
Office of Inspector General

Audit Report

Review of

**Completion of the Metrorail System
Washington, DC**

Federal Transit Administration

**Report Number: TR-1998-213
Date Issued: September 30, 1998**



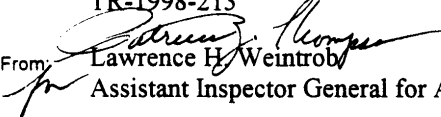


U.S. Department of
Transportation
Office of the Secretary
of Transportation
Office of Inspector General

Memorandum

Subject: **ACTION:** Report on Review of Completion
of the Metrorail System, Washington, DC
TR-1998-213

Date: September 30, 1998

From: 
Lawrence H. Weintrob
Assistant Inspector General for Auditing

Reply to JA-30
Attn of:

To: Federal Transit Administrator

We are providing this report for your information and use. Your September 4, 1998, comments to our August 19, 1998, draft report were considered in preparing this report. An executive summary of the report follows this memorandum.

In your comments to our draft report, you concurred with our recommendation and promised to take action to implement the recommendation. On September 23, 1998, you notified WMATA of needed corrective action. We consider the action to be responsive and the recommendation closed. No additional follow-up action is required under DOT Order 8000.1C.

WMATA also provided comments of a technical nature. We reviewed their comments and made changes to the final report as we deemed to be appropriate.

We appreciate the cooperation and assistance provided by your staff during the audit. If I can answer any questions or be of further assistance, please contact me on (202) 366-1992 or Patricia J. Thompson, Deputy Assistant Inspector General for Surface Transportation, on (202) 366-0687.

#

Attachment

EXECUTIVE SUMMARY

U.S. Department of Transportation, Office of Inspector General

Review of

COMPLETION OF THE METRORAIL SYSTEM WASHINGTON, DC

Report No. TR-1998-213

September 30, 1998

Objectives

The objectives of the review were to (1) determine the current funding, cost, and schedule status and the reasonableness of related data for a subway construction project (project) expanding the existing system in the Washington, DC, metropolitan area and, (2) identify any segments of the expansion project that are at risk for not having adequate Federal and state/local funding, exceeding costs, or not meeting scheduled completion dates.

Background

The scope of our review was a subway construction expansion project encompassing 13.5 miles of track and nine stations which was estimated to cost approximately \$2.1 billion. The project is comprised of four segments which, for purposes of this discussion, will be referred to as segments 1, 2, 3, and 4. Segment 1, which opened in June 1997, extended the Blue Line from Van Dorn Street to Franconia-Springfield, Virginia. Segment 2 extended the Red Line from Wheaton to Glenmont, Maryland. Segment 2 opened as scheduled on July 25, 1998. Segment 3 will close a Green Line gap in northwest Washington, DC, by connecting the U Street-Cardozo station with the Fort Totten station. It is scheduled to open in late 1999. Segment 4, currently scheduled to open in early 2001, will extend the Green Line from Anacostia to Branch Avenue in Prince George's County, Maryland. The project also included an upgrade to the subway system's operations control center which was completed in 1997.

This construction project expands the current Metrorail system from 89.5 miles and 74 stations to 103 miles and 83 stations. The initial system cost \$7.4 billion and opened in phases from 1976 to 1993. The map on page v shows the four segments covered by this review and their relationship to the entire Metrorail system. The Washington Metropolitan Area Transit Authority (WMATA) is responsible for constructing, maintaining, and operating the Metrorail system serving the 4.1 million residents of Washington, DC, and adjacent Maryland and Virginia counties. The average weekday Metrorail passenger trips total 687,000.

The National Capital Transportation Assistance Act of 1969 provided that Federal funding authorized under the Act would be available for completing the entire subway system. In addition, appropriation acts have provided that appropriated funds will remain available until expended. Full Funding Grant Agreements reflect the Federal and

state/local funding amounts for each segment as well as the scope and description of each segment and the estimated total segment cost. The project descriptions cover the stations and track, and the hardware, software, and facilities needed to support the segment. Accordingly, a provision was included in each of the four Full Funding Grant Agreements executed between WMATA and the Federal Transit Administration (FTA), one agreement for each segment of the project, allowing WMATA to transfer remaining balances from completed projects to ongoing projects. WMATA has transferred \$95 million remaining from the original project to the ongoing project.

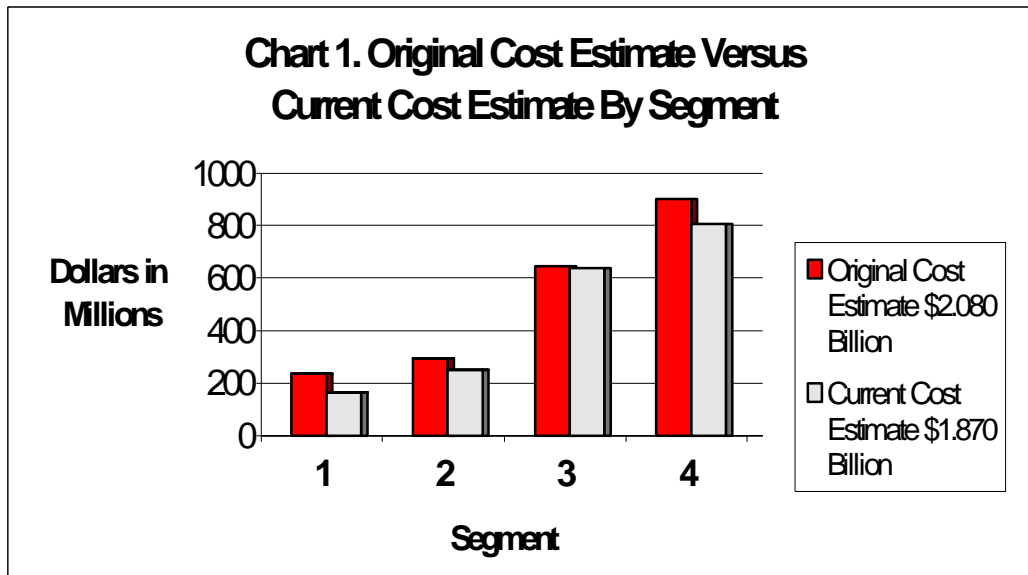
Table 1 provides construction cost, funding, and operating statistics for the Metrorail system.

