April 8, 1963

AN EVALUATION by the BOARD OF COMMISSIONERS DISTRICT OF COLUMBIA of the

RECOMMENDATIONS FOR TRANSPORTATION in the NATIONAL CAPITAL REGION by the NATIONAL CAPITAL TRANSPORTATION AGENCY

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In accordance with Section 204(g) of the National Capital Transportation Act of 1960, the National Capital Transportation Agency submitted to the President of the United States a report entitled, "Recommendations for Transportation in the National Capital Region, Finance and Organization", dated November 1, 1962.

By letter of November 20, 1962, the Bureau of the Budget announced receipt of this report and advised of the President's desire that the Board of Commissioners of the District of Columbia submit comments prior to transmittal of the report to the Congress.

The recommendations contained in the NCTA report of November 1, 1962, will have far-reaching impact upon the future of the National Capital Region. The transportation system recommended in this report would involve an expenditure of $1.6 billion. It will have a major effect upon land uses and values. The proposal will affect where people live, where they work, and how they travel to and from work. The proposed system will have significant effects upon the future development of the downtown area, the location of governmental agencies and other installations, and the stature and vitality of the entire metropolitan region.

Because of the impact of the transportation system recommended by the National Capital Transportation Agency upon the people, the programs, and the financial resources of the District of Columbia

and the National Capital Region, the Board of Commissioners of the District of Columbia has undertaken an extensive study and evaluation of the proposals contained in the National Capital Transportation Agency report of November 1, 1962.

The report that follows represents the results of such studies and the Board of Commissioners' approach to a solution for the transportation of people and goods in the District of Columbia and the metropolitan area.

S U M M A R Y

The Board of Commissioners' evaluation of the National Capital Transportation Agency report is summarized below:

I. THE NATIONAL CAPITAL TRANSPORTATION AGENCY PROPOSES AN INADEQUATE HIGHWAY SYSTEM:

(a) The NCTA report estimates approximately the same number of daily person trips (5,758,000) would be made in the region in 1980 as was estimated under the MTS Plan of 1959 (6,070,000).

(b) The NCTA report estimates that the same number of person trips in the region would be assigned to highways as was estimated under the MTS Plan of 1959.

(c) The reduced highway system, on which NCTA proposes to expend approximately one-third less money than under the MTS Plan of 1959, would be expected to handle the same volume of traffic.

(d) The design and continuity features of the NCTA highway proposals preclude maximum participation in the Federal Interstate Highway Program and jeopardize the District of Columbia's capability to finance those routes on which there is mutual agreement, e.g., Potomac River Freeway, and completion of the Inner Loop.

(e) The NCTA report has not justified elimination of such vital highway projects as the Three Sisters Bridge, the North Leg of the Inner Loop built to Interstate standards, and an East Leg west of the Anacostia River.

II. THE NATIONAL CAPITAL TRANSPORTATION AGENCY HAS PROPOSED A TRANSIT SYSTEM THAT IS NOT FULLY SUPPORTED:

(a) The forecasting technique used by NCTA is questionable for determining the number of people that will use rail transit. Upon this technique, and without a reasonable safety factor, depends the estimates of the numbers to travel by transit and by auto.

(b) The Board of Commissioners questions whether sufficient consideration has been given to the transit alternatives -- specifically greater flexibility and a more realistic balance between express buses and rail transit as proposed in the MTS Plan of 1959.

III. THERE ARE UNRESOLVED PROBLEMS IN THE NCTA PROPOSALS FOR ORGANIZATION AND FINANCE:

(a) The fiscal soundness is a matter of concern. The probability of a deficit has not been clearly dealt with. There is no determination of who would make up a deficit and how.

(b) The role and destiny of the private transit entrepreneur have not been established in the NCTA report. Nor have the regulatory functions and responsibilities in private and public transportation been delineated.

IV. IMPROVED COORDINATION IS NECESSARY FOR RESPONSIBLE TRANSPORTATION PLANNING IN THE NATIONAL CAPITAL REGION:

(a) Coordinated planning more in keeping with the spirit and intent of the Congressional mandates in Public Law 86-669, July 14, 1960, would have accelerated considerably the development of a balanced transportation system with less controversy and more agreement.

V. SUMMARY RECOMMENDATIONS:

A. HIGHWAYS

The current highway programs of the District of Columbia, Virginia and Maryland, as approved by the U. S. Bureau of Public Roads, should continue to advance as rapidly as funds become available.

B. TRANSIT

(1) The commuter railroad proposals of the National Capital Transportation Agency should be initiated as early as possible concurrent with design of the downtown subway loop. At the same time, the use of existing rails for rapid transit should be initiated.

(2) Studies of a more realistic balance between rail and express bus rapid transit as proposed in the MTS Plan of 1959 should be continued.

(3) Subsequent to above, initiate construction of the downtown subway.

(4) Rapid transit extension through the northwest corridor appears to be the logical next step. Other transit route locations and priorities require more study.

C. ORGANIZATION AND FINANCE

The Board of Commissioners subscribes to the recommendations of the Joint Transportation Commission.[1]

(1) Comments by the Joint Transportation Commission on the Report of the National Capital Transportation Agency

I. PLANNING

A. PHILOSOPHY OF URBAN TRANSPORTATION PLANNING

1. The Need for Coordination
2. Examples of Coordinated Planning
3. The NCTA Approach

B. PAST TRENDS AND FUTURE PROJECTIONS

1. National Experience in Urban Areas
2. Toronto: A Case in Point
3. Future Economic Variables

C. THE TOTAL TRANSPORTATION PROBLEM: A PERSPECTIVE

1. Transportation Demands
2. Peak Hour vs. Daily Movements
3. Level of Service

D. THE TRAFFIC FORECASTING TECHNIQUE

1. Description
2. Assumptions
3. Reliability of Results

E. A BALANCED TRANSPORTATION SYSTEM

1. Definition
2. Experience in Chicago
3. Alternatives

I. PLANNING

A. PHILOSOPHY OF URBAN TRANSPORTATION PLANNING

1. The Need for Coordination

A public works project requiring a long-range commitment and having a far-reaching impact upon the people, programs, financial resources and future development of a rapidly growing urban area, must reflect the highest degree of coordination and agreement among responsible public agencies. Equally, any public agency recommending a plan of such magnitude has the responsibility for comprehensive exploration of reasonable alternatives or combinations of alternatives to insure an optimum solution.

In urban transportation planning these principles are important because the commitment of financing and fixed plant is not determined by tangible scientific measurement. Instead, conclusions are developed from forecasts and assumptions about future human behavior, a most unpredictable phenomenon.

Transportation forecasting is an evolving innovational technique in which new methods and changes are introduced constantly. These factors, plus the increasing dependence upon the electronic computer as a forecasting tool, underscore the need for application of mature experience and judgment, and practical logic and perspective, to assumptions and applications of data and methods.

The results from the computer are as good as the judgment and experience applied to the input data. Close coordination and agreement, reflecting judgment and experience of responsible public agencies, are imperative if the final plan is to meet the total transportation needs

and desires of the community.

Without the benefit of close cooperation and agreement on the input assumptions and subsequent "judgment" adjustments, the "checks and balances" process so vital to comprehensive urban transportation planning would be eliminated. The final plan would reflect only the thinking and control of the developing agency.

2. Examples of Coordinated Planning

Recognizing this need for coordination, most comprehensive urban transportation studies today are conducted on a cooperative basis, at policy and technical levels, involving local agencies, State highway departments, mass transportation interests, and Federal agencies.

For example, the Penn-Jersey Transportation Study in the Philadelphia area, started in 1959 and covering an area of 400 square miles, has a policy committee on which nine local agencies, two State highway departments and the Bureau of Public Roads are represented.

The Chicago Area Transportation Study, one of the largest and most comprehensive studies undertaken to date, covers a metropolitan area with a population of seven million people. Its Technical Committee includes the subway engineer of the city of Chicago, two engineers from the Chicago Transit Authority, and representatives of the Illinois Division of Highways, the Cook County and DuPage County Highway Departments and the Bureau of Public Roads.

The 1959 Mass Transportation Survey for the National Capital Region was the product of four years of study and development by officials of the District of Columbia, the States of Maryland and Virginia, five counties, several cities and Federal agencies. The plan reflected the most advanced techniques and talents of experts in the fields of city

planning and transportation. The Congress of the United States recognized this report as "one of the most exhaustive studies of transportation needs ever made in any American city".(1)

In a statement of objectives reflecting the degree of coordination in the Mass Transportation Survey, the following points were made:

> "In order that Mass Transportation Plans for the National Capital Region be fully comprehensive, it is necessary that full consideration be given to expressways, freeways, parkways, and highways, planned and to be constructed in the National Capital Region between the years 1955 and 1980. To accomplish this objective, it is essential that highway planning be fully coordinated with the separate Highway Departments in the District of Columbia and the States of Maryland and Virginia, as may be related to the National Capital Region."(2)

It was also agreed for the Mass Transportation Survey that design plans and cost estimates for highways would be established by having the separate highway departments, the consultant engineer and the survey staff "agree upon standards for design and location and unit price for determining cost estimates."(2)

3. The NCTA Approach

By not using the advice and experience of the regional highway departments in evaluating input assumptions and determining alternative transportation systems to be tested, the NCTA has followed a procedure contrary to all modern urban transportation studies in terms of coordinated and cooperative responsibility at the policy, technical and advisory levels.

Through imput assumptions and adjustments, and selection of

(1) Senate Report No. 1631, 86th Congress 2nd Session.

(2) Mass Transportation Survey, National Capital Region - Objectives, December 14, 1956.

routes and systems, the NCTA has developed a solution which shows all transportation demands and capacities in "balance". Under such control any system can be "balanced" from the mechanical computer although standards of service will vary. Without agreement and acceptance of the total traffic forecasting procedure, including input assumptions and applications, routes and systems, by all responsible agencies, the resultant solution will be subject to question.

The Board of Commissioners is concerned because the approach taken by the NCTA is at variance with the intent of Section 9 of the Federal-Aid Highway Act of 1962, which states that:

> "After July 1, 1965, the Secretary of Commerce shall not approve---any program for projects in any urban area of more than 50,000 population unless he finds that such projects are based upon a continuing comprehensive transportation planning process carried on cooperatively by States and local communities---."

Unless an improved transportation planning process is initiated in the Washington Metropolitan Area, the Federal-Aid eligibility of the highway programs of the District of Columbia, and those programs of Maryland and Virginia within the National Capital Region, may be in jeopardy.

B. PAST TRENDS AND FUTURE PROJECTIONS

1. National Experience in Urban Areas

One of the responsibilities of any urban transportation planning agency is the consideration of past trends in transportation, since they reflect in factual terms, the desires and choices of individuals, as a guide to what they might do under assumed conditions in the future.

The NCTA report forecasts that long-established trends of human behavior can be reversed.

During the period from 1940 to 1960, total vehicle registration in the nation increased 128%. Vehicle miles of travel increased 138%. On the other hand, since the end of World War II, there has been a steady decline in transit riders. This comparison of trends is graphically illustrated in Figure 1, Figure 2, and Table I.

A clear evaluation of these trends was developed in a recent Highway Research Board paper which stated:

> "Important conclusions can be drawn from detailed analysis of recent changes in travel behavior.
>
> "First, the decline in use of mass transportation facilities and the rise in the use of the automobile are parallel phenomena rather than cause and effect. Mass transportation patronage has not declined because automobile use has increased. The decline of one and the increase of the other result from a common cause, the changes in form and structure of the metropolis. These changes, in turn, are linked to advancing technology of power, production, communication and transportation.
>
> "Second, common carrier transportation and private transportation are not properly to be considered as simple alternatives. Each has its appropriate role to play in serving the travel requirements of the metropolis. For travel volumes that are concentrated, in both space and time, like rush-hour travel to the CBD, public transportation serves best and has a natural dominance. For travel that is dispersed, either over a multitude of paths or over many hours of the day, private transportation is the principle mode. For most trips in this category the traveler has no other practicable choice."(3)

With this perspective, it becomes imperative that urban transportation planners recognize the need to provide an adequate level of service for all of the transportation demands of a metropolitan area, including the movement of both people and goods, in terms of efficiency, economy, flexibility, capacity and public desire.

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(3) Metropolitan Growth and Travel Patterns by Frank W. Herring, Deputy Director for Comprehensive Planning, The Port of New York Authority. Highway Research Board, 1961.

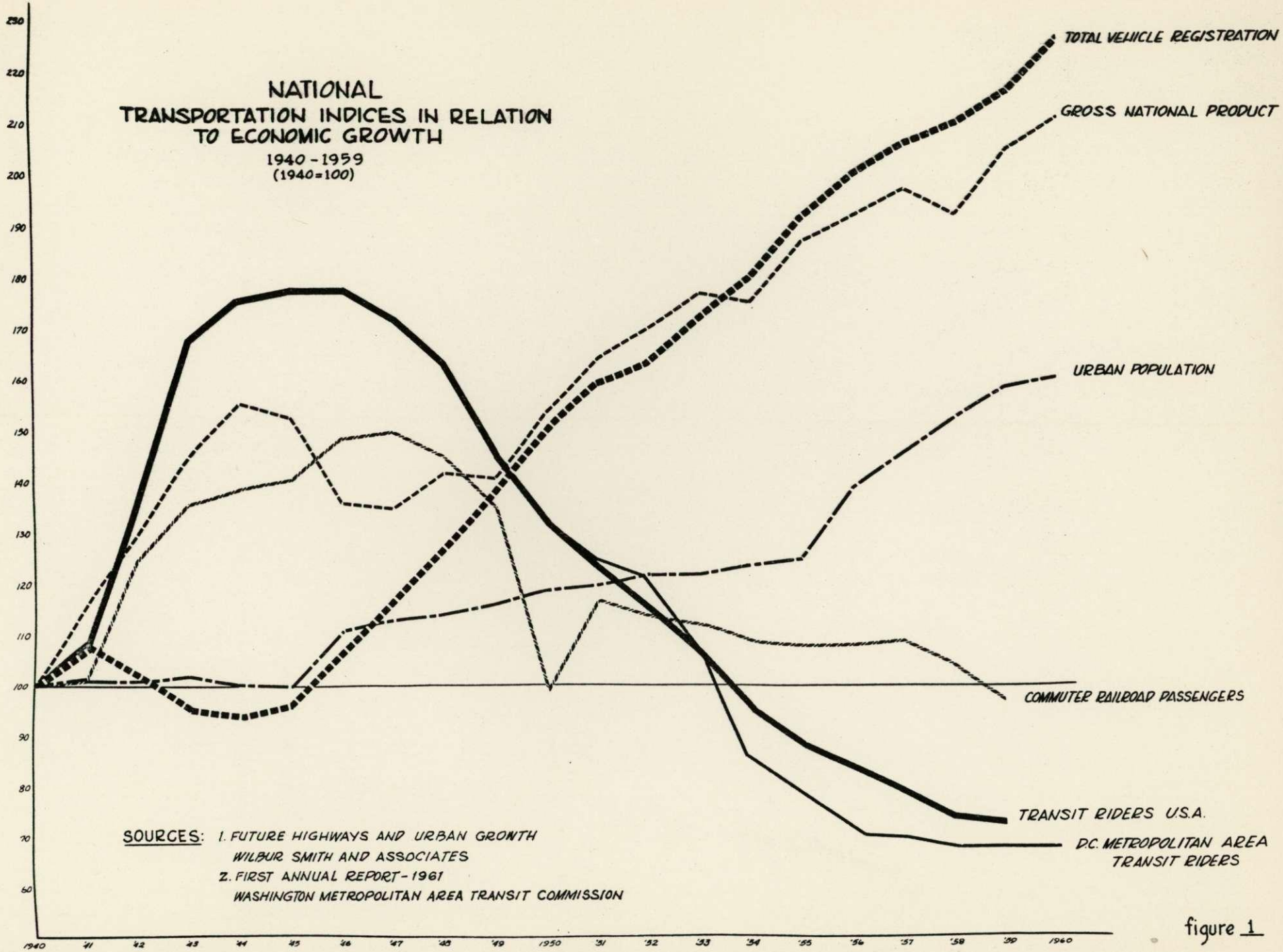
NATIONAL
TRANSPORTATION INDICES IN RELATION TO ECONOMIC GROWTH
1940 - 1959
(1940=100)
TOTAL VEHICLE REGISTRATION
GROSS NATIONAL PRODUCT
URBAN POPULATION
COMMUTER RAILROAD PASSENGERS
TRANSIT RIDERS U.S.A.
D.C. METROPOLITAN AREA TRANSIT RIDERS
SOURCES: 1. FUTURE HIGHWAYS AND URBAN GROWTH
WILBUR SMITH AND ASSOCIATES
2. FIRST ANNUAL REPORT - 1961
WASHINGTON METROPOLITAN AREA TRANSIT COMMISSION

figure 1

NATIONAL FAMILY MEDIAN INCOME
PASSENGER CAR REGISTRATION
and CONSUMER PRICE INDEX
PERCENT INCREASE

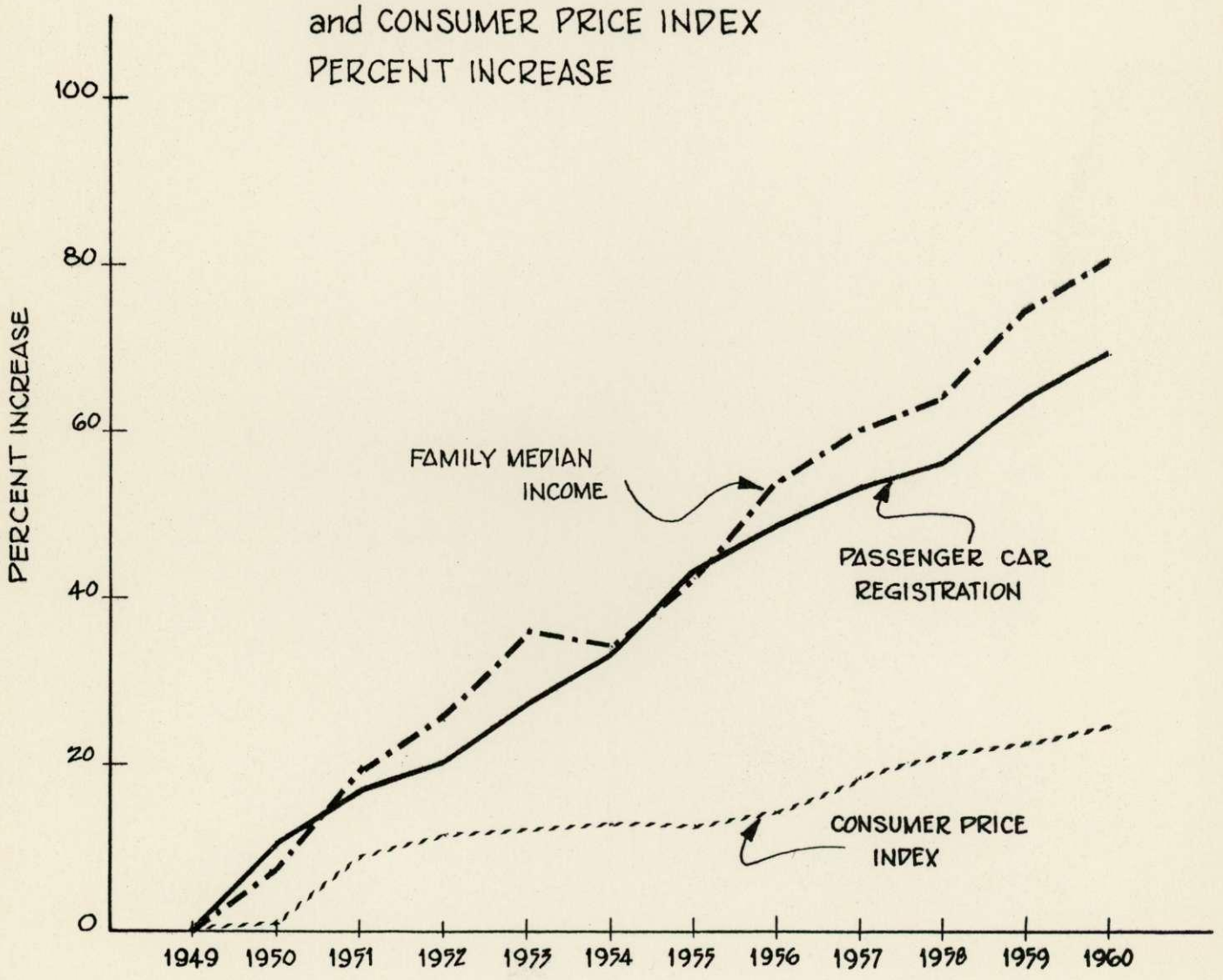

figure 2

TABLE I
Population & Rapid Transit Passenger Trip Trends
1940 - 1960

City & Year	REGIONAL POPULATION TRENDS		RAPID TRANSIT TRENDS			
	Number	% Change of 1940	Total Trips (in 000,000)	% Change of 1940	Trips/Capita	% Change of 1940
New York						
1940	8,706,917	-	1,843.0	-	211.7	-
1950	9,555,943	9.8	1,658.7	-10.0	173.6	-18.0
1960	10,694,633	22.8	1,344.4	-27.1	125.7	-40.6
Chicago						
1940	4,569,643	-	123.0	-	26.9	-
1950	5,177,868	13.3	110.0	-10.6	21.2	-21.2
1960	6,220,913	36.1	111.7	-9.2	18.0	-33.1
Philadelphia						
1940	3,199,637	-	94.0	-	29.4	-
1950	3,671,048	14.7	112.6	19.8	30.7	4.4
1960	4,342,897	35.7	75.0	-20.2	17.3	-41.2

Source: Census Reports and American Transit Association

2. Toronto: A Case in Point

The NCTA report refers to the Toronto subway system as an outstanding example of a modern, efficient and attractive rapid transit facility.

The graphs shown as Figures 3 through 6 illustrate Toronto's experience with a total transit system of busses, streetcars, and its partial rail subway system. Between 1955 and 1961 car registration in Toronto increased about 40%. The number of transit fares decreased 16%.

In a reappraisal of its total transportation needs, the Toronto Transit Commission has stated:

> "Where subways are highly important for the rapid movement of people in the central portion of this large urban community, adequate provision for rapid bus movement on the surface is also very important. Lanes devoted exclusively to bus movement, either on expressways or as extensions to the subway system, will permit the rapid movement of large numbers of persons at high speeds throughout Metropolitan Toronto with minimum use of street space and at minimum cost. These bus facilities may, in some cases, be a private roadway or median strip in the middle of a divided expressway, or may be a single reserved lane, on a highway or street. Therefore, by the use of funds devoted in the proper proportions to the creation of highway, bus line and subway facilities, the total cost for these facilities can be kept at a minimum."(4)

This expression based on experience prompts the Board of Commissioners to question whether the NCTA proposals reflect properly experience in other areas. Careful consideration must be given to this point.

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(4) 1961 Annual Report of the Toronto Transit Commission.

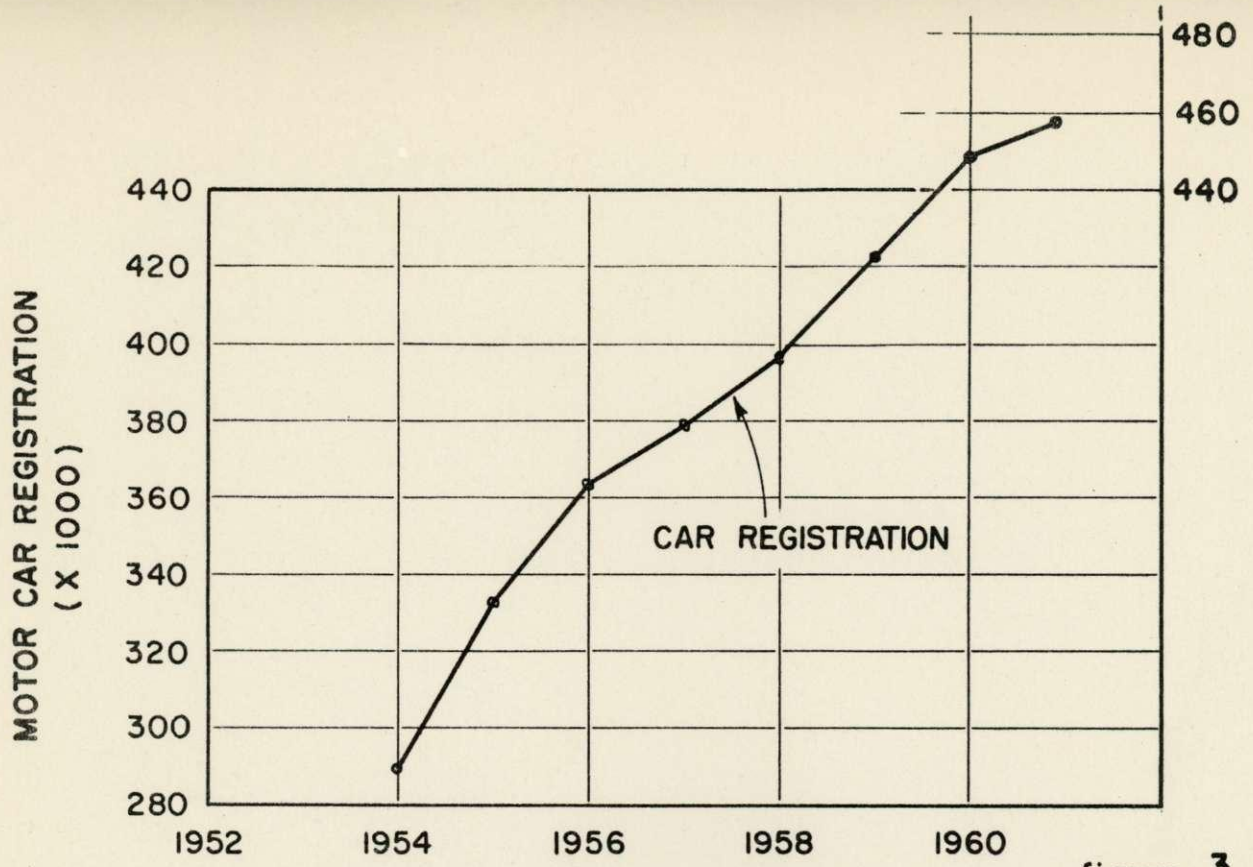
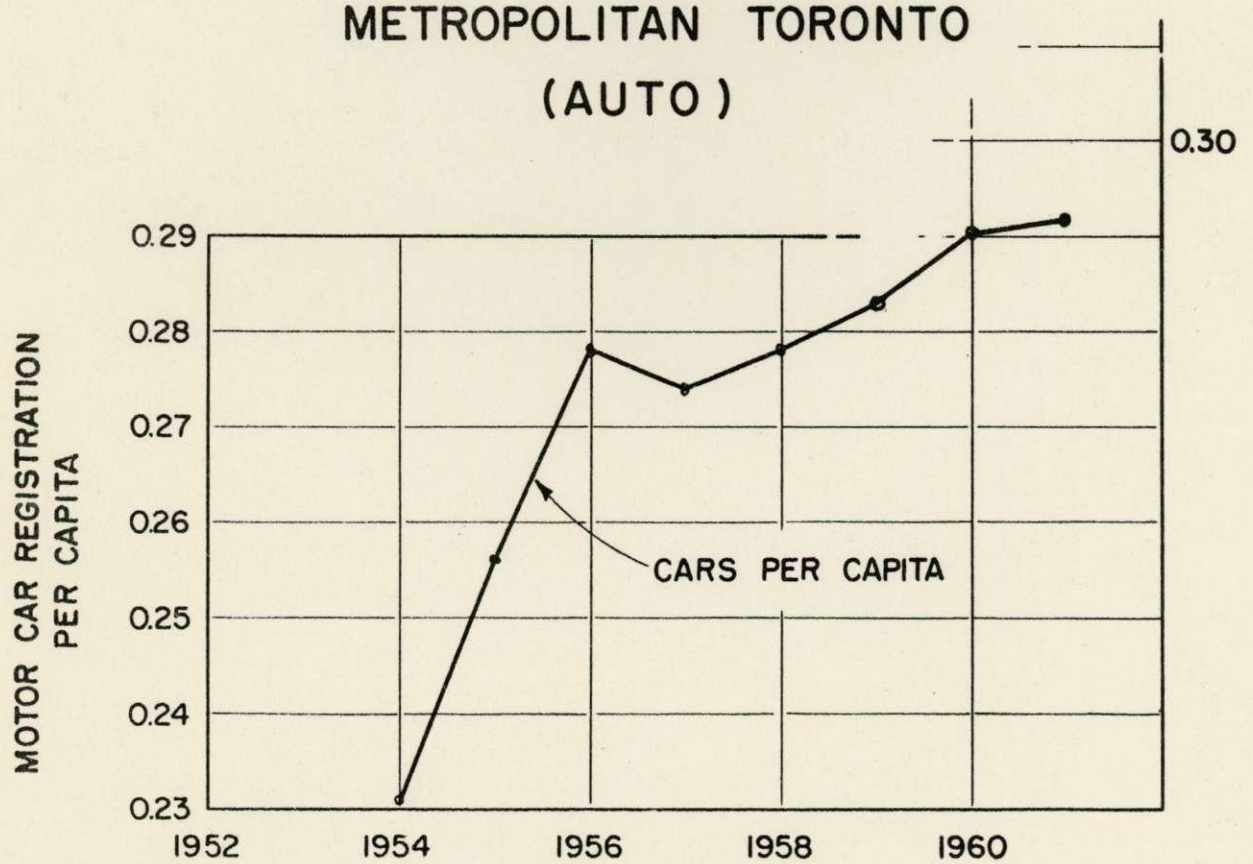


figure 3

TRANSPORTATION TRENDS IN METROPOLITAN TORONTO (AUTO)



