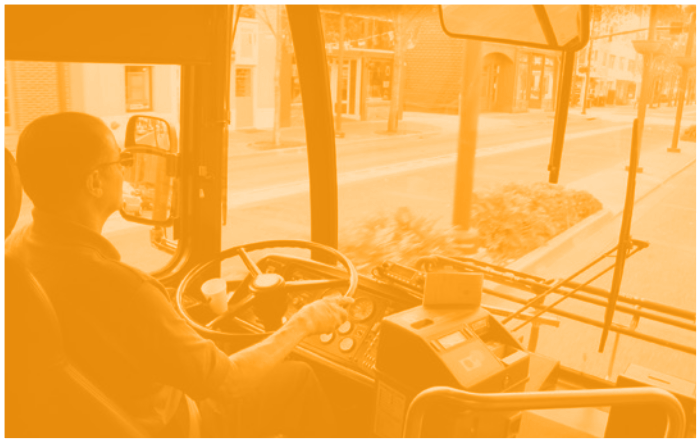
MAKING TRACKS

A Primer for Implementing Transit Fixed Guideway Projects

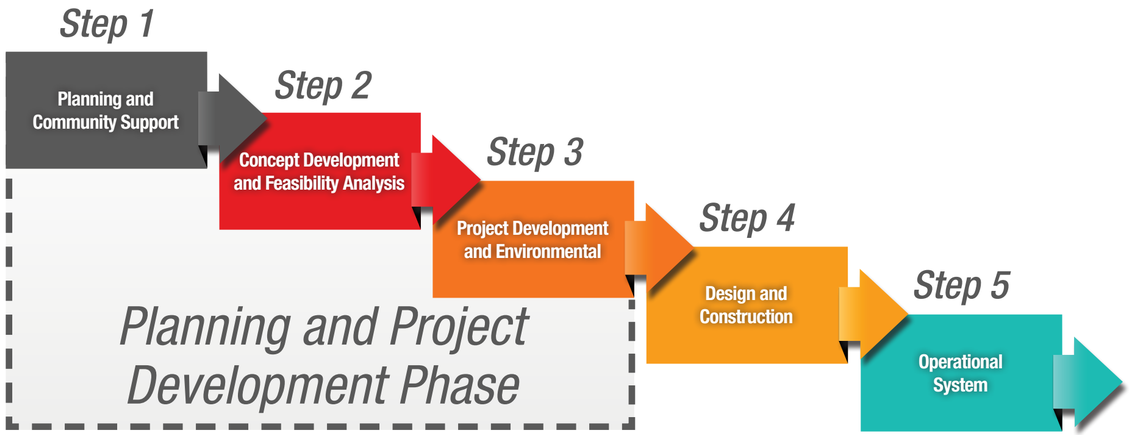


Introduction

Demand for new fixed guideway projects is strong nationwide. Each year hundreds of new fixed guideway projects across the country are proposed for implementation by local communities. Approximately one third of these projects are located in areas where no fixed guideway currently exist. Although beneficial to the accessibility of other modes such as airports and seaports and enhancing economic development within a community, the task of steering these major transit projects from beginning planning stages to a fully operational system can be lengthy, typically ranging from 8 to 12 years. Additionally, securing funding and navigating the way through various state and federal requirements, including community and private sector commitments, requires continued and constant support from the community leaders and implementing agencies to see the project through to completion.

Steps in Developing a Major Fixed Guideway Project

The Florida Department of Transportation (FDOT) has developed this primer to assist local communities through the planning and project development phase, which involves the first **three steps** in developing a major fixed guideway project.

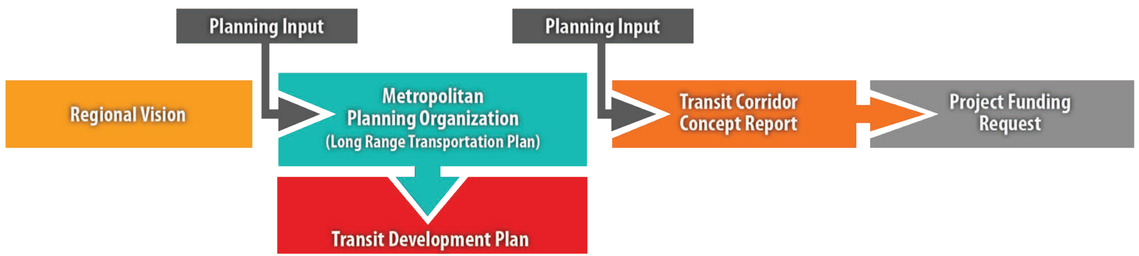


Creating a Vision

Fixed guideway transit systems are typically focused on a regional scale. Thus, regional transportation plans that identify commuter travel patterns are the first step in the planning process. These plans can illustrate the need for regional transit projects connecting high ridership and low income housing areas to employment centers and major destinations. The regional plans feed into the Metropolitan Planning Organization's Long Range Transportation Plans (LRTPs) which prioritize and solidify the transportation funding priorities in large urban areas. Once the regional plans are made consistent with the goals and objectives of the LRTP, the project can move forward to the next step.

