Trolley Folly:

A Critical Analysis of the Austin Light Rail Proposal

September, 2000

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INTRODUCTION

This paper examines aspects of the light rail transit line proposed for Austin by Capital Metropolitan Transportation Authority (Capital Metro). The overall conclusions are:

- Capital Metro and CAMPO projections indicate that light rail will carry, at most, one-half percent of travel in the Austin area in 2025. This very small share of travel is in contrast to the more than one-third of transportation tax resources that will be spent on light rail over the period.

- Capital Metro projects that 43,200 daily riders will be carried in the first year of operation of the initial 20 mile system. This is a significantly higher patronage level than any other new light rail line has achieved in the first year, and seems overly optimistic.

- The speed of the light rail line will be similar to that of buses and considerably slower than peak hour traffic speeds on both freeways and non-freeway arterial streets.

- Capital Metro does not appear to have properly evaluated and considered the benefits and cost-effectiveness of transportation options other than light rail, particularly bus rapid transit (BRT), High Occupancy Vehicle (HOV) Lanes, and High Occupancy Toll (HOT) Lanes. These options appear to provide benefits equal to or significantly greater than light rail for a significantly lower cost.

- Light rail is being promoted in Austin as a mechanism for development. But, the record around the US indicates that most light rail related development has been subsidized by taxpayers (such as tax abatements, direct subsidies, reduced utility charges), as opposed to a natural outgrowth of market forces. Moreover, higher density developments will increase localized traffic congestion and air pollution.

- The Dallas DART light rail system has been declared a success by Capital Metro. In fact, DART's original projections that were used to promote their ballot initiative have been missed by a substantial margin. Ridership has fallen nearly 90 percent short and capital costs have escalated 60 percent. Virtually no reduction in traffic congestion has been achieved. DART's total transit usage has actually dropped since 1988, even as the Dallas area population has grown significantly. DART is a public relations, not a transportation success.

- Capital Metro appears to be shifting its focus from providing mobility to those without automobiles to attracting people who have automobiles as an alternative for travel. This is an expensive and risky strategy and could negatively impact lower

income and minority residents, through higher fares and reduced bus service levels.

- Capital Metro's projected cost of $1.9 billion for the eventual 52 mile system could be exceedingly optimistic. If cost overruns occur, as in other urban areas, much of the proposed system may not be built or bus service could be reduced to subsidize cost overruns and the fare could be increased which would reduce ridership. As longer term light rail plans have developed in the United States, costs have risen above projections and promised routes have been canceled. This is also a risk in Austin.

THE PROPOSAL

Capital Metro has placed a measure on the ballot seeking approval to build a light rail system in the Austin area. Capital Metro proposes to build a 20 mile initial system (the "North/South Corridor"). The second phase will extend the system 32 miles, for a total of 52 miles.

LIGHT RAIL AND TRAFFIC CONGESTION

Austin is growing very rapidly, and traffic volumes are increasing similarly. The most important transportation problem in the Austin area is accommodating this increased demand. Light rail is being proposed as a strategy to assist in reducing traffic congestion. Regrettably, not even the projections of local transportation agencies indicate any material impact of light rail on traffic congestion.

CAMPO (Capital Area Metropolitan Planning Organization) projects that the 52 mile light rail system will attract barely one-half percent of the passenger trips in the Austin area by 2025. While the data for Travis County are not immediately available, it would appear that light rail would attract no more than one percent of person trips. According to these projections, the entire light rail system would attract slightly more than two percent of *new* trips that are generated to 2025 (Figure 1). Alternatively, the other 98% of new trips will be taken primarily by persons in private autos on Austin streets and freeways. Yet more than one-third of transportation tax funding over the next 25 years in the Austin area will be spent on light rail as opposed to roadways, which will continue to provide at least 98 percent of passenger trips.[1]

[1] Based upon CAMPO data. It is assumed that Travis County's transportation demand will change proportionately to its population increase and that all light rail ridership will be in Travis County.

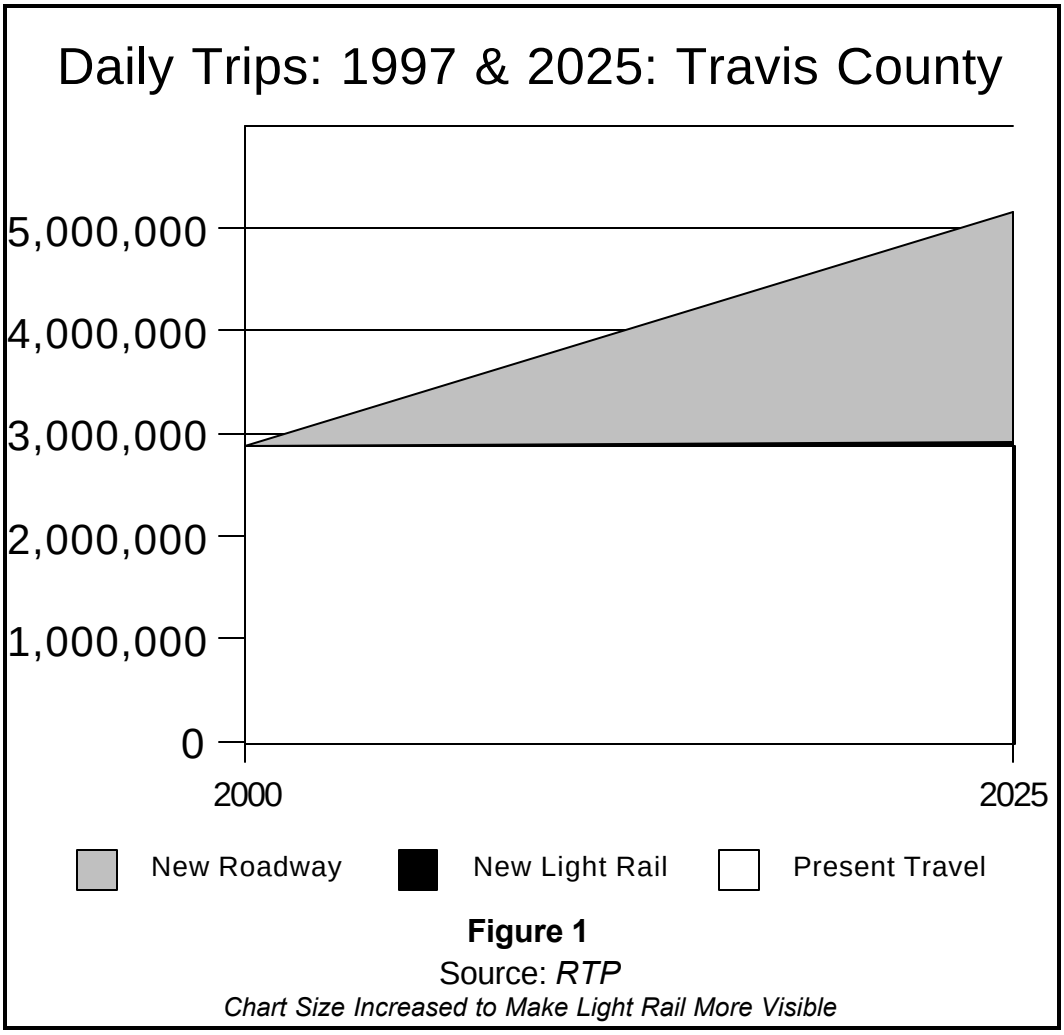

Figure 1
Source: *RTP*
Chart Size Increased to Make Light Rail More Visible

Local officials have indicated virtually the same thing. The recent Greater Austin Chamber of Commerce *Light Rail Blue Ribbon Task Force* report concluded that "light rail will not have a significant impact on VMT (vehicle miles traveled), at least in the near term."[2] Capital Metro's ridership projections for 2025 show only an 8,000 daily increase from 2007 to 2025, which would indicate, consistent with Figure 1 above, that even in the long term, light rail will have no significant impact on traffic congestion. Even Capital Metro's General Manager, Karen Rae, has been quoted as follows:

> *My observation is nothing we do will reduce congestion*.[3]

Light rail systems are routinely touted by proponents as effective strategies for reducing traffic congestion. The facts, however, are otherwise. Traffic congestion has continued to grow in virtually all US urban areas, irrespective of building light rail (Table 1). According to

[2] Greater Austin Chamber of Commerce, *Light Rail Blue Ribbon Task Force Report*, August 2000.

[3] *Austin American-Statesman,* August 16, 2000.

the US Department of Transportation Roadway Congestion Index data covering 1982 to 1997 (Texas Transportation Institute):

- Urbanized areas building or expanding light rail experienced traffic congestion increases of 36.3 percent.

