By Nadine Fogarty, Strategic Economics

Evidence continues to mount that transit has the potential to generate a tremendous amount of value for nearby property owners. Numerous studies demonstrate that, other things being equal, properties near transit stations have higher values. Furthermore, because higher land values and higher development densities tend to go hand in hand, this can also translate into increased development potential, as long as local land use policies allow for more intensive development.

It is no wonder, then, that transit agencies are looking to capturing this value as a potential source of funding for transit construction and operations.

Most “value capture” research focuses on understanding property value increases for existing land uses near transit, in part to demonstrate that public financing interventions are justified in taking back some of the “windfall” gains that property owners receive from the addition of transit. But the results are uneven, with most studies finding a “value premium” anywhere from 5 to 20 percent. The reason for this wide range is that a multitude of factors influence the impact of transit on nearby property values, including distance from the station, size of the transit system, frequency of service, property type, and market conditions. Regional traffic congestion can also result in higher values for properties with good access to transit.

How can transit agencies capitalize on rising property values near stations? The current mechanisms are limited, and fall into three broad categories:

• Special Assessment - a tax assessed against parcels that have been identified as receiving a direct and unique benefit as a result of a public project.
• Tax Increment Financing (TIF) – a mechanism that allows the public sector to “capture” growth in property tax (or sometimes sales tax) resulting from new development and increasing property values.
• Joint Development/Public-Private Partnerships – any of a wide range of strategies that involve cooperation between the public and private sectors to develop transit and/or transit-oriented development (TOD).

All of these strategies have been used by transit agencies in one form or another to “capture” the value of transit near stations, but they are very challenging to implement. Property owners are understandably reluctant to vote to increase their property taxes. Similarly, TIF districts can be controversial, because they divert funds that would otherwise go to other local services. Even where TIF can be implemented the local jurisdiction may have other goals for the tax increment revenues. And while some transit agencies have engaged in very successful joint development projects, they do not typically generate a significant amount of revenue, in part because of the complexity of developing on sites directly adjacent to transit stations.

While most of the value capture research focuses on documenting the higher values of properties near transit, most of the real opportunities to both create and capture value are actually related to new development in the greater station area. This is not surprising, given that new development near a station — transit-oriented development (TOD) — can be designed to take advantage of the benefits of transit. New development can target demand for TOD uses, such as housing or office. It can also take advantage of lower parking demand, higher densities, and other zoning policies that encourage TOD. In some cases, new land is made available for development in conjunction with the construction of a new transit system, as in Portland’s Pearl District. In contrast, existing land uses may or may not be able to capitalize on the presence of transit.

The property owners who have the most to gain from transit — and who are most likely to vote for an assessment district, be in favor of a TIF district, or engage in joint development — are those who have vacant or underutilized land that is ripe for development. Assessment districts and TIF districts are easier to implement in areas where property ownership is consolidated among one or a few owners who are expecting to develop or redevelop their properties. Real estate developers are motivated to cooperate with transit agencies and local jurisdictions if it means their project is more likely to get built, and more likely to be successful.

Moreover, new real estate development has the potential to have a greater impact on station area property values. Existing properties might increase in value by 5 to 20 percent due to transit, but the value of new development is much higher. And importantly, development occurs within a predetermined, finite period of time — providing a unique opportunity to apply a value capture strategy.

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SALT LAKE CITY — The Utah Transit Authority (UTA) has signed a letter of intent with the federal government to fund 20 percent of the cost of four new light rail lines and commuter rail to Provo. UTA General Manager John Inglish says such an agreement with the Federal Transit Administration is unprecedented — transit agencies have in the past approached the agency for funding for one rail line at a time. Inglish says this will save UTA years of waiting in the lengthy federal process. The FTA will fund a total of $500 million of the more than $2 billion it will cost to build the five lines. Local sales tax dollars will fund the rest. (Deseret News 9/25/07)

HOUSTON — A decision by Metro to upgrade three BRT lines to light rail has caused the Federal Transit Administration to withdraw its approval of two of the lines, to require extensive new documentation and public hearings, and to ask Metro to demonstrate its technical capability to implement light rail. Metro made the decision to upgrade because new FTA rules allow ridership to be modeled on the entire transit network instead of on each line alone -- which boosted the lines’ cost-effectiveness to FTA-approved levels and provided cheaper per-vehicle costs. A 2003 referendum called for rail in all of the corridors. (Houston Chronicle 12/8/07)

NEW YORK CITY — The recent mortgage crisis has affected the housing market here as it has in the rest of the country. But real estate analysts say houses in towns located on commuter rail lines are selling much better than houses in towns that are not near rail. Statistics show that commuter rail towns like Maplewood, Montclair and Chatham tend to have less than six month’s worth of unsold housing inventories — a level more characteristic of a rising market than a falling one. Analysts say that housing demand is being driven outward along rail lines because the Manhattan economy remains strong and its roaring housing market has yet to slow. (New York Times 9/16/07)

BEIJING — China’s Ministry of Construction has prioritized developing and funding urban public transportation. According to the Ministry 22 subway and light rail lines totaling 375 miles have begun operation in 10 cities, and 36 lines are under construction — mostly in Beijing, Shanghai and Guangzhou. Construction of a 15-city $81 billion light rail line totaling more than 1,000 miles has also been approved. (The People’s Daily 7/17/07)

HOUSTON — Metro says ridership on its light rail system has doubled in 20 months and now totals 45,000 boardings each weekday — the number of riders forecast for 2020. The Houston-Galveston Area Council noted in a recent report that 41 percent of these riders are new to transit; 49 percent have a car available; 37 percent say that 24-hour rail service would make them use transit more frequently; and 49 percent say they would use transit more if rail lines stop become increasingly attractive. (Houston Chronicle 12/8/07)

