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# REPORT TO THE CONGRESS

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Transit Authority's System Of  
Reporting On The Status Of  
METRO's Costs And Construction  
Progress Needs To Be Improved

B-141529

BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES

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MARCH 13, 1974



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

B-141529

To the President of the Senate and the  
Speaker of the House of Representatives

The Washington Regional Rapid Rail Transit System, commonly called METRO, is being constructed by the Washington Metropolitan Area Transit Authority. This is our report on the need for the Transit Authority to improve METRO's status-reporting system.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of Transportation; and the Chairman of the Transit Authority's Board of Directors.

*James B. Peets*

Comptroller General  
of the United States

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ABBREVIATIONS

GAO	General Accounting Office
METRO	Washington Regional Rapid Rail Transit System

D I G E S T

WHY THE REVIEW WAS MADE

The Washington Regional Rapid Rail Transit System, commonly called METRO, is being built by the Washington Metropolitan Area Transit Authority at an estimated cost of about \$3 billion.

METRO service is expected to bring numerous improvements to the Washington Metropolitan area by

- alleviating traffic congestion,
- conserving energy,
- reducing air pollution, and
- attracting new business and industry.

Because substantial Federal financing is being provided, GAO reviewed the reporting system the Transit Authority used to communicate information concerning METRO's cost and operational status.

FINDINGS AND CONCLUSIONS

Cost and construction status reports prepared by the Transit Authority staff have not provided a complete picture of the METRO project. Reports submitted to the Board have not included estimated cost increases for work not yet under contract, amounting to about \$232 million as of June 1973, and operational delays of several months.

GAO believes that the Board should be advised promptly of changes in estimated costs and construction progress which may affect approved financial plans and scheduled passenger operations. Also, since completion of the project depends on the willingness of Federal and local governments to provide needed funds, it is important that the Board disseminate timely information on METRO's cost and progress to the Federal Government (including appropriate congressional committees) and the participating local jurisdictions.

Estimated costs

METRO's first Capital Cost Estimate-- a detailed estimate of all costs associated with the work needed to complete METRO-- totaled approximately \$2.5 billion and was approved by the Board of Directors February 7, 1969.

On December 31, 1970, the Board approved an updated Capital Cost Estimate, which increased the total by \$485.6 million.

Transit Authority records show that the increase generally was due to changes in plans and designs, actual construction experience, updated pricing information, an increase in the annual average rate of cost escalation, and a delay in ground-breaking because of a congressional funding freeze. (See p. 8.)

When computing cost status, the baseline estimate--in the Transit Authority's case the \$2.98 billion Capital Cost Estimate--should be compared with current cost estimates and actual costs, when available.

On several occasions since December 1970, the Transit Authority staff had reported METRO's cost status to its Board of Directors. These reports, however, have been based on cost increases related to work under contract. No consideration was given to work not under contract even though cost estimates were available for a substantial part of this work. (See pp. 11 and 13.)

For example, in July 1973, the staff reported to the Transit Authority's General Manager that METRO's estimated costs were \$65.9 million higher than the \$2,980.2 million estimate of December 1970.

This report considered only work under contract as of June 30, 1973. The Transit Authority staff did not report it had updated cost estimates for portions of the system not yet under contract which were \$226.9 million higher than those provided for in the December 1970 estimate. (See p. 15.)

Inclusion in status reports of these estimates, together with certain other adjustments totaling \$5.2 million, would have alerted the Board to the need for planning to obtain these additional funds or consider whether alternatives were available. (See pp. 11 to 13.)

#### Operational status

METRO's first Design and Construction Schedule was approved by the Board

in February 1969. Numerous difficulties encountered during design and construction delayed progress and resulted in three revisions to the initial schedule. On November 30, 1972, the Board approved the latest revision. (See p. 10.)

To permit sizable segments of METRO to become operational as they were completed, the Transit Authority established revenue operating phases. The staff knew of operational delays on phases I and IIA in March and May 1973, respectively, and on phases IV and V in June 1973. (See pp. 10 and 15.)

These slippages amounted to from 4 to 9 months on the four phases. The staff did not advise the Board of the delays on phases I and IIA until July and August 1973, respectively, and as of January 30, 1974, had not reported the delays on the other two phases. (See p. 15.)

#### RECOMMENDATIONS

The Transit Authority's Board of Directors should direct the General Manager to establish:

1. A cost and schedule control system which will permit periodic and systematic comparisons between baseline and total current cost estimates and planned and actual progress and will explain significant variances.
2. A system of periodic reporting of such project status information to the Board, the Federal Government (including appropriate congressional committees), and the participating local jurisdictions. (See p. 23.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

In a letter dated December 13, 1973, the Chairman of the Board of Directors said that, though there can be no disagreement with the principle that timely and meaningful reporting is an administrative must, current reporting requirements do not impede that Board's ability to reach timely, considered decisions.

Status reports submitted to the Board are deficient because they do not fully identify differences between METRO's

- baseline and current estimates of cost and
- planned and actual construction progress.

Consequently, persons interested in or responsible for the METRO construction program cannot determine where the program stands in relation to its goals.

Realistic status reporting is an indispensable tool to all participants in an undertaking as large and complex as METRO. Status reports can provide a reliable basis for cost control and for deciding whether plans should be carried out or modified.

METRO's status-reporting system does not accomplish this because cost increases are recognized only with respect to work under contract. It is unrealistic to overlook potential cost increases merely because contracts have not yet been awarded. (See p. 19.)

The Department of Transportation agreed with GAO's recommendations. The Department pointed out, however, that the unique situation in which the Transit Authority finds itself as an interstate compact agency and the pressures to which the Board and its staff are subjected may well account for the apparent failure of the Transit Authority's staff to keep the Board advised of anticipated changes in METRO construction costs.

The Department stated that these factors may have led the Transit Authority's staff and its Board to develop informal and off-the-record methods of apprising the Board of current and anticipated developments and that the Board may have been operating with greater current knowledge than the official record would indicate. (See p. 32.)

MATTERS FOR CONSIDERATION  
BY THE CONGRESS

As a result of experiences in being surprised by cost overruns on projects of significant size and scope, such as METRO, congressional committees have expressed a need for having useful and accurate status reports.

In view of the Board's reservations about GAO's recommendations to improve the reporting system, GAO is recommending that the Congress, through its appropriate committees, require the Transit Authority to make complete status reports which contain comparisons between original and total current cost estimates and planned and actual progress and explain significant variances. (See p. 23.)

