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Planning for Transit-Supportive Development: A Practitioner's Guide

Section 2: General Transit-Supportive Development Planning Topics

JUNE 2014

FTA Report No. 0054
Federal Transit Administration

PREPARED BY

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U.S. Department of Transportation
Federal Transit Administration

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Federal Transit Administration
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U.S. Department of Transportation
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SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liter	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C

REPORT DOCUMENTATION PAGE	*Form Approved* *OMB No. 0704-0188*

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY	2. REPORT DATE June 2014	3. REPORT TYPE AND DATES COVERED July 2008 - June 2014

4. TITLE AND SUBTITLE	5. FUNDING NUMBERS
Planning for Transit-Supportive Development: A Practitioner's Guide—Section 2: General Transit-Supportive Development Planning Topics	NJ-26-1018

6. AUTHOR(S)

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESSE(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
Colette L. Santasieri, Ph.D., Sean C. Vroom, Robert Hughey, NJIT; AECOM Planning + Design; Paul Bay, Transportation Consultant; Citiventure Associates, LLC; Robert Dunphy, Transportation Consultant; E. D. Hovee and Company, LLC; PlaceMatters, Inc.; Van Meter, Williams, Pollack, LLP	FTA Report No. 0054

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER
U.S. Department of Transportation Federal Transit Administration Office of Systems Planning East Building 1200 New Jersey Avenue, SE Washington, DC 20590	FTA Report No. 0054

11. SUPPLEMENTARY NOTES [http://www.fta.dot.gov/research]

12A. DISTRIBUTION/AVAILABILITY STATEMENT	12B. DISTRIBUTION CODE
Available from: National Technical Information Service (NTIS), Springfield, VA 22161. Phone 703.605.6000, Fax 703.605.6900, email [orders@ntis.gov]	TRI-20

13. ABSTRACT

"Planning for Transit-Supportive Development: A Practitioner's Guide" is a toolkit of practical and innovative measures to help Metropolitan Planning Organizations (MPO's), regional planners, transit agencies, and local government elected officials, staff, land use planners, and transit planners integrate transit planning with local land use planning. This guide includes best practices, guidance, success stories, useful techniques, transferable examples, and lessons learned, aimed at providing planners at the regional, corridor, and local levels with ideas on how to integrate, accommodate, and assess transit-supportive development and transit investment. Included are numerous success stories for integrating transit planning and land use planning. This guide seeks to go beyond just highlighting case studies by providing a link between the regional, corridor, and local planning processes for integrating land use and transit and examining regions that have successfully developed and integrated plans. The guide is meant to be a resource for planners to assist them in the development and implementation of strategies to integrate transit and land use planning in an effort to encourage transit-supportive development. "Section 2—General Transit-Supportive Development Planning Topics" presents information on issues that affect all three planning levels, including leadership and champions, regulatory tools, funding and financing, economic benefits, and visualization tools.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Transit-supportive development, transit-oriented development, best practices, integrating land use and transit, regional planning, corridor planning, local planning, real estate developers	172

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	

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FOREWORD

Public Law 109-59: Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005 identified funding for TELUS for Transit. With that funding, the New Jersey Institute of Technology conducted national research on transit-supportive development which culminated in "Planning for Transit-Supportive Development, A Practitioner's Guide." This guide is a toolkit of best practices, guidance, success stories, useful techniques, transferable examples, and lessons learned designed to assist Metropolitan Planning Organizations (MPOs), regional planners, transit agencies, local planners, and local governments with integrating transit planning with local land use planning. It provides a link between the regional, corridor, and local planning processes for integrating land use and transit. This guide is a resource document.

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ABSTRACT

"Planning for Transit-Supportive Development: A Practitioner's Guide" is a toolkit of practical and innovative measures to help Metropolitan Planning Organizations (MPO's), regional planners, transit agencies, and local government elected officials, staff, land use planners, and transit planners integrate transit planning with local land use planning. This guide includes best practices, guidance, success stories, useful techniques, transferable examples, and lessons learned, aimed at providing planners at the regional, corridor, and local levels with ideas on how to integrate, accommodate, and assess transit-supportive development and transit investment. Included are numerous success stories for integrating transit planning and land use planning. This guide seeks to go beyond just highlighting case studies by providing a link between the regional, corridor, and local planning processes for integrating land use and transit and examining regions that have successfully developed and integrated plans. The guide is meant to be a resource for planners to assist them in the development and implementation of strategies to integrate transit and land use planning in an effort to encourage transit-supportive development.

"Section 2—General Transit-Supportive Development Planning Topics" presents information on issues that affect all three planning levels, including leadership and champions, regulatory tools, funding and financing, economic benefits, and visualization tools.

Planning for Transit-Supportive Development: A Practitioner's Guide

Section 2: General Transit-Supportive Development Planning Topics

A. Guiding the Process: Leadership and Champions

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Integration of transit and land use planning resulting in the implementation of transit-supportive development has to date seen limited success in the United States (Utter 2009). There is a general misconception that transit is a key community asset in attracting development to a given area. When this assumption is coupled with the fact that the challenges associated with implementing transit-supportive development are not widely understood, it is easy to see why success has been limited.

Our national goals of decreasing household transportation costs, reducing our nation's dependence on foreign oil, improving environmental quality, and improving economic competitiveness are a strong motivator for changing the way transit planning and land use planning are conducted. Champions are needed to lead the way—to get the attention of stakeholders, motivate them, and work to build consensus.

Section 2A is divided into four parts:

- Getting to a Successful Project: The Need for Leaders and Champions
- Major Planning Issues Associated with Promoting Transit-Supportive Development and the Roles of Champions
- Strategies for Identifying and Engaging Champions
- Case Studies and Lessons Learned by Individual Champions

Getting to a Successful Project: The Need for Leaders and Champions

On the surface, integrating transit planning and land use planning and implementing successful transit-supportive developments perhaps do not appear to be complex processes. In fact, they may seem to require a common sense approach: work together; decide on a regional vision; implement plans at the regional, corridor, and local levels; and construct a series of successful, complementary projects. However, in reality, the need for leaders and champions becomes clear after recognizing that planning and constructing transit lines, stations, and transit-supportive developments require considerable time to reach fruition, that a myriad of agencies and organizations have to agree on both a plan and the priorities that change resource allocation, and that local governments have to enact changes and take more active roles.

In looking at the regions in the United States that have successfully integrated transit planning and land use planning, it is clear that what they have in common is strong, committed, and sustained leadership. Leadership can be realized in several ways:

- **Every project needs champions**. Champions are individuals who step forward—who visualize possibilities, explain them, turn them into reality, and guarantee long term results with long term commitment. Champions from the public, private and not-for-profit sectors are needed to get the process started and to build consensus. When champions from all three sectors work together (e.g., mayor, developer, and president of the Chamber of Commerce), it ensures a broad constituency and builds influence and a compelling "story." Ideally, a public champion should be a political leader with a constituency and a positive reputation who can galvanize support and lend direction to the process. Successful champions are often mayors, legislators, regional government officials, and council members who approach

planning and development with a unique perspective, who are willing to exert positive influence and enthusiasm, and who are committed to stay the course throughout the process. While champions are needed from all three sectors, it is obvious from examining successful transit-supportive developments that without a public champion, success is virtually impossible (Utter 2009).

- **Leaders from different agencies and organizations are needed**—including the executive directors and senior management of transit agencies, MPOs, and regional planning agencies and organizations who are responsible for carrying out the visions and directions that result from the consensus achieved by the champions. These leaders are needed to make critical decisions, such as determining the need for alternative alignments to encourage connections between strong regional centers and selecting alignments more conducive to transit-supportive development.
- **Professional regional and local planners, engineers, and transit specialists are needed** to move plans forward, put the technical pieces in place, and provide technical support to the champions. Their familiarity with "best practice" solutions and innovative methods help ensure that the ultimate vision is carried out.

Transit-supportive development is conventionally categorized as a local land use issue, when, in fact, creating the necessary physical, financial, and regulatory infrastructure to support this type of development ranges from federal to local actions. There are actions that must occur at every level of government to bring coordinated and comprehensive planning to fruition, which requires strong leaders and champions who are willing to work through a multitude of challenges. It makes sense for MPOs and other regional planning organizations to play pivotal roles since they are in a position to coordinate alignment among federal, state, and local governments, all of whom must play major roles to ensure that successful transit-supportive development occurs at a significant rate to produce sustainable communities.

To align the visions, decisions, and investments within a region, MPOs employ different tactics, including education, grant funding, planning support, stakeholder coordination, and public outreach. However, the importance of finding, situating, and supporting champions is often overlooked by MPOs. Despite the frustration many MPOs express about their lack of direct authority and adequate funding, they know the stakeholders throughout a region; they have access to systemic processes and can see the "big picture" better than any of the other players. Transit-supportive developments happen only when the multitude of decisions made by many people are focused on a common outcome. MPOs are uniquely situated to help attract and support champions to guide strategic decisions from regional visioning, through corridor planning, to local implementation of transit-supportive developments.

Major Planning Issues Associated with Promoting Transit Supportive Development and the Roles of Champions

There are many critical issues that affect the process of planning and implementing a transit system, and integrating land use considerations. Opportunities exist at each of these junctures for champions to provide direction, encouragement, influence, support, and strategic decision-making. Following is a discussion of several of these issues and the roles of champions. Table 2A-1 indicates the planning level at which champions are typically needed for each issue.

Table 2A-1

Major Issues and Appropriate Champions

	Major Planning Issues Affecting Transit-Supportive Development	Levels at Which Champions Are Needed		
		State	*Regional*	*Local*
Regional Issues	A region needs a Vision Plan to provide a blueprint for the future, factoring in several goals which include transit-supportive development aligned with the transit system.	✓	✓	✓
Corridor Issues	Priority should be given to transit corridors that connect the strongest regional centers.	✓	✓	✓
	Stations should be sited with easy access to the local street network.	✓	✓	✓
Local Issues	Transit-supportive development regulations should be enacted that make public/private partnerships, financing options and land use controls possible.	✓		✓
	The character of transit-supportive developments should match the community vision and goal.			✓

A region needs a Vision Plan to provide a blueprint for the future, factoring in a myriad of goals that include transit-supportive development aligned with the transit system.

Our growing national emphasis on coordinated planning between federal agencies with previously separate missions has become a major factor. As regional planners look forward, there is every reason to believe that multi-faceted regional plans will soon be a prerequisite for major infrastructure funding.

A major challenge for MPOs in creating effective vision plans is obtaining support and commitment from the local governments responsible for enacting transit-supportive development policies and zoning. Champions from the business community and not-for-profits can play key roles in developing the needed support.

Priority should be given to transit corridors that connect the strongest regional centers.

Encouraging transit alignments that connect strong anchors such as job clusters, downtowns, regional destinations, and future growth centers increases both transit ridership and the market for transit-supportive developments. The best way to reach this objective is to develop regional vision plans that reflect multiple goals, formulate those goals in the corridor plans, and include the local communities in these planning efforts. Including local communities in regional and corridor planning gives the communities an early opportunity to alter comprehensive plans and zoning ordinances, and implement infrastructure improvements that are conducive to attracting transit-supportive development.

Stations should be sited with easy access to the local street network.

Placing stations in areas where there is only single-street access or where streets cannot be built is not conducive to transit-supportive development or pedestrian movements. Situating stations so they function for rail and are also accessed by a strong street network is critical. Commercial development, especially retail, is largely dependent on access to active streets.

Transit modes that support desirable developments should be considered.

Certain transit modes support diverse land uses and attract positive development around stations more than others. Light rail, streetcar, and dedicated right-of-way BRT are considered the most supportive because 1) they generally provide more frequent and all-day service, which attracts more users to both the transit service and to the nearby land uses and developments, and 2) the vehicles associated with these modes are less intrusive than commuter rail cars and more compatible with mixed-use development and pedestrian places.

Transit-supportive development regulations should be enacted to make public/private partnerships, financing options, and land-use controls possible.

Transit-supportive developments are challenging for a number of reasons. This type of development is widely considered by the real estate industry to be the most difficult and expensive to bring to fruition. Most attribute at least a 20 percent premium to this type of mixed-use development, with extensive payback time (Utter 2009). Mixed-use developments are viewed by lenders as riskier than more traditional single use projects. Government support, whether financial or through modifications in zoning regulations, is a key element in attracting developers to build high densities and mixed-uses near transit.

States can play a key role by enacting legislation that permits the creation of special districts that grant localities the right to use financing instruments (such as tax increment financing) that help implement transit-supportive developments.

Local governments can use funding strategies such as tax increment financing, special district funding, and fee waivers to help fund infrastructure and the public amenities designed to work in concert with private transit-supportive development.

Local governments can support these types of developments through amendments to zoning ordinances that permit higher densities and mixed use, and related strategies such as expedited permit approval, development incentives, and infrastructure improvements. It is important that these local government actions be established before development begins. Experienced private developers are attracted to communities where the regulatory and physical infrastructure supports are already in place to promote transit-supportive developments, which facilitates the development approval process.

The character of transit-supportive developments should match the community vision and goal.

For transit-supportive developments to become neighborhoods and town centers, the developments need to reflect the culture, values, societal needs, activities, and preferences of the community. Developers often try to minimize their financial risks by standardizing projects. For that reason, local champions are important since they understand their community culture, and the context needed for creating new neighborhoods. These champions are crucial for local support and the market success of the development.

Strategies for Identifying and Engaging Champions

Some of the fundamental strategies to assist MPOs, regional planning organizations, and others interested in identifying and engaging champions are provided below. These strategies are based on the review of successful efforts in the United States, including those in the case studies below.

Determine champions.

MPOs should develop an understanding of the status and issues of transit initiatives and the types of champions needed, and determine if champions are already in place. Potential champions can be found by meeting with local elected officials, hosting informational sessions with innovative developers, briefing the business community on potential economic development benefits, and conducting outreach with local planning boards. Encouraging someone to step up and take the lead is often all it takes to inspire a potential champion.

Identify a personal "hook."

The best champions have personal passion behind their advocacy. The personal relationships and broad networks that MPO board members and staffs have within a community are valuable in finding the needed leadership for these projects.

Publicly identify champions.

Publicly name and label champions, give them support, and publicly acknowledge their contributions and victories. Once publicly identified, champions tend to gather strength, energy, and commitment.

Develop a clear and well defined transit-supportive development message.

It is essential that the message be understandable and valuable to a large constituency. Images, key messaging, numbers, quantified results, and benefits need to be carefully planned and consistent. Since there are many challenges in implementing transit-supportive developments, performance outcomes are often the best way to explain the objectives, choices, and support needed.

Provide a connection for the principal champions.

It is important for champions to communicate frequently, collaborate closely on goals and agendas, and trust each other. Engaging champions through small task forces or committees that meet regularly can provide information, support, and inspiration. While large group meetings are part of the routine for many champions in their professional lives, the small intimate meetings are where many champions draw their energy, develop strategies, and stay connected to the cause.

Select principal champions who cover a broad range of interests.

Select champions from the public, private, and not-for-profit sectors. The private sector often brings funds and credibility, the public sector offers political savvy and support, and, the not-for-profit sector is able to mobilize large numbers of people and communicate to a broad network.

Identify transit-related development leaders from all of the principal organizations.

MPOs, transit agencies, redevelopment agencies, environmental groups, and chambers of commerce – These leaders will be the key points of contact regarding transit-supportive development issues within their organizations and will routinely coordinate with the other point people. This group of core leaders can expedite

information gathering for developers, keep each of the agencies attuned to opportunities and challenges, and build a strong network to support worthy projects.

Make sure there is a business case supporting investment in the transit-supportive developments.

Most major initiatives benefit from business community support. When elected officials are called on to make investment and approval decisions regarding transit-supportive development, the business community provides justification and support. A credible, articulate, and influential business voice must be part of the champion mix.

Form a not-for-profit transit and transit-supportive development advocacy organization.

These groups are dependable and educated supporters of new transit and transit-supportive development concepts, and can generate political, financial, and technical support.

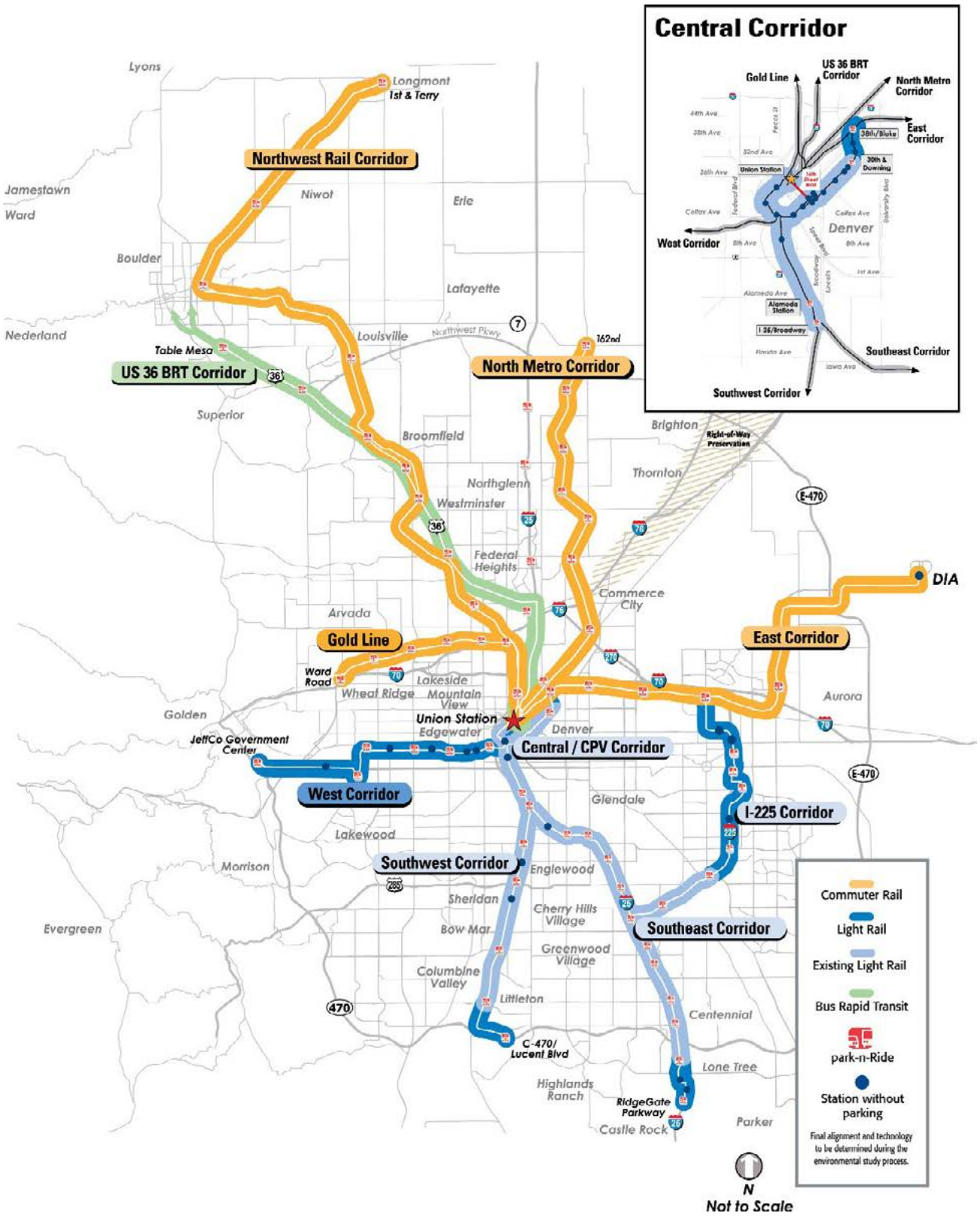
Case Studies and Lessons Learned by Individual Champions

There is no standard definition of who can be a champion. Champions can be elected officials, business leaders, community activists, and citizens. But all are driven by the desire for a specific end result, and the willingness to dedicate their time, energy, resources, and reputation to see it through. The champions highlighted below include a business leader with experience in the role of champion, a mayor who saw a need and created a committee of champions, a bookstore owner whose initial concern regarding transit construction disruption to businesses turned into a passion for street car implementation, and an MPO director whose new vision was not "business as usual."

Case Study 1: Campaigning for Denver's FasTracks

A champion was needed when Denver wanted to construct a new rail corridor transit system (see Figure 2A-1) using local sales tax revenues rather than waiting for federal funds. While a regional vote to increase sales tax was necessary, a similar initiative, called "Guide the Ride" had failed several years earlier. A new approach was needed to allow the region to become the first in the country to use local funding for a transit system.

Tom Clark, Executive Vice President of the Metro Denver Economic Development Corporation (EDC), became that champion. Affiliated with the Metro Denver Chamber of Commerce, the EDC (a separate corporation) is dedicated to attracting jobs and supporting the economy of the region. Mr. Clark had a successful track record of identifying bold, important projects needed in the region, raising private capital to assist with implementation, and playing an active role in ensuring success.



Source: http://www.greenprintdenver.org/images/rapid_transit.gif

Figure 2A-1 *FasTracks System Map*

Creating the Campaign

In an effort to get voters to approve a sales tax increase, Mr. Clark recognized that a campaign to educate voters was needed, and funds to run the campaign were essential.

- **Securing funds** – The EDC raised $1.6M from private sources to assist in campaign activities. Mr. Clark indicated the primary lesson was "be the first money in."
- **Establishing a core leadership team** – Mr. Clark collaborated with the Regional Transportation District's (RTD) General Manager Cal Marsella and RTD Board Chair Mary Blue. Under their guidance, a campaign manager, Maria Garcia Berry, was selected and hired by the FasTracks campaign (a separate not-for-profit). These four individuals became the core leadership and brainpower behind the campaign.
- **Laying the groundwork** – Mr. Clark agreed to use $750,000 of the EDC funds for early polling to ascertain how transit was perceived and what aspects were most valuable to the community. The most important community concerns were about jobs—the mobility to get to jobs and the infrastructure to attract new jobs. This community need was in line with the EDC agenda. Still, Mr. Clark also had to convince his board that expenditure of funds for this campaign was critical. There was little corporate memory of the lessons learned from the "Guide the Ride" failure, so Mr. Clark engaged two key executives of his board and heads of a local bank and global engineering firm, who took the lead in recounting past mistakes and explaining the importance of the current FasTracks effort.
- **Getting the message out** – EDC funds were targeted to create ads and hire economists to quantify the potential economic impact of FasTracks. The early EDC funds placed Mr. Clark squarely in the middle of the campaign strategy team. He became a powerful advocate for the FasTracks vision, ultimately contributing more EDC funds and raising funds from other sources for a campaign total of $4.5M. "Early money is like yeast." Mr. Clark said, knowing that, particularly in the private sector, money follows money and the power of financial contribution is enormous.

  Mr. Clark met with dozens of regional mayors and councils to explain why the EDC was championing the FasTracks project, the impact it would have on local jurisdictions, the messages from the polling, their confidence in the campaign, and the need for other champions to join the cause.

  One organization that was vital to the support of FasTracks was the Metro Mayor's Caucus, a group of 37 mayors who meet regularly to discuss the electoral politics of public policy—regional issues with political overtones. Unanimity is the cornerstone of this group (i.e., one "no vote" on any issue

is the demise of support for that issue). The Metro Mayor's Caucus publicly supported FasTracks and that support has never waivered.

Seeing Results

The local MPO, DRCOG, the Metro Mayor's Caucus, several Colorado counties, and virtually every local jurisdiction supported the FasTracks vote. It passed 52 to 48 percent in the 2004 election, and construction immediately started.

Roadblocks

In 2007, with commodity prices soaring and sales taxes starting to slow, the project ran into budget shortfalls and the estimated price soared from $4.7 to 7.2B. Over the course of two years, with market upsets and RTD general manager changes, the gap was cut to $2.0B. RTD's new general manager was actively advocating a new sales tax increase ballot in 2010, and the RTD Board was leaning in that direction. Mr. Clark was back in the mix of key decision makers, painfully aware of the challenges facing FasTracks and recognizing that the success of his EDC agenda largely hinged on the success of FasTracks. He was aware of the community's mood in the midst of the economic downturn and of other ballot initiatives coming up in November 2010. Mr. Clark knew the consequences of getting a "no" vote. It came down to the question of whether there would be funds to pull off another miraculous campaign and vote. Mr. Clark made the decision to delay the vote. He met with all the players, explained his loyalty to the project, helped them formulate back-up plans, and committed to run the campaign as soon as feasible, likely 2012.

At this writing, Mr. Clark continues to be a critical champion in the bold FasTracks vision. He let it be widely known that his personal and professional reputation was tied to the success of the project. He has educated and empowered countless others in the effort, and has skillfully used the resources he controls to keep the project going.

Lessons Learned

- Identifying funding sources early and leveraging already secured funds is essential for success.
- One person cannot do this alone. Assemble a team of forward thinking and dedicated community members who have a stake in the successful implementation of the project.
- Educating the public early and often is critical in gaining support.

Case Study 2: Strategically Building Support for the Charlotte Area Transit System

Pat McCrory did not run on a platform of transit when he was elected mayor of Charlotte in 1995, but he realized shortly thereafter that a better public transit system was needed (see Figure 2A-2). Five future transit corridors had been identified. Selection and construction of the first corridor needed a champion.

Assembling the Champions

Mayor McCrory's first order of business was to establish the Committee of 10, a group of recruited, multi-sector champions. He strategically assembled highly-regarded and influential leaders from businesses and neighborhoods, and limited the group to 10 people—large enough to represent a cross-section and small enough to be functional.

Choosing the Right Alignment

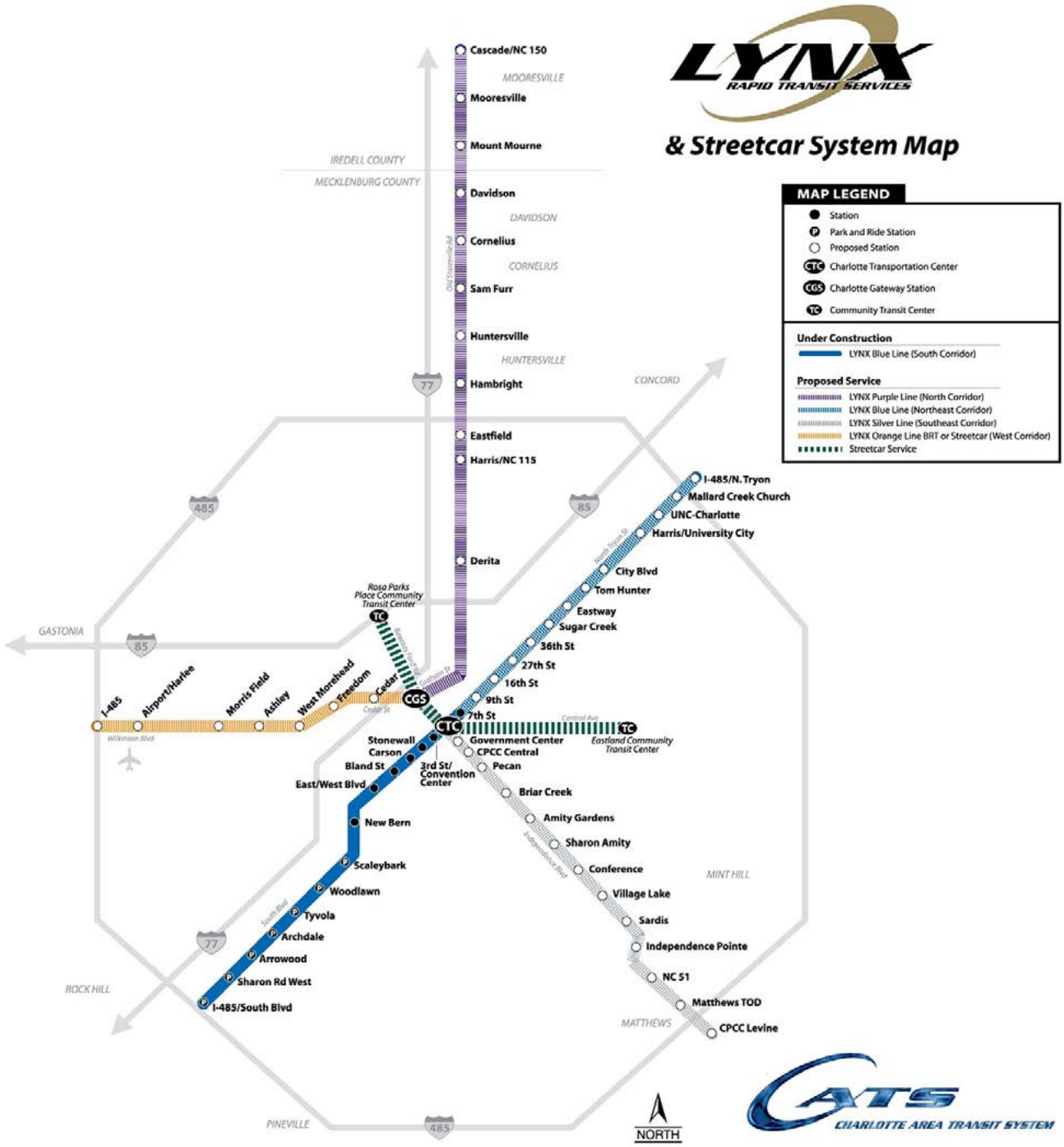
In an effort to understand transit alignment issues, the mayor visited cities with similar growth patterns (Atlanta, Miami, Denver, Dallas, Portland) to ascertain lessons learned. A major lesson learned was that cities frequently selected alignments based on political or community pressure rather than expert analysis. Mayor McCrory and the Committee of 10 brought major lessons learned to their constituencies, and as a result, he was able to overcome political pressures that arose. He advocated for the South Corridor, which transportation experts recommended because it contained the most density to support ridership.

Extolling the Benefits of Transit

Recognizing that a new rail system and an existing bus system would not thrive without riders, the mayor and the Committee of 10 embarked on a campaign to encourage public transit use. Once again, Mayor McCrory recruited champions, this time from the business and development community. They conducted hundreds of talks in suburban communities extolling the benefits of transit —safety, reliability, cost-effective, and clean. They promoted the economic importance of transporting workers to downtown Charlotte jobs and the potential for new development in the corridor.

Putting the Local Pieces in Place

Mayor McCrory worked with the City staff and the City Council to establish local land use incentives to support transit-supportive developments. They established a system of development bonuses for density, which in turn allowed developers to include affordable housing. They also reduced parking requirements and changed zoning codes to encourage infill redevelopment.



Source: Charlotte Area Transit System (CATS)

Figure 2A-2 *LYNX & Streetcar System Map*

Perseverance

Mayor McCrory understood that champions need to remain committed to the cause. During construction of the rail line, cost overruns occurred as a result of the China steel crisis. He defended the project, despite enormous personal criticism: "During the construction, talk radio was calling the line 'the McCrory Line.' And it was not a compliment" (Benmar 2010).

A referendum to rescind the half cent sales tax funding the transit line occurred just two weeks before it opened. It was defeated, but it strengthened the mayor's resolve to stay committed to the project.

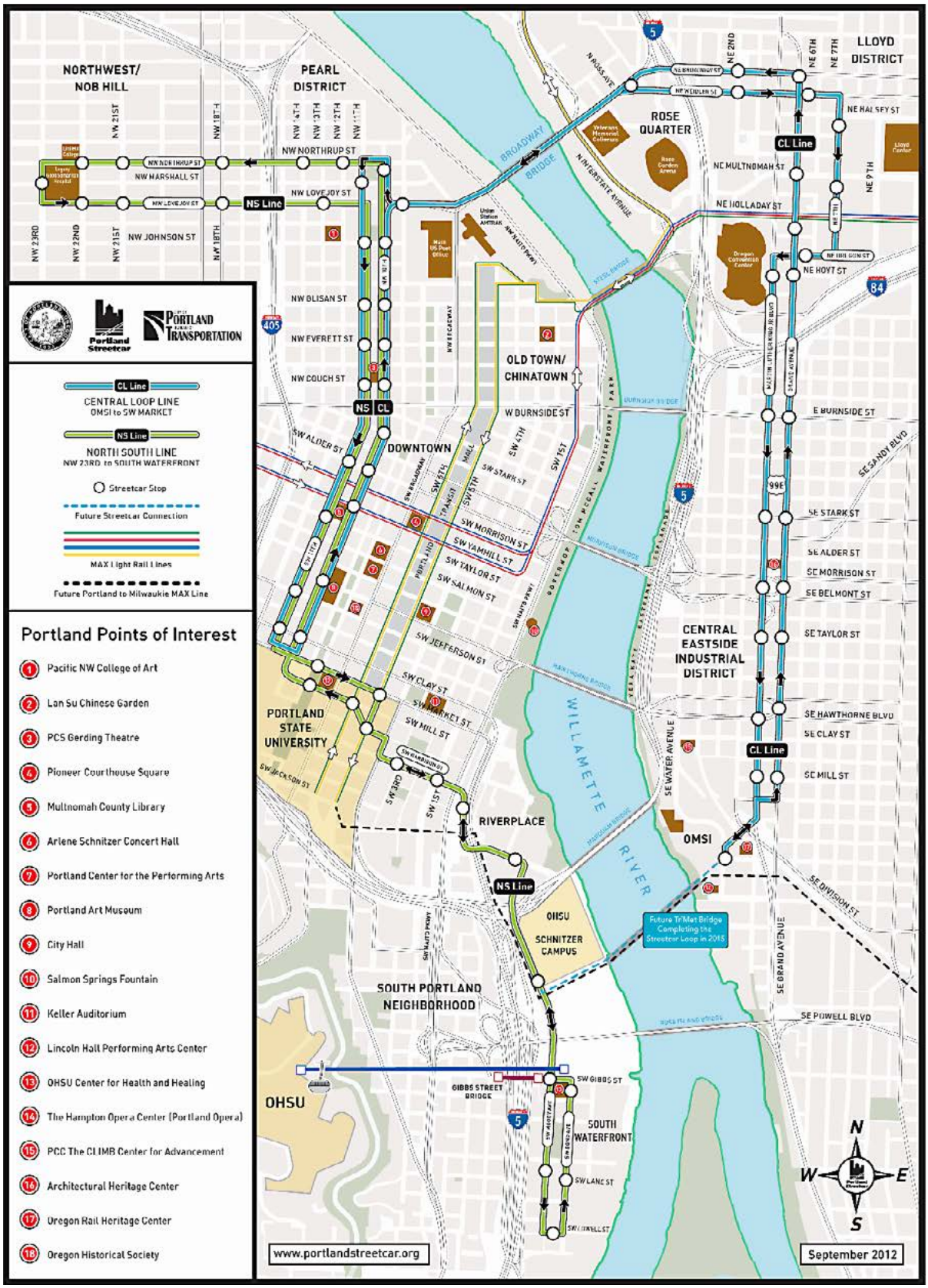
Lessons Learned

According to Mayor McCrory, the transferable tools used to champion the Charlotte Area Transit System included the following:

- Assemble a bipartisan team of business and community activists.
- Clearly and effectively articulate the long-term vision.
- Take the politics out of determining transit routes

Case Study 3: A Streetcar and a Community's Desire—the Portland Streetcar

Michael Powell, owner of a nationally-known bookstore that is one of downtown Portland's major tourist destinations, did not set out to be a streetcar champion. When asked by a small group of business owners to attend a meeting regarding the potential for a streetcar system that would run near his business, he immediately accepted. But his interest was based on concern about the negative impacts such construction could have on his business and the older industrial area in which he was located. He was not inclined to be a supporter. The informal meeting included several businessmen (two bankers, a visionary real estate developer, and a public sector consultant) and centered on a proposal for a downtown circulator from a decade-old city plan. Mr. Powell quickly learned about streetcars, including the fact that construction is faster and vastly less intrusive than light rail and that the economic development benefits to neighborhoods could be substantial. He agreed to help them work towards implementing the project.



Source: http://portlandstreetcar.org/node/4

Figure 2A-3 *Portland Streetcar Route Map*

Portland Streetcar, Inc.

The City's transportation department and transit agency (Tri-Met) were not opposed to the concept, but they were fully engaged in other projects and felt funding for this new venture would not be available. They charged the fledging volunteer group with developing a feasible funding and implementation strategy. The private group incorporated themselves as Portland Streetcar, Inc., (PSI), a nonprofit organization. As PSI moved forward, it used several classic strategies for building advocates and champions:

- **Build a board comprising geographically-dispersed stakeholders from every sector** – The PSI board included the heads of Tri-Met, the City's transportation department, the mayor of Portland (and later the mayor of Lake Oswego as the line was extended), key property owners along the line, utility companies, neighborhood representatives, business leaders, and anchor users such as the Museum of Science and Industry. The inclusion of public sector leadership was initially motivated by the thought that they needed their support on the project. The general manager at Tri-Met saw opportunity, although his middle management ranks were distracted in a turf war over bus vs. light rail. The transit agency was not eager to take on a third mode (streetcar) and called it the "Donkey Trolley." The head of the City's transportation department, however, was an entrepreneurial spirit and willing to consider the project. The mayor was also intrigued and open to the concept. The PSI board met regularly, established officers, and benefitted from a clear mission and a professional executive director. As the PSI board grew from 6 to 15 members, Mr. Powell could sense that the project was gaining momentum: "When that many people donate that much time, you know something is going to happen" (Powell 2010).
- **Follow the money** – The streetcar construction budget of $42M was daunting, so PSI "followed the money." They found private stakeholders whose problems could be solved by a streetcar. Both Portland State University and Good Samaritan Hospital were located on the proposed line, both had parking shortages, and neither was going to receive municipal funding for additional parking. By participating in the streetcar project, they cut their need for parking and gained important City support for a comprehensive solution. Accordingly, both became project funders and major supporters of the project.
- **Build neighborhood support** – PSI recognized the need for community advocates. It established a 20+ member Citizens Advisory Committee that met frequently and was included in many major aspects of the project. Specifically, it weighed in on which mode to use (modern, low floor vehicles, not historic trolleys) and which alignment to choose. Both the PSI Board and the Citizens Advisory Committee conducted hours of meetings and educational forums with neighborhoods, funders, businesses,

and elected officials explaining the benefits and details of streetcars vs. light rail or buses. They traveled to the Czech Republic to inspect potential vehicles and built a strong committed bond in the process.

Results

PSI and the City devised a plan to use local funds (parking revenues, property tax assessments, and other sources) for construction of the Portland Streetcar. Mr. Powell reports that as State and FTA funds were not used, the process of implementing the streetcar system was simplified.

Initial ridership was projected to be 1,700 trips/day, but the Portland Streetcar realized 2,500 trips on opening day, and in 2010 it carried 12,500 trips/day. Figure 2A-3 shows the Portland Streetcar route in 2011. One neighborhood adjacent to the Portland Streetcar—the Pearl District—has flourished with strong land price appreciation and compact, high-quality urban neighborhood development. Part of the reason for this neighborhood's development success is the streetcar and the careful decisions made by its champions.

Continued Commitment

Mr. Powell is still involved with PSI. He has served as chairman of the board and is eager to see the streetcar extension to Lake Oswego now underway. He is often asked to travel to other communities or host visitors to talk about his passion and lessons learned. When asked why he has stayed so active for so long (as great champions do) he answers, "A lot of it is personal relationships. These are now dear friends on the board. It is fun to work with quality people and to see so much progress. It takes a lot of time, I know, but we generated a real product, a train I can see outside my window every day, instead of just another plan" (Powell 2010).

For more information on the Portland Streetcar, refer to the following sections of the Guide:

- "Case Studies in Corridor Planning, Portland Streetcar"
- "Case Studies in Station Neighborhood Planning for Transit-Supportive Development Portland Streetcar: The Pearl District"
- "Non-Federal Funding and Financing Sources for Major Public Transit Projects"
- "Funding and Financing Transit-Supportive Developments"
- "Economic Benefits of Transit-Supportive Development"

Lessons Learned

Mr. Powell indicated the following lessons learned in championing the Portland Streetcar:

- Historically, state and federal monies are targeted to moving commuters from the suburbs to the city (not around the city once they arrive). Hence, FTA and state funds tended to favor commuter rail and light rail. Streetcars traditionally required alternative funding strategies and strong advocates.
- It is essential to have public-private partnerships. The public sector brings resources, and the private sector brings credibility.
- The private sector is not inclined to believe that simply creating a good plan is enough. They bring a skill set oriented to its execution and implementation—another benefit to public-private partnerships.

Case Study 4: Creating and Implementing New Regional Visions: Capital District Transportation Committee, Albany, New York

Due to a decline in manufacturing jobs, the Albany metropolitan area has experienced little growth in recent years. Growth in health care and education sectors and stability in state jobs related to Albany's designation as New York's capital has barely made up for the loss in other job sectors. Despite this, the area is an outstanding example of good planning practices and has been cited by several national researchers, FTA, and the Federal Highway Administration (FHWA). Observers give credit to the leadership of John Poorman, long-time staff director for the Capital District Transportation Committee (CDTC), the MPO for the region.