SAN FRANCISCO — Mayor Gavin Newsom will ask voters next year to approve a carbon tax on businesses as a way to provide financial incentive for conserving energy and motivating workers to use public transit. The ballot measure would increase the city’s 5 percent commercial utilities tax by an as-yet-undetermined amount to encourage energy savings and combat global warming. A payroll tax cut would be offered to businesses that get more employees to use transit. (Associated Press 12/6/07)

SAN FRANCISCO — Recent polls show a strong majority of residents are willing to pay a 25-cent gas tax to reduce the effects of global warming. Survey respondents said they would want the funding to go to clean fuel and energy research and transit. (San Francisco Examiner 11/5/07)

BOSTON — Governor Deval Patrick’s $2.9 billion transportation bond measure includes $20 million for the state’s transit-oriented development program. Money would help fund affordable housing and infrastructure improvements around transit stations. (Providence Business News 11/30/07)

DENVER — Property rights activists are watching closely as the Regional Transportation District begins land acquisition for the West Corridor light rail line. They can’t challenge the RTD’s acquisition of land for tracks, stations and parking, but are considering challenging RTD’s right to use land for transit-oriented development. Law allows the RTD to put small-scale commercial and retail development on land at stations. But the City of Lakewood, for example, wants RTD to wrap parking garages with commercial or residential development, and to move parking away from stations in to make room for bigger projects. RTD wants the legislature to add housing to the list of allowable uses at stations. (Rocky Mountain News 12/3/07)

LONDON — The UK is spending £6 billion ($32 billion U.S. dollars) to build a 74-mile subway from the easternmost to westernmost parts of the London region. The “Crossrail” project — first proposed 18 years ago — is being called the largest rail construction project in the Northern Hemisphere, and will increase the capacity of the city’s transit system by 10 percent. The London Underground is the world’s oldest subway system and one of the longest, with 275 stations, 253 miles of track, and 3 million daily passengers. (The Guardian 10/5/07)

USA — Virgin Airlines ranks the “Top 11 Underground Transit Systems” on its www.virgin-vacations website, noting that “when you’re traveling, it’s good to know public transit can get you where you want to go”: 1) London, Europe’s largest and oldest system; 2) Paris, where every building is within 1600 feet of a station; 3) Moscow, with the highest ridership at 8.2 million/day, and 44 of 172 stations rated as architectural landmarks; 4) Madrid, second largest European

ULI Says TOD A Best Bet In ’08

“EMERGING TRENDS in Real Estate,” the widely read annual forecast published by the Urban Land Institute and PricewaterhouseCoopers, cites TOD as a best bet for investors for the fourth year in a row in 2008. Noting the U.S. real estate market faces a greater downside risk this year due to tightening credit markets and a slowing national economy, the editors go on to laud TOD under the headline “Build Transit-Oriented Development”: “Congestion mounts everywhere and people get sick of losing time in traffic jams and car-dependent lifestyles. Higher gas prices, global warming issues, and pollution just add to frustration levels. Condominiums, apartments, and retail near light rail or subway/train stops become increasingly attractive, almost can’t miss.”

The report goes on to note that while 24-hour cities remain favorites with investors — including New York, Seattle, San Francisco, Los Angeles and Washington D.C. -- suburbs are still alive and well in part because of their affordability. “But successful suburbs will need to embrace diversity in housing and recognize the benefits of orienting mixed-use development around mass transit,” write the authors, noting that high gas prices and lengthening commutes will keep people from choosing far-flung suburbs. “Annual car expenses — loan payments, gas, regular maintenance service, repairs, insurance — can exceed debt service on a $100,000 mortgage.”

At www.uli.org/bookstore
system and the world’s densest network; 5) Tokyo; 6) Seoul, the second most heavily used system; 7) New York City; 8) Montreal; 9) Beijing, expanding from 71 miles to 300 miles for the 2008 Olympics; 10) Hong Kong, only 56 miles but with 2.5 million riders daily; 11) Sao Paulo, Brazil. (www.virgin-vacations.com/site_vu/11-top-underground-transit-systems-in-the-world.asp)

SAN JOSE – As fast-growing tech companies like Google Inc. and Facebook continue gobbling up quality commercial space in Mountain View, demand has gotten strong enough to justify the cost of redeveloping obsolete industrial structures. Projects are taking advantage of transit orientation, which includes the Valley Transit Authority’s light rail system and Caltrain’s Baby Bullet Express service, which whizzes commuters from San Francisco in less than an hour. Developers are targeting sites near transit in part because of the higher densities allowed at sites of 5 acres or more within 2,000 feet of stations. (Silicon Valley Business Journal 11/16/07)

USA – Amtrak is chugging toward its fifth-straight record year for ridership nationwide, helped by high gasoline prices and congested highways and airports. But funding remains a problem — Amtrak hasn’t been out of the red since its launch in 1971, meaning it must rely on government handouts. Amtrak has requested $1.3 billion in next year’s federal budget, nearly twice the amount proposed by the Bush Administration. Both the House and Senate have approved nearly the amount requested by Amtrak, but Bush has promised to veto any spending bills exceeding his budget requests. (Associated Press 12/22/07)

USA – So far it appears that New Urbanist projects are weathering the downturn in the real estate market better than conventional development. Anecdotal evidence suggests that projects are enjoying diversity, closeness to transit, and the appeal of urban living are helping offset the biggest housing decline in years. For example, Arlington, Virginia, which is served by MetroRail, has seen prices rise 20 percent over last year, and prices in Washington D.C. are up 5 percent whereas they’ve declined elsewhere in the region. Real estate data in Denver, too, shows prices in walkable neighborhoods have risen sharply compared to the rest of the region, and Dallas, Detroit, Philadelphia and Atlanta have similar stories. (New Urban News October/November 2007)

PHOENIX – Light rail’s Midas touch appears able to beat the downturn in the real estate market here. Many big-budget projects along the new rail line’s route are moving forward despite the market, and more than 50 developments worth $6 billion are slated to rise near the line in downtown Phoenix, Tempe and Mesa. Developers look to Dallas as inspiration: Since DART’s 20-mile light rail system opened property values are up 25 percent over similar properties not served by rail. (bizAZ Magazine 11/12/07) . . . Office rents along the new line have jumped $6 in the last two years as buildings change hands in advance of the opening of the new system. (Arizona Republic 7/17/07)