- Urbanized areas not building or expanding light rail experienced *lower* traffic congestion increases of 34.2 percent.

Table 1
Traffic Congestion and New Rail Systems

Urbanized Area	1982	1997	Change	New Rail Openings 1982-1997
Atlanta GA	0.85	1.23	44.7%	Expanded new subway
Baltimore MD	0.78	1.05	34.6%	Built new LR and subway
Boston MA	0.91	1.24	36.3%	Expanded/Modernized HR/LR/CR
Buffalo-Niagara Falls NY	0.60	0.72	20.0%	Built new LR
Chicago IL-Northwestern IN	0.94	1.28	36.2%	Expanded HR
Cincinnati OH-KY	0.81	1.08	33.3%	
Cleveland OH	0.75	1.01	34.7%	
Columbus OH	0.61	1.04	70.5%	
Dallas TX	0.77	1.04	35.1%	Built new LR & CR
Denver CO	0.77	1.08	40.3%	Built new LR
Detroit MI	0.98	1.18	20.4%	Built DPM
Fort Worth TX	0.73	0.91	24.7%	
Ft. Lauderdale FL	0.70	1.08	54.3%	Built new CR
Houston TX	1.09	1.07	-1.8%	Built Busway/HOV lane network
Indianapolis IN	0.62	1.05	69.4%	
Kansas City MO-KS	0.56	0.76	35.7%	
Las Vegas NV	0.67	1.07	59.7%	
Los Angeles CA	1.39	1.51	8.6%	Built new LR/HR/CR
Miami-Hialeah FL	0.97	1.26	29.9%	Built new HR/CR/DPM
Milwaukee WI	0.76	1.01	32.9%	
Minneapolis-St. Paul MN	0.70	1.13	61.4%	
New Orleans LA	0.89	0.99	11.2%	
New York NY-Northeastern NJ	0.94	1.11	18.1%	
Norfolk VA	0.75	0.97	29.3%	
Oklahoma City OK	0.57	0.85	49.1%	
Orlando FL	0.65	0.93	43.1%	
Philadelphia PA-NJ	0.98	1.05	7.1%	
Phoenix AZ	0.94	1.13	20.2%	
Pittsburgh PA	0.72	0.76	5.6%	Modernized LR/Built Busways
Portland-Vancouver OR-WA	0.79	1.22	54.4%	Built new LR
Sacramento CA	0.71	1.14	60.6%	Built new LR
San Antonio TX	0.73	0.92	26.0%	
San Bernardino-Riverside CA	0.73	1.15	57.5%	Built new CR
San Diego CA	0.80	1.12	40.0%	Expanded new LR, built new CR
San Francisco-Oakland CA	1.04	1.33	27.9%	Expanded HR & CR

Urbanized Area	1982	1997	Change	New Rail Openings 1982-1997
San Jose CA	0.76	1.08	42.1%	Built new LR, expanded CR
Seattle-Everett WA	1.05	1.26	20.0%	
St. Louis MO-IL	0.81	1.03	27.2%	Built new LR
Washington DC-MD-VA	0.99	1.33	34.3%	Expanded new subway/CR
Average			34.7%	
Areas opening light rail			36.3%	
Areas not opening light rail			34.2%	
Areas opening any rail			38.9%	
Areas not opening any rail			32.1%	

CR: Commuter Rail; DPM: Downtown People Mover; LR: Light Rail; HR: Heavy Rail.
Calculated from Texas Transportation Institute.

Only *one* urbanized area reported a *decrease* in traffic congestion – Houston – where the voters rejected light rail and the transit agency responded by implementing the largest busway/HOV lane system in the U.S. In contrast, Dallas experienced a 35% increase in congestion over the period.

Given the infinitesimal impact light rail has on traffic congestion, it is difficult to suggest that light rail be considered as part of a *mix* of various strategies to reduce congestion. Proponents, when confronted with their own passenger projections, often admit that light rail *alone* will not solve the traffic problems. On the contrary, light rail does not even contribute to the solution.

Proponents often claim that light rail can carry up to 12 lanes of freeway traffic. Yet, no new light rail system carries the equivalent number of people as even a single lane of freeway traffic (Figure 2).

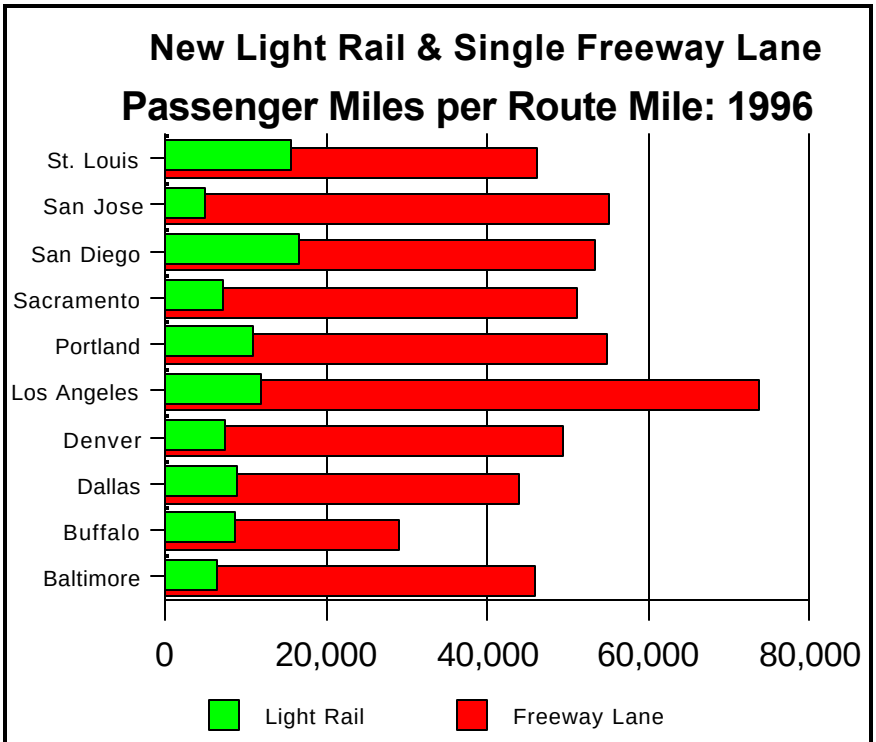

Figure 2

Estimated from FHWA, Texas Transportation Institute and National Transit Database information.

Light rail proponents frequently use apparently large numbers to suggest that light rail has a significant impact on traffic congestion. For example, 60,000 riders a day are carried on light rail in Portland, 45,000 in St. Louis, and 40,000 in Dallas. Yet, in each of these urban areas, total transit ridership, including light rail, represents less than two percent of travel. Even in the light rail corridors, ridership is small compared to adjacent freeways.

- In Portland inbound (toward downtown), light rail volume averages approximately 1,100 per hour during the 6:00 a.m. to 9:00 a.m. peak period. By comparison, ***each*** lane of the adjacent Banfield Freeway (Interstate 84) carries approximately 2,600 people per hour – nearly 2.5 times the volume of the light rail line. In the outbound direction, each freeway lane carries 1,500 persons hourly, 28 times the light rail average of 55 passengers during the same period (Figure 3). Overall, during the morning peak period, the freeway carries more than 10 times the volume of the light rail line.[4] Portland's new west side light rail line carries barely 1,000 riders per hour inbound each morning peak hour. In the case of both routes, light rail carries many former bus riders.

[4] Oregon Transportation Institute, *Max Versus Banfield Freeway: A Comparison of Actual Passenger Usage*, Internet: www.hevanet.com/oti/MVFE.htm, based upon Oregon Department of Transportation and Tri-County Metropolitan Transit District data, 1994.