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## CHAPTER 1

### INTRODUCTION

The Washington Regional Rapid Rail Transit System, commonly called METRO, is the product of nearly two decades of congressional and citizen effort to relieve traffic congestion and to improve the physical character, economic growth, and well-being of the National Capital region. It is being constructed by the Washington Metropolitan Area Transit Authority at an estimated cost of about \$3 billion. Initial passenger service is scheduled to begin in June 1975, and the entire system is scheduled to be operational by 1980.

### WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

The Transit Authority was created on February 20, 1967, by an interstate compact between Maryland, Virginia, and the District of Columbia pursuant to Public Law 89-774, approved November 6, 1966 (1 D.C. Code 1431). The Transit Authority's primary function is to plan, develop, finance, and operate a rapid rail transit system serving the Washington Metropolitan Area Transit Zone. The zone includes the District of Columbia; the cities of Fairfax, Falls Church, and Alexandria and the counties of Arlington and Fairfax in Virginia; and the counties of Montgomery and Prince Georges in Maryland.

The Transit Authority is governed by a board of six directors consisting of two members from Maryland, Virginia, and the District of Columbia and their alternates. The directors and alternates from Maryland and Virginia are appointed by and selected from the Washington Suburban Transit Commission and the Northern Virginia Transportation Commission. The directors and alternates from the District are appointed by the District of Columbia City Council from among the Commissioner, Assistant Commissioner, and Council members.

The Transit Authority's chief administrative officer, the General Manager, is responsible for all activities subject to policy direction and delegations from the Board. Other Transit Authority officers are the Deputy General Manager, the Comptroller, the Secretary-Treasurer, the General Counsel, and the Chief of Design and Construction.

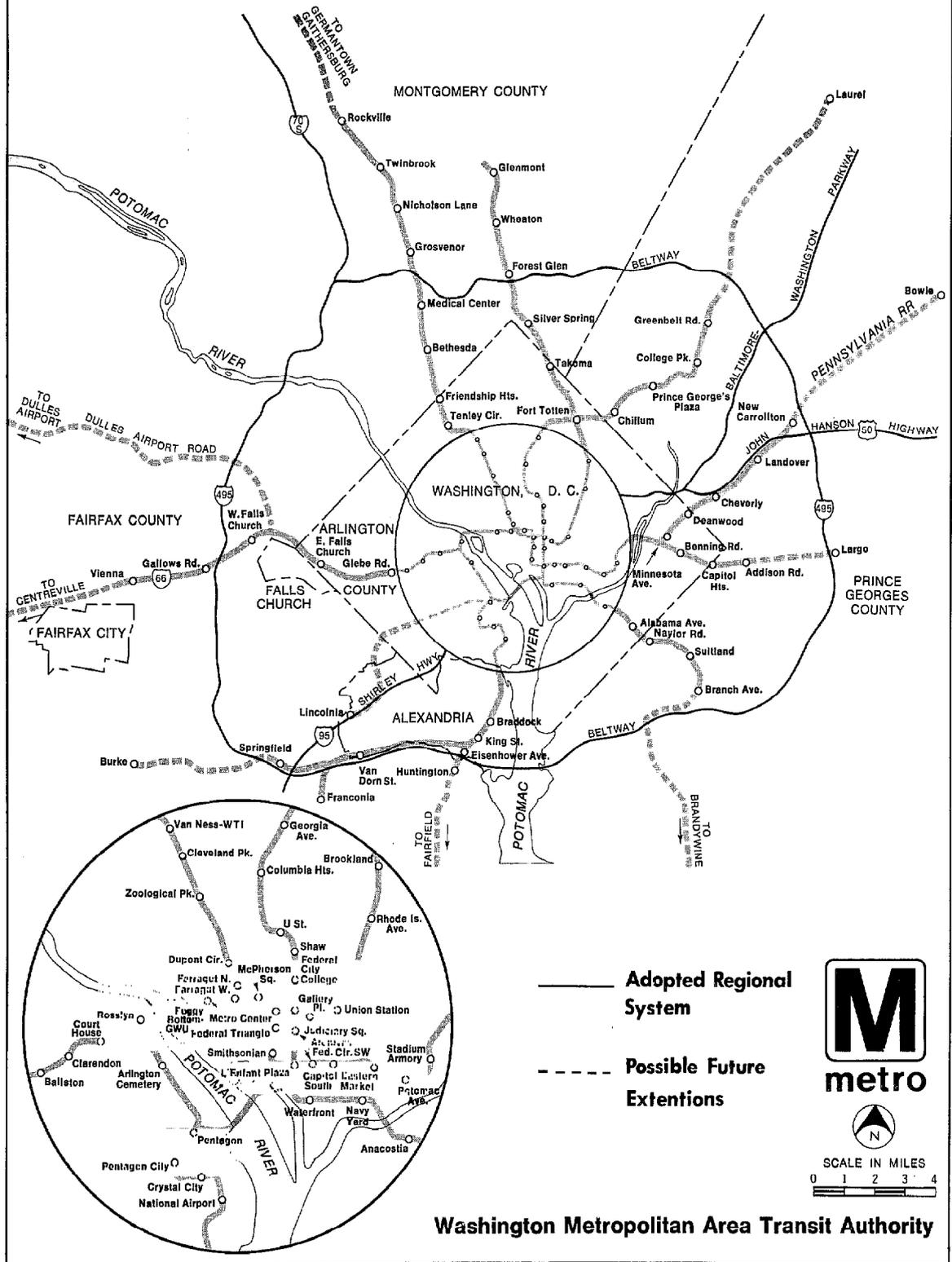
## DESCRIPTION AND FEATURES

As presently envisioned, METRO will comprise three principal routes traversing the District. These routes will branch into 10 as they reach the suburbs and will thereby permit broad regional coverage. The map on page 7 shows the route alignments and station locations.

METRO will feature

- a 97.7-mile network of rapid rail facilities, including 47.2 miles underground;
- 86 stations, including 53 underground;
- 556 air-conditioned cars each capable of carrying 175 passengers;
- automatic train control and communications systems to guarantee passenger safety and safe train operations; and
- an automatic fare collection system.