Table 1			
Metrorail System Project Statistics			
	Existing System	Segments Covered by Review	Completed System
Miles of Track	89.5 miles	13.5 miles	103 miles
Number of Stations	74 stations	9 stations	83 stations
Costs	\$7.4 billion	\$1.9 billion	\$9.3 billion
Cost per Mile	\$84 million/mi.	\$140 million/mi.	\$91 million/mi.
Funding: Federal	\$5.1 billion	\$1.2 billion	\$6.3 billion
State/Local	\$2.3 billion	\$700 million	\$3.0 billion
Completion Dates	1976 through 1993	2001	2001
Average Weekday Trips	676,000	78,000 ^{a/}	760,000 ^{a/}

^{a/} Columns do not add across because table shows anticipated average weekday passenger trips when segments are completed in 2001 while the Existing System column reflects average weekday passenger trips during 1998.

Results

Federal, state, and local funding is sufficient to pay for construction of the four segments comprising the 13.5 mile/nine station project. WMATA's June 30, 1998, total cost estimate for the project is \$1.870 billion. Final construction costs for all 4 segments are estimated to be below WMATA's original cost estimates. As a result, WMATA has identified potential net surplus funds of \$210 million for this project. WMATA intends to add the surplus to the \$95 million surplus transferred from the original 89.5 miles of construction for a total surplus of \$305 million. WMATA plans to use the surplus funds to purchase rail cars and construct a rail yard at Branch Avenue. Final project costs could be further reduced if money set aside for unforeseen costs (contingency funds) are not needed. Chart 1 compares each segment's original cost estimate with WMATA's current estimates.



WMATA opened segment 1 as scheduled on June 29, 1997, and segment 2 opened on schedule on July 25, 1998. Based upon discussions with WMATA's Director of Construction and FTA's independent Project Management Oversight Contractor, we believe there is a risk segment 3 may not open as scheduled in late 1999. Although we believe segment 4 is also at some risk, it is likely to open on time. The determining factor will be the contractor's ability to catch up on the work that is about 8 months behind schedule.

Funding is Sufficient to Pay for Construction

In its latest quarterly estimate of June 30, 1998, WMATA projected the four-segment Metrorail construction project will cost no more than \$1.870 billion, which is 10 percent below WMATA's original cost estimate of \$2.080 billion. Construction contract awards below WMATA's original cost estimates were primarily responsible for the savings/surplus construction funds totaling \$210 million. In addition, WMATA transferred \$95 million of surplus from the initial 89.5 miles of construction to this project. As a result, \$305 million of surplus funds have been identified for use on other capital needs.

Additionally, the final cost of the project may be less than the WMATA cost estimate of \$1.870 billion because the \$1.870 billion includes contingencies of \$126 million, money set aside to fund unforeseen costs. The final cost of the project could be further reduced by the amount of contingency funds not needed for project costs.

WMATA identified \$62 million as contingency funds in its latest quarterly cost summary report. Our review of WMATA's documents identified \$64 million more that WMATA treats as "unofficial contingency" funds. WMATA's reporting of project cost information to the FTA would be improved by clearly identifying the full amount of funds set aside to

fund contingency costs, or \$126 million.

There is Limited Risk to Meeting the Construction Schedule

Segment 1 opened on time on June 29, 1997, and segment 2 opened on time on July 25, 1998. While WMATA contends both segments 3 and 4 will open on time, there is some risk for each.

The contractor for the Columbia Heights station on segment 3 in northwest Washington, DC, was 8 months behind schedule as of June 1998 which puts the scheduled “late” 1999 opening at some risk of slipping into 2000. The contractor has added resources to the project and WMATA is optimistic the contractor can complete the station on time for the scheduled late 1999 opening. We agree with the assessment of FTA's independent Project Management Oversight Contractor that there is a risk the segment may not open as scheduled in late 1999.

Two of the five stations on segment four are 5 and 8 months behind schedule. However, the risk to this segment opening on time in early 2001 may not be serious because the contractors have more than 2 years to make up the delays.

Use of Surplus Funds

WMATA intends to use the available \$305 million of surplus funds to purchase rail cars and construct a rail yard. The rail cars and a rail yard were in WMATA's original plans for the project but were eliminated when Congress provided less funding than anticipated. In April 1998, FTA approved amendments to the Full Funding Grant Agreements to allow the use of Federal project funds for rail cars and the rail yard.

Recommendation

We recommend FTA require WMATA to identify in their quarterly cost summary reports all unobligated funds and all funds reserved for contingencies.