Making the Connections

LRTP's define a purpose and need for large scale projects and garner support from the public in further pursuit of these projects. In some areas, it may be necessary for two or more MPOs to join forces, making a connection for a regional system, coordinating local resources and bridging funding gaps. Other local government and economic development agencies can be enlisted to assist in planning and promoting the project. The local transit agency will be a key player in assessing the impacts of the project as part of the overall transit system, from including the project in their transit development plan to ultimately operating the major fixed guideway system. Strong local leadership is essential at all levels to foster public support and create momentum in ensuring the projects are implemented.



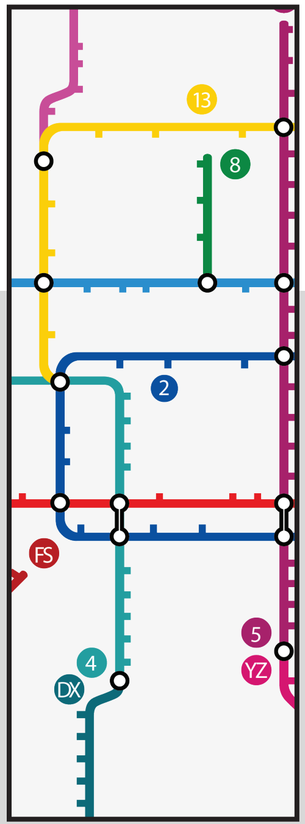
Concept Development and Feasibility Analysis

Once the project concept receives initial approval in the regional and MPO planning processes, a more detailed corridor analysis is required. At this point, transportation strategies and alternatives are analyzed within the local land use framework and compared to determine the most appropriate solution for connecting regions, neighborhoods, or destinations. Stakeholders are engaged to make critical decisions such as alignments, transit technologies, right-of-way needs, connecting modes and routes, capital and operational needs, order of magnitude costs, implementation schedule, and how each scenario will be funded. Station locations and surrounding transit oriented land use plans should also be considered at this point to enhance the viability of the system. At its conclusion, a detailed corridor and feasibility study should provide enough information to advance to the next phase of project development and assist in determining whether to pursue public or private sector funding or a combination of both in building and maintaining the project.

Choosing a Transit Technology

The type of transit system selected is based on the unique character and needs of the community, and is dependent on a variety of factors including size of service area, commute patterns, cost, available resources and the surrounding land uses. Types of rail fixed guideway technologies for consideration include cable car, commuter rail, heavy rail, hybrid rail, inclined plane, light rail, monorail, automated guideway, and streetcar rail. Bus Rapid Transit (BRT), which operates in exclusive rights-of-way, is also considered a fixed guideway project. Commuter rail, heavy rail, and light rail technologies are often selected to address regional commuting needs that span several cities or large urban areas. These rail technologies typically connect a central city with outlying suburbs and communities.

The following pages illustrate operating characteristics of the various technologies.



Automated People Mover

Automated People Mover or automated guideway transit is a fully automatic form of transit usually elevated with rubber-tire vehicles powered by an electrified third rail. The most common application in the U.S. is at airports, such as Tampa International. Another emerging transit technology is Personal Rapid Transit which is a People Mover that uses small automated vehicles carrying 4 to 6 passengers.

Type of Service Provided:
Local to medium length trips

Type of Station:
Elevated platform

Spacing Between Stations:
Varies, generally less then one mile

Examples:
Skyway, Jacksonville, FL (above); Metromover, Miami, FL; Yurikamome, Tokyo Waterfront

Bus Rapid Transit

Bus Rapid Transit (BRT) is a bus-based mass transit system with specialized design, services and infrastructure to improve quality of service and reduce delay. BRT along the regional spine would operate primarily within a fully dedicated right-of-way (busway) in order to avoid traffic congestion.