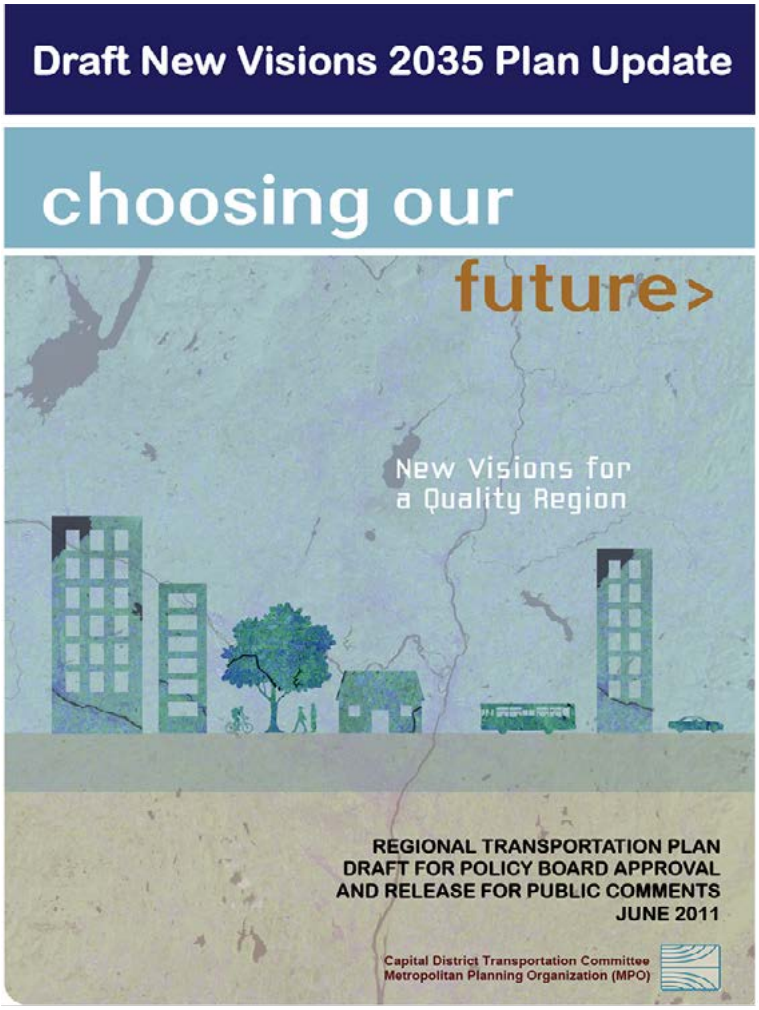
The CDTC is one of three key regional agencies. It occupies an office just down the hall from the Capital District Regional Planning Commission (CDRPC), which acts as the comprehensive planning agency and has close working relationships with the Capital District Transportation Authority (CDTA), which operates transit within the region. CDTC has also fostered an excellent working relationship with planners from the New York State Department of Transportation (DOT). All of these agencies have benefitted from the leadership of the CDTC.

New Visions: Long-Range Plan Development

One of the most noteworthy achievements of the CDTC is its long-range plan, New Visions for the Capital District, adopted in 1997 and updated regularly since then (see Figure 2A-4). The majority of long-range transportation strategies and new capital project initiatives in the region continue to be generated through the MPO forum and the processes of plan development.

Figure 2A-4

Draft New Visions 2035 Plan Update



Source: http://www.cdtcmpo.org/rtp2035/summary.pdf

In approaching the New Visions effort, the CDTC decided that it was time to focus on where the Capital District wanted to go over the next 25 years in terms of economic development, land use, mobility, and intermodal integration. The CDTC envisioned this exercise to be a meaningful process, a change from "business as usual." Substantial public involvement was a key component. Nine task forces were established and charged with five overriding considerations: safety, land use, environmental impact, resource efficiency, and social justice/equality. The task forces, supported by the CDTC staff, were composed of interested parties (citizens and groups) and policy board members. Many of the participants were stakeholders who had never been invited to sit at the planning table with the CDTC or other transportation organizations. For example, the Freight Task Force included representatives from the railroads, the airport, the port, Conrail, UPS, and the New York State Motor Truck Association. The Urban Issues Task Force included the Urban League, the Council of Albany Neighborhoods, and church representatives.

The New Visions Plan started with the issues of economic development and land use and worked across all task forces to ensure that the transportation plan adopted would foster and build strong urban, suburban, and rural communities, enhance the quality of life in the region, and result in real improvement in transportation functions, with basic system preservation needs met first. These were not just words on paper, but specific actions spelled out with identified means of measuring progress.

The New Visions Plan used an atypical approach to implementation by focusing on annualized implementation budgets for 17 categories of planning, capital, operations, and maintenance across highway, transit, and intercity transportation modes. Since 1997, the CDTC has used (and updated) these budgets to identify the differences between intended investment patterns and actual investment patterns. Available funds in the CDTC's Transportation Improvement Program have been steered primarily to fill these gaps. This has led to significant investment in Intelligent Transportation Systems (ITS), Transportation Demand Management (TDM), land use planning, bicycle and pedestrian projects, and system preservation. Consideration of additional highway capacity projects, typically a mainstay of MPO programs, has taken a back seat in order to address deficiencies in the annual budgets for other plan elements.

After 15 years, the policies of the plan and its implementation tools have become integral to planning and programming considerations at both the CDTC table and throughout the region.

Converting the Promise of Sound Land Use Planning into Reality: The Linkage Planning Program

The Linkage Planning Program was established by the CDTC as an implementation strategy of the New Visions Plan. The CDTC determined that a significant portion of its federal planning funds should be used to help integrate land use and transportation decisions by local governments and transportation agencies. Since 2000, the CDTC has provided staff and private consultant support to cities (and others) to support local community planning initiatives. These initiatives include improved land use plans, highway and transit designs, zoning ordinances, bicycle and pedestrian accommodations, and driveway and sidewalk development standards.

The core of the CDTC regional land use and transportation policy, as adopted in the Long-Range Plan, is reflected in 10 strategies and 31 adopted principles. The policy thrust is that good site and community design can help realize the region's goals, and that transportation actions will play a role. The CDTC established the Linkage Planning Program to provide funding to convert the promise of sound land use planning into reality. The CDTC encourages submissions for funding from local agencies and groups and provides guidance by asking them how their proposed planning will support these seven strategies:

1. Support urban revitalization and redevelopment of existing commercial and residential areas.
2. Improve street connectivity and reduce driveway conflicts.
3. Enhance and develop activity centers and town centers.
4. Enhance and develop transit corridors and transit-supportive built environments.
5. Encourage a greater mix and intensity of land uses.
6. Develop bicycle and pedestrian friendly design standards.
7. Create an integrated multi-modal transportation network.

While many metro areas seek to engage in integrated land use and transportation planning, the CDTC's example is different for several reasons. First, the scale is impressive—65 separate studies in more than 33 individual municipalities, totaling nearly $4M. This alone has allowed the MPO to establish substantial on-the-ground public participation and integrate its regional policies into local plans throughout the region. Second, the structure is innovative—the MPO staff manages the contract; study objectives are both local and regional; and, state and regional agencies participate with local representatives in every study group. Finally, the results have been noticeable—local ordinances have been changed and capital project submissions to the CDTC are now nearly universally derived from the Linkage Planning Program. Several outstanding examples of planning and implementation resulting from the Linkage Program are available.

Colloquy on the Coming Transformation of Travel

In 2005, John Poorman, staff director for the CDTC, worked with the New York State MPOs, FHWA, and the USDOT Volpe Transportation Systems Center to fund, plan, organize, and conduct a two-day colloquy (workshop) in Albany to explore the implications of changes in demographics, the economy, the housing market, the requirements of energy and climate change, and the impacts of globalization on urban development and transportation. Thirty-one leading researchers and thinkers in the fields of economics, urban planning, transportation, and public policy from across the United States, from academia, consulting, government and industry were brought together to produce recommendations for MPOs, transit and highway agencies. Six years later, the recommendations of the colloquy continue to provide an agenda for MPO capacity building nationwide and reflect the CDTC's approach to planning.

Integrating Transit and Land Use through a Corridor Study

In the New Visions Plan, the CDTC identifies the most important transit corridor in the region to be between its two largest cities, Albany and Schenectady. The CDTC determined that the corridor's potential for integrating transportation and land use planning made it the most important in the region for achieving the regional objectives of urban revitalization, modal choice, VMT (vehicle miles of

travel) management, and equity. This determination was made despite growing congestion in the I-87 corridor between Albany and Saratoga County, the region's radial growth corridor.

The CDTC proposed, sponsored, and led a 17-mile corridor study of land use and multimodal transportation alternatives, in partnership with the NYSDOT, the transit agency, and four municipalities.

Such multi-modal corridor studies are not typical for MPOs. Most corridor studies are sponsored by the state DOT or by the transit agency, with a presumed preferred alternative at the beginning, even if alternatives are explored. It is relatively uncommon for the MPO to be involved. In this case, the CDTC study resulted in selection of the bus rapid transit alternative and a definition of feasible land use patterns. Implementation planning was then turned over to the transit agency, CDTA, which embraced the bus rapid transit project as its central strategic project. Supportive land use planning has continued with the municipalities through the Linkage program.

Lessons Learned

According to John Poorman, the following lessons learned are critical to success:

- Get all players on the same page – Signal prioritization for BRT will not occur until traffic engineers are on board. Transit-serving land use patterns will not occur until developers are willing to be flexible. Establish clear policies at a regional level and remember that it takes time to gain the support of the agencies needed for implementation.
- Create compelling plans that are flexible enough to have a sufficient shelf life – The CDTC has cast its policies as self-evident, reflecting broad, intelligent consensus. Seeking wide support for such policies provides the best chance to sustain implementation activities through the ups and downs of fiscal conditions and through changes of agency leadership and municipal administrations. At the same time, flexibility allows specific projects to emerge in a form that reflects objective analysis, public input, and real-world conditions.
- Celebrate achievements – A shift from an "us-them" perspective to "us" is essential to implement highway, transit, and land use actions that are mutually supportive. Routinely commend signs of support and celebrate steps by each and every player that reflect mutual goals.

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B. Transit-Supportive Development Regulatory Tools

Prepared by:
New Jersey Institute of Technology

Visions, goals, and good intentions toward creating more sustainable communities through planning for transit-supportive development are all vital components of success; however, a legal framework that enables and encourages transit-supportive development is critical. Regulatory tools can serve a number of purposes, including restricting growth in one area and redirecting growth to another, allowing more intense and varied growth, promoting partnerships between the public and private sectors toward a common goal, and providing funding and financing. Regulatory tools also allow for a new paradigm in an effort to preserve the environment, reverse negative environmental impacts, and improve quality of life.

A multitude of transit-supportive development regulatory tools have been enacted by state, regional, and municipal governments. This section of Guide focuses on a few regulatory tools that have proven successful in several regions of the country. Regional regulatory tools include urban growth boundaries and urban service districts which serve to concentrate growth within a regional boundary. On the local level, transit-supportive/oriented/related districts generally focus on areas within ½ mile of transit stations/stops; local zoning tools allow for more concentrated growth near transit stations/stops. Design standards or guidelines allow a community to control its appearance by governing elements such as site planning, densities, building heights, and pedestrian amenities. Real-world examples of these regulatory tools are provided.

For more information on legal mechanisms for funding and financing, and public/private partnerships, refer to the "Funding and Financing Public Transit and Transit-Supportive Development" section of the Guide. For more information on how specific locales used regulatory tools to encourage transit-supportive

development, refer to "Case Studies in Corridor Planning" and "Case Studies in Station Neighborhood Planning."

Examples of Regional Regulatory Tools

Although urban growth boundaries and urban service districts do not directly relate to transit-supportive development, these tools can set the stage for planning that recognizes a region's desire (and need) to control and perhaps redirect growth.

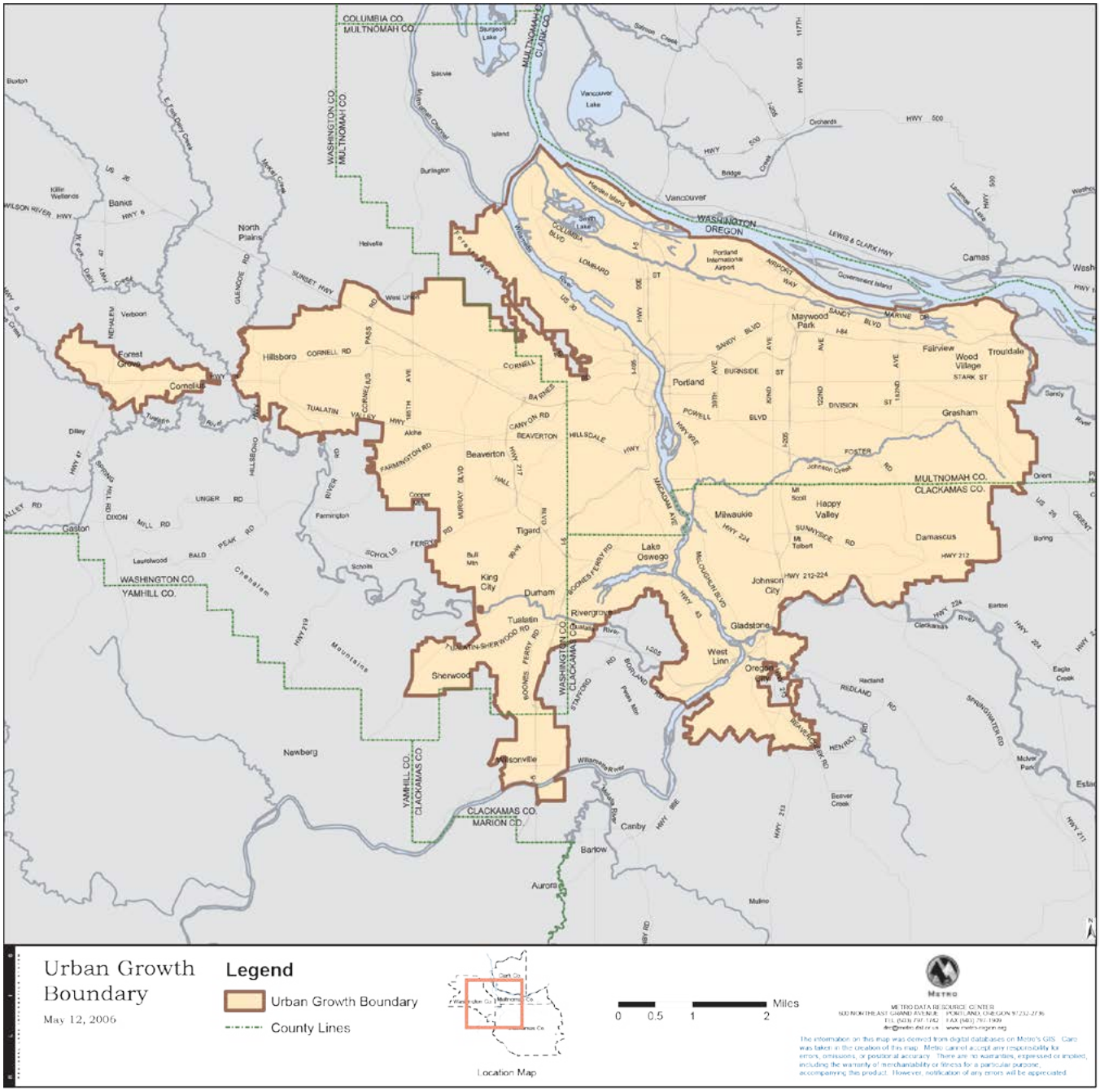
Urban Growth Boundaries (UGBs)

An Urban Growth Boundary (UGB) is a dividing line between two areas—one where growth is desirable and will be concentrated, and one where growth is undesirable and will be restricted to protect and preserve environmentally-sensitive areas. A UGB can be a single demarcation of an urbanized area for concentrated growth or can take the form of a tiered system in which sub-areas of varying growth degrees are designated. A UGB is a growth management tool used by the public sector to proactively curb sprawl and protect environmentally-sensitive areas by promoting compact development patterns, thus creating compact, mixed-use, walkable, sustainable communities. A UGB can be designated by a state, regional, or local government and is usually enacted after voter approval. As noted in the "Case Studies in Corridor Planning" section of the Guide, some UGBs are voluntary. Both the San Francisco Bay Area and Denver areas have established voluntary programs based on the strong support of regional planning agencies and local governments. The Focus program in the San Francisco Bay area established Priority Development and Priority Conservation Areas. The Denver Regional Council of Governments (as part of its Metro Vision 2035 Plan) established the UGB area around the designation of 70 high-density urban centers.

Various legal mechanisms such as zoning are used to enforce the goals of the UGB.

Portland's UGB

In 1973, the state of Oregon established the nation's first comprehensive land use planning system, which called for adoption of defined urban growth boundaries. UGBs are required by State law to contain an adequate supply of buildable land to accommodate expected growth during a 20-year period. The Metro Regional Government (Metro) is responsible for managing the Portland metropolitan area's UGB, which is reviewed every five years to determine changing needs (if any) for expansion (see Figure 2B-1). Expansion has occurred several times since the law was enacted. Currently, the growth boundary includes 1.3M people in a 400-square-mile region. Metro has been empowered with coordinating regional and local comprehensive plans and requiring consistency between local comprehensive plans and state and regional goals.



Source: http://library.oregonmetro.gov/files/ugbmap0506.pdf

Figure 2B-1 *Portland's Urban Growth Boundary*

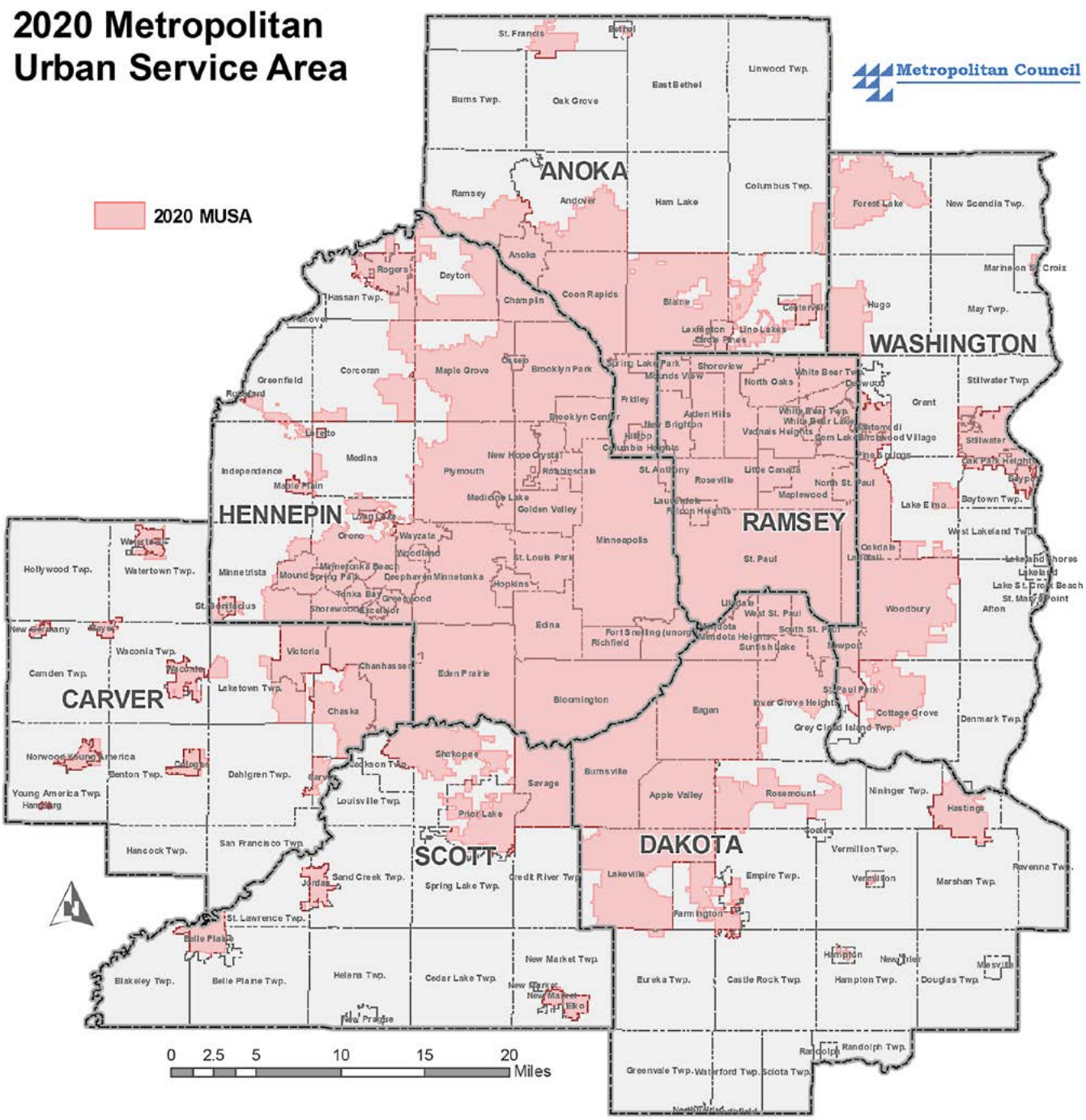
The 2040 Growth Concept is the current management tool of Portland's UGB. It directs most development to existing urban centers and along major transportation corridors, promotes transportation options including public transit, bicycling, walking, and driving, and encourages the creation of jobs and retail businesses close to where people live. The UGB, along with Metro and TriMet's planning and implementation efforts, have clearly proven successful. Since this boundary was adopted, Portland has expanded it by less than three percent of its original size, while the population has grown by more than one third.

Urban Service Districts (USDs)

Similar to UGBs, Urban Service Districts (USDs) are geared toward concentrating development within a defined geographic region. The difference is that USDs focus on the provision of services, including sewer, water, wastewater treatment, and transit. The infrastructures that provide these services are either in place or must be planned by the region encompassed by the USD. These services would not extend outside of the USD. This tool serves to encourage infill development, concentrate development, preserve open space and natural areas, use urban land more efficiently, and focus infrastructure funding within the urban district. A USD can be contained within a UGB but would not extend beyond the UGB.

Minneapolis/St. Paul USD

The creation of the Metropolitan Council in the late 1960s by Minnesota legislation was aimed at providing planning assistance to the almost 200 local communities in the seven-county region. An early action by the Metropolitan Council was the creation of the Metropolitan Urban Service Area boundary (MUSA) (see Figure 2B-2). Services within the MUSA include sewer, highways, and mass transit. In the late 1990s, the Metropolitan Council revised the MUSA and created permanent rural and agricultural areas beyond the MUSA limits. The MUSA boundary was determined through the compilation of county and municipal comprehensive plans. A key role of the Metropolitan Council is to work with the counties and cities to encourage increased density along transportation corridors to make efficient use of existing infrastructure. The MUSA is implemented through county and municipal comprehensive plans and through agreement between the Metropolitan Council and the cities and counties regarding urban development.



Source: http://www.metrocouncil.org/about/facts/MUSAfacts.pdf

Figure 2B-2 *Metropolitan Council MUSA Boundary Map*

Examples of Local Regulatory Tools that Encourage Transit-Supportive Development

Transit-Supportive/Oriented/Related Policies

Another regulatory tool available to state and local governments is the designation of areas adjacent to transit stations/stops as "transit-supportive." This designation comes with rules, policies, and ordinances focused on a desired development outcome—higher densities, mixed land uses, pedestrian amenities, and access to public transit. The goal is to encourage people to live and/or work near the transit station/stop and to use public transit. One such mechanism is the creation of Specific Plans that are tools for implementing comprehensive land use plans. Specific Plans serve to refine and target the general plan's goals for a particular community by regulating the land use activities within that community. While not all areas of the country use Specific Plans, there are other methods used, including overlay districts that accomplish the same purpose.

Transit Revitalization Investment District Act (TRID)

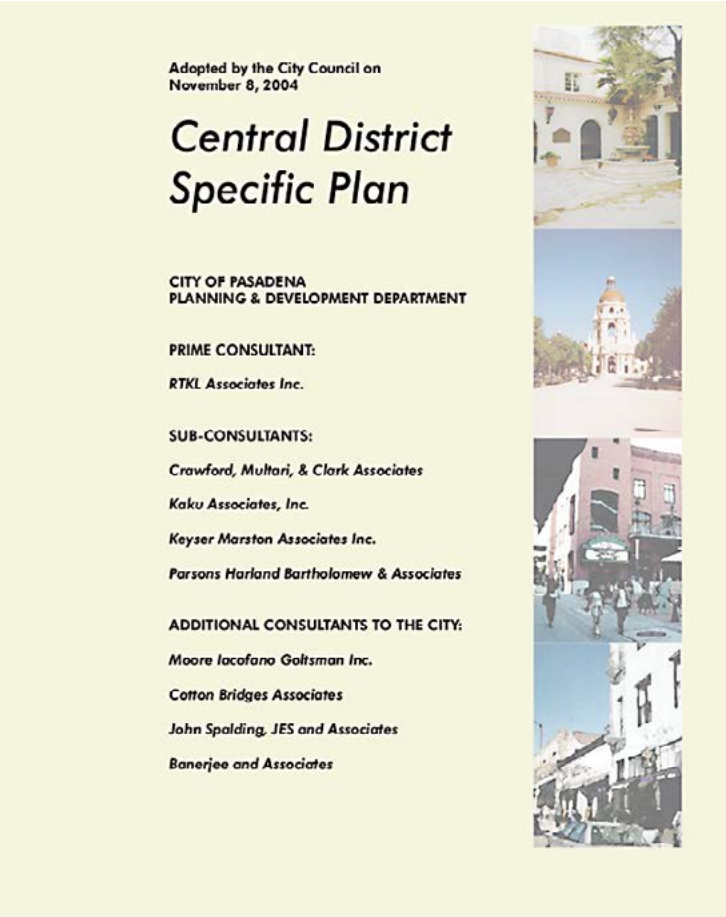
In 2004, the Commonwealth of Pennsylvania enacted the Transit Revitalization Investment District (TRID) Act. The Act's purpose is to authorize local and county governments, transit authorities (including AMTRAK), and other transportation providers (public or private) to enter into formal partnerships to 1) create TRIDs, 2) facilitate and implement transit-oriented developments, and 3) promote economic development, community revitalization, and increased transit ridership. The TRID program is administered by the Department of Community and Economic Development (DCED) working with the Pennsylvania Department of Transportation (PennDOT). TRID is applicable statewide, and may be designated by a local government in any geographic area or neighborhood, including vacant, under-utilized or land that could be redeveloped, located around a commuter rail, light rail, busway, or similar transit service stop or station. A planning study is required to be undertaken by one or more municipalities, with the active involvement of a public transportation agency and a county, for the purpose of establishing the boundaries, existing environmental conditions, existing and proposed land use, property availability, development potential, required zoning amendments, desired infrastructure, and necessary transportation-related improvements to support implementation of a proposed TRID. TRID implementation is governed by a management entity (such as a municipal authority) established by the partnering government(s) and agencies through a development agreement specifying the responsibilities of each participant. Participating transit agencies are authorized to acquire and improve property for defined real estate development activities, provided such land is the minimum necessary to accomplish a TRID planning study's objectives for a designated TRID area, coordinated with the pertinent county or municipal redevelopment authority (as applicable). A number of plans have been developed but, to date, none of the TRID projects have advanced to the implementation stage.

City of Pasadena Specific Plans

The City of Pasadena's 1994 Land Use Element of its General Plan required preparation of seven Specific Plans with the purpose of directing new development to areas along major corridors and adjacent to the proposed Pasadena Blue Line light rail stations (see Figure 2B-3). Development of these plans at an early stage was a clear acknowledgement that station areas could benefit from different approaches to fully maximize their potential. Each of Pasadena's six stations is included within one of three Specific Plans. For preparation of the Specific Plans, each of the station areas was subjected to a detailed analysis which included existing land use, key characteristics, market potential, mobility, environmental considerations, and the potential to support compatible new development, infill and/or redevelopment. Each plan considers not only the immediate station area, but also sub areas or distinctive neighborhoods in or adjacent to the station areas. For a closer look at Pasadena and other California municipalities that created Specific Plans as a means of focusing development around a transit station, see the Gold Line case study in the "Case Studies in Corridor Planning" section and the Del Mar Station case study in the "Case Studies in Station Neighborhood Planning" section of the Guide.

Figure 2B-3

City of Pasadena Central District Specific Plan



Source: http://www.ci.pasadena.ca.us/Planning/Central_District_Specific_Plan/

Zoning: Enabling Transit-Supportive Development

The predominantly-used Euclidian zoning system often prohibits transit-supportive development because it promotes the separation of uses. Typical zoning instruments in certain non-urban areas also limit compact and higher density uses, which is counterintuitive to transit-supportive development. Some regulatory tools created counter this and include form-based codes, incentive zoning, and overlay districts, as described below. It should be noted that zoning changes are generally preceded by comprehensive planning efforts that point to the need to amend or override the existing zoning.

Form-Based Codes

Contrary to traditional zoning, form-based codes focus on regulating development to achieve a specific urban form rather than segregating uses and mandating maximum intensity of development. This tool serves to implement the community's vision and is rooted in public participation. The form-based codes are derived from a regulating plan that points to the allowed form and scale of development within a particular area. Specification for elements such as sidewalks, on-street parking, and street amenities and building form standards (configuration and function) are included. Additionally, architectural, landscape, sign, and environmental resource standards may be included in the codes. Rather than prohibiting use, form-based codes focus on the form, mass, and relationship of the buildings within the public realm.

Moving towards a form-based code, the City of Palo Alto updated its zoning ordinance to allow for mixed-use buildings and higher densities to enhance neighborhood character and walkability in the area surrounding the California Avenue Caltrain station. The updated zoning ordinance was approved by the City Council on September 11, 2007, and became effective on October 11, 2007. The changes directly reflected the vision laid out in the City's previously updated Comprehensive Plan and are applied through various overlay zones. These new form-based codes or "context based design guidelines" incorporate innovative zoning techniques and a form-based, design-oriented approach through the development of building and site planning design prototypes. The new context-based design criteria specifically address multi-family, commercial, mixed-use, and pedestrian transit-oriented development.

The City of Hayward (California) adopted a form-based code to replace a TOD zoning classification around its South Hayward Station to encourage and direct development. For more information on this topic, refer to the "Case Studies in Station Neighborhood Planning" section of the Guide.

Zoning Overlay Districts

In an effort to alter some (or all) of the zoning codes in a particular area, a new code can be superimposed over an existing one. By designating an area near a

transit station/stop as an overlay district, a municipality's vision for creating a more sustainable community can be realized, or at least permitted. The overlay can allow for higher densities, mixed-uses, reduced parking requirements, and specific design guidelines (such as those to preserve and enhance a historic district).

The City of Phoenix created a transit-oriented zoning overlay district in conjunction with its Metro light rail system. It encourages development within close proximity to the transit station and applies to all new land uses and developments. The zoning overlay addresses standards such as:

- Minimizing building setbacks within close proximity to the station
- Maximizing building frontage and pedestrian open space
- Mandating clear windows for at least 50 percent of the building façade facing the street
- Minimizing blank building walls
- Mandating building entries oriented to the platform, station, street, or accessway
- Providing for pedestrian scale signs

A number of cities discussed in the "Case Studies in Corridor Planning" and in the "Case Studies in Station Neighborhood Planning" sections of the Guide have used similar standards to those noted above, either via overlay districts or by incorporating specific design guidelines for transit station areas that borrow form based concepts to encourage livable, sustainable principles.

Incentive Zoning

Incentive zoning is a means of achieving community visions by providing tradeoffs for developments to address specific planning goals. Whereas traditional zoning is restrictive, incentive zoning encourages specific types of development and increases a development's profitability. Incentive zoning gives the municipality flexibility in negotiating community benefits and developer rewards. For example, a developer may be permitted to exceed zoning ordinance limits (i.e., density, building heights, floor area ratios) or receive an exemption from certain impact (or other) fees in exchange for constructing affordable housing, pedestrian amenities, or a park. While this is a powerful tool, it should be used with caution. A community's goals must be clearly defined to ensure that the resulting development is on par with the benefits to the community.

Arlington (Virginia) offers an example of incentive zoning in which private developers get development projects approved through the site plan option, which allows more flexibility in development form, use, and density than that permitted by right in a zoning district. The majority of site plan review proposals are for hotel, residential, office and mixed-use development in certain high

density zoning districts and typically within the Metro station corridors. The site plan option encourages affordable housing contributions, reduced parking ratios, transit subsidies for new tenants, improved transportation design and streetscape improvements, public art contributions, etc. For more information, see http://www.arlingtonva.us/departments/CPHD/planning/ applications/site_plans/CPHDPlanningApplicationsSite_plansMain.aspx.

Another incentive zoning component that Arlington uses to encourage private developers is the Green Building Density Program. Private developers are encouraged to construct environmentally-responsible buildings that meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEEDTM) ratings. Enacted in 2000 (then modified in 2003 and 2009), the Green Building Density Incentive Program allows developers to apply for bonus density or bonus heights for large office, high-rise residential, and mixed-use projects that incorporate LEED certified green building components. Thus, a request for bonuses may result in additional densities between 0.05 and 0.45 FAR for office buildings, between 0.10 and 0.50 FAR for residential buildings, and/or additional height up to three stories for special exception site plan requests. The site plan proposal must guarantee a LEED rating at one of the four LEED award levels (Certified, Silver, Gold or Platinum) for the bonus to be approved (Arlington Environmental Services 2011).

Planned Unit Development

A Planned Unit Development (PUD) is a regulatory process (and a type of development) that allows flexibility of site design beyond the bounds of the existing zoning designation. It is a mechanism for controlling design and land uses. The New York State Legislative Commission on Rural Resources defines a PUD as a planning tool that offers municipalities "a constructive way to incorporate many innovative land use techniques (such as incentive zoning and cluster development) within a single, coordinated development plan" (Livable New York 2011). A PUD is a method of developing a large tract of land in a way that meets the goals of the community without the hindrances of the established lot by lot zoning ordinance. This method is often used for an undeveloped suburban area, large urban undeveloped lots, and urban redevelopment areas (Murphy and Stinson n.d.). The creation of a PUD must be in accordance with a comprehensive plan. The Orenco station on the Westside MAX Blue Line in Hillsboro (Oregon) is an example of a PUD (see Figure 2B-4). Originally envisioned as a high technology campus, the site was ultimately developed as a transit village. For more information on Orenco Station, refer to the "Case Studies in Station Neighborhood Planning" section of the Guide.

Source: http://www.nahb.org/generic.aspx?sectionID=219&genericContentID=471&print=true

Figure 2B-4 *Orenco Station Illustrated Overall Site Plan*

Design Standards or Guidelines

Design standards or guidelines allow a community to control its appearance and function by governing such elements as site planning, densities, building heights, and pedestrian amenities. Within a transit station area, design standards and guidelines can serve to promote transit-supportive development. Following are a few examples of the TOD design standards and guidelines that have been prepared by state and local entities.

The Florida Department of Transportation (FDOT) developed TOD guidelines as general parameters and strategies for local governments and agencies to promote and implement transit-supportive developments. The guidelines set minimum standards and ranges for density (population, residential, employment), intensity of uses, parking, use mix, and street network items. These standards and ranges fluctuate depending on the transit mode (special, light rail, BRT, heavy rail, local bus, express bus) and urban transects (urban core, urban general, suburban, rural). For instance, in the urban core, the desired residential density within a ½-mile radius of a transit station is greater than 35 dwelling units per acre and minimum building heights of 12 stories, while the desired suburban range is 5–30 dwelling units per acre and minimum 4 stories. These guidelines were established to assist local governments in setting development standards for the ½-mile radius of planned or existing transit stations.

In anticipation of the 2009 commencement of Northstar Commuter Rail services in Minnesota, the municipality of Coons Rapids prepared TOD design guidelines for the Riverside station area. These guidelines were the articulation of the municipality's expectations for a high-quality, regionally-significant transit-oriented development on a 23-acre site. The guidelines address issues of scale, access, and views. A menu of street types, building types, frontage types, and open space types is presented in an effort to assure that development is varied, unique, and incremental.

Lessons Learned

- A multitude of tools are available to encourage transit-supportive development. Some tools rely on legal mandates and controls, some are voluntary in nature, but all of the success stories show support at both the regional and local levels. Shared consensus and cooperation are a necessity. Whatever the technique employed at the local level—overlay district, form-based code, incentive zoning, or intentionally broad development districts—the key to success is a community's clear vision of the future.
- A thorough understanding of the community's needs, goals, and fabric is required prior to implementing any regulatory tool. If the tools do not reflect the community's attributes, the end product may be unsatisfactory.
- Regarding UGBs, it is important to note that the implementing governmental entity should customize the UGB concept to reflect the unique qualities, goals, trends, and conditions of the region it will impact.
- Creating zoning that enables transit-supportive development is only one key to fostering transit-supportive developments and sustainable communities. A local community should use a variety of complementary tools, and the legal mechanisms should be flexible enough to allow for community changes over time.

Resources

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C. Non-Federal Funding and Financing Sources for Major Transit Projects

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Competition for federal funding is fierce. Not all proposed public transit projects receive federal funds for capital costs, so they require other sources of funding. For those projects that do receive federal funds, 100 percent of the capital cost is generally not provided, thereby requiring a local funding match. Additionally, many transit agencies cannot cover ongoing operating costs from fare revenues. Inevitably, funding and financing public transit must be derived from several sources. The general

practice for planning transit projects during the corridor study is to consider all sources of potential funding, regardless of the funding is federal or non-federal. When financing is further developed, it is done by identifying federal and/or local funding sources.

The purpose of this section is to provide descriptions of non-federal funding and financing sources for public transit projects. All of the sources described below have been used across the United States to fund or finance at least part of a new transit system. Provided are three case studies that highlight the use of non-federal sources for public transit systems, and lessons learned about choosing the "right" funding source. (For information on federal funding programs for transit projects, refer to FTA's website, http://www.fta.dot.gov/.)

Non-Federal Sources of Funding and Financing

Provided below are descriptions of a variety of non-federal funding sources for states, regions, and municipalities interested in developing or expanding public transit systems. As shown in the case studies included later in this section, a mix of federal and non-federal sources is generally needed to advance major public transit initiatives.

State Funds

A national survey of state funding for public transportation prepared by the American Association of State Highway and Transportation Officials (AASHTO) revealed that state transit funding was about equal to federal funding ($12.3B vs. $13.1B) in 2008. In 2008, 11 states, including California, New York, Massachusetts, Pennsylvania, and New Jersey, provided non-federal funding in excess of the federal funding amount provided. Table 2C-1 shows the most common state sources for transit funding.

Table 2C-1

Most Common State Sources for Transit Funding in 2008

Source for Transit Funding	Number of States
General funds	19
Gas tax	16
Bond proceeds	12
Registration/license/title fees	9
General sales taxes	8
Motor vehicle/rental car sales taxes	8
Interest income	5

Source: AASHTO, 2010, Survey of State Funding for Public Transportation

Twenty-seven states reported that they used other sources for funding, such as state highway funds, trust funds, miscellaneous revenues, fees or taxes, lottery funds, documentary stamps, and other types of assessments. Six of these

27 states relied solely on these miscellaneous revenue sources. Table 2C-2 indicates the breakdown of state funds allocated for public transportation.

Table 2C-2

Breakdown of State Funds Allocated for Public Transportation

Expenditure Category	Amount
Operating expenditures	$6.9B(56%)
Capital	$2.9B (23%)
Either capital or operating	$93M (1%)
Miscellaneous	$2.4B (20%)

Source: AASHTO, 2010, Survey of State Funding for Public Transportation

Among 36 states reporting the funding types for all of their transit dollars, $6.4B (74%) were dedicated funds compared to $2.0B (20%) of non-dedicated funds (AASHTO 2010).

State Infrastructure Banks

A State Infrastructure Bank (SIB) is a relatively new development in transportation finance. A pilot program for 10 states was established in 1995 by the USDOT, which in 1997 opened program eligibility to all states, providing a total of $150M. An SIB establishes a revolving loan fund designed to complement traditional transportation grants. SIBs are established and administered by the states and provide states with a mechanism to finance a wide variety of transportation projects through loans and credit enhancements. Money from an SIB is loaned out to project sponsors, repaid, and then loaned out again to other project sponsors.

In addition to highway projects, SIBs are capable of assisting with a wide range of public transportation projects, including vehicle purchases, facility construction, rail modernization, and joint development projects related to transit facilities.

For an SIB to commence lending to transit projects, a cooperative agreement must be negotiated between the FTA Administrator, the State, and any other party to the SIB. A 2005 report identified 38 states with infrastructure banks, of which 21 had executed agreements with FTA. At that time, only eight had made transit loans, and they were generally small, under $15M statewide. Only Florida ($40M) and Minnesota ($21M) invested greater amounts, and they were for relatively small projects. Equipment purchases in Palm Beach County were the largest loans ($12M).

While the monetary levels are currently small, SIBs have a number of advantages:

- Ability to bring in private funds
- Flexible project financing
- Lower expectations for debt coverage ratios

- Recycling of funds
- Accelerated project completion

SIBs may prove to be a good source for future projects (TransTech Management 2005).

