



A NATIONAL SYNTHESIS OF TRANSIT AND COMPLETE STREETS PRACTICES

APRIL 2018



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EXECUTIVE SUMMARY



The Florida Department of Transportation (FDOT) adopted its statewide [Complete Streets Policy](#) in 2014, which promotes safety, quality of life, modal choices, and economic development in Florida. This policy encourages that FDOT routinely plan, design, construct, reconstruct, and operate a system of “Complete Streets” sensitive to the surrounding land uses and traffic network. Following adoption, FDOT has undertaken several initiatives to help advance Complete Streets policy goals, such as [The Complete Streets Implementation Plan](#), the designation of [District-level Complete Streets Coordinators](#), a [Context Classification system](#), [FDOT Design Manual](#), and various educational outreach activities. In support of the FDOT’s focus on the integration of Complete Streets principles into its plans and programs, FDOT’s Transit Office has prepared this resource to answer such questions as:

- **What does it mean to integrate transit and Complete Streets?**
- **What are the practices that do so?**
- **How can transit agencies and projects support Complete Streets in their own Florida communities?**
- **What are the important lessons learned from the successful integration of transit and Complete Streets?**

These questions framed the research for understanding the nature and challenges of integrating transit and Complete Streets nationwide and the investigation of projects, agencies, and communities demonstrating success on the ground. In reviewing over 50 Complete Streets resources and examining the efforts of over 30 communities, the following key findings were explored:

- Although Complete Streets policies have proliferated nationwide and continue to do so, there is a noticeable disconnect between Complete Streets policies and the meaningful implementation of desired transit service and related amenities.
- Broadly, Complete Streets projects tend to be bicycle- and pedestrian-focused, relatively low-cost, and designed to be implemented in the short term; fewer address the challenges and successes of transit integration.
- Ample design guidance with Complete Streets and transit integration is available.
- Two types of transit and Complete Streets project categories exist - new transit investments and roadway improvement projects in areas with existing transit.
- FDOT’s context classification system is an opportunity for integrating transit and Complete Streets in practice – it provides a useful framework for identifying transit system designs and strategies that are supportive of the local land use context and characteristics.
- An understanding of the relationship between the Complete Streets process and transit integration is emerging, identifying key opportunities and areas for integration practices.



As a result, this document explores these practices through specific case studies:


PRACTICE	CASE STUDY
Developing a strong local policy	Commonwealth of Massachusetts' proliferation of strong Complete Streets policies
Implementing a regional vision through new transit investments	City of Charlotte Centers, Corridors, and Wedges
Prioritizing Network Enhancements for Transit	City of Los Angeles' Mobility Plan 2035's Transit Enhanced Network
Launching a coordinated string of transit-oriented developments (TOD)	City of Phoenix's TOD commitment and evolution of practice
Funding a Complete Streets enhancements program	Jacksonville Transportation Authority's Mobility Corridors
Using a project scoping form to identify transit integration opportunities	City of Seattle's Complete Street Checklist
Converting roadway upgrade into a street transformation	FDOT's Nebraska Avenue Road Diet
Deploying emerging transit technologies	City of Chicago's Link the Loop
Transit Integration in Action	Cleveland Healthline Bus Rapid Transit (BRT)

These practices and approaches provide information based on the experiences of others, distilled into descriptions of planning approaches, implementation strategies, notable outcomes, and demonstrated examples of the practice or approach in action. The following findings from both the higher-level research and from the integration practices were explored for application in Florida:

- **Transit and Complete Street integration practices can be applied in many different contexts and at different phases of planning, allowing integration options for all types of projects across Florida (providing transit is present or planned).**
- **Florida's policy and planning framework for transit and Complete Streets provides a strong foundation for transit integration.**
- **Transit and Complete Street integration can and should occur at all stages of planning and project development. Each integration practice is embedded into the Complete Street framework and can support different project phases.**

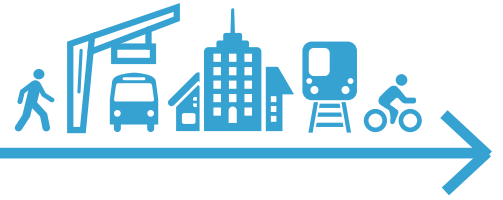
Through this research and analysis, this document helps to define what is meant by transit and Complete Streets integration, what are the practices that can help do so, which ones are particularly applicable in Florida, and what are the lessons learned.

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CHAPTER ONE: Introduction

1 INTRODUCTION



The Florida Department of Transportation (FDOT) [Complete Streets Policy](#) encourages Complete Streets to serve the needs of transportation system users of all ages and abilities (including but not limited to pedestrians, cyclists, motorists, transit riders, and freight handlers), while maintaining safety and mobility. FDOT's policy recognizes that Complete Streets are context-sensitive and require a transportation system design that is supportive of land development patterns and built form. Following adoption, FDOT has undertaken several initiatives to help advance Complete Streets policy goals:

- [Complete Streets Implementation Plan \(2015\)](#): This document is one of the first of its kind among state departments of transportation (DOTs) and represents a Complete Streets implementation framework. The Complete Streets Implementation Plan, in collaboration with Smart Growth America, establishes a timeline and action plan for moving FDOT towards more multimodal and context-sensitive practices.
- [District-level Complete Streets Coordinators](#): Emphasizing its focus on the integration of Complete Streets practices, FDOT has assigned a District Complete Streets Coordinator in each of its seven districts. The District Coordinator is responsible for ensuring that Complete Streets principles are infused within FDOT offices, programs, and projects.
- [Context Classification \(2017\)](#): FDOT developed eight context classifications that provide information about the users of the roadway, the regional and local transportation network, and the challenges and opportunities of each roadway user. The context classifications help to inform the identification of design strategies and considerations that are supportive of the local land use context and characteristics.
- [FDOT Design Manual \(FDM\)\(2018\)](#): The new FDM embodies Complete Streets principles and incorporates policies, procedures, and methods for developing context-supportive design strategies on the transportation network in Florida. The aforementioned Context Classifications are embedded in the FDM. The FDM was recognized by Smart Growth America as one of the Best Complete Streets Initiatives of 2017.



FDOT'S COMPLETE STREET CLEARINGHOUSE

Visit www.FLcompletestreets.com for all FDOT presentations, webinars, and workshop materials listed above, plus more informational resources.

FDOT'S CONTEXT CLASSIFICATION SYSTEM IS AN OPPORTUNITY FOR INTEGRATING TRANSIT AND COMPLETE STREETS IN PRACTICE

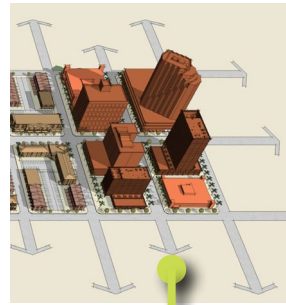
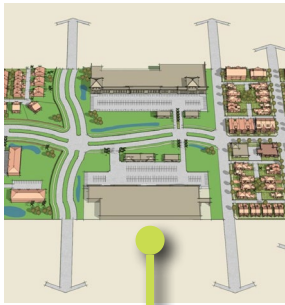
The context classification system provides a framework for identifying transit system designs and strategies that are supportive of the local land use context and characteristics. It provides a foundation for developing a coordinated transit and land use strategy so that transit investments and existing and envisioned development are in sync. The context classification approach considers elements of the community character that influence transit ridership. These elements include variables commonly incorporated into transit demand forecasting tools such as the density (building heights, population and jobs per acre) and diversity (mix of residential, office, and other commercial or institutional uses). The context classification approach also incorporates more subtle measures of transit-oriented community design, such as building and parking placement relative to the street edge and the degree of connectivity in the adjacent street network.



FDOT's Context Classifications Concept

The image (pg. 7) illustrates how transit and Complete Streets can be integrated in different contexts. In rural areas (C2), transit services are likely to be limited to on-demand services, so transit facility needs are minimal. In urban core areas (C6), transit design elements might include extensive transit preferential treatments such as bus-only roadways or contraflow lanes with frequent stations that incorporate high-quality design and serve as a key destination that substantially influences station walk-access elements such as sidewalk width, crosswalk placement, and traffic signal phasing. By contrast, in suburban contexts (C3R or C3C for residential and commercial areas respectively), transit treatments are more likely to be associated with longer stop spacing. Exclusive right-of-way (ROW) may include continuous treatment for a bus rapid transit (BRT) facility or more discrete elements such as queue-jump lanes and access control may be more oriented toward bicycle and automobile access, particularly where park-and-ride and kiss-and-ride serve as important last-mile connections. Similarly, the degree of operational treatments such as transit signal priority should be tailored to meet the multimodal context of the project.

The FDM provides useful guidance on required design controls that affect the incorporation of transit into complete streets, ranging from policy decisions such as selection of an appropriate design speed and intersection and driveway spacing criteria to design details such as sidewalk widths and intersection corner radii. The FDM leaves many elements of transit facility incorporation to the discretion of the design team, and there are opportunities to further weave context classification into the facility design process. For instance, the design of bus bays in the FDM refers users to the [Accessing Transit Handbook](#), in which bus stop placement considers the availability of ROW as a primary determinant in the provision of a bus bay. Infusion of the context-classification approach within the design team might suggest that in more urban contexts, a bus bay is not the best multimodal solution even if ROW is available.



C3C-Suburban Commercial¹



C5-Urban Center³



C4-Urban General²



C6-Urban Core⁴

Integrated Transit and Complete Streets in Different Context Classification Examples

In support of the FDOT's focus on the integration of Complete Streets principles into its plans and programs, FDOT's Transit Office has prepared this resource to answer such questions as:

- **What does it mean to integrate transit and Complete Streets?**
- **What are the practices that do so?**
- **How can transit agencies and projects support Complete Streets in their own Florida communities?**
- **What are the important lessons learned from the successful integration of transit and Complete Streets?**

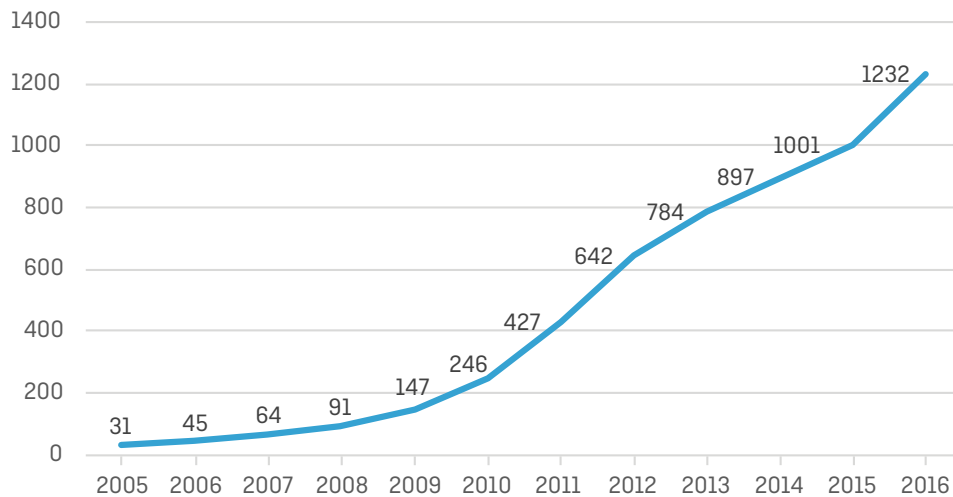
These questions framed the research for understanding the nature and challenges of integrating transit and Complete Streets nationwide and the investigation of projects, agencies, and communities demonstrating success on the ground. The research included a review of over 50 Complete Streets resources, of which the key ones are highlighted below. Through successive rounds of investigation, the practices presented in this document were distilled from Complete Streets efforts in 30 communities nationwide. They represent success in a diverse set of communities and contexts and provide key lessons – similarities, standouts, and potential improvements – to support FDOT's Complete Streets objectives and policies.

IMPORTANT RESOURCES REVIEWED

- Smart Growth America / National Complete Streets Coalition (NCSC) – [The Best Complete Streets Policies of 2016](#)
- NCSC and American Association of Retired Persons (AARP) – [Evaluating Complete Streets Projects](#)
- FDOT District 5 – [Multi-Modal Corridor Planning Guidebook](#)
- American Planning Association – [Complete Streets: Best Policy and Implementation Practices](#)
- University of Minnesota – [Complete Streets from Policy to Project: The Planning and Implementation of Complete Streets at Multiple Scales](#)
- University of Oregon – [Rethinking Streets: An Evidence-Based Guide to 25 Complete Streets Transformations](#)
- AARP – [The Road Ahead: Implementing Complete Streets Policies](#)
- State University of New York at Buffalo – [Measuring the Impact of Complete Streets Projects: Preliminary Field Testing](#)
- Babb, Andrew, and Watkins, Kari Edison. [Complete Streets Policies and Public Transit](#). Transportation Research Record: Journal of the Transportation Research Board, Issue 2543, 2016, pp 14–24.
- Florida DOT and the Center for Urban Transportation Research (CUTR) at the University of South Florida – [Capturing the Benefits of Complete Streets](#)
- Center for Inclusive Design and Environmental Access and GOBike Buffalo – [Evaluating the Impact of Complete Streets Initiatives](#)
- Shapard, James and Cole, Mark – [Do Complete Streets Cost More Than Incomplete Streets?](#) Transportation Research Record: Journal of the Transportation Research Board, Issue 2393, 2013, pp 134–138.
- University Transportation Center for Alabama – [Impacts of Transit in a Complete-Streets Context](#)

TRANSIT AND COMPLETE STREETS NATIONWIDE

Since 2005, the development and implementation of Complete Street and related policies and programs have grown dramatically. More than 1,200 jurisdictions had adopted a Complete Streets policy by the end of 2016. There were 222 policies adopted in 2016 alone – the highest annual total so far.



Complete Streets Policies Adopted Over Time¹

Jurisdictions that have adopted policies and other Complete Streets supportive regulations span from small rural communities to large state departments of transportation and cover the entire United States. These can span from stand-alone policies to being embedded into important foundational planning documents, such as local comprehensive plans, long range transportation plans, etc.”

While Complete Streets policies have proliferated nationwide, growth in the integration of transit and Complete Streets is less clear. There is a noticeable disconnect between Complete Streets policies, which nearly always place emphasis on transit service and/or riders, and the meaningful implementation of desired transit service and related amenities. Only a select few transit agencies have their own Complete Streets policies: Jacksonville Transportation Authority (FL), Metro (Los Angeles, CA), Regional Transportation Council-Nevada (Las Vegas); and Santa Clara Valley Transportation Authority (CA).

Furthermore, many Complete Streets projects tend to be bicycle- and pedestrian-focused, relatively low-cost, and designed to be implemented in the short term; fewer address the challenges and successes of transit integration. This is most likely for several reasons, such as transit’s longer and potentially higher capital and operating costs, a lack of knowledge of transit funding sources and related infrastructure requirements, transit funding availability, and a potentially larger set of transit stakeholders needed for project action.

However, there is ample design guidance for Complete Streets that includes transit lanes and transit-related amenities from national organizations like National Association of City Transportation (NACTO) Officials and the Project for Public Spaces. Most guidance documents consist of recommendations for lane width, sidewalk space, curb extensions, “gateway” treatments, dedicated transit lanes, temporary design and operations, and many other elements.

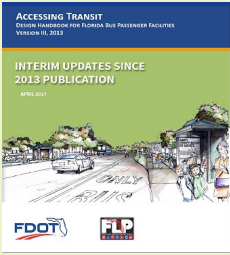


IDEAL ELEMENTS OF A COMPLETE STREETS POLICY

The NCSC annual “Best Complete Streets Policies” analyzes, summarizes, and scores these diverse policies based on comparisons with past policies and on the state of the practice. NCSC evaluates Complete Streets efforts for 10 “ideal elements”:

1. **Vision and intent:** Includes an equitable vision for how and why the community wants to complete its streets. Specifies need to create complete, connected, network and specifies at least four modes, two of which must be biking or walking.
2. **Diverse users:** Benefits all users equitably, particularly vulnerable users and the most underinvested and underserved communities.
3. **Commitment in all projects and phases:** Applies to new, retrofit/reconstruction, maintenance, and ongoing projects.
4. **Clear, accountable expectations:** Makes any exceptions specific and sets a clear procedure that requires high-level approval and public notice prior to exceptions being granted.
5. **Jurisdiction:** Requires interagency coordination between government departments and partner agencies on Complete Streets.
6. **Design:** Directs the use of the latest and best design criteria and guidelines and sets a time frame for their implementation.
7. **Land use and context sensitivity:** Considers the surrounding community’s current and expected land use and transportation needs.
8. **Performance measures:** Establishes performance standards that are specific, equitable, and available to the public.
9. **Project selection criteria:** Provides specific criteria to encourage funding prioritization for Complete Streets implementation.
10. **Implementation steps:** Includes specific next steps for implementation of the policy.³

There is a wide divergence in the strength and effectiveness of policies nationwide. In some policies, modal considerations, such as transit, are not mentioned. Others allow for too many exceptions, reducing the need for practitioners to truly consider all modes and users. Policies in some communities are not enforceable or are not well connected with a community vision or context.



[Accessing Transit: Design Handbook for Florida Bus Passenger Facilities \(2017\)](#)

BEST USED FOR

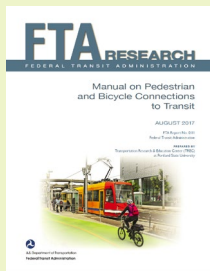
Understanding the design, location, and implementation of transit facilities along roadways in Florida consistent with state and federal laws, policies, and best practices; includes a resource index.



[A Guide to Transit-Friendly Streets \(2009\)](#)

BEST USED FOR

Understanding the fundamental strategies of transit-oriented design, including implementation of adequately sized sidewalks; pedestrian and transit rider amenities; transit priority lanes; traffic-calming measures; and the modification of intersections and signalization.



[Manual on Pedestrian and Bicycle Connections to Transit \(2017\)](#)

BEST USED FOR

Understanding of best practices to help transit and other transportation professionals improve pedestrian and bicycle safety and access to transit, including information and graphic illustrations on evaluating, planning for, and implementing improvements to pedestrian and bicycle access to transit.



[Transit Street Design Guide \(2016\)](#)

BEST USED FOR

Understanding the design, location, and implementation of transit facilities along roadways consistent with state and federal laws, policies, and best practices; includes a resource index.