Management Position

FTA concurred with the recommendation and agreed to ask WMATA to clearly identify all contingency funds in their quarterly cost summary reports.

Office of Inspector General Comments

The action planned by FTA is responsive to our recommendation and should enhance the presentation of WMATA's cost summary reports.

Map of the Washington, D.C. Metrorail System



- Segment 1 -- Wheaton to Glenmont, MD
- Segment 2 -- Van Dorn Street to Franconia Springfield, VA
- Segment 3 -- U Street Cardozo to Fort Totten
- Segment 4 -- Anacostia to Branch Avenue

**COMPLETION OF THE METRORAIL SYSTEM
WASHINGTON, DC**

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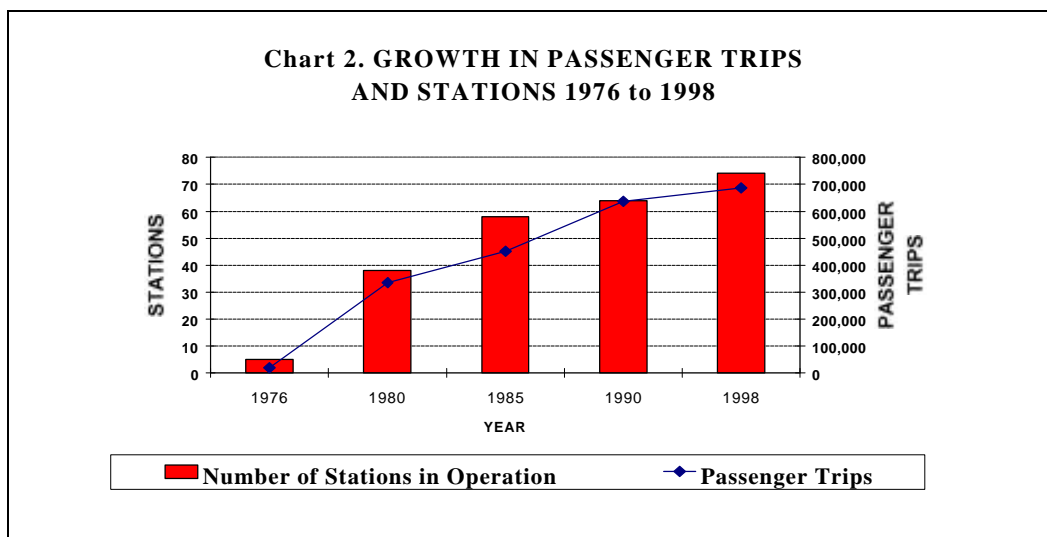
INTRODUCTION

BACKGROUND

On November 20, 1966, Public Law 89-774 was enacted establishing an agreement among the State of Maryland, the Commonwealth of Virginia, and the District of Columbia and creating the Washington Metropolitan Area Transit Authority (WMATA). WMATA had as its purpose the planning, financing, and responsibility for operation of improved transit facilities as part of a regional system of transportation. WMATA developed and obtained regional consensus on a regional rail system and, in 1969, began construction of the Metrorail subway system. Metrorail service began in 1976 with 4.5 miles of subway line and 5 stations providing 20,000 passenger trips¹ per day.

Construction has continued and by completion of the initial project in 1993, 89.5 miles of subway line and 74 stations were open and providing 661,000 passenger trips per day. The initial 89.5 miles and 74 stations cost \$7.4 billion. WMATA transferred \$95 million of surplus funds from this construction phase to the ongoing construction project in Fiscal Years (FYs) 1997 and 1998. This transfer was made pursuant to authority in the National Capital Transportation Act of 1969 (Public Law 91-143) and Full Funding Grant Agreements² that are executed for each project by WMATA and the Federal Transit Administration (FTA).

Chart 2 displays the growth in the number of stations open for service and average weekday passenger trips from 1976 through 1998.



The average weekday Metrorail ridership is now 687,000 passenger trips. The Metrorail

¹ For determining passenger trips, passengers are counted each time they board a vehicle for a different line even though he/she may be on the same journey.

² WMATA has four Full Funding Grant Agreements with FTA, one for each segment of the project.

system was designed to improve traffic flow throughout the Washington, DC metropolitan area by providing an alternative means of transportation for the 4.1 million residents of the metropolitan area that includes suburban Virginia and Maryland.

Combined segments 1-4 included in our review complete the Metrorail system established by WMATA.³ Congress authorized \$1.3 billion of funding for completing the system in 1990 and, at the same time, required the state/local jurisdictions⁴ to contribute \$780 million. Federal funding was to be made available over an eight-year period, FYs 1992 through 1999. Full Funding Grant Agreements for each segment were signed by FTA and WMATA in 1992 which specified the scope and description, estimated total cost, and Federal and state/local funding amounts by segment.

State and local jurisdictions' financing contributions were set forth in a Capital Contributions Agreement wherein the local governments agreed to provide contributions to use in conjunction with Federal grants for constructing the Metrorail system. WMATA and the local jurisdictions have used the Capital Contributions Agreements since 1970 and have amended them as funding for the system changed. The latest agreement, dated January 29, 1992, represents the fifth amendment to the initial Capital Contributions Agreement. The agreement contains schedules showing the contributions to be made by each jurisdiction to be used in conjunction with \$1.3 billion of Federal funding provided for the project. The Federal and state/local funding split for this project was 62.5 percent Federal funding and 37.5 percent state/local contributions. Federal, and state/local jurisdictions have met their funding commitments to date.