Type of Service Provided:
Local, medium, and long distance trips

Type of Station:
On-street, shelter, or platform

Spacing Between Stations:
1/4 mile to 5 miles

Examples (Fixed-Guideway BRT):
LYMMO Orlando, FL (above); Eugene, OR; Cleveland, OH; Boston, MA; Las Vegas,

Modern/Historic Street Car Transit

Modern/Historic Street Cars typically operate as single-car trains powered by overhead catenaries. The vehicles can operate in dedicated-guideways, but they predominantly operate in mixed-traffic and are rarely given signal priority. Often their size, aesthetics, and in some cases vehicle design are similar to light rail transit with the difference being a slower, more localized service.

Type of Service Provided:
Local trips

Type of Station:
On-street, shelter, or platform

Spacing Between Stations:
1/4 mile to 1/2 mile

Examples:
TECO, Tampa, FL (above); Portland, OR; Seattle, WA; Toronto, Canada

Light Rail Transit

Light Rail Transit (LRT) is a public transport using steel-tracked fixed guideways and electric-powered trains. LRT operates primarily in exclusive right of way with vehicles capable of operating as a single train or as multiple units coupled together. The term "light rail" was coined to convey the vehicle's design, "..for light loads and fast movement."

Type of Service Provided:
Local, medium, and long distance trips

Type of Station:
Platform

Spacing Between Stations:
Approximately 1 mile

Examples:
Phoenix, AZ (above); Charlotte, NC; Portland, OR.; Salt Lake City, UT

Self-Propelled Diesel Transit

A self-propelled diesel transit also known as Hybrid Rail Transit or Diesel Multiple Unit (DMU) is a train powered by on-board diesel engines. DMU vehicles can use a chassis similar to light rail for quicker movement or one similar to commuter rail for safety when operating on freight rail corridors.

Type of Service Provided:
Local, medium, and long distance trips

Type of Station:
Platform

Spacing Between Stations:
Approximately 1 mile

Examples:
Austin, TX (above); Trenton, NJ; Portland, OR; Oceanside, CA

Commuter Rail Transit

Commuter Rail Transit consists of a traditional locomotive pulling several passenger rail cars. Commuter rail is a regional passenger rail service that primarily operates between a city center, the suburbs, and commuter towns or other locations that draw large numbers of commuters.

Optimal Operations:
Medium to long distance trips

Type of Station:
Platform

Spacing Between Stations:
2 miles to 5 miles or more

Examples:
SunRail, Orlando, FL (above); Tri-Rail, Miami, FL; Chicago, IL; Long Island, NY; Denver, CO

Heavy Rail

Heavy Rail Transit is an electric railway with six to eight cars or more that operates in a fully-dedicated right-of-way. In distinction from light rail transit, heavy rail is characterized by heavy and high-speed trains with the capacity for high volume of traffic.

Optimal Operations:
Local, medium, and long distance trips

Type of Station:
Platform

Spacing Between Stations:
Less than 1 mile within a city, 1 to 5 miles or more in the immediate suburbs

Examples:
MetroRail, Miami, FL (above); PATCO Speedline, Philadelphia, PA to Camden, NJ; RTA Red Line, Cleveland, OH

Operating Speeds

Average operating speeds (miles per hour) are significantly affected by the number of stations, weight of the vehicle, incline, and number and degree of turns.

Passenger Capacity per Hour

Optimal capacity (passengers per hour) assumes a bus or train arrives at a station every 10 minutes, except for commuter rail which is every 15 minutes.

Average speed information is based on project examples and provided by the American Public Transit Association. Vehicle seated capacity is based on manufacturer specifications, references available upon request.

Corridor Width

Average width of the corridor (feet) does not include space for stations and may be wider at turns, especially in the case of commuter rail.

Operate on Freight Tracks

The Federal Rail Administration restricts the operation of certain passenger rail vehicles on active freight lines. This is in part due to safety in the event of a crash.

Corridor width is based on project examples as provided by the Federal Transit Administration and manufacturer specifications, references available upon request.

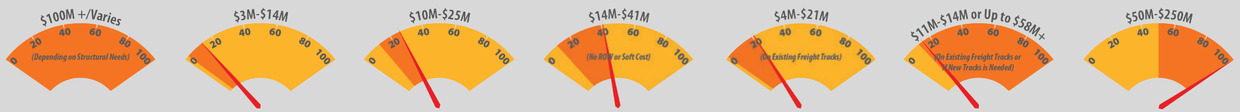
Cost and Benefits

Cost per Trip

Average cost per trip ($ dollars) is the operating cost per passenger not fare, based on national averages and data. The use of fossil fuels greatly increases the cost per passenger.

Cost per Mile

Average cost per mile ($ millions of dollars) includes estimates from completed projects and does not include significant right-of-way which has a major impact on cost.