[Typical Sections for Exclusive Transit Running Ways \(2013\)](#)

BEST USED FOR

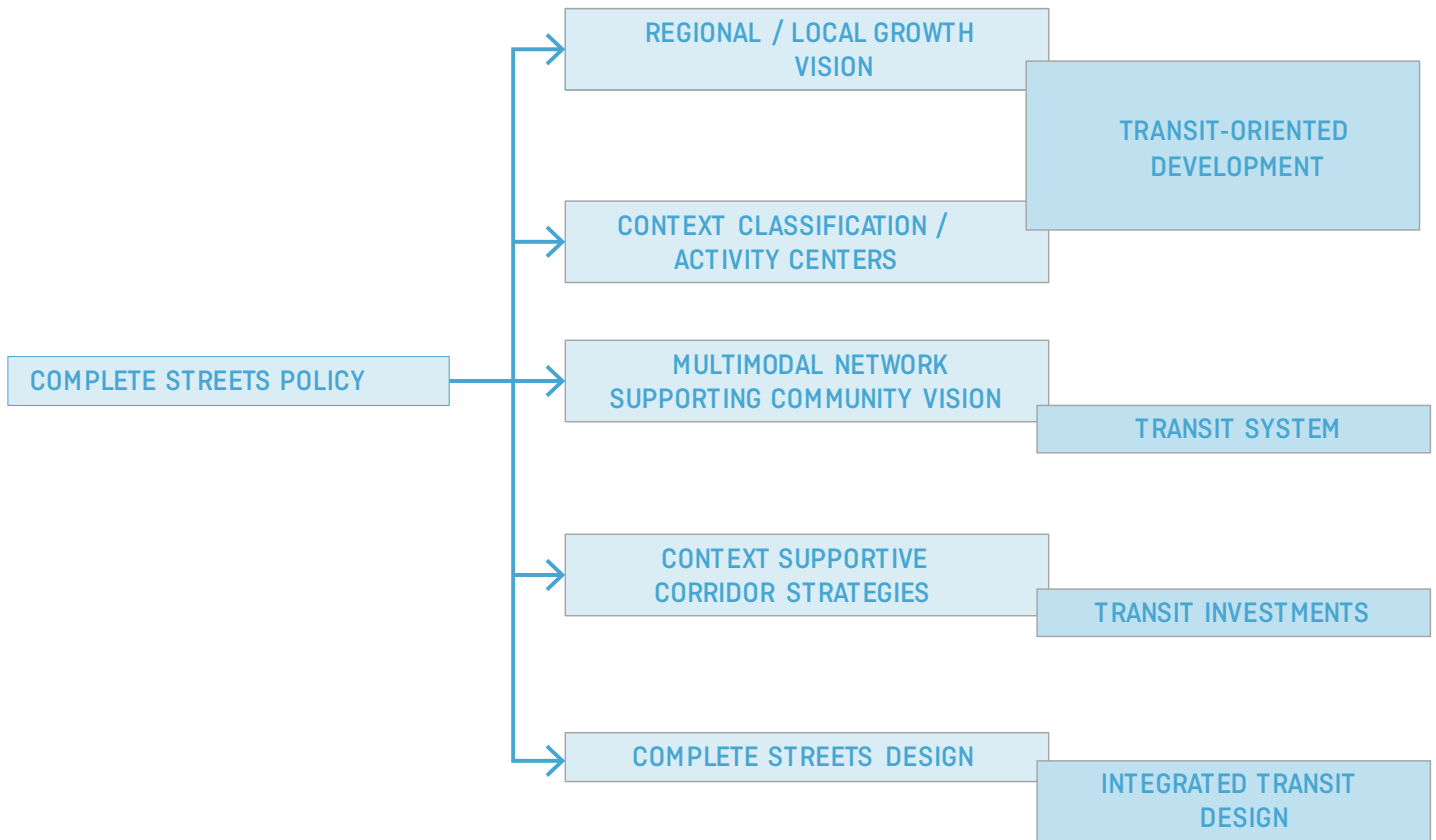
Understanding design possibilities for transit-only ways, such as: concurrent flow curb or median bus lanes, at-grade, reversible one-lane median busway on a two-way street, contraflow bus lane on one-way or two-way streets, and more.

SUMMARY OF INTEGRATION PRACTICES

When considering how to integrate transit and Complete Streets, two project categories of transit integration emerged through an examination of Complete Streets approaches. The first is new transit investments—projects or services that advance Complete Streets and networks through major infrastructure improvements. The second category is roadway improvement projects in areas with existing transit—projects that improve general mobility and access to destinations, with a focus on transit access. These two project categories represent different approaches to project leadership (transit agency versus municipal authority), project workflow (transit-focused mobility versus transit-enabled access), and investment (high versus comparatively low).

Below illustrates the opportunities for integrating transit and Complete Streets into a planning and implementation framework, spanning from the high-level relationship between policies and visions through the planning of transportation systems and corridors and integrated multimodal transportation design.

Complete Streets Process with Transit Integration Points



The case study research helped to identify specific integration practices in a variety of communities and contexts in Florida and beyond. Recognizing that the implementation of transit improvements is often a substantial undertaking – contingent on various agency policies, procedures, and budgets, as well as the ebb and flow of political and financial pressures – these practices encourage proactive involvement throughout the planning and project delivery process:

Summary of Integration Practices and Highlighted Case Studies

PRACTICE	CASE STUDY
Developing a strong local policy	Commonwealth of Massachusetts’ proliferation of strong Complete Streets policies
Implementing a regional vision through new transit investments	City of Charlotte, NC Centers, Corridors, and Wedges
Prioritizing Network Enhancements for Transit	City of Los Angeles’ Mobility Plan 2035’s Transit Enhanced Network
Launching a coordinated string of TODs	City of Phoenix’s TOD commitment and evolution of practice
Funding a Complete Streets enhancements program	Jacksonville Transportation Authority’s Mobility Corridors
Using a project scoping form to identify transit integration opportunities	City of Seattle’s Complete Street Checklist
Converting roadway upgrade into a street transformation	FDOT’s Nebraska Avenue Road Diet
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Transit Integration in Action	Cleveland Healthline Bus Rapid Transit (BRT)

These practices and approaches provide information based on the experiences of others, distilled into descriptions of planning approaches, implementation strategies, notable outcomes, and demonstrated examples of the practice or approach in action.

Footnotes:

- 1) National Complete Streets Coalition [2017]. “The Best Complete Streets Policies of 2016.” <https://smartgrowthamerica.org/resources/the-best-complete-streets-policies-of-2016/>
- 2) National Complete Streets Coalition and Smart Growth America’s Complete Streets Policy Atlas, available at: <https://smartgrowthamerica.org/program/national-complete-streets-coalition/policy-development/policy-atlas/>
- 3) Summarized from National Complete Streets Coalition, “Changing Complete Streets Policy: A Brief Guidebook” <https://smartgrowthamerica.org/resources/elements-complete-streets-policy/>
- 4) <https://www.thetransportpolitic.com/2011/05/25/the-silly-argument-over-brt-and-rail/>
- 5) <https://nacto.org/publication/urban-street-design-guide/streets/downtown-thoroughfare/>
- 6) <https://seattle.curbed.com/2016/4/11/11408920/take-a-seat-seattle-bus-ridership-is-booming;> Dexter Seattle, Adam Coppola Photography
- 7) [https://nacto.org/publication/transit-street-design-guide/;](https://nacto.org/publication/transit-street-design-guide/) 16th Street Mall, Denver, CO



CHAPTER TWO:

Developing a
Strong Local
Policy

2 DEVELOPING A STRONG LOCAL POLICY



Key Aspects:

- Inclusion of all key aspects of an ideal policy, specifically including transit users.
- Overlapping and interlocking Complete Streets Policies.

Role of the Transit Agency:

Local partner but agencies can also adopt a Complete Streets policy of their own.

Policy in Action:

Sherborn, MA

Adoption of a local Complete Streets policy is a formal recognition of the need for safe, effective, convenient, and appealing transportation that enables active street environments and a high quality of life for all citizens. An official policy gives heft to the agency, government, or organization's ability to address multi-year and multi-generational issues, and it functions as a blueprint for action. A strong Complete Streets policy helps guide the implementation of good street design that seamlessly integrates transit service and provisions. This active foresight and planning helps anticipate and overcome potential implementation, financial, and political barriers.

COMMONWEALTH OF MASSACHUSETTS' PROLIFERATION OF COMPLETE STREETS POLICIES

According to the National Complete Street Coalition's (NCSC) 2016 rankings of 13 communities earning top honors, nine were from Massachusetts; and all scored more than 90 points out of 100 on NCSC's scale. As a point of comparison, only one

community (Weymouth, MA) had garnered mentions from NCSC in years past.⁸ Although some of this success can be attributed to the state DOT's incentive program, another success factor is the coordination role the agency plays – through policy support, technical assistance, project selection planning, and local model language. This approach fits their state's needs since coordination is critical in a state where 77 percent of Massachusetts' roadways are locally controlled.⁹ Together there is an interlocking network of Complete Streets policies that cross jurisdictional lines and agency departments.

86 cities and towns in the Bay State adopted policies in 2016, more than any other state.⁸



*South Commons Park
Photo Credit: City of Lowell*

NOTABLE OUTCOMES

In Massachusetts, cities and towns have made notable progress in fulfilling goals to consider all users, all modes, safety, and network connectivity, based on the adoption of Complete Streets policies and as part of MassDOT's program outreach that meet Massachusetts needs. Examples include:¹⁰

- A multi-use path through South Commons Park in Lowell that provides vital connections between the multimodal bus/train terminal, a local school, and a low income apartment complex. It and another multi-use trail spur complement existing work to eliminate an unsafe, auto-centric overpass.
- Strengthening linkages between downtown and commuter rail is the priority in Beverly with American with Disabilities Act (ADA) improvements, bike sharrows, signage, and lighting along an arterial that complement improvements under way on an adjoining road.

- Westwood installed five-foot bike lanes to improve local and regional bicycle connectivity to a major thoroughfare and to the Metro Boston Transit Authority (MBTA) station and an adjacent mixed-use development.
- Newton will address longstanding safety concerns by installing a fully actuated traffic signal in a critical location next to the commuter rail station and an MBTA bus stop, as well as along the pedestrian path between an elementary school, a residential neighborhood, and nearby restaurants. There will be curb extensions to reduce the crossing distance and improve visibility, new sidewalks, ADA compliant ramps, accessible pedestrian signals, bicycle detection, and signage and pavement markings.

- Northampton will build a 250-square-foot raised intersection with curb extensions and new pavement markings, along with sidewalks, ramps, signage, benches and plantings at a high-risk pedestrian crossing connecting the local Amtrak station, transit stop, and the Manhan Rail Trail.

These examples illustrate how coordinated efforts can support broader Complete Streets and transit integration success.

POLICIES IN ACTION: SHERBORN, MA

Sherborn’s Complete Streets Policy includes provisions for all travel modes and users. “The purpose of the Town of Sherborn Complete Streets Policy is to provide safe, convenient transportation routes for users of our roadways, pathways and sidewalks, for the benefit of people of all ages and all abilities. This will include pedestrians, bicyclists, motorists, commercial vehicles, transit vehicles, emergency vehicles, and users of wheelchairs and other power-driven mobility devices. Furthermore, the Complete Streets Policy is to accommodate all road users by creating a road network that meets the needs of individuals utilizing a variety of transportation modes. The policy directs decision makers to consistently plan, design, and construct streets to accommodate all anticipated users including, but not limited to, pedestrians, bicyclists, motorists, emergency vehicles, and commercial vehicles.”¹¹



Rank	Jurisdiction	Policy score
1	Brockton, MA	100.0
1	Missoula, MT	100.0
1	Wenatchee, WA	100.0
2	Hull, MA	98.4
2	Mansfield, MA	98.4
2	Sherborn, MA	98.4
3	Bridgewater, MA	96.8
3	Brookline, MA	96.8
4	Chester, MA	96.0
4	Muskogee, OK	96.0
5	Ayer, MA	95.2
5	Wales, MA	95.2
5	Binghamton Metropolitan Transportation Study, NY	95.2

Footnotes:

- 8) <https://smartgrowthamerica.org/program/national-complete-streets-coalition/policy-development/policy-atlas/>
- 9) <https://smartgrowthamerica.org/app/legacy/documents/cs/complete-streets-massachusetts-webinar-slides.pdf>
- 10) Projects approved in 2017 and 2018; as of publication, not all projects have been built. All descriptions from <https://masscompletestreets.com/Content/Docs/TIER3%20R1%20NARRATIVESltrhead.pdf>
- 11) <https://smartgrowthamerica.org/app/uploads/2017/06/best-complete-streets-policies-of-2016-1.pdf>

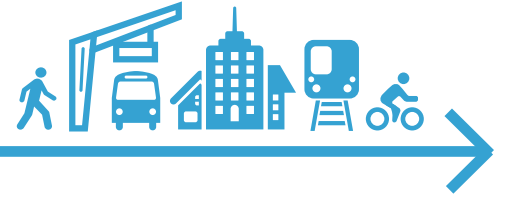


CHAPTER THREE:

Implementing
a Regional
Vision Through
New Transit
Investments

3

IMPLEMENTING A REGIONAL VISION THROUGH NEW TRANSIT INVESTMENTS



Key Aspects:

- Land use and transit vision creates Complete Streets integration organically.
- A robust and nested set of policies, plans, and programs.

Role of the Transit Agency:

Key stakeholder in vision; lead implementer in transit investments.

Vision in Action: LYNX Blue Line

One of the more significant ways to integrate Complete Streets and transit is at the regional level—across multiple corridors, jurisdictions, and on an ongoing basis. A long-term regional vision with a core growth strategy that encourages transit development and supportive land use is a natural Complete Streets complement. Subsequent policies, which can be spurred by new transit development, continually reinforce the use of transit as a tool to promote density and directionality in development. This vision-policy coordination also helps to ensure progress even when difficult circumstances, such as a national recession, threaten to cancel planned investments.



*Skyline of Downtown Charlotte
Photo Credit: Chuck Burton/ Associated Press*

CENTERS, CORRIDORS, AND WEDGES

City and regional policies in Charlotte, North Carolina emphasize transit as the driving element of their growth vision. Well before the concept of Complete Streets was coined, Charlotte’s vision was born in the 1980s as suburban growth began accelerating, and visions about a light rail system concluded in a planning study.¹² Leaders, “recognizing that the City’s quality of life in the coming years would be largely dependent upon how the City responded to growth and redevelopment,”¹³ mapped a hub-and-spoke, five-corridor transit and supportive development plan radiating from the city center. High-intensity development would be encouraged around transit lines and existing infrastructure in areas that could support or needed redevelopment. Lower-intensity development would be directed to areas in between.

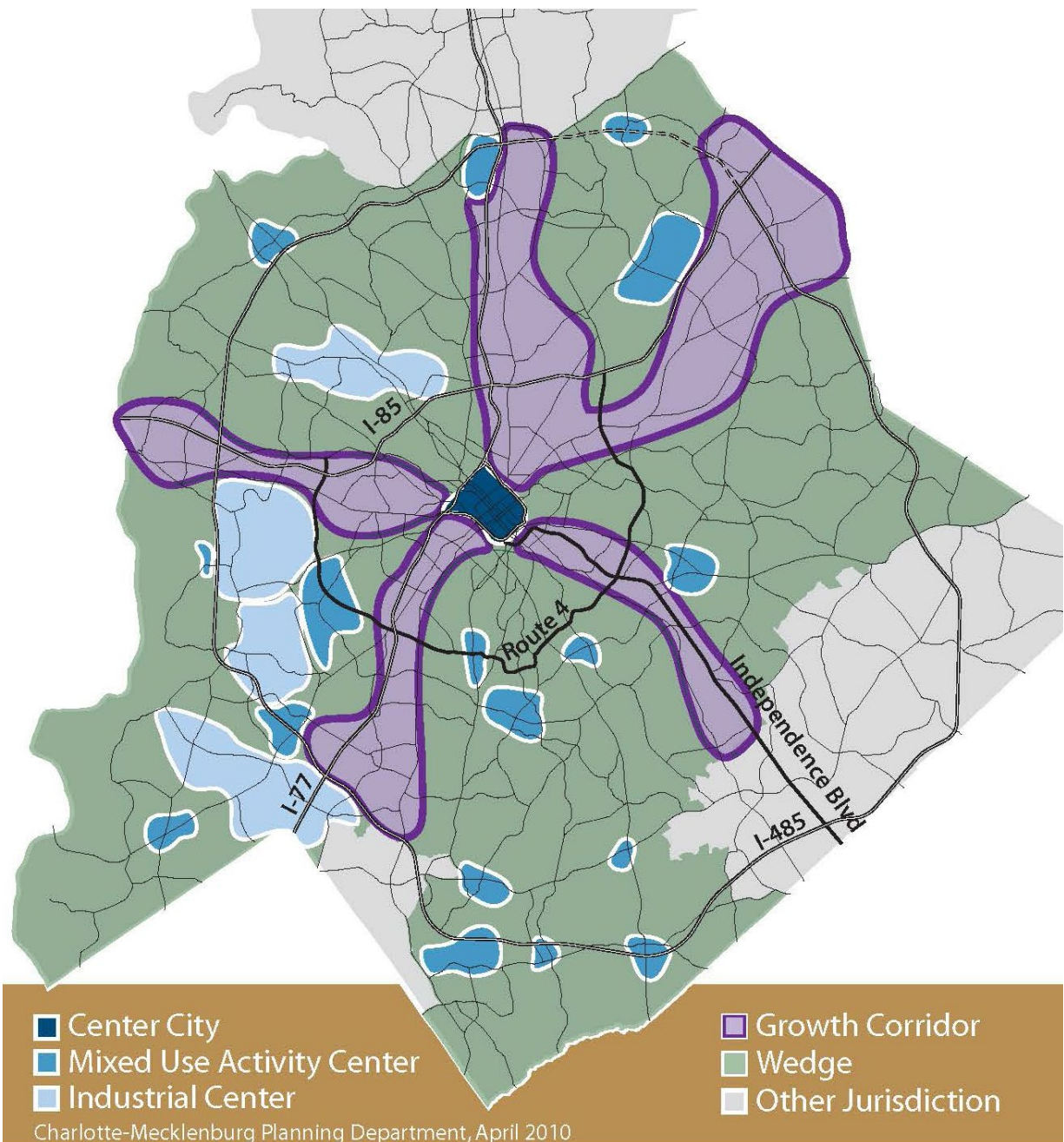
The substantial policy/planning tree, fed by transit projects, enforces the vision at all scales. In the past 20 years, Charlotte has developed a series of land use policies to achieve the vision and aid transit’s success, including transit station area planning principles, detailed station area plans, and zoning.¹⁵ These plans continue to be updated, always in alignment with (and explicit mention of) the overarching vision.



The regional vision and guiding principles set the stage for Complete Streets implementation and are explicit about the inclusion of transit:

1. High-quality, context-sensitive community design
2. Protection of established neighborhoods
3. Residential opportunities to accommodate a diverse population in quality and livable neighborhoods
4. Diligent consideration of environmental benefits and impacts
5. A healthy and flourishing tree canopy
6. More walkable places with a variety of activities
7. A diverse, growing and adaptable economy
8. Revitalization of economically challenged business and residential areas
9. Enhanced transportation networks for pedestrians, cyclists, motorists, and transit users
10. Efficient and coordinated investment in infrastructure that keeps pace with existing and future development¹⁴

This concept, embodied in the Centers and Corridors Vision [and its subsequent update – Centers, Corridors, and Wedges (CCW) in 2010], remains the blueprint for transportation, land use, and public works efforts, and has supported the Complete Streets philosophy that began to emerge in the early to mid-2000s. Charlotte Area Transit System (CATS), a city agency and the lead on all transit projects, was a partner to the City Council, the Charlotte-Mecklenburg Planning Department, Charlotte DOT and others in creating and updating the vision and in setting related design and development principles. This set of nested plans and principles embed the fundamentals of TOD and Complete Streets into the operations of all city departments.

