REPORT OF THE
VIRGINIA DEPARTMENT OF TRANSPORTATION

A Study of Transportation Trust Fund Allocation Formulae (SJR 188) 1992 Interim Report

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

SENATE DOCUMENT NO. 4

COMMONWEALTH OF VIRGINIA
RICHMOND
1993

A STUDY OF TRANSPORTATION TRUST FUND ALLOCATION FORMULAE (SJR 188)

1992 INTERIM REPORT

Virginia Department of Transportation
Ray D. Pethtel, Commissioner
1401 East Broad Street
Richmond, Virginia 23219

June 1992

PREFACE

The Virginia Department of Transportation (VDOT) under the direction of Ray D. Pethtel, Commonwealth Transportation Commissioner, was asked by the 1991 General Assembly through Senate Joint Resolution 188 (SJR 188) to study the Transportation Trust Fund allocation formulae.

This report was prepared under the direction of Mary Lynn Tischer by Robert O. Biletch of the VDOT Policy Office, with sections written by Lawrence C. Caldwell of the VDOT Transportation Planning Division, William C. LaBaugh and George R. Conner of the VDOT Rail and Public Transportation Division, Michael A. Waters of the Virginia Department of Aviation (VDOA), Todd Coyle of the Virginia Port Authority (VPA), and Amy L. O'Leary and Janice T. Zagardo of the VDOT Research Council.

Technical assistance was provided by James W. Atwell, the VDOT Director of Finance, Sally H. Cooper, the VDOT Director of Rail and Public Transportation, Gerald F. Fisher of the VDOT Secondary Roads Division, M. Scott Hollis of the VDOT Urban Division, Robert O. Cassada of the VDOT Programming and Scheduling Division, Peter Kolakowski and Richard A. Davis of the VDOT Budget Division, Charles M. Badger of the VDOT Rail and Public Transportation Division, Gary R. Allen and Brian Smith of the VDOT Research Council, Amelia E. Jordan of the VDOT Policy Office, Cliff Burnette of the Virginia Department of Aviation, and Greg Rest and Glen S. Tittermary of the Joint Legislative Audit and Review Committee. Susan B. Edwards and Margaret W. Redford prepared the tables, typed and edited the report.

An Advisory Network was established to ensure that perspectives from modal, geographic, governmental, and other transportation interests are provided throughout the conduct of the study. The Advisory Network was composed of the following individuals:

David Ash, Clarke County Administrator
David P. Bowerman, Albemarle County
Elizabeth T. Bowles, Fifth Planning District Commission
J. Roderick Burfield, Washington Metropolitan Area Transit Authority
Harry G. Daniel, Chesterfield County Board of Supervisors
Anthony E. Dowd, Virginia Aviation Board
James C. Echols, Director, Tidewater Transportation District Commission
Dwight Farmer, Hampton Roads Planning District Commission
Ellen Farnham
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J. Robert Justice, Highway Users Federation
J. J. Keever, Hampton Roads Maritime Association
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EXECUTIVE SUMMARY

I. INTRODUCTION

During the 1991 General Assembly, several resolutions were introduced that required the study of various aspects of transportation funding. These resolutions refer to the Transportation Trust Fund (TTF) Allocation Formulae that were codified into law in 1985 and 1986 when the TTF was created. The highway formulae were derived from analyses performed by the Joint Legislative Audit and Review Commission (JLARC) which, among other recommendations, called for a periodic evaluation of the formulae to ensure that equity continued to be obtained in the distribution of funds.

Significant increases in population and changes in its household location and employment patterns provided the impetus for review of the allocation formulae. Anticipated reauthorization of the federal-aid program provided another reason for evaluation. The federal-aid program that had been in existence since 1956 was lapsing in September 1991 and concern was expressed that the current formulae might not be compatible with the new program and prevent the Commonwealth from obtaining all of the federal funds for which it was eligible. Comprehensive evaluation of the formulae would also naturally include the study of a rail fund since the first distribution within the formulae is to modes.

Study Mandate and Charge

Senate Joint Resolution 188 mandates that the Virginia Department of Transportation (VDOT, or the Department): (1) study the Transportation Trust Fund allocation formulae and make recommendations for revising the formulae in order to maintain equity in the distribution of the Fund, and (2) assess the need for rail freight and passenger services and programs, and identify funding sources and mechanisms required to provide assistance for meeting rail needs. To fully address TTF allocation issues, a third requirement of the study is to consider the federal, state and local participation in meeting transportation needs.

Allocation equity and policy issues for highways, public transportation, rail transportation, aviation, and ports will be evaluated. The study results will include assessments of current TTF allocation structures and mechanisms and recommendations for alternatives to these structures, if appropriate.

Study Approach

The issues to be addressed include an examination of rail needs and potential funding sources and mechanisms to meet the identified needs, an examination of other modal needs and historic funding patterns, and a study of the highway formulae. First the existing formulae will be evaluated to determine whether equity continues to be obtained; if they no longer provide equity in the allocations, alternative factors and weights will be considered. Lastly, alternative formulae will be discussed.

The methodology to be used in this study for the evaluation of the current formulae is based on that used in the 1983 and 1984 JLARC studies of transportation allocations. Dollar needs will serve as basis of allocations and equitable allocations will be defined as allocation share proportional to needs share. The formulae will be approached from a broader policy perspective as well.

In part, SJR 188 is being conducted by VDOT because of its broad expertise in transportation issues and because it recently completed a number of studies that relate to transportation needs and allocation issues. However, due to the far-reaching implications of findings and recommendations resulting from any study of transportation funding, participation from individuals and groups outside VDOT has been structured into the study process. Five regional public meetings were held and an Advisory Network, consisting of 43 individuals, was established to ensure that perspectives from modal, geographic, governmental, and other transportation interests are provided throughout the conduct of the study.

II. DESCRIPTION OF THE ALLOCATION FORMULAE

Allocations are presently determined by the Code which requires funds to be distributed on the basis of set guidelines. A certain percentage of the funds are assigned for modal allocations and allocations to programs within modes. These proportions were based on the share of needs for each transportation mode and program and are the subject of evaluation. In this study, the formulae for modes and highway allocations to administrative classes and geographic units will be examined to determine if they still provide equitable allocations.

Transportation Trust Fund

The Transportation Trust Fund was established in 1986 as the result of recommendations of the Commission on Transportation in the Twenty-First Century (COT-21). A major purpose underlying the creation of this fund was to provide a separate multimodal fund for transportation facility construction in the Commonwealth. New revenues, which have come to be known as 1986 Special Session revenues, were made available to support modal needs when the TTF was created. Revenues from other

sources are administered through the TTF, as well. The HMOF is a fund designated primarily for administrative overhead and highway maintenance programs.

Funding for Transportation Modes

Special Session revenues remaining after fund administration expenses are removed are currently allocated among modes as presented in Table I.

TABLE I
MODAL ALLOCATIONS

MODE	SHARE OF REMAINING FUNDS
Highway	85.0% plus interest
Mass Transit	8.4% plus interest
Ports	4.2% plus interest
Aviation	2.4% plus interest

Funding for highways, aviation, ports, and public transportation is allocated to separate modal funds. The Commonwealth Port Fund provides TTF funding for ports while the Commonwealth Airport Fund is designated for aviation funding. Allocations made for public transportation are made from the Commonwealth Mass Transit Fund. Allocations made for the rail mode are included in the highway category. Each fund provides for the distribution of monies in various ways.

Funding for Highways

A portion of the highway Special Session revenues and the funds transferred from the HMOF for highway construction are allocated to meet surface transportation needs. The HMOF is a fund designated primarily for administrative overhead and highway programs.

There are several programs that are funded off-the-top of the highway formulae including programs for Industrial Access, Recreational Access, Airport Access, Railroad Access, Construction Training-Supported Services, Capital Outlay, Construction Management, Appalachian federal aid, Forest Highways, revenue sharing, coal severance tax roads, interstate transfer, public lands, and demonstration projects.

In 1979, the General Assembly established an unpaved roads fund. Non-surface-treated roads that carry 50 or more vehicles per day are eligible. Currently by law, 5.67 percent of highway construction funds, excluding interstate federal aid, and its match, Route 28 and Route 58 funds, toll facilities, and the access programs described previously are set aside for the fund. Allocations are made to counties based on the ratio of unpaved mileage in each county carrying 50 or more vehicles per day to the state total of such unpaved mileage.

Funding for the interstate system is derived from the federal-aid program. Federal monies for the interstate can only be used for eligible projects on the system and are, therefore, dedicated funds. States are also required to match federal funds. The required match is derived from each district's primary system funding unless it exceeds 25 percent of the primary system allocation. In that case, the amount exceeding the threshold is taken off-the-top of the Transportation Trust Fund and set aside for allocation before other funds are distributed.

After these special programs have been funded, the remaining construction funds are available for allocation to the primary, secondary, and urban administrative systems. Under the current provisions of law, the administrative classes are to receive allocations proportionate to 40 percent for primary, 30 percent for secondary, and 30 percent for urban.

Geographic allocations are also made by formulae. For the primary system, funds are allocated by formula to construction districts, with vehicle miles traveled (VMT) weighted 70 percent, primary road lane miles weighted 25 percent, and a needs factor weighted five percent. The secondary system county allocation formula for paved roads weights population 80 percent and area 20 percent. Urban system funds are allocated to eligible municipalities by population.

Funding for Public Transportation

Funds for mass transit purposes are derived from both the HMOF and the Commonwealth Mass Transit Fund, a component of the TTF. The Code of Virginia subdivides eligible projects into three categories: formula assistance, capital assistance, and special projects.

Formula assistance for public transportation is allocated 73.5 percent of the Fund and is used primarily for operating assistance. These funds can also be used for capital assistance. Twenty-five percent of the Fund is allocated for capital assistance and the remaining 1.5 percent is for special projects. Special projects include ridesharing assistance, technical assistance, promotional activities, and experimental projects.

Funding for Aviation

The Commonwealth Transportation Trust Fund legislation dictates that the Commonwealth Airport Fund (CAF) is shared between air carrier, reliever, and general aviation airports. Air carrier airports receive 40 percent of the CAF as entitlement funds. Forty percent is allocated by the Virginia Aviation Board (VAB) on a discretionary basis to air carrier and reliever airports. The balance (20 percent) is allotted by the VAB to general aviation airports, also on a discretionary basis.

Funding for Ports

Special Session revenues allocated to ports are designated by the General Assembly for capital facilities or for the preservation of capital facilities. The amount in each category is appropriated by the General Assembly.

III. METHODOLOGY

The methodology used in this study is based on that used by JLARC in their 1983 and 1984 studies of the TTF allocation formulae. Dollar needs were employed as the basis for allocation. The present study utilizes 20-year plans derived from the 2010 Statewide Highway Plan and other long range planning documents. These plans were developed in consultation with local governments and transportation providers.

JLARC evaluated the formulae using an equity criterion whereby equity was obtained when the proportion of allocations equalled the proportion of needs. Initially the same criterion is being applied in this study. It is important that the needs developed be comparable across transportation modes and be derived from equivalent methodologies. This study uses needs that were developed using similar costing methodologies and time frames, and are expressed in equivalent dollars.

IV. IDENTIFICATION OF NEEDS

Needs developed for the five transportation modes total over $52 billion. These needs were derived from various long range plans for each of the modes and represent capital requirements for all of the modes and operating costs for public transit for the 20-year planning horizon. The needs were developed utilizing consistent methodologies and procedures and reflect requirements to continue existing levels of service or to bring systems up to standard. The ability to adequately meet these transportation needs depends on the availability of funding at the federal, state, and local levels, however.

Needs for highways were identified based on adequacy of the road's geometrics, existing and forecast traffic congestion, minimum pavement width and type, whether

bridges were required to be replaced or rehabilitated, present and anticipated railroad crossing and other safety improvements, and spot deficiencies including intersections, curves, and drainage needs due to flooding. On local secondary roads the surface type and pavement width was compared to a set of standards according to traffic volume range. The total miles of roadway by jurisdiction that did not meet the standards was identified and average costs to bring the roads up to standard were applied.

Public transportation needs represent the latest capital and operating assessments provided by the existing operators and all projects included in the Northern Virginia Subregional Plan, extrapolated over the 20-year period.

Rail needs were developed in four categories: purchases of abandoned lines, rehabilitation and improvement of lines, safety, and rail industrial access. These needs were derived in conjunction with the freight railroads and Amtrak and are based on State Corporation Commission standards and Federal Railroad Administration guidelines.

Aviation needs address existing facilities, navigational equipment, and proposed heliport facilities in the Commonwealth. In addition, facility capacity requirements and those for new general aviation and commercial airports were identified. The criteria used to develop the needs are determined by an airport's functional category (general aviation, reliever, or air carrier), service area, and the aeronautical demand generated by the specific users of the facility.

The identification of needs for port facilities is based on an assessment of market factors and future trends in U.S. and Atlantic Coast global trade; world container shipping industry, and competitor ports' strategies in terms of facilities, intermodal operations, perceived market strategy, and labor environments.

V. THE RELATIVE PARTICIPATION OF STATE, FEDERAL, AND LOCAL GOVERNMENTS

Funding for the transportation modes is derived from a variety of sources including federal funds, local tax revenues, local farebox revenues, the Transportation Trust Fund, and the Highway Maintenance and Operating Fund. By projecting into the future the current funding level provided by state, local, and federal governments, the total amount of funds available to meet transportation needs is estimated to be approximately $28 billion. This level of funding falls well short of meeting the $52 billion of transportation needs in the Commonwealth.

VI. ISSUES IN THE DEVELOPMENT OF A RAIL PROGRAM

The railroads serving Virginia are rapidly divesting themselves of lines; new services are not being implemented. The Commonwealth is already involved in federal and state initiatives for rail service; rail freight and intercity passenger transportation are not funded through the TTF, however.

The issue in establishing a rail fund is fundamentally one of determining whether or not it is in the public interest for the state to assist in subsidizing the rail mode. If it is determined to be in the public interest, the appropriate level of funding must then be decided. Other issues involved in establishing a rail program are similar to those for other modes: determining what should be considered eligible for funding and the source of funds.

The programs that have been funded have proven to be successful. The Rail Industrial Access Program has funded 37 projects for businesses that have a combined employment potential of 2,914 employees. The Eastern Shore railroad has been in service for 15 years. Without a rail program with a continuing source of funding, many of the needs that cannot be served by the private sector will go unmet.

VII. ANALYSIS OF THE FORMULAE

Preliminary analysis indicates that there has been some change in the distribution of transportation needs across modes, transportation programs, and geographic areas. Examination of the needs data has revealed that the statutory allocations to the modes may no longer be adequate.

The distribution of needs across highway administrative systems appears to have shifted since the last needs assessment was done in 1984. The share of needs for each administrative system does not match the allocation shares outlined in the Code. The relative shares of needs for primary and interstate highways have increased while those for secondary and urban roads have declined.

Preliminary analysis of the formulae for the geographic distribution of funds within highway systems also indicates that some of the components of the current formulae may be in need of revision. Changing the weights on the current factors or changing one or more of the factors in the formula may increase the accuracy in allocating primary system funds. The formula for paved roads on the secondary system is adequate in terms of appropriate factors, but the weights on the factors may need to be adjusted. Based on statistical criteria, the urban system formula may also require revision. All of the formulae will be reanalyzed in Phase II of the study using updated numbers, and alternatives will be recommended where necessary.

VIII. ALTERNATIVES TO THE FORMULAE

The first phase of the study has focused on review and evaluation of the existing formulae and whether they continue to produce equitable allocations. These analyses will be finalized using the updated needs numbers. In the second phase, the study will examine alternatives to the existing formulae.

Modal Formulae

Once the updated needs numbers are obtained, analyses will be performed to determine if the present proportion of allocations equals the existing proportion of needs for the modes. Alternative funding mechanisms will be reviewed for each of the modes and the total amount of the needs left unfunded will be identified. The feasibility and desirability of establishing a rail fund will also be discussed and, if proposed, the funding source for such a program will be identified. A rail program could be configured in several ways and its purpose will dictate the types of projects that would be eligible for funding. Several program alternatives will be identified and discussed.

Highway Formulae

Changes in the federal-aid program necessitate some changes to the Virginia highway formulae. The Intermodal Surface Transportation Efficiency Act of 1991 was only recently signed into law, and the Federal Highway Administration is still in the process of developing interpretations and guidelines. Therefore, the implications for the formulae have not been fully determined.

Two changes in the federal law are known to require alterations in the formulae, however. The interstate system has been eclipsed by the National Highway System. The 1992 Appropriations Act contains language that would treat the NHS in the same manner as the interstate for formulae purposes. Therefore, for the next year the NHS funds will be allocated before the allocations to the other classes; the match will be derived from the allocation to the primary system up to 25 percent of the district's primary allocation, and the remaining match will come off-the-top of the TTF.

The second area relates to the Congestion Mitigation and Air Quality Improvement program funds. The federal law contains a formula for allocation of the program funds to each state but does not address suballocations within the state. The Appropriations Act addresses the issue by requiring these funds to be allocated by the Commonwealth Transportation Board to non-attainment areas of the Commonwealth in addition to their normal allocations.

Both of these are temporary solutions and will be evaluated in Phase II of the study. Alternatives to this approach will be reviewed and other aspects of the federal program will be examined.

Administrative System and Geographic Allocations

The initial analyses indicate that needs and allocations do not match using the current formulae. Needs on the administrative systems have changed and the proportion of allocations to the systems no longer appears to be appropriate. In the second phase of the study, this will be discussed and alternatives evaluated.

The preliminary analyses suggest that the factors and weights in the Code that distribute funds geographically are no longer appropriate as allocators if the equity definition continues to be used as the criterion. Several factors have been identified for potential consideration. In the second phase, new factors for the formulae will be evaluated.

Alternative Formulae

Alternatives to the existing formulae will also be discussed. At a minimum, several critical areas that have been identified as needing special funding will be examined. Different approaches to formulae will also be discussed. Under consideration are a programmatic approach, one that allocates funds through a priority structure, and one that uses different sets of criteria, for example level of service or alternative definitions of highway class.

IX. ALTERNATIVE DEFINITION OF EQUITY: GEOGRAPHIC DISTRIBUTION OF HMOF AND TTF REVENUES AND ALLOCATIONS

An alternative definition of equity that could be used in evaluating the TTF is the ratio of revenues produced in a jurisdiction relative to the amount returned in allocations. Several studies have examined the geographic distribution of state and federal funds relative to revenues produced. In order to utilize such a definition, the distribution of federal and state funds must be examined over a long enough period to eliminate any fluctuations caused by programming or budgeting decisions.

A study by KPMG Peat Marwick in 1989 estimated that VDOT's Northern Virginia construction district received 71.9 percent of each state and federal transportation dollar generated in the region in fiscal year 1988. Recalculating the same in 1991, the Senate Finance Committee estimated the Northern Virginia District would receive 103 percent of each state and federal transportation dollar in fiscal year 1992. The Senate Finance Committee estimates were more appropriate because they reflected data from a more recent period. A number of factors have significantly changed since 1988 that must be considered when investigating the geographic distribution of revenues and allocations.

The Virginia Transportation Research Council, in 1991, showed that the return to the dollar fluctuates from year to year in each construction district and that few districts receive an exact dollar-for-dollar return in any one year. That study used five years of data to minimize the impact of yearly programming decisions and budget fluctuations on the results.

In order to analyze the transportation revenue return to the nine construction districts in the Commonwealth, it is important to examine the financial structure of each of VDOT's primary activities in addition to the aggregate transportation program. These activities are highway construction, highway maintenance, non-highway modes (public transportation, rail, ports, and aviation), and administration and overhead. A study of the revenue returns to the four programs for each construction district will be addressed in the second phase of this study.

X. SUMMARY AND CONCLUSIONS

The SJR 188 mandate required that the study determine whether the existing formulae continue to provide equity in the allocation of funds. The approach to the study of the TTF has used dollar needs as the basis for allocation. Needs are defined as requirements for highways, transit, aviation, ports and rail that continue the existing levels of service or would be necessary to bring the system up to standard because it is presently substandard or will become so during the target period. Costs associated with improving these systems were identified in today's dollars and these served to define the dollar needs. Requirements were derived from the 2010 Statewide Plans. These plans were developed separately for each of the modes but comparable criteria were applied and the time frames employed were the same.

The formulae were adopted to achieve equity in fund distribution where equity was defined as being obtained when the percentage of allocations equalled the percentage of needs. Although JLARC applied the definition specifically for the geographic allocation, it can be applied to all aspects of the existing formulae.

Review of the modal allocations indicates some changes in the proportionate share of each mode; the most significant aspect of the modal allocations, however, is the large number of needs in all of the modes. These will be addressed in detail in the final report.

The highway formulae were reviewed for ease of administration and interpretation and with respect to the equity criterion. Based on the initial analysis, the location of needs on the administrative classes has changed significantly since the formulae were established. Geographic areas are also not well served using the existing factors and weights. These analyses will be rerun with the updated numbers and discussed in detail in the final report.

The second part of the mandate was to ensure the compatibility of the state formulae with the federal program reauthorization. The federal-aid program that had been in effect since 1956 lapsed in September 1991; the new program was signed into law December 18, 1991. The new federal-aid act involves a significant departure from the previous approach and may result in dramatic impacts on funding levels, policies, programs, and intergovernmental relationships. Priorities are shifted among transportation modes and there are several areas where the law is likely to impinge on Virginia's formulae.

At this time, the full impact of the law is unclear. The conclusions after review of the legislation and discussion with federal officials was that two minor changes to the formulae would accommodate most areas of initial concern: treating the NHS in the same manner as the interstate by allocating NHS funds off-the-top of the TTF, and allocating Congestion Mitigation and Air Quality funds directly to projects in non-attainment areas.

The initial study mandate not only included a review of the federal law but also an analysis of the relative participation of the federal, state, and local governments in funding transportation programs. In discussing the modal needs, it was noted that some needs are funded from sources other than the TTF. Even so, initial analysis indicates that there is a significant shortfall in funding for all modes. The analysis will be finalized with the updated numbers in Phase II.

Proposals for a rail program are premature, as yet. However, establishment of such a program and funding for it from the TTF would affect the overall sufficiency of the modal allocations since funding would of necessity be drawn from the existing modal programs.

In summary, it is clear that the needs of the Commonwealth have changed since the formulae were developed and their modal and geographic bases have shifted. Preliminary analyses of the formulae suggest changes will be necessary if equity continues to be defined as allocations proportional to needs. In the second phase, this definition and others will be discussed and alternative formulae presented.

I. INTRODUCTION

During the 1991 General Assembly, several resolutions were introduced that required the study of various aspects of transportation funding, including the following (see Appendices A-1 through A-5):

- HJR 110 (Fisher, et al) -- need for revising allocation formulae,
- HJR 298 (Giesen, et al) -- sufficiency of secondary roads funding (including unpaved roads),
- HJR 424 (Andrews, et al) -- transportation needs and programs designed to meet those needs, as well as financing alternatives, and
- HJR 471 (Clement) -- sources and methods of financing rail passenger transportation.

All of these resolutions refer to the Transportation Trust Fund (TTF) Allocation Formulae which were codified into law in 1985 and 1986 when the TTF was created. These formulae were derived from analyses performed by the Joint Legislative Audit and Review Commission (JLARC) which, among other recommendations, called for a periodic evaluation of the formulae to ensure that equity continued to be obtained in the distribution of funds.

Significant increases in population, changes in household location and employment patterns provided the impetus for review of the allocation formulae. Anticipated reauthorization of the federal-aid program provided another reason for formulae evaluation. The federal-aid program that had been in existence since 1956 was lapsing in September 1991 and concern was expressed that the current formulae might not be compatible with the new program thus preventing the Commonwealth from obtaining all of the federal funds for which it was eligible.

Comprehensive evaluation of the formulae would naturally include the study of a rail fund since the first distribution within the formulae is to modes. Establishment of a rail fund as suggested by several legislators would necessarily affect the other programs funded through the formulae. Senate Bill 421, introduced during the 1990 General Assembly, would have created a Commonwealth Freight and Passage Rail Transportation Fund. The bill was carried over and discussed again in 1991 when as a temporary measure an amendment to the Appropriations Act provided that funds from the Rail Industrial Access Program would also be used for preservation, acquisition or rehabilitation of rail and abandoned rights of way.

Senate Joint Resolution 188 (SJR 188) was amended to accommodate all the interests in the General Assembly with respect to the analysis of the Transportation Trust Fund allocation formulae.

Study Mandate and Charge

Senate Joint Resolution 188 mandates that the Virginia Department of Transportation (VDOT, or the Department): (1) study the Transportation Trust Fund allocation formulae and make recommendations for revising the formulae in order to maintain equity in the distribution of the Fund, and (2) assess the need for rail freight and passenger services and programs, and identify funding sources and mechanisms required to provide assistance for meeting rail needs. Allocation decisions to support the full range of transportation programs are, in part, tied to the future availability of funds for these programs. Therefore, to fully address TTF allocation issues, a third requirement of the study is to consider the federal, state and local participation in meeting transportation needs.

Allocation equity and policy issues for highways, public transportation, rail transportation, aviation, and ports will be evaluated. The study results will include assessments of current TTF allocation structures and mechanisms and recommendations for alternatives to these structures, if appropriate.

Study Approach

The issues to be addressed include an examination of rail needs and potential funding sources and mechanisms to meet the identified needs, an examination of other modal needs and historic funding patterns, and a study of the highway formulae. First the existing formulae will be evaluated to determine whether equity continues to be obtained; if they nc longer provide equity in the allocations, alternative factors and weights will be considered. Lastly, alternative formulae will be discussed.

The methodology to be used in this study for the evaluation of the current formulae is based on that used in the 1983 and 1984 JLARC studies of transportation allocations. Dollar needs will serve as the basis for the allocation and equitable allocations will be defined as the share of allocations proportional to share needs. The formulae will be approached from a broader policy perspective as well.

Public Comment

In part, SJR 188 is being conducted by VDOT because of its broad expertise in transportation issues and because it recently completed a number of studies that relate to transportation needs and allocation issues. However, due to the far-reaching implications of findings and recommendations resulting from any study of transportation

funding, participation from individuals and groups outside VDOT has been structured into the study process.

VDOT met with representative organizations at the beginning of the study and held five regional public meetings to assist in its design. Public comment was also solicited and a summary of the ideas and opinions is contained in Appendix B.

An Advisory Network, consisting of 42 individuals, was also established to ensure that perspectives from local governments, and geographic, modal, and other transportation interests are provided throughout the conduct of the study. Nominations for the Advisory Network were received from planning district commissions, the Virginia Municipal League, the Virginia Association of Counties, modal interest groups, and jurisdictions. The role of the Network is to represent the interests of these groups to the study team and to serve as an information resource. In addition, Network members review and comment on draft material, provide advice and perspective throughout the study, and propose concepts to be evaluated.

Reporting Requirements

The Department is required to submit an interim report on the progress of the study to the Governor and the 1992 General Assembly and a final report including additional results and recommendations in 1993. This document represents the interim report. It presents an overview of the work plan for the study, a discussion of the issues, the methodology being employed, and status of the progress of the study. A methodology report was prepared and forwarded to JLARC in October 1991; working papers were also forwarded to JLARC during the course of the Phase I study.

Report Organization

This chapter provides an introduction and describes the study mandate, scope, and process. Chapter II presents a description of the allocation formulae as detailed in the Code. Chapter III provides a description of the methodology employed in the study. Chapter IV is a description of the methodology used in the development of needs for highways, public transportation, rail, aviation, and ports. Chapter V discusses the relative participation of federal, state, and local governments in funding transportation needs. This chapter also addresses future funding and funding availability. Chapter VI discusses issues in the development of a rail program. Chapter VII is an analysis of the formulae and includes discussions of modal allocations, allocations to programs within the highway mode, and the allocation to geographic units. Chapter VIII presents alternatives to the current formulae. Chapter IX details an alternative definition to equity and provides the allocation of Highway Maintenance and Operating Fund (HMOF) and TTF allocations compared with revenue received from each district. A summary and study conclusions are found in Chapter X.

