Historical

WASHINGTON METROPOLITAN AREA RAIL COMMUTER FEASIBILITY STUDY

Carl R. Englund, Jr.
Transportation Consultant
76 Ridgeview Drive
Pleasantville, N.Y. 10570

MAY 1971

FINAL REPORT

Prepared For

URBAN MASS TRANSPORTATION ADMINISTRATION
DEPARTMENT OF TRANSPORTATION
Washington, D.C. 20591

The preparation of this report has been financed through Contract DOT-UT-10003 from the U.S. Department of Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1964, as amended.

FOREWORD

At present there are eight commuter trains into and out of Washington, D.C. each weekday. Six are operated by the Baltimore & Ohio; two by Penn Central. The combined ridership of from 1,100 to 1,200 each way amounts to about $\frac{1}{2}$% of the total journey-to-work movement to the District and some 1.3% of the public transport volume.

The Baltimore & Ohio trains, particularly, are operating at staggering losses amounting to approximately $2 for each dollar received. Their ultimate discontinuance can be only a matter of time.

There does appear to be a modest, reasonably compensatory rail commuter potential within the Metropolitan Area. To properly tap this market, a fairly complete restructuring of routes and schedules would be required. By themselves, none of the railroads possess the capability of arranging the interline type operation which could develop the latent commuter potential. Outside guidance would be required to forestall what otherwise will inevitably be a complete disappearance of all rail commuter operations from the area.

SKETCH OF PROPOSED SERVICE ROUTES

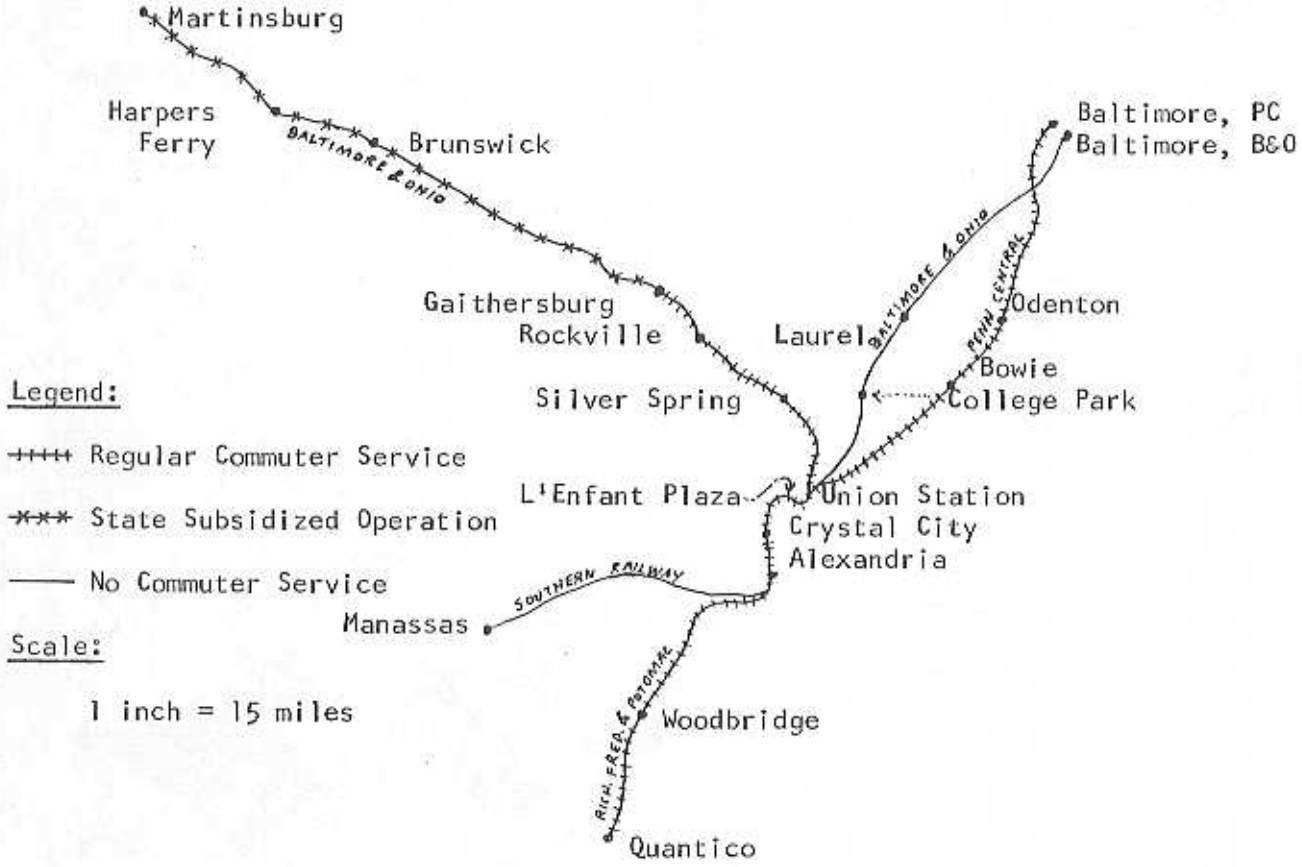


TABLE OF CONTENTS

Foreword, Sketch of Proposed Service Routes..... i

Chapter I

Introduction and Structure of the Study Approach and Report..... 1
Findings and Recommendations
A Restructured Commuter Rail System Appears Feasible..... 2
Revenues Could Come Close to Meeting Expenses..... 2
The Capital Requirements are Relatively Modest..... 2
Ridership Estimates are Promising..... 2
A New Operational Concept is Proposed..... 3
Turbo Train Possibilities Merit Consideration..... 3
Who Should Manage the Service?..... 3
Establishment of an Important New Rail Station..... 3
Local Community Cooperation Would be Vital to Success..... 3
It is Not Recommended that Transit-Type Ridership be Sought 4
Close Low Density, Low Potential Stations..... 4
Concentrate B&O Brunswick Line Commuter Operations in the Demand Area..... 4
Seek State Support to Operate One Express Service West of Gaithersburg..... 4
The Future of Baltimore-Washington Service via the B&O..... 5
Service via the Southern Railway is not Recommended..... 5
Consider Electrification of the First Street Tunnel..... 5

Chapter II, Determination of the Rail Ridership Potential

Part I, Review and Interpretation of Demographic Data

Introduction..... 6
The 1968 Study's Population and Employment Projections..... 7
Population Projections for the National Capital Region..... 7
Employment Projections for the National Capital Region..... 7
Labor Force Projections for the National Capital Region..... 7
Development of Revised Population Estimates for Areas Within the Influence of Rail Lines - Method..... 8
Why Were the Rail Service Influence Limits Set at Approximately Two Miles?..... 9
What is the Population Within the Zones of Major Rail Influence?..... 9
Examining the Trend of DC Employment Locations for the Purpose of Determining Potential Rail Rider Markets..... 11
Statistics of CBD and Southwest District Employment..... 12
Choosing a Station Site in the Southwest Area..... 14
COG Measurements of Journey-to-Work Movements..... 15
Use of Selected COG Figures to Determine Certain Work Flows 15
Questions Raised by the Work Flow Data Proportions..... 16
Consideration of Adjustments in COG Data..... 16