Segment Descriptions

Segment 1 – Van Dorn Street to Franconia-Springfield, Virginia: Segment 1 extended the Blue Line from Van Dorn Street to Franconia-Springfield. Construction began in late 1992 and the segment opened for revenue service on June 29, 1997. The segment consists of one station and 3.3 miles of surface and aerial (elevated) line in Fairfax County, Virginia. It is a vital link to Northern Virginia's network of transportation enhancements that include a transportation center in Franconia adjacent to the station and commuter rail service between Fredericksburg, Virginia, and Union Station in Washington, DC, on the Virginia Railway Express. According to WMATA, the current estimated cost to complete segment 1 is \$166 million. Although segment 1 is completed, the total segment cost is still an "estimate" because all costs have not been finalized.

Segment 2 – Wheaton to Glenmont, Maryland: Segment 2 extended the Red Line from Wheaton to Glenmont, Maryland, and consists of one station, a rail car yard, and 1.35

³ Legislation establishing WMATA authorizes the WMATA Board of Directors to establish and expand a regional subway system.

⁴ The state/local jurisdictions are the District of Columbia, Virginia, and Maryland, Maryland counties of Montgomery and Prince George's, Virginia counties of Fairfax and Alexandria, and Virginia cities of Alexandria, Fairfax, and Falls Church.

miles of underground line. Construction began in mid-1993 and the segment opened on July 25, 1998. Opening the Red Line extension completed the system in Montgomery County, Maryland. WMATA's current estimated cost to construct this segment is \$252 million. Although segment 2 is completed, costs are still "estimates" because final project costs have not been determined.

Segment 3 – U Street Cardozo to Fort Totten, Washington, DC: Segment 3 will close a gap in the Green Line between the U Street Cardozo station and the Fort Totten station in northwest Washington, DC. The segment consists of 2.9 miles of underground line and stations at Columbia Heights and Georgia Avenue. Construction began in early 1994 and is approximately 75 percent complete. Segment 3 is scheduled to open in late 1999 and is currently estimated by WMATA to cost \$639 million.

Segment 4 – Anacostia to Branch Avenue, Prince George's County, Maryland: Segment 4 will extend the Green Line from Anacostia to Branch Avenue in Prince George's County, Maryland. This segment consists of 6.42 miles of underground, surface, and aerial lines in the District of Columbia and Maryland, and five stations at Congress Heights, Southern Avenue, Naylor Road, Suitland, and Branch Avenue. Groundbreaking was held in September 1995 and construction is 56 percent complete. The segment's projected opening for revenue service is early 2001 and is estimated by WMATA to cost \$806 million.

OBJECTIVES, SCOPE, AND METHODOLOGY

This review of the WMATA Metrorail System is one of a series of Office of Inspector General (OIG) reviews of DOT's "mega" infrastructure projects. OIG defines mega projects as those projects having potential costs of \$1 billion or more and/or having a high degree of congressional interest. The objectives of our mega project reviews are, for each project: (1) to determine current funding, cost, and schedule status and the reasonableness of related data for each construction project and, (2) to identify potential financial and schedule risks. Further, these reviews are designed to benefit all Operating Administrations within the Department through increasing awareness of specific large-dollar projects and sharing success stories as well as pitfalls to be avoided. The goal of OIG's mega project reviews is to develop a baseline set of data points on these projects' funding sources, costs, and schedules. We plan to conduct these reviews on an on-going basis.

In assessing the current funding, cost, and schedule status of the four-segment WMATA Metrorail construction project, we reviewed and analyzed project-specific documentation, including financial records, project management oversight reports, construction status reports, Full Funding Grant Agreements, and the Capital Contributions Agreement. We also evaluated the reasonableness of data provided through careful analysis of these documents and through discussions with those involved in project management, including FTA and WMATA officials, and FTA's independent Project Management Oversight

Contractor (PMOC), Day & Zimmerman Infrastructure, Inc. We reviewed prior audit reports issued by the OIG, the General Accounting Office, and WMATA's internal auditors. We did not independently evaluate the merits or potential resolution of any pending lawsuits, disputes, or claims.

We conducted this review from October 1997 through January 1998 and have updated cost and project status information through June 1998. The review was conducted at the WMATA offices and construction sites in Washington, DC, and Suitland, Maryland, and at FTA offices in Washington, DC. We conducted this review in accordance with Government Auditing Standards prescribed by the Comptroller General of the United States. We obtained an understanding of the WMATA's management controls that were relevant to this review. However, we did not review those management controls.

FUNDING and COSTS

Project funding is adequate to construct the latest addition to the Washington Metrorail system. In total, \$2.080 billion of Federal and state/local funding (\$1.3 billion and \$780 million, respectively) was available for construction. As of June 30, 1998, WMATA estimated the cost to complete the four segments and the operations control center at \$1.870 billion, or \$210 million below WMATA's \$2.080 billion cost estimate. According to WMATA, contract awards below WMATA's original cost estimates⁵ were primarily responsible for producing the \$210 million surplus. All estimates appear reasonable and we believe final project costs will be no more than \$1.870 billion. In fact, final costs may be less than \$1.870 billion because the cost estimate includes \$126 million of contingency funds⁶ and the project's final cost would be reduced by the amount of contingency funds not needed for construction.