II. DESCRIPTION OF THE ALLOCATION FORMULAE

Background

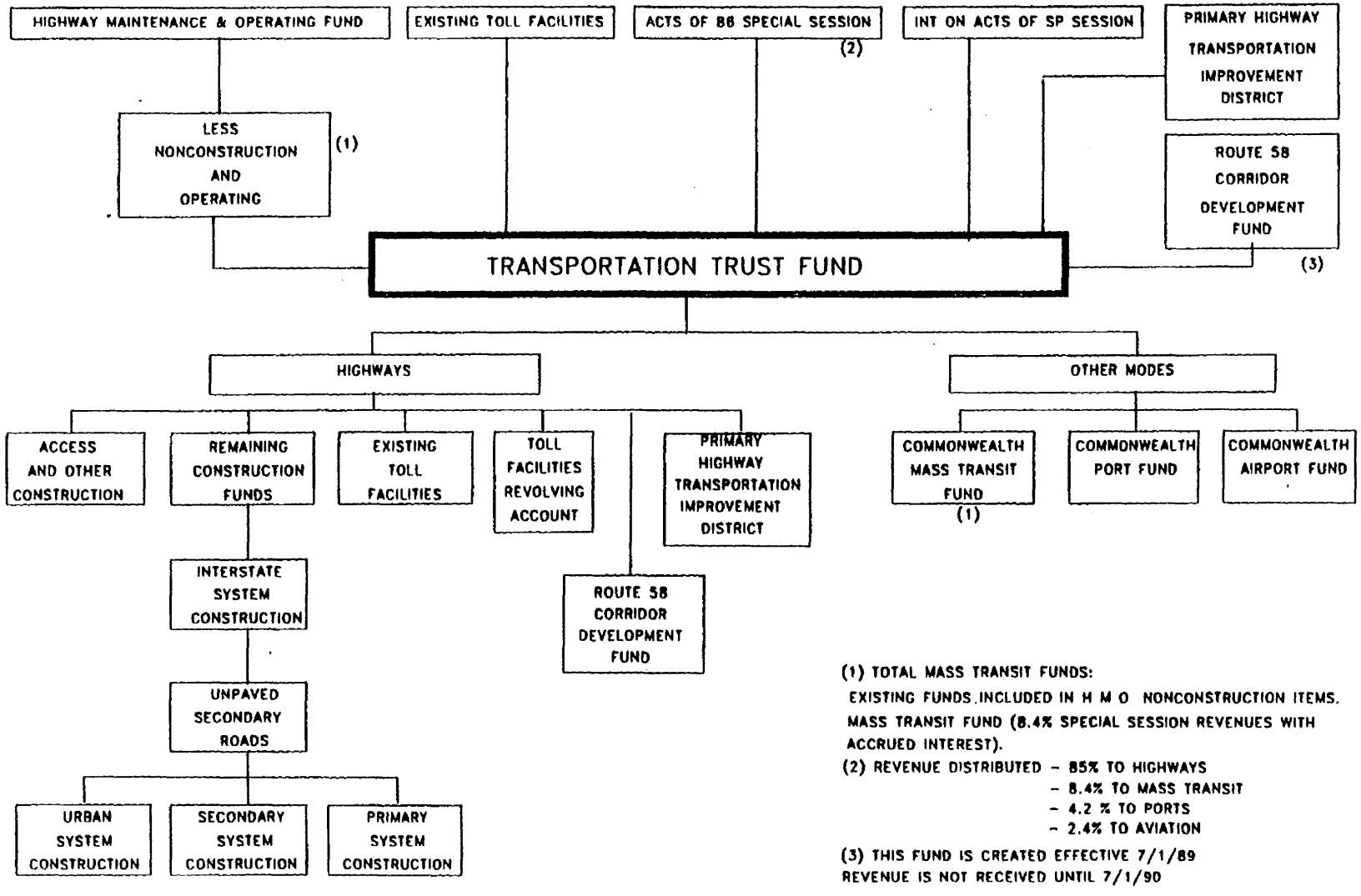
The formulae for distributing Transportation Trust Fund monies to transportation programs are established in the Code and are implemented through the Appropriations Act each year. The following two pages present a schematic representation of the flow of transportation funds in the Commonwealth. The first presents the Transportation Trust Fund distribution; the second describes the highway construction allocation process.

The components of the formulae that were reviewed for this report include:

- modal allocations
- allocations to primary, secondary, and urban administrative highway systems
- geographic allocation of primary, secondary, and urban funds

These components are discussed in the sections that follow.

TRANSPORTATION TRUST FUND DISTRIBUTION
FISCAL YEAR 1990-91

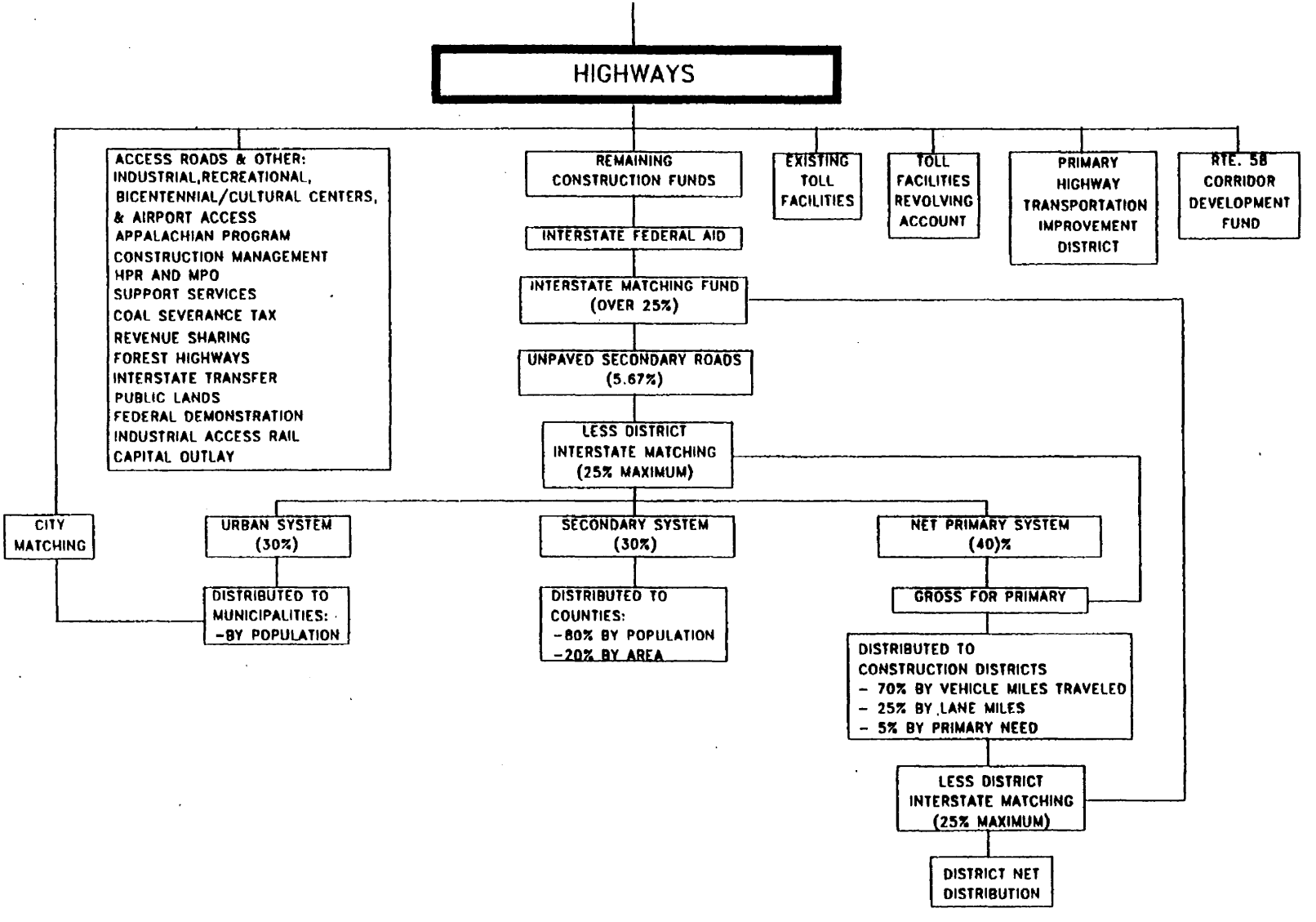


(1) TOTAL MASS TRANSIT FUNDS:
EXISTING FUNDS INCLUDED IN H M O NONCONSTRUCTION ITEMS.
MASS TRANSIT FUND (8.4% SPECIAL SESSION REVENUES WITH ACCRUED INTEREST).

(2) REVENUE DISTRIBUTED - 85% TO HIGHWAYS
- 8.4% TO MASS TRANSIT
- 4.2 % TO PORTS
- 2.4% TO AVIATION

(3) THIS FUND IS CREATED EFFECTIVE 7/1/89
REVENUE IS NOT RECEIVED UNTIL 7/1/90

DISTRIBUTION OF HIGHWAY TRANSPORTATION TRUST FUND REVENUES FISCAL YEAR 1990-91



Transportation Trust Fund

The Transportation Trust Fund was established in 1986 as the result of recommendations of the Commission on Transportation in the Twenty-First Century (COT-21).[1] A major purpose underlying the creation of this fund was to provide a separate multimodal fund for transportation facility construction in the Commonwealth. New revenues, which have come to be known as 1986 Special Session revenues, were made available to support modal needs when the TTF was created. Revenues from other sources are administered through the TTF, as well.

Funding for Transportation Modes

Special Session revenues remaining after fund administration expenses are removed are currently allocated among modes as presented in Table 1.

TABLE 1
MODAL ALLOCATIONS

MODE	SHARE OF REMAINING FUNDS
Highway*	85.0% plus interest
Mass Transit	8.4% plus interest
Ports	4.2% plus interest
Aviation	2.4% plus interest

* Some rail programs are funded, as well.

Funding for highways, aviation, ports, and public transportation are allocated to separate modal funds and then to programs and localities. Allocations made for public transportation are made from the Commonwealth Mass Transit Fund. The Commonwealth Port Fund provides TTF funding for ports while the Commonwealth Airport Fund is designated for aviation funding. Allocations made for the rail mode are included in the highway category. Each fund provides for the distribution of monies in various ways. An overview of these within-mode allocations is provided.

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[1] Confronting Virginia's Transportation Challenge, Phase I Report, The Commission on Transportation in the Twenty-First Century. Richmond, Virginia, 1986.

Funding for Highways

A portion of the highway Special Session revenues and the funds transferred from the HMOF for highway construction are allocated to meet surface transportation needs. The HMOF is a fund designated primarily for administrative overhead and highway maintenance. The order in which allocations are made is indicated by the levels shown in Table 2.

TABLE 2
HIGHWAY ALLOCATIONS

ALLOCATION CATEGORY	MECHANISM & LEVEL
LEVEL 1	
Access Roads & Other (General Construction)	Dollar Amount by Appropriation
LEVEL 1	
Rail	Dollar Amount by Appropriation
Rail Access	50 Percent
Rail Abandonments	50 Percent
LEVEL 2	
Interstates Plus Required Match	Off-the-Top With Match Loop to Primary
LEVEL 3	
Eligible Unpaved Roads	5.67 Percent
LEVEL 4, SYSTEMS AND LEVEL 5, GEOGRAPHIC	
Highway Administrative Systems	Balance of Highway Funds
Primary	40 Percent
To Districts	By Formula
Secondary	30 Percent
To Counties	By Formula
Urban	30 Percent
To Eligible municipalities	By Formula

Access Roads and Other General Construction. The programs included in this category are Industrial Access, Recreational Access, Airport Access, Railroad Access, Bicentennial/Cultural Centers, Construction Training-Supported Services, Capital Outlay, and Construction Management. In addition there are programs for Appalachian federal

aid, Forest Highways, revenue sharing, coal severance tax roads, interstate transfer, public lands, and demonstration projects. These programs are all funded from set aside monies off-the-top of the highway portion of the TTF.

Existing Toll Facilities. The revenue from tolls supports the necessary expenses of the respective toll facilities. Funds are allocated for construction, debt service, and administration.

Toll Facilities Revolving Account. The toll facilities revolving account receives funding from the interest earned on the highway mode's 85 percent share of the 1986 Special Session revenues and the interest on the HMOF. The revolving fund is used to pay for all or part of the costs of planning, operation, maintenance, and improvement in the acquisition and construction of toll facilities. The account can also be used to refinance existing toll facilities bonds.

Unpaved Roads. In 1979, the General Assembly established an unpaved roads fund. Non-surface-treated roads that carry 50 or more vehicles per day are eligible. By law, 5.67 percent of construction funds, excluding interstate federal aid, and its match, Route 28 and Route 58 funds as well as toll facilities and the access roads, are set aside for the fund. Allocations are made to counties based on the ratio of unpaved mileage in each county carrying 50 or more vehicles per day to the state total of such unpaved mileage.

Interstate Funding. Funding for the interstate system is derived from the federal-aid program. Federal monies for the interstate can only be used for eligible projects on the system and are, therefore, dedicated funds. In practice, interstate funds are distributed to each construction district based on the cost to complete the interstate system in a district relative to the cost for the state system as a whole. States are also required to match federal funds. The required match is derived from each district's primary system funding unless it exceeds 25 percent of the primary system allocation. In that case, the amount exceeding the threshold is taken off-the-top of the Transportation Trust Fund and set aside for allocation before other funds are distributed.

Other Administrative Classes. After special programs have been funded, the remaining construction funds are available for allocation to the primary, secondary, and urban administrative systems. Under the current provisions of law, the administrative classes are to receive allocations in the proportions of 40 percent for primary, 30 percent for secondary, and 30 percent for urban. These proportions represented relative needs on the various systems.

Geographic allocations are also made by formula. For the primary system, funds are allocated by formula to construction districts, with vehicle miles traveled (VMT) weighted 70 percent, primary road lane miles weighted 25 percent, and a needs factor weighted five percent. The secondary system county allocation formula for paved roads

weights population 80 percent and area 20 percent. Urban system funds are allocated to eligible municipalities by population.

The factors and weights used in these formulae were identified through statistical analyses. The factors serve as surrogates for need. The weights (percentages) indicate the importance of the factor in predicting highway needs. These formulae were originally developed by JLARC in their studies of transportation allocation,[2] [3] which is summarized in a later section.

Funding for Public Transportation

Funds for mass transit purposes are derived from both the HMOF and the Commonwealth Mass Transit Fund, a component of the TTF. The Code does not specifically address the allocation of the transit HMOF funds. The Appropriations Act each year has directed the Commonwealth Transportation Board (CTB) to distribute all state funds, both HMOF and the mass transit component of the TTF, in accordance with Section 58.1-2425.E.3. This section requires that the funds be subdivided into three categories for allocation: formula assistance, capital assistance, and special projects. The accounting and fiscal tracking of these funds is made cumbersome by the fact that there are two funding sources.

Formula assistance for public transportation received 73.5 percent of the Fund and is used primarily for operating assistance although the funds can also be used for capital assistance. Twenty-five percent of the Fund is reserved for capital assistance and the remaining 1.5 percent is provided for special projects. Special projects include ridesharing assistance, technical assistance, promotional activities, and experimental projects. These allocations are summarized in Table 3.

TABLE 3
PUBLIC TRANSPORTATION ALLOCATIONS

ALLOCATION CATEGORY	PERCENT
Operating (Formula) Assistance	73.5
Capital Assistance	25.0
Special Projects	1.5

[2] Interim Report: Equity of Current Provisions for Allocating Highway Construction Funds in Virginia, Joint Legislative Audit and Review Commission, Richmond, Virginia, 1983.

[3] Equity of the Current Provisions for Allocating Highway and Transportation Funds in Virginia, Joint Legislative Audit and Review Commission, Richmond, Virginia, June 1984.

Funding for Aviation

The Commonwealth Transportation Trust Fund legislation dictates that the Commonwealth Airport Fund (CAF) is allocated to air carrier, reliever, and general aviation airports. Air carrier airports receive 40 percent of the CAF as entitlement funds. Forty percent is allocated by the Virginia Aviation Board (VAB) on a discretionary basis to air carrier and reliever airports. The balance (20 percent) is allotted by the VAB to general aviation airports, also on a discretionary basis. These allocation categories are summarized in Table 4.

TABLE 4
AVIATION ALLOCATIONS

ALLOCATION CATEGORY	PERCENT
Air Carrier Entitlement	40
Air Carrier and Reliever Discretionary	40
General Aviation	20

Funding for Ports

Special Session revenues allocated to ports are further divided by the General Assembly into capital facility funding and preservation of capital facilities. The amount in each category is appropriated by the General Assembly.

Administration of Existing Formulae

Construction of grade crossings, rail access roads and purchase of rail abandonments are funded from the highway allocation. A series of other programs are funded off the top of the highway allocations as well, for example, revenue sharing, coal severance tax roads, capital outlay, and recreation and airport access roads.

Allocations to the interstate system come off the top of the funds available for construction and are programmed by project by the Commonwealth Transportation Board. Therefore, the interstate allocation is not specifically allocated to geographic area and is rather a direct assessment of need reflected in the programming of individual projects with available federal funds.

The interstate match is provided from two sources in the allocation formulae. The initial source is the gross primary allocation to districts where the interstate projects are programmed. If the match required is more than 25 percent of the gross primary allocation for the district, the excess comes off the top. This reduces the funds available for the state systems and requires the 25 percent test to be repeated. This loop is recomputed until a steady state is achieved.

The gross primary allocation is composed of the 40 percent share of systems allocation and is distributed among the districts based on vehicle miles of travel (70 percent), lane miles (25 percent), and a need factor (5 percent). However, because of the interstate match requirement, only the net primary allocation is available for allocation to primary projects. The greater the concentration of interstate projects in a district, the greater the match (up to 25 percent) and less is available for the primary system. Thus, the programming of the interstate projects reduces the funding for primary projects in spite of the three-factor formula for the distribution of gross primary allocations among the districts. The programming in one system decreases the resources in another and also affects the amount available to be distributed to all administrative classes by changing the amount removed off the top.

The placement of the calculation of the 5.67 percent allocation for paving unpaved secondary roads subsequent to the off-the-top interstate match and prior to the interstate match from district primary allocations also means that changes in the programming of interstate allocations will affect the secondary and urban systems as well.

The allocation of funds to highway systems is a function of what funds are remaining after all set aside funding has been removed from the top. In addition, the amount of interstate highway funds programmed will have an impact on the amount of funds available for other systems. Increasing the size of any program that is funded before allocations are made to administrative systems will have the effect of decreasing the amount left over for distribution, given a constant level of total funding. The effects of changing the size of specific highway programs that are funded off-the-top are considered in this study.

Summary

Modal allocations and allocations to programs within modes are presently determined by the Code which requires funds to be distributed on the basis of set proportions. These proportions were based on the share of needs in each transportation mode and are being evaluated in this study to determine if they still provide equitable allocations. The formulae for highway allocations to roadway class and geographic units are also being examined for equity. Analysis of set aside programs and administrative issues are being addressed.

III. METHODOLOGY

Definitions and Criteria

The methodology used in the study is based on that employed by JLARC in their earlier analysis of the formulae. In that study, dollar needs were employed as the basis for allocation. To determine the adequacy of performance, equity was used as the criterion.

JLARC Study

In 1983 and 1984, JLARC reported to the General Assembly their findings concerning equity of the formulae in the allocation of highway and transportation funds. The first report concerned the allocation of highway construction funds; the second expanded on the first by including discussions of funding for highway maintenance, urban street payments, and public transportation assistance.

Interim Study. The interim study reported that changes were needed in the methods for allocating funds. The proportion of funds provided to administrative systems and individual jurisdictions was not found to be reflective of their relative needs. The study reported that revisions to the statutory formulae for the primary and secondary systems were necessary and suggested the establishment of a formula for urban allocations.

The 1983 JLARC study used equity as the criterion for addressing highway needs. Equity was obtained when the relative proportion of funds allocated to a locality was equivalent to its relative proportion of highway needs. Because needs are difficult to measure on an annual basis, it was determined necessary to develop surrogates need. The analysis focused on measuring the relationship between the surrogates and the demographic characteristics of jurisdictions (e.g., population, land area, vehicle miles of travel). Local and regional organizations were asked to participate in the study process and provided input throughout the study.

The study centered around data collected as part of a statewide needs assessment. The total cost of highway projects for a 20-year period was estimated and were used in a statistical analysis. Regression models were developed to explain the variance in needs within administrative highway systems as a function of variance in locality characteristics. Localities were defined in a variety of ways including counties, cities, planning districts, and construction districts. Twenty-three characteristics thought to be measures of administrative system needs were identified (10 for primary, 15 for secondary, and 9 for urban). The relationships among the locality characteristics, and between these characteristics and the measures of need, were explored using correlation matrices. Characteristics were selected for inclusion as independent variables in regression analyses such that multicollinearity would be reduced. Several regression

models were developed for each administrative system (primary, secondary, and urban) over a two-year period. The models were evaluated using coefficients of multiple determination (R^2), collinearity diagnostics, and standard errors of the estimates. Standardized regression coefficients from the best models were then converted into allocation weights or percentages for each characteristic (for each characteristic, the percentage was calculated as the coefficient divided by the sum of all coefficients in the equation). The calculated percentages were then rounded to the nearest five percentage points for ease of administration.

Recommendations were made concerning the appropriate variables and weights to serve as surrogates for needs within each of the highway administrative systems. In addition, recommendations were made concerning interstate matching funds, unpaved roads funding, bridge replacement funds, and administrative system allocations.

1984 Update. The 1984 report to the General Assembly included an update of the 1983 interim study and findings and recommendations for four other transportation programs: urban street payments, county maintenance budgeting, public transportation assistance, and funding for Arlington and Henrico counties. The study used the same approach as the interim study.

Dollar Needs

JLARC employed dollar needs as the basis for allocation. Needs in this study are similarly defined as capital projects that meet the criteria for the 2010 Statewide Highway Plan; the 2010 Public Transportation Plan for transit; the Virginia Air Transportation System Plan (VATSP), the Virginia Air Cargo System Plan (VACSP) and the Airport Sponsor's Five-Year Plans for aviation; the Capital Improvement Plan for ports; and, the 2010 Rail Plan. The standards are described in more detail in the next section.

The needs are displayed in terms of 1991 dollars. Although the needs were accumulated for the 2010 planning horizon, they will not be adjusted for inflation since the date of construction is unknown.

2010 Plans

Construction needs were derived from the 2010 Statewide Highway Plan and long range plans for rail, ports, aviation, and public transportation. The plans represent the most recent, comprehensive assessment available for all modes and were developed in consultation with local governments and transportation providers. The highway needs identified in the plans are consistent with subregional and thoroughfare plans; transit, aviation and port needs were derived from the plans developed by the service providers.

Use of 20-Year Horizon

The 20-year time frame is used because it is a normal reference for strategic planning. The new federal law requires that a 20-year time frame be used for the mandatory state and local long range plans. In addition, 20 years is a natural target in terms of engineering planning horizons. In particular, highways are designed for a 20-year period.

The General Assembly has embraced the idea that the allocation formulae should be based on a 20-year needs assessment. The 2005 Statewide needs served as the definition of needs for the 1983-84 JLARC study of the formulae. Subsequent to JLARC's analysis, the General Assembly required VDOT to conduct a 20-year needs assessment at least once every five years (Section 33.1-23.03 of the Code of Virginia). Since the parameters outlined in the Code were derived from JLARC's analysis using this definition of needs, it is appropriate to evaluate the existing formulae using the same definition.

Alternatives to 20-Year Plans

Some individuals have expressed an interest in using six-year plans instead of the 2010 plans. However, the six-year plans cannot be used because they are a result of the very process the Department is charged with evaluating. The six-year plans are constrained by the current allocation formulae and should, ipso facto, result in equitable allocations.

Another alternative to using 2010 plans is the use of currently existing needs rather than 20-year needs. This would not take into account the needs that will be developing in rapidly growing areas of the Commonwealth. As such, it does not appear to provide the best basis for allocations into the future. The use of currently existing needs is further discussed in the section concerning highway needs.

Defining Equity

The General Assembly required that the formulae be evaluated with respect to equity and that "... specific recommendations (be made) to the General Assembly as to any needed changes in those formulae to maintain equity in the distribution of the Fund." The approach to defining and assessing the equity of TTF allocations that is being used in this study is based on the approach used by JLARC in its 1983-84 study: allocations that are to be made on the basis of needs must be proportional to the needs.

Given an estimate of a share of needs, an equitable allocation may be defined as an allocation share that matches the needs share. For the allocation to localities in the highway formulae, the equity relationship between needs and allocations can be evaluated as follows:

$$A \div N = 1.00 \quad \text{(for each locality)}$$

Where:

A = A locality's allocation share

N = A locality's share of needs

Under the above definition, a mechanism selected to make allocations would be judged as more equitable than another if it produced the smaller deviations from 1.00. The deviations would be accumulated over all the localities and the total deviation evaluated. Since the total deviation could be large because one or two localities have large variations, a distribution of the deviations will be presented and discussed. Where alternative formulae are proposed, they will be judged as more equitable if they produce smaller deviations from 1.00 than the existing formulae. Another important criterion is the magnitude of dollar errors; a large deviation from 1.00 may be considered small when converted to dollars.

Goals of Allocation

Allocation decisions are based on a number of considerations involving funding adequacy, equity, policy goals, administrative efficiency, geographic distribution of funds, and an evaluation of how well they support a comprehensive transportation plan.

Funding Adequacy Issues

Senate Joint Resolution 188 requires the study of the relative participation of state, federal and local governments in financing transportation programs and the identification of funding sources and mechanisms to provide assistance to rail programs. Several initiatives were identified by the Secretary of Transportation during 1991 to increase local involvement in transportation decision-making and funding. These included localities paying a share of the cost of new local construction projects, localities being authorized to make decisions where they have resident expertise, the creation of a fund to provide an incentive to strengthen regional planning efforts, and increasing the amount of funds available through the revenue sharing program. In addition, the Secretary recommended the creation of a Department of Rail and Public Transportation, which was introduced as Senate Bill 223 in the 1992 session of the General Assembly and which will be effected July 1, 1992.

Of critical importance in reviewing the appropriateness of current allocation structures is the impact of the federal reauthorization of surface transportation assistance on state programs and priorities. Changes in federal aid for transportation programs will require modifications to the formulae used in Virginia to allocate funds. Interpreting the

new federal legislation will be an integral component of the study and is necessary to adequately assess the current allocation structure.

Equity Goals

Senate Joint Resolution 188 specifically requires that the equity of TTF allocations be addressed. In 1983, JLARC introduced the use of the equity criterion for judging transportation allocations. JLARC defined equity as allocations proportional to levels of need. While geographic highway allocations were the major focus of JLARC's equity analyses, the same definition could be applied to other components of the formulae.

Policy Goals

Historically, transportation allocations have been based on the relative importance of particular transportation needs in a comprehensive transportation plan. Priorities are identified among competing transportation programs because of their role in meeting basic mobility or freight movement requirements or because they have received inadequate attention in the past (e.g., unpaved roads). Aside from meeting program goals, the objective of a formula is to ensure that funding mechanisms are responsive to changes in need over time. The existing formulae do this by using factors that allow for change (e.g., population).

Administrative Goals

The main goal of the allocation process is to distribute funds in such a way that the transportation goals of the Commonwealth are served. Administrative efficiency, while secondary to the main goal, is an important consideration nonetheless. Ease of annual allocation updates and simplicity of the formulae for prediction and understanding will be employed as criteria for determining adequacy, as well.

Geographic Distribution

An important goal of the present formulae is to distribute TTF funds to geographic units. The distribution of funds is based on identifying the transportation needs in each jurisdiction and developing mechanisms that allocate funds to meet these local needs. The geographic allocation formulae provide a means of dispensing funds to counties, cities, and towns in amounts proportionate to their level of need.

Comprehensive Transportation Plan

The TTF allocation formulae serve as mechanisms to determine the allocation of funds among the different transportation modes, for individual programs within the modes (e.g., primary, secondary, and urban highway classes), and for geographical units within transportation programs. Often, formulae for each modal component of the process are

considered individually and appropriate mechanisms are developed without regard to interactive effects on other modes. When developing an equitable process for allocating transportation funds, it is essential that each component be considered as a piece of a comprehensive transportation plan. Funding of individual transportation modes are linked and the changes in one program resulting from changes in others must be considered.

Modal Needs

The first element of the Transportation Trust Fund allocation formulae is the modal allocations for highways, public transportation, rail, aviation, and ports.

Needs Categories

The following allocation categories identified in the Code are discussed in the report:

- **Highways:** Interstate; Primary; Secondary; and Urban,
- **Public Transportation:** Operating Assistance; Capital Assistance; Capital Assistance for Projects Serving Handicapped; and Special Projects,
- **Rail:** Access; and Abandonments,
- **Aviation:** General Aviation; Air Carrier Entitlement; Air Carrier and Reliever Discretionary, and
- **Ports:** Capital Facilities and Preservation of Capital Facilities.

Comparison of Modal Needs

Application of the equity criterion for modal allocations is predicated on the idea that modal needs can be compared. In order to do that, needs have to be based on the same assessment methodology, use the same time frame, involve comparable criteria and standards, be equivalent in importance and be representative of transportation problems across the Commonwealth. To begin, it is assumed that modal needs are comparable and the equity criterion will be applied.

Not all modes derive their complete funding from the TTF. Twenty-year dollar costs for the modal needs include some that are not currently eligible for TTF funds and some that while eligible, are funded in other ways. Ports and aviation are funded from other revenue sources, as well as from the TTF, as described in the section concerning funding. In evaluating the amount that should be provided by the TTF, it may be helpful to see how much of the need is unfunded for each of the modes using the present

formulae and assumptions about future revenue flows. In this way, the total ability of the Commonwealth to meet modal needs can be evaluated. The aim of General Assembly action may be to equalize underfunding across the modes.

Time Frame. Modal needs are identified over the same time frame. The 2010 statewide plans were chosen in part because highway, public transportation, and most of the aviation and port needs were defined in terms of 1989 needs. All of the needs are being updated to 1991, however, and all needs will be on the same time basis.

