

**SHORT RANGE TRANSIT PLAN
FY 88 THROUGH FY 90 FARE REPORT**

**Southern California Rapid Transit District
January 1988**

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SRTP DOCUMENTS

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FOREWORD

This S RTP FY 88 through FY 90 Fare Report is one of seven documents which comprise the District's FY 88 through FY 90 Short Range Transit Plan. Preparation of this document was requested by the Los Angeles County Transportation Commission in the summer of 1986. At that time it was anticipated that the District would find it necessary to raise fares for FY 88. It was intended that this document would describe the fare-setting process including discussion of fare policy alternatives considered, development of proposed fare structures, and provide projected patronage and passenger revenue impacts for the adopted FY 88 fare structure.

As events transpired, the District's Board of Directors was able to adopt a balanced FY 88 budget without the need to increase fares. This action potentially limited the scope of this document to discussion of the fare policy alternatives which were considered in the course of the Board's fare-setting deliberations. It was decided to incorporate additional information, previously unpublished, documenting the District's experience with its last major fare increase which occurred in July 1985. The fare structure established at that time is the existing tariff which has been extended for a third year by the Board's budget action of June 1987.

The information presented in this document provides a detailed historical documentation of the interaction of fares and patronage through FY 86 (the last full fiscal year for which disaggregate patronage analyses have been prepared). Future fare actions should benefit from this knowledge of previous ridership behavior. Additional information is provided in a previous report entitled FY 1985-86 Fare Policy Study issued in December 1985.

FY 88-90 SRTP FARE REPORT

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1.0 INTRODUCTION

This report has been prepared to 1) document the impacts on District ridership and farebox revenue of a significant fare increase implemented on July 1, 1985, 2) document fare policy alternatives which were considered for implementation in FY 88, and 3) provide projected ridership and revenue assumptions for the FY 88 through FY 90 Short Range Transit Plan. The findings of this study with respect to the 1985 fare increase are of particular importance because of the magnitude of that increase, averaging 70 percent systemwide. Fare increases of that magnitude are unprecedented for transit properties as large as the District (approximately 2,100 buses on the street during weekday peak hours). Refinements to the District's patronage and revenue forecast procedures, reflecting the impacts of the 1985 fare increase, have been incorporated into the procedures used to estimate the ridership and revenue impacts of proposed fare increases. Projections based on the refined procedure were a significant input into the development of the FY 88-90 Short Range Transit Plan.

1.1 HISTORICAL BACKGROUND

The Southern California Rapid Transit District was created in 1964 by an act of the state legislature to be the principal provider of public transit services within Los Angeles County. During the first seven years of District operation, annual operating revenues fully supported annual operating expenses (through 1970). Beginning in 1971, public subsidies were needed to finance annual operating deficits. In the following year, state subsidies were introduced with passage of the Transportation Development Act (TDA). At the end of 1974, federal transit operating subsidies were made available. The increasing availability of public funds to support operating deficits during the first half of the decade of the '70s allowed the District to maintain stable fares. The \$.30 cash base fare of 1969 was in effect through June 1974.

In July 1974, the District implemented a major change in its fare collection procedures. The fixed fare per ride which had been in effect to this point in time was replaced with a zone-based fare collection process. Under this system, the county was divided up into a large number of geographical zones. A \$.25 fare was assessed for each zone through which a rider traveled. The intention behind this change was to make the cost of a ride more equitable for all riders since the similar geographic size of all zones created, in effect, a fare which was directly related to distance traveled. Unfortunately, this experiment was unsuccessful. The complexity of the zone system fare collection process increased running times (and operating costs) thereby discouraging any increase in ridership, and the short distance nature of most trips resulted in a decline in farebox revenues.

The District reinstated fixed fares per ride in July 1975. The \$.25 initial zone charge from the previous fiscal year was retained as the fixed fare for FY 76 (beginning in July 1, 1975). This resulted in a fare decrease compared with the \$.30 cash fare per trip which had been in effect during the year prior to the experiment with zone-based fares. Riders reacted favorably as patronage increased by 42%. The growth in patronage was so large that farebox revenues also increased 57.6% despite the lower fare.

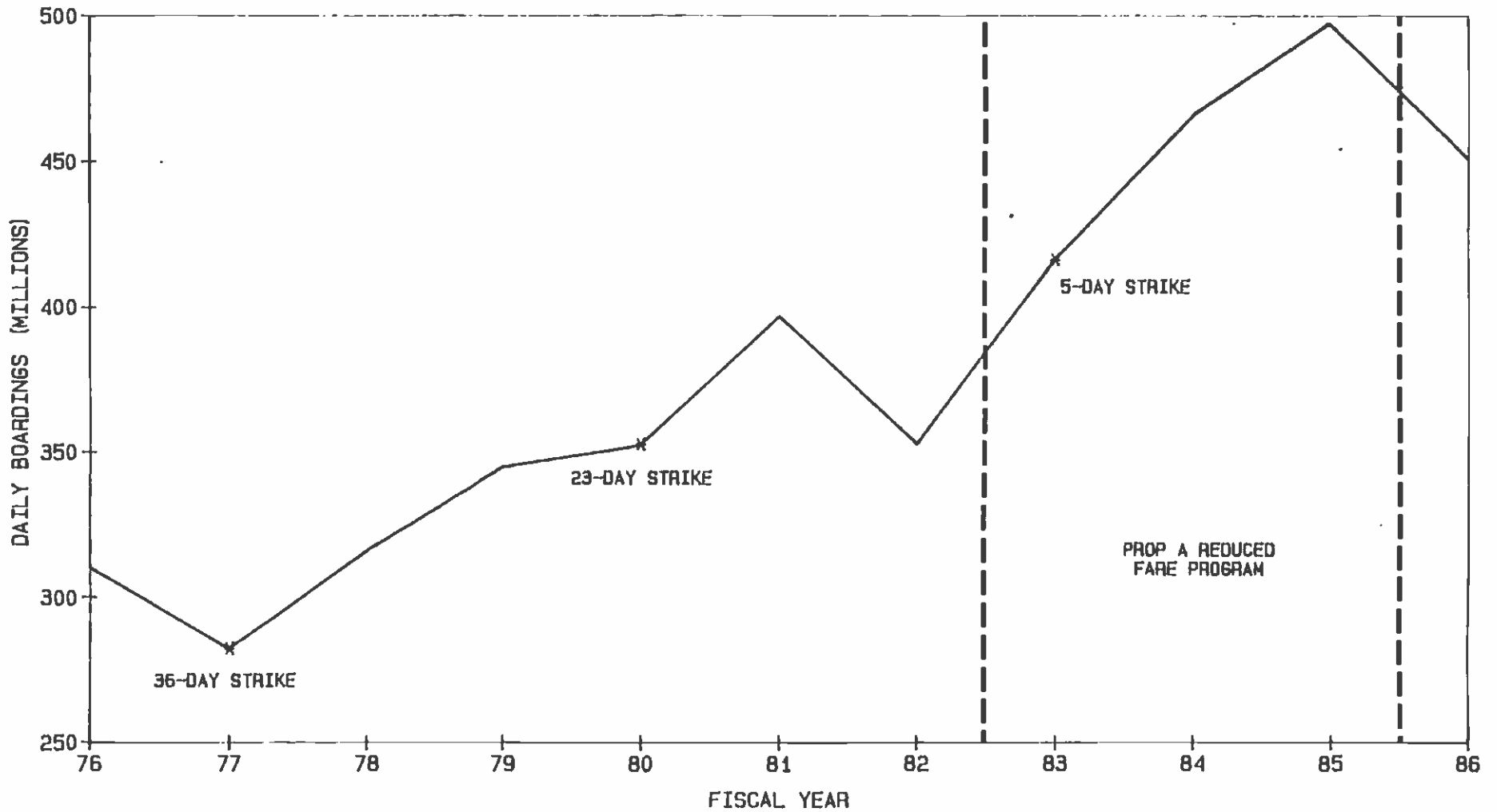
By the following year (FY 77), the operating costs associated with serving the higher patronage demand were increasing at a rate greater than the annual increase in public subsidies. Therefore, a \$.10 fare increase was implemented in July 1976. Patronage demand remained strong as daily patronage grew slightly (less than 1%), even with higher fares, although annual patronage declined as a result of a 36-day work stoppage.

Patronage demand remained strong throughout the balance of the decade of the 70's and into the early 80's. Annual operating costs continued to grow at a faster rate than available public subsidies. The fare increase of FY 77 became the first of annual fare increases for six successive years (through FY 82). Though fares were increasing each year, annual ridership continued to grow through FY 81. The \$.20 fare increase of July 1981, (from \$.65 to \$.85) was ultimately large enough to cause a decline in daily ridership for the first time since FY 75. However, the negative effects of the July 1981, fare increase were to be short-lived.

On November 4, 1980, the voters of Los Angeles County adopted a ballot initiative referred to as Proposition A. Through an additional 1/2 % sales tax, Proposition A was intended to provide funds for three purposes: (1) 25% of revenues to be distributed to Los Angeles County municipalities for local transit-related purposes; (2) at least 35% of revenues to be used to finance the local share of costs for development of a countywide rail transit system; and (3) the balance of revenues to be used to provide additional subsidies for public transit operating expenses. Proposition A also specified that for the first three years after its implementation the 75% of revenues not specifically reserved for local communities would be utilized to fund a reduction of transit fares in Los Angeles County to 1980 levels. Due to a court challenge of the legality of Proposition A, it was not implemented until July 1, 1982. At that time, a \$.50 maximum cash base fare (together with reduced pass prices) was established for all public transit services in Los Angeles County including the District. The \$.50 fare would be maintained for three years (through June 1985).

The 41% fare reduction imposed by Proposition A contributed to three years of substantial patronage growth for the District (Figure 1). Ridership increased from 352.7 million annual boardings for FY 82 (the year prior to Proposition A reduced fares) to 497.3 million annual boardings by FY 85 (the third year of reduced fares). The fare reduction also eased the burden on riders' incomes following six years of fare growth which exceeded the rate of growth of inflation (Figure 2). The 41% patronage increase over three years was

HISTORICAL ANNUAL PATRONAGE



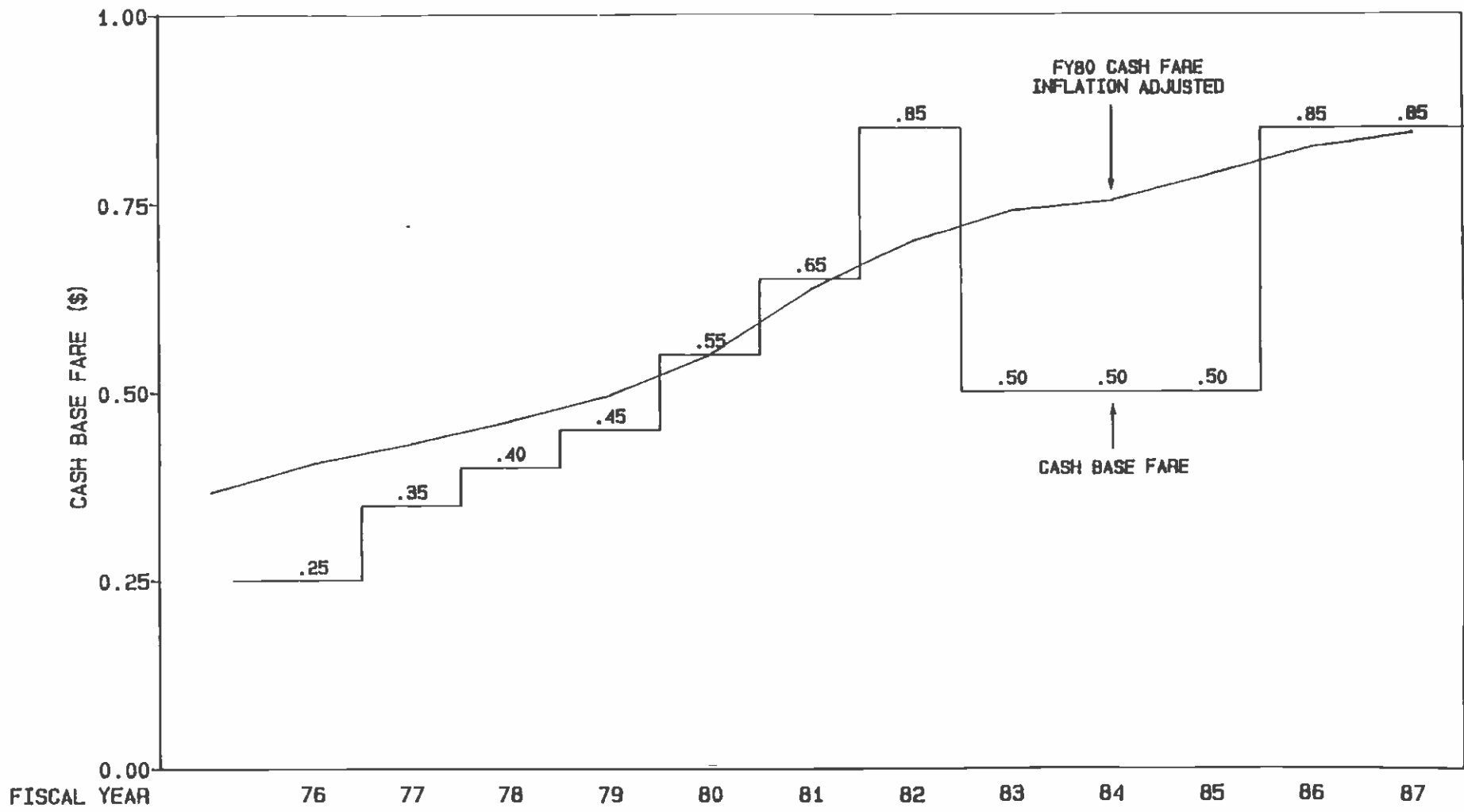
I-3



HISTORICAL ANNUAL PATRONAGE

FIGURE 1

HISTORICAL CASH FARES AND INFLATION



HISTORICAL CASH FARES AND INFLATION

FIGURE 2

accompanied by a 5.9% increase in revenue bus hours of service (limited by available subsidy funds). As a result, the District's service productivity as measured by boardings per revenue bus hour grew from 53.1 in FY 82 to 70.6 by FY 85. Higher productivity was a mixed blessing as overcrowded buses became increasingly common.

The end of the three year reduced fare program mandated by Proposition A was accompanied by a significant reduction in local subsidies for financing operating deficits. The requirement to henceforth dedicate at least 35% of Proposition A revenues to rail transit programs meant that FY 86 subsidies from this source would decline by \$43 million representing about 9% of anticipated operating costs. Since crowded buses were a major problem, few opportunities to reduce operating costs by reducing service levels were available. This meant that the primary source for new revenues to replace subsidy dollars which were no longer available was higher fares.

1.2 FARE SETTING PROCESS

In anticipation of the significantly higher fares that would be needed in the years following the Proposition A reduced fare program, the District undertook an extensive Fare Policy Study beginning in the summer of 1984. The study had several objectives:

- o Determination of the amount of additional revenue that would be needed from the farebox;
- o Investigation of alternatives to the existing fixed fare pricing approach;
- o Identification of ridership changes which would occur as fares were increased, and the effects on farebox revenue of changes in ridership; and
- o Identification of actions which would reduce the severity of any projected ridership declines.

The findings of that study (FY 1985-86 Fare Policy Study, December 1985) led to a recommended fare structure and proposed fare increases which were published for public comment in a Notice of Public Hearing on December 30, 1984. The public hearing, held on February 2, 1985, elicited testimony from in excess of 100 individuals, most of whom objected to the size of the proposed fare increases and urged continuation of as much as possible of existing bus services. The District's Board of Directors adopted increased fares for all categories of riders on February 13, 1985. On February 14, 1985, a program of reduced headways during peak periods on primarily demand-based services was also adopted. Both actions would become effective on July 1, 1985. The adopted service reductions represented 2.4% of FY 85 service levels (about 170,000 revenue bus hours). Proposition A reduced fares and present fares are summarized in Table I-1. Adopted fare increases averaged 70.1% for all riders.

COMPARISON OF PROPOSITION A REDUCED FARES AND CURRENT FARE STRUCTURE

<u>Fare Category</u>	<u>FY 83 - FY 85 Prop. A Reduced Fares</u>	<u>FY 86 - FY 88 Fare Structure</u>
CASH -		
Regular	50¢	85¢
Express (per zone)	25¢	35¢
Elderly	20¢	40¢
Disabled	20¢	40¢
Student	20¢	85¢
College/Vocational	50¢	85¢
Transfers	10¢ (multiple uses)	10¢ (per use)
TICKETS	Face Value	Face Value
TOKENS	50¢	85¢
PASS -		
Regular	\$20	\$32
Express Stamp (per zone)	\$ 7	\$12
Elderly	\$ 4	\$ 7
Disabled	\$ 4	\$ 7
Student	\$ 4	\$12
College/Vocational	\$ 4	\$15

Notes

1. Transfers include time and directional restrictions.
2. Prior to FY 86, only Regular cash riders were subject to express cash surcharges. Subsequently, Student and College/Vocational cash riders have also become subject to such charges.
3. Express Stamps are not required for Elderly, Disabled, Student or College/Vocational pass users.
4. Certain classes of riders are exempt from fare payment, including:
 - o Children under five years of age (a limit of two per accompanying adult)
 - o SCRTRD employees and their dependents
 - o SCRTRD Board members
 - o Blind persons
 - o Uniformed police officers
 - o City of Los Angeles Traffic Control Officers within downtown Los Angeles



**COMPARISON OF PROPOSITION A REDUCED FARES
AND CURRENT FARE STRUCTURE**

TABLE I-1

By the fall of 1986, reduced inflation began to have an impact on the rate of growth of the District's subsidies. Revised projections of subsidy availability for FY 87 and later years made it likely that additional farebox revenue would be needed by FY 88. Additionally, the portion of the District's subsidies which would be available to support operating costs would be limited by increased capital matching fund needs.

A fare increase proposal was published for public comment in a Notice of Public Hearing on February 15, 1987. The Notice also proposed an accompanying set of bus lines which the District could no longer afford to operate beyond the end of FY 87 (most of these bus lines were proposed for subsequent operation under contract to both the County and City of Los Angeles). The public hearing was held on March 21, 1987. The March 1987 public hearing had fewer attendees than the February 1985 public hearing (adverse weather may have been a factor), but criticism of proposed fare increases was consistently focused on two key issues. The public felt strongly that the District should not charge higher fares for the use of its services because of perceived poor performance in controlling costs, and concerns for riders' safety engendered by a series of highly publicized bus accidents which had occurred several months previously. In addition to the concern with the District's management performance, the public felt that the proposed fare increases for discounted fare categories, particularly elderly and disabled riders, would pose a severe financial hardship on these riders.

Mindful of these concerns, the District's Board of Directors sought additional financial assistance from the Los Angeles County Transportation Commission, and directed staff to make every effort to limit proposed expenditures when preparing the District's FY 88 operating budget. In May 1987 the Board of Directors approved all but one of the service cancellations which had been presented at the public hearing. Subsequently, agreements were negotiated to provide additional subsidies for continued District operation of these services until such time as arrangements could be formalized for private provider operation. Also in May 1987 the District was informed by the Chairman of the LACTC of his intention to recommend an additional \$3.9 million subsidy allocation for FY 88 conditioned on the District meeting specified cost control objectives in its proposed budget. These conditions were met and additional funding subsequently approved by the Commission.

On June 25, 1987 the District's Board of Directors adopted a set of four actions which closed a remaining \$9.5 million gap between projected operating expenses and revenues for FY 88. These actions consisting of a \$4.0 million contribution from District equity, \$1.7 million in additional revenue resulting from FY 87 operating cost savings, deferral of a planned \$2.4 million mid-life rehabilitation of the District's RTS-II buses and \$1.4 million in cost savings (attributable to imposition of a limited hiring freeze) provided for adoption of a balanced FY 88 operating budget without the need for a fare increase.

1.3 PURPOSE OF REPORT

This report has three purposes; (1) documentation and evaluation of the impacts of the significant fare increase implemented on July 1, 1985, (2) description of alternative fare policies associated with a fare increase which was proposed for implementation on July 1, 1987, and 3) documentation of the patronage and revenue assumptions used for the preparation of the District's FY 88 through FY 90 Short Range Transit Plan. Sections 2.0 through 4.0 discuss the 1985 fare increase experience. Section 5.0 describes the revisions which were made to forecast methodologies based on that experience. Section 6.0 describes the alternatives analyses performed in conjunction with the 1987 fare increase proposal. Section 7.0 addresses the ridership and passenger revenue assumptions of the FY 88 through FY 90 SRTTP and the potential fare impacts of reduced federal funding availability. Finally, Appendix A provides analyses of an on-board survey which was conducted after the 1985 fare change.

2.0 FY 86 FARE POLICY STUDY

As discussed briefly in Section 1.2, a detailed Fare Policy Study was initiated in the summer of 1984. The primary objective of the study was the development of a recommended fare policy and associated fare structure to be implemented on July 1, 1985. The terms "fare policy" and "fare structure" are closely related, but have distinct meanings. For purposes of this discussion, "fare policy" refers to the set of criteria employed to differentiate pricing among different categories of riders. For example, choices among different pricing mechanisms, such as distance-based, time-based or trip-based fares, and the desire to charge differing fares to selected groups of users, such as the elderly or students, are fare policy matters. The "fare structure" is simply the expression of specific prices associated with each category of rider which "fare policy" has determined should be differentially priced.

The FY 1985-86 Fare Policy Study had three principal components: (1) identification of the basic elements of District operating costs in a manner which would permit determination of costs by type of service and time of day (factors essential to determining the cost-effectiveness of existing and proposed pricing strategies); (2) development of a tool which could be used to project the impacts of proposed fares on ridership and farebox revenue for each segment of ridership, and (3) identification of an appropriate pricing strategy that would yield the additional farebox revenues required while striving for an appropriate balance between the costs of administering the proposed pricing strategy and rider equity. The study produced a disaggregate cost model which was later used to assess the cost effectiveness of studied pricing alternatives, a ridership and farebox revenue projection model which was used to determine the projected impacts of studied fare structures, and a proposed fare policy which, with minor variations, became the basis for adopted fare increases. Section 3.0 of this report addresses fare impact projections. The following discussion focuses on the fare policy alternatives which were considered, the policy which was recommended, and the policy ultimately adopted.

2.1 FARE POLICY ALTERNATIVES

The District's historical fare policy, with the exception of a FY 75 experiment with distance-based pricing for all riders, has been a hybrid of fixed fares for travel on local and limited stop buses and distance-based fares for express buses on freeways. Present fare policy provides for a variety of classes of riders which are subject to differential pricing. These include elderly, disabled, students attending kindergarten through grade 12, college and vocational school students, children under age 5, the blind, District employees, and selected law enforcement personnel. All of these groups are presently entitled to discounted fares to varying extents.

Payment options include cash, prepaid tickets/tokens, and prepaid monthly passes. Cash riders are subject to an initial fare (the cash base fare, or a discounted amount if eligible) upon first boarding a bus, a small surcharge for those riders whose trips require more than one bus (termed a transfer surcharge), and an additional surcharge for riders boarding a bus that will travel on a freeway (termed an express surcharge - an additional express surcharge is assessed for each 4 mile increment or portion of an increment beyond the first 4 miles of freeway travel). Riders using tickets or tokens may substitute these media for cash at specified exchange rates, but are otherwise subject to the fares in effect for cash riders. Prepaid monthly passes permit unlimited travel without payment of additional fare except where express surcharges apply. Prepaid monthly express stamps are also available which provide for a waiver of express surcharges for designated numbers of express travel increments.

The FY 1985-86 Fare Policy Study considered alternatives to the District's historical fare policy as well as variations within the framework of existing policy. Alternatives to historical policy included systemwide distance-based pricing and time-based pricing. Variations of existing policy included changes in the differential prices charged to different classes of riders, altered transfer pricing mechanisms, and promotion of user-side subsidies. The latter were ultimately recommended to the District's Board of Directors.

None of the alternatives to historical policy were found to be viable at the time due to either poor cost-effectiveness or rider inequities. Pure distance-based and time-based fares (where riders are charged on the basis of distance or time consumed) require either technological improvements to fare collection equipment which are not yet reliable enough for day-to-day application on buses, or entail significant additional operating costs due to the time required for periodic verification of fare payment on each bus trip. Furthermore, riders paying based on time-consumed would be penalized with higher fares for travel in congested traffic corridors. Incremental distance-based pricing (already used on District express bus services) was found not to be cost-effective on local buses since the higher operating costs associated with periodic fare inspection would require that fares for the vast majority of riders would need to be higher than with a fixed fare system generating the same net revenues. The District's FY 75 experience with this policy also supported this finding. A special case of time-based pricing, known as differential peak/off-peak pricing, was also found lacking. The intent of this type of fare policy is to encourage greater ridership in the off-peak time periods (when travel demand is relatively low) by offering lower than peak fares. A cost recovery analysis based on FY 84 data showed that District farebox recovery ratios (farebox revenues expressed as a share of operating costs) were higher during peak periods than during off-peak periods although fares were the same at both times. The conclusion of the 1985 study was that discounted off-peak fares would only serve to further reduce the cost-effectiveness of off-peak services relative to peak services.

2.2 RECOMMENDED ALTERNATIVES

With the finding that the District's historical fare policy (fixed fares on local buses, and incremental distance-based fares on express buses) offered the best balance between cost-effectiveness and rider equity, the FY 1985-86 Fare Policy Study limited its fare policy recommendations to variations of existing policy. Three types of alternatives were developed: (1) changes to the differential between fares for selected categories of riders; (2) altered transfer pricing mechanisms, and (3) cultivation of alternative sources of farebox revenue (user-side subsidies). From these alternatives, five policies were recommended to the District's Board of Directors:

- (1) Increasing the price multiple for monthly passes to the cash equivalent of 45 rides from the 40 ride price multiple which had been in effect since July 1980;
- (2) Eliminating the cash discount available to student riders since July 1980;
- (3) Applying the transfer surcharge to each use of a transfer rather than permitting unlimited transfers for a single surcharge payment;
- (4) Reducing the pass price discounts offered to student (K-12) and college/vocational riders with the intent of eventually eliminating discounts for these riders; and
- (5) Encouraging local communities to utilize a portion of the Proposition A revenues that they receive for the purpose of subsidizing pass prices for riders accustomed to receiving a discount.

Increased pass price multiples for full fare riders were recommended because users of these passes (commonly referred to as Regular monthly passes) travel significantly more often each month than users of other varieties of monthly passes offered by the District (e.g. Elderly, Disabled, Student [K-12] and College/Vocational). In recent years (since July 1980) regular passes have been used an average of 95 times per month representing about 60 trips per month per rider (when transfer boardings are accounted for). By comparison, all other types of passes have averaged between 60 and 63 uses per month, or just over 40 trips per month per rider. Exceptions since 1969 to the 40 ride price multiple for Regular passes have occurred in FY 78 and FY 79, when a 45 ride multiple was in effect, and FY 80, when a 36 ride multiple was offered.

