context of the surrounding environment. Whereas Chatham County currently expresses its road functional classification by twelve categories broken up into mainly urban and rural roadways, this section uses the four key roadway functional classes from that list. These four basic types of roads – the arterials, major collectors, minor collectors and local roads - when paired up with the eight different context types present a range of conditions outlined in the design manual. This section evaluates these in terms of their transportation, land use and design characteristics.

Arterials

Arterials are designed to move vehicles over long distances and in the true sense are regional corridors. Typically, over the past 50 years, dispersed single access destinations have located along these facilities which have been designed mainly to provide regional travel. The mixing of local and regional traffic along these corridors often dictates the need for wide, multilane regional highways. However, this typical arrangement and sizing of an arterial is not the only choice.

To begin to address transportation challenges in urban developed corridors, it is important to examine how the principles described in this chapter can be applied in a “retroactive” manner to balance the needs of regional and local travel. In the short term, pedestrian conditions and local circulation can be improved through sidewalk enhancements and cross-access. Intermediate solutions might entail the creation of an alternative street network behind and between properties, so that internal trips can be accommodated without the need for travel on the main arterial. In the long term, a rearrangement of access and structures along the corridor can begin to better approximate a sustainable development pattern. The addition of buildings along the street and the complementary establishment of shared parking can begin to cause certain focal points along the corridor to “evolve” into pedestrian-oriented districts. When this happens, traffic will become more tame, short trips will take place on foot rather than by car, and natural nodes for a regional transit system will be created.

Abercorn in suburban context.

Abercorn in neighborhood context.

Collectors

Secondary to the arterials, major collectors are key to enhancing connectivity within the region. They provide relatively shorter connections and are often between two arterials. They are classified on the basis of the scale of the facility and the traffic volumes they serve but nevetheless form an important link between neighborhoods and the regional transportation system. Collectors in an urban setting often give a place its character. Hence their design should not only balance the quality of travel for all modes, but should also promote other physical street elements like trees, sidewalks and pedestrian amenities and built form. The ability of these key transportation facilities to accommodate all of the above eventually elevates them to be called main streets.

White Bluff Road near Hunter Army Air-field.

Main Streets

Main streets are those roadways serving mixed use centers. Mixed use centers often contain one or more public elements, such as civic or recreational activities. The design of main streets should highlight the role of the mixed use center as a focal point for the community. To efficiently provide access to the many uses located in mixed use centers, the scale and orientation of buildings should be developed to support a park-once, pedestrian friendly environment

River Street.

Local or Neighborhood Streets

The primary role of the neighborhood street as part of the transportation system is access to adjacent uses. In a broader context, neighborhood streets make up a large share of the public space in neighborhoods. Safety is the principal design element on neighborhood streets. Therefore, the roadway design should reinforce slow vehicular travel speeds.

31st Street.

Bicycle and Pedestrian Trails

To increase the percent of trips made by non-auto modes of travel, it is necessary to insure the safety and comfort of all user types, from novice to experienced. A system of bicycle and pedestrian trails should be developed to connect residential areas to mixed use centers and community amenities. In order to fully realize the potential positive benefits of roadway design, land use, and urban design on transportation and environmental preservation, it is essential that each of these subjects be addressed holistically. Roadway design must support the surrounding land uses and influence desired urban form to achieve a balance between mobility and community building.

Bicycle Pedestrian Trail through green-way. City of Charlotte, North Carolina.

Case Study: Victory Drive

The third local case selected for study by the stakeholders at the July workshop was the Victory Drive corridor. This corridor was the subject of a recent bridge replacement project which included the removal of a section of the wall of palm trees to accommodate temporary maintenance of traffic. The lost trees were never replaced.

While the initial focus of the discussion centered on ways to preserve the unique, palm-lined character of the corridor while still recognizing it's role as a link in the regional transportation system.

As was the case with the DeRenne Avenue example, it was clear that Victory Drive was being asked to do too much. It was supposed to be an amenity that unified the community, an arterial corridor for regional traffic (the presence of Truman Parkway raises the stakes on this role) and an access road for the homes and the businesses along it. The work group believed that it would be difficult for this corridor to serve all of those functions long-term.

As ideas were put to paper, the group began to believe that preservation of the corridor might come in rethinking all of the roles of the corridor. If the access function could be shared with an expanded street network built as a part of redevelopment, pressures to widen the road could subside. Additionally, defending the corridor's status as a constrained corridor provides a mechanism to argue that the intrinsic aesthetic value of the corridor demands acceptance of more congestion than might otherwise be tolerated.

The ideas shared in the session helped to suggest how a corridor might be able to preserve its character in the face of regional demands by making sure the design of the street matches the function and the context of the area. Among the ideas were:

- The creation of street network to tie redevelopment to surrounding neighborhoods.
- Moving access away from Victory and onto parallel or cross streets.
- Elimination of "super blocks" by creating more fine-grained network as land develops.
- Long term pursuit of non-interchange crossings of Truman Parkway.

8.0 Design Guidelines

This section is intended to be a synthesis of all of the ideas presented in this manual up to this point. It should help planners and designers to see how these ideas would be implemented physically in terms of limits, dimensions, preferences and design criteria. These guidelines relate back to the initial guidance provided by CUTS. That CUTS vision of the type of transportation systems desired for Savannah and Chatham County included:

- Trees, especially canopy trees, as an historic, essential element of Savannah and Chatham County
- Streets that include provisions for automobiles, bicycles, pedestrians and landscaping
- The provision for all of these uses as an integral part of the planning and design process

As was discussed in the introductory chapter, the design speed of the streets turns out to be a vital element of all three of these points. The first pages of this section discuss the design and protection of tree canopy. The pages that follow discuss street cross section design guidelines. A major component of these cross sections is the safe effective provision of bicycle, pedestrian and landscaping treatments within corridors. Finally, Chapter 9 discusses the process of integrating these solutions throughout the planning and design phases of projects.

Guidelines for Developing and Maintaining Canopy Streets

Tree lined canopy streets with their glorious old oak trees are an integral feature of Savannah, which reflect the City's history. There have been a number of instances in the past, however, when infrastructure development pressures have occasioned the removal of trees from Savannah's urban fabric. While this is to be avoided to the maximum extent possible, in unavoidable circumstances, replacing the removed trees with trees of the same species is recommended. [1]

Even with tree replacement efforts, the desired results – the re-establishment of a tree canopy – may not occur if key design considerations are not considered. The mature height and form of trees, their spacing both laterally and longitudinally and the placement techniques all factor into the ultimate results.

While this section does not purport to be an exhaustive resource regarding tree placement and selection, the intent is to raise some of the transportation design criteria that are critical in the development or replacement of tree canopy. Transportation criteria are often cited as a reason that trees must be removed or cannot be replaced. However, it is often the case that minor design changes can allow local goals regarding trees to be met. With regard to detailed planting specifications and species, the appropriate agency arborist should be consulted.

Tree form

Tree form must be considered primarily in relation to the lateral offset of the planting from the travel way. If canopy trees are desired, selecting the right form is important. Canopy trees are trees with a spread and a foliage that ideally extends to about eight to ten feet or more from the tree trunk. This foliage also needs to be at least eight feet above the pavement surface. That said, the only forms out of the ones in the adjacent graphic that lend themselves to being canopies are trees with rounded, spreading or weeping forms. While not able to form true canopies, trees with fastigate, columnar or pyramidal forms can form excellent screens if that is the goal.

Tree placement

Tree placement is as important as choosing the right tree form. The intent of a tree lined canopy street is to provide structure and enclosure to the street. This can be achieved by spacing trees regularly and in the correct location across the street right-of-way (ROW). Trees spaced too far apart laterally do not provide enclosure and appear more as single trees rather than as a canopy. On the other hand, if placed too closely, the lack of space for growth of foliage may prove to be a problem for the development of canopies. If placed too far apart across the ROW, the canopy will not overhang and enclose the street as intended.

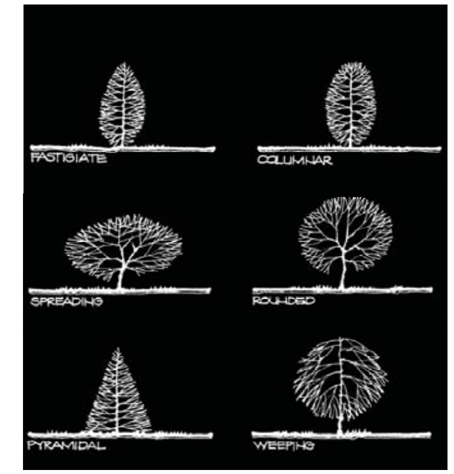
A 4 foot planting strip or amenity strip with tree grates with an additional 6-8 foot sidewalk is the minimum needed for canopy trees to flourish. Ideal conditions may call for more space for trees. In any case, it will be critical to follow the local landscape design guidelines for street and canopy tree planting requirements. The following are the general guidelines for tree planting in the City of Savannah:

- Planting space width less than 4 feet: small tree species
- Planting space between 6-8 feet: medium tree species
- Planting space greater than 8 feet: large tree species
- Minimum distance to street corner: 30 feet
- Minimum distance to utility pole/light pole: 15 feet for small tree; 20 feet for medium tree; 30 feet or more for large tree species

Lateral tree spacing for street trees (with a caliper of less than 11') usually varies anywhere between 15 and 50 feet and depends on the following factors:

- Posted speed limits: Low posted speed generally allows for closer tree spacing
- Tree Species: Trees that have larger canopies need space for the canopies to grow (Oak or Rain tree). On the other hand, palms can be spaced closer because of their form and smaller canopies.
- Street furniture elements: The number of varied street furniture elements like light poles, benches, bollards, art work and sculptures impact the spacing of trees. Spacing should be organized such that if these elements are removed, the gaps can be filled in with trees by continuing the same spacing.

While trees spaced more closely laterally will increase project cost, it is necessary in order to achieve the desired end result of canopy tree coverage. Special spacing considerations at street corners should also be observed.



Tree form is critical to establishing canopy structure.

Source: Booth, Norman K. Basic Elements of Landscape

Use trees to provide a structure to the street.

Source: Arnold, Henry F. Trees in Urban Design

Correct tree form and placement provides side as well as overhead enclosure

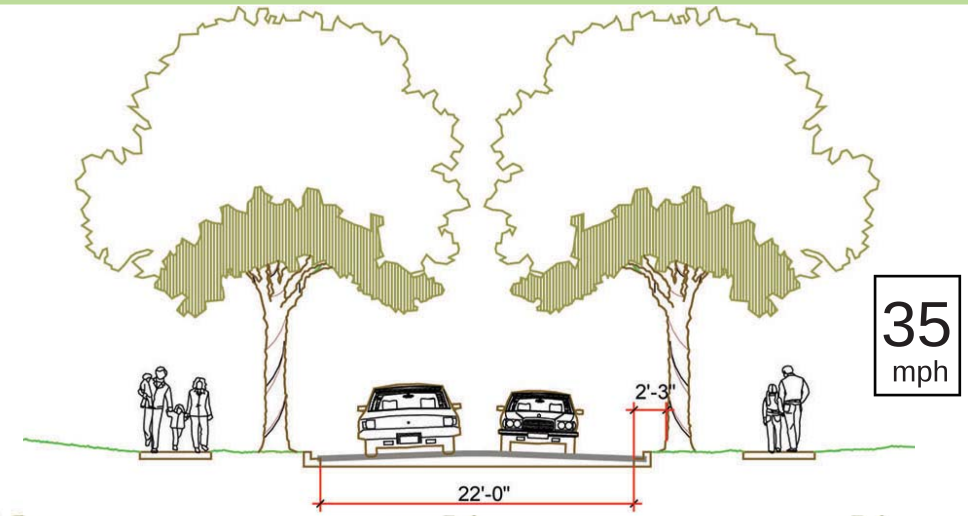
Source; Arnold, Henry F. Trees in Urban Design

1 AASHTO Chapter 5 - "Landscaping in keeping with the character of the street and its environment should be provided."

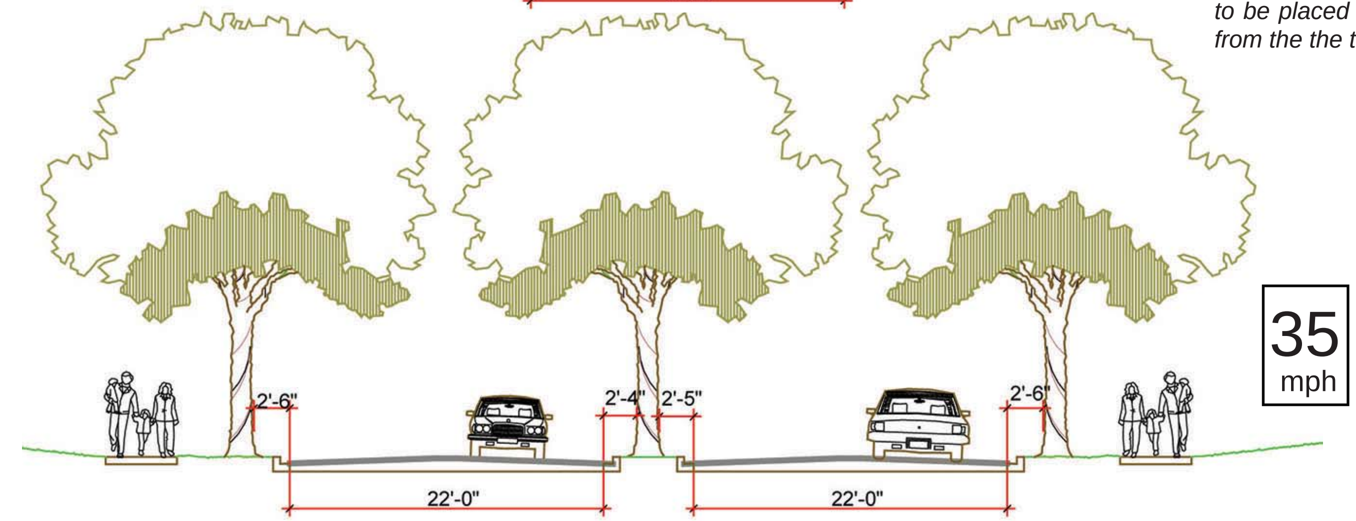
Design speed of the street

This is perhaps one of the most critical design components. The "green book" suggests, and most DOT's take as policy, that when the 40 mph design speed threshold is breached, automobile safety issues take precedence causing a significant shift in design parameters. Most DOT's will not consider a curb and gutter street section above 40 mph. This adversely impacts the development of tree lined canopies on streets because of increased spacing between the travel lane and the trees, when there is no curb to delineate the vehicle travelway [2]. Tree lined canopy streets are best developed on streets with design speeds of 40 mph or less.

(Refer to Appendix - page A4 for table on tree spacing relationship to design speeds)



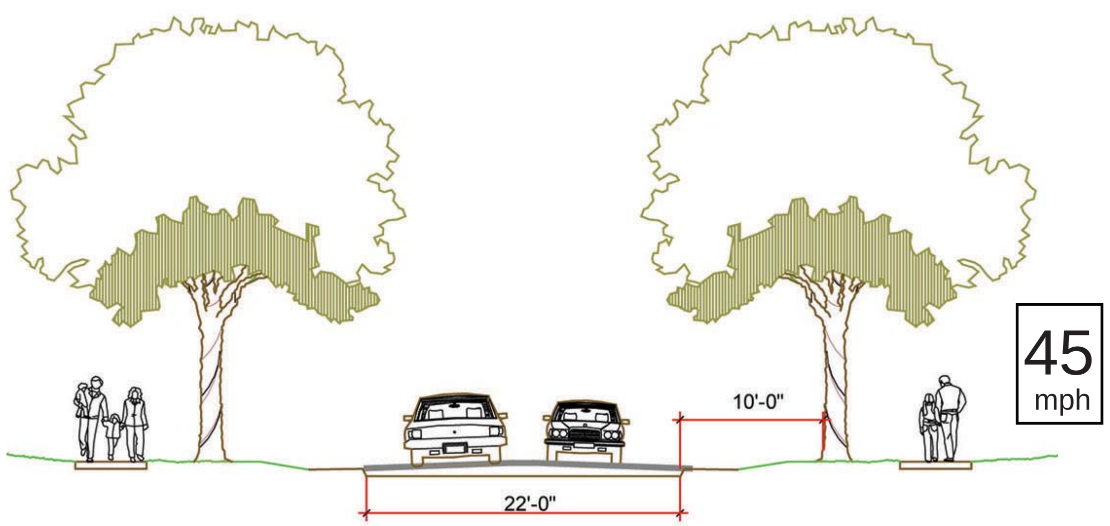
Low design speeds and the right tree form allow for development of tree lined canopies over the street. Low design speeds allows trees to be placed as close as 18" from the the travel lane.

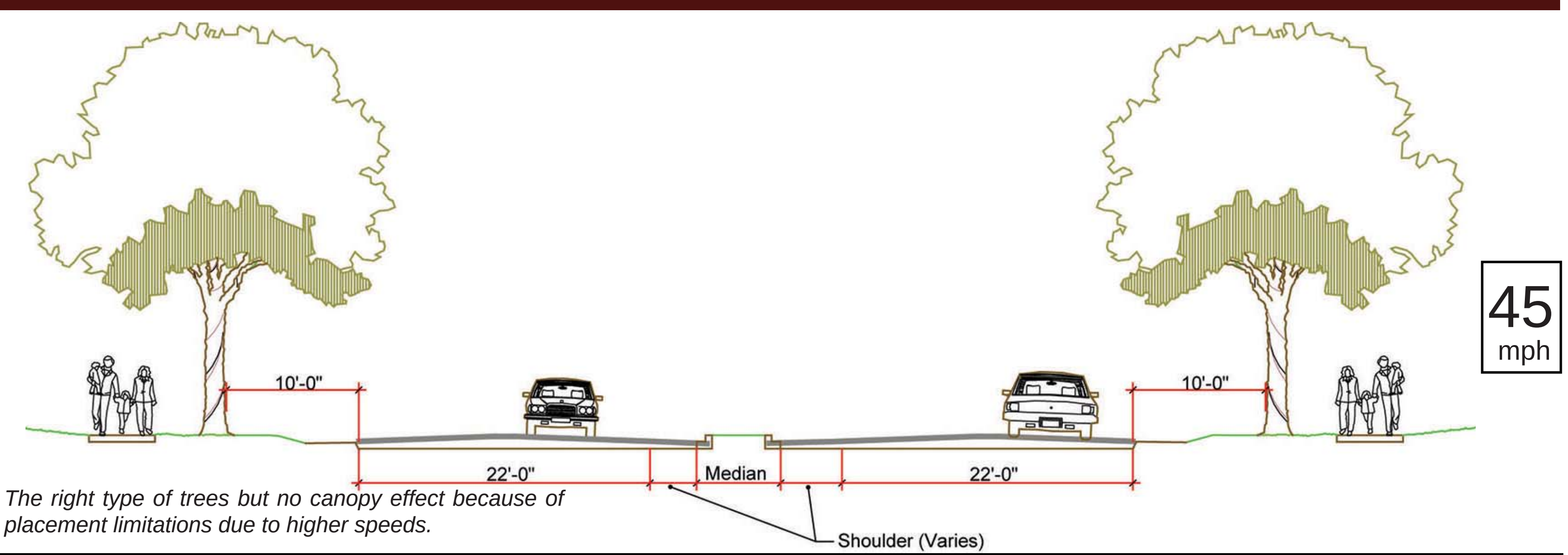


---

2 Geometric Design of Highways and Streets, 2004, American Association of State Highway and Transportation Officials, Chapter 4 – "for urban arterials, collectors, and local streets where curbs are utilized . . . a minimum offset distance of 18 inches should be provided."

The DESIGN BREAK: When the 40 mph design speed is breached, safety considerations cause a significant shift in design parameters. This significantly impacts the goal of developing canopies

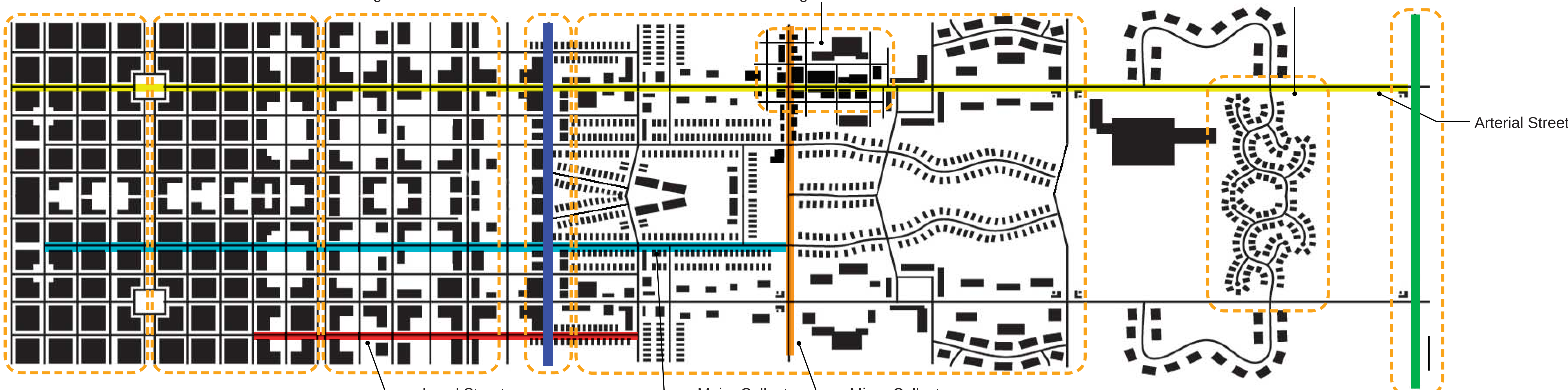




The right type of trees but no canopy effect because of placement limitations due to higher speeds.