Costing Methodologies. A second requirement for comparably defining needs is that similar costing methodologies be used for each project or program that is included in the needs assessment. For all of the modes, the needs for projects are determined based on demand considerations, and planning estimates are developed to use in calculating project costs.

Dollar Equivalence. Comparisons across categories of need also require that needs be displayed in comparable dollars, as they are in this study.

Needs Funded Through Non-TTF Sources

A large number of transportation needs that exist are not fundable from the TTF: those that are currently ineligible for funding, and those whose sheer size requires that they be funded through another source. Needs that are not now eligible for funding from the TTF include maintenance of highway facilities and most rail needs. The latter will be addressed in the study.

The Commission on Transportation in the 21st Century determined that certain highway projects would never be built through normal allocations and would need to be considered for special funding. Since these needs were outside the allocation process, they were removed from formulae consideration. The effects of removing these "special" needs, similar to COT-21, are being considered through the evaluation of the sensitivity of the formulae to their exclusion.

Summary

The methodology used in this study is based on that used by JLARC in their 1984 study of the TTF allocation formulae. Dollar needs were employed as the basis for allocation. The present study utilizes 20-year plans derived from the 2010 Statewide Highway Plan and other long range planning documents. These plans were developed in consultation with local governments and transportation providers.

In addition, a definition of equity was provided. For this report, equity was defined to be allocation share equal to needs share. It is important that the needs developed be comparable across transportation modes and be derived from equivalent methodologies.

This study uses needs that were developed using similar costing methodologies and time frames, and are expressed in equivalent dollars.

IV. IDENTIFICATION OF NEEDS

Needs for each of the modes were developed for the 20-year planning horizon from documents developed in the planning process. These needs represent a comprehensive assessment of the long range transportation requirements for each mode. It is important to note that the needs in this study represent 1989 20-year needs and are currently being updated for Phase II of the study. In addition, all issues raised in this report are to be analyzed in the second phase as well. A detailed description of the methodology used to develop the needs and a summary of the required funding follows for each transportation mode.

Highway Needs

The first comprehensive statewide highway needs assessment was completed in 1984. It resulted in the 1984 Statewide Highway Plan which was published as 22 individual reports (one for each Planning District) plus a summary report. The 1984 Statewide Highway Plan provided the first mechanism for presenting highway improvement priorities and the magnitude of the highway needs. Recognizing its utility, the General Assembly passed legislation in 1985 (Section 33.1-23.03) that required the Department to conduct a comprehensive review of statewide highway construction needs for 20 years and that the review be updated every five years. The 2010 Statewide Highway Plan includes a statewide listing of all construction needs by the year 2010 for all highway systems based on established standards.

Identification of Needs

The process for identifying needs involved four primary components.

Identification of specific roadway deficiencies in non-urban areas. Areas outside of the boundary of an urban or urbanized transportation study area were evaluated as follows. A detailed analysis was performed on functionally classified arterial and collector roads, and a condensed analysis was performed on functionally classified local roads. All non-urban roadways identified as a need in the 1984 plan were reinspected to verify the current conditions. Traffic volume forecasts were developed for the year 2010 and used in identifying anticipated future needs.

Deficiencies were identified on non-urban arterial and collector roadways based on the following factors: adequacy of the road segment's geometrics regardless of volume, existing traffic congestion, forecast traffic congestion, minimum pavement width and type, bridges eligible for replacement or rehabilitation, present railroad crossing protection needs, anticipated future railroad crossing protection needs, identified safety improvements, and spot deficiencies including intersections, curves, and drainage needs due to flooding. On local secondary roads the surface type and pavement width was compared to a set of standards according to traffic volume range. The total of the miles

of roadway by jurisdiction that did not meet the standards was identified and average costs to bring the roads up to standard were applied.

The level of service of a roadway is used as one measure of how well that roadway is performing and whether improvements might be needed. Level of service is a letter designation that represents the operating efficiency of a particular road. It is based on traffic-related variables such as operating speeds and volume-to-capacity ratios. Levels of service range from "A" to "F" where "A" represents a roadway that is free flowing, and "F" is a roadway that is congested. Table 5 describes the levels of service. Tables 6 through 8 give the criteria used to determine existence of a roadway need based on level of service and the other identified highway standards.

TABLE 5
LEVELS OF SERVICE

LEVEL OF SERVICE	DESCRIPTION
A	Free flowing traffic with low volumes and high speeds. Traffic density is low, with speed controlled by driver desires, speed limits, and physical roadway condition. There is little or no restriction in maneuverability due to the presence of other vehicles and drivers can maintain their speed with little or no delay.
B	Stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation. Reductions in speed are not unreasonable, with a low probability of traffic flow being restricted.
C	Stable flow, but speeds and maneuverability are more closely controlled by higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass. A relatively satisfactory operating speed is still obtained.
D	Approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver and comfort and convenience are low but conditions can be tolerable for short periods of time.
E	Lower operating speeds than level D, with volumes at or near capacity of the highway. At capacity, speeds are typically in the neighborhood of 30 mph. Flow is unstable and there may be stoppages of momentary duration.
F	Forced flow of operation at low speeds, where volumes are below capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. The section will serve as a storage area during parts or all of the peak hour. Speeds are reduced substantially and stoppages may occur for short or long periods of time. In the extreme, both speed and volume can drop to zero.

TABLE 6
VIRGINIA STATEWIDE HIGHWAY PLAN
ASSUMED LEVELS OF SERVICE

URBANIZED AND URBAN AREAS

FUNCTIONAL CLASSIFICATION	URBANIZED AREA	URBAN AREA
Interstate	C/D	C
Principal Arterial	C/D	C
Minor Arterial	C/D	C
Collector	C/D	C

TABLE 7
VIRGINIA STATEWIDE HIGHWAY PLAN
ASSUMED LEVELS OF SERVICE

NON-URBAN AREAS

FUNCTIONAL CLASSIFICATION	LEVEL TERRAIN	ROLLING TERRAIN	MOUNTAINOUS TERRAIN
Interstate	C	C	C
Principal Arterial	C	C	D
Minor Arterial	C	C	D
Major Collector	C	D	D
Minor Collector	C	D	D

TABLE 8
VIRGINIA STATEWIDE HIGHWAY PLAN
LOCAL ACCEPTABLE STANDARDS

TRAFFIC VOLUME (VEHICLES PER DAY)	MINIMUM PAVEMENT WIDTH (FEET)	SURFACE TYPE
0-24	12	Light Surface
25-49	14	All Weather Surface
50-399	16	Paved Surface
400-999	18	Paved Surface
1,000-3,999	20	Paved Surface
4,000-5,999	22	Paved Surface
6,000-7,499	24	Paved Surface
7,500 & Over	Multilane	Paved Surface

Urban areas with a population under 10,000. The second component involved the development or update of individual transportation studies for urban areas with a population under 10,000. These studies generally consisted of the identification of the major streets or thoroughfares for the urban area, the conducting of traffic engineering studies to evaluate the existing highway system, and the development of traffic forecasts for an analysis of future needs. Improvements to the thoroughfare system were recommended to alleviate the existing and future deficiencies.

Urban areas with a population between 10,000 and 50,000. The third component incorporated the recommendations of the various transportation studies for urban areas with a population between 10,000 and 50,000, with certain modifications to upgrade the list of proposed improvements for each urban study to reflect current system conditions. These urban transportation studies identified needs on thoroughfares within the urban study areas. Needs on local streets in cities and towns were not included, since they are a local responsibility.

Urban areas with a population greater than 50,000. The fourth component involved urbanized areas with a population greater than 50,000. In all such areas, a comprehensive, cooperative, and continuous transportation planning process produces plans that are periodically reviewed and revised. Evaluations of short-range improvements are generally made on an annual basis, usually by corridor or site, whereas the long-range needs are evaluated on a less frequent, but still periodic basis. Many of

the current transportation plans were the result of updates in the early 1980's and are now being re-evaluated. The recommendations that were approved by the individual Metropolitan Planning Organizations (MPOs) at the time of the development of the 2010 Statewide Highway Plan were incorporated directly into the plan.

For the Northern Virginia region, development and adoption of a subregional plan was finished just before completion of the 2010 Statewide Highway Plan. The recommendations contained in the Northern Virginia subregional plan were included in the Statewide Highway Plan. Since the subregional plan addressed needs on the arterial roads, but not collector roads, an analysis of collector and local roads was conducted in the same manner as for areas of the state not having an urban transportation study.

Cost Estimation of Recommended Highway Improvements

In preparing the estimated costs for the Statewide Plan, roadway projects and actual construction costs were reviewed statewide. Average costs per mile were developed for projects on primary and secondary roads based on the type of terrain (flat, rolling, or mountainous), the pavement width, and the type of construction project (minor widening, reconstruction, or new alignment) for both secondary and primary roads. Higher per-mile cost estimates were used in major urbanized areas such as Northern Virginia and Tidewater, where construction costs are substantially higher than the statewide average.

This methodology was used to develop costs for the 1984 Statewide Plan and the VDOT Construction Cost Index (a measure of the inflation in constructing highway projects) was used to convert the costs to 1988 figures. The resultant per-mile costs were consistent with those from the most recent construction projects.

Estimated costs for local roads were derived; structure costs were based on 1988 per square foot unit costs. Historically, right-of-way costs have been found to be reasonably well represented by applying an expansion factor based on the right of way cost as a percentage of the total estimated construction cost.

Revisions To Needs

During the 1989 session of the General Assembly, legislation was passed which created the U.S. Route 58 Corridor Development Program and Fund for the purpose of providing an improved east-west highway system along the southern boundary of the Commonwealth. Although the Highway Plan includes some costs associated with improvements recommended for this corridor, the full list of candidate projects has not been identified and a dollar value associated with those additional projects has not been included in the plan.

Adjusting the 2010 highway needs to reflect analysis in the Route 58 corridor results in a total need of $37.1 billion. Table 9 depicts a breakdown of the total needs by funding category and Virginia Department of Transportation construction districts.

In response to public comment, a review of the 1989 highway needs assessment was undertaken as part of this study. One element of this review consisted of sending the 2010 highway needs to each locality in the state that receives a construction allocation, with a request to comment on any needed changes. Comments from localities are to be evaluated in accordance with the criteria used for identifying the needs in the 1989 assessment.

A second element of the review includes a reassessment of the needs on local secondary roads. This will include an updated assessment of the miles of non-standard local secondary roads as well as a review of the estimated cost per mile for improving these roads.

Another element of the evaluation is a review of bridge needs. The portion of the total highway needs that is eligible for the use of federal bridge funds for replacement and rehabilitation of bridges will be identified. A final element consists of removing projects that have been constructed since July 1, 1989 from the needs list.

In addition to the review of the 1989 needs, preparation for the five-year update of the 20-year needs assessment, as required in the Code, is beginning. This update will take three years to conduct and will include all highway needs to the year 2015. The assessment is expected to be available in late 1994.

TABLE 9
PRELIMINARY 1989 NEEDS ASSESSMENT
YEAR 2010 HIGHWAY NEEDS SUMMARY BY CONSTRUCTION DISTRICT*
($ MILLIONS AND PERCENT OF SYSTEM)

DISTRICT	INTERSTATE SYSTEM NEEDS	PRIMARY SYSTEM NEEDS	SECONDARY SYSTEM NEEDS	URBAN SYSTEM NEEDS	TOTAL NEEDS
Bristol	$624.7 7.6	$1,565.2 11.2	$1,078.3 11.2	$209.0 3.7	$3,477.2 9.3
Culpeper	$90.2 1.1	$894.7 6.6	$658.6 6.9	$63.6 1.1	$1,707.0 4.6
Fredericksburg	$268.3 3.3	$1,816.5 13.4	$546.9 5.7	$38.3 0.7	$2,670.0 7.2
Lynchburg	$0.0 0.0	$821.4 6.0	$825.0 8.6	$252.1 4.4	$1,898.5 5.1
Northern Virginia	$2,165.4 26.3	$2,709.4 19.9	$2,969.0 30.9	$277.8 4.9	$8,121.6 21.9
Richmond	$933.8 11.4	$1,841.2 13.6	$1,140.1 11.9	$282.0 4.9	$4,197.1 11.3
Salem	$748.7 9.1	$1,402.4 10.3	$1,103.0 11.5	$828.1 14.5	4,082.2 11.0
Staunton	$902.9 11.0	$801.7 5.9	$942.6 9.8	$293.9 5.1	$2,941.1 7.9
Suffolk	$2,493.0 30.3	$1,735.0 12.8	$344.0 3.6	$3,469.3 60.7	$8,041.3 21.7
Total	$8,227.0 100.0	$13,587.5 100.0	$9,607.5 100.0	$5,714.1 100.0	$37,136.0 100.0

* These needs are currently being updated.

NOTE: Projects under construction as of 7/1/89 are not included as a need.

Current and Total Needs

Analysis of the currently existing needs was performed for the Advisory Network. Current needs were defined as needs that existed as of July 1, 1989, the time of the latest needs assessment for the 2010 Statewide Highway Plan. They included functionally classified arterial and collector roadways that (a) were determined to have poor geometrics, (b) had an existing volume-to-service volume ratio (a measure of congestion) of greater than 1.0, (c) were less than 16 feet wide, (d) had bridges currently eligible for replacement or rehabilitation, (e) contained identified safety improvements, or (f) contained spot deficiencies such as intersections, curves, or drainage (flooding) needs. In addition, they included functionally classified local secondary roadways that did not meet the rural local acceptable standards based on volume, width, or surface type. These were differentiated from those roads and bridges that are presently in good condition and can meet the existing service level but which will become substandard sometime within the 20-year target.

Currently existing needs equal approximately $22.7 billion of the $37.1 billion total needs (61 percent). Table 10 shows that the distribution of currently existing needs across transportation districts is significantly different than the distribution for total highway needs. Urban districts (Northern Virginia, Richmond, and Suffolk) have a larger share of total than current needs. This is due to the large number of congestion-related needs that will result from the growth anticipated in these districts in the future. Currently existing needs are summarized by construction district in Table 10.

TABLE 10
YEAR 2010 CURRENT AND TOTAL HIGHWAY NEEDS
(IN MILLIONS OF DOLLARS)

DISTRICT	2010 CURRENT NEEDS	DISTRICT SHARE (%)	2010 TOTAL NEEDS	DISTRICT SHARE (%)
Bristol	$2,343.6	10.3	$3,477.2	9.3
Culpeper	1,316.1	5.8	1,707.0	4.6
Fredericksburg	1,101.8	4.9	2,670.0	7.2
Lynchburg	1,545.6	6.8	1,898.5	5.1
Northern Virginia	4,462.3	19.7	8,121.6	21.9
Richmond	2,508.2	11.1	4,197.1	11.3
Salem	2,999.0	13.2	4,082.2	11.0
Staunton	2,020.5	8.9	2,941.1	7.9
Suffolk	4,395.2	19.4	8,041.3	21.7
Total	$22,692.3	100.0	$37,136.0	100.0

Public Transportation Needs

Public Transportation in the Commonwealth currently includes fixed route and demand responsive bus services, specialized transportation for the disabled, ridesharing services, ferryboat service in the Tidewater area, and Metrorail service in Northern Virginia. In addition, Virginia localities are currently: (1) initiating commuter rail service in the Northern Virginia region, (2) considering the establishment of light rail service in the Tidewater area, and (3) initiating enhanced bus service leading to eventual rail service in the Dulles Corridor.

There are 32 public transportation systems in Virginia serving ten urbanized areas of the Commonwealth. In total, 58 jurisdictions with over 50 percent of the state's population have public transportation services.

The productivity of the Commonwealth's transportation network is also enhanced by the activities of 16 local ridesharing programs. These programs serve 36 counties and 22 cities having a combined total population of nearly four million people, making service available to over 70 percent of the state's population. They encourage many types of ridesharing activities including car, van, and bus pools, as well as public transit. Rideshare programs also promote the use of commuter park-n-ride lots, High-Occupancy-Vehicle (HOV) lanes, employer flex-time, and parking management.

Needs Assessment Process

The Department assesses short and long range financial needs of Virginia's public transportation systems and rideshare programs. This includes collecting and analyzing data about future needs, evaluating operations through annual statewide performance evaluations and compliance reviews, and incorporating elements of plans developed by transit providers. Some of this information is presented in the Department's Six Year Improvement Plan. Using this information, the Department, in coordination with local transit systems, the Virginia Association of Public Transit Officials (VAPTO), and the state Secretary of Transportation, formulates and implements plans and programs designed to improve and promote public transportation services for citizens of the Commonwealth. Implementation includes administration of an annual public transportation financial assistance program of approximately $72.0 million to support costs of administration; fuel, tires, maintenance parts and supplies; capital improvements; ridesharing; technical and planning assistance; and demonstration/experimental activities.

Latest Identification of Needs

The needs identification process involved different procedures depending on whether it was for the Northern Virginia region or not. The public transportation needs for Northern Virginia were identified by the regional transportation planning process and reported in the Northern Virginia 2010 Transportation Plan. The needs include those for

commuter rail and Metro rail since they are eligible for funding under the public transportation program. The public transportation service needs for the rest of the Commonwealth were developed using data collected from each of the public transportation service providers. By and large the data relate to the maintenance of existing service and the addition of new service by existing providers but do not reflect the initiation of transportation services in other areas.

Each system submitted a six-year capital needs listing. All of the capital needs are included and are expressed in 1989 dollars. The operating needs for each system were based upon the fiscal year 1989 projected budgets and include 100 percent of the total operating expenses. Public transportation capital is defined as large real and personal property items (i.e., buses, maintenance vehicles, and facilities). Capital project proposals are reviewed for justification, appropriate size and scope for local needs, and eligibility for state participation by the Department. Recommendations are presented to the Commonwealth Transportation Board for final approval. Costs of capital projects are determined in a cooperative effort between the Department and local governments and are based on industry averages and local prevailing rates.

The six-year capital needs list was used to develop an average yearly capital funding level which was then expanded to generate a 20-year capital needs funding requirement. This procedure generated the needs required to maintain the current level of service through the year 2010.

In order to more accurately reflect the increased need for public transportation services, all of the public transportation systems and the independent ridesharing agencies were grouped into four categories based on their growth potential. An assumption was made about their anticipated growth and the needs were increased by that assumed amount. The four categories are:

- No potential for expansion,
- Moderate potential for expansion (assumes a 10 percent expansion of the base year operating and capital needs),
- High potential for expansion (assumes a 20 percent expansion of the base year operating and capital needs), and
- Very high potential for expansion (assumes a 50 percent expansion of the base year operating and capital needs).

These expanded needs were then projected out to fiscal year 2010 and are shown by construction district in Table 11.

TABLE 11
YEAR 2010 PUBLIC TRANSPORTATION AND RIDESHARING NEEDS SUMMARY*
BY CONSTRUCTION DISTRICT
(IN MILLIONS OF DOLLARS)

CONSTRUCTION DISTRICT	TOTAL OPERATING NEEDS THRU THE YEAR 2010	TOTAL CAPITAL NEEDS THRU THE YEAR 2010	TOTAL RIDESHARING NEEDS THRU THE YEAR 2010	TOTAL NEEDS THRU THE YEAR 2010
Bristol	$24.2	$8.4	$0.0	$32.6
Culpeper	53.8	19.0	0.7	73.5
Fredericksburg	1.6	0.7	2.8	5.0
Lynchburg	63.2	14.8	0.0	78.0
Northern Virginia	5,240.7	3,321.1	9.9	8,561.8
Richmond	630.3	80.0	4.2	714.4
Salem	87.7	35.3	0.0	123.0
Staunton	20.4	12.0	0.7	33.1
Suffolk	837.0	346.4	0.2	1,183.5
Special Statewide Projects	---	---	---	12.4
Total	$6,958.8	$3,837.5	$18.4	$10,817.3

* These needs are currently being updated

NOTES: Capital and ridesharing needs are 100 percent of costs.
Operating needs are defined as 100 percent of the total operating expenses.
Totals may not sum due to rounding.

These needs represent capital and operating assessments provided by the existing operators and the projects included in the Northern Virginia Subregional Plan. Also included are the latest estimates for the Virginia Rail Express (VRE) expansion, the additional needs for bus service in the Potomac Rappahannock Transportation District, the Norfolk-Virginia Beach Passenger Rail service, completion and extension of the Metro rail system, Metrorail rehabilitation and rail car replacement, light rail in Norfolk-Virginia Beach, commuter rail for Northern Virginia, and bus replacement and facilities improvements statewide.

Rail Needs

Rail transportation has served the nation and the Commonwealth since the late 1800's. Although there has been a decline in freight and passenger service since the 1940's, rail transportation still provides a needed service. At the present time, additional transportation capacity exists and service is expandable for both freight and passengers.

Rail Freight Service

Rail freight service involves the movement of large volumes of goods over a fixed guideway. In Virginia, this guideway consists of approximately 3,295 route miles owned by 12 railroad companies. These facilities cover 85 counties, 33 cities, and 117 towns.

Between 1950 and 1989, the percentage of revenue freight transported by rail was reduced by 19 percent with most of the commodity shifts being accommodated by truck. Over 50 percent of the light density route miles were abandoned during the period 1970 to 1989. Increased service options and improvements to trailer-on-flat-car (TOFC) and container-on-flat-car (COFC) have stimulated interest in rail, however. And, since 1987, the Commonwealth has granted funds to 37 businesses to install connecting rail facilities with a potential employment of 2,914.

Rail Intercity Passenger Service

Intercity rail passenger service is provided by Amtrak. Ten intercity services are presently being operated which prior to 1971 were operated by private railroad companies. Much of the Commonwealth's service was lost with the transfer to Amtrak because lines that failed to meet the minimum revenue criteria were dropped. Many states have decided to fund their lines with state money through Amtrak's 403(b) program through which the state subsidizes the service provided. That program allows state and local governments to contract with Amtrak to operate additional local and regional services. Amtrak's current 403(b) policy requires that the sponsoring state be responsible for reimbursing Amtrak for 70 percent of the service's projected long-term operating loss, with Amtrak responsible for the remaining 30 percent of the service's loss, up to an annual maximum of $1 million. In the last ten years, patronage by citizens of the Commonwealth has increased by 53 percent.

High speed rail service, such as that found in other countries, does not exist in the United States today. However, many states and the federal government are studying equipment and routes for the potential implementation of this type of service. A route in Virginia is among those being considered.

Needs Assessment Process

Since 1975, an Annual State Rail Plan Update has been developed in accordance with Federal Railroad Administration (FRA) regulations. This plan includes discussions of historical trends, changes in service, abandonments, and identifies problems and potential projects. During its development, it is reviewed by the State Rail Advisory Committee and presented at a public hearing. Rail issues and needs are summarized in the Commonwealth of Virginia Preservation of Essential Rail Service 1990 document.

Although rail needs can be identified, the timing and amount of the need for state funding cannot be established precisely. The purchase of abandoned rights of way is generally based on known administrative decisions and is done at specified times. The timing of other needs, however, is not determinable because it depends on the actions of others. Railroads generally wait until the last minute to identify lines for abandonment. They do not want to identify the lines early and arouse unnecessary local reaction in the event that a later transaction would postpone or reverse their decision. The same holds true for businesses deciding where to expand or build new facilities.

Identification of Needs

Following the introduction of a bill in the 1990 session of the General Assembly providing funding for rail (Senate Bill 421), additional data were obtained on the rail needs for various committees. This information was again updated in 1991. Following is a general description of the freight and passenger needs identification process and the associated cost estimates. It is important to note that needs for commuter rail are not included in this description. Those needs can be included with either the rail or public transportation modes, and for the purposes of needs identification are included in the public transportation section.

Rail Freight. Rail freight needs can be grouped into four categories: purchases of abandoned lines, rehabilitation and improvement, safety, and rail industrial access. A list of abandoned lines and potential abandonments was created and lines with multiple transportation uses that could potentially be sold were added to the list for purchase. Potential abandonments were determined to be those lines which were marginally profitable, carrying less than five million gross tons per year or having less than 30 carloads per mile. The total mileage involved approximately 504 miles. An approximate purchase value per mile was assigned to each segment based on its location and use.

Benefit/cost analyses were performed in accordance with Federal Railroad Administration guidelines on 13 lines for which cost information was available. The ratios resulting from these analyses ranged from 1.17 to 3.22 (ratios higher than 1.00 indicate a greater benefit than cost, higher meaning greater benefit). To estimate the value of the improvement and rehabilitation needs, the cost information on the 13 lines was obtained. Subsequently, the cost of upgrading eight more lines to Class II FRA Track Safety Standards became available and was added to this estimate. The standards incorporate different factors for different classes of track. Examples of some of the criteria used are the number of ties per rail length, the number of bolts per joint, the number of spikes, and the number of spikes per tie. A complete description of the standards can be found in the FRA's Track Safety Standards. In addition to the track upgrading costs, costs attributable to planning and engineering were added. Applicants for rehabilitation or improvement projects were assumed to contribute 30 percent of the cost with others, including FRA, providing partial funding ($1 million), as well.

The mileage involved in the improvement and rehabilitation analysis totaled approximately 358 miles at a cost of $34 million. The need is actually somewhat larger due to unidentified long-range needs not included in this assessment.

Safety needs were based on existing track safety standards obtained from the State Corporation Commission's Division of Railroad Regulation. Safety needs include grade crossing protection and warning systems, which have been identified in the Grade Crossing Inventory Program and are not included in the rail needs, but are included in the highway needs.

Rail Industrial Access needs (connections to businesses) are the fourth category of freight rail need. Inquiries and requests for the Rail Access program exceed $1.5 million per year. Distributions for this program are at the discretion of the Commonwealth Transportation Board, with projects within a single jurisdiction being limited to no more than 25 percent of the available funds.

The total rail freight needs are estimated to be $116.5 million excluding administrative and operating costs, purchases for highway purposes, grade crossing protection devices and grade separation, matches, and other contributions. These needs are summarized in Table 12.

Intercity Rail Passenger. Intercity rail passenger needs are either capital, intercity service, or high speed rail needs. To identify capital needs, contacts were made with Amtrak, various localities, the Federal Railroad Administration, and other states to obtain updated information on needs, proposals, and cost estimates. Amtrak provided a list of their immediate station improvement needs. These needs include station refurbishment, elevators, handicapped access, and new station construction. Based on previous visits to the stations by Department personnel, additional needs were estimated and included.

Cost estimates for a new north-south service which were previously submitted by Amtrak were updated and included as intercity passenger needs. In addition, the cost for a potential east-west service was estimated from cost data provided by other states with similar services.

TABLE 12
YEAR 2010 RAIL NEEDS*
(IN MILLIONS OF DOLLARS)

FREIGHT RAIL NEEDS	
Rehabilitation	$34.14
Planning & Engineering	2.85
Equipment	0.70
Procurement **	50.85
Rail Industrial Access	28.00
Total Freight Rail Needs	$116.54
PASSENGER RAIL NEEDS	
Intercity Capital	$5.41
Intercity Service	33.60
Procurement **	12.25
High Speed Rail (Maglev)	0.50
Total Passenger Rail Needs	$51.76
Total Rail Needs	$168.30

* These needs are currently being updated.

** Procurement for three joint use passenger and freight rail lines totals $24.5 million. For the purposes of this analysis, half ($12.25 million) has been deducted from freight needs and added to passenger needs.

High speed rail service could occur after the year 2000. Although the service could be implemented earlier, only planning costs are included in the needs inventory. More information on this service will be available after completion of the federal studies which received additional emphasis in the Intermodal Surface Transportation Efficiency Act of 1991.

The identified needs for intercity passenger rail total $51.8 million, excluding administrative costs, engineering costs, and funding provided by others. These needs are summarized in Table 12.

Aviation Needs

Virginia's first aviation law was enacted in 1928, when the Commonwealth had 1 licensed aircraft, 8 airports, and 37 licensed pilots. In the 63 years since then, the Commonwealth has promoted the development of an extensive air transportation system. Today, there are over 4,100 based aircraft, 333 public and private airports, and more than 15,500 licensed pilots in the state. The current importance of aviation in Virginia is indicated by the 31.9 million airline passengers who flew into and out of the Commonwealth last year and by aviation's roughly $6.2 billion annual contribution to the state's economy.

Recognizing the importance of aviation to the state's economy, the Virginia General Assembly has charged the Virginia Department of Aviation (VDOA) with the responsibility of planning the state's aviation system (Section 5.1-1.6 of the Code of Virginia). In fulfilling this requirement, VDOA produces and continuously updates the Virginia Air Transportation System Plan (VATSP). The first VATSP was published in 1975. It represented the Commonwealth's first modern comprehensive airport system plan. Since 1978, five new airports (Louisa, Chesapeake, Brookneal, Mecklenburg-Brunswick, and Tazewell) have been added to the system. These airports represent 20 percent of the new airports recommended in 1975.

The airline industry has experienced dramatic changes as a result of the Airline Deregulation Act of 1978. The operating freedom airlines now enjoy has placed new challenges on the VDOA to ensure the Commonwealth's commercial facilities remain the finest in the country. For example, in just the past four years, VDOA has assisted eight commercial airport sponsors in building new airline terminals or renovating existing structures.