SOURCE: LETTER DATED FEB. 13, 1963 FROM DIRECTOR, TRANSPORTATION DIVISION, METROPOLITAN TORONTO PLANNING BOARD

figure 4

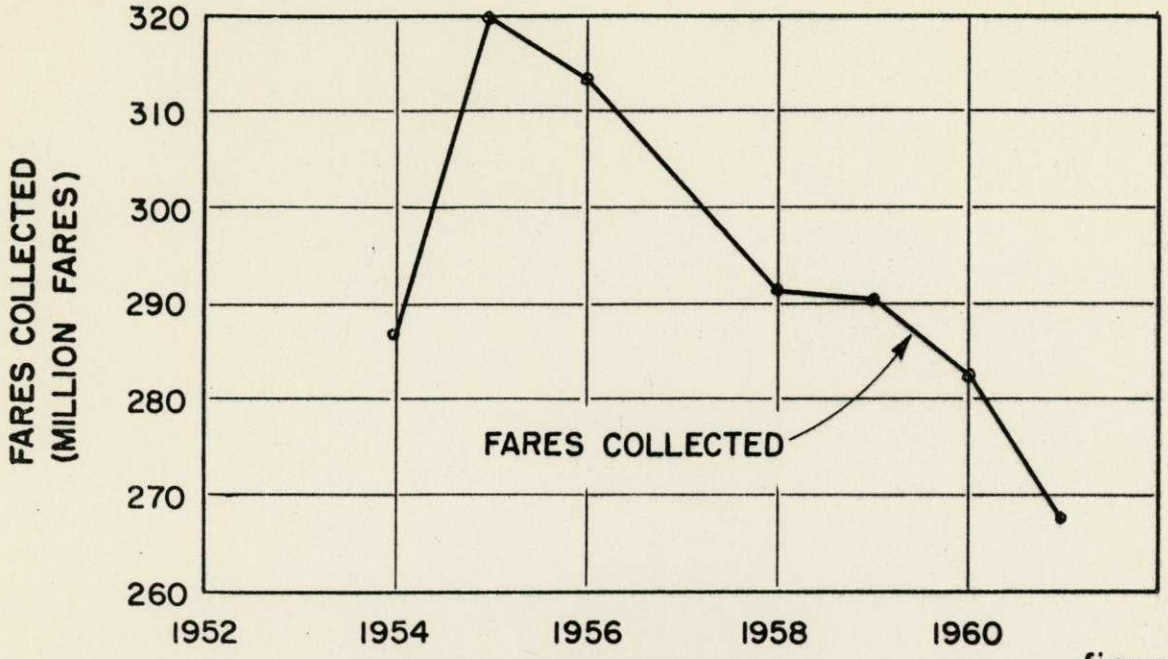
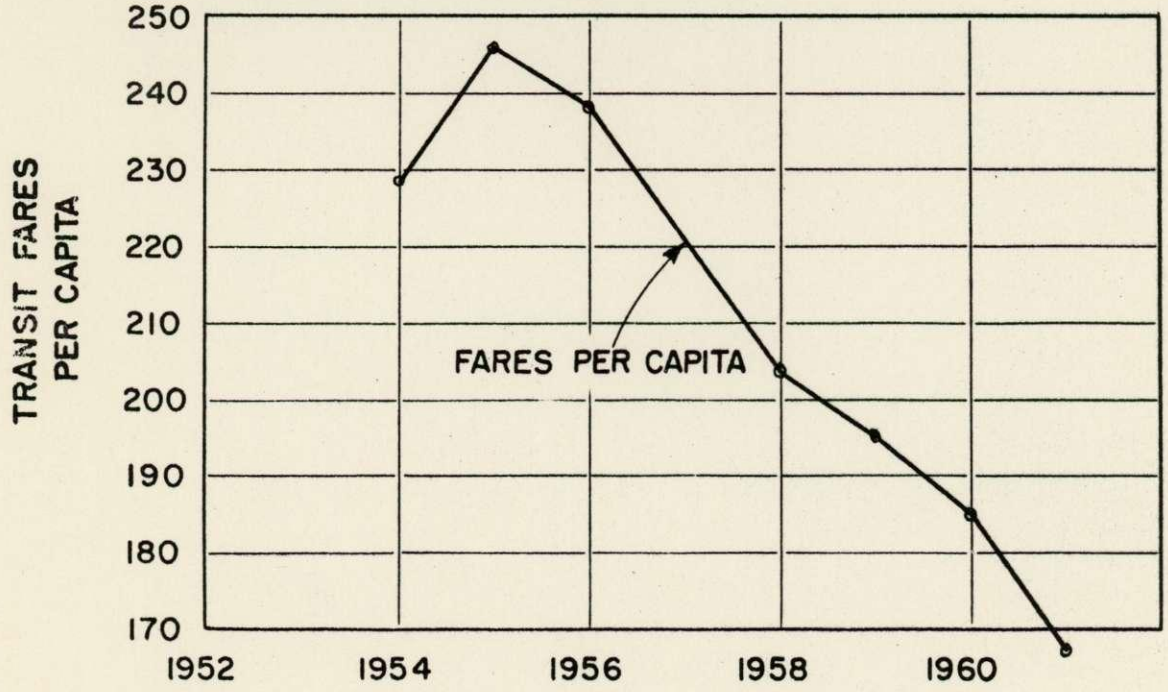


figure 5

TRANSPORTATION TRENDS IN METROPOLITAN TORONTO (TRANSIT)



SOURCE: ANNUAL REPORT, TORONTO TRANSIT COMMISSION

figure 6

3. Future Economic Variables

Since future transportation requirements will be intimately linked with future economic growth, the urban transportation planner must recognize and anticipate the forces that will shape these requirements.

The following discussion outlines these forces and illustrates the impact of future economic variables upon transportation requirements. (5)

> "Chief among the forces that will shape future transportation requirements are a changing industrial mix, an increased discretionary element in people's budgets, and the complementary nature of transportation.
>
> "With regard to the first of these -- the changing product-mix of our economy -- several points should be made. First, as our economy grows, the labor and capital component of our output increases relative to the raw-material input; and since labor and capital are mobile, industry is finding it less and less necessary to be tied to particular geographic areas. This trend is accelerated by the fact that our transportation systems now provide us with good access to most areas. Consequently, we can expect that industry will become more mobile, and that it will locate closer to its markets rather than to its sources of raw materials. This change will be a major factor that must be taken into account in planning for new transportation facilities.
>
> "A second aspect of the changing product-mix is that as our incomes have gone up, we have increased our demand for services more than for goods. That is, we now buy relatively more packaging along with our foods, more personal services, more recreational activities, and the like. These service activities tend to be consumer-oriented and therefore highly related to residential patterns.
>
> "A short but revealing way to summarize these developments is to point out that both of these trends in the product mix of our economy lead us to expect that employment patterns will be much more highly dispersed than they have been in the past. The impact of this on journey-to-work patterns is clear.
>
> "Referring to consumer preferences, it is clear that rising per capita income is making quality of service more and

(5) Abstracts from "The Demand for Transportation Services in a Growing Economy" by Charles J. Zwick, presented to the 42nd Annual Meeting of the Highway Research Board, Washington, D.C., January 9, 1963.

more important. Today there is less need for us to seek the minimum cost method of moving people; rather, we have to anticipate which is the most desirable transportation system given people's wants and desires.

"From the evidence to date, we may conclude that most Americans want higher quality in their transportation systems, in that they are willing to pay for such advantage as privacy, flexibility, and time-saving. In the 1930's consumers allocated about 9 percent of their total expenditures to transportation; in the late 50's -- with higher per capita income -- they allocated 12 percent.

"A Third major force ... is the complementary nature of transportation. In a relatively advanced economy like that of the United States, people are buying goods which by their very nature increase the demand for transportation services. Chief among these is individual home ownership ... certainly one of the strongest desires and goals of our society. In 1900, 35% of the U.S. population owned homes, while 65% rented. By 1957, 60% of the population owned homes. If we look at the 1957 data by income groups, we note that over 83% of the families with incomes above $10,000 owned homes in 1957. In short, home ownership has increased rapidly and will probably continue to do so as our society becomes wealthier. Among other things, this desire leads to a low density residential pattern. Low-density residential patterns mean, in turn, that the demand for transportation services goes up and the mode of travel will probably change. One of the challenges confronting us today is how to provide an efficient public transportation system in the face of low residential densities and more dispersed employment.

"Also, the demand for recreational activities is growing rapidly. Shorter work weeks and higher incomes allow families to spend significantly more on recreational activities, which again may require new transportation facilities."

The above discussion contrasts the implications of future economic development with the transportation plan proposed by the NCTA, in which the highway and express bus elements so vital to these recognized trends are subordinated to the fixed rail transit element.

C. THE TOTAL TRANSPORTATION PROBLEM: A PERSPECTIVE

1. Transportation Demands

A comprehensive transportation plan should provide an adequate

level of service for all of the various differing transportation demands of the National Capital Region.

Peak hour radial movement to and from work is only one of the many transportation demands, including non-radial peak movement, off-peak movement, tourist travel, movement of goods and weekend travel. Many of these demands can only be served by highways.

By subordinating all other demands to the single demand of peak hour radial work movement, and by failing to recognize the highway network as the backbone of any urban transportation system, the NCTA has produced a plan which is unbalanced in terms of providing equal and adequate service to all users of transportation facilities.

2. Peak Hour vs. Daily Movements

A realistic perspective of the total demands on the regional transportation system can be developed by considering the total trip desires in a 24-hour weekday.

In the 25-year period from 1955 to 1980, total daily person trips will increase from approximately 3,135,000 (6) to 5,758,000 (7). The NCTA forecasts that, of the 1980 person trips, 757,000 (8) will be handled by their proposed rail transit, commuter rail and express bus systems. The rest, approximately 5 million trips, including some undetermined number of trips by local bus, were assigned to the highway and street system.

(6) "Mass Transportation Survey - Traffic Engineering Study" by Wilbur Smith and Associates, 1956. P. 86, Table XXVI.

(7) NCTA Appendix Vol. III, P. 37, Table 8. $\frac{A + B}{2}$

(8) 1980 - 756,697 NCTA Appendix Vol. V, P. 29, Table IV-1
1955 - 640,000 Op cit (6) 1955 Transit Trips
Diff. 116,697 Estimated Increase in Transit Trips.

Thus, approximately 117,000 of the estimated increase in travel from 1955 to 1980 would be served by the proposed rail transit, commuter rail and express bus system. This represents 4½% of the total increase for this period. In other words more than 95% of the increase in trips made by residents of the region in this 25-year period will be carried on the highway and street system, according to the NCTA estimate. These relationships are illustrated in Figures 7 and 8.

During the peak hour, the period of the day providing the greatest justification for rail transit, the proposed transit system, including rail transit, commuter rail and express and local bus, is expected to provide service for about 159,000(9) trips, or 24% of the total peak hour load of 660,000(10) trips. Seventy-six percent or 501,000

---

(9) From NCTA 1980 Forecast transit trips by purpose. Total transit trips, including bus, 159,000. Average of Forecast "A" & "B" - Transit Distribution Loadings - Systems 123-B and 121-B.

Transit Trips 1980	Sector 0	Non-Sector 0	Total
Forecast B System 121-B	98,691	63,809	162,499
Forecast A System 123-B	94,351	61,259	155,610
			159,054 Average

(10) 1980 Morning Peak Hour Trip Composition, Washington, D.C.

Trip Purpose	(A) Total Daily Trips	(B) Conversion Factors	(C) Peak Hour Trips	(D) Peak Hour Transit Trips	
Work	2,116,000	0.2217	469,117	110,000	69%
School	614,000	0.2333	143,246	43,000	27%
Non Home Based	751,000	0.0242	18,174		
Miscellaneous	553,500	0.0297	16,439	6,000	4%
Social-Rec.	857,500	0.0085	7,289		
Shopping	866,000	0.0068	5,889		
			660,154	159,000	100%

(A) Appendix Volume III, Table 8, P. 37 (average of Plans A & B)
(B) Appendix Volume III, Table 9, P. 47 (both directions added)
(C) C = A x B
(D) See (9) Above.
Note to (9) and (10)
NCTA estimates that approximately 7% should be added to (9) for intra-zonal transit trips. However, (10) Column (C) would also have to be increased similarly for all intrazonal trips, both auto and transit. Thus the over-all percentage carried by transit would not be affected.

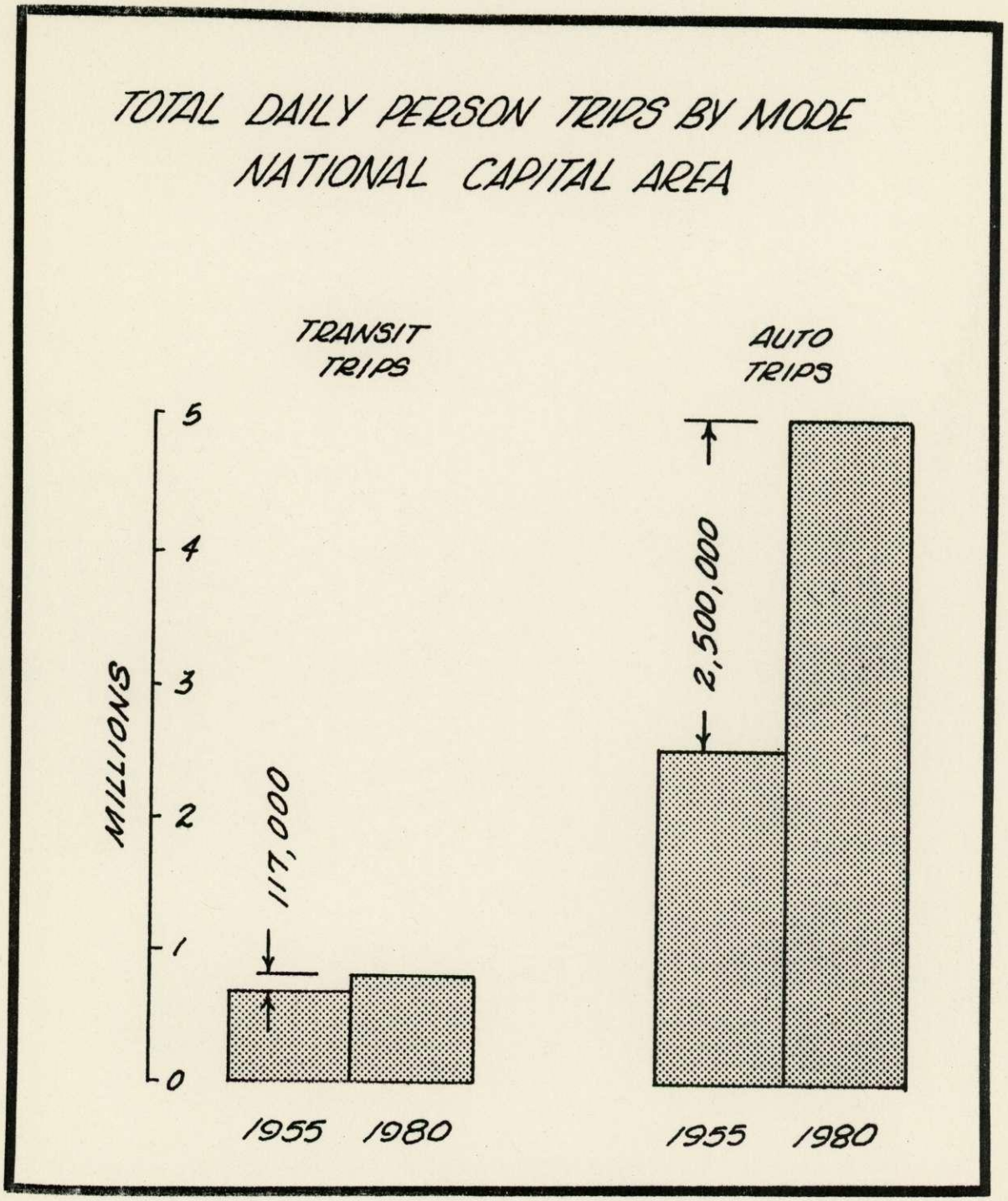
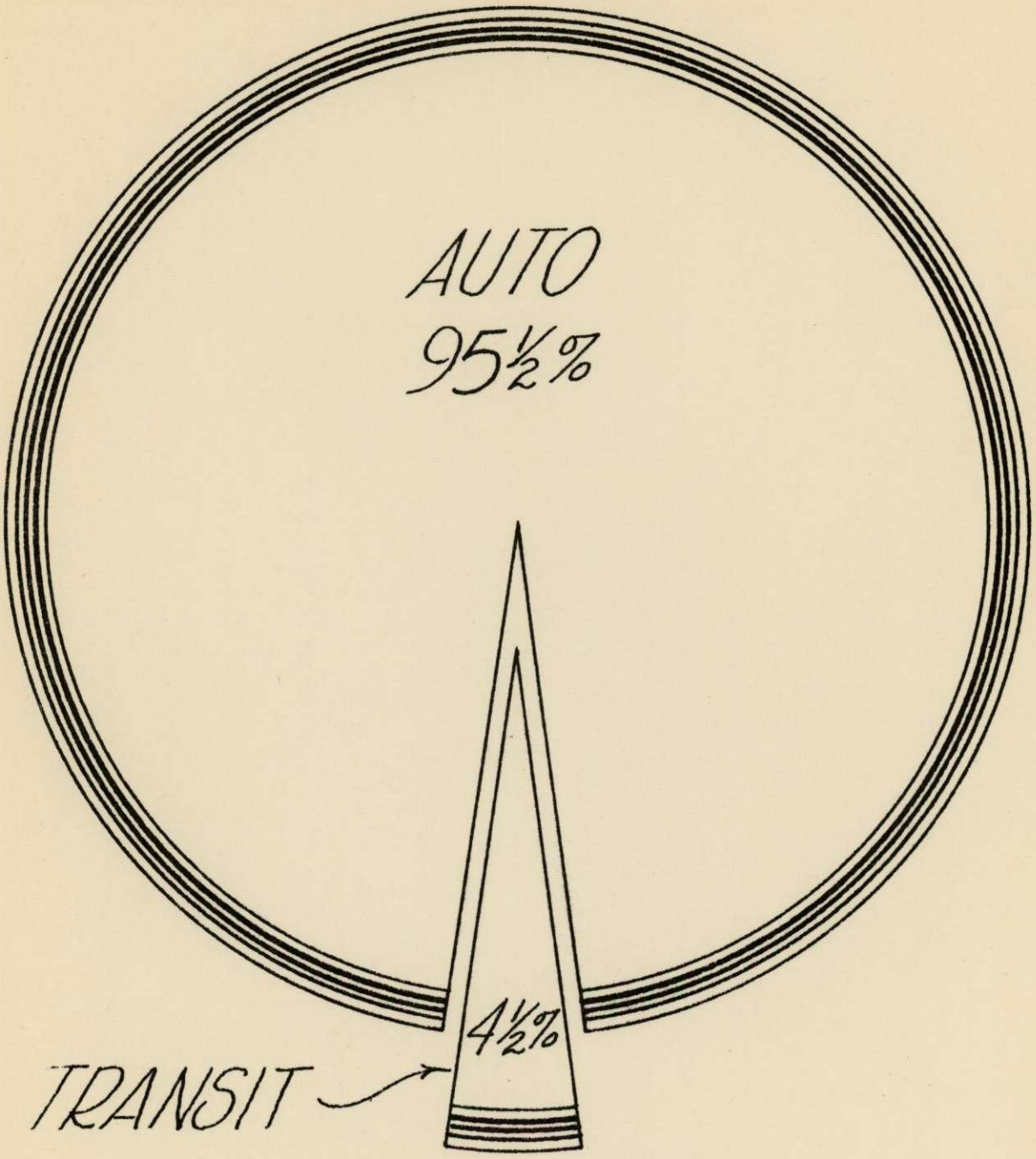

TOTAL DAILY PERSON TRIPS BY MODE
NATIONAL CAPITAL AREA
TRANSIT TRIPS
AUTO TRIPS
MILLIONS
5
4
3
2
1
0
117,000
2,500,000
1955
1980
1955
1980

FIGURE 7

PERCENT BY MODE OF TOTAL INCREASE
IN DAILY PERSON TRIPS



1955 TO 1980
NATIONAL CAPITAL AREA

FIGURE 8

of these person trips will use the highway system in the peak hour. Figure 9 illustrates this relationship. Approximately 25% of the 660,000 peak hour trips are to Sector O. NCTA estimates that it will serve 60% or 97,000 of this total. The remaining estimated peak hour transit trips, or 62,000, are non-downtown oriented.(9)

Certainly a highway system which serves the overwhelming majority of transportation demands in the region, including the major portion of peak hour travel, should provide a high level of service to its users.

3. Level of Service

A total transportation system, reflecting the needs and desires of the community, should provide convenient, free-flowing traffic for all types of trips, including transit, auto and trucks, even during the normal peak hour.

The NCTA claims that its program will provide a free choice of alternative modes of travel.

Choice can be free but not comparable, unless alternatives are given equal weight in terms of relative comfort, convenience, speed and cost.

While planning a free-flowing and convenient rapid transit system, the NCTA has penalized the highway system by causing higher than acceptable levels of congestion and, correspondingly, lower than normally accepted design standards.

For example, design capacities in the range of 1700 are used instead of the accepted 1500 vehicles per lane per hour.

In its November 1, 1962 Report, the NCTA "questioned the

(9) See previous page

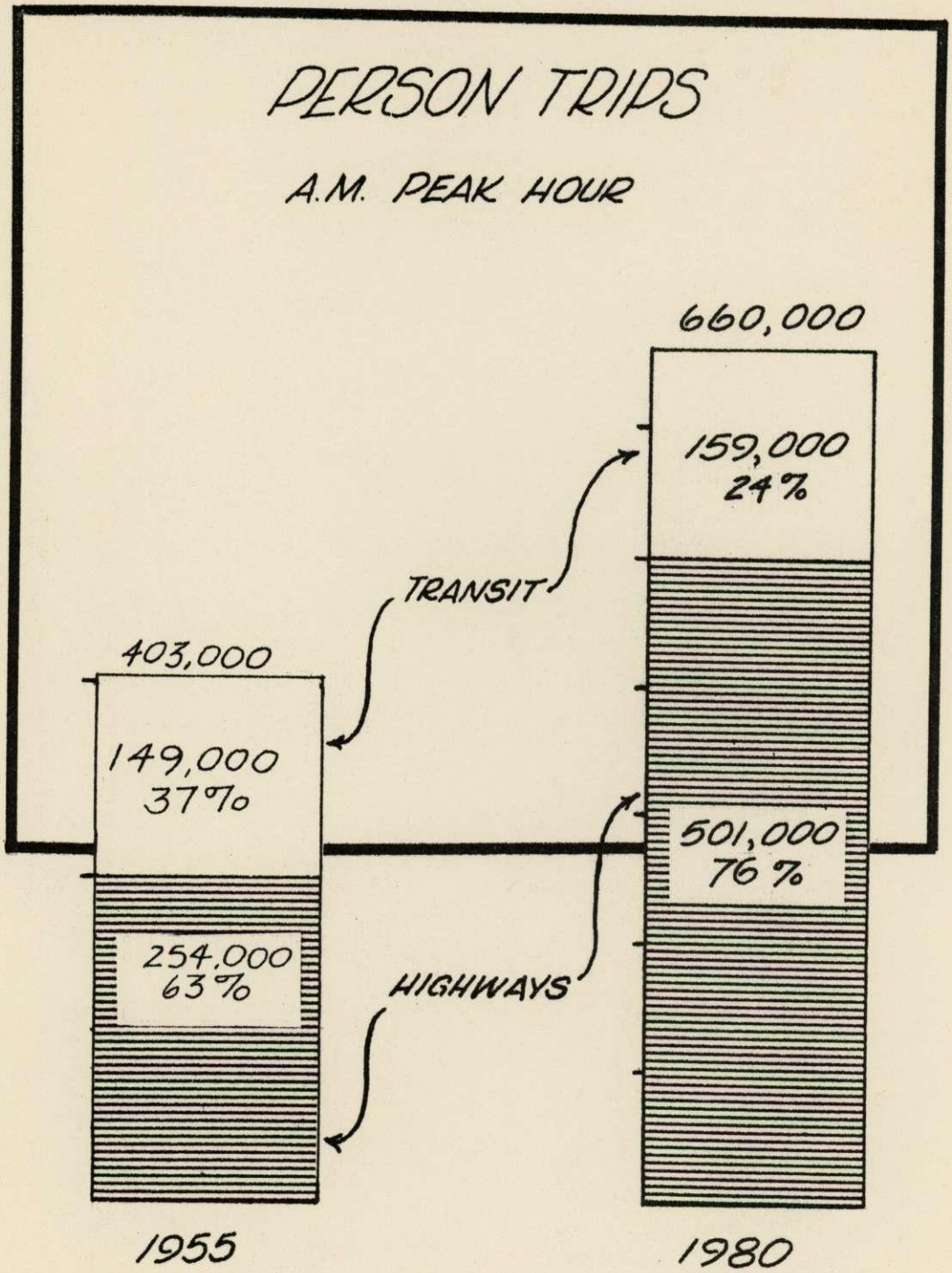

PERSON TRIPS
A.M. PEAK HOUR
660,000
159,000
24%
TRANSIT
403,000
149,000
37%
501,000
76%
254,000
63%
HIGHWAYS
1955
1980

FIGURE 9

assumption of the 1959 Plan that central area freeways would carry only 1500 vehicles per lane per hour and place our capacity at a more realistic 1700 vehicles per lane per hour."(11) What is referred to by the NCTA as an assumption is the design standard acknowledged by the American Association of State Highway Officials. It is an accepted national policy in the design of urban freeways. The data, reasoning and analysis that led to the use of 1500 passenger vehicles per lane per hour as the practical, or design capacity, are carefully documented in the Highway Capacity Manual, an accepted publication of the Highway Research Board. To increase this national standard for the central area of Washington, D.C., thereby accepting a lower level of service on the freeway system in this area, much of which is on the National System of Interstate and Defense Highways, conflicts with the design standards adopted by AASHO for the National System of Interstate and Defense Highways.

Lane design capacity is not the only criterion required for good engineering design of an urban freeway. During peak periods operating conditions on urban freeways are dependent upon the capacities of potential bottlenecks, which generally occur at interchanges where traffic is added to the main line of the freeway without adding additional lanes. By assuming higher lane capacities in the central area of Washington where interchanges occur frequently, the NCTA has increased the probability of congestion and overloading at the heart of the freeway network.

A primary function of a freeway is to provide for the safe movement of people and goods. With control of access and other modern

(11) NCTA Report, November 1, 1962, Page 25, Paragraph 2.

design features built into freeways, many of the underlying causes of accidents on arterial streets are eliminated. Accident and fatality rates on freeways are less than one-half as great as on arterial streets.

Research by the Bureau of Public Roads has shown that accident rates on the Pentagon Network, a freeway system, are much higher during both morning and afternoon peak hours as compared to day or early evening. Congestion on portions of the Pentagon Network develops when volumes are 1500 to 1600 vehicles per lane per hour because of frequent access points and considerable weaving. The research shows that congestion and overloading (at volumes above 1500 vehicles per lane per hour), are not conducive to a high level of safe operations.[12]

Traffic flows are not constant but surge periodically. The peak five minute flow in the design hour is the critical volume. This peak five minute flow may vary from 1.1 to 1.5 time that of the hourly flow. It is another of the many reasons for the 1500 vehicles per lane per hour design capacity figure.

D. THE TRAFFIC FORECASTING TECHNIQUE

1. Description

The results and conclusions developed for any traffic forecasting procedure are only as good as the judgment and experience applied to the input data. This point was noted by the traffic consultant to the National Capital Transportation Agency in his initial feasibility

(12) Bureau of Public Roads Report, 1962, entitled "Pentagon Transportation Study."

report,[13] which stated, "It is the assumptions inherent in data fed into these computerized models which will determine which, if any, travel mode is favored in the results."

The procedure employed by the NCTA is described in the appendices of the November 1, 1962 Report, and will not be repeated here. However, it is appropriate to note again that traffic forecasting in its present stage of development is an evolving innovational technique in which new procedures and methods are introduced constantly and old ones are discarded.

It is, however, most important to consider very carefully the assumptions used in the procedure and the reliability of the results, since the NCTA is proposing a large public works project, based on conclusions reached by the Agency which reflect unilateral control, unproved techniques, and optimism of the Agency.

2. Assumptions

The transit forecast developed by the NCTA was built on an empirical pyramiding of a large number of untested assumptions. If the assumptions balance in terms of favoring neither one nor the other mode of travel, a reasonable case can be made for the reliability of the results.

If, however, the assumptions inherently favor one mode of travel, then the conclusions based on these assumptions must be questioned. The following discussion of specific assumptions indicates that one mode of travel has been favored by the NCTA in developing its transportation plan. Conversely the traffic demand on the alternative mode (the highway

(13) Feasibility Analysis of Traffic Forecasting Techniques for the National Capital Transportation Agency, Traffic Research Corporation, January 12, 1962.

system) is underestimated.

(a) According to the NCTA, over 43,000, or 27% of the peak hour transit trips, are school trips.[14] Since the modal split model was not developed to handle school trips (home-based), the NCTA assumed the following:

1. School trips with either end or both ends in the District of Columbia or the City of Alexandria were assigned to the transit system.
2. No school trips, either by bus or private car, were assigned to the highway network.