PROJECT FUNDING IS SUFFICIENT TO COMPLETE CONSTRUCTION

Adequate Federal, state, and local funding has been committed to complete construction of the four segments. Federal funding for the project was provided in the National Capital Transportation Amendments of 1990 (Amendments). The Amendments authorized \$1.3 billion to be available in eight annual increments beginning FY 1992 and ending FY 1999. Full Funding Grant Agreements, one for each of the four segments, established the expected Federal contributions by fiscal year. The Full Funding Grant Agreements are signed by FTA and WMATA and reflect the Federal and state/local funding amounts for each segment as well as the scope and description of each segment and the estimated total segment cost. The project descriptions cover the stations and track, and the hardware, software, and facilities needed to support the segment.

The Amendments also provide required state/local contributions of not less than 60 percent of the \$1.3 billion Federal funding amount or \$780 million. A total of \$2.080 billion of Federal, and state/local funding (\$1.3 billion and \$780 million, respectively,) was available to complete Metrorail construction. While WMATA's \$2.080 gross construction cost estimate appeared as early as 1987 in a report to Congress, detailed individual segment cost estimates, equaling the gross estimate, were provided to OIG by WMATA in the Capital Contributions Agreement (Agreement) dated August 20, 1992. The Federal and state/local funding split for this project was 62.5 percent Federal funding and 37.5 percent state/local contributions.

⁵ We refer to WMATA's 1987 estimate as their original estimate for both the gross and segment amounts.

⁶ Contingency funds are an estimated sum or a percentage of contract costs set aside to pay for expected but unidentified (unforeseen) construction costs, such as differing site conditions, which often occur. Setting aside contingency funds is a common practice on construction projects.

State and local jurisdictions' financing contributions are set forth in the Agreement wherein the local governments commit to provide contributions to use in conjunction with Federal grants for constructing the Metrorail system. The Agreement, signed by WMATA and representatives of each local jurisdiction, contains schedules of payments showing the monthly contributions to be made by the jurisdictions. Based on our review, we determined that, to date, appropriations acts have fully funded the 8-year Federal commitment established in the 1990 Amendments and state/local jurisdictions have contributed their scheduled matching funds.

Table 2 shows the amount of construction funding available from Federal Appropriations acts and local jurisdictions' contributions from FY 1992 through FY 1999.

Table 2. Federal and State/Local Funding Available for Construction			
Fiscal Year a/	Federal Appropriations (\$ millions)	State/Local Contributions (\$ millions)	Total Funding Available for Construction (\$ millions)
1992	96	58	154
1993	154	92	246
1994	200	120	320
1995	200	120	320
1996	200	120	320
1997	200	120	320
1998	200	120	320
1999	50	30	80
Total	\$1,300	\$780	\$2,080

a/ Figures for FYs 1992 through 1998 represent actual Federal appropriations and local contributions. FY 1999 represents planned appropriations and contributions.

PROJECT COSTS ARE BELOW ESTIMATES

With approximately 99 percent of all construction contracts awarded, WMATA's latest quarterly cost figures dated June 30, 1998, estimate the total cost for completing the four segments and the operations control center to be \$1.870 billion. This cost figure is 10 percent below WMATA's original \$2.080 billion cost estimate, resulting in savings/surplus funds of \$210 million. Our review of detailed cost documents and summary cost reports found that the \$1.870 billion estimated cost includes \$126 million of contingency funds.

WMATA identified only \$62 million of a potential \$126 million as contingency funds in its quarterly cost summary reports. However, we identified an additional \$64 million that

WMATA treats as “unofficial contingency” funds.⁷ The project’s final cost will be further reduced by the amount of all contingency funds not needed for construction.

Our review of the bid tabulations and contract files for the segments showed that contract awards were significantly below WMATA’s original cost estimates. The WMATA Director of Construction attributed the low award amounts to a very competitive construction market at the time construction bids were solicited, low inflation, insurance cost savings, and low real estate acquisition costs. Furthermore, our review showed that project cost growth was minimized because WMATA did not materially change system designs after contracts were awarded. Consequently, change orders represent only 4 percent of WMATA’s June 30, 1998, project cost estimate. Table 3 provides WMATA’s original cost estimate; WMATA’s June 30, 1998, estimated costs to complete construction; and the amount of surplus funds identified by WMATA.

Table 3.			
Original Cost Estimate Versus Current Estimate			
Segment	Original Cost Estimate (in millions)	June 30, 1998 Cost Estimate^{a/} (in millions)	WMATA Identified Surplus (in millions)
1	\$ 236	\$ 166	\$ 70 ^{b/}
2	294	252	42
3	644	639	5
4	901	806	95
Operations Control Center Upgrades	5	7	(2)
Total	\$2,080	\$1,870^{c/}	\$210

a/ Although segments 1 and 2 are completed, total segment costs are still "estimates" because all costs have not been finalized.

b/ \$2 million of the \$70 million surplus was used for the increased costs on the Operations Control Center.

c/ This figure includes \$126 million of contingency funds for unplanned costs.

SEGMENT FUNDING AND COST ANALYSIS

Segment 1 – Van Dorn Street to Franconia-Springfield, Virginia – Segment 1, which extended the Blue Line to Franconia-Springfield, opened June 29, 1997. The segment is estimated to cost \$166 million or \$70 million less than the \$236 million budgeted. Two million dollars of the \$70 million surplus was used to fund increased costs of the operations control center. The remaining \$68 million surplus is part of the \$210 million of savings/surplus funds identified by WMATA. Based on our review of available cost records and discussions with WMATA project management officials, we found WMATA’s estimated cost of \$166 million to be reasonable.