Cash discounts have been offered to students (grades K-12) since 1969 except for a three year period from July, 1977 through June, 1980. Concurrently, discounted price monthly passes have also been offered to these riders since 1969. Significantly, consistently over 90% of student riders use a monthly pass. Based on this consideration, elimination of student cash discounts was recommended because riders needing to get to school would still have the option of purchasing a discount priced monthly pass.

Transfer surcharges are imposed because riders who use more than one bus to complete their trip tend to have longer average trip lengths than riders using only one bus. Thus, the transfer surcharge is an attempt to improve fare equity with respect to the amount of service consumed within the constraints of a fixed fare pricing policy. Transfers have always had time limits and direction of travel restrictions placed on their use in an effort to ensure that they are restricted to their intended purpose of facilitating single trips which require more than one bus. Transfer surcharges have historically been small relative to the size of the cash fare because it is not possible to structure service in a manner that serves all possible origins and destinations with trips on a single bus. So riders who are forced to transfer because of the geometry of the bus system should not be unduly penalized by higher transfer surcharges. On the other hand, frequent bus riders who must transfer regularly to complete their trips have the option of purchasing a monthly pass which may be more attractive to these types of riders because the monthly pass permits an unlimited number of transfers with no surcharge. Because of the availability of monthly passes, and the operating efficiencies that result from the use of passes rather than cash for fare payment, it was recommended that transfer surcharges be imposed on each use of a transfer rather than just the initial use as had been historical transfer pricing policy. An additional benefit of this recommended policy is the potential for a reduction of fraudulent transfer usage since transfers which are illegally resold may only be used for a single boarding rather than multiple boardings.

The recommended reduction of the price discount offered to Student (K-12) and College/Vocational pass users was intended to shift some of the burden of higher fares away from full fare riders. From FY 81 through FY 85, the share of riders who paid full fare declined from 70.3% to 64.5%, but as a result of fare changes during that period, the share of farebox revenues derived from full fare riders increased from 87.8% to 88.7%. Much of the shift in revenue recovery from discount fare riders to full fare riders resulted from the considerable pass price discounts for student and college/vocational riders in effect during the Proposition A reduced fare program. The additional farebox revenue requirements of FY 86, necessitating significant fare increases, would have to be met in a manner that did not further burden the vast majority of riders paying full fares.

Finally, if discount fare riders' contributions to farebox revenue were to be increased at a greater rate than full fare riders' contributions during FY 86, an external means of assisting them with the payment of higher fares was needed. The 25% of Proposition A revenues channeled to local communities for transit-related purposes offered a solution. It was recommended that local communities be actively encouraged to utilize a portion of their Proposition A revenues to provide pass price subsidies to District riders who were residents of their communities. If such subsidies were to be directed particularly toward riders faced

with the greatest fare increases (those riders accustomed to receiving a pass price discount), then a larger proportion of the ridership gained during the Proposition A reduced fare program could be retained after FY 86 fare increases, and the impact of higher fares for these individuals would be lessened.

2.3 ADOPTED ALTERNATIVES

The District's Board of Directors agreed with most of the fare policy recommendations presented to them. The adopted FY 86 fare structure incorporated higher fares for all classes of riders together with the elimination of cash discounts for student riders, transfer surcharges imposed on each use of a transfer, and reduced pass price discounts for Elderly/Disabled, Student and College/Vocational riders (see Table I-1 in Section 1.2). Additionally, District representatives were directed to work with local communities to encourage provision of pass price subsidies. Many communities ultimately established pass price subsidy programs.

Board action differed from the recommended policy with respect to pass price multiples for Regular passes. Board members wanted to encourage a larger number of riders to use passes in order to promote improved operating efficiency. Therefore, the adopted fare structure incorporated a \$2 discount from the 40 ride price multiple for Regular passes yielding an effective price multiple of 37.6. Furthermore, while the adopted fare structure significantly reduced the pass price discounts offered to student and college/vocational riders, there was no Board consensus for adoption of a longer range policy of eventual elimination of pass price discounts for these groups.

3.0 FY 86 PROJECTED IMPACTS

The FY 1985-86 Fare Policy Study included the development of a ridership and farebox revenue projection model based on the historical relationships between District patronage and fares for each category of ridership. The historical database was limited to FY 81 through FY 85 as prior to FY 81 quarterly fare surveys were not conducted. The resulting model was used to evaluate the impacts of a variety of fare structure alternatives that were considered by the District's Board of Directors.

Analysis of projected costs and revenues conducted at the beginning of 1985 forecast a need for an additional \$55-\$60 million in farebox revenue during FY 86. This amount of additional annual revenue was expected to be sufficient to permit operation through the end of FY 87 before another fare increase might be needed. Evaluation of the impacts of the adopted FY 86 fare structure in February 1985, using the preliminary ridership projection model, forecast nearly \$60 million in additional farebox revenue during FY 86 and a systemwide patronage decline of 17.5%.

The projection model underwent further refinement during the spring of 1985 at which time sensitivity to the relative changes in cash and pass prices for each category of riders, and methods to account for the availability of pass price subsidies were incorporated. The refined model is documented in the FY 1985-86 Fare Policy Study published in December 1985. The application of the refined model to final FY 85 patronage and farebox revenue data serves as the basis for the projected FY 86 impacts discussed subsequently in this report. Systemwide projected impacts of the FY 86 fare structure using the refined model forecast a \$58.3 million increase in farebox revenue and a 13.0% decline in patronage.

3.1 PROJECTION METHODOLOGY

The refined ridership and farebox revenue projection model, documented in the FY 1985-86 Fare Policy Study, consists of a set of mathematical relationships that express the historical relationship between District annual ridership changes and cash and pass fares from FY 81 to FY 85, inclusive. While the mathematical form of the relationship is the same for each category of ridership (Regular, Express, Elderly/Disabled, Student [K-12], College/Vocational, Ticket, Free and Special Services), the values of model coefficients vary for each category. Individual coefficients were estimated from historical data using regression analysis.

In its simplest form, the model expresses the ratio of projected linked trips to existing linked trips as a linear combination ($a+bx$) of a constant term (specific to each ridership category) and the product of a fare sensitivity coefficient (termed the fare elasticity for each

ridership category) and the difference between the proposed and the existing average fare per trip (expressed as a proportion of the existing average fare per trip). For example, the refined model relationship for full fare riders was:

$$\frac{(\text{Projected Trips})}{(\text{Existing Trips})} = 1.0277 - .3077 \frac{(\text{Proposed Avg. Fare} - \text{Existing Avg. Fare})}{(\text{Existing Avg. Fare})}$$

The average fare per trip is determined from the cash fare and monthly pass price taking into account the share of riders using each method of fare payment and the average number of trips taken per pass. Determination of average fares also must account for occasions where proposed changes to cash fares (expressed as a percentage of the original cash fare) differ from proposed changes in pass prices. The availability of pass price subsidies also affects average fare determination. All of these factors are accounted for in the complete model specification.

In its simplest form, described above, the model is traditional in the sense that models having its particular mathematical structure are widely used throughout the transit industry to estimate the patronage response to proposed fare changes. Commonly, the constant term is not used, and the elasticity coefficient is simply assumed to equal -.33. This formulation is referred to as the Simpson-Curtin relationship, named for its authors. The Simpson-Curtin formula is useful in situations where local data of sufficient detail is not available to customize the value of the elasticity coefficient. It is, however, limited to application only in those instances where fare changes are relatively small (perhaps 50% or less). When extreme fare changes are being considered (for example, a 300% fare increase) it can yield impossible predictions (i.e., negative ridership).

Some of the fare changes adopted for FY 86 were quite large. Student (K-12) fares, for example, were increased 325% (from \$.20 to \$.85) for cash riders, and 200% (from \$4 to \$12) for monthly pass users. College/Vocational pass users experienced similar increases (from \$4 to \$15, or 275%). Evaluation of the impacts of fare increases of this magnitude required an alteration of the traditional Simpson-Curtin model form. This was accomplished by placing limits on the range of applicability of the simple model form, and then assuming that fare increases exceeding those limits could be modeled as a series of fare increases, each within the limits of model applicability, occurring over a very short period of time. Fare change model limits were established for each ridership category based on historical fare changes contained in the database used to initially determine model coefficients. These fare change model limits varied between 40% and 50% depending on the ridership category. It was then possible to consider a 100% fare increase, for example, as the equivalent of a 40% increase followed by another 40% increase followed by a 2% increase (1.40 times 1.40 times 1.02 equals approximately 2.00) assuming that the fare increase model limit was 40% for purposes of this example.

Therefore, to continue the example, if a 40% fare increase produced a ratio of projected to existing ridership of .90 (representing a 10% loss of patrons), and a 2% fare increase resulted in a projected to existing ridership ratio of .99, then the 100% fare increase of our example would result in the equivalent of two successive 10% ridership declines followed by an additional 1% ridership decline, or (.90 times .99) an overall projected ridership decline of 19.81% (ratio of projected to existing ridership of .8019).

This hybrid variation of the traditional Simpson-Curtin model form became the tool which was used to project the ridership impacts of the adopted FY 86 fare structure. Farebox revenue impacts were a by-product of application of the patronage estimation model since the resulting farebox revenues could be determined by multiplying forecast passenger trips by the projected average fare per trip.

3.2 PROJECTED IMPACT ON PATRONAGE

FY 85 District patronage and fare data from the historical database and the adopted FY 86 fare structure were processed using the refined patronage estimation model to project FY 86 patronage for each ridership category. The resulting projections are provided in Table III-1, below.

TABLE III-1
FY 86 PROJECTED BOARDINGS BY FARE CATEGORY

<u>Fare Category</u>	<u>FY 85 Boardings (000)</u>	<u>Proj. FY 86 Boardings (000)</u>	<u>Proj. Change from FY 85</u>
Regular	299,081	256,925	-14.1%
Express	17,014	13,178	-22.5%
Elderly/Disabled	61,392	59,667	-2.8%
Student (K-12)	79,698	67,064	-15.9%
College/Vocational	14,991	11,403	-23.9%
Free	20,777	21,353	+2.8%
All Others	4,310	3,168	-26.5%
Systemwide	497,263	432,758	-13.0%

Note: All Others includes ticket/token users and Special Services patrons.

Average fare increases were comparable for all ridership categories except Student (K-12) and College/Vocational riders (and Free riders for obvious reasons). Fare increases for these two groups of riders averaged approximately three times those experienced by other riders. Express riders were among those groups expected to experience the largest patronage declines because historically they were found to be the most sensitive to fare changes. They are also among the least transit dependent of ridership groups because of a high degree of auto availability (based on historical on-board surveys of ridership).

Conversely, Elderly/Disabled patrons are relative captives of the bus system because of a lack of alternatives, and as a result were found to be among those ridership groups least likely to lose riders because of the fare change. In Section 3.4, it will be seen that this group was to be afforded the greatest availability of subsidized passes by local communities.

3.3 PROJECTED IMPACT ON PASS USAGE

Since the adopted FY 86 fare structure was intended to encourage an increase in the share of riders using passes, it is to be expected that projections of declines in FY 86 pass sales resulting from higher fares would be smaller than corresponding projections of FY 86 patronage declines. Additionally, an increasing share of riders would be expected to use passes. Table III-2 depicts pass sales and pass shares projected for FY 86.

TABLE III-2
FY 86 PROJECTED PASS SALES AND PASS SHARES

Pass Category	FY 85 Passes Sold	Proj. FY 86 Passes Sold	Proj. Chg. From FY 85	FY 85 Pass Share of Linked Trips	Proj. FY 86 Pass Share of Linked Trips
Regular	1,022,255	895,600	-12.4%	.328	.334
Express	171,454	127,320	-25.7%	.462	.443
Elderly/ Disabled	838,217	878,630	+4.8%	.810	.875
Student (K-12)	1,430,161	1,237,670	-13.5%	.888	.914
College/ Vocational	282,895	197,870	-30.1%	.911	.833
Systemwide	3,744,982	3,337,090	-10.9%	.481	.496

The projected shares of riders using passes in FY 86 among Regular, Elderly/Disabled and Student (K-12) ridership categories exhibit increases, as expected, compared with FY 85. However, despite the attempt to encourage greater pass participation systemwide, Express and College/Vocational pass use was not expected to grow as a result of the increase in pass prices exceeding the increase in cash fares for these riders with the adopted FY 86 fare structure. Nevertheless, systemwide pass use in FY 86 was expected to expand to include an additional 1.5% of trips resulting in an overall pass sales decline (10.9%) which was less than the projected FY 86 decline in patronage (13.0%).

3.4 PROJECTED EFFECT OF PASS PRICE SUBSIDY AVAILABILITY

A significant adopted FY 86 fare policy, intended to reduce the impact of fare increases, encouraged local communities to utilize a portion of their Proposition A revenues to subsidize the cost of monthly passes for local residents. Since users of discount priced passes would experience the largest percentage price increases, efforts were devoted to encouraging subsidy availability for these groups in particular (Elderly/Disabled, Student [K-12] and College/Vocational). By June 1985, 20 communities and four County Supervisorial District's had committed to provision of such subsidies (see Table III-3). All subsidy providers offered discounts to Elderly/Disabled pass users. The County and six cities extended subsidy availability to Student (K-12) pass users. The County and four of the six communities subsidizing Student (K-12) pass prices also offered subsidies to College/Vocational pass users. Three communities elected to subsidize the cost of all available pass types for their residents.

Generally, the size of the subsidies offered was sufficient to maintain FY 85 pass prices for users benefiting from subsidy availability. This meant that subsidized pass purchasers would experience no pass price increase. Typical subsidies offered were \$3 toward the \$7 cost of an Elderly/Disabled pass, \$8 toward the \$12 Student (K-12) pass price, \$11 toward the \$15 College/Vocational pass, and \$12 toward the \$32 monthly cost of a Regular pass. Express riders received no subsidy toward the purchase of monthly Express stamps; however, the \$12 subsidy offered by some communities for Regular pass purchases benefited express riders by reducing the Regular pass portion of their monthly pass cost.

Encouragement of pass price subsidy availability was expected to have its greatest impact on Elderly/Disabled riders. Residents of communities offering subsidies for these riders represented 82.2% of FY 85 pass purchasers. As a result, it was expected that 85.1% of FY 86 Elderly/Disabled pass sales would be to purchasers of subsidized passes (a decline in the number of passes sold to non-subsidized Elderly/Disabled riders was anticipated). As was shown in the previous section of this report, the wide availability of Elderly/Disabled pass price subsidies was expected to encourage an increase in pass sales to these riders (+4.8%) as well as an increase in the share of Elderly/Disabled riders using passes (+6.5%) since Elderly/Disabled cash fares were not to be subsidized.

Student (K-12) and College/Vocational pass users were expected to receive considerably less benefit from pass price subsidy availability as only a small number of communities elected to subsidize pass prices for these groups. Nevertheless, the combination of an expected 10.7% of FY 86 Student (K-12) pass sales being subsidized and a larger cash fare increase (325%) than pass price increase (200%) for Student (K-12) riders was expected to increase the share of Student (K-12) riders

PROJECTED FY 86 PASS PRICE SUBSIDY AVAILABILITY

<u>Community</u>	<u>Elderly/ Disabled</u>	<u>Student (K-12)</u>	<u>College/ Vocational</u>	<u>Other</u>
Alhambra	X			
Baldwin Park	X			
Bell	X			
Burbank	X			
Covina	X			
El Monte	X			
Glendale	X			
Hawthorne	X			
Huntington Park	X			
Inglewood	X			
La Puente	X	X	X	
La Verne	X			
Los Angeles	X			
Los Angeles County (Districts 2-5)	X	X	X	
Monterey Park	X	X		
Pico Rivera	X	X		
San Fernando	X			
South Gate	X	X	X	Regular/Express
South Pasadena	X	X	X	Regular/Express
Temple City	X	X	X	Regular/Express
West Hollywood	X			
Est. Share of FY 85 Passes Sold	82.2%	8.6%	7.7%	0.5%
Proj. Share of FY 86 Passes Sold	85.1%	10.7%	11.6%	0.6%

Source: SCRTD Planning Department
June 1985



**PROJECTED FY 86 PASS PRICE
SUBSIDY AVAILABILITY**

TABLE III-3

using passes (+2.6%) and limit the expected decline in Student (K-12) pass sales (-13.5%) to less than the expected loss of Student (K-12) patronage (-15.9%). The low impact of College/Vocational pass price subsidies (an expected 11.6% of FY 86 College/Vocational passes to be sold) was not expected to be large enough to prevent a decline in the share of College/Vocational pass users (-7.8%) due to the significantly larger increase in pass prices (275%) compared with cash fares (70%) for this group of riders.

The expected cost of FY 86 subsidy provision to local communities was \$3,558,580 with the majority of subsidy costs attributable to Elderly/Disabled pass price subsidies (\$2,243,580) and lesser amounts devoted to Student (K-12)(\$1,062,000) and College/Vocational (\$253,000) pass price subsidies. Though not verifiable through actual experience, the revised ridership forecasting model projected 5.1 million annual passenger boardings would be retained on District services as a direct result of pass subsidy availability. This means that if pass price subsidies were not offered, the projected systemwide FY 86 patronage decline would be 1.0% larger.

3.5 PROJECTED IMPACT ON FAREBOX REVENUES

Systemwide farebox revenue projections were indirectly obtained from application of the refined ridership projection model. Projected patronage by fare category was multiplied by projected average fare for each fare category to determine forecast farebox revenues. Effective fare increases (based on the weighted contribution of cash and pass fare increases) and projected revenues are shown in Table III-4, below. The systemwide projected average fare increase was 70.1% yielding an expected \$58.3 million in additional farebox revenues during FY 86.

PROJECTED FY 86 CHANGES IN AVERAGE FARE AND FAREBOX REVENUES

<u>Fare Category</u>	<u>FY 85 Revenue (000)</u>	<u>Proj. FY 86 Revenue (000)</u>	<u>Proj. Revenue Change from FY 85</u>	<u>Proj. Avg. Fare Change from FY 85</u>
Regular	\$92,319	\$130,082	+40.5%	+64.2%
Express	\$13,399	\$16,485	+23.0%	+58.5%
Elderly/ Disabled	\$5,052	\$8,351	+65.3%	+70.4%
Student (K-12)	\$7,017	\$18,265	+160.3%	+209.0%
College/ Vocational	\$1,584	\$4,048	+156.2%	+233.9%
Free	-----	-----	-----	-----
Other	\$2,353	\$2,804	+19.2%	+64.0%
Systemwide	\$121,724	\$180,035	+46.9%	+70.1%

The projected revenues and average fare changes contained in Table III-4 incorporate the availability of pass price subsidies in projected revenues for Elderly/Disabled, Student (K-12) and College/Vocational riders. Because of this, the projected average fare changes shown for these three fare categories are those experienced by riders who are not subsidized. Riders eligible for a pass subsidy would see no change in out-of-pocket costs provided that they choose to purchase a pass.



**PROJECTED FY 86 CHANGES IN AVERAGE
FARE AND FAREBOX REVENUES**

TABLE III-4

4.0 DOCUMENTATION OF FY 86 IMPACTS

An annual comparison of projected and actual ridership response to the July 1, 1985 fare change reveals that for all fare categories except Student (K-12) and Other (Ticket and Special Services patrons) significantly greater numbers of riders continued to use District services than had been expected. A 9.5% decline in boardings and a 10.5% decline in linked trips was experienced, compared with a projected 13.0% decline. Passenger revenues increased nearly \$68.3 million exceeding the projected \$58.3 million increase by \$10 million. Higher patronage and resulting revenues permitted restoration of service which had been reduced during July 1985 in anticipation of greater patronage declines than those which materialized. Rather than sustaining a planned 2.4% service reduction (170,000 revenue hours), a 1.5% service expansion (108,000 revenue hours) was permitted. The service expansion, together with the decline in boardings, resulted in reduction of the District's annual boardings per bus hour from 70.6 in FY 85 to 63.0 in FY 86. This permitted relief of overcrowding in many instances.

Planned objectives of the July 1985 fare increase were achieved including achievement of sufficient additional farebox revenues to sustain FY 86 fares through FY 87, increased use of passes by District riders, a reduced share of farebox revenues derived from full fare paying riders, and institution of pass price subsidies through the use of local communities' Proposition A funds. The share of farebox revenue derived from full fare riders decreased from 88.7% to 85.6%, while the share of riders paying full fare increased from 64.5% to 68.9%. The systemwide share of linked trips made by pass users increased from 48.1% to 49.1%, and the number of communities offering pass price subsidies expanded from an initial 20 (plus four County Supervisorial Districts) to 31 by June 1986. Discussion of FY 87 ridership and projections for future years is provided in Section 7.0.

The section which follows details both systemwide and individual fare category observed impacts of the July 1, 1985 fare increase. It includes an analysis of the effects of pass price subsidies, identification of factors which may have influenced differences between observed and expected ridership response, and discusses relevant findings, where appropriate, of an on-board ridership survey conducted during the spring of 1986.

4.1 SYSTEMWIDE RIDERSHIP AND REVENUE IMPACTS DURING FY 86

Actual ridership exceeded expectations during FY 86. The 9.4% observed annual decline in boardings, compared with a 13.0% projected decline, meant that 17.6 million more boardings were served than had been anticipated. The patronage decline on weekdays (-10.6%) was nearly as large as expected. However, weekend patronage declined significantly less than had been anticipated as Saturday patronage was off only 7.6%, and Sunday and Holiday patronage remained basically unchanged (-0.1%).

The overall result was that a portion of the additional ridership which was gained during the Proposition A reduced fare program period was retained despite a return to higher fares during FY 86. Figure 3 depicts average daily patronage for recent years (through FY 86) exemplifying these observations.

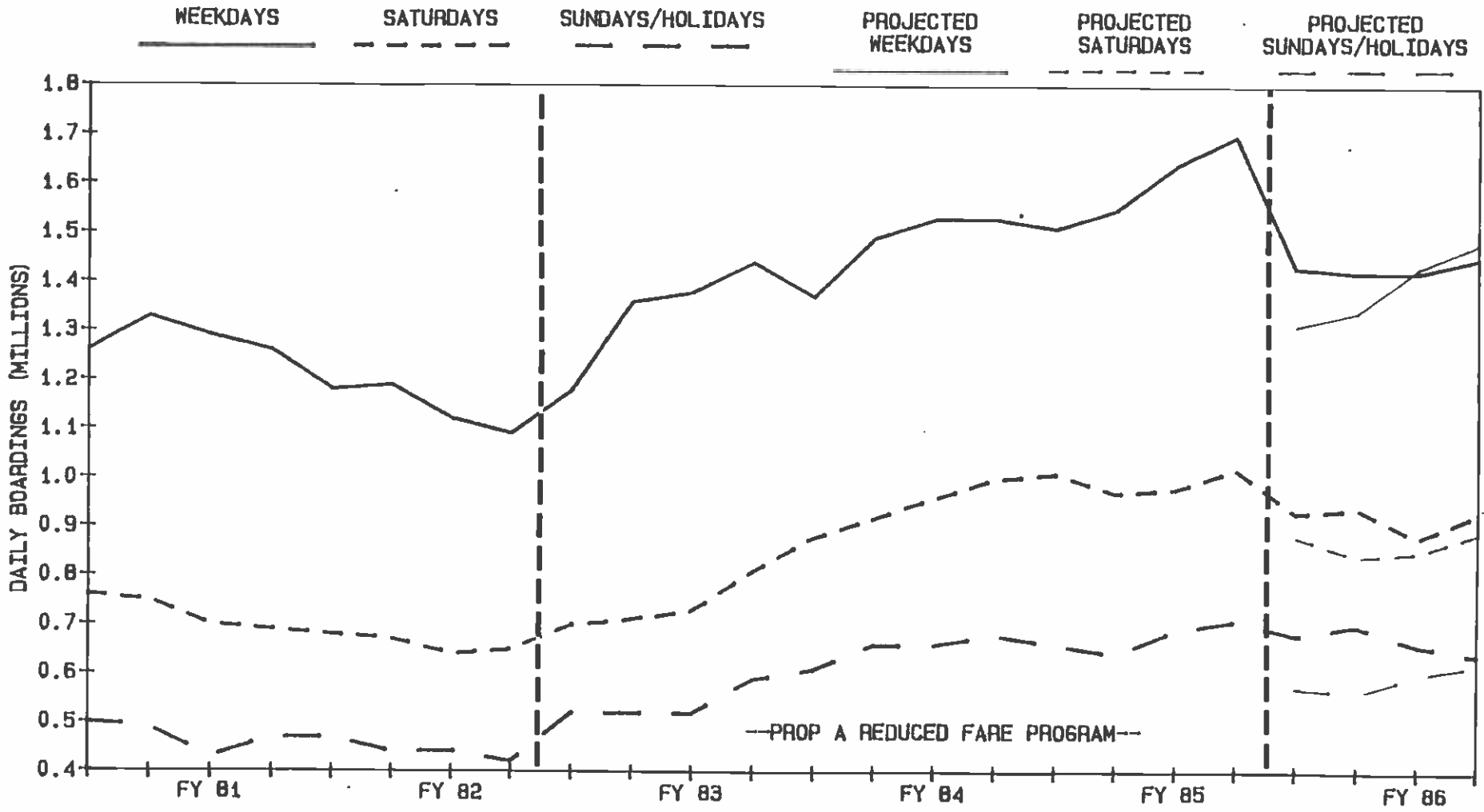
The ridership response to higher fares was not immediate. During the first six months following the fare increase, a 5.5% decline in systemwide patronage was experienced as shown in Table IV-1. For the second six months of FY 86, the ridership decline was larger compared with the comparable period of time during FY 85. This is attributable to the stability of FY 86 quarterly patronage compared with the rapid patronage increases occurring during each successive quarter of FY 85.

Comparisons of actual FY 86, projected FY 86 and actual FY 85 ridership, revenue, linked trips and revenue per trip are provided in Tables IV-2 and IV-3. These comparisons demonstrate that both ridership and revenue was greater than anticipated during FY 86, except for Student (K-12) and Other (Tickets and Special Service patrons) ridership categories. The 17.6 million annual boardings in excess of projected boardings resulted in nearly \$10 million of additional farebox revenues. The change in average revenue per trip, shown in Table IV-3, is a measure of the average fare increase experienced by riders in each fare category. Variations in this value from projections are attributable to differences between projected and actual use of available forms of fare payment (cash or monthly pass).

A comparison of the changes in boardings, shown in Table IV-2, and the changes in linked trips, shown in Table IV-3, reveals a slightly larger decline in linked trips (-10.5%) than in boardings (-9.4%) during FY 86. This results from an increase in the share of boardings which are transfers. The transfer share of boardings has been increasing since FY 81 (see Table IV-4). Since both cash and pass users have exhibited increasing transfer rates during this period of time, it is likely that progressively fewer riders are finding their travel needs met through the use of just one bus.

