IMPACT OF IMMEDIATE-ACTION TRANSIT IMPROVEMENTS

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•VOTERS of Fulton and DeKalb Counties, Georgia, which include the City of Atlanta, approved the proposal of the Metropolitan Atlanta Rapid Transit Authority (MARTA) to implement a two-part public transportation improvement program. The regional plan is described as the Long-Range Transit Program, of which the Short-Range Transit Improvement Program is a part.

The major part of the long-range program, major in expense and effort, is the construction of a $1.32 billion rapid transit system consisting of 64 miles of trunk lines—50 rail and 14 busway—and more than 1,500 miles of surface bus routes. However, although smaller in cost and in spite of difficulty of implementation and duration, the second part of the MARTA program is actually first in sequence of implementation.

MARTA's $45 million Short-Range Transit Improvement Program was designed to provide for Atlanta's immediate public transportation needs, needs that could be met, at least in major part, by improvements to the existing public transportation system. By taking immediate action to improve the existing system, MARTA is able to meet some of the people's transportation needs now, rather than making them wait 7 to 10 years to realize some benefit from tax payments that go to provide the new system.

The immediate-action transit improvements implemented to date have had significant impacts. Before we discuss these impacts it is proper to describe the entire short-range program, which has the following seven parts:

1. Purchase the privately owned Atlanta Transit System, Inc.;
2. Lower fares to 15 cents with free transfers, hold the 15-cent level for 7 years, and then increase the fare by 5 cents per year to 30 cents the tenth year (after 10 years, the fare will be set to equal one-half of operating costs);
3. Increase the operating fleet by purchasing 490 new, air-conditioned 47-passenger buses, 125 of which will replace old vehicles in the original fleet;
4. Expand services by establishing new crosstown and radial routes, improving frequencies and service periods on existing routes, establishing special neighborhood-oriented service in transit-dependent neighborhoods, and providing express park-and-ride service from suburban locations;
5. Provide radio communication equipment for all operating and service vehicles;
6. Provide passenger shelters at high-volume transit stops; and
7. Improve informational customer services.

The entire program is funded by a combination of two-thirds federal and one-third local funds, the local funds being provided by a 1 percent sales tax in Fulton and DeKalb Counties. However, all operating costs incurred by the transit improvements would be financed entirely by local funds.

These are the major elements of the MARTA immediate-action program. There are a number of other improvements, minor in the context of the public aspects of the program, including two new bus maintenance facilities.

Transportation has always been a significant factor in the Atlanta region. In fact, Atlanta was created by the intersection of three railroad lines at a point that was, in 1837, totally undeveloped. Public transportation in Atlanta is more than 100 years old, and it is significant that the action by the voters of Fulton and DeKalb Counties to fund and approve the MARTA program occurred on the 100th anniversary of the first transit line established in Atlanta in November 1871. Public transportation in Atlanta was originally a private operation, beginning with two of Atlanta's leading citizens who orga-

nized the Atlanta Street Railway Company and established a line 2 miles long that ran from downtown, past the home of the president of the company, to the home of the other founder. Other transit lines were established by competing companies. In 1889, the first electric streetcar line in Atlanta was established to provide service from Five Points, the center of town, to Atlanta's first subdivision, Inman Park. The streetcar line developer built a new street in which a streetcar line could be constructed.

The several private street railway companies merged in 1902 to become the Georgia Railway and Electric Company. This company became the Georgia Power Company, which, in 1948, sold its transportation activities to create the Atlanta Transit System, Inc. It was this company that MARTA purchased on February 17, 1972, to become, for the first time in MARTA's 6-year history, an operating agency.