The \$166 million segment cost estimate includes \$4 million of costs due to approved contract modifications and project change orders. The \$166 million estimate also

⁷ WMATA quarterly cost summary reports show these funds as unobligated budget funds but WMATA has historically treated them in the same manner as contingency funds, i.e., using them to pay for unplanned costs. We combine the identified and unidentified amounts and refer to them collectively as “contingency funds” throughout the report.

includes \$6 million of contingency funds that remain on the project because of a disagreement with the Virginia Railway Express (VRE) over who will pay for construction of a concrete wall separating WMATA's tracks from the tracks used by VRE. If VRE pays for the wall, the \$6 million could be transferred to the other three segments or, if not needed, would be added to the \$210 million of available surplus funds.

<i>Overview of Segment 1 Costs</i>	
WMATA's Original Cost Estimate	\$236 million
Current Estimated Cost	\$166 million
Contingency Funds included in the Current Estimated Cost	\$ 6 million
Surplus Funds identified by WMATA	\$ 68 million ^{a/}

a/ \$2 million of surplus funds used for increased costs of the operations control center

Segment 2 - Wheaton to Glenmont, Maryland – As of June 30, 1998, segment 2 was forecasted by WMATA to cost \$252 million, or \$42 million less than the \$294 million initially budgeted. This \$42 million is included in the \$210 million of surplus funds identified by WMATA. The \$252 million cost estimate includes \$12 million in contingencies and \$6 million of approved modifications and project change orders. As of June 30, 1998, \$220 million had been expended. Even though milestones have been missed and additional costs incurred, we believe WMATA's cost estimates for this segment are reasonable.

Project is on Schedule Because WMATA Took Aggressive Steps to Enforce Missed Milestone Dates

In accordance with the contract, WMATA began assessing deductions (liquidated damages)⁸ from payments to the station contractor in June 1997 for missing an interim milestone date related to providing the escalator/elevator contractor access to the station. While liquidated damages for this milestone are no longer being withheld, they are accruing on another missed milestone because the contractor did not meet the final completion date for the station. These accrued liquidated damages will be assessed the contractor at the completion of the contract.

Liquidated damages were set at a fixed daily charge. The amount of the charge was established in the contract as \$1,500, \$2,500, \$3,000, or \$4,000 per day, depending on which interim milestone date or final completion date was not met. As of June 30, 1998, approximately \$1.3 million has been withheld from the station contractor. This amount will be used to pay for additional costs associated with delaying follow-on contractors, such as the escalator/elevator contractor, who are deprived access to the station by the date established in their respective contracts because the station contractor missed a

⁸ Liquidated damages is a specified amount stipulated in the contract to be recovered from the contractor for each day he delays completing specified work.

milestone date.

<i>Overview of Segment 2 Costs</i>	
WMATA Original Cost Estimate	\$294 million
Current Estimated Cost	\$252 million
Contingency Funds included in	
The Current Estimated Cost	\$ 12 million
Surplus Funds identified by WMATA	\$ 42 million

Segment 3 – U Street Cardozo to Fort Totten, Washington, DC – WMATA projects that segment 3 will cost \$639 million, or \$5 million less than budgeted. The \$639 million cost includes paying \$54 million for approved modifications and project change orders. The \$5 million is included in the \$210 million surplus identified for the project. WMATA’s estimate includes using the full \$42 million in contingencies. As of June 30, 1998, \$485 million has been expended leaving approximately \$154 million of work to be completed.

The segment is 75 percent complete. WMATA does not anticipate any additional surplus funds on this segment because additional costs for differing site conditions and contractor claims may deplete the contingency funds for this segment. In our opinion, WMATA’s plans to fund the segment are reasonable.

Pending Claims May Increase Segment Costs

WMATA has approved a contract modification for one portion of tunnel work for \$35 million due to differing site conditions experienced by the contractor through June 1, 1996. (The \$35 million is included in the \$54 million of approved modifications and project change orders.) WMATA is now negotiating a settlement with the contractor for differing site conditions experienced after June 1, 1996.

In addition to these costs, a tunnel contractor for this segment filed a \$44 million lawsuit against WMATA in U.S. District Court in late 1997. The contractor contended that WMATA solicited bids on contract documents that WMATA knew were incomplete, inaccurate, and misleading, causing the contractor to perform work radically different than the work described in the contract. WMATA filed a Motion to Dismiss and alternatively for Summary Judgment in December 1997. It argued the contractor did not exhaust the administrative remedies contained in the contract which required him to appeal first to the Dispute Resolution Board. The Judge denied WMATA’s Motion on June 19, 1998, on the basis that the contractor's claim was outside the contract. The Judge refused to consider WMATA's alternative motion for Summary Judgment due to lack of support. A pretrial schedule has been set, including a status conference on June 28, 1999.

The Director of Construction believes the claim will be settled for less than \$44 million. However, if the claim is settled for more than the \$42 million held in contingency on this segment, additional funds would be needed to complete the segment. WMATA intends to use contingency funds from other segments in the event this shortfall occurs.