In 1989, VDOA began a year long study to completely update all elements of the VATSP. The VATSP Update recommends the general location and characteristics of new airports and the nature of expansion for existing aviation facilities. It shows the timing and estimated cost of facility development, relates airport system planning to the economic development and environmental goals of the Commonwealth within a comprehensive planning framework up to the year 2008.

Identification of Needs

The VATSP, the Virginia Air Cargo System Plan (VACSP) 1991, and Airport Sponsor's Five-Year Plans were the three documents that made up VDOA's Continuous Airport Planning Program (VCASP). The VCASP was used to identify aviation needs for the year 2010. The principal objective of VCASP is to insure that airport plans and programs remain responsive to the Commonwealth's air transportation needs. The three recently completed VCASP reports were included in this needs assessment, as well as the preliminary results of a first phase development study for a new regional airport in eastern Virginia, and a recent survey of individual airport sponsors.

The VATSP provided the majority of the information for this needs assessment. It addresses existing capital facility needs, navigational equipment needs, and for the first time, heliport facility needs in the Commonwealth. In addition, the VATSP identifies facility capacity needs, and the need for new general aviation and commercial airports.

The second VCASP document included in this needs assessment is the Virginia Air Cargo System Plan. This plan provides a comprehensive review of air cargo activity in Virginia and the facilities needed to support future growth. In short, the VACSP determined that Virginia's air cargo facilities will need to expand almost three-fold over the next 20 years to accommodate forecasted growth. The air cargo facility improvements are needed to support a segment of the aviation industry that contributes in excess of $100 million annually to the State's economy.

Airport Sponsor's Five-Year Plans are the third VCASP element that identify future aviation facility needs. The Five-Year Plans are site specific and represent, in many cases, recommendations of airport master plans. Some of the projects included in this document are in direct response to state and federal mandates regarding airport safety, and environmental regulation. In addition, the results of a recent survey of individual airport development needs were compared with five-year plans to arrive at final needs estimates.

When the capital development needs of the aviation system were first identified as part of the work of the Commission on Transportation in the Twenty-First Century, Washington National and Dulles were federal facilities. Subsequently, (June 1987) the airports were transferred to the Metropolitan Washington Airports Authority (MWAA) pursuant to legislation adopted by Congress and the General Assembly. Hence, the needs of National and Dulles are included in this needs assessment and are listed separately.

The final source of information included in this needs assessment is input from a feasibility study to determine the need for a new commercial airport (Southeastern Virginia Superport) in the Commonwealth. A preliminary capital development estimate for such a facility is included. It is based on similar projects across the country.

Description of Needs

Each airport has individual facility needs based on its role in the National Air Transportation System, as depicted in the National Plan of Integrated Airport Systems (NPIAS), and in the Commonwealth's Airport System. The size and scope of an airport's needs are determined by its functional category (general aviation, reliever, or air carrier), the airport's service area, and the aeronautical demand generated by the specific users of the facility. For example, the length, width, and location of an airport's runway is determined by such factors as terrain, altitude, air space requirements, based aircraft by type, and number and type of operations. Among the variables included are the number of instrument flight rule (IFR) operations compared to visual flight rule (VFR) operations, itinerant operations versus local operations for each type of aircraft category, and whether the airport has scheduled passenger service or is classified as a reliever facility. These same variables also determine other capital needs at airports including taxiways, ramps, aprons, terminal and related operating buildings, hangars, parking lots and access roads. Other capital needs include specific safety-related projects such as lighting systems, beacons, security fencing, and electronic navigational and landing aids.

Development of Needs

Cost figures for the projected 20-year aviation needs were taken from the Virginia Air Transportation System Plan, the Virginia Air Cargo System Plan, and individual Airport Sponsor's Five-Year Plans. The VATSP and VACSP costs were determined by applying forecasted aeronautical demand variables according to Federal Aviation Administration (FAA) planning criteria, Advisory Circular (AC) 150/5300-12, "Airport Design Standards-Transport Category Airports" and AC 150/5300-4B, "Utility Airports, Air Access to National Transportation", to determine specific facility requirements. The results of this analysis was then applied to appropriate unit costs to estimate the cost of 20-year aviation needs. In order to determine a total estimated cost for the 20-year period, the cost estimates identified in the VATSP and VACSP were: (1) compared to cost estimates identified in individual Airport Sponsor's Five-Year Plans, (2) added to cost estimates provided by the Metropolitan Washington Airports Authority for Washington National and Dulles International Airports, and (3) added to an initial cost estimate for planning and developing a new commercial airport in eastern Virginia.

Needs Not Eligible for TTF Funds

The FAA's Airport Improvement Program (AIP) Handbook, Order 5100.38A, and the Virginia Department of Aviation's "Financial Aid to Airports-Procedural Guide" identify projects eligible for TTF funding. As a general rule, any need or project that can produce revenue for an airport sponsor is not eligible for funding at either the federal or state level. This would include such needs as automobile parking lots, aircraft hangars, restaurants in terminal buildings, and non-public use areas in terminal buildings (e.g., airline and rental car counters and office space). The only current exception to this rule are costs

associated with the relocation of underground fuel storage systems and/or the construction of new fuel storage systems. They are eligible because of the public interest and need to protect the environment.

The examples cited above, with the exception of fuel storage systems, while related to capital improvements, are ineligible to receive funds from the TTF. In addition, there are many other non-capital aviation needs that are not being funded by the TTF that the airport sponsor, the private sector, and aviation special fund are supporting. The four largest non-capital needs not currently eligible for TTF funds are operating costs, maintenance costs, promotion costs, and the costs associated with the installation of state-owned navigation aids and related facilities and equipment.

Operating Costs. The cost of operating a public-use airport in the Commonwealth is borne entirely by the airport sponsor. These costs vary according to the size and category of the facility. In general, only the largest airports are entirely free of local government financial support. This is because the largest airports usually generate sufficient revenue to cover the full cost of operating the facility, as well as sufficient revenue to retire debt. In addition to debt-related expenditures, examples of operating costs are personal services, federal certification/safety-related requirements, liability insurance, utility costs, and airport marketing and public relations efforts.

Maintenance. One key to ensuring long-term return on capital investment is a properly managed and financed maintenance program. The Virginia Department of Aviation has a modest maintenance program designed to encourage local efforts to maintain and preserve system airports. The Department provides financial assistance to airport sponsors to help perform non-recurring maintenance. Non-recurring maintenance is defined as upkeep that is not common or routine with respect to the preservation of the airport. Runway painting, general pavement repair, lighting systems, and navigational aid repair are examples of eligible maintenance projects. Examples of ineligible recurring maintenance projects include grass mowing, snow removal, rubber removal, and runway sweeping.

The Maintenance Program is a non-capital program managed by the Virginia Department of Aviation. The Department provides approximately $275,000 each fiscal year from the Aviation Special Fund for this program. The cost of each maintenance project is shared on a 4:1 basis between the Department of Aviation and the airport sponsor.

Promotion. Airports in many respects are operated as businesses. Like other businesses, they need to promote their services and facilities in order to remain competitive. The economic climate of today requires airport sponsors to develop aggressive marketing plans that address both the retention of existing service providers and users, as well as the attraction of new ones. To meet this need, the VAB, with the support of the airport industry, established the "Virginia Air Service and Airport Promotion

Program" in August of 1983. This non-capital program has proven very successful over the years. Annually the Virginia Department of Aviation allocates between $100,000 and $200,000 for this program. The distribution of funds is subject to VAB approval and employs a sliding scale to share costs. It is more completely described in the Department of Aviation's "Financial Aid to Airports - Procedural Guide."

Facility and Equipment. Another non-capital need not currently receiving TTF funds is the Virginia Department of Aviation's Facility and Equipment (F&E) program. As a result of this program, the Commonwealth enjoys one of the most extensive and modern NAVAID (navigational aid) systems in the country. The purpose of the F&E program is to augment the federal NAVAID system and provide those areas of the Commonwealth which do not qualify for federal NAVAID systems with equal or better navigational aids. The Commonwealth's NAVAID system includes 7 localizers (part of an Instrument Landing System), 2 SDFs (simplified directional facilities), 5 DME's (distance measuring equipment), 26 NDBs (non-directional beacons), 23 PAN AM weather dissemination systems, 19 AWOSs (automatic weather observation systems), and 43 airport UNICOM radios. Identified F&E improvements in the VATSP total more than $21 million over the next 20 years.

Needs for Which TTF Funding is Sought

When the first 20-year needs analysis was conducted as part of Governor Baliles' Commission on Transportation in the Twenty-First Century, Washington Dulles International Airport (IAD) and Washington National Airport (DCA) were not included in the needs assessment because they were owned and operated by the federal government. In March 1987, IAD and DCA were leased from the federal government to the Metropolitan Washington Airports Authority, so that a vehicle could be established which would be responsive to the enormous facility requirements of both airports as a result of continued passenger growth and increased market demand resulting from airline hubing.

Since that date, the demand for services and improved facilities has increased faster than anticipated. In 1990, over 25.5 million passengers used DCA and IAD, an increase of over two million passengers from 1986 and over 10.1 million from 1982. In addition, since its construction in 1940, National Airport has received very little attention from the federal government in terms of capital improvements. For many years, a "band-aid" approach was used to accommodate increased passenger demand. The airlines provided the bulk of the cost of terminal improvements over the years. Likewise, Dulles opened in 1962 as the jet port for Washington. It was designed for 100-passenger jet aircraft, not the 400-passenger jets which operate today. According to the 1990 VATSP, IAD and DCA together generated over $3.1 billion in annual economic activity, $788 million in payroll and 46,000 jobs. Together, they represent 53.8 percent of aviation's total economic benefit to the Commonwealth. In order to satisfy and efficiently manage the demand placed on these two airports, large-scale facility development is necessary. The

MWAA has undertaken a 20-year development plan for both airports which will exceed $1.9 billion. Yet the MWAA had not previously sought state funding support from the Commonwealth Airport Fund. The airports appear to satisfy all requirements for inclusion in the TTF airport program, and IAD is the single largest generator of aviation fuel tax revenues for the Commonwealth. Although DCA does not generate any aviation fuel tax revenue for the Commonwealth because of federal legislation that dates back to the 1940's, both airports contribute to the TTF through the state's 4.5 percent sales tax.

The year 2010 total aviation capital improvement needs statewide represent a cost of $2,846,189,000 in 1989 dollars. Table 13 represents a breakdown of this 20-year needs assessment by airport category.

TABLE 13
YEAR 2010 AIRPORT SYSTEM NEEDS SUMMARY*
BY AIRPORT CATEGORY
(IN MILLIONS OF DOLLARS)

AIRPORT CATEGORY	FIVE-YEAR NEEDS FY90-FY95	FIFTEEN-YEAR NEEDS FY95-FY2010	TOTAL NEEDS YEAR 2010**
Air Carrier	$128.678	$ 58.610	$187.288
Reliever	43.131	100.286	143.417
General Aviation	40.417	104.768	145.185
Total	$212.226	$263.664	$475.889

* These needs are currently being updated.

** Does not include data for Washington National Airport and Washington Dulles International Airport which are overseen by the Washington Airports Authority.

TABLE 14
COMMONWEALTH OF VIRGINIA AIRPORT SYSTEM NEEDS*
FY 1990 TO FY 2010
(IN MILLIONS OF DOLLARS)

FACILITY	NEEDS
Washington National Airport	$867.00
Washington Dulles International Airport	1,003.30
Total (MWAA)	1,870.30
Southeastern Virginia Superport	500.00
Air Carrier, Reliever, General Aviation	475.89
Total Statewide Airport System Needs	$2,846.19

* These needs are currently being updated.

Port Needs

The Department of Conservation and Economic Development, through the Division of Ports, supervised and regulated all port activities in the Commonwealth until 1952. In that year, the General Assembly created a separate agency, the Virginia State Ports Authority, to supervise port operations. To bring about unification of state ports, the 1970 General Assembly greatly expanded the agency's powers and renamed it the Virginia Port Authority (VPA).

Total cargo handled in 1970 by the port facilities in Hampton Roads totaled 2.3 million tons. During the decade of the 1970's general cargo tonnage increased to three million tons. In 1989, tonnage handled at the Virginia Port Authority facilities exceeded six million and 1990 general cargo tonnage surpassed 7.2 million.

The Virginia Port Authority is responsible for developing the expansion of waterborne commerce and port development as outlined in Title 62.1, Waters of the State, Ports and Harbors; Chapter 10 of the Code of Virginia.

The first port development plan, Port of Hampton Roads Long-Range Marine Terminal Development Plan was completed in 1970. The plan was rather basic in that it addressed itself only to matching current business with specific facility requirements. No detailed recommendations were made as to the exact location of future facilities. The central focus of the plan was on the need for additional ship berths and cranes.

In 1973, Volume I, Port Development Plan for Public General Cargo Facilities in Hampton Roads was compiled. The plan developed a general cargo forecast, evaluated general cargo facilities, recommended facility improvements and an approach to financing the improvements. The plan was the first comprehensive port development plan for the Port of Hampton Roads.

In 1982, an Integrated Master Plan for the Port of Hampton Roads was developed. This was an important element of port unification as future cargo business and development requirements were calculated from a total port-wide perspective. Concurrent with this integrated planning effort was the creation of Virginia International Terminals, Inc., a single maritime terminal operating entity under the auspices of the Virginia Port Authority.

In 1986, the first six-year plan, Port of Hampton Roads Facilities Assessment and Recommendations, 1985-1991, was developed to address short, intermediate, and long-range expansion alternatives for port facilities.

Identification of Needs

The identification of needs for port facilities is based on an assessment of market factors and future trends in U.S. and Atlantic Coast global trade; world container shipping industry; and competitor ports' strategies in terms of facilities, intermodal operations, perceived market strategy, and labor environments.

The growth of container cargo through VPA facilities is forecast to be between 2.8 percent and 4.1 percent per year through 2010. Under even the lowest forecast, projected container throughput will exceed estimated terminal capacity in the 1993 to 1995 time frame.

Changes have taken place on the size of ship lines calling at the port. Container carriers have introduced a variety of new technologies including Post-Panamax container ships (those too wide to utilize the Panama Canal), double-stack train services, and automated information systems. The strategy in the international container shipping industry continues to be minimization of expenses through economies of scale and consolidation of services requiring larger and more modern shiphandling and associated facilities.

General cargo capacity of a port facility is calculated by total breakbulk and container berth space. In evaluating the performance of a marine terminal, it is common practice to compare its actual throughput with its optimum throughput where throughput may be measured as the tonnage or number of containers handled by the terminal within a specified period.

The optimum usage level of a port facility is 80 percent. All three facilities (Norfolk International Terminals South, Newport News Marine Terminals, and Portsmouth Marine Terminal) are operating beyond efficient capacity. In order to meet even the existing needs, additional port facilities are required.

The Virginia Port Authority's marketing efforts are attracting new ship lines and additional services of existing lines to Norfolk International Terminals (NIT). Today container tonnage handled at the terminal is beyond the optimum 80 percent usage level that provides the most efficient movement of cargo. NIT's 1990 container tonnage levels were at 97 percent of capacity. Portsmouth Marine Terminal (PMT) is now also operating beyond efficient capacity and has no room for future port growth. Newport News Marine Terminal (NNMT) is also approaching efficient capacity and, like PMT, has no room for expansion.

Norfolk International Terminals North (NIT North) is currently the only facility with land available for expansion for current and future port growth. Construction of NIT North must begin immediately in order to accommodate any new ship line service.

The following projects will complete waterside facilities at each terminal:

- Cruise Facility at Newport News Marine Terminal
- East Waterfront Project at Portsmouth Marine Terminal

Norfolk International Terminals (South) has been completed.

Cost Estimates

Construction costs were estimated by utilizing standard cost estimate guidelines and historical cost data. There are no typical costs for constructing a ship berth. Constructing a ship container berth 1,500 feet long and 114 feet wide and the necessary supporting equipment are costed using estimates of architectural and engineering fees, dredging costs, construction cost per linear foot, development of backup area for container cargo handling, staging, storage, and equipment.

Total construction/development time for a 1,508-foot berth with required components is estimated at 42 months. Even if construction were to begin today, the facility would not be fully "on-line" until December 1994. Eventually an additional several thousand feet of marginal wharf, yard equipment, and back-up area will be required.

The year 2010 total port capital improvement needs represent a cost of approximately $1.2 billion in 1991 dollars.

Needs Funded From Non-TTF Sources

General maintenance, rehabilitation, and cargo handling improvement projects are funded from non-TTF sources. The individual projects and estimated costs are contained in condition surveys for each terminal.

Two condition surveys were done to determine these needs. The 1986 Condition Survey evaluated needs on the land side of the terminal while the 1991 Condition Survey assessed needs on the pier structures. Total maintenance and rehabilitation needs are as follows:

TABLE 15
YEAR 2010 PORT NEEDS
MAINTENANCE, REHABILITATION AND CARGO HANDLING
(IN MILLIONS OF DOLLARS)

TERMINAL	COST
Newport News Marine	$2.667
Norfolk International	8.923
Portsmouth Marine	2.333
Total	$13.923

Total portwide needs through the year 2010 are shown in Table 16.

TABLE 16
YEAR 2010 PORTWIDE NEEDS SUMMARY*
(IN MILLIONS OF DOLLARS)

FACILITY	NEEDS
Portsmouth Marine Terminal	$48.675
Newport News Marine Terminal	50.657
Norfolk International Terminals North	189.192
Norfolk International Terminals North - Expansion	268.000
Virginia Inland Port	7.257
Portwide (Land Acquisition and Cargo Handling Improvements)	8.202
New Terminal Facility (Location to be determined)	400.000
Navigation Improvements	
Craney Island Replacement	71.000
55-Foot Outbound Channel	67.500
Southern Branch of Elizabeth River	18.600
Eastern Branch of Elizabeth River	11.397
York River (37 Feet)	4.360
York River (39 Feet)	8.300
Maintenance	15.000
Total	$1,168.140

* These needs are currently being updated.

Summary

Needs developed for the five transportation modes total over $52 billion. These needs were derived from various long-range plans for each of the modes and represent capital requirements for all of the modes and operating costs for public transit for the 20-year planning horizon. The needs were developed utilizing consistent methodologies and procedures and reflect requirements to continue existing levels of service or to bring systems up to standard. The ability to adequately meet these transportation needs depends on the availability of funding at the federal, state, and local levels, however. The following chapter addresses the issue of funding.

V. THE RELATIVE PARTICIPATION OF FEDERAL,STATE, AND LOCAL GOVERNMENTS

The major focus of this study is to determine whether equity exists in the current allocation formulae in the distribution of TTF funds. This objective addresses the issue of equitably "splitting up the pie." To completely address the adequacy of the TTF formulae, consideration must be given to the amount of funding available for transportation programs. Several sources fund transportation and the goal of this chapter is to address the relative participation of federal, state, and local governments in funding transportation needs.

The Importance of Considering Revenue Trends

Each transportation mode is supported through different combinations of state and federal revenue sources that operate through the HMOF and TTF and since these revenue sources experience different growth rates, each mode is affected differently. Funding sources for each mode are displayed in Table 17.

TABLE 17
REVENUE SOURCES: TTF ALLOCABLE FUNDS AND HMOF FUNDS FOR TRANSIT

MODE	REVENUES		
	HMOF HIGHWAY	SPECIAL SESSION TTF REVENUES	HMOF TRANSIT
Highways and Rail	X	X	
Transit		X	X
Aviation		X	
Ports		X	

HMOF funds are a mixture of state and federal revenues, while Special Session revenues are supported entirely by state taxes and fees. This relationship is demonstrated in Table 18.

TABLE 18
STATE AND FEDERAL REVENUE SOURCES

REVENUE SOURCE	REVENUES		
	HMOF HIGHWAY	TTF	HMOF TRANSIT
STATE AID			
Motor Fuel	X	X	
Motor Vehicle Sales and Use	X	X	
Motor Vehicle License	X	X	
General Sales and Use		X	
Road Tax		X	
International Registration Plan*	X		
Other	X	X	
FEDERAL AID			
Dedicated Revenues	X	X	X

* Out-of-state truck apportioned vehicle registration

As a result of the funding priority structure, the inflationary impact of non-construction programs appears as a reduction in the amount available for construction transferred from the HMOF. This reduction in the amount that can be transferred amplifies the reduced purchasing power for construction that results from inflation.

Federal, State, and Local Funds Available

Revenues available through the Highway Maintenance and Operating Fund and the Transportation Trust Fund are projected annually by VDOT. These projections account for HMOF and TTF revenues from all sources. There are some revenues available for all modes that are not a part of these funds, but these are neither substantial nor predictable.

Generally, all revenues estimated to be available for highways are included in the VDOT projection. Funds expended by a locality for a local project will not appear. Also, in some instances, a project that will relieve an established need will be constructed with

local revenues. Even though the need is met, the funding is not reflected in the TTF revenue estimate.

Mass transit funds from state sources are included in the HMOF and TTF revenue projections. Federal funding for rural mass transit projects are also included because the State is the designated recipient. Federal and local monies provided directly to transit operators is not reflected in the HMOF or TTF.

Federal and local funding for ports and aviation are not included in the TTF projection. Neither are any state revenues which might be available from sources other than the Special Session revenues.

The TTF appropriation includes an item for improvements for industrial access railroad tracks, which is funded through the TTF. Current federal highway legislation also appropriates funds for safety improvements at railway/highway crossings. These safety improvements include protective devices as well as grade separations and are taken into account in the statewide needs assessment and are included in the HMOF/TTF revenue estimates.

Localities were asked to provide estimates of local revenues but responses were limited. On the basis of the low response rate, it was determined that local revenues for highways could not be included as part of the study.

Federal Mandates That May Affect State Plans, Priorities, and Funds Availability

Future federal mandates will have a significant impact upon plans, priorities, and funding availability. Plans may be affected because future mandates could shift federal implementation priorities among transportation modes, or among subsystems within a specific mode. With changed federal emphasis, state plans may need to be altered in order to retain federal funding. For example, current federal law requires VDOT to regulate outdoor advertising, or face loss of some highway construction funds. Future mandates could contain similar requirements as prerequisites to continued funding.

The most significant of the federal mandates is the Clean Air Act Amendments of 1990. These amendments will impose several requirements on transportation in areas where the air quality standards are not met. In order for a project to be eligible for federal funds, it must be in conformity with the amendments. The focus of these measures is to meet the National Ambient Air Quality Standard by reducing carbon monoxide emissions and improving ozone quality. A further description of the Clean Air Act Amendments can be found in Appendix C.

Another federal mandate that will have a significant impact is the Americans with Disabilities Act (ADA). Title II addresses the impact that the ADA will have on public

services, including transportation. In particular, the ADA prohibits public entities from denying individuals with disabilities the opportunity to use public transportation services. All vehicles used in fixed route service or in a demand responsive system must be readily accessible to and usable by individuals with disabilities, including those who use wheelchairs. Public transit agencies providing fixed route public transportation must also provide comparable paratransit service. These requirements will result in increased costs to public transportation providers in bringing their facilities up to standard. Operating costs may also increase as a result of the ADA. The extent to which costs will increase has not been yet determined and will be examined further in Phase II of the study. Some other important federal mandates are summarized in the Appendix C.

Anticipated Changes in Federal Funding

Major federal funding has been provided by the Intermodal Surface Transportation Efficiency Act of 1991, which was signed into law on December 18, 1991. This new law will have a dramatic impact on funding levels as well as policies, programs, and intergovernmental roles and relationships.

The Intermodal Surface Transportation Efficiency Act of 1991 provides for a six-year $155 billion reauthorization for surface transportation programs. Approximately $123 billion will be initially directed to highway programs and the remaining $32 billion will be directed to public transit. The new law consolidates funding into a fewer number of programs, requires a higher match level, and earmarks funding for particular program categories. In addition, the law allows shifting of funds between highways and transit.

The overall amount of funding has been increased. Virginia is expected to receive total highway apportionments averaging $436 million over the next six years. This is a 50 percent increase over the average $290 million received annually since 1987. Table 19 details the program funding of the new federal law.

TABLE 19
ESTIMATED MAJOR PROGRAM FUNDING FOR VIRGINIA
FROM THE INTERMODAL SURFACE TRANSPORTATION
EFFICIENCY ACT OF 1991

HIGHWAY PROGRAM	FUNDING IN MILLIONS OF DOLLARS		
	Six-Year Total	FY 1992	Annual Average
Interstate Construction and Substitution	$341	$91	$57
Interstate Maintenance	486	65	81
Bridge	362	49	60
National Highway System	402	62	67
Surface Transportation Program	457	55	76
Congestion Mitigation and Clean Air Act	108	18	18
Federal Lands	10	-	-
Reimbursement	80		13
Apportionment Adjustment	35	19	6
Minimum Allocation	41	0	7
Donor State Bonus	129	0	21
Metropolitan Planning	-	3	-
90% of Payments	10	0	2
Special Projects	155	11	26
Total	$2,616	$372	$436
Percent of Nation	2.28	2.31	2.28
Percent of Contributions	85.7	86.8	85.7
Five Year Total 1987-91	1,450	-	290
Difference 87-91:92-97	1,166	-	146
Percent Change	+50		+50
Transit	332	38	54
Grand Total	$2,938	$410	$490

Within the highway portion of the bill, a reordering of the programmatic structure has been effected. Categories have been combined, and new categories have been established, as follows.

Interstate Construction and Substitution

The Interstate Construction and Interstate Substitution programs are funded only over the next four years. Funding is provided to complete the currently approved projects contained in the interstate cost estimate and the interstate substitution cost estimate. The substitution program in Virginia is already complete, but the Commonwealth expects to receive $341 million for interstate construction projects over the next four years. With the completion of these projects, initial construction of the approved interstate system in Virginia will be complete, according to the federal definition. Substantial interstate needs remain, but they do not meet the federal requirements for inclusion in the interstate cost estimate.

Interstate Maintenance

Under the previous act interstate improvements not identified in the interstate cost estimate were financed through the Interstate 4R (resurfacing, restoration, rehabilitation, and reconstruction) program. The 4R program has been replaced by a 3R program. This program does not provide for participation in projects which would add additional (reconstruction) lanes unless they are restricted to high occupancy vehicles (HOV). Over the six years of the act, some $486 million would be provided to Virginia.

National Highway System

A 155,000 mile National Highway System (NHS) is established and will be defined over the next four years. The National Highway System will become the successor to the Interstate System. This system includes the present interstate system as well as other principal arterial routes. Funding for improvements on the national highway system can be used for adding new capacity, providing for presently identified interstate 4R needs which are not eligible for interstate maintenance funding as well as providing for other principal arterial needs. Virginia would receive $402 million for National Highway System improvements over the next six years.

Bridge Program

The bridge program is continued in its present form although funding is increased to reflect increased national concern over deficient structures. Virginia is expected to receive $362 million over the six-year authorization.

Surface Transportation Program

The surface transportation program replaces the existing Rural Secondary and Urban categories, and includes projects on the primary system not on the National Highway System, as well as the present safety categories. Besides traditional highway projects, eligibility is extended to capital costs for mass transit, passenger rail (including high speed rail), publicly owned intra- or inter-city bus terminals and facilities, expenses for contracted passenger rail or magnetic levitation service provided by public or private carriers, and magnetic levitation systems, including expenditures on rights of way and associated facilities. Total funding would amount to $457 million over six years.

Transportation enhancements and transportation safety each are allotted ten percent of the apportionments. Fifty percent of the apportionments to the state must be divided between the metropolitan areas of the state with a metropolitan statistical area population of over 200,000 and the other areas of the state in proportion to their relative share of the state's population. The remaining 30 percent of funds may be programmed in any area of the state.

Congestion Mitigation and Air Quality Improvement Program

Eligible projects must be listed in a state implementation plan that has been approved pursuant to the Clean Air Act, as amended. No new capacity (additional lanes) may be added unless it is identified in the congestion plan, which is also required. Apportionments are available only for non-attainment areas and is to be distributed to states according to relative population in those areas, with a multiplier for the degree of non-attainment. A non-attainment area is an area that exceeds the national ambient air quality standards for ozone and carbon monoxide. Approximately $108 million would be provided to Virginia over the six years.

Equity Adjustments

Through a series of special provisions, some states' apportionments are increased to provide more equitable funding from a variety of perspectives. These special provisions include reimbursement, apportionment adjustment, minimum allocation, donor state bonuses, and 90 percent of payments. Combining these categories, Virginia will receive an estimated $295 million over the six-year authorization.

Planning

The planning function is divided into two parts -- metropolitan planning and statewide planning. In metropolitan planning the role of the metropolitan planning organization is expanded in terms of project selection and transportation decision-making. In statewide planning, the state takes the lead in project selection and transportation

decision-making in consultation with local officials. The roles of state, regional, and local officials and private citizens are strengthened in the new law.

Special Projects

Virginia will receive an estimated $155 million for specific federal demonstration projects identified by Congress.

Highway Funding

Funding for highways is based on the historical level of funding provided from various sources as well as expected funding from the Six-Year Improvement Program and new federal legislation. The following sections describe historical funding and anticipated funding levels and relate the amount of available funding to total needs.