MARTA began operations as an authority on January 3, 1966, but its roots go back to statements and studies of the area planning commission as early as 1952. It was at that time that the Metroplitan Planning Commission noted the importance of mass transit to the area. This recognition progressed in various stages through the years, and in 1954 the first statement of the need for a rapid transit system was documented. This was followed by a series of studies of expressways, commuter patterns, and the further need for transit, which led in 1961 to a detailed plan for a mass transit system. A more detailed plan was produced in 1962 under the auspices of a Transit Study Commission. A series of legislative acts in the Georgia General Assembly culminated in a constitutional amendment allowing creation of a transit agency in the Atlanta area in 1964. The legislative act creating MARTA was passed in 1965 and was followed by a series of referenda on participation by eligible counties and the City of Atlanta. The counties of Fulton, DeKalb, Clayton, and Gwinnett and the City of Atlanta approved participation.

MARTA began operations in 1966. The Board of Directors of 10 Atlanta area business people, none of whom may hold public office, began to assemble a staff and employed a consultant. Further reevaluations of the transit plan were made in 1967 with a detailed report published in November 1967, which led to a funding referendum in November 1968. This referendum was unsuccessful. A major reason for its failure was reliance on property tax for the local source of funds for construction; a second reason for its failure was lack of assurance of federal funding assistance. MARTA was instructed by local officials to restudy the plan and to derive a new program for reconsideration.

Another plan, in 1971, used a different source of revenue, the sales tax. By this time, the Urban Mass Transportation Act of 1970 had been funded, making $3.1 billion immediately available under contract authority and a total of $10 billion available over 12 years. This encouraged Atlanta citizens to commit their funds with some assurance of matching federal funds.

The referendum was successful by a narrow vote, but many people who voted against the issue stated they did not vote against rapid transit itself but against additional taxes.

With the passage of the referendum and the assured finances of the total program, MARTA was able to move immediately to enact its Short-Range Transit Improvement Program and to begin implementation of its long-range program. Just prior to the referendum, Secretary of Transportation John A. Volpe announced approval of a $30 million capital grant to implement the short-range program. Sales tax provided the $15 million matching funds. MARTA quickly moved to implement the various elements of the program and began negotiations immediately with the owners of the Atlanta Transit System, Inc. On February 17, 1972, MARTA purchased the Atlanta Transit System and began its operations, and on March 1, 1972, the fare was reduced from 40 to 15 cents.

As stated, the major difference between the successful Atlanta proposal in 1971 and the earlier defeat in Atlanta, and defeats elsewhere, was in the method of financing. Other proposals were tied to some combination of property taxes and fare-box revenues for construction and operation. The financial plan approved for Atlanta is tied to neither property taxes nor fare structure. The Atlanta plan is based on receipts from a local option 1 percent sales and use tax and a low fare policy subsidized by sales tax revenues. Another unique financial feature of the approved program is its short term. Forecasts of transit patronage and sales tax revenues suggest that the entire cost of construction

can be retired in 14 or 15 years. This compares to a term of 30 to 40 years usual for a project of this size.

The sales tax-low fare financial plan for Atlanta was developed by assuming that urban transportation is, in economic terms, a mixed-benefit public good. This assumption is based on the characteristics of an urban transportation system. Private benefits accrue to the user of the system through the achievement of mobility resulting in monetary income through work trips and other benefits such as shopping, medical, and educational trips. Whereas the degree of usage of a given system can be determined with reasonable reliability and user charges are in most cases based on that usage, the usage itself is in response to the supply, and determination of how much transit service people really want and are willing to pay for is a problem. Public benefits also accrue to the community as a whole through the very existence of a viable transportation facility; the relationship between transportation and economic development is well documented.

Of specific concern in the Atlanta financial plan is the equity aspect of the proposal. The sales tax is generally accepted to be a regressive tax; that is, the proportion of income paid out in taxes decreases with larger incomes. However, as will be shown, the financial program for MARTA overcomes these regressive aspects.