Part II, Preparation of the Ridership Estimates

Introduction..... 17
The Rail Commuter Zone Ridership Forecasts..... 18
Work Trips to Crystal City and Washington from the South.. 18
Work Trips to Washington Including L'Enfant Plaza (B&O)... 19
Work Trips to Washington Including L'Enfant Plaza (PC).... 22
Breakdown of Forecast Detail, RF&P and Southern Ry..... 24
Breakdown of Forecast Detail, B&O Northwest..... 25
Breakdown of Forecast Detail, B&O Northeast..... 26
Breakdown of Forecast Detail, PC Northeast..... 27

Part III, Other Background Information

New Work Locations, Reverse Movement Trends..... 28
Movements Across the District..... 28
The Shirley Highway..... 29
Summary: Present Common Carrier Status of the Journey-to-Work Market..... 29

Chapter III, Operational Status of the Railroads

Introduction..... 40
Trackage Segments Inspected and Studied..... 40
Output Desired From Field Work; An Important Observation.. 41
Why Has the Effective Trackage Throughput Capacity Diminished?..... 41
Can the Needed Trackage Capacity Be Restored?..... 42
Field Inspection, B&O Metropolitan Branch..... 42
Field Inspection, B&O Washington Branch..... 44
Field Inspection, PC Chesapeake Division Main Line..... 45
Field Inspection, RF&P, Joint and Owned Trackage..... 46
Field Inspection, SR Main Line..... 49
Washington Union Station..... 51
Summary..... 52

Chapter IV, The Model

Introduction..... 58
The Importance of a L'Enfant Plaza Station Location..... 58
A Transit-Type Market is Not Sought..... 59
Design Criteria for the Model..... 59
Presentation of the Model..... 60
The Model, East and Southbound..... 61
The Model, North and Westbound..... 62
The Model, Penn Central..... 63
Considerations Behind Scheduling and Crewing..... 64
Fare Collection..... 64
Financial Status of B&O Commuter Service..... 65
Conclusions Developed Concerning Service Continuance..... 65
Ridership Checks on the Baltimore Line, B&O..... 66
Ridership Checks on the Brunswick Line, B&O..... 67
Redefining the B&O Brunswick Line's Commuter Zone..... 68
Off-Peak Schedules..... 70
Reverse Movements..... 70
Quantico as an Outer Terminal..... 70

Future Expansion of the Service; Example of Added Start... 70
Facilities Required, B&O, PC..... 72
Facilities Required, RF&P..... 73
Joint Requirements..... 74
Open Agencies..... 74
Amenities..... 74
Equipment Required..... 75
Desirable Specifications..... 75
Equipment Sources..... 75
Car Shop Facilities..... 76
Washington Union Station..... 77

Chapter V, Capital and Operational Costs

Introduction..... 79
Check List of Capital Outlays..... 79
Rehabilitated Equipment..... 80
Conventional Type New Equipment..... 81
Another Possibility, Turbo Train Equipment..... 82
Commuter Service Start-up Costs..... 82
Summary, Various Capital Cost Alternatives..... 82
Estimated Costs of Operation..... 83
Possibilities for Economies..... 84
Relating Costs to Conventional Per-Mile Figures..... 84
Revenue Projections, B&O, RF&P..... 85
Important Relationships, Revenue Generation Potential to Costs..... 85
Estimated Costs of Operation; Revenue Projections, PC..... 86
Turbo Train Operational Costs - Estimates..... 87
Summary - Estimated Operational Expenses vs Revenues..... 87
Support Payments..... 87
Terminal Costs..... 88
Discussions with the Brotherhoods..... 89

Chapter VI, Implementation of the Model

Possible Management..... 90
Community Cooperation..... 91
A Suggested Timetable..... 91
Bus Carrier Cooperation..... 92

Maps and Sketches

Sketch of Proposed Service Routes..... i
Map A, DC Central Business District Zones..... 13
Map B, Bus Orientation along B&O Brunswick Line..... 20
Map B-1, Bus Orientation along B&O Baltimore Line..... 21
Map B-2, Bus Orientation along PC Baltimore Line..... 23
Map C, Bus Orientation in the Shirley Corridor..... 31
Map D, Schematic - Railroad Operational Functions..... 53
Map E, Trackage Sketch L'Enfant Plaza..... 78

Tables

Table A, The National Capital Region Population Projections 1970-2000..... 32
Table B, The National Capital Region Employment Projections 1970-2000..... 33
Table C, The National Capital Region Labor Force Projections 1970-2000..... 34
Table D, The National Capital Region Projected Rate of Increase in Selected Characteristics..... 35
Table E, The National Capital Region Percentage Distribution of Labor Force and Employment..... 36
Table F, Selected Projections 1970-2000..... 37
Table G, Population Projections for the Areas Within the Immediate Influence of the Commuter Rail Lines.... 38
Table H, District of Columbia Employment, Central Business District, 1970..... 39

Photographs

L'Enfant Plaza Bus Terminal, PC in Background..... 54
Crystal City Looking North, Possible Station Site..... 54
Roberts Lane, Alexandria (RF&P) Looking West..... 54
Van Dorn (SR) Looking East. Piggyback Yard to Right..... 54
Van Dorn (RF&P) Looking East. Possible Station Site..... 55
Franconia (RF&P) North from Highway. WMATA Site on Right, Station Left..... 55
Newington (RF&P) Looking North. Formerly Accotink..... 55
Beneath Backlick Road (SR) Looking East..... 55
Looking West to Silver Spring Station (B&O) from Georgia Avenue Bridge..... 56
Team Tracks at Silver Spring (B&O). Possible Parking.... 56
Garrett Park (B&O) Looking East. Limited Parking Right.. 56
Randolph Road Crossing (B&O) Looking East. Possible New Station Site..... 56
Rockville (B&O) Showing Limited Parking in Rear of Station..... 57
Gaithersburg (B&O) Looking West. Storage Track to Left.. 57
Present Gaithersburg Parking Facility - About 40 Cars... 57
College Park (B&O) Looking North. Note Short Platforms, No Shelter..... 57

CHAPTER I

INTRODUCTION

FINDINGS AND RECOMMENDATIONS

CHAPTER I

WASHINGTON METROPOLITAN AREA
RAIL COMMUTER FEASIBILITY STUDY

Introduction

The entire Washington Metropolitan Area is swiftly expanding outward. The institution of a restructured commuter rail service, which would be sound enough to be retained over a period of time, could help guide the future configuration of an expanding region. With the knowledge of the existence and continuity of good rail service, future suburban development may gravitate toward the best transportation access pathways to the CBD.

Rail service would assist materially in reducing pressure on highway access routes from farther-out points, particularly at the most critical rush hour times. It also should materially ease the rate of increase of automobile parking requirements to be met within the CBD.