Historic Funding Level

The needs summarized in Table 9 are highway construction needs eligible for funding through the Transportation Trust Fund. They do not include maintenance or operating expenses. They also do not include the costs to construct streets that are functionally classified as local in cities and towns which are a local responsibility. Currently, a limited amount of highway funds from the TTF are made available for rail access and preservation needs. Those rail needs are not included in Table 9 but are detailed elsewhere in this report.

The amount of highway construction funds available in the last five fiscal years is shown in Table 20. These funds include state funds, federal funds, and the required urban match from cities and towns. The amount of other local funds and special or private funds spent on highways is not available.

Table 20 shows that for fiscal years 1987 through 1991, the TTF has provided approximately $253 million per year, or 38 percent of the total funding available. Federal funding has averaged about $307 million per year, or 46 percent. The remaining funding was provided from local matches and transfers from the HMOF.

TABLE 20
HISTORIC FUNDING LEVEL FOR HIGHWAYS
(IN MILLIONS OF DOLLARS)

FUND SOURCE	FY 87*	FY 88	FY 89	FY 90	FY 91
STATE FUNDS					
TTF	$97.106	$301.571	$290.004	$302.483	$274.412
HMOF	144.326	66.354	158.013	104.678	56.917
Sub-total State	241.431	367.925	448.017	407.161	331.329
FEDERAL FUNDS					
Interstate	200.702	225.895	252.364	136.202	166.539
Other	114.511	98.794	117.156	110.651	113.888
Sub-total Federal	315.213	324.689	369.520	246.853	280.427
LOCAL FUNDS					
Urban Match **	5.700	7.500	7.600	3.000	2.920
Special/Private Funds	N/A	N/A	N/A	N/A	N/A
Total	$556.644	$692.614	$817.537	$654.014	$611.756

* TTF created partway through FY 87; new revenues collected for only part of fiscal year
** Total matches shown in the Six-Year Improvement Program; not included in total.
N/A - Not Available

Forecast Funding Level

Historically, state funds in the HMOF not used for maintenance have been transferred to the TTF for construction. With increasing maintenance costs, the amount of funds available for construction has been steadily decreasing. In the very near future it is expected that maintenance costs will consume all of the state revenues in the HMOF. When this occurs not only will the HMOF not provide funds to be transferred for construction, but additional funds from either the TTF or other revenue sources may be required to fund the HMOF. For the analysis of state funding of highway needs, it has been assumed that there will be no net revenues for construction from the HMOF over the 20-year period or any transfers to the HMOF.

The current Six-Year Improvement Program for fiscal years 1991-1992 through 1996-1997 is shown in Table 21. The amounts shown do not reflect the additional $151 million per year in federal funds expected under the recent federal legislation. Until all of the requirements of the federal legislation have been analyzed it would be difficult to show how those funds would be allocated to administrative classes.

The new federal-aid program provides funding obligations for a six-year period. It provides Virginia an average annual obligation that is approximately $151 million greater than that received under the previous program ($436 million per year versus $285 million per year). The estimate of 20-year needs met from federal funds is derived from this program. Beyond the six-year funding period of the latest federal bill, Virginia's revenues from federal sources are simply conjecture. This analysis assumes the new average annual allocation will apply over the 20-year forecast horizon.

Currently, state law requires cities and towns receiving an urban allocation to provide a two percent match of funds. While there have been recent proposals to revise the amount of local matching funds, this analysis assumes the current law requiring only a two percent urban match will remain in effect for the 20-year forecast period.

TABLE 21
SIX-YEAR IMPROVEMENT PROGRAM
FY 1991-92 THROUGH 1996-97
(IN MILLIONS OF DOLLARS)

ADMINISTRATIVE SYSTEM	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	TOTAL
Interstate	222.093	139.116	139.116	139.116	80.932	80.932	801.305
Interstate-Min. Alloc.	52.545	–	–	–	–	–	52.545
Primary	149.040	173.700	178.833	177.950	186.086	195.772	1,061.381
Urban	111.780	130.275	134.125	133.462	139.565	146.829	796.036
Secondary	134.976	157.232	161.897	161.084	168.112	176.831	960.132
Total	670.434	600.323	613.971	611.612	574.695	600.364	3,671.399

Highway Needs and Available Funding

Table 22 shows the funding available to meet highway needs. Total highway needs amount to $37.1 billion. Assuming federal funding of $436 million per year remains constant over 20 years, it will provide for $8.7 billion of the total highway needs. There is currently a two percent local match required for urban projects which would provide $114 million of the total. Special funding provides for $652 million of the needs. Based on the average annual allocations from the fiscal year 1992 Six-Year Improvement Program expanded to a 20-year horizon (see Table 21), the TTF will provide $8.7 billion in highway funding. This leaves $18.9 billion which remains to be funded.

TABLE 22
20-YEAR HIGHWAY NEEDS AND FUNDING SOURCES
(IN MILLIONS OF DOLLARS)

Total 20-Year Needs		$37,135.97
20-Year Needs Met From:		
Estimated TTF Funds	8,734.71	
Other State Funds (HMOF)	0.00	
Federal Funds	8,720.00	
Local Funds	114.28	
Special/Private Funds	652.42	
Total From All Sources	18,221.41	
Remaining To Be Funded		$18,914.56

Public Transportation Funding

Public Transportation needs are funded by: (1) federal assistance, (2) local assistance (fares and local taxes), and (3) state aid (TTF and HMOF). For fiscal year 1992 the TTF provided $37.5 million out of a total need of $329 million. The remaining needs were funded by: (1) $57.0 million in federal funds, (2) $111.0 million in local fares, (3) $88.6 million in local taxes, and (4) $34.9 million in state HMOF funds. Based on the eligibility requirements in the Code of Virginia, local operators were eligible to receive an additional $27.5 million in TTF funding in fiscal year 1992.

Historic Funding Level

Historical funding for mass transit is as follows.

TABLE 23
PUBLIC TRANSPORTATION HISTORICAL FUNDING
(IN MILLIONS OF DOLLARS)

SOURCE	FY 1988	FY 1989	FY 1990	FY 1991
TTF Funds	$39.08	$34.49	$38.02	$37.49
HMOF Funds	35.27	34.99	35.19	36.42
Federal Funds *	30.02	28.70	27.66	29.72
Local Fares	90.60	93.91	102.29	105.38
Local Taxes *	31.97	43.12	41.10	48.52
Total	$226.94	$235.21	$244.26	$257.53

* This table does not include Starke-Harris funds or other Northern Virginia local funds spent in support of transit capital projects that are not included in the state aid program of projects.

For fiscal years 1988 through 1991, the TTF provided approximately $37 million per year, or about 15 percent of the public transportation funds. Funds from the HMOF averaged about $35 million per year (15 percent of total funding). Federal funding contributed another $29 million per year (12 percent) and local taxes and farebox revenues contributed $139 million per year, or 58 percent of all funding.

Forecast Funding Level

The revenues by source for fiscal year 1992 were projected over a 20-year period to determine the year 2010 needs for public transportation. Table 24 shows the 1992 forecast for funding by source.

TABLE 24
1992 FORECAST FUNDING FOR PUBLIC TRANSPORTATION
(IN MILLIONS OF DOLLARS)

SOURCE	REVENUES
TTF Funds	$37.47
HMOF Funds	34.89
Federal Funds	56.97
Local Fares	111.04
Local Tax Revenues	88.74
Total	$329.11

Public Transportation Needs and Available Funding

Table 25 shows public transportation needs and available funding. Total public transportation needs amount to $10.8 billion. Federal funding will provide for $863 million of the total public transportation needs. This includes $37.9 million per year for 8 years to fund the completion of the 103-mile Metro system. This special federal allocation will then end. Also assumed are a 50 percent increase in all other federal funds and $6 million authorized for Dulles Corridor analysis and preliminary engineering.

Funds from localities include fares, which will provide $3.3 billion, and local tax revenues which will provide $1.2 billion. Another $698 million of the needs have been identified as being funded from the Highway Maintenance and Operating Fund. Based on the average annual allocations from the fiscal year 1992 Six-Year Improvement

Program expanded to a 20-year horizon, the TTF will provide $864 million in funding. This leaves $3.9 billion which remains to be funded.

Historically, the TTF provided approximately $37 million per year (about 15 percent of the public transportation funds). Because of the increased amount of funding provided by the federal government, if the same level of state support continues, the relative share of the TTF decreases (to 11 percent of the funding) over the 20-year period of time. Between the HMOF and the TTF, the historic share of total state aid is approximately 30 percent.

TABLE 25
YEAR 2010 PUBLIC TRANSPORTATION NEEDS AND FUNDING SOURCES
(IN MILLIONS OF DOLLARS)

Total Needs Thru The Year 2010		$10,817.30
20-Year Needs Met From:		
Estimated TTF Funds	864.34	
Other State Funds (HMOF)	697.80	
Federal Funds *	863.62	
Local Funds		
Fares	3,272.40	
Tax Revenues **	1,239.80	
Total Met From All Sources	6,937.96	
Remaining To Be Funded		$3,879.34

* Federal revenues include $37.9 million per year for eight years to fund the completion of the 103-mile Metro system. This special federal allocation will then end. This assumes a 50 percent increase in all other federal funds and includes the $6 million authorized for Dulles Corridor analysis and preliminary engineering.

** For the 20-year projection, local share is based on receiving the maximum eligible state aid per the Code of Virginia.

Rail Funding

Rail funding is currently provided by the TTF through highway allocations for rail access projects and rail corridor improvement projects. The historical level of these allocations is described below.

Historic Funding Level

Between fiscal year 1987 and fiscal year 1991, $4.7 million were provided from the Transportation Trust Fund for rail access projects and rail corridor improvement projects. These funds have been reduced to $250,000 for each of these programs in fiscal year 1992 because of the revenue shortfall. During this time, $1.7 million was granted by the Federal Railroad Administration for planning and rehabilitation purposes. The bulk of these funds are discretionary.

Each of these programs requires a local match. Funding for rail passenger station improvements have either been provided by Amtrak, the owning railroad, or a jurisdiction. Improvement costs ($200,000) being made to the Fredericksburg station are being shared by the railroad and Fredericksburg.

TABLE 26
RAIL HISTORICAL FUNDING
(IN MILLIONS OF DOLLARS)

SOURCE	FY 1988	FY 1989	FY 1990	FY 1991
TTF Funds	$0.82	$1.00	$1.04	$1.04
Other State Funds	0.00	0.00	0.34	0.75
Federal Funds	0.10	0.00	0.54	0.48
Local Funds *	0.02	0.00	0.20	0.27
Special/Private Funds	0.07	0.06	0.80	1.20
Total	$1.01	$1.06	$2.92	$3.74

* This table does not include all funding, only that reported as expended or identified as a project in which the state or locality was involved.

Forecast Funding Level

Federal and State funding has declined over the last five years. Since the majority of the funds are discretionary in nature, no funding source was identified to meet needs other than contributions from others. Forecasted funding for fiscal year 1992 are as follows:

TABLE 27
FY 1992 FORECASTED FUNDING LEVEL BY SOURCE
(IN MILLIONS OF DOLLARS)

SOURCE	REVENUES
TTF Funds	$0.50
Other State Funds	0.00
Federal Funds	0.06
Local Funds	*
Special/Private Funds	1.73
Total	$2.29

* Local funds would be required to match any federal or state grants which may be available. The required match amount would amount to 30 percent of the total project cost. If all of the projects included in the cost estimate were implemented over the 20-year period, approximately $11.6 million would be the average annual needs.

Non-TTF Funding Sources

Most of the funds available for rail improvements, rehabilitations, or purchases have been provided by private companies. The remaining resources have been provided by the federal government, Amtrak, and local jurisdictions or authorities. Funding is not presently available to implement projects to satisfy the identified needs. In some cases the needs, including the shortline railroads, may be addressed by others at such time as they become critical. Most (e.g., corridor purchases, new passenger service, etc.) will not be addressed without funding.

Present legislation allows the funding of rail access projects, rail corridor improvement projects, and purchases under the Transportation Trust Fund. However, the funding is subject to budget allocations.

The funding sources for rail needs, projected through 2010, are presented in Table 28.

TABLE 28
YEAR 2010 RAIL NEEDS AND FUNDING SOURCES
(IN MILLIONS OF DOLLARS)

Total 20-Year Needs		$168.30
20-Year Needs Met From:		
Estimated TTF Funds	0.00	
Other State Funds	0.00	
Federal Funds	0.50	
Local Funds	11.10	
Special/Private Funds	*	
Total Met From All Sources	11.60	
Remaining To Be Funded		$156.70

* Amtrak, railroad, and business contributions have been excluded. These contributions are generally in excess of 30 percent of need.

Aviation Funding

Aviation needs are funded based on FAA and state eligibility guidelines and available funds. Based on established criteria, all aviation needs are prioritized by airport and project type and then ranked accordingly. Starting with the highest ranking need, each need is funded at the maximum state participation level, subject to approval by the Virginia Aviation Board. This funding process parallels the FAA's funding process. Currently, the FAA participates in funding eligible needs at a level of either 75 percent or 90 percent, depending on the size of the airport (projects at Norfolk, National and Dulles are funded at the 75 percent level; all others are funded at the 90 percent level), with the balance funded by the state (5 or 12.5 percent) and locality (5 or 12.5 percent).

Whether or not an eligible project receives funding within a particular time period ultimately depends on the availability of both federal and state funds. The lack of either

within a particular time period can lead to increased costs for a project. Also, because the state does not control local expenditures for airport development, airport sponsors effectively control the amount and timing of both federal and state expenditures.

Historic Funding Level

The Commonwealth Transportation Trust Fund legislation dictates how the Commonwealth Airport Fund is divided between air carrier, reliever, and general aviation airports. As discussed earlier, air carrier airports receive 40 percent of the CAF as entitlement funds based on enplaned passengers. Forty percent is allocated by the Virginia Aviation Board on a discretionary basis to air carrier and reliever airports, and the balance (20 percent) is allotted by the VAB to general aviation airports, also on a discretionary basis.

To determine the allocation of discretionary funds, the Department of Aviation uses a priority methodology to develop a list of recommended airport improvements for consideration by the VAB. Each project is rated according to the following criteria:

- Project essentiality,
- Facility benefit/use,
- Sponsor responsibility, and
- Economic and air service development.

The methodology is explained in the Department of Aviation's Financial Aid to Airports: A Procedural Guide for Airport Sponsors, 1988.

After discretionary projects have been prioritized, they are segregated by category, (air carrier, reliever, general aviation) analyzed according to project funding eligibility, and presented to the VAB for its consideration.

Because the Department of Aviation is mandated to maximize the flow of federal airport improvement funds to the Commonwealth, the list of projects is also compared to the Federal Aviation Administration's provisional funding plan. Generally, federal and state airport improvement plans are parallel; however, the timing of projects may occasionally differ. Negotiation may be required to ensure that individual projects are funded in the most efficient manner.

Aviation receives 2.4 percent of the TTF for capital improvements. From January 1987 through December 1990, this share of the TTF has totalled $44,423,996. The average share per year over the last four fiscal years has been $10,308,368.

The Aviation Special Fund (Section 5.1-51, Code of Virginia) is the source of funding for current non-capital needs such as the Maintenance program, the Facilities and Equipment program, and the Promotion program. During fiscal year 1991, $275,000 was

allocated for the Maintenance program, $400,000 for the Facilities and Equipment program, and $100,000 for the Promotion program.

The federal government provides funding for airport needs through the Airport Improvement Program (AIP), authorized by the Airport and Airway Safety and Capacity Expansion Act of 1987 (P.L. 100-223). The three primary types of AIP funds that the Commonwealth receives are: (1) entitlement funds (commercial service airports only -- using a formula based on total annual enplanements), (2) apportionment funds for general aviation airports (using a formula based on population and square miles), and (3) discretionary funds (based on need for both air carrier and general aviation airports). In fiscal year 1991, the Commonwealth airports received a total of $49,930,541 in federal funds. That year represented the largest allocation of federal funds ever, exceeding the previous record year 1988 by over $20 million. The five-year average for 1987-1991 was just over $30.5 million.

Both public and private airport sponsors contribute funds to meet capital and non-capital needs (15 of Virginia's 75 public-use airports are privately owned). The level of involvement and financial commitment is dependent on the size and nature of each airport. Today, the actual level of local participation is unknown, however, if the original 1986 COT-21 formula (1/3 federal, 1/3 state, 1/3 local) is applied, the local and private share exceeds $950 million for capital, facilities and equipment, and maintenance needs. To accurately quantify local and private funding would involve extensive research by the Department of Aviation.

Federal funding for aviation for fiscal years 1987 through 1991 averaged $30.5 million per year. Table 29 summarizes historical federal funding for aviation.

TABLE 29
HISTORICAL FEDERAL FUNDING FOR AVIATION
(IN MILLIONS OF DOLLARS)

YEAR	FEDERAL FUNDS
1987	$17.579
1988	29.655
1989	26.399
1990	29.147
1991	49.931

Aviation Needs and Available Funding

Table 30 summarizes total aviation needs and available funding. Total aviation needs amount to $2.8 billion estimated federal fund revenues over the 20-year period is $1,110.87 million. The TTF is expected to provide $250.2 million in funds based on the average annual allocations from the fiscal year 1992 Six-Year Improvement Program. This leaves $543 million which remains to be funded.

TABLE 30
YEAR 2010 AVIATION NEEDS AND FUNDING SOURCES
(IN MILLIONS OF DOLLARS)

Total 20-Year Needs		$2,846.19
20-Year Needs Met From:		
Estimated TTF Funds	250.17	
Other State Funds	0.00	
Federal Funds	1,110.87	
Local Funds/Private	941.85	
Total Met From All Sources	2,302.89	
Remaining To Be Funded		$543.3

Port Funding

The port mode is funded from several sources that dedicate funds for specific uses. The following sections describe historical funding for ports, anticipated funding for the 20-year horizon, and the application of these funds towards port needs.

Historical Funding

The port mode derives its funding from three sources: TTF funds, state general funds, and special funds. TTF funds are comprised of transfers to the Commonwealth Port Fund (CPF) and interest earned from the fund. TTF funds are used solely for capital and terminal maintenance projects. State general funds are used only for operating expenses and do not go toward the funding of capital improvements. Special funds are derived from income earned from terminals and are primarily used for operating expenses. These funds are occasionally used for small capital projects. There is

currently no federal funding for ports. Historical funding for ports is summarized in Table 31.

TABLE 31
PORT HISTORICAL FUNDING
(IN MILLIONS OF DOLLARS)

SOURCE	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991
TTF Funds Transfer	$5.57	$17.51	$17.16	$17.63	$20.04
TTF Funds Interest	0.04	0.49	0.89	0.93	1.09
General Funds	25.51	20.01	15.53	15.91	13.54
Special Funds	3.92	3.11	4.17	3.15	4.22
Total	$35.04	$41.12	$37.75	$37.62	$38.89

Table 31 shows that for fiscal years 1987 through 1991, approximately $16 million per year was provided by the TTF (42 percent of all funding). State general funds and special funds make up the balance of the funding, with $18 million per year (48 percent) and $4 million (10 percent), respectively.

Forecast Funding

Forecast funding for ports is given in Table 32. TTF funds represent those funds expected to be transferred to the Commonwealth Port Fund for the five-year period. In addition, port funding includes an estimated $12 million per year from state general funds and another $4 million is forecasted in special funds. These funds are not anticipated to be used for any capital projects. There is currently no federal funding for ports.

TABLE 32
PORT FORECAST FUNDING
(IN MILLIONS OF DOLLARS)

SOURCE	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
TTF Funds	$19.17	$20.04	$21.37	$22.59	$23.86

Port Needs and Available Funding

Port needs amount to $1.2 billion. The TTF is expected to provide $440.9 million in funds based on average annual allocations from the fiscal year 1992 Six-Year Improvement Program. This leaves $727.3 million which remains to be funded.

TABLE 33
YEAR 2010 PORT NEEDS AND FUNDING SOURCES
(IN MILLIONS OF DOLLARS)

Total 20-Year Needs		$1,168.14
20-Year Needs Met From:		
Estimated TTF Funds	440.87	
Other State Funds	0.00	
Federal Funds	0.00	
Local Funds	0.00	
Special/Private Funds	0.00	
Total Met From All Sources	440.87	
Remaining To Be Funded		$727.27

Summary

Funding for the transportation modes is derived from a variety of sources including federal funds, local tax revenues, local farebox revenues, the Transportation Trust Fund, the Highway Maintenance and Operating Fund, and private sources. By projecting the current funding level provided by the TTF into the future, estimating local participation in transportation funding, and considering funding expected from the new federal legislation, the total amount of funds available to meet transportation needs is estimated to be approximately $28 billion. This level of funding falls well short of meeting the $52 billion of transportation needs in the Commonwealth.

VI. ISSUES IN THE DEVELOPMENT OF A RAIL PROGRAM

Senate Joint Resolution 188 requires that the Department assess the need for rail freight and passenger services, and funding sources and mechanisms to provide assistance for meeting these needs. Chapter VI presents the results of the Department's analyses of critical rail issues including a discussion of the basis for state involvement in rail services, background information and an identification of existing programs, demands and issues. Recommendations to enhance the equity and sufficiency of funding for rail services will be discussed in Phase II of the study.

Railroads perform a valuable transportation function for the citizens and businesses of the Commonwealth, providing cost effective and efficient movement of bulk commodities, such as coal and fertilizers, and large volumes of general cargo. However, the rail network in Virginia is shrinking, precluding shippers in some areas from shipping cargoes by rail. While governmental groups and/or shortline operators have preserved rail service on some lines, other services and their rights of way have been lost.

Prior to 1971, freight railroads also transported intercity passengers. The National Railroad Passenger Corporation (Amtrak) was created in that year to preserve a core national passenger rail network. While Amtrak's use continues to grow and its financial performance has improved, the federal government remains unwilling to fund any major expansion of Amtrak into new areas, and the Corporation does not have the resources, especially equipment, to do so on its own. The implementation of additional or new service would require state and local support. This has given cause for the development of rail assistance programs by various states and groups to retain and initiate those services considered vital.

Virginia Rail Service

There are 12 freight railroads and one intercity passenger railroad presently operating in Virginia.

Rail Freight Service in Virginia

Rail freight service is a general term used to designate railroad service that carries goods including merchandise, produce, and minerals on a fixed guideway.

There are three classes of freight railroads. Class I railroads are the major railroads with annual operating revenues in excess of $50 million, in 1985 dollars ($94.4 million in 1991 dollars after being adjusted for inflation). Class II railroads have annual operating revenues in excess of $10 million ($18.9 million in 1991 dollars) but less than $50 million. Class III railroads have annual operating revenues of less than $10 million.

Rail service is provided in Virginia by three Class I railroads, one Class II railroad, and eight Class III and switching rail companies. Table 34 identifies each of the railroads by class. Also, Figure 1 is a map showing the location of the railroad freight lines within Virginia.

TABLE 34
FREIGHT RAILROADS OPERATING IN VIRGINIA

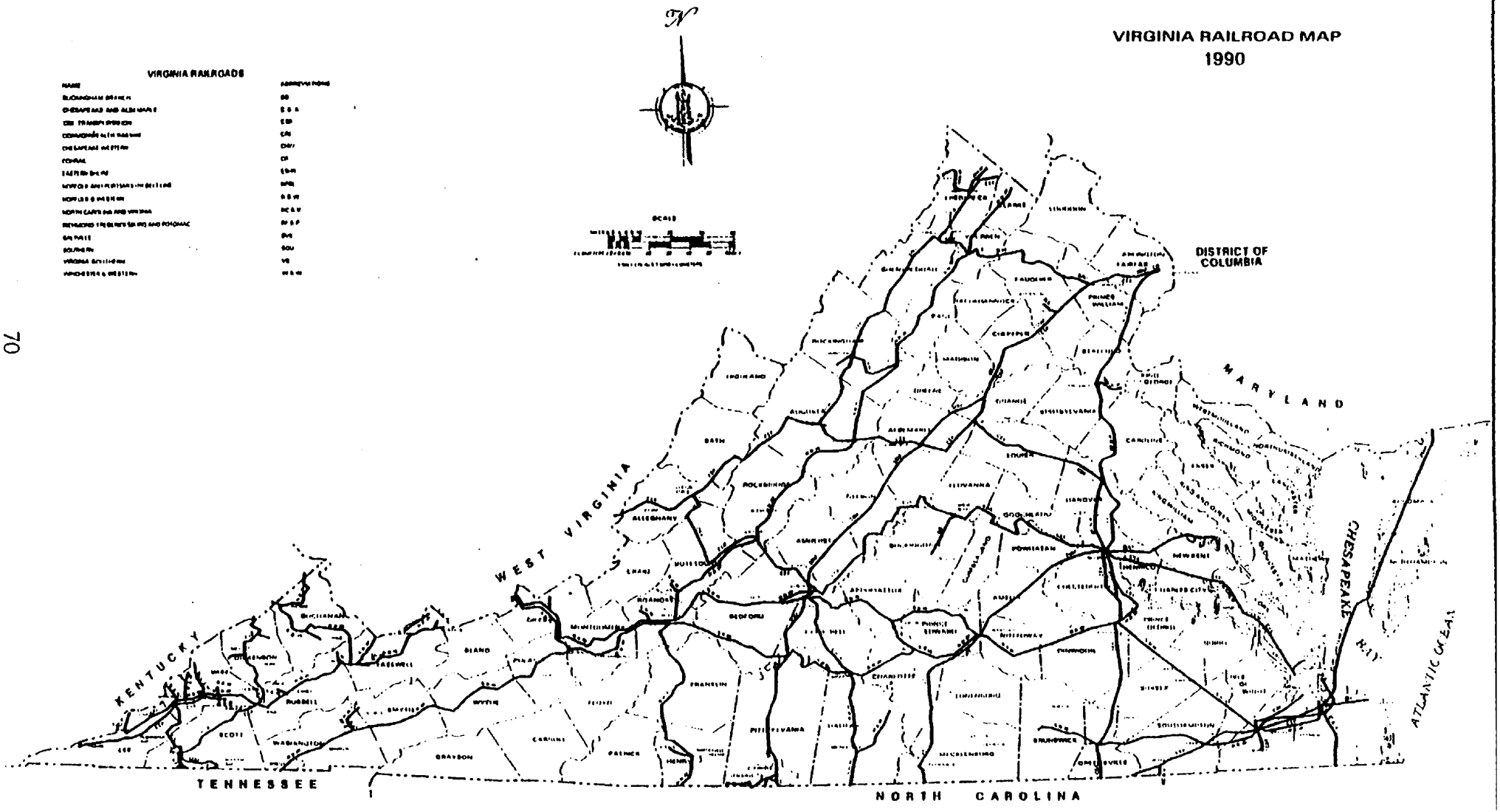
CLASS	RAILROAD
I	Conrail
	CSX Transportation
	Norfolk Southern Corporation
II	RF&P
III & Switching	Buckingham Branch
	Chesapeake and Albemarle
	Chesapeake Western
	Commonwealth Railway
	Eastern Shore Railroad
	Norfolk and Portsmouth Beltline
	North Carolina and Virginia Railroad Company
	Winchester and Western

FIGURE 1

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF TRANSPORTATION

VIRGINIA RAILROAD MAP
1990



The total Virginia rail network mileage in 1970 was approximately 4,021 route miles, excluding yards and sidings, and of this total, 1,072 were classified as light density service (less than one million gross tons moved per mile). The route miles presently total 3,295 miles.

Freight Rail Abandonments

Since 1970, railroads have abandoned approximately 726 miles of rail line including approximately 52 percent of the light density lines. During the last three years, 182 miles of track were abandoned with the granting of 19 abandonments or service discontinuances. This represents approximately 33 percent of the total mileage abandoned in the 19-year period between 1970 and 1989. Such action deprives localities of an alternative form of transportation which usually results in higher shipper costs and increased freight movement over the highway system. Each of the railroads have identified more mileage to be abandoned in the future.

Wilbur Smith and Associates conducted a study[4] in 1983 for the Department that identified 25 light density rail lines that had the potential for being abandoned in the future. Since that time, six more lines have been added to the list, eight lines have been abandoned, and five were sold to shortline operators. Abandonments in the Commonwealth have occurred in 32 counties and potential abandonments could involve 16 counties.

The loss in rail freight service can be attributed to the decline in revenue freight carriage. Much of this decline occurred on lines already considered marginal. With the reduction in inventories, time sensitive shipments and/or economics, many commodities were transferred to other modes. In 1950, railroads carried over 56 percent of the revenue freight, this declined to approximately 44 percent by 1960 and to just over 37 percent in 1989. The bulk of this decrease in rail use was shifted to the trucking industry and resulted in an increase in trucks on the nation's highways.

Rail Passenger Service

In this report, the term rail passenger service will be used to designate railroads which carry passengers from one city to another as their main source of revenue. Examples include intercity passenger rail service and potential future high-speed rail passenger service such as magnetic levitation rail (Maglev). Commuter rail service is a form of mass transit and is included in the public transit section of this report. One passenger service also transports automobiles owned by the persons utilizing the passenger service.

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[4] A Study of Rail Freight and Passenger Service Improvement Options, Wilbur Smith and Associates, Columbia, SC, October 1983.