WASHINGTON D.C. – The Metrorail subway is one of this country’s most successful transit systems, in a region that enjoys one of the nation’s best real estate markets. A recent survey found 100 joint development projects currently underway across the U.S. -- with the largest number in Washington D.C. But a recent, scathing report by a panel of Metro-appointed experts blasts the transit agency for its failure to encourage more TOD as a means of increasing revenues and ridership. Among problems cited: Real estate is not the core mission of transit agencies and expertise is often limited, with the result that properties are often put out for development ahead of the market or without supportive planning in place, and development goals often take a back seat to issues like access and parking. (ULI’s http://thegroundfloor.typepad.com 9/17/07)

MIAMI – Miami’s on-again off-again streetcar project got a jumpstart when both the Miami City Commission and Miami-Dade County Commission backed a multimillion-dollar deal to build the streetcar as well as a baseball stadium, museum campus and underwater tunnel to the Port of Miami. Mayor Manny Diaz has cobbled together a plan to use two community redevelopment agency districts to fund these “legacy-building” projects. There are about 100 development projects underway within a half mile of the streetcar alignment. (www.lightrailnow.org 12/21/07)
A common misconception about transit-oriented development is that there's only one type of development that qualifies as TOD. "But we're not Manhattan!" residents protest. "Our streets can't handle the traffic!" city staff complains. "We need to preserve our park-and-ride capacity!" transit agencies argue. TOD partners often struggle with decisions about station development and access, and with planning outcomes. The diversity of transit modes, corridors, and local and regional land-use contexts causes the decision-making process to be complex and fragmented.

To aid in the planning process, Reconnecting America’s Center for Transit-Oriented Development (CTOD) has developed typologies at two scales: the corridor, and the district (or place). Typologies have the potential to simplify complicated decisions about transit and land use planning and to help communicate them to a wide audience by identifying the key decision points and relating these to both ideal scenarios and real-life places at the same time. The urban-to-rural "transect," for example, is a typology that has served as a powerful New Urbanist tool for land-use planning and street design because it provides a shared language that can be used in the decision-making process.

The use of typologies in decision-making is becoming more and more common as cities and transit agencies around the country realize the complexity entailed in planning and building high-quality transit-oriented development. The following discussion — of CTOD’s typologies as well as typologies developed by the planning and design firms of Arup and of Glatting Jackson — illustrates current thinking about definitions for the common types of TOD and the ways they can be distinguished from one another in terms of their role and function within the regional system.

**CTOD’s Typologies**

The Center for TOD published its first typology (see below) in 2004 in the TOD best practices manual entitled *The New Transit Town* (Island Press, 2004). Since then CTOD has developed new iterations of the typology for use in specific places — in Denver, Houston, and in the San Francisco Bay Area. All are discussed here.

### New Transit Town TOD Typology

<table>
<thead>
<tr>
<th>TOD Type</th>
<th>Land-Use Mix</th>
<th>Minimum Housing Density</th>
<th>Housing Types</th>
<th>Scale</th>
<th>Regional Connectivity</th>
<th>Transit Modes</th>
<th>Frequencies</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Downtown</td>
<td>Primary office center</td>
<td>&gt;60 units/acre</td>
<td>Multifamily Loft</td>
<td>High</td>
<td>High Hub of radial system</td>
<td>All modes</td>
<td>&lt;10 minutes</td>
<td>Printers Row (Chicago)</td>
</tr>
<tr>
<td></td>
<td>Urban entertainment Multi-family housing Retail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LoDo (Denver) South Beach (San Francisco)</td>
</tr>
<tr>
<td>Urban Neighborhood</td>
<td>Residential</td>
<td>&gt;20 units/acre</td>
<td>Multifamily</td>
<td>Medium</td>
<td>Medium access to downtown</td>
<td>Light-rail</td>
<td>10 minutes peak</td>
<td>Mockingbird (Dallas) Fullerton (Chicago) Barrio Logan (San Diego)</td>
</tr>
<tr>
<td></td>
<td>Retail Class B commercial</td>
<td></td>
<td>Loft Townhome</td>
<td></td>
<td>Subregional circulation</td>
<td>Streetcar Rapid bus Local bus</td>
<td>20 minutes offpeak</td>
<td></td>
</tr>
<tr>
<td>Suburban Center</td>
<td>Primary office center</td>
<td>&gt;50 units/acre</td>
<td>Multifamily Loft</td>
<td>High</td>
<td>High access to downtown</td>
<td>Rail Streetcar Rapid bus Local bus Paratransit</td>
<td>10 minutes peak</td>
<td>Arlington County (Virginia) Addison Circle (Dallas) Evanston (Illinois)</td>
</tr>
<tr>
<td></td>
<td>Urban entertainment Multi-family housing Retail</td>
<td></td>
<td>Townhome Single family</td>
<td></td>
<td>Subregional hub</td>
<td></td>
<td>10-15 minutes offpeak</td>
<td></td>
</tr>
<tr>
<td>Suburban Neighborhood</td>
<td>Residential</td>
<td>&gt;12 units/acre</td>
<td>Multifamily</td>
<td>Moderate</td>
<td>Medium access to suburban center</td>
<td>Light-rail</td>
<td>20 minutes peak</td>
<td>Crossings (Mountain View, CA) O'Hare-Chicago O'Hare-Crownvile (San Jose, CA)</td>
</tr>
<tr>
<td></td>
<td>Neighborhood retail Local office</td>
<td></td>
<td>Townhome Single family</td>
<td></td>
<td>Access to downtown</td>
<td>Streetcar Rapid bus Local bus Paratransit</td>
<td>30 minutes offpeak</td>
<td></td>
</tr>
<tr>
<td>Neighborhood Transit Zone</td>
<td>Residential Neighborhood retail</td>
<td>&gt;7 units/acre</td>
<td>Townhome Single family</td>
<td>Low</td>
<td>Low access to a center</td>
<td>Local bus Paratransit</td>
<td>25-30 minutes Demand responsive</td>
<td>Prairie Crossing (Illinois) Seaside City (California)</td>
</tr>
<tr>
<td>Commuter Town Center</td>
<td>Retail center</td>
<td>&gt;12 units/acre</td>
<td>Multifamily</td>
<td>Low</td>
<td>Low access to downtown</td>
<td>Commuter train Rapid bus</td>
<td>Peak service Demand responsive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Residential</td>
<td></td>
<td>Townhome Single family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THE NEW TRANSIT TOWN TYPOLOGY