Context and Functional Classification Matrix

Functional Classification of Streets	Context Types							
	Landmark Historic District	Neighborhood Historic District	Traditional Neighborhoods	Village Centers	Suburban Communities	Gated Communities	Scenic Corridors	Rural or Undeveloped Corridors
Arterial	Page 29	Page 30	Page 30	Page 31	Page 32	Page 32	Page 33	Page 34
Major Collector	Page 35	Page 36	Page 39	Page 37	Page 39	Page 39	Page 39	Page 39
Minor Collector or Main Street	Page 40	Page 41	Page 41	Page 42	Page 43	Page 43	Page 44	Page 44
Local or Neighborhood Streets	Page 45	Page 46	Page 46	Page 47	Page 48	Page 48	N / A	N / A



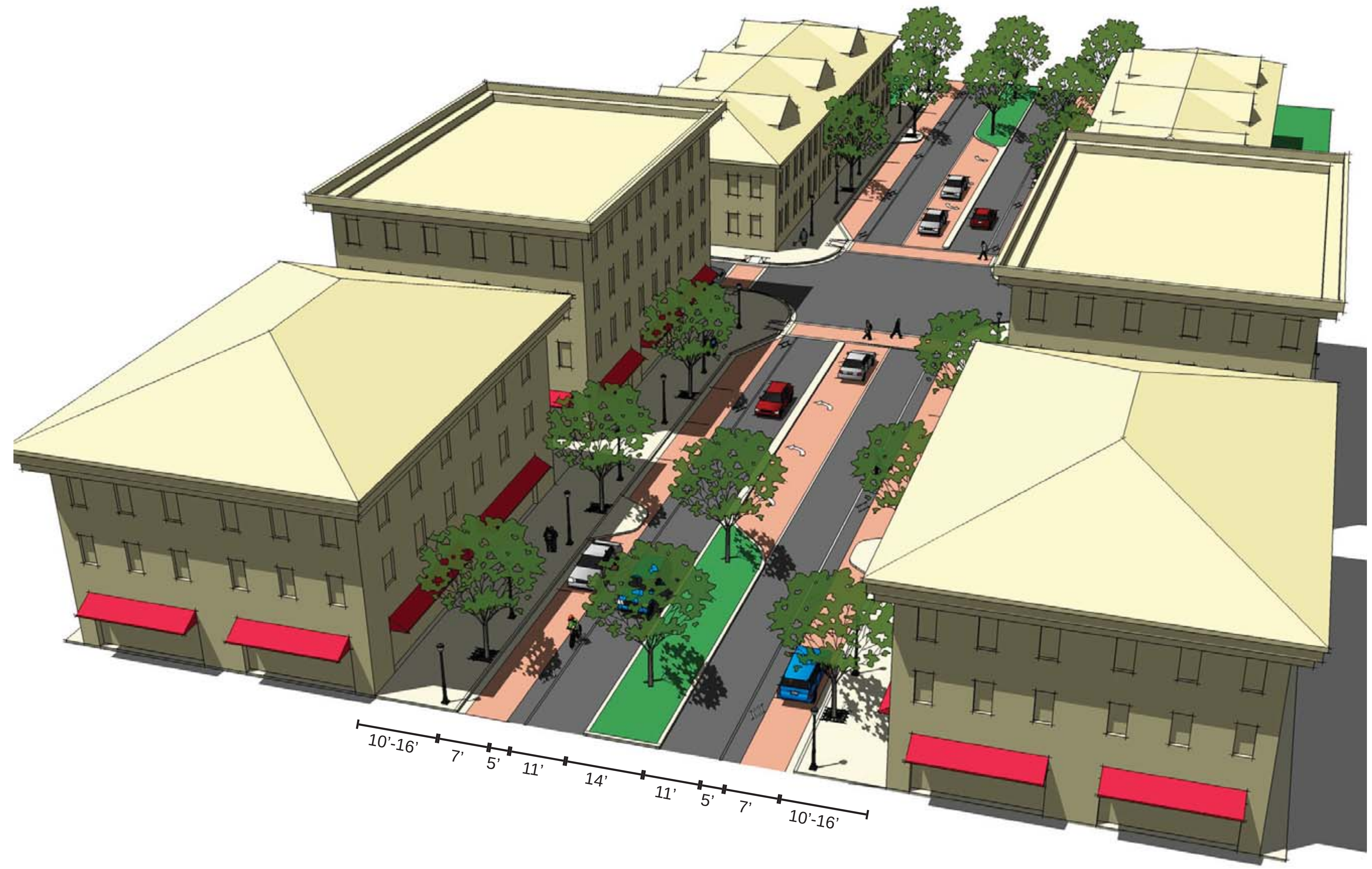
The transect diagram is a reflection of the development patterns in Savannah and Chatham County. This section of the manual is structured to reflect street characteristics in each of these contexts and the table above, is a page index that matches up street types with contexts. Many of these street conditions appear in various contexts.

As work to implement recommendations of this manual continues, it will be necessary for the City and County to map the study area in to contexts and characterize streets in a diagram similar to the above.

Context Type:

Landmark Historic District

Functional Classification: **Arterial**



Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median	14' Max with street trees
Lane Width (max)	11' (3)
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	10' min with on curb planting; 16' max including amenity zone
Intersection Spacing (Full intersection)	400'
Trees	Canopy trees (edge and Center)
Mid-Block Crossing	No
Traffic Calming Elements	Optional
Block Size / Intersection	400' max block size
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	No planting strip

3 AASHTO, Chapter 7 - "Lane widths may vary from 3.0 to 3.6 m (10 to 12 feet). Lane widths of 3.0 m (10 ft.) may be used in highly restricted areas having little or no truck traffic. Lane widths of 3.3 m (11 ft.) are used quite extensively for urban arterial street designs."

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	Optional
Lane Width (max)	11'
Design Speed	25 - 30 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	8' (15' max including amenity zone)
Intersection Spacing (Full intersection)	800' max (Match with existing Grid)
Trees	Canopy trees
Mid-Block Crossing	Yes: where blocks exceed 600'
Traffic Calming Elements	Yes
Block Size / Intersection	To match with existing street grid
Building Placement	Varies
Planting Strip / Amenity Zone	No planting strip


Neighborhood Street
as above, but without median

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	11’
Design Speed	30 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5’
On-street Parking	7’
Sidewalks	10’ (15’ max including amenity zone)
Intersection Spacing (Full intersection)	660’
Trees	Street trees*
Mid-Block Crossing	Yes: where blocks exceed 600’
Traffic Calming Elements	Yes
Block Size / Intersection	600’ max block size 1200’ full intersection
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	No planting strip Amenity Zone

*May or may not necessarily fulfill canopy tree conditions

*Does not preclude the formation of canopies

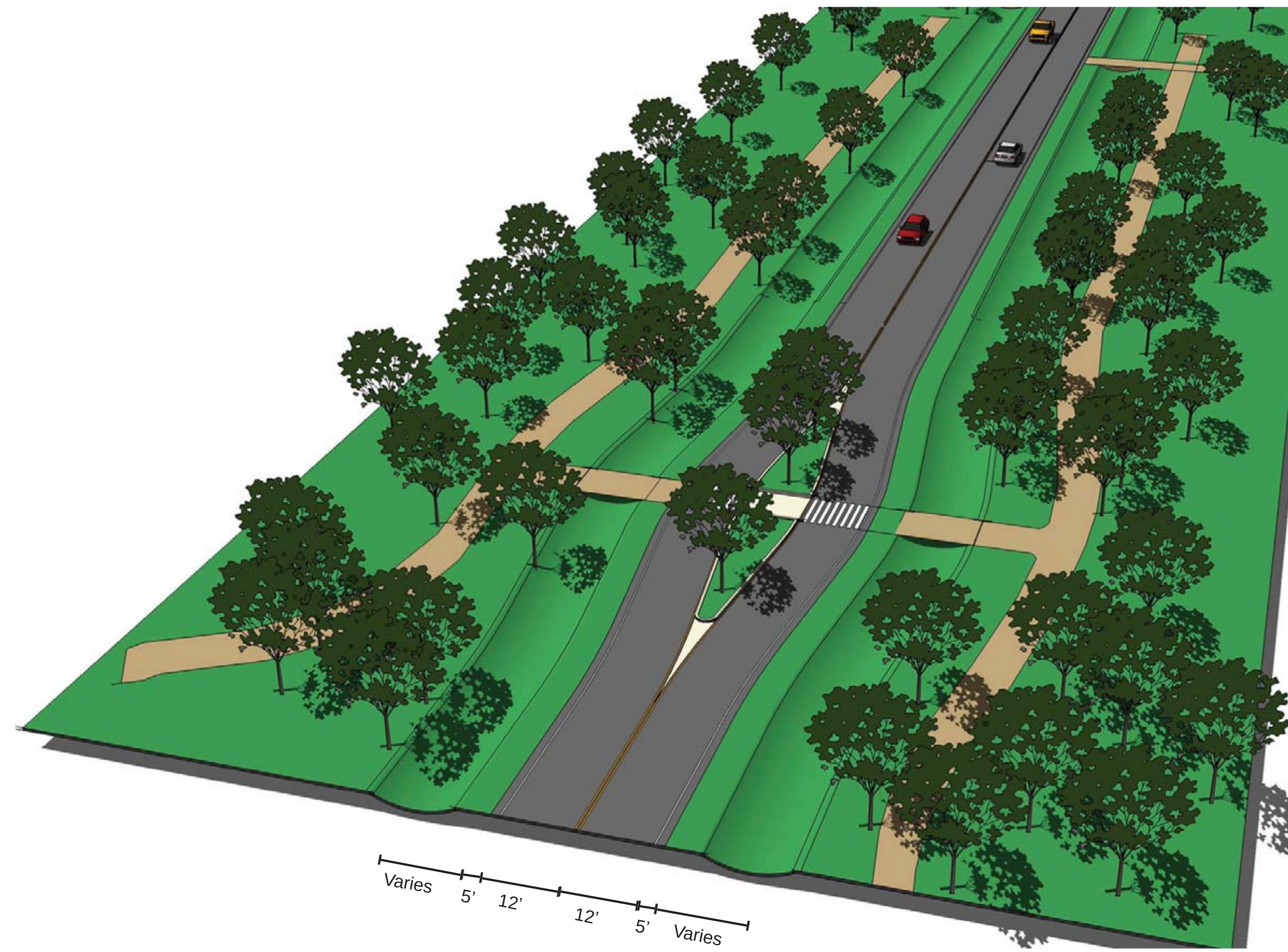
Context Type:

Suburban Communities / Gated Communities

Functional Classification: **Arterial**

Lane Limits (number of through lanes)	4
Right Turn Lane	No: Unless very heavy turning volume
Median (width, raised / flushed)	Yes: raised medians/with trees. Left turn lane flush where applicable @ intersection. 20' maximum
Lane Width (max)	11'
Design Speed	45 mph
Shoulder / Curb & Gutter	Curb & Gutter or shoulder where development does not face up on the street/road
Bike Lanes	5'
On-street Parking	No
Sidewalks	6' (where curb & gutter condition) No sidewalk in shoulder condition
Intersection Spacing (Full intersection)	800'
Trees (street trees or informal canopy trees)	Where shoulder/bike lane: informal tree planting Where curb & gutter: street trees
Mid-Block Crossing	Yes: At pedestrian and trail crossing location
Traffic Calming Elements	Vertical and horizontal deflection in roadway alignment
Block Size / Intersection	1200' max block size
Building Placement	
Planting Strip / Amenity Zone	4' planting strip

Lane Limits (number of through lanes)	2
Right Turn Lane	No: Unless very heavy turning volume
Median (width, raised / flushed)	No: for 2-lane section. Yes: Grass median 14' wide for 4-lane section
Lane Width (max)	12'
Design Speed	50 mph
Shoulder / Curb & Gutter	Shoulder 5' to 6' paved (to be used as a bike lane)
Bike Lanes	5' - 6' or paved shoulder.
On-street Parking	
Sidewalks	No sidewalk. Off road trail: min 10' wide where appropriate
Intersection Spacing (Full intersection)	
Trees	Canopy trees*
Mid-Block Crossing	Yes: At pedestrian and trail crossing location
Traffic Calming Elements	Vertical and horizontal deflection in roadway alignment
Block Size / Intersection	N/A
Building Placement	N/A
Planting Strip / Amenity Zone	N/A



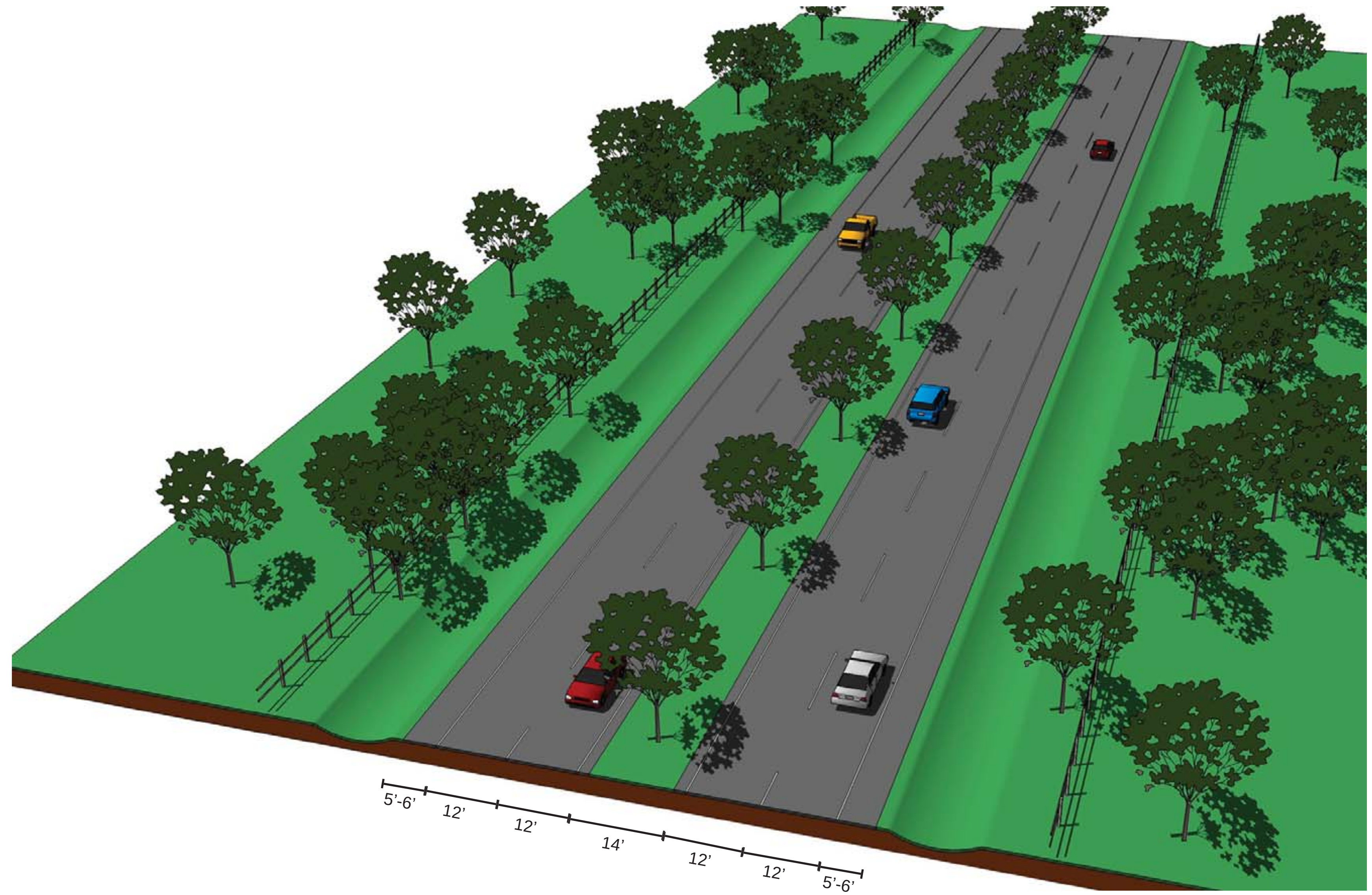
*Re-establish or develop canopy tree conditions where appropriate. Develop planting patterns (formal planting or informal tree clumps as appropriate) to enhance view sheds and visibility of scenic corridors

Context Type:

Rural or Undeveloped Corridors

Functional Classification: **Arterial**

Lane Limits (number of through lanes)	4
Right Turn Lane	No: Unless very heavy turning volume
Median (width, raised / flushed)	No: for 2-lane section. Yes: Grass median 14' wide for 4-lane section
Lane Width (max)	12'
Design Speed	50 mph
Shoulder / Curb & Gutter	Shoulder 5' to 6' paved (to be used as a bike lane)
Bike Lanes	5' - 6' or paved shoulder.
On-street Parking	
Sidewalks	No sidewalk. Off road trail: min 10' wide where appropriate
Intersection Spacing (Full intersection)	
Trees	Replace natural tree patterns
Mid-Block Crossing	Yes: At pedestrian and trail crossing location
Traffic Calming Elements	Vertical and horizontal deflection in roadway alignment
Block Size / Intersection	N/A
Building Placement	N/A
Planting Strip / Amenity Zone	N/A



Context Type:
Landmark Historic District

Functional Classification: **Major Collector**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10'
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	10' min with on curb planting
Intersection Spacing (Full intersection)	400'
Trees	Canopy trees
Mid-Block Crossing	No
Traffic Calming Elements	Optional
Block Size / Intersection	400'
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	No planting strip

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10'
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	8' (15' max including amenity zone)
Intersection Spacing (Full intersection)	1200'
Trees	Canopy trees
Mid-Block Crossing	Yes: where blocks exceed 600'
Traffic Calming Elements	Yes
Block Size / Intersection	600' max block size
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	No planting strip

Context Type:
Village Center

Functional Classification: **Major Collector**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10'
Design Speed	30 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	8' (15' max including amenity zone)
Intersection Spacing (Full intersection)	1200'
Trees	Street trees*
Mid-Block Crossing	Yes: where blocks exceed 600'
Traffic Calming Elements	Yes
Block Size / Intersection	600' max block size
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	No planting strip

*Does not preclude the formation of canopies

Context Type:

Traditional Neighborhoods, Suburban Communities and Gated Communities

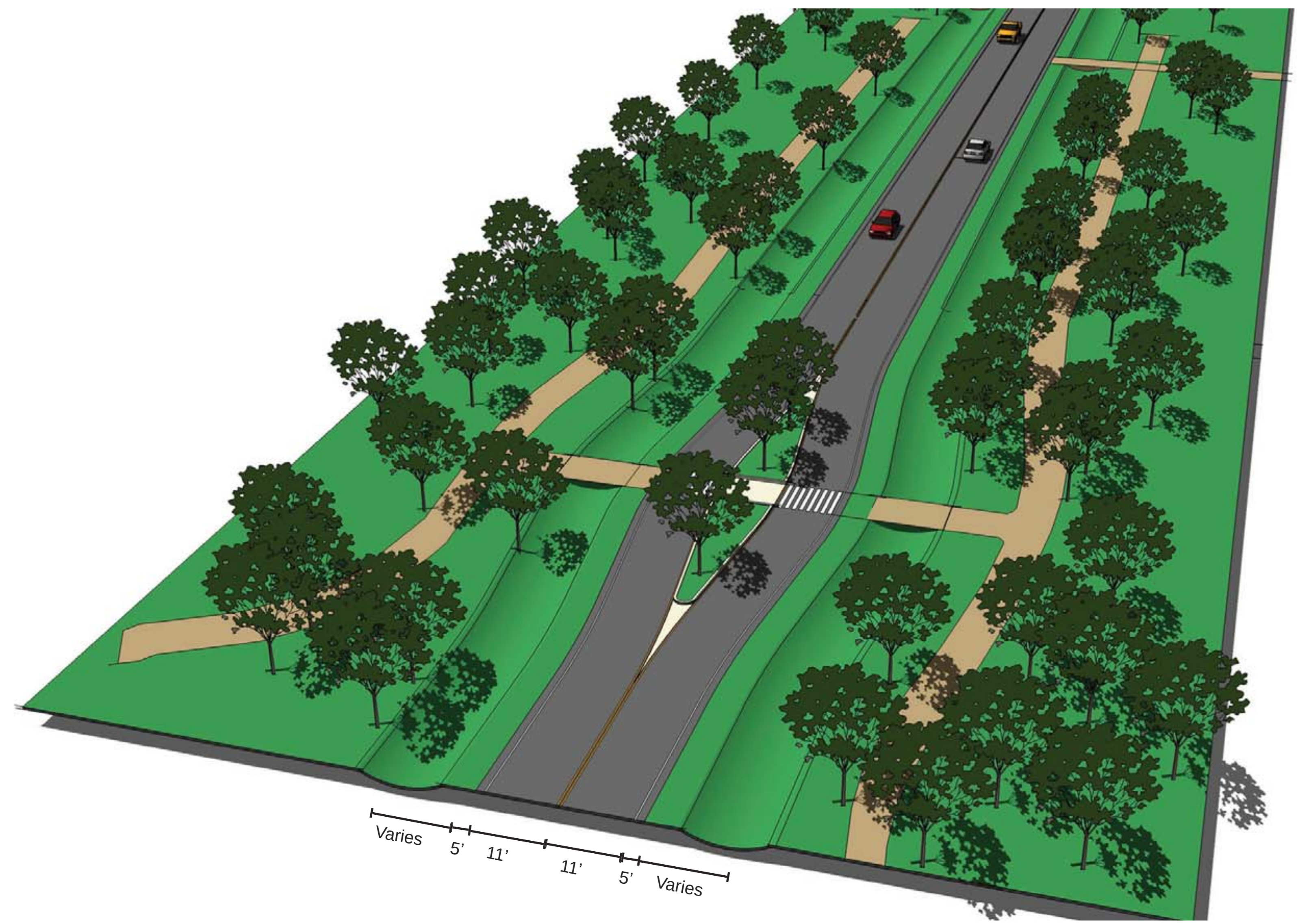
Functional Classification: **Major Collector**



Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	14' Maximum
Lane Width (max)	10'
Design Speed	30 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	8' (15' max including amenity zone)
Intersection Spacing (Full intersection)	1200'
Trees	Street trees*
Mid-Block Crossing	Yes: where blocks exceed 600'
Traffic Calming Elements	Yes
Block Size / Intersection	600' max block size
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	No planting strip