Intercity Rail Passenger Service. Intercity rail passenger service is provided by Amtrak. Amtrak owns some rail corridors and has agreements to operate passenger service on the lines of other railroads. Currently available to travelers in Virginia are nine intercity trains and an auto-ferry service, all operated by Amtrak. Figure 2 contains a map showing the location of the intercity passenger lines within Virginia.

Under federal legislation, Amtrak has the authority to provide intercity rail passenger service. In 1970, when the private railroads were operating passenger services, there were 4.9 billion passenger miles traveled nationwide and railroads lost the equivalent in present dollars of $1.5 billion. By 1990, the passenger miles had increased to 6.1 billion with losses of $350 million. Many of the routes are booked months in advance and there is a need for more equipment. Numerous stations are in need of repair or replacement because of their age and the need to meet new regulations, while new stations are being proposed in different locations. Additional service can be initiated provided others cover any operating losses. Nine states now participate with Amtrak in providing additional services. As noted previously, the Commonwealth does not have a funding program to aid in providing additional services.

There is some local participation in intercity rail passenger facilities. The Commonwealth's program is limited to studies and negotiations with Amtrak regarding service changes or improvements. Interest is beginning to be generated in high-speed rail and its future potential, however.

Loss of Intercity Passenger Service. Many intercity passenger services and routes were discontinued in the late 1960's and early 1970's. One of the major casualties was east-west service through the state. Urban areas such as Roanoke, Charlottesville, Norfolk, and Bristol lost some or all of their rail passenger service. Implementation of any new service would require state and local financial assistance.

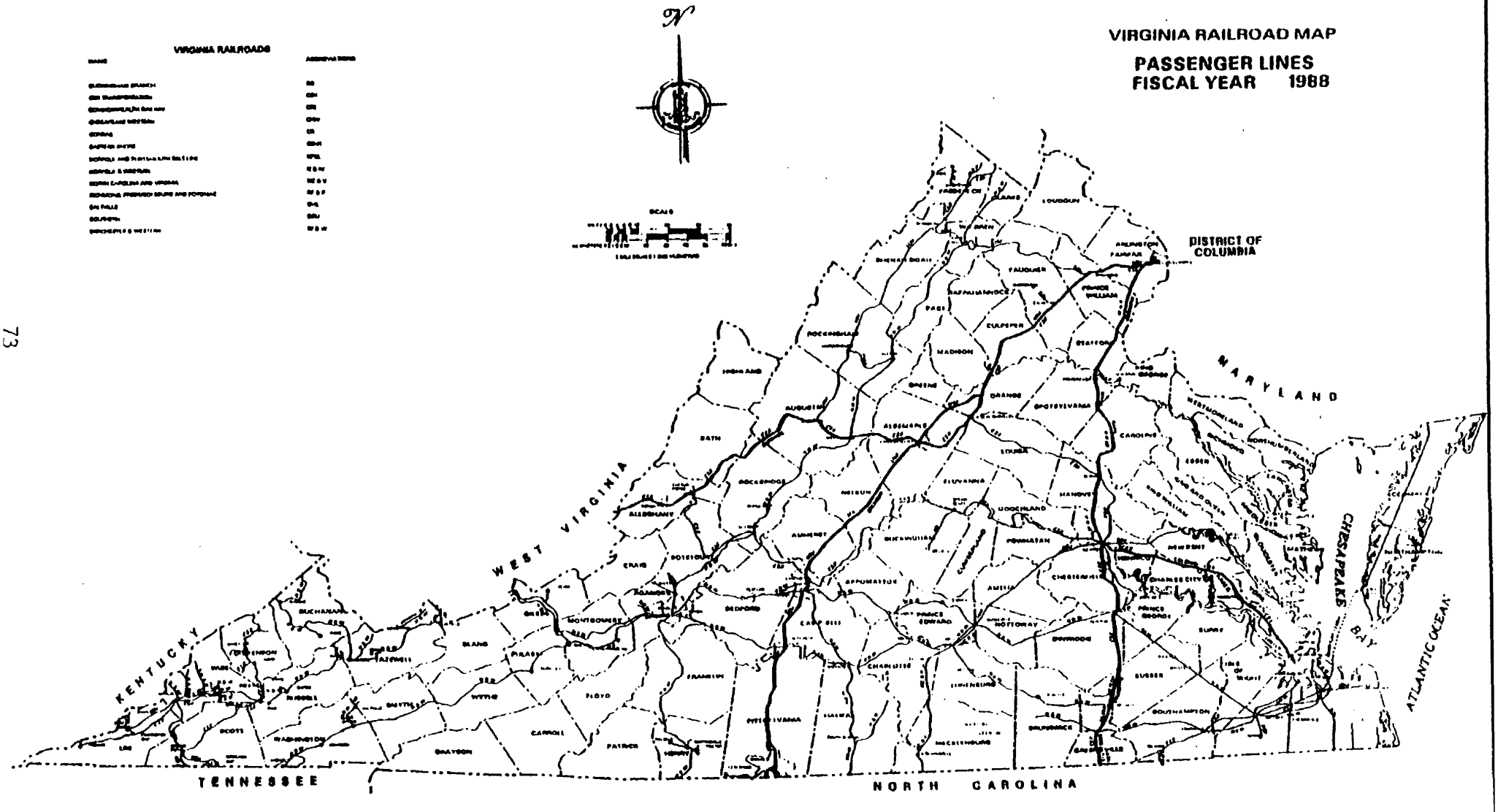
High-Speed Rail. No state program presently exists regarding this type of service. Federal studies have outlined potential corridors in the United States for use of this type of service and some of the corridors involve the Commonwealth. The U.S. Department of Transportation is presently receiving proposals to study the technological options and proposals for route segments will be received in 1993. Seventeen areas or states are now in some stage of studying high speed operations including Maglev. In many cases, the service is being considered as an alternative to short haul air transportation. The present activities concerning this service will be confined to studies; however, funding has been provided under the new federal law to construct a Maglev technology as quickly as possible. Any type of high speed service will require funding for grade separations at intersections for safety reasons.

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF TRANSPORTATION

VIRGINIA RAILROAD MAP

PASSENGER LINES
FISCAL YEAR 1988



Legislative History and Funding

From the late 1800's to the early 1970's, a multitude of regulations had been placed on railroads. Some of these regulations were issued to ensure certain service delivery. Since the early 1970's, the trend has been to reduce the regulations which has resulted in additional abandonments, and during this period the state lost more than 50 percent of the light density rail route mileage and approximately 20 percent of the total route mileage. Also, east-west passenger service to and from Norfolk was terminated because of insufficient revenues.

The history of state and federal funding and federal regulations for freight and passenger rail services is described below. Additional detail on this subject can be found in the Rail Legislative History and Funding[5].

Freight Service: Federal Regulation and Funding

In general, freight railroads are private-for-profit corporations. During their early years, railroads offered the only feasible means to transport products from isolated and distant areas to more centrally populated areas. Federal involvement in these services initially stemmed from a need to control certain activities and practices. In more recent years, federal involvement has focused on the provision of appropriate levels of cost-effective service. Several important federal legislative interventions are summarized below to provide a background for discussing Virginia's freight rail program needs.

Interstate Commerce Act of 1887. Freight services operate under Interstate Corporation Commission (ICC) rules and regulations and provide a common carrier service. ICC controls began with enactment of the Interstate Commerce Act of 1887, which provided federal regulation of the railroad industry. This initial act required the railroads to provide equal service to all, and to do so at reasonable rates. The act basically regulated monopoly practices against isolated shippers and established rate-making policies and common carriage obligations. Subsequent court actions provided that once a railroad initiated service, no portion of that line could be abandoned until the entire rail service was endangered by loss.

Federal Involvement Since the 1970's. By the early 1970's, the railroads, especially carriers servicing 17 states in the Northeast and Midwest, found themselves facing massive bankruptcies. To deal with the immediate possibility of railroad failure and service discontinuation, Congress passed the Regional Rail Reorganization Act of 1973, better known as the 3R Act. The 3R Act resulted in the formation of Conrail. This Act

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[5] Rail Legislative History and Funding, Virginia Department of Transportation, Richmond, VA, 1991.

recognized the need for government takeover and subsidization of some rail freight services, and also, the need for a more efficient abandonment process.

To assist shippers and communities, the 3R Act provided grants to purchase, operate, and rehabilitate railroads and railroad equipment in states on an eligible mileage ratio basis. The 3R Act provided $90 million to the 17 eligible states each year for two years. Originally, the Act provided funds for operational assistance and 70 percent matching funds for acquisition and modernization. Even though the 3R Act improved the business conditions for some railroads, the railroads' problems continued and spread to the West. To prevent the otherwise eminent collapse of the nation's rail system, the Railroad Revitalization and Regulatory Reform Act, or the 4R Act of 1976 was enacted.

The 4R Act served to expand the federal assistance available for rail service beyond the 17 Northeast and Midwest states. The 4R Act extended the federal program for five years and changed the federal/state matching ratio to 100 percent federal funds for the first year, 90 percent the second, 80 percent the third, and 70 percent the fourth and fifth years. The $180 million authorization for the years covered in the 3R Act was increased to $360 million over the five-year program.

The 4R Act also provided for reform of railroad regulations for mergers and abandonments. The 4R Act went further than the 3R Act in establishing that railroads could no longer be required to provide service on lines that were unprofitable. The Act expanded the definition of unprofitable to include return on investment. In instances where shippers required continued service, the 4R Act allowed shippers to subsidize the cost of the unprofitable rail service in order to continue service.

The Local Rail Service Assistance Program was initially developed through the 3R Act; however, the Local Rail Service Assistance (LRSA) Act of 1978 re-oriented the program toward lines still owned and operated by private carriers by permitting interested parties to revitalize branchlines prior to abandonment or service discontinuances.

In 1980, Congress passed the Staggers Rail Act which has had a dramatic effect on the industry and continues to govern the railroad industry today. The Staggers Act is based on the principle that less regulation and greater dependence on economic forces will provide a more efficient rail system. The Staggers Act, like the 4R Act, continued to streamline the abandonment procedures. It defined costs to include opportunity costs on the investment capital of the railroad, making abandonments even more easily justifiable. It granted the ICC the authority to establish terms of sale on lines for operating carriers who were petitioning for abandonment. The Act also increased the ICC's discretionary powers by allowing the Commission to bypass formal investigations, and by establishing a time limit for the entire abandonment procedure. The regulations issued under this Act greatly reduced the cost and the time required for railroads to eliminate unprofitable lines through abandonment.

Additionally, the Northeast Rail Service Act of 1981 modified the LRSA Act to eliminate operating assistance as a use of Local Rail Service Assistance funds.

Finally, in 1990 the federal Appropriations Act (deficit reduction package) imposed a fuel tax on transportation modes, including rail. The funds generated by the tax on railroads and 50 percent of the other monies derived from this tax were earmarked for the general fund to be used to offset the federal budget deficit. While railroads contribute directly into the Transportation Trust Fund, they do not receive any direct assistance. The balance of the tax receipts were to be placed in the federal Transportation Trust Fund. The annual cost of this tax to the railroads exceeds $100 million.

Existing Rail Freight Programs

There are currently four federal and state programs that provide assistance to freight rail. Three address freight needs and one addresses the need for grade crossing warning devices.

Local Rail Service Assistance Program. The Department has administered this federal program since 1976. The program is designed to assist localities in retaining and improving essential rail service or obtaining a substitute service. Beneficiaries of the funding provided under this program have been the counties of Accomack and Northampton, and the cities of Norfolk and Virginia Beach (Eastern Shore Railroad), and Virginia State University. In each case, these services would have had little chance of surviving without assistance. Because of the limited amount of funding, the demand for funds under this program exceeds the supply. Currently several lines could become eligible but have not applied for this funding, while others have inquired but have not completed the qualifications.

Grade Crossings. The Department maintains an inventory of all grade crossings in the state. This inventory is used to identify needs for safety improvements. The federal funding for this program is provided by Section 130 of the Highway Safety Act. The needs and funding are included under the highway needs portion of this report.

Rail Industrial Access. Prior to 1984, the Commonwealth of Virginia provided no support for rail freight services. In that year, the General Assembly initiated a rail industrial access program. The rationale for establishing this program was that the availability of funds to assist new or expanding rail-oriented businesses in constructing access tracks would enhance the Commonwealth's economic development efforts.

Assistance is provided under this state program to construct, reconstruct, or improve part or all of the necessary tracks, and related facilities on public or private property currently used or being developed, existing or prospective, for single industries or industrial subdivisions under firm contract or already constructed, including those subdivisions owned or promoted by railroad companies and others. Applications for

funds must be approved by the local governing body in part because the amount of funding provided in any year within a jurisdiction is limited.

Continued growth of interest in the Rail Industrial Access Program indicates that there is a demand for this function. By providing financial assistance to new or expanding rail-oriented industries, the program is a factor in generating capital expenditures, increased employment, and revenue-producing freight, all of which contribute to the economic vitality of the Commonwealth. Funding has been provided to 37 projects over the last five years and the number of projects for the near future exceed the amount of funds available. In fiscal year 1991 there were 22 potential projects. Of this total only nine were either fully or partially funded.

Rail Preservation Program. In fiscal year 1991, a temporary state program was initiated to provide assistance to improve railways and related facilities specific to rail operations on public or private property and to acquire or lease rail properties for transportation purposes. The assistance provided may be used as a portion of the required non-federal matching share for the utilization of federal funds by public and private parties and could also be used to match other grant funds obtained by the applicant.

During this year, applications from five railroads for seven projects were received totaling approximately $2.1 million. One railroad withdrew their project because of time constraints. Six projects were approved for partial funding totaling $500,000.

A study undertaken previously by the Department identified 12 marginally profitable rail lines which may likely require financial assistance at some point in the future in order to remain in service. An additional nine lines are being studied for rehabilitation.

The Rail, Transit, and HOV Committee of the Commonwealth Transportation Board requested that the option of purchasing rail corridors for the continuation of service and other transportation uses be investigated. As a result, five lines or corridors were identified for which consideration could be given to their purchase for transportation uses.

A recent survey by the National Conference of State Rail Officials found that 30 states have some type of state-administered rail acquisition program, and 46 states have some type of state-administered rail rehabilitation program. Of the 9,611 miles acquired, 80 percent was through government acquisition. Ninety-nine percent of the miles of rail banked (purchased for later use) was acquired by state governments. The report also stated that the 13,158 miles of line were rehabilitated with the help of state-administered rail funding programs. Of the total non-private funds spent on rail programs, states have provided 69 percent of the funds.

Freight Service: Federal Assistance to Virginia

Funding in Virginia from the Local Rail Service Assistance Program, which is set by federal statutory formula each year, has declined from $1.3 million used for operation and rehabilitation in fiscal year 1976, to $36,000 utilized for state rail planning purposes in fiscal year 1991. In 1984, a provision was added to provide federal discretionary funding which would be distributed on a competitive basis. Discretionary funding is still available and a grant for $444,000 was approved in fiscal year 1991 to be used for rehabilitation of the Eastern Shore rail line. Except for the Virginia State University Project, the required matching funds for this federal program have been provided by others including local jurisdictions. No funding for this program has been requested under the current Administration's transportation bill. Recently legislation was introduced to reauthorize funding ($60 million) for the program through fiscal year 1994. The American Association of State Highway and Transportation Officials (AASHTO) has submitted information to Congress supporting continuation of funding for the program.

Freight Service: State Funding

The Rail Industrial Access Program did not receive funding until the adoption of the 1986-1988 Appropriations Act. An annual allocation of $800,000 was budgeted for a two-year period, and funding was continued at the same level in the 1988-1989 appropriations. An amendment to the budget later increased the program funding to $1 million per year for 1989-1990. Due to the Commonwealth's budgetary problems, the $1 million for fiscal year 1991 was cut to $500,000. For fiscal year 1992, the monies were again reduced for the Rail Industrial Access Program, allowing only $250,000 to be used for rail industrial access projects.

House Bill 2, introduced and passed by the 1986 special session of the General Assembly, increased the sales and use tax by one-half of one percent. Additionally, this bill amended the Code of Virginia to allow one-seventh of the net revenue derived from the sales tax to be paid to the Transportation Trust Fund for transportation purposes. None of these funds were specifically allocated to rail programs.

Senator Frank Nolen introduced legislation (Senate Bill 421) during the 1990 General Assembly to create a Commonwealth Freight Rail Transportation Fund. It was subsequently amended by Delegate Moss to include a Commonwealth Passenger Rail Transportation Fund. The final bill proposed that each fund would receive 0.75 percent of one percent of the Transportation Trust Fund Special Session revenues and generate a total of approximately $7 million per year. The monies were to be used for: (1) rail line preservation (reduction of abandonments of viable services), (2) acquisition or rehabilitation of rail lines and equipment, (3) acquisition and preservation of abandoned rights of way, and (4) financing new rail freight and passenger services. The Senate passed the bill; however, the House committee voted to carry the bill over to the 1991 General Assembly. As an interim measure the budget was amended to provide $1 million

for railway acquisition, lease, or improvement. This $1 million was later reduced to $500,000.

In the 1991 session of the General Assembly concern over the budget resulted in the bill (SB 421) not being approved by the House; however, the Budget Bill again provided for railway acquisition, lease, or improvement by stipulating that $250,000 of the $500,000 set aside for rail industrial access be used for that purpose.

Intercity Passenger Service: History and Funding

The passage of the Transportation Act of 1958 was the first federal legislation that placed the regulation of passenger train service under the control of the ICC and made provisions for the discontinuance of passenger service. Prior to this time, railroads had to petition each states' public utilities commission for permission to discontinue a service. This occasionally resulted in contradictory rulings for a service that passed through several states.

Additional relief for the passenger service obligations of the railroad came with the passage of the National Rail Passenger Act of 1970. This act created the Amtrak, which took over almost all the intercity passenger trains on May 1, 1971. The act also allocated $40 million to subsidize the operation of Amtrak in its first year. Freight railroads which joined Amtrak, by contributing rolling stock or equity to the new Corporation, were permitted to discontinue their own passenger services. Four railroads declined to join Amtrak and were required to continue their own passenger trains. Since then two of the railroads have joined Amtrak and two have ceased operations. States do not have to contribute to the operation of these lines.

Section 403(b) of the 1970 Act allows state and local governments to contract with Amtrak to operate additional local and regional services. Amtrak's current 403(b) policy requires that the sponsoring state be responsible for reimbursing Amtrak for 70 percent of the service's projected long-term operating loss, with Amtrak responsible for the remaining 30 percent of the service's loss, up to an annual maximum of $1 million. Capital expenditures for station construction and right-of-way improvements are on a negotiated basis between Amtrak and the contracting state. If additional locomotives and passenger equipment are required to initiate such a service, the state or local entity must fund their purchase.

The level of public expenditures required to maintain Amtrak operations was one of the main issues that prompted Congress to pass the Amtrak Reorganization Act of 1979. The 1979 Act established performance measures for Amtrak routes and required that the railroad carry out annual route evaluations. Routes that failed to meet these established performance criteria were to be removed from the Amtrak system. The Act also required that Amtrak recover at least 50 percent of its operating expenses from ticket sales. Since 1979, Amtrak has progressively improved the ratio of its expenses covered

by revenues, reaching 77 percent in 1990. Its goal is to cover 100 percent of its operating costs by the year 2000.

Congress recently passed the fiscal year 1992 transportation appropriations bill. The bill provides funding for Amtrak for the fiscal year that began on October 1--federal operating support of $331 million, and federal capital support of $175 million. While other funding was also provided, additional funding is needed for equipment.

Intercity Passenger Service: Federal Assistance to Virginia

Federal funds are provided to Amtrak for their entire system. Amtrak allocates them where they are needed. The Commonwealth does not directly receive any federal funds for intercity passenger service.

Passenger Service: State Funding

The Intermodal Surface Transportation Efficiency Act of 1991 states that the policy of the United States is to design and construct a Maglev technology in the shortest time practicable. Funding in the amount of $800 million is to be provided through 1997 for these and other high-speed activities. The Secretary of Transportation shall submit a study report to Congress by June 1, 1995, on the commercial feasibility of constructing one or more systems in the United States.

Funding is not presently available from the Commonwealth for improving existing services or establishing new routes through Amtrak. To date, the Commonwealth has set aside only a small amount of funds ($2,000) to be used for high-speed rail studies. Currently no state research and development fund exists that would accommodate high-speed rail projects. Federal programs now being developed will require matching funds from state, local, and private sectors.

Establishing A Rail Fund

The issues involved in establishing a rail program are similar in nature to those concerning other modes and involve decisions on whether or not a project serves the public interest and if so the extent of the Commonwealth's financial participation. The following sections identify some of the major questions that will be addressed in Phase II of the study.

Railroad Funding

The source and amount of funding are at the bases of any decision to establish a rail program. The level of state participation, the purpose of the program and the manner of allocation of funding will be considered. Indirect benefits and contributions from other sources should also be incorporated into the analysis.

Because of the problems encountered in the 1800's which involved the Commonwealth's assumption of debts, the Constitution was amended to prohibit certain types of investments by the Commonwealth. There is also a general legislative policy against competing with private enterprise. At the same time there is a recognition that rail is a necessary component of a balanced transportation system and even though private enterprise can provide many services, certain ones can only be provided y a public entity.

Aid can be in the form of grants or loans. The repayment of loans can generate additional funds for other projects; however. The type of aid should depend on the circumstances. This issue will be covered in more detail in the final report.

Eligibility and Allowable Expenses

In most programs, administrative, capital and maintenance costs are considered eligible items. The addition of intercity passenger service by Amtrak would require consideration of funding for a service contract which would include operating assistance.

Project and recipient eligibility requirements would have to be established to ensure that only projects having a public interest are funded, with those projects having the highest priority being considered first. The requirements and procedures developed for and adopted by the Commonwealth Transportation Board for the Rail Corridor Assistance and Rail Access Programs have established eligibility criteria. The criteria limit the amount of funding that can be provided to any one county or project during a fiscal year and designate eligible recipients. The corridor program for rehabilitation requires a benefit cost ratio of one or greater to be considered for funding.

Cost Sharing

How much the parties should contribute is another issue. Contributions show support and commitment. Under the existing state and federal programs the matching shares for localities or others generally range between 30 and 50 percent. There are cases where the local contribution can be zero or 100 percent; however, the general requirement is 30 percent or less. These issues, and others, will need to be considered during the course of the study and recommendations will be provided in the final report.

Rationale for State Involvement

In order for the Commonwealth to become involved in funding a rail program or function, it must serve a public purpose that cannot be reasonably accomplished by private enterprise. In the future, both surface and air congestion will increase. Travel purposes will become more diverse. For many reasons a portion of the population may have to rely on the use of rail service for long distance trips. There are alternatives, such as high-speed rail, that can become viable options for an effective approach to resolving

many problems. Rail freight operations have excess capacity which could be utilized and intermodal operations could prevent the increase of congestion on certain parts of the highway system. The following discussion identifies the reasons that the Commonwealth should consider increased involvement in both rail freight and rail intercity passenger services.

Preventing Loss of Services

Railroads are generally private, for-profit companies which own and maintain their own facilities. As with any private entity, they need to earn a reasonable profit and provide dividends in order to attract capital. Under previous regulations, railroads were forced to retain unprofitable segments. New regulations are allowing the abandonment of previously protected lines and services. These abandonments may be in the best interest of the private company, and yet detrimental to Virginia's economic development interests. Some of the lines being abandoned are not low-density lines. Abandonment of such lines can have a serious impact on communities served, many of which are already economically depressed. Rural areas are likely to lose rail services, resulting in loss of service to small areas and increased costs. Future abandonments could be reduced with small rehabilitation investments or through encouraging operation by others such as shortline operators.

As a result of the changes in regulations since 1970, the Commonwealth has experienced a loss of approximately 20 percent of its total route mileage and more than 50 percent of the light-density line mileage. Passenger service has also decreased. Prior to 1970, passenger trains crossed the state but much of this service was not included in Amtrak's basic system. To satisfy the demand for passenger service, which is increasing throughout Virginia, state and local assistance would be required. The Commonwealth, however, did not sponsor supplemental 403(b) (Amtrak passenger service which requires that a state support deficits) service within the state. Currently, there is no mechanism to enable state support and involvement in promoting this modal choice in such communities.

Retention of Valuable Rights of Way

Several rail corridors could be purchased for the continuation of rail service or used for multiple transportation purposes. Not all of the lines which have been abandoned or are potentially subject to abandonment would qualify as essential rail service. However, in many cases, the purchase of the corridor for transportation or recreational purposes would be in the public interest. Examples are the right of way for the W&OD Railroad in the Northern Virginia area and the Dora to Galax line, which has been transferred to the Commonwealth.

Evidence of Continuing Demand for Assistance in Preventing Abandonments

Needs are identified through field reviews, requests for assistance, and the filing of an application for abandonment. In 1990, the Department received seven applications for railway rehabilitation or improvement from five railroads totaling approximately $2.1 million. Only $500,000 was available to assist these project requests, all of which had benefit-cost ratios in excess of 6.0. To date, 21 lines have been identified as needing some form of rehabilitation. Also, there are at least five rail corridors for which purchase should be considered.

Increasing Demand for Intercity Passenger Services

Amtrak ridership has risen only 27 percent over the last 20 years due to route cutbacks in 1979, 1981 and 1985. Lack of equipment has limited train capacity on some routes and prevented service expansion in some areas. Much of this increase has occurred between Richmond and the Northeast. In 1971, Richmond was served by four Amtrak trains; today, seven daily Amtrak trains link Richmond with the Northeast. Requests have been received by the Commonwealth for station improvements and two additional services or routes. The first request was for a second train from Washington, D.C. to Newport News. The second was for east-west service similar to the Mountaineer train, the former east-west service that used to operate in the state. Amtrak is not presently considering either service, and financial support would have to be provided if any service were to be implemented in the state. Amtrak is planning daily service along the Cardinal route when sufficient equipment is available. Also, Amtrak is studying additional New York to Atlanta service which would travel along the I-81 corridor linking Washington, D.C. with Charlottesville, Lynchburg, Roanoke and Bristol. It is felt that Amtrak should consider extending the Northeast corridor's high-speed service south along I-95 into Virginia. Future consideration will have to be given for additional passenger track, either at-grade or elevated, along the Interstate 95/Crescent corridor.

Reduced Federal Funding

Federal funding for local rail freight service activities has been drastically reduced since the beginning of the program in fiscal year 1976 with the majority of the funding in fiscal year 1991 being discretionary funds. Virginia has been fortunate in receiving a share of these reduced funds; however, receipt of any future funds is not guaranteed.

Federal funding for Amtrak has been declining. Although the Intermodal Surface Transportation Efficiency Act of 1991 provides funding, the level of support is inadequate to fund major route extensions or substantial equipment purchases. The Act did provide new funding for high-speed rail passenger activities including the development and construction of Maglev technology.

These federal reductions or limitations in funding for freight and passenger rail services, and the increased emphasis on providing high-speed passenger rail, place an additional burden on the states.

Benefits to the Citizens of the Commonwealth

Rail services would aid in accomplishing the Commonwealth's goal of maintaining a comprehensive transportation system. In the passenger area, small towns would be served, providing basic mobility for Virginia's citizens, especially the elderly and those who cannot drive or have no access to a vehicle. Essential inter-city service provides linkage of small towns in Virginia with larger cities, enabling citizens to tend to their business matters. In the freight area, services to and from ports, as well as throughout the Commonwealth, could enable greater transportation options for commodity movements.

The retention, addition, and improvement of service will foster competition, resulting in better service at a more reasonable cost. Substantial investment costs in other transportation areas could be saved because rail provides realistic options to address environmental, safety, energy, and hazardous material transportation concerns.

Current Commonwealth Transportation Board Position

The current position of the Commonwealth Transportation Board is to support rail services in Virginia. On December 21, 1989, the Commonwealth Transportation Board passed a resolution that directed the Department of Transportation to develop a comprehensive policy for the purchase, rehabilitation, and preservation of rail corridors subject to abandonment but vital to the economic stability of an area.

The policy was developed and formally adopted by the Board on July 19, 1990. The adopted resolution states that the Commonwealth Transportation Board considers railways and rail corridors to be important elements of the statewide transportation system. Furthermore, the Board considers the acquisition, lease, and improvement of railway lines and facilities, or provision of assistance to appropriate entities to be for the common good of the Commonwealth. Part of the policy also required the adoption of procedures for the allocation, distribution, and protection of any funds that may be made available, although no funds were to be used for operating expenses.

Summary

The railroads serving Virginia are rapidly divesting themselves of lines; new services are not being implemented. The Commonwealth is already involved in federal and state initiatives for rail service; rail freight and intercity passenger transportation are not funded through the TTF, however.

The issue in establishing a rail fund is fundamentally one of determining whether it is in the public interest for the state to assist in subsidizing the rail mode. Then, if it is determined to be in the public interest, the appropriate level of funding must be determined. Other issues involved in establishing a rail program are similar to those for other modes: what should be considered eligible for funding and determining the source of funds.