The railroads' contribution potential should be related to the statistics which indicate that not only will employment within the District of Columbia continue to increase, but also that the draw from suburban areas to fill employment needs will be escalating rapidly.

Concomitant needs point to a healthy commuter rail operation as an important element which should be contributed toward the creation of a balanced transit/transportation complex within the region.

The purpose of this study is to determine the economic and social feasibility and desirability for the restructuring or expansion of existing commuter rail services within the Metropolitan Area.

Structure of the Study Approach and Report

The study approach and correlated report text are organized in sequential fashion starting with initial demographic data development, progressing through detailed field work, and concluding with economic considerations dealing with the implementation of a commuter rail operation. The report is divided into six chapter groupings:

Chapter I is principally devoted to presentation of the Findings and Recommendations.

Chapter II develops step-by-step the background data required to formulate rail ridership forecasts.

Chapter III reviews the operational status of the railroads and investigates their capabilities to perform a commuter service.

Chapter IV presents the proposed service model for institution of a reasonably viable rail service.

Chapter V develops the Capital and Operational Costs.

Chapter VI discusses Implementation of the Model.

A Restructured Commuter Rail System Appears to be Feasible

A restructured commuter rail service, embracing three important routes in the Washington Metropolitan Area, could be operated on weekdays under conditions requiring only a very modest level of support payments after service is well underway. The routes would be:

1. Baltimore & Ohio	Gaithersburg - Washington, 21 miles
2. Richmond, Fredericksburg & Potomac	Quantico - Washington, 34.7 miles
3. Penn Central	Baltimore - Washington, 40.3 miles

Revenues Could Come Close to Meeting Expenses

The estimated expenses of operation, annualized, would be on the order of $2.74 million (1971 dollars); the revenues in the neighborhood of $2.37 million. The first year gap between revenues and expenses would tend to be somewhat greater due to the expected time lag in achieving maximum ridership levels; it is estimated to be not less than $500,000.

The Capital Requirements are Relatively Modest

The capital requirements to inaugurate the services shown in the Model, Chapter IV, would, in part, be dependent upon the type of rail passenger equipment to be specified.

The acquisition of rehabilitated main line rail equipment, offering all comforts, would set the capital needs at $9 to $9.5 million.

The installation of one of the most modernly equipped small commuter rail systems in the nation, employing new equipment, would set capital needs at $14.1 to $15.6 million. Further verification would be required for a possible turbo train installation estimated at $13.4 million.

The foregoing outlays are inclusive of rail equipment, parking and station facilities, and changes needed in the railroads' physical plants.

Ridership Estimates are Promising

The estimated ridership range which can be reasonably achieved during the first year of operation is between 12,500 and 14,200 trips per weekday. The Baltimore & Ohio proportion would be 3,600 to 4,000 for Gaithersburg-Washington service (Brunswick-Martinsburg not included). The Richmond, Fredericksburg & Potomac Quantico-Washington service would carry 4,500 to 5,000; the Penn Central Baltimore-Bowie-Washington service a range between 4,400 and 5,200. Future growth potential appears to be good.

A New Operational Concept is Proposed

A new concept for operation is suggested which, from an experimental standpoint, would be a first in the nation. Commuter trains and crews running on the B&O Brunswick Line and the RF&P Quantico Line would be "interlined." They would proceed from their terminal at one end of the two-route commuter zone to the other and then turn back.

This mode of operation would substantially reduce capital outlays for equipment and, at the same time, provide excellent cross-Metropolitan Area schedules for an expanded rider base by linking Washington's CBD and the Southwest employment centers with such suburban employment complexes as Crystal City, Va., and Rockville, Md.

If the interline run commuter train concept could be inaugurated and operated successfully, it should provide valuable clues for solution of commuter train operational costs where similar possibilities now exist in other major cities.

Turbo Train Possibilities Merit Consideration

Continuous research and development efforts have played a key role in the ongoing New York-Boston Turbo Train operations. Service failures and component replacement problems now appear to be approaching a satisfactory minimum. Tentative budget figures, based on the best information available, indicate that if new rail equipment is to be purchased and operated, the proposed commuter train configurations of the Turbo Train should be seriously considered both from the standpoint of possible first-cost savings and subsequent operational savings.

Who Should Manage the Service?

Organizationally there are a number of alternate management possibilities. These include: The Washington Metropolitan Area Transit Authority (WMATA), The Metropolitan Washington Council of Governments (COG), a special authority created by the Congress, or a subdivision of Amtrak (National Railroad Passenger Service Corporation).

Establishment of an Important New Rail Station in the District of Columbia

A new station, expected to be a principal ridership generator, would be established on Penn Central trackage at L'Enfant Plaza. The new station would be adjacent to the off-street bus terminal located at the Plaza. Excellent service would be afforded to the fast-growing Southwest Area employment centers. Convenient transfers to bus feeder service also could take place here.

Local Community Cooperation Would be Vital to the Success of the Project

It would be imperative, to guarantee the success of the commuter rail operation, that the fullest cooperation be forthcoming at

local community levels. Assistance would be especially important in developing such rider amenities as good parking facilities, proper street or highway access to stations, the best locations for stations to be constructed.

It is Not Recommended that Transit-Type Ridership be Sought

It is not recommended that the rail commuter operation should attempt to handle transit-type ridership from and to close-in areas to the CBD. The railroads' major area of contribution to the region is considered to be that of expediting trips from and to communities located outside the transit/bus dominated zones. By following this precept, the railroad operation will be better organized to play an important future role as a key feeder to the Rapid Transit System when its operations commence.

Volume service for very short transit-type distances generally is too costly for a railroad operation to provide unless major subsidies are to be forthcoming.

Close Low Density, Low Potential Stations; Improve Ridership and Revenue

Certain lightly patronized stations should be closed in order to speed up train movements and thereby provide a transportation package of the best possible quality.

The relatively low deficits projected for the operation are due, in large part, to the fact that it has been possible to design an all-new operational concept which gets away from a very costly, ridership-inhibiting local-stop type of service. Without the express-type runs now proposed, the Model could not function unless additional trains (and equipment and crews) were to be added. This type of service expansion would escalate the deficits to high levels.

Concentrate B&O Brunswick Line Commuter Operations in the Demand Area

It is recommended that the Baltimore & Ohio commuter operations be cut back from Brunswick, 49 miles, and based on the high volume potential Gaithersburg - Washington segment, 21 miles. Ridership west of Gaithersburg is at a relatively low level; present forecasts do not indicate major growth in the near future.

Such a decision, of course, would not preclude future use of the farther-out portions of the B&O route for major commuter movement if the demand develops. For the time being, a reasonably viable pattern of quality service would be concentrated in an area that demonstrates the potential for adequate support.

Seek State Support to Operate One Express Service West of Gaithersburg

It is recommended that consideration be given to the operation of one round trip express run from points west of Gaithersburg. This train probably should run between Martinsburg, W. Va., 73 miles out, and Washington. It would serve an area lacking both bus operations and good highway connections to Washington.