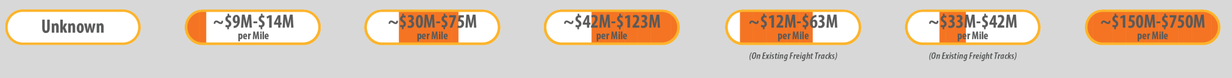
Operating costs per unlinked trip are provided by the National Transit Database. Generalized cost per mile does not include right-of-way costs or professional services. These costs are loosely based on existing system information as provided by the Federal Transit Administration and the National Transit Database and designed for sketch-level planning and comparison purposes only. Reference available upon request.

Jobs Created per Mile

Investing in fixed-guideway transit has been associated with job creation. This metric uses the generalized cost per mile by technology as previously described.

Increased Business Sales per Mile

The return on investment in business sales in the local economy ($ millions of dollars). Return on investment uses generalized cost per mile described previously.



The American Public Transit Association annually publishes ,"The Public Transportation Fact Book," which contains national aggregate statistical data covering all aspects of the transit industry in the United States and Canada. The number of jobs created and return on investment in business sales were developed using the ratios suggested by this fact book, such that every $1 billion invested in public transportation supports and creates 36,000 jobs and every $10 million in invested yields $30 million in increased business sales.

Public or Private Funding

Large scale rail projects can typically run from $40 million per mile for light rail to $250 million per mile and greater for heavy rail, depending on the selected technology and infrastructure. Due to the significant capital costs, many communities choose to pursue federal funding through the Federal Transit Administration's (FTA) New Starts or Small Starts programs. The Capital Investment Program: New Starts, Small Starts, and Core Capacity Improvements is the federal government's primary financial resource for supporting locally-planned, implemented, and operated transit guideway capital investments.

New Starts projects are categorized as capital projects greater than $250 million, while the Small Starts projects have a total capital cost of less than $250 million and seek a federal share of less than $75 million. The maximum federal share for funding New Starts projects is 80% of the project cost, though 50% is a more common funding level. A local match is required for the remainder of the project cost.[1]

To be eligible, project sponsors must request entry into the New Starts program. Once approval is received, all projects seeking funding from the program must be evaluated and rated based on project justification and local financial commitment criteria. This project development and evaluation process is a multi-year, multi-phased process that has a significant impact on the overall implementation schedule for the project. Florida has a State New Starts program for those projects that receive federal New Starts approval. It may potentially provide state funds to match up to 50% of the non-federal share of the capital cost of the project.

Another option for funding major fixed guideway systems is a public-private sector partnership where the private railroads own and/or operate the rail, as in the case of the planned All Aboard Florida rail project. In this scenario, the private rail company owns the tracks and will design, construct, and operate high speed rail with limited or no assistance from FDOT. These types of partnerships can be beneficial in that project timeframes can be compressed due to lack of federal financial requirements and commitments. Choosing a funding strategy at this point in the planning process is critical, as it will drastically change the course for project implementation. Project sponsors should closely assess and weigh the long-term benefits of any funding strategy.

[1] For more information on the New Starts program, visit http://www.fta.dot.gov/12347_5221.html.

Step 2 – Concept Development and Feasibility Analysis

Local Funding Commitment

Securing a long-term source of local funds for the capital match and continued operation and maintenance of the transit system is one of the most challenging aspects in implementing a locally-driven fixed guideway project. As operations and maintenance are typically funded by local government sources, discussions regarding community referendums and sales tax measures will often begin during this stage of the planning process.

Agency Roles and Responsibilities

It is important to define the roles and responsibilities of each agency and stakeholder involved in ensuring the implementation of the project. A well-defined project management plan, identifying the overall project sponsor agency and the supporting agency roles and responsibilities, sets clear expectations during the life of the project and allows for a seamless transfer between project phases. In many cases, the FDOT or planning agency may conduct the concept and feasibility, project development, and environmental studies in cooperation with the transit agency and local governments. However, as the project advances into design and construction, the operating agency, whether it is the transit agency or authority or local government, will likely assume the role of project sponsor.

After the project has received approval to enter into the federal New Starts process or a public-private partnership has been forged, more detailed technical analyses are required to assess the actual costs and to document the mobility and economic benefits of the project. These studies should address the final alignment, technological specifications, operational needs, station locations and designs, land use, environmental and economic benefits, and provide detailed capital and operations costs. An environmental study is also conducted during this phase, along with an environmental class of action. Most importantly, the project development process should demonstrate local community support and a strong financial commitment. The culmination of this phase results in a locally preferred alternative that is adopted by the region's municipal policy boards. The project sponsor can then request entry into the FTA's engineering phase of the New Starts process. At the conclusion of engineering, negotiations may commence with FTA on a full funding grant agreement for New Starts, or a project construction grant agreement for a Small Starts project.