Local Sales Tax

Sales taxes are the most widely-used source of dedicated local and regional funding for transit, ranging from 60 of non-federal costs in regions smaller than 200,000 people to 78 in regions of 1M+ people. Sales taxes have also been the most popular financing method in transportation ballot measures. Between 2000 and 2005, 40 percent of all measures with a finance component incorporated some form of sales tax. Sales taxes also generate the largest amount of transportation funding approved by ballot measure. Most of the California transportation ballot measures have featured sales taxes. In California, tax increases require a supermajority of two thirds to be successful (Center for Transportation Excellence 2006).

Generally, sales taxes provide the greatest yield and stability and are among the most broadly acceptable sources of funding for public transportation. At the local and regional levels, additional sales taxes enacted for transit typically range from 0.25 to 1 percent. Because they can be regressive (imposing a greater burden on lower income consumers), it is common to exempt various combinations of food, clothing, and prescription drugs. Two other taxes are similar in nature, use taxes and excise taxes. A use tax is the equivalent of a sales tax that is applied to items that may not typically be covered by sales taxes, such as lease or rental transactions, while an excise tax also represents a type of sales tax and may be charged on an ad valorem basis as a percentage of the price or as a fixed dollar amount per transaction. Gasoline taxes are a good example of an excise tax and a tax typically reserved to states, although some states, such as Florida, allow localities to adopt supplemental gas taxes.

Sales taxes have been a common source of funding for new transit projects. Seattle's Link Light Rail is funded through the Sound Transit System created in 1996 after voters from King, Pierce, and Snohomish counties approved a Motor Vehicle Excise Tax and sales taxes to support the agency (Sound Transit 2010). Light rail in Dallas became a reality in 1983 when 13 cities adopted a one percent sales tax to be used for transit. Houston, Phoenix, Charlotte, and Denver have all used a sales tax to support transit.

Sales taxes also have the advantage of targeting non-residents, which is a benefit for local transit systems that serve large numbers of commuters and visitors from adjacent jurisdictions.

Property Taxes

Property taxes are a major revenue source of local governments. A share of the property tax is often set aside for special districts, including transit authorities and school districts, and for specific public functions like police and sanitation. Property taxes have become an important source for transportation funding. Seventeen percent of all transportation ballot measures between 2000 and 2005 involved property taxes, and one-fifth of all successful initiatives are property tax measures. Property tax measures also had the highest success rate of any financing proposal at the ballot box, with more than 80 percent of all property tax measures related to transportation winning approval over this time period (Center for Transportation Excellence 2006). Imposing property taxes in a commercial area where only developers and non-residential property owners pay has been a selling point with voters.

Tolls and User Fees

The use of revenues from highway, bridge, and tunnel tolls is typically legally restricted to the toll facilities themselves. There are, however, a few examples where toll revenues are more flexible, such as in New York and San Francisco. In addition, there is a growing list of examples of individual facilities where a portion of tolls are used to finance transit, including I-15 in San Diego, the I-95 express lanes in Miami, and the Dulles Toll Road in Northern Virginia, which is described in the case study below.

Special Districts

Pressures to limit traditional local and regional taxation have given rise to the use of various special districts within which revenues can be raised to support necessary public services and facility improvements in the designated areas. California enacted the Mello-Roos Community Facilities Act in 1982, Arizona passed the Arizona Community Facilities District Act in 1988, and, Florida has similar legislation. The districts are typically created by local units of government in advance of development and include the authority to issue various types of bonds that are serviced by charges to property calculated through formulas that incorporate a variety of factors.

A Tax Increment Financing (TIF) district is a form of a special district focused on capturing the added value of revenues from increases in taxes due to redevelopment and public investments. In 2008, the City of Dallas created the TOD TIF District to encourage dense, pedestrian-friendly TODs adjacent to DART light rail stations with the goal of stimulating new private investment and increasing real estate values. Any increase in tax revenues (caused by new development and higher property values) is paid into a special TIF fund to finance improvements. Local Improvement Districts (LIDs) described for the Portland

Streetcar below involve the assessment of a direct tax on the private sector to support the development of the new infrastructure (Moudon et al. 2007).

Developer Financing

Development opportunities on adjacent properties owned by the transit agency or the public offer the potential for joint development, in partnership with private developers. These include both joint developments, where the transit agency owns the land and development of property held by the public, but not necessarily the public. These joint development projects can involve cost-sharing of transit facilities—in some cases, having the developer build the necessary facilities—and private developments constructed on transit agency property. In addition to the direct revenues generated, joint development can help boost ridership as well as establish a standard for other private development on strictly private property (Cambridge Systematics et al. 2009).

Case Studies

Following are three case studies that highlight the use of non-federal sources for public transit systems. While the West Corridor (Denver) and Dulles Corridor projects both used federal funding in their mix, the purpose of the case studies is to focus on the sources of non-federal funds. Regional sales taxes were used for the West Corridor Light Rail in Denver, a comprehensive funding package was used for Portland Streetcar, and toll financing and assessment district revenues were used for the extension of the Metrorail Orange Line (Dulles Corridor).

Case Study 1: West Corridor Light Rail, Denver

The West Corridor Light Rail in Denver is the first major rail corridor funded from Denver's FasTracks program. The light rail transit line runs west from the edge of downtown Denver for 12.1 miles, with 12 stations, ending at the Jefferson County Government Center near Golden. The West Corridor, described as "the most diverse and historic corridor in the region," was served by a trolley until 1950. In 1988, the Regional Transit District (RTD) purchased the corridor for future transit. A Major Investment Study was completed in 1997 and concluded that a light rail line along the old interurban transit line was the Locally Preferred Alternative (LPA). This was adopted by the RTD Board and the Denver Regional Council of Governments (DRCOG). FTA approved the West Corridor Light Rail line with a $308.8M grant from the New Starts program and an additional $9.5M in Congestion Mitigation and Air Qualify (CMAQ) funds matched to $391.65M in local funding.

Increasing the Sales Tax to Fund Light Rail

The funding for the West Corridor Light Rail line was solidified with the passage of the FasTracks plan ballot initiative in November 2004. Voters in the eight county RTD approved an increase in the sales tax from 0.6 to 1 percent,

an amount estimated to bring in $4.7B to pay for the capital costs of 28 miles of light rail, 94 miles of commuter rail, 18 miles of BRT, expanded bus service, and 21,000 new parking spaces.

Two prior transit funding votes in Denver had both been defeated, and this one had faced significant opposition from the governor, the state treasurer, conservative think tanks, anti-tax groups, and even the director of the Colorado DOT. A strong campaign effort was initiated by engaging a prominent political consultant to head the team 18 months before the election, gathering early grassroots support. Their success was attributed to extensive polling, winning business and community support, running aggressive TV and radio ads (funded by $3.5M from the business community), and quick responses to criticism. There was unanimous support from the region's 31 mayors, and Denver's Mayor Hickenlooper (elected governor in 2010) was an advocate on the front lines. The plan was specific, showing planned routes and stations. The message was framed simply, stating that for 4 cents on a $10 purchase, FasTracks would deliver projects that people would use and would ultimately make Denver a better place. That message was presented against a background of a strong economy, rapid growth, and concern among environmentally-conscious voters about the long-term impacts of car-oriented growth. The initiative passed, 58 to 42, authorizing the most complete public transit system in the West. Once the West Corridor Light Rail project was sufficiently advanced, FTA completed a Full Funding Grant Agreement in early 2009.

Managing the Down Side – Declining Revenues and Increasing Costs

In 2007, flush with local funds and enthusiastic community support, the project received an early notice from FTA to proceed. But by the following year, when the RTD and the contractor reached agreement on a guaranteed maximum price for construction of the West Corridor Light Rail project, the total project cost of the West Corridor had increased from $634M to $707.6M, reflecting the extraordinary escalation in the cost of construction materials and fuel worldwide. Then, the impact of the global recession hit the Denver region, taking a bite out of the sales tax revenues. An Annual Program Evaluation conducted by the RTD documented a funding gap of $2.2–$2.4B and the need to increase the sales tax to close that gap.

An independent assessment of the budget, a requirement of the State of Colorado, was sponsored by the Denver Regional Council of Governments in 2010. They found that 86 percent of the required properties needed for the FasTracks program had already been acquired, reducing a significant program risk; that the program had advanced sufficiently; that an appropriate level of contingency was being applied to construction costs; that operating costs for new lines appeared reasonable; and that the revenue sources to complete the project within the revised budget and revised schedule were justified. The big unknown,

however, was the assumption of new sales taxes to fill the gap (Urban Engineers, Inc., 2010).

Staying on Schedule, Planning for the Future

Fortunately, the West Corridor Light Rail line has locked in the cost through a construction contract and is scheduled for completion in 2013. Beyond the construction, the emphasis will be on ensuring good access to the station, and promoting real estate development to support the ridership targets. The challenge is to fund the rest of the FasTracks program. On March 8, 2011, the RTD Board of Directors approved the 2011 FasTracks Financial Plan, which is assuming a ballot initiative in 2012 for a 0.4 percent sales and use tax increase. While acknowledging the difficult economic and political times, the RTD Board committed the agency to finishing the promised plans in a timely fashion.

Implications for the Future

The Denver region is a good example of how to use sales tax revenues in funding transit projects. The level of taxation selected (less than ½ percent) was low enough to gain majority approval and the right amount to yield the needed revenues. The bigger challenge was how Denver could anticipate the increase in construction costs followed by the worst economic crisis in decades, a region that has had its share of energy related boom and bust cycles. Having promised early completion of these transit lines, the agency runs the risk of losing support in some of the jurisdictions whose projects would be drawn out.

Case Study 2: Portland Streetcar

The Portland Streetcar was conceived not as a transportation mode per se, but as a tool to support economic development. The goals of this project were to improve the Central City by using high-quality transit service as an incentive for compact mixed-use development, to link neighborhoods with a convenient and attractive transit alternative, and to attract new transit ridership. Portland had already achieved significant success linking redevelopment with its MAX light rail system. The streetcar offered the chance to provide similar connections to neighborhoods not served by light rail, at a lower cost. (For more information regarding Portland Streetcar and Portland's Westside Max [Blue Line], refer to the "Corridor Case Studies" section of the Guide. For more information regarding Portland's Interstate MAX [Yellow Line], refer to the "Challenges in Corridor Planning: Four Case Studies of Practical, Transferrable Solutions" section.)

Comprehensive Funding Package

The $60M for the initial 2.6 miles of the Portland Streetcar was relatively inexpensive in transit terms. That created the opportunity to fund it locally and to avoid the complicated federal New Starts program, which is designed for

larger projects. (FTA subsequently introduced a Small Starts program for exactly this kind of project.) Moreover, since redevelopment was a central goal, there was the possibility of bringing developers into the partnership, as both financial and development affiliates. The City of Portland contributed half of the funding for the first 2.6-mile phase through City parking bonds, and 30 percent came from a local improvement district and a tax increment assessment. The Local Improvement District (LID) includes owners of adjacent properties, who stand to gain the greatest benefit from their close proximity to the Streetcar. This funding, coupled with other public and private resources, helped fund both the Streetcar and the critical investments in the urban environment that complement the higher-density vision for the area. For the second phase of the project (1.2 miles from Portland State University to Riverplace), the LID and tax increment funding accounted for almost three quarters of the total funding. For the final phase of the initial 4.0-mile project, the LID and tax increments accounted for over one third of the funding, a lower share due to a $10M contribution from regional transportation funds. Table 2C-3 provides a breakdown of the capital funding sources.

Table 2C-3

Capital Funding Sources for Portland Streetcar

Funding Amount	Funding Sources
$28.6M	Bonds backed by revenues from parking rate increase in the City
$21.5M	Tax Increment Financing (TIF) from the Portland Development Commission (North Macadam URA, $12.20M; South Park Blocks URA, $7.50M; Tax Increment Funds $1.80M)
$19.4M	Local Improvement District (LID) taxed non-residence property owners
$10M	Regional transportation funds
$8.75M	City funds (City General Fund, $1.80M; City Parking Fund, $2.00M; City Transportation Fund, $1.70M; Tram Transfer, $0.15M; Transportation Fund, $0.60M; Transportation Systems Development, $2.50M)
$5M	Reallocated transit funds from Tri-Met
$4.7M	Other funds (Gibbs Extension Savings, $0.66M; U.S. HUD Grant, $1.95M; Miscellaneous, $2.09M)
$3.1M	Transportation land sales
$2.1M	Connect Oregon
$103.15M	***Total construction costs***

Source: www.portlandstreetcar.org/pdf/capital_and_operations_summary_20100908.pdf

Operating Costs

The operating costs for FY 2010 were $5.5M for a ridership of about 4M, a cost per rider of $1.37. Sources of the $5.5M operating budget (2010) included $ 3.2M from TriMet, $1.8M from the City of Portland, Office of Transportation, and $0.5M from fares, sponsorships, and promotions.

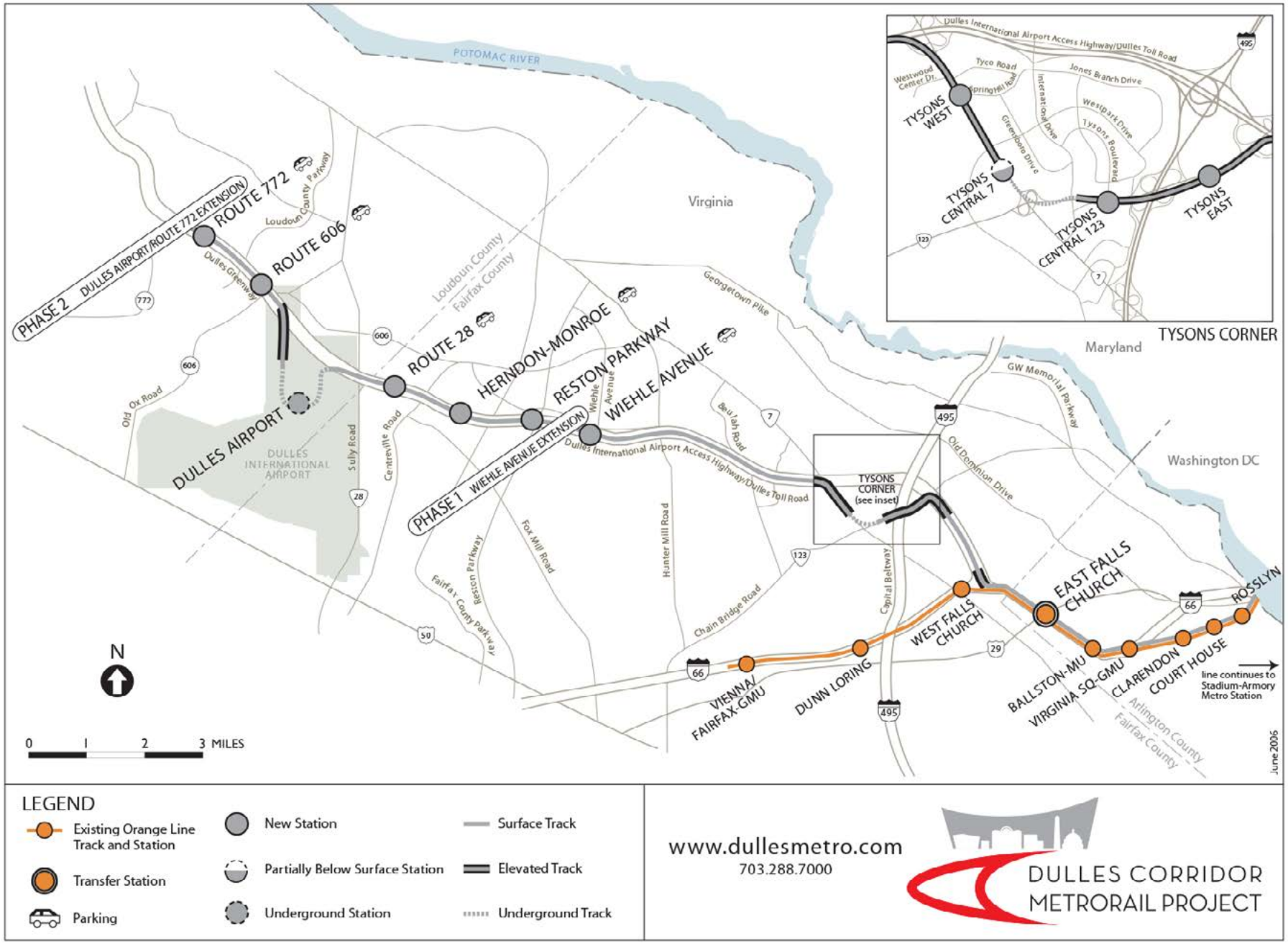
Impact and Transferability

The Portland Streetcar demonstrates several important lessons. One is that a smaller footprint vehicle is faster and easier to build, but can also have significant impacts on development, especially if linked into a broader plan. The low costs made this project affordable with all local funds, and the $103M investment, of which one third was paid by property owners and developers, was able to leverage $3.5M in real estate investment (Brookings Institution 2009).

Case Study 3: Dulles Corridor Metrorail Project Extension to Wiehle Avenue

Metrorail (Metro) is a rapid transit system operated by the Washington Metropolitan Area Transit Authority (WMATA). The network's five lines include the Orange Line, which runs for 26 miles connecting Fairfax County (Virginia) to New Carrollton (Maryland). The Metropolitan Washington Airport Authority (MWAA) is in the process of extending the system by 23 miles from East Falls Church to Washington Dulles International Airport west to Ashburn (see Figure 2C-1). Phase 1 will run from East Falls Church to Wiehle Avenue on the eastern edge of Reston and will include four stations in Tysons Corner. This 11.7-mile extension of the Metrorail Orange Line to Wiehle Avenue in Reston will include five new stations, four of them serving Tysons Corner. The project's second phase will complete the line from Wiehle Avenue to Loudoun County, with six additional stations, including one at Dulles Airport. The project is under construction, with the first phase scheduled for completion in late 2013.

Connecting Dulles International Airport to Washington's Metro system has been a regional goal dating back to the airport construction in the 1960s. Since then, Tysons Corner (about midway between the airport and downtown) has become Virginia's largest employment center, and 12th largest in the U.S., with more than 105,000 employees, 2 major regional malls, and 14 hotels. This rapid transit system line is now becoming a reality, with the federal approval of the transit line, and Fairfax County's approval of a plan to transform this auto-dependent suburban center into a vibrant, mixed-use, transit-oriented center anchored by four new rail stations.



Source: http://www.dullesmetro.com/pdfs/Route%20Map%20FINAL_6-06.pdf

Figure 2C-1 *Dulles Corridor Metrorail Extension Map*

Funding Mix

FTA funding was critical for project advancement, but represented only 28 percent of costs, down from the original hopes for a 50 percent FTA, 25 percent State, and 25 percent local split. Non-federal funding sources were needed to make this extension a reality. Table 2C-4 provides a breakdown of the funding sources.

Table 2C-4

Capital Funding for Phase 1 Extension

Funding Source	Percentage of Total Cost*
Metropolitan Washington Airports Authority (Dulles Toll Road Revenue)	47%
Federal Transit Administration	31%
Commonwealth of VA (VA Transportation Act, State Bonds, STP Funding from FHWA)	6%
Fairfax County Commercial Tax District	17%

* Numbers rounded up

Source: Dulles Corridor Metrorail Project – Extension to Wiehle Avenue Northern Virginia, Full Funding Grant Agreement, November 2010

Of particular interest in this case study is the creation of a Commercial Tax District and the use of toll road revenue to fund construction of this extension. These two sources combined will contribute approximately $1.6B, more than half of the $2.75B estimated cost for the 11.7-mile Phase 1 extension.

Commercial Tax Districts

Two Commercial Tax Districts were created to fund the Fairfax County share of the project, one for each phase of the transit line. The Phase 1 Dulles Rail Transportation Improvement District operates on a levy of $0.22 per $100 assessed value on commercial- and industrial-zoned properties and rental units. It was approved by the Board of Supervisors in 2004. At the end of 2009, the Fairfax County Board of Supervisors approved the creation of the second commercial tax district that will help fund Phase 2 of the Dulles Rail project, allowing the County to raise $330M in tax revenue from commercial property owners along the line. Rates are scheduled to increase gradually from 5 cents per $100 of land value in 2010 by 5 cents each year until 2013, when the rate will plateau at 20 cents and stay in effect until all three proposed stations are operational. The Board of Supervisors' decision followed the announcement in 2009 by the Western Alliance for Rail to Dulles (WARD) that the majority of landowners along the line agreed to tax themselves to help create the three stations beyond Reston on the route to Washington Dulles Airport: Reston Parkway, Herndon-Monroe, and Route 28. WARD is a non-profit organization of property owners, including most of the region's major developers. The County agreed to review the Comprehensive Plan to see what changes could be made to support TOD at the stations to capture the value of the rail investment. The County also agreed to protect the property owners from down-zoning and higher transportation taxes.

A study by the George Mason University School of Public Policy estimated (intermediate forecast) that corridor growth between 2010 and 2050 for the Phase 2 section would be 125,000 jobs and over 24,000 households. This is in addition to growth in the Tysons Corner area itself, which is expected to add 100,000 jobs and 40,000 households (Sturtevant and McClain 2010). Much of the growth is already built into the expectations of developers, and their rationale for agreeing to tax themselves. Despite the obvious advantages to property owners, the amount of time and coordination required to reach agreement demonstrates the difficulty of relying on an increase in property taxes.

Dulles Toll Road Revenue

A significant share of the funding will come from an increase in tolls on the Dulles Toll Road, a freeway built in 1984 by the Virginia Department of Transportation (VDOT). The toll road is adjacent to the Dulles Airport Access Highway, constructed in 1962 to provide access exclusively to the airport. In 2005, an agreement was reached with VDOT to transfer operation of the toll road to the MWAA in return for assuming associated debts and committing to build a transit line in the median. In 2010, the fare surcharge was increased by 25 cents at the main line plaza and 25 cents at the ramps. An additional 25-cent increase was planned for January 1, 2012. Toll increases beyond 2013 will be analyzed based on actual financial performance and potential receipt of any additional federal funds.

Impact and Transferability

The Dulles Corridor Metrorail Project Extension is a huge project, with enormous financing needs. Fortunately, it is located in one of the nation's most prosperous suburbs, which helps facilitate local financing. It is currently estimated that the local assessments will raise almost $0.75B, with surcharges on toll road users raising about $1.5B. For Phase 1 alone, revenues from the assessment districts are projected to bring in more than $100M per Metro station ($730M total), and the toll road revenues are projected to generate more than double that amount ($1.56B).

Using assessment districts is a technique that requires a thriving real estate market, especially one with growth potential. Developers and property owners must be supportive to gain the consensus for new taxes. At the same time, local government must be supportive. Objections must be addressed from those who feel developers are being charged too much (an unfair burden) and those who feel developers are being charged too little for their windfall profits.

A problem with using toll revenues is convincing toll road drivers who do not use the transit line that it is worth their additional payments because they or their families may use the transit line someday and, if a sufficient number of drivers switch to public transit, the driving commute will be eased.

Lessons Learned

Choosing the "right" type of non-federal sources for a specific transit project in a specific locale depends on a number of factors, many of which are contextual and unique to individual locales (Cambridge Systematics et al. 2009). These factors include the following:

- Types of transit agencies and services to be funded
- Elements for which funding is being sought (e.g., ongoing agency programs or individual projects)
- Type of source that is desired and that is appropriate (e.g., pay-as-you-go funding or debt financing [bonding])
- Local and regional perspectives on the role of public transportation in the community now and in the future (Cambridge Systematics et al.2009)

Additionally, whether state and/or local enabling legislation is in place also makes a difference.

Once there is an agreement on the contextual factors, stakeholders must agree on the pros and cons of different funding sources and how they satisfy criteria, such as:

- Revenue yield adequacy and stability
- Cost efficiency in the application of sources
- Equity across demographic, income, and geographical jurisdictions
- Economic efficiency in balancing who pays and who benefits
- Political and popular acceptability
- Technical feasibility (Cambridge Systematics et al. 2009)

Revenue yield is a principal consideration. From a pragmatic viewpoint, it makes little sense to invest a lot of energy in low yield while passing up the revenue sources that generate a considerable amount of funding. Several of these are discussed below.

- *Leveraging State Funding* – Taking advantage of State funds would seem an ideal option. In the parlance of real estate developers, it is "other people's money," and free of local obligations. State funds do not come burdened with all the complexities and regulations of federal funding. However, it is not that simple. First, proponents should determine whether their state is one that is supportive of transit. If not, it is probably not worth fighting an uphill battle (at least in the short term) for a new project. States sometimes have their own rules for grants to localities, so there may be a few hoops to jump through. In addition, there may be a form of political score keeping

at the state level, such as an "upstate/downstate," or another form of geographical competition, so that a region that scores a new transit system may lose out on competing for a new state university, or may feel obligated to support increased educational funding in another city. Going to the well on State funding too often is to be avoided, making it essential to decide whether a particular transit project is worth cashing in political capital. State Infrastructure banks may be a valuable option, especially for the most highly ranked projects, but for now this funding source seems directed primarily to relatively small projects.

- *Hitting the Jackpot with a Sales Tax Initiative* – A dedicated sales tax for transit is ideal because grows naturally with the economy and is there for the long term, and, at the right level of taxation, it can generate significant levels of funding. There are advantages as well as disadvantages to a dedicated sales tax for transit. Foremost is that sales taxes cover a broad tax base, so percentages which sound small to voters (e.g., Denver's case for 4 cents of $10) generate large amounts of money. The tax keeps pace with inflation and grows with the economy (which is a negative when the economy is down). Making the case for a sales tax is the equivalent of a political campaign, so the timing must be right, and the message compelling. However, since a major transit investment requires a considerable community dialogue, and probably a consensus on a different vision for growth, these could be considered complementary discussions.
- *Property Taxes* – While often a sensitive subject among citizens, property taxes may be desirable for three prime reasons:

  1. Can generate sizable levels of income, although far less than sales taxes, that grow with the economy of the taxing district
  2. Can be structured to apply to only developers and future residents through local districts such as TIF Districts and BIDs, both of which represent an "other people's money" appeal to local tax payers
  3. Reinforce plans to direct growth and revitalization, making it possible to pay for the greater costs of mixed-use and compact development, creating a harmony between local plans and financing.

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D. Funding and Financing Transit-Supportive Developments

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The purpose of this section is to provide an overview of how transit-supportive developments can be and are funded and financed. This section also provides perspectives from developers in their attempts to fund and finance transit-supportive development projects.

Introduction

The Complexity of Funding Transit-Supportive Developments

Two perspectives should be kept in mind regarding funding transit-supportive developments. First, lenders and investors view transit-supportive developments as "risky." This is because such developments are a relatively new concept, involve multiple uses, and take substantial time to develop. A transit-supportive development does not fit into the conventional model of single-use buildings (common in the suburbs) that are simpler to design, cheaper to build, and easier to predict profitability. In fact, in comparison to single-use buildings, transit-supportive developments require more diligent study and analysis, are harder to compare and cost, and, therefore, are ultimately attractive to a smaller group of developers, buyers, and investors. This means that the financial side of transit-supportive developments is always a challenge.

Second, the trepidation of the financial system is exacerbated by the uncertainty associated with the public process, a "catch-22" for the developer. The conservative nature of the private financial markets in evaluating transit-supportive developments forces almost every project to bring in public partners and funding. Yet, the public funding always brings public process. The public process (development approval, approval of grants/loans, etc., or the

approval of public capital) usually adds unpredictability and greater risk. This may further concern private sources. Public entities that want quality transit-supportive development projects need to be vigorous champions and active partners with the developer for the financial elements to come together. In fact, private markets are most comfortable making the financial commitment to the jurisdictions that voice the strongest political will, have supportive plans and zoning in place, build community endorsement, and streamline the approval process. Successful agreement between developers and public partners usually involves some risk share and allows the project to provide public benefit with developer contributions/concessions to the community, but the overall project revenue can maintain enough margins so that the developer can still make the project feasible from a business perspective.

The Difference between Funding Sources and Financing Sources

Though frequently used interchangeably, it is important to understand the difference between "funding" sources and "financing" sources. Funding sources are sources of cash equity—the money stream that pays off the different loans (e.g., public, private, bank, government, and personal loans). Funding sources include developers and investors who provide up-front cash to launch projects, profits generated by the transit-supportive development itself, and grants and public sources of money that do not need to be repaid. (Note: Equity investors want to get their cash paid back plus generate a return on their money, but they are "at risk" and forfeit their capital if the project cannot afford to pay them. Therefore, equity investors are considered funding sources.)

Financing sources are entities and tools that provide loans to build projects. Financing sources take many forms (discussed below), and they all expect to be repaid with interest by a funding source, usually cash generated by the transit-supportive development project. Financing sources always ask: "How and when will I get paid back?" The answers vary for each project, so it is important to pick funding sources and financing sources that are compatible.

Public-Private Partnerships for Transit-Supportive Developments

A single building does not make a village, a "place," or a transformation. Most successful transit-supportive developments comprise various uses in several buildings unified by a strong public realm and public facilities. Creating such a district is more difficult and expensive than building a single structure on an existing lot without the burden of place-making. But successful transit-supportive districts almost always require plazas, pedestrian amenities, and structured or below-grade parking. These are infrastructure expenses that can be appropriately supported by public funds. Additional public funds may also be warranted based on the specific uses being attracted and the expectation that they will generate substantial revenue for the community.

Research conducted by the Center for Transit-Oriented Development (Center for Transit-Oriented Development 2010) resulted in a common guideline for communities regarding public investments: for every $1 spent on the transit line, the local jurisdictions should expect to invest (fund) another $.50 on development infrastructure to realize healthy transit-supportive developments. This is a gross figure that reflects various types of local investment—from general road system upgrades to specific infrastructure investments for particular transit-supportive developments. How much is appropriate for the public sector to invest in a privately-developed transit-supportive development? One way to answer is that question is by using the "but for" test: "but for" the public funds, the project would not be financially feasible (i.e., would not be able to generate enough cash flow to pay back all the loans and the investors) and would not go forward. The public sector investment may be as little as 10 percent of the total project cost, although 25–30 percent is not unusual, especially if a large amount of structured parking has to be provided. (In 2011, structured parking requires a subsidy on land worth $65/SF or less.)

Development Agreements

Development agreements are key documents in establishing and managing transit-supportive development public-private partnerships. While there are usually a series of documents involved before the transaction is complete, the development agreement spells out the responsibilities of each party, contingencies, funding sources, events of default and associated recourse, performance measures and timing, and other pertinent requirements needed to move forward. For instance, if a developer agrees to build and share a parking structure with dedicated transit parking, the development agreement will explain the transit district's operational requirements and the amount and form of compensation the developer will receive. Each development agreement is negotiated and customized to a particular project.

Transit-Supportive Development Project Budgets

Developers view projects in terms of balancing the "uses" and "sources" of funds. Uses of funds can be thought of as the project budget, including the costs associated with: acquiring the land and entitlements to build on the land, conducting the pre-development due diligence, constructing the buildings, paying interest and fees associated with financing, and paying the professionals-architects, engineers, attorneys, leasing agents, marketing firms, and lobbyists. Sources of funds refers to how the uses of funds are paid. These sources include both public and private funding and financing sources. Equity, debt, bonds, and grants are counted to make sure there are enough sources of funds to pay the bills for the uses of funds as they come up. For transit-supportive developments, there are usually sources from many providers because the projects are complex. The term "layered" is used to express the fact that a project will have many obligors by the time it is built and operating.

Developers are flexible in how the public sector can participate in the funding process. If the public sector can pay for wider sidewalks, parking, new street construction, or maintenance expenses (for a period of time), that directly reduces the uses of funds or increases the sources of funds for the project. There are many public sector funding and financing tools that are useful to realizing quality developments. When a project receives expedited approvals, developers view this as a reduction in the project budget (uses of funds). Accelerated approvals result in fewer consultants and less interest expenses, which saves money and reduces the risk of potential tenants becoming impatient and leaving the project. Reducing parking requirements is an even more powerful way to cut the budget. For example, at $20,000+ per structured space, every surplus space costs the development large amounts of cash.

The bottom line for public-private partnerships: if public sector participants can find ways to support transit-supportive development, chances are the developer will find a way to make the public investments fit into the "sources" and "uses" to benefit the project.

Common Sources of Private Sector Funding and Financing

Since private developers build most transit-supportive development, the following discussion begins with the financial sources commonly used by the private sector. Note that the list of financial tools available to the private sector is much more limited than those available to the public sector.

Sources of Private Sector Funding

Sources of private sector funding include project profits, personal equity, and purchased equity (investors).

Project Profits

Private developers look first to the transit-supportive development project earnings to be their ultimate funding source. When they apply for bank loans, issue project bonds, or engage investors, the first and most important source of funds is the project's profitability. A project that does not show a reasonable profit will not attract investors, and is infeasible. Hence, it is important for the public sector to be aware of a project's profitability when negotiating terms or investing in a project.

Personal Equity

Personal equity is the personal savings and cash resources of the developer. Most development firms are companies with, at most, several employees developing small- to medium-sized projects. Typically, the owner of the firm has some personal resources, but not enough to fund complex and expensive transit-supportive development projects. This is the case because, despite the best efforts, not all projects make a profit. In those cases, the developer loses money—personal cash. When developers do

make a profit on transit-supportive developments, it usually takes about 5–7 years, but often 10 years or more for the developer to receive any cash return.

Purchased Equity (Investors)

Developers often need equity investors who are willing to share the risk on a project for a good rate of return, particularly on larger projects. Smaller and newer developers usually turn first to friends and family for investments. Larger and more experienced developers tend to partner instead with institutional investors (e.g., pension funds and insurance companies) who have large amounts of capital to invest and need projects to provide a return. In either case, the developer becomes a middleman whose job is to build and lease the project so the investors will get their money back and make a profit.

The cost of buying equity (the rate of return the developer must pay to find investors) varies with project type and location. A common rule of thumb is that investors seek a project that can produce about a 15 percent return on their investment. Equity investors are paid from the profits before the developer gets paid, giving investors a "preferred position" among funding sources. In higher risk projects, investors are sometimes guaranteed a specific amount by the developer, regardless of the project's performance. Every deal is structured differently and negotiated based on the details of the project.

Sources of Private Sector Financing

This section describes the financing tools used by most private developers after the equity funding source is in place. Sources of private sector funding include bank loans and institutional partners.

Bank Loans

A primary source of project financing available to the private sector is construction loans from commercial banks. The bank expects to be repaid from the first revenues of the project, well ahead of the investors and the developer. The percentage of the project cost funded by the bank varies with market conditions, type of project, and credentials of the developer. Since 2008, common bank loans have been 60–70 percent of the project value. For example, on a $10M project, the developer and investors must pay the first $3–4M in expenses, and the bank will fund the remaining $6–7M. Since $3M is a sizable amount, most developers need to find other investors. (In good market conditions, a Loan to Value ratio of 80–90% is often allowed.) For any construction loan, the bank will insist on being secured with a deed of trust on the property, and will frequently also require a personal guarantee from the developer. Commonly, the personal guarantee must be secured with another asset, such as a second trust deed on the developer's residence to protect the bank's investment in case the project fails. For larger development firms, other assets may be used instead of a personal residence.

Institutional Partners

Institutional partners usually refer to pension funds or insurance companies. Both types of firms cover their obligations with earnings they receive on their investments, and both are conservative. Institutional partners prefer to invest in (or buy out) buildings that are already constructed and leased, which eliminates construction and marketing risks. But they also dedicate a small portion of their funds to developing projects and, occasionally, developers can use these institutions to finance construction of a new transit-supportive development.

The main real estate financing product of institutional partners is the permanent or "take-out" loan, which is a long-term loan on the property, tantamount to a mortgage. Reflecting the institutions' preference to minimize the risk of the construction period, they prefer to issue a "promise" to issue a mortgage on the property once it is built. Often, they require property leases to be in place, reducing the property risk to management issues (rather than construction or leasing issues). Construction lenders, especially banks, expect to have a take-out commitment in place before they grant a loan for construction. Thus, once the building is built and "stabilized," the insurance company or pension fund agrees to pay off the bank's construction loan. The institution that issues the take-out commitment expects to either sell the building (based on its lease revenue and profit expectations) or to be paid over time from the cash flow of the transit-supportive development. The term "spec building" refers to situations where the lenders are willing to fund construction of a building before there are any leases (or condo sales) in place. These situations are entirely speculative and the risk is much higher. This is a rare decision among banks and institutions, and when done, generally reflects a substantial additional collateral, and/or a location that is viewed as a "never miss," exceptional opportunity.

Institutional partners also include Real Estate Investment Trusts (REITs)—real estate companies that are publicly-owned and traded as equities on the stock exchange. REITs tend to specialize in real estate niches (e.g., retail, apartments, specific geographic areas). Although each one is different, REITs all buy and develop property for their portfolios. REITs can partner with local developers and provide take-out purchase agreements for projects that are built and leased, and sometimes fund the entire development themselves.

Another source of private sector financing is private equity funds. Like REITs, these funds work with local developers to develop or acquire completed projects. Although they tend to specialize, private equity funds are private investment funds, not public company investment funds. Their money sources tend to be wealthy individuals and other global funds.

Common Sources of Public Sector Funding and Financing

Sources of Public Sector Funding

The public sector has several sources of funds that can be used for transit-supportive developments. To a private developer, these funding sources are better than private equity because they do not carry the requirement of repayment plus interest and are viewed as "free money" for the project. Sources of public sector funding include land contribution/write down, prioritization in capital improvement programs, property tax forgiveness, fee waivers, tax increment financing (TIF), public improvement fees (PIFs), grants, federal tax credits, historic tax credits, new market tax credits (NMTC), and public sector tenancy.

Land Contribution/Write Down

A common and powerful tool used by jurisdictions and urban renewal authorities is the reduction in the cost of the land to the developer. While land is usually only 10–20 percent of the project's total cost, a contribution of that amount is tantamount to the developer's profit margin. Accordingly, that public funding source can turn a marginal project into one that attracts a developer and investors. This tool is often used to "even the playing field" for expensive urban sites to compete with cheaper, suburban land that would otherwise yield the developer a larger profit. Jurisdictions particularly like this tool when they already hold the land as surplus. In many cases, the land is purchased by the public sector (with or without eminent domain) and resold to the developer at a price low enough to make the transit-supportive development financially feasible.

Prioritization in Capital Improvement Programs

Local jurisdictions can often reduce project costs simply by prioritizing their existing capital improvement fund and prioritizing the implementation of infrastructure projects around the transit-supportive development (e.g., streets, traffic signals, lighting, sidewalks, district utility upgrades, and district stormwater drainage projects). Similarly, parks departments can absorb the cost of the plazas, open space, and enhanced landscaping aspects of a transit-supportive development. This approach of redirecting local infrastructure work is most appropriate when the transit-supportive development is designed to provide an amenity serving the broader community or region. Local jurisdictions may find this funding mechanism attractive since it does not require special authorizations or additional budget allocations.

Property Tax Forgiveness

Property tax forgiveness is a common tool used by local jurisdictions because it does not require a cash outlay per se and the cost to the public sector is spread out over several years. The developer sees it as reducing the project budget. The

value of this approach to a project depends on the level of property taxes being charged by the jurisdiction, and the term of the forgiveness.

Fee Waivers

Jurisdictions can help fund projects by forgoing the revenue associated with development fees, such as impact fees and building permit fees. This funding mechanism is welcomed by developers as cost savings in their budget. While the type and amount of forgone revenue depends on local policy, it is frequently resisted by the public sector because development fees usually contribute to the jurisdiction's annual operating income, rather than to a capital account. The concept of funding capital projects with operating revenues is not a sustainable approach, and is thus widely viewed as poor public policy.

Tax Increment Financing (TIF)

TIFs are one of the most powerful and broadly-used public funding sources for transit-supportive developments. Basically, a jurisdiction measures the baseline tax revenues it is receiving from an established district before the project is constructed. When the transit-supportive development is complete, the development will presumably generate increased tax revenues to the jurisdiction. That increment amount of the taxes for a limited period of time is dedicated to help fund the project. Once the term of the TIF has ended, the entire increment reverts to the jurisdiction to use as it likes. To the developer, this is a "free money" source of funds for the transit-supportive development. To the community, it is a new source of revenue that would not have been realized if the project was not constructed. TIFs can be based on sales and/or property taxes, are usually issued by urban renewal authorities, and in most states, can only be used for projects located in blighted areas.

Public Improvement Fees (PIFs)

PIFs are a tool that can be customized and are generally used for retail-oriented projects. A PIF is a private fee imposed through the covenants on the property used to help fund project costs and operations. PIFs must be permitted by state legislation and by the local jurisdiction. To the shoppers in the PIF district, it feels like an additional sales tax levied on purchases. Payment of the fee is actually voluntary, and the sales tax receipt shows the sales tax and the PIF on separate lines. (Few consumers notice the difference or decline to pay the fee.) A major consideration of PIFs is whether the additional tax will put the project at a competitive disadvantage with consumers, and hurt the viability of the project. PIFs work best when a project starts with a comparatively low sales tax and is brought to the same level as surrounding jurisdictions or when a project has a captive market. The City of Lakewood in Colorado has three retail locations where a PIF is in place: Belmar (2.5% on all sales transactions), Creekside Shopping Center (1.5% on all sales transactions), and Colorado Mills (1.4% on all sales transactions).