The programs that have been funded have proven to be successful. The Rail Industrial Access Program has funded 37 projects for businesses that have a combined employment potential of 2,914 employees. The Eastern Shore railroad has been in service for 15 years. Without a rail program with a continuing source of funding, many of the needs that cannot be served by the private sector will go unmet.

VII. ANALYSIS OF THE FORMULAE

Analysis of the Transportation Trust Fund allocation formulae involves the allocation of funds to transportation modes and the evaluation of the highway allocation process. The needs for each mode were initially evaluated with respect to the level of funding available to meet them. A separate rail fund will be discussed in greater detail in Phase II of the study. However, if a rail fund is proposed without additional dollars in the fund, the amount allocated to the existing modal programs will be reduced.

With respect to the highway formulae, the first phase of the study was focused on the allocation to administrative classes and distributions to localities. The first phase of the study was also oriented to the evaluation of the existing formulae, with no attempt to address different factors for current formulae or development of entirely different formulae. In the second year, such issues will be addressed, as well as access funds, city street payments, and funds for paving unpaved roads.

An important consideration in the analysis of the formulae is the effect of rounding the percent allocations to modes, administrative systems, and geographic areas. If, for example, the primary need share is 39 percent, and this is rounded to 40 percent in the formulae, the rounding error could cause a significant shifting of funds from one administrative system to another. This can also occur in determining modal allocations or allocations to individual jurisdictions.

Modal Allocations

The first component of the TTF formulae is the allocation of funds to modes. Revenue is distributed by percentage as follows:

Highway	85.0%
Public Transportation	8.4%
Ports	4.2%
Aviation	2.4%

Allocations made for rail and airport access are included in the highway category.

The criterion for initial evaluation of the modal allocation is the equity of distribution defined to be allocations proportional to needs. In order to use this evaluation, needs should be comparable across modes. In this study, the time frame is comparable; furthermore, needs are defined similarly across modes as construction needs based on forecasts of demand for facilities, except for operating expenses for transit and commuter

rail. The key issue in the modal allocation is the amount of the need for each mode that should be funded through the TTF.

In order to assess modal funding, the proportions of needs that are expected to be unfunded for the 20-year period were analyzed. Table 35 shows that none of the transportation modes is expected to receive funding adequate to meet all of its needs. The table considers expected funding for the 20-year period from all sources. Based on the assumptions, 46 percent of transportation needs remain to be funded. The proportion of unfunded needs ranges from 17 percent for aviation to 93 percent for the rail mode. About half of the $37 billion in highway needs is expected to be funded and 36 percent of the $10.8 billion of public transportation needs remain unfunded.

TABLE 35
2010 MODAL NEEDS
(IN MILLION OF DOLLARS)

MODE	TOTAL NEEDS	UNFUNDED NEEDS	PERCENT UNFUNDED
Highway	$37,135.97	$18,914.56	50.9
Rail	168.30	156.70	93.1
Public Transportation**	10,817.30	3,879.34	35.9
Aviation	2,846.19	543.3	19.1
Ports	1,168.14	727.27	62.3
Total	$52,135.90	$24,221.17	46.5

* Some rail needs are currently funded through highway allocations.

** Commuter rail and WMATA are shown as part of Public Transportation for purposes of this analysis, but could be combined with the rail mode.

Based on the historical level of funding, the TTF is expected to fund 38 percent of the needs. Whether that is an appropriate level is another question that will be addressed in the final report.

Modal Issues

When assessing the appropriate level of funding for each of the modes, several issues other than equity must be considered.

Port Authority Revenue Bonds

In 1988, the General Assembly appropriated $106.1 million in revenue bonds to the Virginia Port Authority for the purposes of financing the acquisition of land and equipment and the construction of facilities at existing ports. These bonds are payable from the revenue set aside from the Commonwealth Port Fund, a fund established as part of the Transportation Trust Fund. The revenue for the CPF is a result of the 1986 Special Session Acts, which derived additional revenues from increases in the Virginia sales and use tax, motor vehicle fuel tax, and motor vehicle registration fees. These revenues provide security for the bonds.

The security for the Port Authority bonds is dependent on the Commonwealth Port Fund receiving 4.2 percent of the Transportation Trust Fund. In the bond document, there are several references to the CPF being guaranteed this 4.2 percent. Changing the modal allocations to an amount less than the current 4.2 percent level could affect the ability of the Port Authority to retire the debt on the bonds. A decrease in this proportion could potentially cause the rating on the bonds to be dropped from its current Aa/A+ rating and make the bonds less attractive to potential buyers.

While the concerns of a lower bond rating are definitely worth consideration, the effect of a change in the allocation level to the port fund is unclear. This will be analyzed further.

Commuter Rail

In this study, commuter rail needs have been considered in the needs for public transportation. It is important to note that these needs can alternatively be considered as a component of the rail mode. There has been interest in performing an analysis with commuter rail needs being treated in this manner. For the purpose of this report, commuter rail will continue to be considered with public transportation, but flexibility has been maintained to enable analysis of its combination with rail. In the second phase of the study, if a new rail program is proposed, consideration will be given to the incorporation of commuter rail needs in that program area.

Highway Allocations to Administrative Systems

The formulae specify allocations within the highway mode by identifying funding for a series of program areas, a distribution of remaining funds to highway classes, and lastly to geographic areas. This report discusses evaluation of the existing formulae for modes, and within the highway formulae for highway classes and geographic areas.

The distribution of needs across administrative systems has changed significantly since the 2005 needs assessment performed by JLARC in 1984. As can be seen in Table 36, the needs have more than doubled since the 1984 assessment. Interstate needs have increased from 11 percent of 2005 needs to over 22 percent of the 2010 total. This is due in part to increased attention given to the interstate system as well as to the fact that much of the system is reaching the end of its design life. The significant increase in axle loadings over the design has also accelerated its deterioration. To a lesser degree, the same is true of the primary system. It also experienced a disproportionate increase in needs, with the share increasing from 32 to almost 37 percent. Needs shares for the secondary and urban systems have both declined, from 35 to 26 percent for the secondary system, and from 22 to 15 percent for urban needs. The following table summarizes the distribution of needs in these two studies.

TABLE 36
2005 AND 2010 NEEDS ASSESSMENTS
(IN MILLIONS OF DOLLARS AND PERCENT)

SYSTEM	2005 NEEDS**	2005 SHARE	2010 NEEDS***	2010 SHARE
Interstate	$1,675.966	11.00	$8,227.030	22.15
Primary *	4,878.343	32.02	13,587.378	36.59
Secondary	5,339.813	35.05	9,607.471	25.87
Urban	3,341.169	21.93	5,714.089	15.39
Total	$15,235.291	100.00	37,135.967	100.00

* Includes $476.8 million in 2005 needs for unclassified new facilities.
** Estimated in 1984
*** Estimated in 1989. These needs are being updated.

Highway Allocations To Localities

This section describes the methodology used for preliminary analyses of the current geographic allocation formulae for primary, secondary, and urban construction funds. It includes a discussion of issues related to the equity and appropriateness of the current allocation formulae and focuses on the question of whether the current factors and weights continue to provide fair and equitable allocations. Results of the preliminary analyses of the current formulae are also summarized.

The analyses include sensitivity tests of whether removing specially funded projects from the needs estimates would result in different models. Initial sensitivity analyses were performed to determine the effect of excluding needs that would not normally be funded through regular highway allocations. The relative fit and performance of models that include and exclude specially funded projects were examined.

Methodology

The methodology used for statistical tests of the current allocation formulae is similar to the approach used in JLARC's 1983-84 study of the allocation process. Since localities' road needs cannot be updated annually, the goal of the statistical analyses is to identify one or more frequently updated, readily available measures (factors) that are strongly related to needs. Multiple regression and correlation analysis were used to assess the strength of the relationships between the most recent 20-year needs and factors in the formulae.

The goal of the correlation analysis was to identify the strength of the relationships between individual factors and localities' dollar needs. The closer in value that a correlation coefficient (r) is to +1.00 or -1.00, the stronger the relationship. A correlation coefficient of zero indicates no relationship between the variables. JLARC identified potential factors for the formulae it tested on the basis of their strong correlations with need.

The goal of the multiple regression analysis, on the other hand, was to identify the strength of the relationships between groups of factors and localities' dollar needs. The coefficient of determination, or R^2, indicates how strongly a set of factors is related to localities' dollar needs. It is an indicator of the proportion of the variation in dollar needs that is explained by the set of factors. The closer the R^2 value is to 1.00, the stronger the relationship between the factors and dollar needs. Frequency distributions of the prediction errors that resulted from application of the current formulae are also presented. These distributions summarize the number of jurisdictions that fall within specified error ranges (e.g., how many counties have actual and predicted needs shares which are less than one-half of a percent, how many have errors that are between one-half and one percent different, and so on).

Regression equations yield standardized regression coefficients (beta weights) for each factor. In the JLARC analysis, these beta weights were used to derive weights for the factors. That is, the beta weights represent the relative importance of each of the factors in predicting needs. The sum of all of the factor weights was made to total 100 percent so that each factor's proportionate share could be calculated easily. The same approach for estimating factor weights was employed in this analysis.

The formulae were evaluated with and without the special needs. The discussion that follows is based on them being excluded.

Analysis of the Primary System Formula

Currently, funds for primary system construction are allocated to the nine construction districts using the following factors and weights:

- 70 percent by Primary Vehicle Miles of Travel (VMT),
- 25 percent by Primary Lane Miles, and
- 5 percent by Need.

The need factor is divided among three districts that have the largest under allocations relative to needs:

- 1.95 percent to Northern Virginia,
- 1.88 percent to Bristol, and
- 1.17 percent to Fredericksburg.

Another aspect of the current primary system formula that should be kept in mind is that up to 25 percent of a district's primary system allocation may be used to match interstate federal-aid funds.

Correlation analysis of the current formula indicates that VMT continues to be strongly related to primary system dollar needs ($r=.88$). However, primary lane miles ($r=.17$) and the primary road need factor ($r=.30$) are not now strongly related to primary dollar needs.

Results of the multiple regression of 20-year primary needs on the current formula factors are summarized in Table 37. The statistical results suggest that districts' needs might be estimated more accurately by increasing the weight of the VMT factor and decreasing the weights of the lane miles and need factors.

TABLE 37
PRIMARY ALLOCATION FORMULA

CURRENT FACTORS	CODE WEIGHTS (%)	REGRESSION WEIGHTS (%)
VMT	70	86
Lane Miles	25	7
Need	5	7

Table 38 indicates the difference between actual share of needs and predicted share. For example, for a district that has a current needs share of ten and the formula predicts 12 percent, the error is described as two percent. Although an absolute error in the range of one to two percent may seem small, it should be kept in mind that the dollar value of these errors could be substantial. Further review of the formula and consideration of alternative factors would seem to be warranted in the second year of the study.

TABLE 38
MAGNITUDE OF PREDICTION ERRORS USING THE CURRENT PRIMARY ALLOCATION FORMULA

PERCENT DIFFERENCE	NUMBER OF DISTRICTS
Less than 0.50	0
0.50 to 0.99	2
1.00 to 1.50	1
1.51 to 2.00	3
2.01 to 2.50	3
2.51 to 3.00	0
Total	9

Note: Errors are expressed as the absolute value of percent of actual need minus the percent of predicted need.

Analysis of the Secondary System Formula

The current formula for paved secondary system construction allocates funds to the Commonwealth's counties on the basis of two factors:

- 80 percent by population, and
- 20 percent by land area.

The correlation analysis shows that population continues to be very strongly related to secondary construction needs (r=.96). The area variable, however, is not now strongly related to secondary road needs (r=.12).

Results of the initial multiple regression analysis are summarized in Table 39. The results of the statistical analysis suggest that counties' paved secondary road needs might be estimated more accurately by increasing the weight of the population factor and decreasing the weight of the area factor.

TABLE 39
MULTIPLE REGRESSION RESULTS FOR
PAVED SECONDARY ALLOCATION FORMULA

CURRENT FACTORS	CODE WEIGHTS (%)	REGRESSION WEIGHTS (%)
Population	80	95
Area	20	5

Table 40 presents the difference in shares that result when the current secondary system formula is used to predict counties' 20-year paved secondary needs. In most counties, the percent of actual share minus the percent of predicted share is 0.30 or less. The prediction errors for some of the state's larger, more urbanized counties suggest that further review of the formula is warranted in the second year of the study.

TABLE 40
MAGNITUDE OF PREDICTION ERRORS USING THE CURRENT PAVED SECONDARY ALLOCATION FORMULA

PERCENT DIFFERENCE	PERCENT OF COUNTIES
Less than 0.10	22.7
0.10 to 0.19	23.7
0.20 to 0.29	20.6
0.30 to 0.39	9.3
0.40 to 0.49	5.2
0.50 to 0.59	7.2
0.60 to 0.69	3.1
0.70 to 0.79	2.1
0.80 to 0.89	1.0
0.90 to 0.99	1.0
1.00 or more	4.1
Total	100.0

Note: Errors are expressed as the absolute value of percent of actual need minus the percent of predicted need.

Analysis of the Unpaved Secondary System Formula

The current formula for allocating construction funds for unpaved secondary roads is based on a single factor: existing miles of unpaved secondary roads carrying 50 or more vehicles per day. Allocations are made to the Commonwealth's counties.

Needs for unpaved roads in the secondary system are calculated by multiplying the number of miles needing paving by the average cost per mile to pave. Since the allocation formula and the needs are both solely a function of the number of unpaved road miles, the correlation analysis would show a perfect relationship between existing

miles of eligible unpaved secondary roads and unpaved secondary dollar needs. Thus, by definition, the current formula performs well.

Analysis of the Urban System Formula

The current urban system formula allocates funds to cities and towns with populations of 3,500 or more that have eligible projects based on a single factor: population.

The correlation analysis shows that population is still strongly related to 20-year urban system needs (r=.89). However, the multiple regression results indicate that a formula based on population alone warrants further examination. The R^2 value of 0.81 is notably lower than it was in JLARC's earlier work, indicating that there is potential for improving the current formula.

Table 41 shows the errors that result when the current urban formula is used to predict 20-year needs.

TABLE 41
MAGNITUDE VALUES OF PREDICTION ERRORS USING THE CURRENT URBAN ALLOCATION FORMULA

PERCENT DIFFERENCE	PERCENT OF COUNTIES
Less than 0.10	27.8
0.10 to 0.19	23.7
0.20 to 0.29	18.6
0.30 to 0.39	4.1
0.40 to 0.49	2.1
0.50 to 0.59	3.1
0.60 to 0.69	1.0
0.70 to 0.79	2.1
0.80 to 0.89	1.0
0.90 to 0.99	3.1
1.00 or more	13.4
Total	100.0

Note: Errors are expressed as the absolute value of percent of actual need minus the percent of predicted need.

Summary

Preliminary analysis indicates that there has been some change in the distribution of transportation needs across modes, transportation programs, and geographic areas. Examination of the needs data has revealed that the statutory allocations to the modes may no longer be adequate.

The distribution of needs across highway administrative systems appears to have shifted since the last needs assessment was done in 1984 and the share of needs for each administrative system does not match the allocation outlined in the Code. The relative share of needs for primary and interstate highways has increased while those for secondary and urban roads has declined.

Preliminary analysis of the formulae for the geographic distribution of funds within highway systems also indicates that some of the components of the current formulae may be in need of revision. The primary system formula allocation no longer meets the equity criterion outlined in this report. Changing the weights on the current factors or changing one or more of the factors in the formula may increase its accuracy in allocating primary system funds. The formula for paved roads on the secondary system is adequate in terms of appropriate factors, but the weights on the factors may need to be adjusted. Based on statistical criteria, the urban system formula too, may require revision. All of the formulae will be reanalyzed in Phase II of the study using updated numbers.

VIII. ALTERNATIVES TO THE FORMULAE

The first phase of the study has focused on review and evaluation of the existing formulae and whether they continue to produce equitable allocations. These analyses will be finalized using the updated needs numbers. At this point, however, it appears that the existing formulae do not fully produce equitable allocations. Thus, in the second phase, the study will examine alternatives to the existing formulae.

Modal Formulae

Once the updated needs numbers are obtained, analyses will be performed to determine if the present proportion of allocations equitably meets the needs for the modes. Alternative funding mechanisms will be reviewed for each of the modes and the total amount of the needs left unfunded will be identified. The feasibility and desirability of establishing a rail fund will also be discussed and, if proposed, the funding source for such a program will be determined. A rail program could be configured in several ways and the purpose will dictate what types of projects would be eligible for funding. Several program alternatives will be identified and discussed. In addition, where the funding source is stipulated to be the TTF, funds would of necessity be drawn from other modes. Thus, the issue of reduced allocations to other modes will be discussed and the sufficiency of funding in the TTF will be addressed.

Highway Formulae

Changes in the federal-aid program necessitate some changes to the Virginia highway formulae. The Intermodal Surface Transportation Efficiency Act of 1991 was only recently signed into law, and the Federal Highway Administration is still in the process of developing interpretations and guidelines. Technical amendments will be enacted by Congress in 1992, and federal rule making is expected throughout the year. Thus, the implications for the formulae have not been determined.

Two major changes are known to require alterations in the formulae, however. The interstate system has been eclipsed by the National Highway System. The NHS includes all of the interstate highways plus other principal arterials. The Code specifically identifies funding for the interstate and obviously does not address this enlarged system that replaces it. The 1992 Appropriations Act contains language that would treat the NHS in the same manner as the interstate for purposes of the formulae. Therefore, for the next year the NHS funds will be allocated before the allocations to the other classes; the match will be derived from the allocation to the primary system up to 25 percent of the district's primary allocation, and the remaining match will come off-the-top of the TTF.

The second area relates to the Congestion Mitigation and Air Quality Improvement Program funds. The federal bill contains a formula for allocation of the program funds to each state but does not address suballocations within the state. The Appropriations Act

addresses the issue by requiring these funds to be allocated to non-attainment areas of the Commonwealth in addition to their normal allocations. One way they can be distributed to the non-attainment areas is by population. The Appropriations Act is moot on the distribution other than to require such allocation to be in addition to the regular allocations by formulae.

Both of these are temporary solutions and will be evaluated in Phase II of the study. Alternatives to this approach will be reviewed and other aspects of the federal program will be examined. One alternative that has been suggested is to take all the federal match for the interstate, and/or NHS, off-the-top of the allocations rather than from the primary system allocations. In the study, sufficient matching funds will be ensured for any formula proposed.

Administrative System and Geographic Allocations

The initial analyses indicate that needs and allocations do not match using the current formulae.

Administrative System Allocation

Needs on the administrative systems have changed and the proportion of allocations to the systems no longer appears to be appropriate. In the second phase of the study, this will be discussed and alternatives evaluated. In particular, some Advisory Committee members have suggested that the definition of administrative systems does not adequately address the way the roads are used and the different types of traffic that are carried on the roadways. Some would argue, for example, that a secondary road in Northern Virginia carries enough traffic, particularly through-traffic, to be considered a major arterial and thus more appropriately aligned with the primary system. The pros and cons of using a functional rather than an administrative definition of highways will be evaluated.

Geographic Allocation

The preliminary analyses suggest that the factors and weights that are in the Code are no longer appropriate as allocators if the equity definition continues to be used as the criterion. In the second phase, new factors for the formulae will be evaluated. First, the exploration of alternatives will involve factors that have a strong relationship with needs and then their ability to improve the performance of the current formulae will be assessed. Several factors have been identified for potential consideration and are presented in Table 42.

TABLE 42
POTENTIAL FACTORS FOR ALTERNATIVE MODELS

POTENTIAL FACTORS	REMARKS
Area	Easily obtainable; reflects system size requirements
Population	Easily obtainable; theoretically sound; practical; measures change
Population Density	Combines population and area; congestion indicator
Population Growth	Easily obtained; good change indicator
Employment	Strongly correlated with population
Registered Vehicles	Strongly correlated with population
VMT	Strongly correlated with population; available only for primary
Lane Mileage	Easily obtainable; indicator of system size
VMT ÷ Lane Miles	Congestion indicator; available only for primary
Centerline Mileage	Easily obtainable; less attractive than lane mileage
Population ÷ Lane Miles	Easily obtainable; congestion indicator
Accident Rate	Strongly correlated with population
Transit Ridership	Only available by transit system.
Pollution Levels	Not available by individual jurisdictions.

When considering the inclusion of new factors or developing alternatives, simplicity of the formulae will also be included. The specification of complex indices might enhance the performance of the formulae but might be difficult to understand. While appropriate for analysis, a complex web of factors and weights would hardly be reasonable for inclusion in the Code of Virginia. Correlations of factors and needs will be performed and a combination of factors will be developed that will accurately predict need and will also attempt to be sensitive to changes in need between the five-year assessments.

Preliminary evaluation of the relationship between factors identified in Table 42 and needs shows some promising alternatives. Table 43 summarizes the relationships for each of the administrative systems. The strength of the relationship is listed as low,

moderate, or high depending on the degree of statistical correlation. A negative sign means an inverse relationship such that the needs share decreases the more the locality has of the factor, (e.g., the larger the area, the less the primary needs). Correlational analysis is not enough to determine useful factors for the formulae, however. Causal relationships are more reasonable to understand than just correlational ones and also allow for changes in the allocations as the factor increases or decreases over time. One reason population is a useful variable in a formula is that as population changes, allocations will, as well. The same is not true of area; since it is not expected to alter over time, the allocations would be unchanged.

As discussed in the methodology section, evaluation will also depend on the performance of the factors and weights. Only those factors that provide equitable allocations for the most districts or localities will be judged to perform well.

TABLE 43
CORRELATIONS OF FACTORS AND LOCALITIES' NEEDS SHARES
BY ADMINISTRATIVE SYSTEM

ALTERNATIVE FACTORS	NEEDS SHARE FOR			
	PRIMARY	PAVED SECONDARY	UNPAVED SECONDARY	URBAN
Population Change	LOW	LOW	- LOW	N/A
Population Density	N/A	LOW	- LOW	N/A
Area	- LOW	LOW	MOD	N/A
Congestion	N/A	N/A	N/A	N/A
Vehicle Registrations	MOD	HIGH	- LOW	N/A
Primary Lane Miles	LOW	N/A	N/A	N/A
Paved Secondary Lane Miles	N/A	HIGH	N/A	N/A
Accident Rate	MOD	HIGH	- LOW	N/A

Notes: LOW indicates a correlation ranging from 0.12 to 0.31.
MOD indicates a moderate degree of correlation, ranging from 0.46 to 0.64.
HIGH indicates a correlation of 0.81 or above.
Negative sign (-) denotes a negative correlation.

Alternative Formulae

Alternatives to the existing formulae will also be discussed. At a minimum, several critical areas have been identified as needing special funding that are not now identified in the formulae.

Bridge Program

One growing problem is the number of bridges that are found to be deficient. Not only are they increasing in number but also the resources are not always provided to address the problem. Currently, bridge replacement and rehabilitation projects must compete with other construction projects for available funding. The commitment of funds for bridge work has been hampered because in many jurisdictions, the high cost of bridge projects would require a major part of their total allocation. That is, allocating funds to bridge projects would leave little funding for other construction projects. This is particularly true for the secondary system. As a result, few bridge projects are programmed.

There are several ways to target funding to bridges. One is to provide incentives, for example if funding were provided from federal monies, the match would not be taken from the system allocations. A requirement could be established that if a certain percentage of bridges in an area is deficient, no funds could be spent on other projects until the bridge is programmed. This does nothing to help the small area that can not accumulate enough funds to pay for a bridge, however. In the latter case, the only solution is to provide funds that are targeted for the bridge. One such proposal is the creation of a statewide bridge fund. Creation of a separate fund would enable allocations to be made for bridge projects while leaving additional funding for other highway work. Various requirements could also be established that rotate eligibility to ensure geographic equity.

To study the creation of a special bridge program, needs for deficient bridges will be removed from the needs list and analyzed separately. Bridge needs will be determined by identifying bridges that are eligible to be replaced or rehabilitated with federal-aid monies.

Programmatic Approach

Several priority programs are identified in the current formulae, for example, unpaved and access roads. An alternative to the existing formulae is to allocate all funds through a programmatic approach. Similar to the federal program, one could identify priority areas in addition to those already in the formulae, for example: safety, congestion mitigation, transportation management, air quality, intermodalism, and so on. This will be evaluated in Phase II of the study.

Some have suggested that administrative systems are not efficient allocation bases and have suggested a functional approach. Others have indicated that the notion of administrative system should be dropped altogether.

Some members of the Advisory Network have tried to introduce the idea of having priorities established within the needs lists. In one sense, that is done already in that the 20-year plan becomes effected through the priorities established in the six-year plan. Some would argue however for a statewide listing of priorities, where one need is traded-off against another. Still others would argue for a different way of defining the needs. It has been suggested that different criteria be employed to determine needs and also that the priorities be established among the substandard roads and bridges. All of these will be addressed in the second part of the study.

Alternatives to needs will be evaluated, as well as the requirement to distribute funds geographically. Programmatic allocation and use of level-of-service criterion will all be discussed in Phase II.

IX. ALTERNATIVE DEFINITION OF EQUITY: GEOGRAPHIC DISTRIBUTION OF HMOF AND TTF REVENUES AND ALLOCATIONS

Introduction

In recent years, allocations made to the transportation program in Virginia have declined in real dollars, peaking in fiscal year 1989. The construction program, excluding interstate construction, has continued to shrink since fiscal year 1988. With real needs growing rapidly over the same period, localities are paying more attention to the distribution of the financial burden relative to the distribution of allocations. As a result, it has been suggested that in the allocation of TTF funds, a jurisdiction should receive as much from the fund as it contributes in the form of revenues. This alternative definition of equity requires that the geographic distribution of financial resources return to each jurisdiction its share of funding based on use.

The precise calculation of the geographic distribution of allocations and revenues is impossible for several reasons. The first is that the revenue data are not reported in the level of detail required to pinpoint the exact tax burden of each region. Fuel taxes, for example, are levied at the point of distribution, not consumption. In addition, motor vehicle sales and use taxes and motor vehicle license fees are credited to the jurisdiction in which a traveller lives, not necessarily the same jurisdiction in which a traveller generates the majority of his or her travel. Also, the geographic distribution of the benefits of transportation systems is not necessarily the same as the distribution of the allocations. The net benefits of transportation improvements in any one region depend in large part on the exact type of infrastructure investment. For example, enhancements to the interstate system that pass through a region are sure to generate the largest economic benefits in the neighboring regions with interchanges. Alternatively, the same dollar investment in local road construction or maintenance will net the largest return to the region itself.

Historical Studies

Several studies have been performed to analyze the relationship between allocations to local jurisdictions and the revenues earned by these localities. These studies are summarized in the following sections.

KPMG Peat Marwick Study

"A Study of Financial Resources for Transportation in Northern Virginia" was conducted by KPMG Peat Marwick in 1989. Peat Marwick estimated that VDOT's Northern Virginia construction district received 63.2 percent of each state transportation dollar generated in the region in fiscal year 1988. They also estimated that for both state and federal sources combined, the return was 71.9 percent for the same year.

Senate Finance Committee Study

In 1991, the Senate Finance Committee presented an estimate of the return in allocations to revenues generated for the Northern Virginia District by extending the KPMG Peat Marwick analysis to fiscal year 1992. For that year, they determined that Northern Virginia was slated to receive 103 percent of each state and federal transportation dollar generated in the region. The Committee considered the use of combined state and federal funds and allocations to be the most appropriate basis for analysis.

Virginia Transportation Research Council Study

A number of factors have significantly changed since 1988 which must be considered when investigating the geographic distribution of revenues and allocations. First, the Commonwealth Transportation Board has provided the Northern Virginia District with a greater share of federal highway revenues since 1988. This increase in federal share has the effect of increasing the return to the dollar for the region. In addition, Northern Virginia currently receives a portion of the five percent state discretionary fund which was reserved solely for the Bristol District in 1988. Finally, updated vehicle miles of travel and population figures have given the Northern Virginia area a slightly greater share of TTF allocations. Given these changes, it is important to consider data from a more recent time period.

In 1991, the Virginia Transportation Research Council studied all sources of revenue and allocations that flow through both the TTF and the HMOF, including state and federal sources. The study examined fiscal year 1988 through fiscal year 1992 in order to identify current trends in programming decisions and budget fluctuations. The study expanded the scope of the previous work to include each of the Department's nine construction districts.

The study also refined and enhanced the methodology and models used in previous work. The more sophisticated modelling caused a difference in results among the studies.

Comparisons of Allocations and Revenue Shares. Based on estimates of the geographic distribution of allocations and revenues, the dollar return to each construction district was calculated. Table 44 presents the ratios of allocations to revenue shares for the nine construction districts from fiscal year 1988 through fiscal year 1992. In addition, an average of the five fiscal years is presented. The average is more representative of the underlying structure of transportation finance in Virginia than any one year since it minimizes the impact of yearly programming decisions and budget fluctuations on the results. Furthermore, the long planning horizon characteristic of large construction projects and maintenance programming introduces a lag in the identification, planning, and budgeting for transportation projects that is minimized somewhat by the use of an average figure.