The reasons for these criteria are not clear. Patterns of school travel do not appear to fit the radial transit plan. Examination of crowded parking lots and neighboring streets at our local universities and high schools, and recognition of the many trips by auto to drop off and pick up small children at our grade schools, seem to conflict with the assumptions of the NCTA. Since the school trips are a significant portion of the estimated A.M. peak hour transit trips, the impact of a lesser percentage of these trips on transit may be significant.

(b) The NCTA has used the A.M. peak hour for purposes of determining the extent of the highway network. Yet, by applying appropriate conversion factors, developed by the United States Bureau of Public Roads from the 1955 O & D

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(14) From NCTA 1980 Forecast, transit trips by purpose - Average of Forecasts A and B.
Total transit trips including bus 159,000.
School transit trips including bus 43,000.

data, to the total daily trips estimated by the NCTA it can be determined that there are approximately 748,000 total trips in the P.M. peak hour.[15] This is 88,000, or 13%, more than the total 660,000[10] trips developed for the A.M. peak hour.

This would indicate that the total demands on the highway network in the P.M. peak hour are greater. However, a detailed examination of this demand is not apparent in the NCTA report.

(c) The two automobile costs considered in the cost ratio, which is a variable in the computation, are parking fees and out-of-pocket car operating expense (gasoline plus oil change and lubrication). Parking fees in the downtown zones were estimated by NCTA to increase by 60% over

---

(15) 1980 Afternoon Peak Hour Trip Composition, Washington, D.C.

Trip Purpose	(A) Total Daily Trips	(B) Conversion Factors	(C) Peak Hour Trips
Work	2,116,000	.2133	451,343
School	614,000	.0421	25,849
Non-Home Base	751,000	.1379	103,563
Miscellaneous	553,500	.0770	42,620
Social-Rec.	857,500	.0537	46,048
Shopping	866,000	.0910	78,806
			748,229

(A) NCTA Appendix Volume III, Table 8, p. 37 (Average of Plans A & B)
(B) Peak Period Trip Factors By Directional Purpose of Trip for Washington, D.C. - Interim Report - U.S. Bureau of Public Roads August 27, 1962.
(C) (A) x (B)

(10) See page 12.

present fees. As indicated later in this report parking fees and time to park a car and walk to destination have a major influence on NCTA's estimate of the number of transit riders. This increase was used in the modal split while other economic indices - income, transit fare, gasoline and oil prices - were held at the present level. Since the parking policy of the downtown area is uncertain, the effect of using the 60% increase is questionable. Furthermore, in developing the model, 1,000 miles between oil change and lubrication were used to calculate these costs. This same figure was used for 1980 in face of recent improvements which allow many thousands of miles between oil changes and lubrications. While admittedly a minor assumption, it is a minor assumption which tends to favor one mode of travel. When all such assumptions are added up, the resultant impact on the final conclusions may be significant.

(d) The median income per worker is one of the five factors used by the modal split technique. The NCTA assumed a constant median income to the year 1980, although the geographic distribution of incomes about this median was changed. The Federal employees in this region already have been granted a substantial pay increase over the incomes used by the NCTA in the preparation of this report. A person in the GS-1 Civil Service Classification already receives an income in excess of the salary range in the

lowest category used by NCTA. This would indicate that transit usage was considered to be based solely upon relative income rather than upon absolute income. Present trends indicate that disposable income, in constant dollars, will increase between now and 1980. Several transportation studies have taken this factor into consideration in their estimates of future travel. Studies by the Bureau of Public Roads and others indicate that increased income produces increased auto ownership and to date, at least, an increased dependence upon the automobile for most types of travel. This increased dependence upon the automobile will result in a corresponding decrease in dependence upon other modes of travel. The following data, from "Family Income 1, 1957," a publication of the Washington Board of Trade, Economic Development Commission, give the recent trend in median family income for D.C., its suburbs, and for the urban area as a whole.

TABLE II

	1956	1955	1949	1947	Increase 1947 - 56
D. C.	$4,900	$4,748	$3,800	$3,836	28 percent
Suburbs	6,773	6,551	5,109	4,639	46 percent
Urban Area	5,878	5,622	4,357	4,162	41 percent

For the Washington SMSA, median family income rose from $4,262 in 1949 to $7,577 in 1959, an increase of about 78% according to U.S. Census data.

Figure 10 graphically illustrates the relationship between median family income and mode of transportation to place of work by census tracts for workers residing in the Washington SMSA. For example, about 68% of the workers with a median family income of $7,000 used private automobiles to commute to and from work and about 78% of the workers with a median family income of $10,000 used private automobiles to commute to and from work.

Further examination of the 1960 census data reveals that the median family income for: (1) Montgomery County was $9317 and 82 percent of the workers used automobiles to commute to and from work, (2) Fairfax County was $8607 and 82 percent of the workers used automobiles to commute to and from work, and (3) Prince Georges County was $7471 and 80 percent of the workers used automobiles to commute to and from work.

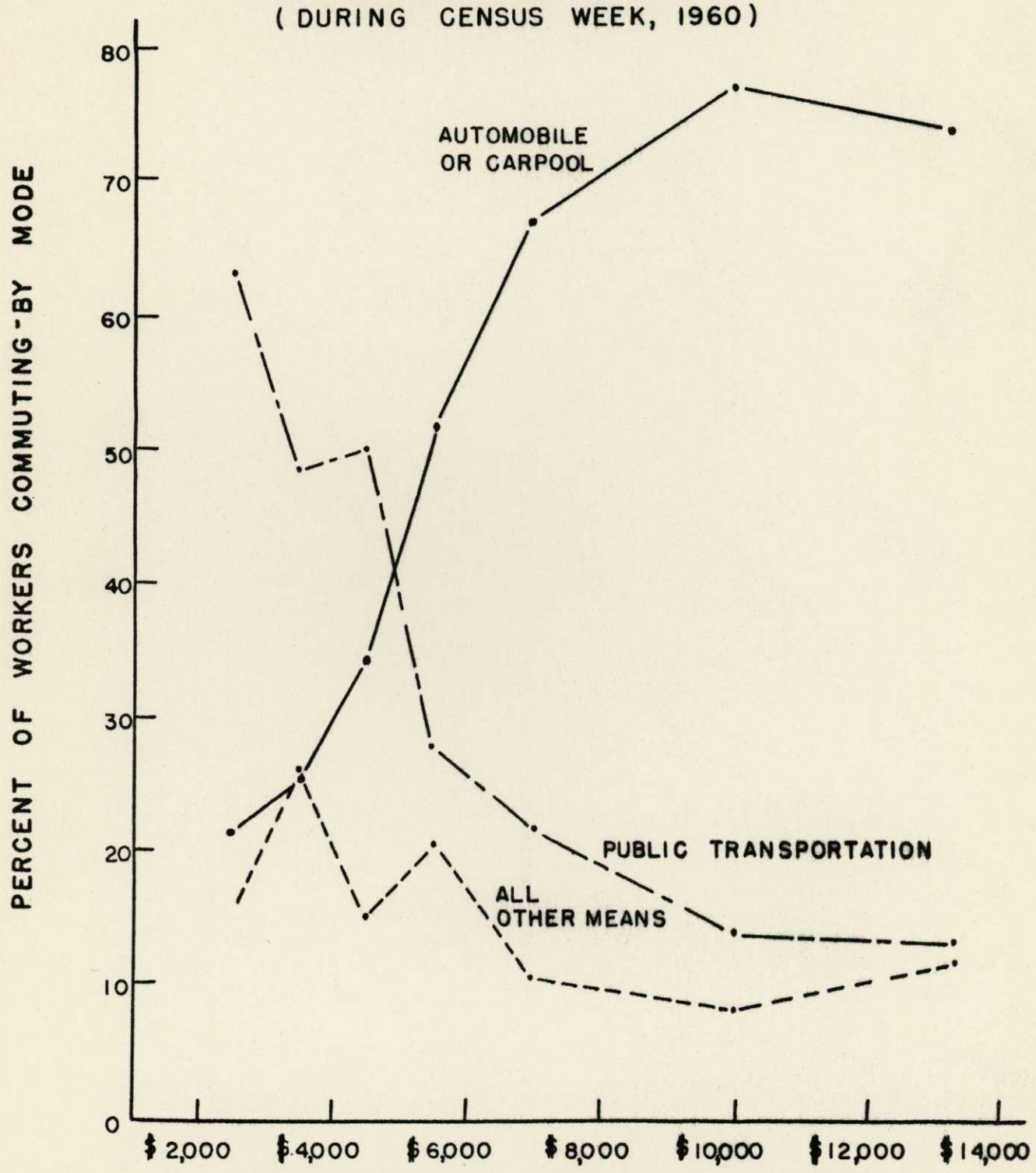
Figure 1 shows that auto registration has increased as the gross national product has increased. Similarly, median family incomes have increased as the gross national product has increased.(16)

(e) The portion of combined auto-transit trips (trips in which both the auto and public transit are used) made by auto were never assigned to the highway network. The bus portion of transit trips were not assigned to the highway network. Yet, the GSA Federal Employee Parking Study used

(16) U.S. Census of Population and Housing of 1960.

WASHINGTON, SMSA

MODE OF TRANSPORTATION TO AND FROM WORK
VS MEDIAN FAMILY INCOME 1959
(DURING CENSUS WEEK, 1960)



REF: U.S. CENSUS OF POPULATION AND HOUSING, 1960
PHC (1) NO.-166 (D.C.-MD.-VA.)

FIGURE 10

by the NCTA points out that of 88,600 employees working in the downtown area, approximately 4700, over 5%, used auto and bus as the mode of transportation.[17] It is reasonable to assume that since bus stops today are much closer than rail transit stations will be under the NCTA plan, many more combination trips can be expected in the future. The impact of these additional trips on the highway system should have been included.

3. Reliability of Results

The procedure developed by the NCTA for determining the modal split consists of the preparation of diversion curves which express that portion of total trips that can be expected to travel by public transit. The data from the surveys used for diversion curve development could not contain the full range of conditions expected in 1980 with a rapid transit system. Extrapolations of the curves developed for Washington were necessary. To provide information upon which to base these extrapolations, data from other cities, especially Toronto, were used as a source. Of the 80 diversion curves used for work trips in the morning peak hour, 34 were developed without any specific data obtained from Washington, but were established from relationships for other cities and from the configuration of the other 46 curves.

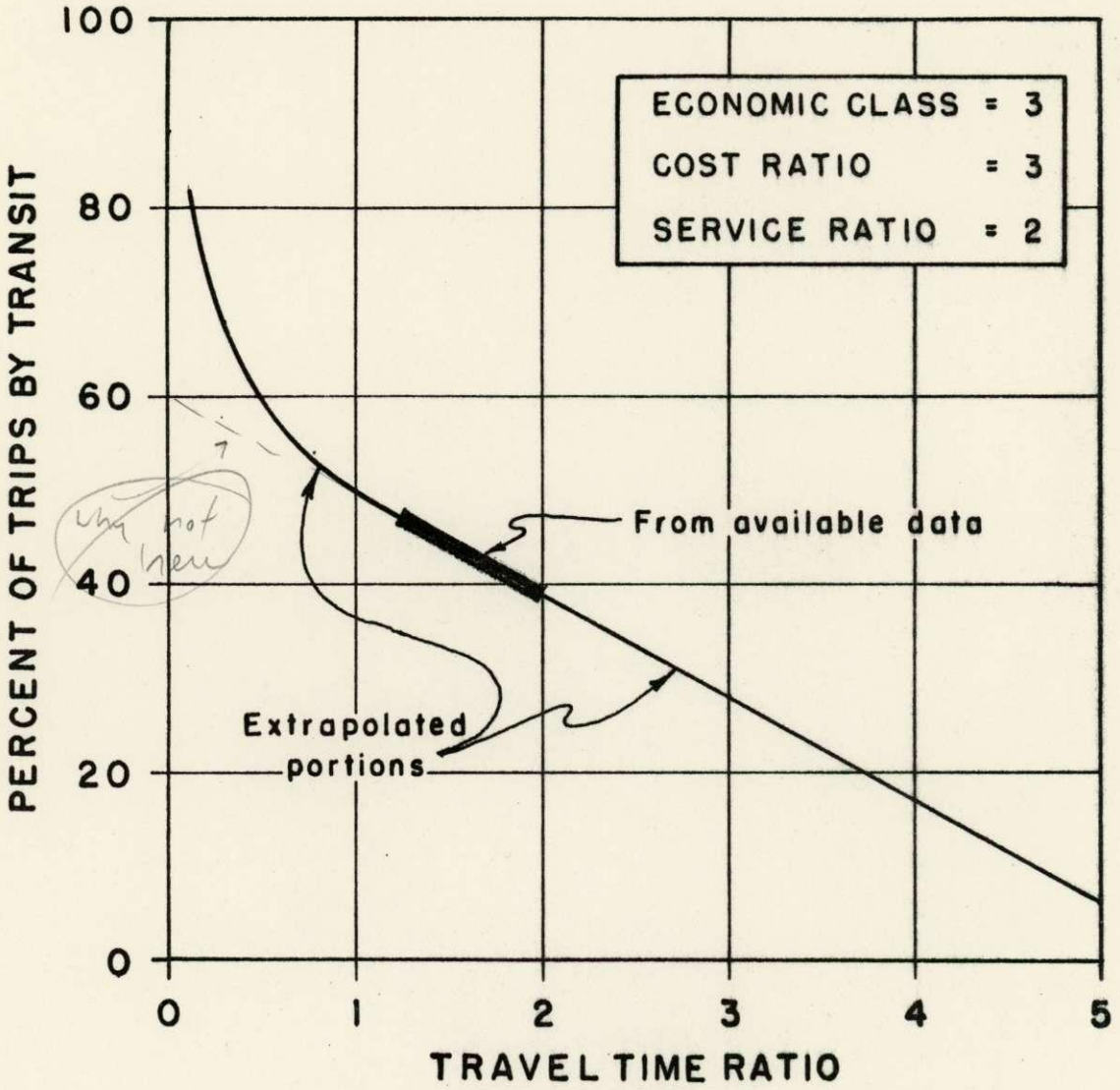
The available Washington data relates only to short portions of those 46 curves, generally in the range of TTR of 1.2 to 2.0 (TTR - travel time ratio, total time by transit divided by total time by auto).

(17) Federal Employee Parking and Transportation Survey, Washington Metropolitan Area, General Services Administration, 1962, Volume I, Page 10.

For TTR's of 1 or less (transit faster than auto) the curves were extrapolated, or extended, in a curved path, as shown in Figure 11. This extrapolated section would indicate a higher use of transit than if a straight line extension were used. In the critical ranges a straight line extension or a different curved path would be as logical as the curved path chosen. As used in the modal split procedure, the NCTA curves give a higher estimate of transit usage than would a straight line extrapolation.

An observation is warranted relating to the reasonableness of the NCTA modal split curves as presented in the November 1, report. Figure 12 is taken from page 58 of that report. This figure shows that in this case 88% of the travelers in the low income bracket would choose transit where travel times are equal. However 70% of the travelers would continue to choose transit for a ratio of 5, that is, if transit travel time were 5 times longer than auto. The application of the curves by NCTA results in the assignment of person trips to transit that might require 2 1/2 hours even though that same person trip might be made in 30 minutes by private auto.

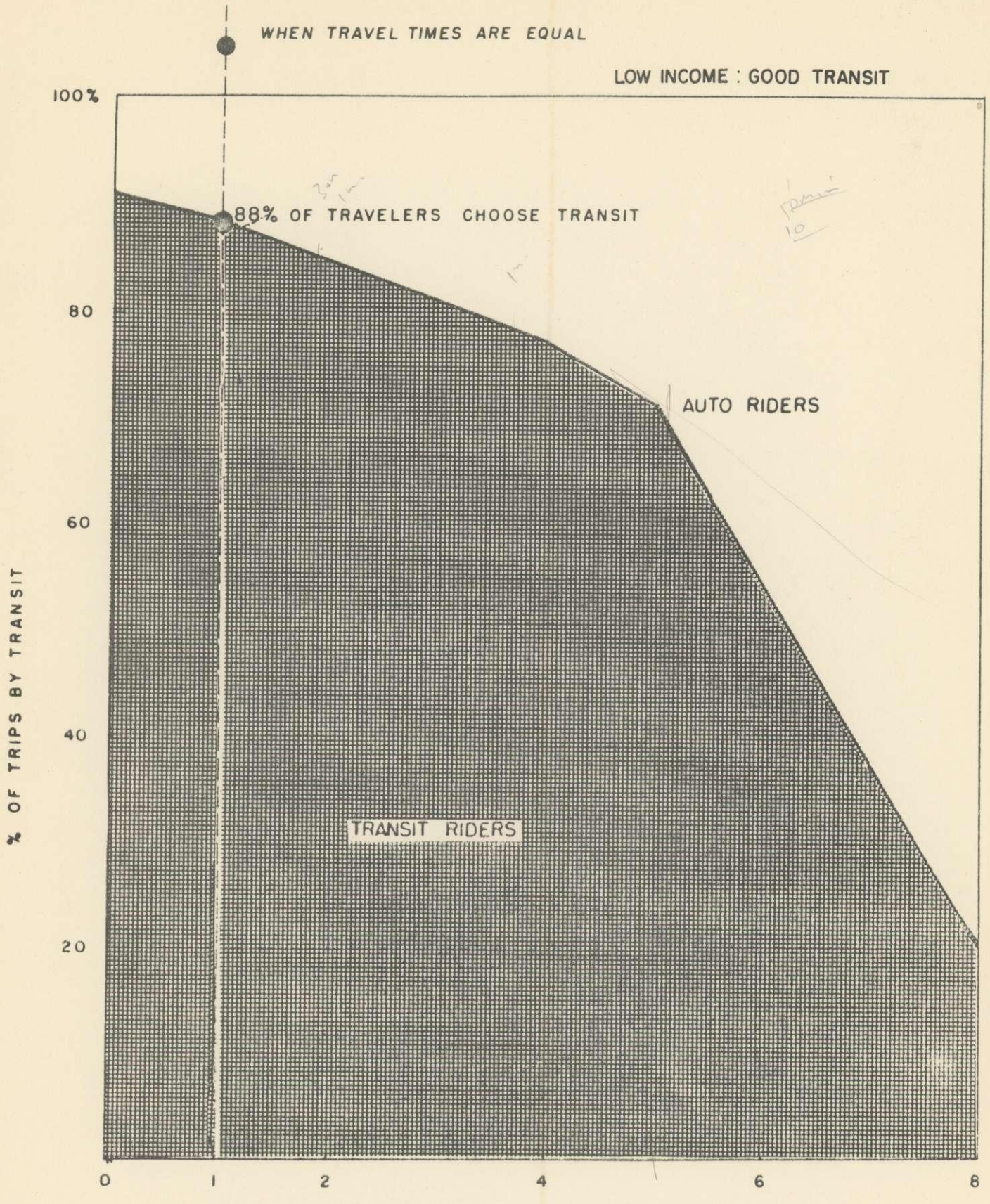
It is difficult to test the ability of the extrapolated portions of the curves to produce a realistic modal split. The Washington Metropolitan Region is a unique and complex urban area with unusual governmental and organizational inter-relationships. In such a community, which has grown in an auto-oriented manner, it is questionable that the experience of other metropolitan areas can be used as more than a rough indication to measure the choice of the citizens of the National Capital Region, let alone predict what their choice will be in the future.



TYPICAL MODAL SPLIT CURVE

Ref. NCTA Appendix, Vol. III pg. 62, fig. 10 and pg. 64, fig. 11

figure 11



REF. NCTA REPORT TO THE PRESIDENT, NOV. 1, 1962 PAGE 58, FIG. 20

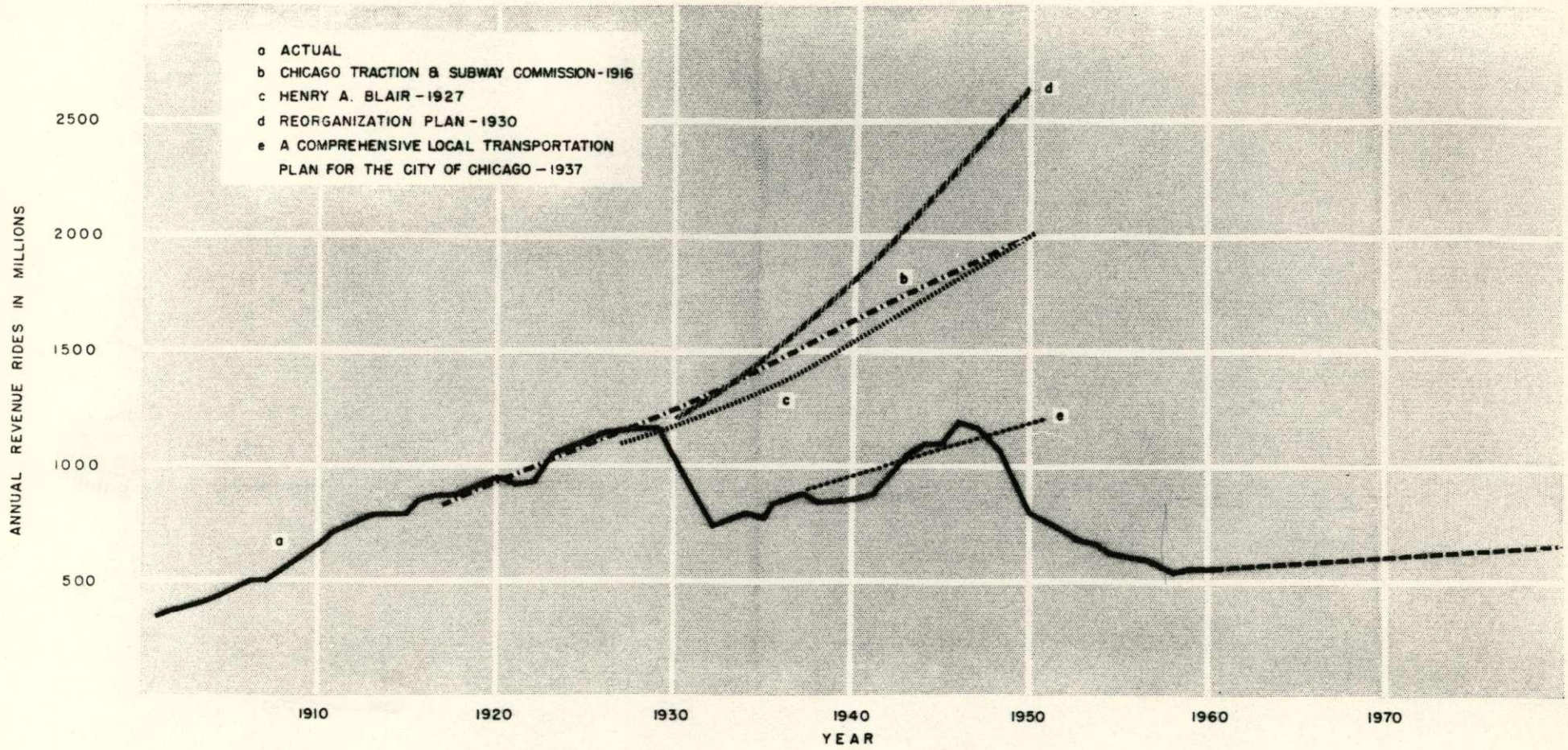
figure 12

These modal split relationships as represented on the curves, are assumed by NCTA to remain constant through time, that is, 1955 relationships are used to predict 1980 travel habits. Less sophisticated, but no doubt rational predictions of transit usage have been made before. Figure 12-a shows how four estimates made in 1916, 1927, 1930 and 1937 in the Chicago metropolitan area have widely missed the mark.

Several tests to determine the reasonableness and accuracy of the results of the traffic forecasting procedure were undertaken jointly by the NCTA, the Washington Metropolitan Area Transportation Study and the Bureau of Public Roads.

The first test attempted to compare the known values resulting from the 1955 Origin and Destination Survey with those estimated by the NCTA procedure. This test would evaluate the ability of the modal split program to reproduce a known historical event. This same event was a significant factor in the development of the modal split curves. There is no way to prove that it would relate directly to the ability of the program to predict future events. The following table shows the actual 1955 transit trips, those estimated by the model for 1955, and the percent difference of the model from the actual number of trips.

	Transit Trips		
Sector	Actual 1955	Model	Percent Difference
0	9,612	10,375	+ 7.9
1	5,181	4,498	- 13,2
2	9,318	8,571	- 8.0
3	24,570	26,307	+ 7.1
4	10,274	11,303	+ 10.0
5	6,569	6,791	+ 3.4
6	10,612	10,926	+ 3.0
7	6,421	5,063	- 21.1
8	5,981	4,628	- 22.6



ACTUAL USE OF TRANSIT FACILITIES FROM 1901 TO 1960 AND ESTIMATED TO 1980, COMPARED WITH VARIOUS PROJECTIONS OF ESTIMATED USE — CHICAGO

FIGURE 12A

Of the nine sectors checked, two show an error in excess of 20% in the number of transit trips. Two have an error less than 5%. Thus, we may conclude that even though the model was calibrated by the data used for testing purposes, it is only moderately reliable in reproducing the actual number of trips in sectors.

The joint venture also applied a number of sensitivity tests to the NCTA results, using the same morning peak hour work trips and the identical model used by the NCTA in developing the 1980 estimates.

In the first set of tests, a single factor was changed in each test. All other factors remained as estimated by the NCTA. Results were compared with the transit trips established by the NCTA as their final estimates of the work trips by transit in 1980 as shown below.

Change	Number of Transit Trips	Percent Change From Base Data
A. Increase income by 50 percent	103,265	- 4.5
B. Fares increased by 15 cents	102,731	- 5.0
C. Fares doubled	99,752	- 7.8
D. Increase wait and transfer time on transit by 50 percent	91,864	- 15.1
E. Reduce transit speeds by 1/3	93,249	- 13.8

These tests indicate that the model is relatively insensitive to income and a change in the fare structure. Resistance factors for bus and streetcar operation are commonly accepted as a decline of 1/3% in passengers for each 1% increase in fares. The 15 cents increase in fares would vary from a 60% fare increase in the ten mile square to 30%

in the band centered on the beltway. If the same standard were applied to transit, a 15 cents increase in fares could be expected to decrease ridership by 10 to 20%. Doubling fares would, under this standard, reduce ridership by 33% instead of the 7.8% derived from the model. By contrast, the model is relatively sensitive to transit headways and speeds. It appears from the results of the sensitivity tests and visual examination of the modal split curves that, along with the travel time ratios, the level of service factor is the most critical element in determining the modal choice. The level of service for both transit and auto travel is determined by summing up those portions of travel time not actually in motion in a vehicle. These are the walking and waiting times. For the most part these are small increments of time and not easily determined. An under- or over-estimate of one or two minutes of walking and waiting time could materially affect the forecast. Sensitivity tests of the curves by the United States Bureau of Public Roads show that the curves are extremely sensitive to the time, usually referred to as the walking time, from where a person parks his car to his office. The U. S. Bureau of Public Roads using the NCTA forecasting techniques found that a one-block increase in walking distance would theoretically increase area wide transit usage by 32%. This result appears to be unrealistic. It does not appear logical that the American public attaches such a significance to the relatively small time that is affected in this approach.

The sensitivity of the model was further tested by changing more than one factor at a time by selected groupings among the following variables:

1. Time required to park a vehicle
2. Time required to walk from parking area to destination
3. Cost of parking
4. Auto speeds

The results of these tests are as follows:

Change	Number of Transit Trips	Percent Change From Base Data
F. Use 1955 time to park car and walk to destination	90,308	- 16.5
G. Use 1955 parking costs and 1955 time to park car and walk to destination	76,133	- 29.6
H. Auto speeds increased by 1/3 parking costs decreased by 1/3 walk times from parking place to destination decreased by 1/3	80,571	- 25.5

It is clear that modest changes in these variables can materially affect the estimated volume of transit traffic.

These tests indicate that if the actual conditions in 1980 with respect to parking costs, wait and walk times, transfer times and travel times on the transit and highway system vary from the assumptions made by the National Capital Transportation Agency, substantial changes in the estimate of the division of trips by mode of travel may result.

In this connection, there appears to be no indication that a "factor of safety" has been introduced into the NCTA estimates. Rather it seems that most assumptions are optimistic insofar as transit travel is concerned. Therefore, serious questions must be raised as to the adequacy of the highway facilities as proposed, since even a modest reduction in the estimate of transit diversion would tend immediately to overload the underdesigned NCTA highway system.

To develop an independent appraisal of the reliability and sensitivity of the NCTA results, the firm of Thompson, Ramo Wooldridge, Inc., was asked to review a number of the NCTA appendices from the standpoint of statistical reliability and traffic implications. This firm is currently engaged in a traffic simulation signal study for the District of Columbia to develop a traffic simulation computer model to optimize traffic movement through a traffic signal system. The firm is highly qualified in the area of traffic engineering and forecasting.

In summarizing their analysis, Thompson, Ramo Wooldridge, Inc., made the following observations:

> (a) "The highway system planned by NCTA appears to be inadequate in that capacities of the various corridors do not contain adequate safety factors to cover actual predicted demands on some corridors, nor the increased demands which may not have been predicted by virtue of inherent errors in the forecasting process.
>
> (b) "The statistical procedures used in the development of the modal split model are, in many cases, relatively informal. Because of the wide variation of sample sizes, the variability and non-homogeneity of the data, and methods of curve fitting used, it is difficult to estimate the standard error.
>
> (c) "Because of the NCTA's selection of highway operating speeds it appears likely that the travel times by auto were such as to bias the modal split to give unduly low percentages for auto travel.
>
> (d) "In the development of the modal split there appears to have been no attempt to quantify the effect of captive riders, either by transit or by auto, under existing conditions and to project these phenomena for application to the split on the proposed plan."