This revenue provides funding for demolition of existing infrastructure and construction of new public improvements—public streets, sidewalks, utilities, parking facilities, stormwater management and sanitary sewer systems, and open space (http://www.lakewood.org/PIF/).

Grants

Grants are available from many sources, including state and federal governments and local foundations. Since funds are limited, criteria for grants are quite specific, so the key is pinpointing the right source for the transit-supportive development needs. Grant programs are highly competitive because they are scarce and public agencies must be the applicants or co-applicants. This puts the developer one step removed from control of the process and often shifts the application burden to a public agency. The grant application process is time consuming and lengthy, with a low probability of success. That said, the opportunity for additional sources of funds is compelling enough that available grants should be pursued.

Federal Tax Credits

Several federal tax credit programs can be used to help fund transit-supportive developments. The most commonly used is the Low Income Housing Tax Credit (LIHTC). Essentially, a developer who builds affordable housing projects in qualifying low income census tracts is entitled to a federal tax credit. The tax credit can be used by parties other than the developer, so it can be "sold" to another entity with a "tax appetite"—an entity that has an upcoming tax liability that can be reduced by offsetting it with the LIHTC.

Historic Tax Credits

Historic tax credits, although less potent than LIHTC in terms of the financial benefits they offer, often make the difference in the ability to preserve a historic building.

New Market Tax Credits (NMTC)

NMTCs, a relatively recent federal tax credit program, are intended to complement the LIHTC program by supporting commercial developments in qualifying low-income areas. There is an allocation system, but thus far, availability of the tax credits has been more abundant than LIHTC, and their use is expanding. Moreover, the tax credits themselves are structured to provide more financial benefit to the taxpayer so they are more potent than LIHTC. Frequently, a project that qualifies for NMTC can receive 15–20 percent of the total project cost from the sale of these tax credits.

Public Sector Tenancy

Often overlooked, this funding tool can be extraordinarily powerful. The concept involves the public sector locating some of its functions (e.g.,

city offices, libraries, community centers) within the transit-supportive development and agreeing to a market rate lease for a set period of time or choosing to buy the completed space from the developer once it is built. Either way, the public entity is simply using its occupancy budget and paying what it would pay otherwise (and in some cases less).

Sources of Public Sector Financing

The biggest advantage the public sector brings to financing (loans to a project) is the ability to issue tax-exempt debt at lower interest rates. The interest rate charged on a long term loan (called a bond) can either be taxable, single-tax exempt, or double-tax exempt. That is, the lender, or owner of the bond, will receive revenue from the borrower's interest payments. If the interest income is subject to taxation by both the state and the federal governments, it is called taxable. If the lender must pay only federal taxes on the interest revenue, it is called single-tax exempt. If the lender does not have to pay any income taxes on the interest revenue, it is called double-tax exempt.

When public sector financing tools are used, the loans/bonds are usually double-tax exempt. Since the bondholder revenue will not be taxed, the interest rate the project has to pay can be lower. The interest rate reduction realized on double-tax exempt bonds varies with market conditions, but in most situations generally runs 2–5 percent less than taxable rates. This can be a substantial benefit. For instance, a 5 percent savings on a $10M project that takes 18 months to construct could be in the $400,000 range. The jurisdiction's issuance of tax-exempt debt for a project does not cost it any cash or foregone future revenue, making this financing tool attractive and a commonly-used method to fund transit-supportive development. However, there is always a concern about how much project responsibility the jurisdiction bears. General Obligation (GO) bonds put the full faith and credit of the jurisdiction behind the repayment of the bonds. This constitutes a guarantee to use all the resources of the public entity if necessary to pay the debt. This type of obligation reduces a jurisdiction's ability to borrow money in the future, and therefore the use of GO bonds is severely limited.

More commonly, jurisdictions prefer to have an independent agency (such as an Urban Renewal or Development Authority) issue the bonds. Then, in the rare case of a bond default, the jurisdiction is not obligated to make the payments. This leads to consideration of the strength of the sources used to repay exempt bonds. It varies widely, but the most common types are TIF/PIF bonds, parking revenue bonds, private activity bonds (PABs), Special District bonds, and guarantees.

TIF/Pilot Increment Financing Bonds

If a jurisdiction decides that a transit-supportive development qualifies for TIF, the funds can be paid on a reimbursement basis (i.e., the actual amount of incremental taxes is paid to the developer as they are earned over a period of years.) Or, if the developer cannot wait for payment and needs the funds up- front to construct the project, the expected tax increment can be used as the source of repayment for a tax-exempt bond. Since the TIF bond will be issued before the project is built and operating, there is a fair amount of risk in projecting what the actual tax increment will be over a period of 20–25 years.

Parking Revenue Bonds

When a public parking facility is part of the transit-supportive development, tax-exempt parking revenue bonds are an eligible financing tool. In this case, the parking revenues from the facility are projected, a reserve is taken as a payment cushion in the event the projections are not met, and bonds are issued. The proceeds from the bonds are used to pay the contractors and suppliers needed to construct the facility. With parking revenue and other kinds of bonds, additional revenue streams (e.g., parking meter revenue or parking revenues from another location) can be committed to the bond payments to reduce the amount of the reserve required and to lower the interest rate charged. Also, insurance and "letters of credit" can be purchased to get the lowest possible interest rate.

Private Activity Bonds (PABs)

PABs are tax-exempt bonds that a jurisdiction agrees to issue to help fund the transit-supportive development, while the source of repayment is entirely the responsibility of the developer and the project. Akin to industrial revenue bonds (IDRBs), PABs offer the developer a lower interest rate, but do not provide "free money" to the project as found in TIFs and PIFs. Revenues from the project generally must be used to make the bond payments, thus reducing the profit to the developer. Nonetheless, the developer is receiving a lower interest rate on money that would otherwise have to be borrowed from a bank or institution at commercial, taxable rates.

Special District Bonds

Public Improvement Districts (PIDs) and Business Improvement Districts (BIDs) are common examples of Special Districts. In almost every case, when the District issues bonds, the bonds are used to build public improvements and infrastructure and they are repaid from an increased property tax assessment on the property. It is important to note that Special District bonds do not provide "free money" to the project like a TIF does. Since the developer owns the land, the developer is raising his own property taxes to pay the bonds. Accordingly, these bonds are only a financing loan tool. To the extent

that project properties are sold, the developer can reduce his liability for the bond payments. If the entire project is sold, the developer's entire liability is extinguished. Also, residential properties are frequently excluded from having to pay for special district bonds, so the transit-supportive developments mix is critical. (As mixed-use communities become more common, new types of special districts are being authorized at the state level. These Special Districts tax residential, as well as commercial properties—under the theory that the commercial properties also benefit from public infrastructure.)

Guarantees

Another financing tool available to the public sector is to guarantee a private sector obligation of the project. For example, a City issuing a guarantee to a bank would make the construction loan cheaper to the project, increase the loan-to-value amount of the advance, and make the loan feasible (when it otherwise might not be). Such a guarantee may not be for the entire amount or the entire term of the loan. Often, it is adequate to guarantee loan performance to a specific risk-reducing milestone (e.g., completing construction, obtaining 50% pre-leases, signing an anchor tenant.) Guarantees are attractive as a non-cash way for jurisdictions to assist transit-supportive developments, but they are used infrequently. Accounting standards require governments to place the full amount of the guarantee in a reserve fund until the obligation is removed. This requirement ties up government cash and counts against their bond ratings, which (as described above) is generally avoided. However, guarantees are a financing tool that can be structured and managed to minimize the disadvantages and are a viable alternative when other approaches are not feasible.

Case Studies

This section includes case studies for CityCenter in Englewood (Colorado), Brewery Blocks in Portland, and Avalon Walnut Creek at Contra Costa Centre in Walnut Creek (California). These case studies provide examples of how some of the funding and financing tools available to the public and private sectors were used for transit-supportive developments.

Case Study 1: CityCenter in Englewood

CityCenter is located in Englewood, Colorado, a suburb of Denver (see Figure 2D-1). The development is near the Englewood Station on the Regional Transportation District (RTD) Light Rail line. It is a mixed-use redevelopment on the site of a deteriorated and vacant regional mall. When the mall started to decline, it caused a great revenue loss for this small first-ring suburb with a population of about 30,000 people and an average household income below the area median. The City did not have the financial resources or staff to address the redevelopment of the 55-acre, 1.3M SF mall. When the property

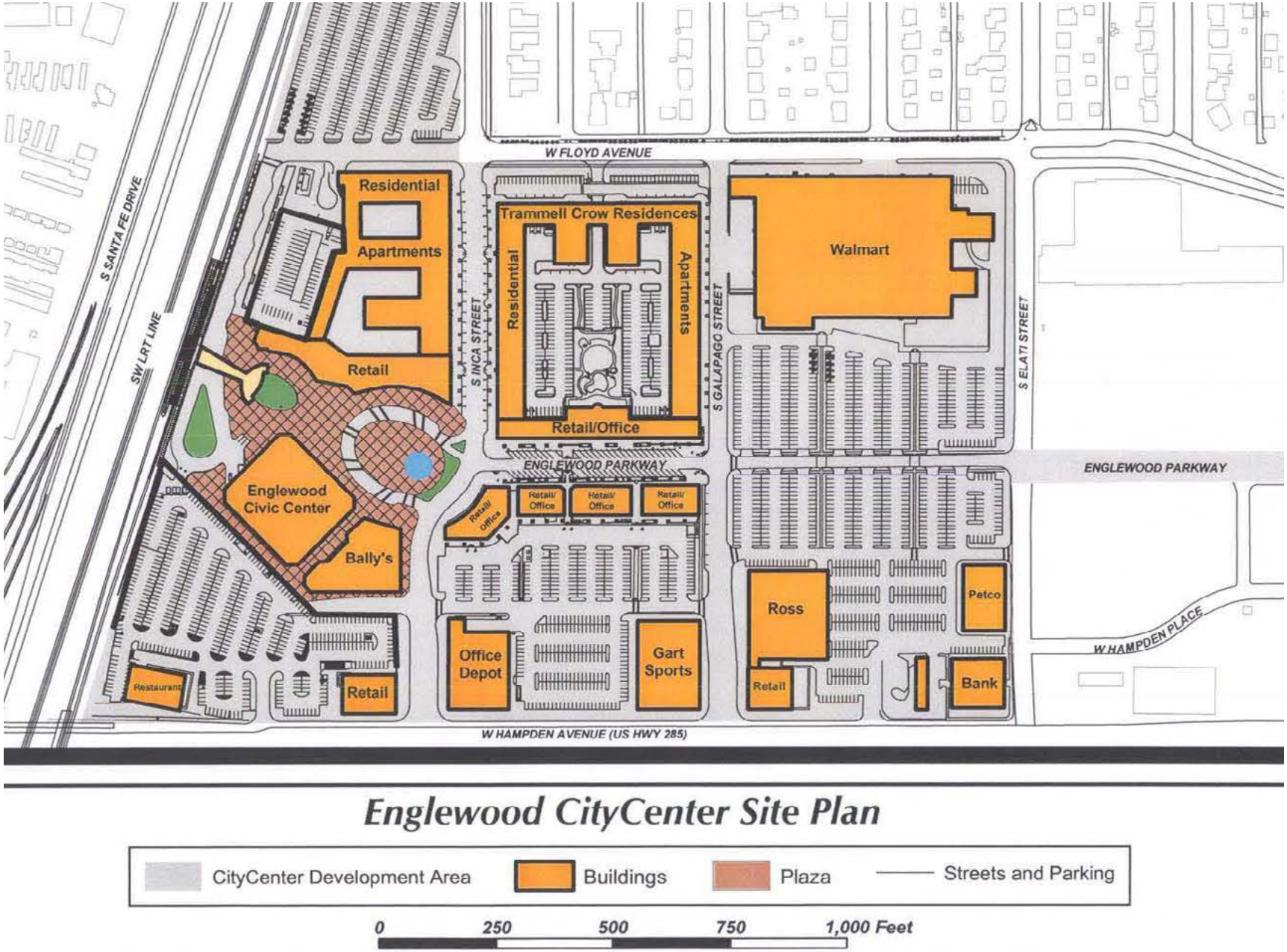
was nearly vacant and more of a liability than an asset, the City of Englewood was "gifted" the mall from its previous owner, Equitable Life Insurance. The City purchased the only outparcel (Joslin's department store) to control the outcome of the site, which sits firmly in the center of the downtown area. The City subsequently issued a request for proposal for a developer, and selected Miller-Weingarten, who proposed a big-box retail use in this downtown center.

Figure 2D-1

CityCenter in Englewood

Source: Flickr, Guanerteme, used with permission under Attribution-NonCommercial ShareAlike 2.0 Generic (CC BY-NC 2.0), http://flickr.com/photos/99663048@N00/26919759

When a light rail station was proposed adjacent to the site, the City became concerned about whether the proposed big-box retail would be the best use of the site. With assistance from outside development consultants, the City decided on a mixed-use transit-supportive development plan and effectively became the land developer (see Figure 2D-2). Since the City owned the land, it was responsible for the demolition, site work, utilities, streets, and sidewalks; and the landscaping needed to divide the site into parcels and sell/lease them to users. The City also chose to redevelop the only building that did not require demolition, the Broadway Southwest department store. This building was redeveloped for new City offices, courts, a museum, and a library.



Source: City of Englewood, CO, http://www.englewoodgov.org/indec.aspx?page=468

Figure 2D-2 *Englewood CityCenter Site Plan*

The project was conceived in mid-1997, and the first phase was opened in summer 2000 with the ribbon-cutting of the light rail/regional bus transit station. Completed in 2003, it was the first major transit-supportive development in the Denver region and, with development of more than 1M SF, it remains one of the largest.

Table 2D-1 provides the project details for CityCenter.

Table 2D-1

CityCenter Project Details

Site Size	55 acres	
Uses	Retail (including a Walmart) – 380,000 SF	
	Office – 50,000 SF	
	Housing – 438 rental apartments	
	Civic (city offices, courts, library, museum) – 145,000 SF	
	Parking – structure of 803 spaces (shared between civic and transit)	
	Transit – LRT station, 8 bus bays, bike lockers, pedestrian bridge, 910 transit parking spaces	
Project Timeline	1997–2003	
Land Owner(s)	Originally City of Englewood Environmental Foundation; parcels subsequently sold or leased to Miller-Weingarten, Walmart, Trammell Crow Residential, City of Englewood, and Regional Transportation District	
Developer(s)	City of Englewood Environmental Foundation acted as land developer; other land owners acted as their own vertical developers	
Project Budget	Land Acquisition Budget	$1.0M
	Land Development Budget	$34.0M
	Building Development Budget	(est) $150.0M
	Total Project Budget	$185.0M
Land Development Financing Program	Walmart (land purchase)	$ 3.4M
	Trammell Crow Residential (land purchase)	$ 4.7M
	Miller-Weingarten (land lease from City)	$ 5.0M
	Regional Transportation District funds (including CMAQ grant)	$ 5.7M
	City Equity	$ 15.2M
	Total:	$ 34.0M

The CityCenter project faced complex challenges and opportunities, including the following:

- As a precaution, the City of Englewood used a small subsidiary (Englewood Environmental Foundation) to acquire the site from Equitable Life Insurance. This protected the City when unexpected contamination was found. Possibly as important, this inadvertently made the development entity a small, nimble organization with only three directors (all City department heads) who could respond quickly to the many decisions they faced. (If the decisions had to be made through the City Council, it may have delayed the project.)

- The City of Englewood did not want to be the master developer, but the developer they originally selected was a retail REIT and legally prohibited from developing a mixed-use project. By default, the City had to assume the role.
- There was immense community desire for a department store and equal concern when Walmart was the only retailer attracted to the area. One of the agreements made with Walmart was a "go dark" provision that would allow the City to buy back the property at the market rate (without the use of eminent domain) if the property sat vacant for more than a fixed amount of time.
- Originally, a cinema anchor was planned to best share use of the transit parking. Mid-project, the cinema industry collapsed and the tenant withdrew. The entire development plan had to be redone, ultimately moving residential to the cinema location and substituting office and retail on the previous site.
- A small community with a small budget, the City of Englewood did not have adequate funds for the site work, utilities, and place-making required of the land developer. When they funded redevelopment of the old department store as the Civic Center with a tax-exempt Certificate of Participation, the project was underwritten with a value high enough to both redevelop the building and use $12M in cash for site work.
- RTD applied for and received a federal Congestion Mitigation and Air Quality (CMAQ) grant from FTA to help fund the landmark pedestrian bridge that connects the parking to the rail platform.
- RTD also retains an easement for parking spaces dedicated to transit from 6 AM to 6 PM daily.
- To brand the district and reinforce its civic nature, the City entered into an unusual arrangement with the non-profit Museum of Outdoor Arts to provide outdoor sculpture, outdoor programming, a full-time museum, discounted class rates for Englewood residents, and rotating displays of art inside the Civic Center building.

Results of the CityCenter project included:

- CityCenter won many national awards and helped restore Englewood's tax base.
- The project is the center of civic activities, ranging from the summer picnics around the fountain to a holiday parade.
- Several new businesses and developments in the area were spurred by the initial redevelopment.
- The residential units continue to enjoy strong rents and occupancy, largely due to the transit proximity and neighborhood atmosphere.
- Walmart and other value retailers have done well. However, the small Main Street units have suffered from inadequate visibility, and Main Street has seen more turn over. Without a private developer in the lead, the project has

not had additional development and has not improved with age. It is well-maintained but requires updates and improvements.

Case Study 2: Brewery Blocks in Portland

Brewery Blocks, a five-block transit-supportive development district, is located on 4.6 acres of land in Portland, Oregon (see Figure 2D-3). It is located adjacent to the Portland Streetcar line that opened in 2001. (For more information regarding Portland Streetcar, refer to the "Corridor Case Studies" section. For more information on the station neighborhood in which Brewery Blocks is contained, refer to the "Station Neighborhood Case Studies" section.)

Figure 2D-3

Brewery Blocks, Portland

Source: Van Meter Williams Pollack, LLP

Developed on a former brewery site on the southern edge of the Pearl District, the $300M project was an aggressive move by a strong, local developer just as the tech bust hit the Portland economy in 2000. Still, the unique combination of renovated office space, new Class A office space, high-end retail destinations, and luxury apartments and condominiums was a tremendous economic success for the developer. The developer was able to provide investors a 500 percent return over 7 years. The project and its components have won countless national awards, many for their exceptional achievements with sustainable development, historic preservation, and urban place-making.

Block 1 houses Whole Foods as the first floor retailer in a 158,000 SF LEED™ (Leadership for Energy and Environmental Design) Silver office building. The principal office tenant is Portland District Cooling Company, which provides chilled water for the Brewery Blocks and has been extended across W. Burnside towards downtown. Block 2 is the site of the former Blitz-Weinhard Brewery and

involved a sensitive adaptive reuse into a LEED Silver structure with 50,000 SF of retail and restaurants and a 200,000-square foot office building. Block 3 includes The Henry, a 15-story LEED-Gold high rise condominium building with more than 11,000 SF of retail, and the Portland Center Stage, a 56,000 SF performing arts center in a registered historic building with LEED Platinum status. Block 4 houses a new 270,000 SF 10-story office and retail building anchored by the Art Institute, Anthropology (retail), and PF Chang's (restaurant) at ground level. The building incorporates extensive environmental features and carries a LEED Gold rating. Block 5 is home to The Louisa, a LEED Gold, 16-story luxury apartment building built over retail uses that includes West Elm home décor as an anchor.

Gerding Edlen acquired the brewery property and developed the entire district. For the Gerding Theater on Block 3, the developer sold the existing Armory building to the City of Portland for slightly less than cost. Portland Center Stage (PCS), a local theatre, used Historic Tax Credits and New Market Tax Credits to augment its $33M capital campaign for a theater renovation. The City of Portland also backed a loan, which PCS services to finance the $38M project.

Table 2D-2 contains the project details for Brewery Blocks.

Table 2D-2

Brewery Blocks Project Details

Site Size	4.6 acres	
Uses	Office, retail and multi-family residential – 1.3M SF	
	123 condominium units, 242 high-rise apartments	
	Parking – 1,350 space underground garage	
	Performing Arts Center	
Project Timeline	2000–2006	
Land Owner(s)	JP Morgan, Multi-Employer Property Trust, City of Portland	
Developer	Gerding Edlen Development	
Project Budget	$300,000,000	
Project Sources of Funds	City loan for parking*	$6.0M
	City grant for infrastructure	$ 2.5M
	Developer equity/funding	$78.5M
	Union Pension Fund equity	$52.0M
	Commercial bank loans	$72.0M
	Institutional loans	$89.0M
	Total	$300.0M
	**In return for City loan, developer agreed to offer 400 parking spaces at $1 per hour for 10 years*	
	Block 1 Retail/Office: $37M bank loan at 70% LTV plus developer equity	
	Block 2 Office/Retail rehab: $57M presale to institution	
	Block 3 Condo/Retail: $50M institutional lender at 70% LTV plus developer equity; Gerding Theater –$38M City loan, Historic Tax Credits, NMTC, and philanthropic contributions	
	Block 4 Office and Retail: (information unavailable at this time)	
	Block 5 Residential and Retail: $34M sold to institutional investor	

The Brewery Blocks project faced complex challenges and opportunities, including the following:

- The market conditions were difficult during development.
- The historic buildings had unknown and expensive rehabilitation costs.
- The five-block scale of the project was large, and separate funding for each building was required.
- A large amount of private developer equity was required. This could not have been redeveloped by a small developer.
- There was an additional expense with the insistence on cutting edge sustainability features and design, but a long list of grants and financial assistance was available to help offset the cost of green design.
- The 2001 opening of the Portland Streetcar line, including a stop near the Brewery Blocks, gave the development a boost.
- The redevelopment efforts were supported by the City and the neighboring Pearl District.

Results of the Brewery Blocks project results included:

- An economic return to investors of 500 percent over 7 years
- 128,000 annual visits to the Performing Arts Center
- More than $1.3M in additional property taxes in first 5 years
- Land value appreciation of nearly 500 percent
- Increase in jobs from 200 to 4,000
- Increased weekday transit ridership from 4,982 in 2000 to 7,837 in 2005
- Condominiums sold out before the building opened, at prices ranging from $250,000 to $1.4M

Case Study 3: Avalon Walnut Creek at Contra Costa Centre in Walnut Creek

Avalon Walnut Creek at Contra Costa Centre is a residential and local serving retail development in Walnut Creek, California (see Figure 2D-4). It is located near the Pleasant Hill/Contra Costa Centre BART Rail Station. The development will be constructed in two phases. Phase 1, which began construction in August 2008, will consist of 422 residential apartments, 100 for-sale town homes, and over 35,000 SF of local serving retail (dining, convenience retail, business services, and personal services). Phase 2 will be a 290,000 SF office building, including a 20,000 SF business conference center. Avalon Walnut Creek is part of the Contra Costa Centre Transit Village, a 125-acre multi-use development consisting of approximately 2.4M SF of existing Class A office/commercial space,

two full-service hotels, 50,000 SF of retail/restaurants, and nearly 2,700 multi-family residential units. The site is adjacent to the Pleasant Hill BART Station.

Figure 2D-4

Avalon Walnut Creek at Contra Costa Centre, Walnut Creek

Source: Time Structures, Inc. http://www.timestructures.com/

The 1983 specific plan for the Contra Costa Centre project (updated in 1998) envisioned the key to tying the whole development together would be the property in the center that was retained by BART. In the initial planning, there was considerable development flexibility built into this parcel to allow for adjustment as the overall project evolved. Both BART and the County (through the Contra Costa County Redevelopment Authority) wanted to let the project mature, and in BART's case, let the ridership grow before settling on a final plan for the 18.2-acre parcel.

In 1995, it was time to extend the original vesting agreement between the County and BART. The County felt that the time was right to address future development of the site and added a clause to the agreement extension requiring BART to test the market by preparing a request for proposals to determine joint venture interest. There was strong interest, and Millennium Partners was selected to devise a development proposal. At that time, the most likely scenario appeared to be the development of a regional retail center stressing entertainment. While the concept may have fit the market, it was not accepted by the established Contra Costa Centre neighborhoods or the surrounding three towns, which were looking to attract similar uses as part of their commercial center plans. In 1997, Millennium was asked to withdraw and rethink its proposal.

In 1998, the community engaged in a planning exercise to develop acceptable alternatives for the site. The recommendation for the development of office space was not driven by what people wanted, but by the need to find a use

that could support the cost of replacement parking. The estimated cost of replacement parking to meet the required 1.05-to-1 BART standard had an estimated price of $35M (the actual number at completion was $50M). This requirement and the estimated costs forced the County to explore a new financing model if agreement was going to be reached on future development. (Parking replacement costs are a common problem in altering the land use of park-and-ride parcels.)

A charrette process with broad community participation was held in 2001 to determine the total build-out plan for the 18.2-acre site:

- 422 residential apartments (including 85 affordable units)
- 100 for-sale condominiums
- 36,000 SF of resident-serving retail
- 19,400 SF of business conference center space
- 270,000 SF of office space
- 1,550 space parking garage

The County, the Contra Costa County Redevelopment Agency (RDA) and BART put together the business plan that revolved around the creation of a Joint Powers Authority (JPA) called the Pleasant Hill BART Leasing Authority. At the same time, the land use plan that had emerged from the charrette process was submitted and adopted as the required P1 Plan under the Planned Unit Ordinance.

JPA comprises two members of the BART Board of Directors and two members of the County Supervisors. The County Redevelopment Director and the Manager of Property Development for BART are co-executive directors of the JPA. The JPA entered into a lease for the BART property and then entered into sub-leases to the developers. Both BART and the County will share in ground lease payments for the property.

While this case study focuses on the Avalon Walnut Creek, it is important to note that there are more than 20 development parcels in the project area, and 13 different development partnerships have been structured to bring Contra Costa Centre to reality. The financial structure of the Avalon Walnut Creek project is a complex public-private partnership and includes the following:

- BART, Contra Costa County, and the Contra Costa County RDA formed a JPA called the Pleasant Hill BART Leasing Authority.

- The JPA leases the land from BART and, in turn, subleases the property to the developers for construction of the transit village. The subleases are for a 100-year term.
- AvalonBay Communities (national apartment REIT) and Millennium Partners (large-scale mixed-use master developer) represent the private side of the BART property partnership. Together they formed Pleasant Hill Village Associates, LLC, which subleases the ground from the JPA.
- Ground lease payments from the developers to the JPA will be shared between BART (25%) and the county (75%), which will create a sizable income-earning asset (estimated to total $700M–$1B) for the general funds of both public agencies.
- The RDA is responsible for financing a variety of public infrastructure and improvements that include the transit parking garage, roads, drainage infrastructure, parking, streets, and place-making elements.

Table 2D-3 provides the project details for Avalon Walnut Creek.

Table 2D-3

Avalon Walnut Creek Project Details

Site Size	18.2 acres		
Uses	Residential, retail, conference center		
Project Timeline	2005–2010 (phases 1 and 2)		
Land Owner	BART (San Francisco Bay Area Rapid Transit District)		
Developer(s)	Pleasant Hill Village Associates LLC (an arrangement between AvalonBay Communities and Millennium Partners)		
Project Sources of Funds	Garage	*Total Cost $ 51.2M*	
		Sources	$ 45.7M – County (TIF, RDA bonds, developer fees)
			$5.5M – Developer equity
	Infrastructure	*Total Cost $19.9M*	
		Sources	$ 9.9M – County (RDA bonds)
			$10.0M – Developer equity ($5.0M Mello Roos, $4.5M LIHTC, $0.5M future project profits)
	Apartments	*Total Cost $153.7M*	
		Sources	$2.5M – RDA loan
			$9.0M – Taxable bonds at 6%
			$126.0M – Exempt bonds at 5%
			$ 16.2M – Developer equity

The Contra Costa Centre project faced complex challenges and opportunities, including:

- Extended public process period, which is oblivious to private market cycles
- Complex legal and governance structure of the public-private partnership
- Challenge of designing and funding BART replacement parking

- Challenge of generating and structuring an arrangement to give the public agencies a long-term revenue stream
- Requirement of RDA to front-end major infrastructure expenditures
- Difficulty in financing bonds in the "great recession"
- Cost risk is only shared between the County and the developer; BART's interests are not similarly aligned and are more focused on design and public relations, with less concern about schedule or cost impacts
- Bond financing offered a low-cost of capital, but issuance was complex and costly with fees

Results of the Avalon Walnut Creek at Contra Costa Centre project included the following:

- Nearly $225M has been invested in Avalon Walnut Creek, funded by the project partners AvalonBay Communities and the County of Contra Costa.
- The development is intended to be a national model and showplace for sustainable, transit-supportive development.
- After eight months of residential leasing in a difficult economic time, AvalonBay reported excellent activity and was on schedule to be fully leased by April 2011.
- Leasing of the 35,000 SF of retail is behind schedule due to a broker change. Starbucks is the only retail tenant thus far signed (early 2011).

For additional information on the funding and financing techniques used at various regional and local levels, refer to Section 4, "Case Studies in Corridor Planning," and Section 5,"Case Studies in Station Neighborhood Planning for Transit-Supportive Development."

Lessons Learned

When public entities enter into public-private partnerships on transit-supportive developments, the risks and returns need to be evaluated, just as they are on the private sector side. Following are some lessons learned:

- **Political perception is important:** The public sector must keep in mind that every decision has potential headlines written in response. The most common concern is that the government is giving public money to rich, private developers on projects that are not needed. Editorials may hint that the public entity is being out-negotiated or outsmarted. Managing the messaging is critical throughout the project. The following strategies should be considered:
  - Be clear about the public benefits of the project and quantify them as much as possible. Make the public benefits the key message at the

project outset and continue to repeat it. Go overboard on public education and communication. Make an exceptional effort to explain the public benefits in small groups and to be as transparent as possible.

- Manage the expectations of the community and do not "overpromise" outcomes from the development—hard numbers and dates never seem to be forgotten. These projects are prone to changes and delays and it is inevitable that results will be different from original projections. The results may be better (or worse) than expected, but the outcomes may turn out to be successful endeavors that are assets to the communities and region.
- Early on, find champions for the project from the business community. When business community champions say it is a "fair deal and good for the economy," it may carry more weight than coming from an elected official. For more information on champions, refer to "Guiding the Process: Leadership and Champions."
- Position the project as a regional asset and bring in additional voices from other jurisdictions to ratify and support the transaction.
- Negotiate development deals so both sides can "win." There are inevitable ups and downs on projects, and both parties are needed to get it done. If a deal is lopsided, one party or the other may walk away. Resist the temptation to see a headline about how the jurisdiction made a "windfall good deal"—it may make the public officials look good—but could prove to be certain defeat for the project when the public-private partnership is eroded.
- Shield the developer from the political drama around the project. In general, developers are not sophisticated about the political world and can overreact. When there is internal bickering and disagreement, it can demoralize developers and confuse them about a community's true objectives.

- **Consider short-term vs. long-term success:** In assessing and describing the public benefits of the project, consider the long- term (5+ years) and short-term outcomes. Promoting investment in a project because it is bringing a grocery store to a neighborhood is usually popular, but if the grocery store closes in 15 months, will the public think the project is a failure? In fact, retail elements of a mixed-use project generally lag 18+ months behind residential and office components because it takes that long to have residents move in and determine what is missing in the neighborhood. At that point, developers have to go through their own process—formulating retail concepts, selling them to investors, and getting the locations built and/or leased. "Retail follows rooftops," so, in most cases, the residential needs to be in place first.

An alternative approach would be to promote a project as the catalyst for long-term neighborhood regeneration, with a grocery store as part of the mix. Ideally, give citizens a short-term and tangible plan, and a long-term and far-reaching vision to help create a context for the project.

- **Anticipate project delay:** It is almost inevitable that a transit-supportive development will be delayed (rarely during construction) due to uncontrollable events. For instance, there are delays when the council cannot decide whether to approve the project and appoints a task force to do additional study and hear more public testimony. And there are delays when the neighboring jurisdiction becomes afraid of competition from the new transit-supportive development, so the mayor launches a series of meetings to "calm the storm," and that adds an extra three months. Sometimes major tenants decide to delay occupancy until the holiday season, and other tenants follow suit.

  Projects need to be politically-and financially-situated to expect and absorb delays. Due to delays, transit-supportive developments often cost 20–25 percent more than conventional projects. Whatever the cause, explanations to the public should be prompt, calm, and matter-of-fact. At the same time, negotiations with the developer need to adhere to the contractual milestones envisioned at the outset of the project.

  An essential public sector strategy is to continually monitor whether the project is on track, albeit with vicissitudes, and whether greater intervention is warranted. Appointing a person to be in charge of monitoring the project and providing regular progress reports can substantially reduce the risk of delays and surprises.

- **Anticipate project surprises and changes:** Delays are often the mildest form of surprise and change. Other surprises and changes can occur when anchor tenants go out of business, financing dries up, a competitive project is built two blocks away, and mayors and councils change. Transit-supportive developments inevitably suffer from a number of surprises over the course of the years and many stages of a project. Some problems are terminal; most can be resolved. Sophisticated public entities know this, and at the outset they may appoint an experienced internal person, or hire a trusted private sector advisor to help differentiate and manage any surprises so that the project can continue to move forward.

- **Develop a long-term definition of success:** Occasionally, finished projects do not live up to the pre-development images, get the leases that were expected, or meet financial expectations. Any of these scenarios can become a public relations nightmare for the local jurisdiction. Mixed-use transit-supportive developments can take 5–7 years to "stabilize" and find their footing. Since another 5–10 years may be needed to reach the

construction phase, communities do best using a long-term definition of success. Projects that seem disappointing for one reason or another at the outset often "outgrow" their awkwardness and become acceptable.

- **Public agencies are important partners:** Sometimes there are clear project mistakes that are sometimes evident in design—tenant mix, marketing, management, or finance. At that point, the public entity should take responsibility as a project partner to correct the problem, even if dramatic steps are required (e.g., firing a developer, refinancing bonds, or re-leasing spaces with new positioning). The jurisdiction should be transparent with the community (without violating development agreement confidences) and firmly move forward.

- **Not all developers will succeed as promised**: Public entities have difficulty recognizing the nuanced but important differences between developers, and frequently choose the wrong developer for a project. Whether the developer is inexperienced in transit-supportive developments, not sufficiently capitalized, lacks understanding of public-private partnerships, or gets in over his/her head, the outcome is the same—the relationship between the public entity and the developer becomes difficult.

  Legal agreements are needed to set out performance milestones for each party, with consequences for default. The public sector must hold the private sector developer accountable. Public partners often fear public relation challenges, legal concerns, lack of immediate alternatives, and embarrassment over unsuccessful public request for proposals process. These concerns are all legitimate. But more often than not, moving forward on a project is the right choice. When bonds are issued on a project, they need to be kept current, and every project needs to have strong leadership and developer expertise to succeed.

- **Explain defaulting on bonds**: When bonds default, even if the bonds are issued by an authority or special district separate from the jurisdiction, there is clearly an effect on municipal bond investors. Investors will question whether the credit of the jurisdiction is as good as they had thought, and wonder whether the default was caused by a market-wide condition or a project weakness. It is important to explain the situation accurately to the public and to the investment community and to dispel fears about the credit worthiness of the jurisdiction. It can be done effectively, primarily because the event is a rare occurrence.

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E. Economic Benefits of Transit-Supportive Development

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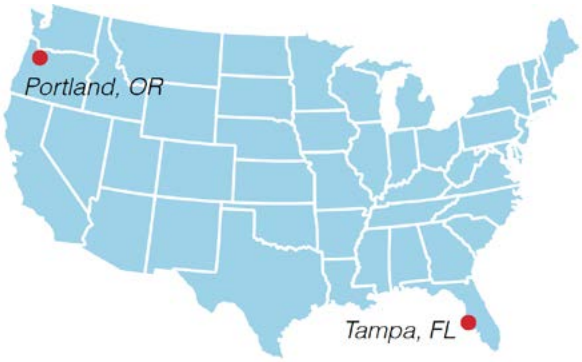


This section delves into the issue of economic benefits of completed transit-supportive development and provides two case studies demonstrating its benefits. In another section of the Guide, "Assessing the Potential for Economic and Environmental Benefits of Transit-Supportive Development," information is provided on how regional and local transit agencies, development organizations, and city governments can assess the economic and environmental benefits of transit-supportive development.

Transit-supportive development is the use of effective and reliable transit to encourage surrounding development, which, in turn, supports transit by increasing ridership and revenues. Convenient access to transit can be key to fostering mixed-use development. Increased density and mixed-use in station areas not only supports transit, but can lead to increased economic development and environmental benefits.

Public transit had a longstanding tradition of shaping the urban landscape, until the advent of the automobile. Post-World War II, the focus of public transit policy shifted more to the social objectives of serving a transit-dependent population and less on addressing broad economic and land use issues, and the environmental benefits of transit.

With the advent of light rail transit and more recent reintroduction of streetcar systems, national attention is coming full circle, suggesting a

rebalancing of economic, environmental, and equity interests. In evaluation and prioritization of transit projects, local project sponsors and planning agencies are placing greater emphasis on a broader range of evaluation criteria to include economic development, environmental benefits, and cost effectiveness. This requires practitioners to use new tools for the planning and delivery of integrated systems for transit, higher-density and mixed-use development, and related public services.

The reconnection of transit to economic development in decision-making extends back 30 years to the light rail and station area planning of the 1980s and 1990s. With early projects aimed at facilitating transit-supportive development, much of the subsequent reporting of economic benefits was based on anecdotal accounts. More systematic quantification and testing of results have followed, albeit not always done rigorously or comprehensively. The process of studying the economic benefits of transit-supportive development is still in an embryonic stage, especially with regard to articulating dependable rules that can be applied to a wide range of scenarios.

Assessing Economic Benefits

When determining the economic benefits of transit-supportive development, specific metrics of success are quantified. Typically, indicators of economic impact include constructed or rehabilitated building space, jobs, wages, and spending (see Table 2E-1). These effects can be distinguished between one-time construction versus longer-term (ongoing) benefits. For some communities, it may be useful to calculate site-specific direct effects and indirect/induced multiplier effects benefitting the larger regional economy.

Table 2E-1

Economic Benefits of Transit-Supportive Development

Type of Benefit Experienced		Metrics
Economic Development	New construction & building rehabilitation	• Added building square footage (by use) • Increased market and taxable valuation (improvements & land valuation with associated property income gains)
	Direct & multiplier effects	• Added housing • Construction and long-term jobs/payroll • Added local and regional spending • State & local tax revenues
	Transit "premium"	• With and without transit scenarios

A challenge to assessing the economic benefits of transit is how to separate the transit effect from other factors that affect development. This longstanding question asks, "but for" the transit investment, would the development have occurred? Experience across the U.S. indicates that transit seldom makes the difference solely on its own. Other factors that influence development include perceptions of regional and local market opportunity, provisions of other key public infrastructure, availability of large underutilized redevelopment sites, master-

planned development projects, and place-making investments. The specifics vary depending on the nature of each project–its scope, location, and timing.

The types of economic development benefits that can be identified and quantified are provided in Table 2E-1. Transit "Premium" refers to the added or incremental gain in development or property valuation gained as a result of the transit investment that likely would not happen otherwise.

Specific examples of how these metrics have been applied retrospectively (in Portland and Tampa) are provided later in this section. The section of the Guide titled "Assessing the Potential for Economic and Environmental Benefits of Transit-Supportive Development" illustrates how economic development metrics can be applied prospectively— prior to construction—to transit-supportive development projects. Examples include planning that has been undertaken in Boise, Reno, and San Antonio.

Statistical modeling can be used to quantify the relationship between economic benefits and transit-supportive development, but the research is expensive and requires substantial data. An alternative approach for emerging transit technologies is to focus on the experiences of places with recent transit investment as a means to better assess the added increment, or development premium associated with transit.

Economic Benefits of Existing Transit-Supportive Developments: Case Studies

Demonstrating best practices in transit-supportive development is readily illustrated from the experiences of communities that are actively working to forge the transit-development nexus.

Retrospective case studies for two cities that have realized economic development associated with new transit systems are presented in this section. Portland represents a city that has made investments over the last three to four decades in multiple transit modes–bus/transit mall, light rail transit, and streetcar–each with the explicit objective of serving to facilitate and leverage mixed-use development. Tampa reintroduced an historic streetcar with the goal of reinforcing a vibrant tourism industry, and attained the unexpected benefits of urban residential and mixed-use development.

For each case study, information is provided to set the historical context and background for the completed transit investment. This is followed by discussion of the resulting benefits and lessons learned.

Case Study 1: Portland Transit – A Mix of Modes

With approximately 570,000 residents in a metro region of 2.2M, Portland provides a useful case study of economic benefits realized from transit-

supportive development. Oregon is noted for its adoption of the nation's first comprehensive land planning system in 1973. The City of Portland is recognized as a national leader for explicitly linking transit investment to economic development over a time frame extending back several decades.