The TOD typology in The New Transit Town was intended to address the problems inherent in a “one-size-fits-all” approach to TOD, and to instead acknowledge that different strategies are necessary to create holistic transit-oriented neighborhoods in different planning contexts. The types were not intended to serve as strict definitions of place characteristics and planning approaches, but rather to identify some of the critical similarities and differences among transit-oriented neighborhoods. The typology focused on the broad land use and transit characteristics of six place types.

DENVER TYPOLOGY

In 2006 CTOD assisted the City and County of Denver in preparing a TOD Strategic Plan, and used this opportunity to update the TOD typology and apply the concepts in a specific context. The Denver region is in the midst of a major transit expansion, building five new rail lines in 15 years. When the system is built out, the number of stations within the City of Denver will increase from 19 (at the time the strategic plan was created) to a total of 40. This level of investment and expansion has the potential to radically shift the real estate and development market in the region.

The typology (to the right) frames an approach to planning for each station area within the city, and was used to set basic guidelines. For example, when a project was proposed for a station area where there was no station area plan in place, the typology could serve as a reference point to help gauge the appropriateness of the proposed development – thus providing a starting point for the planning and decision-making process.

As part of the Denver planning exercise, transit corridors and stations were mapped in order to get a big picture view of how different place types would interact along the corridor, and how decisions made at the station level would affect the corridor as a whole and vice versa. (See map below.)

This typology was developed by CTOD for use with Denver's TOD Strategic Plan.
The self-diagnostic table (top) and station area development guidelines (bottom) are included in a station area planning manual that the Center for TOD developed for the Metropolitan Transportation Commission in the San Francisco Bay Area.

**MTC PLACE TYPES**

In the San Francisco Bay Area, CTOD helped the Metropolitan Transportation Commission, which is the region’s metropolitan planning organization (MPO), create a station area planning manual that presents simple guidelines for the build-out of station areas according to place type. The Bay Area is in the midst of a major transit expansion of the already extensive transit network, and in 2005 enacted a policy requiring that communities plan and zone for a certain number of housing units at stations along transit corridors in order to qualify for capital funding for transit. MTC also created station area planning grants to help implement this policy. After the pilot cycle of grants was complete, MTC decided grantees needed more guidance in identifying the appropriate scale and approach for different TOD place types.

The manual developed by CTOD includes questions that assist planning partners in a self-diagnosis about where a particular community falls along the continuum of TOD place types. The manual also offers simple guidelines for each place type including appropriate housing types, total housing units per station area, and number of jobs per station area. It includes planning principles to help inform the development of station area plans, and a menu of building and open space types that help with the visualization of development outcomes.
CTOD’s Corridor Typology

CTOD’s corridor typology (to the right) was developed as part of a study of strategies to encourage the development of mixed-income housing near transit. Entitled “Realizing the Potential: Expanding Housing Opportunities Near Transit,” the study was sponsored by HUD and the Federal Transit Administration, and included case studies of five transit corridors in five regions – Boston, Charlotte, Minneapolis, Denver and Portland. Census, parcel, and transit agency data was gathered to determine the characteristics of land parcels and land use relationships along each corridor. Transit mode was one of several characteristics used to determine five corridor types: district circulator, destination connection, planned growth, commuter, and urban commuter. Each corridor type — the transit mode, street section, and various technological arrangements — was found to have implications for the real estate market and for ridership.

The corridor typology was developed to aid in the understanding of the relationships between the regional scale and the station area scale. Transit systems are planned at the corridor level, the FTA New Starts evaluation process focuses on the corridor, and it’s the mix of places and destinations along a corridor that often determines system performance. Land use planning at this larger scale aids in determining the best placement of stations and place types to help achieve the right land use mix along the corridor.

<table>
<thead>
<tr>
<th>Land Use Characteristics</th>
<th>Predominant Land Uses</th>
<th>Commercial/Mixed</th>
<th>Mixed/Outdated Uses</th>
<th>Commercial/Civic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Connects to</td>
<td>Major Regional Job Center</td>
<td>Downtown</td>
<td>Major Regional Job Center</td>
<td>Major Job Centers</td>
</tr>
<tr>
<td>Station Type Mix</td>
<td>Neighborhoods, Centers</td>
<td>Urban Downtown</td>
<td>Mixed Typologies</td>
<td>Mixed Typologies</td>
</tr>
<tr>
<td>Densities</td>
<td>Low to Moderate</td>
<td>High</td>
<td>Low to Moderate</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>TZ Population*</td>
<td>Low</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Redevelopment Opportunity</td>
<td>High if Freight Line/ Low if Residential</td>
<td>High</td>
<td>High</td>
<td>Moderate to Low</td>
</tr>
<tr>
<td>Household Sizes</td>
<td>Large</td>
<td>Small</td>
<td>Small to Moderate</td>
<td>Small to Moderate</td>
</tr>
</tbody>
</table>

*Pre-Rail Line Construction and Operation **Ridership description based on a scale of low to high, *Man-in, Many-out = boarding at many stations, alighting at many stations *

The corridor typology was created as part of a study for HUD and FTA about strategies to promote mixed-income TOD housing.