E. A BALANCED TRANSPORTATION SYSTEM

1. Definition

The NCTA claims to strike a sound balance between highways and mass transportation. Apparently the "balance" criteria used by NCTA is the proposed expenditure of similar sums of money on fixed transit and on highways.

However, a generally accepted definition of a "balanced" system is one which matches transportation facilities to the demonstrated transportation needs of an urban area. Another definition is that a "balanced" system provides an adequate level of service for all of the various, differing demands of an urban area.

2. Experience in Chicago

The Chicago Area Transportation Study, one of the largest and most comprehensive undertaken to date, has developed a report that includes both transit and highway recommendations.

The Chicago study found that three-fourths of the trips in the metropolitan area are by automobile. It estimates that by 1980 this proportion will rise to 85 percent. To meet this demand, the study proposes the construction of 230 miles of freeways in addition to the 290 miles already completed or scheduled for construction. Additional transit facilities are included in the proposed plan; however, these facilities comprise about 6.6 percent of the cost. The proposed transit system extensions include express bus, suburban bus, and suburban railroad facilities along with rapid transit. The Chicago report recognized that express bus service can be scheduled with very little risk on expressways. Travel projections indicate that in 1980, bus services will carry a greater proportion of transit passenger miles than rapid transit.

3. Alternatives

Based on experience in Toronto and Chicago, careful consideration should be given to the proportion of funds to be allocated for the various forms of mass transit. The NCTA has not revealed any comprehensive study of varying combinations of bus and rail transit in its report. The Agency has not released any evidence to date to indicate that a thorough study of the potential of buses for mass transit has been made, although many reasons for considering the use of buses, in terms of flexibility and economy, have been advanced recently.

The NCTA plan provides 52 miles of express bus operations on freeway and parkway at a cost of approximately $4 million, and 98 miles of rapid transit and commuter rail facilities at a cost of approximately $788 million.(19) While many other factors are involved, particularly the problem of downtown distribution, recent reports and the experience of Chicago would indicate strong reason to consider the possibility of greater use of buses on radial freeways.

In a recent paper presented to the Highway Research Board, the author, in discussing the point at which the question of more freeways or rail transit is raised, states

> "At such a time, before giving consideration to sinking new capital in fixed linear inflexible rail facilities, those urban areas should first consider the feasibility of bringing into being publicly acceptable express bus routes between suburbs and their CBD's, particularly where such routes fan out over 180 degrees or more from their CBD's." (20)

(19) NCTA Report of November 1, 1962, Page 32 and 49.

(20) "The Urban Passenger Transportation Problem". Nathan Cherniack, Economist, The Port of New York Authority, Highway Research Board, 1961.

The importance of this consideration is confirmed by a recent article in Traffic Quarterly, (21) comparing fixed vs. flexible transit networks, which states:

> "If we compare a new fixed transit facility (rail, subway, monorail, etc.) with a new flexible facility (bus operation over an expressway), we can make the following statements:
>
> 1. "First Cost: The first cost, public and private, of an expressway and bus equipment is generally lower than that of a fixed transit facility.
>
> 2. "Amortization Period: It is generally much shorter for expressways and buses than for a fixed facility, due to lower first costs and the shorter time required to recapture them for expressways (utilization of capacity has a definite effect here and is discussed more fully below).
>
> 3. "Salvage Value: The salvage value of a rail facility, at any time in its economic life, is exceedingly low. This is consistent with the experience of other highly specialized industries where the market for physical plant and equipment is very limited. Buses, on the other hand, can be used on any type of street or road, and the expressway, itself, can serve passenger cars and trucks. In the extreme case of total obsolescence of the expressway, the salvage value would be reduced to the resale value of the right-of-way. Since urban expressway right-of-way constitutes a large portion of the first cost of an expressway, the salvage value should be relatively high.
>
> 4. "Utilization of Capacity: The inherent flexibility of bus operation enables the bus to be utilized on surface streets on regular and irregular trips during off-peak hours, while the fixed system is bound to the same path and pick-up and discharge points. Ideally, an expressway can be designed to operate at or near its vehicular capacity for a large part of the day by varying the percentage of buses operating on it at different times."

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(21) "Modern Expressways and Public Transportation" by John J. Heier and David M. Glancy, Traffic Quarterly, January 1963.

II. THE ROLE OF HIGHWAYS

A. PERSPECTIVE

B. CRITERIA

C. BENEFITS

D. FINANCING

II. THE ROLE OF HIGHWAYS

A. PERSPECTIVE

Before discussing the NCTA highway proposals in detail, it is important to consider the role of highways in urban areas from the broad perspective of National impact and executive and legislative intent.

By the Federal-Aid Highway Act of 1956, the Congress enacted into law the largest peace-time public works program in the history of the world. The National System of Interstate and Defense Highways is one of the principal foundation stones for the economic growth of the country, including the enlargement of our industrial pace, the development of our National resources and the revitalization of our cities.

With the Federal-Aid Highway Act of 1961, the President and the Congress underscored the vital importance of completing this system within a reasonable time by expanding authorizations and emphasizing the element of National Defense, in which the capacity for moving defensive and retaliatory weapons, military supplies, and manpower with speed and precision, gains increasing importance each day.

The urban extensions of the Interstate System are vital links in the National network. In the President's message to the Congress on "The Transportation System of the Nation",[1] he stated:

> "Highways are an instrumental part of any coordinated urban transportation plan, and must be an integral part

(1) House Document No. 384, 87th Congress, 2d Session, April 5, 1962.

> of any comprehensive community development plan."

On February 28, 1963, in a statement before the Subcommittee on Housing of the Senate Committee on Banking and Currency, with respect to The Urban Transportation Act of 1963 (S. 6 and S. 917, 88th Congress), Robert C. Weaver, Housing and Home Finance Administrator stated:

> "The transportation requirements of our rapidly expanding urban areas have been, and will continue to be, met largely by improved highway networks and private automobiles. However, these alone are not sufficient to meet the present, let alone future, transportation needs of our cities. Mass transportation is also needed. Persons who cannot afford to drive, or are unable to do so, need mass transportation facilities at all times. Also, many persons owning private cars prefer to use mass transportation for certain trips, particularly commuter travel."

The most important functions of the Government of the United States, executive, legislative, judicial and military, are centralized, controlled and directed within the urban boundaries known as the National Capital Region. The public officials responsible for these functions live, work and travel in this metropolitan area. The vital functions of Government that generate transportation demands on a 24-hour, top-priority basis cannot and must not be delayed or penalized by a limited and inadequate highway facility.

For these reasons, it is important that the Washington Metropolitan Area be provided with a highway system offering a high level of service in terms of safety, efficiency, flexibility and capacity.

Recognition of this need for high quality highway facilities is implicit in the Federal-Aid apportionments to the District of Columbia. For example, in fiscal year 1963, approximately $35 million, almost 88% of the total apportionment to the District is earmarked for the Interstate System.

With such a mandate, the Highway Departments of the District of Columbia, and the neighboring States, have an obligation and responsibility to gear their resources and abilities to the highest level possible to provide a highway system consistent with these National requirements and obligations.

Under date of January 30, 1963, the Administrator of the U. S. Bureau of Public Roads addressed a letter to the Director of the Department of Highways and Traffic, D.C., which stated:

> "The States share with the Bureau the responsibility to carry out this completion of the Interstate System by 1972 as well as other provisions of the 1956 Federal-Aid Highway Act."
>
> "Our records indicate that the District of Columbia has obligated 58.3 percent of its Interstate apportionments; these obligations cover 22.8 percent of the total estimated cost of the system. A greatly accelerated program for developing the system must be initiated and sustained if the system is to be completed on schedule."

Thus, one branch of the Federal Government, in accordance with the schedule established in the Federal-Aid Highway Act, is urging the District of Columbia to "greatly accelerate" its Interstate Highway Program. Another Federal Agency, the NCTA, urged deferral of key projects,

that effectively stopped the highway program, for a year prior to completion of its studies, and has now advanced unacceptable highway planning proposals.

B. CRITERIA

The geometric design standards for the National System of Interstate and Defense Highways[2] provide that:

> "The National System of Interstate and Defense Highways is the most important in the United States. It carries more traffic per mile than any other comparable national system and includes the roads of greatest significance to the economic welfare and defense of the Nation. The highways of this system must be designed in keeping with their importance as the backbone of the Nation's highway system. To this end they must be designed with control of access to insure their safety, permanence and utility and with flexibility to provide for possible future expansion."
>
> "Interstate highways shall be designed to serve safely and efficiently the volumes of passenger vehicles, buses, and trucks, including tractor-trailer and semi-trailer combinations and corresponding military equipment, estimated to be that which will exist in 1975, including attracted, generated, and developed traffic on the basis that the entire system is completed."
>
> "On all sections of the Interstate System, access shall be controlled by acquiring access rights outright prior to construction or by the construction of frontage roads, or both. Control of access is required for all sections of the Interstate System."

The National System of Interstate and Defense Highways is a continuous integrated network of the Nation's most heavily travelled routes, linking the country's metropolitan areas and serving the national defense

(2) Adopted by the American Association of State Highway Officials, July 12, 1956 - approved by the Bureau of Public Roads, July 17, 1956.

in time of emergency. The system serves vehicle drivers and goods movement over long distances between cities, and carries traffic within urban areas as close as possible to their final destination.

The objective of the freeway program in the National Capital Region is to relieve congestion on our local streets by providing such an integrated system of freeways with the capacity to move safely and efficiently not only those vehicles travelling through the metropolitan area, but also those vehicles moving people within the metropolitan area and furnishing services and goods so necessary to a rapidly growing urban community. Each portion of the freeway and highway system is vital if the system is to function efficiently.

C. BENEFITS

The need for a free-flowing, efficient and continuous freeway program is obvious in today's congestion. We pay for inadequate roads and streets, in tension, inconvenience, accidents, time and gasoline wasted, and in the prices of everything we buy and sell. Figure 13 illustrates the high cost of inadequate roads as traffic volumes increase.(3) Studies of existing freeways show that in some cases their cost is balanced out by motorists' savings in less than 10 years.(4)

(3) Figure 13, Source - Report on Quality of Traffic Service, Chicago Area Transportation Study, presented at the 41st Annual Meeting of the Highway Research Board.

(4) Annual Report of the U. S. Bureau of Public Roads for Fiscal Year 1962, Page 19.

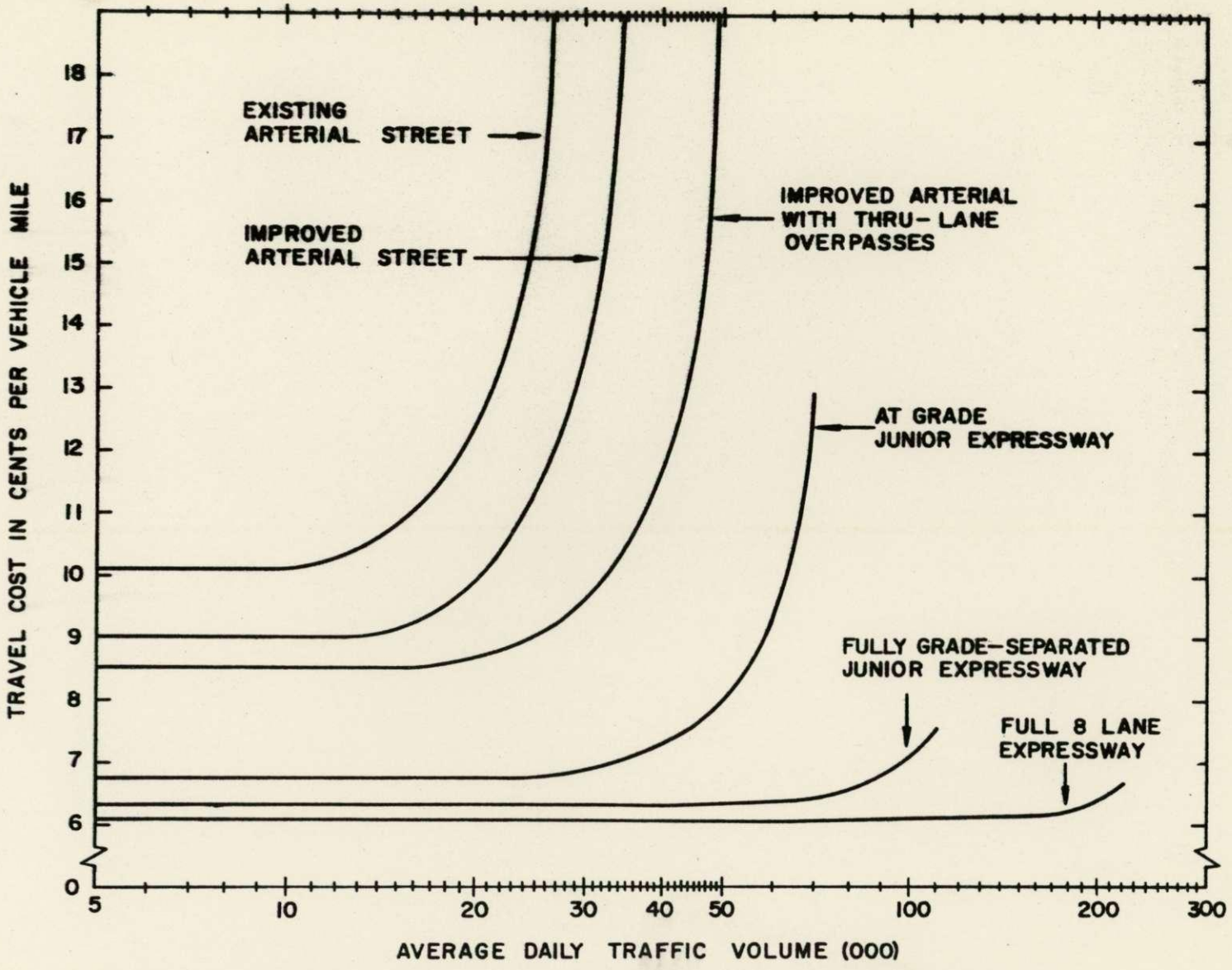


FIGURE 13 - TRAVEL COST-VOLUME FUNCTIONS FOR ALTERNATE TRAFFIC FACILITY DESIGNS

The safety features of the National Interstate System will save at least 5,000 lives a year. Accident rates on freeways are less than one-half of the rate on other roads with comparable traffic. Interstate routes go into and through our large urban communities, by-passing central business districts, relieving congestion and speeding commuters and shoppers from suburbs.

The NCTA report advances opinions concerning the so-called detrimental effects of freeways on urban areas. It does not mention any advantages and benefits that have been gained from urban freeways, such as improved property values, stimulated urban renewal, accelerated industrial and residential development, and a greater return on investment as compared with congested city streets.

The Southwest Urban Renewal Area in the District of Columbia is an excellent example of a total revitalization plan in which freeways have become an integrated element in the renewal process, carefully balanced and interwoven with other community facilities to achieve attractiveness, freedom of movement, convenience and economy.

In terms of land use, in 1790, the year of the L'Enfant Plan, approximately 3,600 of the 6,100 acres in the original city were reserved for streets and alleys, or approximately 59%.

In 1950, the area that was later the Southwest Urban Renewal Area had 266 acres in streets and alleys out of a total 552 acres, or 48.2%. Today, under urban renewal, and after providing for the freeway, the requirements for streets and alleys have been reduced to 229

acres, a reduction of almost 15% in land area required for such purposes and representing only 41% of the gross area, as compared to the 48.2% in 1950.

The estimate of assessable property at the completion of the project in 1965 is approximately $144 million. This compares with approximately $24 million in 1958 at the initiation of the urban renewal project, indicating a six-fold increase in tax revenue within a short period of seven years. The Southwest Freeway has not produced the many detrimental effects cited in the NCTA report.

To provide an improved tax base and improved relocation facilities, the 1961 Federal-Aid Highway Act has greatly liberalized the conditions under which air rights may be developed for either private or public purposes on the rights-of-way for Interstate highways. For example, in 1958, the Bureau of Public Roads cooperated with the City of New York in arranging for appropriation of a three-dimensional area for the new approaches to the George Washington Bridge, leaving the air rights to the city for a planned housing development. These expressway air rights were sold at auction in 1960 for $1,065,000. Apartment houses are being built there to accommodate a thousand families, at an investment of approximately $19.6 million -- over three times the value of the properties originally acquired in this particular area. The city will have a higher tax return than before the houses in place were torn down for the expressway. Washington can secure these same uses of air rights.

D. FINANCING

The Federal-Aid highway program operates on a pay-as-you-go basis. Its cost is paid entirely by highway users. No revenues from general taxes, such as the income tax, are used to finance Federal Aid for highways. The Federal tax on motor fuel and certain other highway-related taxes go into a Highway Trust Fund which provides the money for the Federal-Aid payments to the States. The annual amounts of Federal-Aid authorized to the States are set by Congress, but the law requires that they be maintained in conformity with the revenues accruing to the Highway Trust Fund. The funds thus made available annually are apportioned among the States according to methods prescribed by law.

These funds are used to finance 90% of the cost of each Interstate project undertaken. In the District of Columbia, the remaining 10% of the cost is financed out of the Highway Fund, which is derived from D.C. gasoline taxes, registration and inspection fees, permit fees, special assessments and other highway-related sources.

A yearly budget is prepared by the Department of Highways and Traffic, based on anticipated highway fund revenues for that particular fiscal year, and then submitted to the Congress for project approval and actual appropriation of the funds as requested.

Thus, the highway program in the District of Columbia, in effect, receives Congressional approval twice; first, with the authorization of the Federal-Aid apportionments; and, secondly, with the appropriation of D. C. matching funds.

III. THE NCTA HIGHWAY PLAN

A. THE HIGHWAY SYSTEM

B. THE INTERSTATE SYSTEM PROPOSED BY NCTA

C. THE NCTA REPORT AND THE 1959 HIGHWAY PLAN

D. THE HIGHWAY SYSTEM AND TRANSIT RIDERS

E. THE NATIONAL CAPITAL TRANSPORTATION AGENCY RECOMMENDED SYSTEM AND A.M. PEAK HOUR VOLUMES

F. FORT DRIVE AND THE NCTA INTERSTATE HIGHWAY SYSTEM

G. FIGURE 4 - PAGE 16 NCTA APPENDIX V

H. THE POTOMAC RIVER CROSSINGS

I. THE SITUATION IN THE NORTH CENTRAL AREA OF WASHINGTON

J. THE SITUATION IN THE EAST CENTRAL WASHINGTON AREA

K. HIGHWAY CAPACITY AND RESPONSIBILITY

L. THE DOWNTOWN FREEWAY SYSTEM

III. THE NCTA HIGHWAY PLAN

A. THE HIGHWAY SYSTEM:

The highway system proposed by NCTA is discussed on Pages 42, 43, 44, 45 and 46 of the report of November 1, 1962. The discussion in the first paragraph under the title "The Highway System" and Map "J" (opposite Page 42) uses terms interchangeably so that it is difficult to determine precisely the point of the discussion. For example, the first sentence refers to freeways and express parkways (underscoring supplied) open to traffic, but Map "J" does not show any "express parkways."

The same map shows an "express street system" in lieu of the North Leg of the Inner Loop.

Map "J" also shows, by legend, an expressway or improved major arterial on Alabama Avenue, from Suitland Parkway to approximately 13th Street, S. E., and extending westerly via Portland Street to the Anacostia Freeway. Furthermore, the map shows that the expressway legend applies to East Capitol Street, from approximately 17th Street, S. E. and N. E. easterly across the East Capitol Street Bridge to the District of Columbia Line; North Capitol Street, from approximately M Street to Missouri Avenue; and New York Avenue, from approximately First Street, N. W. to South Dakota Avenue.

The terms "Other Freeways and Parkways", "Expressways and Improved Major Arterials" and "Other Arterials" as used in the legend, seem to be a mixture of various things. Rock Creek Parkway, as shown on this map, would be just that, with no intersections at grade and with service presumably available only for passenger cars. The other five streets presumably would be available to all traffic, with numerous intersections

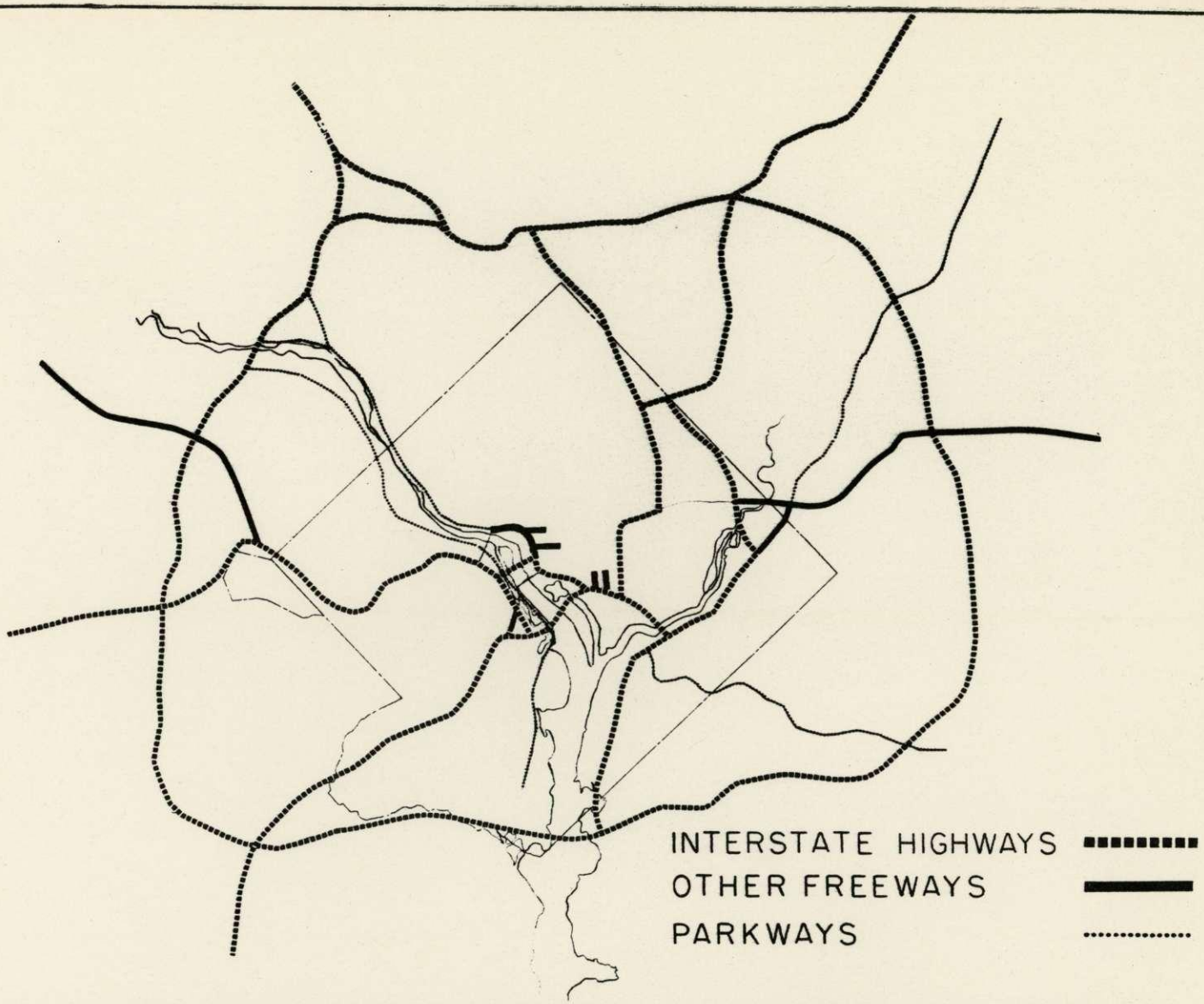
at grade, controlled by traffic lights. In normal highway parlance, the term "expressway" means a divided arterial highway for through traffic with full or partial control of access and generally with grade separations at intersections. The term "expressway" would, therefore, not apply to the latter five streets mentioned previously, without major alteration and construction.

At the top of Page 43, the NCTA Report says that when certain non-delineated freeways and parkways are opened to traffic, and when others are completed which are presently under construction or committed, the region will have "a 205-mile freeway system." In compiling this summary, the Agency apparently has mixed expressways and surface streets with freeways.

B. THE INTERSTATE SYSTEM PROPOSED BY NCTA:

In the first full paragraph at the top of Page 43 of the NCTA Report of November 1, 1962, there appears the following sentence: "It includes a continuous interstate highway system." The word "it" refers to the freeway system proposed by the NCTA. There is no indication in the report that the Agency conferred with any of the State Highway Departments to determine whether the Interstate Highway System is acceptable to such departments, as required by the Federal-Aid Highway legislation, or whether the freeway system proposed by the NCTA would be acceptable to the U. S. Bureau of Public Roads as a part of the National System of Interstate Highways.

There follows as Figure No. 14, a map identified as "Map G" which is taken from Page 21 of the NCTA Report. Map "G" as duplicated here shows only the freeways and parkways included in the NCTA Report.



NCTA RECOMMENDED FREEWAY and PARKWAY SYSTEM
for the WASHINGTON METROPOLITAN AREA

Ref. NCTA Report to the President, November 1, 1962 Map G, pg. 21

figure 14

It does not show rail transit, commuter railroads or bus routes on freeways. The legend delineates the Interstate Highway System proposed by the NCTA.

Apparently, the NCTA proposes one Interstate Route approaching the District of Columbia from Virginia across the 14th Street Bridges and a second Interstate Route approaching the City across the Theodore Roosevelt Bridge. Traffic following these two interstate routes would be "doubled up" and cause congestion on the Southwest Freeway. The NCTA is not proposing that the Interstate should cross the Potomac River on Key Bridge.

If the Three Sisters Bridge is not built and the Interstate System does not cross the Potomac River on Key Bridge, there is no practicable and acceptable method currently for financing the Potomac River Freeway. Such a change in financing would cost the District of Columbia an additional $25 million of local funds.

Approaching the District of Columbia from the north and northeast, the NCTA concept combines two six-lane Interstate Routes (I-70-S and I-95) into one freeway. This will require detailed study, but presents no insuperable obstacles. The planning thus far by the Highway Departments for I-95 and I-70-S has contemplated an eight-lane freeway on each of these facilities.

While the concept of a continuous interstate highway system as proposed by the NCTA includes connections with other routes in the strict sense, it lacks acceptable continuity from the standpoint of indirectness, insufficient capacity, and inferior service. It violates fundamental principles by combining major routes for serious lane imbalance.

C. THE NCTA REPORT AND THE 1959 HIGHWAY PLAN:

The second full paragraph on Page 43 of the November 1, 1962 Report of the NCTA, includes the following sentence: "The key features of the 1959 highway plan remain unchanged." This conclusion is difficult to understand. The Inner Loop concept is changed; bridge capacity over the Potomac is reduced; interstate traffic is concentrated in the "T" at the Capitol; and important routes are combined at lesser capacity in the heart of the region. One-third of the estimated cost of the MTS planned highways is eliminated - mostly in the District. All of these changes are major. The "key" features are changed.

The NCTA Report also contains a statement on Page 43 to the effect that "From a dozen points along the Beltway, radial expressways lead inward to serve the suburbs and the District." The statement that there will exist "a dozen radial expressways" leading into the District of Columbia is misleading. Under the NCTA concept of freeway planning, the "twelve" would be combined and reduced to five by the time they get to the downtown area.

D. THE HIGHWAY SYSTEM AND TRANSIT RIDERS:

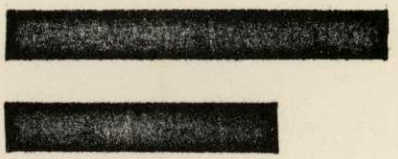
The statement included in the third paragraph on Page 43 of the NCTA Report, to the effect that the highway system proposed by the Agency reflects greater patronage of the proposed new transit system, does not reflect the total picture. Using the Agency's own estimates, while its transit system would cost forty percent more money, it would carry the same number of riders daily as the transit system proposed under the 1959 plan. (See Figure No. 15)

The transit system proposed for 1980, throughout the entire region, would carry only 117,000 more person trips per day than did the transit

COMPARISON OF RECOMMENDED RAPID TRANSIT SYSTEMS NCTA & 1959 MTS PLANS

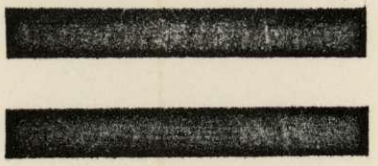
COST & RIDERS

ESTIMATED COST



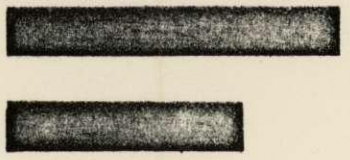
NCTA	$ 793,000,000 [1]
1959 MTS	564,100,000 [2]

ESTIMATED NUMBER OF RAPID TRANSIT RIDERS AVERAGE WEEKDAY 1980



NCTA	756,700 [3]
1959 MTS	760,000 [4]

CAPITAL COST PER RAPID TRANSIT RIDER



NCTA	1,050 [5]
1959 MTS	740 [6]

Ref: 1·NCTA NOVEMBER 1 REPORT- page XVI
2·1959 MTS TRANSPORTATION PLAN·page 7
3·NCTA APPENDIX VOLUME V — page 29
4·1959 MTS TRANSPORTATION PLAN- page 51
5·1÷3
6·2÷4

figure 15

system in 1955. While this increase is important, it should be compared to the substantial increase of trips on highways between 1955 and 1980. The number of trips on highways would increase by 2,500,000 according to the NCTA figures.

E. THE NATIONAL CAPITAL TRANSPORTATION AGENCY RECOMMENDED SYSTEM AND A. M. PEAK HOUR VOLUMES:

Improving arterial streets is necessary as an adjunct to a properly integrated system, but it is the least desirable solution of the major highway problem in terms of cost for service provided.

