

RAIL TRANSIT WORKS

Light Rail Success Stories
from Across the Country

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EXECUTIVE SUMMARY

With a range of policies—Priority Funding Areas, the Rural and Community Legacy Program, brownfield cleanup—Maryland has made a concerted effort to control sprawl. One tool that the state could make better use of is developing transportation alternatives. Case studies of nine metropolitan areas across the country show that urban rail lines—whether light rail or heavy rail—carry more passengers than projected and can play a role in making cities stronger economic and residential centers. Maryland could capture some of these benefits by constructing a comprehensive rail system in Baltimore and surrounding communities.

Cities across the country that have invested in new or expanded rail service have experienced strong ridership.

- When Denver extended light rail service to two suburbs, Littleton and Englewood, ridership in the first year was 40 percent higher than projected.
- In car-dependent Los Angeles, many commuters have turned to the subway. Planners expected 100,000 passengers daily on a new section of the Red Line and had to add cars when ridership rapidly reached 120,000 daily.
- St. Louis reintroduced rail service in 1993, decades after the city's street-car lines closed. Ridership by the end of the first year was expected to be 12,000 passengers daily. Actual use was 3.5 times higher, with 44,000 daily riders.

By increasing access to downtown, a rail system can encourage redevelopment of underused areas and enhance their desirability.

- In Los Angeles, the opening of the Red Line has prompted renovations and new construction, rejuvenating the Hollywood area.
- Two billion dollars of construction has occurred along Portland's Eastside rail line, mainly as infill development.
- In Washington, D.C., residential property close to rail stations is worth \$6 to \$8 per square foot more than comparable properties farther away.
- In Dallas, locations near the light rail line have risen 25 percent in value compared to more distant properties. New development and higher property values can also translate into increased property tax revenues for city government.

Maryland can reap many of the benefits of rail transit if it constructs an integrated rail system in Baltimore.

- Baltimore's existing urban rail lines are inadequate. Even those segments that draw high numbers of riders have not reached their full potential because the region has made little use of transit-oriented development.
- The Maryland Transportation Administration's proposed 109-mile system would make Baltimore and its suburbs more accessible and would represent a commitment to investing in older communities in the region that could spur other development.
- The Transportation Equity Act for the 21st Century, the federal appropriations bill that provides partial funding for transportation projects, is up for reauthorization this year. Maryland will allocate funding for various projects. At the top of the list should be rail in Baltimore.

INTRODUCTION

The effects of sprawl are familiar to anyone who lives in Maryland. Baltimore, a city of 736,000 people in 1990, lost 85,000 residents by 2000.¹ At the same time, the counties surrounding Baltimore endless sprawl—low-density subdivisions in which the only way to go anywhere is by car.

Low-density suburban development destroys open space by paving over land and fragmenting wild areas with roads. Development in existing urban areas, on the other hand, requires little additional pavement. There is a direct trade-off between urban and suburban development: the U.S. Environmental Protection Agency estimates that for every underused or abandoned urban acre that is developed, 4.5 acres of undeveloped land are

preserved.² Thus, redevelopment in Baltimore and its inner suburbs can help protect the Maryland countryside from sprawl.

In addition, urban redevelopment can protect water and air quality. Building in existing developed areas does not substantially increase runoff into nearby streams, thereby protecting water quality. The proximity of residential, commercial, and retail districts in urban areas allows shorter car trips compared to suburban living and reduces air pollution.

Sprawl and its consequences are not inevitable. Cities and communities are constructed as designed; they are not predestined to be ugly or beautiful, car-dependent or transit- and pedestrian-friendly. In recognition of this, Maryland has already taken the initial steps to control sprawl. By identifying Priority Funding Areas and supporting growth in those corridors only, Maryland seeks to encourage more concentrated development and reduce sprawl.

Maryland has another opportunity now to combat sprawl by making Baltimore a more livable city that will draw new residents and businesses. One important way to enhance Baltimore's attractiveness is by improving transit. The Metro, opened in 1983, and light rail, opened in 1992, were first steps toward a rail system, but the lines are not extensive enough to adequately serve the area.

A rail system will not change Baltimore overnight, but it is another tool for shaping the city's and Maryland's future.



Light Rail stop at Baltimore-Washington International Airport

THE CHALLENGES FACING BALTIMORE

Baltimore has experienced a dwindling population and declining employment for decades, trends that have reduced the city's economic resources. The largest source of revenue for the city of Baltimore is property taxes, which provide over half of the city's general fund, but property tax revenues fell during most of the 1990s.³ Income taxes are the second-largest source of income for the general fund. For nearly 20 years, the number of income tax returns declined until the strong economy in the late 1990s led to a slight increase.⁴ With a weak tax base, the city has struggled to provide the public services necessary for attracting new residents and businesses.

The Baltimore area's current transportation system is not much of an asset for a city struggling to revitalize itself. Roads are congested. Bus service, though extensive, is too often slow. Rail transit is limited and inconvenient, and fails to serve much of the region. The Maryland Transit Administration (MTA) operates a north-south light rail line that runs through downtown Baltimore. The city's Metro subway line, coming in from the northwest and looping through downtown, does not connect with the light rail. Transferring between light rail and the subway requires walking a block from the Metro station to the light rail station. Commuter rail service has several stops in Baltimore, but adds little to intra-city transit.

The result is that only three percent of Baltimore-area residents ride the Metro or light rail, compared to 12.5 percent in Washington, D.C.⁵ This is largely because Baltimore's rail lines do not reach into many of the region's neighborhoods, 440,000 jobs in the Baltimore area are not currently served by rail transit, and little transit-oriented development has occurred.⁶

The limited usefulness of the Baltimore region's rail lines as a transit option has also muted their impact as a development tool. By drawing a steady stream of people, rail stations can be attractive places for new development. Baltimore and its inner suburbs have received little of this benefit thus far because of modest ridership numbers and because MTA and the state, despite its relatively strong smart growth policies, have provided few incentives for transit-oriented development.⁷

In other cities across the country, construction of rail lines and stations often has prompted new urban development and enhanced the value of existing property. Easy access to downtown and a steady flow of people to and from rail stations make downtown development more profitable for developers, and residents' desire for transportation choices places a premium on properties accessible by train. Higher property values translate into enhanced revenues for local government and better city services for urban residents.

A new rail system in Baltimore could help urban revitalization efforts directly and indirectly by acting as a catalyst for



Light Rail in downtown Baltimore

change. Constructing a rail system suggests a new vision for and commitment to the city's future. As in other cities, higher pedestrian traffic rates around stations may draw new urban development. In addition, greater access to existing commercial space could make it more valuable.

Increased tax revenues, from new projects or from the increased value of existing developments, would give the city more resources to help neighborhoods, restore public spaces, and build the city's infrastructure. These improvements

can help reduce sprawl in Maryland by making Baltimore and its inner suburbs a more appealing alternative to suburban residential developments.

As the case studies below show, newly constructed rail systems and expansions to existing systems have been well-received in cities across the country. More people have chosen to ride trains than planners anticipated and rail construction has prompted new urban development. The cities discussed are as different from each other as they are from Baltimore, yet rail has consistently performed well.

