

District 5

MULTI-MODAL CORRIDOR PLANNING GUIDEBOOK

Version 1 | August, 2013



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ACKNOWLEDGMENTS

THANK YOU to the many professionals who contributed to the development of this Multi-Modal Corridor Planning Guidebook. Some shepherded its overall development. Others crafted the text or critiqued the document. Still others participated in workshops and served as a sounding board throughout the development process.

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“Man is a being who asks questions. From the time we are born we begin to ask questions . . . It might even be said that mankind’s history is the history of questions and answers that we men have formulated.”

—Octavio Paz, Mexican poet.

PROLOGUE

Alexander von Humboldt was a 19th Century German naturalist and explorer after whom the Humboldt Current, off the west coast of South America, was named. At one point in his life, Humboldt said: “From my earliest youth I had felt an ardent desire to travel into distant regions, which Europeans had seldom visited.” This desire arose, he said, when he felt “an irresistible attraction in the impetuous agitations of the mind.” At the age of 29, he traveled to Central and South America on an expedition that lasted five years. With the information that he collected, he compiled a 30-volume chronicle of his travels.

Everything attracted Humboldt’s attention—the temperature of the ocean, the fish that lived in it, the plants he found in his path. He climbed mountains, explored rivers, and sailed the oceans. Humboldt’s research laid the foundation in several fields of modern science. It all began with his intense curiosity, and his insatiable desire for knowledge that accompanied him throughout his life. In the words of American essayist Ralph Waldo Emerson, “Humboldt was one of those wonders . . . who appear from time to time, as if to show us the possibilities of the human mind, the force and the range of the faculties.”

What do we learn from Paz and Humboldt? The benefit of asking questions and the wealth of knowledge derived from acquiring the answers. A robust and thorough planning process yields its greatest success when we seek to know and understand what we need to plan for and what endeavor will make us successful.

It has become an unfortunate practice to seek to find a look-up table or generic write-up as if they will adequately and properly address every issue or problem handed to us.

As planners, managers, and decision-makers, we should not fear to use judgment and make bold decisions in our development of responsive, comprehensive and effective transportation plans. Let’s never assume nor generalize factors that could lead to inadequate or incorrect conclusions.

This planning guidebook has been prepared to provide an effective approach to accumulating useful data and information needed for stakeholder engagement, problem identification and the development of appropriate transportation solutions. It all starts with asking the right questions.

Ask questions to understand stakeholders’ visions, perception of transportation problems, values and desires.

Be curious and ask questions to understand the existing conditions of the entire transportation context. Do not assume or surmise.

Ask questions to learn the conflicts and hot buttons in the community.

Again it all starts with asking questions and can result in effective and successful planning.

- John Philip Moore, EIT
FDOT District 5

USING THIS GUIDEBOOK

This Guidebook has been developed for a wide range of users, including Florida Department of Transportation (FDOT) District Five Intermodal Systems Department (ISD) staff, and staff in other FDOT units, Metropolitan Planning Organization (MPO) and Transportation Planning Organization (TPO) planners, local governments, and transit agencies. The Guidebook includes a step-by-step process that produces the information necessary to understand the scope and budget of a transportation project, so that a project may be thoughtfully considered for FDOT funding.

1

BACKGROUND AND INTRODUCTION

- WHAT is multi-modal planning?
- WHY do it?
- HOW can this Guidebook help?

2

TRANSPORTATION PLANNING CONTEXT

- HOW does it fit into existing FDOT process?
- HOW does this differ from Context Sensitive Solutions?
- WHAT about Complete Streets?

3

THE PLANNING PROCESS

- HOW do you do multi-modal planning?
- HOW is it different for different sized projects?
- HOW do you define a problem?
- WHAT data do you need?
- HOW do you define guiding principles, purpose, and need?
- HOW do you measure success?
- HOW are alternatives developed?
- HOW can land use solutions be part of multi-modal strategies?
- HOW do you compare and select alternatives?

BACKGROUND: IGNITING THE TORCH

The Pass the Torch Meeting is a vehicle for FDOT District 5 Design group to formally hand a project over to Construction. The specific purpose of the Pass the Torch Meeting is to discuss and provide all relevant information used by the Design Team throughout the Production Process and to **transfer that information and knowledge** to Construction. The concept was developed in our District. It has been adopted by District 1 to encourage communication across all functional groups in FDOT. Ultimately, the outcome is to eliminate unforeseen conditions on the job site and thereby complete the job on time and within budget.

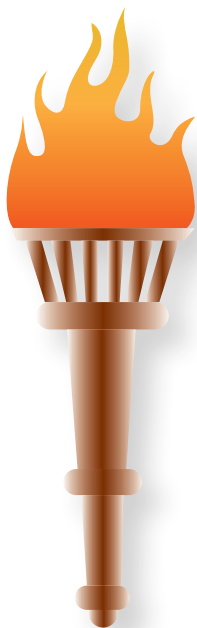
This metaphoric expression alludes to the ancient Greek torch race, in which a lighted torch was passed from one runner to the next. It symbolizes relinquishing responsibilities for a project to the next functional group.

Igniting the torch should apply to the ISD Unit's **transferring information and knowledge** about what is learned in planning (the problem clearly defined, the purpose and need to be addressed, the users to be served, the customer expectations, the range of alternatives to be evaluated, the method of evaluation, and the reasonable costs, schedule and budgets associated with implementing the range of alternatives) to other FDOT units for more detailed study (in the case of PD&E) or for simple implementation (in the case of Maintenance, Traffic Operations, etc.). Working together with the other disciplines and maintaining a team approach will ensure that the flame stays lit while passed through each phase of the project, which will lead to projects that meet community goals and commitments and therefore a more efficient and predictable project delivery.

Based upon the recent experience of the Intermodal Systems Development (ISD) unit, we have been receiving requests from our customers for multi-modal corridor project studies, projects that have a different goal or purpose than our traditional widening projects. Multi-modal corridor projects look to provide complete

streets, transit accessibility, and accommodation for safe movement of pedestrians and bicyclists. Implementation of multi-modal solutions requires a thoughtful planning process that engages all stakeholders and end users.

Based upon these considerations, this document has been produced to provide guidance on the development of multi-modal transportation projects that will be sustainable through further phases of the project, across all functional groups in FDOT, so that there will be no need to extinguish and re-light the torch to meet Department standards and our stakeholder expectations.



To that end we began this process by interviewing many of our stakeholders, including key players in our District family, planning partners in each of our MPOs/TPOs, transit agencies, cities, and counties, to determine how to best craft a planning process that achieves the Department and our customers' collective objectives. Based on this input, we developed the step-by-step planning process that is outlined in detail in this document.

We learned that implementing multi-modal solutions in accordance with Department standards and customer expectations can be challenging. In response, we researched several requirements of our trade to assure that planning multi-modal facilities in accordance with the requests of our customers can meet Department standards or secure appropriate exceptions or variances. Some of the topics that were raised and have been covered in this document include guidance on setting proper posted speeds in relation to the context of the roadway, planning for appropriate cross sections for transit service such as Bus Rapid Transit, and planning for safe pedestrian and bicycle travel.

The Guidebook is intended to be a living document that will serve the District to successfully deliver in a consistent, predictable and repeatable manner, the types of projects that our local governmental agencies and planning organizations are now raising to the top of their priority lists.

INTRODUCTION

The Florida Department of Transportation (FDOT) has prepared this Planning Guidance to provide direction on how to plan for multi-modal transportation investments. This Guidebook provides a new direction for the planning of these facilities within the FDOT District 5 region. Its focus is to guide the development of all transportation facilities, with the goal of investing in transportation facilities that work well for all users, are affordable, and that support community planning, economic development and mobility goals.

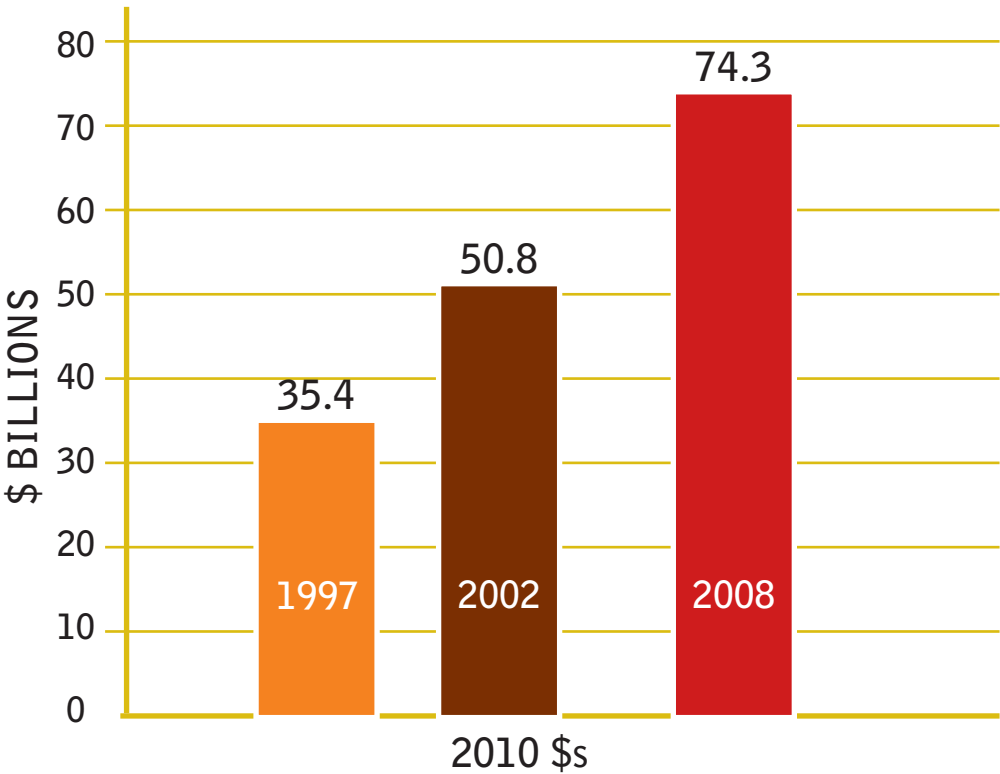
Why do we need this Planning Guidebook?

Our transportation world is changing in many ways, from the ever decreasing financial resources to the need to provide transportation choices for all users. This section outlines the key reasons for developing this Guidebook.

Money: Transportation dollars are limited, and are becoming even more scarce. State transportation revenues are not keeping pace with escalating construction costs and growing needs. As with other states, we face a shortfall between revenue expected from existing sources and projected needs to both maintain existing infrastructure and build new projects. The chart below shows Florida’s transportation funding shortfalls through 2008. Estimates peg our State’s shortfall at \$50 billion through 2035.¹ Multi-modal solutions can provide more mobility and more travel choices for less money.

FLORIDA METRO AREA TRANSPORTATION FUNDING SHORTFALL ESTIMATES

(Source: MPO Situational Analysis, December 2010)



¹ Governor Scott’s Regulatory Reform Transition Presentation, December 2010

Safety: Roadways in District Five have been ranked as some of the most dangerous roadways in the country when it comes to bicycle and pedestrian travel. In Florida from 2000 to 2009, 5,163 pedestrians were killed, resulting in a fatality rate of 3.0 deaths per 100,000 residents.² The pedestrian fatality rate per 100,000 people in Florida is twice as high as the national average, as shown in the chart below.²

Improve Work Program Predictability and Streamline Project Delivery: Today's reality is requiring government to use the money it has more effectively. Transportation agencies are expected to deliver more projects than ever before, and the environment in which projects must be delivered is increasingly challenging.

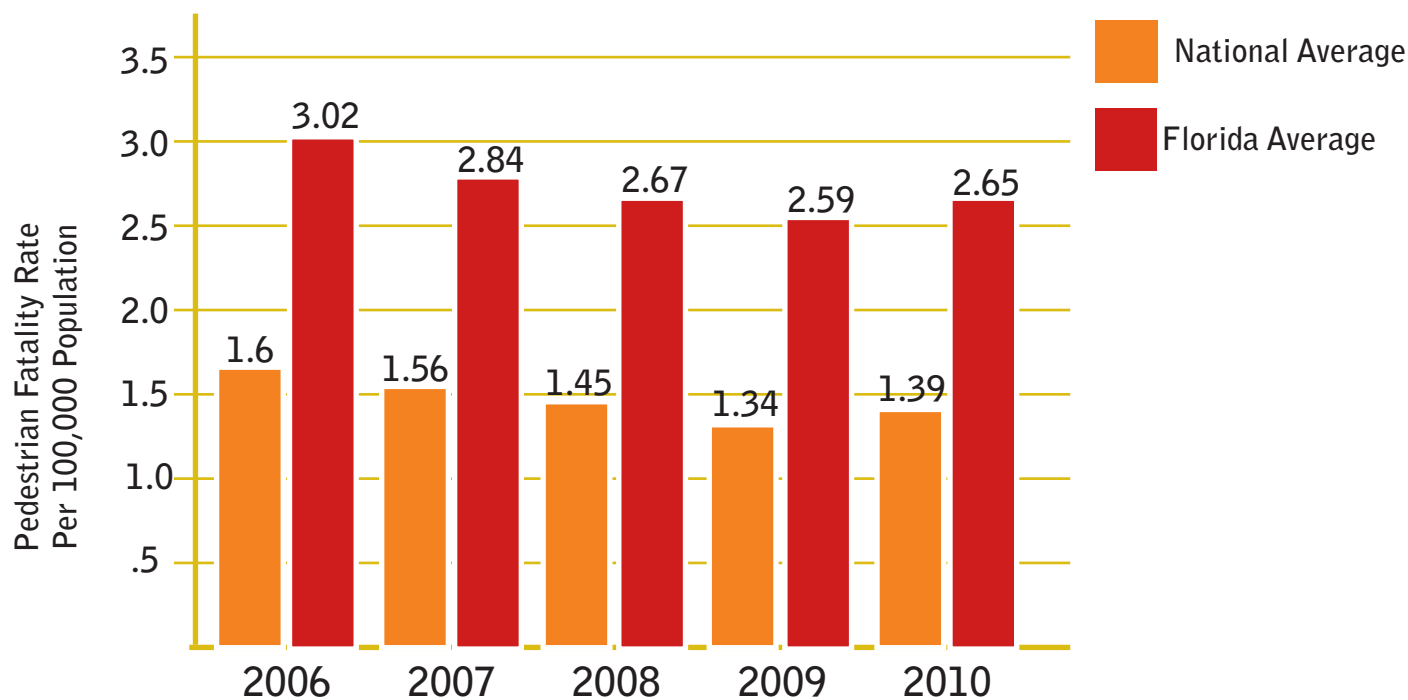
Our federal funding partners (USDOT agencies, FHWA, FTA, FAA) provided direction to streamline and link transportation planning and environmental review processes. On August 10, 2005, the Safe, Accountable,

Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law. SAFETEA-LU promotes more efficient and effective federal surface transportation programs by including provisions for improving and streamlining the environmental process during the planning and development of transportation projects. These provisions are intended to enhance the consideration of environmental issues and impacts within the transportation planning process and to encourage the use of products from the planning process in the National Environmental Policy Act (NEPA), (known as the PD&E process by FDOT) process. Specifically, the transportation planning provisions (Section 6001) and NEPA provisions (Section 6002) emphasize improved connectivity between the planning and NEPA processes and early and increased coordination, communication, and collaboration with resource agencies and the public.

The passage of USDOT's Moving Ahead in the 21st Century Act (MAP-21) calls for more effective

PEDESTRIAN FATALITIES

(Source: Dangerous By Design 2011, Transportation for America)



² Dangerous by Design, 2011, Transportation for America.



By 2025, 1 in 5 Americans will be 65 or older. (Source: www.completestreets.org, Photo Credit: Dan Burden)

transportation planning and even more streamlined project delivery. More emphasis is now being placed on establishing criteria for the evaluation of new performance-based planning processes. In other words, State DOTs and MPOs must now develop performance targets with the intent of understanding the effectiveness of projects and the processes required to implement projects. MAP-21 places much emphasis in efficiency of project delivery. According to MAP 21, accelerated project delivery can be achieved through early community buy-in and commitments and expanded authority for categorical exclusions (CE). In particular, the expanded use of CEs, which are simplified environmental reviews, includes multi-modal projects, projects within existing right-of-way, and projects receiving limited federal assistance.

In current planning systems, decisions about what transportation solutions should be are often predetermined before really understanding the full range of

potential solutions, and often default to solutions that are not affordable and/or do not meet community desires. Early planning can help save money, deliver projects and programs efficiently and effectively, and ensure that transportation solutions are affordable, implementable and meet community desires. This planning guidance provides an opportunity to achieve this.

Community Desires: There is an increasing demand for multi-modal solutions from MPOs, TPOs and communities served by FDOT District 5. More and more of our population require alternative travel choices/modes to meet their needs. In 2011, Florida has the highest percentage of the population over the age of 65 at 17.3%.³ Combined with the numbers of young people who are not yet able to drive (approximately 21%⁶), more than one third of the population in Florida needs transportation choices other than driving by automobile.⁴

³ Michael B. Sauter; Douglas A. McIntyre (2011-05-10). "The States With The Oldest And Youngest Residents". <http://247wallst.com/2011/05/10/the-states-with-the-oldest-and-youngest-residents/3/>.

⁴ US Census Bureau, 2011. <http://quickfacts.census.gov/qfd/states/12000.html>.

FDOT cannot “solve” congestion by simply building more, wider and faster state roadways. There will never be enough financial resources to supply the endless demand for capacity and, even if there were, communities would not allow the number and size of roadways that would be required to be built. Communities no longer accept Interstate-era roadway designs being forced into community contexts; they require a balanced transportation network to meet their mobility and economic development goals. Further, we realize that the “wider, safer, and faster” approach to road construction is not even solving the problem. Sprawling land uses are creating congestion faster than we can increase roadway capacity. FDOT simply cannot afford to build all of the roads that are needed to address this increase in congestion.

Historically, FDOT has sought to address congestion primarily by increasing the capacity of the state highway system. This approach was the result of the post-World War II mandate to build roads that were “wider, safer and faster.” The transportation community responded to this mandate, and professional organizations such as American Association of State Highway and Transportation Officials (AASHTO), Institute of Transportation Engineers (ITE), and Transportation Research Board (TRB) helped standardize planning and design practices to get the job done.

This Guidebook recognizes that the role of the transportation facility varies by community, and that there is a need to balance the desire to *go through a place* with the *desire to go to a place*. Transportation facilities have many purposes, including providing local and regional mobility, supporting economic revitalization, and providing new and better access to businesses, offices and homes. Transportation facilities exist within rural, urban and suburban contexts, and function as main streets, arterials, collectors, and interstates within each of these land use contexts. This report intends to help transportation and land use planners, engineers, and designers, communities, elected officials, and others plan transportation facilities that provide safe travel choices for all users and that fit within the future desired context of the community that it serves and passes through.

This Guidebook recommends a modified approach to multi-modal planning. It suggests the need to fully understand a transportation problem before programming a solution to the problem. It requires a multi-disciplinary team of planners, engineers, and others to really think through the wide range of potential solutions to solve the transportation problem in a way that also supports community goals and objectives and is affordable.

The transportation planning and design context has changed. In recent times, the goals for the transportation system have broadened significantly in response to social views and an emphasis on livability and sustainability which includes concerns of environmental preservation, economic vitality, cultural cohesion, and social justice. The transportation industry has developed various terms that describe this approach to transportation, including “context sensitive solutions”, “multi-modal” solutions, “complete streets”, and livability.

From the perspective of FDOT District 5, how these terms relate to each other can be illustrated using a tree. The roots of the tree represent the stakeholders and end-users of the roadway. Development of sound transportation solutions starts with engaging all the stakeholders and understanding the needs of all the potential users of the public right-of-way. The trunk is the strength of the tree and represents the Context Sensitive Solutions (CSS) approach that connects the roots with the branches. The branches of the tree are the many tools that are

used to achieve context sensitive solutions. Each tool is oriented toward a specific area of transportation or land use (or both transportation and land use). A number of them have overlapping characteristics. Complete Streets is one of these tools that is applicable when planning or designing a multi-modal street. Transit-oriented development (TOD) is another tool, which is applicable when planning or designing a transit solution. Other tools include rightsizing, green streets, and traffic calming, among others.

The end goal of all these tools and of the context-sensitive solutions approach is “livability”, represented by the fruit on the tree. Livability is a broad concept that can mean different things to different people. However, there are certain key characteristics of livable communities—easy access to employment centers, vibrant town centers, healthy citizens, mobility for all, housing choice, clean air, etc. These characteristics are the “fruits” of the various CSS tools and are elements of livability.

CONTEXT SENSITIVE SOLUTIONS (CSS)

The ideas of how transportation projects are developed to better support communities’ goals and objectives has developed into an arena of transportation planning and design often referred to as Context Sensitive Solutions (CSS). CSS is a process that ensures that transportation projects are designed holistically, directly evaluating impacts to the built and natural environment and providing recommendations that support a community defined vision for the future.

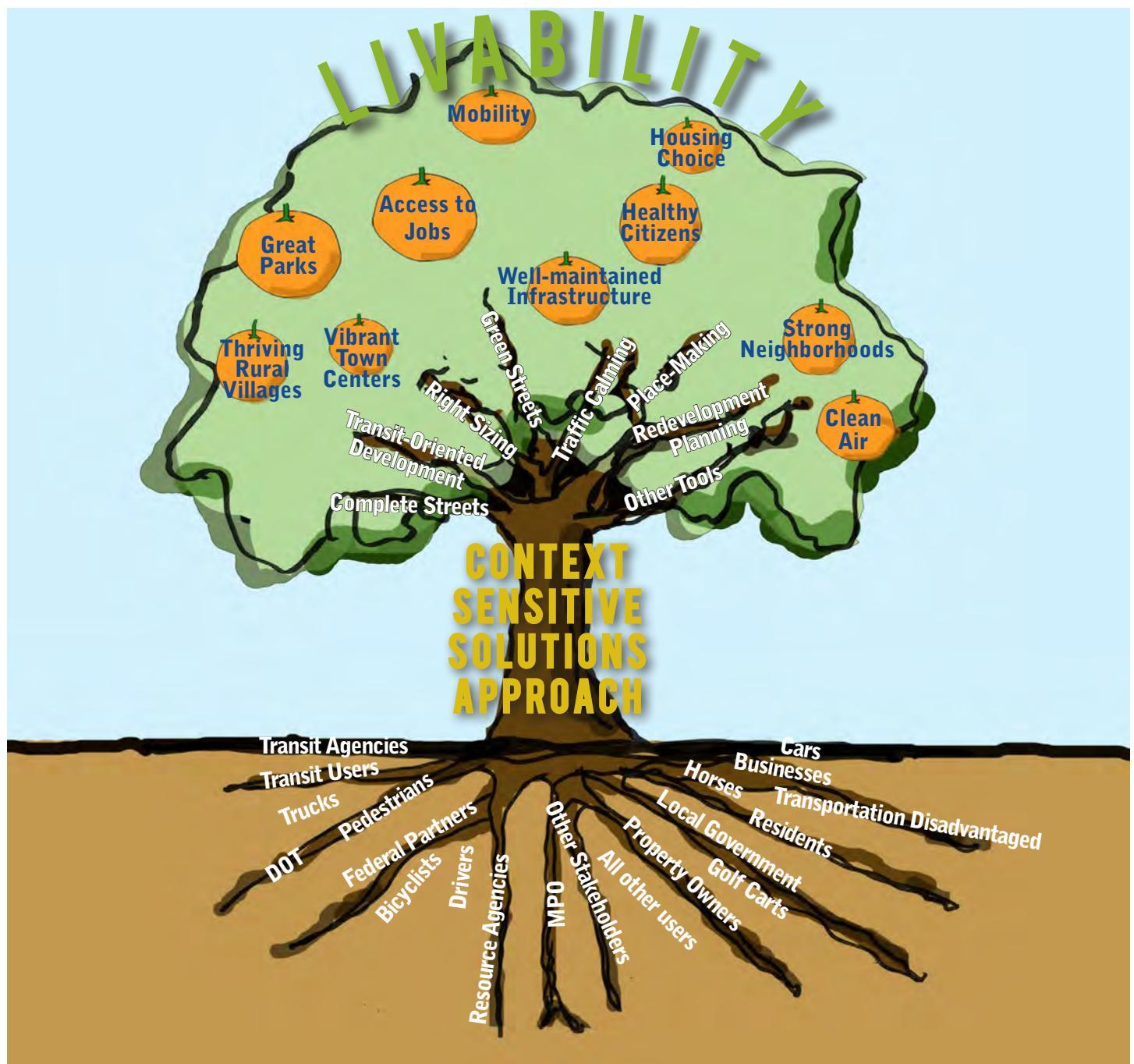
CSS happens when existing processes are designed to help make transportation decisions that are sensitive to



Look for the CSS icon throughout the Guidance for topics that support FDOT CSS Policy.

impacts and improvements on both the environment and communities. CSS is not a new process or a process separate from other transportation processes. To the greatest extent feasible, all projects should be planned, designed, constructed, and maintained to be sensitive to the context. No project is exempt. Sometimes referred

CSS AS REPRESENTED BY A TREE



CSS is the overall approach to achieve a livable community. Multi-modal mobility is one of the elements that contributes to livability.

- Roots = Stakeholders and End-users
- Trunk = Overall CSS Approach
- Branches = Many CSS Tools
- Fruits = Livability Goals

to as “Thinking Beyond the Pavement,” CSS reflects an understanding that a host of important and often competing values or interests must be considered in defining and addressing transportation needs. Being sensitive to the context does not always add cost or time to complete a transportation project. As shown below, the key elements are safety, mobility, and community values.

ELEMENTS AFFECTING CONTEXT SENSITIVE SOLUTIONS

(Source: FDOT Project Management Handbook, Chapter 9.)



Community values may include the preservation and enhancement of scenic, aesthetic, cultural, historic, environmental and other community resources. Being sensitive to the context involves collaboration of technical professionals, local government officials, community interest groups, landowners, facility owners, the general public and other stakeholders who will live and work near and use the transportation facility. Collaboration of this kind helps the Project Team gain an understanding of community values, and incorporate or address them in

the development of a project. Fundamental to CSS is the development of a number of alternatives, and selection of the best “context sensitive” solution to meet project and community needs. CSS affects solutions beyond design or planning decisions. Decisions that can be sensitive to the context, include decisions about project start date, end date, night work, signs, signals, drainage, lighting, utilities, design speed, lane widths, presence of on-street parking, access levels, and more.

It is important to note that “context” is much more than the physical appearance of the street. At the local level, the context includes the role of the roadway in supporting community life. The context sensitive roadway can serve as a focus of development or redevelopment. People want to walk, bike, live or shop along these roadways, and not just drive along them on their way to another place. Context sensitive solutions can support healthier, sustainable communities by encouraging walking, bicycling, and transit, which supports a diverse range of development patterns and community types.

The context of the roadway’s transportation function or role is essential; some state highways serve vital regional and statewide mobility goals, and others do not. The role of the roadway must be determined as part of planning in order to understand the modes that should be served and the range of alternatives that should be evaluated during the planning process and the succeeding transportation development phases after planning.

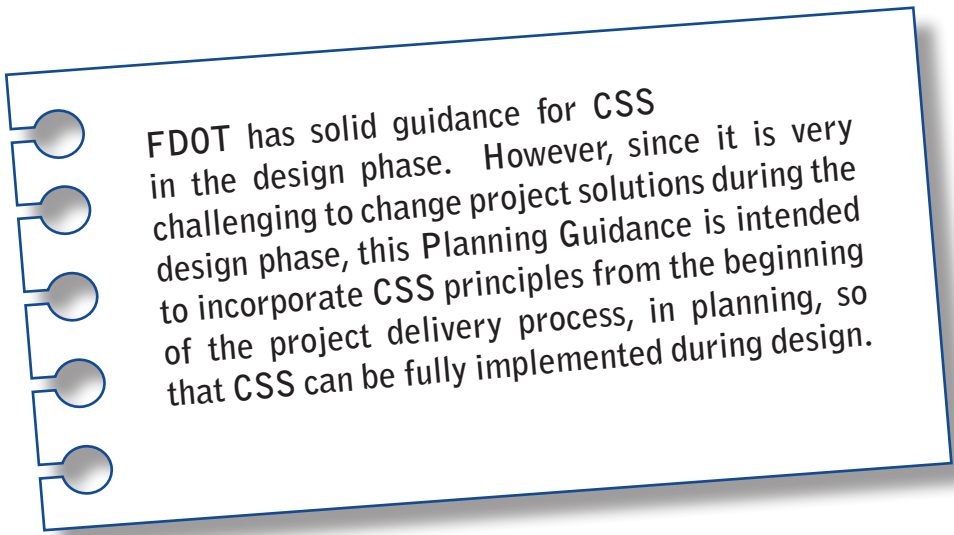
In addition, the financial context must be considered during planning. Local, State and Federal transportation funding for capital and operations/maintenance is in short supply. Considering the value that is realized from a transportation investment is critical to ensure that expenditure of these funds makes good long-term financial sense.

FDOT's Definition of CSS

FDOT adopted a CSS policy in 2008, as outlined on the next page. This states that it is the policy of the Florida Department of Transportation (FDOT) to use a CSS approach on transportation projects and activities for all modes appropriate to scale, cost, location, and schedule. The policy states that CSS is a proactive, collaborative, interdisciplinary approach to transportation decision making, project development, and implementation, taking into account the views of stakeholders, and the local area where a project will exist, be operated, and be maintained. CSS considers the physical setting and seeks to enhance and conserve community defining features and environmental resources. According to the policy, this approach is intended to balance safety and mobility needs with local community goals.

FDOT Consideration of CSS in Design

At FDOT, the idea of CSS concepts really began with the Transportation Design for Livable Communities (TDLC) policy, which was adopted in 1998 and subsequently incorporated into Chapter 21, Plans Preparation Manual (PPM), Volume I. Florida Policy on Transportation Design for Livable Communities summarizes the intent of this initiative, as stated below.



FDOT has solid guidance for CSS in the design phase. However, since it is very challenging to change project solutions during the design phase, this Planning Guidance is intended to incorporate CSS principles from the beginning of the project delivery process, in planning, so that CSS can be fully implemented during design.

Ten years later, in 2008, the Department adopted its first Policy on CSS. In 2012, FDOT further strengthened the application of CSS by adopting a new chapter in the Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (referred to as the Green Book). This new chapter 19, titled Traditional Neighborhood Development, outlines context sensitive design elements for more compact, multi-modal neighborhoods. This guidance outlines policies recommended for Florida's local roadways and complies with American Association of State Highway and Transportation Officials' (AASHTO) requirements. The guidance is included in full in the Appendix.

FLORIDA POLICY ON TRANSPORTATION DESIGN FOR LIVABLE COMMUNITIES

It is the policy of the Department to consider Transportation Design for Livable Communities (TDLC) features on the State Highway System when such features are desired, appropriate, and feasible. This involves providing a balance between mobility and livability. TDLC features should be based on consideration of the following principles:

1. Safety of pedestrians, bicyclists, motorists, and public transit users.
2. Balancing community values and mobility needs.
3. Efficient use of energy resources.
4. Protection of the natural and man-made environment.
5. Coordinated land use and transportation planning.
6. Local and state economic development goals.
7. Complementing and enhancing existing Department standards, systems, and processes.



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POLICY

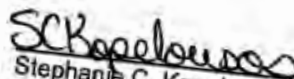
Effective: November 20, 2008
Office: Environmental Management
Topic No.: 000-650-002-a

CONTEXT SENSITIVE SOLUTIONS

It is the policy of the Florida Department of Transportation (FDOT) to use a Context Sensitive Solutions (CSS) approach on transportation projects and activities for all modes appropriate to scale, cost, location, and schedule.

Context Sensitive Solutions is a proactive, collaborative, interdisciplinary approach to transportation decision making, project development, and implementation, taking into account, the views of stakeholders, and the local area where a project will exist, be operated, and be maintained. CSS considers the physical setting in which a project or activity is to be implemented, and seeks to enhance and conserve community defining features and environmental resources. This approach seeks to balance safety and mobility with local priorities. FDOT will encourage communities to contribute financially or in-kind toward enhanced project features and maintenance.

Consistent with the CSS principles prescribed by the Federal Highway Administration, FDOT transportation projects and activities shall be compatible and consistent with available resources, FDOT policies, and community visions.


Stephanie C. Kopelousos
Secretary

www.dot.state.fl.us

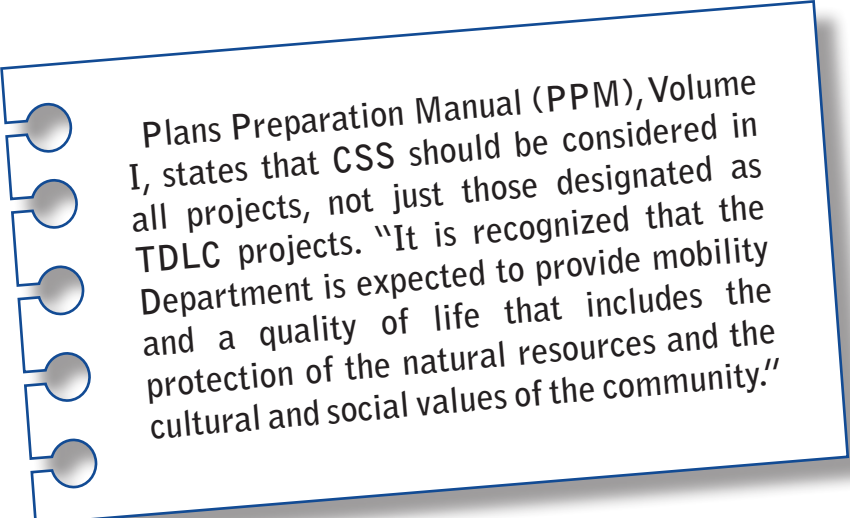
Consistent with the CSS principles prescribed by the Federal Highway Administration (FHWA), FDOT transportation projects and activities shall be compatible and consistent with available resources, FDOT policies, and community visions. FDOT makes it clear how CSS should be applied during the design phase.

There is no specific funding allocated for context sensitive features incorporated in highway projects. If identified as early as the planning phase, context sensitive features should be part of the community and the agency's evaluation and vetting processes. The need for these features should be fully understood and, as such, these features should not be perceived as "adding" to project or maintenance costs in latter stages (i.e. PD&E or Design).

These features can be funded with normal project funding as long as the project's programmed scope and estimates accurately reflect the community values. Joint ventures/interjurisdictional agreements may be necessary when FDOT and the local governments mutually agree that context sensitive treatments are desired. For instance, if decorative lighting is desired, FDOT will usually pay for the basics (assuming that lighting is warranted); and the local government picks up the difference. In addition, the local government must sign a Maintenance Agreement accepting responsibility to maintain additional features requested.

Federal Highway Administration's (FHWA's) Definition of CSS

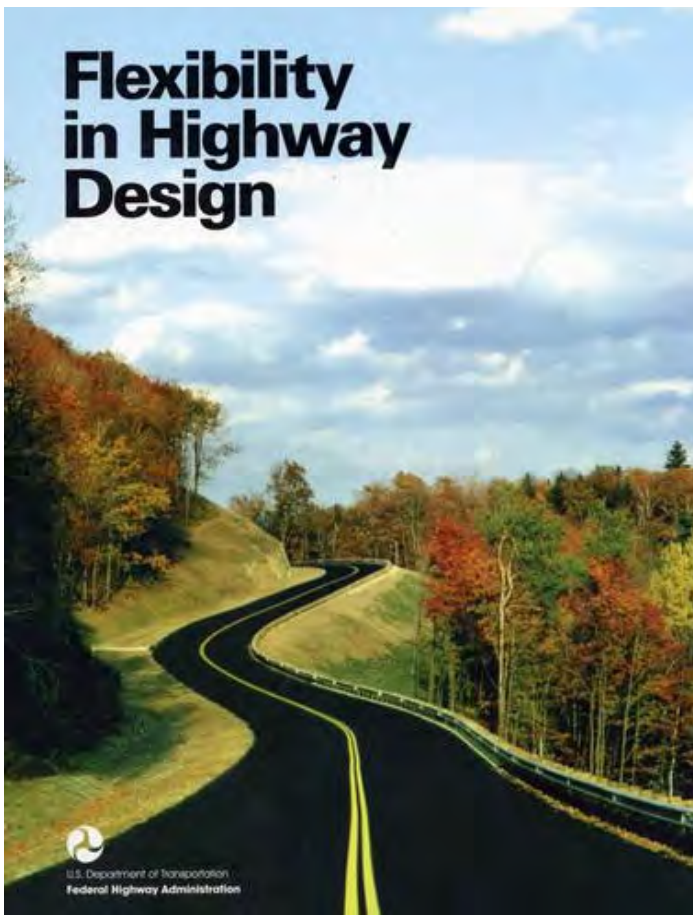
The idea that roadways should be planned to support the vision of the place and to provide access for all modes is not new. The groundwork was laid in the 1990s. Developing transportation projects that are sensitive to their surrounding environment, especially in scenic or historic areas, and that include broad public involvement were ideas brought to the national stage in the 1991 Inter-modal Surface Transportation Efficiency Act. These ideas were further encouraged by the 1995 National Highway



Plans Preparation Manual (PPM), Volume I, states that CSS should be considered in all projects, not just those designated as TDLC projects. "It is recognized that the Department is expected to provide mobility and a quality of life that includes the protection of the natural resources and the cultural and social values of the community."