The fact that a considerable number of route changes have been implemented since FY 81, most notably changes occurring as a result of the District's Sector Improvement Program, suggests that service changes are the principal cause of increased transfers. The Sector Improvement Program was intended to increase the cost-effectiveness and schedule reliability of District services. This was accomplished through consolidation of routes and segmentation of services passing through the Los Angeles CBD. Changes of this nature have undoubtedly contributed to increasing transfer rates with time.

HISTORICAL DAILY PATRONAGE



HISTORICAL DAILY PATRONAGE

FIGURE 3

IV-3

FY 86 PATRONAGE VARIATION BY SIX MONTH INTERVAL

<u>Fare Category</u>	<u>Actual Jul-Dec Change from FY 85</u>	<u>Actual Jan-Jun Change from FY 85</u>	<u>Actual Annual Change from FY 85</u>	<u>Proj. Annual Change From FY 85</u>
Regular	-0.8%	-4.3%	-2.6%	-14.1%
Express	+6.6%	-10.4%	-1.9%	-22.5%
Elderly/Disabled	+8.5%	-4.9%	+1.5%	-2.8%
Student (K-12)	-40.4%	-49.5%	-45.6%	-15.9%
College/Vocational	-13.9%	-22.1%	-18.2%	-23.9%
Free	+5.7%	+6.6%	+6.2%	+2.8%
Other	-29.6%	-59.2%	-44.7%	-26.5%
Systemwide	-5.5%	-13.0%	-9.4%	-13.0%



FY 86 PATRONAGE VARIATION BY
SIX MONTH INTERVAL

TABLE IV-1

**FY 85 and FY 86 BOARDINGS AND REVENUE BY FARE CATEGORY
PROJECTED VERSUS ACTUAL**

<u>Fare Category</u>	<u>FY 85 Boardings(000)</u>	<u>FY 86 Projected Boardings(000)</u>	Projected	<u>FY 86 Actual Boardings(000)</u>	Actual
			<u>Change From FY 85</u>		<u>Change From FY 85</u>
Regular	299,081	256,925	-14.1%	291,280	-2.6%
Express	17,014	13,178	-22.5%	16,692	-1.9%
Elderly & Disabled	61,392	59,667	-2.8%	62,299	+1.5%
Student (K-12)	79,698	67,064	-15.9%	43,392	-45.6%
College/Vocational	14,991	11,403	-23.9%	12,259	-18.2%
Free	20,777	21,353	+2.8%	22,058	+6.2%
Other	4,310	3,168	-26.5%	2,385	-44.7%
Systemwide	497,263	432,758	-13.0%	450,365	-9.4%

<u>Fare Category</u>	<u>FY 85 Revenue(\$000)</u>	<u>FY 86 Projected Revenue(\$000)</u>	Projected	<u>FY 86 Actual Revenue(\$000)</u>	Actual
			<u>Change From FY 85</u>		<u>Change From FY 85</u>
Regular	\$92,319	\$130,082	+40.5%	\$141,525	+53.3%
Express	\$13,399	\$16,485	+23.0%	\$18,794	+40.3%
Elderly & Disabled	\$5,052	\$8,351	+65.3%	\$9,384	+85.7%
Student (K-12)	\$7,017	\$18,265	+160.3%	\$13,438	+91.5%
College/Vocational	\$1,584	\$4,048	+156.2%	\$4,653	+193.8%
Free	---	---	---	---	---
Other	\$2,353	\$2,804	+19.2%	\$2,181	-7.3%
Systemwide	\$121,724	\$180,035	+46.9%	\$189,975 (1)	+56.1%

	<u>FY 85 Daily Boardings</u>	<u>Projected FY 86 Daily Boardings</u>	<u>Actual FY 86 Daily Boardings</u>	<u>Actual Change From FY 85</u>
Weekdays	1,600,020	1,390,000	1,430,990	-10.6%
Saturdays	995,038	869,750	919,890	-7.6%
Sun. & Hol.	674,414	592,070	673,430	-0.1%

(1) \$6.437 million of additional revenue in FY 86 resulting from advance sales of tickets, tokens and other lesser sources of passenger revenue are excluded.

Source: SCRTD Planning Department
August 1986



FY 85 and FY 86 BOARDINGS AND REVENUE
BY FARE CATEGORY PROJECTED VERSUS ACTUAL

TABLE IV-2

**FY 85 AND FY 86 TRIPS AND REVENUE PER TRIP BY FARE CATEGORY
PROJECTED VERSUS ACTUAL**

<u>Fare Category</u>	<u>FY 85 Linked Trips</u>	<u>FY 86 Projected Linked Trips</u>	<u>Projected Change From FY 85</u>	<u>FY 86 Actual Linked Trips</u>	<u>Actual Change From FY 85</u>
Regular	197,584	169,665	-14.1%	189,672	-4.0%
Express	11,537	8,930	-22.6%	10,985	-4.8%
Elderly & Disabled	40,476	39,262	-3.0%	39,778	-1.7%
Student (K-12)	52,415	44,075	-15.9%	28,007	-46.6%
College/Vocational	9,432	7,215	-23.5%	7,631	-19.1%
Free	12,614	12,964	+2.8%	15,388	+22.0%
Other	4,196	3,047	-27.3%	2,366	-43.6%
Systemwide	328,254	285,158	-13.1%	293,827	-10.5%

<u>Fare Category</u>	<u>FY 85 Revenue/ Trip</u>	<u>FY 86 Proj. Revenue/ Trip</u>	<u>Projected Change From FY 85</u>	<u>FY 86 Actual Revenue/ Trip</u>	<u>Actual Change From FY 85</u>
Regular	\$.467	\$.767	+64.2%	\$.746	+59.7%
Express	\$1.162	\$1.842	+58.5%	\$1.711	+47.2%
Elderly & Disabled	\$.125	\$.213	+70.4%	\$.236	+88.8%
Student (K-12)	\$.134	\$.414	+209.0%	\$.480	+258.2%
College/Vocational	\$.168	\$.561	+233.9%	\$.610	+263.1%
Free	\$.000	\$.000	---	\$.000	---
Other	\$.561	\$.920	+64.0%	\$.922	+64.3%
Systemwide	\$.371	\$.631	+70.1%	\$.647	+74.4%
(Revenue/Boarding)	(\$.245)	(\$.416)		(\$.422)	

Source: SCRTD Planning Department
August 1986



FY 85 AND FY 86 TRIPS AND REVENUE PER
TRIP BY FARE CATEGORY PROJECTED VERSUS
ACTUAL

TABLE IV-3

HISTORICAL TRANSFER SHARES OF BOARDINGS

<u>Fiscal Year</u>	<u>Transfer Share of Cash Boardings</u>	<u>Transfer Share of Pass Boardings</u>	<u>Transfer Share of All Boardings</u>
81	.302	.319	.308
82	.318	.344	.328
83	.318	.343	.329
84	.320	.343	.330
85	.330	.361	.346
86	.341	.364	.349

Source: SCRTD Planning Department
 Compiled from historical quarterly fare surveys, and
 on-board surveys conducted in FY 83 and FY 86



HISTORICAL TRANSFER SHARES
OF BOARDINGS

TABLE IV-4

Changes in the fare structure introduced in July 1985 have altered the proportions of farebox revenue contributed by the various categories of ridership. The objective of reducing the share of revenue derived from full fare paying riders was achieved as Regular, Express and Other categories of ridership increased their overall share of boardings from 64.5% to 68.9% of all riders while revenue derived from these groups declined from 88.7% to 85.6% of all farebox revenues (see Table IV-5). This meant that a corresponding increase in the share of revenues derived from discount fare riders (Elderly/Disabled, Student [K-12] and College/Vocational) occurred. Discount fare ridership declined from 31.3% to 26.1% of boardings while revenue derived from these riders increased from 11.3% to 14.4% of farebox revenues. Not all of the increased share of farebox revenues obtained from discount fare riders was directly contributed by these riders as nearly half (1.5% out of 3.1%) was derived from local community pass price subsidy program revenues.

Changes in the proportion of riders using passes also occurred. The total number of monthly passes sold during FY 86 declined less than expected (see Table IV-6). Furthermore, the share of riders using passes increased for all except Express ridership categories. Student (K-12) and College/Vocational pass usage is a special case for FY 86 because of a problem in counting cash riders in these fare categories under the adopted fare structure. Since cash discounts are no longer offered to these riders, quarterly fare surveys for FY 86 do not explicitly identify Student (K-12) and College/Vocational cash riders' shares of daily patronage. As a result, the proportion of full fare cash riders who are Student (K-12) or College/Vocational riders has been estimated based on historical quarterly data. This method of processing disaggregate patronage data essentially assumes no change in the relative proportion of these riders who use cash or monthly pass methods of fare payment. Thus, it is not possible to determine whether or not any significant change in pass versus cash usage occurred for Student (K-12) or College/Vocational patrons. Nevertheless, it appears that there has been an overall increase in the proportion of all District riders who use monthly passes from 48.1% during FY 85 to 49.1% for FY 86.

4.2 IMPACTS BY RIDERSHIP CATEGORY

Generally, greater than anticipated patronage (and, correspondingly, revenue) occurred for most categories of ridership. Student (K-12) and Other (Ticket and Special Services patrons) riders represented notable exceptions as declines in patronage far exceeded expectations. On the other hand, the declines in ridership observed for Regular and Express riders were considerably less than projected. Thus, while the systemwide patronage decline was reasonably consistent with expectations (-9.4% actual compared with -13.0% projected), variations between observed and projected changes for individual fare categories were often substantial. This section examines these variations for each fare category.

FY 85 AND FY 86 RIDERSHIP AND REVENUE SHARES

Boardings

<u>Fare Category</u>	<u>FY 85 Share</u>	<u>Projected FY 86 Share</u>	<u>Actual FY 86 Share</u>
Regular	.602	.595	.647
Express	.034	.031	.037
Elderly & Disabled	.123	.138	.138
Student (K-12)	.160	.155	.096
College/Vocational	.030	.026	.027
Free	.042	.049	.049
Other	.009	.006	.005

Revenue

<u>Fare Category</u>	<u>FY 85 Share</u>	<u>Projected FY 86 Share</u>	<u>Actual FY 86 Share</u>
Regular	.758	.725	.745
Express	.110	.092	.099
Elderly & Disabled	.042	.047	.049
Student (K-12)	.058	.102	.070
College/Vocational	.013	.022	.024
Free	---	---	---
Other	.019	.012	.011

Source: SCRTD Planning Department
August 1986



**FY 85 AND FY 86 RIDERSHIP
AND REVENUE SHARES**

TABLE IV-5

FY 85 AND FY 86 PROJECTED VERSUS ACTUAL PASS UTILIZATION

<u>Fare Category</u>	<u>FY 85</u>	<u>Projected FY 86</u>	<u>Projected</u>	<u>Actual FY 86</u>	<u>Actual</u>
	<u>Passes Sold</u>	<u>Passes Sold</u>	<u>Change From</u>	<u>Passes Sold</u>	<u>Change From</u>
			<u>FY 85</u>		<u>FY 85</u>
Regular	1,022,255	895,600	-12.4%	1,165,991	+14.1%
Express-1	39,217	29,590	-24.5%	30,676	-21.8%
Express-2	40,152	29,860	-25.6%	32,211	-19.8%
Express-3	40,439	29,880	-26.1%	32,551	-19.5%
Express-4	33,339	24,550	-26.4%	22,224	-33.3%
Express-5	18,307	13,440	-26.6%	12,099	-33.9%
Elderly & Disabled	838,217	878,630	+4.8%	972,307	+16.0%
Student (K-12)	1,430,161	1,237,670	-13.5%	874,914	-38.8%
College/Vocational	282,895	197,870	-30.1%	270,099	-4.5%
Systemwide Totals	3,744,982	3,337,090	-10.9%	3,413,072	-8.9%

<u>Fare Category</u>	<u>FY 85 Pass</u>	<u>Projected</u>	<u>Actual</u>
	<u>Share of</u>	<u>FY 86 Pass</u>	<u>FY 86 Pass</u>
	<u>Linked Trips</u>	<u>Share of</u>	<u>Share of</u>
		<u>Linked Trips</u>	<u>Linked Trips</u>
Regular	.328	.334	.390
Express-1	.403	.394	.355
Express-2	.417	.399	.429
Express-3	.511	.486	.471
Express-4	.573	.545	.457
Express-5	.610	.579	.494
Elderly & Disabled	.810	.875	.856
Student (K-12)	.888	.914	.884
College/Vocational	.911	.833	.913
Systemwide	.481	.496	.491

Source: SCRTD Planning Department
August 1986



FY 85 AND FY 86 PROJECTED
VERSUS ACTUAL PASS UTILIZATION

TABLE IV-6

4.2.1 FULL FARE (NON-EXPRESS) RIDERS

TABLE IV-7

SUMMARY OF IMPACTS

	<u>Proj. FY 86</u>	<u>Actual FY 86</u>
Boardings	-14.1%	-2.6%
Linked Trips	-14.1%	-4.0%
Revenue	+\$37.7 million	+\$49.2 million
Share of Boardings	.595	.647
Share of Revenue	.725	.745
Passes Sold	-12.4%	+14.1%
Pass Share of Trips	.334	.390
Revenue per Trip	+64.2%	+59.7%

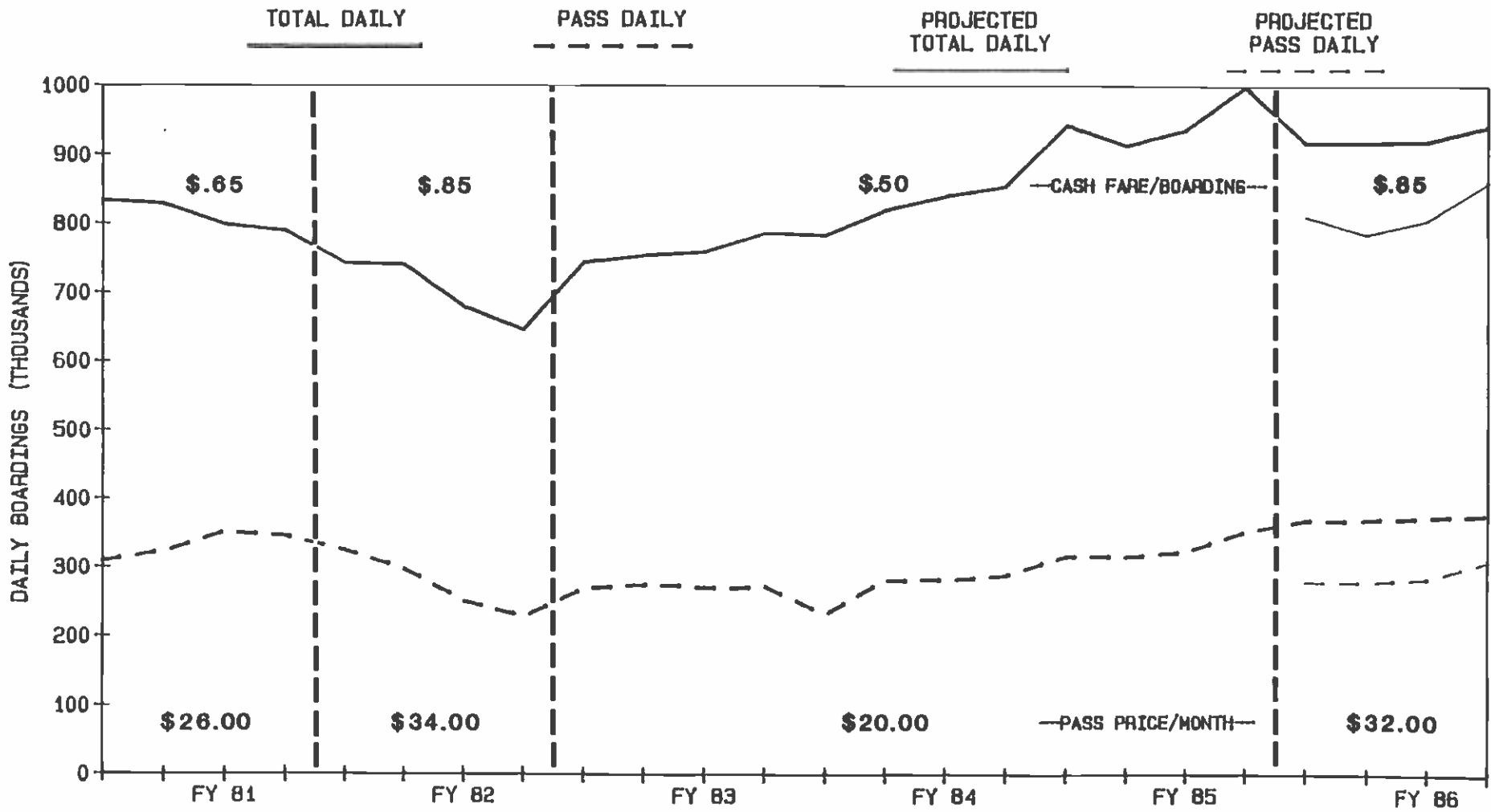
This is the largest single group of District riders, contributing nearly two-thirds of all boardings. Riders in this group receive no fare discounts and virtually no subsidy towards established fares (approximately 0.5% of these riders were offered pass price subsidies by local communities). Riders in this fare category are predominantly patrons of local buses (express bus riders constitute a separate fare category).

This group experienced the second lowest rate of fare increase (only Express riders benefited from lesser increases). The base cash fare was increased 70% (\$.50 to \$.85), and monthly pass prices were increased 60% (\$20 to \$32). The relative increase in monthly pass prices was lower because the District wished to encourage a larger proportion of riders to use passes, thus the monthly pass price was reduced \$2 from its historical price of 40 times the cash base fare.

These pricing policies were successful in encouraging a significant increase in the share of these riders using monthly passes. The effective average fare increase experienced by this group of riders was less than 60% because of greater pass utilization (the number of times each pass was used in any given month). As a result, ridership decline was significantly lower than anticipated (2.6% fewer boardings compared with a projected decline of 14.1%), and the number of monthly passes sold over the course of the year actually increased. Resulting revenues were \$11.5 million higher than anticipated. The level of additional unexpected revenue from this group of riders more than offset the \$1.5 million lower than anticipated revenue derived from all other categories of riders.

Significantly higher than anticipated ridership by full fare riders during FY 86 resulted in retention of nearly all of the ridership gains accrued during the Proposition A fare reduction program (see Figure 4). The relatively small decline in full fare ridership during FY 86, compared with projected decline, has been attributed to a higher level of transit dependence among District riders than has historically been

HISTORICAL FULL FARE (NON-EXPRESS) PATRONAGE



IV-12



HISTORICAL FULL FARE (NON-EXPRESS) PATRONAGE

FIGURE 4

assumed. This translates to a lower elasticity for such riders, and updated parameter estimates in the District's patronage projection model could account for this, to some extent, in future model applications. More experience with future fare change impacts will add to the District's understanding of the fare versus patronage dynamics of this group of riders.

4.2.2 FULL FARE EXPRESS RIDERS

TABLE IV-8

SUMMARY OF IMPACTS

	<u>Proj. FY 86</u>	<u>Actual FY 86</u>
Boardings	-22.5%	-1.9%
Linked Trips	-22.6%	-4.8%
Revenue	+\$3.1 million	+\$5.4 million
Share of Boardings	.031	.037
Share of Revenue	.092	.099
Passes Sold	-25.7%	+24.3%
Pass Share of Trips	.443	.419
Revenue per Trip	+58.5%	+47.2%

Though a smaller than average segment of District ridership, this group contributes the highest average revenue per trip (and consumes a greater amount of service at a higher cost per trip). Patrons in this fare category utilize District express buses. This is the only fare category where fares are proportional to distance traveled (distance-based). Pass price subsidies are generally not available to this group (only 0.5% of these riders were offered such subsidies).

Express riders experienced the lowest average fare increase. Cash fares increased between 48.6% and 60% depending on the number of express zones included in a trip, and monthly pass price increases (including the cost of express stamps) varied between 63.0% and 67.3%. The relatively higher rate of price increases for monthly pass users compared to cash fare increases resulted in a slightly lower proportion of express riders using passes. This was the only group of riders among which pass use (as a share of trips) was known to decline from prior year levels.

A surprisingly low decrease in Express patronage occurred in response to higher fares. Although express riders are known to be among the least dependent on transit (on-board surveys consistently show higher than average household incomes and auto availability for this group of riders), Express ridership response to FY 86 fare increases was comparable to the observed response for full fare non-express riders. The increases in cash versus pass fares for Express riders and the resulting higher proportion of Express riders using cash in FY 86 led to a decline in the sale of Express pass stamps which was nearly as

large as anticipated (24.3% actual decline compared with a 25.7% projected decline). Not surprisingly, Express riders traveling the greatest distance (4 and 5 express zones) exhibited the greatest shifts from pass to cash usage since the difference between cash and pass price changes was greatest for these riders (a 5-zone pass increased 67.3% compared with a 48.6% increase in the 5-zone cash fare, while a 1-zone pass increased 63.0% compared with a 1-zone cash fare increase of 60%).

Figure 5 shows historical trends for Express ridership including the immediate impact of FY 86 fare increases. Interestingly, virtually all of the decline in Express patronage occurred during the fourth quarter of FY 86 (April through June). Note that fourth quarter express patronage declined significantly in FY 82 and to a lesser extent in FY 84, although neither prior deviation was as large as that observed during FY 86. Observation of future Express patronage behavior will be needed to clarify what has happened. Nevertheless, recalibration of patronage model parameters for Express riders is indicated.

4.2.3 ELDERLY/DISABLED RIDERS

Table IV-9

SUMMARY OF IMPACTS

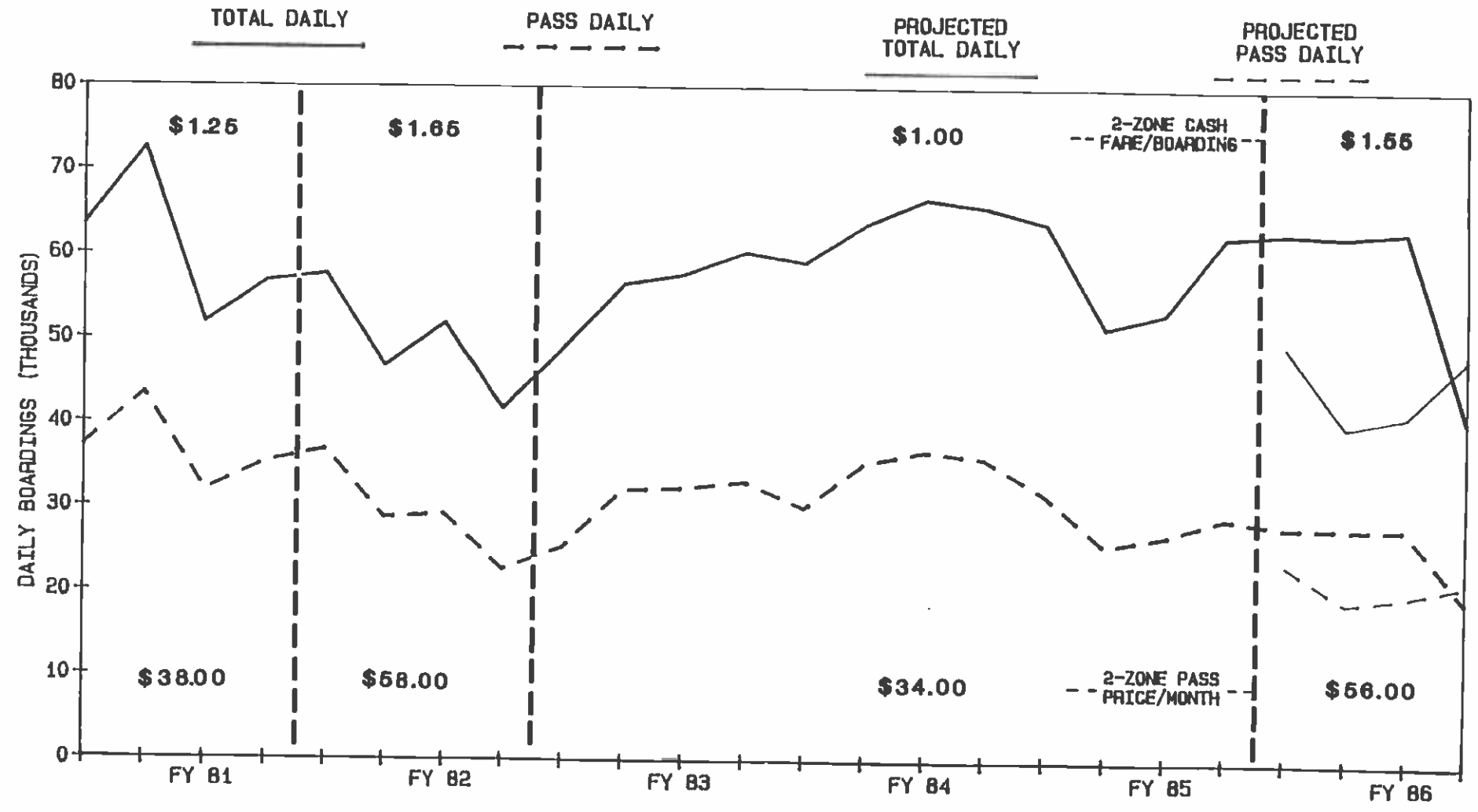
	<u>Proj. FY 86</u>	<u>Actual FY 86</u>
Boardings	-2.8%	-1.5%
Linked Trips	-3.0%	-1.7%
Revenue	+\$3.3 million	+\$4.3 million
Share of Boardings	.138	.138
Share of Revenue	.047	.049
Passes Sold	+4.8%	+16.0%
Pass Share of Trips	.875	.856
Revenue per Trip	+70.4%	+88.8%
Share of Passes Subsidized	.851	.791
Subsidy Required	\$2.24 million	\$2.31 million

Although treated for analysis purposes as one fare category, two distinct groups of riders are represented. The vast majority of patrons in this analysis group are Elderly (80.6% based on FY 86 pass sales). These riders use all modes of District service though they predominately use local buses. Elderly and Disabled patrons are exempt from express surcharges.

Even though these riders constitute only about 1 of every 7 District patrons, they are the largest group of riders eligible for discounted fares and the second largest (next to Regular patrons) of the fare analysis groups. Federal regulations dictate that this group of riders receive at least a 50% fare discount during off-peak travel periods. District policy has historically extended discounts of at least this magnitude to these riders throughout the day. Substantial pass price discounts have also been historically available.

IV-15

HISTORICAL FULL FARE EXPRESS PATRONAGE



HISTORICAL FULL FARE EXPRESS PATRONAGE

FIGURE 5

Adopted fare increases for these riders in FY 86 were substantial although significant discounts from full fares were continued. Cash fares were increased by 100% (from \$.20 to \$.40). The monthly pass price was increased by 75% (from \$4 to \$7), but increased pass use was encouraged through the wide availability of pass price subsidies offered by local communities and financed with local Proposition A revenues. Pass price subsidies of \$3 per month were initially offered to 89.8% of Elderly/Disabled riders with an expectation that 85.1% of FY 86 Elderly/Disabled passes sold would be subsidized. From an initial 20 communities and four County Supervisorial Districts, subsidy availability increased during FY 86 as 11 additional communities elected to offer such subsidies to their Elderly/Disabled residents. This meant that 92.5% of Elderly/Disabled riders were eligible to receive pass price subsidies by the end of FY 86. Ultimately, 79.1% of Elderly/Disabled passes sold benefited from price subsidies. The success of this program was further exemplified by higher than anticipated growth in the total number of Elderly/Disabled passes sold throughout FY 86.