PLANNING IMPLICATIONS FOR CORRIDOR TYPOLOGY

We are just beginning to understand the role of corridor types in determining what kind of TOD projects will flourish, and the implications for land use and transit planning. In addition, issues relating to the real estate market for TOD and the location of mixed-income housing can be addressed at the corridor level. After assessing the regional real estate market, a corridor-level market assessment can help determine whether the rail investment could spur the market. Finally, the FTA’s New Starts process is about whether to make investments in corridors. When examining alternative funding options, the corridor is also the ideal scale for considering strategies such as tax increment financing.

It is clear that corridor types are not defined by transit technology alone — the chosen alignment and station locations and size of the system also help define the dynamics of a corridor. It is also clear that corridor types are not static, and that over time the characteristics of a corridor are likely to change. For example, the Rosslyn-Ballston Metrorail corridor in Arlington County, Virginia, started out as a planned growth corridor 35 years ago with a decision by the county government to focus new development around stations. The amount of development that has occurred has caused it to become a destination connection corridor, which has changed the planning environment so that the emphasis is no longer on promoting and focusing development but rather on improving pedestrian and bicycle access to stations and creating high-quality public space.
Other Approaches

The planning and design firms of Arup and Glatting Jackson have also developed typologies, and their approaches are both different and complementary.

Arup’s typology (above) for BART (the Bay Area Rapid Transit District), focuses on station access, and which categorizes station types according to characteristics such as ridership, station size, the existing or planned street network, parking capacity and fill time, mode share for walking, and number of bus bays. This typology can be used to help analyze what will facilitate station area development given different contexts and goals, as well as define the transit agency’s role in planning for the area around the station. Arup’s typology can be used along with the CTOD typologies for a finer-grained analysis of the relationships between land use and transit access. Integrating the two can help with decision-making at a range of scales, and is an important step forward in our understanding of the diversity of places around transit.

Glatting Jackson developed a station typology (to the right) for Charlotte, North Carolina, where 64 stations are being built as part of the region’s first fixed-guideway transit investment. This typology looks at both access and land use issues, since the transit agency in Charlotte is a department within city government, and transportation and land use planning are considered jointly. The Glatting Jackson typology first considers factors that influence the form and function of stations (see the Station Area Form diagram), and uses an urban to rural transect to illustrate the existing land use context for stations. The typology also considers the station’s service area (see the Station Function By Mode diagram), since this will influence, for example,
The Glattling Jackson typology considers the station’s mobility, place-making and land development roles to define station types and the role of the transit agency and city in design, planning and development.

The challenge of combining these three approaches to TOD typologies is that each addresses different scales and purposes. As we move forward in our understanding of typologies, we are working on several avenues simultaneously, including:

- Refining our typology to make sure we have a broad enough menu for application in many conditions, while still maintaining the distinctions between types.
- Advancing our empirical understanding of place types and performance through research.
- Assembling standards and best practices for development and access planning in different place type contexts.
- Using the TOD typology to help cities, transit agencies, and regions craft strategic visions and implement policies and capital improvements to support TOD.
- Look for our upcoming “TOD 202” typology and station area planning booklet, to be published early this spring.

The amount of parking that should be provided, bus and taxi accommodations, and pedestrian connections. Lastly, the typology considers the station’s mobility, place-making and land development roles – in other words, the station’s ability to catalyze and create development opportunities over time. Stations are then grouped into five types (see bottom diagram) to provide a big-picture view that can inform decision-making about a range of station development issues, including station location, the relationship between the station and its surroundings, and its role as a place in the community.
What exactly is bus rapid transit or BRT? At Reconnecting America we get asked that question a lot, and have put this transit technologies typology together to serve as a guide. But when talking about transit technologies there is no black and white: The modern streetcar is not so very different than light rail. Most heavy rail systems are powered by a third rail, but some use an overhead wire just like light rail and streetcars. And while many commuter rail lines in the East are powered by electricity, in the West commuter rail is typically powered by diesel. Meantime, Chicago’s South Shore commuter rail line operates in the street during some sections — and uses an overhead wire — just like a streetcar. But it’s the answer to that first question — “What’s BRT?” — that best illustrates how these definitions blur into a continuum made of many shades of gray:

**FULL BRT**
Full-scale BRT operates as a fully grade-separated system, using dedicated bus lanes, an intelligent transportation system (ITS), and with full-scale stations, low-floor boarding, branded vehicles and off-vehicle ticket vending. Successful BRT needs all these elements to provide all the benefits attributed to BRT. The Orange Line in Los Angeles is one recent example of full-scale BRT. Buses can be as long as 65 feet and carry 90 passengers per bus. Recent system costs range from $25 million/mile (Orange Line) to an estimated $49 million/mile (a new line in Hartford). System costs typically include: guideway reconstruction, platforms and/or shelters, and new buses — ranging from $300,000 for a conventional 40-foot bus to $1.6 million.
In This Typology There's No Black And White, Only Shades Of Gray

By Jeff Wood

million for an articulated 60-foot vehicle with all the bells and whistles. Other elements included in the cost are: ITS technology, including signal preemption, GPS (geographic positioning system), and arrival-time information for the stations. Costs can increase if the line requires the construction of bridges or subway tunnels.

**PARTIAL BRT**
Some BRT systems don’t run entirely in dedicated lanes; sections of track can run in streets, in HOV lanes, or in dedicated transit lanes. These systems can include other features, including ITS, stations, etc. One example is the EMX Busway in Eugene, Oregon, which runs in traffic for 40 percent of its route, and in a single bi-directional dedicated lane for the remainder. Houston’s express buses are another example, and operate in freeway HOV lanes along with vanpools and cars. Costs for partial BRT systems are much lower. Eugene’s EMX Busway cost $6 million/mile. Houston’s HOV system cost about $8.8 million/mile for 111 miles.

**RAPID BUS**
Rapid bus is not really BRT -- buses run in traffic in regular bus lanes but with limited stops. Some systems include ITS, stations, and low-floor boarding. Examples include the Metro Rapid system in Los Angeles. Costs typically include buses, station canopies, and GPS for real-time-arrival information and signal preemption.