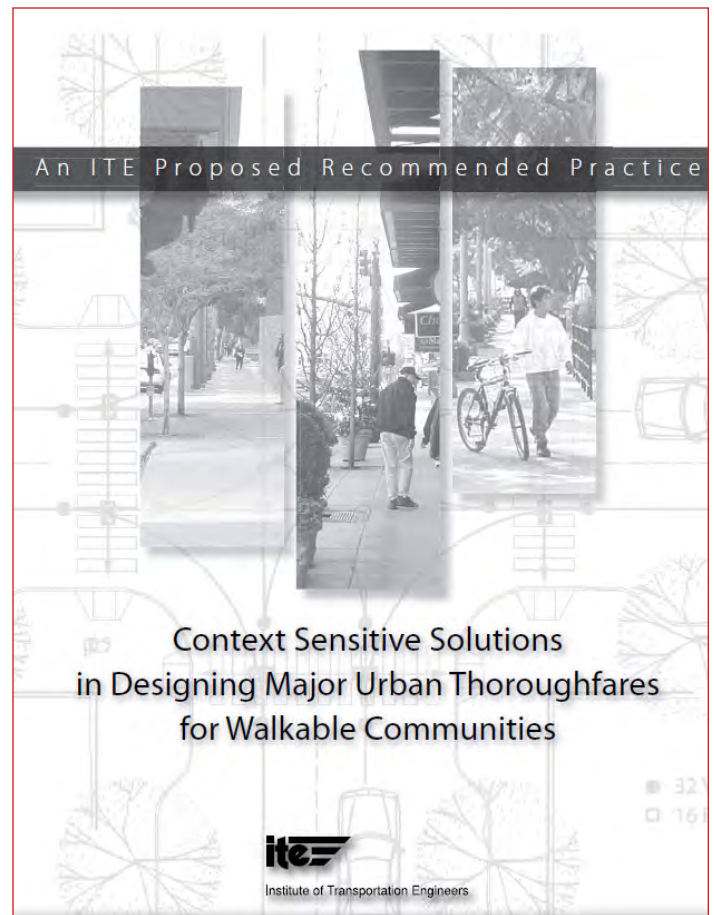
System Designation Act, which states that designs may take into account "the constructed and natural environment of the area; impacts of the project upon environmental, scenic, aesthetic, historic, community and preservation interests; and access for other modes of transportation". In 1997, FHWA, in cooperation with AASHTO, published Flexibility in Highway Design, which identifies and explains ways to reduce the impact of transportation projects on environment by using the range of acceptable design guidelines.

The CSS movement gained further momentum in 1998, when the Maryland State Highway Administration (SHA), in cooperation with AASHTO and FHWA, hosted "Thinking Beyond the Pavement: A National Workshop on Integrating Highway Development with Communities and the Environment While Maintaining Safety and Performance." The workshop presented several principles of Context Sensitive Design (CSD), including the importance of establishing a multidisciplinary team to plan projects; maintaining open and continuous communication with all stakeholders; and understanding the landscape involved, the neighboring community, and the area's valued resources before designing engineering solutions.



In 1997, FHWA published *Flexibility in Highway Design*, which identifies and explains ways to reduce the impact of transportation projects on environment by using a range of acceptable design guidelines.

Moving into the 21st Century, the concepts that define CSS evolved from unique techniques implemented in special cases to standard approaches for transportation planning and design. Many professional transportation organizations have institutionalized the idea of Context Sensitive Solutions, including FHWA, American Society of Civil Engineers (ASCE), TRB, AASHTO, ITE, American Society of Civil Engineers (ASCE), National Association of City Transportation Officials (NACTO), and many state Departments of Transportation (such as Massachusetts, Pennsylvania, New Jersey, and Oregon).



In 2006, ITE published a guidance for practitioners on how CSS concepts and principles may be applied in roadway improvement projects that are consistent with their physical settings.

COMPLETE STREETS

Complete Streets is one of the tools of CSS which applies to the design of streets to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street. “Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations.”⁵

⁵ National Complete Streets Coalition, www.completestreets.org

MULTI-MODAL SOLUTIONS

Multi-modal solutions provide safe, practical access to streets for all: vehicles, pedestrians, bicycles, freight, and transit. Because multi-modal solutions require that transportation facilities connect to places that can be reached by walking, bicycling, driving, or taking transit, multi-modal solutions require both land development and transportation elements to be planned and designed together. Multi-modal solutions are often accomplished through the larger transportation system or network which provides the full range of transportation options.

LIVABILITY

Livability is the end goal of CSS and includes all the tools of CSS. According to the US Department of Transportation (USDOT), livability is about tying the quality and location of transportation facilities to broader opportunities such as access to good jobs, affordable housing, quality schools, and safe streets. This includes addressing safety and capacity issues on all roads through better planning and design, maximizing and expanding new technologies such as Intelligent Transportation Systems (ITS), using Travel Demand Management approaches to system planning and operations, and other efficient and community-sensitive ways of moving people and goods. To further explain Livability, USDOT developed the following Guiding Principles:

- *Provide more transportation choices.* Develop safe, reliable and economical transportation choices to decrease household transportation costs, reduce our nations' dependence on foreign oil, improve air quality, reduce greenhouse gas emissions and promote public health.
- *Promote equitable, affordable housing.* Expand location- and energy-efficient housing choices for people of all ages, incomes, races and ethnicities to increase mobility and lower the combined cost of housing and transportation.



Multi-modal solutions require both land development and transportation elements to be planned and designed together.

- **Enhance economic competitiveness.** Improve economic competitiveness through reliable and timely access to employment centers, educational opportunities, services and other basic needs by workers as well as expanded business access to markets.
- **Support existing communities.** Target federal funding toward existing communities - through such strategies as transit oriented, mixed-use development and land recycling - to increase community revitalization, improve the efficiency of public works investments, and safeguard rural landscapes.
- **Coordinate policies and leverage investment.** Align federal policies and funding to remove barriers to collaboration, leverage funding and increase the accountability and effectiveness of all levels of government to plan for future growth, including making smart energy choices such as locally generated renewable energy.
- **Value communities and neighborhoods.** Enhance the unique characteristics of all communities by investing in healthy, safe and walkable neighborhoods - rural, urban or suburban.

SUSTAINABLE COMMUNITIES

(Source: <http://www.sustainablecommunities.gov>)



The federal partnership of USDOT, HUD, and EPA adopted six principles of livability to guide overall programs and funding streams.

TRANSPORTATION/LAND USE CYCLE

(Source: PennDOT Smart Transportation Training Presentation for District Staff, 2008)



A historic village, surrounded by farmland is served by a 2-lane rural roadway.



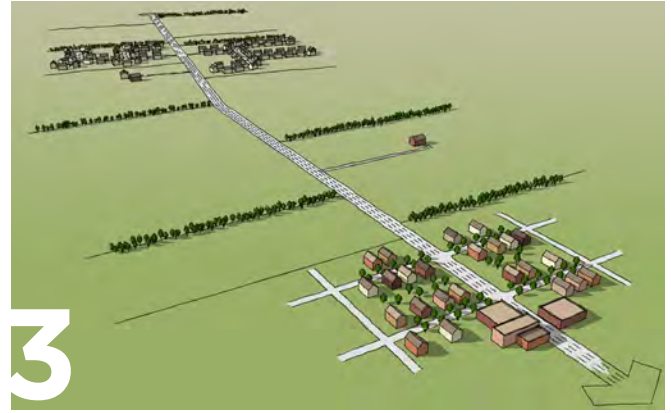
After the road is widened, land values increase. Several property owners now request a rezoning to commercial uses. They argue there is a need for stores and offices closer to the new subdivisions, and that the land is now worth too much to be used for agriculture. Their request is approved.



These conditions are requiring the DOT and partner agencies to think outside the box, for solutions that go beyond widening-solutions that are multi-modal and integrate land use planning.



A few landowners go to the municipality and request a rezoning. The requests are approved and the landowners sell their land to developers, who build new homes.



The commutes between the village and the new subdivisions soon lead to a high level of congestion on the state roadway. FDOT widens the road to accommodate this new traffic.



Now the level of congestion has increased further, and FDOT must widen the road again! Notice how the 6-lane arterial has changed the "small-town" character of the historic village.



Many of our state arterials are in this stage where the last remaining parcels have been developed, and traffic congestion remains an issue. The roadway is over-capacity but cannot be widened because of physical, financial, or environmental realities. In the meantime, growth is still desired by communities searching for new tax base.



There is an ability to incrementally add new network but we must look beyond the right-of-way to achieve this solution, as we need partnerships with landowners, developers, municipal leaders, and others. Land use should also be part of the multi-modal transportation solution.



The new network has allowed this community to accommodate new growth but with a different development pattern. This more compact mixture of uses will reduce trip lengths and total number of trips, and would allow for pedestrian, bicycling, and transit to become viable alternatives. Now this community is not reliant on a single state facility and a single mode of travel.

FITTING INTO THE FDOT PROJECT DEVELOPMENT PROCESS

The Planning process is the first decision-making step in the project development process. As shown on the diagram below, studies that go through multi-modal corridor planning come from a variety of sources, including problems identified in Long Range Transportation Plans, problems identified from FDOT operations systems such as pavement and bridge maintenance systems, and other sources (e.g. identified by elected officials). Planning is the process used

PLANNING WITHIN THE FDOT PROJECT DEVELOPMENT PROCESS



to define the problem, purpose and need, modes to be served, evaluation criteria to be used, and the range of alternatives to be compared. It is important to understand what the planning process should entail. First and foremost, it can not and should not have a pre-determined outcome in terms of the solution. This process should be tailored to the complexity of the problem to be solved and the level of information and input needed from stakeholders in order to develop potential solutions to the problem.

A planning study should provide the necessary information to program the next phase of any transportation project it is recommending. This information includes the proposed project's:

- Order-of-magnitude costs
- Feasible implementation schedule
- Enough project information to scope out the succeeding phase

There are many potential outcomes of planning.

For multi-modal planning studies, the typical outcomes include transportation strategies, land use strategies, or a combination of the two. Transportation strategies that are called for by planning studies can take the form of capital projects, operational improvements, and maintenance improvements for various modes (roadway, transit, pedestrian and bicycling, etc.). Sometimes, planning studies can call for additional, more detailed analyses and planning efforts on a smaller focus area or a corridor.

At its conclusion, a planning study should provide the necessary information to program the next phase of any transportation projects (both capital and non-capital projects) that are being recommended. This information includes the order-of-magnitude costs, an idea of feasible implementation schedule, and enough project information to scope out the succeeding phase.

The next phase after planning is determined by the level of further technical engineering and environmental analyses necessary to make a decision to proceed with a selected alternative or strategy. For instance, an intersection improvement alternative which may involve minor geometric changes or additions of sidewalks and crosswalks, and where no new right-of-way is anticipated, would not require detailed environmental impact analyses. For relatively simple strategies such as these, where no to minimal impact is expected and no obvious public controversy is anticipated, a lower level of engineering and technical analyses than the typical Project Development and Engineering (PD&E) level analyses might be sufficient. These strategies might go through some engineering analyses (the concept development component of PD&E) and could go right into design and implementation afterwards.

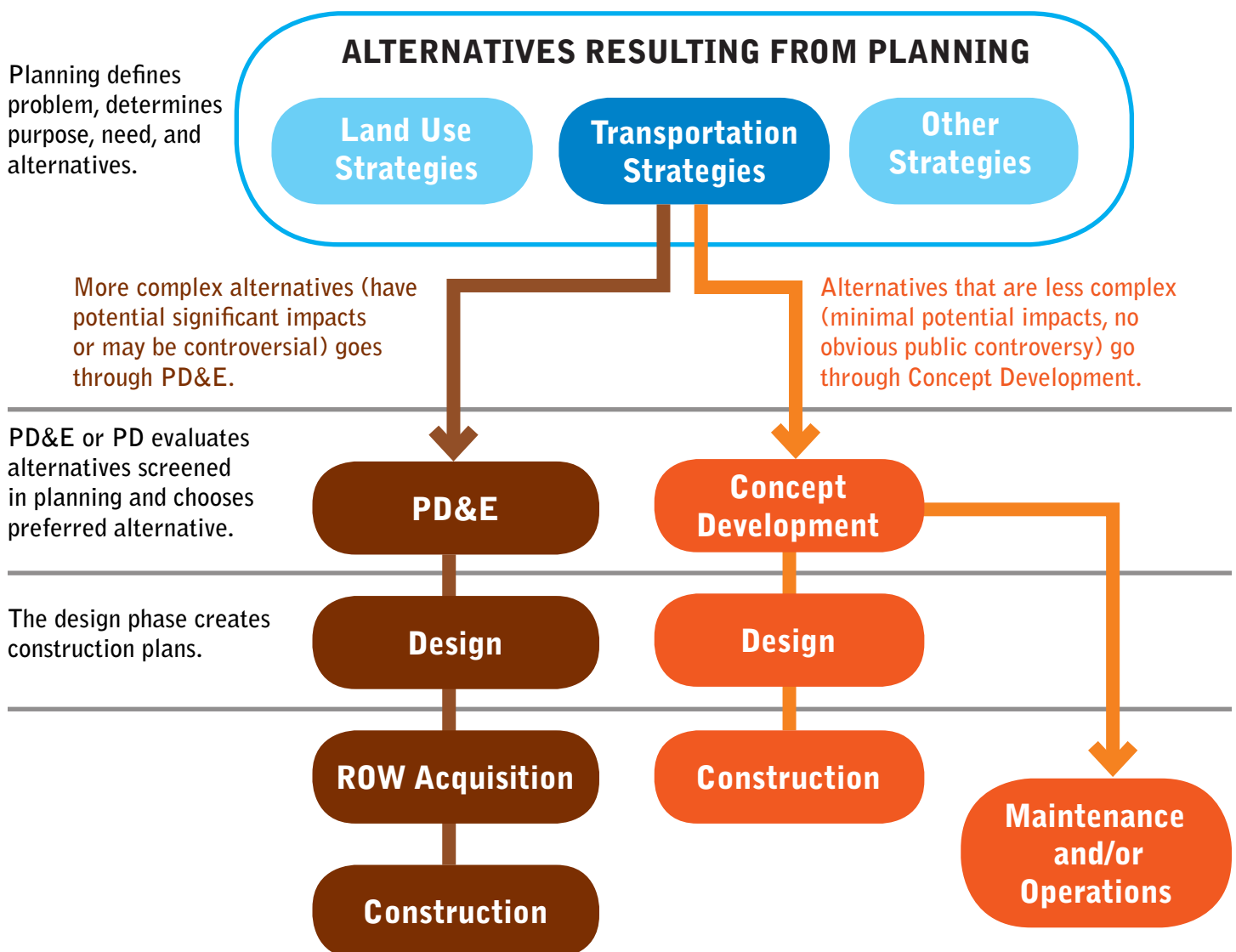
However, for more complex strategies where new right-of-way is anticipated, or more significant community impacts need to be evaluated, or if greater controversy is expected; a more traditional PD&E might be warranted. These projects would go through PD&E, and right-of-way acquisition, before being designed and constructed.

Because multi-modal planning studies routinely deal with lower impact pedestrian and bicycling improvements, there might also be strategies/alternatives that are identified in planning which can be implemented as part of routine and recurring FDOT or municipal projects (i.e. roadway maintenance projects, utility maintenance,

operational improvements, etc.). These alternatives would not require separate analyses and engineering and will be identified for implementation during the next programmed maintenance improvement. An example of this type of alternative would be a crosswalk or a bicycle lane re-striping that can be implemented as part of a roadway's routine pavement resurfacing.

Details of proposed transportation alternatives (scope, schedules, range of solutions, budget) are determined during the planning phase so that alternatives that are advanced to the next phase are screened of "fatal flaws".

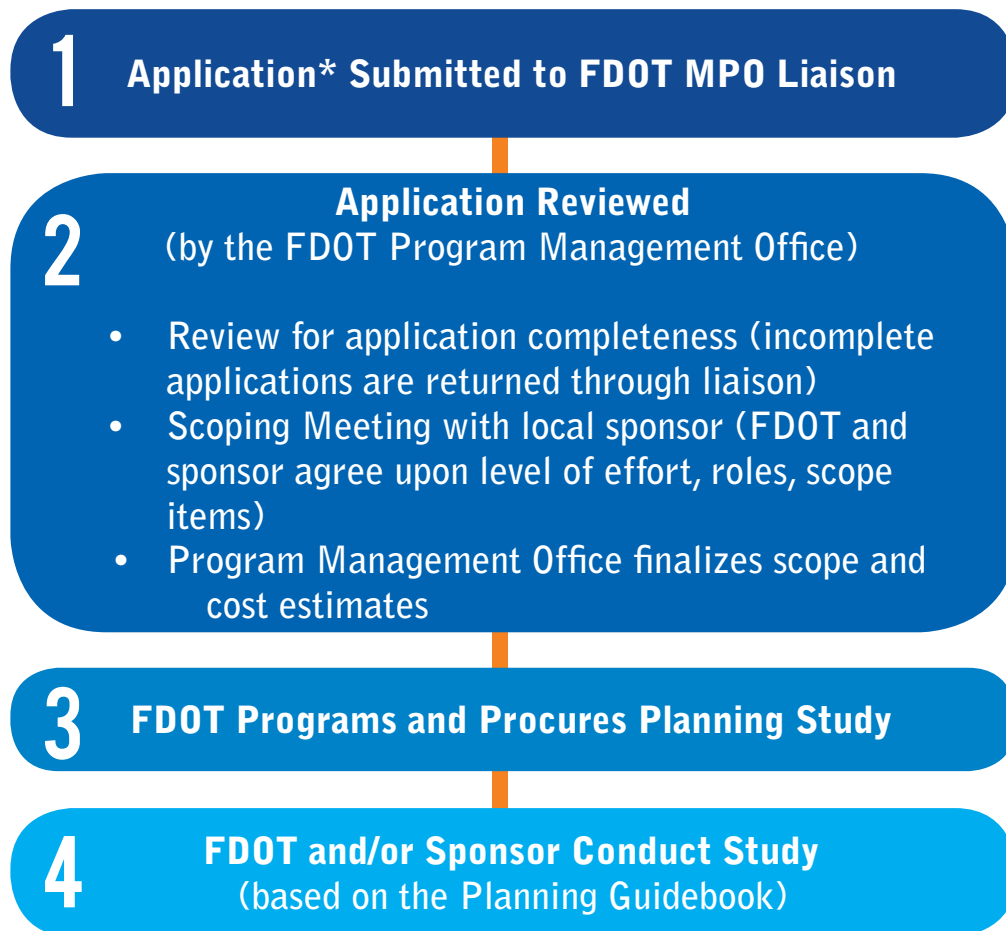
NEXT PHASE(S) AFTER PLANNING FOR TRANSPORTATION STRATEGIES



Alternatives that are advanced should be affordable (based on fiscal realities), supported by the community, and meet the purpose and need established by the planning study. These details will equip FDOT and other implementing agencies with necessary information to program projects. For FDOT, transportation capital projects are submitted by MPOs/TPOs through the Priority Projects Programming Process (4P).

The programming and prioritization process for FDOT funded planning studies aligns with the 4P process for capital projects and is outlined below. The process below encourages projects to be submitted through the MPO/TPO and the FDOT MPO liaison.

PROGRAMMING PROCESS FOR PLANNING STUDIES



* A copy of the current application form for planning studies is included in the appendix.

** The FDOT 4P Process is an internal programming process for FDOT funded studies and projects. Project sponsors should contact their MPO FDOT liaison for more information about the process.

The Project Delivery process is initiated in response to a problem identified in the transportation system. It covers a range of activities extending from problem identification and assessment to identification of the range of potential solutions that could solve the problem. The development of a range of solutions to address problems often involves input from transportation planners, community leaders, citizens, environmental specialists, landscape architects, natural resource agencies, local public works officials, permitting agencies, design engineers, financial managers, and agency executives. Solutions might target a single mode of transportation, or address the range of users including pedestrians, bicyclists, transit operators, automobile drivers, and freight operators moving freight and goods. It is important to engage the right team of people on the project from the beginning.

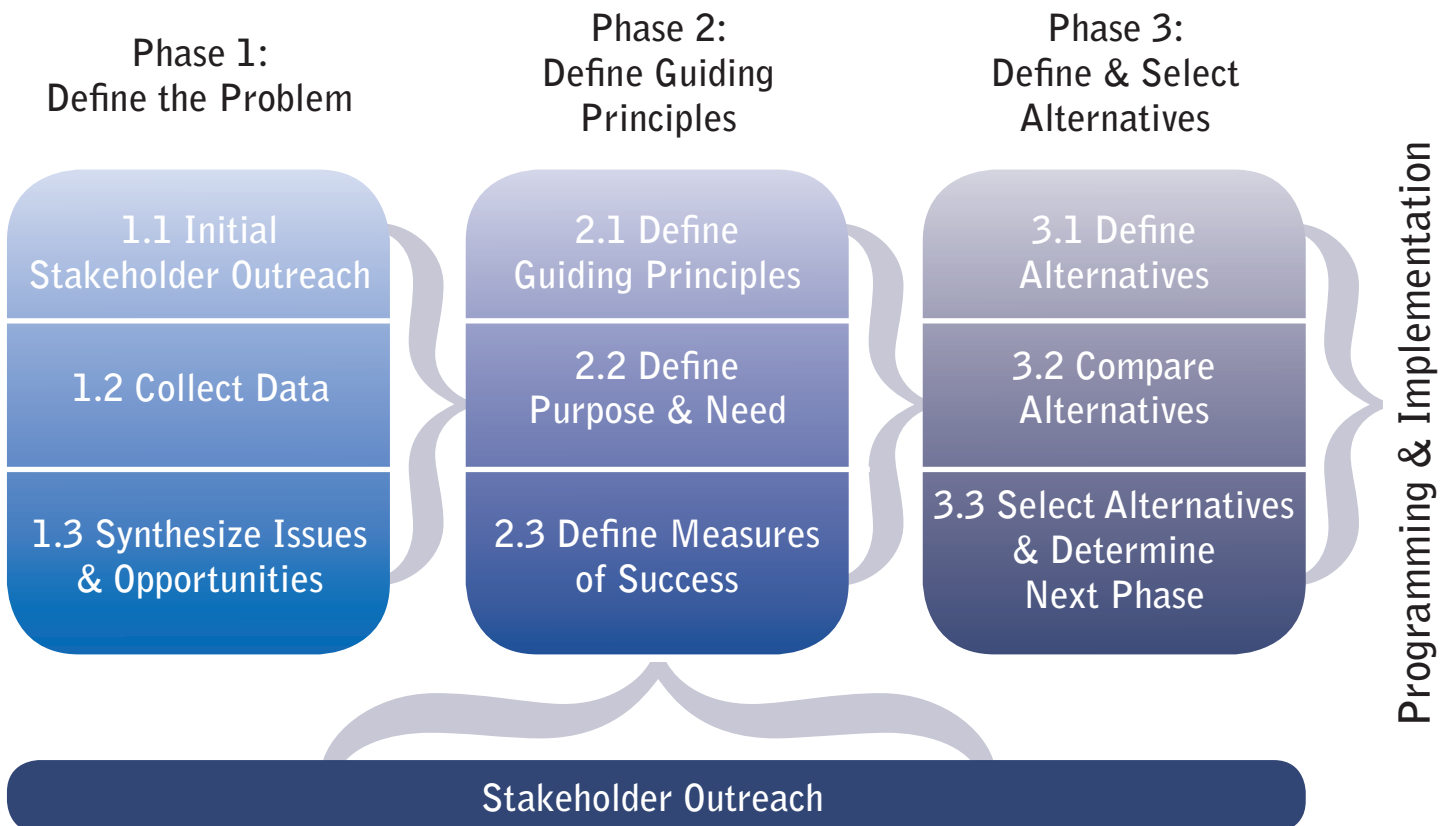
The sequence of decisions made through the project delivery process progressively targets solutions and, ultimately, leads to a project that addresses the identified problem. There should be ample opportunities for public participation throughout the process. Transportation decision-making is complex and can be influenced by legislative mandates, environmental regulations, financial limitations, agency programmatic commitments, and partnering opportunities. Decision-makers and reviewing agencies, when consulted early and often throughout the project delivery process, can ensure that all participants understand the potential impact these factors can have on project implementation.

This chapter outlines the first phase of this process, the Planning Process. This process is designed to clearly define the transportation problem, goals and objectives, and to use this information to develop and evaluate a range of potential solutions that address the goals and objectives. Planning studies may differ in complexity and where appropriate, the process describes the different approaches for simple, moderate, or complex studies.

THE PLANNING PROCESS

The planning steps are grouped into the following three major phases: (1) Define the Problem, (2) Define the Guiding Principles, and (3) Define and Select Alternatives. The steps within each of these phases can overlap or may even occur simultaneously, however the project phases should be followed sequentially.

It is important to note that although the planning process is presented as discrete steps, the context of the problem (political realities, physical constraints, financial and resource constraints) might require some steps to be expanded or truncated to address the task at hand. The user must exercise good professional judgment to use the appropriate level of effort in order to achieve the intent of each planning step within the contextual realities of the problem.



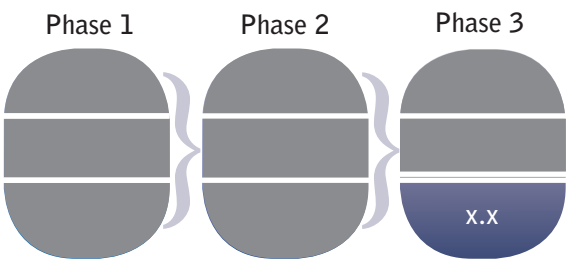
STEPS FOR MULTI-MODAL PLANNING STUDIES

How To Use This Section

The following pages describe examples of the three scales of planning studies. The steps outlined in this section will be described throughout the discussion using a simple problem and a moderate/complex problem. The moderate and complex problems have similar methods and are combined in most steps. It is noted in the text where moderate and complex differ. The examples show the most typical issues and questions that arise during planning studies and how the guidance can be applied. The steps are not intended to be all-inclusive descriptions, but rather to give a sense of level of detail and information needed at different scales.

TOOLS DISCUSSED IN EACH STEP

These diagrams indicate where each step (shown in highlighted box) is with respect to the entire planning process.



Boxes with these headings and outlines illustrate how the planning step can be applied to the example simple or moderate problem. Practice exercise sheets for applying the planning steps on the moderate problem example are included in Appendix F.

SIMPLE PROBLEM



MODERATE PROBLEM



Boxes with this heading and outline refer to community engagement tools that can be used throughout the planning process.

COMMUNITY ENGAGEMENT TOOL

Stop signs throughout the Guidebook introduce a list of evaluation questions that need to be answered before moving to the next planning step.



STOP HERE! Proceed to the next step only if you can answer yes to the following questions.

SCALE OF PLANNING STUDIES

The level of effort put into planning studies should depend on the scale of the planning problem at hand. Although the problem might not be fully vetted, the entity leading the study will have some information to be able to categorize the planning study. A planning study may be simple, moderate, or complex.

The level of complexity of a project can be influenced by issues such as the number of stakeholders that should be engage, the potential for conflict amongst stakeholders, number and diversity of alternatives that should be explored, level of engineering needed to understand the feasibility of alternatives, and overall magnitude of the problem. It should be noted that problems may look like one level of complexity at the beginning, but another level once more information is known. These categories are meant as a general guideline to provide information on potential costs, resource needs, and coordination efforts for each study. In general, the scale of a planning study depends on the various factors outlined in the table below.

STUDY TYPES AND THEIR TYPICAL CHARACTERISTICS

	Nature of Problem	Study Area Size	Stakeholders Involved/Impacted
SIMPLE	Recognized problem by stakeholders	An intersection Corridor along one to two city blocks	Immediate property owners, local jurisdiction, FDOT
MODERATE	Recognized problem by some stakeholders Solution is not fully vetted	Corridor less than 5 miles Area less than 30 acres (4 or 5 city blocks)	Multiple stakeholders
COMPLEX	Nature of problem is not known or clearly defined by stakeholders	Corridor more than 5 miles Area more than 30 acres (4 or 5 city blocks)	Multiple stakeholders

* Does not include higher level engineering work (detailed modelling, preliminary engineering, detailed environmental analysis, etc.)

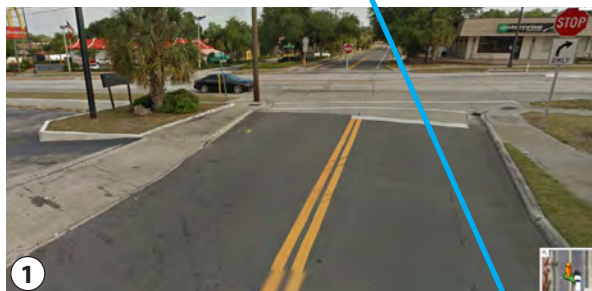
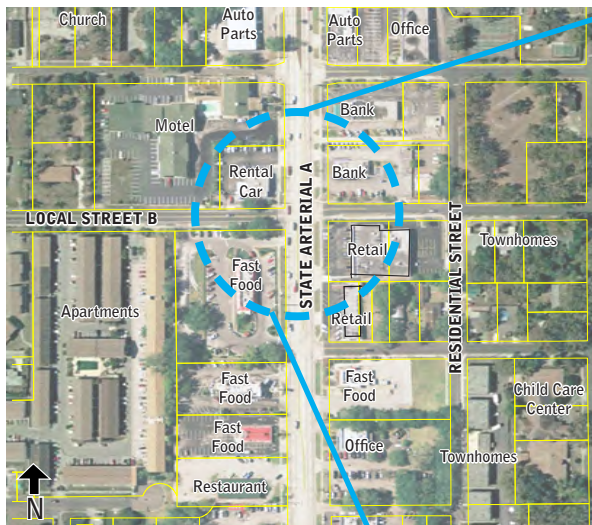
Regional Significance	Funding for Potential Solution(s)	Rules of Thumb: Average Cost of Planning Studies*	Potential Outcome of Planning
Identified in FDOT Maintenance Program Identified in LRTP as a need	Annual programmed funds No special funding request needed	Less than \$50,000	Solution may align with programmed routine maintenance
May be identified in LRTP as a need	None available, funding dependent on solution identified	\$50,000 to \$300,000	Solutions may range from short-term to long-term strategies Some strategies may go directly to design; some may go through PD&E; others may align with programmed maintenance projects
Not clearly identified in LRTP as a need; purpose and need have not been vetted	None available, funding dependent on solution identified	Greater than \$300,000	Solutions may range from short-term to long-term strategies Some strategies may go directly to design; some may go through PD&E; others may align with programmed maintenance projects

BACKGROUND OF EXAMPLE PROBLEMS

(to be used throughout guidebook)

SIMPLE PROBLEM

An intersection of a state arterial A (four-lane state arterial) and local street B (two-lane local street) has been identified as a problem intersection for multi-modal traffic by the City. The state arterial is programmed for routine maintenance. The City wants to explore possibilities of improving safety and pedestrian access at this intersection.



MODERATE PROBLEM

A two-mile regional arterial corridor (state arterial A) located about 10 miles from the city's downtown has been identified as a potential redevelopment corridor by the City. The DOT wants to improve multi-modal mobility along this five-lane roadway and has partnered with the City to develop a multi-modal corridor plan.

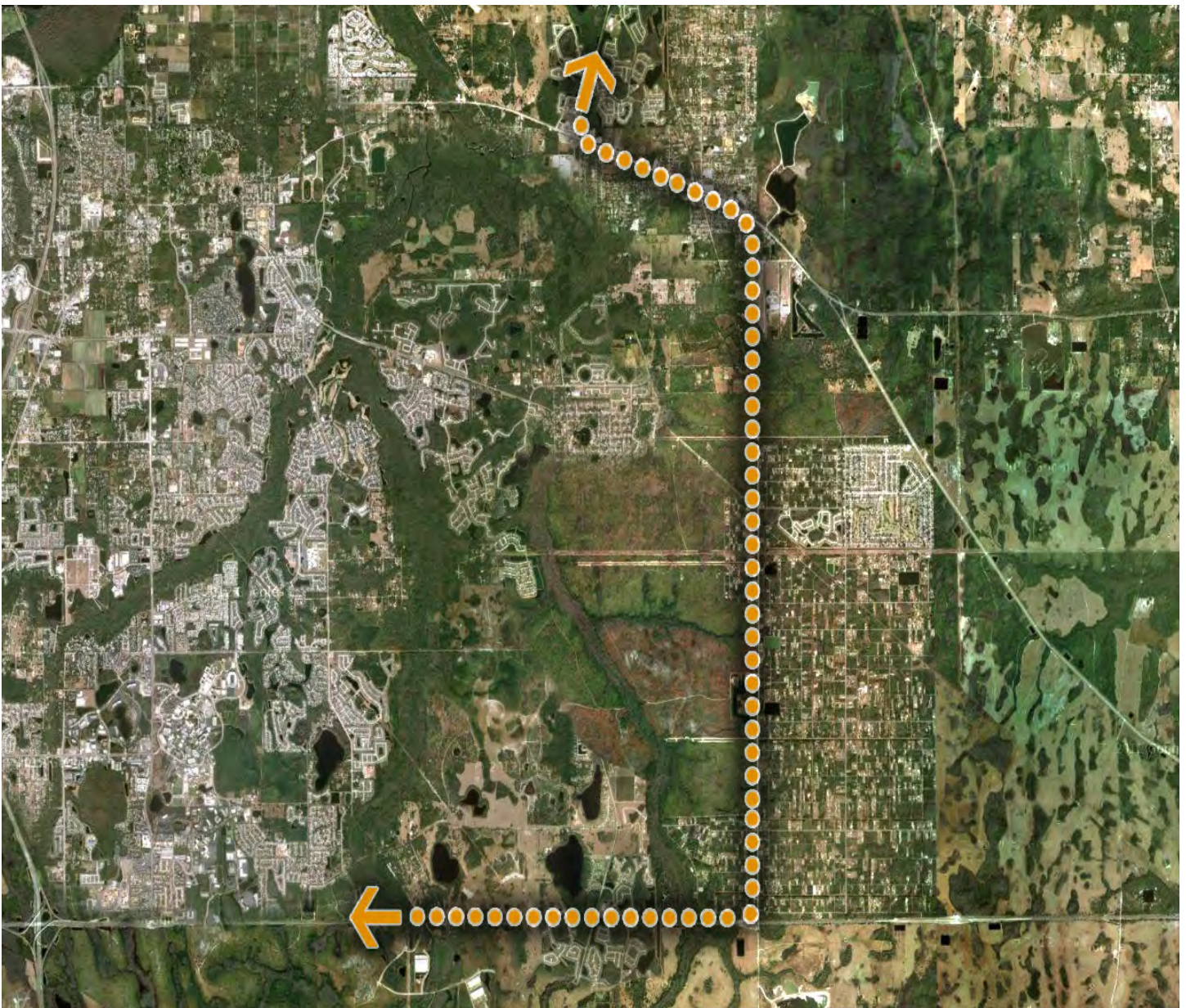


BACKGROUND OF EXAMPLE PROBLEMS (CONT.)

(to be used throughout guidebook)

COMPLEX PROBLEM

A new 10-mile regional arterial corridor is being advocated by a state official on the eastern fringe of the City. The proposed corridor will connect an established small town center, through a suburban part of town, and some rural sections. The corridor parallels a regional commuter rail line that is currently planned and crosses a few county trails. The proposed roadway is not part of the region's long-range transportation plan and is not included in any of the local comprehensive plans.



PHASE 1: DEFINE THE PROBLEM

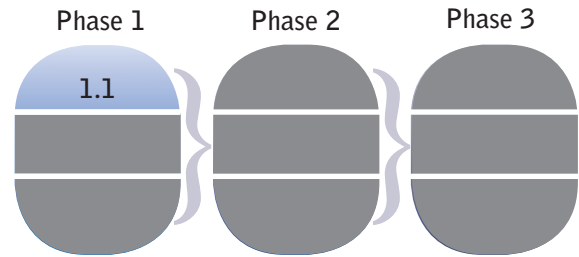
Intent: Establish a clear definition of the problem that is understood by stakeholders, through a thorough investigation of the study area's issues and opportunities that is supported by targeted data collection.

KEY STEPS:

Step 1.1 Initial Stakeholder Outreach



A successful multi-modal plan depends on strong stakeholder engagement throughout the study process, but especially during the beginning of the process. A thoughtful outreach effort not only results in effective planning because it incorporates meaningful and timely input from the actual users of a plan, it also allows the planning process to be a venue for community leaders to take ownership, and support the plan through implementation.



At this early stage, outreach is focused on soliciting information to better understand the problem, define the issues and opportunities related to this problem, and seek additional data to support the succeeding steps of the study. Some of the activities related to outreach at this phase include group meetings, one-on-one interviews, steering committees/advisory groups, and targeted meetings with partner agency staff.

SIMPLE PROBLEM (refer to page 28 for problem background)

POTENTIAL STAKEHOLDER OUTREACH ACTIVITIES

- Kick-off meeting with DOT and city staff
- Follow-up meeting to understand “safety issues” cited by the City
- Meeting to understand perspective of property owners/businesses around the intersection
- Coordination with municipal representatives on anticipated schedule and potential impacts

MODERATE PROBLEM (refer to page 29 for problem background)

POTENTIAL STAKEHOLDER OUTREACH ACTIVITIES

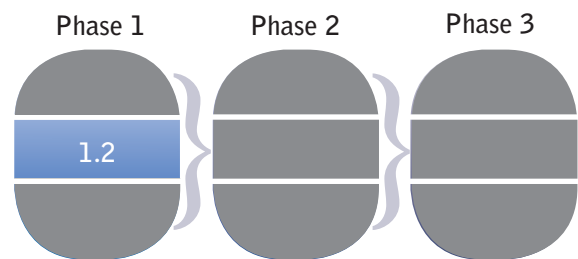
- Study team kick-off meeting and regular monthly meetings
- One-on-one stakeholder interviews or focus group discussions with corridor stakeholders, including representatives of local jurisdiction, area businesses and neighborhood groups, regional transportation planning organization, transit agency, community leaders, major employers and property owners, and special interest groups
- Steering committee/advisory group formation
- Community kick-off meeting (if problem has not been discussed/vetted with the larger community)

COMMUNITY ENGAGEMENT TOOL: STAKEHOLDER INTERVIEWS



Photo Credit: Dan Burden

One-on-one stakeholder interviews are an effective way to look at the study area and glean the opportunities and issues of the area from the eyes of the stakeholders. These meetings are intended to be short, relatively informal meetings, each focused on an individual stakeholder or stakeholder agency. Information received from stakeholder interviews are typically reported in a synthesized manner without attributing comments to each interviewee. This technique lends to more open conversations, where a study team can learn from stakeholders about their desires and needs more candidly than at public forums. The interviews also provide an early opportunity for the study team to learn the potential challenges and test early ideas.



Step 1.2 Collect Data

After or concurrent with the initial stakeholder outreach, a more targeted data collection effort can be conducted. This effort will be focused on providing answers to key questions that help define the existing and proposed land use, transportation, policy, and financial contexts of the planning problem. Data collection efforts should seek to answer questions similar to the ones listed below to provide a basis for defining the planning problem and proceeding to the next phase of developing the study's guiding principles.