When the financial plan for the successful MARTA program was developed, property taxes were excluded from consideration as a source of revenue. The cost of the public transportation system for the four-county system was estimated to be $1.42 billion. At the indicated level of federal participation of 67 percent, the local share would be $473 million. Several revenue sources were considered. Analysis of these sources (sales tax, payroll tax, admission and amusement tax, hotel and motel tax, income tax, automobile license fees, gasoline tax, and cigarette tax) showed estimated revenues as given in Table 1. Only three sources—sales, payroll, and income taxes—indicated potential revenues of sufficient magnitude to accomplish the project.

In the early stages of development of the financial plan, it was assumed that public funds would be used to pay the capital cost and that user charges, or fares, would pay for operation of the system when constructed. This approach would appear to meet the standards of equity for two of the three possible sources of capital funds. With fare incomes meeting operating costs, the system users would pay in proportion to their benefit (use). An income or payroll tax would be equitable if it were a flat rate and would be a preferred inequity if it were a surcharge on a graduated state or federal tax base. However, sales tax is considered to be regressive and, therefore, as a source of capital funds would be undesirably inequitable.

Further, political consideration resulted in removal of the payroll tax as an alternative fund source. It was judged that the constitutional framework and political atmosphere were such that a tax such as this could not be levied. Financial plan development stood at an impasse with each of the two remaining fund sources having proponents and opponents. It was not until a new factor was introduced that the impasse was resolved. Financial discussions, as stated previously, treated capital and operating costs as separate and distinct categories. Without recourse to the economic considerations as such, financial planners had considered the provisions of the physical system itself as a public good, such as city streets, fire and police protection, and similar services. The provision of the operating system was considered only in terms of pure benefit financing with the user paying all operating costs. Sam Massell, mayor of Atlanta, introduced the mixed-benefit concept indirectly by suggesting the sales tax for both capital and operating funds with the alleged regressiveness of the sales tax counteracted by free or low fare. Consideration of this concept led to a proposal of a sales tax of 0.75 percent and a 15-cent fare.

The proposal was introduced to the 1971 session of the Georgia General Assembly. Following much discussion in legislative chambers, public forums, and news media, a sales tax proposal for transit financing passed both houses of the General Assembly and became a part of the MARTA enabling legislation. The proposal was amended to provide for a 1 percent tax instead of 0.75 percent but for a 10-year period only, after which the rate would be reduced to 0.5 percent. Also, after that period, application of tax revenues to operating expenses is limited to 50 percent. The additional ¼ per-

cent is in lieu of any further cash contributions by the state as authorized under a state constitutional amendment approved by voters in 1966, which permits the state to participate financially in rapid transit up to 10 percent of the total cost.

Table 2 gives estimates of transportation cost burdens for work trips for various tax and fare combinations. These include a 1 percent sales tax, the previous 45-cent transit fare including transfer cost, the 15-cent fare, the sum of the 15-cent fare and sales tax, use of the automobile, income tax, and other combinations. As shown in Figure 1, the automobile is the most regressive in terms of transportation cost. The least regressive is a 2 percent income tax with a 15-cent fare. However, this is very close to the 1 percent sales tax and the 15-cent fare adopted. (The 2 percent income tax was not considered as a source of revenue.) These figures relate to the total cost of transportation to and from work. In short, the sales tax and low-fare method of financing public transportation can be judged as an equitable financing method when overall public transportation service, as well as direct cost, is considered.

On a strict analysis of the sales tax, the financing method is regressive and creates an undesirable equity, but when the low fare is considered with the sales tax, in terms of transportation cost, the regressiveness, and therefore the inequity, is significantly reduced if not cancelled entirely. Economic benefits accruing to the region as a whole from implementation of the public transportation system also are significant. Even if it is urged that such economic benefits accrue primarily to high-income groups, the system provides special compensatory opportunities to low-income groups through special route services. It may therefore be concluded that, on strictly construed economic theory, the MARTA financing plan does not provide equity; however, the plan does approach equity more nearly than a continuation of previous procedures. From a subjective viewpoint that considers opportunities created and nonquantifiable and social effects, the adopted financial plan and transportation system are satisfactory from an equity standpoint.