The ratios can be interpreted as the return to each dollar contributed by a district. In other words, an average ratio of 1.34 in Bristol can be viewed as a return of $1.34 for each dollar contributed over the five-year period. Table 44 clearly illustrates that few districts receive an exact dollar-for-dollar return in any one year.

TABLE 44
RATIO OF ALLOCATION TO REVENUE SHARES BY CONSTRUCTION DISTRICT
(FY 1988 - FY 1992)

DISTRICT	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	AVERAGE
Bristol	1.35	1.28	1.39	1.41	1.29	1.34
Culpeper	0.97	0.86	1.01	0.91	0.91	0.93
Fredericksburg	1.06	0.89	0.97	0.89	0.81	0.92
Lynchburg	1.01	1.01	1.08	1.06	1.00	1.03
No. Virginia	0.83	0.83	0.85	0.92	1.27	0.94
Richmond	0.87	0.93	0.82	0.83	0.74	0.84
Salem	0.89	0.88	0.95	0.90	0.84	0.89
Staunton	0.88	0.87	0.94	0.88	0.82	0.88
Suffolk	1.26	1.33	1.23	1.25	1.06	1.23

Note: Ratio greater than 1.00 indicates a net recipient. Ratio less than 1.00 denotes a net donor.

Comparisons indicate that the transportation program responds to the needs of different areas. One example of this flexibility can be seen in the Suffolk District. During the five-year analysis period, Suffolk received relatively large interstate allocations. This funding allowed for the completion of transportation facilities that required several years of concentrated funding. With the completion of these projects, interstate funding has been directed to the Northern Virginia District. (Several similar examples precede the beginning of the analysis period covered, such as the dedication of interstate construction funding in Northern Virginia in the 1970's and in the Richmond District in the early 1980's.)

The district return to each dollar contributed has not remained stable over the five-year period. The ratio of the allocations share to the revenue share in Table 44 fluctuates in roughly the same direction as the allocations share.

Summary

An alternative definition of equity that could be used in evaluating the TTF is the ratio of revenues produced in a jurisdiction relative to the amount returned in allocations. Several studies have examined the geographic distribution of state and federal funds relative to revenues produce. In order to utilize such a definition, the distribution of federal and state funds must be examined over a long enough period to eliminate any fluctuations caused by programming or budgeting decisions.

In order to analyze the transportation revenue return to the nine construction districts in the Commonwealth, it is important to examine the financial structure of each of VDOT's primary activities in addition to the aggregate transportation program. These activities are highway construction, highway maintenance, non-highway modes (public transportation, rail, ports, and aviation), and administration and overhead. A study of the revenue returns to the four programs for each construction district will be addressed in the second phase of this study.

X. SUMMARY AND CONCLUSIONS

Senate Joint Resolution 188 mandates a study of the Transportation Trust Fund Allocation Formulae. The first year has focused on establishment of the approach to the study and setting up the databases for the analyses. Another component of Phase I has been to solicit information from a large number of individuals and groups on the performance of the formulae and alternatives to it. Public hearings were held throughout the Commonwealth and an Advisory Network was established composed of individuals from planning district commissions, counties, cities and towns, and modal interest groups, among others. The role of the Network is to represent these interests to the study team, serve as an information resource, review and comment on draft material, provide advice and perspective throughout the study, and propose concepts to be evaluated.

The first task was to review the existing formulae and evaluate their basic operation. The second task was to establish a methodology to employ in their evaluation, identify the data to be analyzed, and determine the analysis techniques to be used. A methodology report was provided to JLARC in October 1991 which outlined the approach to the study of the Transportation Trust Fund Allocation Formulae.

The mandate required that the study determine whether the existing formulae continue to provide equity in the allocation of funds. It was thus considered reasonable to base the methodology on that employed by JLARC in the development of the current formulae. The approach to the study of the TTF used dollar needs as the basis for allocation. Needs were defined as requirements for highways, transit, aviation, ports and rail that continue the existing levels of service or would be necessary to bring the system up to standard, because it is presently substandard or will become so during the target period. Costs associated with improving these systems were identified in today's dollars and these served to define the dollar needs. Requirements were derived from the 2010 Statewide Plans. These plans were developed separately for each of the modes but comparable criteria were applied and the time frames employed were the same.

A 1989 needs assessment was available for all modes. Some members of the Advisory Network felt it was important to update the needs to a 1991 base. Needs lists were forwarded to each locality and to transit and rail providers with a request to review and update them where appropriate, using criteria provided by the Department. The Virginia Port Authority and the Virginia Department of Aviation also updated their numbers to reflect changes since 1989. The Department of Transportation is in the process of reviewing the updates.

Use of the 20-year needs base was the most controversial part of the study. Two alternatives had been proposed: use of six-year plans and use of current rather than long range needs. The six-year plan could not be used because it was a result of the very process that was being evaluated. The plan was constrained by the current allocation formulae.

Analysis of the current needs indicated that approximately 60 percent of the needs exist now; the remainder will develop over the 20-year target period. Rather than employ current needs in the analysis, however, it was believed better from a strategic perspective to use the total 20-years worth of needs and include needs that will be developing in rapidly growing areas of the Commonwealth.

A question had been raised about the highway needs and whether all needs were equal. Threshold levels were established and when a roadway or bridge fell below the threshold it was considered deficient. Thus, a road or bridge below a specified point is considered substandard and included in the dollar needs total. There has been no trade-off between needs, i.e., a safety need was not more nor less important than a capacity need. Alternative methods of prioritizing and allocating needs will be considered in Phase II, including the use of vehicle miles traveled by lane mile, population, employment, congestion, transit ridership and pollution levels.

These formulae were adopted to achieve equity in fund distribution where equity was defined the percentage of allocations equal to the percentage of needs. Although JLARC applied the definition specifically for the geographic allocation, it can be applied to all aspects of the existing formulae.

The most significant aspect of the modal allocations is the large number of needs in all of the modes. These needs and their funding sources will be addressed in detail in the final report.

The highway formulae were reviewed for ease of administration and interpretation and with respect to the equity criterion. Based on the initial analysis, the location of needs on the administrative classes has changed significantly since the formulae were established. Allocations to geographic areas are also not well served using the existing factors and weights. These analyses will be rerun with the updated numbers and discussed in detail in the final report.

The second part of the mandate was to ensure the compatibility of the state formulae with the federal program reauthorization. The federal-aid program that had been in effect since 1956 lapsed in September 1991; the new program was signed into law December 18, 1991. The new federal-aid act involves a significant departure from the previous approach and may result in dramatic impacts on funding levels, policies, programs, and intergovernmental relationships. Priorities are shifted among transportation modes and there are several areas where the law will impinge on Virginia's formulae.

At this time, the full impact of the law is unclear. Technical amendments will be offered during the course of 1992 and the federal government will be initiating rule making proceedings later in the year. The conclusion at the end of Phase I, after review of the legislation and discussion with federal officials, is that two minor changes to the formulae

would accommodate most areas of immediate concern. Those changes could be accomplished by language in the budget bill as follows:

> "Pending the General Assembly's future action on the distribution of Transportation revenues, a matter currently under study as directed by SJR 188 of the 1991 session, the Commonwealth Transportation Board is hereby authorized to enter into project agreements with the United States Government to secure the maximum level of federal funding for transportation programs in the Commonwealth, including agreements that provide for the allocation of funds necessary to comply with federal law but which allocation may differ from formulae provided in the Code of Virginia in the following areas:
>
> 1. Funds apportioned under federal law to the National Highway System shall be treated for state formulae purposes, as interstate funds, pursuant to § 33.1-23.1; and
>
> 2. Funds apportioned under federal law for congestion mitigation and air quality improvements shall be allocated to designated transportation projects in clean air non-attainment areas of the Commonwealth in addition to funds allocated to these areas pursuant to § 33.1-23.1. The Chairman of the Board shall promptly report to the Governor and the Chairmen of the Senate Finance and House Appropriations Committees any actions taken pursuant to this paragraph."

Evaluation of these temporary approaches and a series of alternatives will be evaluated in the second phase of the study. House Joint Resolution 135 (HJR 135) which was passed in the 1992 session also requests that any changes in the statutory relationships among state and local governments and regional agencies as they relate to the Transportation Trust Fund Allocation process be evaluated in the study. Other areas for study, previously discussed, were also identified in HJR 135.

The initial study mandate not only included a review of the federal law but also an analysis of the relative participation of the federal, state, and local governments in funding transportation programs. In discussing the modal needs, it was noted that some needs are funded from sources other than the TTF. Even so, initial analysis indicates that there is a significant shortfall in funding for all modes. The analysis will be finalized with the updated numbers in Phase II.

Proposals for a rail program will be discussed in the Phase II Report. Establishment of such a program and funding for it from the TTF would affect the overall sufficiency of the modal allocations since funding would be drawn from the existing modal programs.

In summary, it is clear that the needs of the Commonwealth have changed since the formulae were developed and their modal and geographic bases have shifted. Preliminary analyses of the formulae suggest changes will be necessary if equity continues to be defined as allocations proportional to needs. In the second phase, this definition and others will be discussed and alternative formulae presented.

APPENDICES

SENATE JOINT RESOLUTION NO. 188

Requesting the Virginia Department of Transportation to study the statutory formulae for distribution of the Transportation Trust Fund.

Agreed to by the Senate, February 4, 1991
Agreed to by the House of Delegates, February 15, 1991

WHEREAS, in 1982, the Joint Legislation Audit and Review Commission undertook an extensive study of the provisions for allocating highway construction funds; and

WHEREAS, numerous changes have been made in Virginia's transportation programs, agencies, and finances, most notably through the work of the Governor's Commission on Transportation in the Twenty-First Century and the actions of the 1986 Special Session of the General Assembly; and

WHEREAS, the statutory formulae for distributing the Transportation Trust Fund for highways, transit, airports, and ports should be reviewed periodically to maintain equity in its distribution; and

WHEREAS, the Commonwealth Transportation Board has determined that it is in the public interest to reserve abandoned rail corridors for future transportation purposes, to preserve critical rail lines in the Commonwealth, and to foster and promote rail passenger and freight service in areas where such service is critical to the overall transportation objectives of the Commonwealth; and

WHEREAS, the Virginia Department of Transportation has completed the 1989 quinquennial review of highway construction needs, including an analysis of airports, ports, public transit and freight rail; and

WHEREAS, the Virginia Department of Transportation is undertaking an analysis of the structure and geographic boundaries of its construction districts, which may produce results that have direct implications for existing elements of the allocation formulae; and

WHEREAS, during 1991, the Congress of the United States is expected to reenact the Surface Transportation and Uniform Relocation Assistance Act, which may produce substantial changes to the future distribution of federal funds, several of which are expected to affect state-funded programs and allocations; and

WHEREAS, data available as the result of the 1990 census may illustrate the need for still further changes in the formulae for allocating highway construction funds in Virginia; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Virginia Department of Transportation be requested to (i) study the formulae for allocating the Transportation Trust Fund in Virginia, (ii) determine the need for revising those formulae, and (iii) make specific recommendations to the General Assembly as to any needed changes in those formulae to maintain equity in the distribution of the Fund and the relative participation of federal, state, and local governments in financing transportation programs.

The Department is further requested to assess the need for rail and freight passenger services and programs and identify the funding sources and mechanisms to provide assistance for such services and programs.

The Joint Legislative Audit and Review Commission staff is requested to provide technical assistance through its review and to comment on the methods and analysis to be used by the Department.

The Department shall submit an interim report of its progress to the Governor and the 1992 Session of the General Assembly and shall complete its work in time to submit its recommendations and final report to the Governor and the 1993 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents. The Department is further encouraged to present its interim and final reports to the Joint Legislative Audit and Review Commission.

1991 SESSION

LD9155408

HOUSE JOINT RESOLUTION NO. 424

Offered January 22, 1991

Establishing a joint subcommittee to study funding of Virginia's transportation programs.

Patrons—Andrews, Callahan, Cunningham, R.K., Byrne, Rollins, Mayer, Stieffen, Grayson and Clement; Senators: Waddell and DuVal

Referred to the Committee on Rules

WHEREAS, in recent years, Virginia, in general, and Northern Virginia, the Greater Richmond area, and the Hampton Roads areas, in particular, have experienced considerable population growth; and

WHEREAS, this population growth has often resulted in increased traffic congestion; and

WHEREAS, both as the result of inflation and also as the result of rising world petroleum prices, the cost of highway construction and maintenance and asphalt and other materials used in highway construction and maintenance has risen rapidly; and

WHEREAS, the recommendations, made less than five years ago by Governor Baliles' Commission on Transportation in the Twenty-First Century (COT XXI), to meet the Commonwealth's transportation needs into the first decade of the next century have already proved inadequate to meet Virginia's transportation needs in the last decade of the present century; and

WHEREAS, the effectiveness of COT XXI's transportation funding strategies was vitiated by the rejection of pledge bond financing first by the Virginia Supreme Court and then by the voters; and

WHEREAS, the passage by the Congress of the Clean Air Amendments of 1990 and the upcoming Congressional debates of reauthorization of the federal highway program present still further challenges to Virginia's transportation programs; and

WHEREAS, a nationwide recession complicated by war in the Middle East presents additional variables which must enter into Virginia's transportation funding calculation; and

WHEREAS, adequate, sound, modern, and efficient transportation is essential for Virginia's future economic growth and the quality of life of the Commonwealth's residents; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That there is hereby established a joint subcommittee to study funding of Virginia's transportation programs. The joint subcommittee shall be composed of eleven members, four of whom shall be members of the House of Delegates appointed by the Speaker of the House of Delegates and three of whom shall be members of the Senate appointed by the Senate Committee on Privileges and Elections. Additionally, the Speaker and the Senate Committee on Privileges and Elections shall each appoint one private citizen active in and knowledgeable about economics, banking, and finance and one private citizen active in and knowledgeable about the transportation construction industry.

The joint subcommittee shall study the transportation needs of Virginia and programs designed to meet those needs, evaluate alternatives for financing those programs, and present appropriate recommendations to the Governor and General Assembly.

The joint subcommittee shall complete its work in time to submit its findings and recommendations to the Governor and the 1992 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for processing legislative documents.

The indirect costs of this study are estimated to be $13,675; the direct costs of this study shall not exceed $9,900.

Implementation of this resolution is subject to subsequent approval and certification by the Joint Rules Committee. The Committee may withhold expenditures or delay the period for the conduct of the study.

1991 SESSION

LD9114436

HOUSE JOINT RESOLUTION NO. 471

Offered January 22, 1991

Establishing a joint subcommittee to study financing rail passenger transportation projects.

Patron—Clement

Referred to the Committee on Rules

WHEREAS, there are many needs for transportation system improvements throughout the Commonwealth; and

WHEREAS, in urban and suburban areas, opportunities to achieve significant improvements in mobility and reduction of congestion through improvements to highways are relatively limited; and

WHEREAS, to achieve meaningful improvements in mobility in these areas, government programs must concentrate on moving people rather than vehicles; and

WHEREAS, the efficiency of bus-based mass transit systems is limited in many areas by the fact that buses must operate over highways already oversaturated with private automobiles; and

WHEREAS, rail passenger transportation systems do not need to compete with trucks and automobiles for space on highways; and

WHEREAS, providing rail-based alternatives to the single-occupant commuter automobiles has the potential of improving the mobility of the rail passengers while simultaneously reducing highway congestion; and

WHEREAS, rail transportation systems have considerable untapped potential not only as commuter transportation, but also for inter-city passenger service; and

WHEREAS, especially in light of the rejection of pledge bonds by the voters in November 1990, potential sources of state funding for support of rail passenger transportation development projects appear to be very limited; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That there is hereby established a joint subcommittee to study sources and methods of financing development of rail passenger transportation in Virginia and evaluating competing proposals for rail passenger transportation development projects.

The joint subcommittee shall be composed of seven members, four of whom shall be appointed by the Speaker of the House of Delegates from the membership of the House of Delegates and three of whom shall be appointed by the Senate Committee on Privileges and Elections from the membership of the Senate.

The joint subcommittee shall complete its work in time to submit its findings and recommendations to the Governor and the 1992 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for processing legislative documents.

The indirect costs of this study are estimated to be $13,465; the direct costs of this study shall not exceed $6,300.

Implementation of this resolution is subject to subsequent approval and certification by the Joint Rules Committee. The Committee may withhold expenditures or delay the period for the conduct of the study.

1991 SESSION

LD9037462

HOUSE JOINT RESOLUTION NO. 298

Offered January 11, 1991

Establishing a joint subcommittee to study state secondary highway construction allocations.

Patrons—Giesen, Hanger and Wilkins; Senator: Nolen

Referred to the Committee on Rules

WHEREAS, on December 31, 1989, there were 45,250 miles of state secondary highways in Virginia; and

WHEREAS, as of that date, only 76.24 percent of the state secondary highway system (34,497.86 miles out of 45,250 miles) was paved; and

WHEREAS, only 6,114.18 miles of the 10,752.14 miles of unpaved state secondary highways meet the fifty-vehicles-per-day standard for eligibility for paving; and

WHEREAS, in calendar year 1988, a year in which more unpaved state secondary highways were paved than in any other year, only 577 miles of unpaved state secondary highways were paved; and

WHEREAS, in calendar year 1989 only 336.58 miles of unpaved state secondary highways were paved; and

WHEREAS, many of the areas of the Commonwealth experiencing rapid economic development and population growth are served by state secondary highways, many of which are unpaved; and

WHEREAS, crooked, steep, gravel roads carrying high volumes of traffic create hazardous conditions for all motorists, but most particularly for school buses; and

WHEREAS, in order to promote safety and assist orderly development, particularly in Virginia's more rural areas, paving of unpaved state secondary highways should be accorded an enhanced priority; and

WHEREAS, various provisions of state law, particularly the formula for allocation of funds for the construction of state secondary highways, inhibit efforts to bring adequate resources to bear on this increasingly critical situation; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That there be established a joint subcommittee to study Virginia's laws relating to state secondary highway construction and formulate recommendations aimed at making available more appropriate levels of funding for state secondary highway construction, with particular emphasis on the paving of unpaved state secondary highways. The joint subcommittee shall be composed of seven members as follows: four members of the House of Delegates to be appointed by the Speaker of the House and three members of the Senate to be appointed by the Senate Committee on Privileges and Elections.

The joint subcommittee shall complete its work in time to submit its findings and recommendations to the Governor and the 1992 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for processing legislative documents.

Implementation of this resolution is subject to subsequent approval and certification by the House/Senate Joint Rules Committee. The Committee may withhold expenditures or delay the period for the conduct of the study.

The indirect costs of this study are estimated to be $13,675; the direct costs of this study shall not exceed $6,300.

LD4168463

HOUSE JOINT RESOLUTION NO. 110

Offered January 23, 1990

Requesting the Joint Legislative Audit and Review Commission to study the statutory formulae for distributing highway maintenance construction funds.

Patrons--Fisher, Callahan, Plum, Woods, Orrock, Howell, Rollins, Cunningham, R.K., Fill, Hargrove, Parrish, Andrews, Watkins, Brickley, Almand, Keating, Cohen and Van Landingham; Senators: Waddell and Calhoun

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Referred to the Committee on Rules

WHEREAS, in 1980 the General Assembly, through the passage of Senate Joint Resolution No. 50, set in motion a multi-year study of Virginia's transportation programs, agencies, and finances by the Joint Legislative Audit and Review Commission (JLARC); and

WHEREAS, the final results of JLARC's studies were embodied in a series of measures enacted by the 1985 General Assembly; and

WHEREAS, among the most significant changes brought about by the work begun by JLARC in 1980 was the revision of the statutory formulae for distributing highway maintenance and construction funds; and

WHEREAS, since JLARC's last study of the highway funding was begun ten years ago, numerous other changes have been made in Virginia's transportation programs, agencies, and finances, most notably through the work of the Governor's Commission on Transportation in the Twenty-First Century and the actions of the 1986 Special Session of the General Assembly; and

WHEREAS, data available as the result of the 1990 Census may illustrate the need for still further changes in the formulae for allocating highway maintenance and construction funds in Virginia; now, therfore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Joint Legislative Audit and Review Commission is requested to study the formulae for allocating highway maintenance and construction funds in Virginia and the need for revising those formulae.

The Commission shall complete its work in time to submit its findings and recommendations to the Governor and the 1991 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for processing legislative documents.

Official Use By Clerks	
Agreed to By The House of Delegates	**Agreed to By The Senate**
without amendment ☐	without amendment ☐
with amendment ☐	with amendment ☐
substitute ☐	substitute ☐
substitute w/amdt ☐	substitute w/amdt ☐
Date: _____	Date: _____
_____	_____
Clerk of the House of Delegates	Clerk of the Senate

APPENDIX B
PUBLIC MEETINGS AND WRITTEN COMMENTS ON SJR 188

A total of 120 total responses were received concerning SJR 188. Of these comments, 63 were presented at the five public meetings held throughout the state. A total of 70 written responses were received in the Policy Office through the mail. Thirteen comments were made both at the public meetings and to the Policy Office. The following table summarizes the affiliations of the respondents to SJR 188.

TABLE B1
SJR 188 COMMENTS BY AFFILIATION

AFFILIATION	NUMBER OF COMMENTS
Locality	54
Association	19
Private Citizen/Company	18
State Agency/Assembly Member	18
Commission/Authority	11
Total	120

The comments were grouped into three categories: (1) those concerning general issues, (2) those concerning funding, and (3) comments addressing specific issues to evaluate in the allocation formulae. The comments are summarized below with the number of respondents indicated in parenthesis.

General Issues

Public Participation. Public input needs to be considered throughout the study, not just at the beginning and end. Create an advisory group consisting of local government officials, planning groups, and the general public. Circulate draft reports for review. (23)

Timing. Consider the effects of the new federal bill. Postpone until new bill is decided on. (10) Need results sooner than two years. (2)

Coordinate With Other Studies. The impacts of other General Assembly mandated studies need to be considered. These include SJR 30 (study of transportation policies), SJR 235 (state/local government partnerships), Senate Bill 421 (rail funding), and SJR 238 (vehicle cost responsibility). (5)

Compare To Other States. The allocation process in Virginia should be compared to that in other states. (3)

Simplify the Formulae. Formulae as they currently exist are too complicated and difficult to understand. (7)

Flexibility. There needs to be more flexibility (for localities) in the use of funds. (4)

Benefits. Need to address economic and societal benefits to be derived - how to "get most bang for the buck." (2)

Regional Needs. Address regional needs (needs which localities share). Cooperation is needed between federal, state, and local governments. (5)

Modal Needs. Consider complete system of all modes. Consider modal needs in relation to their proportion of overall needs and contribution to transportation funds. (4)

Funding Issues

Sufficiency of Funding. Almost everyone mentioned lack of funding and to include an assessment of funding adequacy. It was suggested to include an examination of new funding sources. The real issue is funding availability, not splitting up the pie. Many jurisdictions expressed concern that they were not getting their fair share.

Do Not Change Formulae. Leave the formulae alone, they are working as they stand now. Localities in southwest Virginia said that changes which shift money away from rural areas are undesirable. (23)

Match Allocations With Revenues. Localities should get back what they contribute to the TTF (based on tax revenues). Put the money where the traffic is. Highway user taxes should be used for highway purposes only. (18)

Provide Incentives To Localities. Provide match incentives so that localities are more inclined to increase their dollar contribution. Provide incentives to localities that consider environmental problems: air pollution, congestion, energy use, and special needs (handicapped). Move people, not cars. (10)

Modal Funding. Increase funding for mass transit (13), rail (11), ports (2), and provide funding for bikes (5). Explore alternative modes of funding. Do not increase funding for mass transit (or any other mode). (2)

Off-the-top funding. There were many comments concerning set aside funding:

- Too much taken off-the-top (3).
- Continue or increase funding for unpaved roads. (8)
- Do not provide funding for unpaved roads. (3)
- Need a periodical review of set aside funds. (2)
- Need set asides for rail (2), bridge/secondary bridge (4), safety projects (1).

Maintenance. There needs to be more emphasis on funding for maintenance. This was mentioned mostly in urban areas, who said they do not support funding for unpaved roads. (4)

Safety. Increase funds for safety projects. Need to repair roads that will be dangerous in future. Build safe transportation systems. (5)

Evaluation Issues

Road Classification. Administrative system classification is not appropriate. Need more emphasis on secondary roads. (13)

Priorities. Evaluate priorities based on facilities currently at or above capacity. Exclude other facilities. Evaluate priorities based on level of service. (2)

Special Factors. Consider unique geologic, topographic, geographic, and economic features among the localities. (2)

Variables To Evaluate:

- VMT (12)
- VMT per capita (1)
- Tax revenues (2)
- Land area (increase its weight) (2)
- Traffic density (1)
- Federal/park/all road miles (4)
- Lane miles HOV (2)
- Transit ridership (3)
- People moved in HOV. Average peak period vehicle occupancy (3)
- Need (1)

- Population (3)
- Licensed motor vehicles (3)
- Lane miles (2)
- Route miles (1)
- Unpaved lane miles (for secondary). (2)
- Congestion (3)

Do not use:

- Population for urban areas (5)
- Area (2)
- Lane miles (2)

APPENDIX C

The Clean Air Act Amendments of 1990

These amendments are perhaps the most significant of the federal mandates. They will greatly increase the number and complexity of air quality studies needed annually to support highway projects. The law imposes several requirements on transportation in areas where the air quality standards are exceeded. Each project must be demonstrated to be in conformity with the amendments. The focus of these measures is to reduce vehicle miles traveled and to reduce single-occupancy use of vehicles. Flexibility will be severely constrained because addition of projects to the approved plan will require a new conformity finding, and once a project is approved as part of the plan its removal would require a finding that overall air quality was not diminished. The Clean Air Act directs the Environmental Protection Agency (EPA) to issue "regulatory guidance" on the nature of the transportation and air quality requirements. The role of the Federal Highway Administration is to act only as a consultant. Non-compliance can result in the forfeiture of federal highway funds.

The Revised Federal Wetlands Policy

This policy will require that the Department not contribute to the loss or degradation of any wetlands within the Commonwealth. In short, the Department's construction program must result in no-net loss in wetlands. This policy will probably result in increased project cost and delays in advertisement. The policy may also eliminate the Nationwide Permit or at least increase the processing time.

The Virginia Water Control Board's Water Protection Permit

This permit, if implemented, will void the Corps of Engineers' (COE) Nationwide Permit. The proposal will extend the 404(B)1 guidelines and the no-net loss policy to all highway projects including the headwaters projects. Again, this permit process will increase costs and add time to transportation projects.

EPA Corps of Engineers Memorandum of Agreement

Implemented in February 1990, this agreement affects standard permit applications, and defines the Environmental Protection Agency Corps of Engineers role in the no-net loss policy. This policy will require two for one mitigation of forested wetlands. The agreement also requires the analysis of alternatives prior to consideration of any mitigation for wetlands loss. The Department is now required to prove there are no alternatives to avoiding the wetlands before any mitigation or replacement plans will be approved. This could greatly alter or even cancel projects in the Suffolk, Richmond, and Fredericksburg Districts.

State Water Control Board/VDOT Memorandum of Agreement

This policy relates to administration of the Underground Storage Tank Program. The initial intent of the program was to oversee petroleum storage tanks at the Department's facilities throughout the state. However, the agreement has been extended to incorporate a review and permitting process for the removal of underground storage tanks and contaminated soils encountered prior to or during project construction. The lack of smooth implementation of this part of the agreement could affect the proposed advertisement of 12 to 15 projects. This problem has become more critical each month.

The Department is finding contaminated soils on an increasing number of projects, and the delays resulting from the slow response time by the Water Control Board are becoming longer.

Cultural Resource Agreement for State Funded Projects

This agreement with the State Department of Historic Resources involves extensive cultural resource work on state-funded projects. It requires VDOT to mirror the Federal process for handling cultural resources. On state-funded projects, the Department is now required to locate and evaluate archaeological sites and historic sites that are eligible for the National Register of Historic Places, and mitigate potential impacts upon any property on or eligible for the National Register.

State Environmental Review Process

The State Environmental Review Process took effect on July 1, 1991, and requires that VDOT provide the state natural resources agencies an opportunity for early input on all proposed state-funded projects. VDOT will be required to develop procedures for scoping all projects and incorporating resource comments into project design to minimize environmental impacts. The Department will have to resolve all agency concerns prior to requesting a Commonwealth Transportation Board decision on a project. Any project with unresolved issues will ultimately be referred to the Secretaries of Transportation and Natural Resources for a final decision.

Chesapeake Bay Preservation Act

The Act was passed in 1988 and affects all localities east of the fall line. All localities within this area must adopt a conservation plan by December 1991, in order to comply. Development must meet general performance criteria. These include:

- Preserve natural vegetation
- Minimize disturbance of land
- Minimize impervious cover such as paving
- Strictly control erosion during clearing and construction

- Control storm water runoff and its quality
- Pump out septic tanks every five years
- Provide a reserve septic drain field equal to the primary
- Subject to site plan review
- Control storm water quality in agricultural and forestal areas

All state and local governments must also comply with these requirements. However, utilities, roads and railroads are exempt if they comply with erosion and sediment control requirements. The Department of Transportation has developed a comprehensive erosion and sediment control program which has been accepted by all of the appropriate regulatory agencies.