# REGIONAL RAPID RAIL TRANSIT SYSTEM



Washington Metropolitan Area Transit Authority

BEST DOCUMENT AVAILABLE

## CHAPTER 2

### ESTIMATED COSTS, FUNDING, AND

#### SCHEDULED OPERATING DATES

#### ESTIMATED COSTS

The Transit Authority's Board of Directors approved METRO's first Capital Cost Estimate<sup>1</sup> totaling \$2,494.6 million on February 7, 1969. On December 31, 1970, the Board approved an updated estimate, which increased METRO's estimated costs by \$485.6 million to \$2,980.2 million. According to Transit Authority records, the increase was due to the following:

	<u>Amount</u>
	(millions)
Actual construction experience, more definitive plans and drawings, updated pricing information, and a design change	\$211.2
5- to 7-percent increase in annual average escalation factor	219.1
Delay in groundbreaking of 14 months because congressional funding freeze increased amount of escalation	<u>55.3</u>
	<u>\$485.6</u>

#### FUNDING

The Transit Authority planned, in April 1971, to obtain the funds needed to construct METRO from the following sources:

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<sup>1</sup> A formal document prepared by the Transit Authority's General Engineering Consultant and reviewed by the Transit Authority staff. It is a detailed estimate of all costs associated with the planning, design, construction, real estate acquisition, equipment procurement and installation, and testing necessary to prepare METRO for revenue operations.

	<u>Amount</u>
	(millions)
Federal appropriation	\$1,147.0
Net proceeds from revenue bonds and other income	1,109.7
Contributions from local jurisdictions:	
District of Columbia	\$208.7
Montgomery County	110.4
Prince Georges County	86.6
Alexandria	30.6
Fairfax County	61.9
Arlington County	54.0
Fairfax City	2.6
Falls Church	.8
Unallocated	<u>167.9</u>
	<u>723.5</u>
 Total	 <u>\$2,980.2</u>

The Federal appropriation is channeled through the Department of Transportation. The Department also approves and guarantees the payment of the Transit Authority's revenue bonds and provides an interest subsidy.

The above jurisdictions established a cost allocation formula in March 1969. The amounts of such allocations will be updated in December 1974 and every 2 years thereafter. The unallocated portion of the jurisdictions' share, or \$167.9 million, plus one-third of any cost growth associated with construction are to be distributed on the basis of the existing cost allocation formula.

As of June 30, 1973, the Transit Authority had reported a cost increase of \$65.9 million. Our analysis of the status indicated the costs had increased to approximately \$300 million at this time. (See ch. 3.) In any event, under existing arrangements one-third of the cost increase will be allocated to the local jurisdictions. According to Transit Authority officials, they plan to obtain the remainder from the Federal Government.

SCHEDULED OPERATING DATES

In February 1969 the Board of Directors approved METRO's initial Design and Construction Schedule. Numerous difficulties encountered during design and construction delayed progress and resulted in three revisions to the initial schedule. On November 30, 1972, the Board approved the latest revision.

To permit sizable segments of METRO to become operational as they were completed, the Transit Authority established revenue-operating phases. The effect of delays on the scheduled operating dates and composition of these phases is summarized as follows:

Comparison of Scheduled Operating Dates

Phase	<u>February 1969</u>			<u>November 1972</u>		
	<u>Miles</u>	<u>Stations</u>	<u>Scheduled operating date</u>	<u>Miles</u>	<u>Stations</u>	<u>Scheduled operating date</u>
I	5.6	7	Dec. 1972	4.6	6	Dec. 1974
II	12.6	13	Dec. 1973	13.0	19	May 1976
IIA	-	-	-	5.9	4	July 1976
III	27.6	27	Dec. 1974	16.8	11	Apr. 1977
IV	17.4	16	Dec. 1976	17.3	17	Dec. 1977
V	15.6	11	Mar. 1978	23.4	20	Dec. 1978
VI	<u>18.9</u>	<u>12</u>	Dec. 1979	<u>16.7</u>	<u>9</u>	Dec. 1979
Total	<u>97.7</u>	<u>86</u>		<u>97.7</u>	<u>86</u>	

According to Transit Authority records, the above slippage resulted primarily because (1) a congressional funding delay caused a 14-month delay in the start of construction, from October 1968 to December 1969, (2) actual subsurface conditions were more severe than METRO plans and specifications assumed, and (3) numerous design and construction delays occurred in work critical to beginning public service on the dates planned.

## CHAPTER 3

### NEED TO IMPROVE METRO'S STATUS-REPORTING SYSTEM

The Transit Authority's Board of Directors established METRO's cost and operational goals and is responsible for monitoring construction progress to insure that they are met. We believe, therefore, that the Board should be promptly advised of changes in estimated cost and construction progress which may affect approved financial plans and scheduled passenger operations. The Board could then evaluate the impact of this information on future plans and policies. Further, since the successful completion of the project depends on the willingness of the Federal and local governments to provide necessary resources, it is important that they are provided with useful and timely data on cost and progress. The Transit Authority's reporting policies and practices need to be improved to meet these requirements.

Cost and construction status reports prepared by the Transit Authority staff should provide a complete picture of the METRO project. However, cost status reports submitted to the Board did not include estimated cost increases which amounted to about \$232 million as of June 1973. Also operational delays of several months that were known to the staff were not promptly reported to the Board.

To accurately portray cost status, the baseline estimate-- in the Transit Authority's case the \$2,980.2 million Capital Cost Estimate--should be compared with current cost estimates and actual costs, when available. When computing METRO's cost status, however, the staff computed cost increases only on work under contract. It did not consider work not under contract even though updated estimates were available for a substantial part of this work. The staff reported that METRO's costs had increased by \$65.9 million as of June 30, 1973, but did not report that it had obtained from its General Engineering Consultant updated cost estimates for certain portions of the system not yet under contract, which were \$226.9 million higher than provided for in the December 1970 Capital Cost Estimate. The inclusion of these estimates when reporting METRO's cost status, together with certain other adjustments totaling \$5.2 million, would have alerted

the Board to the need to plan to obtain these additional funds or consider whether alternatives were available.

Also the staff knew of problems in June 1973 that would delay revenue operations on four METRO phases between 4 and 9 months. The staff had not reported this information to the Board as of June 30, 1973. The Board was advised of the operational delays on two phases in July and August 1973 but had not been advised of the delays on the other two as of January 30, 1974.

We are not contending that, had these deviations from the baseline estimates been reported, they could have been avoided. We believe, however, that such variances should be included in status reports given to the Board. The Board could thus give more timely consideration to the need to develop and test alternatives, redirect existing resources, or plan to obtain additional resources if necessary.