The practical test of the MARTA program has been seen in the response of the citizens to the first steps of implementation. At the time of MARTA acquisition, the Atlanta Transit System was operating a fleet of 504 buses over 80 routes that made up 1,088 route-miles. Service amounted to approximately 19 million vehicle-miles, and 57.5 million passengers were being carried annually, including 13 million transfer passengers. Average weekday revenue passengers amounted to 150,000, excluding transfers, with two-thirds of these carried during the peak hours. Saturday and Sunday ridership amounted to approximately 43 percent and 15 percent of weekday ridership respectively.

The population of the Atlanta Standard Metropolitan Statistical Area at the time of acquisition was approximately 1,450,000 persons of whom 780,000 lived in the area served by the transit system.

The reduced fare was placed in effect on March 1, 1972. At that time, the basic cash fare was reduced from 40 cents, or 3 tokens for $1.00, to 15 cents. All zone charges were eliminated, as was the 5-cent transfer charge. Fares in Clayton County, which did not approve the referendum, remained at their previous level, as did special service fares such as those for the Falcon Flyer, the Stadium Shuttle, and Six Flags services. School fares remained at 10 cents. At that time, those paying special fares amounted to 17 percent of the total MARTA ridership, leaving 83 percent of MARTA's passengers who were actually affected by the fare reduction.

During the first 3 months following the initiation of the reduced fare, weekly statistics were compiled from system-wide revenue records to quantify ridership increases. These increases and system-wide ridership for all revenue passengers ranged from 11 to 22 percent per week. It is important to note that these represent the increase in actual passengers at the reduced fare over the number of passengers who were anticipated under the previous fare structure, from estimates prepared by the Atlanta Transit System prior to its acquisition by MARTA. Comparable increases for passengers who actually experienced reduced fares range from 16 to 27 percent, averaging 23 percent over the 13-week period. Transfers also increased significantly because of the elimination of the transfer charge. These statistics have also been maintained on a monthly basis, and compilation is continuing. Monthly ridership statistics for the first

Table 1. Potential tax revenue estimates (in thousands of dollars) for 1970.

County	Sales at 0.5 Percent[a]	Payroll at 0.5 Percent[b]	Admissions and Amusements, 2 Percent Increase	Hotel and Motel, 2 Percent Increase	Income			Automobiles at $5	Gasoline at 1 cent/gal	Cigarettes at 2 cents/pack
					Personal at 1 Percent	Corporate at 1 Percent	Total			
Dekalb	4,467	3,397	140	60	6,292	750	7,042	1,115	1,776	972
Fulton	15,467	15,214	1,100	1,300	11,143	3,550	14,693	1,415	3,270	1,526
Clayton	783	679	26	20	1,238	117	1,355	250	402	208
Gwinnett	617	296	14	10	769	83	852	185	355	164
Total	21,334	19,577	1,280	1,390	19,442	4,500	23,942	2,965	5,803	2,870

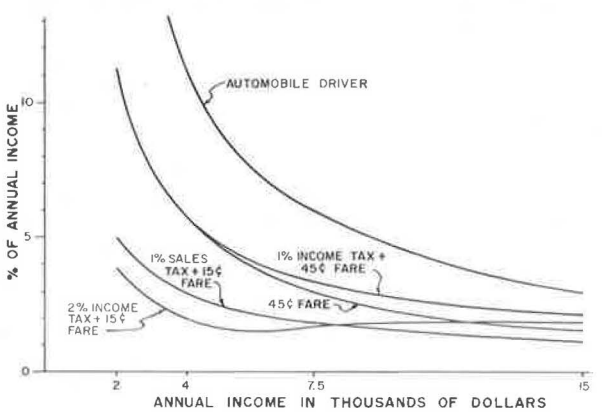
[a]Of the sales tax for Dekalb and Fulton Counties, Atlanta accounts for $13,700.
[b]Of the payroll tax for Dekalb and Fulton Counties, Atlanta accounts for $13,815.