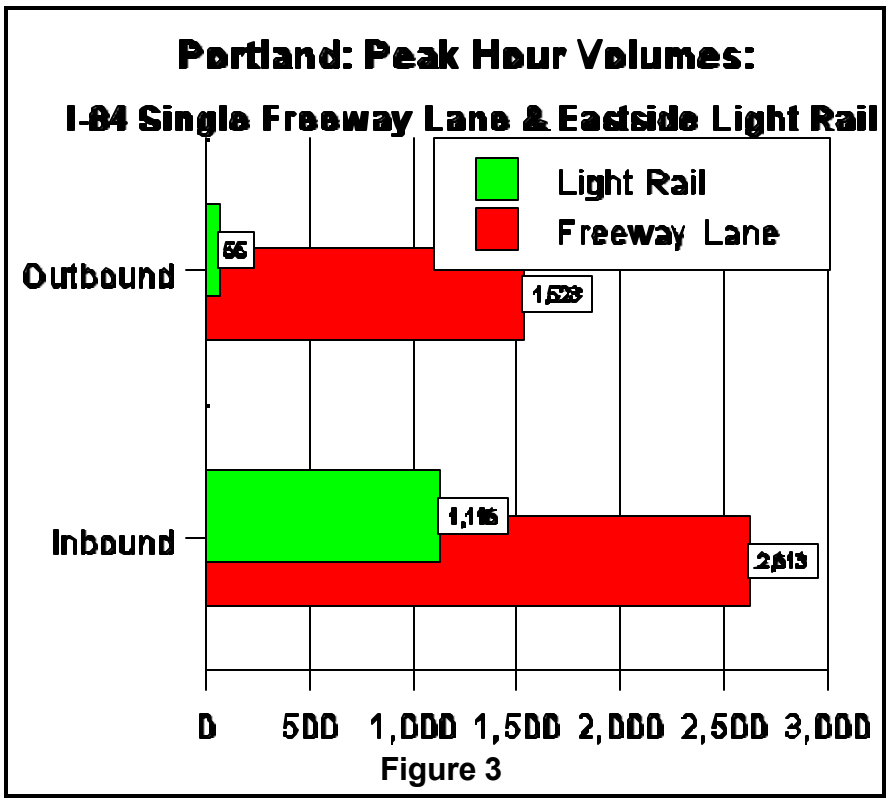

Figure 3

- In St. Louis, inbound peak hour light rail ridership is approximately 60 percent less than the capacity of a single freeway lane. When an approach to the bridge was closed for weeks due to accident damage, many commuters experienced 100 percent increases in their travel times. Yet, even in this short term crisis, light rail's passenger volume remained 40 percent *below* that of a single freeway lane.[5]

Portland and St. Louis have published studies suggesting that a large percentage of light rail ridership has been attracted from automobiles. Yet despite these transit agency sponsored studies, traffic volumes have continued to grow.

- Latest traffic counts in Portland show that volume on Interstate 84, adjacent to the light rail line, has increased 70 percent since the year before light rail opened. This rate of increase is greater than that of any other downtown oriented freeway corridor in the Portland area.

- In slow growing St. Louis, traffic on the adjacent Mississippi River Bridge (I-55/64/70) has increased by more than 20 percent since the year before the light rail line opened. Despite being able to save between $4.00 and $11.00 in parking charges by taking light rail and parking free on the other side of the river, the vast

[5] Ellen Perlman, "The Little Engine that Might," *Governing Magazine,* August 1998. Highway volumes from the Missouri Department of Transportation.

majority of commuters continue to drive.

Part of the problem is that, despite the rosy studies, a large percentage of ridership comes from the former bus riders who are forced to transfer to light rail.

RIDERSHIP

Capital Metro estimates that 43,200 riders will be carried on the 20 mile light rail system in the opening year (2007).[6] Capital Metro further anticipates that 46 percent of these riders will be new to transit. This is considerably higher than the 35 percent achieved by DART in Dallas, with the balance of ridership – 54 percent – being bus riders who will transfer to light rail. This is considerably higher than the 35 percent DART claims to have achieved in Dallas (below).

Some bus riders in Austin will transfer to light rail for two reasons:

- For some, light rail may provide a more direct trip than the previous bus service.
- For most, transfers to light rail will be forced as bus routes no longer traverse the entire distance to downtown or the University of Texas. For these riders, it is likely that the time required to transfer will lengthen travel times.

The projection of 43,200 for the opening year is especially aggressive. The light rail lines that have the highest ridership have failed to achieve such high ridership in their first year, including the Los Angeles Blue Line (the nation's busiest light rail line), San Diego's Tijuana line, St. Louis, Dallas and Portland. It should also be noted that each of these cities have substantially larger downtown areas than Austin (downtown including the University of Texas), further suggesting that the ridership projection is unrealistically high. If ridership falls below projections, this could further impact the financial stability of the project due to decreased fare revenues.

Cost per New Rider

Cost per new rider is used by the Federal Transit Administration as a measure of the cost effectiveness of new transit lines. This measure captures the cost of the new benefit obtained by a transit investment, and is required for analysis by the federal government. Capital Metro estimates a cost per new rider of $11.70 (capital and operating).[7] Thus, for each new rider commuting every work day by light rail, the cost would be $5,265 annually.[8] This is more than enough to lease each new light rail commuter a mid-sized car, such as a Ford Taurus, Honda Accord or Toyota Camry.

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6 Capital Metropolitan Transportation Authority Federal New Starts Report, 1999.

7 Capital Metropolitan Transportation Authority Federal New Starts Report, 1999.

8 Assumes 225 work days annually (adjusted to account for holidays, vacation, sick and personal days).

SPEED

Capital Metro commissioned Hickling Lewis Brod Decision Economics, Inc. (aka HLB Decision Economics, Inc.) to produce a technical report that suggested that the light rail line would reduce travel times. This is at odds with the experience of light rail lines around the nation and an analysis performed by the Greater Austin Chamber of Commerce. A critique of the consultant study is found in Technical Appendix A: Exaggerating Benefits (available on the TPPF website at www.tppf.org).

There is a common misperception that light rail is rapid transit. In fact, however, since light rail operates in streets and crosses roadways at signals (rather than overpasses), the speeds typical of heavy rail systems, such as the Washington, DC Metro or the nation's subway system cannot be achieved. Generally light rail operates at speeds similar to that of buses in local traffic, as appears to be the plan for Austin.

The Chamber of Commerce estimated the average operating speed of the light rail line at from 12 to 20 miles per hour. This slow speed is consistent with a light rail system that operates approximately one-half of its distance in the road (as did the streetcars that were removed from service over 50 years ago). Thus, light rail's operating speed may or may not be more than the average Capital Metro bus speed, which was 14 miles per hour in 1998.[9] Moreover, this is slower than the average peak hour operating speed of freeways in the Austin area (48 miles per hour) and even less than that of non-freeway surface arterial streets (29 miles per hour during peak period).[10] This slow operating speed makes light rail less attractive for automobile commuters and would tend to suggest that the assumption of 46 percent new ridership (above) is overly optimistic (Figure 4).

[9] Calculated from National Transit Database information.

[10] Texas Transportation Institute, latest available data, 1997.

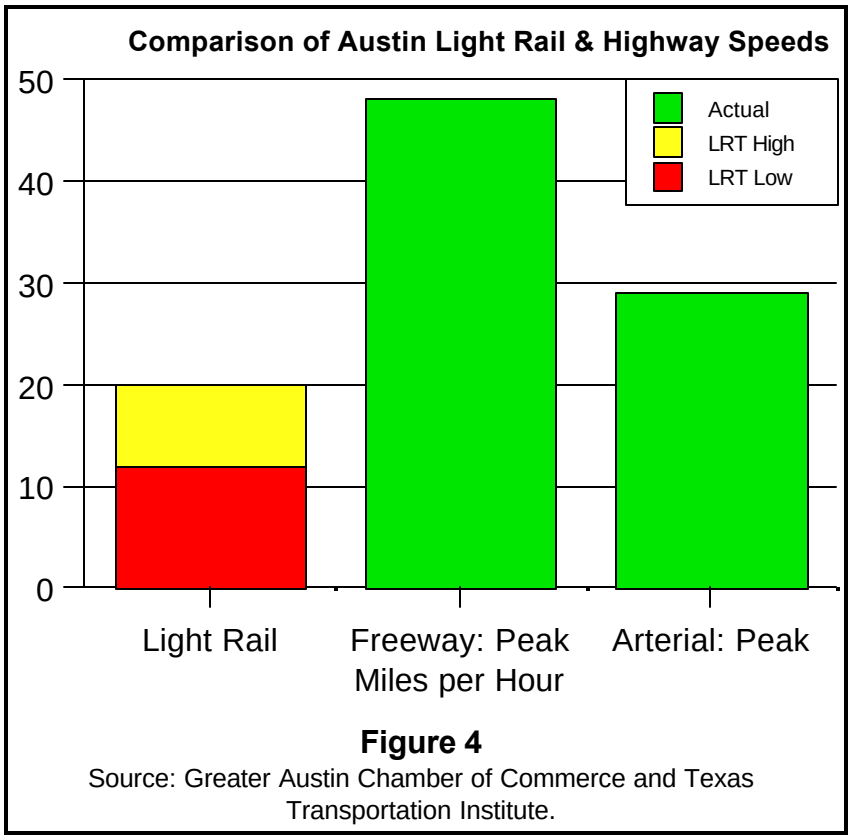

Figure 4
Source: Greater Austin Chamber of Commerce and Texas Transportation Institute.