*Does not preclude the formation of canopies

Lane Limits (number of through lanes)	2
Right Turn Lane	No: Unless very heavy turning volume
Median (width, raised / flushed)	No
Lane Width (max)	12'
Design Speed	50 mph
Shoulder / Curb & Gutter	Shoulder 5' to 6' paved (to be used as a bike lane)
Bike Lanes	5' - 6' or paved shoulder
On-street Parking	N/A
Sidewalks	No sidewalk. Off road trail: min 10' wide where appropriate
Intersection Spacing (Full intersection)	
Trees	Replace natural tree patterns*
Mid-Block Crossing	Yes: at pedestrian and trail crossing location
Traffic Calming Elements	Vertical and horizontal deflection in roadway alignment
Block Size / Intersection	N/A
Building Placement	N/A
Planting Strip / Amenity Zone	N/A

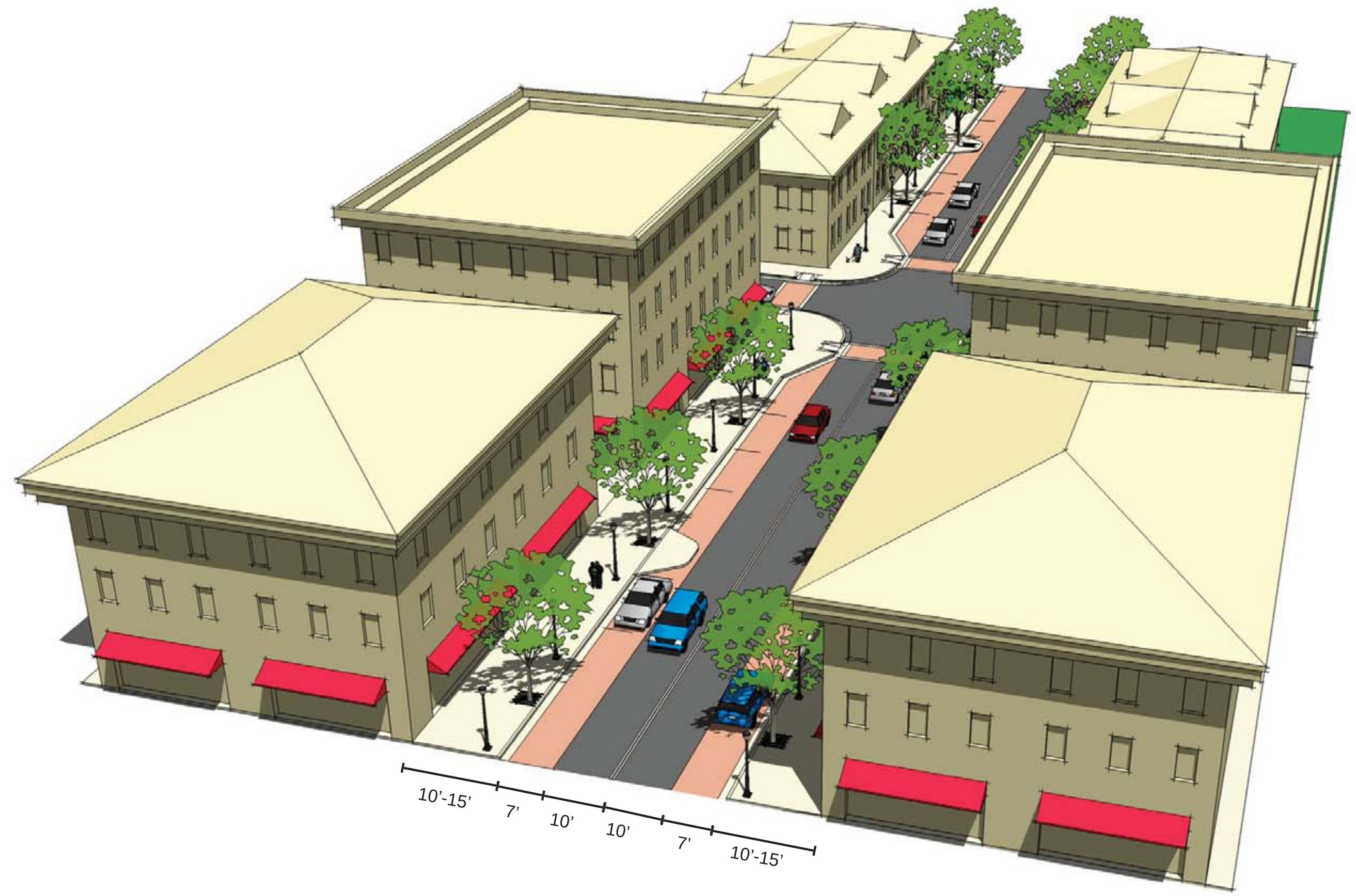


*Re-establish or develop canopy tree conditions where appropriate. Develop planting patterns (formal planting or informal tree clumps as appropriate) to enhance view sheds and visibility of scenic corridors

Context Type:

Landmark Historic District

Functional Classification: **Minor Collector**



Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10'
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	10' min with on curb planting
Intersection Spacing (Full intersection)	
Trees	Canopy trees
Mid-Block Crossing	No
Traffic Calming Elements	Optional
Block Size / Intersection	
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	No planting strip

Context Type:

Neighborhood Historic District, Traditional Neighborhoods

Functional Classification: **Minor Collector**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10'
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	8' min on curb/off curb
Intersection Spacing (Full intersection)	
Trees	Canopy trees
Mid-Block Crossing	Yes: Where blocks exceed 600'
Traffic Calming Elements	Yes
Block Size / Intersection	
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	

Context Type:

Village Center

Functional Classification: **Main Street**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10'
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	5'
On-street Parking	7'
Sidewalks	10' min on curb planting
Intersection Spacing (Full intersection)	400'
Trees	Street trees*
Mid-Block Crossing	Yes: Where blocks exceed 600'
Traffic Calming Elements	Yes
Block Size / Intersection	
Building Placement	Edge of ROW
Planting Strip / Amenity Zone	No planting strip

*Does not preclude the formation of canopies

Context Type:

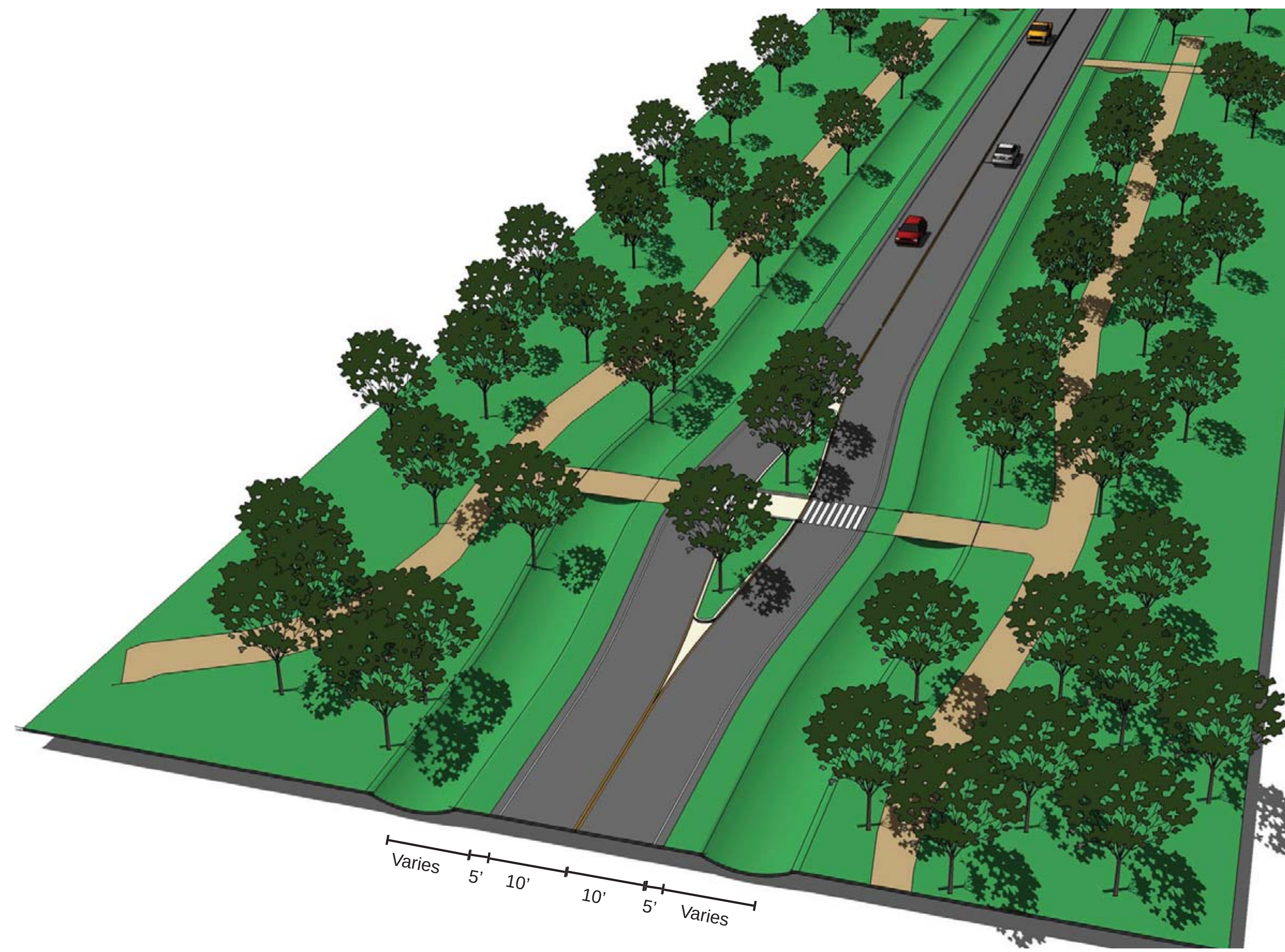
Suburban Communities and Gated Communities

Functional Classification: **Minor Collector**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	Yes: raised median - flush at intersections and driveways: 20' max 4' min
Lane Width (max)	10'
Design Speed	35 mph
Shoulder / Curb & Gutter	Curb & Gutter
Bike Lanes	Yes: (max up to total 6')
On-street Parking	Yes: (max up to total 8')
Sidewalks	6' min if off curb
Intersection Spacing (Full intersection)	660'
Trees	Street trees*
Mid-Block Crossing	Yes: Where blocks exceed 600'
Traffic Calming Elements	Yes
Block Size / Intersection	
Building Placement	
Planting Strip / Amenity Zone	4' planting strip

*Does not preclude the formation of canopies

Lane Limits (number of through lanes)	2
Right Turn Lane	No: Unless very heavy turning volume
Median (width, raised / flushed)	No: for 2 lane section Yes: Median @ intersection 14' max
Lane Width (max)	10'
Design Speed	35 mph
Shoulder / Curb & Gutter	5' - 6' stabilized earth shoulders; (not paved)
Bike Lanes	Bikes within the traffic stream or parallel bike-ped trails.
On-street Parking	No
Sidewalks	No
Intersection Spacing (Full intersection)	N/A
Trees	Canopy Trees*
Mid-Block Crossing	At intersections of bike-ped trail crossings with these roads
Traffic Calming Elements	Vertical and horizontal deflection in roadway alignment
Block Size / Intersection	N/A
Building Placement	N/A
Planting Strip / Amenity Zone	



*Re-establish or develop canopy tree conditions where appropriate. Develop planting patterns (formal planting or informal tree clumps as appropriate) to enhance view sheds and visibility of scenic corridors

Context Type:
Landmark Historic District

Functional Classification: **Neighborhood Street or Local Street**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10’
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb and Gutter
Bike Lanes	No
On-street Parking	7’
Sidewalks	Yes: 10’ Min with on curb planting
Intersection Spacing (Full intersection)	N/A
Trees	Canopy trees
Mid-Block Crossing	No
Traffic Calming Elements	Optional
Block Size / Intersection	N/A
Building Placement	N/A
Planting Strip / Amenity Zone	

Context Type:

Neighborhood Historic District and Traditional Neighborhood

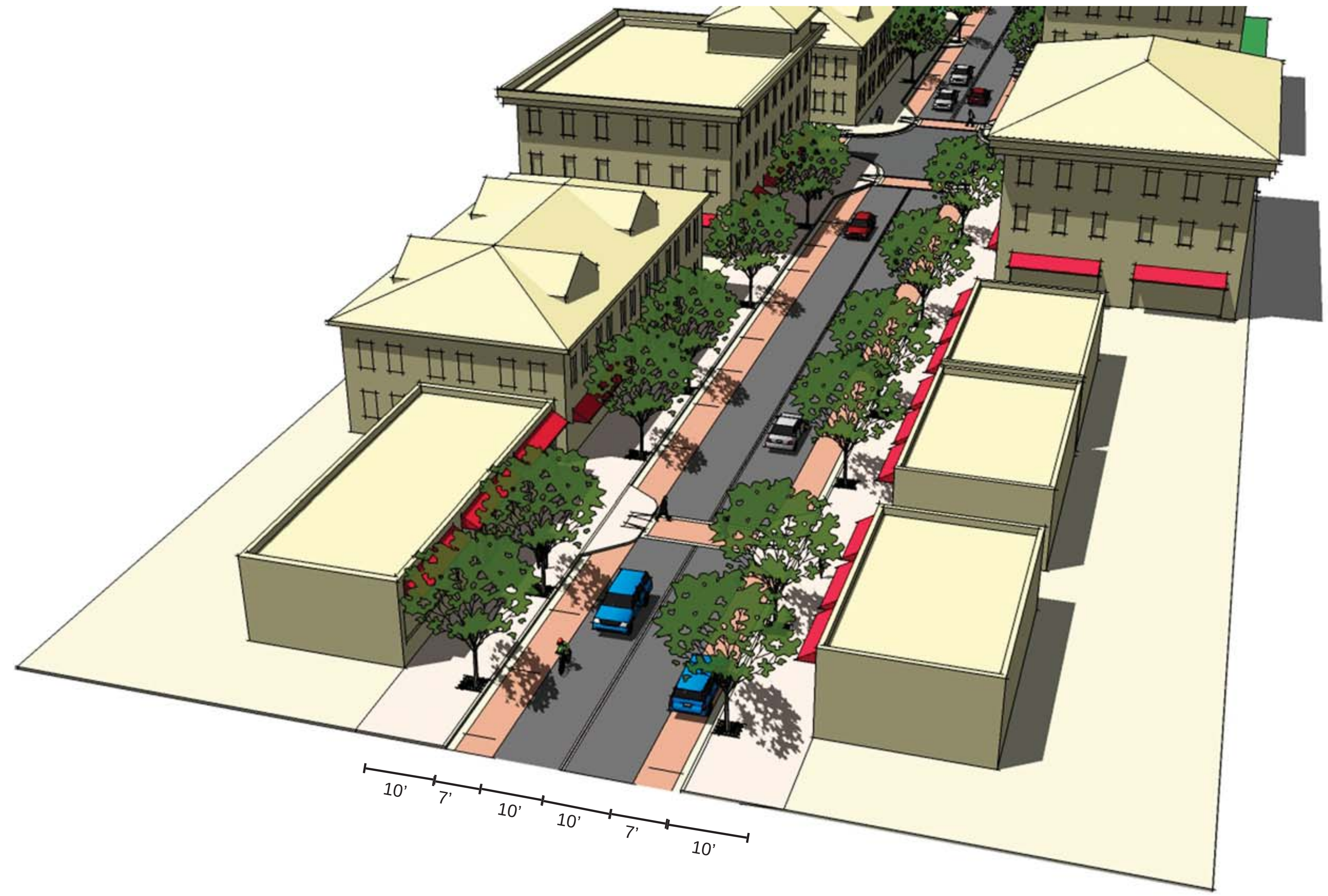
Functional Classification: **Neighborhood Street or Local Street**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10'
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb and Gutter
Bike Lanes	No
On-street Parking	7'
Sidewalks	8' Min (optional on/off curb planting
Intersection Spacing (Full intersection)	N/A
Trees	Canopy trees
Mid-Block Crossing	Yes: Where blocks exceed 600'
Traffic Calming Elements	Yes
Block Size / Intersection	N/A
Building Placement	N/A
Planting Strip / Amenity Zone	4' Planting Strip in Traditional Neighborhood

Context Type:
Village Center

Functional Classification: **Neighborhood Street or Local Street**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10’
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb and Gutter
Bike Lanes	No
On-street Parking	7’
Sidewalks	10’ Min with on curb planting
Intersection Spacing (Full intersection)	660’
Trees	Street Trees*
Mid-Block Crossing	Yes: Where blocks exceed 600’
Traffic Calming Elements	Yes
Block Size / Intersection	N/A
Building Placement	N/A
Planting Strip / Amenity Zone	



*Does not preclude the formation of canopies

Context Type:
Suburban Community or Gated Community

Functional Classification: **Neighborhood Street or Local Street**

Lane Limits (number of through lanes)	2
Right Turn Lane	No
Median (width, raised / flushed)	No
Lane Width (max)	10’
Design Speed	25 mph
Shoulder / Curb & Gutter	Curb and Gutter
Bike Lanes	No
On-street Parking	7’
Sidewalks	8’ with on curb planting 6’ with off curb planting
Intersection Spacing (Full intersection)	800’
Trees	Street Trees*
Mid-Block Crossing	Yes: Where blocks exceed 600’
Traffic Calming Elements	Yes
Block Size / Intersection	N/A
Building Placement	N/A
Planting Strip / Amenity Zone	4’ Planting Strip or off curb planting

*Does not preclude the formation of canopies

9.0 The Process for Context Sensitive Solutions

The guidelines presented in the preceding chapter present an ideal for the design of streets in Savannah and Chatham County. But how do we go about reconciling these ideals with the real-world demands of the traveling public in a growing region? The answer may lie in the creation of and adherance to a vision of the City and County that can be supported by the community. The following are some suggestions regarding how that sort of buy-in might be achieved.

Elements of the Process

1. **Big and Small Plans** – One of the biggest challenges in planning for a region is the responsibility to account for regional needs (such as moving people over long distances or accommodating major new developments), while respecting the integrity of the neighborhoods that make up a city. Because of this dichotomy, no single planning process can possibly do an effective job of putting the pieces together in a way that will make the community a better place in the long run. At the end of the day, however, making Savannah and Chatham County a better plan is exactly what we must achieve. The way to accomplish this is to take a series of steps, all with different goals, that add up to a plan for the region and its neighborhoods. That set of steps should include:

- Regional Visioning
- Neighborhood and Corridor Studies
- An Inclusive Design Process

The changing face of Abercorn Street as it passes from one context to another. The two lane section to the north supports twice as much ground floor density as the multi-lane section to the south due to the presence of network.

2. **Framework** - In any good planning process the first step that must be undertaken is to establish a framework for decision making during the process. This means deciding things like what evaluation criteria should be considered, what collaborators should be consulted, who will be the decision makers, etc. The establishment of a framework applies to both large regional planning processes, and smaller neighborhood-focused processes.

The elements to be considered in the framework might include the following:

- *Evaluation Criteria* – Whether the subject of the planning study is the region, a neighborhood or a corridor, it is important to establish the ultimate goals to be achieved. Is the primary goal to move cars faster over a long distance? This may be an appropriate goal, for example, on a limited access facility such as Truman Parkway.

  If, however, a broader set of goals are appropriate, this should be established at the outset; preferably through a public process. Is preservation of an area's character important? Revitalization of land use? Safety of bicyclists and pedestrians? If these or other criteria are important, they should be considered appropriately as decisions are made regarding the right transportation projects. Inordinately weighting mobility criteria such as vehicle speed or level of service can be and has been highly detrimental to the character and livability of Savannah's communities.

- *Stakeholders* – Identifying and involving the right stakeholders at the outset can not only make project implementation faster and easier; it can often lead to the identification of alternatives that would not other-wise have been considered.

- *Identification of Alternatives* – The identification and fair evaluation of a full set of alternatives is the most often neglected step in the process. This is ironic, since it is probably the step that has the most potential to make a difference. Instead of coming to a conclusion early in the process (e.g., we are widening this road from two to four lanes) and trying to defend this decision, remaining open to alternative solutions (adding network, accepting a higher level of congestion, changing land use assumptions) can lead to lower costs and a higher degree of satisfaction.

- *Decision Making* - At the end of a process it is important that the entity in charge of making a decision documents and explains the basis for that decision. This documentation and communication needs to follow the project along the course of its development so that designers or stakeholders who come to the process later, understand the decisions that have been made.

3. **Design Elements** – All of the elements that will be part of a street should be considered in making design decisions. If regional vehicular needs are the only design element that drives design decisions, it is likely elements such as trees, sidewalks and bicycle facilities will suffer. Often, finding a middle-ground design solution can prove beneficial to the community at large and assure that all of the elements of the street can work well together.

Implementation Strategies

Since these processes are not currently the norm in the City and County, change will require a commitment on the part of the local jurisdictions. The following are some ideas that should help in making positive change toward a more balanced process.

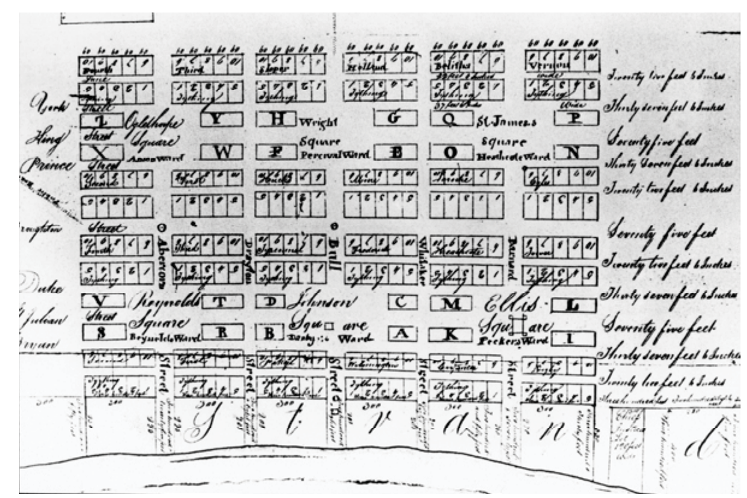
A Playbook for Savannah/Chatham County

Definition of Roles and Responsibilities – Implementation of these ideas will require a champion. This must be a person or persons who believe in the principles espoused in this manual and who is willing to monitor and influence projects from beginning to end. This will include reminding all parties of their proper roles in a collaborative process. It remains an open question regarding where this person be housed or to whom they should report, but the person must be empowered to engage in the project development process throughout. It is unlikely that any existing staff person at any local agency has the necessary time available to commit to an undertaking of this importance. Since the issues covered in this manual are cross-jurisdictional, there would be some logic to creating a position for a technical coordinator within the MPO. Regardless of position or location, however, the role of change agent will be a difficult one. One of our workshop participants, Gary Toth from New Jersey DOT describes how his life as agent of change was not always easy, but that it was often very rewarding. The short term cost involved in funding such a position can be a difficult challenge for a community, but the potential to so profoundly affect the quality of life for so many residents should make this step one at least worthy of consideration.