The following pages list potential questions/ data needed for a planning study. This list does not represent the only questions a planning study can explore, nor does it represent a minimum required list of data and information needed. The decision on what data is needed, and to what level of detail/accuracy of analysis is needed should be based on the planning team's professional assessment of the planning context of the study.

POTENTIAL QUESTIONS TO ASK DURING DATA COLLECTION TO UNDERSTAND THE TRANSPORTATION CONTEXT

DATA NEEDED	POTENTIAL DATA SOURCE	
	SIMPLE	MODERATE + COMPLEX
What are the existing physical conditions? - What is the existing right-of-way (ROW)? - What is the existing roadway geometry? - What are the existing speed limits and intersection controls? - What is the condition of the roadway/sidewalk/transit facility?	- Field review - Existing survey - Web-based mapping, including aerials	- Field review - Existing survey - Local jurisdiction's Geographic Information System (GIS)-based parcel data - Existing aerials - Web-based mapping
How are people moving around in this area? - If there are challenges to mobility, what is the nature (local or regional, multi-modal)? - What is the average trip length? - Will travel patterns be similar in the future? Are there major land use or transportation changes that would cause travel patterns to shift?	Stakeholder interviews	- Stakeholder interviews - Transit data, if available - Existing sub-area model or regional model - O-D Survey, if necessary for complex projects - Project-specific sub-area model, if necessary for complex projects
What is traffic like currently and in the future? - What are the existing and projected traffic volumes? - What component of the traffic is freight traffic? - What are the congestion levels? - When and how long is the peak traffic? - What are the average travel times for typical trips? - What are the travel speed characteristics?	Existing FDOT traffic data	Project-specific traffic data, supplemented by other existing resources
What is the role of the roadway within the study area? - Does the corridor have a major role for a specific mode? (pedestrian/bicycle/freight/transit/auto) - What is the rest of the transportation network like?	- Stakeholder interviews - Existing FDOT traffic data - Field review - GIS-based mapping	- Stakeholder interviews - Existing FDOT traffic data - Field view - GIS-based mapping - Project-specific mapping
Are there any safety concerns? - Does the crash data indicate any specific problem areas or trends? - Does the crash data indicate a high occurrence of pedestrian/bicycle incidents?	- Stakeholder interviews - Existing FDOT crash database	- Stakeholder interviews - Field review - Existing FDOT crash database - Efficient Transportation Decision Making (ETDM) database

DATA NEEDED	POTENTIAL DATA SOURCE	
	SIMPLE	MODERATE + COMPLEX
What is transit mobility like currently and in the future? - What existing and proposed transit service serves the area? - What are the current and planned operating characteristics (ridership, frequency, headways)? - Where are the existing and proposed transit stop locations? - Are there existing transit stop amenities? - Are there signs that transit users' needs are not being met? (e.g. informal paths in grass)	- Field review - Existing survey - Web-based mapping	- Stakeholder interviews - Field view - Transit agency database and mapping - Transit use data (Automatic Vehicle Location (AVL) or Automatic Passenger Count (APC) data), if available and necessary for complex projects
What is pedestrian/bicycle traffic and infrastructure like currently and in the future? - What are the pedestrian and bicycling traffic volumes? - What is the pedestrian crossing activity at intersections? Near bus stops? - What do the existing and proposed sidewalk network look like? - Where are the existing and proposed bicycle lanes/multi-use trails? - Do sidewalks and crosswalks meet ADA standards? - Are there impediments in the sidewalks? - Is there a buffer between the sidewalk and the street? - Is shade/landscaping provided?	- Stakeholder interviews - Field review - Web-based mapping	- Stakeholder interviews - Field review - Transit agency database and mapping - Transit use data (AVL or APC data), if available and necessary for complex projects

Massive amount of data is no guarantee of effective planning. In fact, a common feature of controversial studies that have not led to implementable results is a massive amount of collected data which are not responsive to the problem's context. The approach to true multi-modal planning, lies not in amassing data, but rather in sophisticated probing and interpretation of the data gathered. What we really need to know are not long lists of raw data but answers to a structured set of probing questions that can help frame issues and opportunities.



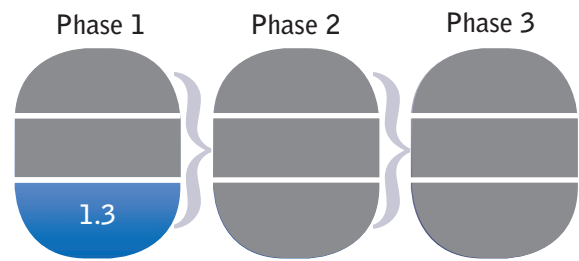
POTENTIAL QUESTIONS TO ASK DURING DATA COLLECTION TO UNDERSTAND THE LAND USE CONTEXT

DATA NEEDED	POTENTIAL DATA SOURCE	
	SIMPLE	MODERATE + COMPLEX
What type of area is being served by the corridor? - What is the existing and planned future land use (urban, suburban, rural; transitioning or stable) - Is there an economic development goal for the area? - What is the future vision for the area?	- Stakeholder interviews - Field review	- Stakeholder interviews - Field review - Local plans and policy documents - GIS-based mapping from local jurisdiction
Who are the predominant users of the corridor? - What are the existing and future traffic generators in and around the study area? - Are there uses generating local trips? Pedestrian/ bicycling trips? - What are the existing and projected population and employment? - Are there any special population groups?	- Stakeholder interviews - Field review - Web-based mapping	- Stakeholder interviews - Field review - Transit agency database and mapping - Transit use data (AVL or APC data), if available and necessary for complex projects - Census data - Comprehensive plans
Are there land uses that require special consideration? - Are there sensitive environmental uses or major environmental features in the area? - Is the area part of a historic district? - Are there major community venues (schools, parks, etc.) that generate more non-motorized traffic?	- Stakeholder interviews - Field review - ETDM database	- Stakeholder interviews - Field review - GIS-based mapping from local jurisdiction - Local plans and policy documents



POTENTIAL QUESTIONS TO ASK DURING DATA COLLECTION TO UNDERSTAND THE POLICY AND FINANCIAL CONTEXT

DATA NEEDED	POTENTIAL DATA SOURCE	
	SIMPLE	MODERATE + COMPLEX
What are the regional priorities related to this area? • What are the plans and programs in the MPO Long-range Transportation Plan (LRTP)? Transportation Improvement Program (TIP)? FDOT Unified Planning Work Program (UPWP)? Regional Planning Council's plans? • Are there any cross-jurisdictional plans?	• Stakeholder interviews • Regional plans and programs	• Stakeholder interviews • Regional plans and programs
What are the local goals and priorities related to this area? • Do the local plans and policies address this area (comprehensive plan, land development regulations, vision plans)? • Are there major public and private land use and infrastructure investments in the horizon? • Is the area part of a special use district/taxing district (CRA (Community Redevelopment Authority), BID (Business Improvement Districts), NID (Neighborhood Improvement District), etc.)? • What are the priorities of the local neighborhood, local business owners, community groups, etc.?	• Stakeholder interviews	• Stakeholder interviews • GIS-based mapping from local jurisdiction • Local plans and policy documents



Step 1.3 Synthesize Issues and Opportunities

The information collected will provide a better understanding of the multi-modal transportation challenges and begin to frame the potential alternatives to address these challenges. This information should be synthesized in ways that can be easily communicated to

and understood by community members and decision-makers. The planning team should utilize graphics, diagrams, maps, charts, and other visualization tools to present key findings in a concise, easy to relate format.

SIMPLE PROBLEM (refer to page 28 for problem background)

Activities/Products in Steps 1.2 and 1.3

- Aerial Map (can be from web) showing context and adjacent land uses
- Photographs showing crossing and sidewalk conditions
- Plan or diagram showing existing conditions (intersection geometry and traffic signal operations)
- Local future land use maps
- Traffic data from existing datasets
- Crash data from existing database
- Stakeholder interview notes or diagrams/graphics
- Summary of issues and opportunities to consider (in narrative and graphical form)

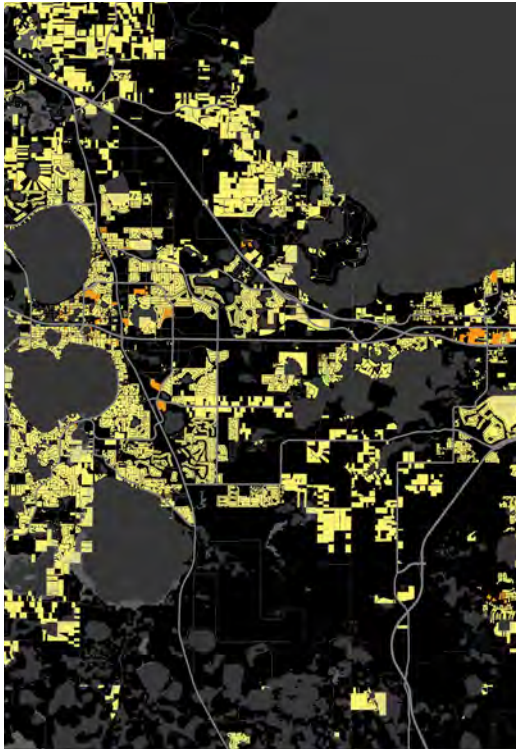
MODERATE PROBLEM (refer to page 29 for problem background)

Activities/Products in Steps 1.2 and 1.3

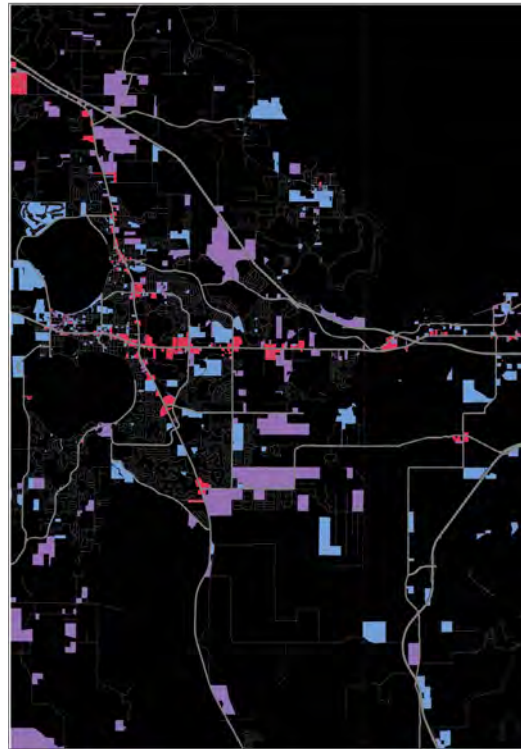
- Study area base maps and context maps
- Maps and diagrams showing various aspects of existing and proposed conditions of the study area: land uses, multi-modal transportation network, environmental features, development pattern, etc.
- Maps, diagrams, charts illustrating the characteristics of multi-modal travel patterns and traffic characteristics
- Summary of issues and opportunities to consider (in narrative and graphical form)

EXAMPLE OF MAPPING TO ILLUSTRATE EXISTING LAND USE CHARACTERISTICS

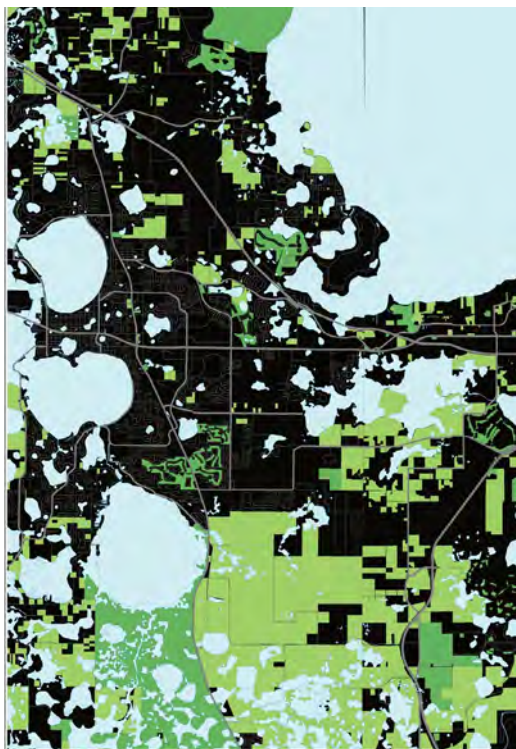
(Source: FDOT SR 50 Multi-Modal Corridor Study)



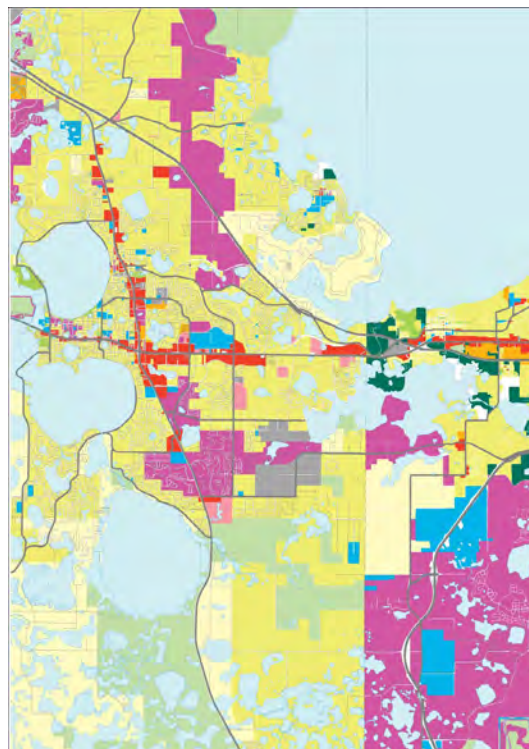
Residential Uses



Commercial, Industrial, and Institutional Uses



Conservation and Open Areas



Future Land Use

EXAMPLE OF MAPPING TO ILLUSTRATE EXISTING AND PROPOSED ROADWAY NETWORK

(Source: FDOT SR 50 Multi-Modal Corridor Study)



Existing Roadway Network



Effective Roadway Network



Planned Roadway Network

EXAMPLE OF MAPPING TO ILLUSTRATE DEVELOPMENT CHANGES OVER TIME

(Source: FDOT SR 50 Multi-Modal Corridor Study)



1958

- Area dominated by citrus industry
- SR 50 serves small town and connects to the rest of the region



1995

- Citrus land becomes an attractive location for residential development
- Large master planned communities start to develop
- Commercial development intensifies



2004

- Master planned communities are established
- Large employment uses (e.g. hospital) are established
- Large-scale, single-use development becomes common

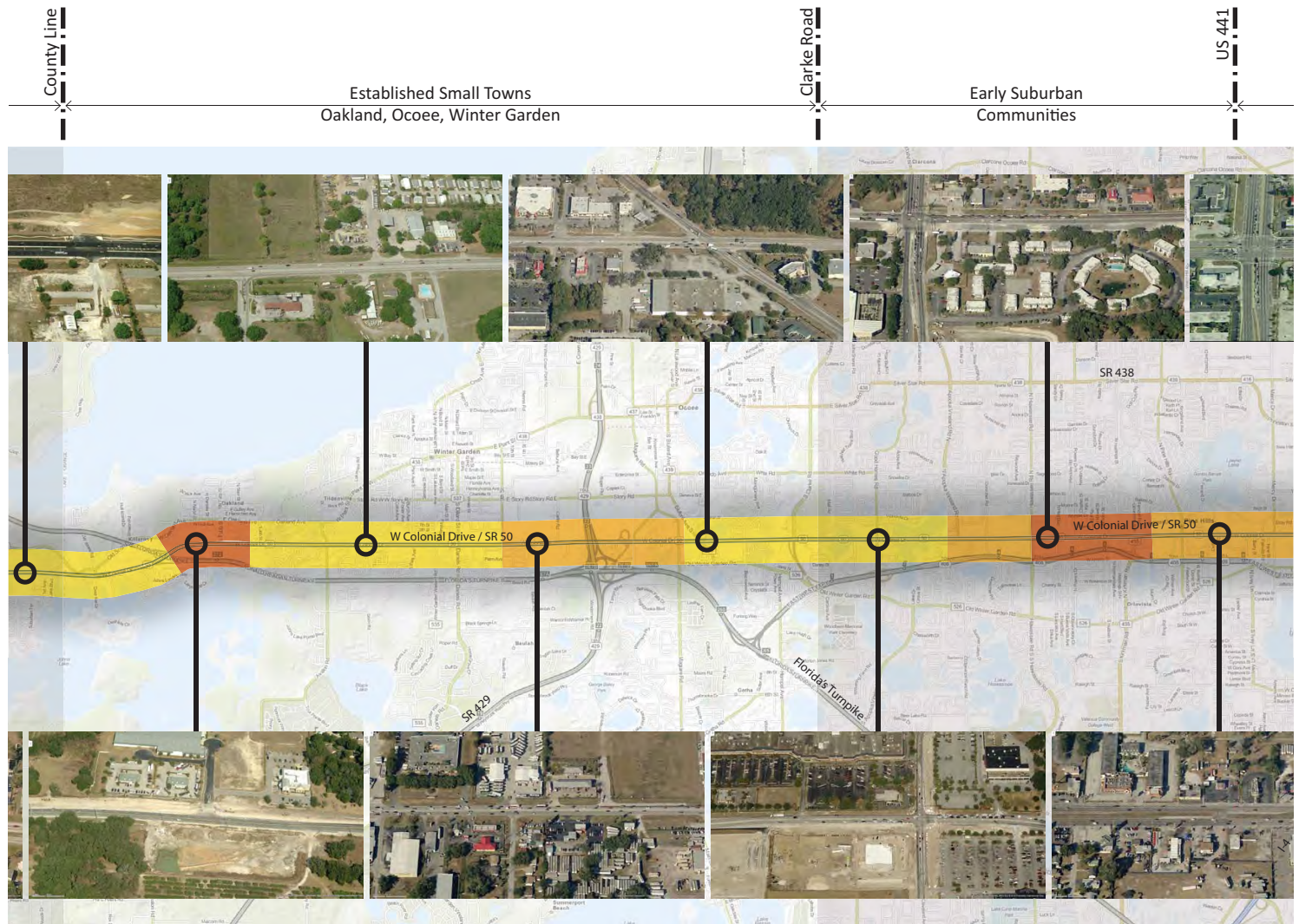


Today

- Roadway network is connected in a few places but lacks a fine grain system of local-serving streets
- Development halts temporarily
- Most remaining undeveloped land is located along south side of corridor

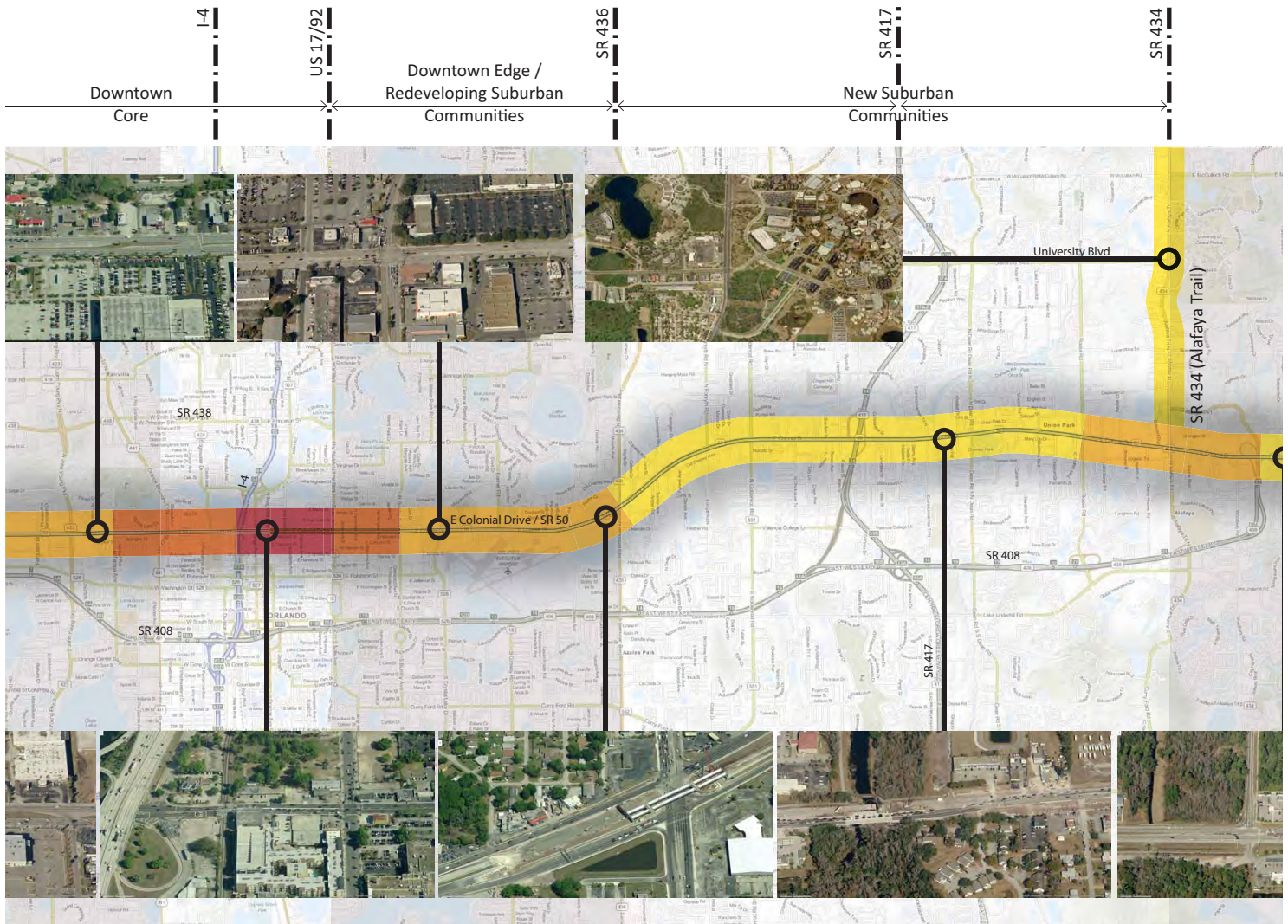
EXAMPLE OF MAPPING TO ILLUSTRATE EXISTING CORRIDOR CHARACTER

(Source: FDOT SR 50 Multi-Modal Corridor Study)



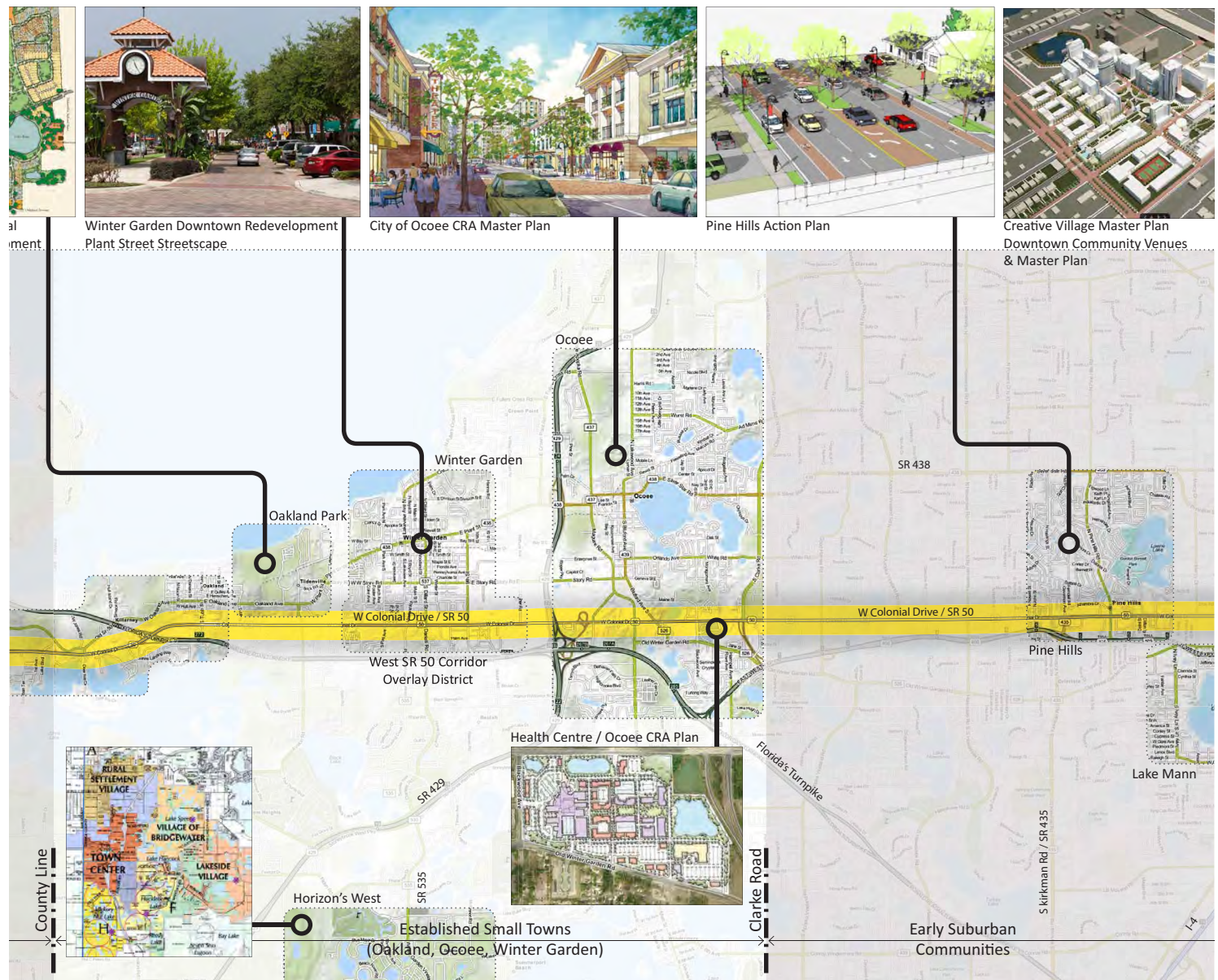
CORRIDOR CHARACTER

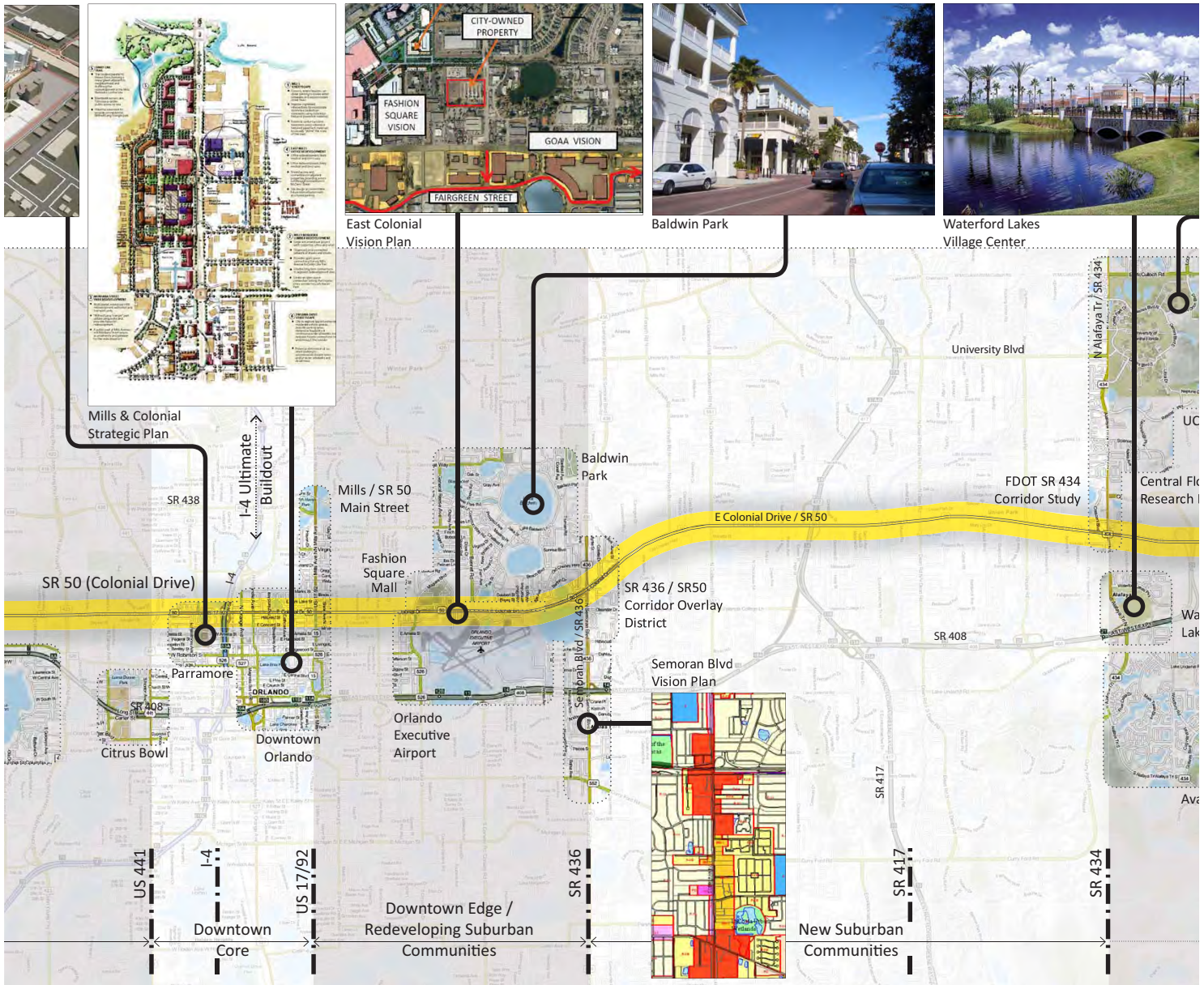
- Urban Core
- Traditional Grid Network
- Auto-Oriented Commercial Development
- Suburban Character / Sparse Network
- Rural Character / Undeveloped Areas



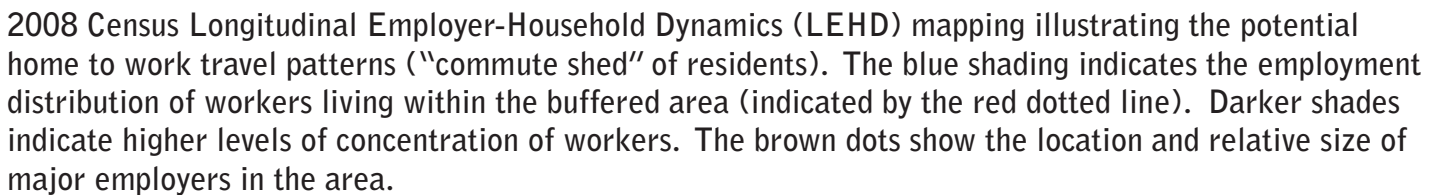
EXAMPLE OF MAPPING TO ILLUSTRATE COMMUNITY VISIONS

(Source: FDOT SR 50 Multi-Modal Corridor Study)





(Source: FDOT SR 50 Multi-Modal Corridor Study)



EXAMPLE OF MAPPING AND NARRATIVE TO ILLUSTRATE TRAVEL PATTERNS

(Source: FDOT SR 50 Multi-Modal Corridor Study)

Traffic Distribution Based on Bluetooth Sampling



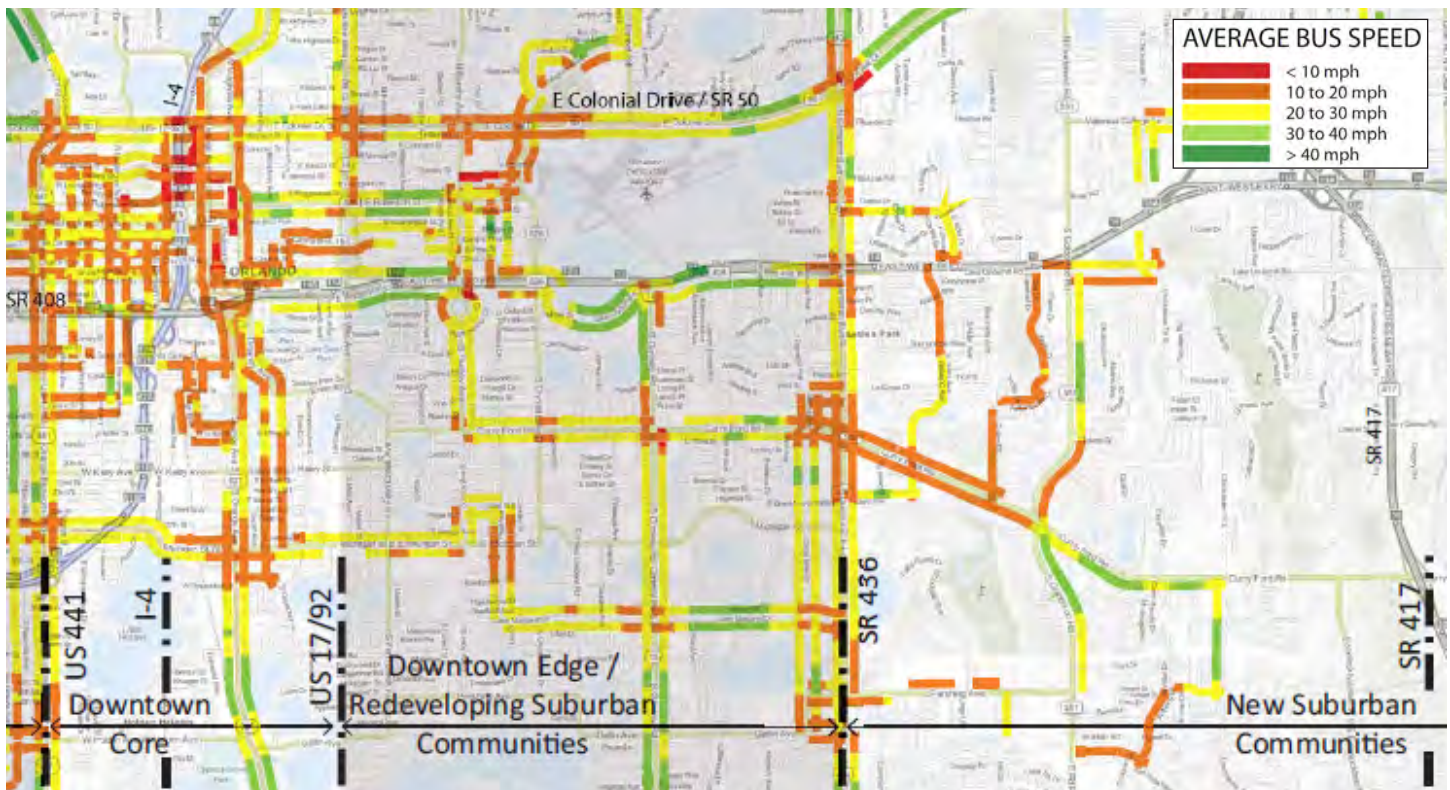
Only half of the traffic travelling eastbound during the morning peak period continues on past the study corridor. The other half goes to a destination or a cross street along the corridor.

Traffic Volumes Based on Tube Counts



The traffic volume doubles and the largest increase in traffic volume occurs on the eastern half of the corridor.

EXAMPLE OF MAPPING TO ILLUSTRATE TRANSIT OPERATIONS CHARACTERISTICS



SIMPLE PROBLEM (refer to page 28 for problem background)

Problem Definition

How can we improve the ability of pedestrians and bicyclists to more safely and comfortably cross the intersection of A and B streets? Can any of these potential improvements be done as part of the forthcoming resurfacing of the State Arterial A?

MODERATE PROBLEM (refer to page 29 for problem background)

Problem Definition

How can we provide improved multi-modal options for local trips (trips that are 3 miles or less in average length), the predominant trip type occurring along the State Arterial A corridor? How can we better support economic development goals of the community and enhance existing residential neighborhoods through targeted transportation investments?



STOP

STOP HERE! Proceed to the next phase only if you have accomplished the intent of this phase. If you can answer the following questions, you have successfully completed Phase 1: Define the Problem.

- Is there a clear understanding of the problem?
- How often, and for how long, does the problem occur?
- Are the stakeholders in agreement with what the problem is and what the objectives of the study are?
- What is the transportation problem? Is the problem a challenge related to mobility, safety, capacity, or facility condition? What modes are experiencing these problems?
- What are the major land use and transportation issues and opportunities that we should know about as we proceed with the study?
- How much money is available to solve this problem?

PHASE 2: DEFINE GUIDING PRINCIPLES

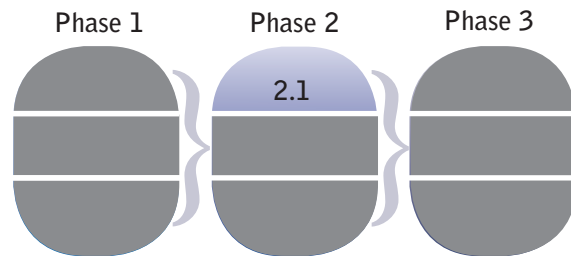
Intent: Establish a set of principles that is supported by the study's stakeholders and that will guide the development and evaluation of alternative solutions/strategies to address the problem defined in Phase 1.