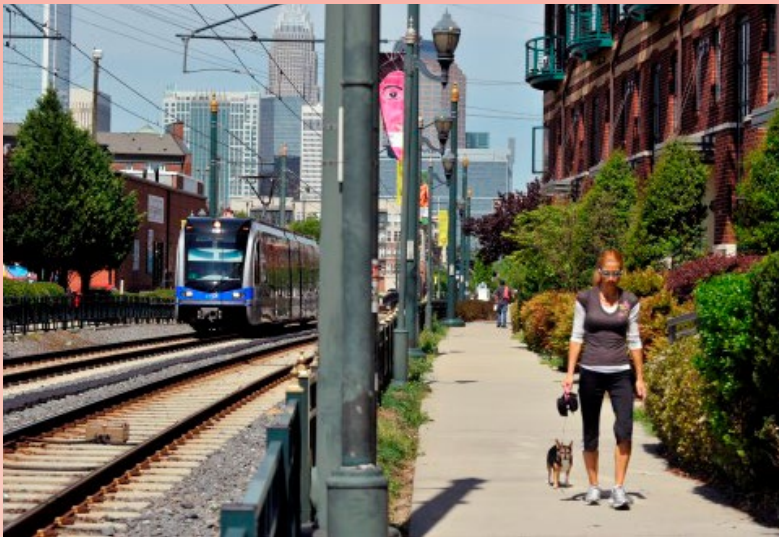


Centers, Corridors, and Wedges in Charlotte, North Carolina¹⁴

The policies and principles in the CCW provide the city’s foundation and planning framework for all subsequent plans, from corridor plans to neighborhood investment plans. And although the city’s vision is solid, it is not rigid—the growth framework provides the flexibility needed to respond to changing conditions and circumstances. Built-in performance measures help assess progress toward regional goals and determine whether adjustment is needed. Growth targets have been set at 70 percent of new multi-family residential uses and 75 percent of new office uses constructed in Activity Centers and Growth Corridors, with an emphasis in Growth Corridors on Transit Station Areas.

Charlotte’s Interlocking Network of Policies and Plans Towards a Regional Transit Vision¹⁶

PLAN/POLICY	LEAD AGENCY	OUTCOME/IMPORTANCE
<p>1994 & 2010 Centers, Corridors, and Wedges</p> <p>Future land use and transportation vision for the metro area: Transforms unfocused development patterns in corridors and wedges to compact mixed-use development along corridors and in station areas</p> <p><i>Also: 2015 Comprehensive Plan (1997); CATS 2030 Transit Corridor System Plan (1998)</i></p>	Charlotte-Mecklenburg Planning Department	Established five primary transportation and development corridors
<p>2025 Integrated Transit/Land Use Plan</p> <p>Proposes details for development of rapid transit system and supporting land use in specific areas (e.g., BRT and rail in specific corridors, concentration of office centers, station land uses) to achieve Centers and Corridors vision</p> <p><i>Also: Smart Growth Principles (2001)</i></p>	<ul style="list-style-type: none"> • Charlotte City Manager’s Office • Mecklenburg County Manager’s Office • Charlotte DOT • Charlotte-Mecklenburg Planning Commission 	Laid the groundwork for implementation: voters passed a half-cent sales tax increase to fund transit improvements; and CATS conducted major investment studies for each corridor that would be incorporated into the metro area’s long-range transportation plan
<p>Urban Street Design Guidelines</p> <p>Complete Streets policy sets out six-step process for designing streets, with consideration of needs of all users and potential conflicts and tradeoffs</p>	Charlotte DOT	Created consistency across implementation of Capital Improvement Plan projects, area plans, street maintenance activities, and through development ordinances
<p>Transit Station Area Plans</p> <p>Sets minimum design, development and land use standards and lays out detailed infrastructure and design plans within ½-mile of a transit station</p> <p><i>Also: Transit Station Area Principles; Transit Station Area Joint Development Principles</i></p>	Charlotte-Mecklenburg Planning Department	Set up supportive capital investments in transit corridors: \$50 million South Corridor Infrastructure Program for the Blue Line, and \$107 million Northeast Corridor Infrastructure Program for the Blue Line Extension
<p>2016 Transportation Action Plan</p>	Charlotte DOT	Identifies the key transportation actions to support the land use vision and goals
<p>Charlotte Place Types and Unified Development Ordinance</p> <p>Creates “Charlotte Places”, linking them to development ordinances and zoning districts that include TOD priorities like rail-trails and parking/transit balance</p>	Charlotte-Mecklenburg Planning Department	In development as of November 2017. Improves regulatory environment to support TOD



*Charlotte Blue Line
Photo Credit: Nancy Pierce*

NOTABLE OUTCOMES

Charlotte's regional vision and plan establishes five primary rapid-transit corridors (South, Southeast, North, Northeast, and West) and guides the adjacent and intermediate land development and street design. Planning for the Blue Line (South Corridor) moved quickly in the late 1990s and early 2000s. In 2006, the Metropolitan Transit Commission adopted its 2030 Transit Corridor System Plan creating a positive outlook for bus and rail across the region. The Blue Line successfully opened in 2007. However, in that same year, the global recession took effect, funds dried up at all levels of government and progress faltered. The Blue Line extension was postponed. The first phase of the \$928 million Red Line (North Corridor) commuter rail was no longer feasible for a 2012 opening. The streetcar planned from downtown west to Charlotte Douglas International Airport had to become bus service. Ultimately, Charlotte's ambitious transit plans were deferred by about four or five years.

Even with these setbacks, there were still successes; for example, implementation of the Urban Street Design Guidelines continued through the Capital Improvement Plan projects, area plans, street maintenance activities, and development ordinances. Most notably, since the vision was established about 20 years ago, the city has implemented four major segments of its Transit System Plan.

The continued parallel movement of these projects through a serious financial crisis demonstrates the resiliency of a solid transportation-land use framework, supportive policy layers and equally supportive implementation safety nets. Challenges continue, but the city has been able to pivot around the core of its transportation vision. At the time of the transit system plan adoption in 2006, for example, light rail was not Federal Transit Administration (FTA) cost-effective. However, in 2017, amid the adoption of the Silver Line and a change in FTA criteria more favorable to light rail, the city began a plan refresh. CATS is considering interlining with the Southeast Corridor, integration of lines within Uptown/Center City, and a new look at its plans for the North Corridor, West Corridor, BRT, streetcar and Sprinter bus. It is also reassessing bus operations through a new initiative called Envision My Ride, which will explore efficiency of bus/rail connections, and first-last mile connectivity. The long-term implementation process in an era of higher expenses – spurred in part by existing sprawl, technological costs, increased environmental and health awareness, and political concerns – illustrates how successful a coordinated and integrated approach can be.

Status of Active Transit Vision Segments in Charlotte, NC

	LINE	DESCRIPTION	STATUS
OPERATIONAL	Blue Line (South Corridor, light rail)	15 stations, 9.6 miles from Uptown/Center City to Interstate 485 beltway	Began operating in 2007
	Sprinter (West Corridor, enhanced bus)	Direct route from Uptown/Center City to Charlotte Douglas airport	Began operating in 2009
	Gold Line, Phase 1 (Center City Corridor, streetcar)	Six stations, 1.5 miles within Uptown/Center City	Began operating in 2015
UNDER CONSTRUCTION	Blue Line Extension (Northeast Corridor, light rail)	11 stations, 9.4 miles from Uptown/Center City to University of North Carolina-Charlotte	Expected to begin operating in 2018
PLANNED	Charlotte Gateway Station	Multimodal station, including Amtrak, along Gold Line	Awarded \$30 million federal grant in 2015, but seeking full funding; delayed to 2024 completion
	Silver Line (Southeast Corridor, light rail)	Replaced initial proposal of 14 miles of bus rapid transit	In November 2016, light rail adopted into 2030 Plan as locally preferred alternative and CATS has begun to preserve the corridor, seek funding
	Gold Line, Phase 2 (Center City corridor, streetcar)	Subsequent phase in eventual 6.4-mile alignment	Still in plan

VISION IN ACTION: LYNX BLUE LINE

One of the most noticeable outcomes of Charlotte's dedication to a transit-focused regional vision is the success in both ridership and private development along the LYNX Blue Line/ South Corridor, the city's (and state's) first light rail line, which began operating in November 2007. As of the second quarter of 2016, the American Public Transportation Association documented LYNX weekday ridership at 17,100, making it the 18th largest light rail system in the United States in terms of ridership.¹⁷ This is ahead of the original pre-construction projections. LYNX Blue Line almost hit its 2025 ridership projections by 2016.¹⁸

Notably, the City of Charlotte has invested significantly in transit-corridor public infrastructure. After the Blue Line was greenlit, the City reserved \$50 million for the South Corridor Infrastructure Program, funding capital improvements around South Corridor light rail stations (and simultaneously incentivizing TOD). A year after the line began operating, this program had already funded 14 miles of sidewalks, 1.5 miles of multi-use trails, 10 miles of bicycle lanes, eight miles of street widening, seven streetscape improvement projects, and 27 intersection improvements.¹⁹ Similarly, the Blue Line Extension (currently under construction) has spurred its own \$106.6 million capital effort to fund road work, pedestrian facilities, and landscaping.

As plans for the Blue Line took shape, the city formed a TOD Response Team to assist developers with entitlements, finances, and public improvements. A South Corridor Land Acquisition Fund allowed for the assembly of key sites to attract and facilitate private development.²⁰ Development in the corridor attributed to the presence of light rail totaled \$1.45 billion as of 2014.²¹ A 208-unit multi-family complex at the New Bern station explicitly acknowledged transit's role in its development and in residents' lives: it features a "LYNX Lounge" with a coffee machine, leather chairs, live camera feeds of the trains, and an exit directly onto the rail platform.²² Among the lessons learned from the process was that TOD success "[r]equires an understanding of the expected return to all partners (e.g. financial, social or qualitative) and how success is measured," and that it is "important to focus on the function and relationship to transit – not just adjacency to transit."²³



LYNX Blue Line
Photo Credit: James Willamor, Wikimedia²⁴



LYNX Blue Line
Photo Credit: Jeff Siner, The Charlotte Observer

Footnotes:

- 12) *South Corridor Light Rail Project, Charlotte-Mecklenburg County: Environmental Impact Statement*
- 13) *Centers, Corridors and Wedges Growth Framework (2010):* [http://www.charmeck.org/Planning/Land%20Use%20Planning-CentersCorridorsWedges/CentersCorridorsWedges\(Adopted\).pdf](http://www.charmeck.org/Planning/Land%20Use%20Planning-CentersCorridorsWedges/CentersCorridorsWedges(Adopted).pdf)
- 14) [http://www.charmeck.org/Planning/Land%20Use%20Planning-CentersCorridorsWedges/CentersCorridorsWedges\(-Adopted\).pdf](http://www.charmeck.org/Planning/Land%20Use%20Planning-CentersCorridorsWedges/CentersCorridorsWedges(-Adopted).pdf)
- 15) https://www.fhwa.dot.gov/livability/case_studies/guidebook/livabilitygb10.pdf
- 16) Summarized from *Joint Use Task Force (CRTPO Technical Coordinating Committee) presentation (2017); Charlotte DOT, "Transit Ready in Charlotte" presentation (2009)*
- 17) <http://www.moderncities.com/article/2017-jan-charlottes-lynx-light-rail-ten-years-later>
- 18) Harrison, Steve (November 24, 2007). "A momentous arrival: After opening-day hoopla, what's ahead for Lynx?". *The Charlotte Observer*
- 19) <https://www.aarp.org/content/dam/aarp/livable-communities/old-learn/transportation/livability-in-transportation-guidebook-planning-approaches-that-promote-livability-aarp.pdf> 20) <https://www.slideshare.net/CNU17/transit-ready-design-pleasant-cnu17>
- 21) *Transportation Action Plan 2013 annual report:* <http://charlottenc.gov/Transportation/Programs/Documents/2013%20TAP%20Annual%20Report.pdf>
- 22) [http://www.charlottemagazine.com/Charlotte-Magazine/April-2015/Stacked-City-Real-Estate-in-Charlotte/;](http://www.charlottemagazine.com/Charlotte-Magazine/April-2015/Stacked-City-Real-Estate-in-Charlotte/) https://www.honolulu.gov/rep/site/dpptod/dpptod_docs/Pleasant_TODSymposium_2013.pdf
- 23) <https://www.slideshare.net/CNU17/transit-ready-design-pleasant-cnu17>
- 24) <https://www.bisnow.com/charlotte/news/multifamily/work-starts-on-yet-another-apartment-development-near-the-blue-line-extension-74174>

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CHAPTER FOUR:

Prioritizing

Network

Enhancements

for Transit

4

PRIORITIZING NETWORK ENHANCEMENTS FOR TRANSIT



Key Aspects:

- Identified corridors that prioritizes increasing transit system ridership and efficiency across the city.
- A supportive Complete Streets Design Guide that helps work through potential modal and ROW conflicts while prioritizing safety.
- A supportive first and last mile transit investment plan to help build the network.

Role of the Transit Agency:

Partner and stakeholder in the Transit Enhanced Network Plan; operator of numerous BRT lines, leader of the first and last mile plan.

Complete Streets strategies should integrate well within a broader transportation network. A Complete Streets approach that integrates transit corridor considerations within a larger multimodal network enhances the efficiency and connectivity of the system. The benefit of this approach is that it can help achieve broader transit system goals such as increased transit ridership and active transportation use – not just one or the other.

TRANSIT ENHANCED NETWORK

In 2008, the State of California adopted a Complete Streets policy.²⁵ In response to this policy, the City of Los Angeles' Mobility Plan 2035 provides the foundation for achieving a transportation system that balances the needs of all road users, most notably through a Complete Streets network lens. The first key policy initiative is to “[l]ay the foundation for a network of Complete Streets and establish new Complete Streets standards that will provide safe and efficient transportation for pedestrians (especially for vulnerable users such as children, seniors, and the disabled), bicyclists, transit riders, and car and truck drivers, and more.”²⁶

One critical piece of this Complete Streets network is the Transit Enhanced Network (TEN), which is designed to improve safety and street conditions for pedestrians and transit users. Working in collaboration with the transit operators, combined with street improvements of city-managed enhancements, the TEN Plan strives to:

- provide reliable and frequent transit service that is convenient and safe;
- increase transit mode share;
- reduce single-occupancy vehicle trips; and
- integrate transit infrastructure investments with the identity of the surrounding street.

With over 230 miles of streets, the TEN corridors were selected based on a data-driven analysis of factors such as ridership, destinations, employment, and population²⁷. These corridors can receive enhancements to improve line performance and/or the overall user experience for people who walk and take transit. Enhancements range from streetscape improvements for safer and easier walking to transit shelters or bus lanes.²⁸



Transit Enhanced Network from City of Los Angeles Mobility Plan 2035²⁹

The most significant supportive policy of the City of Los Angeles' Mobility Plan 2035 is the Complete Streets Design Guide.³⁰ Not just a design guide, this document provides guidance in addressing design tradeoffs within a limited ROW when using a Complete Streets framework for planning and design. In developing enhanced networks for each mode, the City recognizes that these designations may create challenges as individual streets may be included in multiple networks. For example, on a street that is identified as both part of the TEN and the Bicycle Enhanced Network (BEN), designs must include both dedicated transit facilities and protected bicycle facilities, if feasible. These designations of TEN and BEN carry significant emphasis towards prioritizing those modes over other potential elements. This design guide includes a set of design tools that help negotiate these potentially conflicting requirements by offering solutions that can promote multiple modes in certain circumstances. The guide presents pictures, cross sections and more, intended to supplement existing street engineering and design guidance and firmly establish the tenets and practices of Complete Streets in the City.

Another important support document to Mobility Plan 2035 is the transit agency, Metro's, First Last Mile Strategic Plan [2012]. As part of the countywide Sustainability Planning Policy and Implementation Plan and the Regional Transportation Plan/Sustainable Communities Strategy Joint Work Program, the First Last Mile Strategic Plan works to better coordinate infrastructure investments in station areas to extend the reach of transit with the ultimate goal of increasing ridership.³¹ These guidelines help facilitate the integration of mobility solutions in a complex, multimodal environment – most notably to improve the user experience by supporting intuitive, safe and recognizable routes to and from transit stations.

Combined, the Complete Streets Design Guide and the First Last Mile Strategic Plan show the City, County, Region, and Transit Agency's commitment to integrating transit into its Complete Streets.



*Dedicated Buse Lanes, Orange Line BRT
Photo Credit: Pablo J. Maneiro, Jr.³⁴*

NOTABLE OUTCOMES

Because the Mobility Plan 2035 is relatively new, outcomes are not available. However, the plan identifies already successful projects as the standard for what TEN projects should embody – such as the Metro Orange Line BRT. As one of the first BRT lines in the United States, the Orange Line BRT connects the city’s North Hollywood subway station to the Western San Fernando Valley. The line opened in 2005 with 14 miles of dedicated busway. By May 2006, the Orange Line was averaging nearly 22,000 weekday boardings, a figure not expected until the year 2020. In response to demand, the line was extended another four miles in 2009. The line offers a variety of amenities and desirable service features for riders that help ensure continued popularity, including off-vehicle fare payment options, headways of 10 minutes or less, loop detectors installed at intersections, helping to keep buses moving smoothly through higher traffic areas and soundproofing measures on portions of the busway to reduce noise impacts on adjacent neighborhoods. Separated bicycle and pedestrian paths run adjacent to eight miles of the route; the remaining six miles feature designated on-street bike lanes.

Metro is committed to the continued viability of the Orange Line, and in 2012 the Orange Line Bus Rapid Transit Sustainable Corridor Implementation Plan built on the success of the Orange Line by providing recommendations to create a network of transit-oriented districts at station areas along the corridor.³² Planning for these districts along the corridor will support continued and growing demand for transit services along the Orange Line’s route.

In addition to planning for the Orange Line’s continued success, Metro has taken steps to evaluate the line’s success through project performance evaluation. In partnership with the FTA and the National Bus Rapid Transit Institute, Metro conducted a comprehensive evaluation of their Metro Orange Line Bus Rapid Transit service. A wide variety of performance metrics were captured and evaluated including capacity; travel time; reliability; safety and security; results of an on-board survey; assessment of the project’s image and brand identity; and an overall appraisal of project benefits such as ridership, financial feasibility, transit supportive land use, environmental quality, and overall performance of the Orange Line in meeting project goals. **The results of the evaluation indicate that the Orange Line achieves the following objectives:**

- **Reduced travel time;**
- **More reliable service;**
- **Lower capital expenditures than the Metro Gold Line Light Rail Transit;**
- **Cost efficiencies that are higher than the Metro Gold Line;**
- **Improved overall mobility in San Fernando Valley; and**
- **Attraction of “choice” riders.³³**

The plans, projects, and evaluations supported and led by Metro with the help of the City of Los Angeles illustrate the value of planning for transit as part of a holistic Complete Streets approach. Envisioning a future condition, laying out a framework for implementation, and evaluating performance, all support the type of transit network success that a community desires.