The service could not be operated on a break-even basis. The estimated minimum deficit would be on the order of $125,000 per year, or more. It is suggested that the States of Maryland and West Virginia jointly investigate the desirability of underwriting this special service.

The Future of Baltimore-Washington Services via the Baltimore & Ohio

Indications point to the advisability of dropping the Baltimore-Washington commuter services of the B&O. Their Baltimore area rider origins, which represent about half of the total ridership, should be consolidated into an improved Penn Central Baltimore-Washington service.

Track capacity problems appear to inhibit possibilities of economically viable expansion of B&O commuter service on this line. Bus competition is well organized and carries the vast majority of riders to and from points within a reasonable radius of Washington. The financial situation appears to be difficult to improve with losses approaching a mark triple that of revenues collected.

Service via the Southern Railway, Manassas to Washington, is Not Recommended

Rail commuter service over the route of the Southern Railway between Manassas, Va., and Washington presently would not appear to be either financially or operationally feasible. There are serious problems of track capacity availability; Shirley Busway competition is very strong; the access routes to the majority of potential station sites are poor.

Operation of a commuter service, at this time, over tracks of the Southern Railway also would tend to create a degree of service duplication throughout a substantial portion of the rider-producing areas south of Washington. This could result in lowered revenue yields and accompanying increased subsidy requirements for services south of Washington.

This recommendation should not be construed as barring future consideration of a Southern Railway operation.

Consider Electrification of the First Street Tunnel Under Capitol Hill

If possible, the First Street Tunnel should be electrified in order to provide a through service link for Penn Central electric, multiple-unit commuter trains between Union Station and L'Enfant Plaza. Operation of electrified trains by Penn Central would be less expensive than the use of diesel or turbine propelled trains.

Amtrak commissioned a tunnel electrification cost review of the mile-long double-track link between Union Station and Virginia Tower which was based on far more exacting clearance requirements than those posed by multiple-unit, self-propelled electric cars. The magnitude of the resultant Amtrak cost estimates temporarily has halted further electrification consideration at this time.

CHAPTER II

DETERMINATION OF THE RAIL RIDERSHIP POTENTIAL

Part I - Review and Interpretation of the Demographic Data

Part II - Preparation of the Ridership Estimates

Part III - Other Background Information

CHAPTER II

DETERMINATION OF THE RAIL RIDERSHIP POTENTIAL

Part I - Review and Interpretation of the Demographic Data

The original 1968 Metropolitan Area Pilot Transportation Study prepared for the United States Senate Committee on Public Works provided a detailed breakdown of (a) location of population groupings, (b) quantification of areas of employment, and (c) other related demographic data of importance for determining rail commuter rider potential.

The work statement for the current 1971 Washington Metropolitan Area Rail Commuter Feasibility Study calls for updating the 1968 study's pertinent demographic data together with development of certain required additional data.

The three principal sources employed for updating were:

(1) Available data from the Council of Governments (COG).

(2) Available data from the 1970 Census.

(3) Certain projections from a 1969 study undertaken for COG by Hammer, Greene, Siler Associates - "The Economy of Metropolitan Washington."

Considerable reference also was made to various other sources including:

(1) Feasibility Study for Bus Rapid Transit in the Shirley Highway Corridor, 1970, undertaken for COG by Howard, Needles, Tammen & Bergendoff.

(2) District of Columbia CBD Employment, 1970, prepared by the District of Columbia Motor Vehicle Parking Agency.

(3) Pedestrian Circulation Plan, 1970, prepared for the Southwest Employment Area Transportation Committee by Wilbur Smith Assoc.

(4) City of Bowie (Maryland) Transportation Study, 1969.

Data from the foregoing sources has been correlated with COG procedures in order to establish compatibility of treatment and thus avoid creating any variations in certain key bases for projections. COG currently uses HGS figures for future projections, DC Motor Vehicle Parking Agency figures for CBD employment, 1970 Census Data to the degree available, and preliminary COG "Empiric Model 1980" data for journey-to-work information. (This COG study has not yet been formally released).

The 1968 Study's Population and Employment Projections

A comparison of the 1970 - 2000 projections from three 1968 study report tables (full version, pages 67 et seq) with actual 1970 census figures, plus accompanying revised projections to the year 2000, points to some interesting changes that have taken place in the District of Columbia's proportionate relationships with the Maryland and Virginia suburbs.

A review of the original Tables A, B, and C follows. Updated versions of these tables are included in this study report on pages 32,33 and 34.

Table A - Population Projections for the National Capital Region

(1) The District of Columbia population estimated to be 833,800 by 1970 actually was 756,510 or almost 9.3% less than the projection made in 1968. The latest available projections indicate that population will continue to lag behind the 1968 forecasts until the year 2000 when a small gain will be shown.

(2) The Suburban Maryland 1970 census population exceeded the 1968 projection by 4.4%; forecasts through the year 2000 continue on about the same relationship.

(3) The Suburban Virginia 1970 census population was about 4% less than the 1968 forecast; by 2000, the population is expected to exceed the original forecast by 24%.

Maryland suburban population is expected to represent almost 46% of the regional total by the year 2000; Virginia suburbs 39%; the District of Columbia 15%.

Table B - Employment Projections for the National Capital Region

(1) Actual employment within the District of Columbia was 14% more in 1970 than the 1968 projections indicated; by the year 2000 this will have increased to 32% above the original 1968 forecasts for the year 2000.

(2) Suburban Maryland employment in 1970 was 7.3% above the 1968 forecasts; Suburban Virginia was up 1.5%.

(3) By the year 2000, the District of Columbia now is projected to provide 39.3% of the employment; the Virginia Suburbs 31.2% and the Maryland Suburbs 29.5%.

Table C - Labor Force Projections for the National Capital Region

(1) The 1968 study forecast a 1970 labor force in the District of Columbia of 413,650. The 1970 actual was 349,825 or 15.4% less than projected. Measured against the original forecast base, the Maryland Suburbs showed an increase of 7.7%; the

Virginia Suburbs a decline of 13.6%.

(2) Between 1970 and 2000, the increase now indicated for the District of Columbia is 115%; for Maryland Suburbs 213%; for Virginia Suburbs 246%. For the Metropolitan Area as a whole, the indicated increase by the year 2000 is 194.4%.

Three additional tables provide expanded comparisons of the degree and direction of population, employment and income growth. They are:

Table D - Projected Rate of Increase in Selected Characteristics, 1970 - 2000, by sub regions (page 35)

Table E - Percentage Distribution of Labor Force and Employment, 1970 - 2000 (page 36)

Table F - Selected Projections, 1970 - 2000 (page 37)

Development of Revised Population Estimates for Areas Within Influence of of Rail Lines - Method of Computation

Census tracts located generally within two miles of rail lines were selected for the 1968 Study. Estimates of 1960, 1970 and 1980 population per tract were obtained from the Regional Development Guide.