KEY STEPS:

Step 2.1 Define Guiding Principles

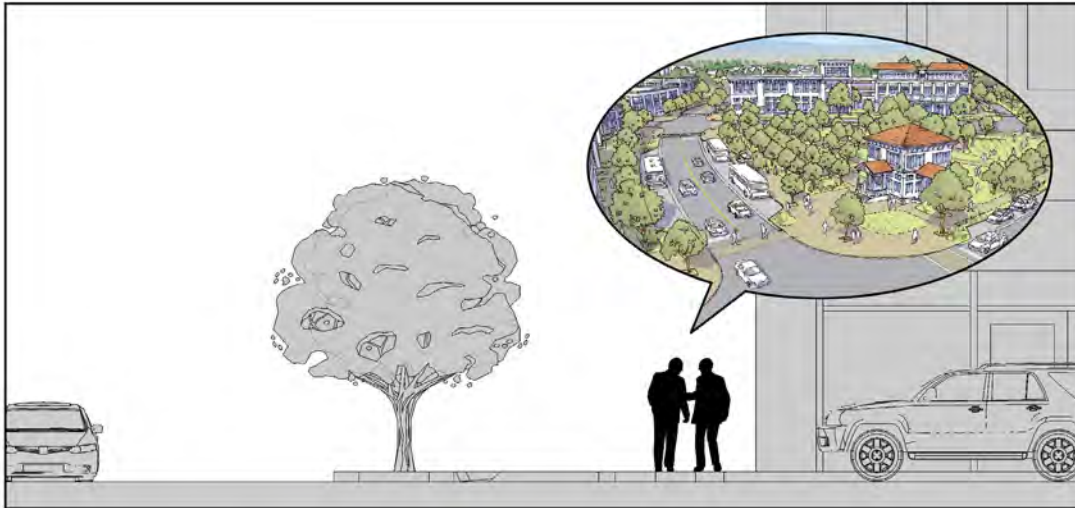
Based on the findings from the previous phase and continued input from the stakeholders, the study team can then develop the guiding principles of the study. Ideally, the guiding principles should be a brief list of succinct points that speak to what a community thinks is important as it relates to the multi-modal transportation vision and the associated land use goals of the study area. Principles can be visionary and focused on the future, but should be stated in plain, non-technical language and understood by community members. At a minimum, the principles should address:

1. What the **vision of the place** is: The vision may relate to the desired future land use pattern (i.e. urban, suburban, rural, small town, etc.) and scale and nature of future growth (e.g. remain small town, increase residential density, increase employment opportunities, etc.), or the role of the place in the region (e.g. employment center, residential enclave, neighborhood retail, regional shopping area, etc.). The vision of the place should be synthesized based on the regional and local vision and goals for the study area, which are those reviewed in Phase 1 and vetted with area stakeholders.
2. Who the **major users** of the facility are: Based on the vision of the place, coupled with the observed data, the study team can define who the major users of the facility are currently and in the future. These users may include pedestrians, bicyclists, transit users, freight traffic, motorists, etc., and should also include demographic groups from major land uses around the facility (elderly, school children, tourists, retailers, employees, minority groups, etc.). An understanding of the users can help determine what the role of a facility should be.

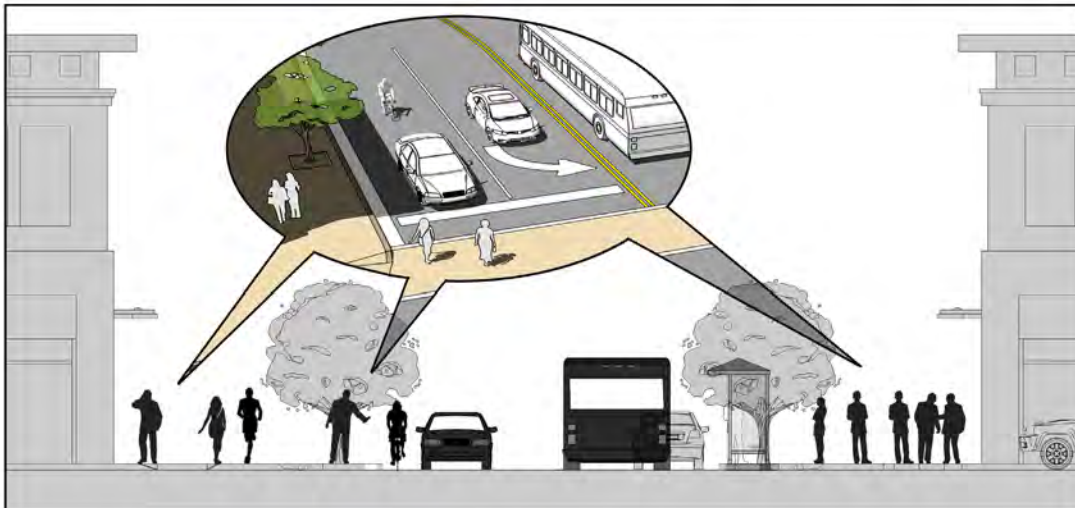


3. What the **desired role of the facility** is: The desired role of the facility will draw heavily from synthesized regional and local vision and goals for the study area and the transportation data which were reviewed in Phase 1 and vetted with stakeholders. This will also take into consideration who the users are, based on observations of existing and future transportation and land use conditions. A facility could function as a regional commuting facility with longer-distance trips or a local-serving roadway with mostly short-distance trips.

ESTABLISHING GUIDING PRINCIPLES



Vision of the Study Area



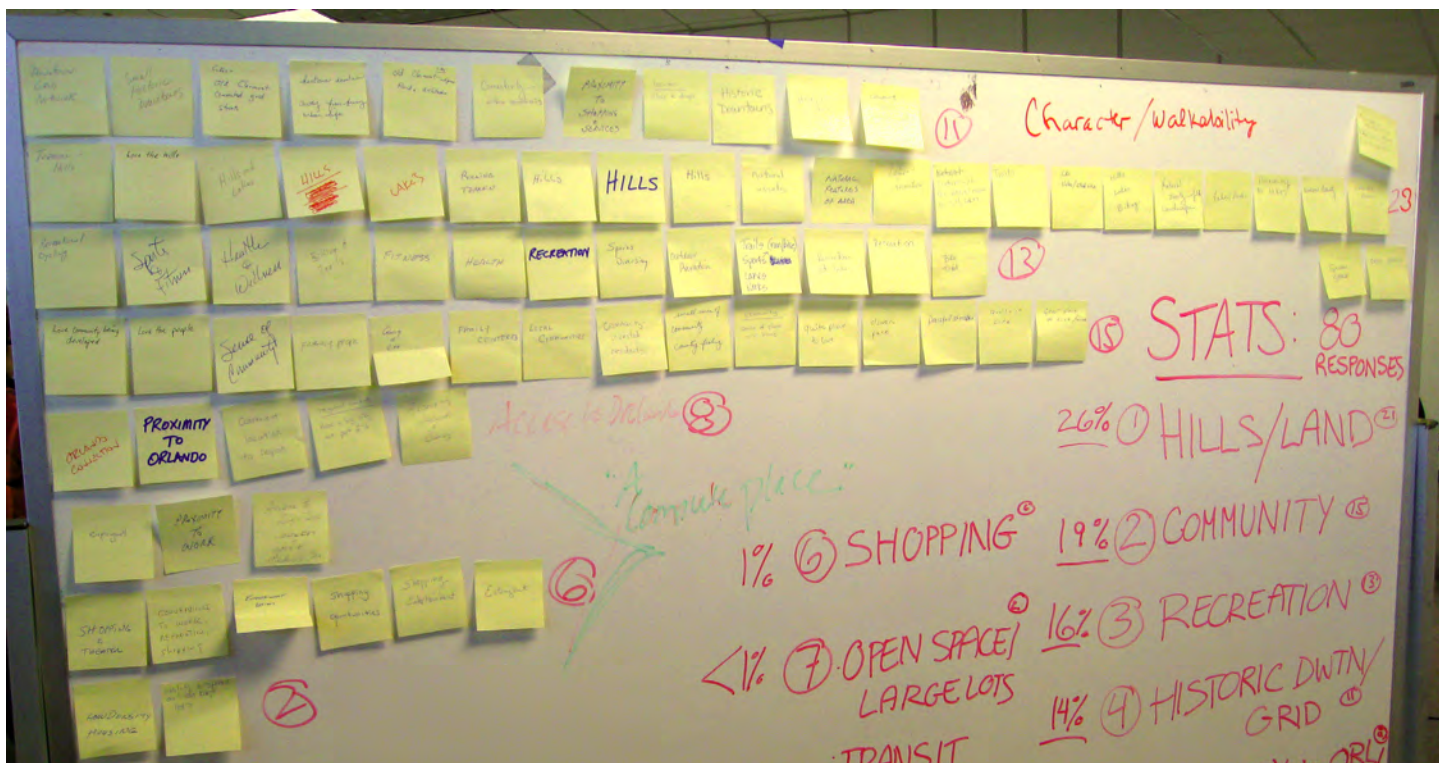
Major Users of the Facility



Desired Role of the Facility

Guiding principles should address (a) what the vision of the study area is, (b) who the major users are, and (c) what the desired role of the facility is.

ESTABLISHING A SHARED VISION



A “sticky note” voting board identifying the community’s perceived challenges and opportunities.

SIMPLE PROBLEM (refer to page 28 for problem background)

GUIDING PRINCIPLES

- Provide increased mobility and access to pedestrians and bicyclists crossing the intersection.
- Leverage the public investment (resurfacing along state arterial A) to help encourage private redevelopment.

MODERATE PROBLEM (refer to page 29 for problem background)

GUIDING PRINCIPLES

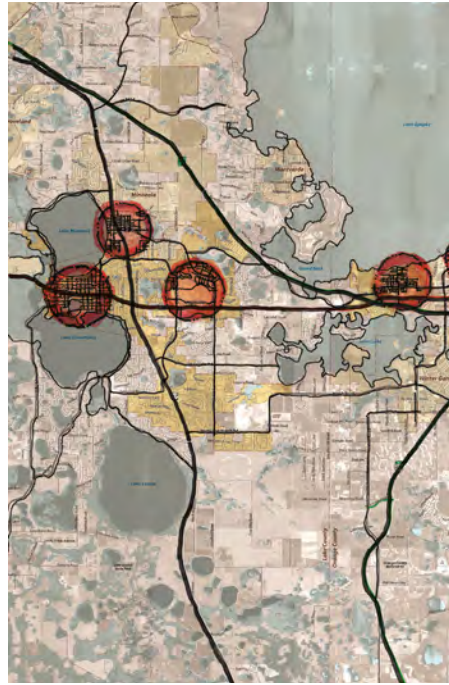
- Provide for local mobility to connect activity areas along the corridor.
- Accommodate regional traffic but not at the expense of improved multi-modal mobility and access to local destinations.
- Leverage local and state public investment to spur economic development.
- Preserve and enhance existing residential neighborhoods.

EXAMPLES OF CORRIDOR GUIDING PRINCIPLES

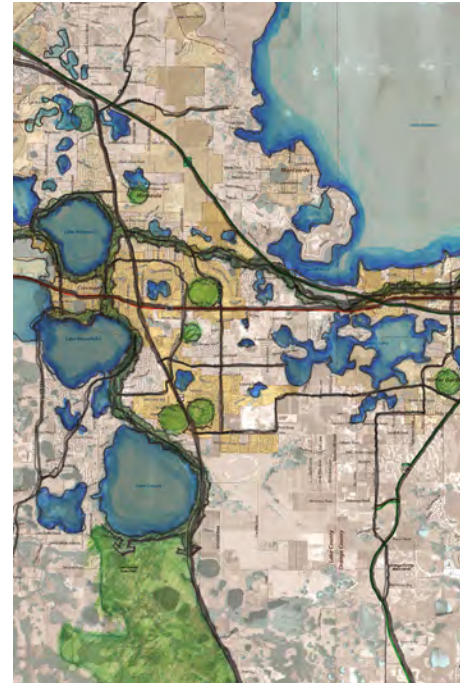
(Source: FDOT SR 50 Multi-Modal Corridor Study)



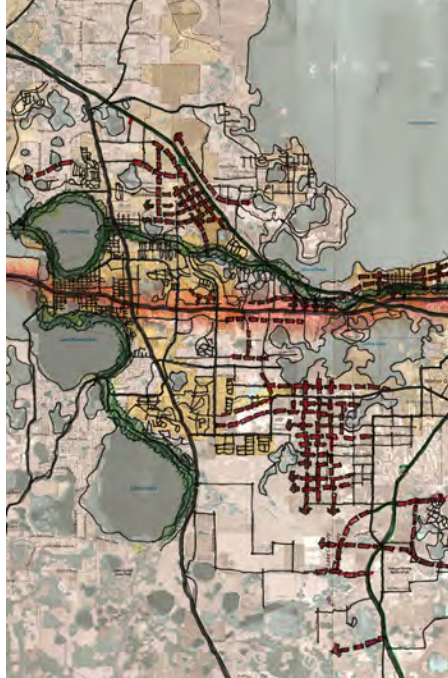
Preserve and Celebrate Landscape



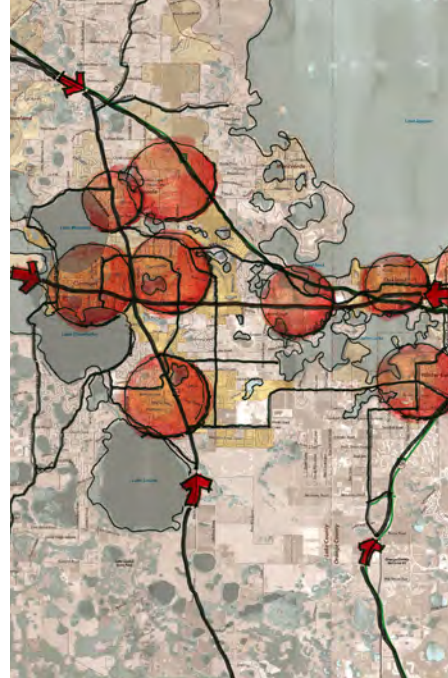
Preserve Historic Character



More Play



Enhance Connectivity

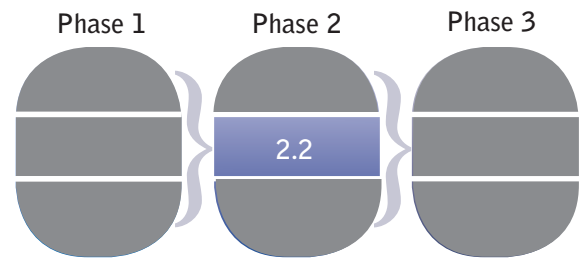


"Turn the Car Around"

Step 2.2 Define Purpose and Need

The next step in the process is the development of a clear “purpose and need” that will guide the succeeding steps of the study, which may include planning and designing new transportation facilities. This section will draw from understanding of the challenges in Phase 1 (Define the Problem) and the guiding principles to establish the rationale for the planning study (purpose) and the level of severity of the planning problem (need).

The purpose will be based on the defined problem and guided by the principles stated in the previous step. For instance, the problem could be the lack of mobility options between local destinations along a corridor. The purpose of the study would be to provide for additional mobility options, but within the parameters of the guiding principles (i.e. to support economic development goals, to enhance neighborhood livability, etc.).



It should be noted that the planning “purpose and need” statement will form the basis for the more detailed purpose and need section required by the National Environmental Policy Act (NEPA) process, if the planning study advances a strategy that would require NEPA approval. For roadway problems, FDOT uses the Project Development & Environment (PD&E) process to comply with NEPA. The needs statement should be supported by the multi-faceted data and findings of the previous phase, and should not be focused only on traffic and safety aspects of the problem.

SIMPLE PROBLEM (refer to page 28 for problem background)

Purpose statement: To provide better pedestrian and bicycling mobility and access at the intersection of street A and street B.

Needs statement: Better pedestrian mobility and access is important at the intersection as evidenced by the following data/observation:

- Large volumes of pedestrian attempting to cross the intersection during the morning and afternoon peak have been observed.
- Higher than average ridership levels have been observed at transit stops located along both sides of the state arterial A near the intersection.
- The property owner of the retail store on the southeast corner of the intersection is planning to redevelop his property to a higher density mixed-use development. He is concerned that access to his property is insufficient.
- The children from the neighborhood on the west side of the state arterial attend an elementary school on the east side of the state arterial.

MODERATE PROBLEM (refer to page 29 for problem background)

Purpose statement: To provide additional multi-modal mobility options that support economic development goals and enhance the existing residential neighborhoods.

Needs statement: Expanding mobility options is necessary because there is observed existing and potential future demand for transit, pedestrian, and bicycling travel in the area and appropriate pedestrian, bicycling, and transit accommodation is necessary to spur the right level of economic development. Highlights from the data collected in Phase 1 that support this observation include:

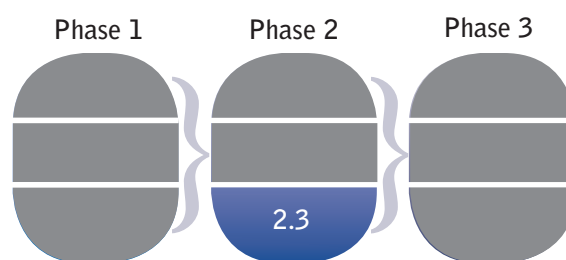
- More than 50% of observed trips during the peak periods are local, which begin and end along the corridor and have an average trip length of 2 miles or less. These trips can be accomplished by walking, bicycling, or transit.
- Transit ridership data show higher than average volumes of passengers boarding and alighting at 5 out of the 8 bus stops along the corridor.
- Crashes involving pedestrians and bicyclists are occurring around the major intersections and near transit stops.
- The corridor has been designated by the City as part of the priority economic development corridor and is part of the community redevelopment agency (CRA) district. The City has adopted land development regulations and zoning that call for mixed-uses, compact development at activity centers, and site design/lot layout that encourage multi-modal travel (reduced parking requirements, shared parking, etc.)
- The City is talking to a number of property owners near the intersection of local street B about redeveloping an existing retail center into a higher intensity mixed-use development.

Step 2.3 Define Measures of Success

The measures of success are the evaluation criteria that will be used to compare different solutions that will result from the planning study. These measures should be derived directly from the previous two steps- guiding principles, and the purpose and need. As such, these may include a broader set than conventional performance measures used in roadway projects. These measures should be:

Holistic and reflect community “values”

Traditionally, FDOT projects have used measures of success to compare the effectiveness of proposed alternative solutions. As conventional transportation solutions focused on roadway capacity and traffic flow,



traditional traffic engineering measures focused on automobile capacity (e.g., level-of-service, delay, queuing, travel speeds, vehicle miles traveled, costs per trip, etc.) have been used to gauge effectiveness. It is imperative to evaluate solutions beyond these conventional measures and include measures that are based on a community’s visions, priorities and values, which are reflected in the guiding principles and purpose and need of the study.

These measures would address performance of all transportation modes/users that were deemed important based on the previous steps, as well as other “values”, such as safety, economic development, community character, and environmental and cost impacts. A more holistic set of performance measures would not only better reflect the desires of the community, it also allows for solutions to gain support from multiple interests (including non-traditional decision-makers of transportation investments) and therefore, more likely to be implemented. This is especially true as traditional transportation funding streams based on the auto-capacity set of measures become increasingly limited and jurisdictions are made to compete for discretionary funding that have a broader set of goals and objectives (including economic development, livability, housing, environmental conservation, etc.)

Effective measures of success provide a balanced perspective of all users, while also providing a range of measures that focus on key objectives within modes. Balanced measures of success also account for community goals and how these goals fit into the larger transportation

network (i.e., local versus commuter oriented). Projects typically have a wide range of needs and objectives, so no individual measure of success should be used to determine the solution to a problem. For instance, a community may want to implement bike lanes on a FDOT arterial while minimally impacting traffic mobility. Measures such as bicycle level of service or pavement condition could be used to measure impacts to bicyclists, while the traditional vehicle level of service and volume to capacity ratio could still be considered for traffic mobility.

Understandable and Easy to Communicate

With competing interests, expertise, and community concerns over potential transportation projects, measures of success should communicate to all of those involved. The measures should be easy to calculate, be based on data from a convenient source, and be easily understood by the non-technical community. Despite the relative simplicity of the measures, they should produce a good deal of understanding with minimum calculations. For instance, measures that describe the pedestrian environment in an area can be as simple as determining the number of crosswalks per mile, the type of pedestrian

SIMPLE PROBLEM (refer to page 28 for problem background)

POTENTIAL MEASURES

GUIDING PRINCIPLE	MEASURE
Provide increased mobility and access to pedestrians and bicyclists crossing the intersection.	- Number of legs of intersection where pedestrians can safely cross - Number of potential pedestrian/vehicular conflict points - Signal time allocated to pedestrians - Number of new ADA-compliant curb cuts/intersections - Number of conflicts/obstruction along pedestrian path (utility poles, etc.)
Leverage the public investment (resurfacing along state arterial A) to help encourage private redevelopment.	- Number of direct sidewalk access points to property - Percentage of area retail businesses served by sidewalks along the front doors of developments - Percentage of area retail businesses served by bicycle lanes along the front doors of developments - Can project schedule of resurfacing work accommodate the level of new pedestrian/bicycling facilities?

signals provided, and the presence of ADA-compliant ramps. While it seems logical that having more data and conducting more analysis can produce beneficial results, a simpler and easier to understand set of evaluation criteria that is sensitive to the context may lead to better stakeholder buy-in and the ultimate success of the study.

Specific to the Study

Effective measures of success should be developed for specific studies and not just “copied and pasted” from previous studies with similar attributes. For example, while peak hour vehicle level of service is generally used for many traffic related roadway considerations, a study

exploring ways to improve pedestrian safety along and across a corridor may focus on the number and spacing of pedestrian crossings instead. Perhaps more relevant measures should be explored including sight distance and gaps at existing driveways that the multi-use path will intersect.

The tables on the previous and next pages provide examples of measures of success and how they can be calculated. Measures should be customized for specific study purpose and need. These measures are ONLY examples for consideration and do not reflect specific study outcomes or goals.

COMMUNITY ENGAGEMENT TOOL: TARGETED STAKEHOLDER WORKSHOPS



Interactive workshops are an effective tool that can be used during key milestones of the planning study and can vary in effort depending on the level of complexity of the study. At this second phase, a simple planning study might require a one to two-hour stakeholder group meeting to present the findings, confirm the study problem, and develop the study’s purpose and need and guiding principles. For a complex study, this task might be accomplished with a true interactive workshop participated in by community members. This workshop might combine some of the steps in Phase 3 (Define & Select Alternatives) and might require anywhere from half-day to multiple day of activities.

MODERATE PROBLEM (refer to page 29 for problem background)

POTENTIAL MEASURES

GUIDING PRINCIPLE	OBJECTIVES	MEASURE
Provide for local mobility to connect activity nodes along the corridor.	Increase mobility through walking and bicycling	- Percentage of streets with pedestrian/bicycling facilities - Percentage of walkable streets (streets with fronting uses)
	Increase ease of transit use	Proximity of transit stop to land uses served (Low/High)
	Provide efficient vehicular mobility	- Number of public street links between state and local roads - Overall street connectivity index
Accommodate regional traffic but not at the expense of improved multi-modal mobility and access to local destinations.	Reduce vehicular delay	- Intersection LOS - Travel time - Intersection queuing - System throughput (Area-wide E/W and N/S capacity)
	Maintain local access	Signal density
	Facilitate freight traffic along other regional facilities	Connections to interstate and arterial roadways within 3 miles of the corridor
Leverage local and state public investment to spur economic development.	Increase transit reach at activity nodes	- Number of employees reached within ¼ mile of improved transit stops - Number of population reached within ¼ mile of improved transit stops
	Increase pedestrian connections at activity nodes	Percentage of streets with new pedestrian facilities near activity nodes
Preserve and enhance existing residential neighborhoods.	Limit impact to existing residential neighborhoods	Number of impacted residences
	Increase multi-modal access to residential areas	Percentage of sidewalks/bicycle lanes in residential neighborhoods
	Connect neighborhoods to local community venues and activity centers	Number of direct sidewalks/bicycle lane connections between residential neighborhoods and community parks, schools, community centers, etc.

STOP

STOP HERE! Proceed to the next phase only if you have accomplished the intent of this phase. If you can answer yes to the following questions, you have successfully completed Phase 2: Define Guiding Principles.

- Do the guiding principles, purpose and needs statements capture the vision and goals of the community for the study area?
- Have you translated these principles and purpose and needs statements into evaluation measures that will be used for comparing and selecting the alternatives in Phase 3?
- Have you reached an agreement with stakeholders/decision makers on these evaluation measures?

PHASE 3: DEFINE & SELECT ALTERNATIVES

Intent: Develop alternative strategies, evaluate these strategies, and select a set of short and long-term strategies that address the problem defined in Phase 1 and best support the guiding principles established in Phase 2.

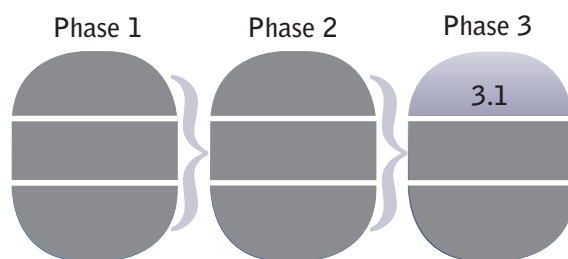
KEY STEPS:

Step 3.1 Define Alternatives

After a clear understanding of the problem and the guiding principles of the study, the next step is to develop a set of alternative solutions that address these problems and principles. Alternatives are developed in an iterative process where input from stakeholders and data help refine initial ideas.

The Alternatives should Cover a Full Range of Options

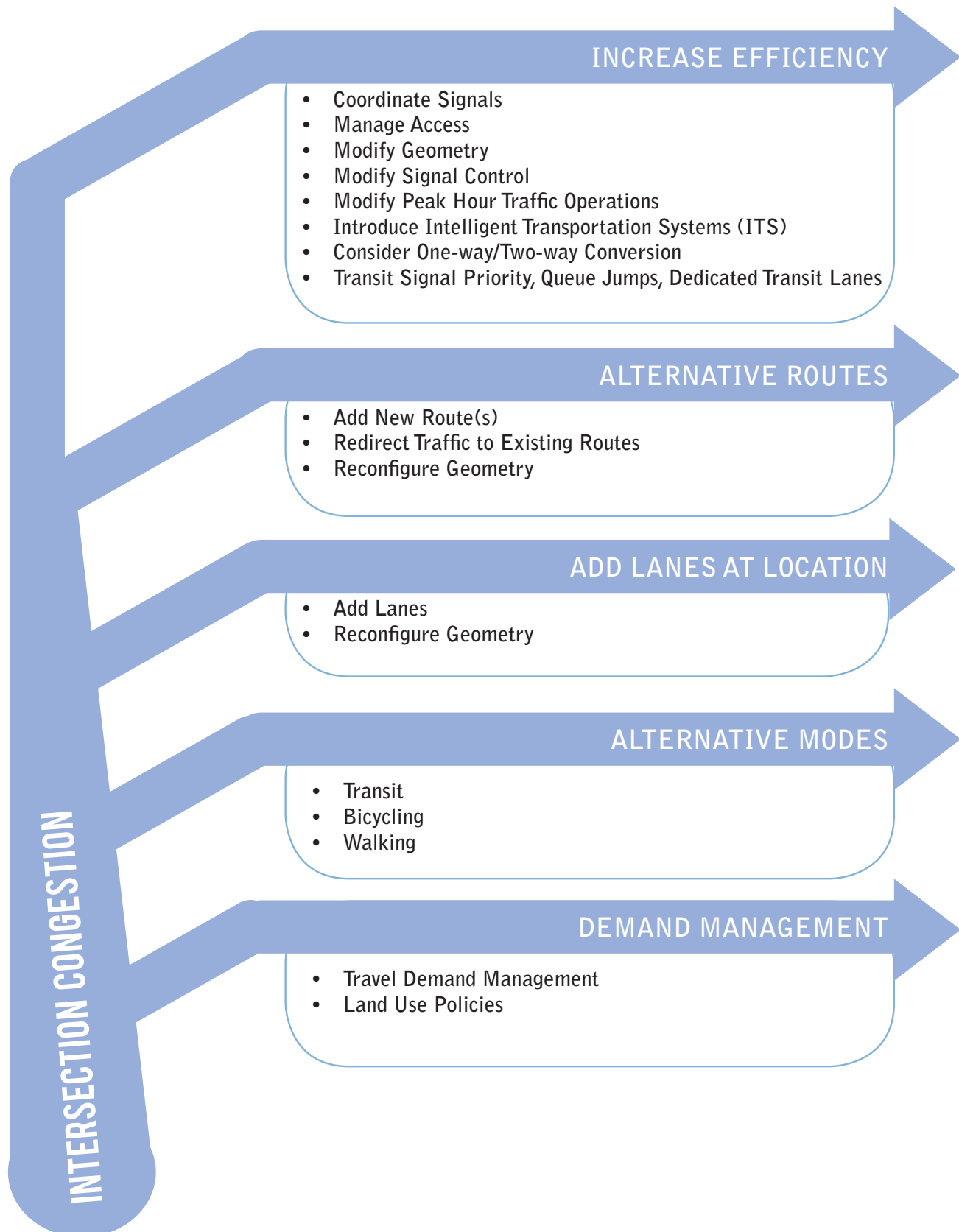
A full range of alternative solutions may include transportation and land use approaches, and may entail implementation efforts beyond that of the transportation entity that lead the study. Solutions that result from state multi-modal planning efforts require a true partnership of transportation and land use agencies. To compare the benefits and impacts, the wide range of alternatives should include a no-build alternative, as well as one or several build alternatives. Indeed, solutions for true multi-modal planning projects do not always require capital projects (i.e. new roadway or facility). Some of the solutions that



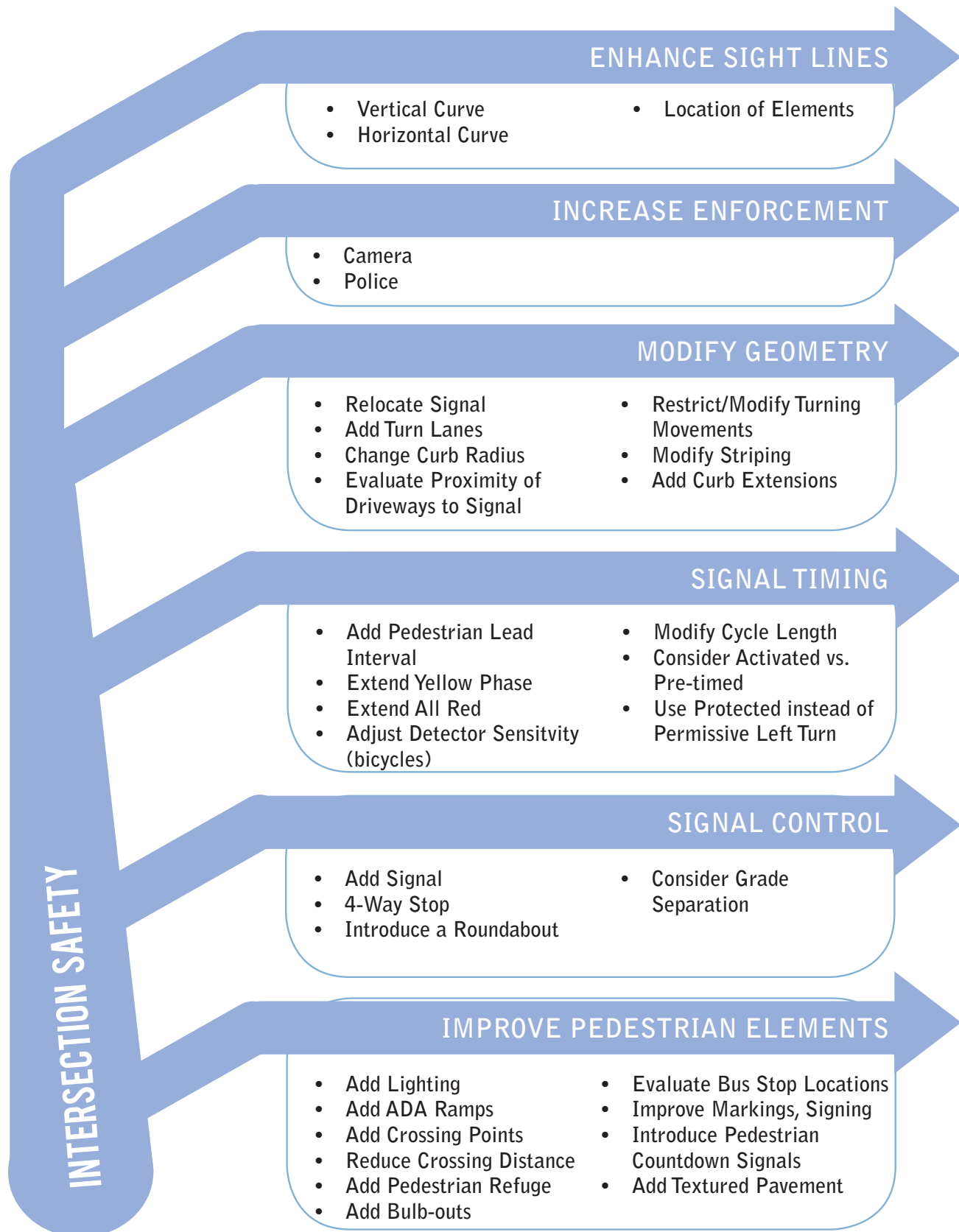
come out of planning may be best accomplished through a minor construction project, a maintenance project, a traffic operations solution, streamlined procedures, or a land use program or policy, among other potential solutions.

The figures in the next three pages illustrate a range of solutions for different multi-modal corridor issues. These demonstrate that typical challenges that may seem to require a vehicular capacity-oriented solution only can be addressed by implementing a combination of solutions through a partnership of multiple agencies.

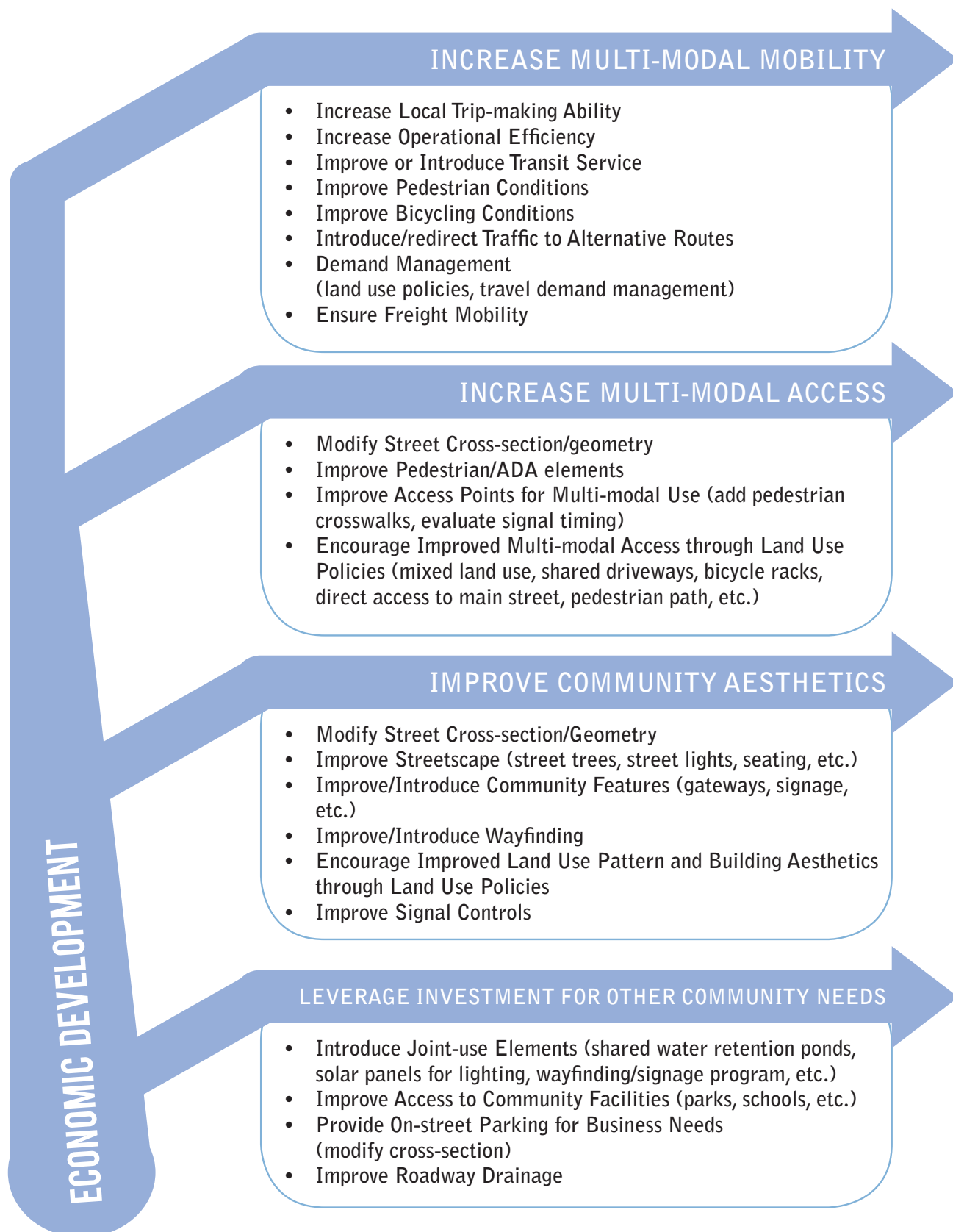
EXAMPLES OF MULTI-MODAL SOLUTIONS TO ADDRESS INTERSECTION CONGESTION PROBLEM



EXAMPLES OF MULTI-MODAL SOLUTIONS TO ADDRESS INTERSECTION SAFETY PROBLEM



EXAMPLES OF MULTI-MODAL SOLUTIONS TO ADDRESS ECONOMIC DEVELOPMENT PROBLEM



The Alternatives should Have Enough Information for Planning-level Evaluation

The alternatives should be defined to a level that allows for evaluation and assessment to advance some solutions to the next level of project development or implementation. This means that alternatives would need to include planning-level information on estimated costs of implementation and costs of operations/maintenance, and potential implementation time-frame. Alternatives defined at this stage should include order-of-magnitude costs (is it \$20 million or \$2 million?) and would not require detailed engineering and design or long range estimates (LRE), which are typically done during the PD&E and preliminary engineering phases. Developing a planning-level set of alternatives will help communities and decision-makers have an early understanding of the level of commitment and resources necessary, and focus on alternatives that are considered feasible. This will help transportation agencies and communities avoid spending unnecessary time and resources performing detailed assessments and design on alternatives that are not feasible or acceptable because of costs, time-frame, and community acceptance.

The Alternatives should Support the Role of the Roadway/Facility

CSS The alternative solutions developed for the study should support the guiding principles, and should especially respond to the role of the facility established by the guiding principles. For a corridor study focused on a roadway, the following guiding questions can help consider the “role of roadway” as alternative strategies are developed.