Los Angeles Orange Line BRT
Photo Credit: Dan Reed, Flickr

Footnotes:

- 25) [California State Legislature AB 1358, The Complete Streets Act](#)
- 26) <https://planning.lacity.org/documents/policy/mobilityplnmemo.pdf>
- 27) <https://la.streetsblog.org/2014/03/14/l-a-s-draft-mobility-plan-2035-a-concrete-future-direction/>
- 28) <https://planning.lacity.org/documents/policy/mobilityplnmemo.pdf>
- 29) <https://planning.lacity.org/documents/policy/mobilityplnmemo.pdf>
- 30) <https://planning.lacity.org/documents/policy/CompleteStreetDesignGuide.pdf>
- 31) http://media.metro.net/docs/sustainability_path_design_guidelines.pdf
- 32) <http://www.reconnectingamerica.org/assets/Uploads/20120629OrangeLineCIPFinalReport.pdf>
- 33) https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA0004_Research_Report_Summary.pdf
- 34) <http://www.tfm.org/pages/nabi/lacmta-nabie.html>

CHAPTER FIVE:

5 Launching a Coordinated String of Transit- Oriented Developments

5

LAUNCHING A COORDINATED STRING OF TRANSIT-ORIENTED DEVELOPMENTS



Key Aspects:

Transit spurs development, and development spurs transit. The interconnection is evident and critical - investment in TOD increases ridership and keeps the system viable over the long term.

Role of the Transit Agency:

Key stakeholder and partner with other regional agencies.

TOD Program in Action:

Sustainable Communities Collaborative

The previous example focused on integration of Complete Streets from the transportation perspective. This practice coordinates a land use and development strategy around transit station areas in a systemic manner to define the synergies and relationships among Transit Oriented Developments (TODs) within a broader district. This practice strengthens this connection of land use and transportation visions, allowing for coordinated action strategies over successive projects to achieve the defined vision.

CITY OF PHOENIX'S TOD COMMITMENT AND EVOLUTION OF PRACTICE

Phoenix, the seat of Maricopa County, is the fifth largest city in the United States. It covers 517 square miles and continues to annex more land. The City's land expansion and population growth has fueled its economy. However, leapfrog development has left land areas close to the downtown core underutilized as new construction has risen in the suburbs and exurbs.



Timeline of TOD Evolution



*Rendering of Phoenix Light Rail
Photo Credit: mobilitywithoutlimits.com*

The City of Phoenix found the alignment of funding, public interest, and support from the development community needed to encourage the approval and construction of a light rail line, which opened for service in 2008. Light rail ridership has exceeded projections and by 2016 had a weekly ridership of over 49,000 passengers.³⁵

The City understood that transit would spur development and that the light rail system would help catalyze changes in the market. Specifically, areas around the planned transit stations could enhance mobility options, increase access to housing, create distinctive and attractive places, and promote environmental sustainability. To maximize these potential benefits, the City was proactive in developing and implementing strategies to spur investment in TOD around station areas, with the broad goal of increasing ridership and supporting the long-term viability of the system.

In 2003, in anticipation of the light rail system, the City adopted a TOD Overlay Zoning District to encourage mixed-use development on lands located approximately one-quarter mile on either side of the light rail route. The primary intention of the Overlay was to promote redevelopment of the older, strip-style commercial centers located along the corridor.³⁶ In 2007, the city sought policy assistance for promoting TOD along the light rail corridor. Through collaboration with the U.S. Environmental Protection Agency Smart Growth Implementation Assistance Program, the City of Phoenix developed several options for encouraging TOD through the development of a policy toolbox to coordinate mixed-use, pedestrian-friendly land uses and development near station areas. With a focus beyond government agency support, the 23 strategies in the toolbox assist municipalities, property owners, and developers in promoting TOD to positively impact both property values and future development potential. They also provide a level of certainty about the type of uses and forms that are desired by the public

and private sectors. The TOD tools are organized in two ways. First, the tools are grouped according to their primary function in defining and supporting the implementation of TOD:

- Strategic planning
- Local visioning and land use policy
- Development assistance
- Placemaking and access
- Land assembly
- Programmatic and institutional

Second, the tools are organized to reflect the general sequence in which the tools would be deployed: planning and visioning, implementation, and ongoing programs. Not all the tools can be applied to each station area. The variable context along the corridor provides the different mixtures of tools to be used.³⁷

In 2014, Phoenix adopted a Complete Streets Ordinance, shifting the focus of street design to the safety and comfort for all users of the public realm. The ordinance is designed to encourage and facilitate active transportation and public health.³⁸ In addition to encouraging TOD along the light rail corridor, the City recognized the critical interconnections between development and transit and has worked to enhance the public realm and create a system of multimodal networks that provide accessibility and circulation. This has resulted in more transportation choices and a greater quality of life for residents. Phoenix has a strong foundation for Complete Streets enhancements, with a gridded road pattern and extensive trail network, and it has taken significant steps to improve amenities, such as wider sidewalks, more street trees and shade, landscaping, and bicycle facilities—including parking and bike share programs.

The most recent addition to the TOD evolution is Reinvent PHX, which is a partnership between the City of Phoenix, the U.S. Department of Housing and Urban Development, Arizona State University,

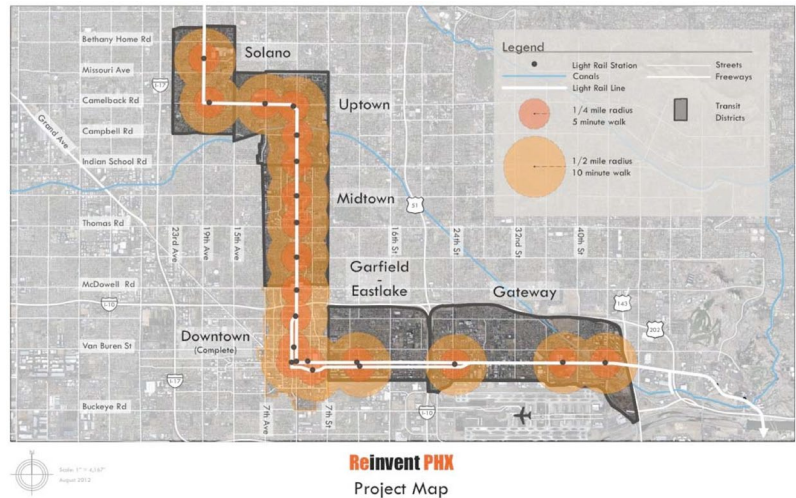
Vitalyst Health Foundation, and others. This partnership has committed to developing walkable, opportunity-rich communities connected to light rail through the development of action plans for districts along the light rail system. This transition from individual TOD plans to a district approach that groups proximate TODs under one action plan provides a coordinated development strategy and vision.



*Phoenix Complete Street
Photo Credit: www.phoenix.gov*

The plans establish a community-based vision for the future and identify investment strategies to improve the quality of life for all residents with the following objectives:

- **Quality Development** - Create an attractive investment environment for high quality and equitable Transit-Oriented Development.
- **Smart Growth Model** - Establish a model process for guiding smart, cost-effective investment along light rail corridors.
- **Civic Engagement** - Empower the community, including low-income and limited English-speaking residents, to be actively involved in the decision-making and implementation processes.
- **Return on Investment** - Capitalize on the community's investment in light rail by guiding development to benefit residents, lower the cost of living and enhance unique and historic characteristics.³⁹



Reinvent PHX Project Map⁴¹



Specific Reinvent PHX Recommendations in the Gateway District:

1. Complete a water and sewer infrastructure needs assessment
2. Develop a mixed-income TOD demonstration project
3. Complete two housing rehabilitation projects
4. Reuse a city-owned building as a small business support organization
5. Install enhanced crosswalks at three identified locations
6. Organize a walking club for public safety patrols
7. Engage with Maricopa Medical Center and Arizona State Hospital on the Complete Streets improvement concept in the Conceptual Master Plan⁴⁰

Most recently, this process has also informed the City's General Plan Amendments currently underway.



Mixed-use development along the Valley Metro light rail line⁴⁴

NOTABLE OUTCOMES

As early developments started showing success, other new projects were proposed. Some developments even included incentives, such as light rail passes, as perks in lease agreements. More than 15,000 residential units have been developed along the corridor since 2005.⁴²

Evidence of the demand for greater density can be found in the growing number of real estate web pages (such as www.lightrailconnect.com) and services that have been created to cater specifically to those who want to live and work near the light rail corridor, offering not only housing listings, but advertising jobs and entertainment opportunities along the corridor as well.⁴³

The regional transit agency, Valley Metro, also sees itself as critical to the success of TOD. Its TOD vision is articulated “[b]y assisting in promoting high quality, more intensive development on and near properties adjacent to the light rail, [they] can increase ridership

and support long-term system capacity. Also, such development creates attractive investment opportunities for the private sector and stimulates additional development.” They do this by assisting local communities in developing the policy framework and implementation strategies that build community support for TOD, improve access to public transportation, provide pedestrian and bicycle infrastructure and

amenities, and create new living spaces that better serve the region with more mobility options.⁴³

Combined this TOD program approach demonstrates the value of coordinated action strategies over successive projects to achieve the defined vision.⁴³

Development driven by light rail has topped \$8 billion – almost \$6 billion has been invested by the private sector, with an additional \$2 billion from public sector projects.⁴³

TOD PROGRAM IN ACTION: SUSTAINABLE COMMUNITIES COLLABORATIVE

The Sustainable Communities Collaborative (SCC) is a non-profit partnership working with private funds to provide economic catalysts for the communities connected to the Valley Metro light rail system. The \$20 million Sustainable Communities TOD Fund, provided by Local Initiatives Support Corporation (LISC) and Raza Development, encourages, leverages and guides development of quality, equitable TOD near the light rail line. The SCC focuses on:



Housing: Fund, support and promote mixed-income housing (market, affordable, and workforce).



Public Health: Promote fresh and healthy food connected to transit-oriented communities and holistic planning that leads to pedestrian and bicycle friendly urban environments.



Community: Create vibrant urban environments and transit-oriented communities that have schools, healthcare facilities, complete streets, shade and streetscape elements, open spaces, social and cultural activities, and a mix of uses.



Transportation: Promote and facilitate development of multimodal networks with transit, bicycle paths, pedestrian plazas, and complete streets to reduce reliance on vehicles.



Union at Roosevelt is the first project funded by the Sustainable Communities TOD Fund, formed to support quality transit-oriented development along the light rail line. The mixed-use development near downtown Phoenix is on a lot that had been vacant for over 50 years.⁴⁶



Financial: Attract additional investment into the region for quality, community-centered development at all income levels.

Since 2011, the Fund has provided \$20 million of loan funds leveraging over \$375 million in additional private investment for 24 developments connected to the light rail corridor, including: 2,044 affordable, workforce, market rate, and mixed-use housing units and 200,000 square feet of commercial space.⁴⁵



Phoenix Light Rail
Photo Credit: phoenix.gov

Footnotes:

- 35) Valley Metro Rail – FY 2016 Ridership Report http://www.valleymetro.org/publications_reports/ridership_reports
- 36) www.valleymetro.org TOD Brochure and www.phoenix.gov
- 37) www.phoenixcommunityalliance.com ULI Rose Center Advisory Services Program Report
- 38) www.phoenix.gov
- 39) <https://www.phoenix.gov/pdd/topics/reinvent-phx>
- 40) <https://www.phoenix.gov/pddsite/Documents/Five%20Year%20Action%20Plan%20GATEWAY.pdf>
- 41) www.valleymetro.org July 28, 2015 press release – Everybody Benefits from Public Transportation
- 42) <https://www.phoenix.gov/pdd/topics/reinvent-phx>
- 43) www.smartgrowthamerica.org/how-phoenix-az-is-using-transit-oriented-development-to-reinvent-downtown/
- 44) Valley Metro
- 45) www.sustainablecommunitiescollaborative.com/our-accomplishments/
- 46) Sustainable Communities Collaborative



CHAPTER SIX:

Funding a
Complete
Streets

Enhancement
Program

6

FUNDING A COMPLETE STREETS ENHANCEMENT PROGRAM



» Key Aspects:

- Region-wide corridors that enhance transit system ridership and efficiency for existing transit populations.
- Distinguishing between simpler “quick-fix” and larger design-level components.
- Selected demonstration projects leverage future funding.

» Role of the Transit Agency:

Leader in both operations and capital improvements.

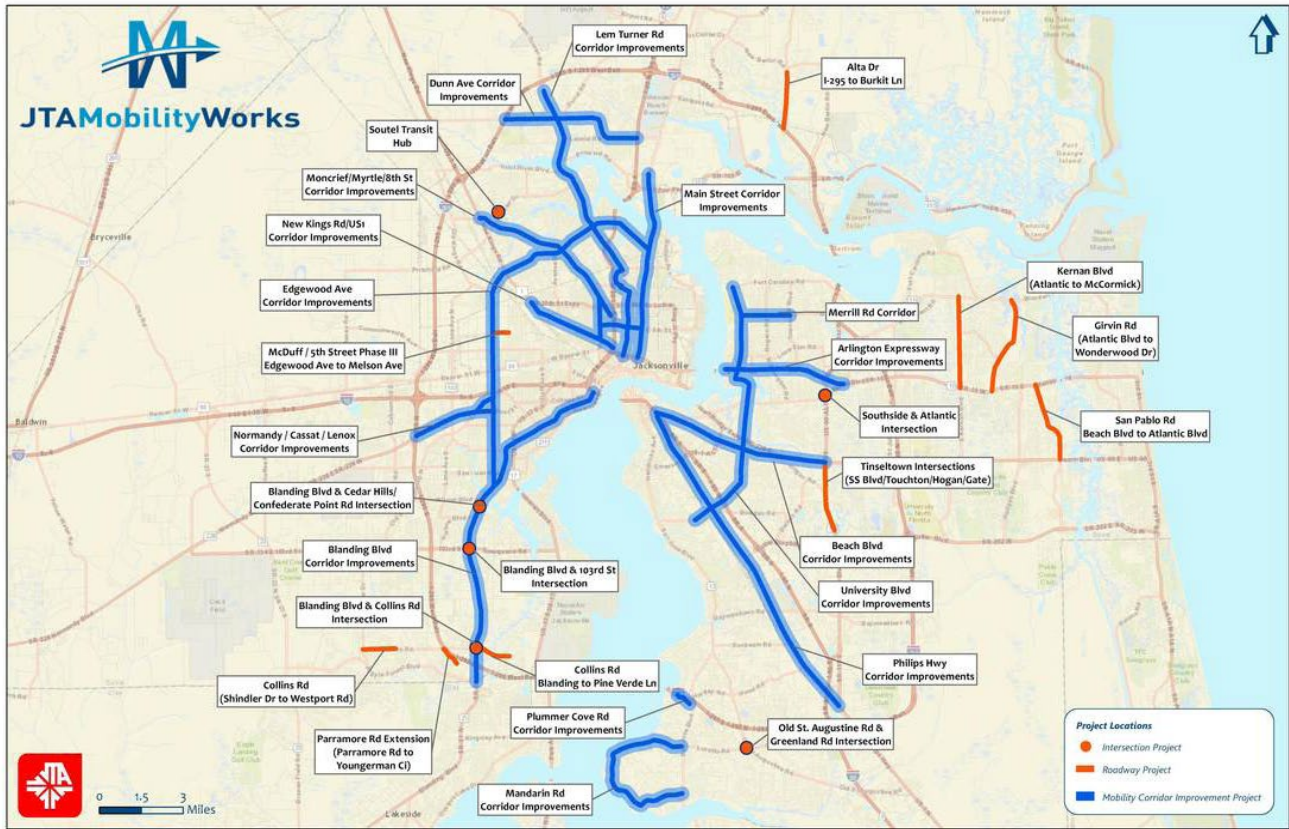
Capturing the full ridership potential for a transit system, including attraction of choice riders, is an important goal in an era of limited funding. Focusing Complete Streets work within higher-ridership corridors that enable areawide mobility for transit-dependent populations helps prioritize finances and focus on an agency’s contribution to regional safety, mobility, economic opportunity and equity goals.

MOBILITY CORRIDORS

The Jacksonville Transportation Authority (JTA), the dual roadway and transit agency in Jacksonville-Duval County, Florida, decided in 2014 that its nearly 50-year-old transit system needed an overhaul. Leaders were realistic about the City’s challenges and mobility options:

“ JTA recognized that for the City of Jacksonville to build its public transportation ridership, JTA had to shift its focus from moving people out of cars and onto public transportation, a strategy that was neither realistic nor particularly effective for a region as spread out as Jacksonville. ... Instead JTA had to focus on capturing the transit dependent population that was not taking advantage of the public system. ”⁴⁷

In a process it called the Route Optimization Initiative (ROI), which was completed in late 2014, the agency replaced meandering and infrequent routes with faster and more reliable service along 14 key corridors connecting vital neighborhoods – all at the same operating cost. JTA enhanced late night and weekend service, for example, by doubling the number of routes running after 11 p.m. and increasing the number of routes running after midnight from three to 16 – with a goal of providing new job opportunities for transit-dependent shift workers.⁴⁸ JTA identified these target corridors using variables that indicated demand and accessibility levels for riders within the one-quarter- to one-half-mile area around transit stops, alongside walk audits.



JTA's Mobility Corridors⁵¹

Through this process, the importance of first- and last-mile connectivity became clear. Customers taking advantage of the new, more direct routes might now need to walk further distances to a desired stop. It was clear JTA would need to improve this connectivity, both to enable access to the updated transit network and to ensure users' safety.

To help make this a reality, JTA in 2015 launched the MobilityWorks program that includes 27 projects, of which 14 are "roadway" (street segment and intersection work, primarily located on the edge of the city) and 13 are cross-city "mobility corridor" efforts.⁴⁹

Mobility Corridors, specifically, are a series of Complete Streets-based enhancement projects located within one-quarter mile of the region's high-ridership corridors, such as the installation of compliant stops, sidewalks, shelters, and other bicycle and pedestrian improvements. Community charrettes for each corridor, conducted in Fall 2015 through Spring 2016, helped JTA identify and prioritize projects that facilitate walking, biking, and riding within these corridors, balancing often competitive street functions within specific neighborhood contexts. Design charrettes also served as additional coordination points with FDOT, whose roads are often part of Mobility Corridors. This program signaled a shift in the planning of roadways: pedestrian, bicycle, and transit accommodations are "no longer merely viewed as 'amenities' to be added when feasible, but central to the design process."⁵⁰

Projects fall under two initiatives: Transit Enhancements (quality-of-life focused improvements such as ADA compliant stops and shelters, trash bin placement, and sidewalk connectivity) and Complete Streets (design-focused reallocation of space such as the provision of bike lanes, mid-block crossings, etc.). The enhancements explicitly move JTA’s network toward federal and state goals, including those articulated in federal transportation legislation, FDOT’s Complete Streets Policy and Implementation Plan, and Path Forward 2040, North Florida Transportation Planning Organization’s Long Range Transportation Plan.