Furthermore, under existing arrangements, the participating local governments will be required to fund one-third of cost increases above the December 1970 Capital Cost Estimate of \$2,980.2 million. Therefore, they should be advised promptly of METRO's cost status and whether additional funding will be required. The Federal Government also has a considerable interest in the status of the project. It has already made a substantial commitment of funds to construct METRO, and the Transit Authority has informed us it intends to seek additional funds from the Federal Government for cost increases not funded by local governments.

#### METRO PROGRESS REPORTS

As of June 30, 1973, the Transit Authority staff was submitting nine monthly or bimonthly reports to the Transit Authority's Board of Directors. Each report provides details on a particular aspect of METRO construction and lists progress since the last report was prepared. The reports do not differentiate between baseline and current estimates of cost and planned and actual progress.

For example, the Transit Authority's Office of Engineering prepares a bimonthly staff report on design. The report shows (1) those portions of the METRO construction program

for which the design process has been completed, those being designed, and those to be designed and (2) progress since the last report was prepared.

The report, however, does not (1) show whether estimated costs have increased or decreased for portions of the construction program under design, (2) identify those sections behind schedule which may delay construction contract awards, or (3) compare what was accomplished in the design process with what should have been accomplished.

In general, the other eight reports similarly do not clearly show the status and progress of the program compared with objectives.

#### REPORTED COST INCREASES

The Transit Authority staff periodically computed METRO's cost status and advised the Board of cost increases on several occasions. In July 1973, the staff reported to the General Manager that METRO's cost had increased by \$65.9 million as of June 30, 1973. This report was based on work under contract as of June 30, 1973, as shown below.

<u>Cost category</u>	<u>Portion of December 1970 estimate under contract</u>	<u>Contract amounts as of June 30, 1973</u>	<u>Variance over or under (-)</u>	
			(millions)	(percent)
Phase I	\$ 220.7	\$ 252.5	\$31.8	14.4
II	486.8	579.0	92.2	18.9
III	11.8	5.0	-6.8	-57.6
IV	67.0	84.0	17.0	25.4
V	12.3	4.5	-7.8	-63.4
Systemwide equipment	<u>310.8</u>	<u>250.3</u>	<u>-60.5</u>	-19.5
	<u>\$1,109.4</u>	<u>\$1,175.3</u>	<u>\$65.9</u>	5.94

Updated estimates were available for project units in phases II, III, and IV and systemwide costs

Each project unit in a particular phase must pass through planning and design stages before contracts are awarded. During these stages, the Transit Authority's General Engineering Consultant prepares and submits to the Transit Authority staff updated cost estimates at various milestones on the basis of more definitive project criteria which have been developed. Although numerous project units in phases II, III, and IV had reached such milestones at June 30, 1973, for which updated cost estimates had been prepared, the staff did not include these updated estimates in its status report of June 30, 1973.

We obtained from the staff the latest estimates at June 1973 for project units in phases II, III, and IV that were in the planning and design stages and compared these estimates with those in the December 1970 estimate. METRO's estimated costs for this work had increased by \$171.4 million, as follows:

<u>Phase</u>	<u>1970 estimate</u>	<u>Latest estimate</u>	<u>Increase</u>	<u>Percent of increase</u>
(000 omitted)				
II	\$ 60,972	\$106,568	\$ 45,596	74.78
III	202,696	224,326	21,630	10.67
IV	<u>338,860</u>	<u>443,059</u>	<u>104,199</u>	30.75
Total	<u>\$602,528</u>	<u>\$773,953</u>	<u>\$171,425</u>	28.45

According to the staff, the bulk of the \$171.4 million increase is due primarily to (1) changes to the design and alinement of the baseline system as additional details became available and (2) schedule slippage which contributed to higher escalation factors. The Transit Authority also had updated estimates for systemwide equipment and other systemwide costs which were not under contract as of June 30, 1973, and, therefore, were not reported. The latest estimates for these items amounted to \$587.7 million, or \$55.5 million more than the December 1970 estimate of \$532.2 million. The

largest portion of the \$55.5 million increase relates to engineering and architectural consultant fees and insurance costs estimated to be incurred during future METRO construction.

Project units in Phases V and VI--estimated to cost \$733 million--had not been sufficiently developed to prepare updated cost estimates.

A recap of METRO's cost status as of June 30, 1973, when compared with the Capital Cost Estimate, follows.

	<u>Dec. 1970</u> <u>estimate</u>	<u>Latest</u> <u>cost data</u>	<u>Increase</u>
	<u>(millions)</u>		
Phases and systemwide equipment under contract	\$1,109.4	\$1,175.3	\$ 65.9
Estimate for phases not under contract	602.5	773.9	171.4
Estimate for systemwide equipment and systemwide costs not under contract	532.2	587.7	55.5
Phases which have not been re-estimated	733.0	733.0	-
Miscellaneous adjustments	<u>3.1</u>	<u>8.3</u>	<u>5.2</u>
	<u>\$2,980.2</u>	<u>\$3,278.2</u>	<u>\$298.0</u>

#### OPERATIONAL STATUS

To insure that the Board of Director knows of METRO's operational status, the Transit Authority staff should submit periodic reports to the Board which (1) compare planned and actual construction progress and (2) explain the reason for significant variations identified by such comparisons. The Transit Authority's General Engineering and General Construction Consultants prepare and submit monthly reports that contain such information to the staff, but these reports are not made available to the Board. Although the staff had advised the Board of construction problems encountered, the staff had not promptly advised the Board of the operational delays resulting from these problems.

The staff knew of operational delays on phases I and IIA in March and May 1973, respectively, and on phases IV and V in June 1973. These slippages amounted to from 4 to 9 months on the four phases. The staff did not advise the Board of the delays on phases I and IIA until July and

August 1973, respectively, and, as of January 30, 1974, had not reported the delays on the other two phases.

The Board established the latest scheduled operating dates for the METRO phases on November 30, 1972. The following table identifies the operational delays which the Transit Authority staff expected to occur as of June 30, 1973.

<u>Phase</u>	<u>Scheduled operating dates as of November 30, 1972</u>	<u>Estimated operating dates as of June 30, 1973</u>	<u>Delay</u> (months)
I	Dec. 1974	June 1975	6
II	May 1976	May 1976	-
IIA	July 1976	Nov. 1976	4
III	Apr. 1977	Apr. 1977	-
IV	Dec. 1977	Sept. 1978	9
V	Dec. 1978	June 1979	6
VI	Dec. 1979	Dec. 1979	-

A discussion of (1) the problems causing these delays, (2) when they were recognized by the staff, and (3) when they were reported to the Board follows.

