

Bus Rapid Transit: Issues and Characteristics

NAME AND LOCATION OF AGENCY	Chicago Transit Authority Chicago, IL	Lane Transit District Eugene, OR	Massachusetts Bay Transportation Authority Boston, MA	Puerto Rico Highway and Transportation Authority; San Juan, PR	Santa Clara Valley Transportation Authority San Jose, CA	Virginia Dept. of Rail and Public Transportation
Was light rail considered as an option in any of the corridors where you are planning/have planned BRT?	No	Yes	Yes	No	No	Yes
If you answered "yes" to the question above, what were the main reasons for choosing BRT over light rail?	N/A	An urban rail study was completed due to strong interest by some in rail. Study indicated that our community is not large enough to support rail.	Could provide equal service--less cost, less disruption--quicker schedule to begin revenue service.	N/A	N/A	BRT selected as an interim step towards extension of metrorail. LRT evaluated only as option to Metrorail (heavy rail), not as option to BRT.
What is the general view of the residents in the corridor(s) being or planned to be served by BRT?	Not sure	Mixed feelings: some in favor of light rail, some in favor of BRT	Mixed feelings: some in favor of light rail, some in favor of BRT	Not sure	Majority in favor of light rail	Metrorail extension preferred; BRT supported as interim step.
Are your planned/existing BRT services part of a planned network of BRT routes in your metropolitan area?	N/A	Yes	Yes	No	No	No
If no to the question above, what is your planning situation?	We are testing/plan to test BRT in one corridor before we decide on the wider application of BRT.	N/A	N/A	We are testing BRT as feeders to heavy rail in 3 corridors.	We are planning each corridor separately in terms of the selection of a transportation mode--a different public transportation mode can be selected for each corridor.	BRT is interim step to build infrastructure and develop ridership markets.
What are the main elements included in your planned/existing BRT system?	Feeder buses at main termini; Improved pedestrian access to BRT stations; Traffic signal priority; Real time traveler information; Reduced stop operation.	Exclusive bus lanes within the main activity center(s) it serves; Exclusive bus lanes on the "line-haul" portion of the BRT service; Park-and-ride locations at bus terminal/main stations; Feeder buses at main terminal; Distinct character/color of BRT buses to be easily recognized by passengers; Improved pedestrian access to BRT stations; Traffic signal priority; Real time traveler information; Reduced stop orientation; Off-vehicle fare collection; All-door boarding/alighting; Same-level boarding/alighting; Free transfer between bus lines from and to BRT; Land use proposals to support BRT.	Exclusive bus lanes within the main activity center(s) it serves; Feeder buses at main terminal; Distinct character/color of BRT buses to be easily recognized by passengers; Improved pedestrian access to BRT stations; Traffic signal priority; Real time traveler information; Reduced stop operation; Off-vehicle fare collection; Same-level boarding/alighting; Free transfer between bus lines from and to BRT.	Exclusive bus lanes within the main activity center(s) it serves; Exclusive bus lanes on the "line haul" portion of the BRT service (partial); Park-and-ride locations at bus terminal/main stations; Distinct character/color of BRT buses to be easily recognized by passengers; Integration into existing HOV lanes (HOV lanes under construction); Traffic signal priority; Real time traveler information; Reduced stop operation; Land use proposals to support BRT.	Exclusive bus lanes within the main activity center(s) it serves; Distinct character/color of BRT buses to be easily recognized by passengers; distinct signing (for pedestrians and vehicles) leading to and at BRT stations; Traffic signal priority; Real time traveler information; Off-vehicle fare collection; All-door boarding/alighting; Same-level boarding/alighting; Free transfer between bus lines from and to BRT.	Exclusive bus lanes on the "line-haul" portion of the BRT service (semi-exclusive); Park-and-ride locations at bus terminal/main stations; Feeder buses at main termini; Distinct character/color of BRT buses to be easily recognized by passengers; Distinct signing (for pedestrians and vehicles) leading to and at BRT stations; Integration into existing HOV lanes; Improved pedestrian access to BRT stations; Real time traveler information; Off-vehicle fare collection; All-door boarding/alighting; Same-level boarding/alighting; Land use proposals to support your BRT.