JTA’s 2016 Complete Streets report explains the vision, context, charrette process, and design alternatives for each corridor, providing “a long-term ‘menu’ of capital improvement options for implementation”. The result is a list of prioritized recommendations that reflect these general categories:⁵²

Keystone Projects: Projects JTA would use to showcase “Complete Streets” for immediate effect. These should be reasonably substantial projects that could be implemented in the near term.

Operational/Safety Enhancements: These represent “quick fix” improvements that can provide immediate safety and operational improvements at a lower cost.

Long-Term Vision Projects: These are complete, larger scale projects for the corridor or corridor segments. These are bolder, more costly investments, which would be included in a long-range plan.

Projects are scored using a prioritization matrix aligned with the priorities within FDOT’s Complete Streets Implementation Plan: Safety for All Transportation System Users; Access to Destinations; Economic Competitiveness; Environmental Sustainability; Public Health; Social Equity; and Quality



JTA Bus Stop
Photo Credit: www.jaxdailyrecord.com

of Life. Thus, as funding becomes available, the project prioritization scores allow for flexibility in selection.

The MobilityWorks program is supported by a local gas tax, extended by a vote of City Council in 2014. With up to \$100 million on the table over the next five years, JTA set up the program with the understanding that project demand would exceed the revenues from the local gas tax. JTA issued bonds to cover a Council-approved project list – including some construction work carried over from the Better Jacksonville Plan – and agreed that a portion of the gas tax revenue would go to the City for pedestrian and bicycle improvements. It is choosing to prove the strength of its investment with “keystone” projects – substantial Complete Streets projects that demonstrate their transformative potential – alongside “quick fix” low-cost improvements to gather support and funding for more resource-intensive work and to develop a long-term capital program for Complete Streets. In sum, \$ 5 million was for transit enhancements and \$10 million was for Complete Streets.

The Mobility Corridors project demonstrates that a transit agency can lead the way in a regional multimodal transformation. This program provides a focus on communities and a financial commitment to improve transit ridership in concert with greater economic and health opportunities and through a citywide mobility plan supporting the implementation of transit-supportive land use policies.

MobilityWorks Project Prioritization Matrix

<u>Mobility and Safety</u>	<u>Planning & Funding Leveragability</u>	<u>Public Health & Livability</u>	<u>Economic Development & Competitiveness</u>
Bike Ped Crashes	Facility Designation	Access to Social, Cultural, Recreational Resources	Adjacent to Substantially Vacant/ Redevelopable Commercial Property
Access to Key Transit Routes	Funding Leveragability	Social Equity	
ADA Compliance & Lighting	Support Local Planning Initiatives	Access to Healthy Food	
Vehicle Capacity Ratios			
Transit Ridership			

NOTABLE OUTCOMES

JTA's initial ROI process was a success, with a six percent ridership increase in the first year (FY 2015-16)⁵⁴. In FY 2016, JTA broke ground on three MobilityWorks road projects and five corridor projects, according to the Agency's 2016 annual report. The five keystone projects, all currently listed as "in development" in late 2017, are described in the table below.

Of MobilityWorks' 27 projects (roadway and corridor), 12 have been completed. Transit enhancements (quick-fix changes) are complete in the Arlington Expressway, Beach Boulevard, Blanding Boulevard, Dunn Avenue, Edgewood Avenue, Lem Turner Road, Merrill Road, New Kings Road, and Philips Highway corridors, as well as the Southside Boulevard

Corridor Visioning Study. Nine projects are in development, including the five "keystone" Complete Streets corridors; and seven are pending.

As its corridor projects are ultimately related to larger quality of life enhancements, JTA is also working to develop health- and TOD-related measures, for example, by conducting before-and-after health impact assessments in partnership with the Northeast Florida Health Planning Council. It is also assessing changes in private investment and retail vibrancy in project-adjacent areas.⁵⁵

By focusing on these critical first mile/last mile connections between complete streets and transit, JTA will continue to transform its transportation network in a multimodal fashion.

Keystone Projects

CORRIDOR	ENHANCEMENTS	COST/DURATION
University Blvd. (North)/Merrill Mobility Corridor	Roundabout, including appropriate sections of multi-use path, reduced lane widths, traffic study to determine future lane requirements on Merrill/University approach, with buffered bike lanes (anticipated funding partnership).	Estimated cost: \$2.5 million; Approx. 24 months.
Mandarin/Plummer Cove Mobility Corridor	New sidewalk installation from Bolton Abbey Drive to Orange Picker Road.	Estimated cost: \$700,000; Approx. 12-18 months.
Cassat/Normandy/Lenox Mobility Corridor	Traffic study to determine future lane requirements between Normandy and Cassat Avenue reducing travel lanes from four to two including median installation and bike lanes.	Estimated cost: \$900,000; Approx. 6-9 months.
8th/Myrtle/Moncrief Mobility Corridor	Pedestrian safety and aesthetic enhancements along 8th Street and James Hall Drive near UF Health including planted medians, mid-block crossings, refuge islands, crosswalks, reduced curb radii.	Estimated cost: \$800,000; Approx. 18 months
Main St. Mobility Corridor	Traffic study for Springfield-area lane conversion to include buffered bike lanes and re-opening of median with striped crosswalks at 3rd, 5th, 7th, and 9th Streets, Cottage Avenue and 11th Street.	Estimated cost: \$2 million; Approx. 14-18 months.



JTA Bus
Photo Credit: Karel C. Danzie

Footnotes:

- 47) Northeast Florida Multimodal Transportation Opportunity Corridors, Jacksonville Transportation Authority Application for 2015 TIGER Discretionary Grant: http://www.jtafla.com/PDF/TigerGrant_2015/JTA_TIGER_Final_060315.pdf
- 48) Northeast Florida Multimodal Transportation Opportunity Corridors, Jacksonville Transportation Authority Application for 2015 TIGER Discretionary Grant: http://www.jtafla.com/PDF/TigerGrant_2015/JTA_TIGER_Final_060315.pdf
- 49) Construction on the first project, the intersection at Old St. Augustine Road and Greenland Road, began in October 2015.
- 50) Jones, Fred and Sloboden, Jaimison. JTA's Mobility Corridors: Improving Transit System Performance through Enhanced Safety and Urban Design: <http://trrjournalonline.trb.org/doi/abs/10.3141/2651-13>
- 51) JTA and Michael Baker International. (slideshow presentation) "JTA's Mobility Corridors: Improving Transit System Performance through Enhanced Safety and Urban Design"
- 52) Jones, Fred and Sloboden, Jaimison. JTA's Mobility Corridors: Improving Transit System Performance through Enhanced Safety and Urban Design: <http://trrjournalonline.trb.org/doi/abs/10.3141/2651-13>
- 53) JTA and Michael Baker International. (slideshow presentation) "JTA's Mobility Corridors: Improving Transit System Performance through Enhanced Safety and Urban Design"
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- 55) Jones, Fred and Sloboden, Jaimison. JTA's Mobility Corridors: Improving Transit System Performance through Enhanced Safety and Urban Design: <http://trrjournalonline.trb.org/doi/abs/10.3141/2651-13>

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CHAPTER SEVEN:

Using a Project

Scoping

Form to

Identify Transit

Integration

Opportunities

7

USING A PROJECT SCOPING FORM TO IDENTIFY TRANSIT INTEGRATION OPPORTUNITIES



Key Aspects:

- A project development process that publicly and clearly integrates transit considerations in a comprehensive and standardized manner.
- An analytical tool to find the right opportunities for integrating transit and Complete Streets.

Role of the Transit Agency:

Partner and stakeholder.

Checklist in Action:

Dexter Avenue Roadway Improvements

Unless a project includes a fixed-guideway or dedicated lane for transit, transit is often not a primary consideration within a Complete Streets project. However, if a transit route exists or is planned, one way to ensure transit is incorporated is to use a form process that helps practitioners identify ways for integrating transit into their project. This can help to leverage planning, design, and implementation efforts between local jurisdictions and the transit agency and overcome challenges in administering different funding programs. In Seattle, the City developed a project scoping form to synthesize integration in a thoughtful deliberate manner that reflects both the City's commitment to Complete Streets and the project's context and purpose. This scoping form helped transform a repaving project into a Complete Streets project, improving transit accessibilities and achieving implementation cost efficiencies.

COMPLETE STREET CHECKLIST

Seattle was one of the nation's earliest adopters of a Complete Streets policy. In 2007, City Council passed an ordinance directing the Seattle DOT to evaluate all new major road projects funded by Bridging the Gap – the \$365 million transportation improvement levy approved by voters in 2005 – for Complete Streets elements. The evaluation requirement was expanded six months later to all major road projects, regardless of funding source.

Although many factors, such as context-sensitive design and multimodal feasibility, must be considered for all applicable projects, Seattle's Complete Streets Policy offers Seattle DOT some discretion in decision-making, allowing exemptions under specific circumstances. This flexibility also extends to implementation and funding: implementing a Complete Street strategy may be

Seattle DOT's Complete Streets Guiding Principle:

“ [T]o design, operate and maintain Seattle's streets to promote safe and convenient access and travel for all users – pedestrians, bicyclists, transit riders, and people of all abilities, as well as freight and motor vehicle drivers. ”⁵⁶

achieved through an incremental series of improvements rather than just a single project, and “all sources of transportation funding” should be available for implementation.

In response to the 2007 policy, the Seattle DOT developed a Complete Streets checklist to be used during scoping for major road projects to ensure that Complete Streets principles are considered in project delivery. It is one of

the few agencies nationwide that publicly and clearly integrates transit considerations into the project evaluation process in a comprehensive and standardized manner. The City’s Complete Streets approach reinforces its land use/ transportation vision by addressing context and existing plans, including urban design and neighborhood plans, adaptive streets opportunities, and green initiatives.



Checklist elements and a partial list of components include:

- **Context-** which requires identifying the street’s arterial classification (e.g., principal, minor, collector) and type (e.g., downtown neighborhood, urban village main, neighborhood corridor, industrial access way)
- **Public and private project coordination-** which includes a list of questions to gain an understanding of other relevant projects occurring in the area
- **Channelization-** which requests information on average daily traffic, roadway cross-sections, and ROW conditions, and requires further review under certain conditions
- **Road conditions and adjacent usage-** which includes pavement conditions, tree and sidewalk assessments, land uses, and flex lane usage
- **Safety-** which includes documentation of speed limit and 85th percentile speeds, collision data, intersection signalization, and traffic calming recommendations
- **Network integration-** which includes aligning with master plans and Intelligent Transportation Systems
- **Pedestrian, bicycle, transit, and freight infrastructure-** which includes master plan compliance, explanations for deferral from master plan recommendations, crossing widths, sidewalk gaps, distance between bus stops, and curb radius and clearance standards
- **Urban design and planning-** including forestry assets and maintenance, existing design concept plans, and neighborhood plans
- **Public space opportunities-** such as repurposing underutilized roadway, tactical urbanism, and art programs
- **Green stormwater infrastructure-** including code compliance, potential for partnership with the city public utilities department, and protection of existing green infrastructure.⁵⁷

Transit Infrastructure

Consult with Transit & Mobility to complete this section.

a. Transit Classification:

- | | |
|--|---|
| <input type="checkbox"/> Principal Transit Route | <input type="checkbox"/> Local Transit Route |
| <input type="checkbox"/> Major Transit Route | <input type="checkbox"/> Temporary Transit Route |
| <input type="checkbox"/> Minor Transit Route | <input type="checkbox"/> Minor Restricted Transit |

b. Is the project on the Frequent Transit Network? Yes No

c. Are there bus stops in the project area? Yes No

i. Are all bus stops in project area within close proximity to a controlled crossing? Yes No

ii. Average distance between bus stops in/adjacent to project area: _____

iii. If bus stops are less than 0.2 miles (1056 ft.) apart, can stops be consolidated? Describe below:

e. Describe any [Transit Master Plan \(TMP\)](#) recommendations NOT included in project scope and reason for deferral:

Describe TMP recommendations for the project scope:

Describe relevant ROWIM transit design standards:

Excerpt of Seattle DOT's Complete Streets Checklist⁵⁸

NOTABLE OUTCOMES

Although the checklist doesn't necessarily require integration, it provides a deliberate approach for project managers and designers to find the right opportunities to do so. The checklist includes questions that require analytical responses and require reviewing other relevant policies and plans with the proposed project in mind. All projects at the beginning of project development are evaluated through this checklist. The project manager needs to consult with others in the agency to confirm and validate these

opportunities, helping to ensure that the assessment is vetted as well as consistent with the City's and community's goals. In addition, this tool is part of the agency's larger Complete Streets commitment that has also laid the foundation for successful levies on additional transit corridor improvements. In 2015, voters approved a 9-year, \$930 million levy to "Move Seattle" which funds transit corridor improvements, including seven new bus rapid transit lines.



Move Seattle
Photo Credit: www.seattlebikeblog.com

CHECKLIST IN ACTION: DEXTER AVENUE ROADWAY IMPROVEMENTS⁶¹

Using tools such as this checklist helps ensure integrated and comprehensive transportation projects advancing larger community goals and visions.

The Dexter Avenue project involved re-paving approximately 1.5 miles between Roy Street and Fourth Avenue North in 2011. The road segment runs north from the Belltown neighborhood, just northeast of downtown, through Westlake and East Queen Anne neighborhoods. Seattle has a street type classification that has 10 neighborhoods with “downtown”, “urban village”, and “neighborhood” descriptors that reflect the same type of context zones as FDOT’s C-6 urban core through C-4 urban general definitions.

The following improvements/actions were included:

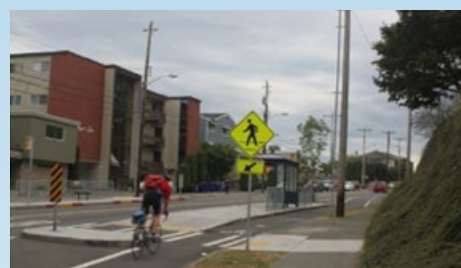
- **Poor condition sidewalks replaced**
- **Pedestrian ramps**
- **Two new crosswalks on Dexter Avenue North**
- **Buffered bike lanes on each side of Dexter Avenue North**
- **Dedicated transit islands at 10 of 12 bus stops**
- **New storm drains, detention facilities, subsurface drain system, and a green bioretention surface water overflow area**
- **Dedicated left-turn lanes at busy intersections**
- **Street lighting upgrades**

Seattle DOT’s Complete Streets policy changed the approach for the Dexter Avenue improvements. Planned as a road diet, it incorporated Complete Streets elements with an emphasis on supporting transit and enhanced multimodalism, not just auto safety.

Public opinion has been favorable, especially among bicyclists. Dexter Avenue is the primary bicycle corridor to reach downtown, with 300 southbound bicyclists per hour during the AM peak (compared with approximately 850 motorists per hour); transit travel times have remained consistent and bus ridership has increased by 30 percent between 2010 and 2013.



Before



After



Before



After



Dexter Avenue
Photo Credit: NACTO.org

Footnotes:

- 56) <http://clerk.ci.seattle.wa.us/~scripts/nph-brs.exe?d=CBOR&s1=115861.cbn.&Sect6=HITOFF&l=20&p=1&u=/~public/cbor2.htm&r=1&f=G>
- 57) Categories are grouped, and the list of components is abbreviated for brevity. View the complete checklist on Seattle's Complete Streets website: <http://www.seattle.gov/transportation/completestreets.htm>; http://www.seattle.gov/transportation/docs/2017_StandardChecklistCompSts.pdf
- 58) http://www.seattle.gov/Documents/Departments/SDOT/PlanningProgram/CompSt_Checklist.pdf
- 59) A road diet is when the number of travel lanes and/or effective width of the road is reduced in order to achieve systemic improvements.
- 61) FHWA (2015). Road Diets Case Studies, FHWA-SA-15-052. https://safety.fhwa.dot.gov/road_diets/case_studies/roaddiet_cs.pdf
- 62) http://www.seattle.gov/transportation/dexter_pave.htm
- 63) http://www.seattle.gov/transportation/dexter_pave.htm; http://events.kittelsohn.com/system/datas/80/original/Rightsizing_Streets_-_Seattle.pdf

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CHAPTER EIGHT:

Converting
a Roadway

Upgrade

into a Street

Transformation

8

CONVERTING A ROADWAY UPGRADE INTO A STREET TRANSFORMATION



Key Aspects:

- Every project is an opportunity to advance Complete Streets and transit integration, when transit is present.

Role of the Transit Agency: Partner and stakeholder.

Even smaller roadway projects provide opportunities for Complete Streets and transit integration that can have enhanced community outcomes, such as increased ridership, improved multimodal options, and placemaking transportation-oriented improvements. By thoughtfully considering the street function, demographic and land use context, and safety and mobility issues, roadway design enhancements can influence transit accessibility and ridership.

NEBRASKA AVENUE ROAD DIET

Located in the heart of downtown Tampa, Nebraska Avenue links the urban center of the city to northern suburban areas.

Nebraska Avenue connects a series of residential and commercial communities with contexts generally ranging from C3-R suburban residential to C-4 urban general. The modal needs for Nebraska Avenue are heavily influenced by the level of fronting commercial uses and the fact that parallel roadway capacity is provided by Interstate-275 a block to the west. Prior to 2007, Nebraska Avenue was among the highest bicycle and pedestrian crash frequency corridors in the five-county area in the Tampa Bay region (also matching up with FDOT's District 7).⁶⁴ This four-lane undivided, urban arterial corridor had a 50 percent higher than average statewide crash rate.⁶⁵

Acknowledging that Nebraska Avenue was a high crash corridor for bicycles and pedestrians as well as motorized vehicles, FDOT planned to repave and restripe the segment through a \$9-\$10 million redesign over three miles of the road, originally as a Resurfacing, Restoration and Rehabilitation (3R) construction project.⁶⁶

However, the confluence of these safety concerns and highly patronized Transit Route 2, Hillsborough Area Transit's busiest bus line at the time, provided an opportunity to do more. Further, the roadway context was going to change in the near future with new transit investment. In the previous year (2006), Nebraska Avenue was identified as a part of the first phase of Hillsborough Area Regional Transit (HART) bus rapid transit system, MetroRapid, connecting downtown Tampa to the University of South Florida area.