Engagement – The person who is responsible for implementation of this manual must not be afraid to engage in dialog with project designers, the public, elected officials or anyone else who has influence over a project. Such engagement can help to shine a light on the design process and provide early evidence of any contentious issues. Beyond the individual's motivation, however, it will be critical that he or she have clear support from the executive leadership (city, county, MPC). Without such support, as well as recourse to consult those leaders, it will be very easy for supporters of the status quo to resist or ignore the wishes of the community as promoted by the coordinator.

Documentation – Often when projects go wrong, it is not through conscious effort, but miscommunication. It is imperative that designers understand decisions that have been made during the planning process and that planners remain engaged through the design process. The manual "point-person" will be key to assuring this documentation of decisions occurs.

Design elements such as lane width, tree placement, parking, land form and pedestrian facilities can all be seen in this photo



Savannah's 1733 Plan includes plenty of network and connectivity

10.0 Interim Amenity Solutions

The way that streets are designed and planned in Savannah has evolved from the small-scale horse and pedestrian-based principles that were employed in the sixteenth century, to the automobile driven standards that are largely employed today. That evolution took place over a long period of time and changing to fit today's needs in the City and County will take a long time as well. What is to be done in the interim?

While the preceding standards provide an ideal from which to start, in reality some streets in the region and projects that will be developed will not fit neatly into these standards. For example, an agency may make a case that mobility concerns dictate that a road must exceed the lane limit guidelines. Or a street that was built long ago outside of our context sensitive standards might be in need of some retro-fit solutions to improve its livability. Some might refer to these as "band-aid" type solutions, but areas in transition are often in need of a band-aid. The following are a few guidelines to the implementation of these interim solutions, and some of the tools that might help to address community concerns on problem facilities or projects.

Start Early, Stay Involved

With regard to projects under development, the biggest key to impacting the ultimate design is to coordinate early and stick with the process. The further a project has progressed and the more decisions that have been made, the more difficult it can be to effect changes. At the beginning of the process, questions should be asked about the goals and objectives of a planned project:

- What need is this project intended to address?
- What evidence of this need can be presented?
- Is this project only to address transportation needs, or are other community goals to be considered?
- What is the menu of solutions that are being or have been considered?
- Are there other alternatives that can meet the stated goals?
- Would the proposed solution or solutions fit well into the communities touched by the project?
- If not, could different evaluation criteria or design criteria be considered (lower design speed, parallel corridors, land use changes, etc.)?

These questions can come from citizens, partner agencies, or the press, but the questions should be asked until they are answered. If responses are not forthcoming, move up the ladder of responsibility (e.g., elected officials). As the project progresses, continue to communicate with those responsible for the planning, design and even the construction. Often it is found that unpopular decisions late in the process are a result of the lack of documentation and communication of earlier decisions.

Identify Context

In the design of a new project or enhancement of an existing corridor, the context will tend to suggest the appropriate solutions. For example, an arterial passing through an undeveloped rural community probably would not see enough pedestrian use to make an elaborate streetscape project a sound investment. On the other hand, an arterial passing through an urban activity center would not be complete without safe and effective sidewalks. These tools of context identification have been discussed in some detail in this manual. Matching the tools listed later in this chapter to the appropriate context can help to prioritize amenities investments to help communities most and attract subsequent private investment where appropriate.

Identify Needs and Deficiencies

If an area does not have current pedestrian activity, and it is unlikely that future development or redevelopment would stimulate this activity, it may not be wise to invest scarce pedestrian funding in such an area. If a rural area has a marsh character, adding canopy trees may not be the best solution to preserve its character. In order to help identify areas that may be good candidates for amenities treatment, it is helpful to look for a few things that typically go wrong in transportation corridors:

- High Vehicle Speeds – As has been discussed in previous chapters, high design speeds lead to most of the results that communities consider undesirable on a corridor. This includes lower pedestrian safety and lack of trees.
- Lack of Bike and Pedestrian Facilities – Missing or substandard sidewalks, particularly in activity centers are usually a tip-off to a corridor in need of attention.
- Bad Land Form – Nearly as detrimental as missing sidewalks are land forms that do not relate to the sidewalks. If land uses are separated from the street by a sea of parking, the opportunities to create a pleasant street environment are minimal.
- Mismatched Design Features - These might include a missing section of trees on a canopy corridor or grade separated intersections in an activity center.
- Barren Landscape – An utter lack of landscaping, trees, street furniture or other interesting vertical elements can detract from the vitality of a corridor.

Tools and Standards

When a community has identified a project or a corridor in need of some help, the following toolbox of amenities can be of use in softening the impacts of an otherwise negative project:

Sidewalks and Bike Treatments – Section 7 (page 48) includes a detailed discussion on the design of bicycle and pedestrian trails. As has been discussed previously, the applicability of these vital components often depends on vehicle speeds in an area. In general, if vehicle speeds are below 35mph, the types of bicycle and pedestrian treatments outlined in the design guidelines section will work well. As vehicle speeds rise, solutions such as detached sidewalks or reconsideration of bicycle facilities may be appropriate. The Atlanta Regional Commission's Bike and Ped Toolkit is a good reference source for more detail on how to design and implement these solutions in various corridor conditions.

Streetscape Treatments – The addition of street furniture, pedestrian-scale lighting, or alternative paving treatments can add to the vitality and allure of a community. This can be particularly desirable if a municipality is hoping to attract reinvestment to an area. It is often useful to categorize streetscape elements into the functional (benches, lighting, etc.), the aesthetic (paving, landscaping, etc.) and those that fall in between (trees). These elements can be compared to an area's needs and available funding and decisions can be made regarding priorities and timeframe of implementation.

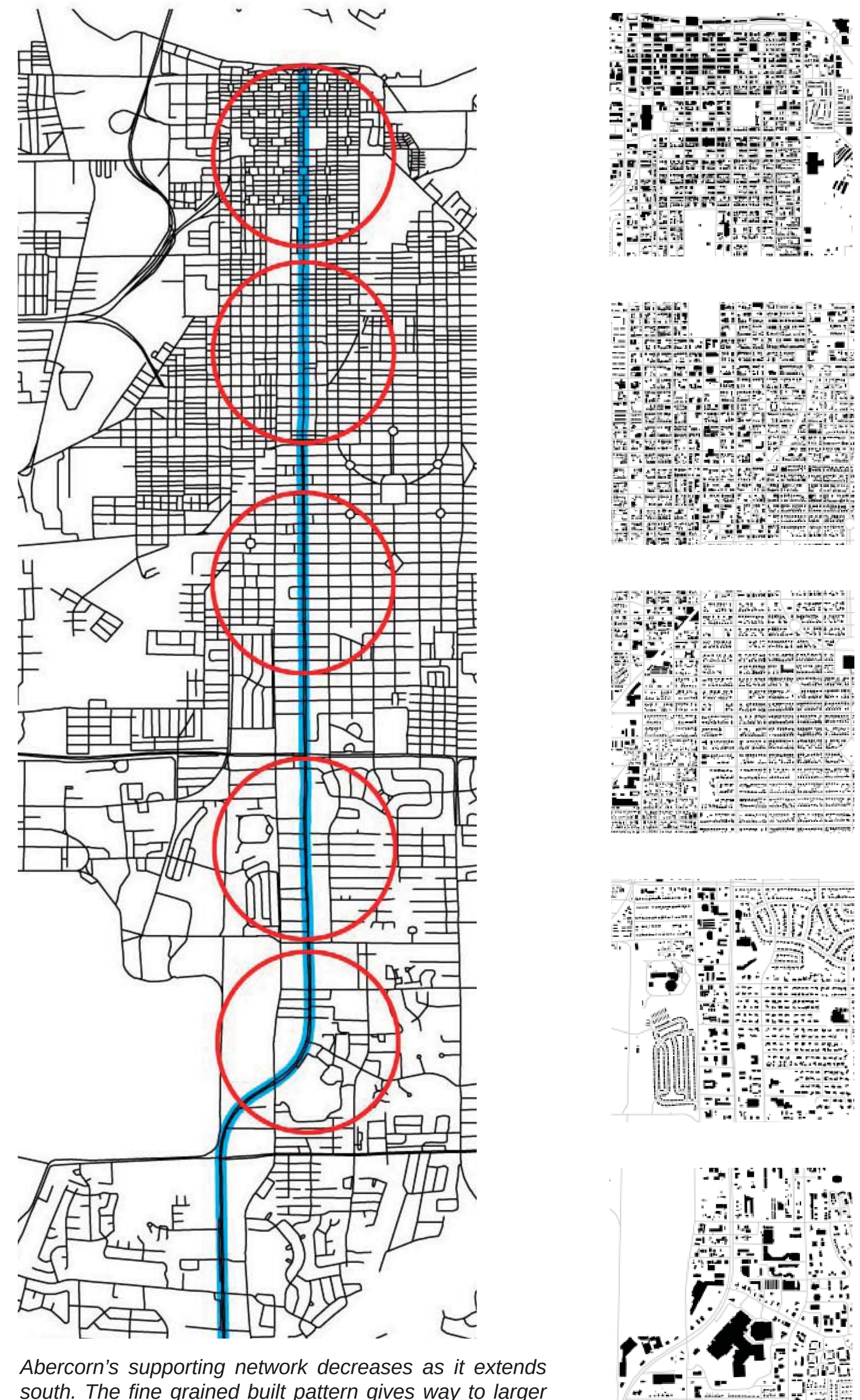
Landscaping and Trees – These elements that are often included as part of streetscape projects hold a special significance in Savannah and Chatham County. As the CUTS resolution clearly stated, trees are considered an essential element of the character of the City and County. Assuring that this character is preserved may be a higher priority here than it might be in other communities. In general, it is important that the historic role and placement of trees and landscaping be given full consideration in the development of transportation projects. The presence of canopy trees could be a factor that suggests consideration of alternative corridors for mobility or relaxed level of service standards. Any removal of trees deemed necessary should be followed by a vigilant effort to replace the trees in kind and in number. Section 7.0 (Guidelines for Developing Canopy Streets) provides some guidance in this regard.

Traffic Calming and Lane Reductions – One of the obstacles to the addition of sidewalks, bike lanes, landscape buffers, landscaped medians or other solutions that add to the livability of an area is the lack of available right of way. One of the places that some communities look for this right of way is in the road itself. Reducing lane widths can help to lower vehicle speeds through sensitive areas and can provide additional space for needed amenities. Some communities have taken this idea one step further and implemented "road diets." St. George Street in Toronto, Ontario, Lake Washington Boulevard in Kirkland, Washington (near downtown), Main Street Santa Monica, California are examples of places where aggresive road diet programs have been implemented.

Connectivity and Access Management – One of the biggest obstacles to creating more livable corridors is the perceived need to widen arterial corridors. As we have discussed, these wide, fast corridors make trees, sidewalks and bike facilities difficult and, at times, impossible to implement. One of the tools that can be utilized to forestall such widenings is to improve system connectivity and corridor access management. The effect of system connectivity can be seen in corridors like Abercorn. As the street's supporting grid becomes more and more sparse going north to south, more and more lanes have to be added to the arterial corridor since the traffic burden is no longer spread out. Ironically, the two lane section of Abercorn to the north supports more than twice the land use density as the multi-lane sections to the south. Many drivers would agree that the experience of driving on the northern portions of Abercorn is more pleasant as well.

In built-out areas where recovering this level of connectivity is more challenging, there are still interim steps that can be taken in the form of access management. Asking one arterial corridor to handle all of the duties of regional traffic movement and property access will typically overload a street and precipitate a widening project. Guidelines for connectivity within the Appendix illustrate the benefits of developing street networks and developing connectivity and the right kind of built form. Section 3.0 of this manual discusses access management as a possible technique, particularly along commercial corridors, to help separate local access trips from longer regional trips. By removing some of the property access duties from the arterial corridor, the need for a widening can often be eliminated, or at least postponed until more substantial network projects might become feasible.

Modified Level of Service Standards – The solution for some communities may be to redefine the problem. If the quest to meet a goal of vehicle level of service (LOS) "D" is causing larger, detrimental effects to the community, perhaps it is not the right goal. The solution for some communities has been to develop a process that utilizes vehicle LOS as only one component of a larger evaluation process. For other communities, the solution has been to develop LOS standards that vary based on the area and its needs. In either case, the right answer will be one that relates to the community's context.

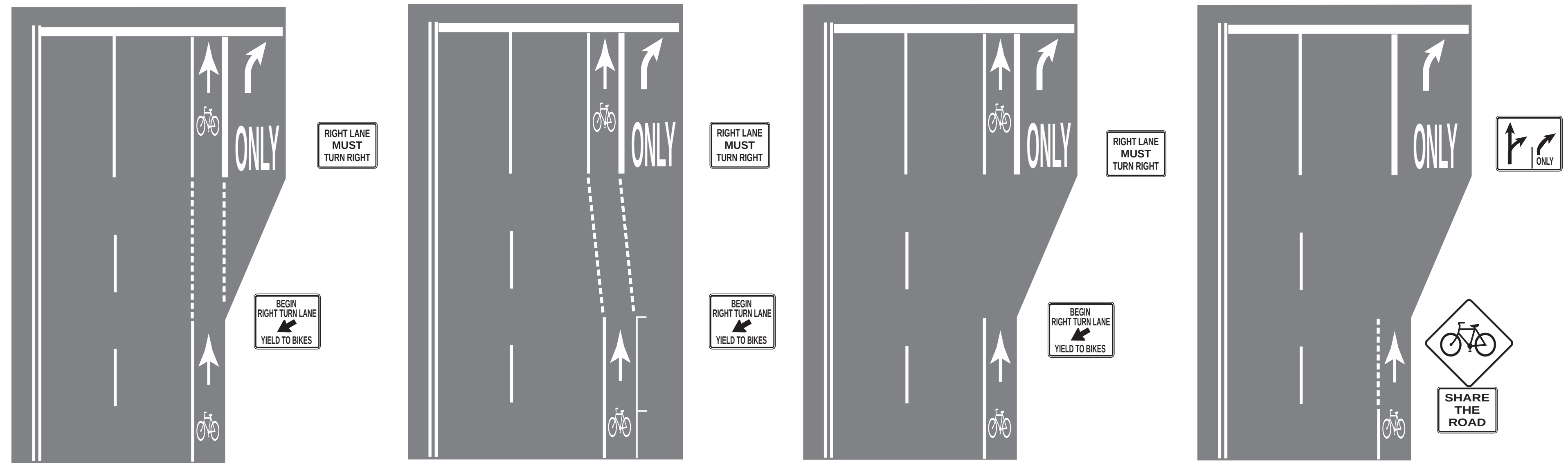


Abercorn's supporting network decreases as it extends south. The fine grained built pattern gives way to larger blocks and pedestrian hostile street environments

Where ROW permits, bike lane should continue up to stop bar or crosswalk.

Example: Typical intersection with bike lanes and turn lanes.

Bicycle Lane at Intersections



A. Right-turn-only lane

B. Parking lane into right-turn only lane

C. Right-turn-only lane

D. Optional right/straight and right-turn only

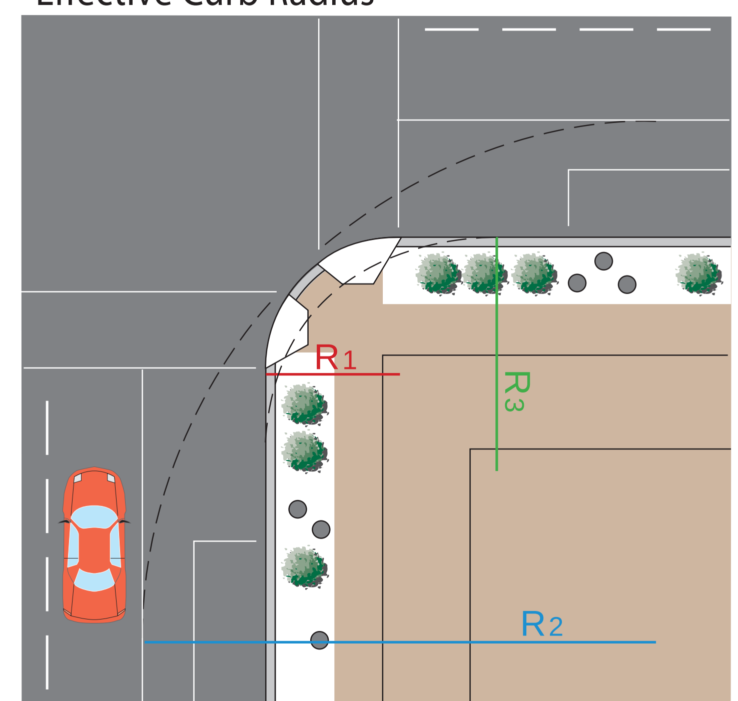
Note: The dotted lines in cases "A" and "B" are optional (see case "C")

Source: AASHTO Guide for the Development of Bicycle Facilities

Curb Return Radius	Min.	Max.
Local - Local	10'	25'
Local - Collector	15'	25'
Collector - Collector	15'	25'
Collector - Arterial	20'	50'
Arterial - Arterial	20'	50'

**Allow encroachment into adjacent lane by design vehicles when turning on low volume streets.*

Effective Curb Radius



Source: Main Street...When a Highway Runs Through It: A Handbook for Oregon Communities

Intersection design should safely accommodate both vehicles and pedestrians.

To comfortably accommodate pedestrians, minimize the curb return radius and intersection pavement width to the greatest extent possible.