Appendix V, of the NCTA Report shows certain inconsistencies between Table II-3 of the appendix and Map "J" of the 1 November 1962 Report of NCTA. For example, Table II-3 shows that Mt. Olivet Road, 17th Street and Kendall Street in northeast and southeast Washington would be an expressway. NCTA does not use the term"expressway" in consonance with the definition previously referred to in this chapter. On these streets, each lane would be expected to carry approximately 1,350 vehicles per hour. (This does not appear as an expressway on Map "J".)

In the event this interpretation of Table II-3 is correct, and the Mt. Olivet Road, 17th Street and Kendall Street facility is expected to carry 1,350 vehicles per hour, it should be recognized that this volume is within 10 percent of the practical capacity for a freeway lane. There is no indication in the report as to how these streets would be converted into essentially a freeway facility. (In conferences on 13 March 1963, NCTA agreed that a freeway facility is needed.)

Table II-3 and Map "J" show Rock Creek Parkway, including extensions to the intersection of Porter Street with Connecticut Avenue, and

northeasterly from the Zoo to 16th Street and Piney Branch Road as an expressway. The National Park Service has under construction a two-lane tunnel to by-pass the National Zoological Park. Apparently, the National Park Service does not now propose a four-lane tunnel or a four-lane parkway to tie in with the Porter Street project and with the Piney Branch Parkway. Neither does the record show that the National Park Service is willing to use these particular facilities as four lanes of expressway in the direction of the peak flow.

Table II-3 lists Sousa Bridge, South Capitol Street Bridge, and Memorial Bridge as expressway facilities. Sousa Bridge does not show on Map "J". Apparently the Agency did not consider Pennsylvania Avenue on either side of Sousa Bridge as an expressway. It is doubtful that it logically can be postulated that a bridge itself can be an expressway or something else without proper consideration of the approaches. Furthermore, Table II-3 shows Memorial Bridge as four lanes of expressway in the direction of the peak-hour flow. As indicated in the portion of this report dealing with the Three Sisters Bridge, plans of the National Park Service and other agencies for the treatment of the area in the vicinity of Lincoln Memorial will reduce the District approaches to Memorial Bridge to the point where the practical capacity will be three lanes with total capacity of about 3,600 vehicles per hour in the direction of the peak flow rather than 6,000 vehicles as assumed by the National Capital Transportation Agency.

The foregoing paragraphs treat four particular points of concern in Table II-3. Analysis of other questionable areas will continue.

F. FORT DRIVE AND THE NCTA INTERSTATE HIGHWAY SYSTEM:

According to Table No. II-5 on Page 18 of Appendix V of the NCTA

Report, the NCTA proposes a six-lane Interstate (1) freeway between approximately the intersection of Deane Avenue and Kenilworth Avenue, north and northwesterly to an intersection with Interstate Route 95 in the vicinity of Sargent Road (Fort Drive).

Under date of July 30, 1962, the Director of the National Capital Planning Commission, transmitted a memorandum dated May 2, 1962, to the Director, Department of Highways and Traffic, D. C., which outlined clearly the policy of the NCPC at that time with respect to Fort Drive. Two points covered in this correspondence are (1) that under no circumstances would Fort Drive be developed to provide more than 4 lanes, and (2) Fort Drive would not become part of the Interstate system and would not be designated as a truck route.

There is attached Figure No. 16 which shows the present width of the right-of-way for Fort Drive in the vicinity of Michigan Avenue. Superimposed on this drawing is a concept for a properly designed six-lane freeway. Substantial additional right-of-way would be required to accommodate such a facility. Any Interstate freeway would clearly violate the above-indicated policy position of the NCPC.

G. FIGURE 4 - PAGE 16, NCTA APPENDIX V:

The NCTA analysis deals primarily with the A.M. peak hour transportation problem. It does not follow, as indicated elsewhere in this report, that the hypothesis of the Agency with reference to trips to be made by highways in 1980 will materialize. There is no recognition in the report

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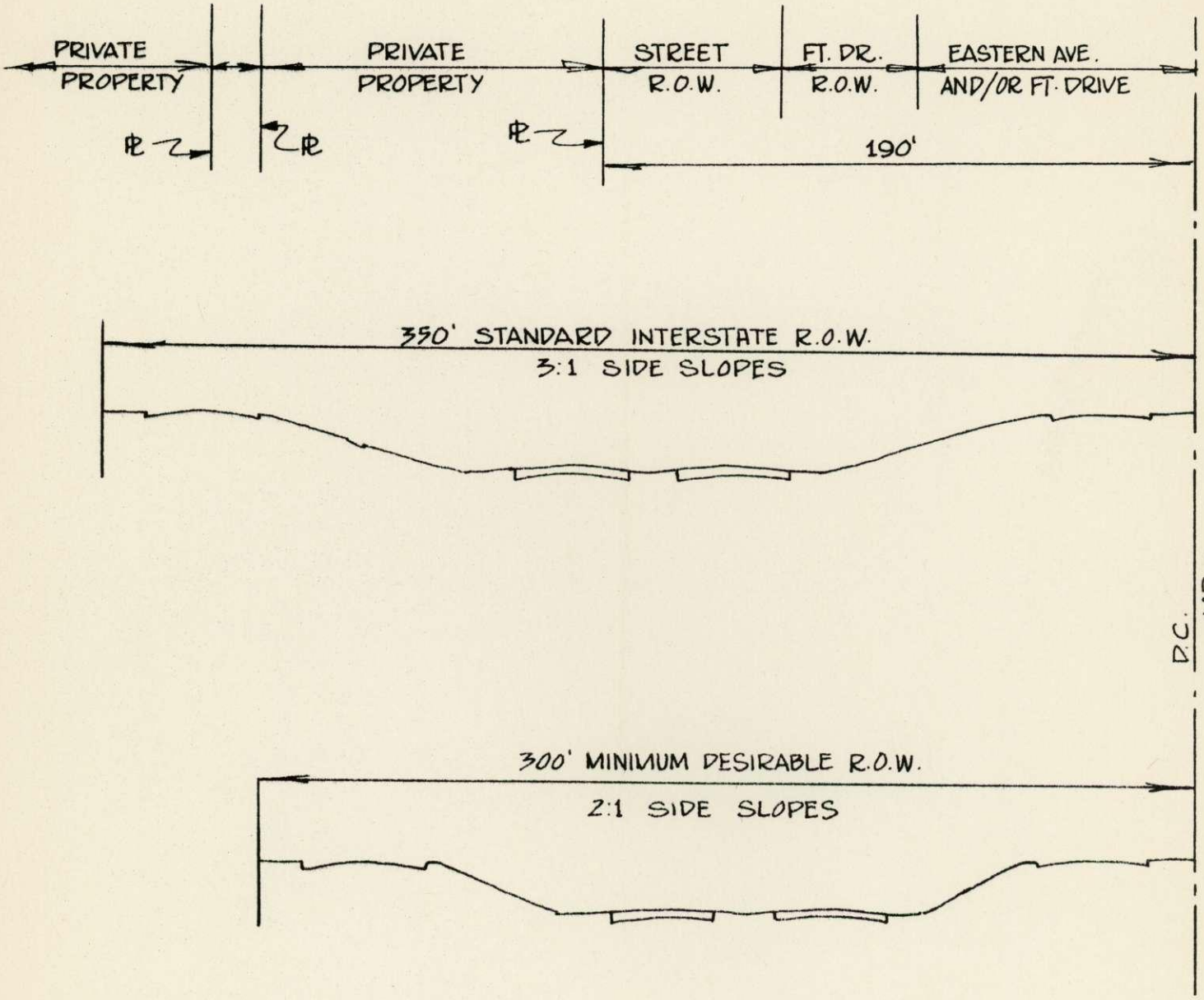
(1) See Map "J" NCTA November 1, 1962 report.



SIX LANE INTERSTATE FREEWAY ALONG EASTERN AVENUE

figure 16

that by the Agency's own figures, the number of daily highway trips in the region will practically double between now and 1980. It logically follows that the material segments of the highway system, with a relatively small increase in freeways as proposed by NCTA, cannot reasonably and adequately handle twice as many daily trips in 1980. There are already numerous troublesome "spots" throughout the region during several hours of the day, on Saturdays, Sundays, and on holidays. The number of "spots" increases with day-to-day growth in traffic volumes.

It is easy to name a few of these areas which already severely restrict traffic flow during such periods, and which unduly impair the efficiency of transportation. A few such areas which can be cited are Seven Corners and Bailey's Crossroads in Virginia, Viers Mill Road, University Boulevard and Georgia Avenue in Montgomery County, and New Hampshire Avenue and University Boulevard in Prince Georges County, as well as various sections of downtown Washington, including the intersection of K Street and Connecticut Avenue, N. W., the Capitol Hill area, and Pennsylvania Avenue.

The Agency tends to dismiss the presence of these "spots" on Page 4 of the NCTA Report of November 1, 1962, stating "Except for chronic traffic congestion within the downtown area and at isolated points outside, existing transportation facilities are adequate for the remaining 20 hours of the day." The Agency, on Page 6 of its report of November 1, 1962, also states:

> "Except for the downtown area and its approaches, there are only a few points where large numbers of vehicles converge during the peak hours to create serious congestion. Congestion at these isolated points can be relieved by (a) improving existing arterial and circumferential streets, (b) attracting to public transportation many of the people who want to go downtown, and (c) constructing for people who want to go elsewhere lateral or circumferential highways that do not cut through built-up areas. A highway circling the area will be completed in 1964. Other road improvements to speed traffic flows in the suburbs are recommended by the Agency."

Traffic Volumes Shown on Figure 4 - Page 16, NCTA Appendix V

The assumptions, the programming, the production of the computer figures, and the hand-balancing, i.e., the adjustment based on judgment, of figures produced by the computer, incident to the preparation of Figure 4, were done by NCTA after the joint computer effort by the NCTA and the Washington Metropolitan Area Transportation Study group. Information has not been made available concerning the basis for "hand-balancing" on various parts of this system. No knowledge is at hand which explains some of the arrangements of the traffic volumes shown on Figure 4. The comments here are confined to three points: (1) the central area bridges across the Potomac River; (2) the situation in the north-central area of Washington; and (3) the situation in the east-central Washington area.

H. THE POTOMAC RIVER CROSSINGS:

That portion of this report entitled "The Three Sisters Bridge"(2) deals in some detail with river crossings. On Page 27 of the November 1st Report of NCTA, the Agency estimated that the total number of vehicles crossing the Potomac River on the central area bridges in 1980 would be 21,500. Figure 4, Page 16 of Appendix V indicates that the Agency corrected its estimate to 19,600 peak-hour crossings in 1977. If we recognize that the central bridges in 1962 carried approximately 16,000 vehicles in the peak-hour, then the Agency contemplates a growth of 19,600 minus 16,000 or 3,600 vehicles in the next 15 years. This is an average annual growth of

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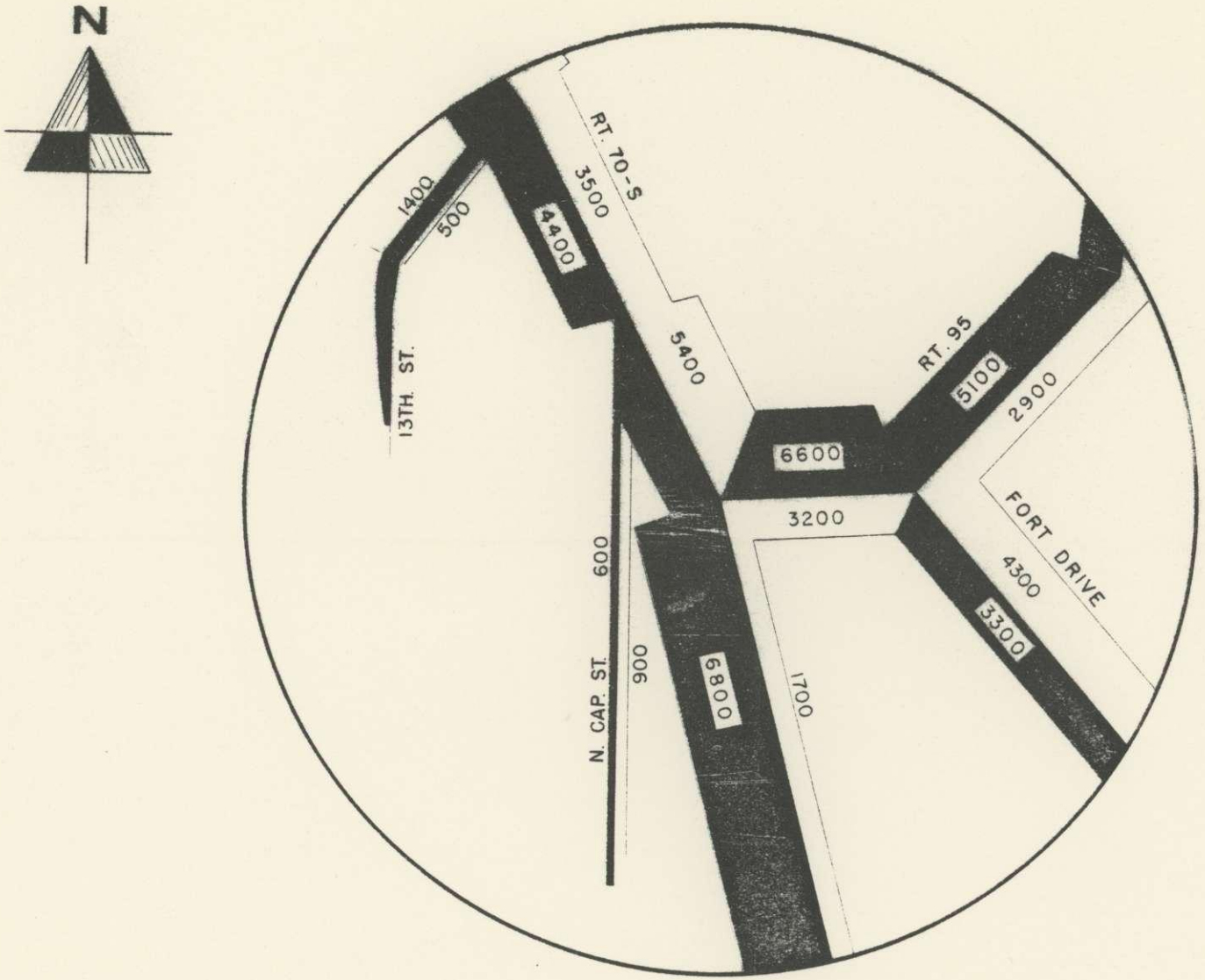
(2) Appendix I

approximately 240 vehicles per hour per year during the next 15 years. During approximately the last 20 years, there has been an average increase in traffic across the Potomac River of 10,000 vehicles per day per year, or approximately 600 vehicles during the peak hour each year in the dominant direction.

If this analysis of the figures released by the Agency is correct, the rate of increase in the peak-hour traffic flow in one direction during the next 15 years would be less than one-half of what it has been for the past 20 years.

I. THE SITUATION IN THE NORTH CENTRAL AREA OF WASHINGTON:

Figure No. 17 shows a portion of Figure 4 from Page 16 of Appendix V. This exhibit indicates that the volume of traffic on the one freeway, Route I-70-S, proposed by NCTA to serve all of north-central Montgomery County and north-central Washington, would carry approximately 10,000 vehicles in the A.M. peak hour in 1977. (This is approximately the same amount of traffic that the Agency estimates would use Cabin John Bridge.) Such a freeway in north-central Washington would be required to serve the northerly part of the District of Columbia; it must serve Silver Spring, Kensington, Wheaton and Rockville areas, as well as areas yet to be developed on to the north in Montgomery County. Aside from the relatively low volume assigned to the freeway, the Agency's traffic assignment shows that a part of this traffic would be diverted to Thirteenth Street and another part to Georgia Avenue as an access to the downtown area and that approximately one-half of the traffic inbound during such peak hour in 1977 would remain on the freeway as it approaches the city. This assumption directly violates experience with reference to the use of other major arterials in this area



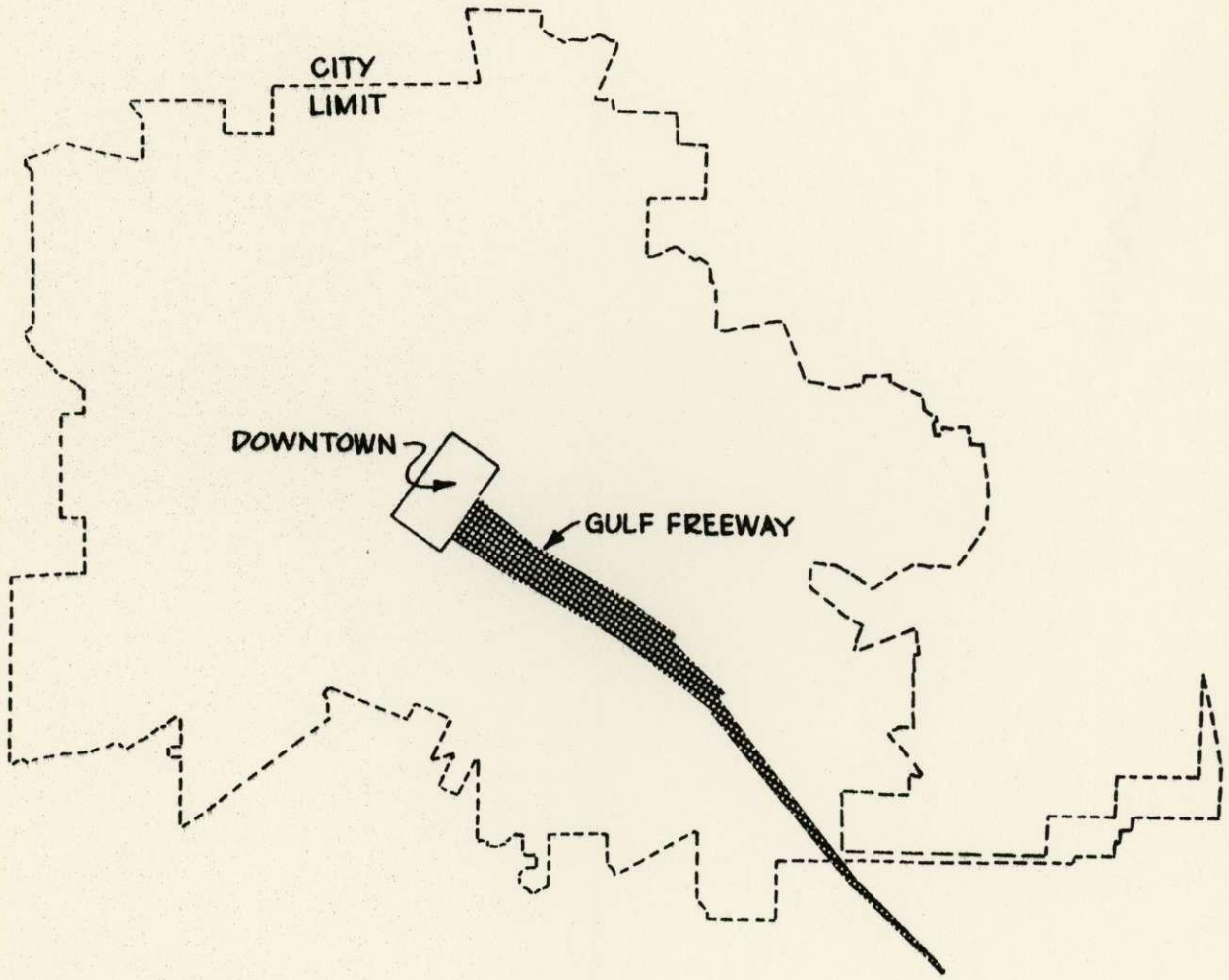
PORTION OF FIGURE 4, NCTA APPENDIX VOL. V

figure 17

at the present time and with respect to the experience on freeways in other metropolitan areas. For example, Figure Nos. 18 and 18a, depict graphically the increase in traffic volumes already experienced on freeways as they approach the heart of a metropolitan area. Figure 18a illustrates actual traffic experience on Shirley Highway.

J. THE SITUATION IN THE EAST CENTRAL WASHINGTON AREA:

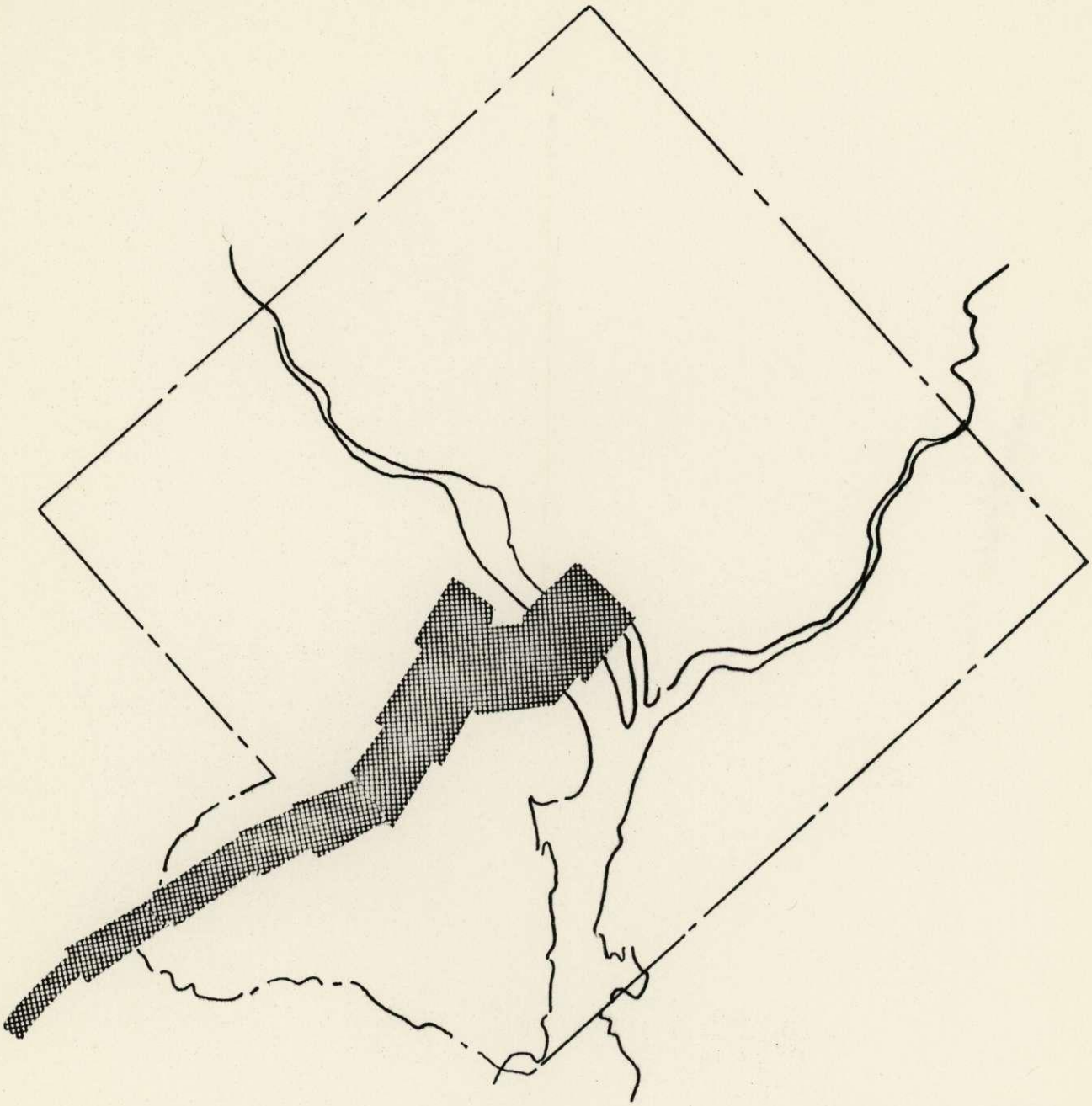
Figure No. 19 is an inset showing a portion of Figure 4 taken from Page 16, Appendix V in the east central Washington area. Figure 4 and the inset shows a facility extending in a southeasterly and southerly direction which apparently is the same as Mt. Olivet - 17th Street, N. E. and S. E. and Kendall Street as listed in Table II-3 and showing two lanes of expressway in the direction of the peak hour flow. According to Table II-3 and making an assumption which seems to apply elsewhere with reference to lane capacity on arterials in Table II-3, it appears that NCTA assumes that the Mt. Olivet - 17th Street and Kendall Street facility both in the Table and in Figure 4 likely would have a capacity in the order of 1350 vehicles per lane. At no place in the Report is it suggested or indicated how this much capacity would be provided on these streets. A study of the flow diagram reflected in Figure 4 suggests that in order to avoid putting the East Leg of the freeway west of the Anacostia River the Agency has done several things. As listed elsewhere in this report, it is proposing a 6-lane Interstate Highway along Fort Drive which is in direct conflict with the indicated policy of the National Capital Planning Commission as late as July 30, 1962. Routing traffic from north central Washington on Interstate 95 in this manner also seems to cause a number of vehicles to cross the Anacostia River twice; once on the Fort Drive extension and again on Benning



TYPICAL FREEWAY TRAFFIC VOLUME APPROACHING DOWNTOWN

Ref: HOUSTON METROPOLITAN AREA TRAFFIC SURVEY - page 19, fig. 6

figure 18



SHIRLEY HIGHWAY
TRAFFIC APPROACHING DOWNTOWN
AM PEAK HOUR

Ref: PENTAGON AREA TRANSPORTATION STUDY - DEC., 1961
VA. DEPT. OF HIGHWAYS TRAFFIC COUNTS

figure 18a

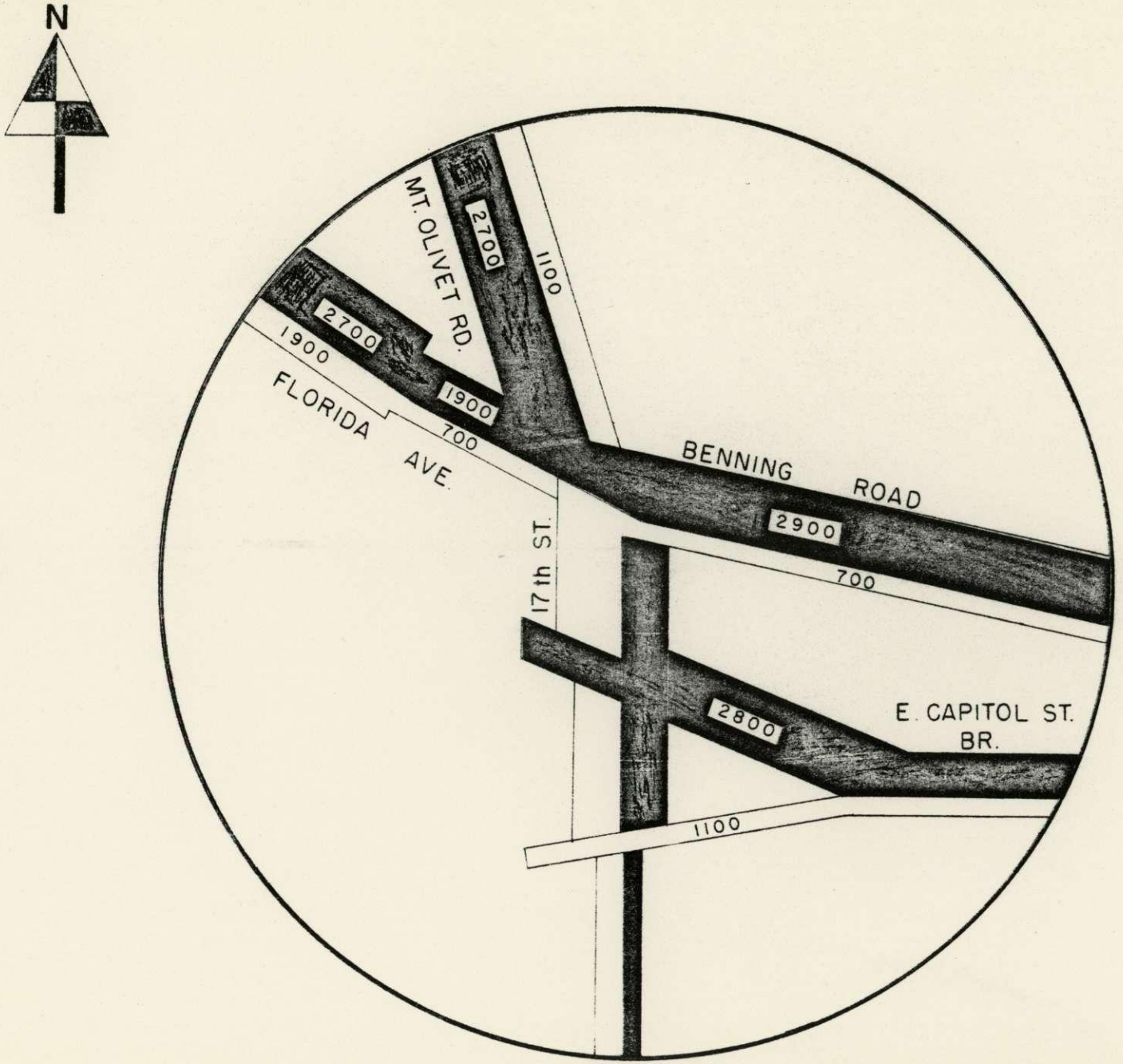


FIG. 19 PORTION OF FIGURE 4, NCTA APPENDIX VOL. V

Road, East Capitol Street, Pennsylvania Avenue, or presumably on the 11th Street S. E. Bridges. In some of these cases ramps are not available to provide this service and substantial reconstruction of Kenilworth Avenue and Anacostia Freeway would be required to accommodate this circuitous service.