For purposes of revision and updating, the Hammer, Greene, Siler estimates contained in the 1969 COG - sponsored report "The Economy of Metropolitan Washington" were employed as the new base. These estimates now are accepted as being more accurate than those appearing in the Regional Development Guide. Since the HGS estimates are not available for areas smaller than county, the original Guide - based tract totals were factored up or down according to the ratio:

$$\frac{\text{(year) HGS forecast for county}}{\text{(year) Guide forecast for county}}$$

New line totals then were computed by applying these factors to the old totals, by county, summed to the rail line. The correction factors by county (1990 population figures are used) are:

Jurisdiction	Reg. Dev. Guide	HGS Low	HGS Low/Reg Dev G.
District of Columbia	931.2	916.4	0.9841
Montgomery County	844.2	1,066.0	1.2627
Prince Georges County	1,011.2	1,472.6	1.4562
Arlington County	232.4	267.3	1.1501
Alexandria City	212.3	173.5	0.8172
Fairfax County	868.3	1,202.0	1.3843
Loudoun County	124.5	91.6	0.7357
Prince William County	294.4	266.7	0.9059
Total	4,518.5	5,456.1	1.3624

Why Were the Rail Service Influence Limits Set at Approximately Two Miles?

The bulk of the potential rail commuters from areas outside the District of Columbia live within 7 to 15 miles' radius of their place of employment.

Prior ridership studies undertaken in the Philadelphia and Boston Metropolitan Areas and in the Southward Area of Chicago have demonstrated that for distances of up to 12 to 15 miles from the CBD, the outer limits being somewhat dependent upon a particular city's suburban configuration, the railroads' influence is confined to relatively narrow corridors. Within these nearby areas, the envelopes of attraction of rail lines (defined as the principal drawing areas for commuters) usually do not show evidence of sizable penetration much beyond a point about two miles away from the trackage. Not until farther-out areas are reached, do rail-prone commuters tend to drive or ride longer distances, in volume, to reach a railroad station.

What is the Population Within the Zones of Major Rail Influence?

Table G develops the population within the zones of major influence of each of the five rail routes under consideration. This table appears on page 38.

The population totals shown do not extend to the farther-out areas along each rail where much broader envelopes of attraction would prevail. Generally the more distant areas' population totals are relatively thin; the measures applied to such areas to determine ridership potential are restricted to journey-to-work information to the extent it is available.

A summary of the data taken from Table G follows:

Railroad Line	1960 [1]	1970 [2]	1980 [2]
Richmond, Fred'b'g & Potomac	126,600	199,400	259,400
% Change		57.5	104.9
Southern Railway	120,600	214,000	282,900
% Change		77.4	134.6
Baltimore & Ohio (Brunswick)	185,500	340,100	424,600
% Change		83.3	128.9
Baltimore & Ohio (Baltimore)	93,400	230,200	297,300
% Change		146.5	218.3
Penn Central	60,900	156,100	195,900
% Change		156.3	221.7

Notes: 1 Census
2 Regional Development Guide tract totals updated by "The Economy of Metropolitan Washington" county projections

There are no overlapping census tracts in the case of the two Baltimore & Ohio routes and the Penn Central Route. Because of the combination of nine miles of common track plus four and a half miles of parallel trackage, there is substantial overlap of Richmond, Fredericksburg & Potomac and Southern Railway census tracts.

The overlap (common spheres of population influence) amounts to:

1970	1980
115,100	135,600

If the two railroads were to divide the population of the areas of common influence, the numbers would read:

	1970	1980
Exclusive Southern Railway	98,900	147,300
50% of Common Population	57,550	67,800
SR Total	156,450	215,100
Exclusive Rich. Fred. & Pot.	84,300	123,800
50% of Common Population	57,550	67,800
RF&P Total	141,850	191,600

Should the choice be narrowed to the use of only one of these two railroads, then the population figures for the major spheres of rail influence would read:

	1970	1980
For the RF&P only	199,400	259,400
or		
For the Southern Ry only	214,000	282,900

Despite the fact that the Southern Railway's trackage is located in a faster-growing area than that of the Richmond, Fredericksburg & Potomac, as subsequent data will show, population figures by themselves are not the sole controlling factors in determining true total ridership potential. The actual outlook for maximizing ridership totals if only one of the railroads is to be used points to the RF&P.

Similarly, as subsequent text and data will develop, the future ridership potential of the Baltimore Line of the Baltimore & Ohio appears to be not as promising as that of the Penn Central despite the fact that the B&O trackage is located in the fastest-growing area in the entire region.

Examining the Trend of District of Columbia Employment Locations for the Purpose of Determining Potential Rail Rider Markets

The location of work centers with respect to railroad termini, in terms of access time required to reach these centers, has been proven to be of considerable importance in determining commuter railroad ridership potential.

The field surveys undertaken in the Spring of 1966 for the Sepact II project in Philadelphia included the mapping of true geographic origins and destinations for more than 10,000 riders. One of the rather startling facts which emerged was that rail use for commuting purposes tapered off almost completely for trips destined to points more than ten minutes away from the arrival terminal, either by foot or by transit.

The apparent human tendency to seek the easiest pathway to work was further illustrated by mapping the home and work locations of those travelers originating in areas where duplicate railroad facilities existed, i.e. both Reading Company and Penn Central services. There was a preponderance of train riders who would drive as much as five or six miles extra to a farther-away line and station. Their evident purpose: to arrive at an in-city rail terminal which frequently was as little as a half block or block closer to their work destination than the in-city terminal of the origin rail line which would be nearest their home.

At the time the surveys were made in the Northeast Area on the two Trenton Lines (Penn Central and Reading), the Reading's fares were slightly higher, trains slower and equipment older. Nonetheless in the majority of cases where Reading Terminal arrivals would be a bit more convenient in terms of proximity to work destination, the riders elected to travel by Reading. Likewise, riders living in Reading territory tended to drive across county to Penn Central stations when this railroad was in a position to provide slightly easier access to work.

Similar tests were applied in the course of completing the recent STAC study in Chicago at two points where competitive railroad services provided different downtown station locations. Here again, despite fare differentials, the riders chose the railroad with the in-city terminal nearest to their employment.

Except in the case of New York City, the preponderance of the major cities' rail commuters walk from their arrival station to work and vice versa. Determination of the rider potential for Washington, D.C. therefore will be closely related to the employment concentrations located within ten minutes' distance by foot or transit to District rail stations.

The fastest growing employment area in the District of Columbia is the Southwest Area. Between 1970 and 1990, employment in the Southwest Area is projected to increase by 64%; the balance of the city by 36%. Though the Southwest Area employment totals are increasing swiftly, the 1990 totals as now projected would represent only about 11% of all District of Columbia employment. It is expected, however, that an above average proportion of those employed will be commuters from homes located outside the District.

Statistics of CBD and Southwest District Employment

Two very recent analyses of employment, one for the CBD and one for the Southwest Area, were completed in the Fall of 1970.