### Phase I

As of November 30, 1972, phase I revenue operations, serving six stations over 4.6 miles within the District, were scheduled to begin in December 1974. However, because of construction problems encountered at Union Station, phase I operations are not scheduled to begin until June 1975.

At Union Station, the METRO route will leave the surface and become subway. A portal at this location will be the only entrance into the underground tunnel large enough to accommodate the 1,400-foot rails and the machinery required to attain operational capability. Therefore any delays at Union Station will also delay the phase I operational date.

The National Park Service is constructing a National Visitor Center directly above the METRO station. After the Board approved the revised design and construction schedule on November 30, 1972, subsurface tests conducted by the METRO contractor revealed that holes for the pilings which would support these structures would have to be deeper than planned. Because the revised schedule contained no time

for contingencies, the extra work involved in installing these pilings will delay revenue operations substantially beyond the scheduled operating date of December 1974.

Transit Authority officials agreed on March 1, 1973, that the phase I operational date of December 1974 would not be met. The staff did not advise the Board of the delays on phase I construction until July 26, 1973, or almost 5 months after they recognized that the December 1974 operating date would not be met. On the basis of information presented to it, the Board voted to revise the phase I operating date to June 30, 1975.

#### Phase IIA

As of November 30, 1972, phase IIA operations, serving four stations over 5.9 miles within the District and Silver Spring, Maryland, were scheduled to begin in July 1976. Segments of this route were designed to use the rights-of-way controlled by the Baltimore & Ohio and Chesapeake & Ohio Railroads. The construction schedule depended on the outcome of negotiations to secure permission from the railroad companies to use portions of their rights-of-way. A settlement was reached with the railroads on March 12, 1973; however, the construction contract bid opening was 8 weeks behind schedule.

Transit Authority officials agreed on May 1, 1973, that the scheduled operating date for phase IIA would not be met. A Transit Authority staff member advised us in July 1973 that as of June 30, 1973, the phase IIA operational date had slipped 4 months. On August 23, 1973, or about 3-1/2 months after they agreed that the phase IIA operational date had slipped, the staff described the problems to the Board. The staff advised the Board that the phase IIA operational date would be delayed a minimum of 6 months and that a new operating date could not be established.

#### Phase IV

Phase IV will extend METRO 17.3 miles and serve 17 more stations in the District, Maryland, and Virginia. As of November 30, 1972, phase IV operations were scheduled to begin in December 1977. However, final route design could not begin until the city of Alexandria approved the location for a service and inspection yard for car storage, safety

inspections, and minor maintenance. Because the city did not approve the yard's location until May 9, 1973, the planned operational date of the Alexandria portion of the route will be postponed.

A Transit Authority staff official advised us in July 1973 that delays encountered thus far would cause the phase IV operational date to slip about 9 months as of June 30, 1973, if the limits of the phase were not changed to omit the delayed section. Although the Board and staff had discussed this problem on numerous occasions, the staff had not advised the Board of the length of the delay by January 30, 1974.

#### Phase V

As of November 30, 1972 phase V was scheduled to become operational in December 1978. It will extend service from the District to Rockville, Maryland, and complete the route that runs through Southeast Washington and terminates at Branch Avenue in Maryland.

Since the design and construction schedule was approved in November 1972, the Transit Authority has been conducting studies to determine alternate route alignments and station locations for the Branch Avenue route and for portions of the Rockville route. The eventual extent of the delay will not be known until the revised locations are approved by the Transit Authority, the District, and Prince Georges and Montgomery Counties.

However, in July 1973, a Transit Authority staff member estimated that the phase V operational date had slipped a minimum of 6 months as of June 30, 1973. Although the staff had advised the Board of these problems, it had not reported the delay to the Board by January 30, 1974.

## CHAPTER 4

### CONCLUSIONS, TRANSIT AUTHORITY COMMENTS

#### AND OUR EVALUATION

#### CONCLUSIONS

The Transit Authority's Board of Directors is responsible for establishing overall policies and is continually required to make important financial decisions affecting the METRO construction program. To accomplish this and control a project as big and complex as METRO, the Board should be given periodic reports which fully and accurately disclose the status of the program, including current cost estimates and construction progress.

Such reports would provide the Board with early identification of potential problems and thus permit it to establish timely policy guidance on the means to resolve such problems or obtain additional funding. The Federal Government and participating local governments also need such information since, under current arrangements, they will be called upon to finance increased costs or accept reductions in service.

#### TRANSIT AUTHORITY COMMENTS AND OUR EVALUATION

The Chairman of the Transit Authority's Board of Directors, in a letter dated December 13, 1973 (see app. I), stated that "There can be no disagreement, of course, with the principle that timely and meaningful reporting is an administrative must." However, he disagreed with our proposal and stated that the Board of Directors did not agree that the current reporting methods impede its ability to reach timely, considered decisions. Our views on the matters cited in his letter follow.

#### Means of exchanging information

The Chairman

- outlined the procedures which the Transit Authority has followed to insure a proper basis of informed decision-making;
- cited several ways in which the Board and other interested parties exchange information and are kept apprised of developments;

--mentioned public weekly meetings, numerous workshops, and executive sessions at which the Transit Authority staff provides data to the Board, as well as annual workshop sessions, in which financial and program planning are discussed.

He said all of these have brought about the development of reporting procedures which meet the purposes of decision-making.

The Chairman also noted that representatives from the regional organizations and local jurisdictions having an interest or responsibility in METRO attend all the Board meetings and workshop sessions. According to the Chairman, forums exist for what is a massive exchange of information among interested parties.

We agree that a substantial volume of information is available dealing with the progress of METRO and that these exchanges of information are necessary and desirable in day-to-day operations.

#### Inadequacy in present status reporting

The Chairman also commented that we seemingly reached our conclusions not because cost experience was unavailable but because it was not translated into projections of potential impact upon total system cost. Therefore the Chairman concluded that our recommendations concerned matters of form rather than substance. He further stated that the Board has two choices, either to follow its current practices or to undertake a continuous exercise in crystal-balling the highly uncertain economic and political circumstances which will develop over the next 6 years. The Chairman and the Transit Authority's General Manager stated that it is not desirable to project cost increases on a regular recurring basis.

We based our conclusions on the fact that information on total cost increases was readily available but was not used to show the status and progress of METRO in comparison with baseline estimates. This is much more than a matter of form. Moreover, periodic, recurring assessments of METRO's progress and status are particularly needed in view of the uncertain economic conditions and political circumstances cited by the Transit Authority officials.