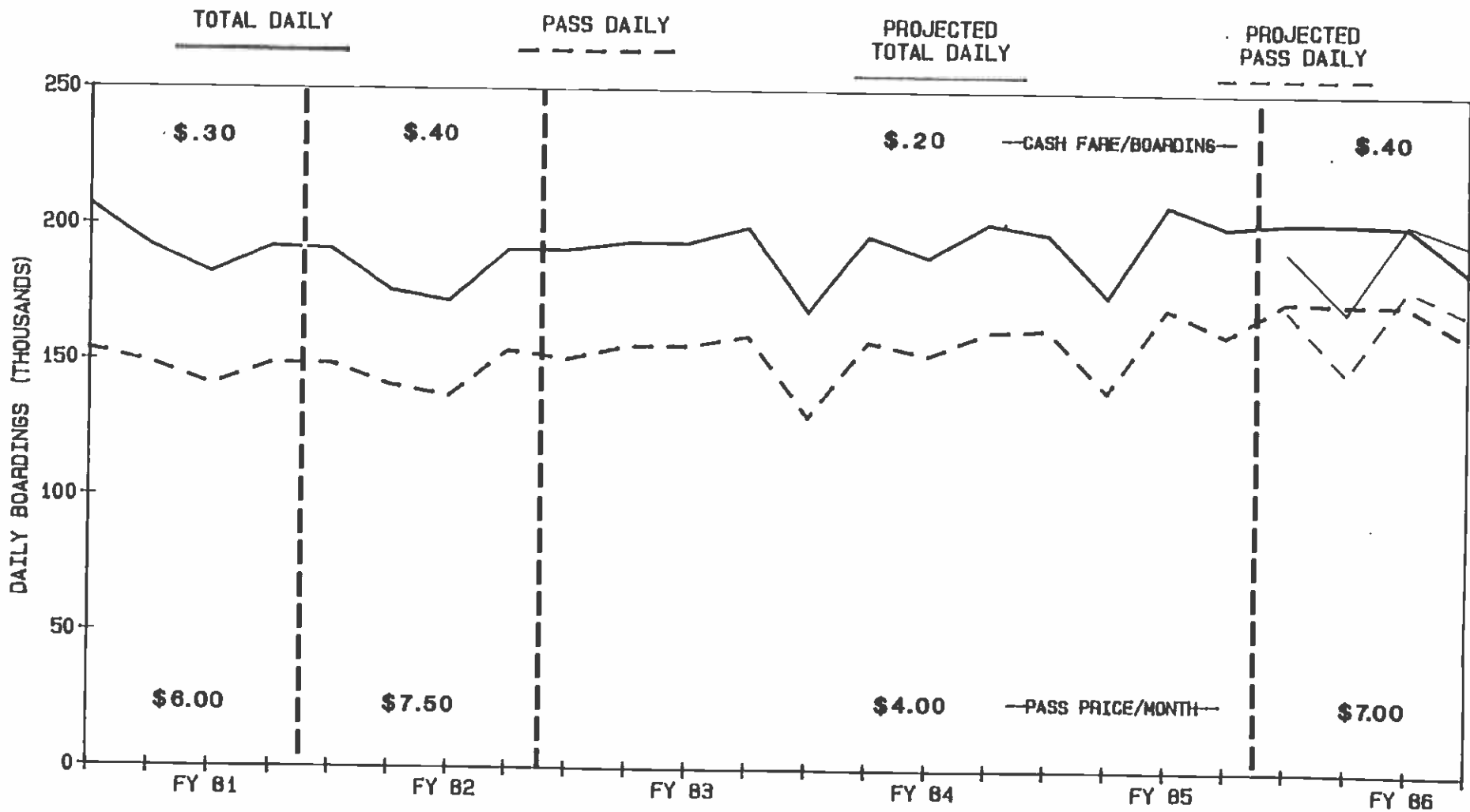
Elderly/Disabled patronage response to higher fares had been predicted to be mild (a 2.8% projected decline in boardings), largely due to the availability of pass price subsidies. The actual patronage response was very nearly as expected as linked trips declined 1.7%, although total Elderly/Disabled boardings rose slightly (up 1.5%) due to an increase in the number of transferring riders. Estimates of the anticipated cost to local communities of providing pass price subsidies were also very close to actual experience. Figure 6 portrays historical Elderly/Disabled patronage experience showing continued stability of Elderly/Disabled ridership levels through FY 86.

4.2.4 STUDENT (GRADES K-12) RIDERS

TABLE IV-10
SUMMARY OF IMPACTS

	<u>Proj. FY 86</u>	<u>Actual FY 86</u>
Boardings	-15.9%	-45.6%
Linked Trips	-15.9%	-46.6%
Revenue	+\$11.2 million	+\$6.4 million
Share of Boardings	.155	.096
Share of Revenue	.102	.070
Passes Sold	-13.5%	-38.8%
Pass Share of Trips	.914	.884
Revenue per Trip	+209.0%	+258.2%
Share of Passes Subsidized	.107	.069
Subsidy Required	\$1.06 million	\$0.49 million

HISTORICAL ELDERLY & DISABLED PATRONAGE



HISTORICAL ELDERLY AND DISABLED PATRONAGE

FIGURE 6

IV-17

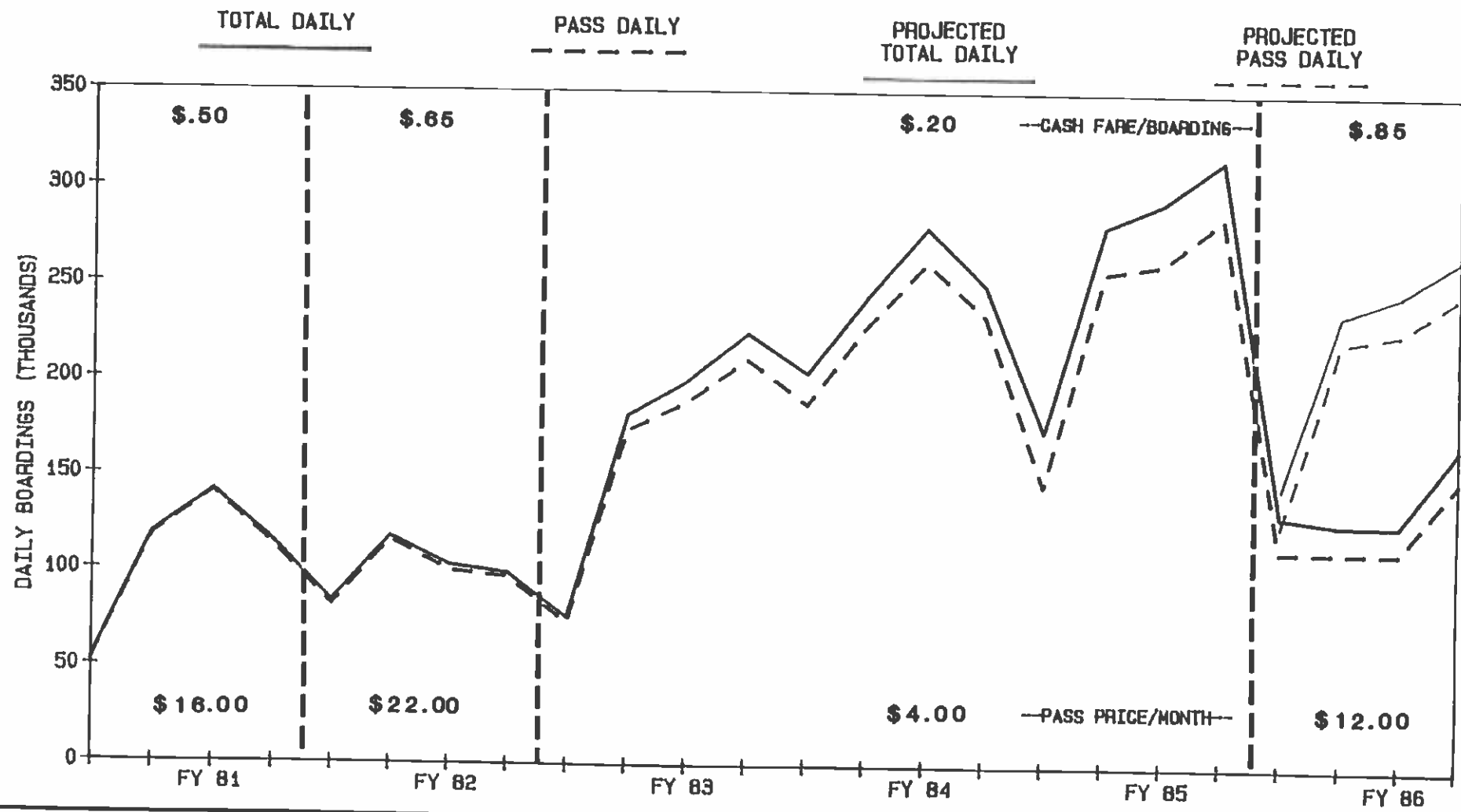
Student riders were formerly the largest group of patrons entitled to discount fares in each of FY 84 and FY 85. As shown in Figure 7, the low fares offered to Student (K-12) riders during the Proposition A reduced fare program (FY 83 through FY 85) encouraged significant growth in ridership. However, Student (K-12) patronage response to higher fares in FY 86 was the most extreme of any fare category with patronage declines approaching three times the rate of decline which had been anticipated. While adopted fare increases were large enough to realize a gain in farebox revenue from Student (K-12) patrons, this fare category was the only one that failed to achieve an increase in revenue at least as large as had been projected.

Higher than average patronage losses had been expected because fare increases for this group of riders were quite large (cash fares were increased by 325%, and pass prices were increased by 200%). Mitigation of potential patronage declines was anticipated from the availability of local community supported pass price subsidies which were initially offered to 7.0% of Student (K-12) riders and subsequently available to 9.2% of these riders. Nevertheless, unexpectedly large patronage declines occurred, and utilization of available pass price subsidies was poor (see Section 4.3.2 for more information regarding Student [K-12] pass price subsidy utilization). Consequently, the cost of providing such subsidies was less than one-half of what was anticipated.

Evaluation of Student (K-12) ridership projections in light of actual experience suggests that much of the difference between projected and actual response is attributable to inappropriate assumptions regarding Student (K-12) ridership behavior employed at the time of application of the ridership projection model. Essentially, historical data used to calibrate the projection model was too limited to permit statistically reliable estimation of model coefficients for Student (K-12) riders. Therefore, coefficients which had been derived for a fare category having assumed ridership behavior most like Student (K-12) riders were used to project fare increase impacts. In this instance, Student (K-12) riders were assumed to be most similar to Elderly/Disabled patrons, at least to the extent of being relatively transit dependent, and, therefore, were assumed to have a relatively low valued coefficient of elasticity with respect to fares. Subsequent reestimation of Student (K-12) model coefficients, incorporating FY 86 data into the historical database, still resulted in statistically unreliable parameter estimates. However, the magnitude of the estimates suggested that the elasticity of Student (K-12) riders with respect to fares is significantly higher than had previously been assumed. Further investigation, utilizing data from the FY 86 on-board survey, revealed that the average household income and auto availability (as a driver or passenger) of Student (K-12) riders is significantly higher than for the average District rider. In fact, the

61-19

HISTORICAL STUDENT (K-12) PATRONAGE



HISTORICAL STUDENT (K-12) PATRONAGE

FIGURE 7

similarity of these characteristics to those of Express patrons suggests that the use of model coefficients for Express riders is most appropriate for projections of Student (K-12) ridership response to fare changes. Additional discussion of this finding is provided in Section 5.0 of this report.

4.2.5 COLLEGE/VOCATIONAL RIDERS

TABLE IV-11
SUMMARY OF IMPACTS

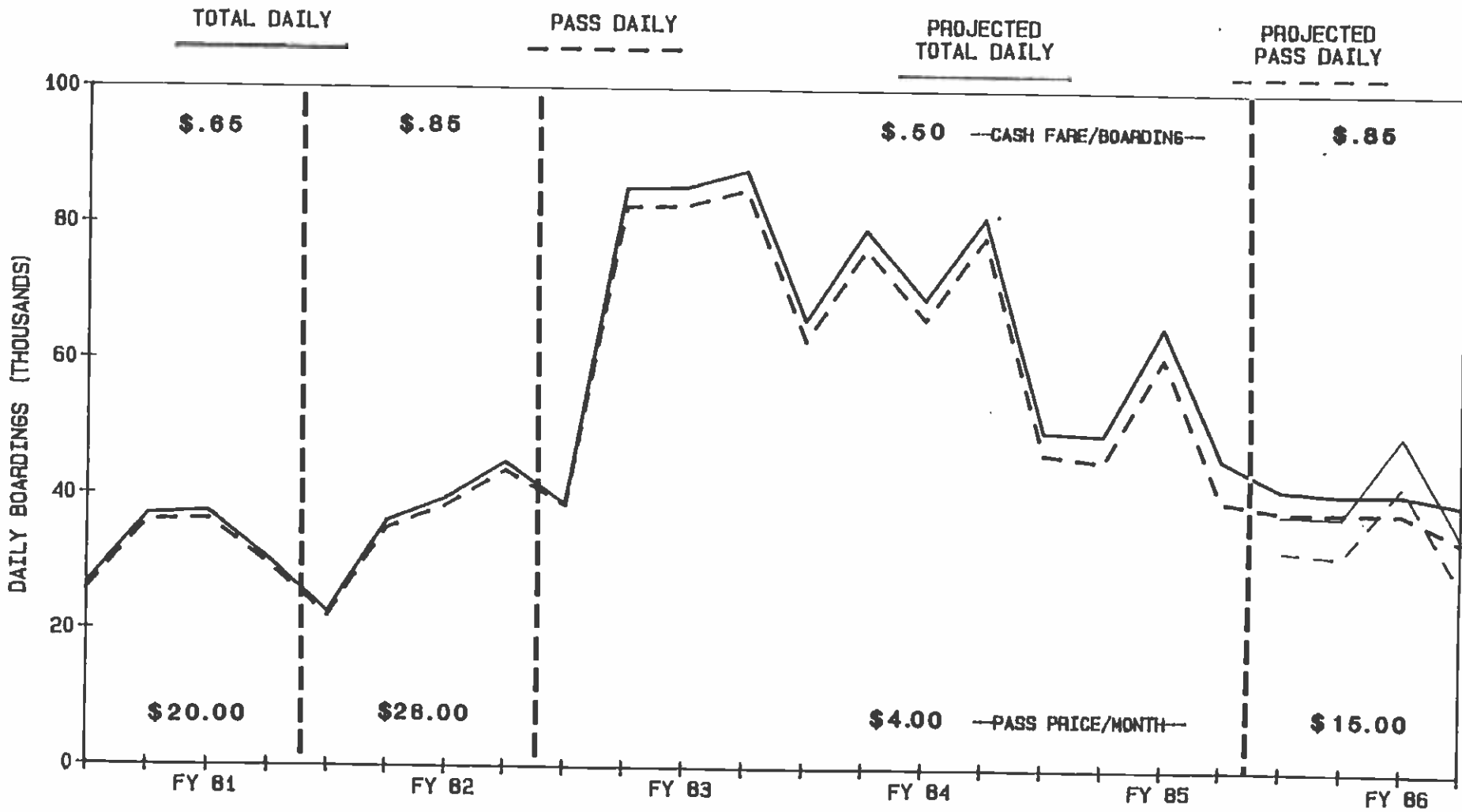
	<u>Proj. FY 86</u>	<u>Actual FY 86</u>
Boardings	-23.9%	-18.2%
Linked Trips	-23.5%	-19.1%
Revenue	+\$2.5 million	+\$3.1 million
Share of Boardings	.026	.027
Share of Revenue	.022	.024
Passes Sold	-30.1%	-4.5%
Pass Share of Trips	.833	.913
Revenue per Trip	+233.9%	+263.1%
Share of Passes Subsidized	.116	.042
Subsidy Required	\$0.25 million	\$0.13 million

College/Vocational riders are one of the smallest fare groups identified for analysis. This group experienced a higher than average rate of fare increase with cash fares increasing by 70% and monthly pass prices increasing 275%. Local community supported pass price subsidies were initially offered to 6.2% of these riders and were ultimately available to 8.5% of College/Vocational patrons by the end of FY 86. Utilization of such subsidies among these riders was poor (see Section 4.3.3).

The overall patronage decline for College/Vocational riders was nearly as large as projected. However, the relatively small decline in pass sales was surprising in comparison to the decline in patronage. As was observed for Student (K-12) riders, College/Vocational patrons exhibit characteristics most like those of Express riders with respect to household incomes, auto availability and indicated elasticity response to fare changes. The findings for College/Vocational riders after model coefficient reestimation (see Section 5.0) are analogous to the observations made for Student (K-12) riders in the previous section of this report (projected patronage declines were larger for College/Vocational riders because original projections assumed a behavior similarity which had been assumed for Student [K-12] patrons).

Given these findings, larger than observed patronage decline should have occurred for College/Vocational riders. Figure 8, which depicts historical College/Vocational ridership trends, suggests an explanation. After peaking in FY 83, College/Vocational patronage declined in each succeeding year. The FY 86 patronage decline appears

HISTORICAL COLLEGE/VOCATIONAL PATRONAGE



HISTORICAL COLLEGE/VOCATIONAL PATRONAGE

FIGURE 8

IV-21

to represent a continuation of this trend. Apparently, the loss of College/Vocational patrons during FY 86 might have been larger were it not for the fact that ridership had already begun to decline during the two previous years for reasons other than the amount of fare charged. It is known that enrollment in state-funded institutions, particularly community colleges, began to decline as a result of higher tuition charges at about the time District College/Vocational patronage began to fall. Assuming causality, it is likely that a number of College/Vocational patrons who might otherwise have been affected by FY 86 fare increases had ceased to use District services before higher fares were imposed, thereby diminishing the magnitude of the ridership loss which occurred subsequently because of higher fares.

4.2.6 OTHER RIDERS

The remainder of the fare categories not yet discussed includes patrons riding free, ticket users, and Special Services patrons. Collectively, these groups contribute 5.4% of District ridership, and over 90% of these riders are permitted free fare privileges.

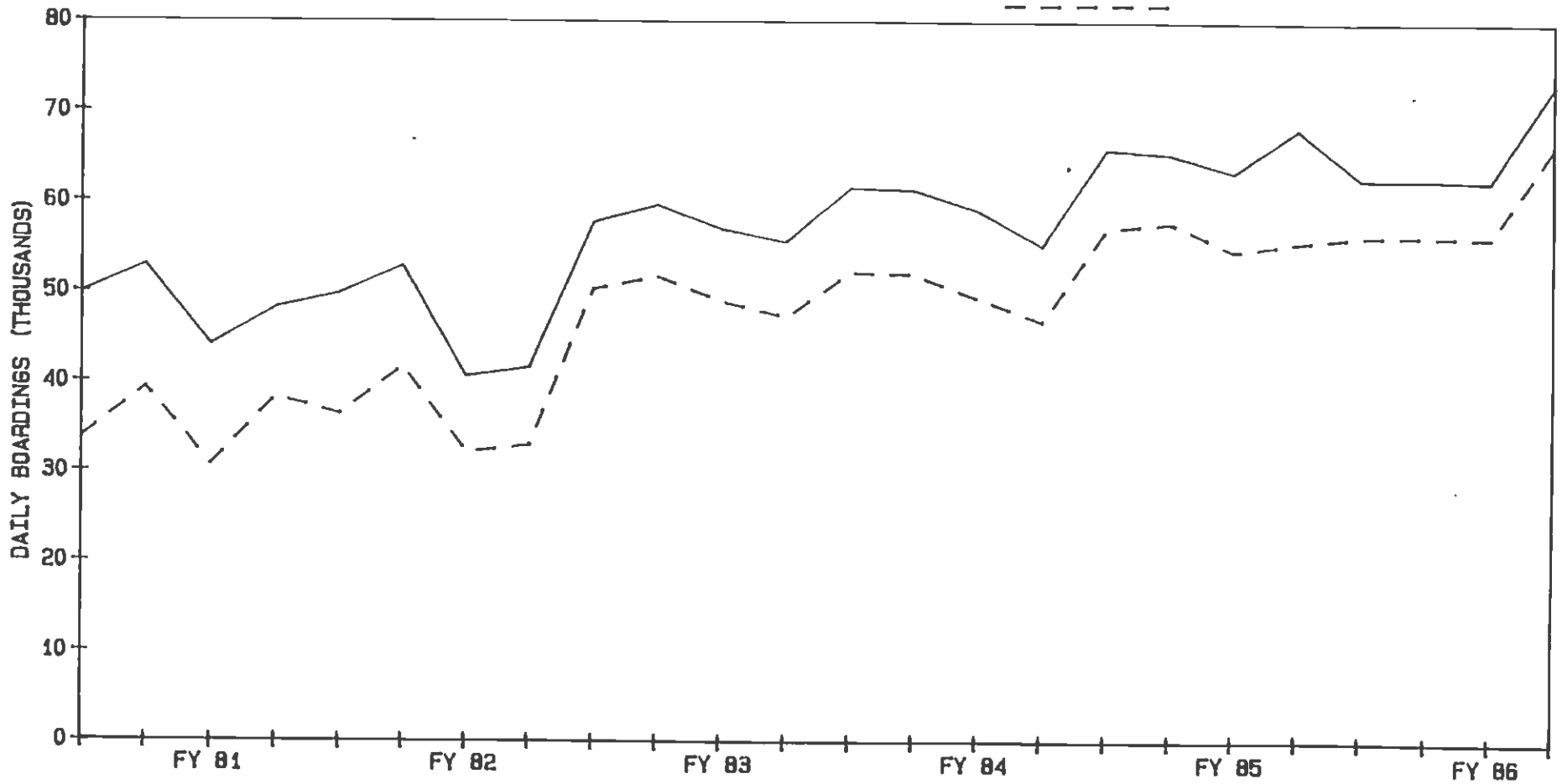
Free fare riders include children under age 5, District employees, the blind, and designated law enforcement personnel. Children under age 5 represent 91.3% of free patrons. As can be seen in Figure 9, this group has been increasing in size in recent years and, as would be expected, is relatively indifferent to periodic fare changes. Some sensitivity to fare changes occurs because the large proportion of children under age 5 within this ridership group must be accompanied by fare-paying adults.

Ticket patrons are primarily full fare riders who have chosen to purchase a ticket, as a form of prepaid fare, rather than carry cash. Presumably, the majority of these riders are infrequent users of District services as evidenced by their choosing not to purchase a monthly pass. This category has historically included riders using District fare tokens as well. As in the case of tickets, tokens represent a prepaid fare alternative to cash. Within the past six years, the availability of District tokens has not been widely promoted, and their primary means of distribution has been through marketing promotions in association with local merchants. Special token sets were minted and sold in conjunction with the Olympic Games which were held in Los Angeles during the summer of 1984. Following the Olympic Games, the sale of tokens was largely discontinued, and few tokens remain in circulation. As a result of limited availability of tokens, the number of riders using tickets or tokens has declined considerably in recent years. Whereas 1.4% of FY 81 ridership relied on tickets and tokens for fare payment, present usage (primarily tickets) is approximately 0.3% of FY 86 patronage.

HISTORICAL NO FARE (FREE) PATRONAGE

TOTAL DAILY

CHILDREN UNDER 5
DAILY



IV-23



HISTORICAL NO FARE (FREE) PATRONAGE

FIGURE 9

Special Service patronage consists of users of additional District services operated in conjunction with various special events such as service to racetracks, the Hollywood Bowl, the Pomona Fair, and the Rose Bowl. Many of these services are subject to individual pricing (some fares are contractually established) and charge a premium fare. Fares for most of these services were revised during the summer of 1985. The majority of Special Service patronage was derived from operation of two shuttle circulator services operating in downtown Los Angeles and Westwood under contract to the City of Los Angeles until October 26, 1985, when District operation was discontinued. The discontinuation of District operation of these two services accounts for the discrepancy between projected and actual patronage shown in Table IV-2 for the "Other" fare category. By the end of FY 86, Special Service patronage represented slightly more than 0.1% of District ridership.

4.3 EFFECT OF PASS PRICE SUBSIDY AVAILABILITY

The advent of significant fare increases in FY 86, particularly for discounted fare categories, prompted consideration of alternatives to relieve the fare increase burden for riders deemed less able than normal to pay higher fares. The principal action chosen to accomplish this was solicitation of pass price subsidies from cities for discount pass users. Thirty-one communities, including the City of Los Angeles, as well as four Los Angeles County Supervisorial Districts (Districts 2-5) eventually elected to offer pass subsidies to one or more discount pass ridership groups. All participants subsidized Elderly and Disabled riders, 17 of them chose to subsidize Student (K-12) passes, and 13 of those subsidizing Student passes also chose to subsidize College/Vocational passes. Five communities (Alhambra, Lynwood, South Gate, South Pasadena, and Temple City) chose to subsidize all pass sales. Subsidies were made available to residents of participating communities through the use of Proposition A Local Return Funds. The subsidies offered by County Supervisorial Districts were available only to residents of unincorporated areas within those Districts. Table IV-12 summarizes the extent of community participation in the pass price subsidy program. Table IV-13 summarizes the overall level of ridership participation during FY 86 in comparison with projections made prior to the fare change.

4.3.1 ELDERLY AND DISABLED PASS PRICE SUBSIDIES

Subsidies for Elderly/Disabled riders are the most widely available, offered by all participating communities. Elderly and Disabled residents of the City of Los Angeles account for nearly 77% of all District riders in this fare group. Together with other participating communities, fully 92.5% of all Elderly and Disabled riders are eligible to receive subsidies of \$3 towards the \$7 price of each monthly pass. The effect of these subsidies is retention of the \$4 out-of-pocket cost for each monthly pass in effect since July 1982.