Table 2. Estimates of transportation cost burden.

Cost	Gross Annual Income			
	2,000	4,000	7,500	15,000
1 percent sales tax[a]	25.00	39.00	63.00	90.00
Percentage of gross income	1.24	0.98	0.84	0.60
45-cent fare[b]	225.00	225.00	225.00	225.00
Percentage of gross income	11.25	5.63	3.00	1.50
15-cent fare[c]	75.00	75.00	75.00	75.00
Sum of 15-cent fare and 1 percent sales tax	100.00	114.00	138.00	165.00
Percentage of gross income	5.00	2.85	1.84	1.10
Cost of automobile[d]	444.00	444.00	444.00	444.00
Percentage of gross income	22.00	11.10	5.92	2.96
1 percent local income tax[e]	0	0	25.50	98.00
Sum of 1 percent income tax and 45-cent fare	225.00	225.00	250.50	323.00
Percentage of gross income	11.25	5.63	3.34	2.15
2 percent local income tax[f]	0	0	51.00	196.00
Sum of 2 percent income tax and 15-cent fare	75.00	75.00	126.00	271.00
Percentage of gross income	3.75	1.88	1.68	1.80

[a]Galambos (4, p. 11).
[b]45 cents each way x 5 days per week x 50 weeks per year = $0.90 x 5 x 50 = $225.
[c]15 cents each way x 5 days per week x 50 weeks per year = $0.30 x 5 x 50 = $75.
[d]8 cents per mile x 11 miles per day x 5 days per week x 50 weeks per year.
[e]Galambos (4, p. 9).
[f]Revenue from 1 percent income tax times two.

Figure 1. Costs of work trips for automobile and transit users as a percentage of annual income.



8 months after the fare was reduced are given in Table 3 and in Figure 2.

Table 3 shows a fairly steady and gradual increase in ridership through the summer of 1972. In the fall of 1972, however, these increases rose considerably, mostly because of the implementation of service improvements.

Table 4 gives the improvements in service that have been inaugurated by MARTA since its acquisition of the system. To date, eight types of improvements have been made, resulting in 22,026,000 additional annual vehicle-miles of service and 35 additional vehicles scheduled. To date, 129 such improvements have been made.

Examination of ridership by time period during the first 3 months of reduced fares shows an increase of approximately $12\frac{1}{2}$ percent in the rush hours and as much as 30 percent during the midday period. On Saturday, preliminary figures indicate an increase of 29 percent, whereas Sunday ridership is up an average of 37 percent. It should be emphasized that these figures are preliminary. Also it should be noted that the weekday time period figures are taken from a selected sample of maximum load point ridership checks, whereas the Saturday and Sunday figures are based on revenues collected. Bus operators have indicated that there has been a significant increase in the number of short trips. These may or may not have been picked up at the maximum load points; therefore, these figures could, in fact, be low.

Critical overloading occurred on many routes immediately after the fare reduction. For example, on one of the normally heavy routes, during the first week under reduced fare, seven consecutive vehicles during one morning peak period were observed carrying in excess of 90 passengers. These overloads became critical so rapidly that MARTA acquired 55 used buses from other systems. These vehicles were reconditioned and put into service in the period between April and October of 1972.

As a result of the overloads, comments on short trips, and general observations and requests for information concerning ridership patterns and rider characteristics, a fare reduction study designed to provide answers to these questions was formulated.

From information available from normal operating sources, MARTA was aware of the increases in ridership. However, from these sources, it is not possible to develop qualitative conclusions about changes in ridership patterns and changes in the transit market. For example, the data available could not show how much of the increase in ridership was due to the decrease in fares, to improvements in service, to new transit riders, and to increased ridership by previous transit riders who, because of the low fare, now have increased mobility. The distribution of trips by trip purpose is also not obtainable from these data.

