

# EXECUTIVE SUMMARY

## RAIL-ORIENTED DEVELOPMENT: STRATEGIES AND TOOLS TO SUPPORT PASSENGER RAIL



**CDOT-DTD-R-2001-19**

*March 2002*



**Colorado Department of Transportation**  
Research Branch

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## **RAIL-ORIENTED DEVELOPMENT:**

### **STRATEGIES AND TOOLS TO SUPPORT PASSENGER RAIL**

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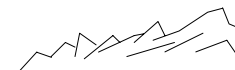
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## ► Introduction

The Rail-Oriented Development: Strategies and Tools to Support Passenger Rail Handbook (the Handbook) is the final work product associated with the Land Use and Transportation System Components to Support Passenger Rail Study (the Study), sponsored by the Colorado Department of Transportation in 2001.

This nine-month Study was initiated in an effort to research and define the land uses, land development patterns and transportation system characteristics that are supportive of passenger rail. The findings of the Study are presented in this Handbook, which has been designed to provide practical answers to questions regarding how to plan for passenger rail. This Handbook lists factors to be considered by local decision makers when developing a community's policies regarding land use decisions that support rail. The Colorado Department of Transportation does not endorse these factors or present them as recommended policies.

This Handbook is based on extensive research into the land use/rail transit relationship, and on an evaluation of existing North American rail transit systems and their urban environments. The Handbook is not meant to advocate rail transit, per se, but rather to describe the recommended land uses and development patterns that would support rail transit in Colorado, as well as those that are likely to emerge as a result of passenger rail.

In addition, it is worth noting that the land uses, development patterns and transportation system characteristics described in this Handbook have value outside of the application of rail transit in Colorado. Communities across the state and country will find that these strategies and tools also achieve a variety of other common community goals, including:

- ◆ A mix of land uses and design treatments, which can help to create lively activity centers and contribute to a sense of place;
- ◆ creation of a balanced transportation system;
- ◆ a land use pattern that can easily be served by any type of transit; and,
- ◆ preservation of open space by encouraging infill development.

## ► Literature Review: Select Findings

Interest in rail transit has undergone a resurgence in the United States over the past couple of decades. This has given rise to an extensive body of new research and analysis into the relationships between rail transit systems and urban form.

### ◆ **Light Rail Ridership Increases with the Overall Size of a Central Business District (CBD)**

Light rail can serve CBDs with between 25,000 and 250,000 jobs. Above this, capacity may become an issue.

### ◆ **Commuter Rail Ridership Increases with the Density of a Central Business District (CBD)**

CBD density plays a more important role in commuter rail ridership than residential density because commuter rail often has only one station at its downtown terminus. Commuter rail operates well when it serves a CBD of at least 100,000 jobs, but becomes even more effective with 250,000 to 400,000 jobs.

### ◆ **Widespread Urban Densities are Not Required for Successful Passenger Rail**

Station catchment area for passenger rail is the land within two miles around a passenger rail station. Station catchment area for local bus routes is the land within one-quarter mile of a bus corridor.

### ◆ **Minimum Residential Densities Apply Only to Station Catchment Areas and Vary by Level of Transit Service**

For example, commuter rail is much less dependent on residential density for success than is light rail, rapid rail or frequent bus service.



Transit Service Level	Minimum Residential Density (Dwelling Units/Acre)
Minimum Bus Service	4
Intermediate Bus Service	7
Frequent Bus Service	15
Light Rail	9
Rapid Rail	12
Commuter Rail	2

◇ **Creating a Mix of Land Uses can Contribute to the Success of the Rail System**

Introducing retail and service-based commercial uses into employment centers can reduce automobile use; as can the introduction of neighborhood-oriented commercial uses into new residential areas.

◇ **The Design of Station Areas and Activity Centers Plays an Important Role in the Success of Rail Transit**

Station areas and other key destinations must be designed for the pedestrian, so that trips can be completed effectively and efficiently on-foot. Necessary elements include sidewalks, crosswalks, street frontage and clear signage.

◇ **Travel Sheds, or the Area from which a Rail Passenger Will Travel to Access the Rail System, Vary by Mode-of-Access**

Mode-of-Access	Travel Shed
Pedestrians	½-mile around rail station
Bicycles	3-miles around rail station
Buses	¼-3 miles around each bus stop on the route serving the rail station, depending on mode of travel to the bus stop
Automobiles	Depends on overall commute time

◇ **Rail Transit Impacts Land Use, Urban Form and Local Economics**

- ◆ It increases the value of commercial property near transit stations.
- ◆ It increases the value of residential property near transit stations.
- ◆ It supports increased intensity of development near transit stations.
- ◆ It influences the regional land development structure.