CASE STUDIES

Dallas

Gary Hufstedler, a senior manager at Dallas Area Rapid Transit, describes Dallas as a city where everyone believes in a “divine right” to drive a large, expensive car at breakneck speed anywhere, at any time. Such an atmosphere seems unlikely to be one in which a light rail system would flourish, but since the Dallas Area Rapid Transit (DART) light rail lines opened in July 1996 ridership in the system has nearly doubled.⁸ The rail system’s initial 20 miles of track, constructed at a cost of \$860 million, were expected to carry 16,000 riders.⁹ In its first month of operation, 19,000 people rode light rail.¹⁰ Each successive expansion—January 1997, June 1997, September 2001, May 2002, and July 2002— attracted more riders.¹¹ Even between expansions ridership rose: in the period from June 1997 to September 2001, average weekday boardings rose from 33,000 per day to 38,000, exceeding the projection of 32,500 daily boardings for that length of track.¹²

DART light rail attracts both passengers who would otherwise be driving and those who would need to ride the bus. Of those riders who had a car available for the trip, 59 percent responded in a

survey that they would drive alone to their destination if light rail were not available, adding to air pollution. Most transit-dependent riders would have taken a bus instead, though 13 percent would have forgone the trip.¹³

With the newest extension, opened in December 2002, DART’s light rail system is approximately 40 miles long. (The Red Line is 27.5 miles and the Blue Line is 24 miles, but they share 11 miles of track through downtown.) Dallas is in great need of additional rail cars to ease crowding at peak commute times and has ordered 20 new cars, but they will not be delivered until December 2006.¹⁴

The light rail system in Dallas has increased real estate values. A study by the University of North Texas Center for Economic Development and Research found that existing property next to stations increased in value by 25 percent more than comparable property not near the rail line.¹⁵ Occupancy rates and rents increased for rail-accessible locations.

Furthermore, the long-term promise of a steady flow of people carried by light rail has influenced where developers site new projects.¹⁶ Private development near completed and planned light rail stations reached \$922 million by 2001 and another \$124 million worth of new projects

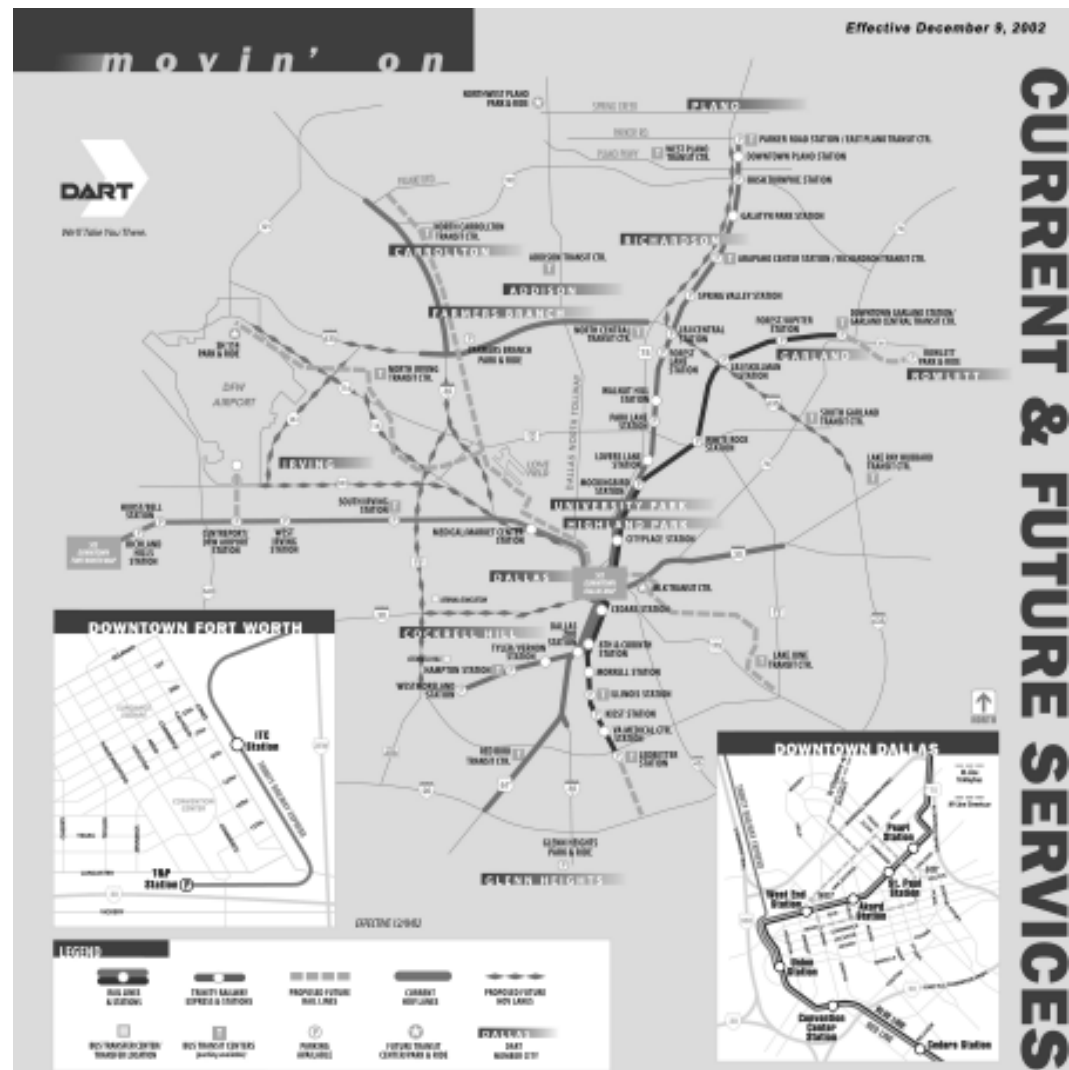
Table 1. DART Light Rail Ridership After Each System Expansion

Date of Expansion	Average Weekday Ridership In the Month Before Expansion	Average Weekday Ridership In the Month After Expansion	Percentage Increase
January 1997	13,615	22,869	68%
June 1997	28,011	31,497	12%
September 2001	38,055	43,422	14%
May 2002	41,667	45,829	10%
July 2002	45,829	56,687	24%

were to have been opened by the end of 2002.¹⁷ These developments include a mix of office, retail, and residential units built close to stations, creating urban villages. At Cedars Station, on the edge of

downtown, a long-vacant structure was converted into 450 loft apartments.¹⁸ Mockingbird Station is now the site of a mixed-use project that is connected via footbridge to the rail station.¹⁹