Conceptualizing, developing and building a fixed guideway transit system is a long-term process. Successful projects are those that are based on sound planning principles, have continuous and committed leadership, community support, and a realistic funding plan. A keen understanding of the process, decision points, and issues will assist communities in realizing their vision for a regional transit fixed guideway system.

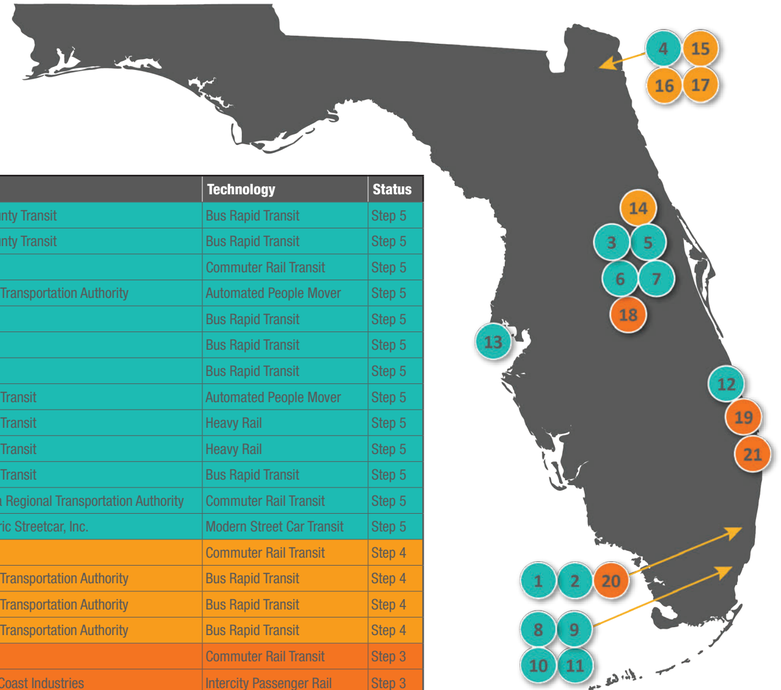
To showcase the demand for new fixed guideway projects in Florida, the table below includes projects in Steps 3-5 of development which are further along in the development phases.

4 **Step 3** - Project Development and Environmental

4 **Step 4** - Design and Construction

13 **Step 5** - Operational System

Note: *Numbers in the legend refer to the number of Florida projects currently in that step*



Project No.	Project Name	Agency	Technology	Status
1	I-595 Express Bus in Managed Lanes	Broward County Transit	Bus Rapid Transit	Step 5
2	I-95 Express Bus in Managed Lanes	Broward County Transit	Bus Rapid Transit	Step 5
3	SunRail Phase I	FDOT	Commuter Rail Transit	Step 5
4	JTA Skyway	Jacksonville Transportation Authority	Automated People Mover	Step 5
5	LYNX LYMMO	LYNX	Bus Rapid Transit	Step 5
6	Orlando LYMMO Expansion	LYNX	Bus Rapid Transit	Step 5
7	Parramore BRT	LYNX	Bus Rapid Transit	Step 5
8	Metromover	Miami-Dade Transit	Automated People Mover	Step 5
9	MetroRail	Miami-Dade Transit	Heavy Rail	Step 5
10	MIA MetroRail Station and Orange Line	Miami-Dade Transit	Heavy Rail	Step 5
11	South Miami-Dade Busway	Miami-Dade Transit	Bus Rapid Transit	Step 5
12	Tri-Rail	South Florida Regional Transportation Authority	Commuter Rail Transit	Step 5
13	TECO Line Streetcar	Tampa Historic Streetcar, Inc.	Modern Street Car Transit	Step 5
14	SunRail Phase II	FDOT	Commuter Rail Transit	Step 4
15	BRT Downtown Phase I	Jacksonville Transportation Authority	Bus Rapid Transit	Step 4
16	BRT North Corridor Study	Jacksonville Transportation Authority	Bus Rapid Transit	Step 4
17	BRT South Corridor Study	Jacksonville Transportation Authority	Bus Rapid Transit	Step 4
18	SunRail Phase III	FDOT	Commuter Rail Transit	Step 3
19	All Aboard Florida	Florida East Coast Industries	Intercity Passenger Rail	Step 3
20	Tri-Rail Coastal Link	South Florida Regional Transportation Authority	Commuter Rail Transit	Step 3
21	Wave Streetcar	South Florida Regional Transportation Authority	Modern Street Car Transit	Step 3

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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