COMMUNITIES OFFERING PASS PRICE SUBSIDIES DURING FY 86

<u>Community</u>	<u>Elderly/Disabled</u>	<u>Student (K-12)</u>	<u>College/Vocational</u>	<u>Other</u>
Agoura Hills	X			
Alhambra	X	X	X	Regular/Express
Baldwin Park	X			
Bell	X			
Beverly Hills	X			
Burbank	X			
Commerce	X			
Covina	X	X	X	
Cudahy	X	X		
El Monte	X			
Glendale	X			
Glendora	X	X	X	
Hawthorne	X	X		
Hermosa Beach	X	X	X	
Huntington Park	X			
Inglewood	X			
La Puente	X	X	X	
Los Angeles	X			
Los Angeles County (Districts 2-5)	X	X	X	
Lynwood	X	X	X	Regular/Express
Manhattan Beach	X	X		
Maywood	X			
Monterey Park	X	X	X	
Pico Rivera	X	X	X	
Redondo Beach	X	X	X	
San Fernando	X	X	X	
Santa Fe Springs	X			
South Gate	X	X	X	Regular/Express
South Pasadena	X	X	X	Regular/Express
Temple City	X	X	X	Regular/Express
West Covina	X			
West Hollywood	X			
Share of Riders Eligible	92.5%	9.2%	8.5%	1.4%
FY 86 Share of Passes Sold	79.1%	6.9%	4.2%	Not Available



COMMUNITIES OFFERING PASS PRICE
SUBSIDIES DURING FY 86

TABLE IV-12

FY 86 PASS PRICE SUBSIDY PARTICIPATION

<u>Pass Category</u>		<u>FY 86 Expected</u>	<u>FY 86 Actual</u>
Elderly & Disabled	# of Passes Subsidized	747,860	768,932
	Share of Passes Sold	85.1%	79.1%
	Subsidy Revenue	\$2,243,580	\$2,306,796
Student (K-12)	# of Passes Subsidized	132,750	60,659
	Share of Passes Sold	10.7%	6.9%
	Subsidy Revenue	\$1,062,000	\$485,272
College/Vocational	# of Passes Subsidized	23,000	11,399
	Share of Passes Sold	11.6%	4.2%
	Subsidy Revenue	\$253,000	\$125,389

Note: Subsidies offered to residents of County unincorporated areas in Supervisorial Districts 2-5, residents of the City of Los Angeles, and residents of 31 other communities. Participation in each pass category varies with community.

Source: SCRTD Planning Department
August 1986



FY 86 PASS PRICE SUBSIDY PARTICIPATION

TABLE IV-13

Patrons took advantage of these subsidies very quickly. Within three months after initial availability, subsidy utilization rates stabilized, as follows:

TABLE IV-14

FY 86 SUBSIDIZED SHARE OF PASSES SOLD (E&D)

	<u>Elderly</u>	<u>Disabled</u>	<u>Combined</u>
Jul-Sep	.76	.60	.73
Oct-Dec	.83	.72	.81
Jan-Mar	.85	.77	.83
Apr-Jun	<u>.80</u>	<u>.74</u>	<u>.79</u>
Annual Avg.	.81	.71	.79

Interestingly, disabled patrons were consistently less likely to take advantage of available subsidies. Also evident from this data is that subsidies were used by over 85% of eligible recipients (based on 79% of passes being subsidized compared with 92.5% of passes eligible for subsidy). The degree to which patrons took advantage of available subsidies varied by community, as follows:

TABLE IV-15

FY 86 SUBSIDY UTILIZATION BY COMMUNITY (E&D)

	<u>Share of Elderly Passes Subsidized</u>	<u>Share of Disabled Passes Subsidized</u>	<u>Combined Share of E&D Passes Subsidized</u>
City of Los Angeles	90%	86%	89%
County (Districts 2-5)	54%	44%	52%
30 other communities	<u>83%</u>	<u>31%</u>	<u>73%</u>
Annual Average	88%	77%	85%

The City of Los Angeles was the most successful in encouraging its residents to take advantage of the subsidy offered. Residents of county unincorporated areas were far less likely to use available subsidies. Surprisingly, a majority of disabled riders outside of the City of Los Angeles did not take advantage of subsidized pass availability.

4.3.2 STUDENT (GRADES K-12) PASS PRICE SUBSIDIES

Subsidies for Student (K-12) riders were offered by 16 communities and 4 County Supervisorial Districts (2-5) comprising 9.2% of all eligible student pass patrons. Sixty percent of residents eligible for student subsidies live in unincorporated areas of the county. As was observed for Elderly and Disabled patrons, utilization of student pass subsidies stabilized after three months, as follows:

TABLE IV-16

FY 86 SUBSIDIZED SHARE OF PASSES SOLD (Student K-12)

Jul-Sep	3%
Oct-Dec	8%
Jan-Mar	8%
Apr-Jun	<u>9%</u>
Annual Avg.	7%

While subsidies were used by 75% of those eligible during FY 86 (based on 6.9% of passes being subsidized compared with 9.2% of passes eligible for subsidy), the degree of subsidy utilization by the end of the fiscal year exceeded 93% of eligible recipients. Subsidized pass sales to residents of county unincorporated areas were 103% of the estimated number of eligible recipients indicating a minor underestimate of student age population for county unincorporated areas. However, subsidized student pass sales for all other participating communities averaged only 36% of eligible recipients. Less than adequate means of subsidized pass distribution may have been a factor in the low utilization rates for these communities.

4.3.3 COLLEGE/VOCATIONAL PASS PRICE SUBSIDIES

College pass subsidies were offered by 12 communities and 4 County Supervisorial Districts (2-5) comprising 8.5% of eligible college pass patrons. Approximately 65% of eligible subsidy recipients were residents of county unincorporated areas. Acceptance of college pass subsidies took longer than for other pass subsidy categories, about 4-6 months, as follows:

TABLE IV-17

FY 86 SUBSIDIZED SHARE OF PASSES SOLD (College/Vocational)

Jul-Sep	2%
Oct-Dec	4%
Jan-Mar	5%
Apr-Jun	5%

Subsidies were used by an average of 50% of those eligible, although by the end of FY 86 approximately 63% of eligible recipients were taking advantage of subsidy availability. No significant difference in the rate of utilization is apparent by area. Residents of county unincorporated areas took advantage of eligibility 51% of the time, and residents of the 12 municipalities providing such subsidies took advantage of them 48% of the time. The significantly lower rate of subsidy utilization by eligible college pass users compared with Elderly and Disabled (85%) or Student (75%) riders suggests that distribution of subsidized passes was far less effective for college riders. Perhaps access to distribution outlets was too limited for the needs of this ridership group.

4.4 CONCLUSIONS OF FY 86 FARE IMPACT EVALUATION

This section has evaluated the District's experience with a significant fare increase implemented on July 1, 1985. Impacts on each segment of District ridership during FY 86 have been identified and compared with projected impacts. Significant differences from expectations have been evaluated for causal factors.

The analyses presented in this section suggest three principal conclusions based on observed ridership response to higher fares:

- (1) The quality of the District's historical database, which relates ridership and revenue to changes in fares, has been improved with the addition of ridership and revenue responses to the most recent fare change. Future models based on this database will become increasingly reliable as the experience of future years is also incorporated.
- (2) District riders are more transit-dependent than previously assumed. Reestimation of ridership model parameters, incorporating FY 86 experience, consistently results in fare elasticities which are lower than previous estimates.
- (3) Some elements of the District's fare policy need further attention. Specific areas requiring attention include transfer pricing, express cash surcharges, and pass price subsidy programs. These issues are detailed below.

An evaluation of experience with higher fares, focusing on individual segments of District ridership, suggests the need for further attention to specific elements of the District's fare policy. Subsequent analyses should address the following:

- o The share of riders who transfer, both cash and pass, has been steadily increasing since FY 81. Analysis has suggested that this is attributable to the effects of service restructuring. Given this finding, riders should not be penalized because they must transfer as a result of the lack of direct service to their intended destination. Therefore, future fare policies should continue to minimize the cost of a transfer relative to the cash fare.

- o Greater use of monthly passes was a specific objective of the FY 86 fare structure. Systemwide, this objective was realized as increasing shares of riders in most fare categories used monthly passes. However, Express riders were subjected to a greater rate of increase in pass costs than for cash fares, and the variance widened as the number of express zones traveled increased. In order for future fare changes to successfully encourage greater reliance on monthly passes by Express riders, increases in the express cash surcharge should be larger than proposed increases in the cost of monthly Express stamps.

- o Local community supported monthly pass price subsidies, utilizing local Proposition A funds, were very successful in minimizing the effects of higher fares on Elderly/Disabled patrons. However, only a small minority of Student (K-12) and College/Vocational riders were offered such subsidies. Furthermore, utilization of these subsidies, when they were offered, was poor among Student (K-12) and College/Vocational patrons. Since the cost to local communities of offering these subsidies is relatively low and the funding source which could be used (Proposition A Local Return funds) must be allocated to transit-related purposes, there seems to be a significant economic benefit to riders and political benefit to local officials associated with offering such subsidies. District policy should encourage a significant expansion of the pass price subsidy program for Student (K-12) and College/Vocational riders. In addition, further study of the manner in which these subsidies are disbursed to eligible riders is needed to ensure that a larger percentage of eligible residents participate in the program. Investigation of alternative forms of subsidy for Student (K-12) and College/Vocational riders is also suggested, since broad-based subsidy programs may be less effective among such riders than programs which are targeted to specific needs. This latter issue is discussed further in Section 6.2.2.

5.0 REVISIONS TO FORECAST METHODOLOGIES FOR FY 88

Section 3.0, "FY 86 Projected Impacts", briefly described the development of a procedure for estimating the ridership and revenue impacts of a proposed fare change. The essence of the methodology is that the projected change in trips for a given fare category (trips in projection year divided by trips in base year) may be expressed as a linear function of a constant term, termed a growth factor because it is generally larger than 1, plus the product of an elasticity coefficient times the change in the average fare per trip (the change in average fare is expressed in proportion to the base year fare). It is further assumed that the relationship remains linear for fare changes of 50% or less (dependent on historical data). The range of assumed linearity is termed the Fare Change Limit. For fare changes greater in absolute value than the Fare Change Limit, a multiplicative (non-linear) relationship is assumed.

The values determined for the elements of each fare category projection relationship in the FY 85 study are provided in Table V-1 along with revised values prepared during FY 87. In those instances where historical data were insufficient to statistically define a relationship for a given fare category, the FY 85 model substituted the relationship for a fare category with similar fare response characteristics. This occurred for Student (K-12), College/Vocational, Ticket, and Other (Special Services) fare categories. These relationships became the basis for projecting the FY 86 ridership response to the July 1, 1985 fare increase.

For all ridership categories except Student (K-12) and Other (ticket and Special Service patrons), actual ridership decline was less than projected by the FY 85 model. Some of the projection error may be attributed to the limited historical database available (five years), and in other instances, such as the Student ridership category, the error may be attributed to an inappropriate assumption about the similarity between ridership response in one category to ridership response in another category (e.g., Students responding to fare changes in a manner similar to Elderly and Disabled riders). Given the additional data afforded by FY 86 experience and the observed inaccuracy of prior projections, a reestimation of projection model parameters was performed. The following section provides the results of that reestimation. Subsequent sections discuss additional projection model refinements designed to accommodate consideration of alternative pricing strategies, and document FY 87 ridership and revenue which serves as a baseline for projections of future year patronage. The FY 87 model revision was used to evaluate possible FY 88 fare changes which were considered during the spring of 1987.

COMPARISON OF FARE ELASTICITY RELATIONSHIPS¹

FY 85 Model Elasticities

<u>Fare Category</u>	<u>a</u>	<u>b</u>	<u>Std. Error</u>	<u>Fare Change Limit²</u>
Regular	1.0277	-.3077	.096	.40
Express	1.0528	-.5409	.094	.44
E & D	1.0131	-.2218	.058	.50
Student	use E & D values		.484	.50
College	use Regular values		.603	.40
Ticket	use Regular values		.387	.40
Free	1.0277	NA	.174	NA
Other	use Regular values		.503	.40

FY 87 Model Elasticities

<u>Fare Category</u>	<u>a</u>	<u>b</u>	<u>Std. Error</u>	<u>Fare Change Limit²</u>
Regular	1.0418	-.2069	.099	.40
Express	1.0299	-.3437	.116	.44
E & D	.9954	-.1240	.037	.50
Student	use Express values		.356	.44
College	use Express values		.498	.44
Ticket	use Regular values		.381	.40
Free	1.0900	NA	.161	NA
Other	use Regular values		.405	.40

¹Elasticity relationship is expressed in the form:

$$\text{Change in Trips} = a + b (\text{Change in Avg. Fare per Trip})$$

²The Fare Change Limit is the maximum change in the average fare per trip for which the elasticity relationship is assumed to remain linear. It is determined from historical changes in average fare and is assumed not to exceed \$.50. Refer to FY 85-86 Fare Policy Study for an expanded explanation of its derivation.



COMPARISON OF FARE
ELASTICITY RELATIONSHIPS

TABLE V-1

5.1 CHANGES TO ELASTICITY RELATIONSHIPS

The elasticity relationships developed in the FY 85-86 Fare Policy Study were reestimated using an expanded database which incorporated FY 86 ridership and revenue data. The same linear regression approach used in that study was applied to weekday ridership and revenue data for each fare category. As before, only the relationships for Regular, Express, and Elderly/Disabled riders yielded reasonable standard errors (a measure of the degree to which the estimated relationship differs from the true relationship--lower values indicate greater accuracy). The reestimated coefficients of elasticity for all three of these categories were consistently smaller in magnitude than corresponding values from the FY 85 study. The values of the estimated constant terms in each relationship also declined for all except the Regular and Free fare categories. Reestimated values are provided in Table V-1.

It was observed in the 1985 study that the estimated relationships for Student, College, Ticket and Other ridership categories were weak in a statistical sense, so they were considered unreliable for forecast purposes. The same is true after the FY 87 reestimation. As before, an evaluation was conducted to determine appropriate substitute relationships for these ridership categories based on observed similarities with the behavior of riders in categories having more reasonable estimated relationships. A primary criteria used to select an appropriate substitute was an observed similarity of elasticity coefficients. In this respect, Ticket and Other ridership elasticities were found to be most similar to the behavior of Regular riders (also true in the 1985 study). Student and College/Vocational ridership behavior closely paralleled the response of Express riders to fare changes. This finding differed from the behavior characteristics assumed previously for these groups.

Express riders have the largest magnitude elasticity coefficient among fare categories with statistically reasonable estimated relationships. This means that their response to a fare change is the most volatile of any ridership group. The relative lack of transit dependency among express riders is attributable to higher than average household incomes and a higher incidence of auto availability than for other ridership categories (based on FY 83 and FY 86 on-board surveys). An evaluation of FY 86 on-board survey data corroborates the lack of transit dependency for Student (K-12) and College/Vocational riders as well. The school trip purpose exhibits the highest household income and auto availability of any trip purpose. Riders under the age of 18 have the highest average household income and the greatest auto availability of any age group (auto availability was defined as having the use of an auto, either as a driver or as a passenger, for the particular trip which was surveyed). Additionally, Student and College pass users exhibit the second highest household income after Express riders and the third highest auto availability after Express and Disabled riders. Given these findings, a decision was made to substitute the estimated relationship for Express riders as a prediction model for the Student (K-12) and College/Vocational ridership response to fare changes.

5.2 INCORPORATION OF ADDITIONAL CAPABILITIES

The 1985 fare impact projection model was designed to provide disaggregate projections of ridership response to proposed fare changes by ridership group. The ridership groups which were defined at that time included:

- o Full-fare non-express riders (Regular)
- o Full-fare express riders (Express)
- o Elderly/Disabled riders (E&D)
- o Student riders in grades K-12 (Student)
- o College and Vocational student riders (College)
- o Free riders (Free)
- o Ticket and token riders (Ticket)
- o Special Services riders (Other)

One of four estimated fare elasticity relationships was applied to each ridership group as shown in Table V-1. Within each ridership group, the model employed a shift share approach to determining the proportion of riders who would use each of the available fare media (cash and ticket/token or pass) given projected changes in the price of each media. Projected ridership shares for each of the media options were an input into the calculation of the projected average fare per linked trip which was subsequently input into the elasticity model for each ridership group. Therefore, the 1985 elasticity model is sensitive to variable price changes among the fare media offered to each ridership group.

Additionally, the 1985 elasticity model was used to evaluate the impacts of availability of community supported pass price subsidies for some ridership groups (E&D, Student and College). This was accomplished by determining the share of ridership in an affected ridership group to whom pass price subsidies would be offered. The analysis was then accomplished by stratifying the ridership into two analysis groups; those eligible to receive pass price subsidies, and those who would not be offered such subsidies. Separate fare change impacts were calculated for each analysis group, and results were then combined to provide an impact projection for the ridership group as a whole.

During FY 87, two additional capabilities were incorporated into the model in order to evaluate studied FY 88 fare policy alternatives. These were (1) sensitivity to the impacts of offering discounted tokens for full fare riders, and (2) sensitivity to the effects of needs-based pricing on Student (K-12) riders. The increasing complexity of the

model also led to computerization of its procedures. Separate spreadsheet models are presently maintained for each of the following ridership groups:

- o Regular & Ticket (full fare non-express riders)
- o Express (full fare express riders)
- o E&D non-express
- o E&D express
- o Student (K-12) non-express with income-based need
- o Student (K-12) non-express without income-based need
- o Student (K-12) express with income-based need
- o Student (K-12) express without income-based need
- o College non-express
- o College express
- o Free
- o Special Service regular fare
- o Special Service premium fare

Each spreadsheet model is provided with the existing fare structure; projection model coefficients; and annualized weekday, Saturday and Sunday & Holiday base year patronage (unlinked boardings and linked trips) by type of fare paid (cash, ticket/token or pass) applicable to each ridership group. Then, for a given proposed fare structure, spreadsheet model outputs include projected ridership and revenue to the same level of disaggregation as the input data. The spreadsheet model is sensitive to:

- o differential rates of proposed price changes among the available fare media,
- o availability of pass price subsidies,
- o discount ticket/token pricing, and
- o availability of needs-based Student pass pricing.

5.2.1 SENSITIVITY TO TOKEN DISCOUNTS

A studied increase to a \$1.00 cash fare in FY 88 was expected to result in a significant increase in the number of dollar bills used for fare payment (between 50% and 95% more dollar bills depending on the assumptions used for analysis). As an alternative to outright prohibition of dollar bill usage, pricing incentives for prepaid fare instruments were considered. Such incentives include lower monthly pass price multiples and discounted prices for quantity purchases of tickets and tokens.

The 1985 version of the fare impact projection model was designed to evaluate the effects of varying pass price multiples. However, independent pricing of tickets and tokens was not incorporated in that model due to the fact that tickets and tokens were evaluated independently from the full fare category of ridership.

In order to evaluate ridership sensitivity to the availability of ticket or token discounts, it was necessary to merge these two ridership groups for analysis purposes. This posed no problem from the standpoint of the fare elasticity relationship itself, since Regular full fare riders and Ticket/Token users were found to respond similarly to changes in fares. However, the shift share technique which is used to determine the distribution of riders among the available fare media could not be calibrated to handle three differently priced fare media (cash, tickets/tokens and passes) when, historically, only two separately priced media had existed (cash and tickets/tokens were equivalently priced). Therefore, a methodology had to be developed to determine the proportion of riders who would use each of the three available fare media before the average fare per linked trip for the proposed fare structure (an input to the elasticity model) could be calculated.

Based on a literature review, it was decided to adapt an existing estimation procedure for the market penetration rate of prepaid fare instruments to the task of identifying the share of full fare riders who would utilize discounted tickets or tokens. In Transit Fare Prepayment: A Guide for Transit Managers (Patrick Mayworm & Armando Lago, Ecosometrics, Inc., January, 1983) a model was developed from cross-sectional data from a variety of transit properties throughout the United States. Based on 1981 data (which included the District among the sampled properties), the model estimates the market penetration share of a prepaid fare instrument as a function of those factors which were found to have a statistically significant impact on the use of such media. The basic model is of the following form:

$$\ln \frac{\text{PENRATE}}{1-\text{PENRATE}} = \text{linear function of (DISC, } \ln [\text{TRIPS}], \text{ COMP, OUTLETS)}$$

where \ln = natural logarithm

PENRATE = share of trips for prepayment plan expressed as a decimal fraction

DISC = discount afforded by prepayment plan expressed as a percentage

TRIPS = average number of trips taken with the given fare instrument

COMP = total number of prepayment plans offered

OUTLETS = number of prepaid sales outlets offering the given fare instrument

In the case of discounted tickets or tokens, TRIPS=1, and the value of COMP for District full fare non-express riders would be 2. Using the coefficient values from the referenced study, the constant term in the equation was reestimated so that the value of PENRATE matched existing District ridership for full fare non-express riders using tickets/tokens (DISC=0 and OUTLETS=10). The resulting equation was

$$\ln \frac{\text{PENRATE}}{1-\text{PENRATE}} = -4.96 + 6 [\text{DISC}] + .005 [\text{OUTLETS}]$$

The calculation of the projected average fare per linked trip for full fare non-express riders is thus performed in two steps. First, the share of riders using the proposed discounted tickets and tokens is estimated from the preceding relationship. Then, the future year distribution of riders among the available fare media is determined using a modified shift share technique which is calibrated by assuming that the base year distribution was as if the proposed ticket/token discount had been in effect during the base year.

5.2.2 SENSITIVITY TO NEEDS-BASED PRICING

An additional studied alternative for FY 88 was a pricing methodology which could target reduced fares to those riders who are economically disadvantaged. Since determination of income is a necessary part of this approach, efforts were focused on Student (K-12) riders because the U.S. Department of Agriculture's Free or Reduced Price Meal Program provides an existing mechanism for identifying riders having an income-based need within this ridership group.

The studied needs-based pricing alternative would result in multiple pass prices for student riders. One price would be established for non-needy Students, and a lower price would be offered to needy Students. This pricing strategy is easily accommodated in the fare impact projection model by stratifying Student (K-12) ridership into needy and non-needy segments before applying the model. Analysis of the income guidelines of the USDA program in conjunction with ridership income data contained in the most recent District on-board survey led to a determination that 60% of Student (K-12) riders could be classified as needy.

In the event that needs-based pricing were to be implemented for Student (K-12) riders, future adjustments to the fare impact projection model would be desirable. For example, different elasticities may be appropriate for needy riders than for non-needy riders, and the desirability of each of the fare instruments offered (cash, ticket/token, or pass) may vary between needy and non-needy riders.

5.3 FY 87 ACTUAL RIDERSHIP AND REVENUE

Due to the extended period of deliberations over FY 88 fare and service levels and operating cost budgeting, the preparation of this document was delayed into FY 88. As a result, some preliminary information on FY 87 patronage and passenger revenue is available for analysis. This section describes the District's FY 87 patronage characteristics and makes some observations on significant ridership trends. As further detailed analysis is performed, the District's patronage projection model will be updated to incorporate FY 87 data.

The most obvious characteristic of FY 87 patronage is a continuation of the decline in ridership which began with the fare increase of July 1, 1985. Annual ridership for FY 87 was approximately 3% lower than FY 86 patronage (Table V-2) declining from 450.4 million boardings to about 437 million boardings. Lower ridership (compared with the previous year) was observed throughout FY 87. While this phenomenon was not unexpected during the first six months of FY 87 (due to the accelerated rate of patronage decline which occurred over the last six months of FY 86), the continued loss of patronage over the last six months of FY 87 is more disturbing. By this point in time, it is unlikely that the July 1985 fare change has continued to be a significant factor in the sustained patronage decline.

The observed rate of patronage decline was notably larger on weekends than for weekdays (Table V-3). This contrasts markedly with the higher rate of patronage loss experienced on weekdays during the year (FY 86) immediately following the July 1, 1985 fare increase. Pass sales data (Table V-4) shows that all except Elderly and Disabled riders contributed to the observed patronage decline. Pass sales declines were significantly larger among Express and Student (K-12) riders suggesting that many of the lost riders were discretionary patrons (riders having other alternatives to the use of public transit). It was observed in the 1986 Onboard Ridership Survey (Appendix A) that Express and Student (K-12) ridership groups were much more likely to have alternative travel modes available than other ridership groups.

The availability of pass price subsidies from local communities increased only slightly for all discounted fare groups during FY 87. However, the proportion of all passes sold which were subsidized increased significantly, particularly among Student (K-12) and College riders (Tables V-5 and V-6). The wide availability of pass price subsidies for Elderly and Disabled riders has probably been the most significant factor contributing to the growth in pass sales to these riders in each of the past two years. In the case of Student (K-12) and College ridership groups, however, the availability of pass price subsidies has been too limited to prevent declines in the number of passes sold to these riders. Among Student (K-12) riders the pass sales decline to residents of communities not offering pass price subsidies has been large enough to result in a larger portion of Student (K-12) passes being subsidized than the proportion of students to whom subsidized passes are offered.