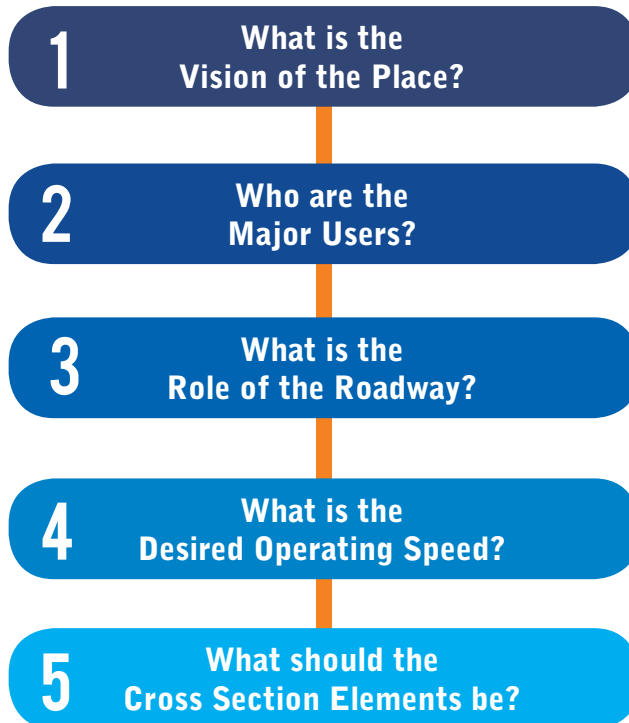
Based on the desired role of the roadway, what should the roadway’s desired operating speed (target speed) be?

The single biggest operational decision that affects a roadway’s geometric design and configuration is its “design speed”. Because design speed dictates the horizontal alignment, superelevation, stopping sight distance, and lane widths (for rural highways) of a roadway, it directly influences the flexibility of a roadway to incorporate certain geometric features. For instance, design speed can influence the feasibility of having street trees, on-street parking, a raised median, or a curbed section with sidewalks. Design speed also influences the placement and setbacks of buildings as well as the level of driveway access.

Because of vehicle speed’s strong influence on the configuration of a roadway, it is important that this be discussed during the alternative development stage of multi-modal corridor studies. The role of a roadway (e.g. serving local and short trips including a high percentage of multi-modal travel, or regional commuting function with a high occurrence of freight traffic) should help to define an operating speed that is reasonable and acceptable to the community and the roadway’s users.

This particular issue might seem unnecessary to discuss when studies involve existing roadways, as posted speeds are traditionally based on the actual observed speeds of vehicles (85th percentile speeds). However, bringing this issue to light during the alternatives development phase will help stakeholders and practitioners think about how current operating speeds are either supportive or not supportive of the desired role of the roadway. This discussion will also help practitioners understand

HOW VISION SHOULD INFLUENCE A ROADWAY’S CROSS SECTION



alternatives that involve land use (development form that encourages the appropriate driving speed) and transportation measures (the appropriate cross-section elements and roadway characteristics) necessary to achieve the desired operating speed and therefore support the function of the roadway.

It should be noted that simply reducing posted speed limits to achieve a desired operating speed is not an appropriate method to reducing actual operating speeds of vehicles. Drivers tend to “read” a road and drive at the speed that they feel comfortable. On roadway segments with vertical and horizontal curvature, design speeds have a much higher role in encouraging the right speeds. However, on roadways in urban and suburban areas in Florida where vertical and horizontal curvatures are more minor, a whole host of land use and transportation features can help encourage drivers to drive at the desired operating speed. These elements include both transportation and land development features such as:

- Horizontal and vertical curvature
- Sight distance
- Shoulder widths
- Roadway widths
- Clear zone
- Access density
- Signal density
- Median
- On-street parking
- Curbs
- Street trees
- Lane widths
- Development form (e.g. building heights, setback, ground floor uses)
- Curb return radii
- Horizontal offsets between inside travel lane and median curbs
- Traffic calming measures

Ask yourself: The posted speed might be appropriately based on the 85th percentile of actual observed speeds, but is this the speed desired by the community to further the multi-modal transportation and land use roles of the roadway? Why are drivers not driving at the desired operating speed? Are existing land development patterns encouraging higher speeds? What land development changes need to happen to encourage drivers to travel at the desired speed? What roadway design changes should occur to encourage the right speeds?

Based on the desired role of the roadway and the desired operating speed, what should the roadway’s cross-section elements be?

The multi-modal elements of a roadway should be determined based on what the roadway’s role is in the transportation and land use context. For instance, answers to the following questions can help determine the elements and nature of the elements included in a roadway’s cross section:

- Is the roadway serving an important pedestrian/ bicycling link currently and in the future?
- Is transit important now and in the future?
- Is the roadway serving heavy freight traffic currently and is this expected to remain in the future?
- What type of multi-modal mobility can help support land use goals of the area?

A variety of cross-section elements and treatments can be accommodated in a roadway with the same functional classification. The cross-sections in the following pages show the changes of a route beginning from the urban core through the various land use context zones and to the rural areas of a community.

A NOTE ABOUT DESIGN SPEED, POSTED SPEED, AND DESIRED OPERATING SPEED



Design speed is a speed that is used to determine the geometric design features of a roadway (e.g., curvature, superelevation, sight distance, etc.).

As described in AASHTO's A Policy on Geometric Design of Highways and Streets, "The selected design speed should be a logical one with respect to the anticipated operating speed, topography, the adjacent land use, and the functional classification of the highway. In selection of a design speed, every effort should be made to attain a desired combination of safety, mobility, and efficiency within the constraints of environmental quality, economics, aesthetics, and social or political impacts." A design speed should reflect the travel desires and habits of a majority of motorists expected to use the facility. If a community would like an adjacent future roadway to operate at a specific operating speed, then the design speed of the facility should be developed to match the desired operating speed, and the desired operating speed should be reinforced by adjacent land uses.

Posted speed limits are typically set at the 85th percentile speed, which reflects the speed at which 85 percent of motorists drive when unaffected by slower traffic or poor weather. These motorists are driving at a speed that directly corresponds to the geometry and design features from the identified design speed, as well as influences of adjacent land development, among other things. Historically, roadways have been designed with a design speed 5 to 10 mph above the posted speed. The effect of this is that drivers usually drive as fast as they believe the roadway can safely accommodate and may encourage speeds higher than the posted speeds.

The **desired operating speed** "is the speed of traffic that, in the expert judgment of the highway designer and community planner, best reflects the function of the roadway and the surrounding land use context"⁶. Identification of this speed can help determine



⁶ Smart Transportation Guidebook, New Jersey Department of Transportation and Pennsylvania Department of Transportation, March 2008.



the design speed. FHWA and several DOTs (e.g. Pennsylvania DOT and New Jersey DOT) have recommended that the desired operating speeds for roadways less than 45mph be the same as the design speed, and the same as the posted speed.

CSS asks that roadways are designed with a consideration for more aligned posted speeds and design speeds. However, designing a roadway to achieve a desired operating speed is not a one-size-fits-all approach. As mentioned earlier, elements other than roadway geometry affect the perception of a roadway, including adjacent land use patterns, commuter patterns, and access along the roadway, to name a few.

Decisions regarding a roadway's design must, therefore, include elements outside of the right-of-way, and involve agencies and stakeholders that deal with both transportation and land use issues. Each roadway will have unique characteristics that require special attention by FDOT and other agencies, and ultimately, these individual circumstances require innovative ideas and tailored approaches to achieve a particular operating speed amenable to all users and all transportation modes.

A series of photographs from a state roadway shows the speed limit sign changing but with minimal changes in the design of the roadway. Because the drivers "read the road", this scenario might create situations where the desired operating speeds are different from the maximum posted speeds. (Photo credit: New Jersey DOT Route 9 Corridor Study)

The Alternatives should Support the Role of the Roadway/Facility (continued)

If transit is an important mode for the area, what is the space or “envelope” needed for future potential transit strategies?

For multi-modal projects, transit strategies might include a whole host of options from first encouraging the right land development form to support transit, to introducing basic transit service (fixed-route or demand-response service), to improving existing transit operations (e.g., decreased headways), to increasing and improving shelters and stations, or introducing premium transit service (bus rapid transit (BRT) or rail transit). If the former of these options is more realistic in the short term, but there is expressed commitment and interest from the community to move towards premium transit service in the longer term, practitioners should take into consideration strategies that will not preclude the feasibility of premium transit. These strategies might include preservation of right-of-way for shared/exclusive transit lanes and/or future station locations.

Investments in premium transit should follow or coincide with transit supportive land use, especially when Federal Transit Administration (FTA) funds are being pursued. If the surrounding land use is not supportive of transit (from the perspective of mix of uses and densities), land use strategies must be in place that have been proven to be successful in achieving transit supportive development in order to compete for federal transit funding. Land use tools, such as zoning, will need to be in place prior to getting permission from FTA to begin Preliminary Engineering for the project.

It should be noted that FDOT Central Office is currently developing design guidance for BRT. As a rule of thumb, BRT lanes should be 12 feet wide, but can be as narrow as 11 feet if proper guidance systems will be installed with the buses. This space does not include area needed for station platforms or access to stations.

A NOTE ABOUT ROADWAY CONFIGURATION AND LAND USE CONTEXT

Relating the roadway configuration to the land use context is fully supported by FDOT’s policies and guidelines. The FDOT Plans Preparation Manual describes the concept of Transportation Design of Livable Communities noting design features that are desirable, acceptable, and feasible for livable communities. These design features have a direct correlation to roadway operating speeds. Maintaining a target operating speed requires features and elements that reinforce that speed. Chapter 21 of the TDLC states that the following principles should be considered to support roadway designs in low speed environments:

- Safety of pedestrians, bicyclists, motorists, and public transit users
- Balancing community values and mobility needs
- Efficient use of energy resources
- Protection of the natural and man made environment
- Coordinated land use and transportation planning
- Local and state economic development goals
- Complementing and enhancing existing Department standards, systems, and processes.



A system of complete streets should have a variety of cross-section elements and treatments to address the full range of multi-modal needs.

ROADWAY TYPES IN DIFFERENT LAND USE CONTEXTS

	Rural	Suburban
Arterial		
Collector		
Local		



Roadway design should be based on a roadway's transportation function (functional classification) as well as its role in the community (land use context). A roadway with the same "arterial" designation changes in character through different land use contexts, from rural through suburban and to the urban core. (The examples above are various roadways within the FDOT District 5 system and the matrix reflect FDOT's functional classification designation.)

Neighborhood

Village/Town Center

Urban Core



The Alternatives should Support the Role of the Roadway/Facility (continued)

If transit and walking are important for the area, what alternatives can address safety issues related to pedestrians accessing transit?

Aside from what has already been discussed in the previous steps and phases, practitioners should look at existing FDOT guidance to understand when and how alternatives that address pedestrian safety should be incorporated in multi-modal corridor studies. One such source is the “Integration of Transit Access and Pedestrian Safety into Intermodal Project Development Process,” developed by FDOT District 5. This document discusses the relationship between transit stop accessibility and

pedestrian safety along the Florida State Highway System. The document “provides for a methodology, to be implemented by the District, to engage transit agency planning and operations staff and pedestrian safety experts to conduct preliminary reviews of key transit corridors in order to identify transit access and pedestrian safety improvement opportunities for consideration in 3R and other State Highway System project scope development.”

The following key points from this guidance should be noted:

- It is important to engage the transit agency before the design process so that “issues and opportunities are identified early and at a stage when 3R (resurfacing, restoration, or rehabilitation) and maintenance projects can be leveraged to incorporate minor changes to transit stop locations or pedestrian treatments to improve the critical pedestrian/transit interaction.
- Improved pedestrian treatments should especially be considered around high transit use areas and along paths that connect transit and land developments that are considered attractors and generators of transit-bound pedestrian traffic, (i.e. major retail centers, community centers, schools, employment centers, multi-family residential developments, etc.)



BUS RAPID TRANSIT ALONG ARTERIAL CORRIDORS

A number of the arterial corridors in the District are being considered by regional and local agencies for some form of premium bus transit. Integrating this new transit service may be the focus of many future multi-modal corridor studies. There are several industry guidance documents on planning and designing corridors to incorporate BRT service on existing arterial corridors. FDOT’s Central Office is developing a forthcoming set of guidance specifically for designing arterial roadways that integrate BRT service. Nationally, TCRP’s Bus Rapid Transit Practitioner’s Guide provides guidelines for integrating and assessing BRT components. (http://www.ftod.com/research/bus_rapid_transit/transit_cooperative_research_program_bus_rapid_transit_practitioners_guide.pdf)

DATA CONSIDERATION WHEN DEVELOPING ALTERNATIVES TO IMPROVE TRANSIT & PEDESTRIAN INTERACTION

Roadway Network, Roadway Design, and Traffic Characteristics	• Street network, block size, and location of pedestrian crossings • Roadway cross-section • Posted speed limit • Annual average daily traffic (AADT) • Signed bicycle routes	• Presence of ITS/fiber optics • Signalized intersections/marked crosswalks • Roadway and pedestrian lighting • Access management classification • Landscaping and pedestrian amenities
Crash Data	• Crash location • Crash type (bicycle or pedestrian crash)	• Crash severity • Daytime/nighttime
Transit Route/ Stop Data	• Bus stop locations • Existing/planned bus shelters or transfer locations	• Daily boardings and alightings • Transit routes showing directionality
Land Development Characteristics	• Shopping centers • Convenience stores • Schools (especially post-secondary schools) • Community venues and public uses	• Major employment generators • Multi-family residential developments • Existing and projected corridor demographic data

The table above includes technical data (from Collect Data step in Phase 1) that should be considered in the development of alternatives for improving transit/pedestrian interaction.

The following are example alternatives that can address pedestrian safety issues near transit stop locations. These examples are referenced by the District 5 Integration of Transit Access and Pedestrian Safety into Inter-modal Project Development Process document, and are listed in the FHWA's Pedestrian Road Safety Audit Guidelines and Prompt Lists (FHWA-SA-07-007) (<http://www.walkinginfo.org/library/details.cfm?id=3955>):

- Adequate level of pedestrian lighting along high traffic pedestrian areas and near transit stops
- Appropriate level of streetscape, transit shelters, and pedestrian amenities
- **Transit stop locations near intersection:** Locate stops on far-side when appropriate based on distance from transit attractor; locate on a bus bay

- **Mid-block Transit Stop Locations:** Shifting to better location (near intersection), move closer to existing median refuge, introduce median refuge, introduction of marked crosswalks, moving stop locations and introduction of bus bays to comply with ADA issues

Improving pedestrian safety at signalized intersections:

- **Right-turn treatments:** Where appropriate, tighter curb radii to discourage high-speed right-turn movements and reduce crossing distance; introduction of (non-free flow) right-turn island in lieu of reducing the curb radii; locating crosswalks/ramps so pedestrians are visible to right-turning drivers
- **Left-turn treatments:** Use of protected instead of permissive phase; use of flashing yellow arrow to allow protected-only phase during peak traffic periods and with pedestrian-activated signal
- **Pedestrian signals:** Improvements in location, increased pedestrian green time, and additional features (audible, count down)

EXAMPLES OF ALTERNATIVE LAND USE & TRANSPORTATION STRATEGIES ILLUSTRATED USING A DEMONSTRATION SITE

(Source: FDOT SR 50 Multi-modal Corridor Planning Study)

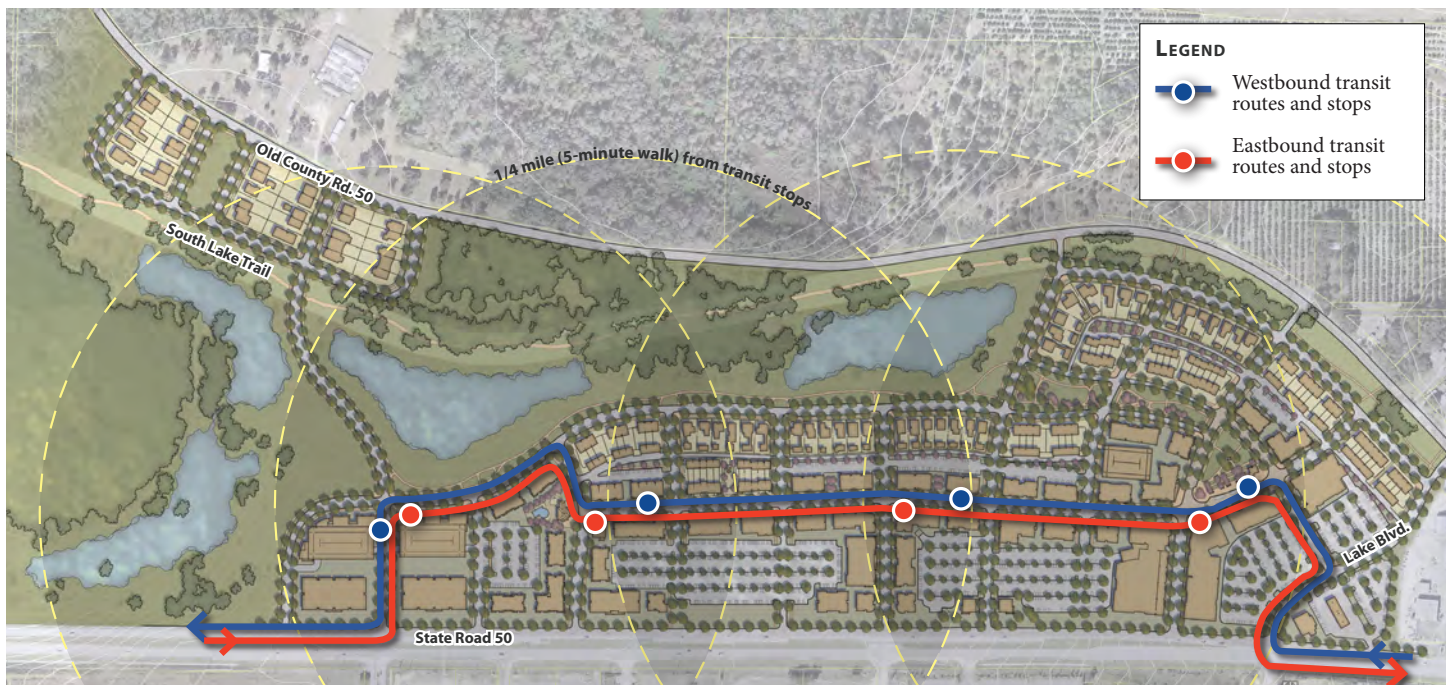
The following are two conceptual development plans for a demonstration site along the FDOT SR 50 Multi-Modal Corridor Study. These illustrate both alternative land use and transportation approaches. One supports multi-modal mobility more strongly than the other.



Scenario A shows a development that is typical to those found along high-growth suburban arterial corridors like SR 50. The land uses include “big box” retail and office buildings set back from SR 50 and a few out-parcel commercial uses along the roadway. A portion of the property has low-density single-family residential uses accessed from Old CR 50 and separated from the commercial uses. Scenario A assumes that most of the internal mobility will occur through vehicular travel along SR 50. Although there are multiple uses on the site, the linkages among these uses do not allow for easy multi-modal access.



Scenario B shows the same types of uses found in the first scenario but developed in a more integrated fashion and with higher densities. The resulting land use mix shows comparable yield for office/commercial and considerably more residential dwelling units. The developments are connected by a framework of local streets and organized in smaller mixed-use urban sized blocks. Internal streets will be developed as complete streets (have sidewalks and bicycle lanes/speeds that accommodate bicycles sharing the travel lanes). Land uses on the site can be accessed from various entry points along SR 50 and Old CR 50.



Potential transit routes and stops of Demonstration Site Alternative B from the SR 50 Multi-modal Corridor Study.

SIMPLE PROBLEM (refer to page 28 for problem background)

POTENTIAL ALTERNATIVES

- Allow full access for local roadway and evaluate possibility of a traffic signal and crosswalks
- Keep access restriction for vehicles but allow pedestrian traffic across State Arterial A (evaluate feasibility of a pedestrian-activated signal)
- Evaluate feasibility of a new signal at nearby intersection
- Stripe bicycle lanes along State Arterial A
- Consolidate driveways along State Arterial A where possible
- Reconstruct sidewalks and crosswalks to meet ADA standards

All relevant stakeholders should be included in a collaborative discussion about potential alternatives. The number of stakeholders would likely be more limited in a simple planning study than a moderate or a complex study. Although guiding principles and measures of success would ideally be outlined earlier in the planning process; it would not be uncommon for simple planning studies to combine elements of defining measures of success and alternatives at one time, as long as the agreement on measures precedes defining the alternatives.

MODERATE PROBLEM (refer to page 29 for problem background)

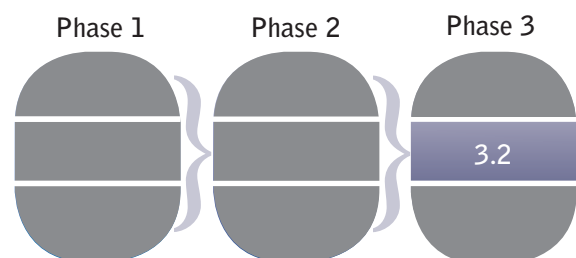
POTENTIAL ALTERNATIVES

- Improve traffic operational efficiency at key intersections
- Improve pedestrian facilities near crosswalks with high pedestrian traffic and high transit ridership
- Re-allocate existing right-of-way to accommodate pedestrian and bicycling use (use narrower or fewer travel lanes to allocate space for wider sidewalk, bicycle lane, on-street parking, or transit use)
- Add mid-block crossings at observed areas of high pedestrian traffic and at high pedestrian generators (schools, community centers, transit stops)
- Implement corridor-wide access management strategy (use of shared driveways, cross-access easements, shared parking)
- Increase transit service (more frequency, more stops, etc.)
- Explore premium transit (BRT-like characteristics- transit signal priority, queue jumps, etc.)
- Encourage land development patterns and densities that create a walkable environment and support transit use, especially within activity nodes
- Develop pedestrian and bicycling connections along existing roadways to neighborhoods
- Develop new local roadway connections to complement arterial roadways (network of slow, two-lane roadways with sidewalks and bicycling accommodation) as part of redevelopment

Because of the project's more complex nature, an expanded list of stakeholders will be involved in developing the alternatives compared to the simple planning study. Also, guiding principles and measures of success as determined by the stakeholders should always be established before defining the alternatives.

3.2 Compare Alternatives

Evaluating alternatives and the previous step of defining alternatives are typically done almost simultaneously or one step immediately following the other. The assessment of alternatives will be done using the measures established in Phase 2. This step is intended to provide a planning-level understanding of alternatives including cost, schedule, community acceptance, and engineering fatal flaws for stakeholders and decision-makers so that alternatives that are likely feasible and practical are advanced to the next step.



Consider the following when evaluating alternatives:

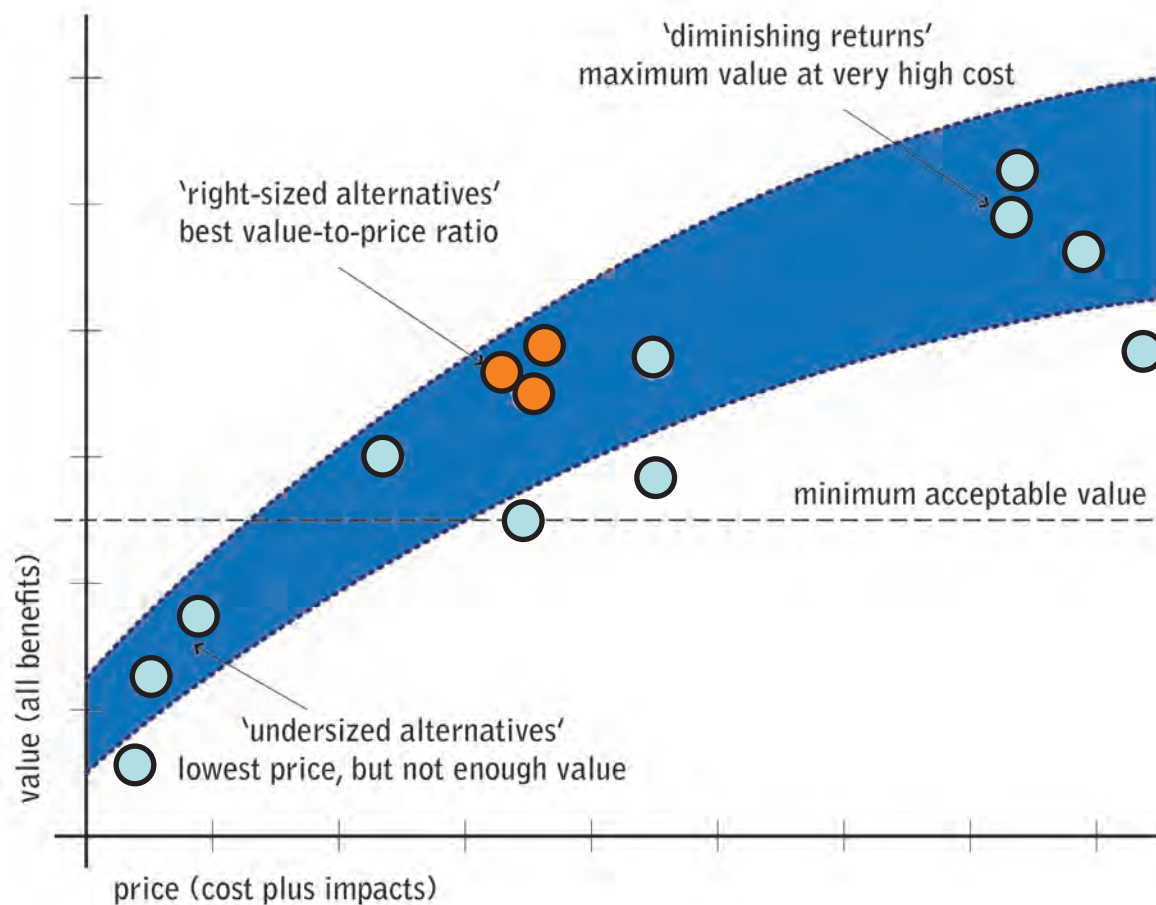
Evaluate Cost vs. Value of Alternatives

In today's reality of limited funding, project alternatives must be cost effective regardless of how "good" a solution may be. The financial environment that FDOT, local governments, and regional agencies are currently operating in requires that innovative and cost-effective strategies be strongly relied upon to provide beneficial solutions to transportation users. In fact, many multi-modal solutions are a result of limited funding where more costly capacity-adding solutions are not feasible.

Performance measures should provide benchmarks for alternatives that offer a balanced, nuanced approach to accommodating stakeholder needs while also considering

a solution's return on investment. Reasonable alternatives arise when costs (both capital and operating costs) are evaluated versus the value (benefits) that are associated with each alternative. For example, if Alternative A meets 100% of the defined project needs and objectives, while Alternative B meets 80% of these same needs and objectives, but costs 50% of Alternative A, then Alternative B may be a better investment than Alternative A. Measures such as cost per existing trip, cost per new trip, and cost per time savings for a range of trip types can help evaluate alternatives' cost/value ratio. Without these types of cost-effectiveness evaluation, stakeholders risk spending time and effort on detailed alternatives, only to determine much later in the process that specific alternatives were not cost-feasible.

VALUE-TO-PRICE RATIO



Alternatives should be evaluated by the "value" it brings to users vs. the cost.
(Source: Smart Transportation Guidebook, 2008)

Practitioners should ask the following questions to arrive at cost-effective alternatives:

- Are there alternatives that deliver most of the desired benefits of an “ideal” alternative, but at a disproportionately smaller cost? What are the trade-offs between benefits and costs?
- Are there alternatives that deliver most of the desired benefits of an “ideal” alternative, but with a disproportionately smaller cost to the quality of life in the community?
- Have alternatives been considered on parallel/other routes/corridors that would accomplish the same or much of the same benefit as the subject corridor?
- What are the long and short-term strategies?

Evaluate Important Trade-offs

The assessment should demonstrate the balance (i.e., trade-off) between important competing measures. One criterion should offset another (e.g., reduced traffic level

of service balanced against a corresponding increase in civic value associated with on-street parking; increased pedestrian safety versus increased vehicle congestion). An early discussion of these trade-offs will help community members fully understand the alternatives and help arrive at a consensus. Often times, some important “values” that need balancing are very difficult to compare directly using a single common measure (think “apples and oranges” comparison). However, calculating them and having them as sources of information should still be done to inform the true cost/benefits of the alternatives. An example of using value to price comparisons to understand the benefits of various alternatives is shown below.

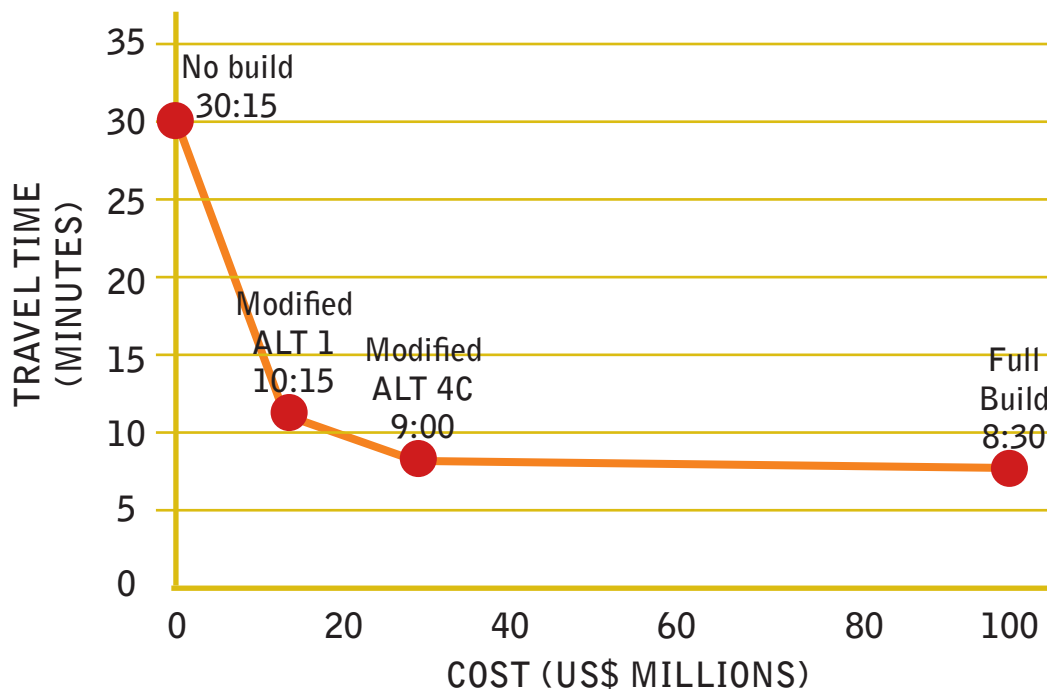
Avoid Weighting and Scoring Schemes

Numerical weighting schemes that seem to indicate some measures are more important than others can oftentimes result in assessments that are controversial and difficult to explain. An open discussion on the assessment and ensuring that the evaluation scores are compared against the guiding principles of the study are more beneficial than complex weighting models that assign value to

ILLUSTRATING TRADE-OFFS BETWEEN ALTERNATIVES

Cost & travel time trade-offs between alternatives

(Source: Marshall’s Creek Study, PennDOT Smart Transportation Case Study)



solutions without full stakeholder understanding. Also, it is important to note that evaluating and selecting alternatives should result from collaborative discussions and informed consent and not through voting. Informed consent is defined as reaching a point where the vast majority of stakeholders have received information and working insight to know the most important issues and tools. In most cases, once the public goes through the learning process and are given the tools, they are likely to grant their consent to a set of solutions that best fits the needs of everybody, with no one left out.

Summarize the Assessment

An assessment summary should be provided in simple form, such as charts, tables, and matrices. Visuals (e.g., photographs, sketches, images, etc.) should also be used for those measures best described graphically.

The following table provides a checklist of elements practitioners should strive for and avoid in defining corridor alternatives.

CHECKLIST FOR DEFINING, EVALUATING, AND SELECTING ALTERNATIVES

(Source: PennDOT Smart Transportation Guidebook.)

Strive For	Avoid
Multi-Party Input: DOT, consultant, specialists (historic, environmental), stakeholder representatives.	Project Staff Only Input: Inside project team, prime consultant only.
Collaborative: Participants sift through wide range of alternatives, with no exclusions. Alternatives are discussed in structured dialogue sessions.	Prescriptive: Range of alternatives is pre-screened and limited. Some alternatives are dismissed early as “fatally flawed.”
Intensive: The entire initial consideration of alternatives is done at a highly focused session ranging from a few hours to no more than a few days.	Protracted: Alternatives are developed over a lengthy period of time (weeks or months).
Iterative: Alternatives are considered again, with the same process as described above, as further understanding and evaluation is gained.	One Time: Alternatives are “closed down” after an early “final screening.”
Aware of Price/Value: Some understanding of price/value relationship at early stage.	Oblivious to Price/Value: No understanding of price/value during alternatives stage.
Expansive: Process seeks alternatives that yield multiple transportation and land use benefits based on the study’s guiding principles and purpose and need.	Constrained: Alternatives are limited to narrow range that addresses vehicular traffic concerns.

COMMUNITY ENGAGEMENT TOOL: TARGETED STAKEHOLDER WORKSHOPS



The workshop format can be utilized when defining and evaluating alternatives. Typically, these will involve multi-party collaborative discussions that are conducted over a focused series of activities where alternatives are defined, discussed and evaluated, and even vetted and agreed upon. Skilled facilitators are key in successful workshops that result in “informed” consensus and ownership of proposed solutions among the community stakeholders. The length of a workshop for defining and evaluating

alternatives depend on the complexity of the planning study.

Solutions that are developed and discussed at a workshop setting are typically refined and reviewed by the study team to confirm their technical feasibility. The results of this technical review are discussed with the stakeholders to arrive at a final set of alternatives and their comparative evaluations.

EXAMPLE SHOWING ALTERNATIVES COMPARED AGAINST CORRIDOR GUIDING PRINCIPLES

(Source: FDOT SR 50 Multi-modal Corridor Planning Study)

GOAL	METRIC	SCENARIO A	SCENARIO B
Multi-modal mobility	Accommodation of regional mobility (person/lane/hour)	1,000	4,500
	Nodes with high levels of local street connectivity (number)	2	4
	Feasibility for accommodating future premium transit service based on potential for increased ridership	Low	Medium
	Expansion of multi-use trail system	Medium	High
Multi-modal access to corridor destinations	Direct/multi-modal access to community parks and open spaces	Medium	High
	Increased transit access to destinations	Low	High
Development of complete places	New mixed-use centers (number)	2	4
Open space conservation	Preserved open space and agricultural land	Low	High

Example of matrix evaluating alternatives versus performance measures that are based on the study’s guiding principles and purpose and need.

EXAMPLE SHOWING GRAPHICAL COMPARISON OF ALTERNATIVE SOLUTIONS

(Source: FDOT SR 50 Multi-modal Corridor Planning Study)



Scenario A Roadways & Multi-Use Trails



Scenario B Roadways & Multi-Use Trails

Comparing the Transportation Networks

One major difference between the two demonstration site scenarios is the ability to accommodate multi-modal mobility. Scenario A has not provided any additional roadway capacity and multi-use facilities while Scenario B has. This new network of roadway can provide alternative route for driving as well as potential transit service routes.

- Existing Roadways
- Proposed Roadways
- Existing Multi-use Trails
- Proposed Multi-use Trails

DO NOT BE PARALYZED BY NEED FOR DETAIL

Many professionals tend to strive for detailed evaluation of alternatives during a planning study. However, caution must be exercised to not conduct too much detailed engineering evaluation on alternatives developed during the planning stage. Remember that this step is intended to provide enough understanding of the cost, schedule, community acceptance, and engineering fatal flaws of proposed solutions, so that solutions that are not feasible are screened out and not carried forward to more advance engineering evaluations. The level of detail needed at this stage should be the level needed to inform the planning decision at hand. More detailed engineering evaluations will be conducted on those solutions that are advanced to the next stage (PD&E, preliminary engineering, etc.), as appropriate.

STOP

STOP HERE! Proceed to the next step only if you can answer yes to the following questions.

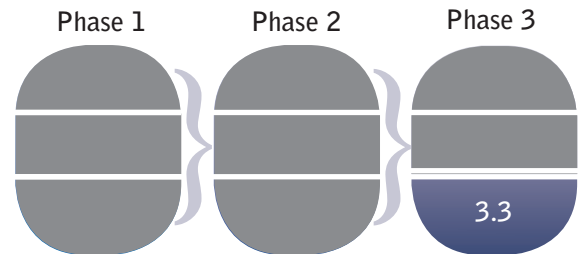
- Have alternatives been considered based on a wide range of measures of success?
- Does the alternatives evaluation process produce easily reproduced results, rather than producing different answers to different users for the same conditions?
- Do the evaluation results yield degrees of success, not just “pass” or “fail”?

3.3 Select Alternatives and Determine Next Phase

Selection of an alternative should be done in a collaborative way with the project decision-makers. These decision-makers should have been defined at the beginning of the study (oftentimes, it is the same as the core project team) and should represent each of the transportation/land use entities that may implement one or more elements of the alternative. How an alternative is chosen should be vetted with the decision-making body at the beginning and at key milestones in the study.

The “Alternative” that is selected at the conclusion of the planning process can and often will have several actions or outcomes. For example, some studies may conclude with the decision to move forward with a capital improvement that would be funded by FDOT while others may conclude that additional land use and/or transportation planning is needed before a transportation capital project should be advanced. The following graphic illustrates the different types of potential outcomes/actions that can result from planning.

It is important to list all of the potential actions and identify who (which agency and land use/transportation entity) is best suited to move forward with that action. It is also helpful to identify the general time frame by which these actions should occur, such as short-term, medium-term and long-term. These actions, roles/responsibilities and time frames should be vetted with the decision-makers prior to adoption by any of the entities involved in the study.



If a transportation capital improvement project is the desired outcome of planning, and if this project is deemed a priority by the MPO or TPO and listed as a project on their LRTP, then the project should move forward into the 4-P Programming process. The information generated during planning should inform the next rational step in the project development process. This next step should be determined based on information such as:

- Level of information needed to support the next phase of the project development process
- Complexity and magnitude of the potential alternatives
- Funding level and sources needed to implement the potential alternative
- Schedule necessary to complete the next phase (or several phases) of project delivery.

As shown in the graphic on the next page, transportation investments can be processed in a number of ways.

MULTI-MODAL CORRIDOR PLANNING

ALTERNATIVES RESULTING FROM PLANNING

Land Use Strategies

- Land Use Policies/Regulations
- Detailed Land Use Plans
- Land Use Programs
- Other Land Use Strategies

Transportation Strategies (all modes)

- Capital Improvements
- Transportation Operations
- Maintenance Project
- More Detailed/Area-Specific Transportation Plans and Programs
- Other Transportation Strategies

Other Strategies

- Utility/Infrastructure Improvements
- Organizational Changes
- Do Nothing (No-Build)
- Other Strategies

EXAMPLE OF ACTION ITEMS

(Source: FDOT SR 50 Multi-Modal Corridor Study)

This table shows an example of an Action Plan that identifies the actions/outcomes of a planning study, including the agency responsible and the time frame associated with each action.