Figure 1. Current DART System and Planned Expansions



Map courtesy of DART

Denver

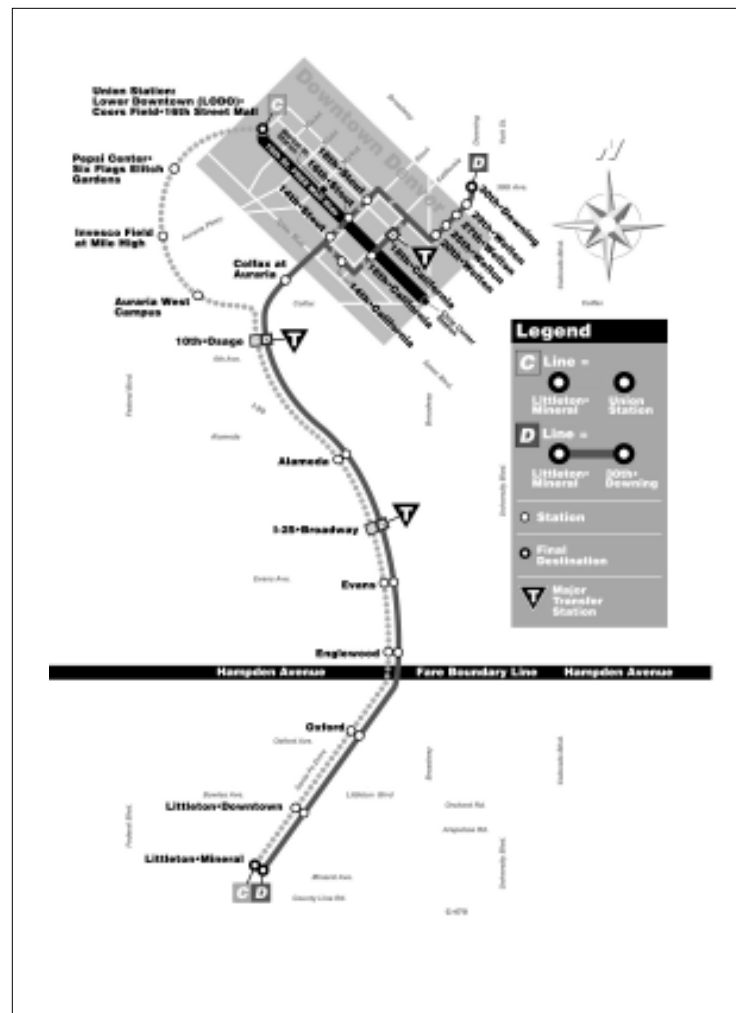
Decades ago, Denver recognized the development potential that transit creates by bringing large numbers of people into downtown areas. The 16th Street Mall, a 15-block outdoor mall served by free shuttles, opened in 1982, long before Denver had light rail. Today, the mall connects Denver's bus, Amtrak, and light rail hubs.

Denver began offering light rail service in October 1994 with 5.3 miles of the D Line through downtown. Since the line opened, ridership has exceeded projections. On opening day, 20 percent more people rode than the Regional Transportation District (RTD) expected.²⁰ The Southwest Line extended the D Line from downtown to the southwestern suburbs of Littleton and Englewood in July 2000. More than 8,400 people rode on the first day, filling up park and ride lots and catching RTD off-guard with the line's popularity.²¹ Ridership on the 8.7-mile route has remained strong, exceeding projections by 40 percent in its first year of operation.

The Central Platte Valley Line, the C Line, opened in April 2001, extending the reach of the light rail system to major entertainment venues and universities. Ridership has exceeded expectations by 15 percent. Total use of the C and D lines in 2002 averaged 35,000 boardings per weekday.²²

Rail passengers are not simply converted bus passengers. RTD conducted a survey of light rail riders in 2001 in which 65 percent of respondents reported having a car available to drive instead of taking a train, and another 10 percent of passengers said they could have received a ride in a car driven by someone else but chose to ride the train. Only a quarter of rail passengers did not have access to a car.²³

Figure 2. Denver Rail System



Map courtesy of RTD

In addition to further enlivening the 16th Street Mall, light rail has brought transit-oriented development to more of Denver and its suburbs. Lower downtown (LoDo) Denver has added many residential units and a riverfront project will soon add 1,800 more.²⁴ The failed Cinderella City shopping mall at the Englewood station has been converted into a mixed use center, housing City Hall, the library, the municipal court, Wal-Mart, Office Depot, IHOP, and other retail stores and restaurants.²⁵

Los Angeles

Though Los Angeles is not typically associated with mass transit, much less a subway, it has a well-used and expanding rail system. The three-line system snakes through Los Angeles' web of freeways, connecting residential and commercial areas. The Blue Line, opened in 1990, runs north from Long Beach on the south side of Los Angeles into downtown. The Red Line begins north of the city in suburban San Fernando Valley, winding through Hollywood into downtown, and east to Union Station, providing an easy connection to Amtrak service. The Green Line, added in 1995 with east-west service, bisects the Blue Line and serves the airport.

Though the rail system does not reach into all 2,265 square miles occupied by the Los Angeles area's 13 million residents, it regularly carries nearly a quarter million passengers. Over 200 rail cars operating on 60 miles of track accessible at 52 stations carry 240,000 passengers on weekdays and 121,000 on weekends.²⁶

The most recent extension of the system occurred in June 2001 with the

lengthening of the Red Line by 6.3 miles into the San Fernando Valley. In the month before the extension opened, Red Line ridership was 65,150 daily boardings. By the end of the first week of expanded operation, ridership reached 120,516, well above the 100,000 passenger target.²⁷ Use of other lines rose also: Blue Line passenger numbers increased by five percent and Green Line ridership rose 10 percent.

Substantial transit-oriented development along the Red Line adds to the subway's appeal. At the Hollywood/Highland stop, a joint development venture led to construction of the Kodak Theater (new home of the Academy Awards), a hotel, retail stores, and restoration of Graumann's Chinese Theater. The facilities opened shortly after the subway stop and have so increased ridership that the Metropolitan Transportation Authority has added cars to its trains at peak hours.²⁸

Los Angeles rail passengers are eager for a transportation alternative to driving a car or riding the bus. Nearly 50 percent of rail passengers had a car available for the trip on which they were surveyed. Only 25 percent did not own a car. Approximately three quarters of passengers knew that bus service was available for their trip but preferred to take the train.²⁹ The train, freed from navigating through Los Angeles' congested freeways, presumably is more reliable.

The next expansion will be the opening of the Gold Line. A 14-mile route heading northeast from Union Station will serve Pasadena beginning in 2003. The Holly Street Village, a transit-oriented housing development with a light rail station built into the ground floor, has already been completed in anticipation of the Gold Line's opening.³⁰ In 2008, another leg of the Gold Line will open, connecting Union Station and east Los Angeles, one of the city's most densely populated regions.³¹



A train on the Los Angeles Red Line.

Figure 3. Los Angeles Rail System



Map courtesy of LACMTA

Portland

Often cited as the paragon of planned growth, Portland can also be held up as example of successful light rail development. The Metropolitan Area Express, known as MAX, extends from the airport on the northeast side of town and the eastern suburb of Gresham, along Interstate 84 to the Lloyd District, crosses the Willamette River to reach downtown, continues westward through a tunnel under the zoo and Forestry Center, and into the western suburbs of Beaverton and Hillsboro.