FDOT's project allowed for community stakeholders, the Hillsborough Metropolitan Planning Organization (MPO), HART, and the local Chamber of Commerce to enhance travel options and mobility in the corridor through a reorganization of the street elements and enhanced transit provisions and service. This Complete Streets project prepared the corridor for the integration of MetroRapid, HART's bus rapid transit line.⁶⁷

Nebraska Avenue Evolution from a standard roadway to community catalyst

- 2006** — The North/ South Line, running through the Nebraska Avenue Corridor, is chosen to be first phase of the MetroRapid Bus Rapid transit project
- 2006/2007** — FDOT lays out plans for the Nebraska Avenue 3R repaving project. Stakeholders collaborate, and the Nebraska Avenue Road Diet Plan evolves with emphasis on Complete Streets
- 2007/2008** — Construction of the road diet; includes integrated bus bays and designated loading zones for HART bus line 2; North/ South MetroRapid line is confirmed
- 2010** — Design phase of MetroRapid is finalized
- 2011** — FDOT study finds Nebraska Avenue to be “significantly safer” and more efficient
- 2013** — MetroRapid ribbon cutting
- 2015** — CUTR study finds MetroRapid increased bus ridership by 10 percent
- 2016** — City of Tampa commissions a Hillsborough Nebraska Avenue Master Plan study to strategize economic development through TOD around MetroRapid stations



Nebraska Avenue,
Photo Credit: Florida DOT

In 2007, construction began on the 3.2-mile segment of Nebraska Avenue from Kennedy Boulevard to Hillsborough Avenue, a segment of the state road notorious for its high crash rates. Improvements included:








- A reduction from four travel lanes to two travel lanes with a new center turn lane and two new bike lanes;
- Additional bus bays and station design allowed for the non-dedicated bus system to be integrated into the existing roadway network;
- Updated ADA compliant sidewalks;
- Median enhancements and mid-block crossings with special pavement treatments;
- Traffic signal and pedestrian signal upgrades; and
- Improved drainage.

All improvements were implemented for a total cost of \$11.1 million, only \$1 million more than the original 3R repaving project budget.⁶⁸ In 2013-2014 (prior to MetroRapid), there was a 10 percent increase in ridership within the corridor.⁶⁹

The dedicated bus loading zones included in these improvements set the foundation for the integration of transit within the corridor. They have since been updated as part of the MetroRapid system, including limited stops, new ticket vending machines, transit signal priority, and enhanced passenger stations with bicycle racks, and low floor buses.

In 2011, a report produced by FDOT gained national attention with performance-based statistics demonstrating that the segment was “significantly safer” after the improvements were made, resulting in a 63 percent reduction in the total crash rate, see table below. The decrease in crashes occurred despite attracting more pedestrians and bicyclists with the improvements.⁷⁰ In addition to safety improvements, residents of surrounding low-income neighborhoods also viewed the improvements as a potential revitalization tool for their community.

*Crash Statistics*⁷¹

CRASH TYPE	BEFORE ENHANCEMENTS	AFTER ENHANCEMENTS	EFFECT
Total Crash Rate	7.6 crashes/million vehicle miles traveled (MVMT)	2.8 crashes /MVMT	 63%
Pedestrian Crashes	7.0 crashes/ yr	2.5 crashes/ yr	 64%
Bicycle Crashes	5.0 crashes/ yr	1.7 crashes/ yr	 66%
Sideswipe Crashes	0.76 crashes/MVMT	0.15 crashes/ MVMT	 80%
Rear End Crashes	1.18 crashes/MVMT	0.82 crashes/ MVMT	 30%
Fatal/ Incapacitating Crashes /Year			 61%
Fatal/ Incapacitating Crashes /MVMT			 50%



New mid-block crossings



Intersection improvements



Bike lane



Median improvements



Bus bays

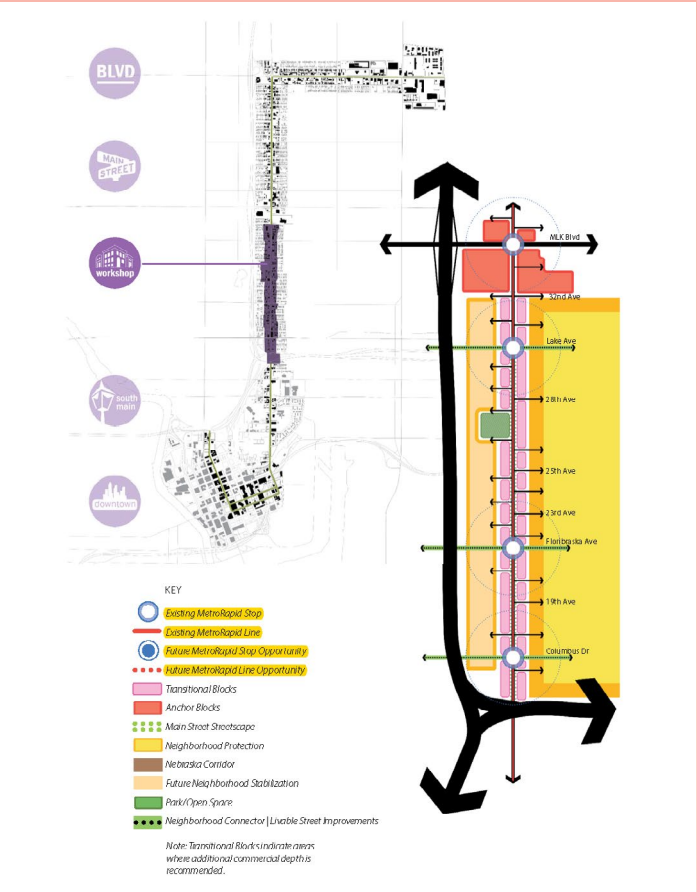


MetroRapid Stations

NOTABLE OUTCOMES

The Nebraska Avenue project was an unqualified success, and its impact continues today in several ways. It has been one of several projects statewide that demonstrated how the integration of land use and multimodal considerations can improve safety and multimodal mobility in the corridor. The safety statistics garnered national attention and has been highlighted in several Complete Streets compilation documents. The project also helped to inform the evolution of FDOT's Lane Elimination Review Process.⁷⁴

In addition, the project, along with the success of MetroRapid North South, has further spurred the City and local community to broadly re-envision the corridor. In 2013, shortly after the Hillsborough MPO officially adopted their Complete Streets policy and the HART MetroRapid North South Line began its first test runs, the City of Tampa commissioned a corridor master plan study for Nebraska Avenue and Hillsborough Avenue. The study built off the Nebraska Avenue Road Diet improvements and the integration of the HART MetroRapid stations. The primary goal of the study was "... to position the Nebraska and Hillsborough Corridors as neighborhoods of livable places, connected people, and collaborative progress" with the most detailed analysis focusing around the MetroRapid stations within the corridor. The result are plans and policies that "support HART's investment in transit improvements such as MetroRapid service by employing transit-



Hillsborough Nebraska Corridor Masterplan⁷⁵

oriented development, livable transportation, and supportive codes and policies to facilitate the desired outcomes." The City will also use the findings of the Nebraska Avenue project as a model for guiding development in other areas of the Center City.

Not only did this project help support new innovations in FDOT's practices, it helped spur a new look at neighborhood economic development.



MetroRapid Bus,
Photo Credit: TBO.com

Footnotes:

- 64) Chin, Ronald A. "Nebraska Avenue [SR 45] from Kennedy Boulevard to Hillsborough Avenue" Florida Department of Transportation. <http://www.fdot.gov/structures/DesignExpo2012/Presentations/GreenJennifer-Nebraska%20Road%20Diet.pdf>
- 65) Chin, Ronald A. "Nebraska Avenue [SR 45] from Kennedy Boulevard to Hillsborough Avenue" Florida Department of Transportation. <http://www.fdot.gov/structures/DesignExpo2012/Presentations/GreenJennifer-Nebraska%20Road%20Diet.pdf>
- 66) Steele, Kathy. "Redesigned Nebraska Avenue significantly safer" *The Tampa Tribune*. 13 July 2011. <http://www.tbo.com/news/redesigned-nebraska-avenue-significantly-safer-243291>
- 67) Schlossbert, Marc; John Rowell, Dave Stamos, and Kelly Stanford *Rethinking Streets: An Evidence-Based Guide to 25 Complete Streets Transformations* http://pages.uoregon.edu/schlossb/ftp/RS/RethinkingStreets_All_V2_high_wCover.pdf
- 68) Schlossbert, Marc; John Rowell, Dave Stamos, and Kelly Stanford *Rethinking Streets: An Evidence-Based Guide to 25 Complete Streets Transformations* http://pages.uoregon.edu/schlossb/ftp/RS/RethinkingStreets_All_V2_high_wCover.pdf
- 69) National Center for Transit Research "Evaluation of HART MetroRapid BRT" <https://www.nctr.usf.edu/wp-content/uploads/2015/08/Evaluation-of-HART-MetroRapid-BRT-Final-Report.pdf>
- 70) Steele, Kathy. "Redesigned Nebraska Avenue significantly safer" *The Tampa Tribune*. 13 July 2011. <http://www.tbo.com/news/redesigned-nebraska-avenue-significantly-safer-243291>
- 71) Chin, Ronald A. "Nebraska Avenue [SR 45] from Kennedy Boulevard to Hillsborough Avenue" Florida Department of Transportation. <http://www.fdot.gov/structures/DesignExpo2012/Presentations/GreenJennifer-Nebraska%20Road%20Diet.pdf>
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- 73) All images are from Chin, unless otherwise cited.
Chin, Ronald A. "Nebraska Avenue [SR 45] from Kennedy Boulevard to Hillsborough Avenue" Florida Department of Transportation. <http://www.fdot.gov/structures/DesignExpo2012/Presentations/GreenJennifer-Nebraska%20Road%20Diet.pdf>
- 74) <http://www.cssnationaldialog.org/2/documents/Tallahassee/Slides-Lane-Elimination-Process.pdf>
- 75) https://www.tampagov.net/sites/default/files/planning/files/60251207_report_hillsnrbk_final.pdf

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CHAPTER NINE:

Deploying

Emerging

Transit

Technologies

9

DEPLOYING EMERGING TRANSIT TECHNOLOGIES



Key Aspects:

- The creation of seamless and successful multimodal transportation activities and options.

Role of the Transit Agency:

Primary funding entity; inter-agency partnership builder.

Advances in transit technology help improve efficiency and reliability in transit service. The deployment of technology solutions has provided transit operational efficiencies, enhanced the rider experience, and can result in increased ridership.

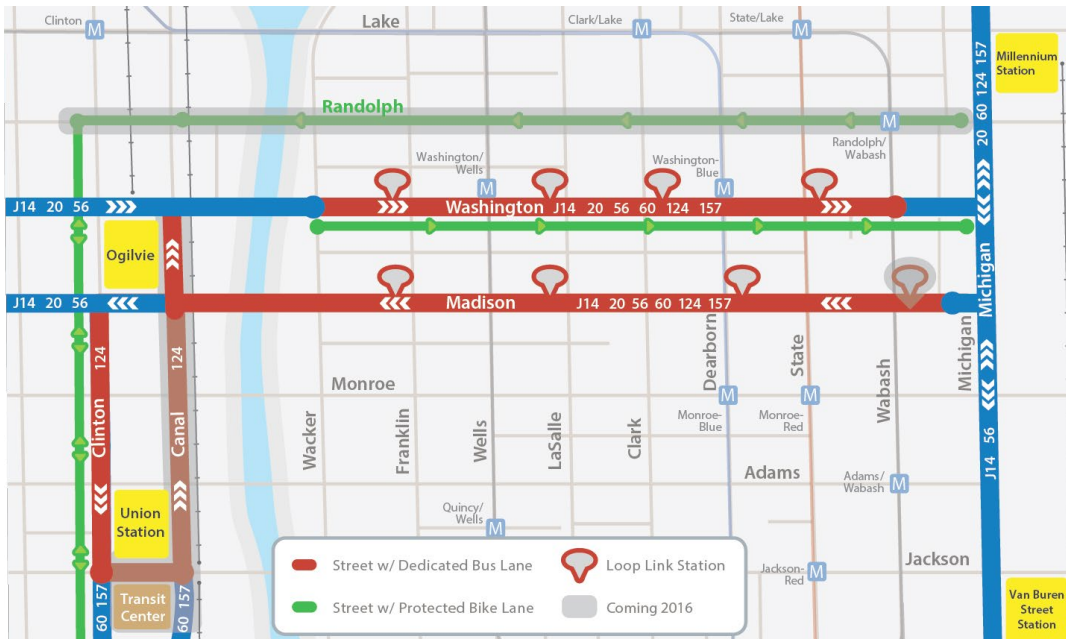
LOOP LINK PROJECT

The City of Chicago's DOT adopted their Complete Streets policy in 2006. Over the past decade, this program has grown to include resources on Complete Streets Design Guidance, Traffic Safety, Streetscapes and Sustainable Design, and other plans and reports. Part of its Complete Streets integration has been the consistent partnership with the Chicago Transit Authority (CTA) to implement innovative multimodal projects.

One product of this collaboration is the Loop Link. Nestled in the heart of downtown Chicago, the Loop Link moves people quickly using dedicated bus lanes with limited stops, reducing traffic congestion and providing seamless connections to the CTA's heavy rail loop system. In terms of the FDM lexicon, Chicago is a C6-Urban Core area with its high densities and building heights, usually identified as regional centers. In these locations, transit ridership and pedestrian activity is at its highest so that complete streets priorities emphasize walking and transit. The purpose of this project was to improve the mobility in downtown Chicago for residents, employees, businesses and visitors. It provides faster, more reliable bus service and organizes traffic flow within pedestrian and bicycle environments as well.⁷⁶



Chicago Transit Authority's Loop Link
Photo Credit: Zbigniew Bzdak, Chicago Tribune



Chicago's Loop Link Map ⁷⁷

The technologies used in the project have the following characteristics:

- **Dedicated Bus Lanes** improve travel time and reliability by reducing traffic congestion for buses on Washington, Madison, Clinton, and Canal streets. Bus trips are expedited by enhancing the speed and reliability of buses carrying almost 25,000 passengers (via more than 1,000 bus trips) daily through the Loop Link and on to all corners of the city.
- **Traffic Queue Jump Signals** prioritize bus movements through an intersection by providing buses with a 'head start' via an early green light by using GPS to track buses as they approach an intersection. Traffic signals provide green time to buses as they approach and move through the intersection, shortening the overall time of the bus trip.
- **Raised Platform Boarding** promotes pedestrian safety and faster boarding for all abilities and provides non-transit customers with additional walk space on sidewalks.
- **Off Board Fare Collection** allows bus riders to pay at a ticket vending machine before they board the bus. Riders may then board the bus through any door, without needing to show the ticket to the bus operator. This substantially shortens the time the bus is stopped at the station, compared to the traditional method of entering one at a time through the front door. ⁷⁸
- **Bus Tracker Displays** at Loop Link stations inform riders about how far away the next arriving bus is.

The \$31.8 million project includes dedicated bus lanes for six routes, stations with easy boarding, and protected bicycle lanes with bicycle traffic signals. ⁷⁶

- **Protected Bike Lanes** allow cyclists to bike comfortably through the Loop Link using protected lanes with bicycle traffic signals on Randolph, Washington, and Clinton Streets. This creates safer streets by organizing travel lanes and reducing conflicts between vehicles, buses, bicyclists and pedestrians.

The Loop Link also features a lane reconfiguration project on Washington Avenue to repurpose five lanes of right of way to three lanes for motor vehicle movement and parking.

The Loop Link's planning phase partners included the Rockefeller Foundation, Metropolitan Planning Council, the Active Transportation Alliance, the Chicago Community Trust, and the Chicago Loop Alliance, who also hope the project will strengthen the economy by improving access to jobs and attractions, while generating more foot traffic to businesses along the route.⁷⁷



*Features of the Loop Link
Photo Credit: BRT Chicago*

NOTABLE OUTCOMES

Since the Loop Link's groundbreaking in 2016, Tribune Media has planned a redevelopment of their property that would add about 9 million square feet of office and residential towers along the Chicago River, connecting the North Side with River North, the Fulton Market district and the Loop.⁷⁸ In the last year, CTA has also launched a pre-paid boarding pilot as a new post-construction feature, to help improve boarding times.

The CTA reports that nearly 30,000 people per day have more reliable and faster transit service – specifically that speeds have improved over the previous bus speed of 3mph. A full assessment of the Loop Link corridor's performance will start in 2018-2019, after the several nearby construction projects are completed.⁷⁹

Transportation technologies have helped ensure the success of multimodal, transit, and complete street integration.



Before and After⁸⁰

Footnotes:

- 76) Chicago Transit Authority, Press Releases, <http://www.transitchicago.com/news/default.aspx?Month=&Year=&Category=2&ArticleId=349%206>, [Chicago: 2016].
- 77) <http://www.transitchicago.com/looplink/>
- 78) New York City Resources, Select Bus Service Features, <http://www.nyc.gov/html/brt/html/about/sbsfeatures.shtml>, [New York: 2017].
- 79) <https://chi.streetsblog.org/2016/12/22/happy-birthday-loop-link/>
- 80) <https://chi.streetsblog.org/2016/12/22/happy-birthday-loop-link/>

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10
CHAPTER TEN:

Transit

Integration

in Action -

Cleveland

Healthline Bus

Rapid Transit

10

TRANSIT INTEGRATION IN ACTION - CLEVELAND HEALTHLINE BUS RAPID TRANSIT



▶ The Healthline BRT project embodies many of the practices previously discussed in this report:

- Strong Complete Streets policy
- Integrated land use and transportation vision
- Transit enhanced multimodal network
- TOD development approach and transit hubs
- Funding emphasis with Complete Streets Improvements
- Early decision-making to identify opportunities
- Excellent integrated design

▶ Role of the Transit Agency: Lead implementor

The Greater Cleveland Regional Transit Authority (GCRTA) Healthline BRT has been a transformative and innovative project. In 2011, it received an Award of Excellence from the Urban Land Institute, and in 2013 it was named the Best Bus Rapid Transit in North America by the Institute for Transportation & Development Policy (ITDP). It has been recognized for having the best return on investment for a transit project, regardless of mode, in the country.

Healthline accomplishes more than just the integration of transit and Complete Streets. It is an urban revitalization and placemaking project, a context-sensitive streetscape effort along Euclid Avenue that incorporates efficient bus service. The coordination of land use planning and transportation planning in the redesign of the street and sidewalk areas has created a connected, vibrant and safe public realm that provides mobility choices, improves quality of life, increases property values, enhances transit hubs and offers a more livable corridor. Unlike other projects where TOD is the follow-on development after transit has been established, Euclid Avenue already had many key elements in place – a mix of land uses: office, retail, institutional and housing.