## ▶ Peer Systems Study: Key Findings

To maximize relevance to this Study, peer rail systems were targeted for application to three prototypical rail corridor types in Colorado, including:

- ◆ *The Front Range*: connects a series of major activity centers.
- ◆ *The I-70 Corridor*: connects the primary CBD with both rural and mountain communities.
- ◆ *Rural Valleys and Mountain Resort Areas*: supports tourism and some demand for daily commuting.

In an effort to learn more about the existing relationship between land use, supporting transportation and rail, the following four peer rail systems were studied:

- ◆ Caltrain (San Francisco)
- ◆ Metra Rail (Chicago)
- ◆ BC Rail (Vancouver)
- ◆ VIA Rail (Victoria)



The following is a summary of key findings from the peer systems study. The full report is included in Appendix B of the Handbook.

#### ◇ Surrounding Land Uses

- ◆ Stations with a low level of rail service induce minimal land use response nearby.
- ◆ Stations with a high level of rail service induce moderate to high land use response nearby.
- ◆ Multiple entities must collaborate on station area improvements, development and redevelopment.
- ◆ Stations near CBDs experience more development and redevelopment than remote stations.

#### ◇ Interconnecting Transportation Systems

- ◆ The location and quantity of parking for rail systems impacts regional and local travel patterns.
- ◆ Stations (within the same system) that are multimodal transportation centers experience boardings comparable to or greater than stations with large parking reservoirs.
- ◆ Sidewalk networks play a critical role in moving commuters from parking areas, transit riders from nearby routes and residents from surrounding neighborhoods.
- ◆ Seamless coordination of transit bus services with rail operations are required to support commuting patterns on the regional and local level.

## ► Putting It All Together

#### ◇ Strategies and Station Types

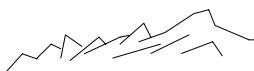
The following two tables summarize passenger rail support strategies and implementation tools. The first table, *Strategies and Station Types*, lists the strategies described in the Handbook, as they apply to the four station types established for the purposes of this Study.

- ◆ *CBD*: stations serving the largest employment areas in the state.
- ◆ *Downtown*: stations serving the downtowns of smaller cities.
- ◆ *Community/Suburban*: stations located outside of a downtown area but within a developed community.
- ◆ *Rural*: stations with little or no adjacent development.

The table uses a system to rate the importance of each strategy in supporting a particular station type. Some of the strategies, such as those associated with regional land use and development patterns, are meant for application on a broader level, rather than for individual stations. Thus, the rating for these strategies is “important” across the board as they provide a solid foundation for planning all elements of rail transit.

#### ◇ Implementation Tools and Entity Roles

The second table, *Implementation Tools and Entity Roles*, shows the tools available to entities seeking to implement passenger rail support strategies.



## Strategies and Station Types

Rail Transit Support Strategies	CBD Station	Downtown Station	Comm/Suburb Station	Rural Station
<b><i>Regional Land Use &amp; Development</i></b>				
Develop a Regional Structure Supportive of Passenger Rail	●	●	●	●
Locate and Develop Activity Centers at/along Potential Rail Stations and Rail Corridors	●	●	●	●
Develop a Hierarchy of Activity Centers	●	●	●	●
<b><i>Community Land Use &amp; Development</i></b>				
Create Employment Density in Existing and Planned Activity Centers	●	●	●	○
Create Minimum Residential Densities for Areas Within Two Miles of Potential Rail Corridors	●	●	●	○
Incorporate Retail and Service-Based Commercial Uses in Employment Centers	●	●	●	○
Incorporate Neighborhood-Oriented Commercial Uses in New Residential Areas	●	●	●	○
Take Advantage of Shared-Parking Opportunities in Mixed-Use Areas	●	●	●	○
<b><i>Station Area Land Use &amp; Development</i></b>				
Determine Station Type and Define Station Area	●	●	●	○
Develop Station Area with the Highest Commercial and Residential Densities	●	●	●	○
Orient Commercial and Service Uses Towards Transit Users	●	●	●	○
Locate Transit, Bicycle and Park-and-Ride Facilities to Facilitate Pedestrian Transfer	●	●	●	●
Orient Buildings to the Street	●	●	●	○
Create a Fine-grained Grid Network for Streets and Sidewalks	●	●	●	○
Prioritize Pedestrian Access and Circulation Through Urban Design	●	●	●	○