SUCCESSFUL RAIL STRATEGIES

Because modern US urban areas are so dispersed, new transit lines can do little to impact traffic congestion. This is despite what might be called a "blind faith" that transit is the solution to urban traffic congestion.

The suburbanized urban form that has emerged in the 20th century has been associated with much greater automobile use. From a theoretical perspective, the answer seems clear to some – reduce automobile usage – which would require significant substitution of trips by transit, walking and cycling. Part of this perception may be due to the fact that so many people now visit environments in which transit works very well as an alternative to the automobile. For example, transit, and especially heavy rail systems (subways and elevated), provides for a significant share of travel in the city of New York, central London, the city of Paris, metropolitan Tokyo, the Chicago Loop and Hong Kong.

Such central cities tend to have very large central business districts (some with more than one million jobs), and residential densities are very high. For example, the city of Paris has approximately one million jobs within its 40 square miles and a residential population density of more than 50,000 per square mile. In an area little larger than Paris, Hong Kong has more than one million jobs and a population density of nearly 100,000 per square mile. Hong Kong's central business district has an employment density of nearly 450,000 per square mile, nearly double that of New York. The central cities of New York and Tokyo

both have approximately two million jobs in their central business districts, and population densities of at least 25,000. Such environments make for successful rail systems.

But such cities are the exception, rather than the rule. Even so, outside Hong Kong and to a lesser degree Tokyo, the suburbs of each of these highly transit dependent central cities are highly automobile dependent. Most tourists, however, rarely venture for any period of time into the suburbs of such cities, and may tend to perceive that all of the urban area looks like the center.

AUSTIN AND THE PROSPECTS FOR RAIL SUCCESS

Austin is less dense than average among US urbanized areas, with less than 2,100 residents per square mile in 1990 (latest data available). The central business district, including the University of Texas, contains less than 20 percent of the employment in the metropolitan area, and this figure is expected to decline.

Because Austin, like other American urban areas, is so expansive, disperse and decentralized, it is impossible to provide transit service that is competitive with the automobile for virtually all but downtown trips. This is the most fundamental reason why new transit investments, as noted above, cannot reduce traffic congestion.

Because so few public transit trips are auto-competitive in the modern urban area, transit is simply not available as an alternative for most trips and most people. This will not change with light rail. As is the case today, transit will remain a choice for people with automobiles for little more than downtown oriented trips. Spending billions of dollars on light rail that primarily serves downtown is particularly short-sighted given that virtually no downtown employment growth is projected over the coming decades. Austin's central business district (including downtown and the University of Texas) is projected by CAMPO to lose considerable employment share in the next 25 years. From 1997 to 2025, CAMPO projects that less than two percent of the new employment in metropolitan Austin will be in the downtown area. Downtown will drop from approximately 15 percent of employment to less than eight percent.[11] A transit system that genuinely provided auto-competitive mobility throughout the region would cost much more. For example, European urban areas have much higher levels of service, with 16 times as many miles of service per square mile as the US average.[12]

DEVELOPMENT AND URBAN FORM

Local proponents of light rail suggest that it can be used to drive what they perceive to be desirable development patterns in the area. Light rail's impact on development has been minuscule around the nation.

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[11] Official 1999 CAMPO Scenario Data (.xls spreadsheet).

[12] Internet: www.publicpurpose.com/ut-intl-geointense.htm.

Little unsubsidized rail related development has occurred in light rail cities: Most development along the light rail lines has been tax subsidized or publicly funded (such as sports stadia and convention centers) which light rail proponents fail to note. In response to the limited development activity around light rail stations, Portland is now offering ten year property tax abatements to encourage development.

Dallas: Questionable claims about light rail and property values: DART in Dallas has claimed (documented in the Weinstein-Clower April 1999 study)[13] that light rail has led to higher property values. This study compared what it considered to be comparable areas along the light rail lines and in non-light rail areas. There are a number of problems with this study:

- Some of the properties evaluated in the light rail analysis were not within walking distance (according to the study, 1/4 mile) of a light rail station.

- The light rail-non light rail comparison areas listed in the study do not appear to be comparable. For example, the non-light rail areas do not include any significant office centers that are comparable to the office centers along the North Central Expressway (which is also the route of the light rail line). There are numerous examples that could have been included.

- The study uses a very small sample of properties, such that exclusion of single properties from the analysis can have significant impact on the overall results.

- Most important, the study fails to factor out the impact of rebuilding and expanding the North Central Expressway, which is also the route of the northern segment of the light rail line. The study simply assumes that all added value is the result of light rail. It would be expected that the North Central Expressway, which accommodates much more transportation demand than the light rail line would have the dominant impact on property values.

Downtown areas are by far the most effectively served regions of metropolitan areas ("Successful Rail Strategies," above). It would be expected that, if light rail is a significant generator of economic activity that it would have a significant impact on downtown office vacancy rates which has the highest density of light rail service in the area. Yet no such effect has occurred in Dallas. In 1995, at the point light rail opened, downtown Dallas had a vacancy rate of 34.6 percent. First quarter 2000 data indicates that Dallas had the worst downtown office vacancy rate in the nation, at 27.6 percent.[14] This is more than eight percentage points worse than the second most depressed downtown area, in Detroit. By

[13] Bernard L. Weinstein and Terry L. Clower, *The Initial Impact of the DART LRT System,* University of North Texas Center for Economic Development and Research, April 1999.

[14] Data from CB Richard Ellis (www.cbrichardellis.com).

comparison, Houston, which did not build light rail, had a downtown vacancy rate of 22.4 percent in 1995 and dropped to 7.2 percent in 2000. Similarly, office vacancies declined significantly in downtown Austin from 20.4 percent in 1995 to 9.1 percent in 2000. The national downtown average office vacancy rate fell from 15.3 percent in 1995 to 7.4 percent in 2000 (Figure 5).[15]

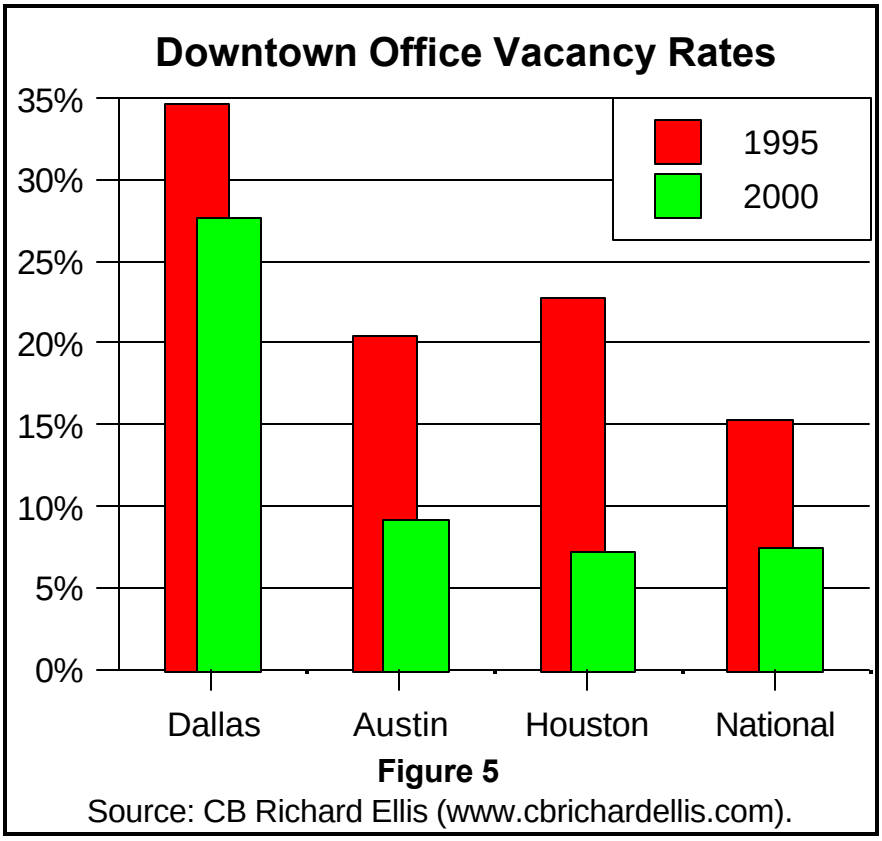

Figure 5

Source: CB Richard Ellis (www.cbrichardellis.com).

In Dallas, and other central cities, there has been a resurgence in central city development. For example:

- There are impressive examples of new "brownfield" residential developments in a number of areas in Dallas, well beyond any possible influence of light rail.
- The north side of central Seattle, where there is no light rail, is undergoing one of the nation's most intense urban development reversals.
- A large area west of Chicago's Loop is experiencing significant "loft" development, having little or no relationship to that city's rail system.
- Denver's lower downtown ("Lodo") and Cherry Creek districts are redeveloping well

[15] Data from CB Richard Ellis (www.cbrichardellis.com).

away from the light rail line.