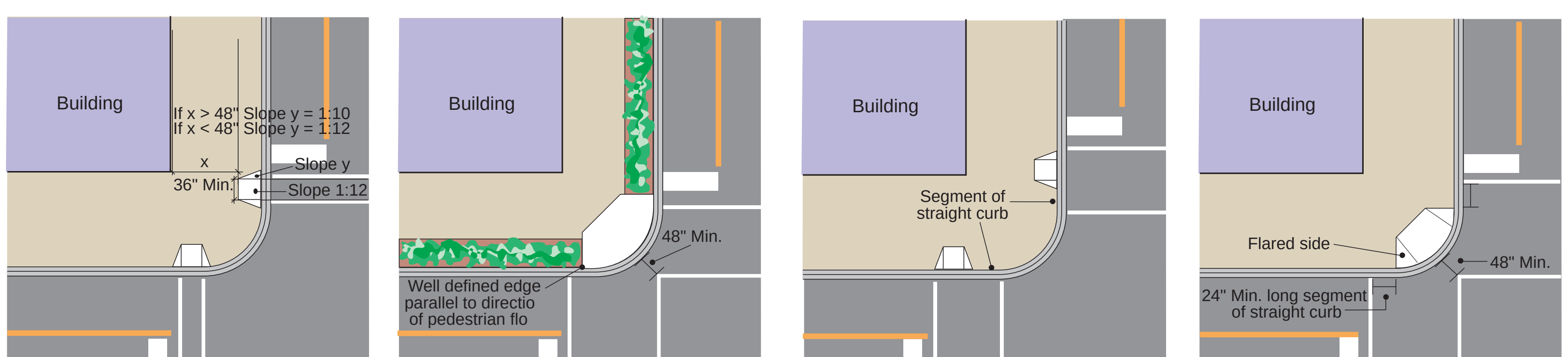
KEY

R1 = Actual Curb Radius

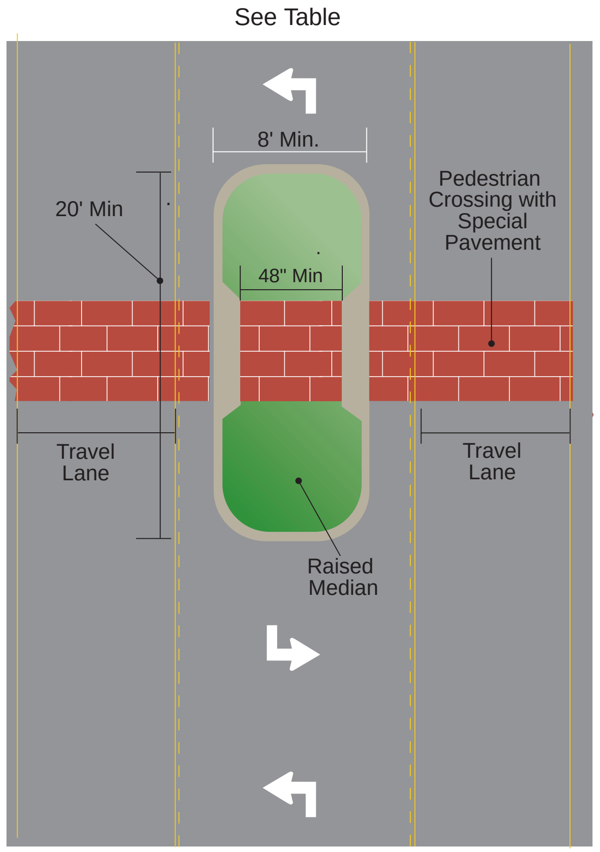
R2 = Effective Radius

R3 = Curb radius needed without bike lane and parking

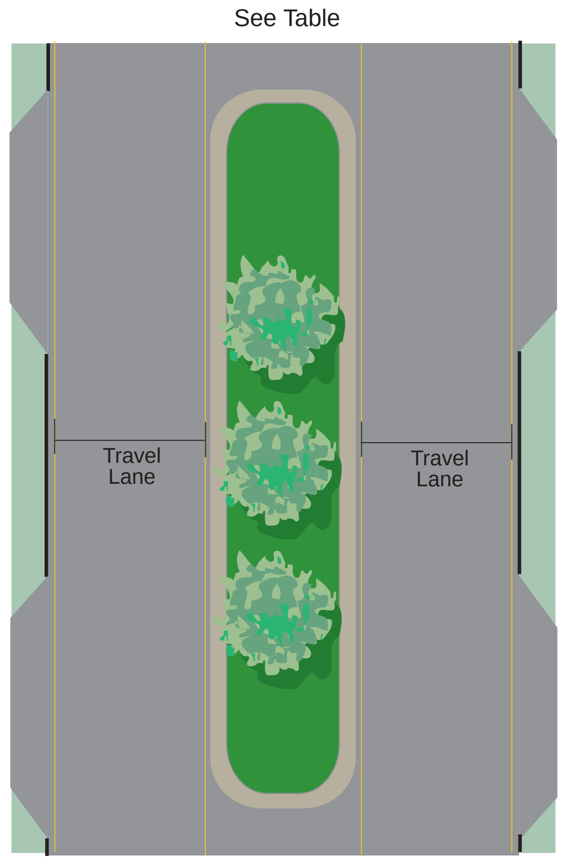
Pedestrian Crossing at Intersections



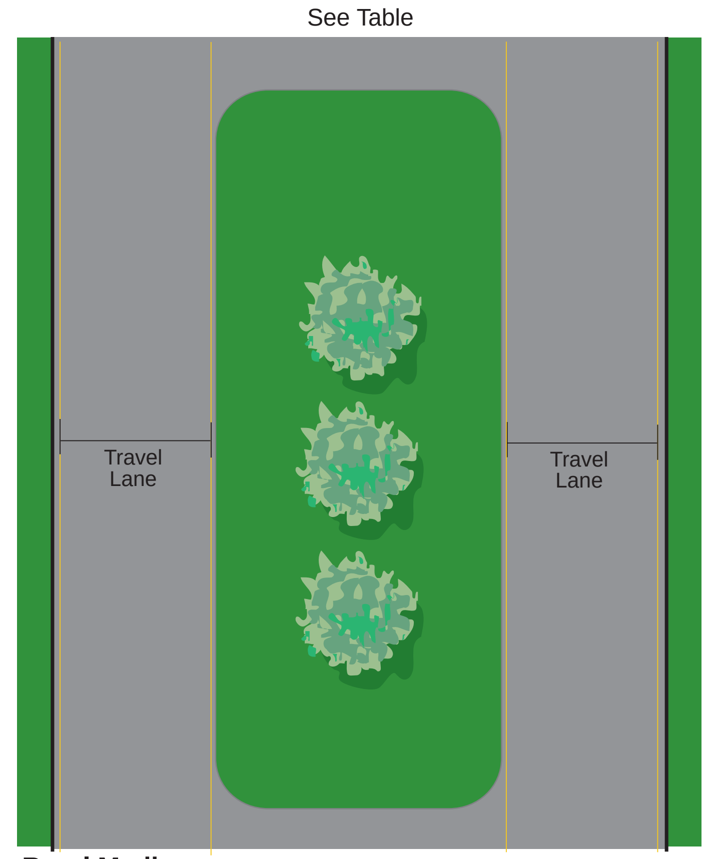
Source: ADA Standards for Accessible Design



Continuous Left-turn
Used on arterial streets in commercial areas with frequent driveway. If blocks are larger than 600', place pedestrian crossing with special treatment as well as pedestrian refuge island at intervals of 600' to 1420' (where possible).

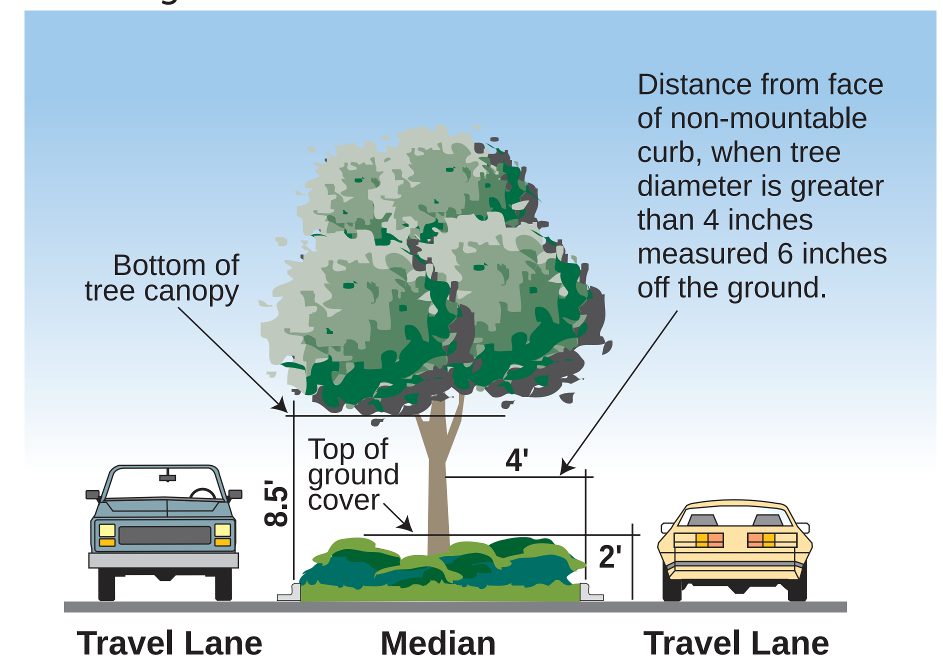


Wide Median
Use on arterial streets with less frequent driveways and intersections.



Rural Median

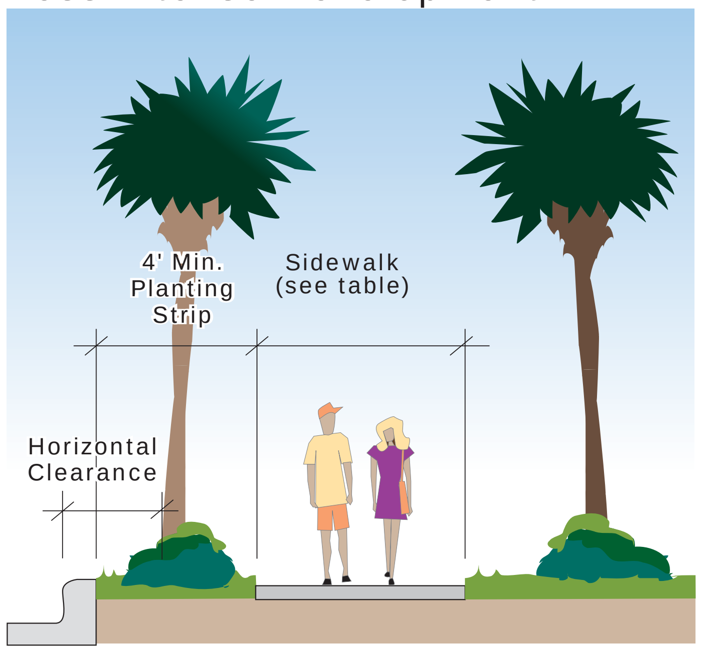
Planting in Medians



Functional Classification	Median Conditions							
	Landmark Historic District	Neighborhood Historic District	Traditional Neighborhoods	Village Centers	Suburban Communities	Gated Communities	Scenic Corridors	Rural or Undeveloped Corridors
Arterial	14' Maximum	Optional	Optional	No	20' Maximum	20' Maximum	2 Lane Section: No 4 Lane Section: 14' Maximum	2 Lane Section: No 4 Lane Section: 14' Maximum
Major Collector	No	No	14' Maximum	No	14' Maximum	14' Maximum	No	No
Minor Collector or Main Street	No	No	No	No	20' Maximum	20' Maximum	2 Lane Section: No 4 Lane Section: 14' Maximum	2 Lane Section: No 4 Lane Section: 14' Maximum
Local or Neighborhood Streets	No	No	No	No	No	No	N / A	N / A

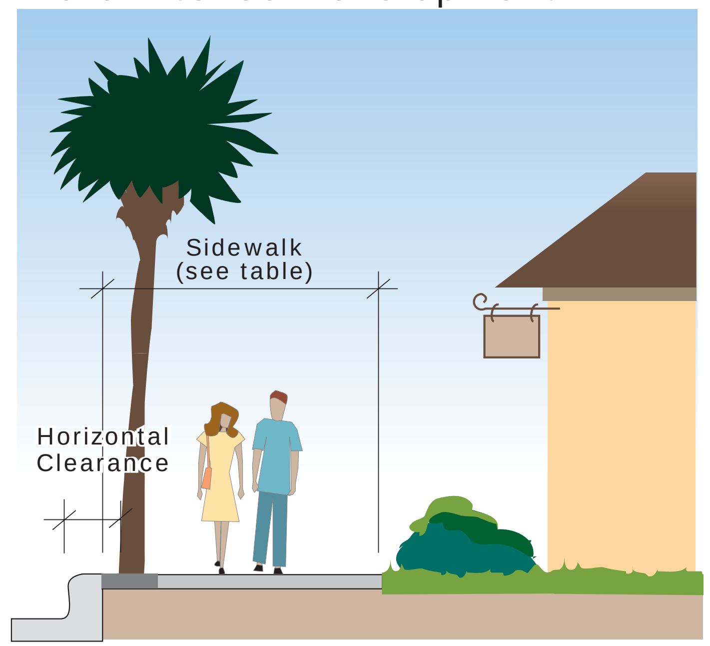
Width of Sidewalks

Less Intense Development



Off Curb

More Intense Development

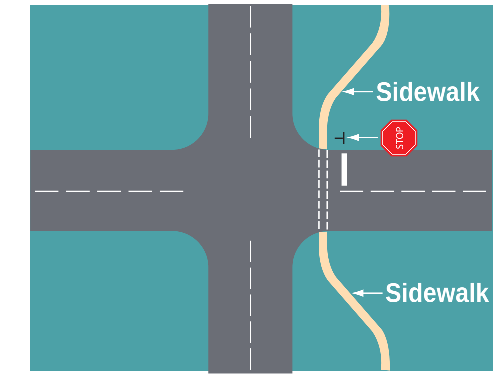


On Curb

Location and Design of Sidewalks

On arterial and collector streets, sidewalks should be located at the outside edge of the road right-of-way, except at intersections where they should be located as shown in the adjacent graphic.

The sidewalk grade should remain consistent along a roadway corridor. At locations where a driveway crosses a sidewalk, the grade of the driveway should match that of the sidewalk.



Offset Sidewalk Intersection Treatment

Minimum Horizontal Clearance Width
Posted Speed < 25 mph: 1.5 feet from face of curb
Posted Speed > 25 mph: 4 feet* from face of curb
* 1.5 feet under constrained conditions

Roadway Reconstruction
Provide sidewalk on both sides of the roadway for:
Arterial in Urban Activity Centers and Rural Clusters
Collectors in Urban Activity Centers, Village Centers, and Rural Clusters
Neighborhood streets in Urban Activity Centers, Village Centers, and Neighborhood Centers

If ROW is constrained, may provide sidewalks on only one side of the roadway for:
Arterials in Industrial land use type
Collectors in Industrial land use type
Neighborhood streets in Neighborhoods, Rural Clusters, and Rural Agricultural land use types

Sidewalk Widths by Classification

Functional Classification	Off and On Curb Sidewalk Widths							
	Landmark Historic District	Neighborhood Historic District	Traditional Neighborhoods	Village Centers	Suburban Communities	Gated Communities	Scenic Corridors	Rural or Undeveloped Corridors
Arterial	10’-16’	8’-15’	8’-15’	10’-15’	6’-8’	6’-8’	5’-6’	No
Major Collector	10’-16’	8’-15’	8’-15’	8’-15’	8’-15’	8’-15’	8’-15’	No
Minor Collector or Main Street	10’-15’	8’-15’	10’-15’	8’-15’	6’-8’	6’-8’	No	No
Local or Neighborhood Streets	10’-16’	8’-15’	8’-15’	10’-16’	8’ (6’ if off-curb)	8’ (6’ if off-curb)	N / A	N / A

(Referenced from Design Guidelines in Section 6.0 of this manual.)

Description — Speed (mph)

	30		35		40		45		50		55		60	
Maximum caliper (diameter) within limits of sight window (mm)	> 4" ≤ 11"	> 11" ≤ 18"	> 4" ≤ 11"	> 11" ≤ 18"	> 4" ≤ 11"	> 11" ≤ 18"	> 4" ≤ 11"	> 11" ≤ 18"	> 4" ≤ 11"	> 11" ≤ 18"	> 4" ≤ 11"	> 11" ≤ 18"	> 4" ≤ 11"	> 11" ≤ 18"
Minimum spacing (c. to c. of trunk) (ft)	22	91	27	108	33	126	40	146	45	165	52	173	60	193

Source: FDOT

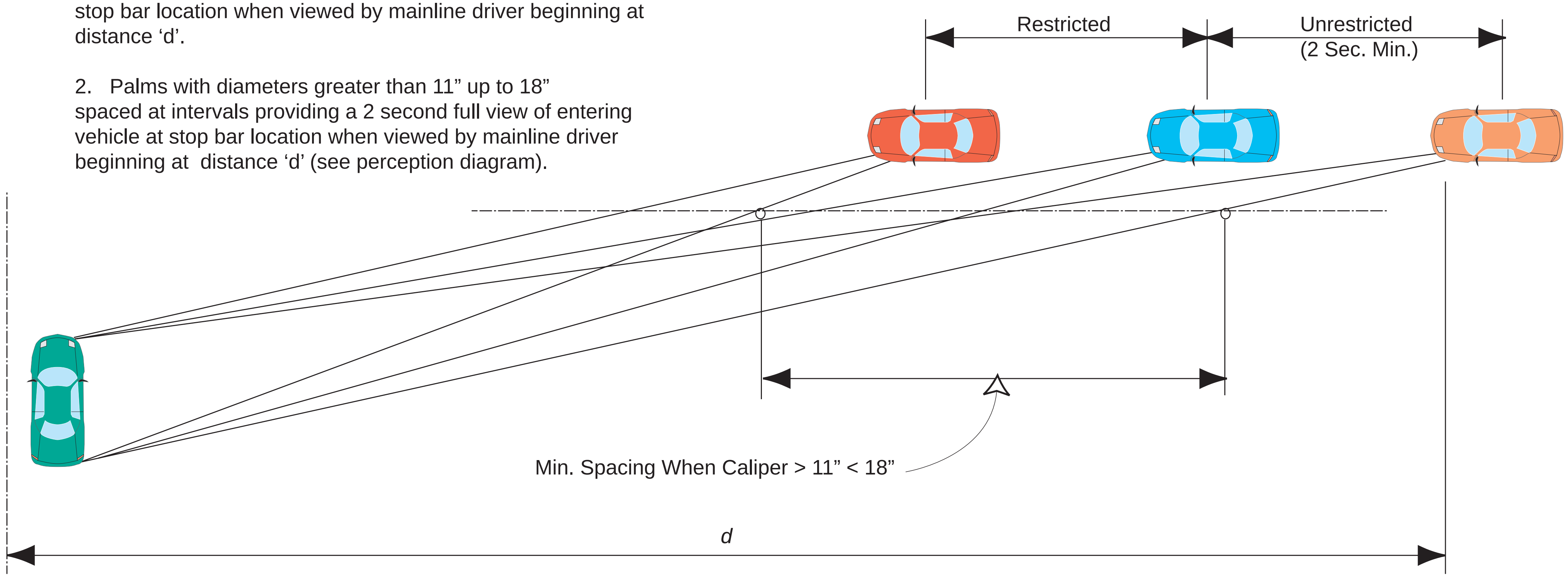
Sizes and spacing are based on the following conditions:

A. A single line of trees in the median parallel to but not necessarily colinear with the centerline.

B. A straight approaching mainline within skew limits

C. 1. Trees and palms less than or equal to 11” in diameter casting a vertical 6” wide shadow band on a vehicle entering at stop bar location when viewed by mainline driver beginning at distance ‘d’.

2. Palms with diameters greater than 11” up to 18” spaced at intervals providing a 2 second full view of entering vehicle at stop bar location when viewed by mainline driver beginning at distance ‘d’ (see perception diagram).



Perception Diagram

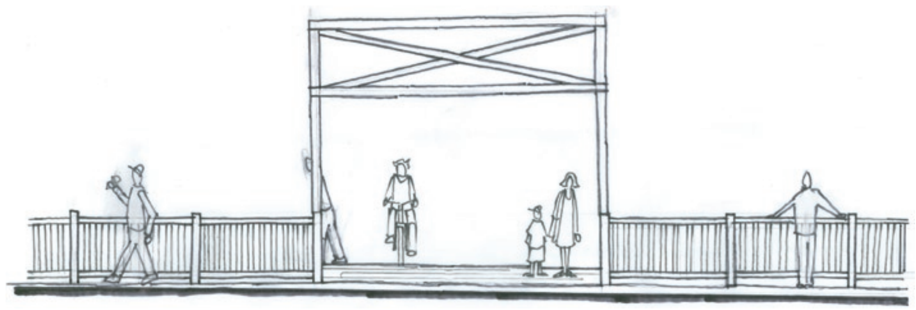
Location of Shade Trees

Shade trees shall be located to provide shade to users of the sidewalks and multi-use trails. On arterial and collector roadways, shade trees should be located between the travel lane and the sidewalk. To provide personal security, users of the sidewalks must be visible from vehicles in the travel lane. Landscaping located between the travel lanes and the sidewalk must not block these views. Therefore, shrubs and tree canopies should be pruned to allow visibility from vehicles in the travel lane to users of the sidewalk.

Location of Traffic Control Devices, Light Poles, and Above Ground Utilities

Traffic Control Devices will be designed and located with the Manual of Uniform Traffic Control Devices and Roadway and Traffic Design Standards

Trail Crossing of Freeway

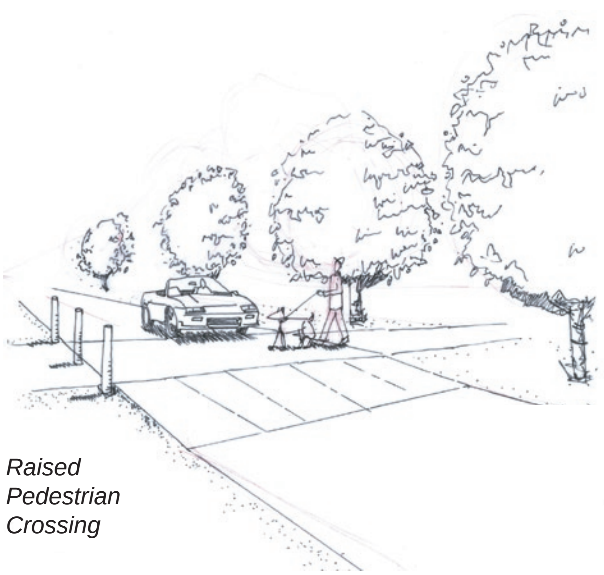


Trail Crossing

Minimum: width of trail
Preferred: width of trail + 4 ft.

- A grade separated crossing is required at freeways.
- This may be accommodated as part of a vehicular crossing by incorporating bicycle lanes and sidewalks or a multi-use trail on a bridge.
- Maximum ramp: 1:12
  A level area 5 feet long must be provided every 30 feet. See ADA regulations for details.

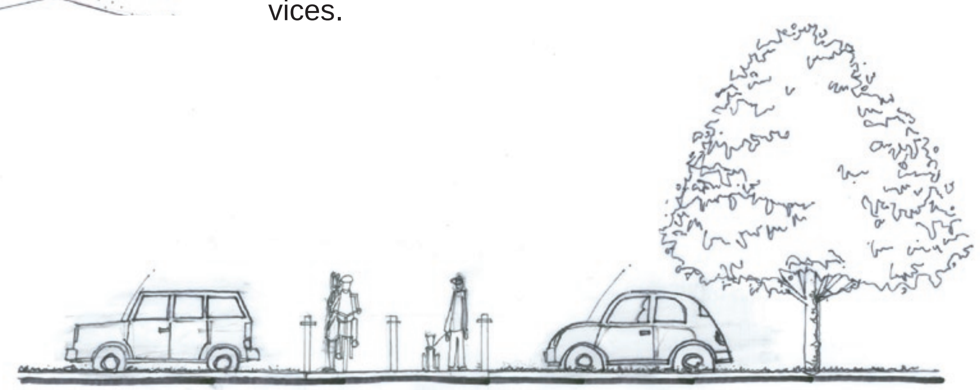
Trail Crossing of Low Volume Residential Street



Raised Pedestrian Crossing

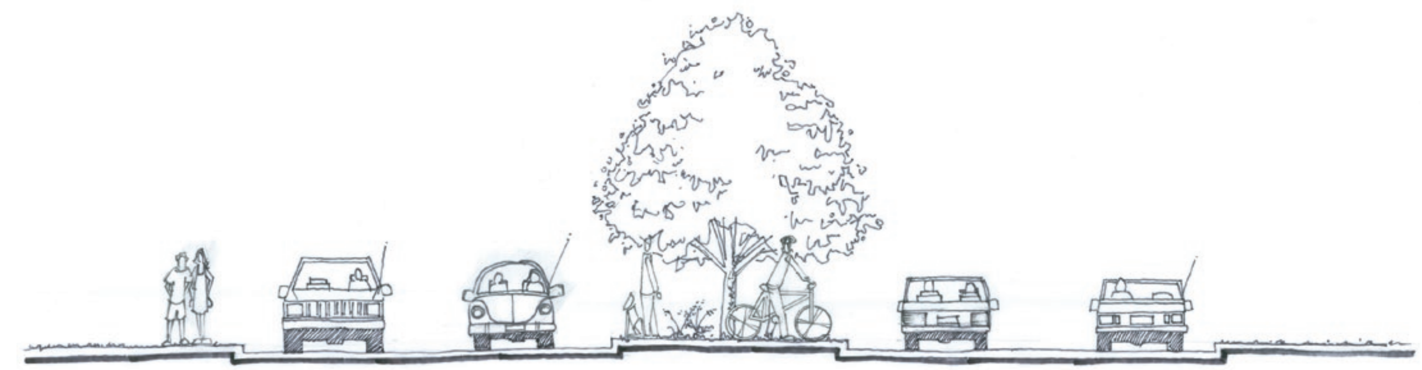
- At roadway crossings, priority should be given to the major movement.
- For paths with daily trips exceeding 1,000 users crossing a residential roadway, the vehicles on the roadway could be required to yield or stop at the trail.