**A TRANSIT TECHNOLOGY TYPOLOGY**
This chart provides a basic review of transit technology specifications. Data sources include APTA, Urban Public Transportation – Systems and Technology” by Vukan Vuchic, TCRP 90: Bus Rapid Transit, lightrail.com, the DART Technology Review Report, and Future Transport in Cities by Brian Richards.

<table>
<thead>
<tr>
<th>MODERN STREETCAR</th>
<th>HERITAGE TROLLEY</th>
<th>BRT</th>
<th>EXPRESS BUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Streetcar” is a generic term that applies to rail transit that runs in the street, providing local service and stopping frequently.</td>
<td>Trolleys of a design dating from 1900-1950, including “replica” cars designed to look like heritage trolleys but with modern amenities including air conditioning.</td>
<td>A relatively new term for busways that offer high-quality service on existing roadways or dedicated ROW</td>
<td>Bus service intended to improve speed over normal buses. Typically runs between downtowns and suburbs.</td>
</tr>
<tr>
<td>Portland, Seattle</td>
<td>New Orleans, Memphis, Little Rock, Kenosha, Galveston</td>
<td>Los Angeles, Boston, Pittsburgh, Cleveland, Eugene, OR</td>
<td>Any city with a bus system.</td>
</tr>
<tr>
<td>$10-$35 million</td>
<td>$2-$12 million</td>
<td>$4-$40 million</td>
<td>$1-$2 million</td>
</tr>
<tr>
<td>$39 million, Seattle</td>
<td>$12 million, Charlotte</td>
<td>$55 million, Pittsburgh West Busway</td>
<td></td>
</tr>
<tr>
<td>$23 million, Portland Phase I</td>
<td>$2.5 million, Kenosha, WI</td>
<td>$6.25 million, L.A.-San Benardino busway on HOV lanes in freeway</td>
<td></td>
</tr>
<tr>
<td>Urban circulator</td>
<td>Urban circulator</td>
<td>Regional, urban</td>
<td>Regional, urban</td>
</tr>
<tr>
<td>8-12 mph</td>
<td>8-12 mph</td>
<td>8-12 mph</td>
<td>15-19 mph</td>
</tr>
<tr>
<td>Stations, platforms (can share with buses), or signage only</td>
<td>Stations, platforms, or signage only</td>
<td>Stations, platforms, or signage only</td>
<td>Platforms or signage only</td>
</tr>
<tr>
<td>Quarter mile</td>
<td>Quarter mile</td>
<td>Quarter mile -2 miles</td>
<td>Limited stops along normal bus route</td>
</tr>
<tr>
<td>8-15 minutes</td>
<td>8-15 minutes</td>
<td>8-20 minutes</td>
<td>10-20 minutes</td>
</tr>
<tr>
<td>In street with traffic, no grade separation</td>
<td>In street with traffic, no grade separation</td>
<td>HOV lanes or separated ROW in median or on curb</td>
<td>In street with traffic</td>
</tr>
<tr>
<td>19-24 feet for double track, 11-13 feet for single track</td>
<td>19-24 feet for double track, 11-13 feet for single track</td>
<td>12 feet single track (Pittsburgh), 28 feet double track (Pittsburgh)</td>
<td>Street width</td>
</tr>
<tr>
<td>40-80 feet</td>
<td>40-50 feet</td>
<td>40-70 feet</td>
<td>33-46 feet</td>
</tr>
<tr>
<td>35-60 feet</td>
<td>30-50 feet</td>
<td>30-50 feet</td>
<td>30-50 feet</td>
</tr>
<tr>
<td>Electric</td>
<td>Electric</td>
<td>Diesel, Electric</td>
<td>Diesel</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
The Federal Funding Partnership

The Rules Used To Evaluate Transit Projects Shouldn’t Get In The Way of Funding Them

Excerpts from Shelley Poticha’s testimony to Congress

The Federal Transit Administration’s proposed new rules for implementing the federal transportation bill, SAFETEA-LU, have been sharply criticized by both Congressman James Oberstar (D-MN), chair of the Committee on Transportation and Infrastructure, and Congressman Peter DeFazio (D-OR), chair of the committee’s Subcommittee on Highways and Transit. Both charge FTA gives undue weight to the “cost-effectiveness” rating used to rank projects for funding – which favors projects that save time for commuters (bus rapid transit and commuter rail) but disadvantages community-building and place-making projects like urban rail and streetcars, which could provide more economic development and land use benefits.

In SAFETEA-LU Congress directed the FTA to consider the land use and economic development benefits on par with cost-effectiveness, and DeFazio held a hearing last September to ask why FTA still does not. At that hearing, DeFazio minced no words: “What concerns me,” he said, “is that no amount of listening will actually inspire this Administration to make enough changes so that a final rule would be acceptable to both this committee and the transit industry who will be governed by this rule for years to come.”

Congress included language in the final FY2008 Omnibus Spending Bill that prohibits the FTA from spending funds to issue a final rule for the New Starts or Small Starts programs. This means that for the next year at least projects seeking federal funds will continue under the existing evaluation framework.

Reconnecting America CEO Shelley Poticha was among those asked to testify about issues with the federal funding partnership at DeFazio’s hearing. Her remarks are excerpted below.

...[Increasingly there is a recognition that] transit is a powerful tool made more powerful when combined with proactive land use and economic development strategies. The Federal Transit Administration and U.S. Department of Transportation are developing the rules for allocating federal transit dollars to fund new transit lines. These rules will have a significant impact on whether or not local efforts to use transit investments to shape future regional growth, support economic development, address environmental challenges, and enhance quality of life are successful.

...[Yet] we hear frequent complaints that funding for transit is not keeping up with demand or rising construction costs. That the length of time, complexity and added cost of trying to navigate the federal New Starts process is increasing and placing an undue burden on transit projects, while highway projects are given much less scrutiny. That there is a growing concern, whether real or perceived, that including a full range of amenities, streetscape improvements, and pedestrian safety enhancements in a proposed transit project will jeopardize federal funding. Yet these are the very features that help maximize walking trips to transit and create high value urbanism.