Atlanta, Washington and Development: Over the past 20 to 25 years Atlanta and Washington have built by far the nation's most extensive rail systems. Yet, rail has not shaped development in these two urban areas. The Sierra Club has ranked both as among the most "threatened by sprawl," as suburbanization has spread and traffic congestion has become among the worst in the nation (Washington ranks second, after Los Angeles, while Atlanta ranks eighth, just ahead of Portland out of 70 areas reviewed by the Texas Transportation Institute in 1997).

Development related to light rail is not necessarily a good thing: Because most trips to higher density developments continue to be made by auto, traffic congestion becomes worse. This is illustrated around the Ballston, Virginia heavy rail station in the Washington area, where population densities are now 400 percent higher than that of the surrounding single family housing areas, while auto trips are 300 percent higher.[16] It is exceedingly rare for transit market share around suburban rail stations to approach 10 percent. As a result, local traffic congestion is much worse. And, because air pollution worsens exponentially as traffic slows down, much more air pollution is produced.

If development is the goal, subsidize it directly: Using light rail to drive development is very ineffective and inefficient. If the public good is served by subsidizing development, then it would be far more effective to provide subsidies directly to developers.

CASE STUDY: DART

The Dallas DART light rail system has been touted as a great success throughout Texas and the nation. Yet by a substantial margin the DART light rail system has failed to live up to its promises.

The 1983 campaign for the DART tax referendum made impressive claims to the voters. Voters were told that DART trains were needed to reduce traffic congestion, and that by 2010:

- 160 miles (14 routes) of rail would be built, including a downtown subway. All of this was to be built for $17.8 million per mile.[17]
- 567 million passenger miles would be carried on DART trains.
- Traffic congestion would get much worse in the Dallas area if rail was not built.

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[16] Due to its speed and capacity advantage over light rail, heavy rail carries far higher volumes and can impact development.

[17] *Vote DART. It's the Best Way to Go*, 1983 campaign brochure produced by the Transportation Task Force.

As has become typical in transit,[18] the results fell far short of the promises.

- The rail system was scaled back to less than 100 miles, even though the tax rate remained at the level that was to finance the 160 mile system. Costs were grossly underestimated in the plans presented to taxpayers, with costs per mile for the first 20 miles approaching $45 million, more than a 60 percent increase (inflation adjusted).

- In 1998, DART trains carried less than 65 million passenger miles – nearly 90% less than the 2000 projection.

- DART's total transit usage has actually dropped since 1988, even as the Dallas area population has grown significantly. [19]

- Traffic congestion has become much worse in Dallas, and light rail has made little if any impact on traffic congestion. DART data indicates that from 3:00 p.m. to 7:00 p.m., outbound ridership on the most heavily traveled line (northern line) averages approximately 3,600, or less than 1,000 per hour. A DART study found that approximately 35 percent of light rail riders would have driven automobiles if light rail were not available.[20] This suggests that, on average, barely 300 automobiles per peak hour have been removed from the roadways of Dallas on the most heavily used light rail line. A single freeway lane carries from 2,250 to 2,750 people per hour, more than double that of DART's light rail line.

Further, regional transportation plan projections indicate that the planned expansion of the

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[18] Rail transit systems usually cost much more than originally estimated, carry fewer riders than projected and cost more to operate. See Don Pickrell, *Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs*, United States Department of Transportation, Urban Mass Transportation Administration, October 1989.

[19] From 1988 to 1998, DART unlinked bus and light rail trips rose 8.1 percent from 55.6 million to 60.1 million (National Transit Database). Over the period 1996-1998, the period when light rail service was introduced, the average fare per unlinked trip fell from $0.58 to $0.49. DART passengers pay a fare for each linked trip (or use unlimited use passes), and transfers between unlinked trips are free. Since the DART fare structure was unchanged over the 1996-1998 period, the ratio of unlinked to linked trips would have remained relatively unchanged except for the changes in travel patterns brought about by the implementation and expansion of light rail service. But, since the average fare declined, the ratio of unlinked trips to linked trips (that is, the number of transfers increased because very few DART transit passengers live and/or work close to rail stations) by approximately 18.4% ($.58/$.49). The resulting increase in transfers suggests a reduction in linked trips of approximately 8-9% percent [(108.1% {change in unlinked trips}) x (1/118.4% {change in ratio of unlinked:linked trips})].

[20] North Central Texas Council of Governments and Dallas Area Rapid Transit, *Multimodal Travel Pattern Analysis*, October 1993.

rail system will have an imperceivable impact on traffic – *all* of the anticipated light rail ridership increase over the next 25 years is nullified by less than four months of street and freeway traffic *growth*.[21]

Despite this performance, DART (and Capital Metro) officials frequently claim that light rail is exceeding projections. In fact, projections of light rail ridership have been reduced a number of times. For example, in 1991 ridership on the Dallas South Oak Cliff and North Central lines was projected at 47,800 in 2005.[22] As of 2000, ridership on these two lines *plus* the West Oak Cliff line is only 37,100 daily.[23] The West Oak Cliff line, which was not included in the 47,800 projection, is the second most highly patronized line of the three. Further, even if the higher projection had been achieved, light rail would have reduced traffic in the South Oak Cliff corridor by barely 0.5 percent.[24]

And, despite light rail, Dallas is also an air quality non-attainment area.

DART's so-called success is limited to public relations, as indicated by DART's former assistant Executive Director:

> *Dallas is a good one, where they declared it a success. If you really think about it, they have a fantastic community relations public relations unit there that simply said they declared victory and spread it around*.[25]

ABANDONING THE CORE MARKET

Through the light rail program, Capital Metro appears to be shifting its customer focus away from the low-income, minority, transit-dependent residents who represent most of the ridership to higher-income riders who have near universal access to automobiles for their travel.

Capital Metro's ridership is predominantly minority (54%) and low-income (66% under $20,000 per /year). Nearly 70 percent of Capital Metro riders do not have access to

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21 Estimated from *Mobility 2020*, Texas Transportation Institute, Federal Highway Administration and DART data.

22 U.S. Department of Transportation Urban Mass Transportation Administration and Dallas Area Rapid Transit *South Oak Cliff Final Environmental Impact Statement*, August 1991.

23 American Public Transit Association data for 2000 first quarter (www.apta.com).

24 U.S. Department of Transportation Urban Mass Transportation Administration and Dallas Area Rapid Transit *South Oak Cliff Final Environmental Impact Statement*, August 1991.

25 Ron Thorstad, Transcript of the June 22, 2000 Greater Austin Chamber of Commerce Light Rail Blue Ribbon Task Force Meeting. Mr. Thorstad is the former Assistant Executive Director at DART responsible for advance planning, preliminary engineering and final design of DART's 20-mile light rail transit system.

automobiles for their trips.

It is far more expensive to carry more affluent "choice" riders than transit-dependent riders. It is also far more difficult to attract new "choice" riders than it is to increase riders who have little or no access to automobiles (see *The Future of Mass Transit in the United States* at www.tppf.org/veritas/vindex.html).

This shift of focus from its primary mission of service to the transit dependent could create difficulties in the future. In Los Angeles, for example, rail funding difficulties led to higher fares and reduced levels of bus services. The result was a civil rights suit filed by the NAACP Legal Defense and Educational Fund, Inc. for the Bus Riders Union, representing low income riders who had been disproportionately injured by the priority placed on building and operating rail. Based upon a court action, Los Angeles has now suspended further rail development and is re-emphasizing the bus services that are still used primarily by transit dependent riders. As a result, after years of declining ridership (falling 161 million annual riders from 1985 to 1996) ridership steadily climbed with a renewed emphasis on buses and low fares (climbing 37 million annual riders since 1996). From 1985 to 1996, MTA ridership dropped nearly 15 million per year. Since 1996, ridership has increased nine million per year.

The overall conclusion is that Capital Metro is proposing a high-cost, high-risk transportation strategy that shifts its focus away from its traditional market to an entirely new group of customers that are more difficult and more expensive to attract and far more expensive to serve. This is a strategy that has not been proven successful in other cities. There does not appear to be much reason to believe that it will be more successful in Austin.

CAPITAL COSTS

The proposed light rail system would be built with the sales tax granted to Capital Metro by voters and with assumed federal funding.

- The minimum capital cost (construction and vehicles) for the light rail line would be approximately $920 million (2000$).[26] This assumes the use of railroad right-of-way already owned by Capital Metro and minimal grade separation (bridges and underpasses to minimize conflicts with automobile, truck, bicycle and pedestrian traffic).