It was felt that there existed an imperative need to determine the answers to these questions for MARTA's own internal use in its continuing planning and program development, as well as to provide information to other transit agencies on MARTA's experience. With the cooperation of the Urban Mass Transportation Administration and in conjunction with the Atlanta Regional Transportation Planning Program (a joint effort of MARTA, the Georgia Department of Transportation, and the Atlanta Regional Commission), MARTA has undertaken a comprehensive study of the effect of the fare reduction and service improvements on transit ridership patterns. This study consists of two basic phases.

One is an on-board survey of transit riders to determine actual ridership patterns. This is a small-sample personal interview survey with detailed questionnaires requesting in-depth information about the transit rider, as opposed to the more traditional hand out-mail back survey in which only limited information is obtained. The Georgia Department of Transportation at this same time was conducting an in-home survey as a part of the continuing transportation planning program. An additional series of questions was included in that survey to provide information about attitudes toward transit and transit usage by nontransit users. The on-board survey was conducted in November 1972. The in-home survey was conducted from October through December 1972. The tabulation and analysis of the data derived from these surveys are now being processed.

The research study has five specific objectives:

1. To separate and quantify the response of riders to the reduction in fare and improvements made to transit services,

Table 3. Record of transit ridership for March through October of 1972.

Month	Total Passengers		Group Affected	
	Number	Increase (percent)	Number	Increase (percent)
March	5,656,100	13.3	3,586,200	19.9
April	5,278,700	19.2	3,456,500	23.0
May	5,812,100	15.5	3,689,500	22.0
June	5,176,600	21.9	3,648,000	22.4
July	5,033,800	23.0	3,625,100	29.2
August	5,464,300	24.6	3,935,200	29.6
September	5,653,800	20.7	3,592,300	29.4
October	5,986,600	25.2	3,731,600	33.4

Figure 2. Trend in monthly passengers and transfers.

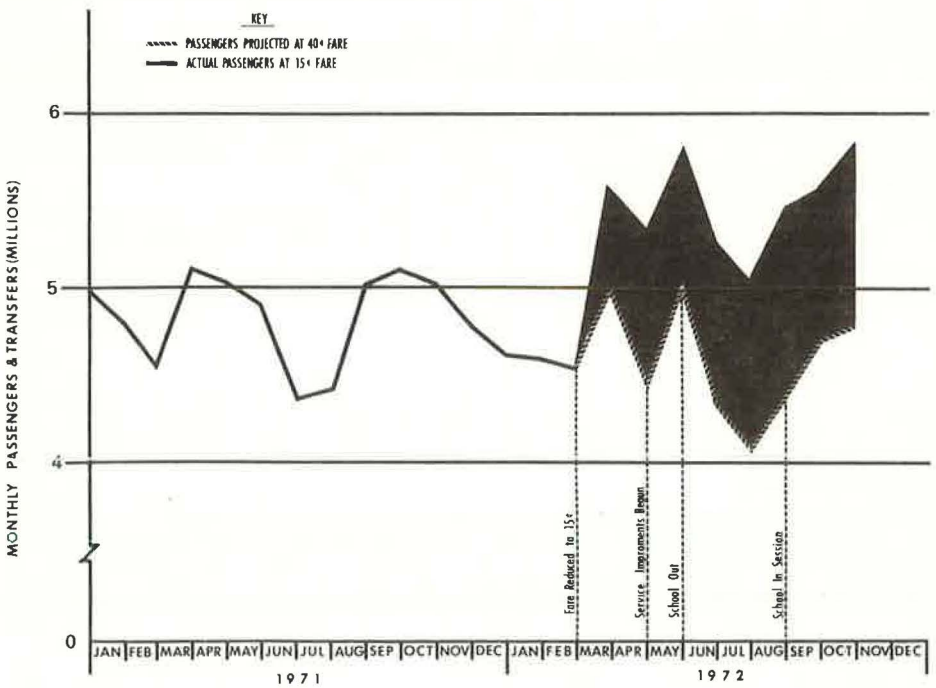


Table 4. Transit service improvements for April through October of 1972.