The District of Columbia Motor Vehicle Parking Agency surveyed the 1970 employment within the Central Business District and prepared estimates for 1971. The numbers are shown in Table H; Map A outlines each employment zone. See page 13 for Map A; page 39 for Table H.

The boundaries of the Central Business District are:

North:	Massachusetts Avenue
East:	Second Street, NW
South:	Constitution Avenue
West:	Twenty-third Street

Examination of Table H in combination with Map A discloses that practically all the employment lies within two miles or less of Union Station. The farthest distant point, Massachusetts Avenue and 22nd Street is only 2.4 miles from the station.

The 1970 CBD Employment totals, summarized, are:

District	Federal	Private	Total 1970	1971 Estimate
7,931	86,324	126,255	220,510	234,460

The Southwest Employment Area Transportation Coordinating Committee retained Wilbur Smith & Associates to prepare employment totals by building including forecasts through 1990.

The boundaries of the Southwest Area are:

North:	Adams Drive (just south of Constitution Avenue)
East:	Second Street, SW
South:	Southwest Freeway
West:	Fourteenth Street

The farthest distant point from Union Station is 1.7 miles.

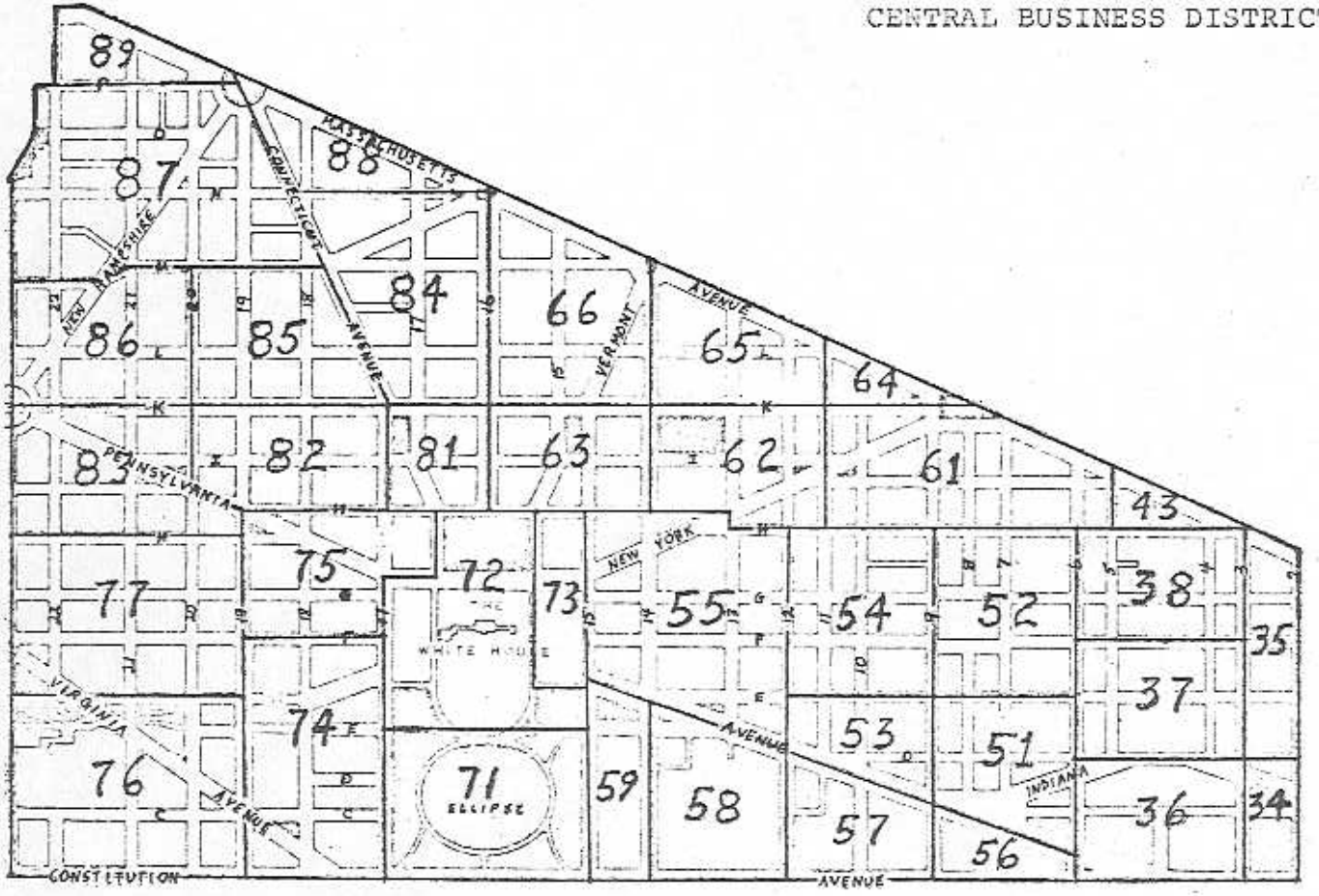
The Employment totals and forecasts were:

1968	1970	1975	1990
38,280	60,746	82,816	99,171

Conservative estimates indicate that considerably fewer than 200 of today's daily rail commuters to the District proceed much farther into either the CBD or Southwest Areas than the Northeast rim adjacent to Union Station. A new or additional station location nearer to centers of major employment would be an absolute necessity before any substantial increase in commuter train ridership could be expected.

DISTRICT OF COLUMBIA

MOTOR VEHICLE PARKING AGENCY
CENTRAL BUSINESS DISTRICT ZONES



MAP A

Choosing a Station Site in the Southwest Area

Around 1960-61 when interest first became keen in developing a short-haul, rapid transit type rail commuter operation, two station sites were chosen along the Penn Central's right of way across the center of the Southwest Area. At that time there still were several freight yards in the area and today's building growth had not started. The locations therefore were sited in the easterly section near the south side of Capitol Hill and in the west adjacent to the Bureau of Engraving and Printing.

In more recent years there has been rapid office building growth toward the center of the area accompanied by a gradual sell-off and shrinkage of available trackside railroad property.

The most logical choice for a station location now appears to be at L'Enfant Plaza between 9th and 10th Streets, S.W. facing the Southwest Area bus terminal located between the railroad tracks and D Street.

L'Enfant Plaza now is the centrum for employment in the Southwest Area. The magnitude of employment in a few of the larger buildings located within 2,000 feet of the proposed railroad station site is impressive.

The following sample cites the present and proposed work population of some of the larger buildings bordering the station area:

Building	1968	1970	1975	1990
Agriculture Admin. & So.	8,864	9,600	9,600	9,600
Engraving Annex	2,294	2,300	2,300	2,300
Group Health Insurance	-	2,000	2,000	2,000
Forrestal Building	-	6,400	6,500	6,500
FAA	3,926	3,900	3,900	3,900
GSA	4,250	4,000	4,300	4,100
HUD	-	4,200	4,600	4,800
L'Enfant Plaza	-	3,700	11,400	11,400
Nassif Building	-	5,000	7,500	7,500
Partial Area Totals	19,334	41,100	52,100	52,100

COG Measurements of Journey-to-Work Movements

The Metropolitan Washington Council of Governments carried out for the Metropolitan Region, between April and November 1968, an average 4% sample of work movements. The actual sample coverage was 3% within the Beltway and 5% outside. The work was based on a home interview approach. Work trips were considered to be "the connection(s) between the home location and the work location." All modes including "walk to work" were tabulated.