- Alternative alignments could raise the cost to $1.2 billion.[27]

[26] Capital Metropolitan Transportation Authority Initial Analysis Report, August 2000.

[27] Capital Metropolitan Transportation Authority, *Future Transportation Alternatives,* October 1999.

The cost of the light rail line would thus be between $46 million and $60 million per mile, which is below the national average cost of light rail lines currently in planning (nearly $70 million per mile).[28]

Capital Metro plans on building an additional 32 miles of light rail, which would cost an additional $1 billion. Capital Metro estimates that the cost per mile for this addition would be approximately $30 million (2000$), well below the national average cost per mile and 25 percent less than the initial system. Capital Metro projects that the eventual 52 mile system will cost $1.9 billion (2000$). Alternative alignments presently under consideration for the initial phase could raise the cost to 2.2 billion (above). At approximately $40 million per mile, this is well below the average national cost per mile of $70 million.

It seems likely that the Capital Metro cost projections are overly optimistic. If the national average cost per mile is applied, overall costs for the 52 mile system would be more than $3.5 billion, at least $1.6 billion more than the figure currently used by Capital Metro. Further, Capital Metro plans on issuing one billion dollars in long term debt to finance construction costs. Capital Metro financial projections do not appear to include the full debt payout period, and as a result, it is likely that debt repayment will be significantly higher than noted here. [29]

There are other reasons to doubt the Capital Metro cost projections.

- National costs per mile have escalated well above projections in many projects, and projects in planning are now experiencing particularly significant cost escalation (below).

- Another factor that could increase light rail costs is changes in scope that might occur after the election. Based upon experience elsewhere, it can be expected that Capital Metro and its consultants may adopt more costly system enhancements and alternatives that could increase costs further.

In addition, Capital Metro is assuming that it will receive approximately one-half of its capital costs from the federal government. There is considerable national competition for these funds, and the Capital Metro projection for federal funding may also be optimistic.

Finally, Capital Metro financial projections indicate that there is little room for cost escalation in its projections. In 2017, for example, Capital Metro projects that it will start the year with virtually no financial reserves.[30] In short, it seems likely that Capital Metro will not have sufficient funding to build the promised light rail system. Parts of the system may not

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[28] Calculated from data on new light rail systems in Federal Transit Administration New Starts Report (2001).

[29] Year of expenditure dollars.

[30] Capital Metropolitan Transportation Authority, Projected Cash Flow, provided by CAMPO.

be built, and as has occurred in other cities building rail, fares may be increased, bus services curtailed, and/or bus purchases delayed to finance the rail system.

THE NATIONAL RECORD: RISING COSTS AND BROKEN PROMISES

Light rail systems are costly, and actual costs tend to rise well above early projections. A United States Department of Transportation (USDOT) report found that, on average, new light rail systems were 30 percent more costly to build than projected (capital costs) and were 16 percent more costly to operate than projected (operating costs).[31] Since the publication of the USDOT report, other light rail lines have experienced significant cost escalation. For example:[32]

- The first 20 miles of the DART light rail system cost 60 percent more per mile (inflation adjusted) than projected.[33]
- The Los Angeles Green Line cost 53 percent more than planned, while the Blue Line cost 149 percent more (inflation adjusted).
- Portland's West Side line increased 184 percent in cost (inflation adjusted).
- Baltimore's Central Line rose 49 percent compared to projected capital costs (inflation adjusted).

A recent National Academy of Sciences report confirms that underestimation of costs and overestimation of usage is a normal pattern for large infrastructure projects, including light rail lines.[34] The report stated:

> *... cost overruns of 50 to 100 percent are common and that overruns of more than 100 percent are not uncommon. Traffic forecasts that are off by 20 to 60 percent when compared with actual development are frequent in large transportation projects.*

There are always detailed explanations for cost escalation and failure to attract projected

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31 *Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs,* United States Department of Transportation, Urban Mass Transportation Administration, October 1989.

32 *Report on Funding Levels and Allocation of Funds*, Report of the Secretary of Transportation to the United States Congress, multiple editions, 1985-1995.

33 *The 1999 Texas Transit Opportunity Analysis: Dallas Area Rapid Transit (DART)*, Texas Public Policy Foundation, June 1999 (http://www.tppf.org/tran4.html) .

34 Mette K. Skamris and Bent Flyvbjerg, "Accuracy of Traffic Forecasts and Cost Estimates on Large Transportation Projects," *Transportation Research Record* (Washington, DC: Transportation Research Board, National Research Council), 1996.

ridership and revenue --- some are more valid than others. But in publicly financed projects the "bottom line" is the same --- the cost of unreliable forecasts is paid by taxpayers, who as often as not have been led to believe that their bill would be considerably less. According to Dr. Charles Lave, Chair of the Economics Department at the University of California at Irvine, urban rail consultants can feel pressured to manipulate computer modes to produce favorable projections. He suggests that consultants should be required to post a bond to guarantee reasonableness of their projections.[35]

Moreover, light rail cost escalation is particularly strong at this point. For example, projects in the 2000 federal planning process experienced cost per mile increases averaging more than 20 percent per year (Table 2).[36]

Table 2
ESCALATION OF PROJECT COSTS IN THE PLANNING PROCESS

Line	FTA Report Date of Earlier Estimate	Cost per Mile in Millions			Years Since Earlier Estimate
		Earlier Estimate	2000 or 1999 Cost per Mile	% Change	
Dallas-North Central Extension	1997	$27.77	$41.38	49.0%	2
San Diego-Mission Valley	1999	$61.19	$73.05	19.4%	1
Denver-Southeast	1999	$30.25	$46.45	53.5%	1
Kansas City-Southtown	1995	$32.00	$44.23	38.2%	4
Minneapolis-Hiawatha	1999	$32.00	$47.70	49.1%	1
New Jersey; Hudson Bergen Complete	1996	$63.41	$104.72	65.1%	3
Norfolk	1995	$7.35	$28.67	289.9%	4
Orange County	1999	$68.57	$75.75	10.5%	1
Orlando	1997	$35.20	$41.10	16.8%	2
Phoenix	1999	$30.00	$47.78	59.3%	1
Portland-North South	---	$98.83	$98.83	0.0%	0
San Diego-Mid Coast	1997	$22.65	$30.76	35.8%	3
San Francisco	1999	$79.59	$98.83	24.2%	1
Average				54.7%	1.5
Average without Norfolk				32.4%	1.8
Annual Average Increase in Costs				29.6%	
Annual Average Increase in Costs without Norfolk				21.0%	

Calculated from data at Federal Transit Administration Internet:site:
http://www.fta.dot.gov/library/policy/ns/ns.htm

Broken Promises: As a result of persistent light rail cost overruns transit agencies have been unable to fulfill promise made to voters. For example:

[35] Charles A. Lave, "Playing the Rail Forecasting Game," *TR News*, September-October 1991.

[36] Less than three percent of this can be attributed to general inflation.

St. Louis: In 1994, local officials placed a sales tax on the ballot that included money to operate the new light rail line and to build six additional rail lines. By 1996 it was clear that the tax was insufficient to pay for more than one of the additional lines. An additional tax to construct the other five lines was rejected by taxpayers in 1997.

Los Angeles: In 1980, the Los Angeles County Transportation Commission obtained voter approval for a 1/2¢ sales tax to support transit operations and build 11 rail lines.[37] By 1990 it became clear that the tax was insufficient to meet the rail promises, and another 1/2¢ sales tax was approved by the voters. By 1998, only three of the promised lines had been built. The transit agency has now imposed a moratorium on future rail construction, which would cancel or indefinitely delay most of the rail lines promised in 1980. Twelve lines that were planned for operation or building in 2001 will not be built.[38]

Dallas: In the early 1980s Dallas voters approved a tax to build a 160 mile rail system by 2010 without federal funding. The program has been scaled back to 100 miles, Additional details are provided in the "Case Study: DART" section of this report (above).

Seattle: In 1996, Seattle voters approved a tax referendum to expand transit in the area, including building a light rail line. It is now clear that the Seattle light rail line is approaching a billion dollars over budget before construction has begun and that there is insufficient funding to complete the program promised to the voters. A group of present and former public officials, including a former Governor, have asked for a moratorium on further spending until an audit of the overruns and their impacts is completed.

Charlotte: In 1998, Charlotte voters approved a tax referendum to build five transit lines and expand bus service. The plan was to cost $1.1 billion through 2025. It is now projected that costs have risen to $2.8 billion and that the program cannot be completed as promised.