Local concern over meeting the federal cost effectiveness index has led some communities to cut back on the number of transit stations, rail cars, or corridor enhancements that would help systems meet or even exceed 20-year ridership projections. Our research shows that actual ridership on many recently built transit lines is higher than predicted by the FTA’s Transit System User Benefit or “TSUB” model. This raises significant concerns about the substantial weight placed on these model results. Overall the data show that the majority of recent rail lines built with federal funding through the New Starts program are performing at least as well as pre-construction projections.

...Ridership numbers are the primary input into the TSUB model used by the FTA to compute cost effectiveness. FTA staff has noted that there are indeed problems with this model’s ability to accurately estimate ridership, particularly because more and more riders are walking to transit, not...
just driving to transit — and the TSUB model doesn’t count pedestrians. I
postulate that the sea change in the real estate market — the unprecedented
interest in dense, walkable neighborhoods around transit stations — cannot
be accurately predicted by the FTA model alone and this is one reason why
actual ridership is higher than expected.

. . . I strongly commend Congress, through SAFETEA-LU, for its work to
raise the significance of land use, and to add economic development to the
list of project justification criteria. . . The law does not require a quantitative
or predictive approach to measuring land use and economic development,
but rather elevates their weight in the justification and review of proposed
transit projects seeking federal funding. Such an approach is similar to that
taken by Canada and the United Kingdom when awarding transportation
funding. Those two countries give much stronger consideration to a full
range of benefits including environmental impacts, specifically the reduction
of greenhouse gas emissions, and for Canada, consideration of economic
development benefits as measured by public/private rates of return.

. . . FTA could play an important role in helping to clearly define
economic development benefits in the context of transit investments, and
through the New Starts evaluation process give greater weight, guidance
and direction to help local communities identify implementation strategies
for linking transit investment, housing and economic development policies
and funding.

These practices are termed “value capture,” and reflect the opportunity
to leverage the transit investment to create economic value that can help
provide ongoing revenue streams for transit agencies and local
governments. Strictly defined from a traditional economist’s perspective,
“economic development” is the measure of productivity derived from a
specific investment — a difficult and abstract concept. Practitioners’
definitions, in contrast, measure real estate development, employment
gains, access to jobs, concentration of economic activity and return-on-
investment.

This approach can include the capitalization of user benefits (users save
money on transportation costs and travel time and spend this savings on
other goods and services), redistributive economic development benefits
(represented through revenue generation from increased property values
and ridership), and the benefits of agglomeration (the potential for
increased business transactions due to densification and proximity of uses).
There are a number of proxies that could be used to evaluate the potential
economic development impacts of transit investments, ranging from
housing, employment and population projections to developer agreements,
local financial contributions to the corridor and targeted public finance tools
such as Business Improvement Districts and tax increment financing.

. . . The rules we use to evaluate proposed transit projects should not get
in the way of building and expanding transit systems . . . Our nation is facing
significant challenges to maintain our economic competitiveness, to address
global climate change, to meet the demands of projected population
growth, and to preserve our quality of life. Expanding the number of regions
with high quality transit, and growing existing transit systems, is critical to
achieving all of these goals.

emissions by introducing a fixed number of
carbon credits that can be bought and sold
among participating entities. Industrial polluters
are the primary target of this regulation,
however, which has little power to curb consumer
emissions.

A recent study by the American Public Transit
Association (APTA) points out that the U.S., with
only 5 percent of the world’s population -- owns a
third of the world’s cars and produces 45 percent
of global transportation-related CO₂ emissions.
Each mile traveled by a single-occupancy vehicle
produces one pound of CO₂, and the average
American household’s carbon footprint totals 22
metric tonnes per year, compared to 10 metric
tones per European household. Of this total, 38
percent (for a one-car household) to 55 percent
(for a two-car household) are transportation
related. Eliminating one vehicle and using public
transit can reduce a two-car household’s carbon
footprint between 25-30 percent.

A significant problem in this country is that dependence on
the automobile has caused us to try to build our way out of traffic congestion
by adding new road capacity – even though more road capacity leads to
more fuel consumption and VMT. Reducing road capacity and increasing
transit service, in contrast, has been found to reduce VMT.

For example, transportation officials seeking to address the problem
of traffic on a major commuter thoroughfare in London called the
Hammersmith Bridge decided to close it to all traffic except buses, bicycles
and pedestrians. When drivers who had used the bridge on a regular basis were surveyed, it
was found that 21 percent no longer drove to
work but were walking, biking or taking transit
instead. This example illustrates the concept of
“induced demand” – that people will drive if
there is room on the road but will choose other
options if there isn’t.

Another recent study of transit in New
England finds the actual reduction in emissions
is far greater for rail than it is for bus, largely
because the higher-density development that
occurs around rail stations is more compact and
walkable. For example, Boston’s rail stations
are surrounded by a tightly knit mix of uses,
which has a far greater effect on VMT and CO₂
emissions than commuter bus stations in more
suburban or rural areas, which are designed
for easy highway accessibility. Rail transit also
produces fewer emissions than bus, especially
if buses use conventional fuel and don’t travel
in dedicated lanes.

According to Growing Cooler, compact, transit-supportive
development patterns alone have the potential to reduce GHG
emissions from driving by 7-10 percent. An interconnected street
network with a diverse mix of uses and development that goes “up”
instead of “out” allows residents to take fewer and shorter car trips,
which will have the effect of limiting emissions-creating fuel-wasting
congestion.
T-4 AMERICA:
Reconnecting America is working with other reform-minded groups to organize a broad-based coalition in support of a wholly redesigned federal transportation bill. We agree with the National Surface Transportation Policy and Revenue Committee — the committee appointed by Congress to examine the needs of the U.S. surface transportation system — that we should not reauthorize the current program and need a new beginning instead. We believe there needs to be greater acknowledgement of the critical role transit and TOD can play in addressing climate change and sustainability, affordability, public health and safety, and national security, and to promote robust local and regional economies. Tentatively titled the “T-4 America” campaign, the goal is to reform policy and funding to respond to our changing world and emerging issues. We will call for infrastructure investments that support national priorities and shared values, accountability, performance measures, and a level playing field. We want increased investment in transit, a strong metropolitan program, an intermodal intercity travel network, a fix-it first program, and incentives for public-private partnerships that support place-making and transportation options.