The opportunity was provided by COG to review much of the Commuter Pattern Summary data which would be pertinent to the determination of any rail commuter operations' feasibility. However, because certain screen-line checks remain to be reviewed, the COG study data cannot yet be released in its entirety.

Portions of the COG data have been employed in this study under conditions where (a) complete abstracts were not necessary and (b) the output would be classed as "preliminary and subject to variance within certain estimated ranges."

The ultimate full availability of COG's Commuter Patterns data for forecasting ridership potential by rail would be of considerable value. Area population totals, and, for that matter, employment totals, by themselves do not furnish or guarantee totally valid indices as to the volume possibilities of journey-to-work movements by any mode be it rail, bus or private automobile.

Use of Selected COG Figures to Determine Certain Work-Flow Proportions

The definition of the approximate relative importance in 1968 of those District of Columbia and Virginia work locations considered to possess a degree of "rail ridership influence" was greatly helped by a review of the COG Commuter Patterns data. Because of usage restrictions, not all the points with lesser work volume were included.

The work movement proportions were determined on a round-number basis by relating the selected rail-prone employment areas to equally selected rail-prone rider origin areas located in the suburbs alongside the five rail routes under consideration. For the Virginia-origin group, slightly over 51,000 work trips were considered; for the Maryland origins, about 65,000. Rail station locations in the District were considered to be Union Station and L'Enfant Plaza. These relationships emerged:

Work Destination	Virginia Origin		Maryland Origin
Five Federal Triangle Dists.	33.3%		57.8%
Cameron Area	13.0%		-
Alexandria	11.6%		-
The Mall	8.1%		10.1%
Contiguous to Mall	7.3%		9.5%
West of R.R. Tracks, Alexandria	5.9%	So. Capitol Hill	3.9%
Union Station	3.7%		13.5%
Crystal City & Nat'l Airport	12.6%		3.2%
Other Key Areas	4.5%		2.0%

Questions Raised by the Work Flow Data Proportions

The sum of the proportions set down for approximate relative work destinations might appear to indicate that the rail ridership potential for the Southwest Area could be relatively low. Two factors exist which should offset this possibility:

1. Because of the scale upon which the work districts were set up, a substantial portion of the eastern segment of the Southwest Area was omitted from the rider origin computations.

2. Employment in the Southwest Area started to expand rapidly toward the end of the COG survey period. The level by mid-1971 is expected to be as much as 70% greater than when the bulk of the surveys took place.

It should be understood that the approximate work-flow relationships shown would not be those which would pertain if all of the area's origin and destination data were to be proportioned on a basis not related to so-called rail-prone sub segments.

Consideration of Adjustments in COG Data

For the purpose of revising and updating COG data relative to Southwest Area work flows, reference will be made to the Wilbur Smith & Associates Employment Trends data developed for the Southwest Employment Area Transportation Coordinating Committee. The new totals will be factored up according to the ratio:

$$\frac{1970}{1968} \qquad \frac{60,746 \text{ (actual)}}{38,280 \text{ (actual)}}$$

The correction factor to be applied therefore would be 1.5868 This should be further increased for providing best current rider potential estimates since the study estimates a 36.3% gain between 1970 and 1975. In order to bring the 1970-onward increase in line with the 1968 base which was used (in effect) by COG, a round number figure of .7 (70%) will be applied to COG work destination numbers having to do with the Southwest Area. This should prove relevant for late-1971 rider indices' determination.

Correction factors for the balance of the Central Business District would be based upon the District of Columbia CBD Employment Study prepared by the District of Columbia Motor Vehicle Parking Agency indicating a 6.3% increase between 1970 and 1971 plus an estimated 4% 1968-70. A round number figure of .1 (10%) will be applied to CBD work destination numbers drawn from COG 1968 Commuter Patterns data.

Part II - Preparation of the Ridership Estimates

The ridership estimates which have been prepared are not purely statistical in nature. They do not follow a set ratio to population or employment in their development. Neither do they call for what could be regarded as substantial proportions of rail ridership acquisition from existing journey-to-work movements.

Overall, the forecasts are carefully tailored to local circumstances and situations. In the case of two specific areas, those on the north side of the Southern Railway where Shirley Highway bus competition would be severe and those along that section of the Baltimore Line of the Baltimore & Ohio which is honeycombed with bus routes, very low estimates are used. Generally speaking, the assumptions are that the rail ridership which is forecast primarily will be drawn from the private automobile.

Due to current restrictions by COG on the publication of detailed movement data from their as yet unreleased commuter movement studies, only general data summaries can be given in this report. Detailed work sheets by zone and district have been prepared. They can be consulted at a later date when release is authorized.

Off-peak ridership is not considered to possess much potential on most rail routes. Consequently neither the ridership projections nor the suggested rail schedules propose that major consideration be given to off-peak. Under the terms of present generally standard rail labor agreements, an off-peak round trip between Quantico and Washington would cost about 70% of an engine crew's basic day's pay; a round trip between Brunswick and Washington 98%. Similar mileages for the train crews would account for proportions equivalent to 46.6% and 65.3% respectively. Even the shorter off-peak turnarounds, despite somewhat less mileage, therefore could become very costly in terms of the probable low ridership density.

Despite very substantial employment at Crystal City, the estimates for rail ridership are held at minimum levels. The weight of evidence points primarily to nearby Virginia communities as the principal domiciles of the workers. These largely are areas from which automobile travel would be much easier to accomplish than, for example, a trip to the Washington CBD.

Summarizing, the ridership estimates are based upon:

1. Primary consideration of the Commuting Patterns Summary prepared by COG.
2. The sizable adjustments which have been made on the COG figures to reflect the greatly increased employment in the Southwest Area of the District of Columbia since the COG field work was undertaken; the much lesser additives for CBD employment increases.
3. The projected population growth in the suburban areas.
4. External influences, e.g. bus, Shirley Corridor bus, geography of rail lines versus other modes, distances from the CBD, service timing and frequency.

The Rail Commuter Zone Ridership Forecasts

The following forecasts provide the basis which has been employed to develop equipment needs, operational expenses, capital needs and the revenue projections. The minimum scheduling contemplated in making up the forecasts called for three trains, properly spaced during the demand period span, for the peak periods. In some instances a fourth train was used. A limited off-peak service also is included.

The forecasts are given first in summarized form and then are followed with more detailed line and station breakdowns.

Work Trips to Crystal City and Washington, D.C. from the South

Southern Railway, including reverse movements.....1,771

Richmond Fredericksburg & Potomac, incl. reverse.....1,989

The foregoing ridership are based on an equal division of common-origin ridership between Edsall and Washington.