Portland has experience with multiple modes of transit including bus and a downtown transit mall, light rail, streetcar, and an aerial tram. Portland has demonstrated a commitment to documenting private residential, commercial, and mixed-use development occurring in conjunction with transit, including continued re-assessment and adaptation from lessons learned.

Historic Context

Like it did in many American cities, transit played an important role in shaping Portland almost from its inception. Incorporated in 1851, eight years before Oregon's statehood, Portland's public transportation system was initiated in 1872 in the form of a horse- and mule-drawn trolley. By the 1890s, steam and electric streetcar lines were in place. It was commonplace for these transit lines to be installed by land developers to promote new subdivisions extending in multiple directions from the city center. Streetcar commercial districts became the activity centers and main streets that still anchor Portland's close-in neighborhoods.

After World War I, petroleum-fueled vehicles began to displace public transportation. Resurgent transit ridership was experienced during World War II with major shipyard developments in Portland. However, by the 1950s, the last city trolley bus lines were terminated as transit ridership dropped to one fifth of its wartime level, completing transit is transition to a smaller, all-gas bus system.

Following passage of new legislation by the Oregon legislature, the City of Portland created the Tri-County Metropolitan Transit District (TriMet) in 1969. After subsequent litigation and a transit worker's strike, TriMet assumed operations of Rose City Transit in December 1969.

Toward a Diversified Transit Portfolio

With the apprehension about regional air quality violations and neighborhood disruption, voters rejected a proposed Mt. Hood Interstate Freeway in 1973. The resulting reallocation of federal funds paved the way for development of the Portland Transit Mall as an exclusive bus/pedestrian mall in 1978. In addition to addressing regional air quality and transportation congestion issues, investment in the transit mall aimed to serve as a catalyst for revitalizing the downtown office and retail district.

Three years later, construction began on a 15-mile light rail transit (LRT) starter line, with LRT service beginning in 1986. Branded as MAX (Metropolitan Area Express), the initial phase of what is now the Blue Line (Figure 2E-1) was augmented

by multiple line extensions, totaling a 52-mile MAX light rail system as of 2012. Four MAX lines now account for a combined total of 87 stations. An added 7.3-mile Portland-Milwaukie LRT extension is scheduled to open in 2015.

In 2009, using existing freight rail tracks, TriMet also opened the 14.7-mile WES (Westside Express Service) commuter rail line serving the suburban communities of Beaverton, Tigard, Tualatin, and Wilsonville. The integrated regional transit system also includes continued operation of 79 bus lines across the urban portion of the metro region's 3 counties.

In 2001, Portland's transit portfolio expanded with reintroduction of streetcar service in the downtown Central Business District (CBD) and adjoining redevelopment areas (Figure 2E-2). The initial 2.4-mile segment, running from Portland State University to a major regional medical center in NW Portland has been extended with three segments, now totaling four miles. Portland Streetcar is owned and operated by the City of Portland in partnership with TriMet. Operations are managed by the nonprofit organization Portland Streetcar, Inc. In September 2012, a 3.3-mile extension to the east side of the Willamette River, known as the Portland Streetcar Loop project, was completed.

Source: E. D. Hovee & Company, LLC.

Figure 2E-1 *Portland MAX Blue Line*

Source: E. D. Hovee & Company, LLC.

Figure 2E-2 *Portland Streetcar with Modern Vehicles*

Long-term planning is aimed at reintroducing a multi-line citywide network with the Portland Streetcar System Concept Plan. Table 2E-2 outlines the Portland Transit Portfolio.

Table 2E-2 *Portland Transit Portfolio*

Transit Mode	Features	Return on Investment (ROI)
Bus System	79 bus lines, 45.5M annual passengers (2010) - 58% of TriMet system	Bus achieves 28% fare recovery of operations costs. Downtown Transit Mall (initially opened 1978) has leveraged $30-$50 of public-private investment for every $1 of original capital investment; mall now includes bus and LRT with limited auto traffic; fully renovated including redesigned shelters in 2009 with the goal of incentivizing a 2nd wave of downtown core area reinvestment.
MAX Light Rail Transit (LRT)	52-mile system with Blue, Red & Yellow lines, 32.0M annual passengers (40% of TriMet system); additional 7.3-mile extension planned	Achieves 52% fare recovery of operation costs; longest operating Blue Line has resulted in approximately $6B of private investment concentrated in Portland's central city but with added development in proximity to stations along entire corridor.
WES Commuter Train & LIFT/Cab	Currently 1.3M annual passengers (2% of TriMet total)	Initially at 5% fare recovery of operations costs; development impact of WES commuter train still too early to determine with early phase operations affected by economic recession of 2007–2009.
Portland Streetcar	4.0M annual passengers on Westside 4-mile line (representing a 5% net addition to TriMet system ridership) (60% of streetcar line is in free rail zone).	Less than 10% of operations budget from direct streetcar fares and sponsorships; more than 90% from TriMet (including transfer fares) and City of Portland (including parking revenues); $3.5B of development investment had occurred in proximity to streetcar alignment (to 2008).

Sources: TriMet and Portland Streetcar, Inc., as of 2010–2011

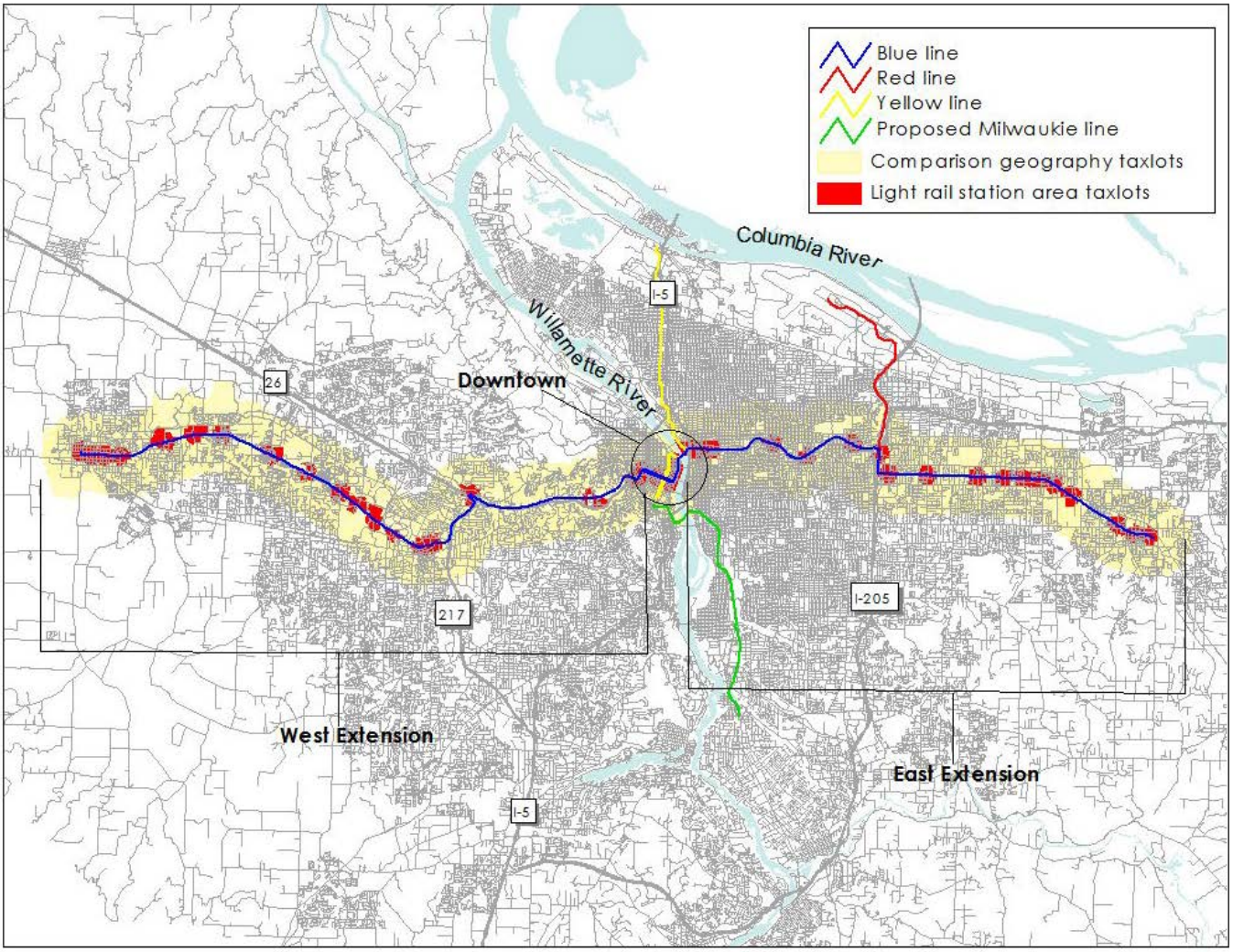
Getting to Benefits of Transit-Supportive Development

Portland first recognized the opportunity for transit-supportive development in the mid-1970s with construction of a downtown Transit Mall as an exclusive bus transfer zone on two parallel streets in the downtown core. Broader systemic awareness of corridor-wide potential for transit to stimulate development was advanced via phased implementation of a regional light rail system, with initial service beginning in the mid-1980s.

Benefits Realized— Portland's MAX Blue Line LRT

Since opening in 1986, the 15-mile eastside segment has experienced an estimated $5B+ in development investment, with a substantial portion in downtown Portland. The 18-mile Westside extension that opened 12 years later in 1998 provides service to the "high-tech" suburbs of Beaverton and Hillsboro, and has been associated with more than $1B of station area investment.

In 2008, an extensive evaluation of Portland Light Rail Transit Land Development Experience and Application was conducted for TriMet (E.D. Hovee & Company 2008). This assessment documents how development patterns have changed within a ¼-mile radius encircling each of the 51 Blue Line LRT stations, compared with experience extending to a broader corridor 1 mile on either side of the LRT alignment (as depicted on Figure 2E-3).



Source: E. D. Hovee & Company, LLC.

Figure 2E-3 *Portland MAX Light Rail Corridors and Blue Line Station Areas*

The evaluation was based on compilation of geographic information system (GIS)-based tax lot data for land within the station areas, totaling 3,000 acres, and for a comparison 1-mile corridor encompassing 28,600 acres. Tax lot market valuations were compared using GIS and assessor's data bases for 1999 and 2007. The database also captured new construction that may have occurred pre-1999 and extending back to 1986 when the CBD and Eastside light rail segments were first opened (using year of construction assessor's data). By comparison, the Westside extension was opened in 1998.

The large tax lot sample offered considerable variation as a means to assess factors influencing real estate development. Following are the principal findings of the overall evaluation:

- The rate of development experienced within the ¼-mile station areas was 69 percent greater than elsewhere for the wider 1-mile corridor extending along the entire LRT route.
- Benefits were especially pronounced for multi-family and mixed-use development. Station area capture of corridor-wide condominium development increased from 14 to 56 percent after the LRT investment. (Note: A more detailed review of the mix of residential and commercial uses was not possible because of the lack of specificity of assessor's tax lot data, especially with regard to mixed-use development.)
- Within station areas, increasing density of development was realized at an average Floor Area Ratio (FAR) of 0.65 above the density of development experienced elsewhere along these corridors.
- Low and moderate value lots redeveloped at rates of 50–100 percent above the redevelopment rates reported for similarly valued lots outside the LRT station areas. (Note: Low value lots were defined as properties where the ratio of improvements to land valuation was less than 0.5:1. Moderate value lots have improvements to land ratios ranging up to 1:1.)
- Vacant land availability did not appear to significantly affect the differences in rates and patterns of development inside and outside of a ¼-mile ring around each station; substantial vacant acreage remains within the ¼-mile station areas and in the remainder of the 1-mile corridor.

In sum, while this type of retrospective evaluation can be challenging in terms of its methodology and data availability, the resulting analysis confirms that MAX light rail has been a substantial development incentive along all segments of the Blue Line. The ¼-mile station area and 1-mile corridor evaluated for comparative development impacts around the Blue Line stations are highlighted in red and yellow, respectively, on Figure 2E-3.

The post-LRT assessment was used as a basis for projecting development that might be expected with a new 7.3-mile LRT alignment currently planned to extend from downtown Portland southeast to the older established suburb of Milwaukie. Based on the Blue Line experience, an approximately 36 percent LRT development premium is expected as added building space is projected to occur in the new station areas—beyond what would be expected in the absence of LRT. This added development can be anticipated as project funding commitments are achieved before and after the planned 2015 system opening.

The character of development experienced in proximity to stations may vary from previous MAX lines in two ways. First, the overall density of development attained with the new MAX line may be less than in other existing corridors because the market has not yet supported as much density for this sub-region as it has in other urban or suburban portions of the metro area. However, densities can be expected to increase substantially above existing conditions. Second, this will be the first

Portland area light rail line opened in a post-recession market environment that is experiencing a slow and uneven recovery. Fewer condominiums are likely to be built in the next few years. The greater near-term market opportunity will be for affordable multifamily rental housing.

Benefits Realized— Portland Streetcar

In 2009, the Portland City Council adopted a Portland Streetcar System Plan Concept Plan. This long-range plan is predicated on attaining a range of transportation, economic development, and environmental benefits during the initial phases of streetcar operations within Portland. For transit-supportive development, the plan observes that "as a development stimulus, the streetcar (to date) has been a resounding success. By 2008, private developers had invested $3.5B within two blocks of the alignment, including over 10,000 new housing units and 5.4M SF of office, institutional, retail and hotel construction." In-depth research of the post-streetcar investment and transit-supportive development experience in Portland was conducted in 2005 (E. D. Hovee & Company, LLC).

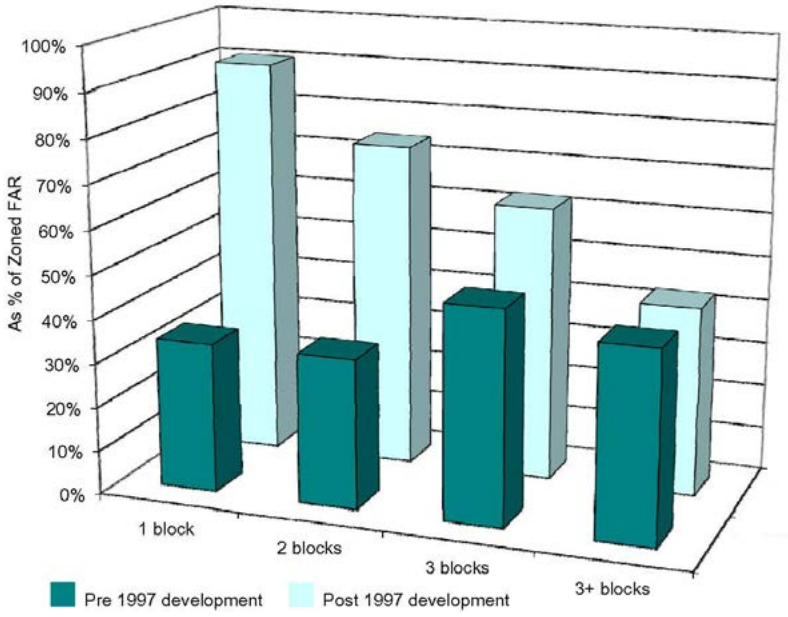
More detailed findings of this research are summarized to include:

- **Increased pace of development** – the Portland analysis indicates that sites within one block of the streetcar line experienced a 5.8 percent annual rate of additions to the existing downtown building stock (over a 7-year period) from new construction versus a 1.0 percent annual rate of increase at a distance of more than three blocks from the streetcar alignment. (Note: Because of the short distance between streetcar stops as compared with light rail, distances are measured from the streetcar line rather than from each station. In effect, the fine-grained nature of an urban streetcar allows for a more continuous pattern of transit-supportive development than is the case with transit modes where stations are more widely spaced).
- **Shifting development preferences** – the Portland Streetcar has connected and stimulated new uses and encouraged economic vitality extending from the NW 23rd Street retail corridor through the newly emergent Pearl District; which includes mixed-use redevelopment of a former rail yard, to the west end of downtown and Portland State University; and recent extensions to the South Waterfront, which now includes a separate tram connection to the city's largest employer—Oregon Health and Science University. After the streetcar investment was secured, lots within one block of the streetcar alignment captured 55 percent of all new development within neighborhoods where the streetcar ran. Pre-streetcar (prior to 1997), these same blocks represented less than 20 percent of the total building inventory in the downtown/Pearl District area. Together, properties situated within three blocks of the Portland Streetcar went from capturing 47 percent of area development pre-1997, to 75 percent post-1997 with the streetcar (see Figure 2E-4).

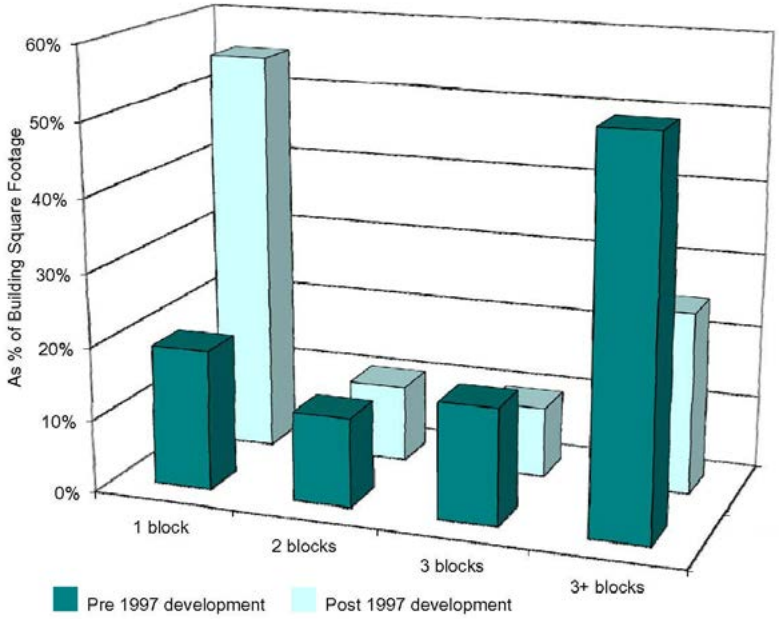
Figure 2E-4

Portland Streetcar Development and Density Impacts

Distribution of New Development by Distance from Streetcar Alignment



Density of Development by Distance to Streetcar Alignment



Source: E. D. Hovee & Company, LLC, *Portland Streetcar Development Impacts*, prepared for Portland Streetcar, Inc., November 2005.

Economic Development Modeling & Portland Streetcar

Prior to the construction of the first phase of Portland Streetcar (opened in 2001), no detailed corridor-wide modeling was conducted to estimate development that might be expected post-streetcar. Pre-streetcar analysis was prepared to estimate the increase in property valuation to support a proposed property assessment district to pay for a portion of project capital costs.

However, detailed analysis was conducted related to key-catalyst planned projects dependent on the Portland Streetcar investment. Most notably:

- The first-phase streetcar alignment was selected in conjunction with a city development agreement with the private developer, Hoyt Street Properties. The mixed-use redevelopment project was a redevelopment of a 41-acre former rail yard just north of downtown at minimum densities and with targets for affordable housing. Commitment for city improvements, as part of a public-private development agreement included removal of outdated and intrusive highway ramps, reintroduction of the historic 200 × 200-foot street grid, and public park space.
- Subsequent extension of the streetcar to a 125-acre South Waterfront situated south of downtown was similarly committed as part of a master plan process and development agreement with a private developer, North Macadam Investors. This included development for residential uses and expansion of the Oregon Health Sciences University medical center.

- **Increasing the density of development** – there is a proven relationship between the density of post-streetcar development and proximity to the streetcar line, with higher levels of density in development taking place near the line. Within one block of the streetcar line, post-streetcar development has achieved 90 percent of the FAR that the zoning regulations allowed.
- The ratio of development realized to the allowable zoned building height and density capacity steadily decreased as distance from the streetcar increased, to only 43 percent of zoned FAR for new development situated more than three blocks from the streetcar line. Post-streetcar, overall downtown and Pearl District development realized within three blocks of the streetcar line was three times the previously zoned capacity. While zoned densities in the traditional downtown core did not change appreciably, allowed densities increased significantly at the northern and southern ends of the core, in the Pearl and South Waterfront districts. This occurred with the 1998 adoption of an updated Central City Comprehensive Plan, concurrent with the commitment to reintroduce the first segment of a modern streetcar system.
- **Bringing residents back to the urban core** – with Portland Streetcar, the residential share of all square footage development increased from approximately 16 percent of the building fabric pre-1997 to 66 percent for

post-1997 development–about four times higher. More recently, the influx of residential activity with destination retail has also been accompanied by new office and incubator space evidencing a clear preference toward these new "hot spots" of mixed-use vitality.

- **Reusing vacant and underutilized property** – more than two-thirds (68%) of new development has occurred on parcels that had improvement to land value (I:L) ratios of less than 0.5—meaning that building improvements were worth less than half the assessed land value. Approximately 20 percent occurred on sites with I:L ratios of 0.5:1.0, and 12 percent to higher value parcels with I:L ratios of over 1.0. Land values typically increase with increased density of development, though this factor was not evaluated as part of the retrospective analysis.
- **Leveraging public-private partnership** – along with the streetcar line, a pivotal consideration affecting the location, pace and scale of recent Central City residential, office, retail and mixed-use development has centered on the negotiation of use of development agreements involving major property owners and development interests with consolidated land ownership.
- **Increased valuation** – a 2009 Brookings Institution's analysis for Portland, Seattle, and Tampa focused on increased development valuation for streetcar corridors, as compared with citywide trends. For Portland, early phase effects from 1997–2003 appeared particularly pronounced for raw land values, increasing at three times the rate of raw land values citywide. Commercial property values increased at 2½ times the citywide rate. Subsequent 2003–2008 gains were slower relative to the initial burst in activity for commercial properties, but with continued substantial valuation gains (relative to citywide) experienced for multi-family condominium and rental units, as well as for raw land (Brookings Institution 2009).

Application to Future Portland Transit Corridors

The willingness and ability to empirically document the observed (after the fact) relationship between transit investment and the associated real estate development for in-place corridors has proven useful for estimating prospective transit-supportive development with future transit corridors. This applies to future light rail and streetcar investments that are consistent with broader transportation system planning in Portland and throughout the metro area:

- Documentation of post-1986–1998 development of the two segments of Portland's first completed light rail corridor (Blue Line) has been used to estimate transit-supportive development potentials for station areas with a Milwaukie LRT line concurrently planned. This includes the assessment of the anticipated rate and resulting square footage of residential/commercial development and the density premium anticipated with station area proximity.

- Documentation of the downtown Portland and Pearl District development, the initial phase of the Portland Streetcar, and a review of the projects planned

by property owners and developers have been used to estimate development that might be expected in conjunction with the 2012 introduction of streetcar service east of the Willamette River—a 3.3-mile loop project extension that is the first streetcar project in the U.S. to receive FTA Small Starts funding. This assessment included evaluation of potential carbon footprint benefits of transit-supportive development in an urban setting compared with the suburban limited-transit alternative. In large part, this analysis was predicated on detailed regional travel data demonstrating substantial reductions in auto use, vehicle miles traveled, and auto ownership in areas offering "good transit and mixed-use," as illustrated by regional travel data provided in Table 2E-3. The combination of good transit and mixed-use also benefits other mode alternatives to the automobile—walking and biking. In Portland, the increase in bicycle activity has been particularly pronounced over the last two decades, with Portland often ranked as the most "bike friendly" city in the nation.

Table 2E-3 *Portland Metro Transport Mode Share by Transit and Land Use Character*

Land Use Type	Mode Share (as % of total)					Vehicle Miles per Day per Capita	Auto Ownership per Household
	Auto	*Walk*	*Transit*	*Bike*	*Other*		
Good transit/mixed-use	58.1%	27.0%	11.5%	1.9%	1.5%	9.80	0.93
Good transit only	74.4%	15.2%	7.9%	1.4%	1.1%	12.38	1.50
Remainder of Multnomah Co.	81.5%	9.7%	3.5%	1.6%	3.7%	17.34	1.74
Remainder of region	87.3%	6.1%	1.2%	0.8%	4.6%	21.79	1.93

Source: Metro 1994 Travel Survey

- A longer-term citywide Streetcar System Concept Plan was adopted by the City in 2009 after assessment of 29 potential corridors. Evaluation measures were organized on the topics of public support, technology and operations, transportation and transit service, economic development, urban form and land use, and green corridors. Economic development measures included assessment of corridor-specific vacant and underutilized lands and remaining development capacity (or "FAR headroom") as defined by current zoning. Green corridor measures are based on sustainable development and infrastructure-related policies, and on associated development incentives applicable to streetcar corridors, including opportunities to incorporate sustainable practices into the system plan and individual corridors.

As indicated in Table 2E-3, the region's 1994 travel survey provided an empirical underpinning to encourage mixed-use development in transit-rich locations. An updated Metro survey completed in 2012 demonstrates how travel patterns are continuing to shift in favor of this transit-development nexus.

Region-wide transit mode share has increased, especially for commuter trips in which the transit mode share went from 5.6 percent in 1994 to 10.9 percent in 2011. Mode share for walking has increased, with even more dramatic gains for

biking. Per household vehicle miles traveled (VMT) dropped by 27 percent due to fewer trips by auto and reduced average trip length.

Increased use of transit and biking is up most dramatically in the close-in portion of the Portland Central City surrounding the traditional CBD. Metro notes that this large increase can be attributed to improved light rail and streetcar service combined with a greater share of the population that increasingly matches housing location with lifestyle choices.

In effect, reduced reliance on the automobile offers economic benefit in the form of a more compact and walkable form of urban development. The result can be a more efficient urban area, with each household spending less of its budget on transportation, and spending less time lost on congested freeways. More household income becomes available for housing and other discretionary purchases. For businesses, benefits include greater access to vendors and customers and enhanced ability to attract and hold a quality labor force—especially young professionals.

Lessons Learned

As Portland looks ahead to expand its vision for transit-supportive development beyond the central core, three key lessons offer insights for the future:

- **Maintaining a tight and rationally-determined, urban growth management process has proven to be supportive of creating urban places with good transit and mixed-use development**. In the mid-1990s, Metro (as the regional planning agency) forecasted 500,000 added residents to the Portland metropolitan region over 20 years, with only 30,000 of the increased number of residents expected to come from Portland. The City of Portland requested a higher allocation of 100,000.

  In response to the question of where the added in-city residents would live, Portland proposed an added 30,000 new residents in the Central City, a goal that seemed unimaginable at the time. This broad planning commitment served as a catalyst for subsequent public policies needed to make the residential development happen, including application of tools such as urban renewal, streetcar introduction, and urban place-making.
- **What works well for the downtown core area is different from what will work along other neighborhood transit corridors across the city and region**. The scale of neighborhood development should be expected to remain smaller and more fine-grained even with increasing density.

  Determining how best to transition and step down density between transit corridors and adjoining, established single family neighborhoods is more challenging. While pivotal in the urban core, master development agreements involving large catalyst projects that serve to justify a large transit investment may occur less frequently elsewhere in the city as redevelopment sites tend

to be smaller. Private reinvestment may involve more infill development plus adaptive reuse of existing structures. Zoning may be more restrictive in terms of the densities and mix of uses allowed. Consequently, transit-supportive development strategies need to be carefully tailored to site-specific and corridor-wide attributes and limitations that are distinctive to each route considered.

- **The wave of real estate prosperity associated with light rail and streetcar through the first decade of this century may not happen again anytime soon**. Through 2015 and perhaps beyond, transit-supportive development will need to occur in a more subdued and uneven period of economic recovery, with the challenges of obtaining financing combined with real estate project values not as supportive of the costs associated with urban development.

  At the same time, it is important for communities like Portland to stay the course, capitalizing on clear consumer, resident, and business preferences for urban, mixed-use, and green development that have persisted even through the economic downturn. Transit has proven to be a catalyst for residential and mixed-use development. Attention to its capacity to foster even greater competitive advantage for business and job development may prove to be more important in the years ahead.

  For Portland, staying the course has continued to yield economic development benefits despite a slower pace of economic activity through the 2007–2009 recession and beyond. In September 2012, Portland Streetcar service was extended to the east of the Willamette River (opposite the historic downtown core), as the first FTA Small Starts-funded streetcar project in the nation. Through the FTA application process, forecasts of anticipated transit-supportive development were provided, which included committed projects. Four years later, with 2012 actual project opening, the total number of eastside development projects and dollar volume is currently less than it was when the project was being planned. However, the number of eastside residential projects and total units is greater than previously planned, indicating strong renewed residential multifamily demand for young urban professionals. A significant post-recession shift has been in residential product type, changing from condominium development to apartment development.

  Planned commercial space (as of 2012) remains impressive despite the low rate of job recovery nationally and regionally. However, renewed—if not stronger than pre-2008—commercial interest can be expected as job growth intensifies, especially for creative service employment in urban flex buildings. As has been increasingly realized by Portland's Pearl District, strong commercial retail and office development interest has tended to follow the urban residential pioneers.

  Note that planned project activity is robust once again on Portland's west side, which has already experienced substantial public-private investment

extending back to initial introduction of streetcar service in 2001. This reflects the ongoing transit-oriented appeal for urban residential and employment, with the added incentive of increased streetcar frequency due to the opening of expanded loop service.

Case Study 2: Tampa – Reintroduction of Historic Streetcar

With 344,000 in-city residents in a rapidly growing region of 2.9M, the city of Tampa has become the 19th largest metro area in the U.S. Drawing from a rich streetcar tradition Tampa reintroduced the vintage Birney replica streetcar in 2002. While initially aimed to further enhance Tampa's visitor appeal, the streetcar has also served to boost Tampa's in-town residential and mixed-use development appeal.

Historic Context

Electric streetcar service was first introduced to Tampa in 1892. Streetcars quickly became "an essential part of everyday life as workers took the streetcar downtown and to the cigar factories of west Tampa" (www.tecolinestreetcar.org). The streetcar system also played an important role for recreation, providing service for activities ranging from weekend picnics to attending ball games.

The system reached peak popularity in the 1920s, carrying almost 24M passengers in 1926 with 11 major routes and over 190 Birney Safety Streetcars on 53 miles of trackway—the most extensive in Florida. Ridership began to decline, with a temporary revival during World War II. Service terminated in August 1946 as buses replaced the electric streetcar system.

The Tampa Electric Company (TECO) Line Streetcar System

The Tampa & Ybor City Street Railway Society launched a "catalyst" effort in 1984 to restart the Tampa Electric Company (TECO) Line Streetcar System. In 1994, a business plan was prepared and approved, with construction authorized. As system manager, the nonprofit Tampa Historic Streetcar, Inc., selected the Hillsborough Area Regional Transit Authority (HART), Tampa's regional transit agency–to manage day-to-day operations and maintenance.

A 2.3-mile Phase 1 line opened in October 2002 at a construction cost of $32M. The purchase of property for a transportation center and construction of a car barn brought the total capital cost to $58M. In January 2003, the initial line was extended by 0.2 miles to the Tampa Convention Center. An additional ⅓-mile (Phase 2a) extension, completed December 2010, provides more direct service into Tampa's Central Business District which has approximately 35,000 downtown core office workers.

First-phase project funding was provided with more than 60 percent of capital costs from federal and state sources through a partnership between the City of Tampa, the U.S. Department of Transportation, and the Florida Department of Transportation. Operating revenue is obtained from a special assessment district, a private endowment fund, fares, and advertising.

The endowment was initially capitalized with funds from demolition of a People Mover (monorail). Harbor Island owners were prepared to pay $5M to discontinue the service. This payment was used to demolish the People Mover, leaving $4M to deposit in an endowment fund for streetcar systems operation. Funding was supplemented by naming rights for individual stations and streetcars associated with the system.

The 11 streetcars of the TECO line are modern replicas of the historic Birney cars (Figure 2E-5), the first streetcars built in the U.S. with factory-installed air conditioning. In its first year of operation, TECO carried 432,000 passengers, more than 20 percent above initial projections. Ridership with seven-day-per-week service has stabilized in the range of 400,000 passengers per year.

Figure 2E-5

Tampa Historic Replica Streetcar

Photo by Bobak Ha'Eri, February 25, 2006, licensed under CC-BY-SA-2.5 <http://creativecommons.org/licenses/by-sa/2.5/>, from Wikimedia Commons <http://commons.wikimedia.org/wiki/File:YborCityTampaFL01.jpg>

With the most recent 2010 Phase 2a extension (Figure 2E-6), TECO provides 11 station stops along its current 2.7-mile route. Four stops are in historic Ybor City, another five in the Channel District, and two downtown.

Station stops are designed to fit the architectural character of each district served. Ybor City stations look like historic train sheds with wrought iron railings and slate shingle roofs. In contrast, Channel District streetcar stops reflect the "sleek industrial architecture" that dominated this formerly industrial and now emerging residential and mixed-use neighborhood.

Figure 2E-6

Tampa TECO Line Streetcar System (with Phase 2a Extension)

Source: TECO Line Streetcar System, <http://www.tecolinestreetcar.org/extension/streetcar_phase_2a_800px.jpg>

Public investment in the streetcar and related amenity development has affected surrounding neighborhood character and resulting development interest. Independent research by the Brookings Institution includes the observation

that "after public investments were made, the industrial uses of the Channelside district, separated from downtown by a major freeway, began to change" (Brookings 2009). Of particular note is that the Southern Transportation Plaza at the system terminus increases ridership appeal with connections to taxis and local and charter bus service.

As originally planned, TECO was oriented primarily to serve and link pivotal Tampa visitor destinations. Tampa's "visitor's crescent" includes the Convention Center, Ice Palace, Garrison Seaport, Florida Aquarium, and the historic Ybor City retail/entertainment district.

Streetcar usage is augmented by special events and conferences. Hotels market and sell streetcar passes and feature streetcars with their advertising and promotional materials. City installation of wayfinding signs and encouragement of "park once" facilities has made both the Channelside District and Ybor City more user-friendly to occasional visitors from outside the community.

Benefits Realized

Like Portland's initial streetcar investment, there was no detailed advance assessment of prospective development potential. Subsequent investment has been documented locally and by a Brookings Institution national study. Benefits identified include:

- Stimulating real estate investment – less than four years after opening, more than $600M of new private development was realized along the 2.4-mile TECO Line Streetcar System. Included were about 2,500 dwelling units completed or under construction in the downtown/Channel District, with an additional 5,500 dwelling units planned. While development has slowed with the economic recession, total investment associated with the streetcar alignment is estimated to approach $1B as of 2010.
- Increased valuation – the 2009 Brookings analysis indicated that median values of multi-family (condominium and rental) property along the streetcar line increased by 118 percent, better than 25 percentage points above the 92-percent increase experienced citywide. Valuation of hotel properties increased by better than 78 percent versus a citywide gain of 44 percent for a nearly 35-percent streetcar premium.

  The greatest value appreciation occurred with vacant land–up by 166 percent, but below the rate of increase experienced citywide. Channelside property values increased by a substantial 313 percent, reflecting the large amount of new development including conversion from industrial to mixed-use.

  In contrast, the already developed district of Ybor City experienced an overall median valuation increase of 71 percent. The Brookings study explains that zoning restrictions on new development plus what has been described as the "party atmosphere" of Ybor City may limit the residential appeal of the district. Additionally, the TECO in Ybor has operated more as transport for

tourists during midday hours and not as much as a transport mode meant to serve a broader range of trip types.

As a final observation, the Brookings study emphasizes the importance of large development parcels to the level of redevelopment that has occurred.

> It should be noted that much of the development in the streetcar corridor came on large industrial or vacant parcels that were ready to be redeveloped. The properties in the Channelside District that have since been redeveloped into condos and high-rise apartments were in a prime location close to downtown. However, their potential before streetcar was likely limited due to their separation from downtown by the freeway and no transportation connection other than auto. With the introduction of the streetcar, many places along the line became connected and each district seems less distant than before (Brookings 2009).

The Tampa Streetcar/Economic Development Nexus

Tampa's investment in an historic replica streetcar system is paying dividends in economic development as well as a functional way to move people....

Tampa had struggled to create an identity that combined its downtown with historic Ybor City, and the new Channelside entertainment and residential district. In many people's minds, they seemed unrelated, despite their close proximity. The streetcar system made the connection. It has become the iconic link to Tampa's urban lifestyle, creating an entirely new identity for the city. This new identity combines entertainment, jobs, and services in the city core. Downtown, Channelside, and Ybor have become one through the streetcar line.

Of equal importance, the new streetcar system offers downtown employees and visitors an opportunity to park their personal vehicles in one place and experience the interesting things to do in Tampa. This "park once" environment works as well for downtowns as it does for shopping malls, and has greatly benefitted cities with streetcar systems. The streetcar, and the related sidewalk, lighting, and aesthetic improvements to the walking environment, create increased shopping activity that benefits merchants and visitors alike, and it reinforces the sense of place.

Since being announced, numerous developers have sought to position projects near the new streetcar line. Housing, both new and converted, has become a hot commodity along the line, with developers prominently advertising their proximity to the streetcar line.

Excerpted from Tampa Historic Streetcar, Inc.., "Tampa's TECO Line Streetcar System: Inventing the Future – Respecting the Past," April 2004

Lessons Learned

The TECO Line Streetcar System has exceeded expectations for increased ridership and tourism-related business. An unexpected but pleasant surprise has come with the opportunity to create a new residential and mixed-use neighborhood in Channelside replacing outdated and underutilized industrial space. This is due largely to the perception of improved connectivity with the downtown core.

Major lessons learned from the Tampa streetcar experience:

- **Streetcar systems can serve as a catalyst for more than enhancing tourism**. As noted in national research conducted by TCRP for Tampa: "When the streetcar was being planned, no one would have conceived of high density in proximity to the line" (TCRP 2010).

  By 2006, there was growing recognition that the "mission of the streetcar system will evolve from its current mission of primarily serving visitors" (English 2006). Increasingly, streetcar has become viewed as a means to further encourage downtown housing and density. The changed emphasis of the policy is augmented with added research by HART, which found that people who typically will not utilize bus transit will travel by streetcar. As demonstrated by the 2010 extension into the downtown core, the streetcar system is also seen as a means to better enable professional services and employees to move more freely in the downtown area to conduct business.
- **In Tampa, streetcar is recognized as contributing to, but not the sole cause of new development**. Other factors of importance have included strong economic growth in the years just after the streetcar opened coupled with renewed interest in urban living and public-private commitment to urban place-making.

  Specifically noted are substantial public investments in a rebuilt waterfront park with a river walk and new museums - what one city official has described as "a lot of place-making." In effect, streetcar contributes another amenity toward an urban fabric that is proving especially appealing to a younger demographic (under age 35) and secondarily to an older, more affluent age cohort (age 55+).

  Benefits to the already well-established historic district of Ybor City, where new construction and building densities are restricted, are appropriately viewed from a different perspective. In Ybor, economic benefits (which have played a lesser role than for the Channelside district) have accrued for new development, as a boost to existing retail, and as added incentive for building rehabilitation.

Resources

For more information on investments and economic benefits, refer to the Urban Land Institute's "10 Strategies for Attracting Investment Near Transit: Lessons Learned from the San Francisco Bay Area" (http://www.ulisf.org/wpLoc/wp-content/uploads/2011/05/111011_ULI-TOD_Report_web.pdf) and Reconnecting America's "Communicating the Benefits of TOD: The City of Evanston's Transit-Oriented Redevelopment and the Hudson Bergen Light Rail Transit System" (http://ctod.org/pdfs/2006CommunicatingBenefitsTOD.pdf).

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F. Economic and Environmental Benefits of Transit-Supportive Development

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This section describes the current best practices used to assess the potential for economic and environmental benefits of transit-supportive development. It focuses on the processes that regional and local transit agencies, development organizations, and city governments can use to assess the potential and actual economic and environmental benefits achieved from transit-supportive development. In another section of the Guide, "Economic Benefits of Transit-Supportive Development," information is provided on the realized benefits of transit-supportive developments.

Section 2F is divided into three parts: 1) the metrics used in economic and environmental benefit analysis; 2) a step-by-step guide for evaluating pre- and post-transit investments for communities considering transit investments as a means to incent and shape development. Recognizing that the integration of transit with development and environmental benefits is rapidly evolving, the information represents a current synopsis, or snapshot, of best practice methodologies for the practitioner; and 3) case studies of three communities planning substantial transit investments with the aim of leveraging private mixed-use development and reshaping their cities. Early-phase experiences (as of 2011–2012) with planning for transit-supportive development are profiled for Boise, Reno, and San Antonio. Following the case studies are lessons learned from the experiences of these three cities.