Austin voters could face similar disappointment. Capital and operating costs could escalate above projections, as they have in other cities. The result is likely to be cancellation of future transit lines, reduction of bus service, and/or higher taxes.

[37] An author of this paper was a member of the Los Angeles County Transportation Commission in 1980 and was the author of a provision that required 35 percent of tax funds to be used for rail development.

[38] Additional lines were added to the original 1980 plan.

THE BUS ALTERNATIVE

Light rail is a particularly expensive strategy for a transit corridor. Capital Metro has also reviewed bus alternatives for the development of transit corridors. A 1999 Capital Metro report[39] found that a 7.5 mile busway route could be built for $50.8 million, compared to $204.6 million for light rail.[40]

Similarly, overall capital and operating costs for bus rapid transit are far less than that of light rail. The costs for the proposed light rail system are far higher than those for existing bus service. For example, the projected cost per passenger of the Austin North/South light rail corridor was projected to be three times as high as existing bus services, according to a 1998 Capital Metro study[41] ($6.97 vs. $2.20[42]).

Among corridor options reviewed by Capital Metro, the Bus Rapid Transit (BRT) option had a far lower cost per rider than any rail option studied ($1.95[43] vs. $6.95 for the North/South light rail line).

These data show that BRT can be a far more cost-effective strategy. However, Capital Metro has not attempted to model ridership and costs of BRT as an alternative to light rail for most of the alignments studied. It appears that Capital Metro has not properly considered alternative transportation improvements, such as busways, HOV lanes, HOT lanes, and bus transit malls that could provide far greater transportation improvements than light rail at a significantly lower cost.[44]

Because the costs of BRT would be far less than those of light rail, there would be the potential to make funding available for other public purposes, such as additional transportation strategies, roadway expansions, lower fares and/or lower local taxes.

Busways have the additional advantage of being available for use by High Occupancy and

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39 Capital Metropolitan Transportation Authority*, Future Transportation Alternatives,* October 1999.

40 Capital Metropolitan Federal New Starts Report, 1999.

41 Estimated from data in Capital Metropolitan Transportation Authority, *Future Transportation Alternatives*, October 1999, applying federally required discount rate to capital costs.

42 BRT includes an additional 15 percent for capital costs based upon national data.

43 It is not clear if the BRT costs include the buses to operate on the BRT line. If these costs are not included, the cost per passenger would increase a maximum of approximately 17¢ to approximately $2.12.

44 Other alternatives not sufficiently considered include high occupancy vehicle (HOV) lanes and high occupancy toll (HOT) lanes, which can also serve as roadways for bus rapid transit.

emergency vehicles, unlike light rail which can only be used by light rail.

Bus rapid transit also has several funding advantages:

- Like light rail, bus rapid transit is eligible for federal funding under the Federal Section 5307 “new starts” discretionary grant program.

- Bus rapid transit projects are also eligible for funding under the Section 5307 “bus” discretionary grant program, which can*not* be utilized for light rail or other rail projects.

- Since the total capital cost of bus rapid transit is likely to be significantly less than those of rail projects, it is possible that the Federal funding share could be more than the 50 percent proposed for light rail. In any event, the lower bus capital costs will surely mean a far lower local share of the cost.

AIR POLLUTION

Because light rail produces virtually no impact on traffic congestion, it has little or no impact on air pollution. This is confirmed by United States Department of Transportation reports.[45]

- The Washington, DC subway system, which carries more than 20 times as many daily riders as are projected for light rail in Austin --- is credited with removing barely one percent of air pollution in the area.[46]

- New rail systems make only modest air quality improvements because ... *only part of the additional ridership of these systems is drawn from SOV (single occupant vehicle) users. Others are drawn from buses, car pools and latent demand.*[47]

- U.S. Department of Transportation assessments have found that light rail projects would have little air quality impact --- largely because they produce little reduction in

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[45] *Report on Funding Levels and Allocation of Funds*, Report of the Secretary of Transportation to the United States Congress, multiple editions, 1985-1995.

[46] United States Department of Transportation and Environmental Protection Agency, *Clean Air through Transportation: Challenges in Meeting National Air Quality Standards*, August 1993.

[47] United States Department of Transportation and Environmental Protection Agency, *Clean Air through Transportation: Challenges in Meeting National Air Quality Standards*, August 1993.

automobile usage.[48] For example:

Portland: "*It is unlikely that any of the transit alternatives would have a noticeable effect on air quality because of the very small number of auto drivers they would attract.* Portland has recently violated national air quality standards, in spite of building more than 30 miles of light rail."

St. Louis: *"The project will have a small (0.3%) reduction is total regional vehicle miles traveled and hence only an insignificant improvement in regional air quality."*

San Jose: *"The project, because of the small number of cars it removes from the road, is expected to have minimal impact on regional air quality."*[49]

Moreover, attracting drivers from automobiles does not always reduce air pollution. Many of the few automobile drivers attracted to light rail must drive to rail stations (at "park and ride" lots). The shorter trips to rail stations may produce nearly as much pollution as the former longer trips because pollution control devices are not fully operable during initial start up and warm up:

... many riders access rail stations by automobile, meaning their trips still entail engine cold starts and subsequent cooling down. This generates the bulk of HC (hydrocarbon) emissions --- 65 percent from a 10 mile trip --- because of an automobile's relative inefficiency and higher emission rates while warming up and higher gasoline evaporation rates when cooling down.[50]

MISINFORMATION FROM LIGHT RAIL PROPONENTS

Like other ballot initiatives around the country, proponents of light rail in Austin have based arguments on erroneous information.

The most important element is the claim that light rail will reduce traffic congestion. As was noted above, there is simply no prospect that light rail can reduce traffic congestion, as Austin's rail proponents own analyses clearly show.

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[48] *Report on Funding Levels and Allocation of Funds*, Report of the Secretary of Transportation to the United States Congress, multiple editions, 1985-1995.

[49] All quotes from *Report on Funding Levels and Allocation of Funds*, Report of the Secretary of Transportation to the United States Congress, multiple editions, 1985-1995.

[50] United States Department of Transportation and Environmental Protection Agency, *Clean Air through Transportation: Challenges in Meeting National Air Quality Standards*, August 1993.

Austin light rail proponents have claimed that Buffalo's light rail system carries 26 percent of daily work trips. The reality is that throughout the Buffalo metropolitan area, transit buses *and* light rail combined carried only 4.7 percent of work trips in 1990 (latest data available), down from 6.6 percent in 1980, at the point light rail opened.[51] From 1990 to 1998, Buffalo light rail ridership dropped 15 percent.[52]

Proponents further indicate that without light rail, Austin will face the same kind of traffic congestion as occurs daily in Silicon Valley (San Jose), Atlanta, Los Angeles and Houston.

The reality is that the Silicon Valley already has built light rail, which has been operated for more than 10 years. During those years, traffic congestion has continued to worsen. Further, Atlanta has built heavy rail (subway and elevated), which carries far higher ridership than can be accommodated by light rail. Los Angeles has built light rail, heavy rail, *and* commuter rail. Among the four areas noted, only Houston has not built rail. At the same time, Houston is the only major urbanized area in which there has been a reduction of traffic congestion. The point is that there is no connection between light rail and traffic congestion.

REALISTIC TRANSPORTATION ALTERNATIVES

Alternatives exist that could materially improve traffic congestion in the Austin area. A serious, objective study should be undertaken to develop a program to improve traffic congestion, rather than simply proceeding with the ineffective plans for light rail. For example, at least the following roadway expansion strategies should be considered:

- New highways could be constructed and additional capacity might be provided on existing highways. Houston *reduced* traffic congestion through expansion of its freeway system, and is the only major urbanized area to have accomplished such a reduction between 1982 and 1997.[53] This does not require a return to the neighborhood destroying highway construction that was associated with urban renewal in the 1950s and 1960s. For example, some European cities are building "metroroute" auto-only freeway tunnels to alleviate traffic congestion. Paris, with the western world's most intensely developed urban rail system, will build 60 miles of under-city tunnels to alleviate traffic congestion.[54] The capacity of IH 35 in Austin and in San Antonio has been more than doubled through double-deck construction.

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[51] US Census Bureau data.

[52] Calculated from National Transit Database and US Census Bureau data.

[53] Texas Transportation Institute.

[54] Christian Gerondeau, *Transport in Europe* (Boston, MA: Artech House, Inc.), 1997.

Even this highway design is typically far less expensive per lane mile than light rail to construct.