FY 87 PATRONAGE CHANGE BY TIME INTERVAL

<u>Time Interval</u>	<u>FY 86 Change from FY 85</u>	<u>FY 87 Change from FY 86</u>
Jul.-Sept.	-4.3%	-2.5%
Oct.-Dec.	-4.8%	-2.1%
Jan.-Mar.	-14.3%	-1.3%
Apr.-Jun.	-13.7%	-6.2%
Annualized	-9.5%	-3.0%

Source: SCRTD Planning Department
September 1987



FY 87 PATRONAGE CHANGE BY TIME INTERVAL

TABLE V-2

FY 87 PATRONAGE CHANGE BY TYPE OF DAY

	FY 85 Daily Boardings	FY 86 Daily Boardings	FY 86 Change From Prior Year	FY 87 Daily Boardings	FY 87 Change From Prior Year
<u>Jul.-Dec.</u>					
Weekdays	1,528,650	1,442,860	-5.6%	1,420,600	-1.5%
Saturdays	989,540	954,080	-3.6%	895,730	-6.1%
Sun. & Hol.	650,170	679,430	+4.5%	651,430	-4.1%
<u>Jan.-Jun.</u>					
Weekdays	1,670,280	1,412,980	-15.4%	1,369,280	-3.1%
Saturdays	1,000,550	925,380	-7.5%	878,920	-5.0%
Sun. & Hol.	700,410	650,710	-7.1%	591,790	-9.1%
<u>Annualized</u>					
Weekdays	1,600,020	1,427,800	-10.8%	1,394,740	-2.3%
Saturdays	995,040	939,730	-5.6%	887,330	-5.6%
Sun. & Hol.	674,420	665,570	-1.3%	622,640	-6.5%

Source: SCRTD Planning Department
September 1987



FY 87 PATRONAGE CHANGE BY TYPE OF DAY

TABLE V-3

FY 85 TO FY 87 PASS SALES COMPARISON

<u>Fare Category</u>	<u>FY 85 Passes Sold</u>	<u>FY 86 Passes Sold</u>	<u>FY 86 Change From Prior Year</u>	<u>FY 87 Passes Sold</u>	<u>FY 87 Change From Prior Year</u>
Regular	1,022,255	1,165,991	+14.1%	1,139,808	-2.2%
Express-1	39,217	30,676	-21.8%	26,833	-12.5%
Express-2	40,152	32,211	-19.8%	28,509	-11.5%
Express-3	40,439	32,551	-19.5%	31,786	-2.4%
Express-4	33,339	22,224	-33.3%	19,228	-13.5%
Express-5	18,307	12,099	-33.9%	11,292	-6.7%
Elderly & Disabled	838,217	972,307	+16.0%	1,060,422	+9.1%
Student (K-12)	1,430,161	874,914	-38.8%	712,851	-18.5%
College/Vocational	282,895	270,099	-4.5%	263,275	-2.5%
Systemwide	3,744,982	3,413,072	-8.9%	3,294,004	-3.5%
Value of Passes Sold	\$37,339,375	\$66,926,370	+79.2%	\$63,915,855	-4.5%

Source: SCRTRD Planning Department
September 1987



FY 85 TO FY 87 PASS SALES COMPARISON

TABLE V-4

COMMUNITIES OFFERING PASS PRICE SUBSIDIES DURING FY 87

<u>Community</u>	<u>Elderly/ Disabled</u>	<u>Student (K-12)</u>	<u>College/ Vocational</u>	<u>Other</u>
Agoura Hills	X			
Alhambra	X	X	X	Regular/Express
Baldwin Park	X			
Bell	X	X	X	
Beverly Hills	X			
Burbank	X			
Commerce	X			
Covina	X	X	X	
Cudahy	X	X	X	Regular
El Monte	X			
Gardena	X	X	X	
Glendale	X			
Glendora	X	X	X	
Hawthorne	X	X		
Hermosa Beach	X	X	X	
Huntington Beach	X	X	X	
Inglewood	X			
La Puente	X	X	X	
Los Angeles	X			
Los Angeles County (Districts 2-5)	X	X	X	
Lynwood	X	X	X	Regular/Express
Manhattan Beach	X	X		
Maywood	X			
Monterey Park	X	X	X	
Pico Rivera	X	X	X	
Redondo Beach	X	X		
San Dimas	X			
San Fernando	X	X	X	
Santa Fe Springs	X			
South Gate	X	X	X	Regular/Express
South Pasadena	X	X	X	Regular/Express
Temple City	X	X	X	Regular/Express
West Covina	X			
West Hollywood	X			
Share of Riders Eligible	92.6%	9.4%	8.7%	1.4%
FY 87 Share of Passes Sold	87.7% Elderly 83.0% Disabled	10.4%	7.2%	Not Available

Source: SCRTD Planning Department
September 1987



**COMMUNITIES OFFERING PASS PRICE
SUBSIDIES DURING FY 87**

TABLE V-5

FY 87 PASS PRICE SUBSIDY PARTICIPATION

<u>Fare Category</u>		<u>FY 86</u>	<u>FY 87</u>
Elderly & Disabled	# of Passes Subsidized	768,932	919,212
	Share of Passes Subsidized	79.1%	86.7%
	Subsidy Revenue	\$2,306,796	\$2,757,636
Student (K-12)	# of Passes Subsidized	60,659	73,906
	Share of Passes Subsidized	6.9%	10.4%
	Subsidy Revenue	\$485,272	\$591,248
College/Vocational	# of Passes Subsidized	11,399	19,067
	Share of Passes Subsidized	4.2%	7.2%
	Subsidy Revenue	\$125,389	\$209,737

Source: SCRTD Planning Department
September 1987



FY 87 PASS PRICE SUBSIDY PARTICIPATION

TABLE V-6

The revenue impact of the FY 87 patronage decline is of a similar magnitude (Table V-7). Total passenger revenue declined from \$196.1 million in FY 86 to approximately \$190.8 million for FY 87, a reduction of 2.7%. The rate of decline was greater among pass users reflecting the relatively large decline in express pass users who purchase the highest priced fare media. The loss of cash riders was probably greatest among discounted fare groups, such as Student (K-12) and College riders, implying that the share of discounted fare riders who use passes has increased. Further analysis of disaggregate patronage data, when available, will identify the underlying dynamics of these observed FY 87 patronage and passenger revenue changes.

FY 86 AND FY 87 REVENUE COMPARISON

<u>Time Period</u>	<u>Revenue Indicator</u>	<u>FY 86</u>	<u>FY 87</u>	<u>FY 87 Change From Prior Year</u>
Jul.-Sep.	Avg. Weekday Farebox Cash	\$400,848	\$394,782	-1.5%
	Avg. Monthly Pass Revenue	\$5,457,944	\$5,239,811	-4.0%
Oct.-Dec.	Avg. Weekday Farebox Cash	\$398,298	\$391,173	-1.8%
	Avg. Monthly Pass Revenue	\$5,667,363	\$5,478,004	-3.3%
Jan.-Mar.	Avg. Weekday Farebox Cash	\$387,370	\$376,378	-2.8%
	Avg. Monthly Pass Revenue	\$5,512,307	\$5,222,277	-5.3%
Apr.-Jun.	Avg. Weekday Farebox Cash	\$389,905	\$382,417	-1.9%
	Avg. Monthly Pass Revenue	\$5,671,176	\$5,365,193	-5.4%
Annualized	Avg. Weekday Farebox Cash	\$394,062	\$386,137	-2.0%
	Avg. Monthly Pass Revenue	\$5,577,198	\$5,326,321	-4.5%

Source: SCRTD Planning Department
September 1987



FY 86 AND FY 87 REVENUE COMPARISON

TABLE V-7

6.0 FY 88 FARE POLICY

The following fare policies were adopted by the SCRTD Board of Directors in April 1985 and reaffirmed in July 1987:

- (1) All local and limited bus service will be subject to a flat fare for initial boardings.
- (2) All express bus service will be subject to an express surcharge varying with increments of freeway distance traveled.
- (3) All special and contract services will be subject to individual pricing apart from this fare policy.
- (4) Fare payment shall be by means of exact change, pass, tickets, transfers or tokens. Cash riders will be subject to a transfer surcharge for each transfer boarding.
- (5) Elderly and disabled riders will receive at least a 50% base fare discount.
- (6) Student (age 5-18 years) and college (full-time students) riders will not be offered any cash discounts.
- (7) Monthly passes will be sold to full-fare paying riders at a price multiple of 37.6 times the base fare plus the applicable distance surcharge, if any. Elderly and disabled passes will be discounted at least 50% from the price of a full-fare monthly pass.
- (8) Free boardings will be permitted for all children under five, SCRTD employees and their dependents, SCRTD Board Members, law enforcement officers in uniform, and uniformed City of Los Angeles Traffic Control Officers within the limits of downtown Los Angeles. All such riders shall not occupy a seat to the exclusion of a fare-paying passenger. Blind persons may ride free without restriction.
- (9) Transfers will be restricted with regard to direction of travel and time of expiration in accord with existing tariffs.
- (10) Outstanding tickets will be honored at face value for cash fare payment. Outstanding tokens will be honored at a value equivalent to the base fare, exclusive of surcharges. Tokens may be sold at a discount as an incentive for riders not to use currency for fare payment.
- (11) Employers, businesses, and local governments are encouraged to provide monthly pass price subsidies to their residents utilizing Proposition A Local Return or other revenues.

Although no fare structure changes were adopted for FY 88, several alternatives to existing fare policies and pricing were considered during FY 88 budget deliberations. The three principal alternatives considered were (1) provision of token price discounts, (2) needs-based pricing of Student (K-12) passes, and (3) revised eligibility criteria for College passes. The following sections describe each of these alternatives and provide a summary evaluation of the alternatives analyses.

6.1 DESCRIPTION OF STUDIED ALTERNATIVES

Alternatives to existing fare policies were considered as a means of addressing a growing problem with the processing of dollar bills received through the farebox, and as an opportunity to better target discounted fares to riders most in need of lower prices. Each of the studied alternatives was considered in detail. For various reasons, none were proposed for implementation.

Discounted tokens were considered as a direct incentive to full-fare riders to reduce usage of dollar bills for on-board fare payment. At the time of FY 88 budget deliberations, fare structures with base fares approaching \$1.00 were being considered as a means of increasing passenger revenues to offset a projected budget shortfall. A study of fare box utilization, conducted in April 1987, provided evidence of the extent of the dollar bill problem with the existing \$.85 base fare. It was evident that higher fares would increase dollar bill usage beyond the capabilities of existing fareboxes to handle them. A procurement of new fareboxes has been underway since 1986. The specifications for the new fareboxes provide for dollar bill handling capabilities considered adequate for potential future needs. However, the delivery of these fareboxes has been delayed by complications in the procurement process. The primary intent of considering token price discounts, therefore, was to provide for a reduction of dollar bill usage until such time as the new fareboxes could be delivered and installed. Specifically, this alternative would have provided for a reduced price for the purchase of full-fare tokens bought in quantities of ten. The size of the discount would depend on the base fare of the adopted fare structure. This alternative was not adopted because the District's Board of Directors was able to provide for a balanced FY 88 budget without a fare change.

Needs-based pricing of Student (K-12) passes was considered as a way of better targeting reduced fares to student riders having the greatest economic need. As considered, the program would have established a two-tiered price structure for Student (K-12) monthly passes. The lower price would be offered to those students identified as needy while all other students would pay a higher price for their monthly pass. The studied means of identifying needy students relied on the cooperation of local school districts. Needy students were defined as those students eligible for participation in the U.S. Department of Agriculture's Free or Reduced Price Meal Program. It was hoped that local school districts, acting as agents on behalf of the District,

would sell the needs-based Student (K-12) monthly passes to eligible students via the same administrative process used by the school districts to distribute meal coupons. Several issues were identified during analysis of this alternative. The potential for fraud existed because student ID's for participants in the USDA program do not have photos. Negotiations between the District and representatives of the Los Angeles Unified School District (by far, the largest school district in the District's service area) stalled because of a reluctance of school district personnel to commit to program implementation while the status of a planned reorganization of the District was in doubt. And finally, specific pricing differentials between needy and non-needy monthly passes were never addressed by the District's Board of Directors because of the lack of need for a fare increase. As a result, the Board of Directors deferred consideration of this program.

Revised eligibility criteria for College monthly passes were considered as an accommodation to adult students enrolled in English/Second Language (ESL) programs, especially through the Los Angeles Unified School District's evening classes program. Because ESL students are typically enrolled for only 10 classroom hours per term, and the District's existing College pass eligibility requirements specify a minimum of 12 classroom hours, ESL students are unable to qualify for College monthly passes. A survey of colleges, universities, and vocational schools conducted during May 1987 revealed that a significant number of additional students would become eligible for the College monthly pass if the classroom hours eligibility standard were to be reduced. While this would have resulted in a projected significant increase in College/Vocational ridership with the reduced eligibility criteria, the revenue loss associated with this change would also have been significant. A large revenue loss would have occurred because most of the newly eligible riders under the proposed eligibility criteria already use District services and pay full fare, rather than the discounted fare offered to College pass users. Because the revenue loss associated with this alternative was significant, and no offsetting source of additional revenue was available, this alternative was not adopted by the District's Board of Directors.

6.2 EVALUATION OF ALTERNATIVES

The previous section described each of the three alternative fare policies considered during the spring of 1987. This section highlights the fare and ridership impact analyses performed during the evaluation of each of the studied alternatives. Additional information about changes incorporated into the District's patronage projection model, specifically intended to address the evaluation of these fare policy alternatives, was previously provided in Section 5.2.

6.2.1 PROVISION OF TOKEN DISCOUNTS

The principal reason for offering tokens at a discount is to provide patrons with a price incentive not to use dollar bills for fare payment. While tokens are mentioned throughout this discussion as the alternative fare media, it should be pointed out that tickets may also be offered for sale at a discount. There are advantages and disadvantages associated with the use of each of these media. However, the focus of this discussion is the impact of offering a discounted single-ride alternative to cash fare payment rather than the specific media used to provide this discount.

The magnitude of the dollar bill problem with the existing fare structure is illustrated in Table VI-1. The table summarizes the results of a survey of farebox utilization conducted in April 1987. While roughly one-third of all daily scheduled buses were found to have full or overflowing fareboxes, the problem is particularly severe for buses which are in service throughout most of an entire day (base buses). On weekdays, over half of these buses were found to have full or overflowing fareboxes. As noted in the table, this problem impacts over 40% (63 of 150) of the District's bus lines. Most of the impacted lines are operated in local service. Express services were less likely to experience farebox fullness due to the peak only operation of such services.

Although not shown in Table VI-1, approximately 20% of buses with full or overflowing fareboxes in the survey were classified as overflowing. Overflowing fareboxes are the most critical because damage to mounting hardware frequently occurs when attempting to remove the vaults from these fareboxes. Replacement hardware is available only from a dwindling supply of spares which will eventually be exhausted since the original manufacturer is no longer in business. Overflowing fareboxes also heighten concerns for revenue security since the overflow of coins and currency prevents proper closure of the vault's door which complicates the physical removal of the vault from the farebox, and requires manual collection of currency by the vault puller.

In view of the existing problems with dollar bills (which constitute about one-half of the value of existing farebox receipts), there is considerable concern that the problem could become unmanageable if fares approaching \$1.00 are found necessary before new fareboxes designed to handle dollar bills could be procured. An analysis of a \$1.00 base fare structure with and without the availability of discounted tokens was performed. It was assumed that a \$.15 discounted token/ticket would be offered at this fare level since that would provide for a continuation of the existing fare for those riders who took advantage of the availability of discounted tokens. This analysis showed that a significant increase in token utilization could be anticipated (see Table VI-2) which could reduce the portion of farebox receipts that would be dollar bills by 10%. However, the expected

EXISTING FAREBOX FULLNESS

	<u># of Base Buses Scheduled</u>	<u>% of Base Buses w/Full or Overflowing Fareboxes</u>	<u>Bus Lines w/50% or more Full or Overflowing</u>
Weekday	1,227	52.8%	63 of 150
Saturday	1,034	41.6%	36 of 113
Sun. & Hol.	861	31.6%	23 of 112

1. Based on farebox survey conducted during April 1987.
2. Corresponding peak buses scheduled were 2,004 for weekdays, 1,121 for Saturdays, and 1,016 for Sunday/Holidays during the sample period.



EXISTING FAREBOX FULLNESS

TABLE VI-1

**SUMMARY OF IMPACTS OF STUDIED FARE ALTERNATIVES
WITH AND WITHOUT AVAILABILITY OF DISCOUNTED TOKENS**

	<u>\$1 Base Fare No Token Discount</u>	<u>\$1 Base Fare \$.15 Token Discount</u>
Est. Share of Boardings using Token	0.3%	4.7%
Est. Dollar Bill Share of Farebox Value	75%	65%
Est. Monthly Tokens Received for Fare Payment	110,000	1,710,000
Annual Cost Impacts Assuming Midday Vault Exchange Program (in millions)		
Farebox Revenue Loss from Token Discount	\$0.00	\$1.70
Commissions to Sales Outlets	\$0.00	\$1.08
Additional Cash Handling Costs		
-Token Processing	\$0.00	\$0.39
-Dollar Bill Processing	\$1.75	\$1.13
Cost of Midday Vault Exchange Program	\$2.37 to \$3.69 ⁽¹⁾	\$0.79 to \$1.58 ⁽²⁾
Total Additional Revenue Collection Costs	\$4.12 to \$5.44	\$5.09 to \$5.88

(1) Estimated to require 9-14 vault exchange crews processing 350-550 daily vault exchanges - avoids \$33 to \$52 million of additional operating costs.

(2) Estimated to require 3-6 vault exchange crews processing 120-200 daily vault exchanges - avoids \$11 to \$19 million of additional operating costs.



**SUMMARY OF IMPACTS OF STUDIED FARE
ALTERNATIVES WITH AND WITHOUT
AVAILABILITY OF DISCOUNTED TOKENS**

TABLE VI-2

reduction of the incidence of dollar bill usage resulting from the availability of discounted tokens would not be large enough to prevent growth in the total number of dollar bills which would be received through the farebox at the studied fare level. Therefore, in addition to offering a discounted token, a program of midday vault exchanges would also be necessary in order to prevent an increase in the number of daily buses that would otherwise need to be removed from service and replaced with another bus because of an overflowing or jammed farebox.

The information provided in Table VI-2 shows that a considerable additional operating cost could be avoided by providing for a vault exchange program. However, the vault exchange program would also add to operating costs and presents additional security problems. The table clearly demonstrates that the availability of a discounted token significantly reduces the scale of the vault exchange program which would be needed. However, even the 120-200 daily vault exchanges anticipated with discounted token availability represent a program likely to be too ambitious given the District's remaining supply of spare farebox vaults. Even if the matter of an adequate supply of spare farebox vaults were not an issue, the added cost of a midday vault exchange program together with the additional costs associated with offering discounted tokens is significant enough to warrant higher fares to pay for the added revenue collection costs.

The District's Board of Directors ultimately provided for adoption of a balanced budget for FY 88 without the need to raise fares. However, the urgency of proceeding with procurement of new fareboxes designed to handle dollar bills remains high.

6.2.2 NEEDS-BASED PRICING FOR STUDENT RIDERS

As discussed previously, this alternative would provide for two-tiered pricing of Student (K-12) monthly passes. Students identified as having an economic need would be eligible to purchase a monthly pass at a lower price than non-needy students.

The evaluation of this alternative focused on the identification of an implementation mechanism rather than the revenue and ridership impacts of specific pass pricing. However, based on the 1986 On-Board Survey of ridership, it was determined that approximately 60% of the District's Student (K-12) riders would meet the income criteria for economic need established by the U.S. Department of Agriculture's Free or Reduced Price Meal Program. The USDA program was chosen as a means of identifying economic need among students because it is available to all schools, and the administrative process for certifying eligibility is already established.

It was hoped that a needs-based Student (K-12) monthly pass program could be offered directly through the schools by piggybacking on the administration of the USDA meal program. The scale of the administrative problem is quite large. Within Los Angeles County there

are approximately 1,252,000 children in 1,827 K-12 public schools administered by 82 school districts. Additionally, 210,000 children attend some 1,200 K-12 private schools, 25% of which are associated with the Archdiocese of Los Angeles. Research indicated that about 88% of school children would potentially have access to a needs-based pass program with the remaining 12% not served because the USDA meal program is not offered in many of the private schools within the County.

Because of the large number of schools, a reasonable approach toward administering a needs-based student pass program should begin at the school district level. One alternative would provide for the District negotiating agreements with each of the 82 school districts which would act as distribution centers for the dissemination of pass media to the individual schools. The school districts maintain data regarding the number of eligible students for the USDA meal program and would, therefore, know how many passes would be required to meet the needs of the individual schools under their jurisdiction. Each school would be responsible for selling passes to qualified students, probably in the same administrative manner that meal coupons are distributed. There would be an additional administrative effort required to account for pass revenues and unsold passes both at the school and district levels.

Preliminary discussions were held between the District and representatives of the Los Angeles Unified School District, the largest district in the County. While school district officials seemed interested in the concept, they expressed some concern about the additional administrative burdens of the program, and also seemed reluctant to consider entering into an agreement with the District while a proposed reorganization of the District was under consideration by the State Legislature. As a result, the District's Board of Directors was not asked to consider this program.

6.2.3 REVISIONS TO COLLEGE PASS ELIGIBILITY CRITERIA

The studied alternative provided for reducing the classroom hours of study required for eligibility for the College/Vocational monthly pass from 12 to 10. Evaluation of this alternative was prompted by concern for English/Second Language (ESL) students, particularly those enrolled in the Los Angeles Unified School District's evening classes program, who are typically enrolled for 10 classroom hours per term. It should be noted that this is not the only segment of the College and Vocational school community which does not meet the existing eligibility criteria for the College/Vocational monthly pass. Graduate students have opposed the current policy as they are typically enrolled in programs which consist of no more than eight hours per week of classroom study.

In order to identify the potential impacts of a change in eligibility criteria, a survey of local colleges, universities, vocational schools, and other institutions was conducted by the District's Prepaid Sales Department in May 1987. Based on an extrapolation of survey data, it

was estimated that the survey data represented about one-third of the college and vocational school student population. This results in a total vocational school population of about 169,000 students, and a college/university population of approximately 295,000 within the District's service area.

From the distribution of enrolled classroom hours and the relative proportions of vocational and college/university students represented in the survey, it was estimated that the studied reduction in monthly pass eligibility criteria would result in a 65.5% increase in the number of College/Vocational riders eligible for a discounted monthly pass. In order to identify that portion of the expected patronage increase that would be new transit riders and, therefore, the anticipated gain or loss in passenger revenue which could be expected with the studied change in eligibility requirements, the fare impact projection model described in Section 5.0 was employed. Since the expected increase in College/Vocational patronage (an additional 65.5%) had been identified, the fare impact projection model allowed for estimation of the portion of those additional riders who would be expected to continue using transit in the event they were required to purchase full fare monthly passes instead of discounted College/Vocational passes. The difference, representing the projected share of additional College/Vocational riders who would not use transit if required to pay full fare, should be comparable to the portion of projected additional College/Vocational riders who would be new transit users.

The results of the analysis showed an expected increase of 7,300 new daily College/Vocational riders. However, 19,400 daily existing full fare riders would also become eligible to use the College/Vocational pass under the studied eligibility criteria. Consequently, the expected additional revenue gained from newly attracted riders would be more than offset by the decline in revenue obtained from former full fare riders who would switch to using the College/Vocational pass. The estimated net revenue loss amounted to \$1.4 million annually. The District could not afford to sustain this revenue decline, and the studied change in College/Vocational pass eligibility criteria was not recommended to the Board of Directors.

7.0 FY 88 THROUGH FY 90 PATRONAGE AND REVENUE FORECASTS

This section documents the assumptions and methodology employed to prepare the patronage and passenger revenue forecasts through FY 90 which served as the basis for the District's financial plan and forecast years' TPM data tables. The financial plan and TPM data tables are provided in the S RTP FY 88 through FY 90 Technical Document. Los Angeles County Transportation Commission guidelines for preparation of the Short Range Transit Plan specify that operators should consider the impacts of potential federal funding reductions on fares, patronage, and service levels as well. The latter part of this section addresses this subject.

7.1 FARE STRUCTURE ASSUMPTIONS

At the request of the District's Board of Directors, the patronage and passenger revenue forecasts provided in this S RTP assume continuation of the District's existing fare structure (shown in Table I-1) through FY 90. It is acknowledged that higher fares may become necessary in future years. Indeed, the S RTP financial plan projects potential revenue shortfalls in each of FY 89 and FY 90. However, the Board of Directors chose not to commit to any specific combination of fare, service level or other revenue increase or cost reduction actions. The principal reason for this is because estimates of future costs and funding availability can vary significantly with time.

Given this basic assumption, future patronage levels forecast for the S RTP may overstate the ridership levels which will be attained in future years, especially if a fare increase is determined to be necessary. One additional caveat concerning S RTP patronage projections relates to the timing of their preparation. The patronage forecasts provided in the S RTP were prepared in May 1987. At that time the estimated patronage for the projection base year (FY 87) was 438.9 million boardings. Actual ridership data for FY 87, described in Section 5.3, resulted in 436.5 million boardings, approximately 0.5% lower than May 1987 projections. The discussion which follows has not been corrected for actual experience in order to remain consistent with data provided in the other S RTP documents.

7.2 PATRONAGE AND REVENUE PROJECTIONS

Projections of future patronage and passenger revenue are influenced by three principal factors: (1) service levels, (2) fare levels, and (3) the number and type of days contained in each fiscal year. This S RTP assumes that service will be provided through FY 90 at approximately the same level operated during FY 87 (7.25 million revenue bus hours for a standard 52-week fiscal year). Also, as previously described, no fare changes were assumed. Therefore, service levels and fare levels are assumed to have no effect on patronage and passenger revenue projections through FY 90.

The number and type of days in a fiscal year will vary for several reasons. The District defines the last day of each fiscal year as the Saturday which occurs closest to July 1. Because the fiscal year always begins on a Sunday and ends on a Saturday, it is always composed of an integral number of weeks, usually 52. Since this provides for a 364 day fiscal year, one day shorter than the calendar year (two days shorter in a leap year), there will be periodic occasions when the accumulation of calendar days in excess of the 364 days in the fiscal year will result in a 53-week fiscal year. Such is the case in FY 88 which began on Sunday, June 28, 1987 and will end on Saturday, July 2, 1988.

In addition to consideration of the number of days in each fiscal year, there is also a need to consider how many of each of three possible types of days (weekdays, Saturdays, and Sunday/Holidays) will occur in each fiscal year. The District operates different levels of service on weekdays, Saturdays and Sundays. The number of Sundays, for scheduling purposes, may vary annually because there are six designated holidays on which Sunday service levels are operated. Three of these (Labor Day, Thanksgiving Day and Memorial Day) always occur on weekdays, and, therefore, there are always at least three weekdays annually on which Sunday service levels are operated. The other three holidays (July 4th, Christmas Day and New Year's Day) may occur on different types of days depending on the calendar. In some years this may mean that additional weekdays will be considered as Sundays for scheduling purposes, or occasionally a Saturday will be treated as a Sunday. The number of each type of day that will occur in each fiscal year is important because the level of service operated (which is determined by the type of day) has a direct influence on the patronage served and the passenger revenue received. Therefore, annualized projections of patronage and passenger revenues are calculated in a manner which is sensitive to the number of days of each type that will occur in each fiscal year. It should be pointed out that the number and types of days in each fiscal year will affect only the portion of passenger revenue which is received directly through the farebox. Since passes are sold on a calendar month basis, the revenue received from this source is assumed to be unaffected by consideration of the number and types of days in the fiscal year.

Projections of future patronage and passenger revenue would normally be based on application of the patronage projection model discussed in Section 5.0. Recall that the model projects the expected annual change in ridership as a function of a constant annual rate of ridership change modified by the effect of any planned change in fares. Since no fare changes were assumed during the forecast period of this SRTF, then annual patronage change would be expected to occur at the constant annual rate contained in the calibrated model. For the period from FY 81 through FY 86, this value was 3.76% for systemwide patronage. This value represented the underlying annual rate of change for District patronage exclusive of consideration of the impacts of fare changes (which occurred in FY 82, FY 83 and FY 86).

District management was concerned that the historical annual patronage growth rate would be too optimistic for use in forecasting patronage change through FY 90 in view of the fact that FY 87 patronage declined 3% from prior year levels even though no fare change had occurred. Therefore, it was decided to assume no growth in patronage from FY 87 to FY 88. For subsequent years (FY 89 and FY 90), only one-half of the historical growth rate, or 1.88% annually, was assumed. The base year (FY 87) and future year projections (through FY 90) of annual patronage and passenger revenues resulting from these considerations are provided in Tables VII-1 through VII-4.

7.3 POTENTIAL IMPACTS OF FEDERAL FUNDING REDUCTIONS

Heightened concern in recent years for the size of the federal deficit poses an annual threat that federal subsidies for public transit will be reduced. Consequently, the LACTC guidelines for preparation of the SRTP stipulate that operators must evaluate the potential impacts of reduced federal subsidies.

This SRTP was prepared with the assumption that federal transit subsidies would continue to be available at FY 87 funding levels. This represents a funding level of approximately \$102 million annually in Section 9 funding for Los Angeles County operators of which about \$49 million is specifically reserved for capital projects with the balance available to reduce operating deficits. The District receives approximately 86% of the available Section 9 operating subsidies by formula allocation (about \$46 million). Funding for the District's capital program varies depending on the needs of the District and each of the municipal operators who are also eligible to use federal capital funding.