We recognize that constructing METRO is a long, difficult task which can be expected to be marked by many changes along the way. Initial cost estimates had to be formulated on the basis of limited knowledge and are, in many instances, based on educated guesses. As construction progresses, more definitive information becomes available and more complete cost estimates can be prepared. However, since the Transit Authority's reporting system does not disclose the difference between actual and planned progress, Federal and local governments which assist in the funding of the project do not know where the project stands in relation to its cost and operational goals.

Realistic status reporting is an indispensable tool to all participants in an undertaking as large and complex as METRO. Status reports can provide a useful basis for cost control and for deciding whether plans should be carried out or modified. The Transit Authority's reporting system for METRO does not, in our opinion, accomplish this.

Under the Transit Authority's present system, cost increases are recognized only with respect to work under contract. When bids are considered for award, it may well be too late because the only alternatives available are to accept or reject them. Of course, any rejection will contribute to delays and, during inflation, may increase costs.

As indicated earlier, the Transit Authority records showed a potential cost increase approximating \$232 million at June 30, 1973, which had not been reported to the Board, the Federal Government, or the participating regional organizations and local jurisdictions having an interest or responsibility in METRO. We believe that the need to report such data is substantive and that it is totally unrealistic to overlook this potential cost increase merely because contracts have not yet been awarded.

#### Reports to the Congress

In discussing the means of exchanging information, the Chairman stated that the Board of Directors, as well as several congressional Appropriations Subcommittees, have been kept advised of METRO's cost experience during the Transit Authority's budgetary testimony in justification of appropriation requests. He also stated that "More recently,

as experience has pointed to larger cost variances, the Board has requested the General Manager to make quarterly status reports." He stated that, because of congressional interest in the project, these reports have been made available to the Chairmen of the four Appropriations Subcommittees having responsibilities for the Transit Authority.

Two quarterly status reports have been issued to the Board and the four Subcommittees by the General Manager since this procedure was established. The first report, dated September 16, 1973, reported cost increases of \$80.4 million as of August 17, 1973. The second report, dated November 29, 1973, reported cost increases of \$94.6 million as of November 16, 1973. In both of these reports, as has been past practice, the Transit Authority's computation of METRO's cost increase was based on contract obligations. No consideration was given to updated cost estimates which were available for a substantial portion of the project which had not reached the contracting stage.

#### Recomputation of capital costs

The Chairman also stated that, when the Transit Authority's original financial plan was developed, provision was made to recompute the capital contribution required from each local jurisdiction during 1974 and every 2 years thereafter. The Chairman stated that the arduous staff and consultant studies which will underlie the 1974 recomputation have been initiated. This extremely complex matter, he said, will require the greater part of a year to complete.

We did not propose that cost status reports be used in lieu of the planned recomputation of METRO's cost. Because the recomputation of costs will be used as a basis to allocate cost increases to the jurisdictions, we agree that an in-depth study is needed. We believe, however, that such biannual recomputations should not be used as a substitute for reporting METRO's cost and operational status on a continuing basis. As indicated earlier the status reports we are recommending can be readily prepared from METRO's existing records.

## CHAPTER 5

### RECOMMENDATIONS AND MATTERS

#### FOR CONSIDERATION BY THE CONGRESS

##### RECOMMENDATIONS

We recommend that the Transit Authority's Board of Directors direct the General Manager to establish:

1. A cost and schedule control system which will permit periodic and systematic comparisons between the baseline and total current cost estimates and planned and actual progress and will explain significant variances identified by such comparisons.
2. A system of periodic reporting of such status information to the Board, the Federal Government (including appropriate congressional committees), and the participating local jurisdictions.

The Department of Transportation, in a letter dated January 23, 1974 (see app. II), said that, in carrying out its responsibilities regarding the Transit Authority, it had experiences which coincide with some of the findings highlighted in our report. The Department agreed with our recommendations.

##### MATTERS FOR CONSIDERATION BY THE CONGRESS

Various congressional committees have expressed an interest in having accurate and useful periodic status information on federally supported projects of significant size and scope, such as METRO, presented to them on a regular, recurring basis. The committees have stated that the need for such information is a direct result of the frustration experienced in being surprised by cost overruns.

In view of the Board's reservations about our recommendations to improve the Transit Authority's reporting system, we recommend that the Congress, through its appropriate committees, require the Transit Authority to make complete status reports which contain comparisons between original and total current cost estimates and planned and actual progress and explain significant variances.

## CHAPTER 6

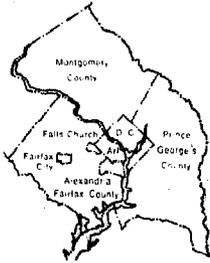
### SCOPE OF REVIEW

Our review was directed primarily toward evaluating the reporting system the Transit Authority used to communicate information concerning METRO's cost and operational status. We also examined the method used by the Transit Authority to compute cost status and identify operational delays.

In addition, we reviewed pertinent plans, reports, correspondence, and records and obtained the views of Transit Authority officials knowledgeable of and responsible for administering METRO. We did not make a detailed analysis or an audit of data supporting documents provided for our use, nor did we evaluate whether estimates or costs incurred were reasonable.

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY  
950 South L'Enfant Plaza, S.W., Washington, D. C. 20024

DEC 13, 1973

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JOHN R. KENNEDY  
*General Counsel*

ROY T. DODGE  
*Chief of Design  
and Construction*

Mr. Elmer B. Staats  
Comptroller General of the United States  
General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Mr. Staats:

This is in response to the letters of November 30, 1973 addressed to the Chairman and Board of Directors and to the General Manager of the Washington Metropolitan Area Transit Authority transmitting copies of a draft of a proposed report of the General Accounting Office entitled, "Need to Improve Metro's Status Reporting System."

The referenced letters request a response by the Chairman within the next 30 days for incorporation as an appendix into the report when published. I am addressing the recommendations contained in the draft at once as a means of providing to each of its recipients our comments to assist them in evaluating its findings. Frankly, I hope too that this letter may influence the findings of the report.

There can be no disagreement, of course, with the principle that timely and meaningful reporting is an administrative must. An enterprise of the vast magnitude and regional significance of Metro demands the setting of extremely high standards. The Board from the very beginning has sought to do so. While the Authority may, from time to time, have failed to fully measure up, it continually strives to do so. While the reporting recommendations made by your staff appear to deal more in terms of their form rather than their substance, we are pleased to have their observations. I wish to assure you personally that they will be given careful consideration and, where applicable, will be carried out. However, for the reasons hereafter stated, the Board does not agree that current reporting methods impede its ability to reach timely, considered decisions.