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What are the main characteristics of the buses you are using/will be using for your BRT services?	Length: 40 feet Articulated: no No. of passenger doors that can be used at the same time by boarding passengers: 1 door Passenger doors on both sides: no Seating capacity: 40 seats Standee capacity: 20 standees Type of propulsion: Diesel Low floor: no	(Likely characteristics; decision not yet made) Length: 60 feet Articulated: yes No. of passenger doors that can be used at the same time by boarding passengers: 3 doors Passenger doors on both sides: yes (ideally) Seating capacity: 50 Standee capacity: 60 Type of propulsion: Prefer hybrid electric, but will likely purchase diesel for short term Low floor: yes Other: "Rail-like" appearance	Length: 60 feet Articulated: yes No. of passenger doors that can be used at the same time by boarding passengers: 4 Passenger doors on both sides: No Type of propulsion: CNG Electric/Diesel Low floor: yes	Length: 30 feet Articulated: no No. of passenger doors that can be used at the same time by boarding passengers: 1 Passenger doors on both sides: no Seating capacity: 21 Type of propulsion: diesel Low floor: possibly	Length: 60 feet Articulated: yes No. of passenger doors that can be used at the same time by boarding passengers: 2 doors Passenger doors on both sides: no Type of propulsion: diesel Low floor: yes	Vehicle specifications to be determined during preliminary engineering.
Does the ideal bus for your BRT system exist?	Yes	No	No	Yes	Yes	N/A
If you answered "no" to the question above, what are the missing features?	N/A	Alternative fuel, quiet (hybrid electric or fuel cell)	Dual mode that has two alternative fuels to diesel.	N/A	N/A	N/A
If you answered "yes" to the question above, please provide the name of the manufacturer.	We are beginning to look at C.V.s by Irisbus for some future downtown applications.	N/A	N/A	Multiple--vehicle is not specialized.	New Flyer Low Floor Articulated	N/A
What is the existing/estimated daily passenger boardings for each of your existing/planned BRT routes?	5,700 per weekday (March 2000); adjacent local route is 24,000.	1st four-mile phase: about 6,000 boarding daily	Total of all routes: 4462 peak period	1500-2000	approx. 25,000	Initial planning estimates: 23,000; ridership figures now being revised.
How many minutes in one-way travel time (including waiting time) are/will be saved by BRT passengers compared to previous "regular" bus services serving the same trip origins and destinations?	Route is 25% faster than local route.	approx. 7 minutes	N/A	no previous service	15-20 minutes	N/A
What percentage of your passengers using/estimated to use your BRT routes, previously used a private car for the same trip?	N/A	Not known	38%	100%	approx. 10-15%	N/A
What percentage increase in passengers are estimated to have taken place as a result of your existing/planned BRT routes compared to previous "regular" bus routes serving the same corridor(s)?	17% increase from start in December 1998 to March 2000.	50%	N/A	no previous service	approx. 10%	N/A
What is the combined route length of your planned/existing BRT system?	18 miles	Pilot corridor: 10 miles; Phase 1: 4 miles; Entire system: approx. 50 miles	16 miles	45 miles	27 miles	24 miles

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How many stations/stops are serving or are planned to serve your BRT routes?	29 stations each direction plus two terminals.	N/A	6 stations	2 stations per route (termini) no interim stations.	approx. 100 stations	5 stations/ 3 stops
How many buses are you using/are you planning to use for your BRT system during peak periods? (excluding reserve buses)	13 buses	4 buses (phase 1)	28 buses	55 buses	approx. 35 buses	approx. 150 buses for all-day operations.
What is the total estimated capital cost of your BRT system?	N/A (being built incrementally)	\$17 million	\$640 million	Not available	\$20 million	\$287 million
What is the peak hour headway on your BRT routes?	15 minutes	10 minutes	3 minutes	2-5 minutes	10 minutes	5 minutes
Approximately what percentage of each of the following types of right-of-way does your BRT routes use: Category A (exclusive, no grade cross Category B (includes right-of-way that is longitudinally physically separated from other traffic, but with grade crossings) Category C (surface streets with mixed traffic)	A: 0% B: 0% C: 100%	A: 0% B: 60% C: 40%	A: 40% B: 0% C: 20%	A: 80% B: 0% C: 20%	A: 0% B: 0% C: 100%	A: 100% B: 0% C: 0%
Please name three features that a BRT system should have that are most cost-effective in terms of making the service a success? (e.g. exclusive lanes, reduced stop operation, off-vehicle fare collection, etc.)	Reduced stop operation, adherence to schedule, connectivity to other transit services (local bus routes, rapid rail, commuter rail).	Exclusive lanes; Signal priority; Appropriate vehicle	Limited stops; Herd boarding; Exclusive lanes	Exclusive lanes; Routing through high-demand corridors; Very limited number of stops.	Signal priority; Special identity; Special vehicles	Reserved guideway and signal priority in mixed traffic; Off-vehicle fare collection; Separate identity (brand) and improved service levels.
What would you consider to be the most attractive features of your planned/existing BRT system?	Service improvements including on-time performance, passenger wait time and travel time. Planned improvements to bus stops, street signaling.	Travel time savings (estimated at 40% over 20 years); New vehicles (clean, quiet); New "Rail-like" image	New vehicles; New stations; Rider information	Frequent peak hour service; Non-stop connection to rapid transit.	New low floor, high quality buses; Signal priority, queue jump lanes; Real time transit information.	Use of existing infrastructure (Dulles Airport Access Road) for guideway; Convertible median stations; built as part of BRT, switch to rail use; Integration with existing regional transit system.
What would you consider to be the least attractive features of your planned/existing BRT system?	Route travels through difficult areas--relationship to adjacent land uses needs to be studied; Non-distinctive buses and signage; Lane configurations interfering with operations, including on-street parking issues.	Some travel in mixed traffic	Not all routes exclusive.	Potential for delays when mixing with traffic around transit stations.	Distinguishing identity (not well defined).	Cannot fully serve Tysons Corner, a major destination, because of lack of exclusive guideway and operational issues associated with congestion on local roadway network.