It is assumed from observation of past budget deliberations at the federal level that the bulk of any potential federal transit subsidy reduction would be achieved through reduction of federal operating subsidies rather than through reduced federal capital funding. This assumption means that the effect of any overall reduction in transit funding is magnified in terms of its impact on available federal operating subsidies. In the extreme, a 52% reduction in overall transit funding would eliminate all federal operating subsidies if capital subsidies were preserved at present levels.

The District's response to a significant revenue shortfall would likely come from a combination of operating cost reductions, actions to enhance available revenues, service reductions, and fare increases. The particular combination of actions would depend on the magnitude of the problem, and the circumstances prevailing at the time. This SRTP projects potential revenue shortfalls in FY 89 and FY 90 using existing funding level assumptions and assuming continuation of present fare levels. The District's Board of Directors requested that no specific actions be proposed in the SRTP to address these potential funding

**FY 87 BASE YEAR PATRONAGE AND REVENUE
(Unaudited Data)**

<u>Type of Day</u>	<u># of Days</u>	<u>Avg. Daily Boarding</u>	<u>Annualized Boardings</u>
Weekday	254	1,403,429	356,470,966
Saturday	52	890,308	46,296,016
Sun. & HoI.	58	623,672	<u>36,172,976</u>
Total Boardings			438,939,958

<u>Type of Day</u>	<u># of Days</u>	<u>Avg. Daily Cash and Other Revenue</u>	<u>Annualized Cash and Other Revenue</u>
Weekday	254	\$397,748	\$101,027,992
Saturday	52	\$263,904	\$ 13,723,008
Sun. & HoI.	58	\$185,879	<u>\$ 10,780,982</u>
Annualized Pass Revenue			<u>\$125,531,982</u> <u>\$ 65,275,000</u>
Total Passenger Revenue			\$190,806,982

Source: SCRTD Planning Department
Projections based on District performance through mid-May 1987



**FY 87 BASE YEAR PATRONAGE
AND REVENUE (Unaudited Data)**

TABLE VII-1

FY 88 PROJECTED PATRONAGE AND REVENUE

<u>Type of Day</u>	<u># of Days</u>	<u>Avg. Daily Boarding</u>	<u>Annualized Boardings</u>
Weekday	260	1,403,429	364,891,540
Saturday	52	890,308	46,296,016
Sun. & Hol.	59	623,672	<u>36,796,648</u>
Total Boardings			447,984,204

<u>Type of Day</u>	<u># of Days</u>	<u>Avg. Daily Cash and Other Revenue</u>	<u>Annualized Cash and Other Revenue</u>
Weekday	260	\$397,748	\$103,414,480
Saturday	52	\$263,904	\$ 13,723,008
Sun. & Hol.	59	\$185,879	<u>\$ 10,966,861</u>
Annualized Pass Revenue			<u>\$128,104,349</u>
Total Passenger Revenue			<u>\$ 65,275,000</u>
			\$193,379,349

Assumptions

- 1) No change in fare structure from prior year.
- 2) No change in average daily patronage from prior year.



FY 88 PROJECTED PATRONAGE AND REVENUE

TABLE VII-2

FY 89 PROJECTED PATRONAGE AND REVENUE

<u>Type of Day</u>	<u># of Days</u>	<u>Avg. Daily Boarding</u>	<u>Annualized Boardings</u>
Weekday	256	1,429,813	366,032,128
Saturday	52	908,046	47,218,392
Sun. & Hol.	56	635,397	<u>35,582,232</u>
		Total Boardings	448,832,752

<u>Type of Day</u>	<u># of Days</u>	<u>Avg. Daily Cash and Other Revenue</u>	<u>Annualized Cash and Other Revenue</u>
Weekday	256	\$405,226	\$103,737,856
Saturday	52	\$268,865	\$ 13,980,980
Sun. & Hol.	56	\$189,374	<u>\$ 10,604,944</u>
		Annualized Pass Revenue	\$128,323,780
			<u>\$ 66,500,000</u>
		Total Passenger Revenue	\$194,823,780

Assumptions

- 1) No change in fare structure from prior year.
- 2) Average daily patronage (and associated cash and other revenue) assumed to grow at 1.88% relative to prior year.



FY 89 PROJECTED PATRONAGE AND REVENUE

TABLE VII-3

FY 90 PROJECTED PATRONAGE AND REVENUE

<u>Type of Day</u>	<u># of Days</u>	<u>Avg. Daily Boarding</u>	<u>Annualized Boardings</u>
Weekday	254	1,456,693	370,000,022
Saturday	52	925,117	48,106,084
Sun. & Hol.	58	647,342	<u>37,545,836</u>
		Total Boardings	455,651,942

<u>Type of Day</u>	<u># of Days</u>	<u>Avg. Daily Cash and Other Revenue</u>	<u>Annualized Cash and Other Revenue</u>
Weekday	254	\$412,844	\$104,862,376
Saturday	52	\$273,920	\$ 14,243,840
Sun. & Hol.	58	\$192,934	<u>\$ 11,190,172</u>
		Annualized Pass Revenue	\$130,296,388
		Total Passenger Revenue	<u>\$198,046,388</u>

Assumptions

- 1) No change in fare structure from prior year.
- 2) Average daily patronage (and associated cash and other revenue) assumed to grow at 1.88% relative to prior year.



FY 90 PROJECTED PATRONAGE AND REVENUE

TABLE VII-4

shortfalls because the magnitude of the revenue needs is likely to change with time, and the Board did not want to suggest that any particular response or combination of actions is any more or less likely to be adopted when an action to resolve a revenue shortfall becomes necessary.

7.3.1. IMPACTS OF REDUCED FEDERAL FUNDING ON FARE STRUCTURE

The patronage projection model described in Section 5.0 provides a tool for translating a specified federal funding reduction into the fare increase which would be necessary to offset reduced federal revenues. Another way of looking at this would be to consider how much of a fare reduction is enabled by the availability of federal subsidies at present funding levels.

The revenue projection model, in the absence of natural patronage change, states that the ridership achieved with a specific fare change is the sum of the existing patronage and the effect of the fare change, where the effect of the fare change is expressed as the product of the fare elasticity (-.26 for the District's patrons considered as a whole) and the change in fare in proportion to the existing fare. For example, with an existing base fare of \$.85 and a proposed fare increase of 6% (approximately \$.05), the projected patronage level would be $1 - .26 \times .06$, or 98.44% of the ridership carried prior to the fare increase. The projected passenger revenue associated with a fare change is the difference between the passenger revenue attained with the proposed fare level and the existing passenger revenue. The passenger revenue attained with the proposed fare level is equal to the product of the projected ridership level and the proposed fare (each expressed in proportion to existing ridership and fare levels). Continuing the example, the projected passenger revenue attained with a 6% fare increase would equal the product of the projected ridership level (.9844 in this example) and the proposed fare level (1.06 in this example), or specifically 1.0435. This means that a 6% fare increase could be expected to result in a 4.35% passenger revenue increase, and an associated 1.56% decline in ridership.

If this example is generalized to an unspecified fare increase and an unknown change in passenger revenue, the general relationship between fare change and revenue change may be expressed as

$$(1 - .26 \times \text{Fare Change}) \times (1 + \text{Fare Change}) = 1 + \text{Revenue Change}$$

This relationship can be solved for the value of the Fare Change that would be required to produce any specified Revenue Change. The size of the fare change (relative to existing fares) which would be needed to offset any particular federal operating subsidy reduction (if fare changes alone were to be relied on for this purpose) can be determined from the above relationship by determining the Revenue Change

represented by the Federal subsidy reduction. In the instance of the District, FY 88 passenger revenue with the existing \$.85 base fare was projected to be \$193.2 million. Therefore, a \$10 million federal operating subsidy reduction would translate to a needed revenue increase of \$10 million which may be expressed as a needed Revenue Change of \$10 million divided by \$193.2 million, or .0518. Substituting this value in the above relationship, and solving for the lowest possible value of Fare Change, results in a value of .0712, which means that a 7.12% fare increase (approximately \$.06) would be needed to provide \$10 million of additional passenger revenue in FY 88.

7.3.2 IMPACTS OF REDUCED FEDERAL FUNDING ON PATRONAGE AND REVENUE

In the preceding section, a generalized model relating the fare change needed to generate a desired revenue change was presented. An element of that model provides an estimate of the ridership impact associated with a given fare change. To illustrate the potential significance of a variety of federal funding reduction scenarios, Table VII-5 depicts the fare increase and resulting ridership impacts associated with a selected set of federal funding reduction assumptions. It is unlikely that the District's response to a federal funding reduction would be limited only to a fare increase. However, assuming a limited response of this kind is convenient to demonstrate the relative importance of federal operating subsidies to the District's overall revenue base.

**POSSIBLE IMPACTS OF FEDERAL FUNDING REDUCTIONS
ASSUMING A RESPONSE LIMITED ONLY TO FARE CHANGES**

<u>Scale of Federal Funding Reduction</u>	<u>Additional District Revenue Required (1)</u>	<u>Fare Change Percent</u>	<u>Equivalent Fare Change in Implied (2) Dollars</u>	<u>Projected Impact on Ridership</u>
-10%	\$8.84 million	+ 6.33%	\$.054	-1.65%
-20%	\$17.68 million	+13.46%	\$.114	-3.50%
-25%	\$22.09 million	+17.31%	\$.147	-4.50%
-33%	\$29.17 million	+22.12%	\$.188	-5.75%
-52% (3)	\$45.99 million	+36.54%	\$.311	-9.50%

(1) Assumes that federal capital funding is retained at present levels.

(2) Assumes that all needed additional revenue is to be generated by a fare increase.

(3) Represents elimination of all federal operating subsidies given assumption 1, above.



POSSIBLE IMPACTS OF FEDERAL FUNDING REDUCTIONS ASSUMING A RESPONSE LIMITED ONLY TO FARE CHANGES

TABLE VII-5

APPENDIX A ANALYSIS OF ON-BOARD SURVEYS

Periodically, the District conducts on-board surveys of its ridership to supplement the method of fare payment information derived from quarterly fare surveys and line-by-line patronage information obtained from an ongoing program of ride checks. The District's on-board surveys are usually designed to ascertain demographic, origin-destination, trip purpose, mode of access, and supplemental fare and bus usage information. Occasionally, these surveys have been used to solicit ridership comments on service quality, awareness of planned District programs, and utilization of available supporting services. The two most recent surveys were conducted during FY 83 and FY 86.

The FY 83 On-Board Survey was conducted in the fourth quarter of FY 83, measuring the first year's effects of the three-year Proposition A Fare Reduction Program. The FY 86 On-Board Survey was conducted in the fourth quarter of FY 86, documenting the first year's effects of the end of the three-year Proposition A Fare Reduction Program.

A.1 DIFFERENCES IN METHODOLOGY: FY 83 VERSUS FY 86 ON-BOARD SURVEYS

The District's FY 83 and FY 86 On-Board Surveys contained several important differences in methodology. First, the FY 83 survey forms were precoded to provide time and bus run identification, while the FY 86 survey forms relied on the rider to provide this information. As a result, some forms were unusable in FY 86 because they lacked time and bus run identification.

A second important difference between the FY 83 and FY 86 survey methodologies is that while all riders were sampled in both surveys only linked trip records were retained for further processing in FY 83; records representing transfer boardings were deleted from the file before processing. A linked trip consists of a consecutive chain of individual bus trips which together represent a patron's entire journey. By sampling only people on the first of however many buses may be used, an attempt was made to ensure that only linked trip records would be included in the sample. By contrast, for the FY 86 survey the District processed all respondents irrespective of whether the sampled patron had boarded the sampled line via a transfer.

For the purposes of this study, in order to facilitate comparisons between the FY 83 and FY 86 On-Board Surveys, an attempt was made to exclude transfer boardings whenever possible. This allows a more direct comparison of ridership characteristics between the District's FY 86 On-Board Survey and the FY 83 On-Board Survey.

In addition, to facilitate comparisons between the two surveys, the data from the FY 86 survey was converted to a standardized form consistent with the FY 83 survey by normalizing the weights from the FY 86 survey. This resulted in the FY 86 survey being aggregated to the sample size when the data is presented in tabular form rather than its usual format of being weighted to weekly boarding totals. It is often more convenient to represent a survey response as a proportion of all respondents, rather than as a proportion of all riders, because the latter is not appropriate for some types of comparisons.

Another difference between the On-Board Surveys is that in FY 83 a 24-hour time period was sampled, whereas in FY 86 only the 14-hour time period between 6:00 A.M. and 8:00 P.M. was sampled. Sampling of the District's Night Service between 6:00 P.M. and midnight was truncated, and therefore not a representative sample. Also, Owl service between midnight and 6:00 A.M. was not sampled.

The usable questionnaires from the FY 86 On-Board Survey represent a response rate of 36.0% of the eligible passengers who actually were handed a questionnaire according to Market Opinion Research, the consultants who prepared the FY 86 On-Board Survey. Eligible passengers were defined as persons 12 and over who boarded the bus. By excluding patrons under age 12, some District patrons were underrepresented in the raw sample. Projections were made by the consultant to expand the completed questionnaires to the population of passenger trips of those age 12 and over who ride buses in a week between the hours of 6:00 A.M. and 8:00 P.M. Also, projections were made to expand the count of children; these estimates were based on actual counts of boarding passengers tabulated by interviewers.

An attempt was made by the consultant, when weighting factors were developed, to account for individuals who were not directly surveyed, but, of course, certain statistics, such as age distributions may be somewhat skewed by this process. The consultant stated, "Despite best efforts by interviewers it is possible some small percentage of boarding passengers did not get counted."

Of interest, student and college riders, as well as regular pass users, are more likely to respond to an On-Board Survey than other classes of riders, as is later shown in Section A.2.4. These groups appear to be over-represented in the On-Board Survey sample.

A.2 COMPARISON OF FY 83 AND FY 86 ON-BOARD SURVEY RESPONSE SUMMARIES

Summaries of response distributions for the District's FY 86 On-Board Survey are compared to the FY 83 On-Board Survey in Tables A-1 through A-13 in the following categories: ridership by number of buses used, by method of fare payment, by time of day, by type of day, by origin purpose, by mode of access to bus, by household income, and by auto availability.

A.2.1 COMPARISON OF NUMBER OF BUSES USED IN FY 83 AND FY 86

Table A-1, "Comparison of Number of Buses Used per Trip by Type of Day," attempts to compare the extent to which District service has directly served the origin to destination travel needs of patrons over time. Although there was no significant change in the number of buses used from FY 83 to FY 86, a slight shift of under 5% in the percentage of patrons who previously used one and two buses moved to three and four buses. This change was most noticeable on weekdays and Saturdays.

The increase in transfer usage over time substantiates the fact that an increase in the average number of buses used has occurred for some riders. The transfer share of all boardings has been steadily increasing each year from FY 81 through FY 86, as previously discussed in Section 4.1, "Systemwide Ridership and Revenue Impacts." Given a pattern of increasing transfer utilization over time, it is possible that the District's service restructuring actions have contributed to a decline in the number of trips that are served by only one bus.

A.2.2 COMPARISON OF NUMBER OF BUSES USED PER TRIP BY METHOD OF FARE PAYMENT

Tables A-2, A-3, and A-4, "Comparison of Number of Buses Used per Trip by Method of Fare Payment" for Weekdays, Saturdays, and Sundays, respectively, provide a means for measurement of the transfer rates of pass users in direct proportion to the transfer rate for cash riders. Since quarterly fare surveys measure cash transfer rates only, On-Board Survey data is the sole means available to convert quarterly fare survey data to linked trips.

Comparisons between the FY 83 and FY 86 On-Board Surveys show that the FY 86 On-Board Survey sample size, excluding transfer boardings, is half as large as the FY 83 On-Board Survey sample size. The reason the FY 86 On-Board Survey sample size has been reduced is that it was necessary to exclude transfer trips from the FY 86 On-Board Survey sample so that only linked trips would be counted as had been done with the FY 83 On-Board Survey; this methodology was used for purposes of a comparative analysis for this study only.

The cash transfer rate, as measured by the appropriate fiscal year fare survey, was used to assess the reasonableness of the On-Board Survey cash transfer rate. Only the cash transfer rates, as shown in the far right column in Tables A-2, A-3, and A-4, are derived from historical fare surveys. All other transfer rates shown in these tables are derived directly from On-Board Survey data, and they are calculated by dividing total transfer boardings for a fare category (2 buses used = 1 transfer; 3 buses used = 2 transfers), by total boardings for that fare category (1 bus used = 1 boarding; 2 buses used = 2 boardings). Note that since the On-Board Survey data from the sample was processed to exclude patrons who had already transferred, the resulting shares are of linked trips.

**COMPARISON OF NUMBER OF BUSES USED PER TRIP
BY TYPE OF DAY**

FY 83 Survey	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Ho].</u>
1 bus	3,166	1,782	1,102
2 buses	2,368	1,422	1,008
3 buses	322	159	189
4 buses	95	33	32
No Response	<u>159</u>	<u>142</u>	<u>84</u>
	6,110	3,538	2,415
Weighted Avg. for Respondents	1.55	1.54	1.64
FY 86 Survey¹	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Ho].</u>
1 bus	1,597	845	566
2 buses	1,316	614	464
3 buses	267	112	90
4 buses	122	48	45
No Response	<u>---</u>	<u>---</u>	<u>---</u>
	3,302	1,619	1,165
Weighted Avg. for Respondents	1.55	1.61	1.67

¹18,058 sample records excluded to remove patrons who were not sampled on the first bus used for their trip - this reduces the comparison to linked trips for purposes of compatibility with the FY 83 survey which sampled only linked trips.



**COMPARISON OF NUMBER OF BUSES USED
PER TRIP BY TYPE OF DAY**

TABLE A-1

**COMPARISON OF NUMBER OF BUSES USED PER TRIP
BY METHOD OF FARE PAYMENT (WEEKDAYS)**

<u>FY 83 Survey</u>	<u>1 Bus</u>	<u>2 Buses</u>	<u>3 Buses</u>	<u>4 Buses</u>	<u>Calculated Transfer Share of Linked Trips</u>	<u>FY 83 Transfer Share From Fare Surveys¹</u>
Cash/Ticket	1,362	847	119	26	.494	.496
Regular Pass	681	584	84	19	.591	
Express Pass	143	91	9	1	.459	
Senior Pass	233	139	21	9	.569	(E&D combined)
Disabled Pass	56	59	7	7		
Student Pass	505	370	45	13	.535	
College Pass	170	160	21	2	.589	
Other	58	73	9	1	.667	
No Response			186 Combined			
Total Respondents	3,208	2,323	315	78		

<u>FY 86 Survey²</u>	<u>1 Bus</u>	<u>2 Buses</u>	<u>3 Buses</u>	<u>4 Buses</u>	<u>Calculated Transfer Share of Linked Trips</u>	<u>FY 86 Transfer Share From Fare Surveys¹</u>
Cash/Ticket	741	518	99	40	.598	.551
Regular Pass	408	387	76	35	.711	
Express Pass	32	25	5	3	.677	
Senior Pass	109	120	18	16	.789	(E&D combined)
Disabled Pass	22	31	1	6		
Student Pass	188	159	29	19	.694	
College Pass	62	50	28	2	.789	
Other	18	8	3	0	.483	
No Response	14	17	8	3		
Total Respondents	1,580	1,298	259	121		

¹Fourth quarter average transfer rate compiled from historical fare surveys.
²Excludes patrons not sampled on first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



**COMPARISON OF NUMBER OF BUSES USED
PER TRIP BY METHOD OF FARE PAYMENT
(WEEKDAYS)**

TABLE A-2

**COMPARISON OF NUMBER OF BUSES USED PER TRIP
BY METHOD OF FARE PAYMENT (SATURDAYS)**

<u>FY 83 Survey</u>	<u>1 Bus</u>	<u>2 Buses</u>	<u>3 Buses</u>	<u>4 Buses</u>	<u>Calculated Transfer Share of Linked Trips</u>	<u>FY 83 Transfer Share From Fare Surveys¹</u>
Cash/Ticket	755	564	49	4	.491	.396
Regular Pass	470	348	84	16	.614	
Express Pass	21	29	0	0	.580	
Senior Pass	159	67	6	1	.370	(E&D combined)
Disabled Pass	53	30	3	0		
Student Pass	236	203	28	6	.586	
College Pass	40	113	3	0	.763	
Other	49	55	0	2	.575	
No Response			144 Combined			
Total Respondents	1,783	1,409	173	29		

<u>FY 86 Survey²</u>	<u>1 Bus</u>	<u>2 Buses</u>	<u>3 Buses</u>	<u>4 Buses</u>	<u>Calculated Transfer Share of Linked Trips</u>	<u>FY 86 Transfer Share From Fare Surveys¹</u>
Cash/Ticket	425	245	42	12	.504	.469
Regular Pass	185	216	33	15	.728	
Express Pass	10	6	4	0	.700	
Senior Pass	79	31	5	5	.487	(E&D combined)
Disabled Pass	15	16	1	0		
Student Pass	90	63	17	11	.718	
College Pass	25	26	4	5	.817	
Other	5	4	2	0	.727	
No Response	10	7	4	0		
Total Respondents	834	607	108	48		

¹Fourth quarter average transfer rate compiled from historical fare surveys.

²Excludes patrons not sampled on first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



**COMPARISON OF NUMBER OF BUSES USED
PER TRIP BY METHOD OF FARE PAYMENT
(SATURDAYS)**

TABLE A-3

**COMPARISON OF NUMBER OF BUSES USED PER TRIP
BY METHOD OF FARE PAYMENT (SUN. & HOL.)**

<u>FY 83 Survey</u>	<u>1 Bus</u>	<u>2 Buses</u>	<u>3 Buses</u>	<u>4 Buses</u>	<u>Calculated Transfer Share of Linked Trips</u>	<u>FY 83 Transfer Share From Fare Surveys¹</u>
Cash/Ticket	438	422	110	1	.664	.433
Regular Pass	270	249	36	1	.583	
Express Pass	12	11	2	0	.600	
Senior Pass	165	60	7	4	.436	(E&D combined)
Disabled Pass	14	20	1	4		
Student Pass	145	144	16	13	.676	
College Pass	55	104	17	6	.857	
Other	19	4	3	4	.733	
No Response			<u>N o n e</u>			
Total Respondents	1,118	1,014	192	33		

<u>FY 86 Survey²</u>	<u>1 Bus</u>	<u>2 Buses</u>	<u>3 Buses</u>	<u>4 Buses</u>	<u>Calculated Transfer Share of Linked Trips</u>	<u>FY 86 Transfer Share From Fare Surveys¹</u>
Cash/Ticket	291	199	31	21	.598	.443
Regular Pass	107	137	40	16	.883	
Express Pass	4	5	1	0	.700	
Senior Pass	48	31	10	1	.528	(E&D combined)
Disabled Pass	27	4	4	0		
Student Pass	58	60	5	3	.627	
College Pass	12	13	0	1	.615	
Other	1	2	0	0	.667	
No Response	<u>17</u>	<u>13</u>	<u>0</u>	<u>4</u>		
Total Respondents	548	451	91	42		

¹Fourth quarter average transfer rate compiled from historical fare surveys.

²Excludes patrons not sampled on first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



**COMPARISON OF NUMBER OF BUSES USED
PER TRIP BY METHOD OF FARE PAYMENT
(SUN. & HOL.)**

TABLE A-4

The FY 83 transfer share of linked trips is a weighted average of the Fare Surveys conducted in each of the four quarters of FY 83. The FY 83 transfer share for weekdays is equal to 0.496 or a ratio of about 1:1-1/2; or, for every one boarding there is an additional one-half transfer boarding. The FY 86 transfer share for weekdays is 0.551, an increase of 5% compared with FY 83.

In the fourth quarter of FY 83, there were 1.44 million average Weekday passengers; of that total, 0.94 million were linked or initial trips. By contrast, in the fourth quarter of FY 86 there were 1.45 million average Weekday boardings equivalent to the sum of initial boardings plus succeeding transfer trips. In FY 86 there were fewer linked trips, that is 0.93 million initial boardings. Thus, there was a 4% increase in transfers between the FY 83 and the FY 86 On-Board Surveys, from 0.5 million in FY 83 to 0.52 million in FY 86, and this is consistent with the observed increase in transfer usage over time shown in Table A-1.

A comparison of FY 83 and FY 86 Weekday bus patrons using one bus (Table A-2) shows there was an increase of 4% and 5%, respectively, of cash/ticket and regular pass usage, while the share of student pass usage decreased 4%. For weekday patrons using one bus in FY 86, 47% used cash/ticket, 26% used regular pass, and 12% used student pass as method of fare payment. In fact, the most common method of fare payment by patrons for all three day types--Weekdays, Saturdays and Sundays--was cash/ticket followed closely by regular pass and then student pass.

As shown in Table A-3, for Saturday patrons using one bus, cash/ticket increased its share by 9%; for two bus patrons on Saturday, regular pass increased its share by 11%. As can be seen in Table A-4, Sunday patrons using one bus increased their use of cash/ticket by 14% and the elderly pass share decreased by 6%; for two bus patrons on Sunday, regular pass increased its share by 6% while college pass decreased its share by 7%. Thus, the discernible pattern on Saturday and Sunday is an increase in share of cash/ticket by patrons using one bus and an increase in share of regular pass for patrons using two buses. The trend of an increase in cash/ticket and a decrease in regular pass was consistent for patrons using three and four buses on Saturday in FY 86.

A.2.3 COMPARISON OF METHOD OF FARE PAYMENT BY TYPE OF DAY

Table A-5, "Comparison of Method of Fare Payment by Type of Day (Weekdays Only)" shows the proportion of riders using each available method of fare payment on weekdays. The major increased shares occurred in the two largest categories, cash/ticket and regular pass, which increased 3.2% and 4.7%, respectively. By contrast, the express pass share declined 2%, the student pass share declined 3.6%, and the college pass share declined 1.6%. On Saturday, the cash/ticket share rose 5.1% while student pass declined 2.5% in its share of total linked trips. On Sunday in FY 86, cash/ticket increased its share by 6.8%, while the college pass share was down by 5.4%.

**COMPARISON OF METHOD OF FARE PAYMENT
BY TYPE OF DAY**

<u>FY 83 Survey</u>				Annualized - FY 83 ²
	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>	<u>Weekday Fare Survey Distribution</u>
Cash/Ticket	2,354 (.397)	1,372 (.404)	972 (.412)	.452
Regular Pass	1,368 (.231)	918 (.270)	556 (.236)	.197
Express Pass	244 (.041)	51 (.015)	26 (.011)	.024
Senior Pass	402 (.068)	232 (.068)	236 (.100)	.113(E&D Combined)
Disabled Pass	128 (.022)	86 (.025)	38 (.016)	
Student Pass	933 (.157)	473 (.139)	318 (.135)	.122
College Pass	353 (.060)	157 (.046)	182 (.077)	.052
Other	143 (.024)	106 (.031)	30 (.013)	.039
No Response	<u>185</u>	<u>143</u>	<u>57</u>	
Total Respondents	5,925	3,395	2,358	

<u>FY 86 Survey</u> ¹				Annualized - FY 86 ²
	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>	<u>Weekday Fare Survey Distribution</u>
Cash/Ticket	1,397 (.429)	725 (.455)	540 (.480)	.452
Regular Pass	906 (.278)	448 (.281)	300 (.266)	.257
Express Pass	67 (.021)	20 (.013)	10 (.009)	.018
Senior Pass	262 (.080)	119 (.075)	88 (.078)	.113(E&O Combined)
Disabled Pass	60 (.018)	31 (.019)	34 (.030)	
Student Pass	395 (.121)	181 (.114)	125 (.111)	.085
College Pass	142 (.044)	60 (.038)	26 (.023)	.025
Other	28 (.009)	10 (.006)	3 (.003)	.050
No Response	<u>35</u>	<u>14</u>	<u>29</u>	
Total Respondents	3,257	1,594	1,126	

¹ 18,089 sample records excluded to remove patrons who were not on the first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.