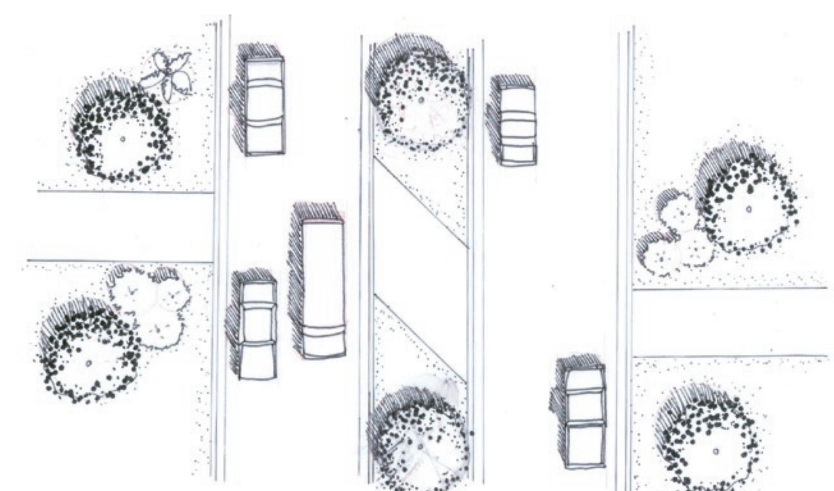
  In such cases, a raised pedestrian crossing should be used to draw attention to the trail crossing.
- Refer to MUTCD for details on design of traffic control devices.



Roadway Crossing

Trail Crossing of High Volume Roadway

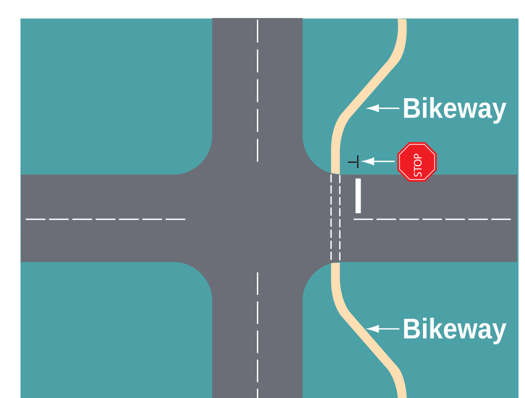




Source: Florida Bicycle Facilities Planning and Design Handbook

- Where signal warrant can be met, pedestrian activated signal should be provided when the pedestrian trail crosses a collector, arterial, or farm-to-market
- If no traffic signal is provided, a minimum of 10 foot wide medians should be provided at unsignalized crossings of a multi-lane roadway. The crossing may be angled at 45 degrees towards approach traffic.

Refer to MUTCD for details on design of traffic control devices.



Offset Bikeways Intersection Treatment
Source: Minnesota Bikeway Design Manual

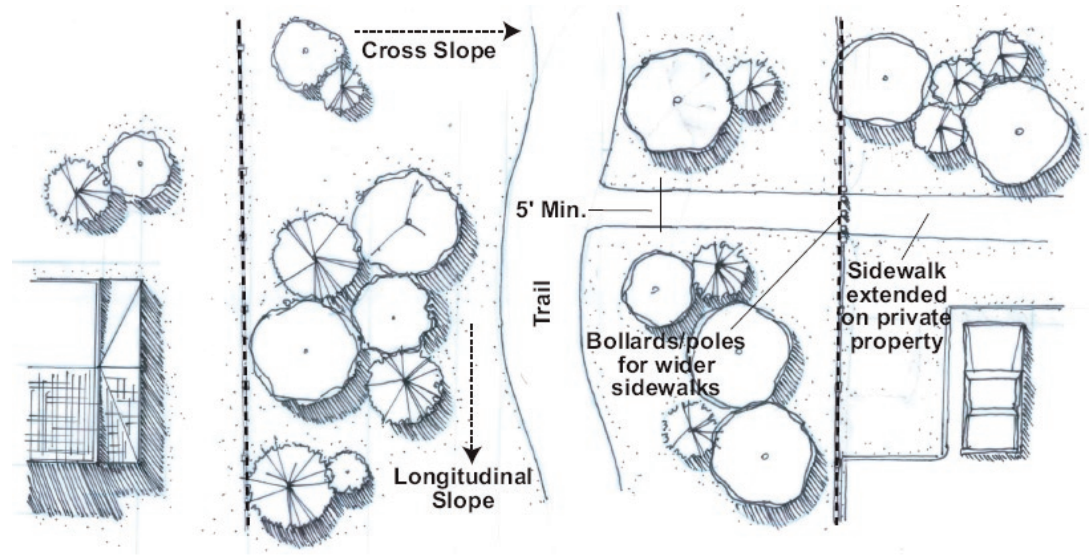
Design Principles
- Provide mobility
- Serve as recreational pathways
- Provide links to natural areas
- Facilitate in habitat preservation
- Design for specific user types

Design Elements

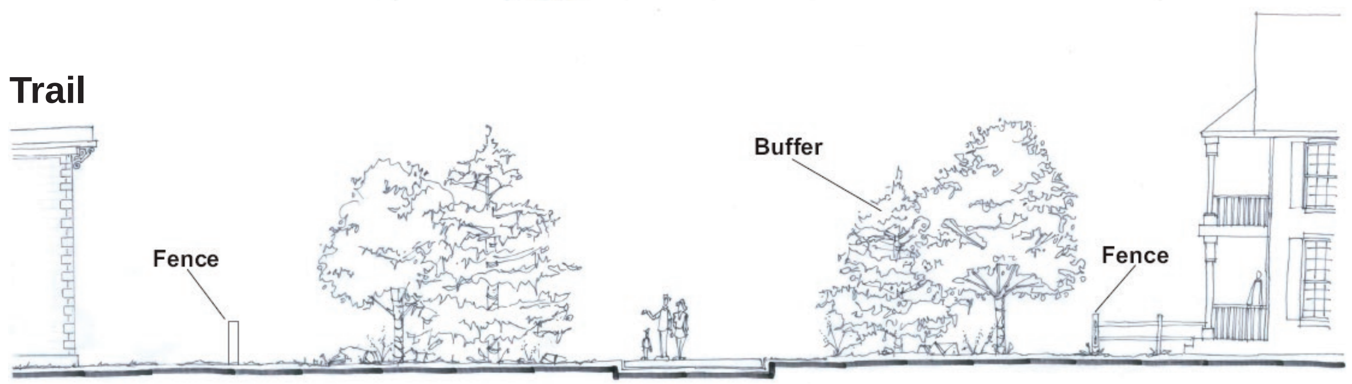
Required:
- Trail
- Buffer
- Signage
- Connections to public and private commercial uses

Recommended:
- Lighting
- Rest areas
- Trail head

Connections to Adjacent Uses



Trail



Trail Users Type	Travel Speeds (MPH)	Longitudinal Slopes (Maximum)	Cross Slopes	Recommended Minimum Tread Width (Two-Way Travel)	Typical Tread Width (Two-Way Travel)	Surface Type
Pedestrian trail users walkers, hikers, joggers, runners, persons confined to a wheelchair, bird-watchers, nature lovers, picnickers, etc.	0 to 5 mph	8%	1% preferred	8 ft.	10 ft.	Concrete
Nonmotorized travel bicyclist, rollerblades, skaters, skateboarders	5 to 20 mph	8%	1 - 4%	10 ft.	14 - 16 ft.	Type 3 Asphalt
Pedestrian / Nonmotorized travel	0-20 mph	8%	1% preferred	12 ft	14 ft - 16 ft	Type 3 Asphalt

Tree Preservation
Wherever possible large established trees should be preserved. To preserve a large tree located in the clear zone:
- narrow trail,
- shift trail, or
- locate a railing between the trail and the tree

When a trail is located in close proximity to a tree, it may be necessary to provide special treatment to the subgrade to protect the root system of a tree. A clear zone may not be needed on hiking trails.

Trail Head
Trail Head may be incorporated into commercial centers, public buildings, or parks.

Features
- Parking (paved or unpaved)
- Paved handicapped parking space near trail head
- Bicycle parking
- Trail head sign
- Trash receptacles
- Information station with map
- Restrooms
- Chilled drinking fountains
- Lighting
- Air pump
- Vending machine
- Play equipment
- Pet amenities
- Picnic tables
- Pavilions

Rest Areas
Space rest areas at appropriate intervals, and include:
- Bench,
- Shade, and
- Paved platform (3 ft wide x 8 ft long).

Weather shelters should be provide every 2 miles, and should include:
- 2 to 3 benches
- Covered shelter,
- Paved platform (10 ft wide x 10 ft long).

Design Principles

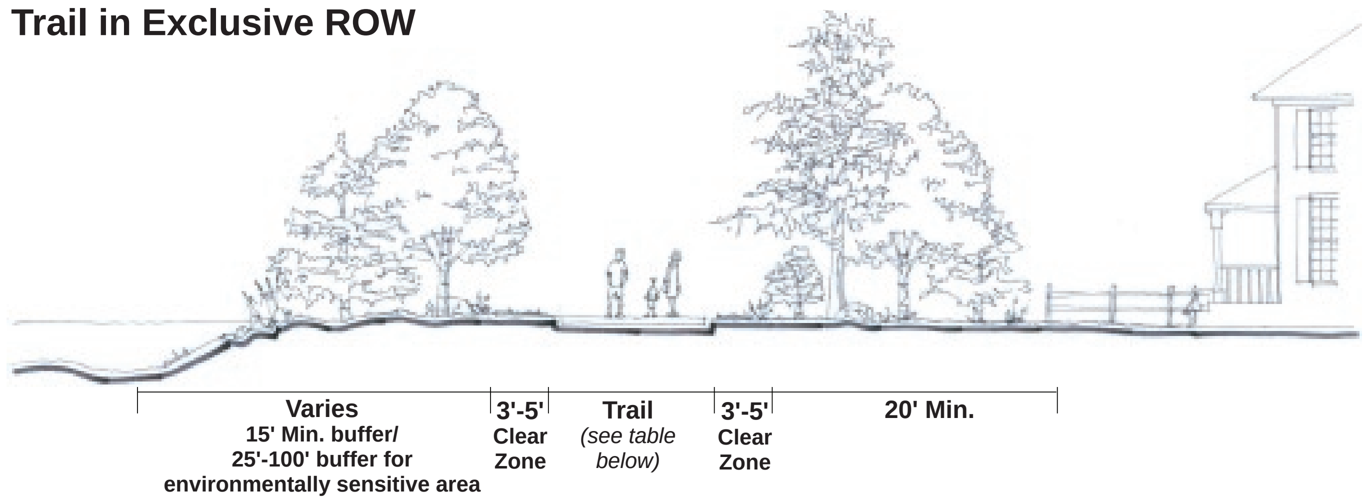
- Provide mobility
- Serve as recreational pathways
- Provide links to natural areas
- Facilitate in habitat preservation
- Design for specific user types
- Provide shade

Design Elements

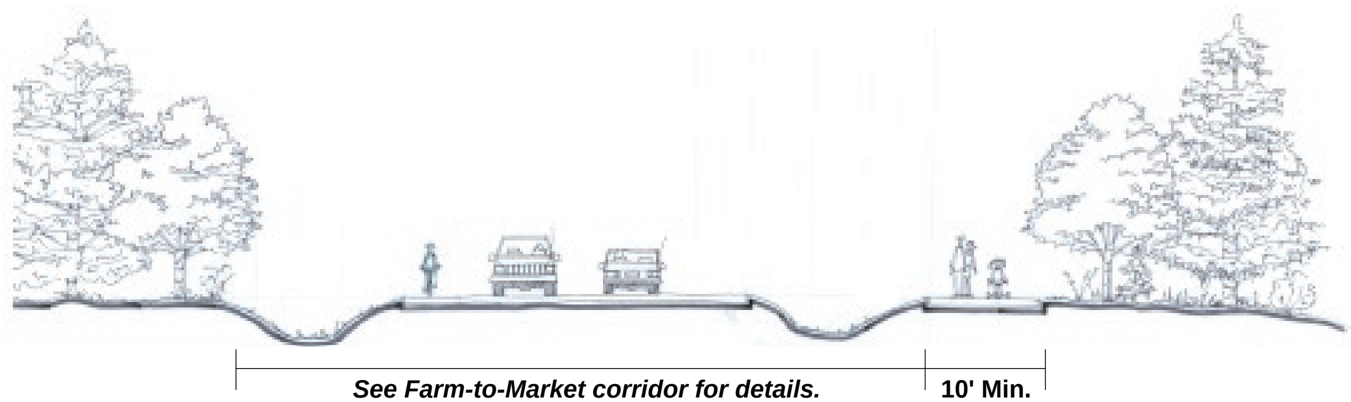
Required:
- Trail
- Buffer
- Signage

Recommended:
- Rest areas
- Connections to adjacent uses
- Trail head

Trail in Exclusive ROW



Multi-Use Trail in Road ROW - Pedestrian and Nonmotorized Trail



Trail Users Type	Travel Speeds (MPH)	Longitudinal Slopes (Maximum)	Cross Slopes	Minimum Tread Width (Two-Way Travel)	Clearing and Grubbing Width (Min)	Selective Thining Width (Min)	Clearning Height (Min)
Hiker	0 to 5 mph	No Restriction	4% max.	6 ft.	10 ft.	20 ft.	8 ft.
Multiuse trail walkers, hikers, joggers, runners, persons confined to a wheelchair, bird-watchers, nature lovers, picnickers, bicyclist, rollerbladers, skateboarders, mountain bikers	0 to 20 mph	8%	1% preferred	12 ft. (10 ft. limit ROW)	18 ft.	28 ft.	10 ft.
Horseback rider	5 to 15 mph	10%	4% max	4 ft.	8 ft.	20 ft.	12 ft.
Multiuse trail with horseback rider	0 to 15 mph	8%	1% preferred	10 ft. (paved) 4 ft. (unpaved)	25 ft.	35 ft.	12 ft.

Trail Head

Features
- Parking (paved or unpaved)
- Paved handicapped parking space near trail head
- Bicycle parking
- Trail head sign
- Trash receptacles
- Information station with map
- Restrooms
- Chilled drinking fountains
- Lighting
- Air pump
- Vending machine
- Play equipment
- Pet amenities
- Picnic tables
- Pavilions

Lighting

May be needed at roadway intersections if trail is used as a commuter transportation corridor.

Rest Areas

Space rest areas at appropriate intervals, and include:
- Bench,
- Shade, and
- Paved platform (3 ft wide x 8 ft long).

Weather shelters should be provide every 2 miles, and should include:
- 2 to 3 benches
- Covered shelter,
- Paved platform (10 ft wide x 10 ft long).

A Manageable Network

It is important to understand street network as a highly important dimension of a street system. Design guidelines may govern how particular streets and roads will be configured to serve their users, and these design criteria rely on many factors of system wide traffic functions and distribution that are closely tied to how thoroughly a network of streets is connected.

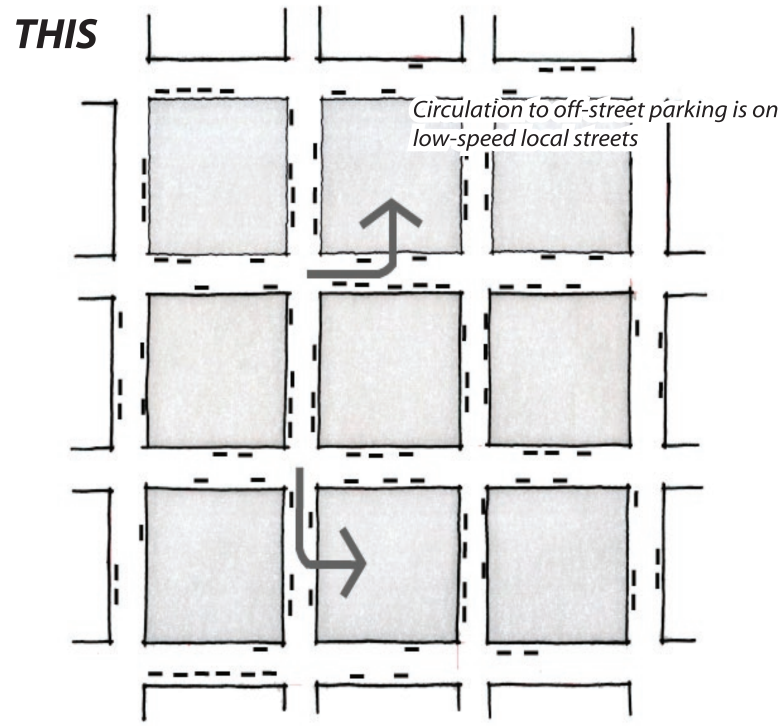
Small blocks are advantageous because they allow the development of a finer grain of urban fabric that at once improves the efficiency of the transportation system, promotes a more healthy, versatile economic base and enhances the nature of the built environment. As the legacy of post-World War II development patterns has given rise to a paradigm of larger sites and greater space between public thoroughfares, it is essential to consider the benefits that defining block size has for a city's character and well being.

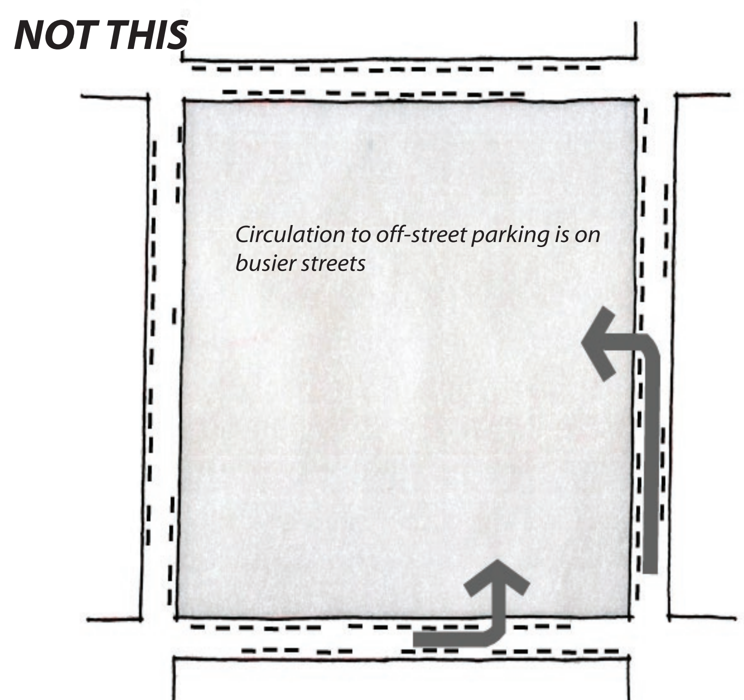
Streets are the foundation of city building: they provide a means of transportation and conveyance while they function as a city's most immediate, accessible public space. For centuries, cities have been created to concentrate trade and the sharing of information, and throughout urban history a variety of concerns has led to the particular arrangement of streets in different cities and towns, including topography, land ownership, economics, transportation technology, climate, and cultural influences. Yet the spaces the streets form—the blocks—are the spaces on which cities will be built. One finds a useful and telling metaphor in likening a city to the human body: streets are the bones on which the city will rest and which will allow it to grow. The blocks that these bones form are the city's potential for growing into its frame: that is, making the most of the land upon which it is built and being strong and healthy.

From a policy perspective, smaller block sizes are a vital element to design guidelines and subdivision regulations that seek to create a livable community. Traditional development patterns sought to utilize valuable land as efficiently as possible by building to the street and utilizing rear access, most notably through mid-block alleys, to provide service to buildings. This way of building had the well-known advantages of allowing more immediate access to the building and keeping services off of already busy streets. After World War II, development patterns shifted away from well-connected networks in favor of development patterns oriented to automobile transportation and emphasizing privacy, plentiful space and, hand-in-hand with being designed for widespread automobile use, ample parking facilities.

In recent years planners have sought to move back to a traditional kind of development and are increasingly developing policies and land development regulations requiring it. However, the placement of buildings alone does not guarantee the successful function of a traditional urban environment: the means of circulation defined by the streets must promote adjacency and accessibility.

While the argument for smaller blocks as a foundation for healthy urban development may be clear, it is also important to note that a solid network of smaller blocks and frequent intersections also have direct, demonstrated benefits for a transportation system as well. Generally, they add travel alternatives and spare main roads and intersections from carrying all of a region's traffic, but they also provide many advantages to multi-modal transportation concerns and parking. Conventional thought in traffic engineering has helped to steer roadway design, subdivision layout, and general street plans away from network, often on the argument that frequency of intersections, turning movements, signals and other confluence points create inefficiency in the overall system. It is important to view the benefits to a strong network of streets and blocks. Network, as characterized by regular intersections, turning opportunities, and redundant paths, actually generates efficiency and enriches a transportation system's effects on the community it serves. It is key to consider a manageable network that provides these benefits of efficiency and community enhancement while meeting the needs of the transportation system, and not to err too far on one side.