“**The Healthline is an example of how BRT can help to revitalize city centers, speed commutes, improve air quality, and leverage investment and development near transit,”** said Walter Hook, ITDP CEO. **“We consider the Healthline to be a best practice for BRT in the US, and our hope is that it encourages other US cities to adopt this cutting-edge form of mass transit.”** ⁸²

Developers saw the transit investment as the catalyst for redevelopment even before the Healthline was operational. They responded to the tree-lined streets, wide new sidewalks, public art and increased foot traffic by investing in new facilities and orienting front doors to the street, creating more activity and social interaction both day and night that encouraged even more private involvement and new business development. The improvements were an important factor in spurring new growth. “The new sidewalks and sleek bus stops are eye catching. The streets look

great, which entices investment,” stated Joe Roman, head of the Greater Cleveland Partnership, the area’s Chamber of Commerce.⁸³

BACKGROUND

Euclid Avenue connects the two largest commercial districts in Cleveland – downtown and University Circle, the latter a hub of world class medical facilities and arts and culture amenities. In terms of the FDM lexicon, downtown Cleveland is a C-6 Urban Core area and the rest of the Healthline corridor generally encompasses a variety of C-4 and C-5 urban contexts, with a high level of transit ridership and pedestrian activity so that modal emphasis focuses on those modes. In the late 1800s and early 1900s, Euclid Avenue was known as the “Showplace of America” and “Millionaires Row” and was home to many influential families, including founding members of Standard Oil, Western Union and General Electric. By the end of the Great Depression, however, the area was in decline, with many mansions being converted to boarding houses. The corridor remained depressed, with abandoned commercial buildings, substandard housing, dilapidated structures and vacant lots, well into the later part of the 20th century.⁸⁴

Beginning in the 1890s, electric streetcars ran along Euclid Avenue; in 1952, the streetcar line was converted to bus operations. Starting in the 1970s, the City proposed and debated plans for improving transit. After failure to secure funding for a subway system, rail network, or electric trolley line, City officials decided to pursue (BRT) as an affordable and realistic solution for Euclid Avenue. Cleveland’s goal was for its BRT line to perform as close as possible to a fixed rail system to attract ridership and secure funding.⁸⁵ Construction started in 2006, and the Healthline opened for service in late 2008.

From the beginning of the project, the City envisioned more than just a transit line along Euclid Avenue. It took a broad view of the potential impact of the project and considered what it would take to attract people to the bus and private investment to the surrounding corridor. By efficiently connecting downtown with University Circle, the BRT service contributes to the unification of

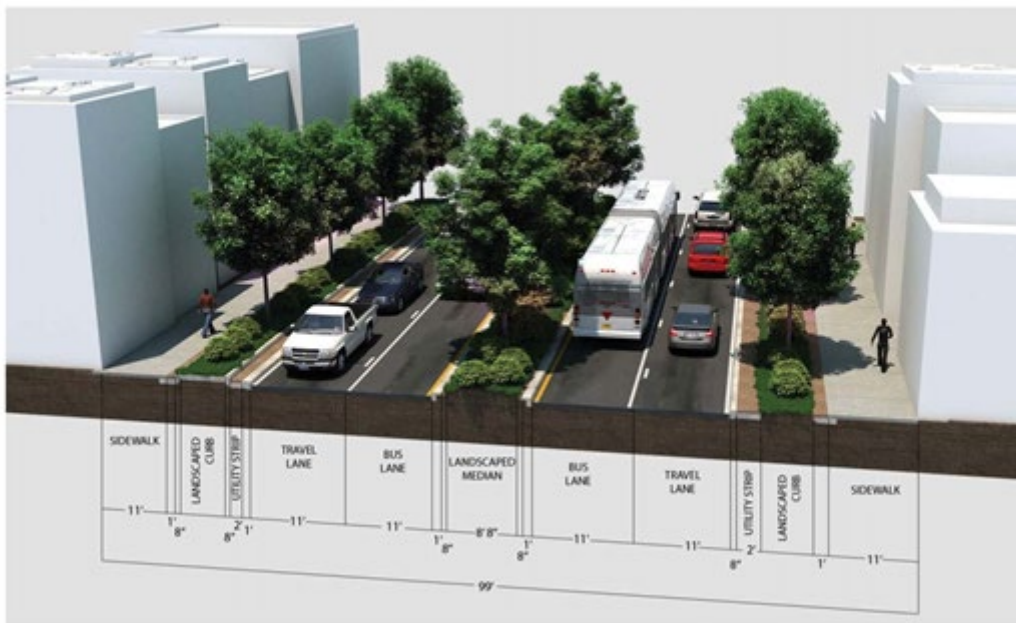


Healthline Route⁸⁶

Cleveland's top economic generators across the entire city. Marketing it as the Healthline ties the service to the City's branding as a hub of medical care and research. By physically linking large hospitals, startups, convention space and cultural amenities, the corridor promotes Cleveland as a world-class destination and a hub for the health care and biotech industries.⁸⁷

The western portion of the BRT project, a 4.5-mile segment from Tower City-Public Square to Stokes Boulevard, which has a connected system of parallel roadways and lower traffic counts, received a full ROW reconstruction from building face to building face including roads, utilities and sidewalks. The street cross-section now maximizes the 100-foot ROW with median dedicated bus lanes and thru lane in each direction; a center median that restricts drivers from turning in front of buses; left-turn lanes at all intersections with a bus station; and on some blocks, bike lanes and/or parallel parking.⁸⁸

The eastern portion of the BRT project, a 2.6-mile segment from Stokes Boulevard to the Stokes Windermere Rapid Station, does not use dedicated median bus lanes; instead, buses operate in mixed traffic. The higher traffic counts and lack of adequate parallel streets in this area of the corridor precluded the conversion of a vehicle lane to a dedicated bus lane. The cross section has two thru lanes in each direction, parallel parking, and bus stations in bump-outs that keep buses in the flow of traffic.⁹⁰



Typical Euclid Avenue Downtown Cross Section⁸⁹

DESIGN AND PROCESS

The development community initially opposed the project, fearing that the stigmas of bus ridership and timeliness would keep choice riders from using a BRT system. Additionally, there were concerns about losing travel lanes and on-street parking.

Ultimately, the success of the corridor design hinged on getting buy-in from the various stakeholder groups. The project required strategic partnerships among diverse interests – public, private, nonprofit and neighborhood. Eighty stakeholders from civic, university, business, social, neighborhood and government organizations participated on the project committee. Goals for the project included not only providing improved transit service, but supporting economic development initiatives, improving the pedestrian environment, enhancing regional access and increasing livability.⁹¹ Design concepts were developed through a six-month workshop process.⁹²



Over 2,000 public meetings were held to gain community perspectives and to assess the interests of the various stakeholder groups, as well as those of potential passengers.⁹²

The project itself met multiple design standards. Euclid Avenue is a U.S. route, so the project followed Ohio Department of Transportation standards for roadway geometry. The roadway is in Cleveland, so the project went through the City’s design review process, meeting its design standards. As a New Starts project, it also had to meet FTA policies. At the time of construction, no ADA guidelines existed for BRT, so the project followed ADA’s rail standards, which required level boarding platforms, with the gap between the vehicle and platform to be no greater than 3” horizontally and 1” vertically. GCRTA installed over 400 ADA ramps to station platforms and cross streets, as well as Braille signage and tactile edges on crosswalks.⁹³

POLICY

Recognizing that government support was needed to foster and incentivize land development near the BRT, the City promoted the coordination of land use planning and transportation planning. An updated master plan, “Beyond 2005: A Vision for Midtown Cleveland” was adopted by the City in 2004. Midtown’s new transit supportive zoning code was adopted one year later. The 2007 update to the City’s Comprehensive Plan called for TOD “in proximity to transit stations and major bus stops to support public transit and strengthen the competitiveness of urban neighborhoods” and specifically recommended TOD be directed to Euclid Avenue, among other locations.⁹⁴

Specialized zoning requirements were created to ensure that land use would complement the Euclid Avenue infrastructure and protect property owner’s investments. However, the requirements formed a flexible development framework, which helped create redevelopment opportunities. For example, underutilized commercial parcels near the hospitals have been developed into incubators, tech companies, and light manufacturing facilities that support the work and research undertaken at the medical facilities.

The City passed a Complete and Green Streets Ordinance in 2011, which requires implementation of sustainable policies and guidelines in all construction projects within the ROW. The goal of the Ordinance is to create a walking, biking and public transportation-friendly city that reduces environmental impacts by incorporating green infrastructure. Some elements of the Ordinance include enhanced transit waiting areas, bicycle lanes and signs, pedestrian refuge areas, public art, crosswalk enhancements, permeable pavement, green spaces, trees, and multi-use paths.

FUNDING

The total project cost was approximately \$200 million; buses and stations accounted for \$50 million while streetscape and roadway improvements cost \$150 million, with an average cost of \$25 million per mile. Of the \$200 million, \$168.4 million was provided by a full funding agreement with the FTA.⁹⁶ Implementation was made possible by a complex funding partnership of multiple organizations, including the GCRTA as the project sponsor, the FTA New Starts program, the Ohio DOT, the Northeast Ohio Areawide Coordinating Agency, and the City of Cleveland, as well as the Cleveland Clinic and University Hospitals – the city’s two biggest employers – who purchased naming rights in a 25-year deal.⁹⁷



Healthline station with pedestrian crossing⁹⁵

TRANSIT NETWORK

The Healthline transports approximately 16,000 riders per day. From 2008-2014, annual ridership increased almost 60 percent. Growth has been in what GCRTA calls “choice ridership – people who could otherwise drive”. The BRT operates 24 hours a day, seven days a week. During weekday peak hours, buses arrive every five minutes. Headways increase to 15 minutes in early evening and 30 minutes late at night. The 4.5 miles of dedicated median bus lanes save 10 minutes of travel time over the previous service - buses travel at 35 mph in their dedicated lanes while normal traffic is limited to 25 mph. The bus operating in mixed traffic with bus stations at bump-outs saves two minutes of travel time.⁹⁸

BRT stations have been designed to resemble rail transit. Raised station platforms meet the height of the bus floor, facilitating level boarding. Off-board fare collection increases efficiency by reducing station loading time. Real time updates of bus arrival times provide predictability for passengers. Stations are modern, well-lit and include emergency phones and closed-circuit security cameras for safety. Each articulated vehicle can carry 100 passengers (47 sitting and 53 standing) and has five sets of doors located on both sides to allow right- or left-side boarding at medians or the curb. Their diesel/electric hybrid motors produce 90 percent fewer emissions than regular buses and have a 25 percent reduction in fuel consumption over standard RTA vehicles.⁹⁹

GCRTA manages traffic along the corridor from a central location. They can visually monitor/verify conditions at intersections, adjust signal operations based on time-of-day and prevailing traffic flows, control left turns and U-Turns, minimize queuing, and integrate bus location/speed information. If a bus is running behind, it can be given a phase jump or green-time extension; if a bus is running ahead, it can sit through a traffic signal cycle.¹⁰⁰

Several BRT stations are within walking distance of RTA’s Red Line, which extends from Cleveland Hopkins International Airport to East Cleveland. Up to 13 percent of Healthline riders transfer to this line.¹⁰²

MULTIMODAL NETWORKS

GCRTA’s comprehensive approach to the corridor and integration of multimodal systems (pedestrian, bicycle, transit, and roadway) led the City and design team to think more expansively about improvements that needed to be made. Decisions that supported the overall success of all multimodal networks included burying power lines, rebuilding out-of-date sewer and water lines, and adding street level facilities such as bicycle lanes, improved sidewalks, and public art along the street.¹⁰³

The corridor accommodates pedestrian travel by incorporating pedestrian-friendly sidewalks and street crossings. To encourage passengers to use crosswalks to reach median bus stations, the City installed pedestrian count-down signals. Additional pedestrian safety measures include bollards to protect ramps, improved pedestrian-scale lighting at intersections, and wayfinding signage on station platforms. The bus-exclusive center lanes allow parking to be integrated back into the street on the outside edge, supporting efforts to revitalize retail storefronts.

COMPLETE STREETS INTEGRATION

Streetscape improvements include design elements such as patterned brick sidewalks, street furniture and extensive landscaping. Although some elements, such as station shelters, lighting, and pavement materials, are consistent along the entire corridor, other elements – shelter size, light fixtures and configurations, pavement patterns, and tree species – are distinct to identify and reflect each neighborhood district found along the corridor.

Over 1,500 trees were planted, creating an urban forest that helps improve air quality in the urban environment. Twenty-six tree varieties were planted along the corridor, with three to seven different species in each of the eight neighborhood districts. This not only provided shade along the pedestrian walks, but a variety of textural interest and seasonal color, and helped unify the entire corridor.¹⁰⁵



Pedestrian Realm ¹⁰⁴

Public art installations are integrated into street design, including pavement patterns in the crosswalks, stone patterns in the street and stand-alone sculptures illuminated by light emitting diode (LED) lighting at night. Cleveland Public Art, a non-profit that works to improve public spaces, coordinated unique opportunities for integrating art along the corridor, such as in planters, tree grates, benches and litter receptacles.¹⁰⁶

Over 500 buildings along Euclid Avenue have been surveyed; in partnership with the Ohio Historic Preservation Office, GCRTA ensured that all historic structures were properly identified and evaluated. The design team worked to incorporate appropriate architectural detailing into streetscape elements to reflect the unique character and history along the corridor.¹⁰⁷

ECONOMIC BENEFIT

The 7.1-mile project catalyzed a powerful transformation of Euclid Avenue and adjacent areas. According to GCRTA, since the BRT line opened in 2008, the corridor has attracted \$5.8 billion in investment - \$3.3 billion for new construction and \$2.5 billion for building rehabilitation - totaling more than 110 projects with over 13.5 million square feet of development.¹⁰⁸ Approximately \$114 has been realized for every dollar spent on creating and launching the BRT service. The number of jobs along the corridor nearly doubled in the first five years following completion.¹⁰⁹

Almost all of Cleveland's downtown development growth since 2008 has occurred either along or immediately surrounding Euclid Avenue, including hotels and residential conversions. Construction of about 5,100 housing units has augmented the corridor's revitalization, with approximately 96 percent of downtown apartments leased. The Cleveland Clinic, initially opposed to the project, ended up revising its campus master plan to face the corridor, supplementing infrastructure improvements with their own branding, including more street trees, specialized pedestrian lighting and enhancements to the transit stations.¹¹⁰



According to GCRTA, since the BRT line opened in 2008, the corridor has attracted \$5.8 billion in investment - \$3.3 billion for new construction and \$2.5 billion for building rehabilitation¹⁰⁸

Cleveland's Economic Development Department, among others, champions the corridor to both commercial and residential developers, emphasizing the permanence of the BRT line's infrastructure and its high-quality passenger amenities. The City uses several financing incentives to attract developers to older industrial and vacant sites, including New Market Tax Credits, Federal Supplemental Empowerment Zone loans and tax credits, the City's Vacant Property Initiative, and various brownfield clean-up and transportation grants from the state and federal government.¹¹¹

OTHER OUTCOMES

Cleveland is applying lessons learned from the Healthline to other bus routes in the city. GCRTA is studying 10 other corridors for improvements, and future projects will likely integrate elements of the Healthline's success to improve transit operations across the city.¹¹³ According to a Urban Land Institute (ULI) business article, "The Healthline has precipitated an economic strategy not just for the corridor, but also for the city. The project has brought about the partnerships necessary for Cleveland to make a transition from an industrial economy to a knowledge-based economy....The corridor is vibrant with possibilities as a place for people to live, work, and prosper, and serves as an example for similar cities in the United States and around the world."¹¹⁴ Like many transit corridors, this one covers multiple contexts in FDM - from C6 Urban Core area to a variety of C4 and C5 urban contexts.



Complete Streets treatments at Healthline Station¹¹²

Footnotes:

- 82) www.itdp.org/itdp-celebrates-clevelands-healthline-as-best-practice-for-us-brt/
- 83) www.blog.cleveland.com Tom Breckenridge, April 27, 2011
- 84) www.sasaki.com/project/105/
- 85) www.nacto.org/case-study/euclid-avenue-brt-cleveland-oh/
- 86) www.sasaki.com
- 87) www.urbanland.uli.org/economy-markets-trends/healthline-drives-growth-in-cleveland/
- 88) www.nacto.org/case-study/euclid-avenue-brt-cleveland-oh/
- 89) www.dot.state.oh.us
- 90) www.nacto.org/case-study/euclid-avenue-brt-cleveland-oh/
- 91) www.sasaki.com/project/105/
- 92) www.brt.cl/healthline-pumps-life-into-cleveland/
- 93) www.nacto.org/case-study/euclid-avenue-brt-cleveland-oh/
- 94) Cleveland City Planning Commission, Comprehensive Plan
- 95) <http://njtod.org/cleveland-the-brt-archetype/>
- 96) www.riderta.com/healthline/
- 97) www.urbanland.uli.org/economy-markets-trends/healthline-drives-growth-in-cleveland/
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- 107) Ohio Historic Preservation Office
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- 110) Landscape Architecture Magazine, June 2011, "Health on wheels"
- 111) City of Cleveland Economic Development Department
- 112) www.sasaki.com
- 113) www.nacto.org/case-study/euclid-avenue-brt-cleveland-oh/
- 114) www.urbanland.uli.org/economy-markets-trends/healthline-drives-growth-in-cleveland/



CHAPTER ELEVEN:

Moving
Forward -
Transit

Integration in
Florida



The integration of transit considerations within a Complete Streets framework continues to evolve. There are good examples around the country of coordinated transit and development plans, alignment of transit corridor and system strategies, collaborative funding strategies, and other practices that foster integrated approaches to transit planning and design. The examples presented in this document provide some key takeaways.