- Traffic bottlenecks should be removed. For example, in some cities the number of through lanes is substantially reduced through freeway interchanges. The result is traffic congestion, which could be alleviated by the addition of relatively short lane sections. In Milwaukee, the addition of a freeway lane in each direction for three miles would eliminate a serious capacity problem anticipated on the entire Interstate 94 corridor in 2010.[55]

- High occupancy vehicle lanes (HOV lanes) should be considered. HOV lanes are express freeway lanes reserved for car pools and other high occupancy vehicles. High occupancy vehicle lanes (HOV lanes) offer the opportunity to reduce traffic congestion in corridors leading to the 80 percent of jobs not in downtown or the University of Texas area. HOV lanes can provide improved commuting speeds to many areas, rather than just to the downtown area where transit and rail benefits are concentrated. This is because car pools and buses can access the HOV lane for part of the trip, even though the origin and destination may be some distance from the freeway. Houston Metro indicates that HOV lanes improve travel times by from 12 to 22 minutes during peak hours.[56] Federal transit funding can be used to construct HOV lanes. High occupancy toll lanes (HOT lanes) should also be considered. HOT lanes are a variation on HOV lanes, in which tolls are charged for single occupant automobiles and could be waived for car pools. The Route 91 high occupancy toll lane in the Los Angeles area has reduced the period of peak congestion by an hour in each direction daily.

Intelligent Transportation Systems

Greater use of computer technologies, through intelligent transportation systems (ITS) is expected to improve traffic congestion without major system expansion.

- Improved traffic signalization is already improving travel times in some corridors.

- On-board navigation systems are already assisting automobile drivers in identifying less congested alternative routes and thereby improving average travel speeds in urban areas.

- The automated highway will bring interactive speed control, with computers

[55] Wendell Cox, *Light Rail in Milwaukee* (Milwaukee: Wisconsin Policy Research Institute), 1998.

[56] Houston Metro, *Guide to Using Houston's High Occupancy Vehicle Lanes*, January 1998.

controlling steering and braking on congested urban freeways. It is expected that roadway capacities could be more than doubled by this technology. Japan plans to have an automated highway in operation in a decade.[57]

- In the more distant future "autonomous automobiles" would combine the features of both the automated highway and navigation systems. Autonomous automobiles would rely on geo-positioning systems capable of guiding automobiles within tolerances measured in inches. The autonomous automobile will be capable of quickly transporting its passengers to virtually any destination on the road network (freeways to local streets), improving roadway capacity, average speeds and safety. It is possible that technology will eventually deliver highway based systems that combine the personal mobility advantages of the automobile with the theoretical advantages of mass transit.

Bus Strategies

In addition to rail, a high quality bus alternative should be studied (Box 1). U.S. government research has shown that where bus service is equivalent to rail service, passengers have no preference for rail (or bus).[58] Other U.S. government research indicates that equivalent bus systems can be developed for one-fifth the cost of light rail systems.[59] Finally, high quality bus systems tend to attract a higher percentage of their ridership from automobiles than do rail systems, largely because of their higher operating speeds.[60]

Of the seven metropolitan areas that increased their per capita ridership by more than 20 percent since 1980, six relied on expanded bus service. The seventh ranking metropolitan area, San Diego, relied on both light rail and expanded bus service.

A high quality express bus/HOV system would operate in the planned exclusive

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[57] Internet: *ITS Online* http://www.itsonline.com/nahsc1.html.

[58] Moshe Ben-Akiva, *Ridership Attraction of Rail Compared with Bus* (U.S. Department of Transportation, 1991).

[59] John Kain, Ross Gittell, Amrita Daniere, Tsur Summerville and Liu Zhi, *Increasing the Productivity of the Nation's Urban Transportation Infrastructure*, United States Department of Transportation Federal Transit Administration, January 1992.

[60] Jonathan E. D. Richmond, *New Rail Transit Investments - A Review* (Cambridge: Harvard University John F. Kennedy School of Government, 1998), p. 27.

light rail rights of way, and would qualify for federal fixed guideway funding.

Further, a busway/HOV strategy would be regional in nature, unlike the fixed route (bus and rail) transit system, which serves only downtown oriented corridors, and that operate at speeds insufficient to attract significant numbers of commuters from their automobiles. The regional effectiveness of high occupancy vehicle strategies is illustrated by Dallas projections that 95 percent of HOV passengers in 2010 will be in carpools, rather than the buses (that are oriented to downtown). A busway/HOV system is capable of providing alternative transportation throughout the entire service area.

BOX 1
THE DRIVING FORCE:
FEDERAL FUNDING

Perhaps the principal driving force in public transit infrastructure improvements such as light rail is the availability of federal discretionary funding. Local areas have the potential to obtain up to 80 percent federal funding match rates. But there is not enough federal or local funding available to provide sufficient conventional bus or rail public transit service to make a material difference in traffic congestion and air pollution. The scarce resources available should be spent on strategies that improve *regional* transportation --- strategies that make it possible for non-single occupant travelers to quickly and conveniently travel from any location in the metropolitan area to any other location. In modern sprawling urban areas like Austin (or Dallas, Chicago, New York, Seattle, etc.) the evidence indicates that bus and car pool based rapid transit systems are by far the most effective and efficient strategy for using the federal money that is earmarked to

Telecommuting

As the information technology revolution continues, expanded use of the Internet, personal computers, mobile telephones and other communications technologies is already moderating travel demand.

- Some companies are "hoteling," a strategy by which employees who spend considerable time outside the office are assigned temporary instead of permanent offices.

- Telecommuting is increasing, and it is likely to increase even more in the future. From 1995 to 1997 telecommuting increased nearly 30 percent.[61] In

[61] "U.S. Telecommuting Trend Surpasses 11 Million: Strong Economy, Internet Spur Growth," Emerging Technologies Research Group, Internet: http://etrg.findsvp.com/prls/pr97/telecomm.html.

1990 it was projected that telecommuting will remove between 50 billion and 150 billion passenger miles nationally from roadways by the year 2000.[62] By 1997 there were indications that the lower projection for 2000 had already been achieved.[63] It would thus appear that telecommuting has already removed considerably more passenger miles than are carried by all public transit bus, light rail, heavy rail and commuter rail services combined (approximately 50 million).

- Telecommuting is likely to be expanded by the establishment of "telework" centers that allow employees to commuter shorter distances and be connected by computer to offices that are farther away.

- Telecommuting is also likely to be expanded to the extent that new urbanist land use policies are successfully implemented. As urbanized areas are constricted in their physical growth, traffic congestion will increase substantially, creating incentives to avoid the work trip altogether and convert to telecommuting. Moreover, as people continue to express their preferences for less dense housing patterns, much more rapid development of larger lots is likely to take place outside bureaucratically delineated urban growth boundaries, which will also increase telecommuting.

62 "Telecommuting Forecasts Released," Telecommuting Research Institute (Los Angeles), 1990. By 1997, the year 2000 forecast of total telecommuters had been exceeded.

63 The Emerging Technologies Research Group Internet report noted above indicated that the number of telecommuters in 1997 exceeded the projection for 2000 made in 1990.

CREDENTIALS

Thomas A. Rubin, CPA, CMA, CMC, CIA, CGFM, CFM is an independent consultant. He served as Controller-Treasurer (Chief Financial Officer) of the Southern California Rapid Transit District in Los Angeles, which was at the time the nation's third largest public transit agency, with an annual budget of more than $1 billion. During his tenure, the light rail Blue Line was opened and much of the $5 billion subway (recently opened) was constructed. Mr. Rubin was the founder of the public transportation practice of Deloitte Haskins & Sells (now Deloitte & Touche, LLP), which he led for more than 12 years. He has been involved in auditing more than 60 public transit agencies and has provided consulting assistance to more than 100. In recent years, Mr. Rubin has been the principal transit expert for the NAACP Legal Defense and Educational Fund, Inc. and the Bus Riders Union of Los Angeles, in their successful legal effort to stop the diversion of financial resources from the largely low income ridership bus service to the expensive rail system.

Wendell Cox is principal of Wendell Cox Consultancy, an international public policy firm. He has provided consulting assistance to the United States Department of Transportation and was certified by the Urban Mass Transportation Administration as an "expert" for the duration of its Public-Private Transportation Network program (1986-1993). He has consulted for public transit authorities in the United States, Canada, Australia and New Zealand and for public policy organizations. Mr. Cox served three years as the Director of Public Policy at the American Legislative Exchange Council, where he oversaw the development of state model legislation and policy reports. Mayor Tom Bradley appointed him to three terms on the Los Angeles County Transportation Commission, where he authored the tax amendment that provided the initial funding for building light rail and the subway. He was elected chairman of the American Public Transit Association Planning and Policy Committee (comprised of transit planning department officials) and the American Public Transit Association Governing Boards Committee (comprised of transit board members). Mr. Cox also chairs the Financial Analysis Committee of the Amtrak Reform Council.