ROADWAY STRATEGIES	ACTION ITEMS	PROCESS/ MECHANISM	LEAD AGENCIES	TIMING
Develop new local roadway connections to complement arterial roadways (network of slow, two-lane roadways)	Continue multi-municipal coordination to align collector network plans (i.e. consider how roadways connect across municipal boundaries)	L RTP	- LSMPO - Municipalities	Ongoing
	Conduct outreach/educational sessions to the development community and local	Outreach opportunities in any ongoing planning process	- FDOT - Municipalities - LSMPO	Immediate
	Develop and adopt collector network plans (master transportation plans)	Comprehensive plan update	Municipalities	Short Term
	Require new developments to build street network according to proposed collector plan	Development permitting	Municipalities	Short Term
	Coordinate with local businesses and explore retrofitting of existing driveways to allow cross-access easements	Development permitting	Municipalities	Short Term
	Allow for alternative traffic impact mitigation strategies that include network improvements	Development permitting	- FDOT - Municipalities	Short Term
Implement corridor-wide access management-strategy	Require increased street connectivity for new development (consider regulations such as those that requires cross access easement, connectivity, minimum block size, etc.)	- Land development regulations review - Development permitting	- FDOT - Municipalities	Mid Term
	Coordinate with FDOT to evaluate access needs and develop a phased implementation plan for managed access, incorporating strategies such as driveway consolidation, cross access easement, etc.	New access management study	- FDOT - Municipalities	Mid Term

ACTION PLAN TIMING LEGEND

Immediate (within the next year) | Short Term (within the next two years) | Midterm (within the next five years)



APPENDICES



PLANS PREPARATION MANUAL, VOLUME 1, CHAPTER 21: TRANSPORTATION DESIGN FOR LIVABLE COMMUNITIES

For most current version, please visit:
<http://www.dot.state.fl.us/rddesign/ppmmanual/ppm.shtm>

Chapter 21

Transportation Design for Livable Communities

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Chapter 21

Transportation Design for Livable Communities

21.1 General

It is the policy of the Department to consider Transportation Design for Livable Communities (TDLC) features on the State Highway System when such features are desired, appropriate and feasible. This involves providing a balance between mobility and livability. TDLC features should be based on consideration of the following principles:

1. Safety of pedestrians, bicyclists, motorists and public transit users.
2. Balancing community values and mobility needs.
3. Efficient use of energy resources.
4. Protection of the natural and manmade environment.
5. Coordinated land use and transportation planning.
6. Local and state economic development goals.
7. Complementing and enhancing existing Department standards, systems and processes.

21.2 Planning

TDLC features are to be considered when they are desired, appropriate and feasible. Incorporating TDLC features are contingent upon involvement of the local stakeholders in the planning and project development processes. Therefore, it is essential that all stakeholders are included from the initial planning phase of the project through design, construction and maintenance.

During the initial planning and scoping phases it is important to identify and assess the desires and willingness of the community or stakeholder to accept all of the ramifications of TDLC, including funding allocations and maintenance agreements of the TDLC features included in a project.

21.3 Application

A team approach is recommended to evaluate TDLC projects or features. Depending on the complexity and/or potential for controversial proposed TDLC features and the district resources available, the team may include representation from Planning, Traffic Operations, Environmental Management, Roadway Design, Right of Way, Public Transportation, Maintenance, Safety, and the Pedestrian/Bicycle and Community Impact Assessment Coordinators. This team should also include the respective Metropolitan Planning Organization(s), local governments/agencies, transit agencies, citizen groups and any others affected by the proposed projects or features.

TDLC projects require documentation of the desired project features determined to be appropriate and feasible for implementation and the respective responsibilities of all involved stakeholders. Documentation may be stand-alone or placed in the design documentation.

TDLC features can be incorporated into new construction, reconstruction, and resurfacing, restoration and rehabilitation (RRR) projects using existing design standards and criteria found in **Chapters 2, 8** and **25** of this volume. When documentation identifies TDLC features for a project or segments of a project, the criteria provided in this chapter may be used with the approval of the District Design Engineer.

21.4 Techniques

Selected TDLC techniques applied by type of highway system are shown in ***Exhibits 21-A, B, C and D*** at the end of this chapter. These techniques are intended as guidance for balancing the need for mobility and the desire for livable communities, and not as standards, policies or procedures of the Department.

21.5 Design Criteria

The criteria in this chapter meets or exceeds **AASHTO** minimums. All TDLC projects are subject to the requirements for Design Exceptions and Design Variations found in **Chapter 23** of this volume.

21.5.1 Design Speed

Recommended design speeds are found in **Section 1.9** of this volume.

21.5.2 Number of Lanes

In developed urban areas, reducing the number of lanes may provide space for pedestrians, bicycles, parking, landscaping etc. This technique may be appropriate depending on volume and character of traffic, availability of right of way, function of the street, existing or planned level of pedestrian, bicycling and transit activity, intensity of adjacent land use, and availability of alternate routes.

The decision to reduce the number of lanes on a project shall be supported by an appropriate traffic capacity study. If transit vehicles and school busses are currently operating in the area of the project, appropriate local agencies should be consulted.

21.5.3 Lane Widths

Minimum lane widths for TDLC projects or segments are shown in **Table 21.1**.

Table 21.1 Lane Widths

Lane Types	Width (feet)
Through Lanes	11 ¹
Turn Lanes	11 ¹
Parking Lanes (parallel)	8 ²
Bicycle Lanes	4 ³

1. May be reduced to 10 feet in highly restricted areas with design speeds ≤ 35 mph. having little or no truck traffic.
2. May be reduced to 7 feet (measured from face of curb) in residential areas.
3. 5 feet adjacent to on-street parking.

21.5.4 Horizontal Alignment

A curvilinear alignment can be used to control vehicle speed by introducing a bend or curve on a tangent roadway. Design should meet criteria in **Chapter 2** of this volume.

21.5.5 Medians

Requirements for medians are provided in **Section 2.2** of this volume. Where continuous raised medians are not provided, such as on 5-lane sections, refuge areas should be provided at appropriate locations. These locations are typically near high pedestrian generators such as schools, park entrances, transit stops and parking lots. Refuge Islands must provide a large enough area for several pedestrians at once while at the same time be of sufficient size and spacing as to not create a hazard. For wheelchair accessibility, it is preferable to provide at-grade cuts rather than ramps.

For landscaping in medians see **Section 21.5.10**.

21.5.6 Horizontal Clearance

Horizontal clearance is the lateral distance from a specified point on the roadway such as the edge of travel lane or face of curb, to a roadside feature or object. Horizontal clearance applies to all highways. Horizontal clearance requirements vary depending on design speed, whether rural or urban with curb, traffic volumes, lane type, and the object or feature.

Rural highways with flush shoulders and highways with curb or curb and gutter where right of way is not restricted have roadsides of sufficient widths to provide clear zones; therefore, horizontal clearance requirements for certain features and objects are based on maintaining a clear zone wide enough to provide the recoverable terrain in **Table 21.6**. The procedure for determining required clear zone widths is further described in **Chapter 4** of this volume.

In urban areas, horizontal clearance based on clear zone requirements for rural highways should be provided wherever practical. However, urban areas are typically characterized with lower speed (Design Speed ≤ 45 mph) more dense abutting development, closer spaced intersections and accesses to property, higher traffic volumes, more bicyclists and pedestrians, and restricted right of way. In these areas, curb with closed drainage systems are often used to minimize the amount of right of way needed. Highways with curb or curb and gutter in urban areas

where right of way is restricted do not have roadsides of sufficient widths to provide clear zones; therefore, while there are specific horizontal clearance requirements for these highways, they are based on clearances for normal operation and not based on maintaining a clear roadside for errant vehicles. It should be noted that curb has no redirection capabilities except at speeds less than the lowest design speeds used on the State Highway System. Therefore curb should not be considered effective in shielding a hazard. Curb is not to be used to reduce horizontal clearance requirements.

Crashworthy objects shall meet or exceed the offsets listed in **Tables 21.2** through **Table 21.5** and objects that are not crashworthy are to be as close to the right of way line as practical and no closer than the requirements listed in **Tables 21.2** through **Table 21.5**.

Table 21.2 Horizontal Clearance for Aboveground Fixed Utilities

Aboveground fixed utilities are objects owned by a public or private utility agency that are more than four (4) inches above the grade and are not accepted by FDOT as crashworthy (such as strain poles, down guys, telephone load pedestals, temporary supports, etc.). Control Zones are not applicable to AFUs.	
NEW ABOVEGROUND FIXED UTILITIES (AFUs) Other than mid-span poles	For urban roadways with curb or curb and gutter with design speeds less than or equal to 45 mph, new AFUs shall not be placed closer than 1.5 feet from the face of curb and as close to the R/W as practical. For all other roadways the AFUs are to be outside the Clear Zones established using Table 21.6 Recoverable Terrain and as close to the R/W line as practical.
NEW ABOVEGROUND FIXED UTILITIES (AFUs) Mid-span poles	Mid-span poles are new poles being installed as part of and within the alignment of an existing pole line. When the existing alignment crosses an intersecting roadway, the mid-span pole is to be placed as follows: For intersecting roadways that are urban with curb or curb and gutter with design speeds less than or equal to 45 mph, mid-span poles shall not be placed closer than 4 feet from the face of curb. For all other intersecting roadways, mid-span poles are to be outside the Clear Zones established for new poles appropriate for the intersecting roadway.
EXISTING ABOVEGROUND FIXED UTILITIES (AFUs)	For urban roadways with curb or curb and gutter with design speeds less than or equal to 45 mph, existing AFUs closer than 1.5 feet from the face of curb shall be relocated as close to the R/W line as practical. For all other roadways, existing AFUs within the Clear Zones established using Table 21.6 Recoverable Terrain shall be relocated as close to the R/W line as practical.

Table 21.3 Horizontal Clearance to Trees

Minimum horizontal clearance for new plantings where the diameter is or is expected to be greater than 4 inches (measured 6 inches above the ground) shall be located outside the clear zone except as follows:

Urban Curb or Curb and Gutter (Design Speed ≤ 45 mph):

4 feet from face of outside curb and 6 feet from edge of inside traffic lane. In areas where the border width or median width are constrained and this criteria cannot be met, this horizontal clearance may be reduced to 1.5 feet from face of outside curb and 3 feet from edge of inside traffic lane.

On existing roadways, the minimum horizontal clearance to existing trees where the diameter is or is expected to be greater than 4 inches (measured 6 inches above the ground) shall be located outside the clear zone except as follows:

Urban Curb or Curb and Gutter (Design Speed ≤ 45 mph):

1.5 feet from the face of outside curb and 3 feet from the edge of the inside traffic lane.

Table 21.4 Horizontal Clearance to Canal and Drop-off Hazards

See **Chapter 4** of this Volume for horizontal clearance criteria for canal and drop-off hazards.

Table 21.5 Horizontal Clearance to Other Roadside Obstacles

Shall be located outside the clear zone except as follows:

Urban Curb or Curb and Gutter (Design Speed ≤ 45 mph):

Shall be located no closer than 1.5 feet from face of curb.

Note: Horizontal clearance to mailboxes is specified in the construction details contained in the **Design Standards, Index 532**.

Note: Transit and school bus shelters shall be placed in accordance with **Rule Chapter 14-20.003, Florida Administrative Code**. Transit bus benches shall be placed in accordance with **Rule Chapter 14-20.0032, F.A.C.**.

Table 21.6 TDLC Recoverable Terrain

Design Speed (mph)	(feet)
≤ 30	12
35	14
40	16

21.5.7 Intersections

Intersection designs must adequately meet the needs of motorists, transit riders, bicyclists and pedestrians. Large return radii increases the crossing distance for pedestrians while small return radii decreases a vehicle's ability to negotiate the turn. Return radii must balance the needs of the pedestrian and the design vehicle. See **Figure 21.1**.

21.5.8 Lighting

Lighting requirements are discussed in **Chapters 2** and **7** of this volume.

21.5.9 Traffic Control

Where traffic volumes are high enough to require traffic signals, they should be placed to allow good progression of traffic from signal to signal. Optimal spacing of signals depends on vehicle operating speeds and signal cycle lengths. At speeds of 35 mph and standard cycle lengths, signals must be at least a fourth of a mile apart. Such spacing is consistent with FDOT's requirements for state highways, and with its recommended minimums for local arterials and collectors.

Where traffic volumes are not high enough to warrant traffic signals, 4-way stop signs and roundabouts should be considered. Four-way stops are considered to have a traffic calming effect and cause minimal delays under light traffic conditions. Roundabouts allow traffic from different directions to share space in the intersection, while signals require traffic to take turns.

Where traffic volumes are high enough to warrant traffic signals but does not require them, roundabouts should also be considered. If Roundabouts are being considered in a TDLC project, refer to **NCHRP Report 672, Roundabouts: An Informational Guide**, adopted by FHWA.

21.5.10 Landscaping

Landscaping on a TDLC project can be provided when a local agency or organization agrees to assume the maintenance of the landscaped area in accordance with all Department requirements. See **Chapter 9** of this volume and the *Florida Highway Landscape Guide* for landscape requirements.

Landscaping shall not interfere with the visibility of “permitted” outdoor advertising in accordance with **Rule 14-40** of the *Florida Administrative Code*. Landscaping shall provide required sight distances in accordance with the *Design Standards, Index 546*. Landscaping shall also comply with the horizontal clearance requirements found in **Section 21.5.6** of this chapter, and **Chapters 2, 4, and 25** of this volume.

Community Aesthetic Features placed in the right of way to represent the community are discussed in **Section 9.3** of this volume.

21.5.11 Parking

When parking is incorporated on a TDLC project, several parking configurations may be considered (parallel, front-in angled and back-in angled). The design of parking facilities should be coordinated with local transit agencies and consistent with state and local laws (including **Section 316.195, Florida Statutes**). For parking lane widths see **Table 21.1**.

21.5.12 Alternative Roadway Paving Treatments

Alternative paving treatments such as patterned pavement may be used to accent the roadway in accordance with the ***Standard Specifications***. Architectural pavers, however, shall not be used on the traveled way of the State Highway System. See ***Section 2.1.6.1*** for additional requirements.

21.5.13 Conversion to/from One-Way Street Pairs

Converting one-way pairs to two-way streets or two-way streets to one-way pairs may be appropriate on TDLC projects. These techniques require a great deal of consideration, planning and public involvement. Some considerations include: safety of pedestrians, bicyclists and motorists, traffic capacity, on-street parking, signal progression along the corridor and transit facilities.

21.6 Pedestrian and Bicycle Considerations

21.6.1 Sidewalks

For criteria refer to **Chapter 2, Section 2.1.4** and **Chapter 8** of this volume.

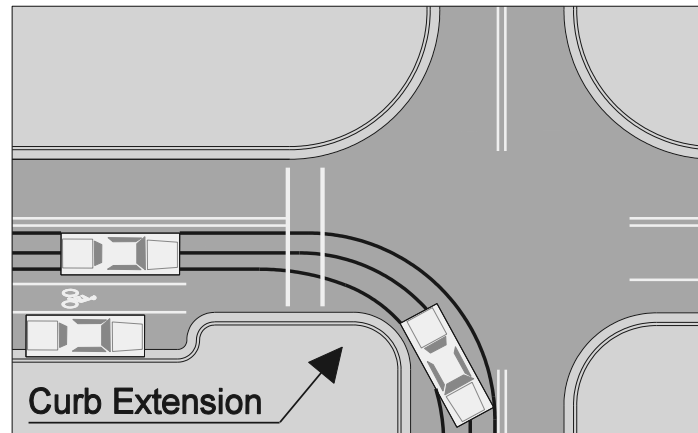
21.6.2 Crosswalks

Marked crosswalks should be provided at signalized intersections. Marked crosswalks should also be provided at midblock crossing locations that are controlled by traffic signals and pedestrian signals, and school crossing locations that are controlled by guards during school crossing periods. The use of uncontrolled crosswalks should be carefully considered. Refer to **Section 8.3.3** for further guidance on designing crosswalks.

21.6.3 Curb Extensions (Bulb-Outs)

Curb extensions, sometimes called bulb-outs, may be used at intersections, or at mid-block locations where there is a crosswalk, provided there is adequate width for existing traffic movements. Curb extensions shorten the crossing distance, and provide additional space at intersections allowing pedestrians to see and be seen before entering a crosswalk. The design of curb extensions must take into consideration the needs of transit vehicles, drainage and bicyclists. See **Figure 21.1**.

Figure 21.1 Curb Extension



21.6.4 Personal Security and Safety Amenities

Personal security and safety is promoted by maximizing visibility in and along parking areas, building entrances, transit stops, sidewalks and roadways. This can be provided by the following techniques:

1. Providing lighting.
2. Lowering vegetation heights.
3. Removing hiding places.

Examples for designing safer communities can be found in The National Crime Prevention Council's publication: ***Crime Prevention Through Environmental Design***.

21.6.5 Bicycle Facilities

Refer to **Chapter 8** of this volume for design of bicycle facilities.

21.7 Transit-Systems and Amenities

Transit accommodations should be developed in cooperation with the local jurisdictions and transit agencies. Refer to **Chapter 8** of this volume and [Accessing Transit, Design Handbook for Florida Bus Passenger Facilities, Version 2, 2008](#) for additional information on the design of transit facilities.

Exhibit 21-A Corridor Techniques

TECHNIQUE	FIHS/SIS		SHS URBAN	SHS RURAL	NON- SHS
	LIMITED ACCESS	CONTROLLED ACCESS			
Improved location, oversized or redundant directional signs	A	A	M	M	M
Use of route markings/ signing for historical and cultural resources	M	A	A	A	A
Increased use of variable message signing	A	A	M	M	M
Landscaping	M	M	M	M	M
Sidewalks or wider sidewalks	NA	M	A	M	M
Street furniture	NA	M	M	M	M
Bicycle lanes	NA	M	M	M	M
Shared Use Paths	NA	M	M	M	M
Conversion to/from one-way street pairs	NA	M	M	NA	M
Alternative paving materials	NA	NA	M	NA	M
Pedestrian signals, midblock crossings, median refuge areas	NA	M	A	M	M
Parking modifications or restoration	NA	NA	M	M	M
Safety and personal security amenities	M	M	M	M	M
Street mall	NA	NA	NA	NA	M

- A "Appropriate"--Techniques which should be included on all TDLC projects unless there are compelling reasons not to do so.
- M "May be Appropriate"--Techniques which should be employed, but must be evaluated relative to context of the particular project.
- NA "Not Appropriate"--Techniques which need not be considered for TDLC projects.

Exhibit 21-B Techniques To Reduce Speed Or Traffic Volume

TECHNIQUE	FIHS/SIS		SHS URBAN	SHS RURAL	NON- SHS
	LIMITED ACCESS	CONTROLLED ACCESS			
Lower speed limits	NA	NA	NA	NA	N
Increase use of stop or multi-way stop signs	NA	NA	NA	NA	N
Speed humps/tables	NA	NA	NA	NA	M
On-street parking to serve as buffer between travel lanes and pedestrian areas	NA	NA	M	M	M
Curb bulb-outs at ends of blocks	NA	NA	M	M	M
Traffic “chokers” oriented to slowing traffic	NA	NA	NA	NA	M
“Compact” intersections	NA	A	A	A	A
Traffic roundabouts to facilitate intersection movement	NA	M	M	M	M
Curvilinear alignment (with redesign, chicanes, winding paths, etc.)	NA	NA	M	NA	M
Street closing or route relocation	NA	NA	M	NA	M

- A “Appropriate” --Techniques which should be included on all TDLC projects unless there are compelling reasons not to do so.
- M “May be Appropriate”--Techniques which should be employed, but must be evaluated relative to context of the particular project.
- NA “Not Appropriate”--Techniques which need not be considered for TDLC projects.

Exhibit 21-C Techniques to Encourage Multimodal Travel

TECHNIQUE	FIHS/SIS		SHS URBAN	SHS RURAL	NON- SHS
	LIMITED ACCESS	CONTROLLED ACCESS			
Sidewalks	NA	M	A	M	M
Pedestrian friendly intersection design	NA	M	A	M	M
Midblock pedestrian crossings	NA	M	M	M	M
Illuminated pedestrian crossings	NA	M	M	M	M
Bicycle lanes/paved shoulders	NA	M	A	A	M
Independent Shared Use Path	NA	M	M	M	M
Bicycle friendly design and parking	NA	M	A	A	A
Transit system amenities	NA	M	A	M	M
Transit user amenities	NA	M	A	M	M
Exclusive transit lanes	M	M	M	M	M
Linking modal facilities	A	A	A	A	A
Lower speed limits	NA	NA	NA	NA	NA
Removal of street parking	NA	NA	M	M	M

- A "Appropriate"--Techniques which should be included on all TDLC projects unless there are compelling reasons not to do so.
- M "May be Appropriate" --Techniques which should be employed, but must be evaluated relative to context of the particular project.
- NA "Not Appropriate" --Techniques which need not be considered for TDLC projects.

Exhibit 21-D Network Techniques

TECHNIQUE	FIHS/SIS		SHS URBAN	SHS RURAL	NON- SHS
	LIMITED ACCESS	CONTROLLED ACCESS			
Design the street network with multiple connections and relatively direct routes	NA	NA	A	M	M
Space through-streets no more than a half mile apart.	NA	NA	A	M	M
Use traffic calming measures	NA	M	M	M	M
Limit local speed to 20 mph	NA	NA	NA	NA	M
Limit lanes	M	M	M	M	M
Align streets to give buildings energy-efficient orientations	NA	NA	M	NA	M
Avoid using traffic signals wherever possible. Space them for good traffic progression	NA	M	M	M	M
Incorporate pedestrian and bicyclist design features	NA	A	A	A	A
Incorporate transit-oriented design	M	A	A	A	A
Design attractive greenway corridors	A	A	A	A	A
Design attractive storm water facilities	A	A	A	A	A

- A “Appropriate”--Techniques which should be included on all TDLC projects unless there are compelling reasons not to do so.
- M “May be Appropriate”--Techniques which should be employed, but must be evaluated relative to context of the particular project.
- NA “Not Appropriate”--Techniques which need not be considered for TDLC projects.

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FDOT GREENBOOK (MANUAL OF UNIFORM MINIMUM STANDARDS FOR DESIGN, CONSTRUCTION AND MAINTENANCE FOR STREETS AND HIGHWAYS), CHAPTER 19: TRADITIONAL NEIGHBORHOOD DEVELOPMENT

For most current version, please visit:
<http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.shtm>

CHAPTER 19

TRADITIONAL NEIGHBORHOOD DEVELOPMENT

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CHAPTER 19

TRADITIONAL NEIGHBORHOOD DEVELOPMENT

A INTRODUCTION

Florida is a national leader in planning, design and construction of Traditional Neighborhood Development (TND) communities, and in the renovation of downtown neighborhoods and business districts. These represent patterns of development aligned with the state's growth management, smart growth and sprawl containment goals. This approach, with its greater focus on pedestrian, bicycle and transit mobility; is distinct from Conventional Suburban Development (CSD). CSDs are comprised largely of subdivision and commercial strip development. TND communities rely on a strong integration of land use and transportation. A TND has clearly defined characteristics and design features that are necessary to achieve the goals for compact and livable development patterns reinforced by a context-sensitive transportation network. The treatment of land use, development patterns and transportation networks necessary for successful TND communities is a major departure from those same elements currently utilized in other Greenbook chapters.

To provide a design that accomplishes the goals set out in this chapter, designers will be guided by the context of the built environment, established or desired, for a portion of the communities because TND communities rely on a stronger integration of land use and transportation than CSD communities. This chapter provides criteria that may be used for the design of streets within a TND when such features are desired, appropriate and feasible. This involves providing a balance between mobility and livability. This chapter may be used in planning and designing new construction, urban infill, and redevelopment projects.

Section B of this chapter discusses the primary objectives of TND in more detail to aid the designer in the selection of proper criteria. Section C sets forth specific design criteria for the transportation system within TND.

The following link provides a handbook containing essential information to provide designers guidance in the successful application of this Chapter:

<http://www.dot.state.fl.us/rddesign/FloridaGreenbook/TND-Handbook.pdf>

B APPLICATION

A project or community plan may be considered a TND when at least the first seven of the following principles are included:

1. Has a compact, pedestrian-oriented scale that can be traversed in a five to ten-minute walk from center to edge.
2. Is designed with low speed, low volume, interconnected streets with short block lengths, 150 to 500 feet, and cul-de-sacs only where no alternatives exist. Cul-de-sacs, if necessary, should have walkway and bicycle connections to other sidewalks and streets to provide connectivity within and to adjacent neighborhoods.
3. Orients buildings at the back of sidewalk, or close to the street with off-street parking located to the side or back of buildings, as not to interfere with pedestrian activity.
4. Has building designs that emphasize higher intensities, narrow street frontages, connectivity of sidewalks and paths, and transit stops to promote pedestrian activity and accessibility.
5. Incorporates a continuous bike and pedestrian network with wider sidewalks in commercial, civic, and core areas, but at a minimum has sidewalks at least five feet wide on both sides of the street. Accommodates pedestrians with short street crossings, which may include mid-block crossings, bulb-outs, raised crosswalks, specialty pavers, or pavement markings.
6. Uses on-street parking adjacent to the sidewalk to calm traffic, and offers diverse parking options, but planned so that it does not obstruct access to transit stops.
7. Varies residential densities, lot sizes, and housing types, while maintaining an average net density of at least eight dwelling units per acre, and higher density in the center.
8. Integrates at least ten percent of the developed area for nonresidential and civic uses, as well as open spaces.
9. Has only the minimum right of way necessary for the street, median, planting strips, sidewalks, utilities, and maintenance that are appropriate to the adjacent land uses and building types.
10. Locates arterial highways, major collector roads, and other high-volume corridors at the edge of the TND and not through the TND.

The design criteria in this chapter shall only be applicable within the area defined as TND.

C PLANNING CRITERIA

Planning for TND communities occurs at several levels, including the region, the city/town, the community, the block, and, finally, the street and building. Planning should be holistic, looking carefully at the relationship between land use, buildings, and transportation in an integrated fashion. This approach, and the use of form based codes, can create development patterns that balance pedestrian, bicycling, and transit with motor vehicle transportation.

C.1 LAND USE

In addition to its importance in calculating trip generation, the Institute of Transportation Engineers (ITE) recognizes land use as fundamental to establishing context, design criteria, cross-section elements, and right of way allocation. The pedestrian travel that is generated by the land uses is also important to the design process for various facilities.

A well-integrated, or “fine grained”, land use mix within buildings and blocks is essential. These buildings and blocks aggregate into neighborhoods, which should be designed with a mix of uses to form a comprehensive planning unit that aggregates into larger villages, towns, and regions. Except at the regional scale, each of these requires land uses to be designed at a pedestrian scale and to be served by “complete streets” that safely and attractively accommodate many modes of travel.

The proposed land uses, residential densities, building size and placement, proposed parking (on-street and off-street) and circulation, the location and use of open space, and the development phasing are all considerations in facility design for TNDs. ITE recommends a high level of connectivity, short blocks that provide many choices of routes to destinations, and a fine-grained urban land use and lot pattern. Higher residential density and nonresidential intensity, as measured by floor area ratios of building area to site area, are required for well-designed TNDs.

C.2 NETWORKS

Urban networks are frequently characterized as either traditional or conventional. Traditional networks are typically characterized by a relatively non-hierarchical pattern of short blocks and straight streets with a high density of intersections that support all modes of travel in a balanced fashion.

Figure 19-1 Traditional Network



New York, NY

Savannah, GA

(Source: VHB)

The typical conventional street network, in contrast, often includes a framework of widely-spaced arterial roads with limited connectivity provided by a system of large blocks, curving streets and a branching hierarchical pattern, often terminating in cul-de-sacs.

Figure 19-2 Conventional Network



Walnut Creek, CA

(Source: VHB)

Traditional and conventional networks differ in three easily measurable respects: (1) block size, (2) degree of connectivity and (3) degree of curvature. While the last does not significantly impact network performance, block size and connectivity create very different performance characteristics.

Advantages of traditional networks include:

1. Distribution of traffic over a network of streets, reducing the need to widen roads;
2. A highly interconnected network providing a choice of multiple routes of travel for all modes, including emergency services;
3. More direct routes between origin and destination points, which generate fewer vehicle miles of travel (VMT) than conventional suburban networks;
4. Smaller block sizes in a network that is highly supportive to pedestrian, bicycle, and transit modes of travel;
5. A block structure that provides greater flexibility for land use to evolve over time.

It is important in TND networks to have a highly interconnected network of streets with smaller block sizes than in conventional networks. There are several ways to ensure that these goals are achieved.

One method is based upon the physical dimensions used to layout streets and blocks. The following list identifies those parameters:

1. Limit block size to an average perimeter of approximately 1,320 feet.
2. Encourage an average intersection spacing for local streets of 300-400 feet.
3. Limit maximum intersection spacing for local streets to approximately 600 feet.
4. Limit maximum spacing between pedestrian/bicycle connections to approximately 300 feet (that is, it creates mid-block paths and pedestrian shortcuts).

D OBJECTIVES

The basic objectives of a Traditional Neighborhood Development are:

1. Safety
2. Mobility of all users (vehicles, pedestrians, bicyclists and transit)
3. Compact and livable development patterns
4. Context-sensitive transportation network

TND features are based upon the consideration of the following concepts. These concepts are not intended as absolute criteria since certain concepts may conflict. The concepts should therefore be used for the layout of proper street systems.

1. Strong integration of land use and transportation.
2. Very supportive of pedestrian, bicycle, and transit modes.
3. Smaller block sizes to improve walkability, and to create a fine network of streets accommodating bicyclists and pedestrians, and providing a variety of routes for all users.
4. On-street parking is favored over surface parking lots.
5. Limited use of one way streets.
6. Speeds for motor vehicles are ideally kept in the range of 20-35 mph through the design of the street, curb extensions, use of on-street parking, the creation of enclosure through building and tree placement.
7. Street geometry (narrow streets and compact intersections), adjacent land use, and other elements within a TND must support a high level of transit, pedestrian and bicycle activity.
8. Provide access to emergency services, transit, waste management, and delivery trucks.
9. Provide access to property.

This approach to street design requires close attention to the operational needs of transit, fire and rescue, waste collection, and delivery trucks. For this reason, early coordination with transit, fire and rescue, waste collection, and other stakeholder groups is essential. For fire and rescue, determination of the importance of that corridor for community access should be determined, e.g. primary or secondary access.

More regular encroachment of turning vehicles into opposing lanes will occur at intersections. Therefore, frequency of transit service, traffic volumes, and the speeds at those intersections must be considered when designing intersections.

When designing features and streets for TND communities, creativity and careful attention to safety for pedestrians and bicyclists must be balanced with the operational needs of motor vehicles.

Finally, it is very important when designing in TND communities to ensure that a continuous network is created for pedestrians, bicyclists, and transit throughout the community to create higher levels of mobility that are less dependent on automobile travel.

E DESIGN ELEMENTS

The criteria provided in this chapter shall require the approval of the maintaining authority's designated Professional Engineer representative with project oversight or general compliance responsibilities.

The criteria provided in this chapter are generally in agreement with AASHTO guidelines with a special emphasis on urban, low-speed environments. Design elements within TND projects not meeting the requirements of this chapter are subject to the requirements for Design Exceptions found in Chapter 14 of this manual.

E.1 Design Controls

E.1.a Design Speed

The application of design speed for TND communities is philosophically different than for conventional transportation and CSD communities. Traditionally, the approach for setting design speed was to use as high a design speed as practical.

In contrast to this approach, the goal for TND communities is to establish a design speed that creates a safer and more comfortable environment for pedestrians and bicyclists, and is appropriate for the surrounding context.

Design speeds of 20 to 35 mph are desirable for TND streets. Alleys and narrow roadways intended to function as shared spaces may have design speeds as low as 10 mph.

E.1.b Movement Types

Movement types are used to describe the expected driver experience on a given thoroughfare, and the design speed for pedestrian safety and mobility established for each of these movement types. They are also used to establish the components and criteria for design of streets in TND communities.

Yield: Has a design speed of less than 20 mph. Drivers must proceed slowly with extreme care, and must yield to pass a parked car or approaching vehicle. This is the functional equivalent of traffic calming. This type should accommodate bicycle routes through the use of shared lanes.

Slow: Has a design speed of 20-25 mph. Drivers can proceed carefully, with an occasional stop to allow a pedestrian to cross or another car to park. Drivers should feel uncomfortable exceeding design speed due to the presence of parked cars, enclosure, tight turn radii, and other design elements. This type should accommodate bicycle routes through the use of shared lanes.

Low: Has a design speed of 30-35 mph. Drivers can expect to travel generally without delay at the design speed, and street design supports safe pedestrian movement at the higher design speed. This type is appropriate for thoroughfares designed to traverse longer distances, or that connect to higher intensity locations. This type should accommodate bicycle routes through the use of bike lanes.

Design speeds higher than 35 mph should not normally be used in TND communities due to the concerns for pedestrian and bicyclist safety and comfort. There may be locations where planned TND communities border, or are divided by, existing corridors with posted/design speeds higher than 35 mph. In those locations, coordination with the regulating agency should occur with a goal to re-design the corridor and reduce the speed to 35 mph or less. The increase in motorist travel time due to the speed reduction is usually insignificant because TND communities are generally compact.

When the speed reduction cannot be achieved, measures to improve pedestrian safety for those crossing the corridor should be evaluated and installed when appropriate.

E.1.c Design Vehicles

There is a need to understand that street design with narrow streets and compact intersections requires designers to pay close attention to the operational needs of transit, fire and rescue, waste collection, and delivery trucks. For this reason, early coordination with transit, fire and rescue, waste collection, and other stakeholder groups is essential.

Regular encroachment of turning vehicles into opposing lanes will occur at intersections. Therefore, frequency of transit service, traffic volumes, and the speeds at those intersections must be considered when designing intersections. For fire and rescue, determination of the importance of the street for community access should be determined, e.g. primary or secondary access.

The designer should evaluate intersections using turning templates or turning movement analysis software to ensure that adequate operation of vehicles can occur. Treatment of on-street parking around intersections should be evaluated during this analysis to identify potential conflicts between turning vehicles and on-street parking.

E.2 Sight Distance

See CHAPTER 3 GEOMETRIC DESIGN, C.3 Sight Distance

E.2.a Stopping Sight Distance

See CHAPTER 3 GEOMETRIC DESIGN, C.3.a Stopping Sight Distance.

E.2.b Passing Sight Distance

Due to the importance of low speeds and concerns for pedestrian comfort and safety, passing should be discouraged or prohibited.

E.2.c Intersection Sight Distance

Sight distance should be calculated in accordance with CHAPTER 3, Section C.9.b, using the appropriate design speeds for the street being evaluated. When executing a crossing or turning maneuver after stopping at a stop sign, stop bar, or crosswalk, as required in Section 316.123, F.S., it is assumed that the vehicle will move slowly forward to obtain sight distance (without intruding into the crossing travel lane) stopping a second time as necessary.

Therefore, when curb extensions are used, or on-street parking is in place, the vehicle can be assumed to move forward on the second step movement, stopping just shy of the travel lane, increasing the driver's potential to see further than when stopped at the stop bar. The resulting increased sight distance provided by the two step movement allows parking to be located closer to the intersection.

The MUTCD requires that on-street parking be located at least 20 feet from crosswalks. The minimum stopping sight distance is 60 feet for low volume (< 400 ADT) streets. Even on slow speed, low volume urban streets, the combination of curb return, crosswalk width and 20-foot setback to the first parking space may not meet the minimum stopping distance. Justification for locating parking spaces 20 feet from crosswalks may be achieved based on community history with existing installations.

E.3 Horizontal Alignment

E.3.a Minimum Centerline Radius

See CHAPTER 3 GEOMETRIC DESIGN, C.4 Horizontal Alignment and Table 3-3 Horizontal Curvature, Low-Speed Urban Streets

E.3.b Minimum Curb Return Radius

Curb return radii should be kept small to keep intersections compact. The use of on-street parking and/or bike lanes increases the effective size of the curb radii, further improving the ability of design vehicles to negotiate turns without running over the curb return.

Table 19-1 Curb Return Radii

Movement Type	Design Speed	Curb Radius w/Parallel Parking*
Yield	Less than 20 mph	5-10 feet
Slow	20-25 mph	10-15 feet
Low	30-35 mph	15-20 feet

* Dimensions with parking on each leg of the intersection. Both tangent sections adjacent to the curb return must provide for on-street parking or else curb radii must be evaluated using "design vehicle" and either software or turning templates.

E.4 Vertical Alignment

See CHAPTER 3 GEOMETRIC DESIGN, C.5 Vertical Alignment.

E.5 Cross Section Elements

E.5.a Introduction

As discussed earlier in this chapter, TND street design places importance on how the streets are treated since they are part of the public realm. The street portion of the public realm is shaped by the features and cross section elements used in creating the street. For this reason, it is necessary the designer pay more attention to what features are included, where they are placed, and how the cross section elements are assembled.

E.5.b Lane Width

Travel lane widths should be based on the context and desired speed for the area where the street is located. Table 19-2 shows travel lane widths and associated appropriate speeds. It is important to note that in low speed urban environments, lane widths are typically measured to the curb face instead of the edge of the gutter pan. Consequently, when curb sections with gutter pans are used, the motor vehicle and parking lanes include the width of the gutter pan.

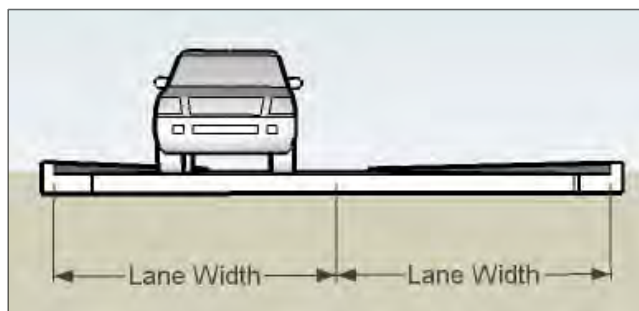
Table 19-2 Minimum Lane Width

Movement Type	Design Speed	Travel Lane Width
Yield*	Less than 20 mph	N/A
Slow	20-25 mph	9-10 feet
Low	30-35 mph	10-11 feet

* Yield streets are typically residential two-way streets with parking on one or both sides. When the street is parked both sides, the remaining space between parked vehicles (10 feet minimum) is adequate for one vehicle to pass through. Minimum width for a yield street with parking on both sides should be 24 feet curb face to curb face. Minimum width for a yield street with parking on one side should be 20 feet curb face to curb face, allowing for two 10-foot lanes when the street is not parked.