A push in the 1970s to restore historic trolley service in Portland led to the construction of light rail in the city. MAX carried its first riders in September 1986 on the 15-mile Eastside Line from Gresham to downtown. By the end of the first year of operation, average daily ridership reached 19,500, exceeding projections by 500 boardings per day.³² Ridership on the Eastside Line has risen steadily, reaching 47,000 daily boardings by June 2002.³³

Two system expansions have been equally popular. Westside MAX, completed in September 1998 at a cost of \$963 million, 73 percent of which came from the federal government, stretches 18 miles from downtown to Portland's western suburbs through the Sunset Highway corridor.³⁴ Much of the construction cost was consumed by drilling two three-mile tunnels under the westside hills.³⁵ Ridership at the end of the first year was projected to be 20,000 daily boardings but actually reached 22,500.³⁶ By 2002, average weekday boardings reached 29,000, surpassing the 2005 projection of 25,200 riders. After the opening of Westside MAX, transit use in the Sunset Highway corridor is 160 percent higher. Half of this increase is due to new transit riders.³⁷

A second extension in 2001 added a 5.5 mile spur off the Eastside Line to reach the airport. The Airport MAX Line cost

\$125 million to construct. Through creative funding, the Tri-County Metropolitan Transportation District (TriMet) built the line without federal funds and without raising property taxes.³⁸ In exchange for development rights on 120 acres at Cascade Station, Bechtel Enterprises and Trammell Crow, private corporations, provided \$28.2 million for the rail line.³⁹

In its first year of operation, daily weekday ridership on this spur was 2,800. Ridership exceeded expectations despite reduced air travel after the September 11 attacks and before any development had been completed at the Cascade Station site part way to the airport. TriMet estimates that 2,300 people get on and off at the airport daily and that an additional 8,000 people ride the line between downtown and where the extension starts at the Gateway Transit Center.⁴⁰

TriMet has adjusted its bus lines to help connect to light rail. In some places, particularly along the Westside Line, it has added service.⁴¹ Eighty-eight bus routes now intersect the MAX lines.⁴²

MAX ridership has increased for 14 years straight.⁴³ TriMet reported that in the 12-month period ending June 30, 2002, MAX overall carried 80,000 riders each weekday, a 12 percent increase from the previous year.⁴⁴ (For comparison, Baltimore Metro and light rail ridership is also 80,000 boardings per weekday. However, Baltimore's total population is larger and the city is more compact, which should boost ridership.)

Portland's increase in transit ridership is particularly notable because it has outpaced both population growth and vehicle miles traveled. From 1990 to 2000, the Portland metropolitan area's population rose 24 percent and vehicle miles traveled grew 35 percent. TriMet bus and MAX ridership rose 49 percent.⁴⁵ TriMet management attributes steady ridership increases to better connections, increased service to popular destinations, and improved amenities.⁴⁶

The construction of MAX has had a positive effect on property values and has spurred transit-oriented development. Researchers at Portland State University have found that a single-family house next to an Eastside light rail station sells for about 10 percent more than a comparable home 1,000 feet away. Approximately \$2 billion of development has occurred along Eastside MAX, primarily as urban redevelopment and infill.⁴⁷ For example, a former Department of Transportation maintenance yard has been turned into mixed-income rental and for-sale housing. Along the Westside Line, a master planned community at Orenco Station will have 1,834 houses when complete. A development

at Beaverton Creek is retail and housing.⁴⁸ In total, 8,000 housing units have been constructed within walking distance of the Westside Line. The master plan for development along the Airport Line will create 10,000 jobs and \$500 million of entertainment, retail, and office space on 120 acres by 2015 at Cascade Station.⁴⁹

The rail system, currently with 38 miles of track and 54 stations, will expand again in 2004 with the opening of Interstate MAX. It runs alongside Interstate 5, the major north-south freeway on the east side of the Willamette River across from downtown. Interstate MAX will connect the Expo Center north of Portland to downtown.

Figure 4. Portland's MAX System



Map courtesy of TriMet

Salt Lake City

The Salt Lake City metropolitan area extends in a relatively narrow strip between the Wasatch Mountains and the Great Salt Lake. The linear shape of Salt Lake City means many people have access to the Transit Express (TRAX) light rail which runs north-south through the middle of the 1.3 million resident urban area.⁵⁰

The initial 15-mile, 16-station North-South Line opened in December 1999.⁵¹ The Utah Transit Authority (UTA) had projected daily ridership on the mature system to be 14,400. Ridership in the first year always exceeded that target and often neared 20,000 riders.⁵²

Figure 5. Salt Lake City's TRAX Lines



Map courtesy of UTA

A 2.3-mile extension to the University of Utah east of downtown opened in December 2001.⁵³ UTA projected 5,000 boardings per day, but just eight months after the line opened average daily ridership topped 10,000.⁵⁴ During the 2002 Winter Olympics, TRAX, using additional rail cars borrowed from Dallas, carried 100,000 people each day.⁵⁵

TRAX has been a success. UTA reports that 30,000 people ride TRAX each day, 10,000 more riders than projected.⁵⁶ Overall transit ridership was on an upward trend before TRAX opened, but the rate of increase has been more dramatic: total rail and bus system ridership is up by 18.5 percent since 1996 and by 23 percent since 1999. Ridership has exceeded projections enough that UTA has lengthened trains to three cars from two and schedules the trains to run more often than originally anticipated.⁵⁷

General popular support has also grown since the system opened in 1999. In November 2000, residents of Salt Lake, Weber and Davis counties—among those counties served by TRAX—approved increasing the sales tax by a quarter of a cent to fund transit expansion.⁵⁸ Another expansion is scheduled to open in 2004. The Medical Center extension will be 1.5 miles long and with the addition of this third line the system will include 21 miles of track.⁵⁹ Many communities initially uninterested in participating now are eager to have UTA build a TRAX extension for their residents. Riverton is paying \$125,000 to be included in a region-wide transit study conducted by UTA.⁶⁰

San Diego

San Diego, California's third-largest metropolitan area with 2.7 million residents, sits along the coast south of Los Angeles and just north of the U.S.-Mexico border.⁶¹ Commuter rail service extending from Los Angeles serves the area north of San Diego, so the city's 48 miles of trolley lines are concentrated to the south and east of the city. The Blue Line begins just north of downtown San Diego in Mission Valley and extends south to Tijuana at the border. The Orange Line runs northeast from downtown.

The Blue Line, built along existing railroad right-of-way, opened in 1981 with street-level trains that make short runs and frequent stops. The Orange Line began operating in 1986. The trolley lines serve downtown entertainment venues, business areas, the convention center, and connects to the Coaster commuter train, which runs from Oceanside south to San Diego.⁶²

The Blue Line was expected to carry 28,000 to 30,000 passengers in 1995, but reached that goal four years earlier.⁶³ By October 2002 ridership had risen to 73,000 daily boardings.⁶⁴ For large events, the rail lines can carry huge crowds: over the weekend of Super Bowl 1998, one million people rode the trains to and from