**Legend:**

- Very Important
- Important
- Somewhat Important



## Strategies and Station Types (cont)

Rail Transit Support Strategies	CBD Station	Downtown Station	Comm/Suburb Station	Rural Station
<b><i>Supporting Transportation System Strategies</i></b>				
Use the Station Type to Prioritize the Most Effective Supporting Transportation Modes	●	●	●	○
Develop Improved Pedestrian Facilities In Station Areas	●	●	◐	○
Provide for Bicycle Access and Circulation in Station Areas and Within Bicycle Travelsheds	●	●	◐	○
Develop Connecting Transit Systems	●	●	●	○
Locate Transit Stops for Convenient Transfer Between Modes	●	●	●	○
Use Park-and-Ride Facilities to Expand Catchment Areas for Rail Passengers	○	◐	●	●
Design Parking Facilities that are Reflective of Local Context and Increasing Demand	◐	◐	◐	○
Use Cost and Availability of Parking to Influence Preferred Modes-of-Access	◐	●	●	○
Make Pedestrian, Bicycle, Transit and Parking Facilities Safe, Convenient and Comfortable	●	●	●	●
<b><i>Transit System Development Strategies</i></b>				
Build Transit Ridership on Buses in Anticipation of Rail Transit	●	●	●	●
Build Supporting Transportation Facilities (access streets, sidewalk networks, park-and-rides)	●	●	●	○
Limit Expansion of Parallel Arterial Roadways	◐	◐	●	●
Coordinate Transit Systems with Different Transit Operators	●	●	◐	◐
Market Transit Systems	◐	◐	◐	◐
Grow Transit Systems Over Time with Incremental Service Improvements	◐	◐	◐	◐
<b><i>Other Strategies to Increase Transit Ridership</i></b>				
Develop and Improve Transit System Management Programs	●	●	◐	◐
Implement Transportation System Management Programs	◐	◐	◐	○
Develop and Implement a Transportation Demand Management (TDM) Program	●	●	◐	◐
Develop Paid Parking Systems	●	●	◐	○
<b><i>Transitional Strategies</i></b>				
Shape Local and Regional Land Development Patterns Proactively	●	●	◐	○
Build Transit Patronage to Levels that Support Rail Transit	●	●	◐	○
Develop a Multimodal Transportation Network	●	●	●	○

**Legend:**

- Very Important
- ◐ Important
- Somewhat Important





## Implementation Tools and Entity Roles

Strategy Implementation Tools	Entities			
	State	Regional	Local	Private Sector
<b><i>Planning</i></b>				
Regional Plans	○	●	●	
Comprehensive Plans		○	●	
Area Plans			●	○
Site Master Plans			●	●
Urban Renewal Plans			●	○
Multimodal Transportation Plans	●	●	●	
Rail System and Corridor Plans	●	●	●	
Pedestrian Master Plans			●	
Bikeway Plans		○	●	
Highway Improvements & Facilities Plans	●	●	●	
<b><i>Education</i></b>				
Public Information and Transit Marketing	○	●	●	○
<b><i>Incentives</i></b>				
Density Bonuses			●	
Expedited Review Procedures			●	
Transferable Development Rights			●	
Reduced Fees			●	

**Legend:**

- Primary Responsibility
- Secondary / Supportive Role



## Implementation Tools and Entity Roles (cont)

Strategy Implementation Tools	Entities			
	State	Regional	Local	Private Sector
<b><i>Regulatory Tools</i></b>				
Urban Growth Boundaries		●	●	
Zoning Ordinances			●	
Development Standards			●	
Street Connectivity and Street Design Standards	○	○	●	
Transportation Level-of-Service Standards		○	●	
<b><i>Organizational / Administrative Tools</i></b>				
Regional Planning Commissions		●	●	
Intergovernmental Agreements	○	●	●	
Joint Development Agreements	○		●	●
<b><i>Targeted Public Investment Tools</i></b>				
Land Acquisition	●	○	●	●
Land Assemblage and Banking		○	●	●
Purchase of Development Rights		○	●	●
Options and Rights of First Refusal		○	●	●
Condemnation		○	●	
Investing in Public Facilities	●	●	●	
Highway Interchange Improvements	●	○	○	
<b><i>Financing Tools</i></b>				
Public Funding	○	○	●	
Capital Improvement Program		○	●	
Rural Transportation Authority and Districts		●	●	
Improvement Districts			●	●

**Legend:**

● **Primary Responsibility**

○ **Secondary / Supportive Role**