It would appear appropriate to set forth the background of procedures which have been followed to assure a proper basis of informed decision making. These procedures have



BEST DOCUMENT AVAILABLE

## APPENDIX I

Mr. Elmer B. Staats

grown out of a lengthy, evolutionary process resulting through an unusual degree of day-to-day involvement on the part of the Board of Directors. All decisions of policy or financial significance are those of the Board. Consequently, the Board meets publicly weekly and since 1967 there have been 363 such regular meetings in addition to numerous workshop and executive sessions. In carrying out the project, the Authority is required to hold public hearings which involve both design and cost characteristics. Sixty-two such hearings have been held by the Board. In addition, the Board has scheduled annual workshop sessions at which its members, their political associates, local government staff, and Authority staff have met to discuss financial and program planning. All of these have brought about the development of reporting procedures which have served to meet the purposes of decision making. Moreover, Authority staff presents to the Board on a regular basis, ten (10) monthly or bimonthly reports which address all program elements.

The Board of Directors has been kept advised, as have the several appropriations subcommittees of the Congress, of the cost experience of the Authority. Since the beginning of construction, that experience has been made a part of the Authority's budgetary testimony in justification of appropriation requests. More recently, as experience has pointed to larger cost variances, the Board has requested the General Manager to make quarterly status reports. These reports, in line with our policy of keeping the Congress informed of our progress and because of Congressional interest in this project in its relationship to broad objectives for the Nation's Capital, have also been made available to the Chairmen of our four Appropriations Subcommittees. Similarly, the Department of Transportation, as guarantor of the Authority's bonds, has been kept informed. The Federal Office of Management and Budget also is made fully aware of developments.

In addition, staff members of the Washington Suburban Transit Commission, the Northern Virginia Transportation Commission, the Montgomery County Department of Transportation, the Prince George's County Department of Transportation, the Maryland Department of Transportation and the District of Columbia Government attend all Authority Board meetings and workshop sessions.

The above recitation, I believe, indicates that forums exist for what is actually a massive exchange and interchange of all information necessary to work of the Board of Directors

Mr. Elmer B. Staats

and for the information of the eight jurisdictions which it represents. Thus, as I indicated earlier, it would appear that your staff recommendations are directed to matters of form.

In addressing the latter, it seems that the report reaches its conclusion not because cost experience is unavailable but because it is not translated into projections of potential impact upon total system cost. Our choice, then, would be whether we keep ourselves informed of current experience and thus alerted to the possibility of further increases in system costs or whether the Board undertake a continuous exercise in crystal-balling the highly uncertain economic and political circumstances which will develop over the next six years.

At the time the Authority's original financial plan was developed, the Board of Directors and the participating local governments recognized that a construction program as vast as the Adopted Regional System and projected over more than a decade would necessitate continuing review and adjustment. The Capital Contributions Agreement which provided for cost allocations and the scheduling of payments among the eight participating jurisdictions contemplated that need. It contains the following language:

Section 3.3. (a) It is understood and agreed that definitive net project costs for the Transit System will not be determined until the Transit System is completed and that, accordingly, the Capital Contributions provided for herein are based on estimates. In order to assure the availability of funds to finance project costs, it is hereby agreed that on a date five years after the start of construction of the Transit System, or July 1, 1974, whichever is the later date, the Capital Contributions required from each Political Subdivision will be recomputed. Such recomputation shall be made by the Authority by computing the local share (one-third) of the net project costs of the Transit System, as then estimated by the Authority, and applying thereto the formulae attached hereto on Schedule B utilizing the then latest available information for the formulae factors, as obtained by the Authority.

## APPENDIX I

Mr. Elmer B. Staats

The Agreement further provides for the review of costs at two-year intervals thereafter.

The Authority has initiated the arduous staff and consultant studies which will underlie the 1974 recomputation. Such recomputation is an extremely complex matter. It must take into account up-dated construction cost estimates, the latest operational assumptions, population and ridership projections and fare structure. The completion of this study will require the greater part of a year. The inter-relationships and complexities involved are indicative of the risks associated with a limited cost calculation and its extrapolation into the future.

The Board is informed regularly of the status of costs compared to program and, as previously indicated, kept abreast of trends. These will be taken into account in the 1974 system cost recalculation. Similarly, the impact of delays on the scheduled operational phases is reported. Periodically, annually or semi-annually, the operational phases are received and recast by the Board to meet changed conditions. To do so more frequently would upset orderly planning and contracting operations. These must have a stable base covering a reasonable period of time -- usually a year.

This letter is not, therefore, intended as an attempt to rebut the calculations and projections contained in the draft. We do not believe such an attempt would be productive. There are, however, a number of questions of fact in the draft which the General Manager will communicate to your staff. [See GAO note.] So this letter is designed to bring to your attention the manner in which the Board has sought to address its decisions and to point up the many complexities associated with the pursuance of its responsibility to the Federal Government and to the participants which it serves. We hope that this resume of our approach to our managerial responsibilities will bring about a better understanding on the part of your office.

In conclusion, I think you must agree that it is the Board of Directors which must be satisfied

---

GAO note: The General Manager provided his comments to us in a letter dated December 13, 1973. We discussed the comments with Transit Authority representatives and have incorporated the changes suggested where appropriate. The report contains no residual differences of fact.

Mr. Elmer B. Staats

that its reporting requirements from the staff meet decision-making needs. The Board, while always seeking improvements, is of the mind that it has the information essential to these purposes.

Sincerely,

  
Jerry A. Moore, Jr.



OFFICE OF THE SECRETARY OF TRANSPORTATION  
WASHINGTON, D.C. 20590

ASSISTANT SECRETARY  
FOR ADMINISTRATION

January 23, 1974

Mr. Richard W. Kelley  
Associate Director of the  
General Accounting Office  
400 7th Street, S. W.  
Washington, D. C. 20590

Dear Mr. Kelley:

This is in response to your letter of November 30, 1973, requesting Department of Transportation comments on the General Accounting Office (GAO) draft report entitled "Need to Improve METRO's Status Reporting System." I have enclosed two copies of the Department's reply.