Historically, the East Leg since 1957 was located along the 10th and 11th Street S. E. and N. E. corridor until last year when exception was taken to this location. During the ensuing months negotiations have been underway with the view to possibly locating the East Leg of the Inner Loop along the westerly bank of the Anacostia River particularly from about Pennsylvania Avenue, S. E., to approximately the extension of Mt. Olivet Road, N. E. Such a location does have several advantages. It would less seriously affect housing. It would provide easy access to the Stadium area in which the District of Columbia has a major interest. It would be possible to provide ramps to Sousa and East Capitol Street Bridges. While it lacks some directness, it is acceptable in terms of good planning. With reference to park areas, the plan does not conflict with the recent concept for changing Kingman Lake and the river front in this area. The NPS now has roughly 65 acres in this general area. By re-aligning the westerly bank of the Anacostia River and by filling, the park area can be increased approximately 50% after providing the necessary right-of-way for the freeway along this location. With careful attention to design and landscaping, the facility can be a creditable asset to the appearance of the area in terms of proper relationship to the remaining park and to the general environment surrounding the Stadium. It will be a pleasant experience for thousands of people who would use the facility each day.

K. HIGHWAY CAPACITY AND RESPONSIBILITY:

Figure No. 20 is an article from one of the Washington newspapers under date of February 10, 1963, which indicates that the General Accounting Office is critical of the design of certain portions of the Beltway in nearby Virginia.

Under the laws of the State of Maryland and the Commonwealth of Virginia and under the laws of the District of Columbia the state highway departments have the primary responsibility for administration of each jurisdiction's respective highway programs, particularly as they relate to major freeways and highways. Similarly, the federal legislation which deals with the Federal-Aid Highway Program including the Interstate highway network reposes the responsibility for federal administration in the U. S. Bureau of Public Roads. The law under which the Bureau administers the program specifically required that the Bureau shall cooperate with the state highway departments in each of the states.

In the past when criticism was made of highway programs, it was clear that responsibility rested with the U. S. Bureau of Public Roads at the federal level and with state highway departments. The NCTA has no responsibility for determining whether major bridges are to be built, how many lanes shall be put in a freeway, the location of freeways, ramps and interchanges. Such responsibility clearly remains "with the government agencies having jurisdiction thereof" by the National Capital Transportation Act of 1960.

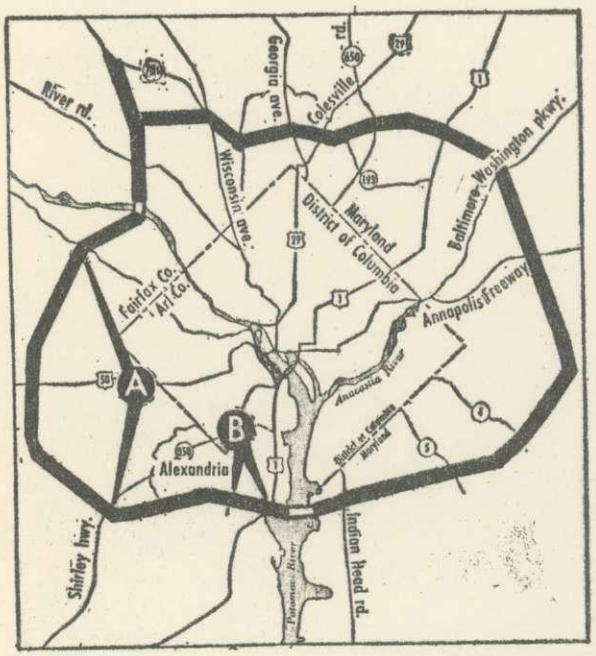
L. THE DOWNTOWN FREEWAY SYSTEM:

The freeway scheme proposed by NCTA in the downtown area is a reduced concept that will not adequately serve highway needs in 1980.

THE WASHINGTON POST

Feb. 10, 1963

Va. Beltway Section Called Too Narrow



The Washington Post

The heavy black line locates the Capital Beltway, including sections marked A and B which a Government report yesterday said were not being construtced sufficiently wide.

8 Lanes Needed Within 12 Years, GAO Report Says

By Willard Clopton
Staff Reporter

Half the Virginia portion of the Capital Beltway will not be wide enough to carry the amount of traffic expected 12 years from now, the Government Accounting Office reported yesterday.

Virginia's 22-mile segment of the Beltway was designed to be six lanes wide, but 11.6 miles of it should be made eight lanes to handle the traffic anticipated in 1975, the watchdog agency said.

Without the additional two lanes, the agency indicated, rush-hour traffic along parts of the Beltway will be very heavy, movement will be slow and passing will be impossible.

However, Virginia Highway Commissioner H. H. Harris said the State has acquired additional right-of-way along the Beltway and can add on the extra lanes when and if they are needed.

The GAO said the six-lane width was chosen on the basis of traffic forecasts made by Virginia in 1957. The forecasts were revised upwards in 1960 but by that time much of the project was under contract, it said.

More than half of the Virginia section of the Beltway, being built at a cost of about $57 million, now is open to traffic and the entire project is scheduled for completion by the end of the year. Maryland is expected to complete its 42-mile segment by the middle of 1964.

According to GAO, the Federal Bureau of Public Roads, which is paying nine-tenths of the cost of the Beltway, was "not disturbed" at the difference between the 1957 and 1960 traffic projections even though the increase along some stretches of the Beltway was as much as one-third higher.

"The Bureau advised . . . that, although the estimated 1975 traffic volumes are above design capacity, they are well below the possible capacity of the facility," the report said.

The GAO went on to cite a policy statement of the American Association of State Highway Officials which defines design capacity as the number of vehicles per lane that can move "freely and safely" and the possible capacity as the amount that can be handled under "unsatisfactory operating conditions."

The latter, says the Association, "is possible of attainment only with high density, slow and uniform operation, and inability to pass. It should not be considered a basis for design."

"It would appear," the GAO report concluded, "that the potential inadequacy of a 57-million-dollar uncompleted Interstate highway facility should be of considerable concern to the Bureau and the State . . .

"The revised traffic forecasts for the Capital Beltway indicate that the adequacy of the present design . . . is at least questionable."

FIGURE 20

Basically, it lacks important parts of the loop concept which planning agencies and the various highway departments across the land have found necessary to collect and distribute traffic in, near and through the cores of major metropolitan areas. There is attached Figure No. 21 which shows examples of the Inner Loop plan concept applied or being considered in the urban areas of Detroit, Philadelphia, Cleveland, Boston, Columbus and as proposed in Washington, D. C.

The Agency plan substitutes an "express street system" for a freeway along the northwesterly portion of the Inner Loop. The Agency employed a consultant(3) to explore the possible design and location of an express street system for the corridor between the Potomac Freeway-Inner Loop Interchange, near 27th and K Streets, N. W., and the intersection of Florida Avenue and New York Avenue, to serve between 2500 and 3500 vehicles in the peak hour in the direction of the major flow. The assumption that the traffic requirement on this portion of the loop would be in the order of this magnitude was made before the traffic needs were developed.

The approach used by the Agency in this case in telling its consultant how many vehicles the facility should serve is at variance with the approach recommended by the highway departments in modern-day highway planning.

From time-to-time the highway departments have prepared policy statements, publications and other literature for use by the states in planning, designing and construction of highways. In 1957 the American Association of State Highway Officials issued "A Policy on Arterial Highways

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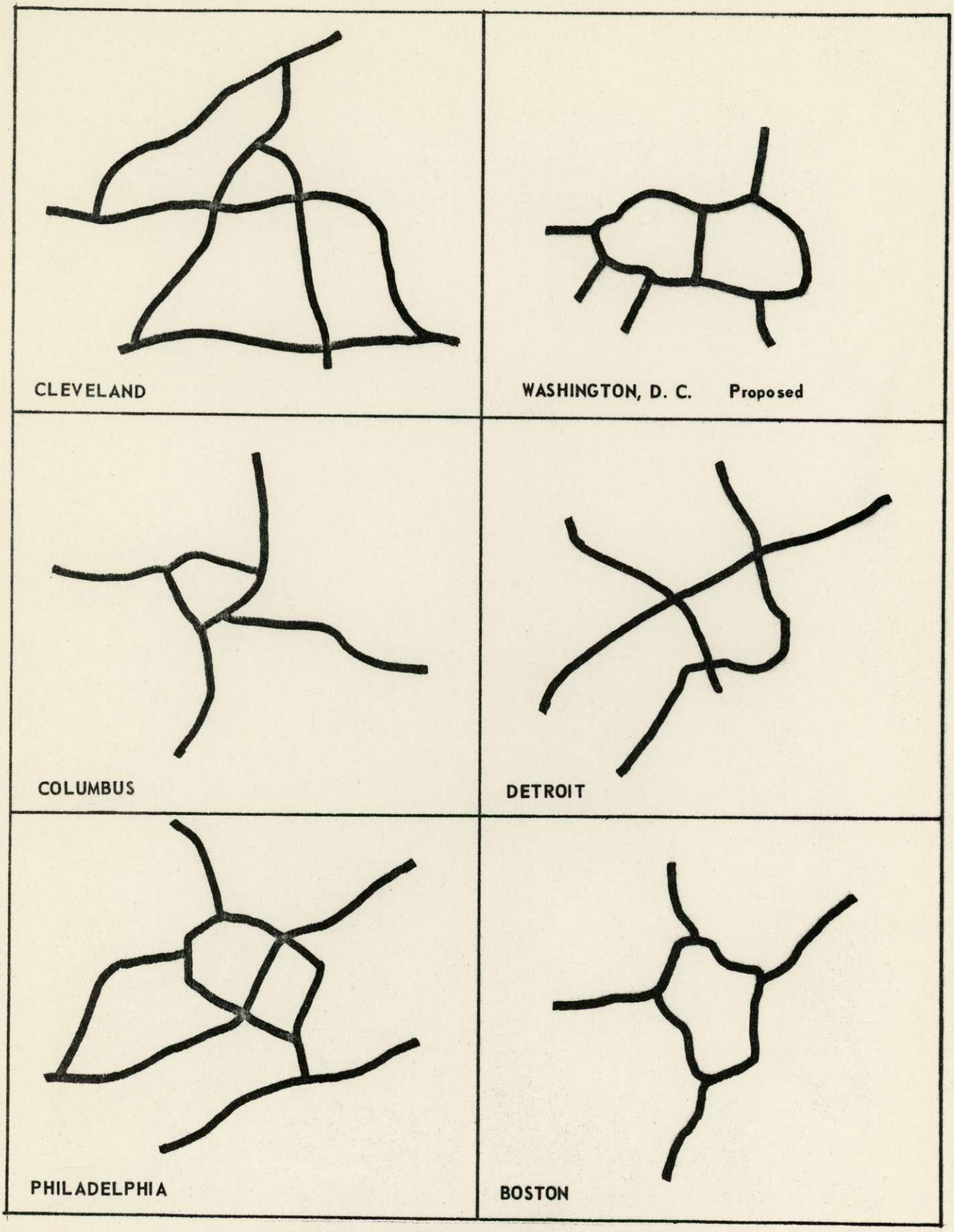
(3) An Express Street System for the North Corridor of the Inner Loop by Blair and Stein Associates, Planners, Washington, D. C.



TYPICAL INNER LOOP FREEWAY SYSTEMS

THE ABOVE DIAGRAMS ARE OF COMPARABLE SCALES, AND THEY ARE SHOWN TO ILLUSTRATE A DESIGN CONCEPT.

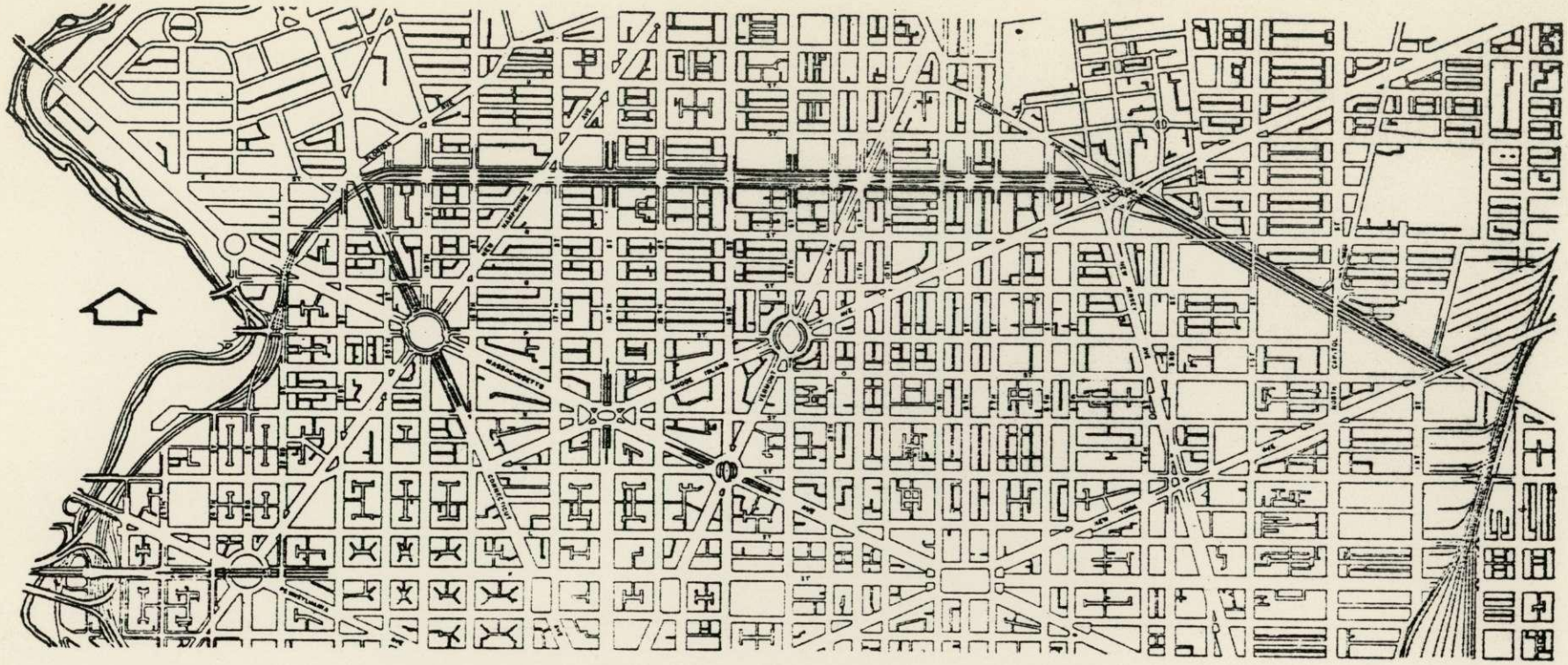
figure 21

in Urban Areas." On Page 6 is the following paragraph:

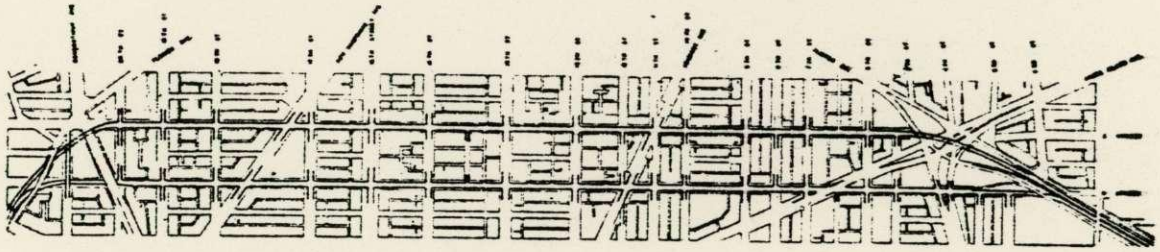
> "Traffic: The anticipated traffic is a major control. A decision should be reached during early planning stages as to the type of service to be provided, hence this type of highway needed. The volume of traffic to be served is the design load which largely determines the type of highway required, while the general desire lines of traffic from O-D data, indicate a preferred location."

Therefore, the highway departments endeavor to ascertain or estimate the volume of traffic to be served in planning highway projects. In the application of this policy, the highway departments collect data with reference to present traffic use. They accumulate data with reference to population; they study existing and proposed land use plans; and, they study retail sales for an index as to possible activity in the region under study. Collectively, these things are analyzed to delineate what the highway departments call traffic desire lines for the present and for some design year in the future. Thus, the highway departments are attempting to ascertain the desire of the American citizen to use his car rather than placing an arbitrary ceiling on the number of vehicles that might be permitted to use any particular facility.

There is attached Figure No. 22 which is a map taken from the consultant's report to the NCTA. This map indicates that the consultant recommended a highway facility essentially along the location previously recommended by the District of Columbia Department of Highways and Traffic. It is important in the consideration of the consultant's recommended design to recall that he was furnished the traffic volume by NCTA. In his consideration of alternate plans to serve this volume, the consultant proposed a six-lane "Junior Expressway" from the interchange near 27th and K Streets, N. W., to approximately 21st and S Streets, N. W. The report submitted by the consultant does not include definite dimensions with



THE EXPRESS STREET SYSTEM



0 800 1600 3200'

scale in feet

ONE-WAY ALTERNATIVE FOR SECTION II

FIGURE 22

Ref. BLAIR-STEIN - NORTH LEG STUDY MAPS # 3 & 4

reference to width of lanes, width of median, width of shoulders, sight distance, and other matters which vitally affect the efficiency of any highway. However, it appears from the cross-section drawings on Pages 20 and 22, and the narrative on Page 20, that the proposed "Junior Expressway" would have dimensions which would drastically affect traffic flow.

Squeezing dimensions for the sake of relatively small economies incident to initial construction vitally affects efficiency of traffic flow and the quality of service provided by projects from the day they are opened to some indefinite time in the future. Over the years all kinds and combinations of facilities have been constructed in various metropolitan areas including "Junior Expressways." There is attached Figure No. 23 which includes some interesting information recently reported to the Forty-first Annual Meeting of the Highway Research Board, in a paper entitled "Quality of Traffic Service - Chicago Area Transportation Study." This figure graphically reflects the relationship in cost per vehicle mile for various kinds of facilities carrying various volumes of traffic. The "Junior Expressway" at grade is very costly per vehicle mile for the volume of traffic that can be served of any of the facilities listed. The improved arterial with through traffic lanes separated, which apparently would be included in the median portion of the North Leg of the Inner Loop, is also expensive for the service provided.

From 21st and S Streets, N. W. to approximately 5th and S Streets, N. W., the consultant recommended a "boulevard" type of improvement. This would require approximately 110 feet of additional right-of-way between termini. The consultant would provide grade separation structures to carry 13th and 16th Streets, N. W., under the proposed boulevard. Presumably,

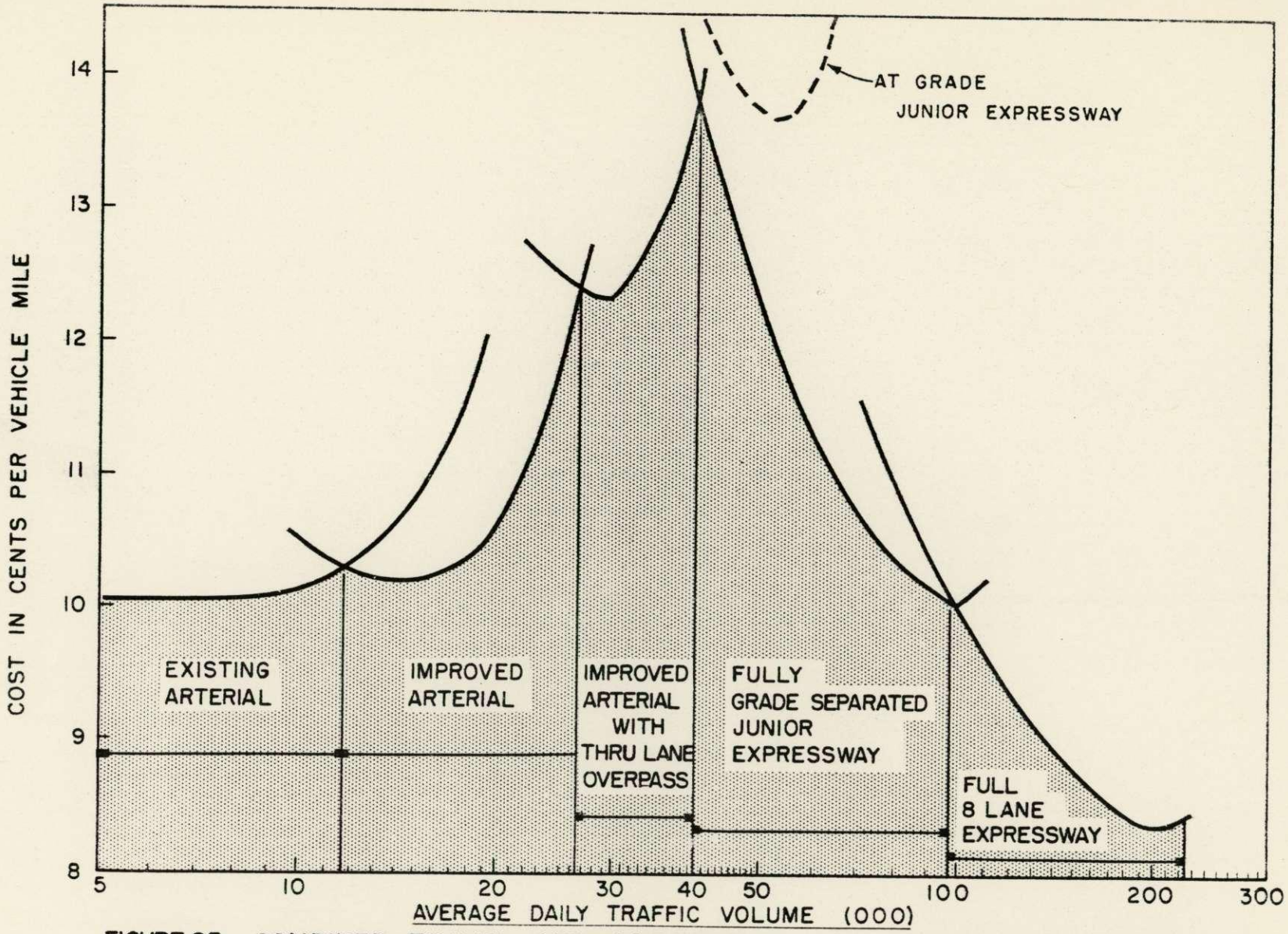


FIGURE 23 COMBINED TRAVEL AND INVESTMENT COST RELATED TO VOLUME FOR ALTERNATE TRAFFIC FACILITY DESIGNS

Ref. QUALITY OF TRAFFIC SERVICE — Chicago Area Transportation Study
Presented At 41st. Annual Meeting
HIGHWAY RESEARCH BOARD

other intersections would be controlled by traffic lights. The consultant also considered the possible use of one-way streets on R and S Streets, N. W. On Page 28 of the report, he outlines the reasons for dismissing the one-way street idea. His comments are as follows:

> "The economy of the one-way alternative for Section II must be compared with the undesirable effects the system would have on the residents of the area and the adjacent properties. Those living in the blocks between the one-way pair would suffer the greatest hardships. They would be caught in a sea of traffic. Not only would they be annoyed by noise and congestion, but the necessity of using all four lanes for through traffic would deprive them of reasonable service and access to their properties and businesses."
>
> "The one-way system is purely a technical solution, and it lacks the potential for creating a visually satisfying environment. The heavy one-way traffic within a minimum right-of-way would, in fact, detract from the appearance of the residential blocks."
>
> "This alternative would not stimulate redevelopment or the up-grading of the adjacent properties. On the contrary, its impact would tend to deflate property values and accelerate the physical deterioration of the area. The funds, saved by substituting the low cost one-way system for the boulevard, may be more than offset by the decline in the area's property values, and the increased services that are characteristically required by deteriorating areas."

The consultant's comments in the first above-quoted paragraph concerning undesirable effects of the one-way streets on the residents, is opposite to the conclusion by the NCTA. On Page 43 of the NCTA Report, the third sentence of the paragraph entitled "Downtown Freeway System" states: "However, the North Leg of the previously proposed loop is replaced by an express street system that would provide adequately for traffic requirements and at the same time preserve desirable neighborhood characteristics and fit in with any future plans for neighborhood improvement." (underscoring supplied) This is not a typical one-way operation because the "Junior Expressway" would funnel heavy volumes of

traffic onto the particular pair of streets involved in this case.

From 5th and S Streets, N. W., and more or less paralleling Florida Avenue to New York Avenue, the consultant again proposed a six-lane "Junior Expressway".

With reference to the above sections from 27th and K Streets, N. W., to approximately the intersection of Florida Avenue and New York Avenue, the NCTA recommended a "four-lane express street system" (Page 17, Appendix V). We do not know for certain what the Agency means by an "express street system". It would, however, have the effect of reducing the practicable traffic capacity on this portion of the Inner Loop from about 6,000 vehicles to 1,600 to 2,400 vehicles in the direction of major flow during the peak hour.

IV. THE NCTA TRANSIT PLAN

A. REASONS FOR CONCERN

B. COMPARISON WITH THE MTS PLAN

C. COMPARATIVE DENSITIES

D. PERFORMANCE ESTIMATES

E. REVENUE ESTIMATES

IV. THE NCTA TRANSIT PLAN

A. REASONS FOR CONCERN

While supporting the concept of a rail rapid transit facility as an integral part of a comprehensive, adequate and well-balanced urban transportation system, the Board of Commissioners must nevertheless express concern over the dominant and optimistic use of rail rapid transit, the limited use of express bus transit, and the reduction in highway facilities implicit in the NCTA proposals.

In view of the possibility of accumulated error in the prediction of a modal split to transit, as discussed in Section I of this report, logic would seem to dictate a more flexible highway network to provide an adequate level of service should the favorable transit predictions fail to materialize. This is particularly true since even the optimistic transit picture forecast by NCTA would serve only 4½% of the increased trips between 1955 and 1980. See Figure 8.

Instead, the NCTA has chosen to propose a highway system which would provide an inadequate level of service even if all of their predictions and assumptions proved to be correct.

Even though the NCTA assumes that all of the transit system costs will be paid from fare box, the Board of Commissioners is concerned about the financial responsibility of the District of Columbia and the National Capital Region, should these forecasts prove to be overstated.

The Bureau of the Census recently reported that in the 190 major metropolitan areas of the Nation only 1/3 of the suburban workers commute to the Central City. Therefore, trips to the Central City are only a part of the total work trips.

B. COMPARISON WITH THE MTS PLAN

Referring once again to the NCTA proposal for a "balanced" transportation system, there is similarity in cost, mileage and layout between the NCTA rail transit system and the hypothetical rail dominant transit system considered as an alternative in the Mass Transportation Survey of 1959. Figure 24 illustrates this relationship.

The Mass Transportation Survey of 1959 rejected this rail-dominant system in favor of its recommended balanced transportation system of highways, express bus, and rail transit facilities.

The MTS study gave these reasons for rejecting the rail transit plan, not unlike the plan currently proposed by the NCTA.

> "The Washington area does not provide the concentration of residential development or downtown employment needed to justify an extensive rail system, with its large capital cost. The suburban population is dispersed over wide areas at low densities, and there are few heavily populated corridors to provide the heavy passenger volumes necessary for economical operations, such as are to be found in other cities where settlement has followed rail lines or topography has channeled growth. The pattern of low-density development promises to continue, since most of the region's residents prefer to live in suburban developments of single-family homes. Where development is at a low density, express transit service loses much of its time advantage over the private automobile, since most persons must spend a considerable amount of time in travelling to the transit stations."
>
> "Another factor that limits the number of trips that can be attracted to express transit is the large proportion of trips that do not begin or end in the downtown area; these cannot be served well by public transit."
>
> "For these reasons, even the introduction of extensive rail transit service would not eliminate the need for a greatly expanded highway network." (1)

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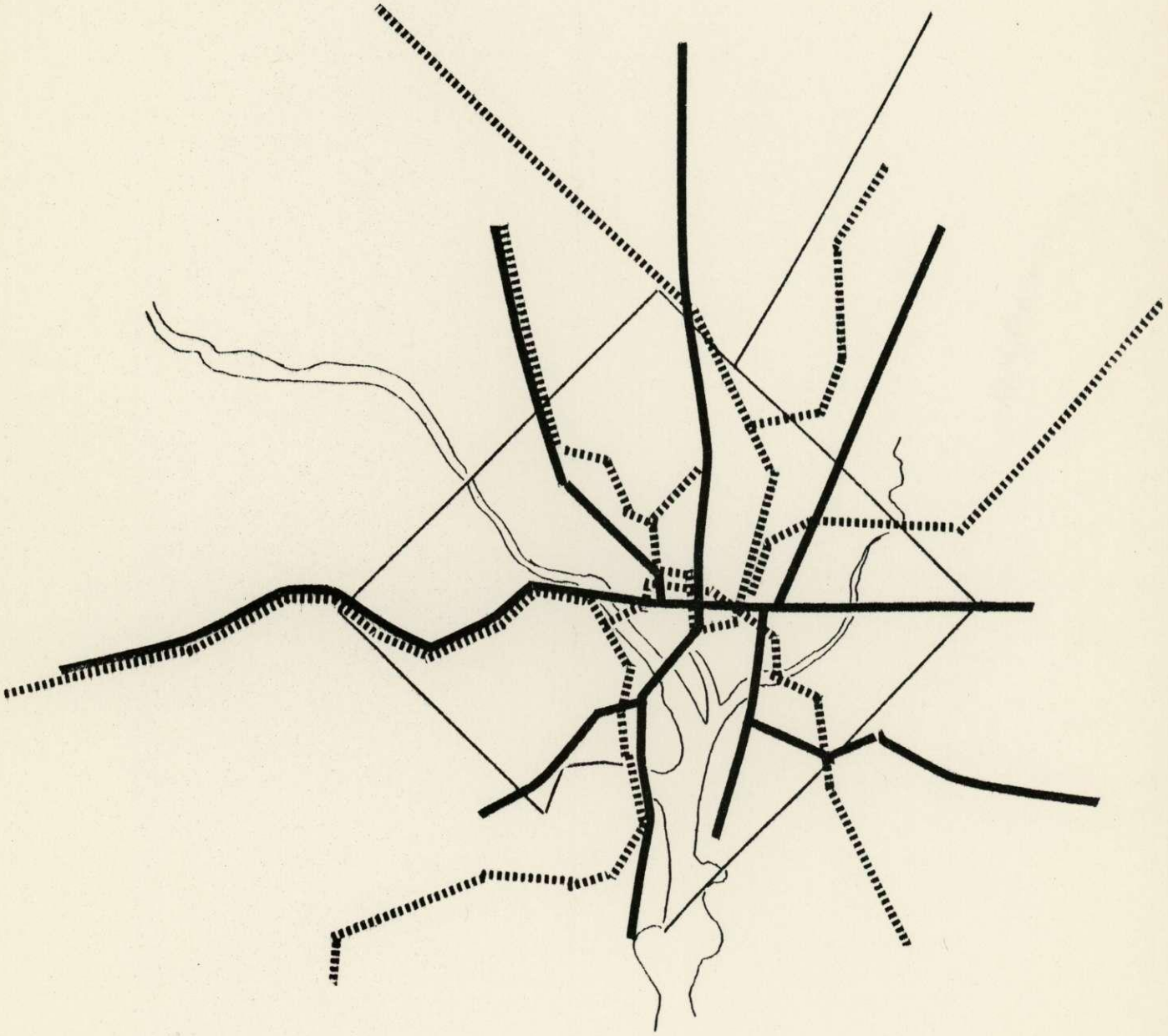
(1) Mass Transportation Survey - 1959, Page 46.