² Compiled from historical fare survey data.



Presented for comparison purposes are Table A-6, "Shares and Percent Change of Linked Trips (FY 83 to FY 86)", and Table A-7, "Annualized Comparison of Boardings and Linked Trips (FY 83 and FY 86)." Tables A-6 and A-7 are a compilation of data from sources including the District's Quarterly Fare Surveys, daily patronage estimates, farebox revenue totals, and monthly pass sales. Cash and pass are combined in all fare categories except "Ticket" and "Free". The "Other" fare category includes both cash and pass for FY 83 and cash only for FY 86; passes have not been accepted for payment on the District's special service lines since August, 1985.

Table A-6 summarizes the percent difference or shift in the shares of linked trips for each of the fare categories from FY 83 to FY 86, and also presents the percent change in linked trips. The only two groups consistently increasing their trip making from FY 83 through FY 86 were Regular and Free riders, the latter predominantly children under five years of age.

Regular cash and pass ridership increased its share of linked trips by 8.0%, from a .566 to .646 share of total District linked trips, representing a 17.9% increase in Weekday linked trips. On Saturdays, regular ridership increased its share by 4.6% from 61.1% to 65.7%, corresponding to a 21.9% increase in linked trips. On Sundays, regular ridership increased its share by 2.3%, from 60.6% to 62.9%, with a 24.2% increase in linked trips.

From FY 83 to FY 86, Express ridership decreased its share of total District linked trips on Weekdays from 4.3% to 4.1%, a .2% difference in share, and a minus 3.2% change in linked trips. On Saturdays, Express ridership decreased its share from 2.9% to 2.3%, a .6% decrease in share, and a negative 7.8% change in linked trips. Sunday Express ridership increased by 15.1%, but the share of Express ridership in relation to total District ridership decreased from 2.6% to 2.5%, a decrease in share of .1%.

College linked trips decreased by 47.9% on Weekdays, 27.3% on Saturdays, and 17.9% on Sundays. On Weekdays, college share shifted from 5.4% to 2.7%, a 2.7% decrease in share; on Saturdays, college share shifted from 3.1% to 2.0%, a 1.1% decrease in share; on Sundays, college share shifted from 3.2% to 2.2%, a 1.0% decrease in share. Thus, although linked trips by college riders sustained large percentage losses, especially for Weekdays, the decrease in share was less dramatic.

Student linked trips dropped by approximately 23.5% on Weekdays, increased 2.2% on Saturdays, and 30.5% on Sundays. Student share shifted from 12.9% to 9.6%, a 3.3% decline in share on Weekdays. On Saturdays, student share shifted from 9.4% to 8.5%, a .9% decline in share. By contrast, on Sundays, student share shifted from 9.6% to 10.4%, a .8% increase in share.

SHARES AND PERCENT CHANGE OF LINKED TRIPS (FY83 TO FY86)

Fare Category	WEEKDAY				SATURDAY				SUNDAY			
	Shares of Linked Trips		FY83 to FY86 Percent Change	FY83 to FY86 Percent Change	Shares of Linked Trips		FY83 to FY86 Percent Change	FY83 to FY86 Percent Change	Shares of Linked Trips		FY83 to FY86 Percent Change	FY83 to FY86 Percent Change
	FY83	FY86	Shift in Share	in Linked Trips	FY83	FY86	Shift in Share	in Linked Trips	FY83	FY86	Shift in Share	in Linked Trips
Regular	.566	.646	+8.0%	+17.9%	.611	.657	+4.6%	+21.9%	.606	.629	+2.3%	+24.2%
Express	.043	.041	-.2%	-3.2%	.029	.023	-.6%	-7.8%	.026	.025	-.1%	+15.1%
Elderly & Disabled	.143	.133	-1.0%	-4.0%	.169	.151	-1.8%	+1.2%	.180	.141	-3.9%	-6.4%
Student	.129	.096	-3.3%	-23.5%	.094	.085	-.9%	+2.2%	.096	.104	+.8%	+30.5%
College	.054	.027	-2.7%	-47.9%	.031	.020	-1.1%	-27.3%	.032	.022	-1.0%	-17.9%
Ticket	.017	.005	-1.2%	-71.0%	.011	.004	-.7%	-53.6%	.006	.002	-.4%	-55.9%
Free	.039	.050	+1.1%	+31.6%	.049	.053	+.4%	+23.3%	.049	.071	+2.2%	+73.0%
Other ²	.008	.003	-.5%	-62.9%	.007	.006	-.1%	+1.5%	.006	.006	0.0%	+18.5%
System Total	.999	1.001		+3.4%	1.001	.999		+13.3%	1.001	1.000		+19.6%

¹ Cash and pass are combined in all fare categories except "Ticket" and "Free".
² The "Other" fare category includes both cash and pass for FY83 and cash only for FY86; Passes have not been accepted for Special Service fares since August 1985.

Source: SCRTD Planning Department
 August 1986

A-11



SHARES AND PERCENT CHANGE OF LINKED TRIPS (FY 83 TO FY 86)

TABLE A-6

**ANNUALIZED COMPARISON OF BOARDINGS AND LINKED TRIPS
(FY 83 AND FY 86)**

Fare Category ¹	<u>WEEKDAY</u>		<u>SATURDAY</u>		<u>SUNDAY</u>	
	FY 83 to FY 86 Percent Change		FY 83 to FY 86 Percent Change		FY 83 to FY 86 Percent Change	
	Boardings	Linked Trips	Boardings	Linked Trips	Boardings	Linked Trips
Regular	+21.2%	+17.9%	+33.1%	+21.9%	+32.4%	+24.2%
Express	+2.2%	-3.2%	-0.3%	-7.8%	+19.3%	+15.1%
Elderly & Disabled	+1.6%	-4.0%	+10.0%	+1.2%	-2.1%	-6.4%
Student	-20.4%	-23.5%	+16.4%	+2.2%	+30.8%	+30.5%
College	-45.8%	-47.9%	-18.5%	-27.3%	-22.7%	-17.9%
Ticket	-71.0%	-71.0%	-53.6%	-53.6%	-55.9%	-55.9%
Free	+13.6%	+31.6%	+42.5%	+23.3%	+62.1%	+73.0%
Other ²	<u>-66.7%</u>	<u>-62.9%</u>	<u>-19.5%</u>	<u>+1.5%</u>	<u>-13.6%</u>	<u>+18.5%</u>
Systemwide	+6.5%	+3.4%	+24.5%	+13.3%	+25.1%	+19.6%

	<u>WEEKDAY</u>	<u>SATURDAY</u>	<u>SUNDAY</u>
Average Daily Boardings	FY 83 1.34 million FY 86 1.43 million	0.74 million 0.92 million	0.54 million 0.67 million
Average Daily Linked Trips	FY 83 0.90 million FY 86 0.93 million	0.52 million 0.59 million	0.38 million 0.46 million

¹Cash and pass are combined in all fare categories except "Ticket" and "Free".
²The "Other" fare category includes both cash and pass for FY 83 and cash only for FY 86;
 Passes have not been accepted for Special Service fares since August 1985.

Source: SCRTD Planning Department
 August 1986



ANNUALIZED COMPARISON OF BOARDINGS
AND LINKED TRIPS (FY 83 AND FY 86)

TABLE A-7

A.2.4 COMPARISON OF METHOD OF FARE PAYMENT BY TIME OF DAY

Table A-8, "Comparison of Method of Fare Payment by Time of Day (Weekdays Only)," contains the weighted count of responses by type of fare paid and by time of boarding when surveyed (Peak = 6:00 A.M. to 8:59 A.M. or 3:00 P.M. to 5:59 P.M.); (Off-peak = all other times). The contents of Table A-8 are analogous to those of Table A-5, except that the distribution of riders is consolidated among time periods to distinguish only between peak and off-peak usage. As was previously noted and is further detailed in the discussion of Table A-9, not all time periods were sampled in the FY 86 On-Board Survey as was previously done in the FY 83 On-Board Survey.

An over-representation of student and college riders for both FY 83 and FY 86 On-Board Surveys is shown in both Tables A-5 and Tables A-8, where the share of student and college riders from the On-Board Surveys exceeds the Weekday Fare Survey proportion of student and college riders. This suggests that student and college riders were more likely to respond to the survey than, for example, Elderly and Disabled riders. The latter groups are less well represented in the On-Board Survey than fare surveys suggest they should be.

A comparison of the results from the FY 83 and the FY 86 On-Board Surveys shows that two fare categories which sustained a loss of patrons for weekdays were student pass and college/vocational pass. In the off-peak hours, the share of linked trips by student pass users dropped from 17.8% to 11.7%, while the share of linked trips by college/vocational pass users dropped from 6.8% to 5.5%. By contrast, the peak hour share of linked trips by student pass users declined from 15.5% to 14.8%, and the share of linked trips by college/vocational pass users declined from 5.7% to 4.0%.

Since school trips most often originate and end in the peak hours, and off-peak boardings by student pass users declined markedly, it appears that a smaller share of student pass users are now using passes for non-school purposes than was the case in FY 83.

The major factor for the substantial loss of student and college/vocational boardings was the July 1, 1985 fare increase. From FY 85 to FY 86, there was a 45.6% decrease in student boardings and an 18.2% decrease in college/vocational boardings as a direct result of the increase in the price of student passes from \$4.00 monthly to \$12.00 monthly and college/vocational passes from \$4.00 to \$15.00 monthly. (See Table IV-2.)

Since the loss of boardings by student pass users was highest in the off-peak time period when discretionary trips are most common, it can be concluded that discretionary or non-school use of passes declined markedly. Previously, when student bus passes had been priced at

**COMPARISON OF METHOD OF FARE PAYMENT
BY TIME OF DAY
(WEEKDAYS ONLY)**

<u>FY 83 Survey</u>	<u>Peak</u>	<u>Off-Peak</u>	<u>FY 83 Distribution¹ of Linked Trips</u>
Cash/Ticket	1,048 (.374)	1,062 (.395)	.452
Regular Pass	768 (.274)	545 (.203)	.197
Express Pass	167 (.060)	55 (.020)	.024
Elderly Pass	138 (.049)	219 (.082)	.113 (E&D Combined)
Disabled Pass	32 (.011)	86 (.032)	
Student Pass	434 (.155)	477 (.178)	.122
College Pass	159 (.057)	182 (.068)	.052
Other	57 (.020)	60 (.022)	.039
No Response	<u>621 Combined</u>		
Total Respondents	2,803	2,686	

<u>FY 86 Survey²</u>	<u>Peak</u>	<u>Off-Peak</u>	<u>FY 86 Distribution¹ of Linked Trips</u>
Cash/Ticket	385 (.407)	404 (.429)	.452
Regular Pass	289 (.306)	266 (.282)	.257
Express Pass	34 (.036)	11 (.012)	.018
Elderly Pass	36 (.038)	71 (0.75)	.113 (E&D combined)
Disabled Pass	14 (.015)	17 (0.18)	
Student Pass	140 (.148)	110 (.117)	.085
College Pass	38 (.040)	52 (.055)	.025
Other	9 (.010)	11 (.012)	.050
No Response	<u>138</u>	<u>189</u>	
Total Respondents	945	942	

¹Annualized distribution of linked trips by fare category compiled from historical fare surveys.

²1,085 sample records excluded because time of trip was not coded, and 9,405 sample records excluded because patron was not sampled on the first bus used for their trip - the latter reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



**COMPARISON OF METHOD OF FARE PAYMENT
BY TIME OF DAY (WEEKDAYS ONLY)**

TABLE A-8

\$4.00, there was increased demand by students who bought the passes for discretionary as well as school trips. Thus students are now more likely to buy a student pass because they need it for school, not because the reduced price encourages additional non-school travel.

A.2.5 COMPARISON OF TRIPS BY TIME OF DAY

Table A-9, "Comparison of Trips by Time of Day by Type of Day," compares the distribution of patrons by time of day and type of day, Weekday, Saturday and Sunday. The FY 83 On-Board Survey sampled a 24-hour time period; in contrast, the FY 86 On-Board Survey sampled a 14-hour time period, 6:00 A.M. to 8:00 P.M. Since in the FY 86 On-Board Survey Evening was only sampled until 8:00 P.M. and Owl was not sampled at all, there are differences in the evening time period results that are directly attributable to survey methodology. Thus, comparisons of the distribution of ridership by time of day for the Owl and Evening periods are not appropriate.

In addition to disparities between the time periods sampled by the FY 83 and FY 86 On-Board Surveys, there are substantial differences in the number of usable responses for time-based stratifications. As previously noted, FY 83 survey forms were precoded with time-related information. FY 86 survey forms were originally designed to provide for precoding; however, it was ultimately left to the interviewers' discretion whether or not to provide this information on all survey forms. As a result, in most instances where respondents themselves did not provide information about the time of their trip, it was not available. The lack of time-related data on many FY 86 survey forms reduced the usable sample size for time-based analyses considerably to about one-half of the usable sample derived from the FY 83 survey.

After controlling for evening and Owl trips, FY 86 On-Board Survey data reveals a pattern of a larger share of weekday trips in the A.M. peak and Midday and a decrease in the P.M. Peak. There was relatively no change in the time of travel on Saturdays and Sundays.

Correspondingly, the Weekday P.M. Peak share of trips is larger in FY 83. The comparison of the FY 83 and FY 86 On-Board Surveys with respect to a distribution of boardings by time of day suggests that more of a balance in A.M. and P.M. weekday peaks has occurred in recent years.

However, it was previously concluded in the District's FY 87-91 Short Range Transit Plan (Subsection 2.4.1 of that document) that there was no significant shift in the distribution of boardings by time of day resulting from the Proposition A reduced fare. Also, a comparison of FY 86 and FY 83 District ride-check data reveals that there is no significant shift of patronage by time of day. Apparently, the manner in which time of day information was determined for each respondent to the FY 86 On-Board Survey has led to the reduced reliability of FY 86 time-of-day based comparisons.

**COMPARISON OF TRIPS BY TIME OF DAY
BY TYPE OF DAY**

FY 83 Survey ¹	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Ho1.</u>
AM Peak	1,199 (.227)	354 (.128)	241 (.129)
Midday	2,106 (.398)	1,423 (.516)	1,124 (.600)
PM Peak	1,987 (.375)	979 (.355)	509 (.272)
Evening	293	653	521
Owl	<u>525</u>	<u>129</u>	<u>20</u>
Total Trips Excluding Evening & Owl	5,292	2,756	1,874
FY 86 Survey ^{1,2}	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Ho1.</u>
AM Peak	599 (.286)	106 (.124)	83 (.128)
Midday	953 (.456)	431 (.504)	395 (.609)
PM Peak	539 (.258)	319 (.373)	171 (.263)
Evening	49	93	16
Owl	<u>Not Sampled</u>	<u> </u>	<u> </u>
Total Trips Excluding Evening & Owl	2,091	856	649

¹ Shares of daily trips, shown in parentheses, exclude Evening and Owl time periods.

² 20,390 sample records excluded to remove patrons who were not on the first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



**COMPARISON OF TRIPS BY TIME OF DAY
BY TYPE OF DAY**

TABLE A-9

A.2.6 COMPARISON OF TRIPS BY ORIGIN PURPOSE

Table A-10, "Comparison of Trips by Origin Purpose by Type of Day," presents a weighted count of responses grouped by purpose: home, work, school, shopping, recreation, medical, other, and no response. In both the FY 83 and the FY 86 On-Board Surveys, bus patrons were sampled at the origin of their trips. The vast majority of linked trips are always home-based, that is, at least one trip end is home. Consequently, a significant proportion of home-based trips is to be expected. However, it is difficult to assess why in FY 86 there is a higher percent of home-based trip purposes.

The most useful comparisons of trip origin or trip destination data are between the distributions for all other trip purposes, excluding home-based trip purposes. It is most appropriate, for analysis purposes, to consider the distribution of other than home-based trip purposes as shown in Table A-10.

Table A-10 depicts the share of school trips as having grown from FY 83 to FY 86. These results are inconsistent with both Table A-6 and Table A-7. In Table A-5, a comparison of the results from the FY 83 and the FY 86 On-Board Surveys shows that two fare categories which sustained a loss of patrons for weekdays were student pass and college/vocational pass. Shown on Table A-6, the student and college categories each had approximately 3% decreases in shares. Also, the student fare category group sustained a minus 23.5% change in linked trips, while the college fare category sustained a minus 47.9% change in linked trips for weekdays.

As previously noted in Section A.2.4, Table A-5 shows that the share of student and college riders from the FY 83 and FY 86 On-Board Surveys exceeds the Weekday Fare Survey distribution of student and college riders. Therefore, there is an over-representation of students in both the FY 83 and the FY 86 On-Board Survey samples. The share of riders by fare category that are student and college in the FY 83 and FY 86 On-Board Surveys exceeds the student and college share of riders in the District's FY 86 Fare Survey.

Due to the large decline in Student and College ridership exhibited in Tables A-6 and A-7 and the evidence of over-representation of Student and College riders in the On-Board Survey sample (see Section A.2.4), it is likely that the distribution of trip purposes for the FY 86 On-Board Survey misrepresents actual ridership behavior. Given large declines in Student and College patronage from FY 83 to FY 86, coupled with increases in systemwide patronage, it is highly unlikely that the school trip purpose share of all trips would increase as FY 86 On-Board Survey data indicates.

**COMPARISON OF TRIPS BY ORIGIN PURPOSE
BY TYPE OF DAY**

FY 83 Survey	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>
Home	2,967	1,956	1,310
Work	1,573 (.513)	671 (.440)	241 (.223)
School	693 (.226)	25 (.016)	5 (.005)
Shopping	276 (.090)	364 (.239)	295 (.273)
Recreation	208 (.068)	250 (.164)	316 (.293)
Medical	73 (.024)	44 (.029)	15 (.014)
All Other	241 (.079)	171 (.112)	207 (.192)
No Response	<u>78</u>	<u>57</u>	<u>26</u>
Total Respondents	6,031	3,481	2,389

FY 86 Survey ¹	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>
Home	1,813	943	766
Work	697 (.480)	272 (.415)	117 (.309)
School	414 (.285)	42 (.064)	11 (.029)
Shopping	100 (.069)	170 (.259)	68 (.179)
Recreation	25 (.017)	54 (.082)	54 (.142)
Medical	69 (.048)	18 (.027)	7 (.018)
All Other	147 (.101)	100 (.152)	122 (.322)
No Response	<u>32</u>	<u>14</u>	<u>15</u>
Total Respondents	3,265	1,599	1,145

¹18,074 sample records excluded to remove patrons who were not on the first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



A.2.7 COMPARISON OF TRIPS BY MODE OF ACCESS TO BUS

Table A-11, "Comparison of Trips by Mode of Access to Bus by Type of Day," shows how the District's bus patrons get to their first bus. Walking as a mode of access is down for all three days--Weekdays, Saturdays, and Sundays and Holidays.

The "Other" category, which may include a combination of atypical transport modes, is up by between 8% and 9% on all three days. The larger proportion of "Other" modes of access among FY 86 survey respondents is suspect; it is possible that the methods used to exclude patrons who had transferred from another bus were not thorough enough.

As shown in Table A-11, the vast majority of bus patrons walk in order to get to their bus, ranging from 94% to 96% in the FY 83 Survey and 85% to 88% in the FY 86 Survey, on Weekdays, Saturdays, and Sundays. When Auto-Driver and Auto-Passenger are combined as a group in the FY 83 Survey, the range of patrons who drove to gain access to their bus was from 4% to 6%; in FY 86, the number who drove to and from their bus stop ranged from 3% to 4%.

The important comparison is between walk versus auto-access, exclusive of "Other" access. Excluding "Other" access, the results change somewhat. The majority of bus patrons still walk in order to get to their bus, ranging from 94% to 96% in the FY 83 Survey and 95% to 97% in the FY 86 Survey, on Weekdays, Saturdays, and Sundays.

When Auto-Driver and Auto-Passenger are combined as a group in the FY 83 Survey, the range of patrons who drove to gain access to their bus was from 4% to 6%. In FY 86, excluding "Other", the number who drove to and from their bus stop ranged from 4% to 5%. Therefore, the percentage of patrons driving to access their bus is very similar in FY 83 and in FY 86, whether or not "Other" access is excluded from the analysis. Therefore, walking remains the overwhelming choice of mode of access for bus patrons.

A.2.8 COMPARISON OF TRIPS BY HOUSEHOLD INCOME

It would be expected that the weighted average and median income for the FY 86 On-Board Survey, as shown in Table A-12 in present dollars, would be higher as a result of inflation since the FY 83 On-Board Survey. Assuming a 4% inflation rate for each year of the three-year period between FY 83 and FY 86, an approximate 14% overall inflation rate, including compounding, would be expected. This expectation is realized in the increase in the weighted average and median income for FY 86 Saturday and Sunday bus patrons, but not for Weekday patrons.

**COMPARISON OF TRIPS BY MODE OF ACCESS
BY TYPE OF DAY**

FY 83 Survey	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>
Walk	5,630 (.936)	3,273 (.957)	2,235 (.952)
Auto-Driver	72 (.012)	16 (.005)	18 (.008)
Auto-Passenger	260 (.043)	120 (.035)	86 (.037)
Other	52 (.009)	12 (.004)	9 (.004)
No Response	<u>96</u>	<u>117</u>	<u>67</u>
Total Respondents	6,014	3,421	2,348

FY 86 Survey ¹	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>
Walk	2,778 (.854)	1,380 (.868)	1,001 (.881)
Auto-Driver	40 (.012)	25 (.016)	1 (.001)
Auto-Passenger	100 (.031)	41 (.026)	35 (.031)
Other	336 (.103)	144 (.091)	99 (.087)
No Response	<u>46</u>	<u>25</u>	<u>26</u>
Total Respondents	3,254	1,590	1,136

¹18,067 sample records excluded to remove patrons who were not on the first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



COMPARISON OF TRIPS BY
MODE OF ACCESS BY TYPE OF DAY

TABLE A-11

**COMPARISON OF TRIPS BY HOUSEHOLD INCOME
BY TYPE OF DAY**

FY 83 Survey	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>
Under \$5,000	1,257	873	682
\$5,000-\$9,999	805	570	523
\$10,000-\$14,999	803	532	266
\$15,000-\$19,999	540	290	158
\$20,000-\$24,999	490	238	229
\$25,000-\$34,999	433	164	109
\$35,000-\$49,999	385	156	50
Over \$50,000	337	86	39
No Response	<u>1,060</u>	<u>629</u>	<u>359</u>
Total Respondents	5,050	2,909	2,056
Weighted Avg.	\$17,343	\$13,688	\$11,873
Median	\$12,883	\$10,108	\$8,308
FY 86 Survey ¹	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>
Under \$5,000	592	243	249
\$5,000-\$9,999	560	307	213
\$10,000-\$14,999	430	235	150
\$15,000-\$19,999	349	153	103
\$20,000-\$24,999	231	113	87
\$25,000-\$34,999	228	95	55
\$35,000-\$49,999	205	63	82
Over \$50,000	201	61	32
No Response	<u>502</u>	<u>343</u>	<u>190</u>
Total Respondents	2,796	1,270	971
Weighted Avg.	\$17,713	\$15,709	\$15,190
Median	\$12,860	\$11,809	\$10,783

¹18,072 sample records excluded to remove patrons who were not on the first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



On Saturdays, the increase in the average and median household income is about 15% and 17%, respectively, very close to the expected increase in income according to the observed inflation rate between FY 83 and FY 86. Therefore, on Saturdays, when household income is adjusted for inflation, there is no significant change in the household income of bus patrons.

Weighted average income for Sunday patrons increased 12% over FY 83 even after adjustment for inflation. This suggests an increase in discretionary travel on Sundays, since patronage by lower income groups has not declined.

By contrast, on Weekdays, the FY 86 On-Board Survey shows none of the expected changes in household income. The data show the same average incomes for FY 86 and FY 83, which corresponds to a decrease of 10% from FY 83 levels after adjusting for inflation.

Since there was a gain in the share of lower income riders, there must have been an accompanying loss in Weekday bus patrons from households with higher than average incomes. Since most of the decline in bus patronage consisted of students who most likely have other available travel alternatives, it can be concluded that students come from households with higher than average incomes.

A.2.9 COMPARISON OF TRIPS BY AUTO AVAILABILITY

Table A-13, "Comparison of Trips by Auto Availability by Type of Day," compares the FY 86 and FY 83 percentage shares of bus patrons who could have utilized an automobile to make their trip. The FY 86 Survey showed an increase of almost 8% in weekday patrons who had no vehicle available to make their trip, from 70% in 1983 to 78% in 1986.

Trends were less obvious for weekend passengers. On Saturday in FY 86, there was an increase of 5.9% in the share of patrons who had no car available for their trip in contrast to the FY 83 Survey. However, Sunday riders' auto availability is not significantly different from FY 83.

In general, fewer riders have a car available in FY 86 than in FY 83. This correlates with the fact that in FY 86 there is an increased share of weekday riders with lower incomes.

**COMPARISON OF TRIPS BY AUTO AVAILABILITY
BY TYPE OF DAY**

FY 83 Survey	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>
Yes-Driver	1,062 (.185)	426 (.130)	219 (.096)
Yes-Passenger	660 (.115)	435 (.133)	168 (.074)
No	4,009 (.700)	2,404 (.736)	1,889 (.830)
No Response	<u>379</u>	<u>273</u>	<u>139</u>
Total Respondents	5,731	3,265	2,276

FY 86 Survey ¹	<u>Weekday</u>	<u>Saturday</u>	<u>Sun. & Hol.</u>
Yes-Driver	380 (.121)	123 (.080)	84 (.077)
Yes-Passenger	314 (.100)	194 (.127)	114 (.104)
No	2,438 (.778)	1,215 (.793)	893 (.819)
No Response	<u>167</u>	<u>85</u>	<u>71</u>
Total Respondents	3,132	1,532	1,091

¹18,066 sample records excluded to remove patrons who were not on the first bus used for their trip - this reduces the comparison to linked trips for compatibility with the FY 83 survey which sampled only linked trips.



COMPARISON OF TRIPS BY AUTO
AVAILABILITY BY TYPE OF DAY

TABLE A-13