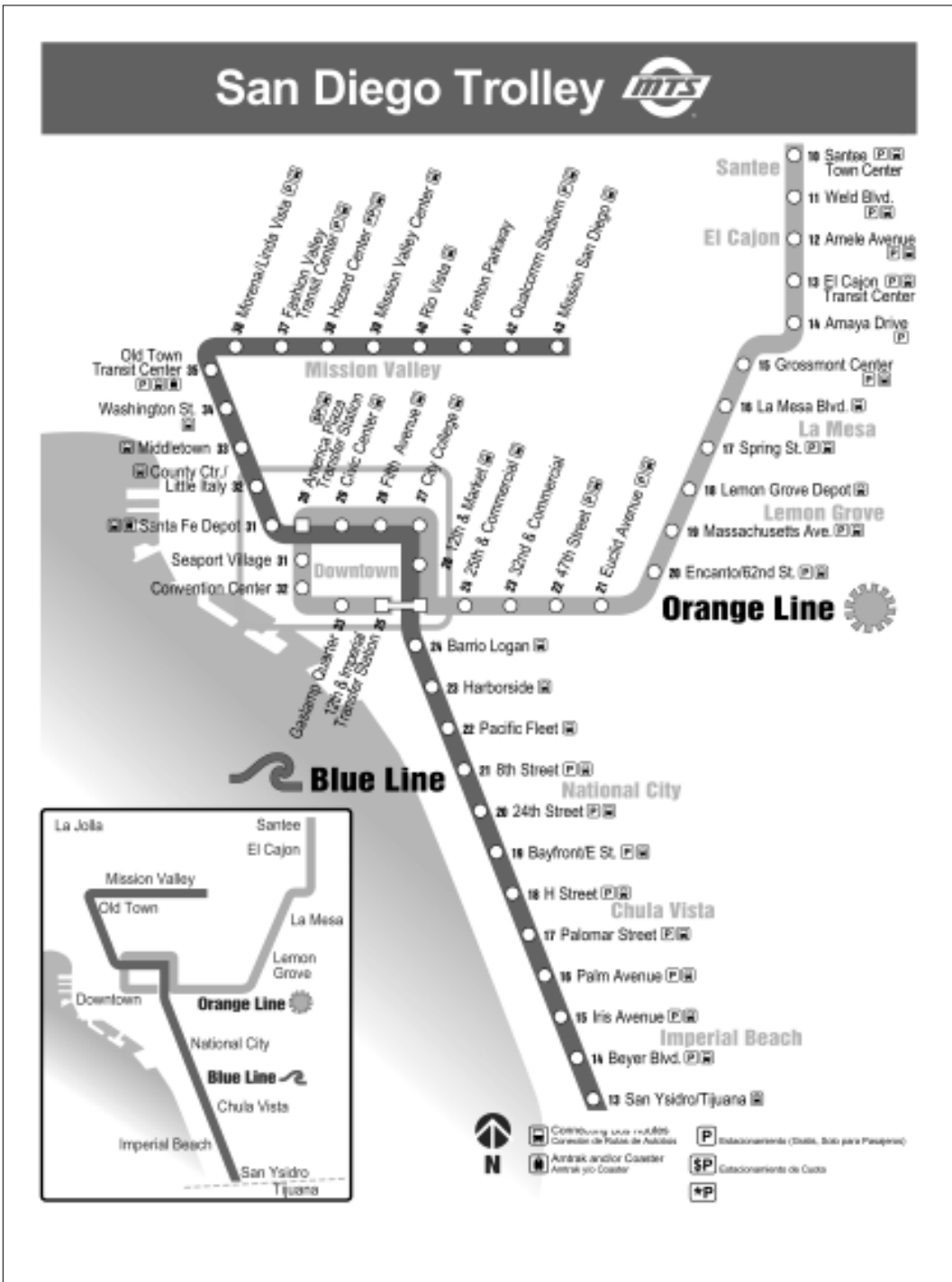
events.⁶⁵ The typical trip on light rail is not entertainment-related, though: 50 percent of riders are going to work, 12 percent to visit family or friends, 10 percent to school, and 9 percent to shop.⁶⁶

The San Diego Trolley serves many lower income neighborhoods where car ownership rates are low. The light rail has not shifted riders from bus service—just 25 percent of rail riders are former bus riders—but has enabled lower income workers to commute to jobs without spending money on a car.⁶⁷

The Metropolitan Transit Development Board has also encouraged transit-oriented development by adopting supportive guidelines and zoning for higher density projects near transit stations.⁶⁸ Projects have been built at 15 of the 49 stations.⁶⁹ One of the most elaborate is at American Plaza, which is a two-block project containing office space, stores, the San Diego Museum of Contemporary Art, and a light rail station entirely within the building.⁷⁰

A system extension is underway in Mission Valley to connect the Blue and Orange lines northeast of San Diego in addition to their junction downtown. The new 5.8-mile segment will open in late 2004 and will add an estimated 11,000 additional riders to San Diego's light rail system.⁷¹

Figure 6. San Diego's Trolley System



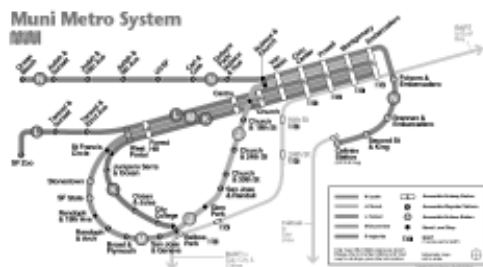
Map courtesy of Metropolitan Transit Development Board

San Francisco

The San Francisco Municipal Railway (Muni) provides rail and bus service to the city of San Francisco. Muni first offered service in 1912 when it began operating streetcars. It added San Francisco's famous cable cars in 1944. The rail system, which consists of five lines covering 25 miles, carried 157,000 riders per weekday in 2001-2002. The system has grown over the years, most recently with an expansion to Caltrain Depot at 4th and King in 1998 and the F Line to Fisherman's Wharf in 2000.⁷²

The price of commercial property near rail stations has risen faster than more remotely located properties. From 1963 to 1968, commercial property near the Lafayette station, under construction at the time, rose 13 percent annually, whereas land in a control area not served by rail rose only 3.6 percent annually.⁷³ New transit-oriented development on Muni property along San Francisco's waterfront is expected to generate \$311 million in revenue for Muni and \$540 million in taxes to the city of San Francisco.⁷⁴

Figure 7. San Francisco Muni Lines



Map courtesy of San Francisco Municipal Railway

The city of San Francisco is just a small portion of the Bay Area's urbanization. Transit needs of residents in that larger area—Contra Costa, Alameda, and San Francisco counties—are served by the Bay Area Rapid Transit (BART) system. BART opened 28 miles of track in September 1972 with daily ridership of 20,000.⁷⁵ BART has expanded steadily

over the years. In 1996, a 7.8-mile addition to North Concord/Pittsburg/Bay Point opened. Five years after opening, the line carried 17 percent more passengers than projected. A 14-mile line to Castro Valley/Dublin/Pleasanton began service in 1997 and now carries approximately 90 percent of its projected passenger load.⁷⁶ Today the system has 95 miles of track served by 39 stations, carrying over 300,000 passengers daily.⁷⁷ In some corridors, BART has captured a huge part of the market: 50 percent of morning commuters who cross the San Francisco Bay use BART.⁷⁸

Transit-oriented development has occurred throughout BART's service area, helped in part by BART's joint development program.⁷⁹ In Oakland, for example, the Fruitvale Transit Village is a \$100 million project serving a low-income community with retail space, a nonprofit

Figure 8. Bay Area Rapid Transit System



Map courtesy of BART

health-care clinic, a child care facility, a library, office space, subsidized housing, and mixed-income housing.⁸⁰ The project is a joint effort between BART, the city

of Oakland, and a community development corporation, and took eight years to plan. Funding has come from BART, Federal Transit Administration, and private sources.

St. Louis

St. Louis built its first cable car line in 1886 and soon expanded that to five lines. Though the electric-powered cars that replaced the cable cars were phased out mid-century, the need for rail transit remained. A little more than a century after the first cable cars began operation, the city opened 17 miles of the MetroLink light rail system through essentially the same transit corridor in 1993.⁸¹

The new system was constructed cost-effectively by using many existing rail facilities in St. Louis. The Bi-State Development Agency built the line through a 100-year-old tunnel, on 14 miles of old Wabash Railroad right-of-way, and on an 1874 bridge across the Mississippi River.⁸² The starter line cost \$20 million per mile,⁸³ far cheaper than a new urban freeway; federal funds covered 75 percent of the cost.⁸⁴ The system initially served the University of Missouri-St. Louis campus, medical center, the downtown area, and the airport, though

not many residential areas.⁸⁵ Nonetheless, ridership was high from the start.