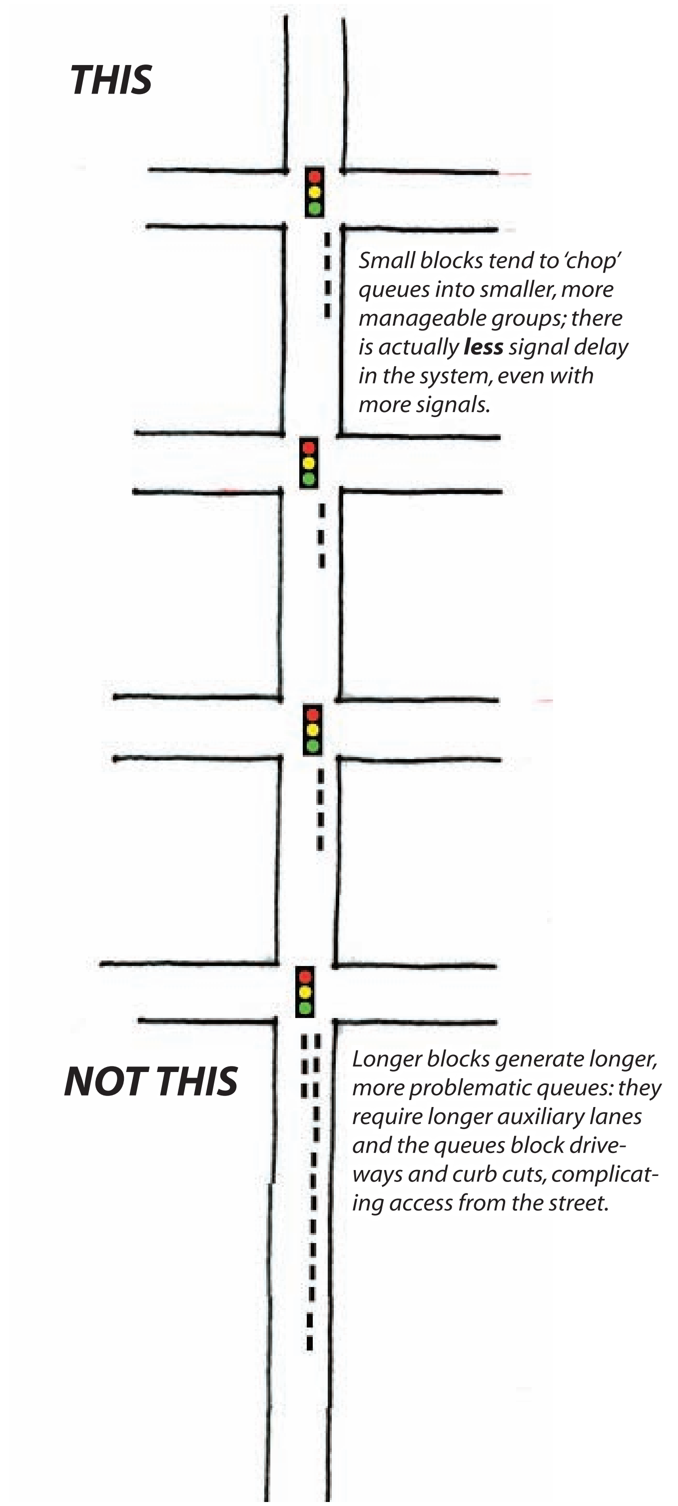


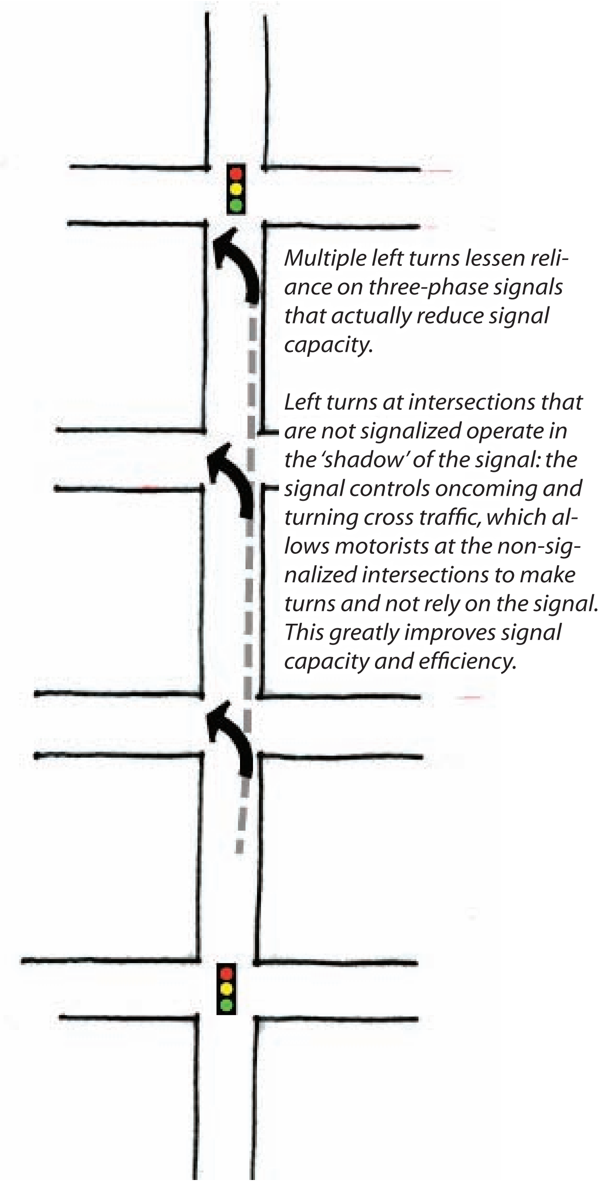
Functional Benefits of a Street Network

The benefits of small blocks that best tie transportation and urbanism concerns involve parking. Parking requirements in land development regulations are often the reason that developers insist on large sites, but when these regulations allow flexibility in meeting their requirements - namely, between on-site parking and parking located on the street - the benefits of smaller block sizes are more apparent.

In smaller block scenarios, street frontage is maximized: the illustration to the right shows nine blocks of 300 feet on a side, compared to the larger block below with one block with 1,000 feet on a side. The combined street frontage of the nine blocks is 10,800 feet (four 300-foot sides, or 1,200 feet per block), which could accommodate 540 cars with on-street parking assuming no restrictions at corners or curb-cuts and 20 feet of length per parking space. The street frontage of the larger single block is only 4,000 feet, which, assuming the same lack of restrictions, would only accommodate 200 cars. Because of the redundancy of the network there is little loss of on-street parking potential in the nine-block scenario, but more parking must be sacrificed in the large block scenario due to auxiliary lanes needed on larger streets. Regardless of the number of parking spaces that can be transferred from off-street to on-street location, it is important to remember that the area required per parking space is greatly reduced - by as much as half - with on-street parking. On-street parking does not require additional space for circulation and landscaping, as these are already accommodated within the existing components of the street. In addition, joint-use parking is much more feasible with smaller blocks, as users of a particular facility may not mind parking in a place not adjacent to it as the superior walking environment reduces the sense of separation from parking to destination.

Any circulation to the interior of the block for on-site parking uses smaller, low-speed local streets with small blocks, but in a large-block scenario it must use larger streets, negotiating turns against greater volumes of oncoming traffic. In the case of structured parking, a standard bay width of 120 feet allows facilities to be placed easily within small blocks: blocks of 240 or even 360 feet on a side can accommodate sufficient width for internal circulation in a parking garage, regardless of the block's length.





Functional Benefits of a Street Network (Continued)

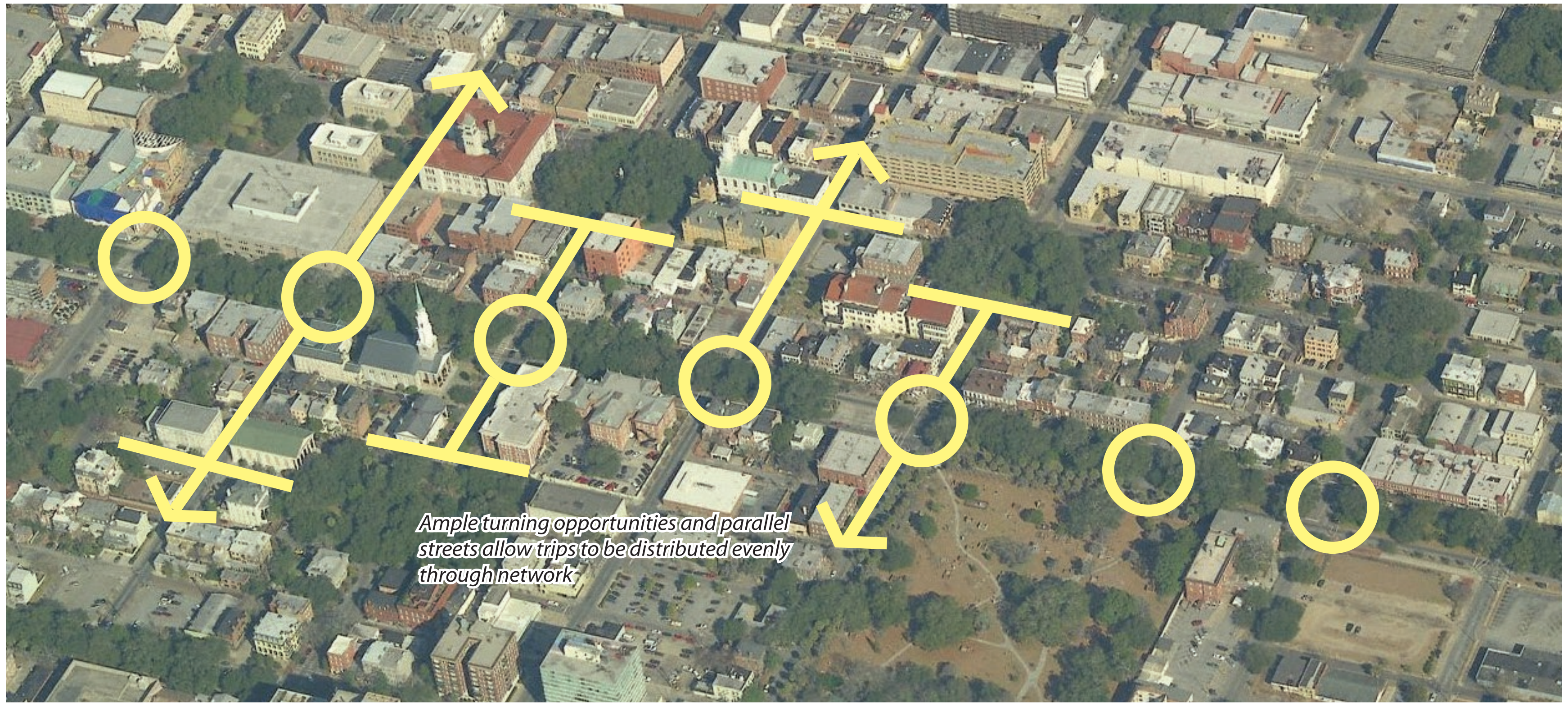
One of the great benefits to the actual system of traffic movement is multiple, frequent opportunities for left turns. This allows traffic signals to avoid a three-phase configuration which deprives the signal of capacity. Left turns at non-signalized intersections operate in the 'shadow' of the signal—this multiplies effectiveness of the signal by reducing left turns that it would normally process, and these left turns are facilitated at the 'shadow' intersections by the signal's periodic control of traffic in the opposite direction.

Small blocks separate a traffic queue that would normally form at isolated signals into smaller groups. This actually allows for reduced signal delay, even if signals are more closely spaced to correspond with a greater number of intersections. Microsimulation models such as SYNCHRO are now showing this configuration to be superior to larger, longer block faces. These longer spaces between signals and intersecting streets create problematically long queues that block driveways and require lengthened auxiliary lanes (e.g. for left turns).

Similarly, in building a denser network, smaller blocks allow motorists an opportunity to avoid left turns on busy streets by making indirect 'loop' turns. Left turns are obviated—indeed, they are less efficient—when the distance added to the trip by making three right turns around a block can be traveled in less time than the intersection delay caused by attempting a left turn.

When these operational factors are considered on the scale of one block, the differences may be modest. Yet when the cumulative effects of regularly-generated volumes are considered for an entire street or road, the potential problems of limited connectivity are much more apparent.

Let us use an example of a two-lane road that has been developed over several years with residential subdivisions, each connected to the main road from a single point of entry. This is an environment that is common and enduringly popular, and indeed the majority of private residential development activity continues to follow its patterns. If each of these subdivisions has twenty dwelling units, conventional engineering assumptions say that each will generate approximately 240 vehicle trips per day. With only one such subdivision along the entire length of the road, movement is interrupted only in the area where turning traffic returning home to the subdivision is trying to access it.

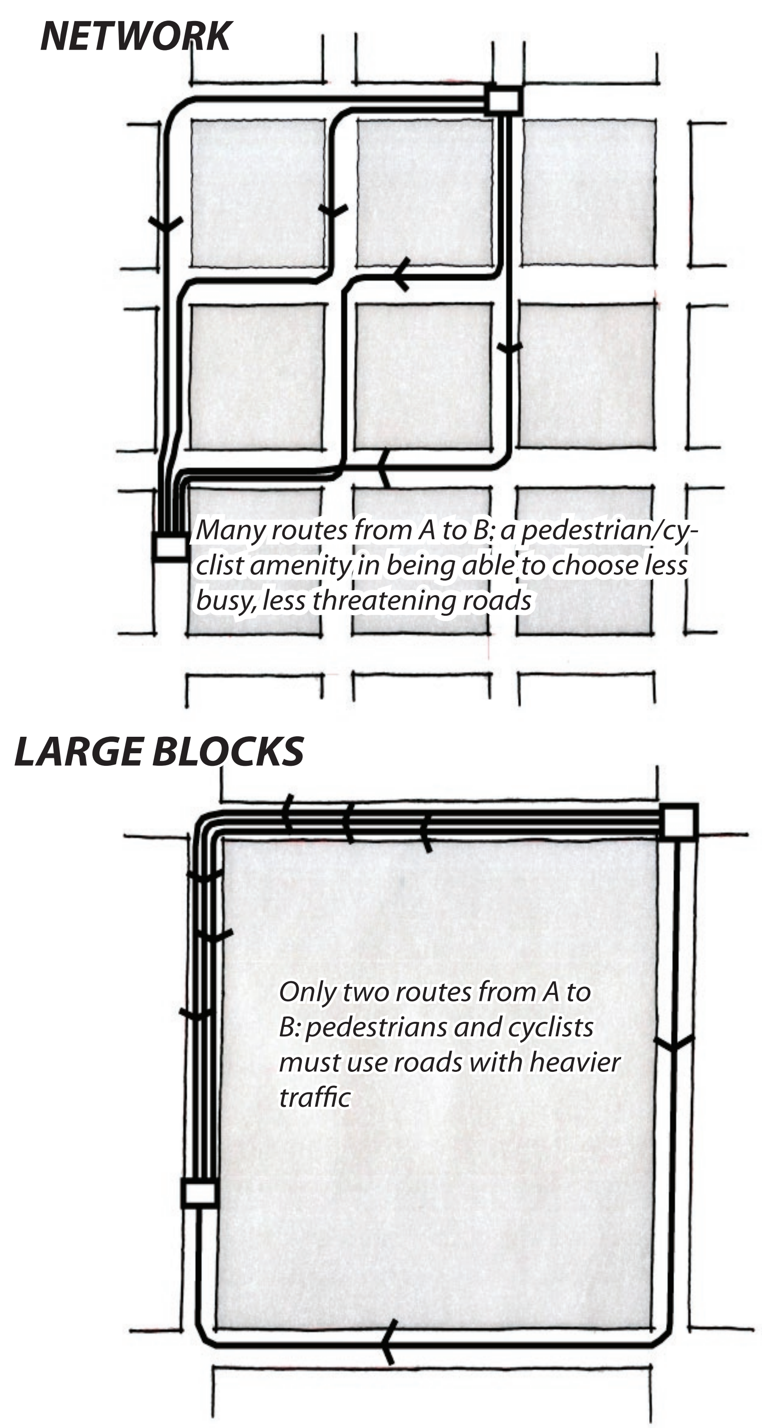


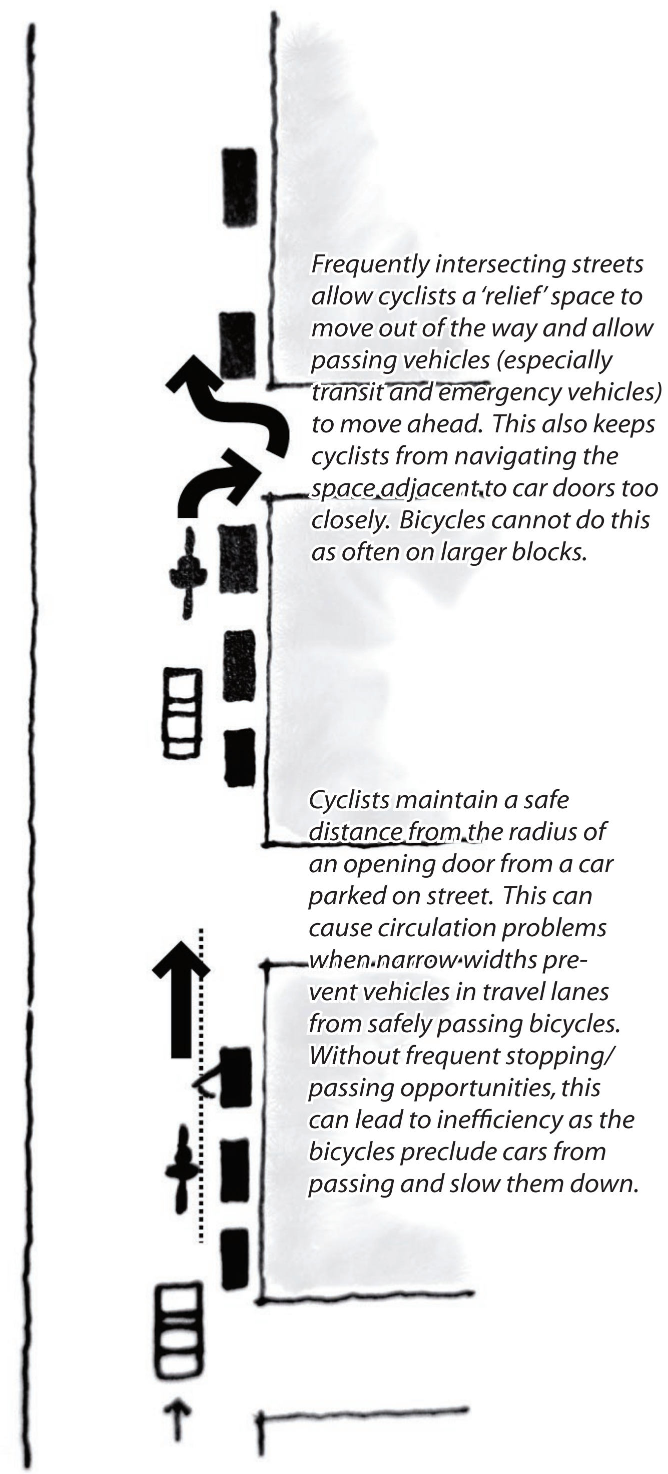
When the road has thirty subdivisions over the course of a mile, though, all accessed by single entrances, this suggests a possible 7,200 trips attempting to use thirty intersections.3 It is here that the benefits of network and small blocks with frequent connection become most apparent: while much of the added traffic volume will attempt to reach the subdivisions from their main points of entry (i.e. local streets that intersect with the main road), other local streets parallel to the main road allow motorists to circulate internally in a way that avoids the main road altogether.

In such a scenario of single-entry subdivisions, the block size is effectively infinite: there is no alternative to using the main road to move from one residential subdivision to another. One must leave the subdivision by a single access point then use the main road to move anywhere else. This increases trip length, travel time, and congestion on the main road as it is forced to serve local as well as more regional trips. Parallel streets and internal network greatly increase the capacity of the street system and leave the main roads better equipped to absorb trips across a greater distance.

This consideration has important implications for a city's transportation system. Even though the scenario may not be as oriented to single-point entry to subdivisions, street patterns without strong connectivity inevitably require the main road that does connect them to be used for anything more than the most immediate local trips. As these roads likely handle trips not directly associated with the subdivisions, they bear a greater traffic burden and lose effective capacity from an increase in turning movements. In the case of the mile-long stretch of road accommodating thirty residential subdivisions, the approximately 7,200 trips add volume to the road equivalent to nearly half of its capacity, and these are strictly trips generated from the adjoining subdivisions in that mile length.

As connectivity is provided and the distance between connecting streets is decreased, the opportunities for alternative routes increase substantially. Not only do more direct routes obviate the need to use main roads, but the presence of alternatives gives flexibility to the users of the main roads who encounter such 'obstacles' as congested intersections, accidents, or other sources of delay.





Pedestrians

Among the greatest beneficiaries to a network of small blocks are pedestrians and bicyclists. As with motorists, smaller blocks allow pedestrians and cyclists a greater variety of routes between destinations. In addition to the flexibility to choose a different route or to continue moving in an alternative direction in the event of obstruction (e.g. to turn at a street if moving traffic presents crossing that street), a denser street network allows pedestrians and cyclists to avoid busy routes and dangerous mixed traffic. Larger blocks, as they channel traffic onto fewer roads, expose pedestrians and cyclists to greater vehicle traffic—and greater chances of vehicle conflict.

Just as the even and relatively frequent spacing of blocks places reasonable demand on the motorist's attention, smaller blocks give the pedestrian a sense of progress in providing a cross street every 75 to 90 seconds. As a general measure, a desirable pedestrian environment that allows adequate traffic movement will have functional block perimeters of between 1,500 and 2,100 feet. This guideline yields walkable block sizes of between 250 to 350 feet by 500 to 700 feet. While the perimeter can be articulated differently among the different block faces, it maintains generally smaller sizes, no more than 400 to 450 feet for square block sides. As most informal directions are given in numbers of blocks (for example, "the store is three blocks past the park on Pine Street"), this maintains a pedestrian's confidence in finding his or her destination in a timely manner. After the destination is found, though, redundancy in the system gives the pedestrian a greater opportunity for a walking circuit: to explore all parts of the neighborhood, the downtown, or whatever environment s/he is in without retracing steps.