Why Evaluate Benefits of Transit-Supportive Development

Evaluating the potential economic and environmental benefits of transit-supportive development provides valuable information for:

- Development of criteria pivotal in determining the need for added or reconfigured transit investment, including evaluation of comparative benefits associated with alternative transit corridors
- Making the case to the local private sector and other stakeholders for value capture funding by applying local resources that may be available from tax increment funding, property and business assessment districts, parking, or other dedicated revenue sources, all of which depend on "monetizing" expectations for added development, business and/or property valuation increases
- Enhancing community outreach to better inform public understanding of transit alternatives and implications in advance of major decisions for transit route selection and funding
- Building interagency and inter-jurisdictional cooperation, which is especially important for corridors likely to involve funding from multiple public sources and/or operate across more than one jurisdiction
- Determining the need for supportive public-private initiatives, ranging from altered land use regulations that facilitate increased density and mixed-use, to marketing the system to riders and prospective corridor businesses and residents
- Fine-tuning transit and development expectations based on early-phase actual experience as a means to inform choices for subsequent system expansion with new or reconfigured routes that are consistent with a community's comprehensive transit system planning process

Economic and Environmental Benefit Metrics

The reconnection of transit to economic development in decision-making extends back 30 years to the light rail and station area planning of the 1980s and 1990s. With early projects aimed at facilitating transit-supportive development, much of the subsequent reporting of economic benefits was based on anecdotal accounts. More systematic quantification and testing of results have followed, albeit not always done rigorously or comprehensively. The process of studying the economic benefits of transit-supportive development is still in an embryonic stage, especially with regard to articulating dependable rules that can be applied to a wide range of scenarios.

It is important to determine what geographic scale—regional, corridor wide, or citywide—should be used for conducting an analysis. In some cases, specific station area evaluation may be important. Major transit system capital investments are typically made on a corridor-wide scale, the primary focus of this discussion.

Economics – The Transit/Development Nexus

When assessing the potential for economic benefits, the following two primary questions regarding benefits should be addressed.

What are the metrics of success?

Indicators of economic impact cover variables such as new or rehabilitated building space, jobs, wages, spending, and tax revenues. These effects can be distinguished between one-time construction versus longer-term (and ongoing) benefits. For some communities, it may also be useful to calculate site-specific direct effects and indirect/induced (or multiplier) effects benefitting the larger regional economy. Getting to these standard estimates requires the ability to forecast new construction and/or property rehabilitation that may be stimulated by a transit investment measured in metrics such as building square footage, mix of residential, commercial, and civic uses, and the resulting property valuation. Metrics of property valuation can be differentiated to cover changes to market valuation of land and/or of building structures. Property valuation can increase in response to new construction, building rehabilitation, and/or improvements in property rental or sales values, even in the absence of construction. Table 2F-1 summarizes these overall metrics.

Table 2F-1

Tampa TECO Line Streetcar System (with Phase 2a Extension)

Type of Benefit Forecast/Experienced	Metrics	
Economic Development	New construction & building rehabilitation	• Added building SF (by use) • Increased market and taxable valuation (improvements and land valuation with associated property income gains)
	Direct & multiplier effects	• Added housing • Construction and long-term jobs/payroll • Added local and regional spending • State and local tax revenues
Environmental	Reduced carbon footprint (compared to suburban development alternative)	• Transportation (less auto use and VMT) • Development (added density, less footprint per resident or job)

How can the role of transit be separated from other factors that also affect development?

The longstanding question asks, "but for" the transit investment, would the development have occurred? Experience across the U.S. indicates that transit seldom makes the difference solely on its own. Other factors that influence development include perceptions of market opportunity, provisions of key public infrastructure, and place-making investments. The specifics vary depending on the nature of each project–its scope, location, and timing.

Environment – Shrinking the Carbon Footprint

Table 2F-1 also serves to illustrate potential metrics related to environmental benefits of transit-supportive development. While there are numerous specific environmental factors to consider in any environmental assessment, the carbon

footprint represents a useful single composite measure of overall quantifiable and potentially monetized impacts of environmental importance, comprising:

- **Transportation footprint** – with the carbon impact calculated based on factors including VMT, carbon dioxide (CO_2) emissions per VMT, and resulting CO_2 emissions per residential or commercial development unit
- **Development footprint** – calculated based on typical CO_2 emissions per unit of residential or commercial development multiplied by number of development units (including effects of construction and ongoing operations)

While the carbon footprint is typically evaluated at a building- or project-specific level, it is more relevant for transit investments to make assessments on a corridor-wide basis, covering the area where residential and business activity will be most directly affected by improved transit service. While assessments of environmental consequences can be made on a stand-alone basis (covering only the corridor in question), a better understanding of how a shift toward transit-supportive development may affect the CO_2 footprint of the larger community is most relevant. This occurs when more households and businesses make decisions to locate in higher density urban communities where there are good transit systems.

With transit investments, a useful comparison is between the carbon footprint typically associated with a pattern of low-density suburban development versus high-density urban development. The high-density alternative should yield carbon footprint savings due to less auto use and fewer miles traveled (good transit) coupled with more compact residential and employment uses (mixed-use). Environmental benefits associated with a good transit/mixed-use option can be estimated on a corridor or community basis.

Guide for Pre-and Post-Transit Investment Evaluation

How can regional and local transit agencies, development organizations, and city governments go about the business of assessing the economic and environmental benefits of transit-supportive development?

The discussion begins with two summary checklists intended to serve as overall guides for key steps to consider:

- Pre-transit – forecasting economic and environmental benefits before the transit investment is made
- Post-transit – retrospectively assessing development actually experienced after the transit investment has occurred

Pre-Transit Investment Checklist

As depicted in Table 2F-2, there are seven steps to consider in evaluating prospective economic and environmental benefits prior to the commitment to construct and provide service in a new or reconfigured transit corridor. Significant preparation including data collection work is required for this type of analysis–as noted in Steps 1 to 3. The without and with transit forecast scenarios illustrated by Steps 4 and 5 represent the core of the evaluation process.

Table 2F-2 *Pre-Transit Investment Checklist for Benefits Evaluation*

Steps	Comments
1. Set corridor(s) to evaluate.	• Could be a single corridor, multiple (or alternative) corridors, or as a template for a city/region-wide transit system plan
2.Define transit benefit areas.	• Typically up to ¼mile for streetcar/BRT, ¼-½ mile for light rail, and up to 1 mile for heavy rail • Consider zones by distance from corridor or station (with closer properties anticipated to receive greater benefit)
3. Compile base data for study area/ transit benefit zones.	• Typically involves use of GIS/Tax Assessor data (as available) • Metrics to cover include ownership, land area and building SF by use, year built, market and taxable property valuation • Include demographics to better assess market demand opportunity • Use database to estimate recent construction, improvements to land valuation, vacant parcels and parcels that can be redeveloped (or FAR headroom), density of development (FARs) per SF building valuation by use • Identify current characteristics of transportation and development carbon footprint (measured as CO_2 emissions per VMT and per added household or job)
4. Prepare no-build or without-transit forecast scenario(s).	• Options for extrapolating recent development experience, adjustment for projections of future metro or study area growth compared to experience, and/or information regarding planned real estate projects (as identified by key property owners and developers) • Set time frame of post-transit forecast (e.g. 5-, 10-, 20-year) • Critical to account for expectation of the economic recovery from 2007–2009 recession and new economic growth trajectory • Forecast outputs of added residential and employment space, land area affected and incremental valuation (by use), remaining development capacity and added carbon footprint vs. the suburban alternative
5. Prepare with transit development scenario(s).	• Draw from experience of other local corridors or cities to estimate the gain in development by zone distance from corridors or station areas (e.g., aggressive and moderate benefit scenarios) • Assign residential vs. employment (and public/exempt use) based on experience locally or with similar transit investment • Similar forecast outputs as in the without-transit scenario • Estimate added land value associated with increased FAR
6. Calculate expected transit premium and value capture opportunity.	• Identify net development, valuation and carbon benefits with transit • Evaluate options for value capture (from tax increment, assessment district, dedicated tax/other revenue sources) • Project annual increments (to support capital/operating costs)
7. Identify conditions to realize with-transit results.	• May include broad parameters of U.S. and regional economic vitality, supporting local public-private investments, place-making and marketing, and required rates of residential/employment market capture

Assumptions regarding future prospects can be based on data that characterizes existing conditions and past development trends, locally and in comparable transit projects. However, a major portion of the analysis inevitably focuses on factors that could prove transformational depending on the local dynamics of a particular community and transit corridor. Factors that typically need substantial vetting include:

- Local expectations about realistic prospects for future regional and corridor economic development compared to what was experienced prior to the 2007–2009 recession
- Whether the transit premium experienced elsewhere can be expected to be the same for a particular corridor, or need to be modified based on local business and real estate market dynamics
- The extent to which the shift to urban residential development experienced in multiple communities with transit-supportive development represents a reasonable and feasible local outcome
- How much reliance to place on past development trends versus currently planned development projects as an indicator of what kind of future development should be expected
- Realistic market opportunity to support higher density development with higher per-square-foot values as a result of transit and related placemaking investment

Steps 6 and 7 in Table 2F-2 are pivotal to determine how results of future scenarios and forecast processes will be used to inform the transit investment decision process. In an era in which local funding options are increasingly constrained, the ability to make the case for partial funding support via value capture mechanisms may be instrumental to closing any project funding gap and demonstrating community and private sector confidence in the transit-development nexus opportunity. Step 7 is important to secure the full range of related public-private commitments–beyond the transit investment itself–to assure successful outcomes 5 to 20 years in the future.

Post-Transit Investment Checklist

Table 2F-3 presents a checklist for jurisdictions interested in assessing actual development and/or environmental performance of the completed transit investment. Retrospective monitoring of what actually occurred, compared to what was expected, can be challenging to undertake as a local priority.

Table 2F-3 *Post-Transit Investment Checklist for Benefits Evaluation*

Steps	Comments
1. Identify purpose(s) of retrospective evaluation.	• May range from determination of added private investment to increased development density to value capture revenue generated • Purposes of review will determine data sources and methodology • Especially important to identify how results may be used–for improved forecasting with new transit corridors or improved value capture opportunities
2. Determine transit corridors and benefit areas to evaluate.	• Area(s) of benefit should be segmented to assess effects of distance from transit stations or corridors on benefits realized • Compare to larger geography as frame of reference (e.g., area outside the corridor, entire city, or metro area)
3. Identify data sources and methodology for retrospective evaluation.	• Options range from quantitative data to qualitative/opinion surveys • Increasingly, GIS/Assessors data offers the most cost-effective resource for retrospective quantitative development analysis but may be weakened if critical data variables are not fully available or reliable–such as building SF, year built/renovated, type of use (including accounting for condominium uses), and valuation • Empirical environmental analysis likely involves different data sources and methodologies, possibly including trip (origin-destination) surveys and retrospective sampled building construction and operating reviews (to assess realized embodied & operational energy/carbon effects)
4. Conduct analysis.	• May need to fine-tune the analysis mid-stream based on data issues (with field or other research to backfill for critical missing items) • May be worthwhile to validate or better inform quantitative results with qualitative insights gained from focus group or stakeholder interviews
5. Document results.	• Outputs should cover such items as added housing and employment, new construction and rehabilitation, added market and taxable valuation, change in development densities (FARs), and net carbon footprint savings (for good transit/mixed-use development) • Comparative output measures should be provided for the transit corridor (possibly with zones by distance from the corridor) and larger reference geography (citywide or metro-wide) • Evaluate results based on comparative geographies and reference to evaluation purposes (or on key policy, planning, development and funding questions)

Dedicating resources to accomplish post-investment analysis is required. There also may be the legitimate concern that the actual performance will not measure up to what was expected. However, the willingness of local communities to learn and adapt from experience, both successes and lessons learned, offers opportunities for better and more sustainable outcomes extending into the next generation.

The objective is to promote success based on what has worked, and to adapt based on lessons learned. In an era of limited resources and global competition, the willingness to forecast, plan, invest, measure, and adapt to actual experience will distinguish the places that are best positioned to thrive.

Assessing the Potential for Economic Benefits of Transit-Supportive Developments: Case Studies

The case studies of projects in planning (in 2012) include Boise, Reno, and San Antonio. All three case studies represent communities involved in the early

phases of planning for possible streetcar reintroduction. All three communities have identified using streetcar as a catalyst to encourage renewed urban and mixed-use development, with the resulting environmental benefits as an important project objective.

Case Study 1– Boise Streetcar, Ramping Up to Transit

With a state capital of more than 200,000 residents in a metro area of 600,000, the city of Boise exemplifies a community that has been actively considering reintroduction of streetcar service with the stated objective of enhancing the long-term economic vitality of the downtown core area and greater metro region. Boise's experience to date serves to illustrate the potential and attendant challenges in planning for transit-supportive development.

Historic Context

Situated in the frontier west, Boise initiated its first streetcar line in 1891 (Figure 2F-1), leading to a multi-line system extending to surrounding communities. That system operated until 1928. As has been experienced across the nation, transit played a substantial role in stimulating and shaping economic development in Boise and its greater urban area through the early 20th century.

Figure 2F-1

Historic Boise Streetcar

Source: From Kali Steppe, Boise State University, *Clang, Clang, Clang, Went the Trolleys*, December 2004.

Historic Streetcar/Development Nexus – Boise, Idaho

"The best example of Boise's progressive nature was the electric trolley system …"

"The trolleys helped to trigger a real estate boom in the North End."

"At the peak of the electric transit system in the Boise valley, trolleys ran a 60-mile loop called the "Boise Valley Loop'."

Trolley service was used to create "leisure and entertainment spots, most notably Pierce Park and the Natatorium, for residents across the valley to enjoy."

"… social events became the mainstay of the Boise & Interurban up until the late teens."

"Another advantage of welcoming the trolley system was the increase in property values. Land value along the line increased dramatically. Occasionally land value doubled if it was situated directly against the tracks."

Excerpts from Kali Steppe, Boise State University,
"Clang, Clang, Clang, Went the Trolleys," December 2004

For the city of Boise, the post-World War I shift in market preferences and public policy from transit to automobile dependency was unrelenting. Although Valley Regional Transit now operates a two-county regional public transportation authority serving the Boise metro area, Idaho remains one of only three states without a dedicated financial mechanism in place to support public transit.

Planning for Boise's Streetcar

Since 2000, several studies have considered the potential role of a downtown circulator system as a central component of the City of Boise's long-term planning. The studies have indicated that construction of a small-scale fixed rail system would contribute to economic development, with particular focus on economic development initiatives for emerging technology sectors as a primary driver of future regional prosperity.

In 2008, the mayor of Boise supported a strong effort to make a streetcar system a reality. As initially evaluated, the streetcar would be an approximately 15-block-long mile loop running east-west through the downtown core, operating with 10-minute headways at peak periods.

Responsibility for further evaluation has been assumed by the city government and the Capital City Development Corporation (CCDC). A 34-member public-private task force guided an initial feasibility assessment process over a nearly 2-year time frame.

Assessing the Potential Economic and Environmental Benefits

Since streetcar system planning remains in progress and funding has yet to be realized, this assessment of potential economic and environmental benefits of transit-supportive development in Boise's downtown core focuses on early-phase research, including:

- Analysis of economic benefits for property owners situated within a three-block distance of a proposed downtown alignment as the potential basis for a local improvement district (LID), which could be considered to assess those property owners anticipated to benefit for a portion of the project capital cost
- Application of the development forecast-modeling process to estimate incremental property tax revenues that could accrue to Boise's three existing urban renewal districts
- Companion research to evaluate economic effects of streetcar investment in the form of jobs, incomes, and tax revenues for the City of Boise and metro area, together with the carbon footprint benefits of added downtown residential and employment development versus the suburban alternative

These benefit assessments were conducted in conjunction with a broader system evaluation resulting in a "Boise Streetcar Feasibility Study: Conclusions and Recommendations," completed with the Boise Streetcar Task Force in June 2010. The feasibility study also addressed planning questions including stakeholder engagement and coordination with local government and utility providers, together with findings and recommendations for operations and capital funding.

Economic Modeling for Transit-Supportive Development

Modeling of opportunities for Boise was driven by a process adapted from documented results of comparable experience in other cities with a track record of operations, with adjustments made due to the national economic recession. The economy has changed expectations for development in Boise as recovery from the recession takes hold. Key steps in the 20-year future forecast process include:

- Identifying existing core area development patterns using parcel-specific geographic information system (GIS) and tax assessor data to determine current land and building areas, valuations, vacant and underutilized parcels, and downtown area development experience in recent decades at one-, two-, and three-block distances from a planned streetcar corridor
- Projecting future base case development that may be reasonably expected in the absence of streetcar, based on an evaluation of observed downtown development experience over the last 30 years (cross-checked via a comparison to planned projects as identified by CCDC with adjustment for potential delayed recovery from the 2007–2009 economic recession)

- Preparing an alternative with streetcar development scenario resulting from greater rates and densities of development, with the greatest streetcar premium forecast for parcels either fronting on or in closest proximity to the streetcar alignment
- Assigning forecast tax assessed valuations typical for the mix of new commercial and residential development under base-case (or no-build) and with-streetcar conditions across each of the one-, two-, and three-block distance zones from the proposed alignment

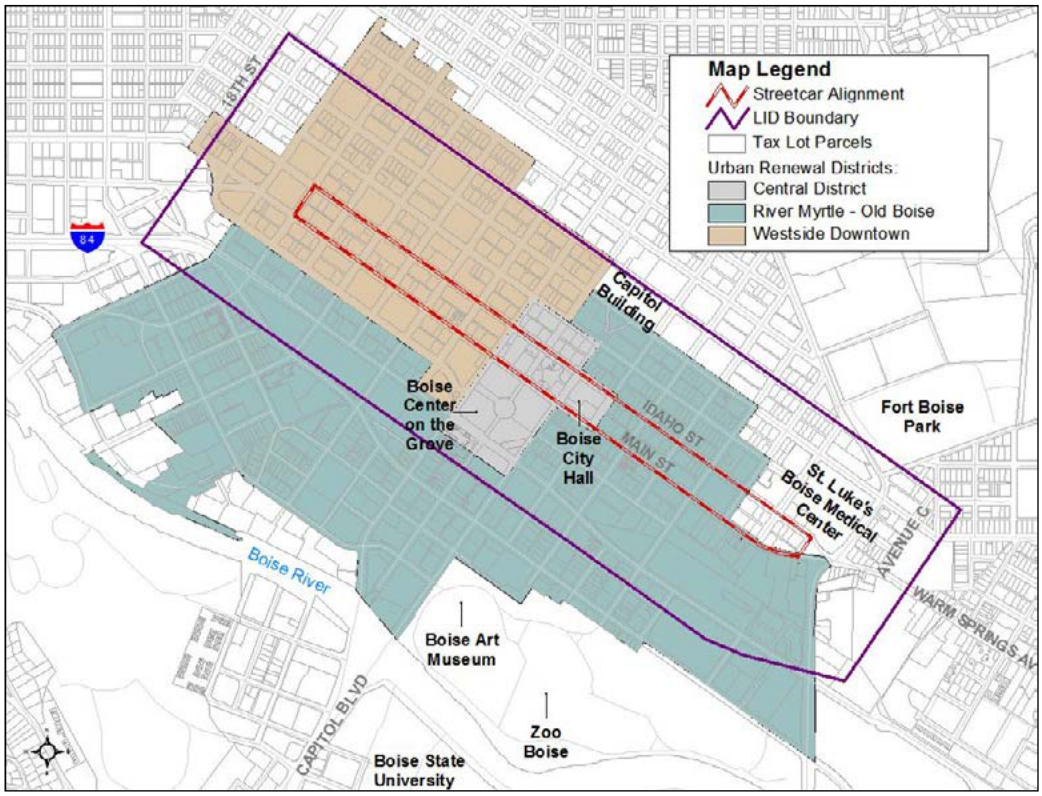
Economic and Environmental Benefits Anticipated

For the downtown Boise area, key potential development-related benefits identified through the initial economic modeling process can be summarized as follows:

- **Downtown development** – from a 2009–2010 base of approximately 7.5M SF of existing building area within a proposed 3-block wide LID corridor area (as shown in Figure 2F-2), base-case (without streetcar) development was forecast at an added 2.7M SF in 20 years (or a 36% increase in downtown building space assuming a return to normalized economic conditions by 2015). The with-streetcar scenario indicated an increase of 4.1M SF (or 50%+ gain) over the same time period. With the severity of the recession and slow pace of economic recovery experienced in Idaho, it is not clear when a return to pre-recession rates of development might be experienced.

Figure 2F-2

Planned Boise Streetcar, Urban Renewal, and Potential LID Districts

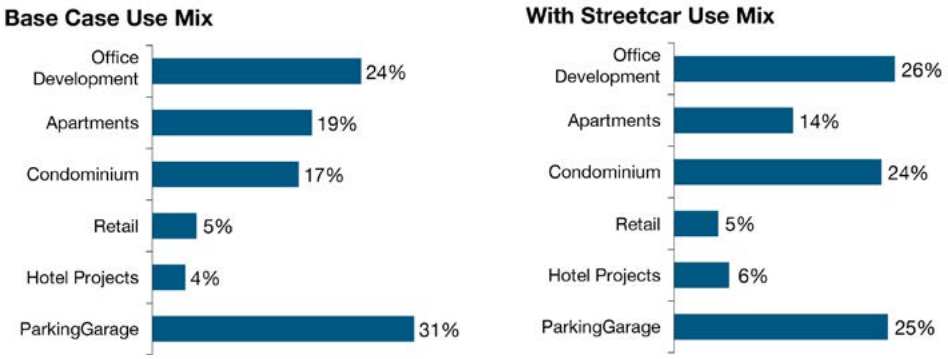


Source: Shiels Obletz Johnsen, LLC; CCDC; and E. D. Hovee & Company, LLC, based on preliminary planning as of 2009–10.

- **Use mix** – anticipated with streetcar is a greater mix of residential and visitor-oriented development, and proportionately less structured parking than with the base-case scenario (Figure 2F-3). For Boise, this would suggest continued transition toward more mixed-use development to complement the existing office and retail core—a trend that got underway but was cut short by the economic recession.

Figure 2F-3

Changing Mix of Boise Downtown Area Development (2010–2030)



Note: Apartments denote multi-family rental units; condominiums represent multi-family units that are individually owned.
Source: Boise CCDC and E. D. Hovee & Company, LLC.

- **Improvements valuation** – added building improvements valuation was projected at 67 percent above what could be expected in the base-case scenario, due to additional square footage plus a mix of higher value development including residential and less structured parking needed with streetcar. Higher value and cost of construction is typically required with increased density (i.e., greater site coverage and more floors) as compared to an historic pattern of one- and two-story development throughout much of the downtown core area.

- **Land valuation versus assessment district cost** – based on increased density (or FAR–floor area ratio) of development, land valuation within the 3-block proposed LID was anticipated to increase by an estimated $3.74 per SF of land area subject to the potential LID assessment, with $1.26 per SF (or $9M total) of this increase attributable to the with-streetcar development premium. This gain alone could cover 90 percent of a potential $10M assessment district, with the remaining 10 percent supported via increased rents, of as little as 0.1 percent, averaged across the inventory of existing structures within the proposed assessment district.

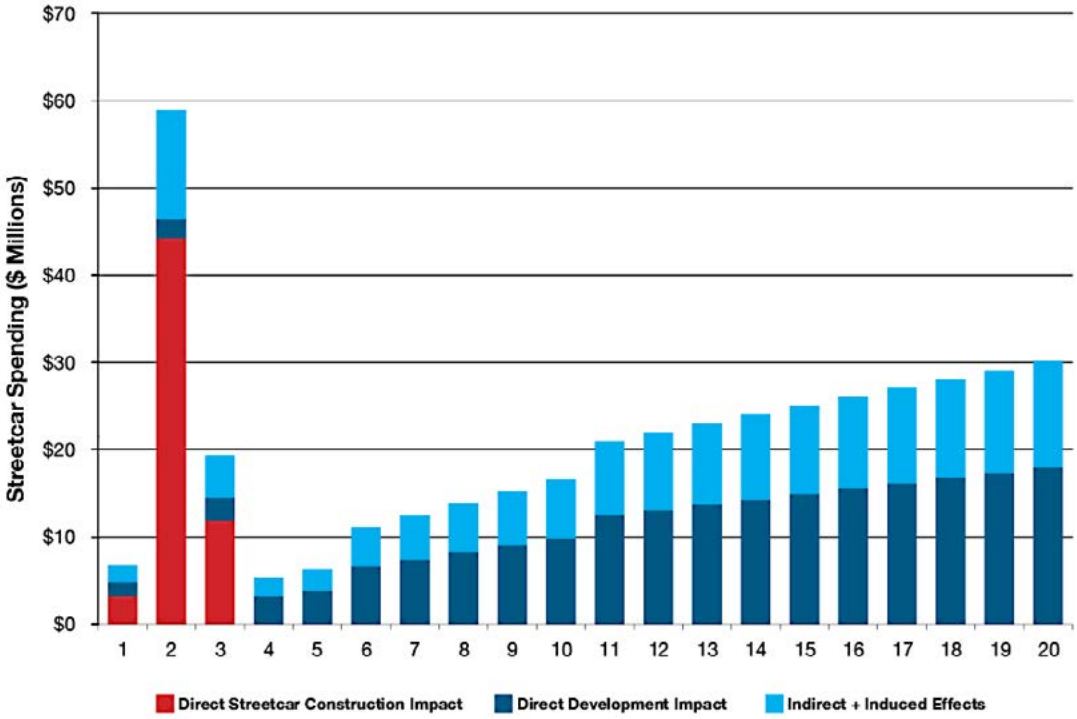
- **Incremental property tax** – three urban renewal districts in the downtown area could benefit from incremental property tax revenues over 20 years of $13.5M, a figure that is 23 percent above what was projected with base-case development. While property tax revenues increase over time as new development comes on the tax rolls each year, the tax increment actually

available to the existing Boise districts would be muted by early expiration of these in-place increment districts. The time period for allocating incremental revenues for the Central District expires in 2018 (just as substantial new assessed value would be coming on-line), with the other two urban renewal districts terminating in 2025–2026, at which time incremental revenues would be reallocated back to general purpose local taxing districts (limiting value capture options with streetcar for the districts currently in place).

- **Economic impacts of streetcar system construction** – the cost of constructing a 15-block-long streetcar system was estimated at $60M (including streetcar acquisition) plus $207M in private downtown development anticipated over 20 years (above what is anticipated with base-case development). With indirect and induced (or multiplier) effects included, total value to the Boise area economy has been estimated at $42M over 20 years, with much of the benefit frontloaded to the initial years of system construction. (Note: Figure 2F-4 provides a year-by-year estimate of construction valuation, with Years 1–3 dominated by streetcar system construction, followed by added downtown property development with multiplier effects to the rest of the Boise area economy). As depicted in Figure 2F-4, the majority of the economic impact occurring in the early years comes from construction activity associated directly with transit system construction. This shifts to benefits occurring with public and private real estate development in succeeding years.

Figure 2F-4

Phase-in of Boise Streetcar Construction Direct and Multiplier Effects by Year from Project Construction

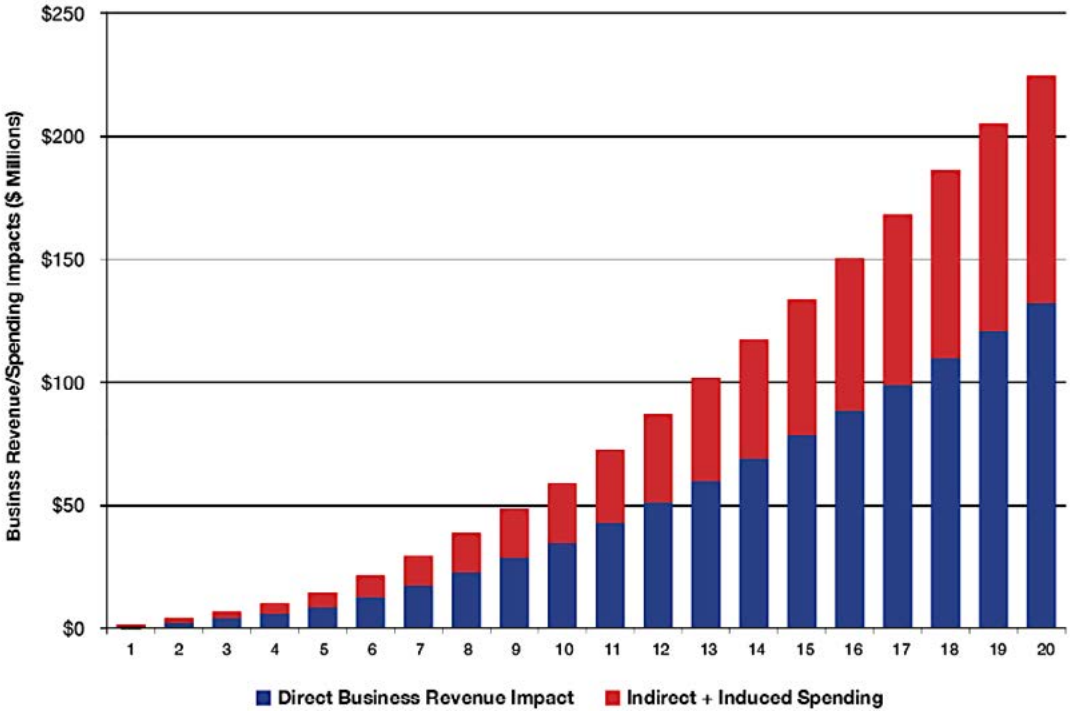


Source: IMPLAN, E. D. Hovee & Company, LLC; all estimates in 2008–09 dollars.

- **Long-term economic impacts** – economic gains would increase incrementally with added development each year, resulting in an anticipated Year 20 effect of 2,125 net new jobs at places of business together with added payroll of nearly $80M per year and $225M in annual business revenues above what otherwise would be expected in the downtown with base-case development, as estimated in 2009 dollars. This represents the cumulative annual benefit after 20 years of streetcar-related development, including direct and multiplier effects accruing to downtown and to the Boise metro area economy. Figure 2F-5 provides a representation of added direct and indirect/induced (or multiplier) effects to the Boise area economy as a result of added long-term employment and residential activity in the downtown Boise area.

Figure 2F-5

Phase-in of Boise Streetcar Operations Spending Impacts (2010–2030) by Year from Project Construction

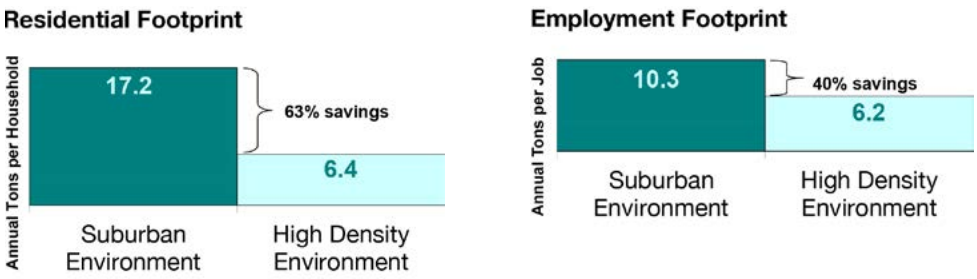


Source: IMPLAN, E. D. Hovee & Company, LLC; all estimates in 2008–2009 dollars

- **Reduced carbon footprint** – initial modeling indicated opportunity for a 50 percent overall savings in carbon emissions with high density urban development compared to a suburban residential and commercial development alternative. This includes a 73 percent prospective cut in annualized transportation and 26 percent reduction in development-related carbon footprint. When viewed by type of development, the savings amounts to a 63 percent reduction in residential carbon footprint covering both the transportation and development components of residential use. With employment uses, a 40 percent reduction in carbon footprint is identified as achievable as the net benefit of added downtown rather than suburban development (see Figure 2F-6).

Figure 2F-6

Boise High-Density/ Suburban Carbon Footprint Comparisons



Source: E. D. Hovee & Company, LLC.

Next Steps

By mid-2010, Boise's Streetcar Task Force issued its conclusions and recommendations regarding project feasibility. Concurrently, CCDC—as the project convener and responsible agency—issued its findings and recommended next steps related to streetcar feasibility and implementation. While concluding that significant economic benefit can be derived by a community that makes a streetcar infrastructure investment, concern was expressed about whether this type of investment remains appropriate in a situation of economic downturn and uncertain recovery, as well as the current limited public understanding of how a streetcar fits within the broader regional transportation picture. The lack of a state-dedicated funding resource for transit, which is especially critical to supporting ongoing operating expense, remains unresolved.

Task force and public input has led to consideration of other route alternatives in addition to the east-west downtown corridor initially proposed. In support of a broader regional transportation strategy, of particular interest is the possibility of a north-south (rather than east-west) alignment that could serve to directly connect downtown Boise to Boise State University. Subsequently, in 2011, the City of Boise received USDOT funding for an alternative transportation study to reassess the route of a downtown streetcar.

Conclusion

While a committed project remains premature, the primary success of early-phase streetcar planning in Boise appears to be increased awareness of the potentially pivotal role that transit may play in supporting regional competitiveness and vitality in the post-recession economic environment ahead. This represents a fundamental rethinking of economic strategy for a state that has not had a strong transit tradition.

Conversely, there is a challenge in garnering a critical mass of property owner, investor, and public support in a community without a historically strong transit constituency, especially during a period of substantial economic uncertainty. Due to the rapidity and severity of the recession (and apparent restructuring of

real estate financing), there is less confidence about when (or if) the market will return to conditions that prevailed over the two decades prior to the downturn.

A related concern is the extent to which cities with strong experience for transit-supportive development (e.g., Portland and Seattle—neighboring, larger metro areas in the Pacific Northwest) should be used as gauges of what might be expected for Boise. The Boise market is considerably smaller, with less experience to date with urban scale mixed-use development, and there is skepticism about whether the dynamics that worked within these larger cities could be replicated if the economy proves to constrain future real estate investment opportunities.

With the development modeling and associated value capture forecasting process, two technical questions were significant. The following questions can be expected to come up in other communities planning for transit-supportive development, albeit in varying degrees, depending on the mix of existing development activity and local policy and funding priorities:

- **To what extent should future development projections be adjusted to reflect short-term cyclical or longer-term structural effects of the economic recession of 2007–2009?** While the recession has been officially defined by the National Bureau of Economic Research as beginning in December 2007 and ending June 2009, a significant real estate downturn was felt later and lasted longer in Boise. Boise metro area unemployment went from less than 3 percent in 2007 to a peak of nearly 10 percent in early 2010, before slowly dropping back to less than 7 percent by late 2012. At the outset of its planning, CCDC's list of planned development projects (compiled with private-sector input) and a review of past downtown core development trends were a gauge of potential future development activity. As a result of the deepening downturn, CCDC subsequently determined that planned projects should no longer be viewed as a reliable guide for future projects. Working with the public-private task force, a more conservative adjusted forecast was developed, substantially downgrading anticipated base case (without streetcar) development prospects, especially for the near term, to 2015.
- **How can measures of potential value capture best address current and prospective local or regional funding mechanisms and priorities?** Even in an environment with robust economic prospects, corresponding value capture capacities are affected by detailed policy and financial considerations. Public policy objectives are further tempered by interests of potentially benefitted property and business owners to participate in funding transit improvements. For Boise, value capture constraints have included potential exemptions or reductions in assessment rates for residential versus commercial projects, exclusion of tax-exempt properties (important in a state capital), and the limited time duration of remaining eligibility for tax increment financing and value capture associated with the downtown area's previously

established renewal districts. A factor of pivotal importance may be the ability to fund the transit investment at the beginning of an economic cycle, which is viewed as more optimistic and predictable. Yet that would be in advance of the future-added development relied on as value capture to pay a portion of local costs of transit system development.

Case Study 2 – Reno, Reinvigorating Virginia Street

Reno, Nevada, is similar in many respects to Boise. Both are western inland cities and are similarly sized—Reno with about 220,000 residents in a metro region of 415,000. Both metropolitan areas were experiencing rapid population and job growth over most of the last decade but were severely affected by the economic recession. While both cities have major state-affiliated universities, other local economic drivers are substantially different. Whereas Boise has benefitted from a mix of state government, high tech, and corporate office as major employers, Reno has had casinos as a major source of employment and business activity, and has a significant downtown/Virginia Street presence.

Regarding transportation, Reno's most distinctive characteristic may be its continuing north-south orientation to Virginia Street as a major local and regional travel corridor for autos and increasingly for transit. This orientation is beneficial for the initial segments of a streetcar system, but may create challenges in planning for transit-supportive development.

The more than five-mile length of the Virginia Street corridor makes full implementation more expensive, raising the question about whether to focus on a shorter "starter" alignment. A second challenge is whether to reinforce this narrow corridor with a two-way streetcar alignment on a single arterial, or to spread the benefit with a couplet arrangement that might use one or two parallel streets, especially through the downtown area.

This profile is intended to illustrate how the transit and economic development planning process can be adapted to serve the distinct needs and opportunities of a substantially different corridor.

Historic Context

Like Boise, streetcars played a role in the early transportation and development in the City of Reno. Legislative authorization from the state of Nevada occurred as early as 1889, with the first rail line successfully completed as an east-west corridor connecting Reno and Sparks in 1904. A second north-south line was added a few months later, extending south from downtown along Virginia Street.

Streetcar alignments served to focus corridors as preferred locations for economic development. As observed by an historical review of Reno Streetcar lines: "Real estate companies were prone to think of traction lines in connection with their tract developments" (Myrick, 1963).

Streetcar service transitioned to bus service by 1927. Over the last half-century, patterns of development along the four-lane Virginia Street corridor became increasingly auto-oriented.

With the regional freeway system, many parts of this traditional travel corridor have since suffered disinvestment with numerous resulting gaps in the built environment. However, Virginia Street continues to serve as the defining arterial for Reno by linking major sources of economic activity. From the approximately 18,000-student campus of the University of Nevada Reno (UNR) to the north, Virginia Street travels through downtown, passing by the Convention Center and most of the city's casinos, and ends at a regional shopping mall.

Planning for a Transit System

In recent years, the 5.4-mile Virginia Street corridor has become the focus of priority consideration for enhanced transit service. In December 2007, BRT service running the length of this corridor was adopted as the locally preferred alternative by the Regional Transportation Commission (RTC) of Washoe County. Phased implementation of BRT service named RAPID began in October 2009 from a new downtown transit center extending south to the Meadowood Mall regional shopping center.

In 2009, the Reno City Council also approved a vision for phased implementation involving eventual transition from BRT to streetcar (and possible eventual light rail) service within the corridor. As outlined, a four-phase plan was envisioned—Phase 1 focused on bus rapid transit (BRT), Phase 2 focused on BRT plus streetcar downtown, Phase 3 expanded streetcar, and Phase 4 focused on conversion to light rail transit (LRT). The multi-step transition was intended to further strengthen economic development opportunities in a seamless fashion, with the potential for existing BRT stops to be converted to streetcar stops. Figure 2F-7 provides a rendering of a potential streetcar.

Figure 2F-7

Potential Streetcar

Source: Stantec and Shiels Obletz Johnsen.

The City of Reno, like other cities, has viewed the advantages of fixed-rail investments as potentially including economic development, iconic value and longevity of the transit vehicles, ridership potential (including ride capacity and quality), environmental impact (including noise, ability to attract and circulate tourists), and the overall ability to shape a city's urban core. A primary disadvantage is that the upfront cost of streetcars (and light rail) is greater than for the bus alternatives.

For transit-supportive development, the primary advantage of fixed rail is that the public investment is seen as providing clear evidence for the relative permanency of transit service. Private developers rely on this sense of long-term commitment to make real estate investments that require stable economic returns over the economic life of a residential, commercial, or mixed-use structure.

Assessing the Potential Economic Benefits

Reno's economic benefits analysis has been focused on assessing development scenarios with and without streetcar, in conjunction with a feasibility assessment process that also addresses costs and potential funding. Regional economic impact (i.e., multiplier) analysis has not been conducted, nor has there been an explicit assessment of potential carbon footprint benefits.

All work to date has been organized to feed directly into an Alternatives Analysis and Environmental Assessment; next steps toward project implementation. Phase 2 of the Virginia Street Transit Corridor analysis began in late 2010, with objectives to establish an informal advisory committee, investigate local funding options, delineate a preferred alignment and service characteristics, and commence an Alternatives Analysis.

Economic Modeling for Transit-Supportive Development

Projection of future Virginia Street corridor development in Reno is similar in methodology to the economic modeling in Boise with the following key steps:

1. Documentation of existing core area development patterns and trends.
2. Projecting future base-case (without streetcar) development consistent with regional population and employment growth projections, and involving a comparison with known, planned development projects for the corridor area.
3. Preparing an alternative with-streetcar development projection.
4. Assigning tax assessed valuations typical for the changing mix of new commercial and residential development anticipated.