	MILES	COST (Millions)
NCTA RECOMMENDED RAIL SYSTEM	98	$788
MTS RAIL DOMINANT SYSTEM ———	77	876

Figure 24

C. COMPARATIVE DENSITIES

The National Capital Transportation Agency asserts in support of its rail transit system that the Washington area ranks higher in suburban densities than do cities having a rail transit system. However, in those cities having mass transit, it is the center city and not the suburbs that provide the basic support for rail transit. A more valid comparison of density might be that of densities along the existing routes in other cities as compared to the proposed routes in the Washington area.

A comparison of population density is made along existing rail transit routes in Toronto, Cleveland and Philadelphia and one of the proposed Washington routes. The Silver Spring-Rockville route is selected for this comparison since it represents one of the more dense suburban areas and the traffic forecast indicates it to be one of the heaviest demand routes. Densities along each of the selected transit routes are on a census tract basis using 1960 data. (1961 for Toronto). The population density measurements were made from the outer boundary of the downtown area to the terminal of each of the rail transit facilities.

Table III and Figures 25 and 26 indicate how the proposed Silver Spring-Rockville line compares with other routes. This comparison shows that densities along the Washington route are considerably less than those along existing transit routes in the other cities.

TABLE III

POPULATION DENSITY ALONG SELECTED RAIL RAPID TRANSIT ROUTES

City	Name of Route	Length of Route	Highest Density (pers.per.sq.mi.)	Average Density (pers.per.sq.mi.)
Philadelphia	N. Broad Street	6.0 mi.	67,000	35,800
Cleveland	West Street	6.5 mi.	24,000	16,800
Toronto	Yonge Street	3.3 mi.	35,100	16,300
Cleveland	East Side	7.5 mi.	34,300	13,600
Washington	Silver Spring - Rockville	13.0 mi.	25,900	9,300

D. PERFORMANCE ESTIMATES

The NCTA proposes that "over-all speeds, including station stops, will average between 45 and 50 miles per hour between the suburbs and downtown." (2) Without challenging the possibility of attaining such speeds under ideal conditions, the Board of Commissioners is nevertheless aware of the past experience of other rail rapid transit system.

For example, the Toronto Subway System, the newest in North America, averages slightly under 16 miles per hour. The Chicago System, the fastest known, averages 20 miles per hour. The New York Subway System averages 16 miles per hour.

(2) NCTA November 1 Report, Page 39

AVERAGE POPULATION DENSITY ALONG RAIL RAPID TRANSIT ROUTES

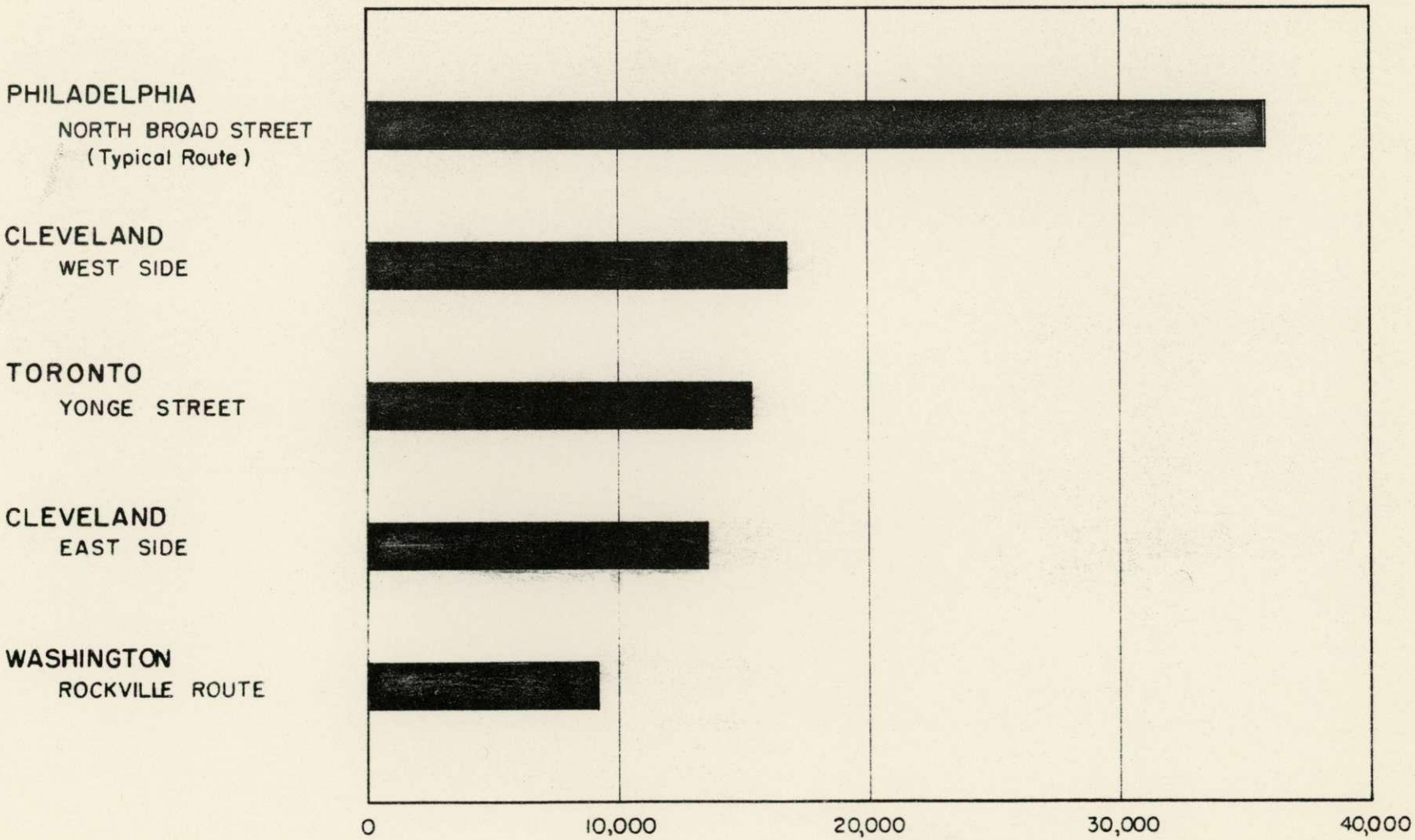


figure 25

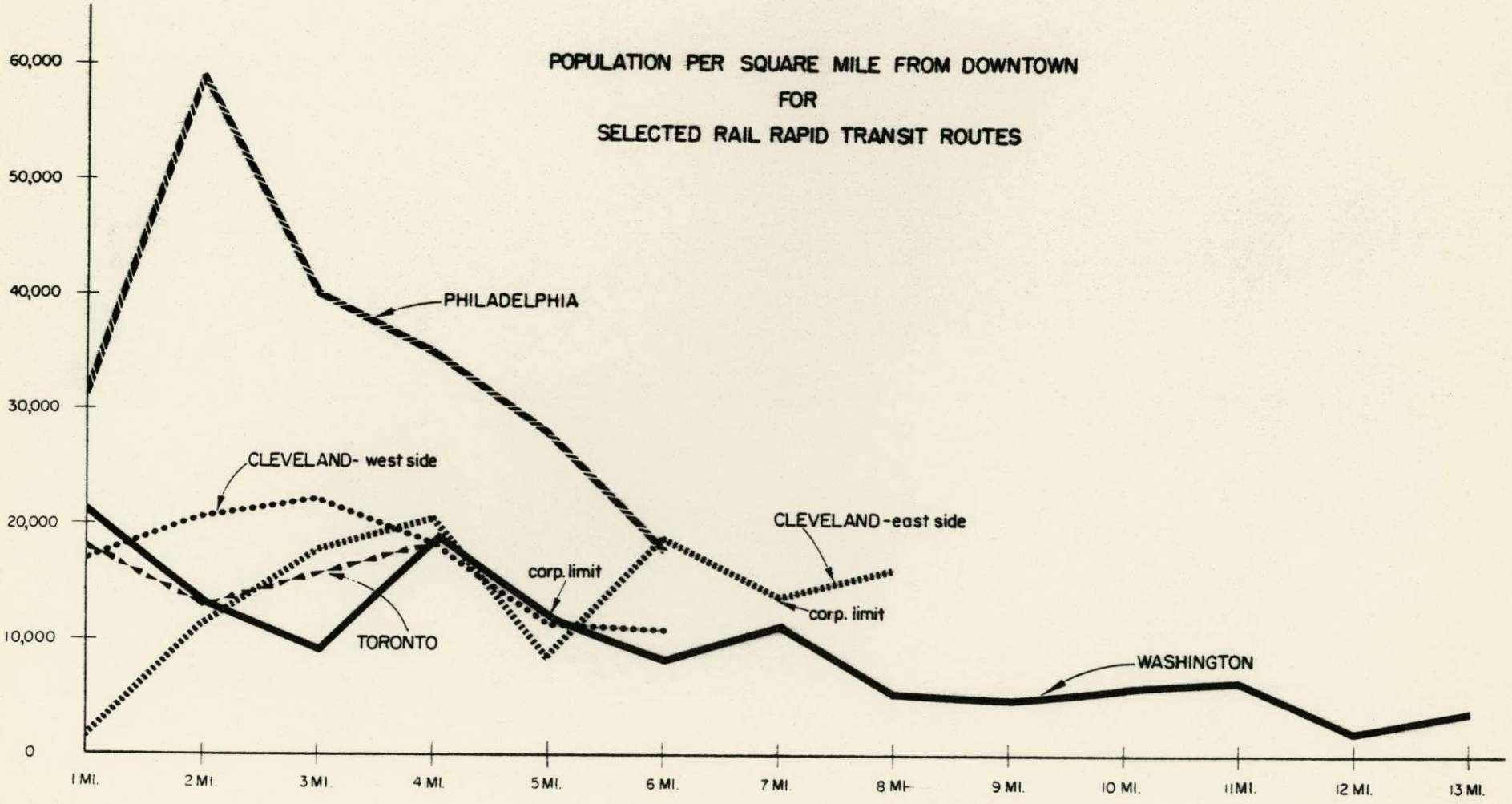

POPULATION PER SQUARE MILE FROM DOWNTOWN
FOR
SELECTED RAIL RAPID TRANSIT ROUTES
60,000
50,000
40,000
30,000
20,000
10,000
0
PHILADELPHIA
CLEVELAND- west side
CLEVELAND-east side
corp. limit
corp. limit
TORONTO
WASHINGTON
1 MI.
2 MI.
3 MI.
4 MI.
5 MI.
6 MI.
7 MI.
8 MI.
9 MI.
10 MI.
11 MI.
12 MI.
13 MI.

figure 26

The NCTA report states that the 83 mile rail system will contain 65 stations throughout the region, of which 30 are in the District of Columbia. It is difficult to understand how trains can average 45 miles per hour when the distances between stops average between one and two miles. These speed assumptions as indicated on Page 26 are very sensitive components of the modal split curves used to determine the potential transit load.

Furthermore, local bus systems are not spelled out in terms of scope, operation and financing. The Board of Commissioners is concerned about service to our people, due to sparsity of stations. D. C. Transit now has over 3,000 bus stops in the District of Columbia alone.

E. REVENUE ESTIMATES

In Volume V of the Appendices, the NCTA expands the estimated 1980 morning one-way peak hour transit traffic by a factor to obtain the estimated full weekday traffic. The resultant figure is then expanded by another factor to obtain an estimate of the annual transit traffic. (3) Some discussion of these expansion factors is in order.

The NCTA uses a divisor of .135 to expand the 1980 peak hour inbound rapid transit patronage to a total daily ridership. We have been unable to ascertain the factual basis for this divisor.

The NCTA uses an annualization factor of 299.6 to develop their annual traffic estimate for 1980. This factor assumes that there will be no decrease in weekend and holiday transit ridership during the next two decades.

---

(3) Appendix V to November Report, Page 29, Table IV-1.

This assumption is contrary to past experience, as the number of equivalent workdays has been decreasing. The established trend towards more leisure time indicates that this drop may continue.

If a shorter workweek is established, or if appropriate consideration is given to the fact that most school trips occur during an 183 day school year, as opposed to the 253 work day year used by NCTA, the impact on this factor and the resultant revenues would be drastic. To illustrate the potential deficit implications resulting from the use of lower factors, Table IV shows the results of substituting 0.15 for the expansion factor to daily traffic and 290 days for the annualization factor.

TABLE IV

ANNUAL TRANSIT PASSENGERS

Rapid Transit	1980 AM One-Way Peak Hour Traffic	Expansion Factor	Estimated Full Work Day Traffic	Annual Traffic (Weekday X 290) (1,000)
Exclusive	86,965	.15	580,000	168,300
From Express Bus	15,981	.20	79,905	23,180
Rail Commuter	6,468	.25	25,872	7,500
Express Bus (Exclusive)	1,347	.20	6,735	1,950
			692,512	200,850

This would reduce 1980 annual passengers by approximately 11.5 percent or revenue by $9,000,000 less than that shown in Table VI-1, Page 68 of the NCTA report.

A reduction of $9,000,000 in estimated revenues per year from 1975 to year 2000 would produce a deficit of $225,000,000 in financing the system from the fare box.

An additional consideration regarding the revenue estimate pertains to the school trips. It appears that all school transit trips were estimated at a flat 25¢ fare. This is the same as the proposed single zone fare. Any reduction in the fare for school trips, as is now the case, would further decrease the revenue estimate as presented by NCTA.

V. THE COST

A. THE COST OF THE TRANSIT SYSTEM

B. THE COST OF THE HIGHWAY SYSTEM

C. THE COST OF THE HIGHWAY SYSTEM TO THE DISTRICT OF COLUMBIA

D. DISPLACEMENT ESTIMATES

V. THE COST

One of the assertions used by the National Capital Transportation Agency in its proposals for the NCTA transportation system is that the Agency's plan will cost $367 million less than the MTS plan of 1959. Another is that the transit system will be self-supporting. Whether these assertions are correct depends upon: (1) whether the estimated cost of the proposed subway and rail system is reasonably correct; (2) whether the estimated cost of the reduced highway system is reasonably correct; and (3) whether people in this area will not follow national trends and will use the transit system in the numbers estimated by NCTA so as to produce revenue adequate to finance the system.

A. THE COST OF THE TRANSIT SYSTEM

On Page 76 of Appendix V under Capital Outlays the NCTA estimates the express transit system proposed in 1959 to cost $522 million. Table 20 on Page 71 of the 1959 Transportation Plan estimates the express transit system, including parking facilities at express transit stations, to cost $564 million. (The variation is a reestimate by NCTA.) The referenced narrative on Page 76 further estimates the cost of the NCTA transit system as $793 million. There have been insufficient data and insufficient time to make a thorough check of the estimate. The comments offered here are general and relate to contingencies and interest during construction.

CONTINGENCIES

Table III on Page 41 of Volume I of the Appendices indicates that approximately 10% has been allowed for engineering and 10% for miscellaneous

contingencies. Ten percent for miscellaneous contingencies is a generally accepted rule on major construction projects where contract plans and specifications are available. Experience in the Department of Highways and Traffic has dictated the use of 25 to 35 percent for over-all engineering and contingencies for complex highway projects estimated from preliminary plans. In subway work where utilities, special building supports, and underground water are problems and where relatively limited borings have been made available and analyzed and in the absence of detailed plans and specifications, it is probable that the contingency item should at least be in the same range.

Informal information has been made available to the effect that Kaiser Engineering in initially preparing an engineering report including an estimate on a part of the subway system had recommended 30% for miscellaneous contingencies exclusive of engineering. Consequently, the contingency column on Page 41 may well increase from $61,400,000 to $184,700,000, thereby raising the total construction cost from $677,100,000 to $800,400,000.

INTEREST DURING CONSTRUCTION

A review of the Agency's construction costs indicate that the interest on money borrowed to finance construction has been omitted from the total construction cost.

It is the general practice in the engineering profession to add from 5% to 10% for financing and interest to cover interest cost during construction. This cost is added to other construction costs to arrive at a total construction cost.

It is felt that a conservative figure of 5% should be added to the Agency's construction cost to cover this contingency. This figure is on the

low side on the supposition that the Agency may receive some government subsidy in its initial construction phase.

Using the 5% factor would increase the construction cost by $40 million.

In preparing the financial plan of operation, the Agency has estimated gross revenues under certain assumptions, but the financial plans presented do not take into consideration any arrangements to meet deficit operations. Sound financial practice dictates that this type of contingency should be provided for in its plan.

A significant statement made by the financial consultant to the effect that "without either a Federal guarantee or tax exemption, even at a 6% rate, in our opinion, the sale of any sizeable block of bonds in the private money market would be exceedingly difficult, if not impossible" indicates sufficient concern over the possibility of a deficit that that contingency should be provided for in the financial plan.

SUMMARY OF TRANSIT COST

Summarizing the above figures the total estimated cost of the transit system may well be increased from $793 million to $957 million.

B. THE COST OF THE HIGHWAY SYSTEM

On Page 77 of Appendix V, the Agency states that "The total capital outlays for highways thus come to $1,408 million for the 1959 plan and to $826 million for the NCTA plan."

Table V-2 on Page 78 of Appendix V reflects the Agency's estimates of highway capital costs to complete the MTS and NCTA systems. The total figures at the bottom of Table V-2 indicate a difference in costs of the highway

systems of $583 million. The difference in estimated costs of the two systems is largely concentrated in the District of Columbia. The following five projects in the District of Columbia account for a major share, 74% of the difference in costs of the two highway systems.

	Project	Difference in Cost MTS- NCTA (Millions)
(1)	Northwest Route (MTS 70-S)	$ 84.0
(2)	North Central Route 95	57.3
(3)	East Capitol Street Complex	54.0
(4)	Intermediate Loop	77.6
(5)	Inner Loop	155.5
		$ 428.4

Project No. 1 (the proposed freeway in Northwest Washington) has been in dispute literally from the day that it was added to the MTS Highway Plan in the summer of 1959. Under the present Federal Aid Highway Legislation there is little probability that a freeway in Northwest Washington and one in North Central Washington could both be financed with Interstate Highway Funds. In view of the issue that has existed with reference to the route in Northwest Washington and the fact that greater population density and therefore need exist in North Central Washington, the District of Columbia has taken the position that the North Central route should be given higher priority. Therefore, there is no financing in sight for a freeway in Northwest Washington and consequently this project is not included in a foreseeable future program.

The same conclusion applies with reference to Project No. 3 (The East Capitol Street Complex).

A firm decision has not yet been made with reference to planning all of the freeway in North Central Washington. A study is about to get underway to determine the routes for I-70-S and I-95 from approximately the Intermediate Loop northerly to the Capital Beltway. However, irrespective of the results of that study, the two facilities, properly designed for the estimated traffic, can, if necessary, be combined between the Intermediate Loop and the Inner Loop. Combining these two facilities, the alleged savings would be reduced by approximately $54.1 million.

Sections of the Intermediate Loop are not included in the highway program of the District of Columbia except for that portion from about 14th Street and Military Road, N.W., easterly, southeasterly, and southerly to East Capitol Street. Therefore only this portion of the Intermediate Loop should be charged to the Highway Program of the District of Columbia in the foreseeable future and the alleged savings in this instance does not apply.

Primarily because of the relocation problem along the 11th Street, S.E. and N.E. section of the Inner Loop the Planning Commission on December 6, 1962, withdrew approval of the 11th Street alignment for the East Leg of the Inner Loop.

A subcommittee of the Coordinating Committee of the National Capital Planning Commission is currently studying the possibility of relocating the East Leg of the Inner Loop along the west bank or the east bank of the Anacostia River. In the event it proves practical and feasible to relocate the East Leg of the Inner Loop along the river and related adjustments are made to the Inner Loop, it is estimated that a savings of about $35.1 million would be realized.

The application of the above narrative and figures indicates that the highway plan now visualized as practicable of accomplishment and financing by the District, would reduce the difference between District plans and the

NCTA plan to $117.1 million instead of $428.4 million, as illustrated by the following tabulation.

Projects	Difference in Cost MTS-NCTA (Millions)	Difference in Cost MTS-DC (Millions)	Present Estimated Difference in Cost NCTA-DC (Millions)
(1) Northwest Route (MTS 70-S)	$ 84.0	$ 84.0	$ ---
(2) North Central Route 95	57.3	54.1	3.2
(3) East Capitol Street Complex	54.0	54.0	---
(4) Intermediate Loop	77.6	83.5	—5.9
(5) Inner Loop	155.5	35.1	120.4
	$ 428.4	$ 310.7	$ 117.7

REGIONAL ARTERIAL IMPROVEMENTS

The Agency has outlined in its report many regional arterial improvements - reconstruction of Arlington Boulevard, an enlarged Little Falls Parkway, Wisconsin Avenue, among others - which will evidently require many grade separations, ramps, and improvements of parallel streets, The costs for these have not been detailed in the report. There is no indication that the costs or acceptability of these improvements have been discussed with the highway departments of Maryland and Virginia.

THE COST OF THE HIGHWAY SYSTEM TO THE DISTRICT

One other cost factor is not apparent in the NCTA cost estimates. Under the Agency plan many streets would require major improvements such as repaving, widening, and channelization to carry the increased traffic volumes. The additional cost of these improvements has not been detailed by NCTA, but it would reduce the gap in total costs of the two highway plans.

C. THE COST OF THE HIGHWAY SYSTEM TO THE DISTRICT OF COLUMBIA

In summary, the highway plan proposed by the NCTA for the District of Columbia, as estimated by the District, would cost approximately $433.1 million with $83.8 million to be financed by the District. The Highway Plan proposed by the District of Columbia would cost an estimated $490.6 million with $82.4 million to be financed by the District. In other words, by spending some $1.4 million less than required under NCTA proposals, the District can provide the highway capacity necessary to move safely and efficiently the traffic volumes forecast for 1975. This is as required by the 1956 Highway Act establishing the National System of Interstate and Defense Highways.

Either plan may require additions in future years. However, it appears that the probability of additional construction by 1980 is more likely under the NCTA plan than under the District Program, since the NCTA plan provides an obviously less complete highway system with a lower standard of service to the automotive public. In any case, additions to the Highway Program in the District will require much additional study. The programs outlined above will require the assets of the District which will be available for many years, permitting the time necessary for study before the programs can begin.

D. DISPLACEMENT ESTIMATES

The NCTA estimate of displacement within the District of Columbia in their report of November 1, 1962, indicates that under their proposal, a considerable reduction in person displacement and tax loss would result. However, detailed examination shows that the displacement estimates do not reflect the picture for current District plans for the following reasons:

1. As was the case in the cost estimate, the comparison was made between the NCTA proposals and the MTS plan. A major share of the displacement

on the MTS plan resulted from projects not being considered by the Highway Department for construction.

2. The right-of-way estimates were not based upon preliminary plans, including interchange layouts, but rather upon arbitrarily assumed locations. In several cases it was assumed by NCTA that existing right-of-way would be sufficient to accommodate their proposed improvements.

3. The displacement estimates of NCTA do not include any displacement within the originally proposed N.W. Urban Renewal Area, nor within the area for which plans are being prepared by the National Capital Downtown Committee, Inc.

In order to place the displacement forecasts in a more comparable light, we have made a comparison of the NCTA highway proposals with the currently proposed highway plan for the District of Columbia. (Table V). This comparison allows for all the assumptions made by NCTA in their estimate. Where the routes are similar, the NCTA estimates are used.

PERSON DISPLACEMENT ESTIMATES

This comparison indicates that the highway displacement of the NCTA system would be 4,330 persons as compared with 12,360 persons under the Highway Department proposed plan. The proposal to combine the North Central facility and I-95 on a common alignment along the B & O Railroad would reduce the displacement of the Highway Department plan to 7,970 persons. (1) Thus, it can be concluded that while the NCTA system

(1) A study is to be conducted to determine the recommended location of the North-Central Freeway. This study will include the possible combination of the two routes and will compare it to the alternative of the separate route for the North-Central Freeway. Included will be an analysis of the impact on the local neighborhoods and the impact on the road users.

TABLE V

ESTIMATE OF PERSON DISPLACEMENT
ALTERNATIVE HIGHWAY PLANS
DISTRICT OF COLUMBIA

PROJECT	NCTA PROPOSALS	D.C. DEPT. OF HIGHWAYS & TRAFFIC PROPOSED SYSTEM	
1. Inner Loop			
North Leg	550*	1690*	
East Leg (Incl.modified Interchange C)	400	2640	
Southeast Freeway	490	490	
Center Leg	- *	- *	
2. Other Routes			
Connection Interchange C to 11th St. Bridge	30	30	
Potomac River Freeway	0	0	
North-Central Freeway	370	5080	(370)**
I-95	2240	2240	(2460)**
No. Capitol St. Ext.	100	0	(100)**
Anacostia Freeway	0	-	
Intermediate Loop	150	190	
	4330	12360	(7970)**

* Estimates do not include displacement within originally proposed N. W. Urban Renewal Area or the National Capital Downtown Committee planning area.

**Reflects revised displacement estimate if I-95 and North-Central Freeway are combined into a single corridor along the B&O Railroad.

would reduce the highway plan displacement, the reduction is not nearly as great as indicated in the NCTA report.

Estimates of both the National Capital Transportation Agency and the District of Columbia reflect anticipated displacement over a ten year period. This would mean an average displacement of 433 persons per annum by the NCTA proposal and 1,236 (797) persons per annum by the District Highway Department. The factor of 2.9 persons per dwelling unit as assumed by NCTA in their analysis, would mean the displacement of 150 families under the NCTA proposal and 425 (275) families per annum under the District Highway Department proposal. This indicates also that the displacement problem can be met over a period of time and requires the establishment of realistic priorities and sound project phasing.

The most recent District Government forecast, covering Fiscal Years 1963-67, estimates an overall displacement of approximately 8,200 families for all governmental programs except Highways, or approximately 1,600 families per annum.

In addition, it must be kept in mind that the estimates of displacement for the NCTA proposals are not based on preliminary plans, but rather upon assumed right-of-way requirements. Final determination of right-of-way requirements could increase the NCTA displacements by a considerable amount. Specific instances where the NCTA estimates appear low are:

1. North Leg Corridor

   The NCTA estimate of displacement for this section is based upon the adoption of the one-way street scheme using R and S Streets. The drastic impact of this particular scheme on the neighborhood, and especially on those residents remaining between R and S Streets, was discussed previously in Section III.

2. The estimate for the combined I-95 and the Intermediate Loop section along Fort Drive assumes the width of Fort Drive would be sufficient and no additional right-of-way would be required. The same is true for their estimate of the local street connections from the Intermediate Loop west of North Capitol Street, that the alignment would follow existing Fort Drive. No preliminary plans were developed to prove out these assumptions. It is very unlikely that the complex type arrangement required for the I-95 Intermediate Loop arrangement proposed by NCTA can be accommodated within the limits of Fort Drive.

3. The NCTA proposal for Kenilworth Avenue and Anacostia Freeway assumes the widening can be accomplished within the present right-of-way and the NCTA estimates do not include any displacement. Due to the limited right-of-way existing at several locations, and the complex interchange requirements resulting from the widening, numerous properties must be acquired with resulting displacement. However, since no plans have been developed for this proposed widening, the displacements cannot be estimated with any degree of accuracy.

THE REHOUSING OF DISPLACED FAMILIES

The Board of Commissioners believes that the displacement problem as presented by both NCTA and the District of Columbia can be resolved through positive programs.

The Board has approved draft legislation for the establishment of a central relocation service to assist in the rehousing of families displaced by all governmental actions.

Citizen organizations, particularly the real estate boards, have been urged to help provide sites and sponsors for moderate rental relocation housing.