Figure 19-3 shows a typical measurement.

Figure 19-3 Lane Width



(Source: VHB)

In order for drivers to understand the appropriate driving speeds, lane widths should create some level of discomfort when driving too fast. The presence of on-street parking is important in achieving the speeds shown in Table 19-2. When bicycle lanes or multi-lane configurations are used, there is more room for vehicles, such as buses, to operate. However car drivers may feel more comfortable driving faster than desired.

Alleys and narrow roadways that act as shared spaces can have design speeds as low as 10 mph, as noted in CHAPTER 16 RESIDENTIAL STREET DESIGN.

Alleys can be designed as either one way or two way. Right of way width should be a minimum of 20 feet with no permanent structures within the right of way that would interfere with vehicle access to garages or parking spaces, access for trash collection, and other operational needs. Pavement width should be a minimum of 12 feet. Coordination with local municipalities on operational requirements is essential to ensure that trash collection and fire protection services can be completed.

E.5.c Medians

Medians used in low-speed urban thoroughfares provide for access management, turning traffic, safety, pedestrian refuge, landscaping, lighting, and utilities. These medians are usually raised with raised curb.

Landscaped medians can enhance the street or help create a gateway entrance into a community. Medians can be used to create tree canopies over travel lanes for multi-lane roadways contributing to a sense of enclosure.

Medians vary in width depending on available right of way and function. Because medians require a wider right of way, the designer must weigh the benefits of a median with the issues of pedestrian crossing distance, speed, context, and available roadside width.

Table 19-3 Recommended Median Width

Median Type	Minimum Width	Recommended Width
Median for access control	4 feet	6 feet
Median for pedestrian refuge	6 feet	8 feet
Median for trees and lighting	6 feet [1]	10 feet [2]
Median for single left turn lane	10 feet [3]	14 feet [4]

Table Notes:

- [1] Six feet measured curb face to curb face is generally considered the minimum width for the proper growth of small caliper trees (less than 4 inches),
- [2] Wider medians provide room for larger caliper trees and more extensive landscaping,
- [3] A ten foot lane provides for a turn lane without a concrete traffic separator,
- [4] Fourteen feet provides for a turn lane with a concrete traffic separator.

E.5.d Turn Lanes

The need for turn lanes for vehicle mobility should be balanced with the need to manage vehicle speeds and the potential impact on the border width, such as sidewalk width. Turn lanes tend to allow through vehicles to maintain higher speeds through intersections, since turning vehicles can move over and slow in the turn lane.

Left turn lanes are considered to be acceptable in an urban environment since there are negative impacts to roadway capacity when left turns block the through movement of vehicles. The installation of a left turn lane can be beneficial when used to perform a road diet such as reducing a four lane section to three lanes with the center lane providing for turning movements. In urban areas, no more than one left turn lane should be provided.

Right turns from through lanes do not block through movements, but do create a reduction in speed due to the slowing of turning vehicles. Right turn lanes are used to maintain speed through intersections, and to reduce the potential for rear end crashes. However, the installation of right turn lanes increases the crossing distance for pedestrians and the speed of vehicles, therefore the use of exclusive right turn lanes are rarely used except at "T" intersections.

E.5.e Parking

On-street parking is important in the urban environment for the success of those retail businesses that line the street, to provide a buffer for the pedestrian, and to help calm traffic speeds. When angle parking is proposed for on-street parking, designers should consider the use of back in angle parking in lieu of front in angle parking.

Table 19-4 Parking Lane Width

Movement Type	Design Speed	Parking Lane Width
Slow	20-25 mph	(Angle) 17-18 feet
Slow	20-25 mph	(Parallel) 7 feet
Low	30-35 mph	(Parallel) 7-8 feet

E.6 Cul-de-sacs and Turnarounds

Cul-de-sacs should only be used where no other alternatives exist. Cul-de-sacs should have walkway or bicycle connections to other sidewalks and streets to provide connectivity within and to adjacent neighborhoods.

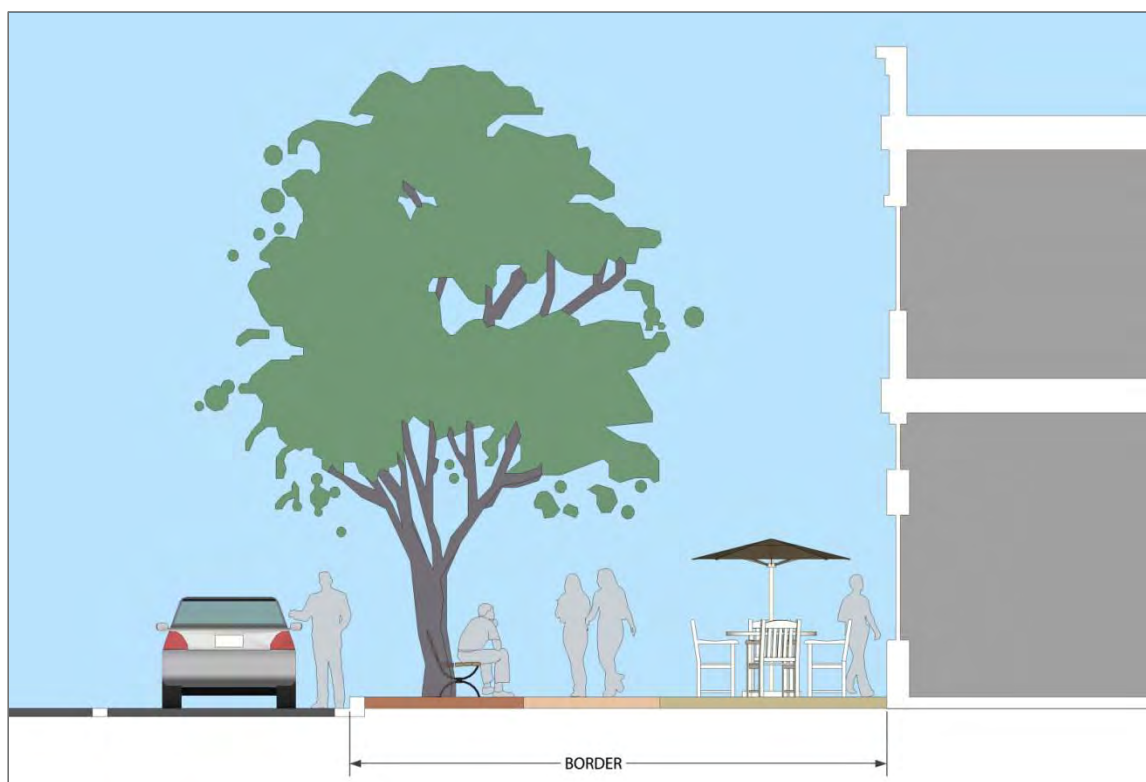
E.6.a Turning Area

A residential street open at one end only should have a special turning area at the closed end. A residential street more than 100 feet long and open at one end only shall have a special turning area at the closed end. This turning area should be circular and have a radius appropriate to the types of vehicle expected. The minimum outside radius of a cul-de-sac shall be 30 feet. In constrained circumstances, other turning configurations such as a “hammerhead” may be considered.

E.7 Pedestrian Considerations

In urban environments, the “border,” or area between the face of a building or right of way line and the curb face, serves as the pedestrian realm because it is the place for which pedestrian activity is provided, including space to walk, socialize, places for street furniture, landscaping, and outdoor cafes. In an urban environment, the border consists of the furniture, walking and shy zones.

Figure 19-4 Border



(Source: VHB)

E.7.a Furniture Zone

The furniture zone can be located adjacent to the building face, but more commonly is adjacent to the curb face. The furniture zone contains parking meters, lighting, tree planters, benches, trash receptacles, magazine and newspaper racks, and other street furniture. The furniture zone is separate from the walking/pedestrian and shy zones to keep the walking area clear for pedestrians, including proper access to transit stops.

E.7.b Walking/Pedestrian Zone

Chapter 8 addresses considerations for pedestrians. In a properly designed urban environment, where buildings are at the back of the sidewalk and vehicle speeds are low, the separation from traffic is normally provided by on-street parking, which also helps to calm traffic. The width of the walking/pedestrian zone should be at least four feet and should be increased based on expected pedestrian activity.

E.7.c Shy Zone

The shy zone is the area adjacent to buildings and fences that pedestrians generally “shy” away from. A minimum of one foot is provided as part of the sidewalk width. This space should not be included in the normal walking zone of the sidewalk.

E.7.d Mid-Block Crossings

Properly designed TND communities will not normally require mid-block crossings due to the use of shorter block size. When mid-block crossings are necessary, the use of curb extensions or bulbouts should be considered to reduce the crossing distance for pedestrians.

E.7.e Curb Extensions

Curb extensions are helpful tools for reducing the crossing distance for pedestrians, providing a location for transit stops, managing the location of parking, providing unobstructed access to fire and rescue, and increasing space for landscaping and street furniture.

Designers should coordinate with public works staff to ensure that street cleaning can be achieved with their equipment, and adequate drainage can be provided to avoid ponding at curb extensions.

E.8 Bicyclist Considerations

E.8.a Bicycle Facilities

Chapter 9 contains information on bicycle facilities. This section is directed to designing bike facilities in TND communities. Designing for bicycles on thoroughfares in TND communities should be as follows: bicycles and motor vehicles should share lanes on thoroughfares with design speeds of twenty five mph or less. It is important to recognize that the addition of bike lanes does increase roadway widths and can increase the tendency for drivers to speed.

When bicycle lanes are used in TND communities, they should be a minimum of 5 feet wide and designated as bike lanes. On curb and gutter roadways, a minimum 4-foot width measured from the lip of the gutter is required. The gutter width should not be considered part of the rideable surface area, but this width provides useable clearance to the curb face. Drainage inlets, grates, and utility covers are potential problems for bicyclists. When a roadway is designed, all such grates and covers should be kept out of the bicyclists' expected path. If drainage inlets are located in the expected path of bicyclists, they should be flush with the pavement, well seated, and have bicycle compatible grates.

Where parking is present, the bicycle lane should be placed between the parking lane and the travel lane, and have a minimum width of 5 feet. Designers should consider increasing the bicycle lane to 6 feet in lieu of increasing parallel parking width from 7 to 8 feet. This helps encourage vehicles to park closer to the curb, and provides more room for door swing, potentially reducing conflict with bicyclists.

Shared lane markings, or "sharrows," can be used instead of bicycle lanes adjacent to on-street parking. The sharrow allows the bicyclist to occupy the lane and therefore avoids placing bicyclists in the "door zone", and does not require an increase in lane width or ROW width for the thoroughfare. Guidance for use of the shared lane marking is included in Chapter 9, Bicycle Facilities and the 2009 MUTCD. See Figure 9-3 for a detailed drawing of a shared lane marking.

E.8.b Shared Use Paths

Greenways, waterfront walks, and other civic spaces should include shared use paths, and provide for bicycle storage or parking. Bicycle storage or parking should also be included in areas near transit facilities to maximize connectivity between the modes.

E.9 Transit

See “Accessing Transit, Design Handbook for Florida Bus Passenger Facilities, 2008” for information: http://www.dot.state.fl.us/transit/Pages/2008_Transit_Handbook.pdf

E.10 Clear Zone

In urban areas, horizontal clearances, based on clear zone requirements for rural highways, are not practical because urban areas are characterized by lower speed, more dense abutting development, closer spaced intersections and accesses to property, higher traffic volumes, more bicyclists and pedestrians, and restricted right of way. The minimum horizontal clearance shall be 1.5 feet measured from the face of curb.

Streets with curb, or curb and gutter, in urban areas where right of way is restricted do not have roadsides of sufficient widths to provide clear zones; therefore, while there are specific horizontal clearance requirements for these streets, they are based on clearances for normal operation and not based on maintaining a clear roadside for errant vehicles. It should be noted that curb has essentially no redirection capability; therefore, curb should not be considered effective in shielding a hazard.

F REFERENCES FOR INFORMATIONAL PURPOSES

The following publications were either used in the preparation of this chapter, or may be helpful in designing TND Communities and understanding the flexibility in AASHTO design criteria:

1. Draft ITE Recommended Practice: Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, 2006
<http://www.ite.org/css/>
2. SmartCode 9.2 <http://www.smartcodecentral.org/>
3. A Guide for Achieving Flexibility in Highway Design, AASHTO, May, 2004
4. Accessing Transit, Design Handbook for Florida Bus Passenger Facilities, 2008, FDOT Public Transit Office:
http://www.dot.state.fl.us/transit/Pages/2008_Transit_Handbook.pdf
5. Safe Routes to Schools Program, FDOT Safety Office:
http://www.dot.state.fl.us/Safety/SRTS_files/SRTS.shtm

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FDOT APPLICATION FORM FOR PLANNING STUDIES



**THIS FORM SHALL BE SUBMITTED FOR ALL PROJECTS
NOT CURRENTLY IN THE FDOT WORK PROGRAM.**

**FDOT
PLANNING STUDIES
INFORMATION
APPLICATION FORM**

As Requested by an MPO or Other Entity

Applicant Agency/Organization:

Contact Person:

Name:

Title:

Address:

Email:

Phone:

FAX:

Corridor:

S.R. #

Limits: From:

To:

County:

Attach the following to the application:

- A map showing location of the area of interest. Label important features, locations, roadways, or additional description to help FDOT understand the scope of the proposed planning study.
- Scope of work for the desired planning study.
- Proposed schedule for the planning study.

Answer the following questions thoroughly:

1. Problem/ Study Description *(please be as comprehensive as possible and use additional pages if necessary)*

- (a) What is the perceived problem being addressed with this study? (e.g. congestion, lack of multi-modal access, safety, economic development, etc.)

- (b) Who are the key stakeholders that should be engaged to understand the problem and potential alternatives?

- (c) What level of cooperation and/or controversy is anticipated?

- (d) What are the major land use and transportation issues and opportunities that need to be considered?

- (e) What development is currently on-going or planned along the corridor?

- (f) What level of complexity of planning study is anticipated? Simple, moderate, or complex (refer to the FDOT District 5 Planning Guidebook for levels of complexity)?

- (g) What level (order of magnitude) of funding is anticipated for the planning study?

- (h) Please indicate what other non-FDOT funding sources you have secured or applied for to fund this planning study (Federal, local, and other sources)?

- (i) What is the anticipated time frame of this study? Are there any critical timeline issues should FDOT know about in relation to conducting this study?

2. **Has this problem been identified and/or described in other studies conducted by the Study Sponsor or local municipality? If yes, specify study name and date.** *Studies can include local comprehensive plans, small area plans, redevelopment plans, master plans, etc.*
3. **Has this problem been identified and/or described in regional and statewide plans and/or priority lists? If yes, specify the study name and date and attach a copy of the study.** *Studies can include State plans, LRTPs, transit development plans, priority lists, feasibility studies, etc.*
4. **Was FDOT involved in any of the previous studies? List the names and unit of the FDOT representatives previously involved.**
5. **Problem Priority** *(If the study is listed on the MPO or TPO's priority lists, specify relative priority. If you are submitting other planning studies at the same time, specify relative priority to other applications submitted.)*
6. **Describe any special characteristics or features of the problem and/or study area that have not been outlined elsewhere in this application.**



SCOPE ELEMENTS AND SCHEDULES FOR PLANNING STUDIES

Elements of Scope of Services for Planning Studies

Scopes of Services for the planning phase of the project development process should be tailored to the problem and subject of the study. Although Key critical issues and level of detail of information needed to understand the trade-offs of alternatives relative to these critical issues will vary, there are some key elements that should be considered for all planning studies. These elements relate back to the planning steps outlined in Section 3 of the Multi-modal Corridor Planning Guidebook. Each of these elements should include the intended outcome of the task and the deliverables that should be produced during the task.

Key Scope Elements:

- 1. Purpose of the Study** – this should describe the purpose of the study, the general problem/opportunity that should be explored and the initial identification of the agencies that are likely to be involved in the study
- 2. Stakeholder and Public Engagement** – this element should describe how stakeholders and the public will be engaged in the study in general terms. The level of detail will depend on the history of the problem/study and the background or work performed previously. This should be tailored to what is learned during the initial stakeholder outreach. The outreach plan or strategy should be developed in response to what is known prior to and what is learned during the initial stakeholder engagement. The general level of engagement and methods of engagement should be outlined, with an understanding that these may change based on input received during initial engagement.
- 3. Data Collection** – this element should outline the transportation, land use, environmental, and other data that is needed to understand the existing and future conditions in the corridor or study area, as well as major influences outside of the study area that could affect travel or land use patterns within the study area.
- 4. Synthesis of Information** – this scope element should provide guidance on how the information collected will be synthesized and summarized so that stakeholders and key decision-makers can easily comprehend what is learned and what it means to the study area
- 5. Definition of Guiding Principles** – this element results in a set of principles that relate to the land use and transportation vision of the study area, the users or modes to be served and the desired role of the transportation facility or network that is being studied
- 6. Definition of Purpose and Need** – this step defines the problem and/or opportunities that should be addressed with the solutions/alternatives developed in the study. This should be fact-based and relate to the data that was collected and synthesized; this should also incorporate the guiding principles.

7. Definition of Measures of Success - this is the element that defines how the alternatives that are developed will be compared to each other and against the purpose, need and guiding principles that have been developed and vetted with stakeholders. This task must be completed prior to the task of developing alternatives.

8. Definition of Alternatives – this scope task should provide guidance on the number and general type (if known at the time of writing the scope) of alternatives that should be developed during the study. These should include alternatives that are either mode-specific or incorporate multiple modes, as determined through the data collection, guiding principles and purpose and need. The level of detail needed for these alternatives should be defined, and should remain at the planning/concept level, keeping in mind that the conclusion of the planning study does not often go directly into the design phase.

9. Comparison of Alternatives – this scope element should describe how the alternatives will be evaluated and compared against each other and against the evaluation measures that have been agreed upon by the stakeholders. For moderate and complex problems, this evaluation may be conducted in stages, with the first stage relying on qualitative analyses and the final phase relying on more detailed and quantitative analyses.

10. Selection of Alternatives and Definition of Next Steps - the final step in the scope is the selection of an alternative and identification of next steps. This should be tailored to the problem under consideration and the input received from stakeholders to date. The process for selecting the preferred alternative should have been vetted during the initial stakeholder engagement to avoid challenges in selecting an alternative to move forward. There are often many tasks that make up the preferred alternative, including both transportation and land use activities.

11. Documentation of Study – this element should outline the format and details of the final report for this study. It should include both technical information and summaries of technical information to satisfy the various requirements of decision-makers.

12. Management and Communication– this element should include how the sponsor and the study team will communicate and manage the study.

Schedules for Planning Studies

The schedules for each planning study should be tailored to the context of the problem and the stakeholders involved. The following show potential schedules for simple, moderate, and complex planning studies.

THESE SHOULD NOT BE USED AS BASIS FOR DEVELOPING ACTUAL SCHEDULES FOR PLANNING STUDIES. Schedules should be developed by the project proponent jointly with key stakeholders and should consider critical timelines and scheduled public events or regular agency meetings.

SIMPLE PROJECT (1 TO 3 MONTHS)

TASKS	MONTH 1	MONTH 2	MONTH 3
1. Stakeholder & Public Engagement			
2. Data Collection			
3. Synthesis of Information			
4. Definition of Guiding Principles			
5. Definition of Purpose and Need			
6. Definition of Measures of Success			
7. Definition of Alternatives			
8. Comparison and Selection of Alternatives			
9. Definition of Next Steps			
10. Study Documentation & Presentation			
11. Management & Communication			

Ignite the Torch Meeting

MODERATE PROJECT (6 TO 12 MONTHS)

TASKS	MONTH 1	MONTH 2	MONTH 3	MONTH 4
1. Stakeholder & Public Engagement				
Conduct Stakeholder Interviews				
Conduct Advisory Group Meetings				
Conduct Coordination Meetings with other FDOT Units				
Conduct Public and Community Planning Workshops				
2. Data Collection				
3. Synthesis of Information				
4. Definition of Guiding Principles				
5. Definition of Purpose and Need				
6. Definition of Measures of Success				
7. Definition of Alternatives				
8. Comparison and Selection of Alternatives				
9. Definition of Next Steps				
10. Study Documentation & Presentation				
11. Management & Communication				



Advisory Group Meetings



FDOT Meetings with other Units



Public Workshops



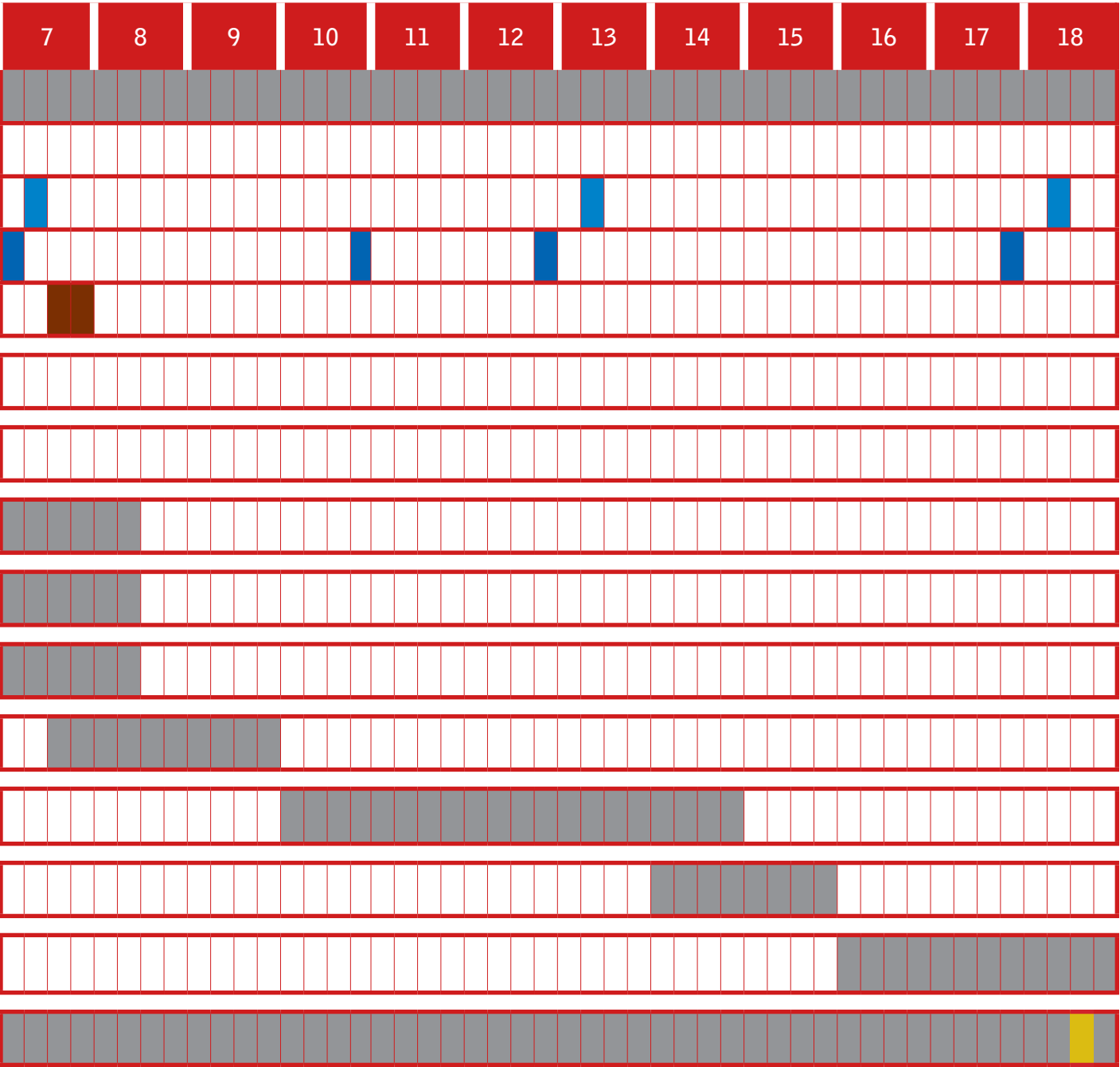
Ignite the Torch Meeting

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COMPLEX PROJECT (12 TO 24 MONTHS)

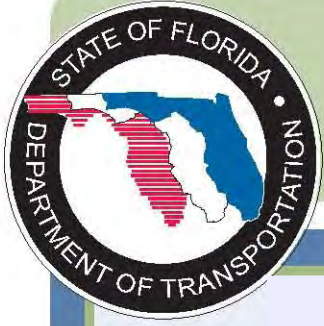
TASKS	1	2	3	4	5	6
1. Stakeholder & Public Engagement						
Conduct Stakeholder Interviews						
Conduct Advisory Group Meetings						
Conduct Coordination Meetings with other FDOT Units						
Conduct Public and Community Planning Workshop						
2. Data Collection						
3. Synthesis of Information						
4. Definition of Guiding Principles						
5. Definition of Purpose and Need						
6. Definition of Measures of Success						
7. Definition of Alternatives						
8. Comparison and Selection of Alternatives						
9. Definition of Next Steps						
10. Study Documentation & Presentation						
11. Management & Communication						

- Advisory Group Meetings
- FDOT Meetings with other Units
- Public Workshops
- Ignite the Torch Meeting





INTEGRATION OF TRANSIT ACCESS AND PEDESTRIAN SAFETY INTO INTERMODAL PROJECT DEVELOPMENT PROCESS



Integration of Transit Access and Pedestrian Safety into Intermodal Project Development Process

November 2011

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Introduction

In addition to carrying a significant proportion of automobile and truck traffic, State Highway System (SHS) facilities also serve as the backbone of many local bus transit systems. Data also indicates that the majority of pedestrian crashes occur along elements of the SHS—especially in urban areas. Each transit stop is a pedestrian trip attractor, and often, transit service is oriented to serve the same land uses that attract pedestrian trips. Hence, improving access to transit stops and enhancing pedestrian safety along transit corridors provides a dual benefit: better utilization of existing federal, state, and local investments in transit service and potential reduction in pedestrian crashes.

While acute transit access and pedestrian safety issues may require development and implementation of stand-alone projects, leveraging the design, mobilization, maintenance of traffic, and inspection phases of existing/planned maintenance and capacity projects provides a much more efficient use of the Department's resources. Because many urban transit corridors are constrained, and are therefore unlikely to be the subject of capacity projects, the most practical/cost-effective means to improve transit access and affect pedestrian safety enhancements will be through the Department's maintenance programs. Because these projects do not, as a rule, include formal planning or preliminary design phases, additional front end work is necessary to ensure issues are brought to the fore and low-cost opportunities are not missed.

Recently, the District undertook a pilot project to assess the added value of incorporating transit agency perspectives in field review and scoping of select corridors where 3R projects are planned. Because of this input, and the input of pedestrian safety experts, short term (low/no-cost) and longer term (medium cost) transit access and pedestrian safety improvements were identified. This document provides for a methodology, to be implemented by the District's Intermodal Systems Development (ISD) group, to engage transit agency planning and operations staff and pedestrian safety experts (as necessary) to conduct preliminary reviews of key transit corridors¹ in order to identify transit access and pedestrian safety improvement opportunities for consideration in 3R and other State Highway System project scope development.

Because FDOT does not have direct experience in planning and operating transit systems, it is imperative that transit agency planning and operations staff be engaged in the project development process early, to ensure that issues and opportunities are identified prior to design. In addition to guidance for integrating local agency transit expertise into the FDOT process, this document also provides technical information related to identifying pedestrian safety issues and opportunities specific to transit stop location and along major roadway corridors in general.

¹ Based on preliminary recommendations from the "Pilot Project," ISD has already cross-referenced critical transit corridors, pedestrian sidewalk gaps, and the state transportation improvement program to develop a target list of "key transit corridors".

Transit Agency Engagement/Coordination

Transit Agency Staff Resources

Based on the outcomes of the Pilot Project, both transit agency planning and operations staff should be included in ISD's transit access and pedestrian safety corridor review process. Planning staff is able to provide a broad perspective on route alignment decisions, route transfer parameters, overall corridor issues and rider demographics. Operations staff complements this knowledge by introducing information related to specific stop location decisions and access issues, bus on-time performance and route navigation issues, and bus operation traffic safety concerns. Appendix A of this document includes contact information for planning and operations staff for each of the following District 5 transit agencies:

- Central Florida Regional Transportation Authority (LYNX)
- Volusia County Public Transportation (Votran)
- Ocala/Marion Transit (SunTran)
- Lake County Transit (LakeXpress)
- Space Coast Area Transit (SCAT)

Transit Agency Field Review Timeline

To ensure adequate time to collect preliminary data, conduct joint field reviews, and provide recommendations to the FDOT Scope Development Team, the following schedule of activities shall be followed when conducting Transit Access and Pedestrian Safety corridor reviews:

Table 1: Schedule of Activities

Activity	Weeks prior to FDOT Scope Development
Schedule preferred and alternative field review dates/request corridor data	16
Corridor data exchange	14
Preliminary meeting to review/clarify corridor data (optional)	12
Corridor field review with transit agency planning and operations staff	10
Field review debriefing session with transit agency staff	10
Preparation of draft transit access and pedestrian safety report	8
Transit agency and ISD review and comment on draft report	6
Revisions to draft issues and opportunities report	4
ISD management review and transmittal to FDOT Scoping Team Leader	2

Transit Access/Pedestrian Safety Data Needs

As discussed below, specific data assets should be collected, exchanged, and assessed by transit agency and ISD staff prior to conducting Transit Access and Pedestrian Safety corridor reviews. Much of this data can be collected on a system-wide level for easy retrieval prior to planned field reviews. Responsibility for collecting these data elements is as follows:

- Roadway and Traffic Characteristics – FDOT/ISD
- Crash Data – FDOT/ISD
- Transit Route/Stop Data – Transit Agency
- Land Use Characteristics – Transit Agency
- Additional Traffic Operational Data (Optional) – FDOT/ISD

Where feasible, these data elements should be illustrated using GIS mapping and plotted/printed as necessary to facilitate easy reference during field review.

Roadway and Traffic Characteristics

While additional roadway and traffic characteristics data may be necessary to evaluate the recommendations identified as part of a Transit Access and Pedestrian Safety corridor review, the following basic elements should be identified and assessed prior to field review activities:

- Roadway cross-section
 - Number of lanes
 - Median type
 - Shoulder type
 - Sidewalk/sidewalk gaps
 - Bike lanes/side paths
 - Estimated lane widths
- Posted speed limit
- Annual average daily traffic (AADT)
- Signalized intersections/marked crosswalks
- Roadway and intersection lighting
- Access management classification

Crash Data

Crash data plotted in GIS format (or CADD) should, at a minimum, convey the following information:

- Crash location
- Bicycle or pedestrian
- Accident severity
- Daytime/nighttime

Crash data is readily available from the Department's mainframe Crash Analysis and Reporting System (CARS) and can be plotted in GIS format using the roadway route ID and milepost information included in the crash data extracts. From a programmatic standpoint it is recommended that a 3 – 5 year district-wide bicycle and pedestrian crash data extract be obtained annually and converted to GIS format with current aerial imagery backgrounds to facilitate transit-pedestrian safety corridor reviews.

Individual bicycle, pedestrian, and transit vehicle crash reports should be provided electronically to the review team and read prior to the field review activities.

Transit Route/Stop Data

As part of the transit-pedestrian safety corridor review program, transit routes and stops should be plotted in GIS format with current aerial image backgrounds. The following information should be shown:

- Bus stop locations by side of road labeled with applicable transit agency stop numbers
- Existing/planned bus shelter or transfer center locations
- Daily boardings and alightings (using colored or scaled symbols)
- Transit routes showing directionality of any route deviations

In addition to existing conditions, planned changes to transit service (as documented in the transit agency's Transit Development Plan) should be noted.

Land Use Characteristics

Prior to conducting preliminary and project team field review, key land uses likely to generate/attract pedestrian trips should be reviewed using aerial imagery and/or property appraiser data. Relevant land uses and demographic data include:

- Shopping centers
- Convenience stores
- Schools (especially post-secondary schools)
- Public and quasi-public uses (government centers, social services providers, hospitals/clinics)
- Major employment generators
- Multi-family residential developments
- Existing and projected corridor demographic data (e.g. population, employment, percent poverty, auto ownership, income)

Corridor Review Technical Methodology

A comprehensive list of pedestrian safety and transit access field review prompt lists is included as part of FHWA's *Pedestrian Road Safety Audit Guidelines and Prompt Lists* (FHWA-SA-07-007). These prompt

lists are reproduced as Appendix B and the entire document may be downloaded in full from the Walkinginfo.org website maintained by the Pedestrian and Bicycle Information Center at the University of North Carolina's Highway Safety Research Center at the following link:

<http://www.walkinginfo.org/library/details.cfm?id=3955>

It is recommended that the Transit Access and Pedestrian Safety Corridor Review teams review the entire document to more fully understand the purpose and use of the prompt lists prior to engaging in field reviews. Consideration should be given to a training session on the interpretation and use of the prompt lists.

A summary of key considerations based on the findings of the Pilot Project and information contained in the *Pedestrian Road Safety Audit Guidelines* are summarized below. Please note that some elements may not be within the scope of 3R/ maintenance projects unless supplemental funding is identified.

1. **Lighting:** A disproportionate number of pedestrian crashes and pedestrian fatalities occur at night. Although many urban roadways include roadway lighting and/or are partially illuminated by adjacent commercial properties, transit stop locations may not correspond with existing lighting elements, and roadway lighting may not be designed specifically to illuminate crosswalk areas at signalized intersections, stop-controlled local street approaches, sidewalk crossings of major commercial driveways, and un-signalized mid-block crossings.
 - a. Where possible, transit stops should be located near/under existing lighting features.
 - b. Lighting at signalized intersections or other marked crosswalks should be evaluated to ensure that the crosswalk areas are adequately illuminated.
2. **Signalized Intersections:** Along most state highway corridors, signalized intersections are the sole opportunities for pedestrians to cross the highway with the benefit of a traffic control device. As such, measures to enhance pedestrian safety at signalized intersections are of paramount importance. The following elements should be considered when assessing pedestrian safety at signalized intersections:
 - a. *Right-turn treatments:*
 - i. Do curb radii enable high-speed right-turn movements? Will reducing curb radii also reduce required pedestrian intervals?
 - ii. Can radii be reduced without reconstruction of drainage systems or restriction of truck turning movements?
 - iii. Is a right-turn lane provided? If not, will curb radii reduction reduce intersection capacity and potentially increase rear-end crashes?
 - iv. Can a (non-free flow) right-turn island be constructed in lieu of reducing the curb radii (be sure the design is consistent with the FHWA preferred design to

focus drivers' attention on the crosswalk area, better accommodate motility of older drivers, and reduce the incidence of sideswipe crashes)?

- v. Are crosswalks/ramps situated so that pedestrians are clearly visible to right-turning drivers?

b. *Left-turn treatments:*

- i. Are left turns operated on protected or permissive phase? Does pedestrian volume, pedestrian crash history, or overall crash history indicate protected-only phasing should be considered?
- ii. Is it possible to retrofit the intersection with the "flashing yellow arrow" left-turn signal such that a protected-only phase can be provided when a pedestrian activates the push-button or during peak traffic periods?

c. *Pedestrian signals:*

- i. Are pedestrian signals clearly visible/properly aligned?
- ii. Are pedestrian push buttons functioning correctly and positioned consistent with ADA requirements?
- iii. Are crossing intervals adequate? Can the "Walk" indication be set to "recall" with the mainline green signal?
- iv. Do crossing signals have audible features?

d. *Transit stop locations:* Transit operations are optimized when bus stops are sited at the far side of signalized locations and pedestrian safety benefits from bus stops being as close to the intersection as possible. However, when buses stop very near to signalized intersections, traffic operations may be adversely impacted and sideswipe crashes may occur as drivers attempt to "whip" around the stopped bus.

- i. Can bus stops near signalized intersections be moved closer to the signal (preferably to a far-side location)?
- ii. Can bus bays be provided to reduce traffic conflicts at bus-stops located very near to signals?
- iii. Are there intersecting (transfer) routes that impact the location of stops near signals?
- iv. If a bus stop is near a signal, but not within 5 –100 ft because of conflicts such as driveways, right-turn lanes, or other constraints, can the bus stop be relocated outside of the signal's influence area?

- 3. **Mid-block Transit Stop Locations:** Because many state highways do not have more than two signals per mile, even in urban areas, transit stops routinely are located at unsignalized locations. Determining whether these stops can be shifted to adjacent signalized locations or

situated to take advantage of an existing or potential median refuge can enhance the overall safety of transit customers.

- a. Proximity to lighting: Can a stop, especially one without an existing pad or shelter, be shifted to take advantage of existing lighting to enhance the security of transit users and help to illuminate patrons who choose to cross the state highway adjacent to the transit stop? If a concrete pad or shelter already is sited in a poorly-lit location, can lighting along the corridor be supplemented (using an existing utility pole, if possible) to help illuminate the spot?
- b. Proximity to median refuge: When possible, transit stops should be sited such that patrons who choose to cross the state highway adjacent to the transit stop can take advantage of existing median refuge islands. Can a transit stop be shifted or combined with an adjacent stop to improve its proximity to an existing raised median? Can a raised median island be constructed (typically within a two-way left-turn lane) to provide mid-block refuge for transit patrons?
- c. *Consideration of marked crosswalks:* Most transit agencies have stop-level passenger volume data. Based on stop-level data, field observations, and pedestrian counts, do stop locations merit consideration for marked crosswalks consistent with Chapter 3.8 of the *FDOT Transportation Engineering Manual*? If a crosswalk is merited, but the stop is within 660 ft of a signalized intersection, can the stop be relocated to the signal or moved further from the signal such that a marked crosswalk (with proper traffic control/warning devices) will not pose a hazard?
- d. Americans with Disabilities Act (ADA) access/bus bays: Detailed ADA review is conducted as part of project design, but early identification of gross ADA access issues may provide opportunities to implement solutions that address both ADA and pedestrian safety issues. Can mid-block bus stops along rural sections (separated from the sidewalk by a drainage swale) be relocated to existing signalized locations? Can ADA-accessible bus bays be constructed near the signals at a comparable cost to correcting the ADA access issues? If a drainage swale is to be filled and piped to provide for ADA access, can a bus bay also be provided to reduce friction on the roadway adjacent to the stopped bus?