N/A = Not Available, Not Applicable

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What advice would you give to an agency embarking on the planning of a BRT system?	Marketing is very important. A marketing effort was made at program beginning but has not been carried forward. Similarly, distinctive buses and signage have not been used. Ridership increases have leveled off significantly after end of marketing effort.	Lots of public/community involvement; Work closely with local agencies (city & county); Aim for high level of transit priority and determine what you would be willing to compromise (bottom line).	Gain community support; Work closely with city traffic officials; Design of bus (vehicle)	Work closely with highway authority to provide transit with priority and right-of-way where possible, to provide fast, reliable BRT operations.	Secure early involvement and support from local agencies who control traffic operations.	N/A
What would you consider to be the most successful BRT system so far in the U.S?	LA's "Rapid"	Pittsburgh	Miami-Dade	N/A	LA-Wilshire	N/A
What are the main reasons for your answer to the question above?	Operating on local streets with signal priority, planned visual/functional coordination of buses and station design, BRT specific operational control center.	High level of transit priority & system has been expanding.	Great opportunity to expand and grow ridership.	N/A	Increased speed, new identity, increase in ridership.	N/A

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Test Finds Ramp Meters Beneficial

- showed savings due to ramp metering ranging from about six percent to 13 percent. However, as mentioned in Section 7.0 of this report, the fuel consumption analysis used in this evaluation used a simple straight-line estimation technique which does not address the tempering of flow typically due to ramp metering, by smoothing the travel speed variability (less acceleration and deceleration).
- There is limited information on benefit/cost ratios of ramp metering evaluations. This current study's benefit/cost ratio of 5:1 for the entire congestion management system and 15:1 for the ramp metering costs only are within the ranges seen for other areas. For five areas (Abilene, Atlanta, Phoenix, Seattle, and previous Minneapolis/St. Paul evaluation efforts), the range of benefit/cost ratios is from 4:1 to 62:1, with an average of 20:1.

Surveys helped researchers understand public attitudes and experiences using the ramp meters. Respondents indicated that their wait time at ramps with meters ranged between four and nine minutes, but usually lasted less than six minutes. These figures approximately agreed with the observed data collected in the study. Respondents to the survey on ramps without meters tended to report that traffic conditions had worsened without metering.

While they expressed a renewed approval of the meters, they also tended to say that there were too many meters previously and that the meters were too restrictive during free-flow traffic conditions. Support for modifying the metering system, as opposed to returning it to its prior condition or turning them off permanently, increased slightly from the "with meters" group of respondents to the "without meters" group.

The study made the following recommendations. The city should consider modifying the metering system to address public concerns, and "seek to balance the efficiency of moving as much traffic during the rush hours as possible, consistent with safety concerns and public consensus regarding queue length at meters." In the meantime, Mn/DOT should "develop a policy for optimizing ramp meter operation that is based on the lessons learned from the evaluation," and work toward the "establishment of a systematic process for developing long-range recommendations for ramp meter operation and modifications." Finally, the researchers suggest that "Mn/DOT respond to the public's need for information on traffic management strategies."

The report resulting from this study is available at <http://www.dot.state.mn.us/rampmeterstudy/reports.html>

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Product and Industry News

transportation is widely used. With its large scale implementation in the high-tech Singapore market, Orbital TMS intends to use the SBS program as a model to pursue other opportunities to help manage public transit systems across the globe.

For more information, visit www.orbital.com.

Siemens and Econolite Renew Agreement for Marketing Traffic Management System Software

Concord, Calif., Jan. 18, 2001—Siemens Gardner Transportation Systems (Siemens GTS) and Econolite Control Products, Inc. today announced the signing of a new, 10-year agreement which re-affirms the exclusive rights for Econolite to market and distribute Siemens GTS central traffic management systems software in North America.

For more information, contact Siemens Energy & Automation, Inc., Information Services, Mail Stop 404, 4900 Old Ironside Drive, Santa Clara, CA 95052 or call 1-800-964-4114, email: seainfo@icn.siemens.com or visit www.sea.siemens.com