Date	Improved Headways and Expanded Service Periods	New Lines and Services	Extensions	Line Revisions	Total Improvements	Additional Vehicles Required	Annual Vehicle-Miles[a]
4-10	16	-	-	-	16	15	274,000
5-01	10	2	3	2	17	6	294,400
6-03	16	1	4	5	26	-	1,091,800
7-24	2	-	-	-	2	-	18,700
8-26	14	2	4	3	23	7	712,400
10-02	4	-	-	1	5	6	115,500
10-14	19	-	-	1	20	1	410,900

[a]The Atlanta Transit System operated 19,108,000 annual vehicle-miles of service before MARTA acquired the system.

2. To obtain descriptive data about transit ridership under the new public operation,
3. To determine the attitudes and perceptions of nontransit users to determine their reasons for nonuse,
4. To establish the relative merit as expressed by both users and nonusers of types of service improvements for MARTA use in deriving implementation schedules, and
5. To provide new data on cost and service elasticity for input to the behavior models on modal choice to be used in the continuing transportation planning program.

The results of the research study are scheduled for release in late spring of 1973.

In conclusion, the immediate-action transit improvements made in the Atlanta region have had a significant impact on the region and specifically on the public transportation system. MARTA was able to effect transit improvements because it presented to the citizens of the region a well-planned transit program, consisting of both short- and long-range components. MARTA was able to establish a funding source that is equitable in application. The 1 percent sales tax now producing about $4 million a month for MARTA is a dedicated revenue source; the sales tax collections must be and can only be used for public transportation purposes. With this commitment of revenue, MARTA is able to make definitive plans to carry out the program. It must be assumed that the corresponding federal funds are also committed to the same degree and that, with the local and federal partnership, the Atlanta region will continue to make transit improvements not only to carry out the committed short- and long-range programs but also over an even longer period of time to provide continuing favorable impact on the region.

Every proposal for improved public transit in recent years has been received by critics with the statement that people are wedded to automobiles and that they will never leave them for public transportation. Atlanta has proved these critics to be wrong. The transit system in Atlanta is carrying nearly 1 million more people each month than would have ridden without the MARTA immediate-action program. MARTA contended before the 1971 referendum that people would switch to public transportation if it was convenient, economical, safe, and fast. The impact in Atlanta has shown that this is true, and, when the new system begins its first operations in 1977, the impact of the longer range improvements on the region and on transit ridership will be even more significant.

REFERENCES

1. Bates, J. W. Equity Aspects of Sales Tax/Low Fare Financing for Public Transportation. School of Land Economics and Urban Affairs, Georgia State Univ., unpublished class paper, May 1972.
2. Coogan, M. A., Landon, J. H., Roe, J. T., III, Rubin, A. M., and Schaffer, E. S. Transportation Politics in Atlanta. Harvard Univ. Law School, Cambridge, 1970.
3. Development Research Associates. Benefits to the Atlanta Metropolitan Area From the Proposed Regional Transportation Program. Metropolitan Atlanta Rapid Transit Authority, December 1971.
4. Galambos, E. C. An Evaluation of Major Revenue Sources to Finance Rapid Transit in Atlanta. Metropolitan Atlanta Rapid Transit Authority, November 1970.
5. Garrett, F. M. History of Atlanta's Urban Development. Seminar on Transportation and Urban Development in Atlanta, October 9, 1971, Georgia Section, American Society of Civil Engineers.
6. Gilcrease, E. E., Jr. Atlanta's Reduced Fare Transit Experience. Metropolitan Atlanta Rapid Transit Authority.
7. Parsons, Brinckerhoff-Tudor-Bechtel. Metropolitan Atlanta Rapid Transit Plan. Metropolitan Atlanta Rapid Transit Authority, September 1971.
8. Rapid Transit for Metropolitan Atlanta. Metropolitan Atlanta Rapid Transit Authority, September 1971.