Due to the irregular shape of parcels outside the downtown, the modeling was adapted to consider two zones of development influence. Zone A spans approximately 500 feet from the streetcar line and is considered of primary

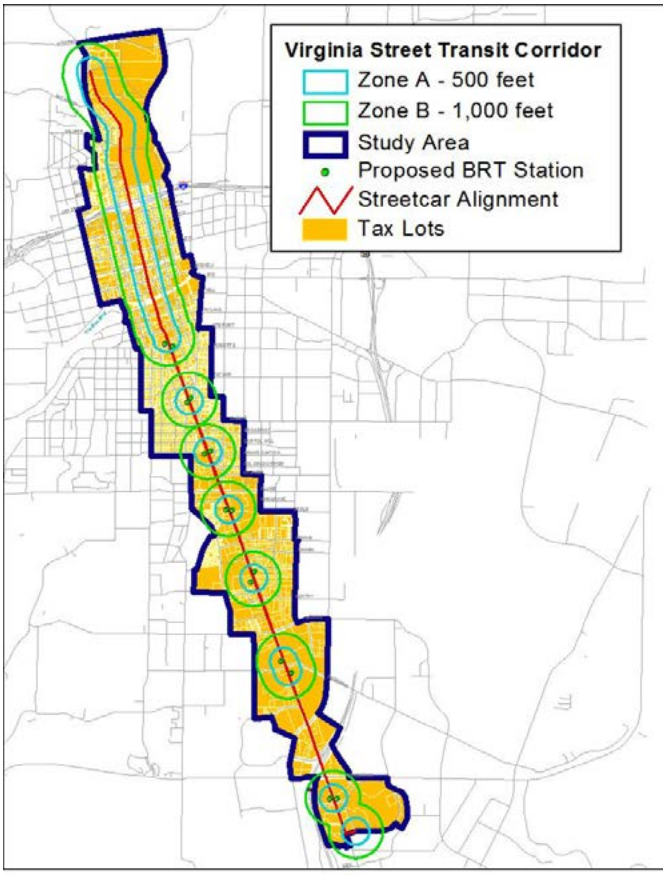
influence, and Zone B extends from 500 to 1,000 feet as a secondary zone of development influence.

It was important for the City of Reno to adapt economic modeling to planned operating characteristics of a streetcar system. From its northern terminus at UNR through the downtown, the streetcar system is expected to operate with closely-spaced transit stops, suggesting opportunity for continuous development impact along the corridor.

South of downtown, transit stops initially were planned to be more widely spaced based on existing BRT stations, meaning that development could be expected to cluster in station areas as it does for heavy or light rail transit. While being reconsidered with Phase 2 analysis, this potential differentiation of anticipated effect for transit-supportive development is illustrated in Figure 2F-8.

Figure 2F-8

Streetcar Study Area for Reno Virginia Street Corridor



Source: Stantec and E. D. Hovee & Company, LLC

Economic Benefits Anticipated

The economic analysis conducted for the City of Reno focused on development and resulting taxable valuation with and without streetcar. Because streetcar has not been anticipated to be in place until about 2015, a 20-year forecast covered

the 2015–2035 time periods. The anticipated economic benefits to be realized by implementing a streetcar system are as follows:

- **Corridor development** – base-case development (without streetcar) was predicated on the extrapolation of 2000–2009 development and regional growth experience forward, albeit adjusted for slower rates of metro area growth forecast post-2009. From a base of 23.8M SF (excluding UNR campus facilities), baseline development (without streetcar) is anticipated to increase 23 percent above current conditions. The with-streetcar scenario involves a 54 percent increase in development (for a 31% development premium with streetcar). In effect, added development anticipated with streetcar is more than double that of baseline conditions.
- **Use mix** – while streetcar is expected to serve as an incentive to all forms of development, the streetcar development premium is most pronounced for residential use. Approximately three times the amount of residential development is anticipated within the streetcar corridor as would occur in the absence of a streetcar investment. Since casino gaming has been negatively affected by greater competition across the nation and the economic downturn, future development prospects currently appear more uncertain than in the past. However, a streetcar system is viewed as a customer-friendly means of connecting lodging with conventions, gaming, shopping, dining, and other destination activities. Further campus development has been viewed by UNR as occurring largely independent of streetcar service, though increased transit utilization is envisioned by the university's master plan and could be expected to increase appeal of the university campus to prospective students and faculty.
- **Development valuation** – if developed for the full length of the 5.4-mile corridor, appraised (or market) valuation with a streetcar system could be expected to increase by as much as $1.5B, with tax-assessed valuation up by more than $400M (in 2009–2010 dollars). Assessed values (or taxable properties) increase by more than 70 percent above current corridor valuations and by more than four times the increase associated with base-case development. This substantial valuation gain with-streetcar is attributable not only to increased valuation gain, but also to an anticipated transition to higher-valued uses (with greater development density and residential use) and a higher proportion of taxable uses.

Looking to the Future

As of late 2010, early-phase assessments had been undergirded by an active working relationship between the Regional Transit Agency (RTC) and the City of Reno. There has been continued commitment to increase the level and quality of transit service to reinforce opportunities for economic development and to shape the city. This has occurred even as the metro region has struggled to emerge from a particularly severe economic downturn, with some of the highest

unemployment rates in the nation, peaking at more than 14 percent for the Reno-Sparks metro area in early 2011.

Virginia Street was developed and remains the spine around which major economic activity for the Reno area gravitates. Just as this strongly linear orientation was well-suited to transit-supportive development in the city's early history, reintroduction of streetcar service offers the chance to reinvigorate and further intensify that linear pattern of development.

On a technical level, economic modeling has reinforced perception of the corridor by the real estate and business community as one that offers continued development opportunity—but with increased intensity of future development activity if catalyzed by an effective and broadly attractive transit option. While a number of planned projects are already in the pipeline (albeit with some on hold due to the recession), the opportunities that have already been identified represent only a fraction of the development that can reasonably be expected, both under base-case (without-streetcar) and with-streetcar scenarios.

Note that previously planned projects have been proposed at relatively low levels of density (with FARs averaging only 0.55), which would continue to reinforce a suburban rather than an urban scale of development. In effect, a streetcar investment can serve to further incent the pace of reinvestment to step up—not only in terms of total development realized but also in the intensity of urban scale development realized. To the extent that streetcar planning and early funding commitments can raise expectations and encourage more urban scale private investment response, the stage will be better set for creating a more vibrant entertainment, commercial, and residential mixed-use corridor once streetcar service is put in place.

Conclusion

Reno, long billed as the "Biggest Little City," articulates how streetcar can make a difference in leveraging opportunities, with special attention paid to:

- Reassessing the feasibility and appropriate timing for the phased evolution of high-capacity transit in Reno from BRT to streetcar to light rail.
- Fine-tuning corridor alignment alternatives to address questions such as phasing of potential corridor segments and whether to place the streetcar line solely on Virginia Street or to use a couplet arrangement in order to expand the area of economic benefit.
- Coordinating with the convention, gaming, and hospitality industries, and employing streetcar as part of an intentional strategy to reposition and freshen the region's destination tourism appeal.

- Integrating with initiatives already benefitting the downtown revitalization, including waterfront reinvestment along the Truckee River and the new Reno Aces ballpark (AAA baseball).
- Coordinating with UNR so transit is viewed as a viable alternative to single occupancy vehicle travel, and integral to branding the full UNR experience.
- More actively folding residential and mixed-use onto what has historically been a largely commercially oriented Virginia Street corridor. This opportunity was just starting to be tapped pre-recession. There is still ample land capacity for renewed activity with economic recovery.

Case Study 3 – San Antonio, Leveraging Transit-Supportive Development

San Antonio, Texas, is a city steeped in a rich heritage coupled with a continually adapting sense of place. With 1.4M in-city residents in a metropolitan area of 2.1M, San Antonio is now the nation's 7th largest city located in the second most populous state in the U.S. Over several decades, San Antonio has developed strong national markets in the military, medicine, and tourism industries.

Historic Context

San Antonio's experience with streetcar systems dates back to 1866, when the City Council granted permission for a mule-drawn streetcar. In 1878, the rights were acquired to construct an initial line, and the resulting nexus between streetcar and economic development was quickly established. One local historical review has noted that this initial line "gave the impetus for long-time property owners to subdivide and develop their land or to sell to real estate speculators who did the same" (Watson 1982).

By 1890, a trolley system map identified nine lines in San Antonio. By 1925, San Antonio had 20 identified streetcar lines. However, by the late 1920s, bus travel and increased auto ownership were competing with, and supplanting, trolley line service.

The Great Depression led to financial insolvency of the streetcar operator. On April 29, 1933, San Antonio became the largest city in the country to make a complete conversion of its transit fleet from streetcar to bus, ending 55 years of street railway travel. Today, San Antonio remains the largest metropolitan area in the U.S. without local fixed-rail transit service.

In 1978, VIA Metropolitan Transit began providing public transportation to serve the San Antonio area. In addition to bus service including downtown (rubber tire) trolley service, VIA provides paratransit, vanpool, and special event park and ride services.

Transit Planning

Recent initiatives have been organized around SmartWaySA, a community-driven initiative for a Long Range Comprehensive Transportation Plan for San Antonio-Bexar County metro improvements through year 2035. High-capacity transit alternatives evaluated have included electric streetcar, BRT, light rail, commuter rail, and HOV lanes. This transit planning process has been prepared in cooperation with the MPO. At the edge of the downtown area, a planned West Side Multimodal Center is intended to serve as an intermodal terminal for BRT, downtown bus lines, an anticipated Austin-San Antonio commuter rail system, inter-city bus service, and taxi services. The intermodal terminal could also serve as a terminus for one or more future east-west streetcar lines.

In 2009, VIA initiated an Inner-City Rail Streetcar Downtown Circulator Study that recommended a comprehensive streetcar system vision, followed by a preliminary implementation plan for a starter project. An overall goal of the planning process now underway is "to shape and fund a streetcar corridor that provides a productive urban form, best serves potential users, and stimulates a net gain to the local economy" (Hovee et al. 2011).

With 50,000 employees, San Antonio's CBD represents the single largest concentration of jobs in the region. Implementation of the proposed streetcar is considered a "catalyst project that will complement current initiatives of both the public and private sectors and enhance economic development in the center city" (VIA/Jacobs 2010).

Assessing Potential Economic Benefits

VIA funded the Inner City Rail Streetcar Feasibility Study ahead of a subsequent economic impact assessment. A distinctive feature of San Antonio's process has been not only to assess the economic benefits associated with any core area streetcar system, but to get an early start in reviewing economic development potentials associated with alternative alignments.

Economic Modeling for Transit-Supportive Development

Understanding the full range of prospective impacts is part of VIA's planning process. An economic impact analysis was conducted for the purposes of analyzing the potential of the streetcar route to "stimulate infill development and capture increases in property values" (Hovee et al. 2011). The impact study is also viewed as instrumental to assess value capture mechanisms that could be used to pay for some portion of the capital costs, both for a starter project and longer-term system rollout.

Evaluation of San Antonio corridor development opportunities has occurred in a similar way to the Boise and Reno case study communities reported above, with key steps involving:

- Documenting existing core area development patterns and trends since 2000.
- Projecting future development pursuant to a no-build scenario to determine growth expectations that should reasonably be anticipated in the absence of streetcar investment (also involving consideration of planned development projects as identified to date).
- Preparing two with streetcar development alternative scenarios termed as an "aggressive development" projection, assuming active public-private cooperative implementation, and a more modest "baseline" with streetcar scenario.
- Evaluating resulting tax-assessed valuations and related value capture mechanisms including potential for an assessment district and/or business tax revenue capture

Like Reno, blocks and parcels in San Antonio have little consistency across the core area regarding shape and configuration. However, San Antonio has a generally tight grid street prevalent throughout much of the core area, suggesting a development modeling process well adapted to primarily two zones of development influence, Zone A and Zone B.

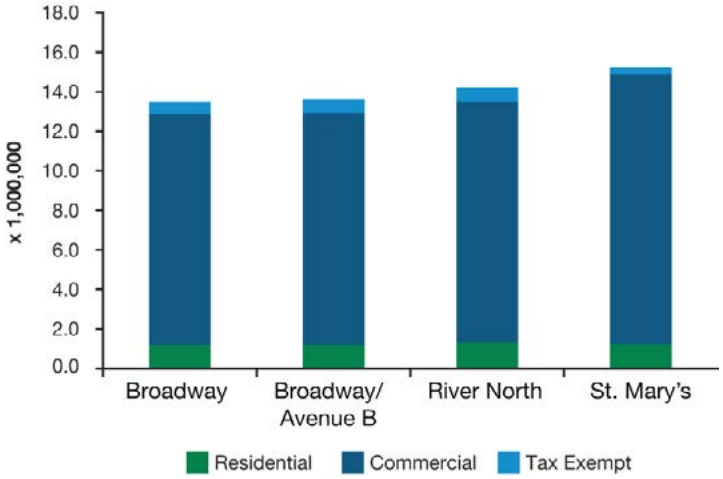
Zone A was identified for properties within about 250 feet (or up to 1 block) from either direction of the streetcar alignment (either as a two-way alignment or separated couplet). Zone B comprises non-Zone A properties within about 500 feet (or up to about two blocks from either direction of the streetcar alignment, though with considerable block size variations). These zones were applied to each of the eight alternative corridors reviewed as a means to assess potential benefits and opportunities for value capture.

Pivotal features of preliminary impact modeling and resulting stakeholder discussion distinctive to San Antonio have included the evaluation of multiple alternative alignments interwoven with the question of whether to model future prospects based on demonstrated development experience or emerging downtown development opportunities (discussed in more detail in "Lessons Learned").

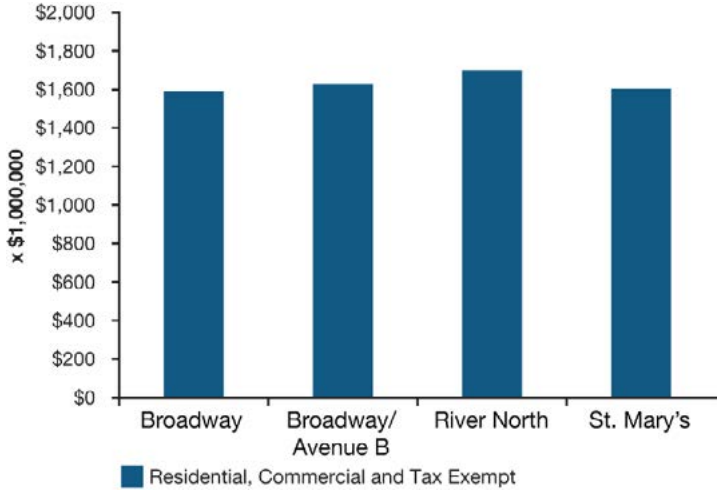
Economic development implications of four distinct east-west and four north-south alternative alignments were considered on a preliminary basis. Key outputs of that assessment included comparison of existing conditions (such as building square footage, valuation, employment, and housing) within about two blocks of each alignment (see Figure 2F-9). This was followed by initial development scenarios of potential development and associated value capture for each prospective alignment.

Figure 2F-9

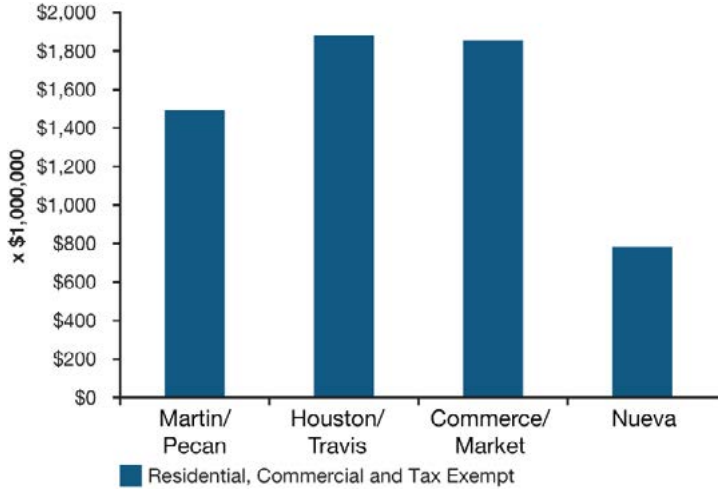
Existing Conditions of San Antonio Streetcar Corridor Options



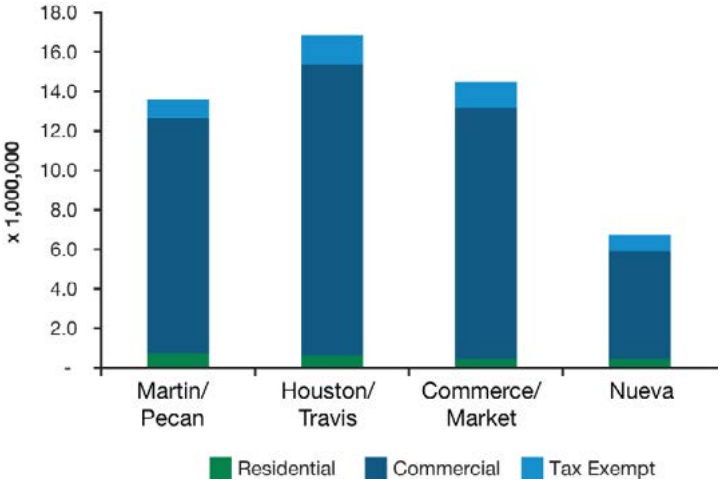
North-South Building Area by Use (in Square Feet)



North-South Assessed Value (Land & Improvements)



East-West Building Area by Use (in Square Feet)

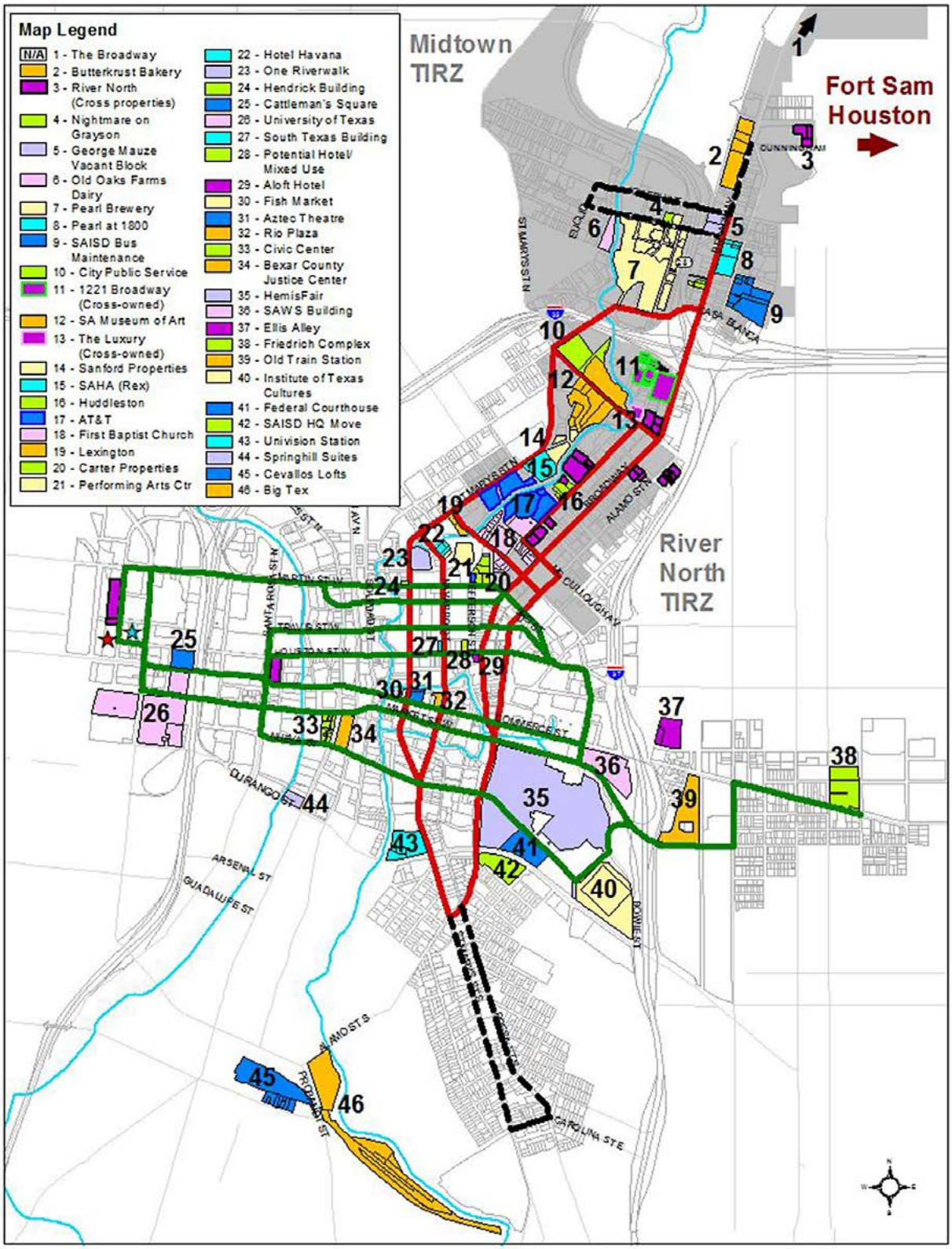


East-West Assessed Value (Land & Improvements)

Source: Bexar County Assessor, E. D. Hovee & Company, LLC.

Potential routing for east-west corridors is varied at the central portions of the streetcar runs, but with common alignments shared at the eastern and western ends of the corridors considered. Similar features are noted for north-south corridors, with the inclusion of optional segments that could be deferred or not built with initial routing.

GIS and economic/demographic data-driven projection methodologies were accompanied by stakeholder interviews as integral to the economic impact assessment process. Interviews proved useful as a means to gather information regarding prospects for planned projects–both in areas that have already experienced recent development activity and at the edges of the downtown core that are still awaiting significant reinvestment (see Figure 2F-10).



Note: Red lines denote north-south streetcar alternatives evaluated. Green lines denote east-west streetcar alternatives evaluated. Red star indicates the location of the Westside Multimodal Transit Center Phase 1. Blue star indicated the location of the Westside Multimodal Transit Center Phase 2.

Source: SABÉR Research Institute Interviews conducted for VIA Metropolitan Transit by SABÉR Research Institute and The Gardner Law Firm.

Figure 2F-10 *San Antonio Planned Development Projects by Streetcar Corridor*

In late 2011, the City, County and VIA voted to fund a downtown streetcar system (even without federal assistance), with the aim of opening by 2016. The capital cost of a starter system with both a north-south and an east-west line has been preliminarily estimated to be in the range of $190M.

Economic Benefits Anticipated

Assuming that an east-west and/or north-south streetcar line could be operational by about 2015, the time frame for assessing development effects is roughly 2015–2035. The following economic benefits are anticipated:

- **Corridor development** – substantial existing development ranging between 6.7–16.8M SF of commercial and residential building area is already on the ground and readily served within two blocks of each of the 8 corridors considered. With-streetcar (under a best case or aggressive scenario), another 1.8–5.8 M SF of added development could be anticipated. Depending on the corridor, the rate of development with-streetcar was projected to be 1½ to nearly 4 times greater with the aggressive scenario than under no-build conditions without streetcar.
- **Use mix** – the potential corridors serve substantial existing development primarily oriented to employment, with 22,500 to 35,000 jobs and 700 to 1,300 residential units currently on the ground within two blocks of the 8 corridors evaluated. Like other cities, a streetcar system in San Antonio is seen as a catalyst to jump-start urban housing, effectively doubling to quadrupling the current core area residential inventory expected over a 20-year horizon.
- **Development valuation** – there is potential for an additional $700–$800M+ in tax-assessed valuation along a single corridor (with greater gains in market valuation). The upper end of this range could represent as much as a 58 percent gain over base year (2010) tax-assessed valuation before accounting for effects of future inflation.
- **Development clustering** – at least three distinct "drivers" have been identified for shaping where and how development might be expected in the future:
  - Clustering near proven activity, with recent developments focused in the vicinity of the internationally recognized Riverwalk area and centered on hotel and office investment over the past decade.
  - Transition to lower cost sites extending to the outer edges of established corridors and where vacant and under-improved properties are more readily available.
  - Large master-planned sites which have been identified, particularly in the River North area and with prospective redevelopment of Hemisfair (the site of a 1968 world's fair exposition).

Conclusion

San Antonio's early focus, using transit planning as a means to leverage transit-supportive development, paid off by raising awareness of the growing role of transit for the ongoing economic and cultural vitality of the city and region. A bottom-line conclusion of the economic impact evaluation is that "the reintroduction of streetcar service can serve as a catalyst for city-shaping and revitalization in San Antonio–beginning in the next 3–5 years and continuing into the next generation" (Hovee et al. 2011).

San Antonio stakeholders have expressed "cautious optimism" about the development opportunities presented by reintroducing streetcar service. While the subject of a downtown circulator is fairly new, early perceptions about its impact on development ranged from "little" to "considerable" benefit. For private projects already under development or well along in planning, there is less perceived potential benefit of a streetcar system than for sites that are not market-ready. However, there is agreement that existing businesses (tourism-oriented and other core area employers) would benefit from improved accessibility and circulation within the downtown.

Early attention to city-shaping via transit has engaged major public-private stakeholders, and ongoing communication between them is expected as the regional transit agency moves into the formal alternatives analysis. San Antonio's process raises two questions pertinent to continued public and private interaction through the subsequent Alternatives Analysis process. An initial question involves the potential tradeoffs and linkages in transit system planning between mobility and development: with the diversity of corridors being considered, San Antonio is faced with the dilemma of determining to what degree should service for existing riders and transit mobility be prioritized as compared with opportunity to leverage new development and ridership opportunity. A second question follows: will future development continue as it has in the past, or will it shift in response to new opportunities?

For the development community, there is a sense that emerging planned project opportunities may shift the focus away from the traditional core to revitalization of large underutilized properties at the edge of the urban core—already occurring with redevelopment of the Pearl Brewery at the northern end of the downtown core area.

Major opportunities for transformational change that may be considered include:

- The River North Area, served by recent northward extension of the Riverwalk, with redevelopment master plan adopted by the City of San Antonio.
- Hemisfair (as a former World's Fair site) at the south end of the core area, with a redevelopment planning process launched in late 2010.

- Other smaller (but potentially significant) planned projects situated toward the ends of the potential streetcar corridors—major expansion of Fort Sam Houston to the north, an intermodal terminal and Cattleman's Square to the west, South Town residential/neighborhood revitalization to the south, and renewed interest east of the Alamo Dome, including redevelopment of former industrial facilities for mixed-use.
- A pivotal question for VIA is whether to invest in an alignment along an already-proven corridor or venture into less-proven territory where considerable opportunity for added mixed-use (especially urban residential) may exist as economic recovery takes hold. With less-proven corridor options, success will depend on public-private planning and commitment. The ideal scenario would be signature catalyst mixed-use development projects that open concurrently with new streetcar service.

Three main conclusions emerged from the initial steps of the San Antonio streetcar impact and planning process:

- There is clear opportunity for a streetcar system in San Antonio to leverage new development that would not occur otherwise.
- There are distinct differences between alternative corridors in the amount and type of development that may be expected.
- Consideration of unproven corridors will depend on up-front public-private transformational commitment made in concert with planned transit investment.

Lessons Learned

Based on the experience of transit corridor and economic development planning in process for Boise, Reno, and San Antonio, the following overview observations are noted:

- **Indicators of success** – two different indicators of success are noted for all three case studies considered. The first indicator is clearly material and measurable, yielding tangible results that the casual observer can experience on the ground. Tangible results can be measured in terms such as investment leveraged, new jobs, residential units, spending, and tax revenues. A second indicator of success, more institutional and educational in nature, reflects changes in community perceptions and decision-making.
- **Transit capacity to incent and shape development** – while in planning mode, Boise, Reno, and San Antonio represent communities that view this type of investment as a means to better serve transit patrons, and also to reinvigorate their cities with a renewed sense of place and urban vitality.
- **Experience-based approach to document benefits** – all three case study cities recognize the importance of building on what works while

adapting to changing needs and opportunities. The three cities profiled are looking to the applicable experience of other cities as well as to their own development experience and interests. Each city is committed to determine how best to adapt in view of local community priorities and changing market expectations, coupled with emerging public and private sector opportunities.

- **Success begins with transit but requires more** – to date, San Antonio, Reno, and Boise have little experience with transit explicitly aimed at city-building. There is naturally more skepticism among private developers and public officials, and a broader public constituency to address regarding the transformative capacity of the transit-development nexus. Public-private leadership is poised to proceed, but must do so within an environment requiring considerable stakeholder and community outreach. A major challenge is to forge both the vision and the will to begin the process of transformational change during an era of continued short- or long-term global and regional market uncertainty. The prolonged uncertainty and difficult financing environment may make some mixed-use forms of development less viable. However, other trends—including a shift to apartment living and the continued high cost of driving—may provide continued impetus toward greater use of transit and more intense urban development.
- **Adaptive learning for community and market fit** –each city must learn how to best fit transit and new development into its existing urban fabric. Not everything that worked for other locations with established track records, such as Portland or Tampa, will be applicable for Boise, Reno, or San Antonio. This may be due to a different economic environment or varied community priorities for transit and development. It is important for each city to develop a thorough understanding of its community's history, needs, community cohesion, and market potential. To ensure the best opportunities for transit-supportive development, it is vital to begin the economic development analysis early in the planning process. For cities planning on pursuing FTA funding, there is often good reason to consider moving forward with initial economic analysis ahead of the formal Alternatives Analysis. This places the streetcar as part of a larger community investment strategy. While less costly than other fixed rail transit modes, the streetcar capital cost and ongoing operating expense is great enough that some level of private investment response will be essential to justify the public funding commitment. Broadening the market to achieve more urban mixed-use development may also prove to be an economic driver behind a broader investment strategy–but only to the extent that the private sector can identify with the opportunity for a return on investment (ROI) not previously realized.

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G. Tools and Techniques for Visualizing and Communicating Scenarios and Alternatives

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Using tools and techniques to design, visualize, and communicate scenarios and alternatives may provide decision makers—as well as the public—with a clear understanding of proposed policies, plans, and transportation improvements, as well as the impacts on quality of life and the natural environment. Use of appropriate techniques can make complicated and cumbersome information instantly and intuitively understandable. Growing pressure to employ such tools and techniques is a direct result of the public's expectation and demand that they be given the opportunity to fully understand and participate in the planning and project development process. However, a recent study of transportation agencies" (e.g., MPOs, municipal governments, and DOTs) use of interactive 3-D visualization tools for public involvement revealed that the practice of using 3-D tools is still in its infancy stage, and agencies and audiences are having difficulties using such tools because of technological and staff skill limitations (Hunter College and Parsons Brinckerhoff 2009).

The purpose of this section is to identify and profile the effective tools and techniques that are available to MPOs, regional planning organizations, and other entities interested in conveying technical information to stakeholders and involving them in the planning process. The first part of this section provides descriptions of several featured tools and techniques followed by examples of their use by a specific transportation agency. The second part of this section presents applications and specifications for each featured tool and technique (as well as others) in a series of tables. The tables provide the potential user with a snapshot of information to help them determine which tool may be applicable to their needs. Recognizing that many tools and techniques require a range of

resources and sophistication, comprehensive nationwide research was conducted to identify effective scenario planning, public engagement, and visualization tools and techniques to assist MPOs, regional planners, and communities in the development of regional, corridor, and community vision plans, as well as land use plans that are supportive of transit.

The tools and techniques presented in this section are some of the most robust, versatile, and widely-used (particularly by MPOs and other regional planning and transit organizations). They are provided to help practitioners identify the correct tool to fit their planning context.

It is important to note that the use of tools, regardless of how high-tech they are, is only one component to success. The following factors are critical to success:

- Good interpersonal skills in applying the tools
- Choices made about how to use the tools
- Settings where the tools are used
- Types of people engaged in the process (e.g., elected officials, citizens, business community)
- Effectiveness of the people managing the tools

Best Examples

Of all the tools and techniques mentioned in various sections of the Guide, the following eight were selected as best examples for applying visualization to integrated land use and transit planning. This range of examples was determined through general professional familiarity with the tools of high- and low-tech, high- and low-cost, and applicability at regional, corridor, and neighborhood planning levels. These are some of the best-recognized tools in their category (i.e., modeling and/or scenario planning, public engagement, transportation modeling, and visualization). The tools in the larger list offer their own unique benefits and may be more appropriate to specific planning contexts.

The following pages provide discussions of each featured tool and techniques, and examples of how specific transportation agencies utilized these tools. Table 2G-1 is a reference for these featured tools and techniques.

Table 2G-1
Tools Profiled

Tool/Technique Name	Use	Example Transportation Agency	Level of ophistication	Relative Cost
MetroQuest	Modeling and/ or Scenario Planning	Chicago Metropolitan Agency for Planning	High Tech	High Cost
CommunityViz	Modeling and/ or Scenario Planning	Nashville Area Metropolitan Planning Commission	High Tech	Low Cost
I-PLACE3S	Modeling and/ or Scenario Planning	Sacramento Area Council of Governments	High Tech	Mid-High Cost
Cube	Transportation Modeling	Montgomery Area Metropolitan Planning Organization	High Tech	High Cost
ULI Reality Check (or Chip Game)	Public Engagement	MPO Participation	Low Tech	Low-High Cost
21st Century Town Meeting	Public Engagement	Chicago Metropolitan Agency for Planning	High Tech	High Cost
Photo Simulation	Visualization	San Diego Regional Council of Governments	High Tech	Low-High Cost
Google Maps, Google Earth, Sketchup	Visualization	Baltimore Metropolitan Council	High Tech	Low Cost

Featured Tool: MetroQuest

MetroQuest is an online tool that is primarily an engagement, visualization, and communication tool, although it also creates and evaluates scenarios. MetroQuest helps users visualize and prioritize land use and transportation options. The tool is designed to be used in face-to-face facilitated meetings, online, or via interactive kiosks. The MetroQuest interface allows online stakeholders and meeting facilitators ("front-end users") to make changes to one indicator to see how those changes impact other indicators shown via graphs and maps. For example, online users could indicate that their vision for the future of their region includes more density around transit nodes. MetroQuest uses graphs and maps to demonstrate how that land use pattern would affect other indicators, like regional footprint, GHG emissions, or average commute time.

While results are general, they are based on "sketch scenarios" created by MetroQuest or by the MPO or other organization running the public engagement process. The sketch scenarios are based on current data, population, and employment projections, and other indicators that the agency or organization must input. Often, this data is available from regional planning organizations, the U.S. Census, or similar data sources. Each sketch scenario represents one possible combination of attributes that front-end users might try. For example, a simple MetroQuest tool might let front-end users choose from diffuse versus dense development, and more transit versus more roadways. MetroQuest would have four scenarios (diffuse with transit, diffuse with roads, compact with transit, and compact with roads) loaded into the online interface. As front-end users

change the two attributes, the appropriate scenario is loaded, showing impacts on graphs and land use changes on maps. The more attributes front-end users can choose from, the more sketch scenarios are required.

MetroQuest will license the online tool, provide support, and create scenarios, but MPOs and other organizations can also create their own sketch scenarios for convenience, flexibility, and cost-savings.

MetroQuest now has the capability to show results created by third-party organizations or firms, such as 3-D visualizations, photos, or videos that are loaded into sketch scenarios. Currently, MetroQuest is primarily used at the regional or corridor level, but the ability to zoom in to the neighborhood level is being developed.

Visualization Capabilities

- Maps
- Graphs
- Photos, video, 3-D models created by third parties

Data Input

- GIS maps and/or satellite imagery
- Census data and projections
- Data to support the analysis for desired indicators (e.g., transportation information, infrastructure cost)
- Any desired videos and photos

Advantages and Disadvantages

MetroQuest is an excellent tool for visualizing broad impacts and trade-offs of alternatives and choices. By clicking a button to change one aspect of a scenario, a participant can see how other indicators are interrelated. They can see the impacts of each choice, and, when the model is populated with many scenarios, get a relatively nuanced and complex view of possible scenarios and policy choices. The visual representations are clear and communicate complex analyses in a simplified way. MetroQuest is web-hosted, so it does not require additional software, although a back-end user (i.e., the MPO) must have an ongoing license.

A disadvantage of MetroQuest is that scenarios are limited. Several options are available for each indicator, but not a full spectrum of choices. Depending on the number of sketch scenarios created, a front-end user might only have a few choices and only see the impacts of a few variables. In addition, the impacts are often shown only in terms of general direction and scale (e.g., if a user changes land use configuration, greenhouse gas emissions might go up or down, but

by a roughly estimated amount). It is not designed to be a highly sophisticated modeling tool.

MetroQuest Application Example: Chicago Metropolitan Agency for Planning

The Chicago Metropolitan Agency for Planning (CMAP) in northeastern Illinois used MetroQuest to develop the GO TO 2040 Regional Scenario, previously having used 21st Century Town Meeting for similar purposes. CMAP's "Invent the Future" process asked participants to use MetroQuest in different ways to indicate aspects of scenarios that best represented their vision for the future. Participants gave input at 57 public meetings, online, and via kiosks located throughout the region. Short online videos were used to prime front-end users with information regarding the different choices available in the MetroQuest interface related to land use, transportation, and environmental sustainability. Once online and kiosk users explored the impacts of different choices via these videos and MetroQuest's interface, they could submit their preferred scenario to CMAP. Approximately 30,000 people participated in this scenario-building process. Common themes were identified from the results of the three venues (i.e., public meetings, online, kiosks). All of this activity led to the development of the preferred scenario. The Regional Scenario was the last step in the development of the GO TO 2040 plan and encapsulated the key policy positions on which GO TO 2040 was based.

CMAP believed that MetroQuest and the process employed in developing the scenario were effective in garnering public input and participation and allowing participants to see the immediate results of the choices they made. They also believed that this visualization tool would be effective in the development of a vision plan, and they are considering such an application for the future.

Featured Tool: CommunityViz

CommunityViz is a software extension of ArcGIS that can be used to perform analysis for land use, transportation, and resource management. The CommunityViz model is what land use will look like given specific population projections and how areas will appear if their existing housing stock is completely built out. It also allocates land uses based on user inputs, analyzes and graphs impacts of different land use and/or transportation scenarios, and creates 3-D visualizations (see Figure 2G-1).

Figure 2G-1

Scenarios for Redevelopment with Use of CommunityViz® Program and its Scenario 360 Component

Source: Courtesy of Placeways LLC

CommunityViz's greatest strength is a strong visual component that allows easy comparison between scenarios (see Figure 2G-2). For example, it allows real-time adjustment of model inputs via slider bars with immediate visual representation in graphs and on maps of how changing these indicators may impact other metrics and the landscape. As an example, the slider bar can be moved to increase or decrease the percent of land that has been built out or change density, and the map and graphs change to reflect the impact for indicators such as average commute time, or average distance to amenities. Thus, a user can view and change scenarios in live meetings and get immediate feedback regarding scenario performance.

Figure 2G-2

Screenshot of CommunityViz® Program and its Scenario 360 component

Source: Courtesy of Placeways LLC

CommunityViz has been employed on multiple scales including regional, corridor and neighborhood, and on a variety of visioning, and integrated land use and transportation projects.

Visualization Capabilities

- Maps of current conditions, alternative scenarios, build out
- Graphs of impacts and indicators
- Scenario 3-D provides 3-D modeling capability, and interoperability with other 3-D tools, such as SketchUp

Data Inputs

- GIS maps and/or satellite information
- Inputs could include any economic, environmental, or social data relevant to the analysis desired (CommunityViz provides national averages in most cases if locally or regionally specific data is not available)

Advantages and Disadvantages

CommunityViz's advantages include a strong visual component that can be demonstrated in meetings in real time (analysis time depends on size of the dataset). The tool's on-screen slider bars allow for changes in one indicator that are immediately reflected in the other indicators by updates in the easy-to-read graphs and maps. In addition, it is a highly flexible tool, allowing for almost any spatial analysis that the user requires, including transportation analysis. It is also easy to use, and is populated with baseline data if locally specific information is unavailable. It has a 3-D component that integrates with its spatial analysis, allowing users to visualize impacts on indicators, and then visualize how the scenario might actually look. It is inexpensive for buyers who already have ArcGIS products.

There are several disadvantages to CommunityViz. It must be used with additional GIS software, its 3-D modeling abilities are inferior to other 3-D tools, and it can take time to run analyses on large datasets, although the latter is also a function of computer processor power; new versions of the software have introduced significantly faster algorithms.

CommunityViz Application Example: Nashville Area MPO

CommunityViz was used by the Nashville Area MPO in Tennessee to create a regional land use model that would form the basis of their 2035 Regional Transportation Plan (RTP). The MPO was interested in achieving close linkage between land use and transportation, which required showing where growth was likely across its seven-county planning region. CommunityViz was used to evaluate and choose among possible "build-out" scenarios relative to land supply, desirability of each parcel for development, and demand (population and employment forecasts). These scenarios were developed using input from

three focus groups created specifically for this purpose. The three focus groups comprised stakeholders representing planners and engineers, water and other utility districts, and real estate agents and developers. These groups discussed what they believe makes a parcel attractive to development. The outcome of these focus group meetings was the development of 13 suitability factors to "score" each parcel's development attractiveness.

Once the model allocated the demand, the results of the chosen build-out analysis were aggregated up to the traffic analysis zone level and imported into the Regional Travel Demand Model, which was then used in the development of the 2035 Regional Transportation Plan. In addition, CommunityViz has been used in coordination with other ongoing sub-regional studies, such as the Northeast Corridor Mobility Study and the Tri-County Transportation and Land Use Study.