We agree with the GAO recommendation that the Washington Metropolitan Area Transit Authority (WMATA) establish a cost and schedule control system and a system of periodic reporting of project status information to responsible officials. In performing our responsibilities which involve WMATA's operations, we have had experiences which coincide with some of the findings highlighted in the report. We will continue to work with WMATA's Board of Directors and staff to improve communications.

Sincerely,

A handwritten signature in black ink, appearing to read "William S. Heffelfinger". The signature is written in a cursive style.

William S. Heffelfinger

Enclosure

DEPARTMENT OF TRANSPORTATION REPLYTOGAO DRAFT REPORT OF NOVEMBER 30, 1973ONTHE NEED TO IMPROVE METRO'S STATUS REPORTING SYSTEMSUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

GAO reports that METRO's reporting policies and practices need improvement to enable WMATA's Board of Directors to carry out its responsibilities more knowledgeably. The current status of METRO's cost and progress is not periodically reported on a regular basis. Moreover, status reports prepared by WMATA's staff and submitted to the Board have not included estimated cost increases of over \$200 million, and operational delays of several months.

GAO recommends that WMATA's Board of Directors direct the General Manager to establish:

1. A cost- and schedule-control system which will permit periodic and systematic comparisons between the original and current cost estimates and planned and actual progress, and provide explanations for significant variances surfaced by such comparisons, and
2. A system of periodic reporting of project status information to responsible officials.

DEPARTMENT OF TRANSPORTATION POSITION

The draft report concerns itself with the timeliness and adequacy of the information being furnished to the Board of Directors of Washington Metropolitan Area Transit Authority by its staff. It correctly points out that the plans and decisions being made by the Board can only be as good as the factual data on which they are based, and that in a period of continuing cost escalation, a mammoth construction program such as is involved in creation of the "Metro" rail rapid transit system cannot be managed effectively without a continuous flow of up-to-the-minute data on cost experience and projections.

The specific facts set forth in the draft report correspond to the experience of this Department in its various relationships with WMATA, and we concur in the report's recommendations for improvement. The report does not, however, take account of the unique political situation in which WMATA finds itself, and the pressures to which the Board of WMATA and its staff are subject, and which may well account for the apparent failure of WMATA staff to keep the Board advised of anticipated changes in Metro construction costs and bus operating expenses. WMATA's status as an interstate compact agency, a difficult one at best, is made even more difficult by the direct involvement in its affairs of the Congress and of this Department as an agency of the Executive Branch of the Federal Government. This may well have led WMATA's staff and its Board to develop informal and off-the-record methods of apprising the members of the Board of current and anticipated developments as opposed to formal reports delivered at public meetings. We point this out only to suggest that the Board may not have in fact been operating in such a vacuum as to current knowledge as the official record would indicate.

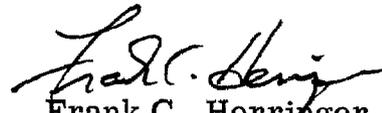
This Department is involved in the operations of WMATA in three significant ways:

- (1) It serves as the channeling agent for Federal funds appropriated by the Congress as the Federal share of the cost of construction of the Metro rail rapid transit system, pursuant to the National Capital Transportation Act of 1969 (Pub. L. 91-143; 83 Stat. 320).
- (2) It approves and guarantees the payment of WMATA's rail rapid transit revenue bonds, and provides an interest subsidy

therefor, pursuant to the National Capital Transportation Act of 1972 (Pub. L. 92-349; 86 Stat. 464).

- (3) It extends capital assistance to WMATA in connection with the acquisition, consolidation and improvement of its "Metrobus" system pursuant to the National Capital Area Transit Act of 1972 (Pub. L. 92-517; 86 Stat. 999) and the Urban Mass Transportation Act of 1964 (49 U.S.C. § 1601 et seq.).

Naturally, we have developed channels and procedures whereby we receive from WMATA, mostly on a staff-to-staff basis, the information which is necessary to enable us to perform our responsibilities under these statutes. In so doing we have encountered many of the same problems which are mentioned in the draft report, and we are working with the WMATA Board and staff to improve communications.

  
Frank C. Herringer  
Administrator

PRINCIPAL OFFICIALS OF THE  
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY  
RESPONSIBLE FOR ADMINISTERING ACTIVITIES  
DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
<u>BOARD OF DIRECTORS</u>		
CHAIRMAN:		
Cleatus E. Barnett	Jan. 1974	Present
Jerry A. Moore	Sept. 1973	Jan. 1974
Cleatus E. Barnett	June 1973	Sept. 1973
Stanley J. Anderson	Jan. 1973	June 1973
Joseph L. Fisher	Jan. 1972	Jan. 1973
Carlton R. Sickles	Jan. 1971	Jan. 1972
Jerry A. Moore	Dec. 1970	Jan. 1971
Joseph P. Yeldell	Jan. 1970	Dec. 1970
Frederick A. Babson	Jan. 1969	Jan. 1970
James P. Gleason	Jan. 1968	Jan. 1969
Walter E. Fauntroy	Nov. 1967	Jan. 1968
Walter N. Tobriner	Feb. 1967	Nov. 1967
VICE CHAIRMAN:		
Herbert E. Harris II	Jan. 1974	Present
Cleatus E. Barnett	Sept. 1973	Jan. 1974
Herbert E. Harris II	June 1973	Sept. 1973
Cleatus E. Barnett	Jan. 1973	June 1973
Stanley J. Anderson	Mar. 1972	Jan. 1973
Jerry A. Moore	Jan. 1972	Mar. 1972
Herbert E. Harris II	Dec. 1971	Jan. 1972
Jay E. Ricks	Jan. 1971	Dec. 1971
Carlton R. Sickles	Jan. 1970	Jan. 1971
Joseph P. Yeldell	Feb. 1969	Jan. 1970
Walter E. Fauntroy	Jan. 1969	Feb. 1969
Frederick A. Babson	Jan. 1968	Jan. 1969
James P. Gleason	Feb. 1967	Jan. 1968

Tenure of office	
<u>From</u>	<u>To</u>

OFFICERS

GENERAL MANAGER: Jackson Graham	Mar. 1967	Present
DEPUTY GENERAL MANAGER: Warren Quenstedt	Oct. 1967	Present
COMPTROLLER: Schuyler Lowe	July 1967	Present
SECRETARY-TREASURER: Delmer Ison	Feb. 1967	Present
GENERAL COUNSEL: John R. Kennedy	Oct. 1967	Present
CHIEF OF DESIGN AND CONSTRUCTION: Roy T. Dodge	Oct. 1967	Present

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