Conclusion

The FDOT has taken a proactive approach to reviewing pedestrian and transit safety and access into the roadway project development and design process. This report provides initial guidance on coordination between FDOT and transit agencies on items to consider from all roadway user perspectives. Evaluation

of planning processes focused on incorporating transit and pedestrian accessibility into roadway design for intersection, maintenance, and resurfacing projects included in the District 5 Work Program. _Potential improvements will be developed through this study process. Whether study recommendations will be able to be included in Work Program projects will depend on the cost, benefit and availability of FDOT and local agency funds. Some study recommendations may be considered in future projects.

Appendix A: Transit Agency Planning and Operations Staff Contact List

FDOT District 5 Transit Agency Contacts							
Agency Name	Head of Agency	Planning Director	Phone Number	Email Address	Operations Director	Phone Number	Email Address
LYNX	John Lewis	Tony Walter	407.254.6009	twalter@golynx.com	Lisa Darnall	407.254.6036	ldarnall@golynx.com
VOTRAN	Ken Fischer	Heather Blanck	386.756.7496 x 4112	hbalnck@co.volusia.fl.us	Elizabeth Suchsland	386.756.7496	esuchsland@co.volusia.fl.us
SCAT	Jim Liesenfelt	Jim Liesenfelt	321.635.7815	jim.liesenfelt@brevardcounty.us	Scott Nelson	321.635.7815 x 401	scott.nelson@brevardcounty.us
Lake	Kenneth Harley	Kenneth Harley	352.742.6580	kharley@lakecountyfl.gov	David Hope, MV Transit	(352) 326-8637	dhope@mvtransit.com
Suntran	Greg Slay	Steven Neal	352.401.6999	sneal@ocalafl.org	Steven Neal, McDonald Transit	352.401.6999	sneal@ocalafl.org

Appendix B: Pedestrian RSA Prompt Lists

Master Prompt List

RSA Matrix

Universal Considerations (For Entire RSA Site)	Topic	Subtopic	RSA Zones			
			A. Streets	B. Street Crossings	C. Parking Areas/Adjacent Developments	D. Transit Areas
I. Needs of Pedestrians: Do pedestrian facilities address the needs of all pedestrians? II. Connectivity and Convenience of Pedestrian Facilities: Are safe, continuous, and convenient paths provided along pedestrian routes throughout the study area? III. Traffic: Are design, posted, and operating traffic speeds compatible with pedestrian safety? IV. Behavior: Do pedestrians or motorists regularly misuse or ignore pedestrian facilities? V. Construction: Have the effects of construction on all pedestrians been addressed adequately? VI. School Presence: Is the safety of children in school zones adequately considered?	Pedestrian Facilities	1. Presence, Design, and Placement	Sidewalks, paths, ramps, and buffers	Crossing treatments, intersections	Sidewalks and paths	Seating, shelter, waiting/loading/unloading areas
		2. Quality, Condition, and Obstructions	Sidewalks, paths, ramps, and buffers	Crossing treatments (see prompts in A)	Sidewalks and paths (see prompts in A)	Seating, shelter, waiting/loading/unloading areas (see prompts in A)
		3. Continuity and Connectivity	Continuity/Connectivity with other streets and crossings	Continuity/connectivity of crossing to ped network; channelization of peds to appropriate crossing points	Continuity/connectivity of pedestrian facilities through parking lots/adjacent developments	Connectivity of ped network to transit stops
		4. Lighting	Pedestrian level lighting along the street	Lighting of crossing	Pedestrian level lighting in parking lots/adjacent developments (see prompts in A and B)	Lighting at and near transit stop
		5. Visibility	Visibility of all road users	Visibility of crossing/waiting pedestrians and oncoming traffic	Visibility of pedestrians and backing/turning vehicles; visibility of pedestrian path	Visibility of pedestrians/waiting passengers and vehicles/buses
	Traffic	6. Access Management	Driveway placement and design along streets	Driveway placement next to intersections	Driveway placement and use in relation to pedestrian paths	n/a*
		7. Traffic Characteristics	Volume and speed of adjacent traffic, conflicting conditions	Volume and speed of traffic approaching crossing, conflicting movements	Traffic volume and speed in parking lots and developments, conflicting conditions	Volume and speed of adjacent traffic and traffic at crossings to bus stops, conflicting conditions
	Traffic Control Devices	8. Signs and Pavement Markings	Use and condition of signs, pavement markings, and route indicators	Use and condition of signs, pavement markings, and crossing indicators	Use and condition of signs, pavement markings for travel path and crossing points	Use and condition of transit-related signs and pavement markings
		9. Signals	n/a*	Presence, condition, timing, and phasing of signals	n/a*	See prompts in B

A. Streets

Master Prompt	Detailed Prompt		RSA Stages			
			planning	design	construction	post-construction
A.1 Presence, Design, and Placement	A.1.1	Are sidewalks provided along the street?	✓	✓	✓	✓
	A.1.2	If no sidewalk is present, is there a walkable shoulder (e.g. wide enough to accommodate cyclists/pedestrians) on the road or other pathway/trail nearby?	✓	✓	✓	✓
	A.1.3	Are shoulders/sidewalks provided on both sides of bridges?	✓	✓	✓	✓
	A.1.4	Is the sidewalk width adequate for pedestrian volumes?	✓	✓	✓	✓
	A.1.5	Is there adequate separation distance between vehicular traffic and pedestrians?	✓	✓	✓	✓
	A.1.6	Are sidewalk/street boundaries discernable to people with visual impairments?		✓	✓	✓
	A.1.7	Are ramps provided as an alternative to stairs?	✓	✓	✓	✓
A.2 Quality, Conditions, and Obstructions	A.2.1	Will snow storage disrupt pedestrian access or visibility?	✓	✓	✓	✓
	A.2.2	Is the path clear from both temporary and permanent obstructions?	✓	✓	✓	✓
	A.2.3	Is the walking surface too steep?	✓	✓	✓	✓
	A.2.4	Is the walking surface adequate and well-maintained?		✓	✓	✓
A.3 Continuity and Connectivity	A.3.1	Are sidewalks/walkable shoulders continuous and on both sides of the street?	✓	✓	✓	✓
	A.3.2	Are measures needed to direct pedestrians to safe crossing points and pedestrian access ways?		✓	✓	✓
A.4 Lighting	A.4.1	Is the sidewalk adequately lit?	✓	✓	✓	✓
	A.4.2	Does street lighting improve pedestrian visibility at night?	✓	✓	✓	✓
A.5 Visibility	A.5.1	Is the visibility of pedestrians walking along the sidewalk/shoulder adequate?	✓	✓	✓	✓
A.6 Driveways	A.6.1	Are the conditions at driveways intersecting sidewalks endangering pedestrians?		✓	✓	✓
	A.6.2	Does the number of driveways make the route undesirable for pedestrian travel?	✓	✓	✓	✓

A. Streets

Master Prompt	Detailed Prompt		RSA Stages			
			planning	design	construction	post-construction
A.7 Traffic Characteristics	A.7.1	Are there any conflicts between bicycles and pedestrians on sidewalks?				✓
A.8 Signs and Pavement Markings	A.8.1	Are pedestrian travel zones clearly delineated from other modes of traffic through the use of striping, colored and/or textured pavement, signing, and other methods?		✓	✓	✓
	A.8.2	Is the visibility of signs and pavement markings adequate during the day and night?		✓	✓	✓

B. Street Crossings

Master Prompt	Detailed Prompt		RSA Stages			
			planning	design	construction	post-construction
B.1 Presence, Design, and Placement	B.1.1	Do wide curb radii lengthen pedestrian crossing distances and encourage high-speed right turns?		✓	✓	✓
	B.1.2	Do channelized right turn lanes minimize conflicts with pedestrians?		✓	✓	✓
	B.1.3	Does a skewed intersection direct drivers' focus away from crossing pedestrians?	✓	✓	✓	✓
	B.1.4	Are pedestrian crossings located in areas where sight distance may be a problem?	✓	✓	✓	✓
	B.1.5	Do raised medians provide a safe waiting area (refuge) for pedestrians?	✓	✓	✓	✓
	B.1.6	Are supervised crossings adequately staffed by qualified crossing guards?				✓
	B.1.7	Are marked crosswalks wide enough?		✓	✓	✓
	B.1.8	Do at-grade railroad crossings accommodate pedestrians safely?		✓	✓	✓
	B.1.9	Are crosswalks sited along pedestrian desire lines?	✓	✓	✓	✓
	B.1.10	Are corners and curb ramps appropriately planned and designed at each approach to the crossing?		✓	✓	✓
B.2 Quality, Condition, and Obstructions	See prompts in Section A for potential issues on obstructions and protruding objects that apply to street crossings					
	B.2.1	Is the crossing pavement adequate and well maintained?				✓
	B.2.2	Is the crossing pavement flush with the roadway surface?			✓	✓
B.3 Continuity and Connectivity	B.3.1	Does pedestrian network connectivity continue through crossings by means of adequate, waiting areas at corners, curb ramps and marked crosswalks?	✓	✓	✓	✓
	B.3.2	Are pedestrians clearly directed to crossing points and pedestrian access ways?		✓	✓	✓
B.4 Lighting	B.4.1	Is the pedestrian crossing adequately lit?	✓	✓	✓	✓

B. Street Crossings

Master Prompt	Detailed Prompt		RSA Stages			
			planning	design	construction	post-construction
B.5 Visibility	B.5.1	Can pedestrians see approaching vehicles at all legs of the intersection/crossing and vice versa?	✓	✓	✓	✓
	B.5.2	Is the distance from the stop (or yield) line to a crosswalk sufficient for drivers to see pedestrians?		✓	✓	✓
	B.5.3	Do other conditions exist where stopped vehicles may obstruct visibility of pedestrians?		✓	✓	✓
B.6 Access Management	B.6.1	Are driveways placed close to crossings?	✓	✓	✓	✓
B.7 Traffic Characteristics	B.7.1	Do turning vehicles pose a hazard to pedestrians?				✓
	B.7.2	Are there sufficient gaps in the traffic to allow pedestrians to cross the road?	✓	✓	✓	✓
	B.7.3	Do traffic operations (especially during peak periods) create a safety concern for pedestrians?				✓
B.8 Signs and Pavement Markings	B.8.1	Is paint on stop bars and crosswalks worn, or are signs worn, missing, or damaged?			✓	✓
	B.8.2	Are crossing points for pedestrians properly signed and/or marked?		✓	✓	✓
B.9 Signals	B.9.1	Are pedestrian signal heads provided and adequate?		✓	✓	✓
	B.9.2	Are traffic and pedestrian signals timed so that wait times and crossing times are reasonable?		✓	✓	✓
	B.9.3	Is there a problem because of an inconsistency in pedestrian actuation (or detection) types?	✓	✓	✓	✓
	B.9.4	Are all pedestrian signals and push buttons functioning correctly and safely?			✓	✓
	B.9.5	Are ADA accessible push buttons provided and properly located?		✓	✓	✓

C. Parking Areas/Adjacent Developments

Master Prompt	Detailed Prompt		RSA Stages			
			planning	design	construction	post-construction
C.1 Presence, Design, and Placement	C.1.1	Do sidewalks/paths connect the street and adjacent land uses?	✓	✓	✓	✓
	C.1.2	Are the sidewalks/paths designed appropriately?		✓	✓	✓
	C.1.3	Are buildings entrances located and designed to be obvious and easily accessible to pedestrians?	✓	✓	✓	✓
C.2 Quality, Condition, and Obstructions	See prompts in Section A for potential issues on obstructions and protruding objects that apply to sidewalks and walkways at parking areas/adjacent developments					
	See prompts in Section A for potential issues on surface conditions that apply to sidewalks and walkways at parking areas/adjacent developments					
	C.2.1	Do parked vehicles obstruct pedestrian paths?				✓
C.3 Continuity and Connectivity	C.3.1	Are pedestrian facilities continuous? Do they provide adequate connections for pedestrian traffic?	✓	✓	✓	✓
	C.3.2	Are transitions of pedestrian facilities between developments/projects adequate?		✓	✓	✓
C.4 Lighting	See prompts in Section A and B for potential issues on lighting that apply to sidewalks and walkways at parking areas/adjacent developments					
C.5 Visibility	C.5.1	Are visibility and sight distance adequate?	✓	✓	✓	✓
C.6 Access Management	C.6.1	Are travel paths for pedestrians and other vehicle modes clearly delineated at access openings?	✓	✓	✓	✓
	C.6.2	Do drivers look for and yield to pedestrian when turning into and out of driveways?			✓	✓
C.7 Traffic Characteristics	C.7.1	Does pedestrian or driver behavior increase the risk of a pedestrian collision?				✓
	C.7.2	Are buses, cars, bicycles, and pedestrians separated on the site and provided with their own designated areas for travel?	✓	✓	✓	✓
C.8 Signs and Pavement Markings	C.8.1	Are travel paths and crossing points for pedestrians properly signed and/or marked?		✓	✓	✓

D. Transit Areas

Master Prompt	Detailed Prompt		RSA Stages			
			planning	design	construction	post-construction
D.1 Presence, Design, and Placement	D.1.1	Are bus stops sited properly?	✓	✓	✓	✓
	D.1.2	Are safe pedestrian crossings convenient for transit and school bus users?	✓	✓	✓	✓
	D.1.3	Is sight distance to bus stops adequate?	✓	✓	✓	✓
	D.1.4	Are shelters appropriately designed and placed for pedestrian safety and convenience?		✓	✓	✓
D.2 Quality, Condition, and Obstructions	D.2.1	Is the seating area at a safe and comfortable distance from vehicle and bicycle lanes?		✓	✓	✓
	D.2.2	Do seats (or persons sitting on them) obstruct the sidewalk or reduce its usable width?		✓	✓	✓
	D.2.3	Is a sufficient landing area provided to accommodate waiting passengers, boarding/alighting passengers, and through/bypassing pedestrian traffic at peak times?		✓	✓	✓
	D.2.4	Is the landing area paved and free of problems such as uneven surfaces, standing water, or steep slopes?		✓	✓	✓
	D.2.5	Is the sidewalk free of temporary/permanent obstructions that constrict its width or block access to the bus stop?	✓	✓	✓	✓
D.3 Continuity and Connectivity	D.3.1	Is the nearest crossing opportunity free of potential hazards for pedestrians?	✓	✓	✓	✓
	D.3.2	Are transit stops part of a continuous network of pedestrian facilities?	✓	✓	✓	✓
	D.3.3	Are transit stops maintained during periods of inclement weather?		✓	✓	✓
D.4 Lighting	D.4.1	Are access ways to transit facilities well-lit to accommodate early-morning, late-afternoon, and evening	✓	✓	✓	✓
D.5 Visibility	D.5.1	Are open sight lines maintained between approaching buses and passenger waiting and loading areas?		✓	✓	✓
D.7 Traffic Characteristics	D.7.1	Do pedestrians entering and leaving buses conflict with cars, bicycles, or other pedestrians?		✓	✓	✓
D.8 Signs and Pavement Markings	D.8.1	Are appropriate signs and pavement markings provided for school bus and transit stops?		✓	✓	✓



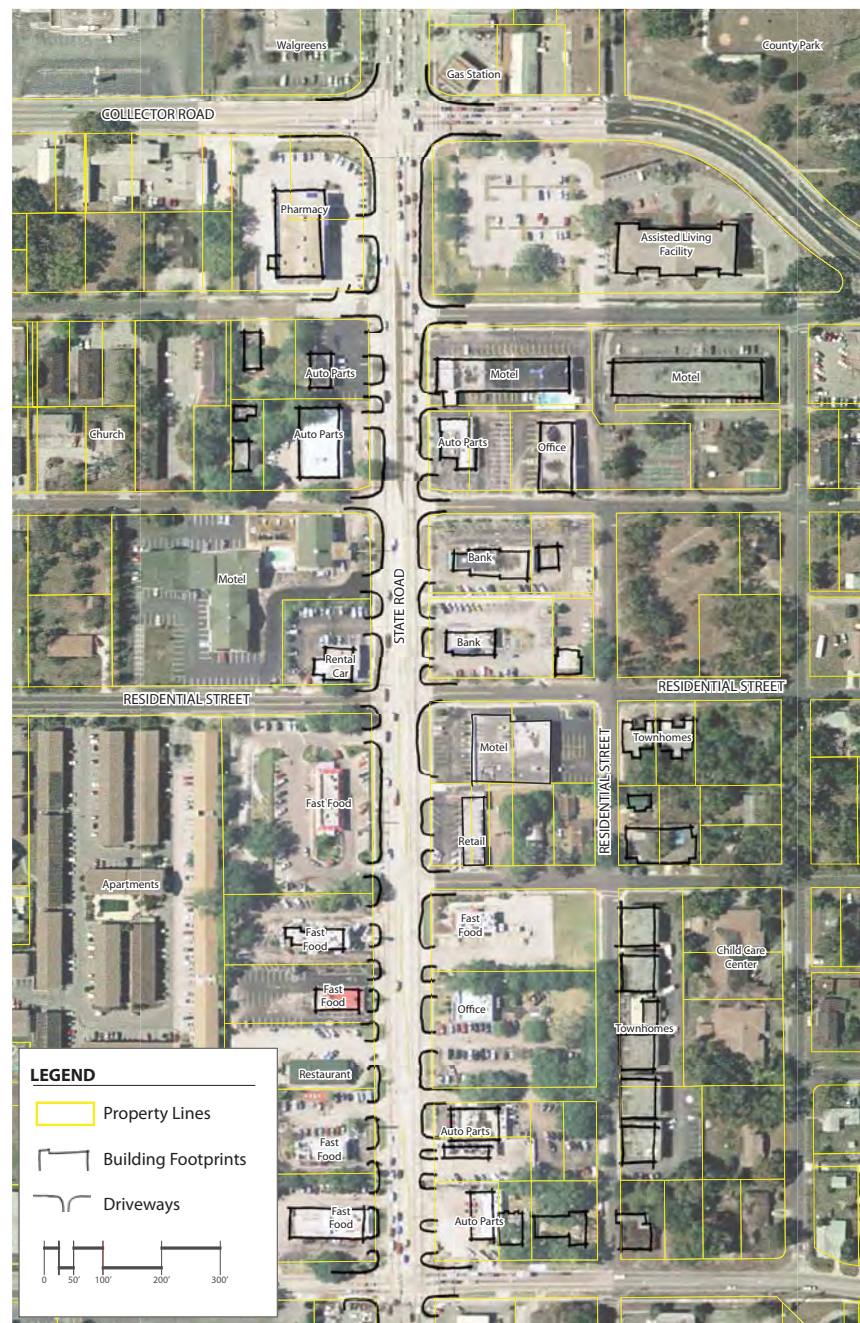
PRACTICE EXERCISE WORKSHEETS

Background: This is a corridor located 10 miles from a City's downtown and experienced its peak in land development during the 1960s to 1980s. In the last decade, it has experienced continued disinvestment with commercial uses moving away and some properties remaining vacant. Recent changes to the area's infrastructure (roadways, sidewalks, parks) have also been sparse. The City is

currently developing programs and policies to encourage private investments and to attract new residents and businesses.

Land Use Context: The corridor includes a variety of development block sizes with low to medium densities. Commercial uses have deep setbacks from the street and land uses are generally separated and include large retail stores, gas stations, and a variety of shopping centers oriented to the automobile. Behind the commercial uses are multi-family and single family uses.

Transportation Context: Regional arterial roadway surrounded by network of local streets. The corridor has sidewalks on both sides, but is frequently interrupted by driveways. This five lane typical cross section has a posted speed limit of 45mph.



2 What are the major factors affecting the **Scale of the Study**?

[illegible]

3 What is the Scale of the Study?

- ☐ Simple
- ☐ Moderate
- ☐ Complex

4 What is your budget for Stakeholder & Public Engagement?

5 Who are the **potential users** of the **roadway/**
right-of-way?

(circle all that apply, write in others)

Employers



Retailers



Freight



Emergency Vehicles



Institutional (schools, churches, etc.)



Residents



Bicyclist



Motorist



Elderly



Children



Pedestrian



Transit user



Alt. Motorized Transp.



Disabled



Others

6 Who are the key **agencies/ stakeholder groups** you need to engage in this Study? **Fill in the following matrix** to identify these groups and what information/ actions are needed from them?

[illegible]

1 Problem Background

Scenario: The City has requested the MPO and the DOT to consider multi-modal improvements along a state arterial corridor. Your team is being asked to conduct a planning study to respond to the City's request.

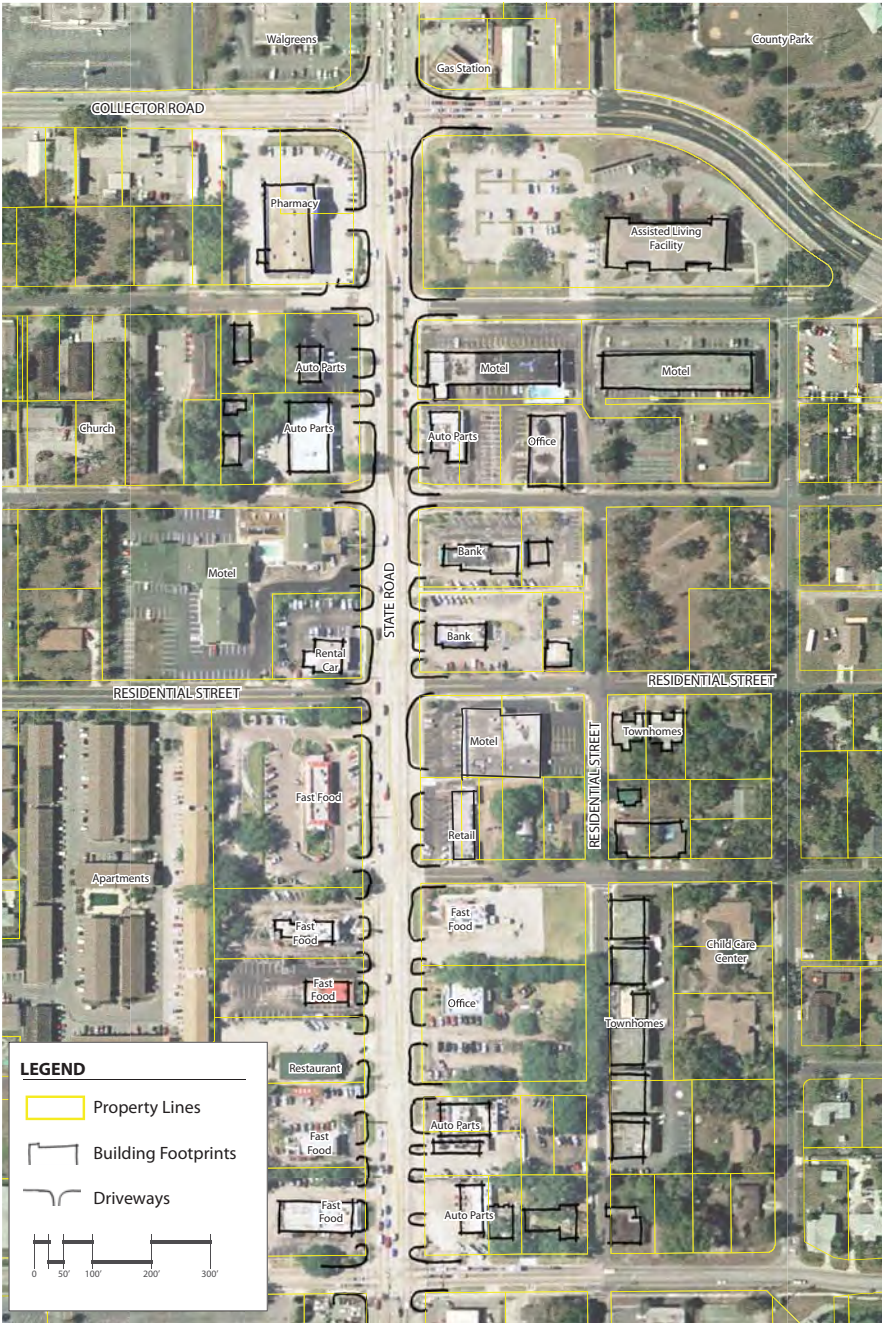
Exercise Goal: Identify (1) data/information needed to understand transportation context; (2) data/information needed to understand land use context; (3) data/information needed to understand policy and financial context.

Background: This is a corridor located 10 miles from a City's downtown and experienced its peak in land development during the 1960s to 1980s. In the last decade, it has experienced continued disinvestment with commercial uses moving away and some properties remaining vacant. Recent changes to the area's infrastructure (roadways, sidewalks, parks) have also been sparse. The City is currently

developing programs and policies to encourage private investments and to attract new residents and businesses.

Land Use Context: The corridor includes a variety of development block sizes with low to medium densities. Commercial uses have deep setbacks from the street and land uses are generally separated and include large retail stores, gas stations, and a variety of shopping centers oriented to the automobile. Behind the commercial uses are multi-family and single family uses.

Transportation Context: Regional arterial roadway surrounded by network of local streets. The corridor has sidewalks on both sides but is frequently interrupted by driveways. This five lane typical cross section has a posted speed limit of 45mph.



2 What information do you need to understand the Transportation Context?

(See Planning Guidebook pages 33 to 34)

Element	Information We need to Know	Source of Information
Physical Conditions		
Travel Patterns		
Existing & Future Traffic		
Role of the Roadway		
Safety		
Transit		
Pedestrian/Bicycling Mobility		
Others		

3 What information do you need to understand the Land Use Context?

(See Planning Guidebook page 35)

Element	Information We need to Know	Source of Information
Current Land Use/ Land Development		
Future Land Use/ Land Development		
Existing & Future Users		
Others		

4 What information do you need to understand the Policy & Financial Context?

(See Planning Guidebook page 36)

Element	Information We need to Know	Source of Information
Regional Priorities		
Local Goals & Priorities		
Funding Opportunities		

1 Exercise Background

Scenario: The MPO has requested the DOT to consider multi-modal improvements along a state arterial corridor. Your team was presented with data and information collected by the MPO (see (2) below). The MPO also presented Guiding Principles that were developed jointly with the municipalities at a recent workshop (see (3) below).

Exercise Tasks: (A) Review the data and information to understand what the issues are; (B) Identify what the purpose and need of the study are based on the data and information and the Guiding Principles; (C) Identify what the objectives are; (D) Identify what measures of success can be used to evaluate alternatives, based on the purpose & need, guiding principles, and objectives.

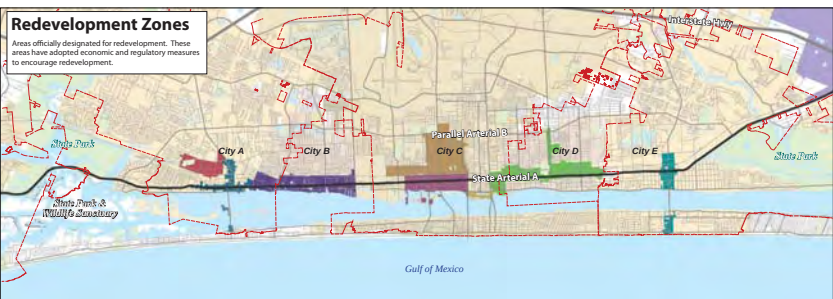
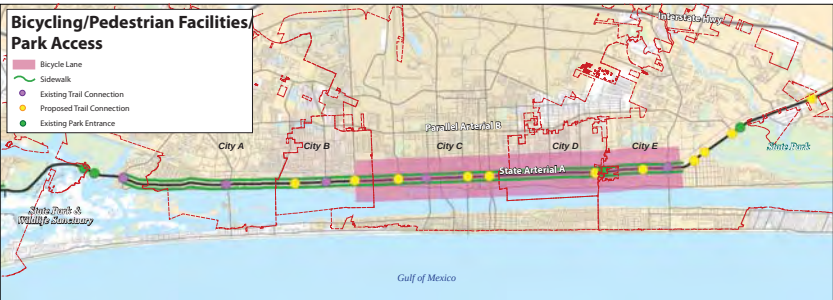
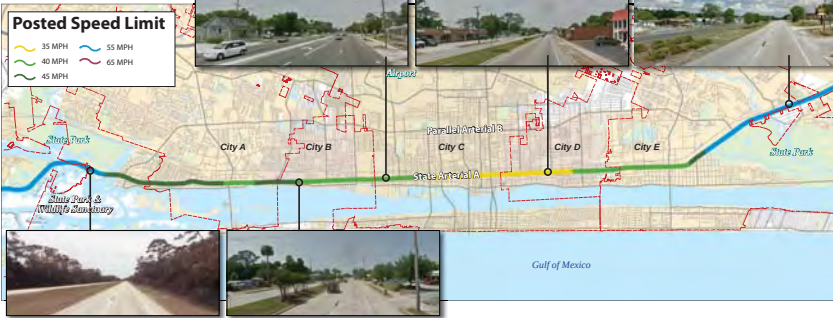
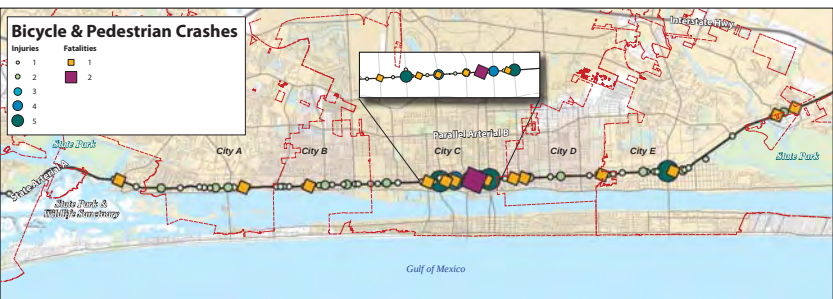
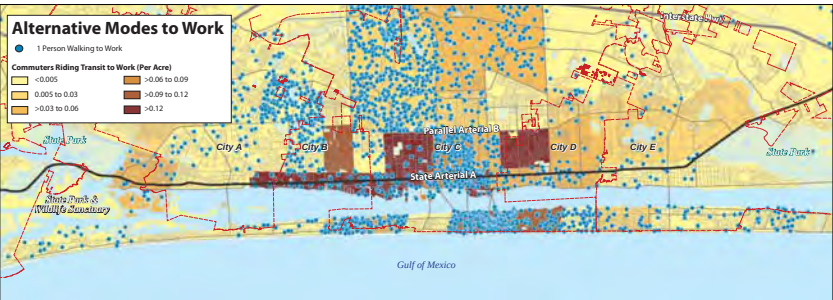
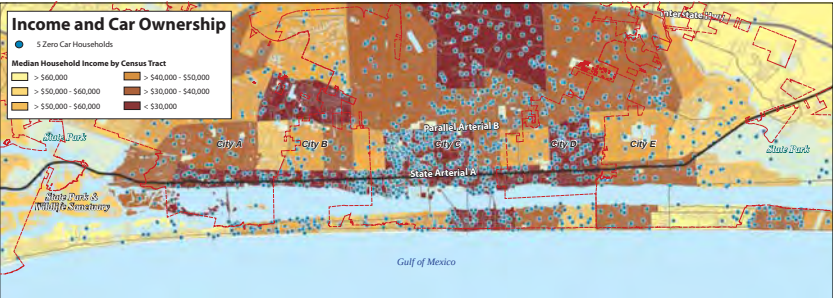
Background: This is a corridor located 30 miles from the closest metropolitan downtown along the southern Gulf Coast. The corridor relies on tourism as its economic base in the last 50 years. In the last 10 years, it has experienced continued disinvestment with commercial uses moving away and some properties remaining vacant. Recent changes to the area's infrastructure (roadways, sidewalks, parks) have also been sparse. A few municipalities are currently developing programs and policies to encourage private investments and to attract new residents and businesses.

Five years ago, a DOT study was conducted on the corridor that concluded there is not a need or a community desire to widen the roadway beyond the four-lane cross-section. The study also concluded that a few intersection changes are needed to accommodate traffic operations and there is a desire to improve multi-modal improvements.

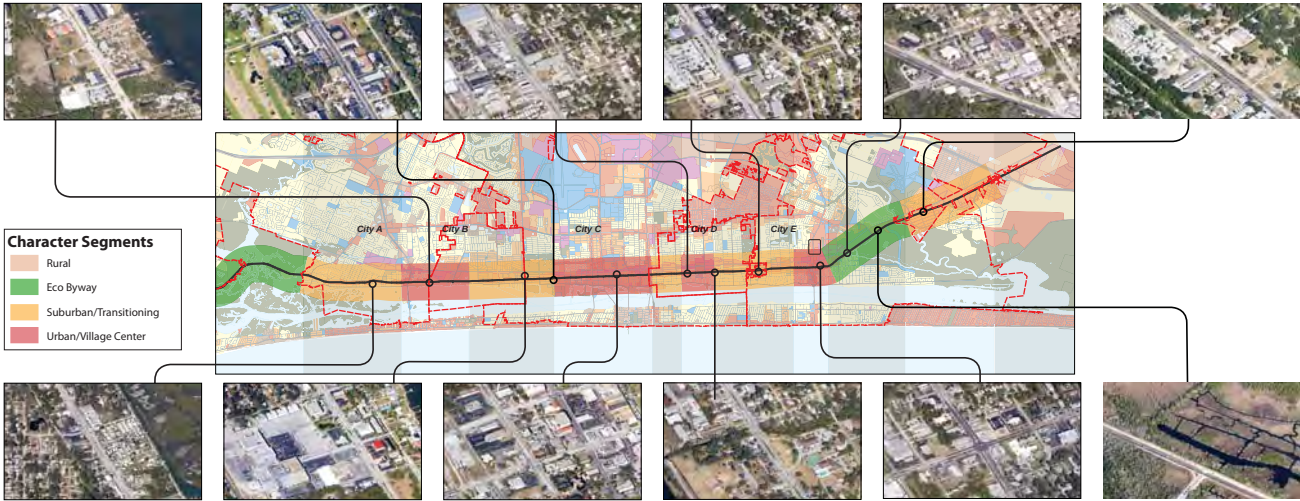
Land Use Context: The corridor links together eight small municipalities, in a variety of development stages. It runs along the southern Gulf coast and links together a number of recreational and ecological assets, including two state parks. Development in the area peaked during 1960s and 1970s, but has since stagnated.

Transportation Context: The Corridor is considered a regional arterial roadway. The corridor has sidewalks along most of the urban segments, but is frequently interrupted by driveways. This five lane typical cross section has a posted speed limit that varies between 35mph to 55mph. An origin-destination study was conducted recently and showed that 60% of the auto trips along the corridor are between one and three miles in length.

2 Synthesis of Data & Information



Synthesis of Data & Information



3 What are the Guiding Principles?

- Enhance **local multi-modal mobility and access** while accommodating regional traffic.
- Connect **activity areas** and capitalize on **local destinations and recreational amenities**.
- Leverage **local and state** public investment to spur economic development.
- Coordinate **corridor-wide investment** to **maximize the return** on public and private investment.
- Preserve and **enhance** existing **environmental and recreational assets**.

4 What is the Purpose of the Investments? (See Planning Guidebook pages 53 to 54)

5 What are the Needs that support this Purpose? (See Planning Guidebook pages 53 to 54)

6 What are the Objectives of the Investment based on the Guiding Principles? What measures can be used to evaluate potential alternatives? (See Planning Guidebook pages 55 to 58)

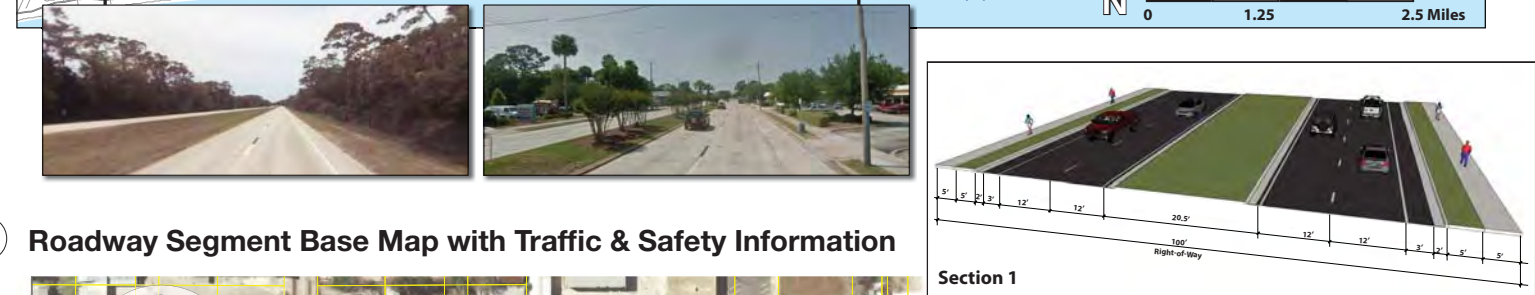
Guiding Principle	Objectives	Measure of Success
Enhance local multi-modal mobility and access while accommodating regional traffic.		
Connect activity areas and capitalize on local destinations and recreational amenities.		
Leverage local and state public investment to spur economic development.		
Coordinate corridor-wide investment to maximize the return on public and private investment.		
Preserve and enhance existing environmental and recreational assets.		

1

Background: This section of the corridor is located in City C and is in a Urban/Village Center character segment (see Exercise 1). State Arterial A through this section is characterized by four through lanes with turn lanes at intersections. Although there

The map displays the study area in Mobile, Alabama, with the Gulf of Mexico to the south. A red dashed line indicates the City Boundary. A yellow line highlights the Study Segment, which is further defined by a blue box. Two inset photos at the top show street views from the study area. A scale bar at the bottom indicates distances up to 2.5 miles, and a north arrow is also present.

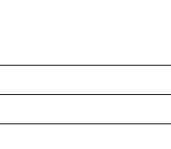
2



3



4



(See Planning Guidebook pages 62 to 63, 66 to 69)

Speed? (See Planning Guidebook pages 63 to 65)

g) Does the **Cross Section** Need to **Change**? **What elements** should be **added or changed**? Draw your proposed cross section alternative(s). (Label alternatives with alternative 1, 2, 3, etc.)

Compare the Alternatives (See Planning Guidebook pages 55 to 58)

[illegible]