Predicted ridership for the first year was 12,000.⁸⁶ Within one month, ridership reached 30,000 boardings per day.⁸⁷ After one year of operation, weekday ridership was 44,000, more riders than planners had forecast for the system's 20th year.⁸⁸ As many as 160,000 people have ridden the train in a single day, traveling to baseball games, Fair St. Louis, and an Evangelical Lutheran Church conference.⁸⁹

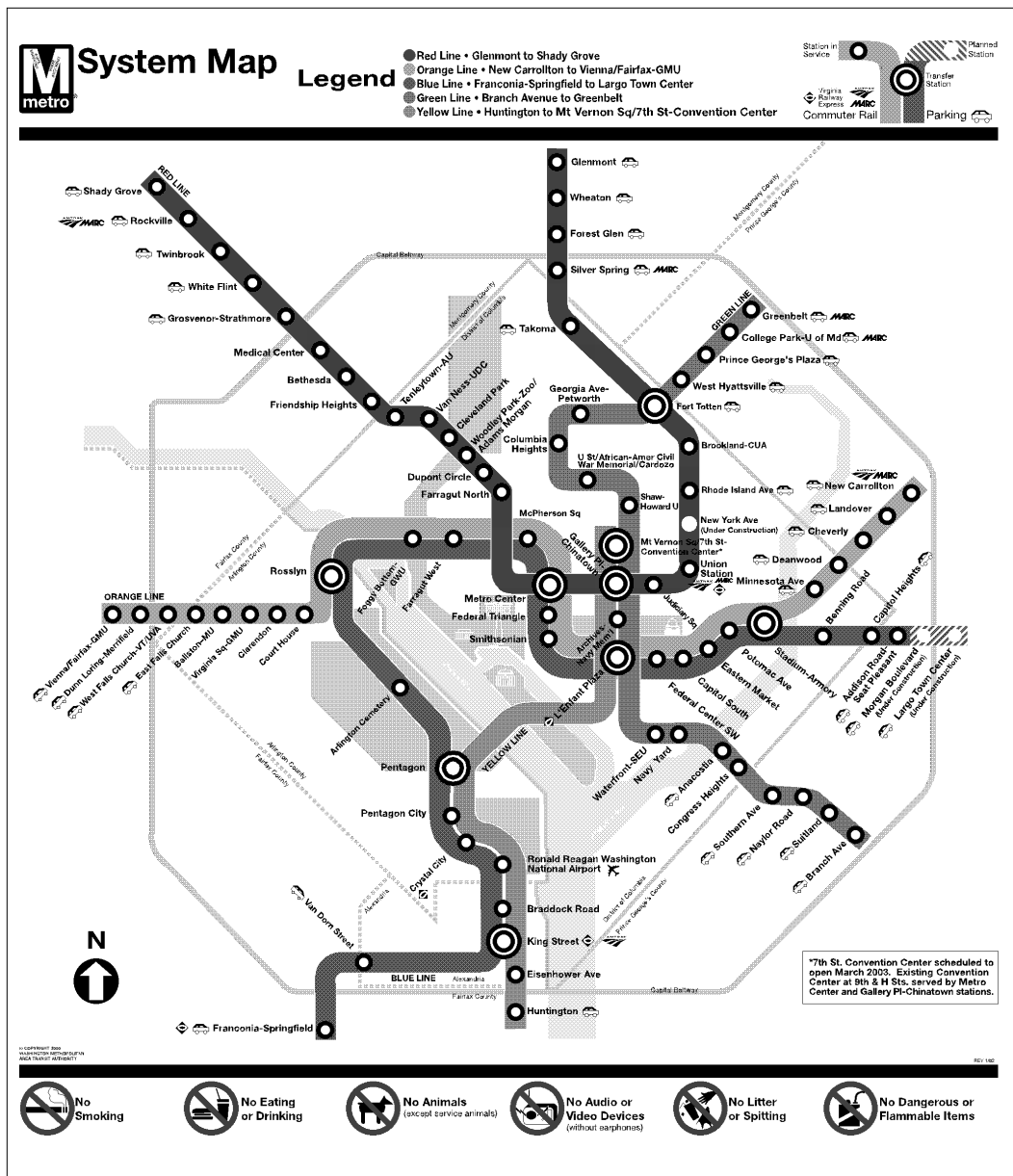
With completion of the St. Clair County extension in 2001, built using new right-of-way and abandoned CSX railroad right-of-way, the system is 34.4 miles long.⁹⁰ The rail line intersects 46 bus routes—many rerouted to facilitate transfers between bus and rail—and offers parking in 16 lots.⁹¹

In a further testament to MetroLink's popularity, Bi-State Development Agency is planning new lines and extensions: the second phase of the St. Clair County extension will open in mid-2003 and a Cross County line and a South Corridor line are both in planning.⁹²

Figure 9. St. Louis' MetroLink System



Figure 10. Washington, D.C., Metro Lines



Map courtesy of Washington Metropolitan Area Transit Authority

Washington, D.C.

The Washington, D.C. metropolitan area is laid out in a wedges-and-corridors pattern that assumes most employment occurs in the city center and that people reside in surrounding areas. When construction on the subway system began in 1969, this assumption was accurate. Development patterns have changed, however, generating multiple employment centers, and the Washington Metropolitan Area Transit Authority (WMATA) has extended the Metro to meet this new need.⁹³

A recent expansion demonstrates WMATA's success at providing riders the rail transit they want. In January 2000, a 6.5-mile extension on the Green Line from Anacostia to Branch Avenue in Prince George's County opened.⁹⁴ Ridership for the expanded section was projected at 26,000 riders per day, but on opening day 32,000 people rode. Ridership has now reached 44,000 per day.⁹⁵

In the region as a whole, WMATA operates 103 miles of subway, which carry 630,000 passengers per weekday.⁹⁶

Overall, approximately 12.5 percent of D.C. residents use the Metro subway.⁹⁷ For selected destinations, the Metro carries a huge percentage of people traveling there. For example, 70 percent of trips to the MCI Center, the basketball and hockey arena at the Gallery Place/Chinatown stop, are via transit.⁹⁸ Overall ridership has been increasing so quickly that WMATA has struggled to meet demand. From 1997 to 2000, ridership during the peak morning commute increased by 16 percent. In response, WMATA ordered 200 more rail cars and began considering strategies for shortening the time trains spend in stations.⁹⁹

Washington has experienced substantial development around its urban stations. On WMATA owned-land, 54 developments worth more than \$2 billion have been built. These projects generate \$6 to \$10 million in revenues per year for WMATA.¹⁰⁰ Another measure of Metro's success is in the boost it provides to property values. Residential property near a Metro station costs \$6 to \$8 per square foot more than distant properties.¹⁰¹

PRINCIPLES FOR SUCCESSFUL RAIL LINES

The examples of rail discussed in the case studies are drawn from cities across the country that built rail systems of varying sizes. Some constructed heavy rail mainly as subways, others built light rail entirely above-ground, others have done extensive tunneling. All have been successful. These principles for successful development of rail systems are general observations drawn from the case studies above.