<i>Overview of Segment 3 Costs</i>	
WMATA's Original Cost Estimate	\$644 million
Current Estimated Cost	\$639 million
Contingency Funds included in the	
Current Estimated Cost	\$42 million
Surplus Funds identified by WMATA	\$ 5 million

Segment 4 - Anacostia to Branch Avenue, Maryland - WMATA projects that segment 4 will cost \$806 million, which is \$95 million less than WMATA's original estimate of \$901 million. This \$95 million is part of the \$210 million of surplus funds identified on the project. The estimated cost includes \$66 million in contingencies and \$11 million in approved modifications and project change orders. The large contingency is appropriate because the segment is only 56 percent complete and includes a lengthy tunneling operation that could result in unexpected problems and substantial additional costs.

As of June 30, 1998, \$457 million has been expended, leaving approximately \$349 million of work to perform. Based on our review of WMATA cost records and discussions with project management, we believe WMATA's estimate for this segment is reasonable.

<i>Overview of Segment 4 Costs</i>	
WMATA's Original Cost Estimate	\$901 million
Current Estimated Cost	\$806 million
Contingency Funds included in the	
Current Estimated Cost	\$ 66 million
Surplus Funds identified by WMATA	\$ 95 million

Operations Control Center – WMATA determined that an upgrade to the operations control center was needed to more safely control trains when the entire 103 mile system is completed. In 1991 WMATA began a \$29 million upgrade to hardware and software for the train control and display systems and the facility housing the operations control center. Seven million of the \$29 million upgrade cost came from funds for the 13.5 mile/nine-station construction project. The \$22 million balance of funding came primarily from separately appropriated improvement grants available to all transit authorities⁹.

⁹ This \$22 million is outside the scope of this mega project review since these grants are separately authorized and appropriated. Therefore, we did not include it in our cost computations.

The center, located in the WMATA headquarters building, provides computerized control and display of the subway trains as they move throughout the subway system. The upgraded center is capable of handling more demands if the system is expanded or more trains are added. The project was completed on February 27, 1997.

As of June 30, 1998, WMATA has spent \$1.305 billion of project funds, including \$815 million in Federal funding and \$490 million in state/local funding. Table 4 provides the costs to date and future costs for the four segments and the operations control center.

Segment	Actual Costs as of June 30, 1998 (in millions)			Future Costs (in millions)			WMATA Estimated Cost to Complete (in millions)	Contingency Funds in Cost to Complete (in millions)	Percent Complete
	Federal Share	State/ Local Share	Total Spent	Federal Share	State/ Local Share	Total Future Costs			
1	\$ 96	\$ 58	\$ 154	\$ 8	\$ 4	\$ 12	\$ 166	\$ 6	100
2	136	81	217	22	13	35	252	12	100
3	300	180	480	99	60	159	639	42	75
4	279	168	447	224	135	359	806	66	56
Operations Control Center	4	3	7 ^{a/}	0	0	0	7	0	100
Total	\$815	\$490	\$1,305	\$353	\$212	\$565	\$1,870	\$126	70

^{a/} Seven million of the \$29 million upgrade cost came from funds for the 13.5 mile/nine-station construction project. The \$22 million balance came primarily from separately appropriated improvement grants available to all transit authorities.

USE OF SURPLUS FUNDS

The National Capital Transportation Assistance Act of 1969 provided that Federal funding authorized under that Act would be available for completing the entire subway system. In addition, appropriations acts provide that Federal funding appropriated to WMATA is available until expended. In accordance with these provisions, WMATA has \$305 million available for other system needs, \$95 million surplus funds from the initial 89.5 mile construction program and \$210 million from the current project.

Federal funding for subway systems was historically used for rail cars, revenue collection systems, and support facilities such as rail yards and operations control centers, as well as stations and track. The rail cars and a rail yard were in WMATA's original plans for the segments and were included as unfunded items in the Capital Contributions Agreement. Therefore, WMATA requested, and FTA approved, amendments to the Full Funding Grant Agreements to allow the use of surplus funds to purchase rail cars and construct a rail yard at Branch Avenue.

On May 5, 1998, WMATA awarded a \$212 million contract to purchase 110 rail cars.

The remaining funds will be used to design and begin construction of the Branch Avenue rail yard.

Recommendation

We recommend FTA require WMATA to identify in their quarterly cost summary reports all unobligated funds and all funds reserved for contingencies.

Management Position

FTA concurred with the recommendation and agreed to ask WMATA to clearly identify all contingency funds in their quarterly cost summary reports.

Office of Inspector General Comments

The action planned by FTA is responsive to our recommendation and should enhance the presentation of WMATA's cost summary reports.

Section 3

SCHEDULE STATUS

Segment 1 opened on-time on June 29, 1997 and segment 2 opened as scheduled on July 25, 1998. Segment 3 in northwest Washington may not open on time. Although WMATA is optimistic segment 3 will open as scheduled in late 1999¹⁰, FTA's PMOC believes there is risk that the segment will not be completed on time. Contractors for the Suitland and Southern Avenue stations are behind schedule on segment 4. WMATA is confident segment 4 will open as scheduled in early 2001 and the independent PMOC believes this segment is not seriously at risk because contractors have more than 2 years to make up lost time.

Table 5 provides the scheduled opening dates for the four segments and the completion date for the operations control center.