Visual representations in the form of mapping of the base scenario were created using ArcGIS (CommunityViz is a software extension of ArcGIS). Integrating this build-out scenario with the travel demand model allowed for analysis of what future growth would mean for transportation demand, and how to design a system to meet the needs of a growing region. Input from the public was garnered during the public participation phase of the RTP. The Nashville MPO felt that CommunityViz performed well in developing the base growth scenario, but acknowledged that there is room for improvement.

Featured Tool: I-PLACE^{3}S

I-PLACE^{3}S is a Web-based modeling tool that can be used for communicating land use and transportation concepts, storing data for easy online use, and evaluating land use and transportation scenarios against a variety of indicators. Because I-PLACE^{3}S is an online tool, or "software as a service," the tool requires no additional software, uses powerful servers to run analyses, and is accessible from any computer. In addition, I-PLACE^{3}S is designed to be usable and accessible by a variety of users.

By inputting new land uses via a map interface, users can easily change scenarios and view graphs and numerical outputs that indicate the general impacts of their new scenarios. For example, will traffic congestion increase or decrease if new work centers are created? Land uses can be modified to be more specific. For example, adjustment factors can be used to change density of a certain land use type (e.g., changing from 2 to 10 dwelling units per acre in a residential land use type), further refining the model.

The tool has various modules that run analyses on different information. For example, the ROI module calculates the estimated return-on-investment for designating a certain area with a specific land use. Thus, analyses can have additional complexity as more modules are employed. Any additional functionality

or modules developed to integrate with I-PLACE^{3}S are made available to future users as part of the tool package.

I-PLACE^{3}S can be used by land use and transportation experts, but it is designed to be usable in nontechnical settings like public workshops. I-PLACE^{3}S has been used primarily at the regional scale and it can work with large datasets. It can also be used at other scales, including the corridor and local neighborhood scale, because it can use parcel level data.

I-PLACE^{3}S was developed by the public sector and is now distributed and maintained by Eco Interactive, a private company. The Sacramento Area Council of Governments (SACOG) has been using the tool since it began its Regional Blueprint process, which is the most well-known example of its application. Other regions are using and adapting I-PLACE^{3}S for similar purposes.

The I-PLACE^{3}S cost structure is based on the amount of data required to be stored and processed, as well as the level of support required. Because it is an online tool, I-PLACE^{3}S requires yearly subscriptions to the service. As an example, SACOG's yearly service is approximately $85,000 and includes two terabytes of data and support services.

Visualization Capabilities

- Online interactive mapping with real-time results

Data Input:

- GIS layers and/or satellite images
- Demographic information such as census data, residential and employment projections
- Any additional information for calculating desired impact analyses

Advantages and Disadvantages

I-PLACE^{3}S is a robust tool with layers of complexity that can provide large amounts of information or simple rough estimates depending on user needs. Its use, particularly in SACOG's process, is well documented, and could easily be replicated. I-PLACE^{3}S most significant advantage is that as a server-based tool, it has enormous processing power in comparison to desktop software tools. It is capable of handling an entire region's worth of parcel-level data, and running analyses on a frequent basis. However, its capacity for processing large amounts of data makes it more expensive than a desktop tool.

I-PLACE^{3}S Application Example: SACOG

SACOG used I-PLACE^{3}S in its Regional Blueprint process to determine how different growth scenarios would affect issues, such as transportation, air quality, housing, and natural resource protection. Recognizing communities as

the building blocks of the region, SACOG's Blueprint process was designed to start at the community level, taking and refining scenarios as the process moved through the county level, and culminating in the creation of a regional vision. I-PLACE^{3}S was first used to create a "business-as-usual" future scenario that showed various impacts on the region if it developed according to current trends and ordinances.

The I-PLACE^{3}S model was used in community workshops throughout the region to help communities evaluate how desirable or efficient the community would be in the future following business-as-usual trends. Small neighborhood groups created a variety of future scenarios that were compared to the business-as-usual model. These groups represented a cross-section of stakeholders from each of the participating communities. I-PLACE^{3}S provided a relatively simple quantitative approach to illustrate order-of-magnitude differences between scenarios, and how efficient and desirable the community would be under each group's proposed scenario.

Prior to beginning the small group exercise, participants watched a short introductory video and slideshow to introduce them to the regional study, the planning issues associated with smart growth, smart growth principles, and the case study sites that they would focus on. Afterwards, the groups were asked to prepare two land use plans for one case study area; one utilizing the smart growth principals presented during the workshop introduction, and another using whatever rules they desired. To create scenarios and analyze them in I-PLACE^{3}S, groups of participants gathered around paper maps of the region with colored stickers corresponding to different "place types" or land uses. They placed the stickers on the map to reflect their vision, and a laptop at each table was used to input the land use changes. I-PLACE^{3}S was used at each table to model and show land use and transportation impacts of the participants" designed scenarios. At the end of each workshop the participants presented the three most important changes, issues, or decisions made (or identified) within the group.

The concepts, themes, and scenarios identified at the neighborhood level were translated into alternative scenarios to be considered and refined at the county level. Similar to the neighborhood level workshops, stakeholders at the county levels were invited to participate in this process. These groups each comprised 150–300 participants. Each county-level group was asked to evaluate the neighborhood scenarios, modify them in any way, and build consensus for those selected according to the prescribed countywide methodology. From the county-level growth scenarios, four Blueprint alternative scenarios were created, refined, and evaluated through similar stakeholder group and public participation processes used at the neighborhood and county levels.

After that, the refined growth scenarios were evaluated by stakeholders and the public to identify a preferred scenario that was further refined and evaluated

regarding its consistency with the identified neighborhood themes and principles. The entire multi-level process culminated in the SACOG Board of Directors adopting the preferred Blueprint growth scenario for the region. The Blueprint continues to be used as a benchmark for local general plans, specific plans, and individual development projects, often in environmental review as an alternative scenario of comparison.

Although I-PLACE^{3}S was used to perform integrated planning analysis throughout the Blueprint process, project managers felt that its most important use was allowing participants to see the outcome of their planning efforts and how their choices would affect the future. By using the same tools that planners do, participants felt a greater sense of inclusion in the process.

Featured Tool: Cube

Cube is a family of transportation forecasting software products provided by Citilabs that run as an extension of ESRI's ArcGIS platform. Cube has several modules: Base (Core Platform), Voyager and Avenue (Passenger Demand), Cargo (Freight Forecasting), Analyst (Trip Table Optimization), and Land (Land Use Forecasting).

Cube is a relatively flexible tool and can be used at the neighborhood, corridor, and regional scale. Cube has a customizable user interface for a variety of skill levels and produces reports that allow for comparison across scenarios. Its modules allow for different methods of transportation analysis from personal trip modeling (Voyager) to freight forecasting (Cargo). Cube Land simulates development, estimating the locations of various types of development based on supply and demand in different economic conditions. Citilabs is now beta testing Mint, an online version of Cube, where the software is hosted online for a fee ("software as a service" model). Mint will allow for the same analysis as Cube but with information more easily shared, and without having to purchase software.

Citilabs also developed Sugar, a transportation network editor extension for ArcGIS, and Accession, which analyzes public transit accessibility by providing an accessibility-mapping overlay on any background map. Users can manipulate the multimodal transport system layer (e.g., adding routes or stops) to create scenarios.

Visualization Capabilities

- Mapping
- Graphical representation of indicators

Data Inputs

- General: base GIS data (land use and transportation)

- Depending on module and desired analysis: economic data, projected growth of population and jobs, transit routes, cargo routes, and amounts of cargo
- Other information needed could include proposed policy changes and expected changes in consumer behavior

Advantages and Disadvantages

Cube is a versatile and robust transportation modeling tool that is widely used. Cube's modules make it possible to add functionality as needed. It is also interoperable with other tools, such as I-PLACE^{3}S, allowing analysis to expand beyond the capabilities of Cube's modules. Cube has the ability to perform a variety of complicated analyses with a user-friendly interface though it requires some level of expertise in transportation planning, if not modeling. In addition, it does not have the real-time analysis capabilities of other scenario-planning tools.

Cube Application Example: Montgomery Area MPO

Cube and Cube Land were used in the Montgomery Integrated Land Use and Transportation Model Development project for the Montgomery Area MPO in Alabama. The goal of the project was to evaluate the current trends in integrated modeling and to create a plan of work to implement a best-practices model in Montgomery.

The Montgomery Integrated Land Use and Transportation Model was built using Cube Land. It uses a growth allocation process that considers transportation accessibility, land use attributes, and neighborhood characteristics, and places new growth based on these attributes on a parcel. The Montgomery Transportation Planning Model (developed using Cube), 2000 Census data, regional digital parcel data, residential data, and business data were all used to create the land use allocation. The model allocated 12 types of households, 8 types of retail employment, and 13 types of non-retail employment throughout the region. The Montgomery planning team built a custom ArcMap interface to allow the users to code in parcel-level input assumptions and visualize alternative scenarios in detail (using ArcScene 3-D). These visualizations, rendered as 3-D models, have helped decision makers and the public understand the forecasts produced by a complicated modeling system.

Featured Technique: "Chip Game" (e.g., ULI Reality Check)

Growth allocation processes like the Urban Land Institute (ULI) Reality Check are regional land-use and transportation visioning processes that use LEGO® pieces, blocks, poker chips, or paper squares to simulate future growth of jobs and residences. For the day-long Reality Check process, each table of regional leaders and stakeholders is given a set of blocks in two different colors, which represent the jobs and housing anticipated at a future target year. Participants must decide where to place all of the blocks on a map of the region, and use

yarn or markers to indicate transit lines and markers to indicate green space or other land uses. This exercise requires participants to grapple with issues of density, regional employment centers, transit, and open space while creating their regional vision for the future.

Reality Check has not been directly used by an MPO since it is a process specific to ULI. However, growth allocation processes have been used for regional, corridor, and municipal visioning and planning. A similar process was most notably used in the Envision Utah process. In addition, the Boston Metropolitan Area Planning Council in Massachusetts used stickers on maps to represent housing and jobs for a 500-person workshop as part of their MetroFuture process. In some cases (e.g., Reality Check and other similar processes) each table's completed maps are digitized for identification of common vision themes and to analyze the performance of the scenarios created against a variety of indicators.

Visualization Capabilities

- Hands-on use of LEGO® pieces, blocks, or paper squares to allocate jobs and housing in the region
- Hands-on use of markers or yarn to indicate desired transportation and transit improvements
- Possible digitization of each table's map and blocks to identify common themes and analyze performance against indicators

Data Input

- GIS base map including current land uses for printing
- Growth projections (for creating sets of blocks for each table that represent expected growth)

Advantages and Disadvantages

Reality Check is a highly-educational exercise for participants. By requiring participants to place enough jobs and housing in their respective area to accommodate future growth, they realize the challenges and trade-offs that must be made. Also, a set of maps that represent potential visions for the future are made quickly and can be synthesized to create a set of alternative future scenarios for further discussion. The hands-on nature of the Reality Check process is intuitive and easy to understand, and illustrates concepts (e.g., mixed-use areas or transit nodes) that might be new to participants. Smaller versions of the Reality Check or "chip game" exercise are low cost in terms of materials.

One disadvantage is the need to digitize maps for analysis with any computer-based models. Also, the ULI Reality Check exercise is geared toward regional leaders, available by invitation only—in contrast to being open to the public—and is expensive due to the large scope of the exercise.

Chip Game Application Example: Research Triangle Regional Partnership

In February 2009, 300 people participated in the North Carolina Research Triangle Regional Reality Check conducted by the Research Triangle Regional Partnership (RTRP). RTRP is a business-driven, public-private partnership whose goal is to keep North Carolina's 13-county Research Triangle Region economically competitive. The 300 participants equally comprised representatives from the public sector, private sector, and academic/nonprofit/civic sector, representing a cross section of stakeholders in the region. Included in this group were the area's two MPOs (Capital Area MPO and Durham, Chapel Hill Carrboro MPO) as well as the area's transit agency, Triangle Transit. The group was divided into 30 tables (10 people each and asked to identify guiding principles for the region. They placed LEGO® pieces and yarn on large maps to create future scenarios for growth, green space preservation, and transportation links. At the conclusion of the exercise, they used CommunityViz to identify common themes, 15 guiding principles, and 5 future growth scenarios. Two days later, in a Report Summit that was open to the public, the 15 guiding principles and 5 scenarios were presented. Approximately 800 people attended, including most of the Reality Check exercise participants, and they were asked to prioritize the top 3 guiding principles (from 15) and top 3 scenarios (from 5) using hand-held voting devices. The summit results were used to create a two-year implementation plan led by the Reality Check Action Committee. The Reality Check Action Committee identified three task forces charged with promoting the Guiding Principles. These task forces and guiding principles included:

- Transit – improve regional transit, matching land use decisions with transit investments
- Vibrant centers – reinvest in city and town centers; promote compact development, density and mixed-use; balance jobs and housing
- Green space – define growth and preservation areas to protect open space, agricultural land and natural resources, especially water supply and quality

A fourth task force has been appointed and charged with seeking the endorsement for the three Guiding Principles from all city and county governments in the region, leading a communications and messaging effort to raise awareness of the importance of quality growth, and garnering public support of the guiding principles.

Representatives of Research Triangle Regional Partnership believed that using the Reality Check process was effective in achieving the desired results from such a large and representative group. They also believed that Reality Check helped participants feel included in the decision-making process.

Featured Technique: 21st Century Town Meeting

21st Century Town Meeting, a service provided by AmericaSpeaks, is a large-scale meeting that allows participants to provide direct feedback and have face-to-face contact with one another. Although each meeting is customized, meetings often use keypad polling to gather direct, anonymous input to gauge support for policies, goals, or scenarios based on previous regional input. In addition, the meetings use round-table discussions to foster better understanding of various viewpoints, and to connect participants to one another. These round-table discussions are often captured via networked laptops (see Figure 2G-3).

Figure 2G-3

Leadership Discussion Table at a 21st Century Town Meeting

Source: Courtesy of America Speaks

Techniques used in the 21st Century Town Meeting could be replicated by organizations other than AmericaSpeaks, particularly if the desire is to focus on smaller scale issues with a smaller group of participants (AmericaSpeaks focuses on large-scale meetings). Other organizations, such as Civic Results and PlaceMatters can support meetings similar to the 21st Century Town Meeting on smaller scales (e.g., to address neighborhood-scale issues) with networked laptops, keypad polling, and other technology.

Visualization Capabilities

- Use of maps (either digital or paper) to guide discussion
- Keypad polling with immediate feedback
- Linking satellite meetings to one another to provide sense of collective action (in some cases)

Data Inputs

- Varies by event

Advantages and Disadvantages

The 21st Century Town Meeting process, compared to less technical meetings, produces large amounts of information and feedback in a short period of time and can reflect the input back to participants in real time, fostering a sense of ownership and transparency. Feedback, maps, and other input are in digital format, which greatly assists and speeds synthesis and analysis. The technology allows the full group of participants to immediately see visual representations (e.g., keypad polling results or synthesized lists) of the input gathered.

A disadvantage of the 21st Century Town Meeting is that it is relatively expensive. Smaller-scale meetings and/or meetings with less technology are less expensive.

21st Century Town Meeting Application Example: CMAP

In Illinois, the Chicago Metropolitan Agency for Planning (CMAP) used the AmericaSpeaks 21st Century Town Meeting process for the regional forum, as part of the Common Ground public engagement for the GO TO 2040 Regional Plan. Sub-regional workshops identified challenges and goals that were reviewed during the regional forum. The regional forum used facilitated discussion, networked laptops, and keypad polling to prioritize goals and issues (see Figure 2G-4). Later, subregional workshops used Paint the Region, an interactive GIS tool developed by CMAP and Criterion Planners, to identify future development centers, transportation corridors, and green areas (see Figure 2G-5).

Figure 2G-4

21st Century Town Meeting

Source: Courtesy of America Speaks

Figure 2G-5

Leadership Discussion Table at a 21st Century Town Meeting

Source: Courtesy of America Speaks

Featured Tool: Photo Simulation

Photo simulation is a visualization technique that manipulates photos of developments, neighborhoods, and small sections of transportation corridors to reflect how areas can change over time. The simulations begin with a photo of existing conditions and, through a series of additional slides, show possible changes to the urban landscape. The images generally transform to denser, pedestrian-friendly areas with more multi-modal transportation options. A number of consulting firms have designed visual simulation tools to help allay community concerns about density, TOD, and multimodal corridors (see Figures 2G-6 and 2G-7).

Figure 2G-6

San Diego Association of Governments (SANDAG) Smart Growth Visualization Tool—Euclid Avenue Trolley Station (Existing)

Source: Smart Growth Visualization Tools and Photo Library, http://www.sandag.org/index.asp?projectid=335&fuseaction=projects.detail

Figure 2G-7

SANDAG Smart Growth Visualization Tool – Euclid Avenue Trolley Station (Conceptual)

Source: Smart Growth Visualization Tools and Photo Library, http://www.sandag.org/index.asp?projectid=335&fuseaction=projects.detail

Less complex photo simulations could be completed at low cost by a user skilled in photo manipulation software such as Adobe Photoshop™.

Visualization Capabilities

- Existing-to-conceptual visual photo simulations of corridors and developments at a local scale

Data Inputs

- Current photos of areas
- Stock images (e.g., buildings, trees) or the ability to create new images to add to the photos simulations

Advantages and Disadvantages

The highly-realistic nature of photo simulations provides the viewer with a real sense of what the proposed changes could look like, and what steps would need to be taken. The realism of these visualizations is superior 2-D maps of potential future scenarios and 3-D drawings. They require no technical planning or transportation knowledge to understand.

However, hiring a service such as Urban Advantage can be expensive. The visualizations are static (i.e., participants in a meeting cannot change the visualization to reflect different planning or transportation options) and they are subjective, since they are based on the data that's put in.

Photo Simulation Example: SANDAG

The San Diego Association of Governments (SANDAG) in San Diego used photo simulation in an effort to promote the incorporation of smart growth principles into local communities in the region. SANDAG consists of 19 jurisdictions (18 cities and 1 county). In 2004, the SANDAG Board of Directors unanimously adopted the Regional Comprehensive Plan (RCP) for the San Diego region. The RCP is based on principles of smart growth and sustainability, largely focusing on greater integration of land use and transportation planning. In 2006, as an implementation action of the RCP, the SANDAG Board accepted its first "Smart Growth Concept Map" showing locations with opportunities for smart growth. In 2008, the jurisdictions were given the opportunity to submit applications for smart growth visual simulations funded by SANDAG in the areas identified on the Concept Map to show what smart growth could look like in local communities.

Nine areas were chosen by an internal committee to undergo the photo simulation. Each application was evaluated using specific criteria. The jurisdictions that were selected had to agree that the simulations, once completed, would be made available to others through SANDAG's website. Making them available to

other jurisdictions in the region would allow those that were not selected to find a smart growth simulation that closely resembled the place type of an area where they wished to consider the application of smart growth principles. To determine the physical elements that would be included in the simulations, SANDAG's visual simulation consultant took into consideration SANDAG's Smart Growth Design Guidelines and worked closely with the land use and transportation planners of the selected jurisdictions. The final simulations were presented to local city councils, planning commissions, and/or planning groups (if desired by the respective jurisdictions), as well as SANDAG Committees and the SANDAG Board of Directors. Many of the simulations have been used in public forums, at community workshops, and in university classrooms throughout the region. In addition, all of the simulations are posted on the SANDAG website at www.sandag.org/rcp. To enhance the effectiveness of the simulation presentations, the consultant developed speaking points for each slide to help future presenters convey an understanding of the simulated improvements.

SANDAG believed that the visual simulations were effective in demonstrating how smart growth principles could be incorporated into local communities and reinforcing that smart growth can look different in each community. The simulations also provide examples of infrastructure improvements (e.g., sidewalks, planted medians, street lighting, transit station improvements, bike lanes) that can enhance the quality of local communities and can receive funding from SANDAG's Smart Growth Incentive Program. Building on the initial visual simulation effort, the agency has hired "on-call" visual simulation consultants for its member agencies to facilitate the production of additional simulations throughout the region.

Featured Tool: Google Maps, Google Earth, and SketchUp

Google Maps and Google Earth allow users to view satellite and aerial imagery, maps, terrain, and user-created content online. Google Earth also allows for the import and viewing of 3-D building renderings. Using Google Maps, online visitors can create new layers, add multimedia content, including photos and videos linked to pins on the map (geo-referenced), create guided tours, and share saved content with others. Google Earth allows for 3-D "fly-throughs" of modeled areas or proposed development. Google Streetview allows users to "walk" through many neighborhoods in the U.S. These Google products have been used for public engagement processes to:

- Allow users to contribute ideas and information to the same map on their own time or from multiple meeting locations
- View proposed land use or transportation scenarios and provide spatially referenced comments

- See development options in 3-D, such as station area plans
- Make comments or choose preferred designs

For example, a Google Map can be used to collect spatially-referenced photos, uploaded by any stakeholder, of assets or challenges of a community. These maps provide the basis for discussion with their visual representation of issues and ideas, and areas that show where assets or challenges might be clustered. Google Maps and Google Earth can be used at the regional, corridor, and neighborhood scales. Google Maps and Google Earth products are scalable, although for some areas, particularly more rural or remote areas, the spatial resolution of the underlying data is not fine enough for detailed neighborhood scale work.

SketchUp, now part of Google, is a user-friendly software for creating 3-D design concepts quickly and easily. SketchUp designs can be saved in the online "3-D Warehouse" and accessed by any user, meaning that designs of buildings, furniture, and people are easy to find and plug in to 3-D models. SketchUp also interacts with many GIS, scenario planning, CAD, and multimedia applications.

Google Earth has been populated with user-created SketchUp models of existing buildings. Hundreds of thousands of buildings have been uploaded to Google Earth, meaning that many areas already have complete 3-D models (such as downtown Denver, Colorado). SketchUp is most practically used at the neighborhood level, but can be used at the corridor and regional levels as well.

Visualization Capabilities

- 2-D and some 3-D views of most areas in the U.S.
- Streetview images
- Creation of layers illustrating land use and transportation options
- Use of existing 3-D models, and the easy creation of new models

Data Inputs

- Usually none (necessary data is embedded in the Google tool)
- Spatial information may be needed to add layers
- For 3-D buildings, information to create an accurate 3-D rendering is required (e.g., building dimensions)

Advantages and Disadvantages

The advantages of the Google Map, Google Earth, and SketchUp tools are that they are free (unless Pro versions are purchased), large amounts of data are already populated, they are relatively easy and intuitive tools to use, and they offer extensive online help. SketchUp is user-friendly in comparison to the vast

majority of 3-D visualization tools and integrates with a wide variety of spatial and GIS tools.

However, Google Maps and Google Earth are not completely flexible in terms of use (although Google adds new functionality regularly); reproduction of Google Maps in publications often requires permission; and satellite imagery is not available for all locations, and varies in quality.

Google Maps and Google Earth Application Example: Baltimore Metropolitan Council

The Baltimore Metropolitan Council in Maryland (BMC) allows users the option of displaying various transportation data such as travel speeds on highways, long-range transportation plan projects, and bicyclists" grades of local roads in Google Earth (see image above). Users can go to the BMC website and download data sets that can be uploaded and displayed in the Google Earth platform. The data are visually displayed using color-coded lines as well as icons that provide pertinent data. Once the data are uploaded to Google Earth, its display can be turned on and off at the user's discretion. BMC has also used Google Maps API to garner feedback during the public comment period for its Long Range Plan, as well as to disseminate current transportation and project related data. Google Maps API has certain advantages over Google Earth for these purposes. Unlike Google Earth, Google Maps API uses a web browser interface and allows data to be easily kept current. Google Maps API also eliminates any concerns a user may have about downloading unfamiliar software since most users have a web browser already installed on their computers. In a similar way, the Capital Regional District in Victoria, British Columbia, uses Google Earth to visualize transportation data. The data they make available pertains to the busiest transit stops, bicycle and pedestrian counts, and congestion levels. While these examples are not related to specific planning processes, Google Earth's ability to visually convey data and information make its potential application to regional visioning and planning processes noteworthy.

Tools and Techniques for Visualizing and Communicating Scenarios and Alternatives – Applications and Specifications

While the examples above feature specific tools and how they have been used in the field by organizations, this section highlights a variety of additional tools and techniques available for transportation and planning organizations in visualizing and communicating scenarios and alternatives. The information in this section and presented in Table 2G-2, Table 2G-3, and Table 2G-4 is meant to provide a snapshot of applications and corresponding data to provide a concise overview. Potential users are encouraged to investigate tools and methods that seem suitable to their needs by contacting the experienced entities provided in Table 2G-4, as well as by reviewing the websites noted in Table 2G-3.

To assist potential users in the selection of the appropriate tool or techniques for visualizing and communicating scenarios and alternatives, the tools and techniques are categorized by their application: Modeling and/or Scenario Planning; Public Engagement; Transportation Modeling; and Visualization (see Table 2G-2, Table 2G-3, and Table 2G-4).

Table 2G-2 provides basic information for each of the tools and techniques, including tool or technique name, application, cost, and description. In addition to being categorized by their application, each tool and technique is arranged by cost, in ascending order, to make it easier for potential users to select a tool that will best fit their budget. Although there are exceptions, there is a correlation between cost and level of sophistication, and low-tech tools are generally less expensive than high-tech tools.

Table 2G-3 provides details related to the technical aspects of each tool, including system requirements, availability, technical support, and tool websites. "System requirements" are the minimum computer software requirements needed to run tool software. "Availability" pertains to how the tool can be acquired. "Technical Support" denotes whether technical support is available, its cost, and terms of support.

Table 2G-4 shows the tool or technique's applicability for use in the three planning levels addressed throughout the Guide (regional, corridor, and neighborhood), as well as examples of organizations that have employed each of the tools and techniques. This information is provided in order to give potential users a starting point for further investigation of real-life examples of how tools and techniques were used, and what they are capable of achieving.

Table 2G-2 *Description of Tools*

	Tool Name	Application	Cost	Detailed Description
Modeling and/or Scenario Planning	CommunityViz	Helps visualize, analyze and communicate important land-use decisions.	$350	CommunityViz is advanced yet easy-to-use GIS software designed to help people visualize, analyze and communicate important land-use decisions. Operating as an extension to ESRI's ArcGIS platform, CommunityViz offers: easy-to-use tools for creating realistic 3D visual models of your world as it is, and as it could be. *Interactive features for analyzing choices about development, growth and change over the years to come. *Myriad ways to make and share decisions about geography and the future of your community, your land and your world.
	INDEX	Measures existing conditions, evaluates alternative plans, and supports implementation of adopted plans.	$1900+	INDEX is an interactive GIS-based planning support system that measures existing conditions, evaluates alternative plans, and supports implementation of adopted plans. Introduced in 1994, it is now one of the most widely distributed planning tools in the U.S., with over 90 organizations in 30 states equipped with the software. INDEX is an integrated suite of tools designed to support the entire process of community planning and development. Applications often begin with benchmark measurements of existing conditions to identify problems and opportunities that merit attention in plans. INDEX is then used to design and visualize alternative planning scenarios, analyze and score their performance, and compare and rank alternatives. Once plans are adopted, INDEX supports implementation by evaluating the consistency of development proposals against plan goals. Over time, achievements are periodically measured with progress reports. The tool is distinguished by its land-use/transportation analysis using a multi-modal travel network integrated with land-use parcels. INDEX is available in either ArcView 3.2, ArcGIS 9x, or MapObjects versions and can be purchased in standard or custom versions by organizations that desire their own copy; or modeling services can be provided by Criterion when analysis, but not software, is desired.
	MetroQuest	Allows stakeholders to set their priorities, try different planning choices and see future consequences related to their priorities.	$30,000 - $200,000	MetroQuest allows stakeholders to set their priorities, try different planning choices and see future consequences related to their priorities. This sets the stage for stakeholders to have a meaningful discussion about future plans and send feedback to planners.
	I-PLACE3S	Facilitates integrated land use and transportation scenario planning. Web-based platform that communicates ideas, stores data, and analyzes potential outcomes.	Varies: Depends on data storage and support needs (SANDAG contract $86,000/2 terabytes +support)	I-PLACE3S is a web-based modeling platform that evaluates land use and transportation scenarios against a variety of indicators. Users interact with a web-based map display to view the impacts of various scenarios. I-PLACE3S can be used by transportation experts, but is designed to be usable in non-technical settings like public workshops.
	Envision Tomorrow	Used to model the development of buildings on a site-by-site basis, as well as create an evaluate land use scenarios.	Varies: $10,000 for software and basic support	Envision Tomorrow uses a ROI model to develop prototype building models (3D) at a site scale. These building are combined at a neighborhood level, and then can be translated into a landscape scale scenario for analysis of performance against indicators.
Public Engagement	AnyWare Tools	Allows for online brainstorming, sorting, and prioritization of ideas both in meetings and via computers and cell phones.	Varies: Low	AnyWare Tools are a low cost, web-based set of tools for planners that provide several interconnected ways to collect feedback from stakeholders, including methods for gathering input from people via cell and smart phone, provided from anywhere, any time. The concept of AnyWare Tools is that planners should not need several different software tools to effectively gather good information and input. Rather, a system of web-based tools can gather input, organize it, and reflect it back to participants, creating a rapid feedback loop.
	Ingage Networks (formerly Neighborhood America)	Transforms static websites into interactive sites for gathering input.	Varies: Medium	A platform that transforms static websites into interactive involvement sites allowing citizens to voice their concerns/comments throughout the planning process.
	21st Century Town Meeting	Conducts large meetings that combine face-to-face interaction and technology for decision making.	Varies: High	AmericaSpeaks provides citizens with a greater voice in planning and policy-making by integrating keypad polling and groupware computers with authentic public deliberation. AmericaSpeaks has managed public engagement programs across the country and around the world, including the redevelopment of Ground Zero after 9/11, the creation of Washington, D.C.'s budget priorities, and regional planning processes in Chicago, Cincinnati, Cleveland and Perth Australia.
	Council and WebCouncil	Facilitates technology-supported meetings to gather public input.	Varies: High	Council and WebCouncil are two tools that can enhance community participation in the decision making process. Council is a facilitated process supported by "meetingware" technology including laptop computers and voter keypads to get feedback and ideas from large groups. The computers are networked together using wireless technology maximizing mobility and reducing setup time. In Washington DC, Mayor Williams has used Council to facilitate two large scale Citizen Summits. The first community-scale gathering took place in November 1999. A second meeting took place in October 2001. Each Citizen's Summit attracted over 2,500 participants. With 10 people at a table and one laptop per table, the mayor could discuss and ask questions about his strategic plan and receive rapid audience feedback. After discussing citywide issues, the group broke into neighborhood constituencies to establish priorities. The first meeting produced a 300-page report outlining next steps, the second meeting focused on follow-up and implementation. WebCouncil is a web-based tool that enables virtual meetings, specialized discussion groups, and resources to manage and track a project. It is often used to keep people involved and active in discussions and next steps in between face-to-face meetings.
	ULI Reality Check (or Chip Game)	Allows participants to place Legos, blocks, or paper squares on a map to represent allocation of expected future residences and jobs.	Varies: Low to High	Reality Check, a one-day, participatory, regional visioning exercise to engage leaders in a regional dialogue on growth issues by allocating growth and siting transportation.
Transportation Modeling	TransCAD	GIS system that stores, displays, manages, and analyzes transportation data.	$3,000 - $10,000	TransCAD is the first and only Geographic Information System (GIS) designed specifically for use by transportation professionals to store, display, manage, and analyze transportation data. TransCAD combines GIS and transportation modeling capabilities in a single integrated platform, providing capabilities that are unmatched by any other package. TransCAD can be used for all modes of transportation, at any scale or level of detail.
	Cube (and Mint)	Provides travel forecasting (module based suite of tools).	$7,500-20,000	Cube is a family of software products that form a complete travel forecasting system providing exceptional, easy to use, capabilities for the comprehensive planning of transportation systems. Cube offers multiple modules that provide different functions for different tasks. Users only need to acquire the modules that they need to complete their tasks, reducing their costs.
	EMME/3	Conducts travel demand forecasting.	$9,000+	Emme is a complete travel demand forecasting system for urban, regional, and national transportation planning. Make informed transport policy decisions with Emme's comprehensive set of tools for demand modeling, multimodal network modeling, visualization and analysis.
	VISSIM	Provides microscopic multi-modal traffic modeling.	$2,000-$18,000	VISSIM is the leading microscopic simulation program for multi-modal traffic flow modeling. With its unique high level of detail it accurately simulates urban and highway traffic, including pedestrians, cyclists and motorized vehicles.
	VISUM	Provides transportation planning, travel demand modeling and network data management.	$6,000-$30,000	VISUM is a comprehensive, flexible software system for transportation planning, travel demand modeling and network data management. VISUM is used on all continents for metropolitan, regional, statewide and national planning applications.
Visualization	Google Earth	Provides satellite imagery, topography, and interactive maps for most of the United States and globe.	0, Pro-$400	Google Earth allows users to view satellite imagery, maps, terrain, 3D renderings of buildings, create new layers, add multi-media content including photos and videos linked to pins on the map (geo- referenced), create guided tours, 3D "fly-throughs," and share that saved content with others.
	SketchUp	Provides user friendly 3D modeling that integrates with GIS, GoogleEarth.	0, Pro-$495	SketchUp, now part of Google, is simple, yet powerful 3D software for creating 3D design concepts quickly and easily. Due to its user-friendly interface and simple tool set, everyone from engineers to elementary students uses SketchUp. And SketchUp interacts well with CAD, 3D and multimedia applications. Download a free version from Google.
	SiteBuilder 3D	Creates 3D scenes from 2D information.	$350 for CommunityViz 4.0	SiteBuilder 3D enables users to create photo-realistic, 3D interactive scenes from 2D map data. With just a few mouse clicks, 2D maps from Scenario 360™ can be turned into realistic 3D scenes that provide insight to support decision making by helping users to see the spatial relationships and visual impacts of multiple alternatives. SiteBuilder 3D for ArcGIS is a component of CommunityViz 3.3. It works as an extension to ESRI's ArcGIS platform.
	Maptitude Geographic Information System	Provides desktop mapping and spatial analysis.	$495	Maptitude is the intelligent mapping solution for business, government, and education. Maptitude is a powerful combination of software and geographic data that provides everything you need to realize the benefits of desktop mapping and spatial analysis with a single, easy-to-use package.
	Urban Advantage	Creates green visions of enriching walkable urbanism by transforming photographs with photo editing software. The results are photo- realistic visualizations that make development visions palpably real and understandable.	Varies: Medium	Urban Advantage creates green visions of enriching walkable urbanism by transforming photographs with photo editing software. The results are photo-realistic visualizations that make development visions palpably real and understandable.
	Space Syntax	Measures the effect of spatial layout on social and economic indicators.	Varies: Medium	Space Syntax has developed a set of advanced software tools that evaluate the role of spatial layout in shaping patterns of human behavior.

Table 2G-3 *Technical Aspects of Tools*

	Tool Name	System Requirements	Availability	Technical Support	Website
Modeling and/or Scenario Planning	CommunityViz	ArcMap 9.2 or 9.3, .Net, DirectX9.0	Download	$650/year	www.placeways.com/communityviz
	INDEX	ArcGIS	CD/DVD	One year with license, then annual fee	www.crit.com
	MetroQuest	Internet, GIS if client develops scenarios	Online tool, or CD/ DVD for face-to- face use	Varies depending on if client creates scenarios, uses only online or also face-to-face tool, yearly fee either way	www.metroquest.com
	I-PLACE3S	ESRI ArcGIS (needed up upload shapefiles)	NA (upload data to website for analysis)	With purchase, yearly contract renewal	www.sacog.org/services/I- PLACE3S
	Envision Tomorrow	ArcGIS	ftp, email	Free ongoing support, indefinitely	www.frego.com/projects/documents
Public Engagement	AnyWare Tools	Internet	Download a software/Hire a service	NA--Support is part of process, but does not continue past contract	www.placematters.org/node/235
	Ingage Networks (formerly Neighborhood America)	NA	Service	NA--Does not require tech support	www.ingagenetworks.com
	21st Century Town Meeting	NA	Service	NA--Does not require tech support	www.americaspeaks.org
	Council and WebCouncil	Internet connection	Hire a service/ Order software	NA--Support is part of process, but does not continue past event and/or contract	www.covision.com
	ULI Reality Check (or Chip Game)	NA	NA	NA--Does not require tech support	www.uli.org
Transportation Modeling	TransCAD	Windows, ArcGIS	CD/DVD	One year with license, then $500-$1,000/yr	www.caliper.com
	Cube (and Mint)	Windows	Download (requires license key)	One year with license, then annual fee	www.citilabs.com/index.php/cube-5.2139/
	EMME/3	Windows, Mac OSX, Linux, Solaris	Download (requires license key)	One year with license, then annual fee	www.inro.ca/en/products/emme/index.php
	VISSIM	Windows, .Net	CD/DVD	One year with license, then annual fee	www.vissim.de/index. php?id=1801
	VISUM	Windows, .Net	CD/DVD	One year with license, then annual fee	www.english.ptv.de/software/ transportation-planning-traffic-engineering/ software-system-solutions/visum/
Visualization	Google Earth	Windows or Mac OSX	Download	Discussion Forum	www.earth.google.com
	SketchUp	Windows or Mac OSX	Download	Discussion Forum	sketchup.google.com/
	SiteBuilder 3D	ArcGIS, Windows, .Net	Download with CommunityViz 4.0	Discussion Forums	http://placeways.com/communityviz/ productinfo/ scenario3d/
	Maptitude Geographic Information System	Windows, XGA video 16 bit color	CD/DVD	$100 first year of tech support	www.caliper.com/maptovu.htm
	Urban Advantage	NA*	Service	NA--Does not require tech support	www.urban-advantage.com
	Space Syntax	NA	Service	NA--Does not require tech support	www.spacesyntax.com

Service: Tool is a service, so this field does not apply or depends upon level of service requested of provider
NA: Not applicable, in some cases because the tool is a service

Table 2G-4 *Applicability of Use in Planning*

	Tool Name	Region	Corridor	Neighborhood	Sample Organizations that have Successfully Utilized Tool
Modeling and/or Scenario Planning	CommunityViz	yes	yes	yes	Pikes Peak Area Council of Governments, Pueblo Council of Governments, Berkeley-Charleston-Dorchester Council of Governments (in progress)
	INDEX	yes	yes	yes	Northeast Illinois Planning Commission, Florida Sustainable Emerald Coast Commission, Puget Sound Regional Council, County of Sacramento (land use/transportation planning)
	MetroQuest	yes	yes	yes	Denver Regional Council of Governments, Chicago Metropolitan Agency for Planning
	I-PLACE3S	yes	yes	yes	SACOG Blueprint 2002,2004, Metropolitan Transportation Plan 2025; San Luis Obispo COG (regional land use/transportation visioning and policy development)
	Envision Tomorrow	yes	yes	yes	Southern CA Association of Governments; Portland Metro TOD analysis; Dallas, TX Comprehensive Plan
Public Engagement	AnyWare Tools	yes	yes	yes	Albany, NY Planning Department
	Ingage Networks (formerly Neighborhood America)	yes	yes	yes	DC Office of Planning
	21st Century Town Meeting	yes	yes	no	DC Area, NYC, State of CA, Maryland-National Capital Park and Planning Commission (Envision Prince George's)
	Council and WebCouncil	yes	yes	yes	Listening to the City (NYC), Unified New Orleans Plan, CMAP Regional Common Ground process
	ULI Reality Check (or Chip Game)	yes	yes	yes	ULI Chapters in: North Carolina Research Triangle Park, Upstate South Carolina, Los Angeles, North Texas, Maryland, and Washington, DC.
Transportation Modeling	TransCAD	yes	yes	yes	Springfield, IL MPO; Pima Association of Governments; Maricopa Association of Governments, Scottsdale, AZ
	Cube (and Mint)	yes	yes	yes	SACOG (integrated with I-PLACE3S), Houston-Galveston Area Council for long-range transportation planning, Atlanta Regional Planning Agency
	EMME/3	yes	yes	yes	Puget Sound Regional Council (integrated land use and regional travel demand modeling)
	VISSIM	yes	yes	yes	Portland Metro
	VISUM	yes	yes	yes	Delaware Valley Regional Planning Commission, Portland Metro, The Mid-Willamette Valley Council of Governments, Spokane Regional Transportation Council
Visualization	Google Earth	yes	yes	yes	Fort Worth Transportation Authority, Metro Boston Transit Authority Green Line expansion, Metro Washington COG, Pikes Peak Area Council of Governments
	SketchUp	yes	yes	yes	Amherst, MA; McMinnville, TN
	SiteBuilder 3D	no	yes	yes	City of Westminister; CO FasTracks TOD station
	Maptitude Geographic Information System	yes	yes	yes	Basis of HUD's Community2020 software, and Maptitude online is used by HUD.
	Urban Advantage	no	no	yes	SANDAG Smart Growth Visualization Tools
	Space Syntax	yes	yes	yes	Seattle Pedestrian Master Plan

* Denotes tools applicability to planning level

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