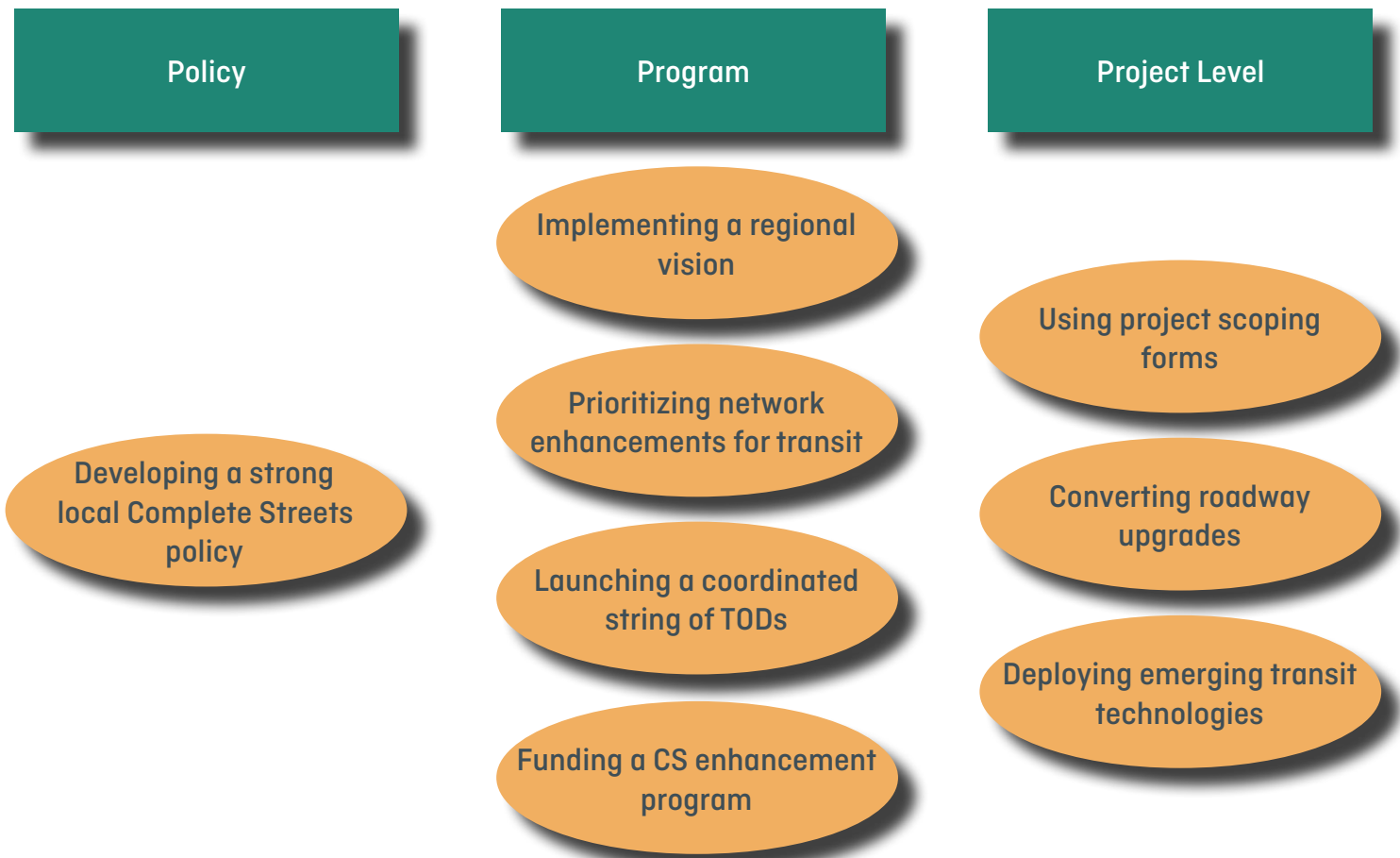
AN INTEGRATION PRACTICE FOR DIFFERENT PHASES AND CONTEXTS

The practices in the preceding chapters illustrate the many different aspects of transit and Complete Street integration. It can span from developing an effective policy to enhancing an existing project already planned. The summary below of the key aspects of each practice highlights these differences succinctly.

PRACTICE	KEY ASPECTS
Developing a strong local Complete Streets policy	<ul style="list-style-type: none"> • Inclusion of all key aspects of an ideal policy, specifically including transit users. • Overlapping and interlocking Complete Streets Policies.
Implementing a regional vision through new transit investments	<ul style="list-style-type: none"> • Land use and transit vision creates Complete Streets integration organically. • A robust and nested set of policies, plans, and programs.
Prioritizing network enhancements for transit	<ul style="list-style-type: none"> • Identified corridors that prioritizes increasing transit system ridership and efficiency across the city. • A supportive Complete Streets Design Guide that helps work through potential modal and ROW conflicts while prioritizing safety. • A supportive first and last mile transit investment plan to help build the network.
Launching a coordinated string of TODs	<ul style="list-style-type: none"> • The creation of the development and transit feedback loop—transit spurs development, and development spurs transit.
Funding a Complete Streets enhancements program in key corridors	<ul style="list-style-type: none"> • Region-wide corridors that enhance transit system ridership and efficiency for natural transit populations. • Distinguishing between simpler “quick-fix” and larger design-level components. • Select demonstration projects leverage future funding.

PRACTICE	KEY ASPECTS
Using a project scoping form to identify transit integration opportunities	<ul style="list-style-type: none"> • A project development process that publicly and clearly integrates transit considerations in a comprehensive and standardized manner. • An analytical tool to find the right opportunities for integrating transit and Complete Streets.
Converting a roadway upgrade into a street transformation	<ul style="list-style-type: none"> • Every project is an opportunity to advance transit and Complete Streets integration, when transit is present or planned.
Deploying emerging transit technologies	<ul style="list-style-type: none"> • The creation of seamless and successful multimodal transportation activities and options.

A menu of approaches exists at the different levels of planning and implementation. Although the practices are characterized at the policy, program, and project levels, they illustrate the different possibilities for transit and Complete Streets integration and multiple practices can work concurrently. For example, the regional vision practice could be used concurrently with the coordinated TOD practice in local comprehensive plans. In fact, whenever possible, it would be more desirable to use multiple, if not all, practices provided they are contextually appropriate. This helps reinforce the likelihood of successful transit and Complete Streets integration.



FLORIDA'S POLICY AND PROJECT FRAMEWORK FOR TRANSIT AND COMPLETE STREETS

From the statewide policy to Complete Streets implementation, FDOT has a clear focus on the planning and design of Complete Streets. It has created a framework for planning and implementing Complete Streets projects – the Complete Streets Policy and Complete Streets Implementation Plan have defined steps for moving FDOT towards multimodal practices in all stages of project development – planning, design, construction, and operations and maintenance. In addition, over 70 communities plus FDOT have enacted Complete Streets policies. Not only is this initial list a good start at a statewide, multi-jurisdictional Complete Streets network, it also helps create the same language amongst transportation planners and engineers. As discussed in several of the integration practices, having supportive and nested policies for Complete Streets helps ensure greater coordination across all stages of planning and project development.

51 CITIES

Auburndale	Lake Wales
Bartow	Lakeland
Bonita Springs	Longwood
Bunnell	Melbourne
Cape Canaveral	Miami
Cape Coral	Mulberry
Casselberry	Naples
Cocoa Beach	Orange City
Cocoa	Orlando
Davenport	Palm Bay
Deerfield Beach	Palm Coast
Delray Beach	Palmetto
Dundee	Panama City
Eagle Lake	Polk City
Fort Lauderdale	Punta Gorda
Fort Meade	Rockledge
Fort Myers	Satellite Beach
Frostproof	St. Petersburg
Grant-Valkaria	Tallahassee
Haines City	Tampa
Highland Park	Titusville
Hillcrest Heights	West Melbourne
Inverness	West Palm Beach
Jacksonville	Winter Haven
Lake Alfred	Winter Park
Lake Hamilton	

10 COUNTIES

Alachua
Brevard
Broward
Flagler
Indian River
Lee
Manatee
Martin
Miami-Dade
Polk

08 REGIONS

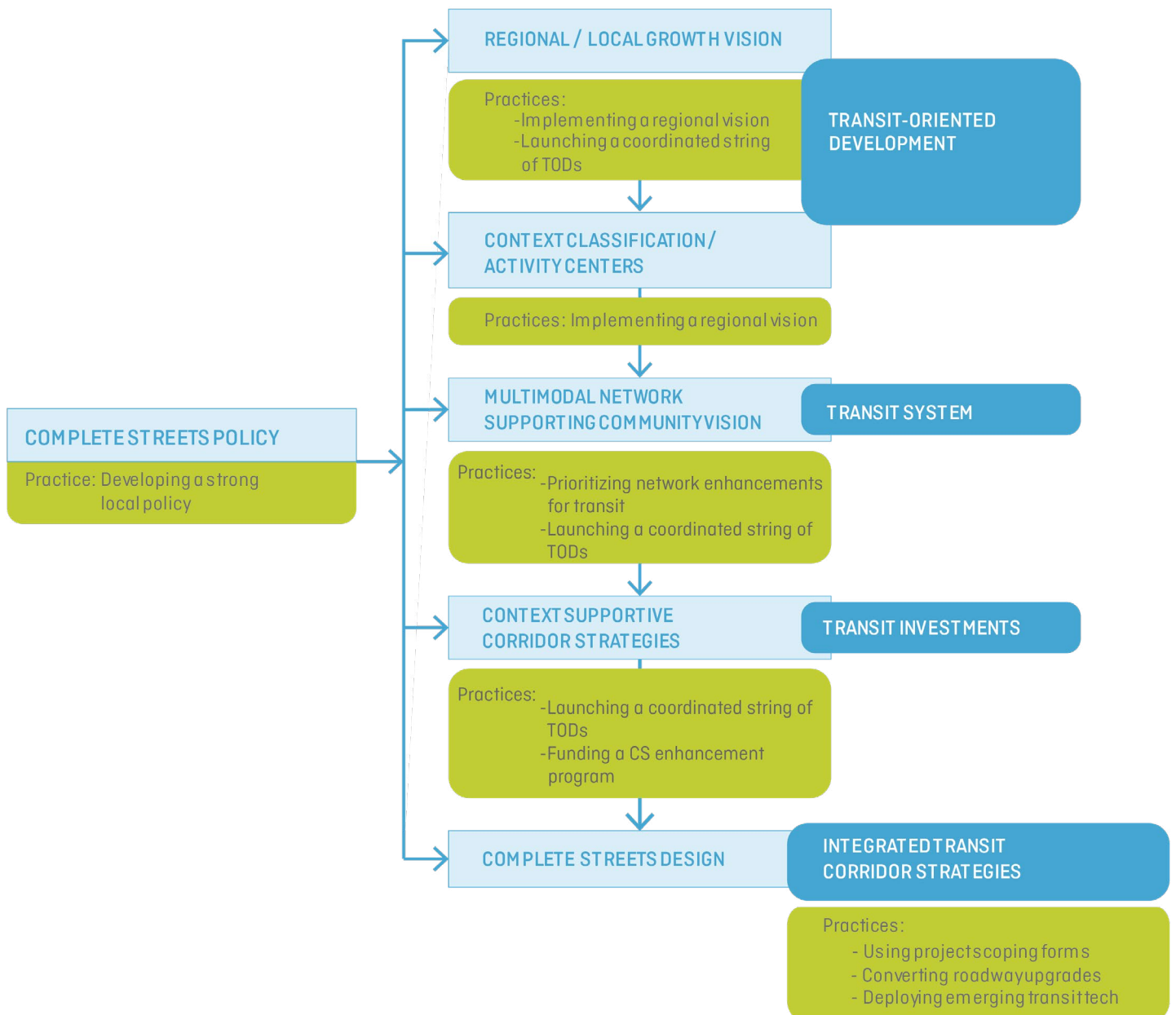
Broward MPO
Florida-Alabama Transportation Planning Organization (TPO)
Hillsborough County MPO
Lee County MPO
North Florida TPO
Palm Beach Transportation Planning Agency
Polk County TPO
Space Coast TPO

Complete Streets Policies in Florida

INTEGRATION SHOULD OCCUR AT ALL STAGES OF PLANNING AND PROJECT DEVELOPMENT

Planning, designing and implementing Complete Streets that integrate transit needs and considerations should occur at the systems and corridor planning phases as well as the design and construction phases of certain projects. The figure below shows how each of the case study practices align with the Complete Streets planning and implementation framework; note that several practices support multiple phases of Complete Streets planning and implementation.

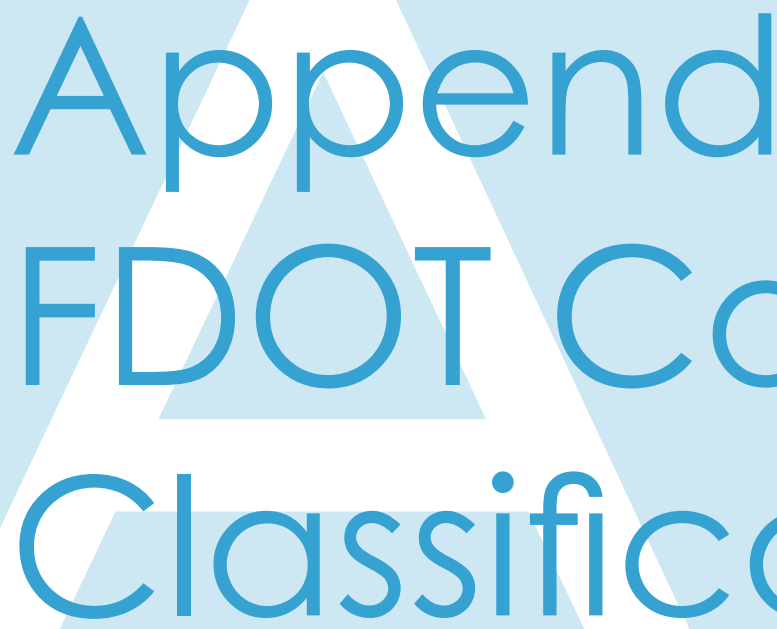
Transit and Complete Streets Integration – and Relevant Practices



CONCLUSION

This resource helps transportation practitioners understand what it means to integrate transit and Complete Streets, the possible integration practices, and the important lessons from communities across the country. It helps expand the understanding of Complete Streets projects and provides examples across different project types and context classifications on the integration of transit and Complete Streets. In particular, FDOT’s context classification system is an opportunity for integrating transit and Complete Streets in practice – it provides a useful framework for identifying transit system designs and strategies that are supportive of the local land use context and characteristics. Together, the communities and practices highlighted demonstrate that integration practices exist for different phases and contexts and can be applied across Florida successfully and in an integrated manner.



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Appendix A: FDOT Context Classifications

Appendix A: FDOT Context Classifications



C1-NATURAL

Lands preserved in a natural or wilderness condition, including lands unsuitable for settlement due to natural conditions.



C2-RURAL

Sparsely settled lands; may include agricultural land, grassland, woodland, and wetlands.



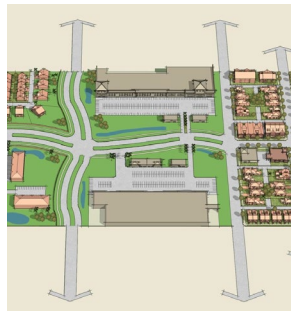
C2T-RURAL TOWN

Small concentrations of town area immediately surrounded by rural and natural areas; includes many historic towns.



C3R-SUBURBAN RESIDENTIAL

Mostly residential uses within large blocks and a disconnected or sparse roadway network.



C3C SUBURBAN-COMMERCIAL

Mostly non-residential uses with large building footprints and large parking lots within large blocks and a disconnected or sparse roadway network.



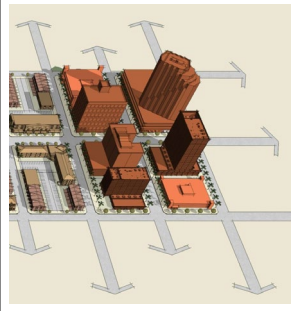
C4-URBAN GENERAL

Mix of uses set within small blocks with a well-connected roadway network. The roadway network usually connects to residential neighborhoods immediately along the corridor or on the back side of blocks fronting the roadway.



C5-URBAN CENTER

Mix of uses set within small blocks with a well-connected roadway network. Typically concentrated around a few blocks and identified as part of a civic or economic center of a community, town, or city.



C6-URBAN CORE

Areas with the highest densities and building heights, and within FDOT classified Large Urbanized Areas (population >1,000,000). Many are regional centers and destinations. Buildings have mixed uses, are built up to the roadway, and are within a well-connected roadway network.

Source: DeWayne Carver, Presentation (2017), "Determining Context Classification for Complete Streets"

Appendix B:

Glossary

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Accessibility. The ease of reaching valued destinations, such as jobs, shops, schools, entertainment, and recreation.

Active Transportation. Any self-propelled, human-powered mode of transportation.

Bus Rapid Transit (BRT) Systems. BRT is an innovative, high capacity, lower cost public transit solution that can significantly improve urban mobility. This permanent, integrated system uses buses or specialized vehicles on roadways or dedicated lanes to quickly and efficiently transport passengers to their destinations, while offering the flexibility to meet transit demand. BRT systems can easily be customized to community needs and incorporate state-of-the-art, low-cost technologies that result in more passengers and less congestion.

Complete Streets. Streets designed and operated to enable safe access and mobility for transportation system users of all ages and abilities, including pedestrians, bicyclists, motorists, and public transportation users.

Context Sensitive Roadway Design. This form of design promotes a collaborative, multidisciplinary process that involves all stakeholders in planning and designing transportation facilities that meet the needs of users and stakeholders. Context sensitive roadway designs are compatible with their setting and preserve scenic, aesthetic, historic and environmental resources; respect design objectives for safety, efficiency, multimodal mobility, capacity and maintenance; and integrate community objectives and values relating to compatibility, livability, sense of place, urban design, cost and environmental impacts.

Green Infrastructure. Green infrastructure is strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations. One common use in transportation of green infrastructure is as an approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure water management approaches and technologies infiltrate, evapotranspire, capture and reuse storm water to maintain or restore natural hydrologies.

Intelligent Transportation Systems (ITS). The application of advanced technologies to improve the efficiency and safety of transportation systems.

Intermodal. The ability to connect, and the connections between, modes of transportation.

Metropolitan planning organization (MPO). A metropolitan planning organization (MPO) is defined in Federal Transportation Legislation (23 USC 134(b) and 49 USC 5303(c)) as the designated local decisionmaking body that is responsible for carrying out the metropolitan transportation planning process. An MPO must be designated for each urban area with a population of more than 50,000 people (i.e., for each Urbanized Area (UZA) defined in the most recent decennial Census).

Mode Share. The percentage share that a particular type of transportation mode (i.e., car, bus, rail, plane, etc.) has in relation to other modes.

Multimodal. The availability of transportation options using different modes within a system or corridor

Placemaking. Placemaking is a multi-faceted approach to the planning, design and management of public spaces. Put simply, it involves looking at, listening to, and asking questions of the people who live, work and play in a particular space, to discover their needs and aspirations. This information is then used to create a



common vision for that place. The vision can evolve quickly into an implementation strategy.

Reliability. Refers to the degree of certainty and predictability in travel times on the transportation system. Reliable transportation systems offer some assurance of attaining a given destination within a reasonable range of an expected time. An unreliable transportation system is subject to unexpected delays, increasing costs for system users.

Road Diets. Entails removing travel lanes from a roadway and utilizing the space for other uses and travel modes.

Sustainability. Meeting the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability incorporates the ‘triple bottom line’ concept, which includes giving consideration to three primary principles: equity (also known as social or people), ecology (also known as environment), and economy (also known as the bottom line or cost component). The goal of sustainability is “the satisfaction of basic social and economic needs, both present and future and, the responsible use of natural resources, all while maintaining or improving the well-being of the environment and ecology on which life depends.”

Traffic Calming. The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. Transportation systems management and operations (M&O). An integrated program to optimize the performance of existing infrastructure through the implementation of systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system.

Transit-Oriented Development (TOD). Transit-oriented development includes a mix of commercial, residential, office and entertainment centered around or located near a transit station. Dense, walkable, mixed-use development near transit attracts people and adds to vibrant, connected communities.

Source of all definitions: [FHWA Planning Glossary](#) and [FTA Transit-Oriented Development](#)

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A NATIONAL SYNTHESIS OF TRANSIT AND COMPLETE STREETS PRACTICES



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