WHY STREETCARS AND WHY NOW?
The tremendous success of the Portland streetcar has stimulated so much interest — and streetcars are so good at promoting development that makes it possible for people not to drive — that Reconnecting America staged three national workshops on how to build new systems last year. Based on our award-winning book Street Smart: Cities and Streetcars in the 21st Century, each workshop — in Portland, Denver, Charlotte — drew an audience of 200 from around the U.S. Panels addressed the questions “Why Streetcars? And Why Now?” and “Where’s the money for capital and operations?”; other topics included “Economic Leverage and Deal-Making,” “Political Strategies for Moving Streetcar Projects Forward,” and “Answering the Rail Critics.” We’ll hold one more workshop — in Minneapolis, Chicago or Philadelphia. Sponsors include PB, APTA, HDR, URS, LTK, Gannett Fleming, Holland & Knight, AnsaldoBreda, United Streetcar/Skoda.

UPCOMING PUBLICATIONS, A NEW BOOK, AND A STATION DATABASE UPDATE:
Weak-market cities are asking how they can use TOD to catalyze reinvestment, and we’re preparing a white paper to provide direction and case studies. Meanwhile, we’ve put together a report on joint development policies and practice, and recommendations for establishing a joint development program. Another soon-to-be-published white paper reviews ridership on rail lines that are “over-performing” their projections. A framing paper on value capture is in the works by CTOD partner Strategic Economics, and we’re publishing a series of “TOD 202” booklets on station area planning and TOD typologies, TOD and employment, TOD and climate change, and mixed-income TOD. A new book will look at the constellation of issues affected by federal transportation policy. And we are updating TOD demand numbers for housing near transit for 40 regions through 2030.

TOD UNIVERSITIES:
Shelley Poticha and Jeff Wood of RA have partnered with John Renne of the University of New Orleans and Planetizen on an online TOD course and user-friendly online discussion forum for TOD networking. Topics range from financing TOD to value capture, joint development, the roles of TOD partners, innovative parking solutions, performance-based zoning, and the importance of urban design. Course materials will be on our website once our commitment to Planetizen is over. At www.planetizen.com; click on “Courses.” Maria Zimmerman served as faculty for a 3-day workshop on TOD for the APA in October and will lead another course in Chicago in June. Planners want technical assistance now that TOD has become a popular way to address problems ranging from traffic to affordability. The McKnight Foundation has asked Reconnecting America to create a TOD “university” in the Twin Cities for developers, urban designers and civil engineers.

AFFORDABILITY AND TRANSIT:
While researching our report “Realizing the Potential: Expanding Housing Opportunities Near Transit,” we found many expiring Section 8 housing units in areas with high-quality transit service. This is worrisome because these units help low-income residents and seniors stay in neighborhoods even as higher-income households move in and prices rise. Reconnecting America has teamed up with the National Housing Trust, which keeps a database of all expiring units, to create GIS maps of expiring units near transit in eight regions. We would like to expand the data and analysis to 24 regions. This work will help us brief legislators considering reauthorizing this program.

IN MINNEAPOLIS-ST. PAUL:
We’ve been working with the McKnight Foundation and St. Paul Community Foundation to assemble a Funders Working Group focused on ensuring the proposed Central Corridor rail project maximizes the potential for TOD and promotes equitable development. Generous funding from McKnight has allowed us to work on a fine-grained analysis of how to activate the market for TOD. We’ve also prepared a TOD Community Toolbox that includes a wealth of information for practitioners and advocates.

HELPING TO IMPLEMENT PLANYC:
Thanks to the Mayor’s Fund to Advance NYC we are working with RA Board President Janette Sadik-Khan, now commissioner of the New York City Department of Transportation, to prepare a focused business plan to help implement Mayor Bloomberg’s PlaNYC over the next two years. PlaNYC is intended to ensure higher quality of life and reduce greenhouse gas emissions by 30 percent.

REVAMPING DENVER’S ZONING TO SUPPORT TOD:
As part of our ongoing work with the City of Denver we are helping the city revamp the zoning code to make TOD easier, and to identify new and existing programs for affordable housing.

NEW BOARD MEMBER AND NEW STAFF:
King County Executive Ron Sims from Seattle has joined Reconnecting America’s board of directors. He has been a leader in talking about climate change and transit, and provided compelling testimony to the U.S. Senate Environment and Public Works Committee last year. Allison Brooks has joined our staff as managing director to assist in overall project management, fundraising and long-range planning. She comes from the East Bay Community Foundation, where she was program officer for Livable Communities. Annie Finkenbinder is a new program associate in the Washington D.C. office. She has both legislative experience (as Hill staffer for Congressman Earl Pomeroy, D-ND) and local government experience (City of Orlando Planning Department). Natasha Daggs is working as an office assistant in the Oakland office, and
Visit the Reconnecting America Website:
A web portal to best practices in transit, TOD, mixed-income housing, place-making, zoning and coding, and more.

Help us collect TOD best practices!
Email jwood@reconnectingamerica.org.

At www.reconnectingamerica.org

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Destinations Matter: Building Transit Success
Travel Characteristics of TOD Households
Climate Change and TOD
Weak-Market Cities and TOD
TOD 202 Booklets on TOD and Employment, Typologies, Transit and Climate Change, and more . . .

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AUGUST 8
NATIONAL WEBINAR ON TOD & MIXED-INCOME

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