Bicycles

With regard to cyclists, although they face the same need for attention to potentially crossing traffic as motorists, more frequent spacing of cross streets gives them an opportunity to let automobile traffic in the same lane move ahead: cyclists can move a safe distance from passing automobiles without worry of encroaching too far into the dangerous 'door zone' of parked cars on the street.

As mentioned previously, smaller blocks encourage a smaller scale of building footprints and denser development. The rewards of this kind of built environment, though, are that the building and the use that it houses are more immediately apparent and accessible to pedestrians, passing motorists, and other people on the same street or block. This is particularly true in the case of retail: while automobiles may not have the comfort of parking in dedicated spaces in front of a building, they may park on the street in front of it or immediately behind it in the middle of a block. Pedestrians and cyclists, though, are not separated from entry to the building at all.

Traffic calming

With block lengths of 300 to 400 feet, a motorist traveling at 30 miles per hour will cross an intersecting street every 7 to 9 seconds, which conforms to the 8- to 10-second "attention span" that is needed to sustain a driver's attention. Each intersection functions as a potential traffic calming device: it is an event that demands attention. Even and frequent spacing of these intersections through shorter block lengths is thus an incentive for the motorist to take slower speeds.

User Safety

Adding redundancy to the network through more streets (and consequently smaller blocks) allows the same number of drivers a greater array of options for reaching a single destination and allows them to be distributed more evenly among these options. With larger blocks and less frequent intersecting streets, a motorist has fewer route options to any destination and all motorists following the same path must share the same streets. This increases the probability of conflicts—of vehicles with other vehicles or of vehicles with pedestrians.

With this greater variety of route options it is more feasible to plan a street hierarchy: naturally some streets will function on a higher level, but with a greater density of streets in the network it is possible to keep other streets more limited in function, serving slower-moving local traffic at reduced volumes. However, the street hierarchy can remain connected through a grid and not based on dendritic patterns of arterials, collectors and culs-de-sac, each with progressively higher traffic volumes that account for a share of all local trips.

Emergency Response

Another element of public safety that benefits from small block sizes is emergency response. In a small-block street pattern, responders can close a block length of a street at the two intersections that define it, prohibiting moving traffic from interfering with an emergency operation and allowing the responders to stage their efforts from two convenient locations. Firefighters in particular prefer to be within 200 feet of a hydrant; blocks up to 400 feet on a side with hydrants on each corner allow this threshold to be maintained.

In general, though, the principle of redundancy that is built into a dense network of small blocks is a great advantage to emergency response vehicles. The frequency of connection in a small-block system provides two, often three completely redundant routes to an event, allowing the responders themselves to circumvent unforeseen obstructions on the way to an emergency.

Place Benefits of Small Blocks

City Legibility

One of the greatest benefits of a well-connected network of streets and small blocks is that it makes a city understandable to residents and visitors alike: there is order and clarity to a city's organization if its streets connect and allow intelligible ways between locations.

Kevin Lynch illustrates this principle through his concept of place legibility, or the ease with which people understand the layout of a place.[1] To do this, people begin by creating their own cognitive picture, or mental map. This includes what a city contains, where it is located, what lies in between and what distinguishes one part of a city from another. Regular users of a city's built environment, such as its inhabitants, and occasional users, such as visitors, both form mental maps, even if to varying degrees. A structure of compact blocks with a dense network of intersecting streets greatly facilitates mental maps in that the connecting paths between locations are sensible and direct: people may choose routes with landmarks that are easier for them to remember, their sense of spatial relationships is based on simpler fundamentals such as number of streets passed and left or right turns. Indeed, in these cases the user may have a sense of the true geography without ever even seeing it on a physical map because the opportunities to analyze connection and direction are much greater.

When block sizes become too large, the order and execution of a mental map are more difficult to achieve. The user of a built environment may even know multiple ways from one point to another, but the reduced opportunities from larger blocks and greater distances between street connections make the overall journey less intelligible and intuitive.

Encourage Local Economy

While urbanism concerns are not necessarily always aligned with economic concerns, it is important to consider that markets for building are finite: the market does not have unlimited demand, and large blocks allow a developer either to build large amounts of space or to use land inefficiently—be that for parking or for space that cannot be used due to the architectural requirements for the building and constraints on the sites. Smaller blocks minimize these concerns in that they provide a more regular, easily divided pattern of land and encourage more efficient land use. In other words, small blocks lead to smaller parcels, which in turn lead to a collection of individual land owners and not a small number of single owners of large properties. With this kind of cadastral pattern, which is amenable to a small-scale economy, it is easier for properties to be reused or redeveloped: landowners do not have to wait for a large-scale tenant, often necessarily from a large-scale national chain, to realize their redevelopment ambitions, and smaller tenants have greater opportunity to find spaces in a variety of buildings than the spaces designed to accommodate them in large-block development.

Smaller blocks can benefit the public more directly as well: through increased tax revenue. Portland, Oregon subdivided land into 200' by 200' blocks to maximize the number of corner lots, which command a greater premium as real estate and therefore generate higher property taxes, relative to all land in the city.

More Efficient Development

Development based on larger blocks—or land areas bounded by arterial roads that lose any scale similarity to urban grid blocks at all—conforms easily to larger patterns: big-box retail, large buildings, and other configurations that are difficult to modify. When development is based on smaller blocks it is required to consider how to use land most efficiently, namely with respect to how much of the land may be built upon. This leads to denser and more sustainable development patterns: buildings that address the street, that locate on-site parking behind buildings, and that may even contain multiple floors to better utilize land.

Enable Mixed Use and Adjacency

Another advantage of small blocks is that they promote adjacency. Typically streets will be dedicated to a single land use, or a mixture of land uses with a common ground-floor element. Yet complementary land uses must be able to access this first land use: residential neighborhoods must be able to access the shopping along main streets; in turn the shopping needs to be close to the neighborhoods it is serving.

With smaller blocks it is feasible to set smaller areas for different uses as a dense street network provides adequate circulation between origins and destinations, where with larger blocks it is difficult to expect effective circulation between uses without the addition of a de facto internal street system. This is often a problem with large commercial sites, such as shopping malls and newer 'power centers.' The size of the sites and the parking required to serve the commercial space necessitates an internal circulation system, yet the residential areas that provide the shopping center's market are entirely separated from it.

Landscaping and Street Trees

In addition to the benefits provided by street network, retaining street trees and seeking to more proactively incorporate them into street design will provide amenity to the built environment and offer elements of roadway design that manage travel speeds and improve safety.

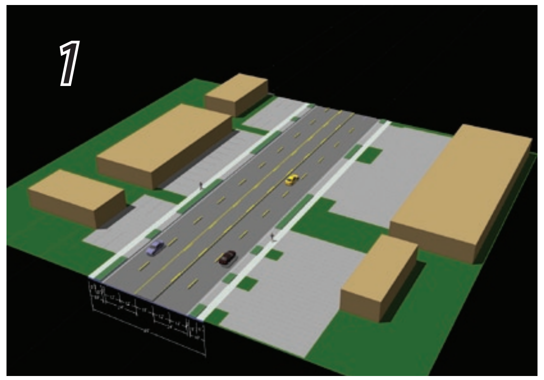
Conventional thought in roadway design has suggested that street trees pose problems: they are a regularly placed roadside obstacle often very close to the road, violating principles of clear zones and sight triangles. The many identified problems of street trees that this thought tends to cite are overcome with care by designers. Depending on the nature of the road, street trees are placed every 30 to 50 feet. These trees are carefully positioned to allow adequate sight triangles at intersections and driveways, to not block illumination of the street from overhead lamps, and not impact lines above or below ground. Street trees of various varieties can be used in all climates, including semi-arid and even arid conditions.

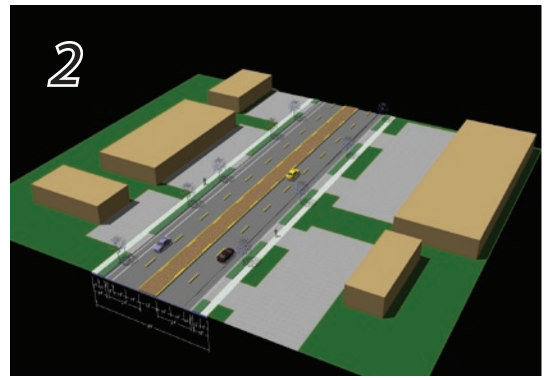
Reduced and more appropriate urban traffic speeds. Urban street trees create vertical walls framing streets, and a defined edge, helping motorists guide their movement and assess their speed (leading to overall speed reductions). Street safety comparisons show a reduction of run-off-the-road crashes and overall crash severity when street tree sections are compared with equivalent treeless streets. Faculty at Texas A&M University led simulation research which found that motorists slow down while driving through a tree-lined streetscape. These observations are also noted in practice when following motorists along first a treed and non-treed portions of the same street. Field observations of the Texas A&M research noted differences in travel speeds of up to 15 miles per hour.

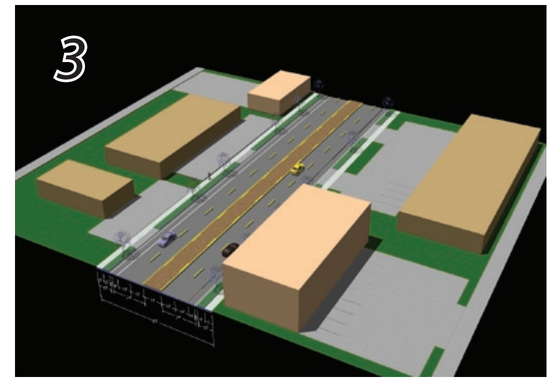
Perceived travel times. Other research and observations confirm that motorists perceive travel times differently when traveling through environments with closely located off-street elements than they do in environments without any such visual peripheries. While this argument is generally made in favor of the urban streetscapes of traditional built environments, encompassing buildings as well as trees, trees do function as the first visual 'dressing' of the street and can have benefits in reducing perceived travel times all on their own.

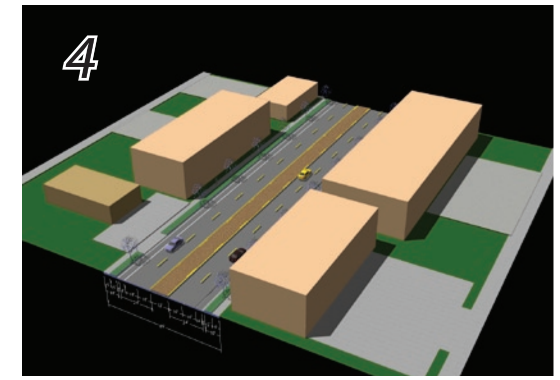
This is an important, if not well understood, point in assessing how roadway improvement programs emphasize delay as a major criterion in justifying and prioritizing projects. Delay, especially at intersections, is often used as a factor in rating a street or intersection's performance (or level of service) in moving traffic through. This approach treats delay as something to be minimized or eliminated and does not seem to be able to express an understanding of psychological phenomena affecting drivers: delay is only regarded as a problem when it is perceived and motorists' expectations for travel speeds are not met. Street trees allow motorists to experience a different environment and, in expanding the realm of their attention and interest, to move at a speed which is inherently comfortable to them.

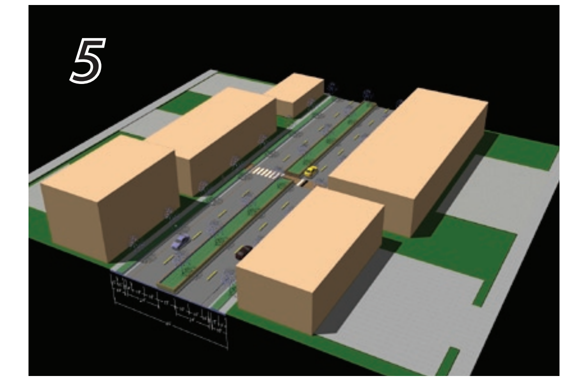
Improved potential traffic operations. When properly positioned and maintained, the backdrop of street trees emphasizes and allows better vision of those features that should be dominant, such as vital traffic regulatory signs. In the absence of a well-developed greenscape, the grey mass of paved surfaces dominates the motorist's field of vision and important signs are less discernible.











Encouraging the Right Land Uses

One essential element in enhancing the process of integrating land use and transportation is enabling land development to define and protect neighborhood and corridor boundaries and to respond to the streets that serve it. In addition to allowing the physical environment to interact with streets and to enhance the pedestrian realm, this type of land development regulation emphasizes building placement as a fundamental part of site development and is not concerned solely with the nature of the use.

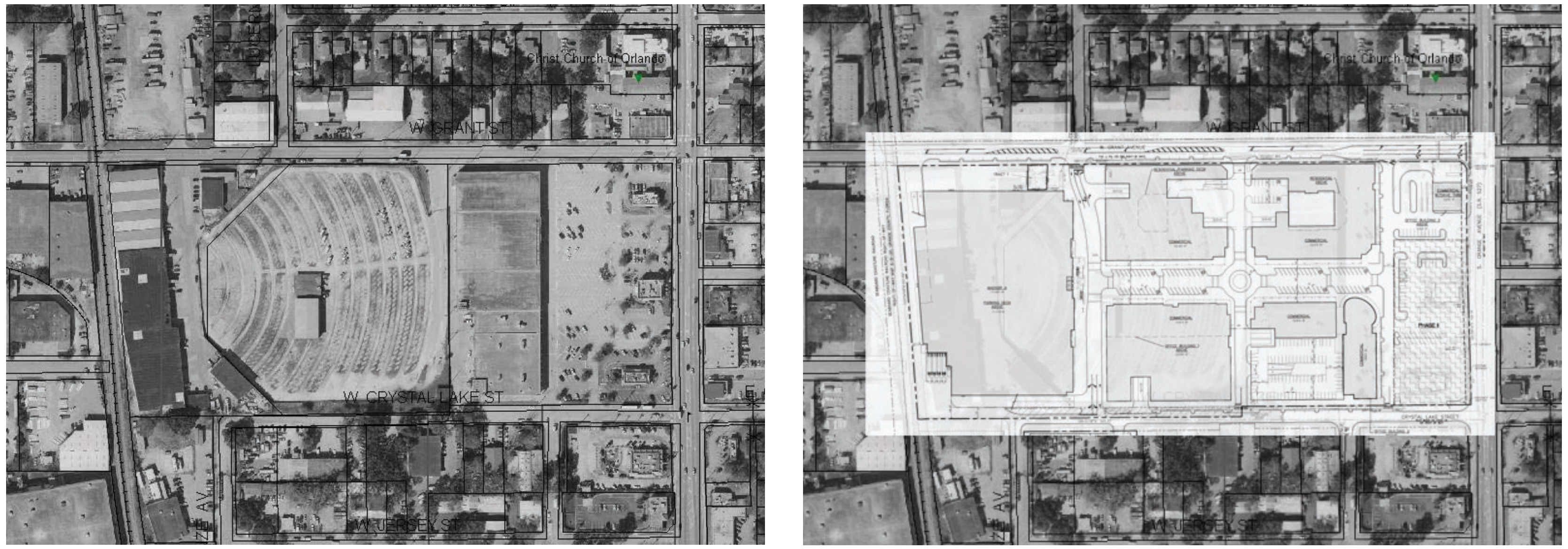
An increasingly common tool for this kind of development is form-based codes that emphasize building placement and envelope, height, relationship to street and other urban design-related concerns over strict separation of land uses. Form-based codes are becoming popular tools in communities where residents have expressed a strong set of preferences for the appearance of their built environment.

Form-based codes being adopted around the United States are designed to reflect a community's vision for its physical appearance and make implementation of this vision possible through a streamlined, simplified land development process. These codes rely on a simple foundation: requirements for building siting need only to be stated in basic terms of a maximum setback or build-to line, a required amount of the lot to be fronted with building mass and a maximum number and density of driveways to be allowed per property (or per block face).

Arlington County, Virginia has adopted a form-based code for its Columbia Pike corridor, an important commercial thoroughfare that, through such limitations on development opportunities as small parcels and traffic congestion, had become less and less attractive as a place for investment since its 1950s heyday. These limitations led over time to a fundamental mismatch between what development opportunities the land and the corridor provided and what demand truly existed. Thus, the land uses were not appropriate for the corridor: parking requirements made development of any new businesses difficult without devoting large sections of a given parcel to surface parking (thus guaranteeing a large number of free-standing commercial uses) and small parcels meant frequent driveway access points along the road.

To address this, land development regulations were adapted and recalibrated to focus on the nature of the corridor first: Arlington County's 'Main Street' and one of the region's primary roads. While the function of such a street in the surrounding urban and social fabric meant that its uses would remain commercial, land development regulations shifted their attention to making sure the buildings addressed the street, that pedestrians could access them as easily as automobiles, and that conceptual plans for mass transit were given an opportunity for success by retaining the strength of the corridor's urban fabric.

Form-based land development regulations, over time, focus on building placement, mass, and overall character and form of the built environment and not simply land use. While use is a critical consideration from a transportation point of view, the nature of the corridor can better define the types of land uses that will be appropriate by 'demanding' a certain character of urban fabric to be developed there. The emerging boulevard example shown here is supporting primarily commercial uses through its placement of buildings to the street (thus maximizing pedestrian access) and its assignment of service- and parking-oriented trips to rear alleys.



An example of form-based codes that require building placement against the street. In this redevelopment site in Orlando, Florida, the placement of new buildings against a network of streets being added to the block defines the street space and makes future widening difficult, if not completely impractical. This is an appropriate street treatment for an urban context.

Encouraging the Right Land Uses

Form-based codes accomplish several benefits for the transportation system as well: first and foremost, their streamlining of mixed-use development through emphasis on proper physical form encourages shorter trips, many on foot, as a decreased reliance on the nature of the land use means that complementary uses can locate closer to one another. They also separate the distribution of trips, allowing service-oriented trips to keep off of main streets, facilitating traffic flow by removing vehicles making frequent turns and increasing the space available for on-street parking (thus decreasing dependence on on-site parking to meet an establishment's needs).

It must be noted that such a system applies to all context types. Encouraging the right land use does not necessarily mean the land use must be the same in all parts of Chatham County, but rather fits the context and the vision for future development.

Indeed, the form-based code does not need to disallow land use and building types that are commonly developed today. The intent of this type of code is not to discourage particular kinds of development, but rather to bring that development in line with a community's vision for its physical environment and to use it to define neighborhoods and commercial districts.

Design Guidelines Sources and Links

Austin, TX
Downtown Austin Design Guidelines, May 2000
http://www.ci.austin.tx.us/downtown/designguidelines.htm

Cary, NC
Design Guidelines Manual, August 2001
http://www.townofcary.org/depts/dsdept/P&Z/Carydesi.pdf

Charlotte, NC (Mecklenburg Country)
CDOT Urban Street Design Guidelines, April 2005
http://www.charmeck.org/Departments/Transportation/Urban+Street+Design+Guidelines.htm

Fort Collins, CO
Fort Collins Design Manual, May 2000
http://fcgov.com/advanceplanning/design-manual.php

Georgia Department of Transportation
GDOT CSD Manual, April 2006
http://www.dot.state.ga.us/csd/access/manualPDF/GDOTCSDManual-Final-2006-04-19.pdf

Georgia Department of Transportation
Pedestrian & Streetscape Guide, September 2003
http://www.walkable.org/download/Georgia_ped_streetscape_guide.pdf

Raleigh, NC
Downtown Raleigh Urban Design Handbook, July 2004
http://www.raleighnc.gov/publications/Planning/Guides%2c_Handbooks_and_Manuals/Urban_Design_Handbook.pdf

Articles & Case Studies relevant to CSS

Maryland Department of Transportation
When Main Street Is A State Highway, 2003
http://www.marylandroads.com/businesswithSHA/projects/ohd/mainstreet/MainStreet.pdf

Michigan Land Use Institute
CSS Policy Draft, November 2004
http://mlui.org/downloads/csspolicy.pdf

Michigan Land Use Institute
People and Pavement, February 2004
http://www.mlui.org/downloads/flexibledesign.pdf

Michigan Land Use Institute
Sensitivity Training, December 2004
http://www.mlui.org/transportation/fullarticle.asp?fileid=16774

Nashville, TN (Davidson County)
Clarksville Pike Corridor Study, May 2003
http://www.nashville.gov/mpc/urban.htm#corridor_studies

National Charrette Institute
Dynamic Planning Process, 2006
http://www.charretteinstitute.org/dynamic.html

National Charrette Institute
What is a Charrette, 2006
http://www.charretteinstitute.org/charrette.html

New Jersey Department of Transportation
Context Sensitive Design (CSD) Info & Chart, February 2004
http://www.state.nj.us/transportation/eng/CSD/

New Jersey Department of Transportation
Future in Transportation (FIT): Create More Connections, August 2005
http://www.state.nj.us/transportation/works/njfit/toolbox/connections.shtm

New Jersey Department of Transportation
Future in Transportation (FIT): Design Roads in Context, August 2005
http://www.state.nj.us/transportation/works/njfit/toolbox/context.shtm

New York Department of Transportation
Context Sensitive Solutions Implementation Plan, May 2001
http://www.dot.state.ny.us/design/css/files/csdplan.pdf

Rhode Island Avenue/US Route 1 - Mount Rainier, MD
Context Sensitive Design Case Study No. 5, August 2002
http://www.contextsensitivesolutions.org/content/case_studies/kentucky_rainier/resources/kentucky_rainier_pdf/

Queensbury, NY
Main Street Design Guidelines (extracted from Town of Queensbury Zoning Ordinance), June 2003
http://www.queensbury.net/mainstreet/Main%20Street%20Design%20Guidelines.pdf

Seattle, WA
Making Streets That Work, May 1996
http://www.ci.seattle.wa.us/transportation/pdf/mstw.pdf

Shelby Farms Parkway – Memphis, TN (Shelby County)
Context Sensitive Solutions Presentation, 2005
http://shelbycountytn.gov/FirstPortal/dotShowDoc/dotContent/Government/OfficeoftheMayor/sfpat_index.htm

Transportation Research Board of National Academies
“Context-Sensitive Design Around the Country”, Transportation Research Circular, July 2004
http://onlinepubs.trb.org/onlinepubs/circulars/ec067.pdf