Table 5. Actual and Scheduled Completion Dates For The 4 Segments And Operations Control Center	
	Scheduled Opening Dates
Operations Control Center Upgrades	Completed February 27, 1997
1	Opened June 29, 1997
2	Opened July 25, 1998
3	Late 1999
4	Early 2001

Segment 1 Was Completed On Time

Segment 1 opened for revenue service on June 29, 1997. The segment, consisting of one station and 3.3 miles of surface line in Fairfax County, Virginia, is a vital link to Northern Virginia's network of transportation enhancements. It is expected to play an important role in easing traffic congestion during the reconstruction of the I-95/I-395/I-495 interchange over the next 10 years, especially due to the station's access to buses, carpools, and the Virginia Railway Express commuter trains. The segment is being used more than originally anticipated. Daily ridership is approximately 11,000 passengers, almost twice as high as projected.

The June 29, 1997, segment 1 opening met the target date established by the WMATA Board of Directors. No major problems occurred with the contractors involved and WMATA has negotiated and settled all major outstanding issues.

Segment 2 Opened On Schedule

¹⁰ The WMATA Board of Directors will establish the specific opening dates for segment 3 and segment 4 when they are closer to construction completion.

The segment 2 extension consists of one station, a rail car yard, and 1.35 miles of underground line. Construction began in mid-1993. Although the station was behind schedule, significant progress in completing the station was made due to the contractor increasing the number of workers on-site in January 1998 and working every Saturday and an occasional Sunday. The segment opened on schedule on July 25, 1998.

Segment 3 is at Risk of Not Opening On Time

Segment 3 is at risk of not opening on time because WMATA's efforts to improve the Columbia Heights station contractor's performance have been ineffective until recently. The segment consists of 2.9 miles of underground line and two stations, at Columbia Heights and at Georgia Avenue. Construction began in early 1994 and is approximately 75 percent complete. Segment 3 is scheduled to open in late 1999.

Columbia Heights Station is Behind Schedule

As of June 30, 1998, the segment's Columbia Heights Station had remained more than 8 months behind schedule for 8 consecutive months. During the early phases of construction WMATA initiated several actions in an attempt to improve the station contractor's performance. For example, during 1995 and 1996, the Resident Engineer and the WMATA Contracting Officer exchanged correspondence with the contractor numerous times and regularly met with contractor officials in an effort to accelerate work. These efforts did not achieve the intended results. WMATA's Contracting Officer and Director of Construction told us termination was allowed by the contract and was evaluated as an alternative, but WMATA management decided that working with contractor management to improve performance was a better course of action. WMATA's decision was based on a determination that not only would termination be costly, but there still would be no guarantee the station would be completed on time.

In June 1997, with the contractor 217 days behind an interim milestone date, WMATA officials began monthly meetings with executive-level contractor personnel. The frequency of meetings increased to weekly in January 1998, at which time the contractor had become 250 days behind schedule. However, these meetings still did not result in reducing the number of days the contractor was behind schedule.

In an April 2, 1998, letter to the contractor's Vice President, WMATA's Contracting Officer directed the contractor to accelerate construction by working two 10-hour shifts per day in the north service room, station vault, and south service room areas. The letter also informed the contractor that this and any previously directed effort required to meet contract interim dates and final completion date would be at no additional cost to WMATA. The Contracting Officer also stated WMATA's belief that the scheduled station completion date was in jeopardy.

In May 1998, the construction company's Vice President in charge of the project was replaced and the contractor added equipment and personnel to the station construction

project. According to WMATA, all courses of action are being taken with major contractors to meet the established opening schedules. WMATA is optimistic that the contractor can complete the station on time for the scheduled late 1999 opening. FTA's independent PMOC, however, is concerned that the station may not be completed in time to meet the scheduled segment 3 opening date due to lack of progress on the station, and will closely monitor the project. We share the PMOC's concerns and believe the segment is at risk of not opening on time.

Claims for Delay Before Dispute Resolution Board

The contractor for the Columbia Heights Station and WMATA have not reached agreement on the number of additional days the contractor should be provided to complete his work. Specifically, the contractor did not agree with the 72 additional days proposed by WMATA for his delayed access to the station's north service room area, and the contractor did not agree with the 150 additional days given by WMATA for all delays occurring between November 1995 and December 1996. WMATA disagrees that more days are warranted and WMATA's Contracting Officer forwarded the issue to the Dispute Resolution Board. The Dispute Resolution Board held 8 days of hearings on the matter in February, March, and April 1998 and a final decision is not due from the Board until October 1998.

Segment 4 is at Some Risk of Opening On Time

Segment 4 extends the Green Line to Branch Avenue in Prince George's County, Maryland. The segment consists of 6.42 miles of underground, surface, and aerial lines in the District of Columbia and Maryland, and five stations at Congress Heights, Southern Avenue, Naylor Road, Suitland, and Branch Avenue. Although the Suitland and Southern Avenue stations are seriously behind schedule, the segment is likely to open on time because two years remain until opening.

The Suitland and Southern Avenue stations on segment 4 to Branch Avenue were behind interim milestone dates by 258 and 165 days, respectively, as of mid-June 1998. In a June 16, 1998, report to WMATA, the PMOC stated it intends to closely monitor progress on these two contracts.

The risk of not meeting the 2001 opening date for this segment is not as great as it is on segment 3 because more than two years remain until the scheduled opening, providing ample opportunity for the contractors to recover lost time. However, we believe the contractors' progress during the next 6 months is critical to assuring that segment 4 opens as scheduled in early 2001.

MAJOR CONTRIBUTORS TO THIS REVIEW

The following is a listing of the major contributors on the review of Completion of the Metrorail System, Federal Transit Administration.

Jackie Goff	Program Director
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