The Board of Commissioners is cooperating with the National Capital Housing Authority to accelerate the construction of much-needed public housing in the District, with greater emphasis on unit sizes required to take care of the larger families and the elderly. The Board has also supported the Authority in its successful applications for demonstration grant funds to test the feasibility both of leasing and acquiring single family residences for the larger families. Also, it has been generally agreed that future Title I urban renewal projects in the District must provide a fair share of public housing and private moderate rental units.

The Community Renewal Program studies, now underway, are expected to develop positive guidelines for handling future family relocation and the establishment of a housing inventory.

VI. CONCLUSIONS

A. GENERAL

B. HIGHWAYS

C. MASS TRANSIT

D. THE MTS PLAN OF 1959 AND THE NCTA PLAN OF 1962

E. FINANCING AND ORGANIZATION

F. DISPLACEMENT AND TAX LOSS

VI. CONCLUSIONS

A. GENERAL

The Board of Commissioners of the District of Columbia has reviewed the November 1, 1962 report to the President by the National Capital Transportation Agency, including the six appendices and the limited studies and data supporting such report and appendices.

It is the purpose of the Board of Commissioners of the District of Columbia to establish a basis predicated on past trends, facts, and the best estimates available, from which a justified position may be derived for the implementation of the future transportation plan for the District of Columbia.

The Board of Commissioners of the District of Columbia is concerned that certain studies which were apparently used by the National Capital Transportation Agency in the preparation of its plan have not been made available for the information of the Board of Commissioners.

B. HIGHWAYS

The Board of Commissioners of the District of Columbia is concerned about compliance with Federal-Aid Highway legislation in light of the NCTA highway proposals. The Federal-Aid Highway legislation requires that the standards used for the construction of the Interstate Highway System "shall be adequate to accommodate the types and

volumes of traffic forecast for the year 1975."

The National Capital Transportation Agency appears to have planned the transportation system with a planning technique that raises many questions as to the validity of its forecasts. It has changed highway standards from normal practice.

The Board of Commissioners of the District of Columbia finds, aside from the technique used by the National Capital Transportation Agency, in preparing its estimates, that the basic planning procedure used varies from the principles spelled out in the Federal-Aid Highway legislation.

Despite some interpretations to the contrary, the Board of Commissioners of the District of Columbia considers that Section 205(a) of Public Law 86-669, 86th Congress, approved July 14, 1960, contains language which clearly reposes in the State and District of Columbia Highway Departments the responsibility and authority for location, design, construction, and operation of freeways, parkways and other arterial highway facilities.

C. MASS TRANSIT

The Board of Commissioners of the District of Columbia supports the proposition that the District of Columbia needs improved mass transit. The Board endorses the philosophy that both buses and rail transit should be blended sensibly and practicably to meet the mass

transit requirements now and in the future.

On the basis of the data thus far made available, the Board of Commissioners of the District of Columbia is not yet convinced that the mass transit plan proposed by the National Capital Transportation Agency represents the optimum blending of fixed rail transit and buses in terms of initial construction costs, serviceability, adaptability to technological changes, usefulness, and flexibility to adjust for future major growth in various parts of the region. The Board recalls that as late as four years ago, an exhaustive study recommended a subway system, estimated to cost about $476 million. At that time it was estimated that there were only two major corridors (one in north-central Washington, and one in northwest Washington) with extensions southeasterly to Anacostia and to Alexandria, Virginia, where population densities were sufficiently great or estimated to become sufficiently great to warrant fixed rail transit.

The studies to date indicate that the greatest need for a subway system appears to be in the downtown area. All the data which have been made available in the MTS Report, in the NCTA Report, and in the report by Meyer, Kain and Wohl, indicate that it would be much cheaper and that a suitable standard of service for most corridors can be provided by bus until the vehicles reach the heart of the city. Therefore, it would be appropriate that the initial expenditures for a rail transit system be confined to the use of existing rail systems through the area, plus a loop subway system in the downtown area.

No evidence is included in the NCTA report of November 1, 1962, or in the appendices, that satisfactorily proves or confirms the projections by the Agency with reference to estimated number of transit riders. This is not to say that the Agency did not make a sincere effort to prepare figures as a guide in undertaking its task. Actually, very limited reliable data were available on which the Agency could postulate how many people might use a particular mode of transport. Significant gaps in the data were filled in by extrapolations -- so-called modal-split curves -- which have no proof in practice. The application of such curves would assign people to transit in certain cases which appear unreasonable.

Sensitivity tests of the curves show that the curves are unduly sensitive to the time, usually referred to as the walking time, from where a person parks his car to his office.

D. THE MTS PLAN OF 1959 AND THE NCTA PLAN OF 1962

The MTS Plan of 1959 recommended 14.3 miles of subway and 20.1 miles of fixed rail transit in open cut, at a total estimated cost of $476 million, and the express bus system proposed in eight corridors was estimated to cost $88 million, for a total cost of $564 million. These figures included parking facilities at express transit stations.

The NCTA has proposed 19 miles of subway, 64 miles of fixed rail transit in open cut, in the medians of freeways, or along existing railroad rights-of-way, and 15 miles of commuter train transit on existing railroad tracks, at a total estimated cost of $793 million.

NCTA's proposal would cost forty percent more money, according to its estimates. As indicated elsewhere in this report, such system by the NCTA estimates would carry the same number of riders per day as that estimated under the MTS Plan of 1959.

While the 1959 Transportation Plan was considered in the NCTA report of November 1, 1962, the District of Columbia believes that the Board does not yet have at its disposal necessary data to adequately compare the merits of the MTS Plan of 1959 and the NCTA Plan of 1962, as to transit.

E. FINANCING AND ORGANIZATION

The Board of Commissioners of the District of Columbia believes that there is a serious question as to the reliability of the estimates by the NCTA with reference to probable number of transit riders, and, consequently, expected revenue.

The Board of Commissioners thus far has been unable to find a clear-cut indication in the NCTA documents that any provision other than payment by the Federal Government is made for covering deficits that may occur. Therefore, if any part of the transportation plan becomes a reality, and if the system involves Interstate operations, the Congress and the Interstate Compact should bear in mind the possibility, if not the probability, that the financing of the system may require continuing subsidies in the years ahead.

With reference to organization and finance, the Board of Commissioners subscribes to the recommendations made by the Joint Transportation Commission.

F. DISPLACEMENT AND TAX LOSS

The Federal-Aid Highway Act of 1962 provides that Federal-Aid funds may participate in financing a proper proportion of costs of relocation payments as may be made by a State Highway Department within certain limitations. The Board of Commissioners of the District of Columbia has drafted and will request the Congress to enact legislation authorizing the use of funds available to the Department of Highways and Traffic, D.C. for paying the District's appropriate share of necessary relocation expenses. As indicated elsewhere in this report, and particularly under Chapter V, "Costs", the Board of Commissioners of the District of Columbia finds that the number of persons displaced by the highway and freeway plan contemplated in the years immediately ahead will range in the order of 8,000 to approximately 12,000 dependent upon the results of the projected study in the north-central corridor. The NCTA notes a much greater displacement figure based on the number of freeways included in the MTS Plan of 1959, a number of which are not in the current and foreseeable programs of the District of Columbia. The number of displacees estimated by the NCTA for their plan appears to be conservative.

The NCTA reference to tax loss does not appear impressive. While tax loss is a most serious matter, the Board of Commissioners

of the District of Columbia must recognize that in order to modernize and improve the city, it sometimes is necessary to expect a temporary tax loss in order to realize subsequent and long-time tax gains, or to prevent other tax losses resulting from congestion and decay. The Board of Commissioners of the District of Columbia is impressed with the fact that in the Southwest Urban Renewal Area, after providing for the freeway, and through modernized land use planning, plus urban renewal, the tax base in some 552 acres of the city will be increased approximately six times.

VII. RECOMMENDATIONS

A. HIGHWAYS

B. TRANSIT

C. ORGANIZATION AND FINANCE

D. COORDINATION

VII. RECOMMENDATIONS

A. HIGHWAYS

The Board of Commissioners of the District of Columbia recommends that the highway program, as proposed by the Highway Departments of Maryland, Virginia, and the District of Columbia, approved by the U. S. Bureau of Public Roads, proceed forthwith, and that the construction be advanced as rapidly as funds become available. This includes the following projects in the District of Columbia: The Three Sisters Bridge; the Potomac River Freeway; the Inner Loop and East Leg; segments of the Intermediate Loop; the Northeast Freeway (I-95); and, continuation of study on the North-Central Freeway (I-70-S).

B. TRANSIT

The Board of Commissioners of the District of Columbia unequivocally supports the proposition that the District of Columbia needs improved mass transit. It recommends that:

Phase (1) (a) Congress appropriate the necessary funds to initiate: (1) a commuter railroad service, on tracks of the Pennsylvania Railroad to Lanham, Maryland; (2) rail transit on tracks of the Baltimore and Ohio Railroad to Rockville, Maryland, and on tracks of the Richmond, Fredericksburg and Potomac Railroad to the

vicinity of Springfield, Virginia; and (3) design of a downtown subway loop providing connections at the Union Station.

(b) That downtown bus service be provided from Union Station pending construction of the downtown subway. Possibly, the current Mass Transportation Demonstration Project providing for internal circulation in the downtown area by means of a minature bus, or bus train, may supplement the downtown subway system.

(c) That careful consideration be given in the design of the transit subway in the Downtown Loop to provide coordination with express buses.

(d) That the NCTA work with the States of Virginia and Maryland in the design of Interstate Highway 66 in Virginia and I-95 to and in Maryland to provide the design flexibility permitting necessary later incorporation of mass transit facilities.

Phase (2)

(a) Subject to the design of the subway loop and studies of the downtown bus circulation, initiate construction of the downtown subway loop and connections to Union Station.

(b) Evaluate transportation alternatives, principally greater use of express buses, as provided for in the MTS study.

(c) Initiate design of a subway link to the Northwest section which is the one sector without freeway or rail service and with a density that might support rail transit.

C. ORGANIZATION AND FINANCE

The Board of Commissioners subscribes to the organization and finance recommendations made by the Joint Transportation Commission.(1)

D. COORDINATION

The Board of Commissioners recommends that the future planning of transportation in the Metropolitan Area give more consideration to the statutory responsibilities of the States of Virginia, Maryland, and the District of Columbia, and be more in keeping with the spirit and intent of Congress as outlined in Section 204(g) of Public Law 86-669, approved July 14, 1960.

(1) Comments by Joint Transportation Commission on the Report of the National Capital Transportation Agency

APPENDIX A

COMMENTS BY JOINT TRANSPORTATION COMMISSION ON THE REPORT OF THE NATIONAL CAPITAL TRANSPORTATION AGENCY

COMMENTS BY JOINT TRANSPORTATION COMMISSION ON THE REPORT OF THE NATIONAL CAPITAL TRANSPORTATION AGENCY

The Joint Transportation Commission (Commission) is currently engaged in active deliberations for the negotiation of an interstate compact for transportation facilities for the metropolitan area of Washington and, therefore, is directly concerned with the NCTA recent report on mass transit. The negotiations of the Commission are being conducted in conformance with the authorization of Congress contained in Title III of the National Capital Transportation Act of 1960 (P.L. 86-669, 74 Stat. 537). This Act provides for the appointment by the President of a Federal representative to participate in the compact negotiations.

The Commission is a body composed of representatives from the States of Maryland, Virginia, and the District of Columbia, created by legislative enactment to study the adequacy of passenger-carrier facilities and services in the Washington Metropolitan Area. The Commission was first established in 1954 (Maryland-House Joint Resolution 12, approved April 2, 1954; Virginia-House Joint Resolution 77, approved March 22, 1954; and District of Columbia-Resolution Board of Commissioners (Order 54-2065, September 27, 1954).

The Commission is composed of nine members, consisting of three members each from Maryland, Virginia, and the District of Columbia. In Maryland and Virginia, one member is appointed by the Speaker of the House of Delegates and a second member by the President of the Senate. In Maryland, the third member of that Delegation

is appointed by the Public Service Commission from one of its members and, in Virginia, the third Delegate is appointed by the State Corporation Commission from one of its members. The members from the District of Columbia consist of two members of the Board of Commissioners and a member of the National Capital Planning Commission.

Since its creation in 1954, the Joint Transportation Commission actively has participated in the evolution and development of the program for transportation in the Metropolitan Area of Washington. Members of this Commission served on the Joint Steering Committee for the Mass Transportation Survey, conducted by the National Capital Planning Commission and National Capital Regional Planning Council from 1955 to 1959. The Mass Transportation Survey produced the Transportation Plan, National Capital Region, in 1959.

The Commission negotiated the Washington Metropolitan Area Transit Regulation Compact, which was adopted by Virginia in 1958 (Chap. 627, 1958 Acts of Assembly of Virginia), by Maryland in 1959 (Chap. 613, Acts of General Assembly of Maryland 1959), and by the Board of Commissioners of the District of Columbia by Resolution adopted December 22, 1960, and the consent of Congress was granted on September 15, 1960 (P.L. 86-794, 74 Stat. 1031). Since March 22, 1961, as prescribed by law, the Washington Metropolitan Area Transit Commission, created by that Compact, has been exercising jurisdiction over private transit companies within the Washington Metropolitan Area, which is comprised of the District of Columbia, Prince

George's and Montgomery Counties, Maryland, and Arlington and Fairfax Counties, Virginia, and Falls Church, Alexandria and Fairfax City in Virginia, and recently extended to include the Dulles International Airport.

Through its members on the Steering Committee, the Commission cooperated with other agencies of government in the formulation of the National Capital Transportation Act of 1960 (Act), which created the National Capital Transportation Agency. That Act (Title III) authorizes the States and the Board of Commissioners of the District of Columbia to negotiate an interstate compact for a regional transportation system.

Encouraged by this Congressional authorization, the Commission has been engaged, pursuant to the enabling legislation of the participating Governments, in negotiating an interstate compact to create an organization, in which the States and their political subdivisions located in the Metropolitan Area, the District of Columbia, and the Federal Government will participate, to provide regional transportation facilities. Substantial progress has been made in those negotiations, and it is expected that the Commission will consummate its negotiations and produce an interstate compact for submission to the legislatures of Maryland and Virginia, the District of Columbia, and the Congress.

Scope of Comments

The negotiations of the Commission to date primarily have been concerned with matters of organization and finance, rather than system design and operating projections.

This is not to say that the Commission is unconcerned with matters of system design and the formulation of the other plans. The contrary is quite the case, since it is contemplated that when the Interstate Compact Agency comes into being it will take over the work of NCTA. It needs to be said that the Commission has not been consulted by NCTA on system design or in the formulation of any of its plans. Such consultation, however, would appear to be desirable, if not necessary, to assure that a final program will be acceptable to the political subdivisions of the area, to the respective legislative bodies of the compact parties, and which will not be materially affected by the succession of an Interstate Compact Agency.

Form of Organization

The NCTA Report proposes that it be authorized by Congress, among other things, to begin construction on the subway system in the District of Columbia and that before completion of the initial portion of that system, a Federal corporation should be created to supersede the Agency. The Report, therefore, contemplates that the Agency created by interstate compact would take over from the Federal corporation and not from the NCTA. It appears to the Commission, however, that the Compact Agency should succeed directly to

the NCTA and that a Federal corporation should be utilized only after it is clearly apparent that a suitable interstate compact can not be created.

It should be pointed out that in the chapter on Organization in Appendix VI (p. 107), the NCTA suggests that it is a suitable organization for handling the transportation project until commencement of actual operations. The Commission, however, does not agree with the apparently inconsistent proposal presented by NCTA in its Recommendations released on November 1, that "Before completion of the initial portion of the system, a Federal corporation should be created to supersede the agency, ..." (p. 87). Since rail service is not planned to commence until 1968, at the earliest, the negotiation of an interstate compact will not delay commencement of operations. As indicated above, the Commission expects that by the end of 1963, it will have available a proposed interstate compact for presentation to the States and to the Congress for legislative action. Under this schedule, all legislative action could be completed during 1965. This would leave ample time for any litigation, particularly in Virginia, to test the legality of the financial aspects of participation by non-federal units of Government.

The legislative history of the transportation project discloses that an Interstate Compact Agency is the preferred form of organization. This was the conclusion of both the Transportation Plan of 1959 and of the National Capital Transportation Act

of 1960. In Title III of that Act, the intent of Congress was stated to be:

> ". . . To promote and encourage the solution of problems of a regional character in the national capital region by means of an interstate compact entered into by the state of Maryland, the Commonwealth of Virginia, and the Board of Commissioners of the District of Columbia, with the consent of Congress ... ."

The legislation further directed that after Maryland and Virginia have approved such a Compact,

> ". . . the President shall submit to the Congress such recommendations as may be necessary or desirable to transfer to such organization such real and personal property, personnel, records, other assets and liabilities as are appropriate in order that such organization may assume the functions and duties of the agency."

The provision of transportation facilities for the National Capital Region should be handled on a cooperative basis by the States, the District of Columbia and the Federal Government. This is made clear in the National Capital Transportation Act of 1960 in the Statement of Findings and Policy (sec. 102). Regional transportation encompasses areas of interest and governmental activities presently being performed by four levels of government; namely, Federal, State, County and City. The placing of the transportation function on a regional basis, therefore, creates significant problems of intergovernmental relations. The interstate compact is uniquely adapted to handling regional problems involving multiple levels of government.

A Federal agency, on the other hand, regardless of its type, would pre-empt the area of problems involved and supersede the local units of government in performance of the functions.

A couple of examples may suffice to highlight the nature of the problem of Inter-governmental relations. The development of regional transportation facilities, particularly as it relates to the design of the transportation system and the location of facilities, necessarily will have a profound effect on the development of the various communities in the National Capital Region. Transportation planning is such a significant element of general comprehensive planning that the planning function for specific communities, which is a function of local government, would be completely frustrated unless the transportation planning is sympathetically approached from the standpoint of coordinating transportation planning and local planning. An interstate compact agency inherently would provide a greater degree of responsiveness to the plans and needs of the local areas and would insulate the Federal Government from becoming directly involved in a matter as purely local as community planning.

An example of another inter-governmental relations problem which highlights the advantages of an interstate compact is the coordination of the privately owned transportation systems and the public facilities. Competition between the two types of systems would be intolerable and each must function as an integrated part

of a whole system with compatible rates and services. The function of regulating the privately owned transit systems is now performed by the Washington Metropolitan Area Transit Commission (WMATC), which is a creature of the Washington Metropolitan Area Transit Regulation Compact between Maryland, Virginia and the District of Columbia. This regulation of private transit follows the traditional pattern and WMATC exercises jurisdiction over service and rates. The necessary realignment of the pattern of service performed by private companies, and the other arrangements which may be required in order to accommodate public and private facilities, would have to be made by orders issued by WMATC. Such orders must conform to the requirements of administrative law and may not exceed the jurisdiction delegated to the Commission. It is doubtful under present law that competition from public facilities would constitute an adequate basis for WMATC to revoke the certificate of any private carrier rendering a competing service (Washington Metropolitan Area Transit Regulation Compact, 74 Stat. 1031, Title II, Article XII, §4(g)). A substantial Constitutional question also is presented as to whether the States, even by amendment of the compact, could delegate to a Federal agency the power to establish a division of service between public and private facilities which would be enforcible by the compact regulatory commission. On the other hand, if the public facilities are owned by an interstate compact agency, the necessary accommodation of the public and private facilities could be accomplished by

legislation at the State level. It is, therefore, entirely possible that the utilization of a Federal Agency necessarily may tend towards the elimination of the private operators.

Plan of Financing

Before returning to a consideration of the proposed plan of financing, a matter having a basic bearing upon the form of organization to be adopted must be presented. The NCTA Report seems to indicate, without expressly so stating, that its proposed plan of financing is recommended only for a Federal agency, and that an entirely different plan of financing would be required for a compact agency. Thus, the Recommendations released on November 1, 1962, state: (p. 85)

> "If a compact agency is to assume real financial responsibility for the system at an early date and relieve the Federal Government of its obligations, it must be equipped with power to secure funds, in addition to system revenues, as security for its financing and operations."

Neither the equities nor the realities of the situation justify or permit this position; nor does it reflect Congressional policy.

In §204(g) of the National Capital Transportation Act of 1960, which directed NCTA to consider and make recommendations with respect to organization and financial arrangements, the Congress provided a standard or guideline for the plan of financing, as follows:

> "Provided, That any recommendations submitted by the Agency shall provide as far as possible for the payment of all costs

> by persons using or benefiting from regional transportation facilities and services, and shall provide for the equitable sharing of any remaining costs among the federal, State, and local governments." (Emphasis supplied)

Although the standard "equitable sharing" may encompass different plans of financing for a Federal or a compact agency, it would not seem that such plans should be materially different. The responsibility to provide transportation services and the financial capacities of the various governments concerned to do so do not vary with the form of organization utilized to provide the regional transportation facilities. Under any form of organization, the Federal government, which will be required to furnish the bulk of the construction capital, at least initially, must retain an element of substantial control. This does not, however, require a Federal agency and the requisite control may be assured through an interstate compact agency in which the Federal government participates.

In the brief interval since receiving the appendices to support the NCTA Report, there has not been sufficient time thoroughly to examine all the elements of the financing plan, and the assumptions on which it is based, or to permit the Commission to appraise the acceptability of the plan to the States and local agencies of government. The Commission recognizes that Plan III contemplates the smallest burden on the Federal government, even though such Plan involves an increase in the total equity investment of approximately

$60,000,000 over Plan II. The Commission points out, however, that Plan III is feasible, as proposed, only if the capital budget and net revenue estimates are realized.

The NCTA Report states that public financing will not be available to provide for costs of construction during the construction period. The necessary corollary to this fact is that construction monies must be provided by the participating governments. While it may be possible for the units of local governments in the area to provide their share of the equity capital (grants) during the period of construction, it would equally seem clear that such governments do not have the capacity to provide, either temporarily or permanently, monies to cover the entire cost of construction. This can be done only by the Federal government. Such an arrangement, moreover, appears to reflect a rough approximation of the relative governmental responsibilities for the project. By far the greater portion of costs are to cover facilities to be located within the District of Columbia. Under traditional methods of government financing of transportation facilities, location of facilities has determined responsibility for financing. The proposed plan of financing would appear realistic and sound in conforming to this established principle. (See NCTA Recommendations, p. 81).

The plan of financing contemplates that the system will generate adequate revenues to meet its operating costs, including depreciation, and to retire all debt. The feasibility of this plan

depends upon whether the estimates for costs of construction and operating projections are realized. It is to be expected that these estimates will come in for close scrutiny in the hearings before the Congressional Committees and the Commission will want to reappraise those estimates in the light of that record.

The financing plan makes no provision for meeting any deficits which may be experienced in the construction or operating budgets. In such a long term project, the estimates of construction are subject to changes due to unpredictable variations in the prices of labor, material and equipment and the net revenue projections are subject even to a greater variety of complex factors, none of which may be predicted with any certainty. Under the best of circumstances, estimates for construction of major projects frequently are not borne out by actual experience and Dulles International Airport may be cited as a recent example in this area. An interstate compact would not be feasible unless the plan of financing dealt specifically with the possible problem of deficits. It would be extremely difficult for the non-federal participating governments to make an open-end commitment, as would be required by the NCTA plan, particularly in view of the large amounts which may be involved.

Financial Participation by Non-Federal Units of Government

The NCTA Report contains a comprehensive analysis of the Constitution and case law of Maryland and Virginia bearing on financial participation by those States and their political subdivisions in the financing of the compact agency (Appendix Vol. VI, Organization and Finance, Chap. II). The Commission has also researched these problems and it would appear that the relevant Constitutional provisions and precedents have been identified.

In light of the NCTA Report, it is clear that both NCTA and this Commission agree that lawful arrangements, in one or more different ways, can be developed to provide non-federal support for the plan of financing as proposed by NCTA. (Appendix VI, p. 66). It appears, however, that NCTA takes the position that the plan of financing proposed by it would not be available if the transportation project were developed by a compact agency. This position appears to be based on policy rather than Constitutional or legal considerations.

The substantial legal questions, therefore, are presented only if the plan of financing for a compact agency is materially different from the plan proposed by NCTA and the States and their local subdivisions are required to assume the role of primary responsibility for financing the construction and operation of the system. These legal questions, however, well may be of academic

interest only. The more basic issue is whether the National Capital Region, with its non-industrial economy oriented to the business of the National Government, has the economic capacity to assume the burden of primary financial responsibility.

With respect to the policy issue, any plan of financing which incorporates the standard of "equitable sharing" set forth in §204(g) of the National Capital Transportation Act of 1960, must of necessity reflect the relative responsibilities of the Federal and local governments.

Impact on Private Transit Industry

One of the policy considerations set forth in §102 of the National Capital Transportation Act of 1960 is ". . . making full use of private enterprise whenever appropriate . . . ." It does not appear that the NCTA Report has fully presented this issue or made recommendations with respect to it.

The NCTA Report states that the proposed transit system requires substantial bus operations and provides that this service be performed by the private companies. This service includes both express and feeder bus services. Except for the statement that subsidies are proposed to operators for services that may be unprofitable, which it is estimated would amount to approximately $7,500,000 in the year 1980, there is no development or discussion of the extent to which the existing private carriers would be affected by the proposed plan.

An analysis of the appendices, however, provides some essential information. The projections indicate that by the year 1980 total express bus passengers are estimated at not in excess of 28,100,000 (App. V, Table IV-10 and 11) and feeder bus passengers are estimated at approximately 60,000,000 passengers by 1980. (App. V, Table IV-17, ftnts 3 and 4). This would indicate that the total passengers carried by bus in the new system would be approximately 88,000,000 in 1980. By comparison, the total passengers carried during 1961 by all of the private transit companies subject to the jurisdiction of the Metropolitan Washington Area Transit Commission aggregated approximately 209,000,000, including approximately 37,000,000 carried by the rail facilities by D. C. Transit System.

The total passenger revenues for those companies totaled approximately $37,700,000 for 1961. The comparable figure for bus revenues by 1980 is not ascertainable from the Report, since no information is given with respect to the passenger revenues from feeder bus operations. The Report estimates that passenger revenues from express bus operations will total approximately $4,700,000 by 1980 (App. V, Table IV-18) and a subsidy payment to feeder bus operators in the amount of approximately $7,500,000 is provided. These two sources of revenue for the private operators total approximately $12,000,000, which must be compared with the total passenger revenues for the private operators in the area of approximately $37,700,000 in 1961. The Report does not indicate how much of

the difference of $25,000,000 may be accounted for by feeder bus revenues.

Without more information, it is not possible definitely to conclude that the transportation plan presents a significant problem from the standpoint of the private operators. It would seem, however, that it would be well for the Agency to present whatever studies, facts or assumptions it has, or has made, as a starting point to ascertain whether there is a problem with respect to the private transit companies, and, if so, the nature and magnitude of that problem. Undoubtedly, the private operators will make known their position at an appropriate time and it would facilitate the consideration of this problem to have the full assistance of the Agency.

In view of the fact that under the Agency plan there would be a substantial curtailment in the scope of private operations, full attention should be directed to the development of satisfactory arrangements to keep the private segment of the system in a state of necessary economic well being. If suitable arrangements for the co-existence of the private and public facilities are not feasible, then serious consideration must be given to the making of necessary provisions for the protection of the rights of the private investors, whatever those rights may be. This problem can not be deferred too long, for it should be resolved prior to the time public facilities go into operation.

Mechanics For Coordinating Service By Private and Public Facilities

It is clear that the proposed public facilities will necessitate major revisions in the pattern of service presently performed by private operators, if competition between public and private facilities is to be avoided. It is clear that the Report does not contemplate such competition, since it assigns the function of providing bus service to the private transit companies.

The plan, however, makes no proposals with respect to the procedures to be used in legally effectuating the change in the patterns of service of the various private companies and the equitable division of the available market among those companies. As indicated in an earlier portion of these Comments, the regulation of the service and rates of the private transit companies is under the jurisdiction of the Washington Metropolitan Area Transit Commission. Under the law administered by that Commission, a certificate may be revoked, in the discretion of the Commission, on application of the holder thereof. If the Agency, or any successor Federal organization, worked out a plan of service satisfactory to all of the private companies, such companies could initiate proceedings before the WMATC for the necessary comprehensive reorientation of service. If, however, the matter is not susceptible to such voluntary arrangements, it is extremely doubtful, as stated above, that under present law, WMATC would have the power involuntarily to revoke a certificate held by a private company in order to avoid competition with service to

be performed by the public facilities.

Under our Federal system of government, the rearrangement of the service areas of the private companies could be accomplished on an involuntary basis only if both the regulatory and the proprietary organizations are agencies of governments at the same level in the Federal structure. It does not seem, as a matter of law, that either the Congress itself or a Federal agency created by it, could prescribe a division of the available market between the private transit companies which would be binding on WMATC. The orders of that Commission, under established standards of administrative law, are governed by the law which it administers and by the facts developed in a hearing. If the proprietary agency, on the other hand, were created by interstate compact, the legislation by the States creating the proprietary agency could delegate jointly to that agency and the WMATC, or to the WMATC if it were named as the proprietary agency, the authority to develop a Plan of Service and direct WMATC to take such action with respect to the outstanding certificates of the private carriers as may be necessary to put that Plan of Service into operation. Conversely, the requisite coordination may be accomplished if the proprietary and the regulatory agency were both creatures of the Federal government. It does not seem, however, that the substantial rearrangement of the service performed by the private carriers can be accomplished if one of the two agencies is Federal and the other State.

This is one of the problems which, up to this point, has led to the conclusion that the ultimate form of organization for the proprietary agency should be an interstate compact. In view of the NCTA proposals that operations of the public facilities may be commenced by a Federal corporation, this problem of administrative law comes to the surface and requires careful consideration.