Encourage Transit-Oriented Development

Transit-oriented development (TOD) improves the accessibility and usefulness of transit by locating homes, jobs, and shops close to rail stations. TOD places

many destinations within easy walking distance of transit and, if well-planned for pedestrian access, new development can further encourage people to use transit. A study of TOD versus typical suburban tract development in the San Francisco Bay Area revealed that residents of the transit-oriented neighborhoods were 60 percent more likely to use transit than were people living in standard developments.¹⁰² Los Angeles, Portland, Dallas, and San Diego all have used TOD to enhance the usefulness of rail transit and to draw people to urbanized areas.

Though local governments have a large role to play in allowing TOD through zoning requirements, transit authorities can also encourage TOD. Transit agencies can establish TOD-friendly policies for agency-owned property. Portland's TriMet limits auto-oriented use, requires minimum densities, and caps parking immediately adjacent to stations.¹⁰³



Denver's light rail passes through many TOD projects.

Photo courtesy of RTD

In Washington, D.C., WMATA operates a public/private joint development program to encourage development on WMATA-owned land.¹⁰⁴ TriMet also provides staff to help developers consolidate parcels of land.¹⁰⁵

Agencies can influence private investment decisions also. RTD in Denver considers TOD-potential in deciding where to locate new routes.¹⁰⁶ The agency has also hired a TOD specialist who works with other agencies, municipalities, and developers to encourage new projects.¹⁰⁷ The Metropolitan Transportation Commission, which oversees transportation planning, coordination, and funding in the Bay Area, steers more transportation financing to those communities that build housing near transit.¹⁰⁸

Provide Easy Pedestrian Access

Easy access to transit centers is crucial. Poor station accessibility at the starting or ending point of a trip reduces ridership.¹⁰⁹ Ideally, stations are located within walking distance of sizeable residential developments or commercial centers. A reasonable walking distance for most Americans is no farther than 2,000 feet, or about three-eighths of a mile.¹¹⁰ (For comparison, Americans walk an average

of 800 feet from their car to work.¹¹¹) That distance can be as much as doubled if they walk through appealing spaces.¹¹² Research conducted in Houston found that every 10 percent increase in pedestrian amenities—adequate sidewalk space, shop fronts, benches—resulted in a 15 percent decline in motorized trips.¹¹³

Enhance Access to Suburban Stations

Existing residential concentrations may not be great enough to allow many people to walk to suburban stations. There, access can be improved with bus service that explicitly serves rail stations.

A distant second choice for station accessibility is for the transit agency to provide parking. Commuters seeking a regular routine want to know that parking will be available at the train station whether they arrive at 7 a.m. or 9 a.m. In Los Angeles, where parking is ample, nearly 30 percent of passengers expressed a willingness to pay an additional fee for a guaranteed or reserved parking space.¹¹⁴ Unfortunately, poorly designed parking often create barriers for pedestrians by placing a hazardous lot or unsafe-feeling parking garage close to the rail station, and by precluding pedestrian-oriented development immediately adjacent to the station.

RAIL IN BALTIMORE

Current Service

While rail in other cities has led to new urban development and boosted property values, Baltimore and its inner suburbs received little of this benefit because the potential of the region's multiple rail lines has not been reached. The MTA's lack of strong policies in support of TOD, the limited frequency of light rail trains due to the single-track route, and other problems have limited the system's effectiveness.

The 15.5-mile Metro, constructed at a cost of \$1.3 billion, opened in 1983 with nine stations. Today there are 50,000 boardings per day as people travel to destinations between Owings Mills and Johns Hopkins Medical Campus.¹¹⁵ More than 40 percent of people who ride the Metro use connecting bus service.¹¹⁶

Construction of the Metro has encouraged some transit-oriented development,

but less than that achieved by other cities. Adjacent to the Reisterstown Road Plaza mall, the MTA built a day care center and police substation with funding from the city of Baltimore and a Livable Communities grant. A development at the Charles Street Metro station includes 250,000 square feet of office space and 25,000 square feet of retail space.¹¹⁷

The Central Light Rail Line opened in 1992 and expanded in 1993, running 26 miles from Hunt Valley in the north, through the west side of downtown, to Cromwell Station/Glen Burnie in Anne Arundel County. The light rail line cost \$460 million to construct, far less than the subway, but because the state received little federal funding it chose to minimize costs by not connecting the light rail line to the Metro.¹¹⁸ Passengers transferring from light rail to subway must walk a block to switch stations. MTA also saved money on the light rail line by building



A Metro station in downtown Baltimore

only a single track in many places, which limits the speed and frequency at which trains can run.

The light rail line carries 30,000 riders per day.¹¹⁹ Commuters are the primary users of light rail: of the 3,000 hourly trips during commute times, 2,700 are in the peak direction.¹²⁰ As along the Metro line, the light rail has drawn relatively little development. A transit-oriented development project has recently been completed at Symphony Center that includes office, retail, and residential space and that adds another close connection point between light rail and subway.¹²¹ However, the project's impact will be blunted by its extensive accommodation of vehicles.

The oldest component of the Baltimore area's rail transit system is the Maryland Area Rail Commuter (MARC) which carries 15,000 to 18,000 passengers per day from northeast of the city to Washington, D.C.¹²² Passenger service has been available along this route for more than 100 years, though the system was not named MARC until 1983.¹²³ In the past several years, Washington-area workers, frustrated by expensive home prices and congested commutes, have begun purchasing homes in Baltimore neighborhoods close to Penn Station-Mount Vernon, Charles North, Bolton Hill, and Reservoir Hill and riding MARC to work.¹²⁴ Thus long-distance rail has provided a development boost to the Baltimore region.

The MTA plans to renovate much of the system in the next two years, but this will not address the basic problem that the system is inadequate. MTA will spend \$80 million to overhaul all 100 rail cars over next two years, \$45 million to fix elevators and escalators, and \$73 million to implement the SmartTrip fare-box system.¹²⁵ SmartTrip is a "smart card" system that will facilitate transfers between buses, light rail, and subway. These improvements, while making the system more attractive and easier to use, will not substantially improve rail transit options in Baltimore.

Proposed System

The MTA envisions an extensive rail transit system. It would enhance the attractiveness of Baltimore and its inner suburbs as places to live, work, and visit. More importantly, a rail system could serve as another tool for Maryland to combat sprawl by helping to revitalize urban Baltimore.

The proposed rail system would connect and expand upon existing lines. By adding 66 new miles of track and 68 new stations, the completed system would include six lines, 109 miles, and 122 stations.¹²⁶ Whether a section will be underground, at street level, or elevated will be decided upon as plans are drawn up for each stage. The cost of construction, desired speed of travel, reliability, noise, visual impacts, right-of-way issues, environmental impact, and effect on vehicular traffic will all weigh into the decision.¹²⁷ The complete system is expected to cost \$12 billion over 40 years, and will require both state and federal funds.¹²⁸

MTA's Advisory Committee recommends three high priority components of the system be completed within the next 10 to 12 years.¹²⁹ Those projects are the Red Line from the Social Security Complex through downtown to Fells Point; a Green Line extension of the Metro from Johns Hopkins Medical Campus north to Morgan State University; and a Purple Line from Madison Square to Martin State Airport.¹³⁰ These three projects will cost \$2.5 billion.

The MTA counts air quality protection, traffic control, urban development, and economic growth among the benefits of an integrated rail system. As more people commute to work or travel to entertainment venues by rail, miles driven will be reduced from what they otherwise would have been. This will help protect air quality, reduce the strain on existing roads, and slow demand for new roads. An estimated 6,900 to 12,800 new jobs



Light Rail provides access to special events

will be created by construction of the rail system and by easier travel throughout the region.¹³¹ More than half the region's 1.4 million jobs will be within easy walking distance of rail transit.¹³² Approximately 850,000 people would live within one mile of a transit station.¹³³ MTA projects an increase in personal income of \$113 million to \$209 million due to new employment and greater profitability of businesses. It also forecasts an increase in property values of \$641 million to \$1.2 billion due to greater development near rail stations.¹³⁴

These benefits will not be realized immediately. Construction on the priority sections will not be complete for a decade or more. Complementary development likely would not begin until construction on the nearest station was well underway. Larger effects, such as increased property values and a broader tax base, will take longer.

Beginning work now on the expanded rail system is important. It will ensure the routes are included in local master plans and will allow MTA to begin securing rights-of-way. The state will be able to begin arranging funding for the project, specifically by requesting federal help for the rail system when the Transportation Equity Act comes up for reauthorization by Congress this year. Maryland will need to prioritize its requests.

Placing the Baltimore rail system at the top of the list will have the greatest benefit for the state.

Federal funding for this rail transit project is important for several reasons. First, the project is expensive and progress will be slower if Maryland tries to finance the construction without federal help. Secondly, the urban development impacts likely will be greater with federal rather than state financing.¹³⁵ Economic activity is drawn toward locations that have received public investments in transportation infrastructure. The draw is even greater when the funds come from federal rather than state sources. Thus spending money on transit in Baltimore and its inner suburbs rather than in outlying areas should encourage economic activity in Baltimore. A study of transportation investments in and around Philadelphia revealed that highway and transit expenditures benefiting suburban residents were about 50 percent higher than those benefiting city residents. This investment difference created an "economically significant, although not overwhelming, incentive for suburban rather than city locations for people and firms."¹³⁶ The estimated impact was the loss of 40,000 jobs in the city of Philadelphia.¹³⁷ Applying this observation to Baltimore suggests that increasing transportation investments in the city will encourage economic activity and development within existing urban areas rather than new suburbs, and thus discourage sprawl.

Figure 11. The Rail System Proposed for Baltimore



POLICY RECOMMENDATIONS

Sprawl is swallowing Maryland's open spaces while Baltimore's potential as a vital economic and residential center remains largely untapped. One tool for revitalizing Baltimore and nearby suburbs and for controlling sprawl is to construct a comprehensive rail system.

Experience in other cities across the country suggests that a comprehensive rail system in Baltimore would be an asset. Rail systems in a variety of cities—new and old, those with a history of rail and those without, those that are mainly sprawl and those that have denser development—have attracted large numbers of riders.

Maryland should prioritize construction of a Baltimore rail system when seeking federal funding for transportation projects.

- The Transportation Equity Act reauthorization by Congress this year, known as TEA-3, will include funding for Maryland. Which specific projects receive money will be determined by the state's preferences.
- Rail in Baltimore will complement the state's existing anti-sprawl efforts more than any highway construction project.

The benefits of expanded rail service will increase over the years, as higher ridership rates encourage development and as rising property values translate into increased tax revenues for the city. Starting planning and construction now will avoid additional delays in realizing these benefits.

The priority sections of rail, which MTA anticipates could be completed within 10 to 12 years, are an important start.

- Those sections are a line from the Social Security Complex east to Fells Point, an extension of the subway from Johns Hopkins Medical Campus north to Morgan State University, and a line from Madison Square to Martin State Airport.
- Planning for these segments will require extensive public participation before MTA can begin purchasing rights-of-way. This review process should begin now to build community agreement for the most useful routing of lines and placement of stations.
- Large transit-oriented developments can take years to complete. Commencing rail planning and construction now will encourage complementary urban development and diminish the need for more urban fringe growth.

MTA should review its policies to ensure that they encourage transit-oriented development.

- Transit-oriented development is a vital component of rail development: it ensures more homes and services are within easy walking distance of rail lines and thus maximizes the usefulness of rail transit.
- Federal transportation funds often can be used as seed money for transit-oriented development if the local transit agency has a development plan.

- The MTA can work with local governments to ensure that land around transit stations is zoned for mixed-use development. Creative planning with private developers could encourage more projects, and providing a liaison within the transit agency can ease the process for developers.

Redevelopment of Baltimore has the potential to curb sprawl on the urban fringe. One of the most powerful tools available to the state to meet this goal is building a strong rail system in Baltimore and its suburbs.



APPENDIX

Light Versus Heavy Rail

Local rail transit in the U.S. is divided into two categories: heavy rail and light rail.¹³⁸ What each category encompasses varies depending on the source.

Heavy rail, also known as rapid rail, metro, or subway, is completely separated from street and foot traffic. Cars are typically powered by a ground-level, electrified, third rail. Because of the separate rights-of-way, heavy rail is more expensive to construct. The Federal Transit Administration's National Transit Database adds several more criteria to the definition of heavy rail: the capacity for a heavy volume of traffic, high speed operation, single or multi-car trains, and high platform loading.¹³⁹ In the preceding case studies, the term heavy rail means a rail line powered by a third rail, operating in a separate right-of-way.

In Baltimore, heavy rail is used on the Metro from Owings Mills to Johns Hopkins Medical Campus. The subway is completely separated from other traffic, whether it is operating underground, at street level, and on elevated track. The Washington, D.C. Metro, New York subway, and parts of the Los Angeles and Boston rail networks use heavy rail.

Light rail is primarily defined by its overhead, rather than ground-level, power supply, and by its ability to operate in shared rights-of-way. Mixing with vehicle and pedestrian traffic is possible because the raised power supply is less hazardous. Further criteria applied to light rail include the use of single cars or short trains, the ability to load passengers

at track or car floor level, and lower traffic capacity than heavy rail.¹⁴⁰ In this report, the phrase light rail means a rail line powered through overhead wires, operating in separate or shared rights-of-way.

Baltimore uses light rail from Hunt Valley to Cromwell. Portland, St. Louis, Pittsburgh, San Diego, and Buffalo are other examples of light rail systems.

Passengers Versus Boardings

Comparing passengers carried per day on a given rail system or line is a crucial aspect of determining the success of a rail system but is difficult to measure. Tracking the number of riders would be simple if every passenger rode a single train in the morning, did not transfer between lines, and then made the trip in reverse in the evening. In reality, trips are more complicated, however, and often involve transfers between lines, different routes in the morning than in the evening, and perhaps an altogether different mode of getting home at night. As a result, transit operators report boardings per day rather than passengers per day. Someone who takes two trains to work in the morning and one train home at night is reported as three boardings. In the case studies above, references to the number of riders or passengers mean the number of boardings.

The American Public Transportation Association provides a rough figure for calculating the number of passengers from the number of boardings. Because most riders take just two trips per day, APTA estimates that the number of passengers is 45 percent of the number of boardings.¹⁴¹

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