If only one of the two carriers were to operate commuter service, the estimates would be:

Southern Railway.....2,400

or -

Richmond, Fredericksburg & Potomac.....2,800

The estimates are conservative and include only 232 reverse-peak riders on the RF&P and 115 on the SR. All totals are one-way; daily round trips would be double the above totals which, in the case of sole RF&P operation would be 5,600 and for the SR, 4,800.

Off-peak should be calculated on the basis of 10% of the peak hour ridership or 280 one direction on the basis of sole RF&P operation; 240 for the SR under similar circumstances. Off-peak should be added to the above totals.

Southern Railway as sole operator incl off-peak.....2,640 one way, 5,280 round trip.

Richmond, Fredericksburg & Potomac as sole operator, incl off-peak, 3,080 one way, 6,160 round trip.

The RF&P has a pair of special market situations at Quantico and Woodbridge which quite possibly could build into very substantial off-peak volume. Flexible off-peak scheduling designed to test the market potential would be desirable.

Work Trips to Washington, D.C. Including L'Enfant Plaza

Baltimore & Ohio Brunswick Line incl. reverse.....1,931 (base)

Add 304 off-peak to 1,931 work trips.....2,235 (total)

The composition would be:

Gaithersburg & East,	work trips.....	1,566 + 200 reverse
" "	way riders.....	50
Brunswick-Germantown	inclusive.....	115
Off-peak.....		304 (Gaithersburg-DC only)

No allowances are made for the Harpers Ferry-Martinsburg segment which currently is just under 50 riders each way.

Including off-peak, the daily round trip total would be...4,470

The indicated future potential of this line appears to be much greater than the "current potential" figures' portrayal of ridership.

Baltimore & Ohio Baltimore Line, work trips.....875 to 1,000

No off-peak. Estimate based on present 3 trains at peak plus added turnback to Jessup.

Maximum daily total (round trip basis) 1,750 to 2,000

This is a special case. The analysis of COG data showed that 95.2% of the work trips, Laurel to Washington inclusive, originated within 9 miles of the District; 80.4% were in the 4 to 6 mile range. It should be noted that COG data for points south of Hyattsville were not employed. Between Berwyn and the District (9 miles), the railroad is paralleled by bus routes which actually make jogs to serve College Park and Riverdale Stations. Examining the Brunswick Line for purposes of comparison, excluding Silver Spring (7 mi.), the first station away from Washington with good rider volume is Kensington (10 mi.). See Maps B and B-1, pages 20,21.

The breakdown of the ridership forecast is:

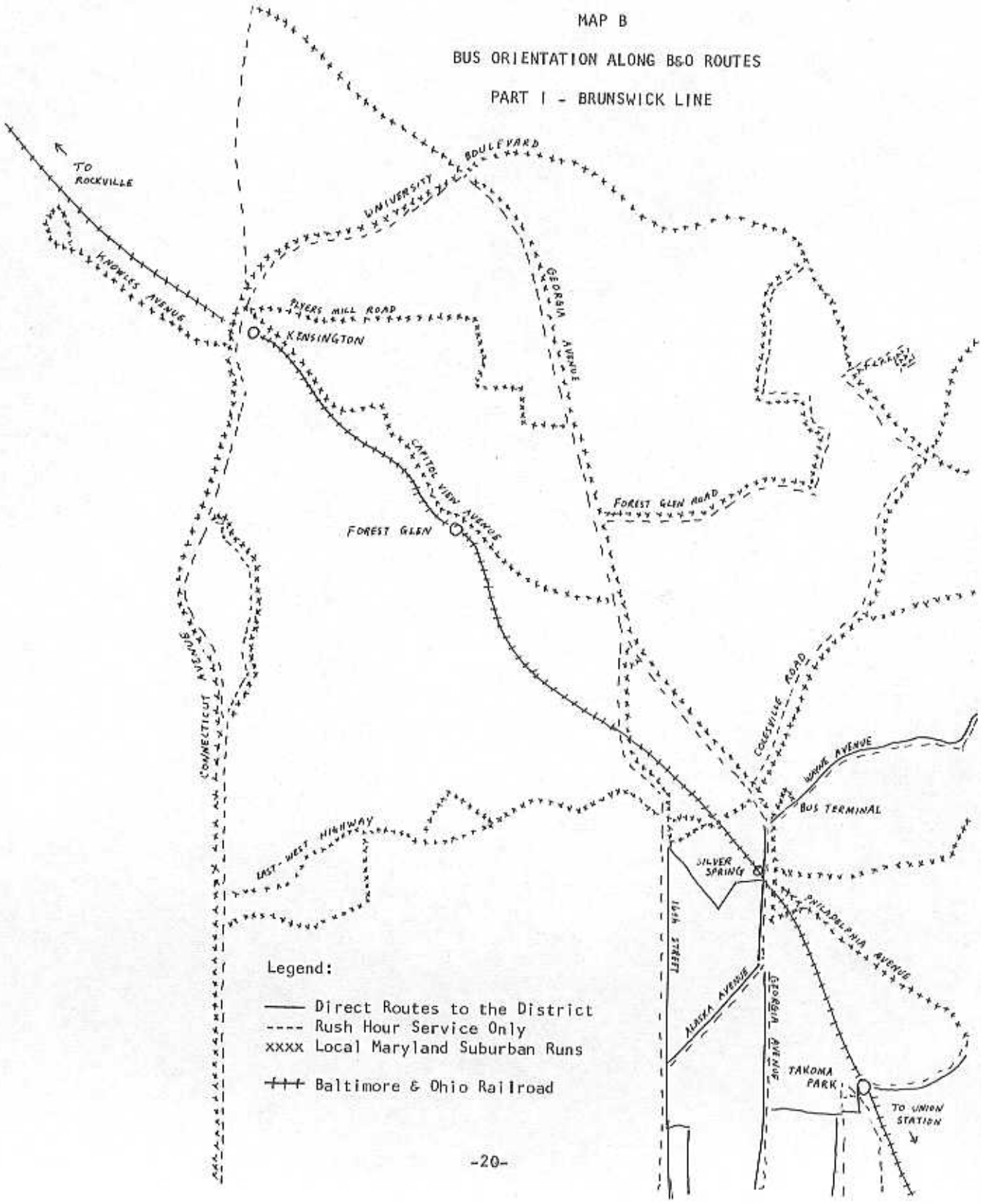
Laurel & South,	work trips.....	702
Baltimore, St Denis.....		153
Elk Ridge, Jessup.....		20..Total...875

At present, the line's ridership is averaging slightly under 220 passengers each way who are originating in the Laurel-Washington segment. The maximum forecast of 1,000 was based on the possibility that the service to L'Enfant Plaza would cause major shifts in modal approach. This latter forecast cannot be said to have unquestioned justification. It is based on certain probabilities.

MAP B

BUS ORIENTATION ALONG B&O ROUTES

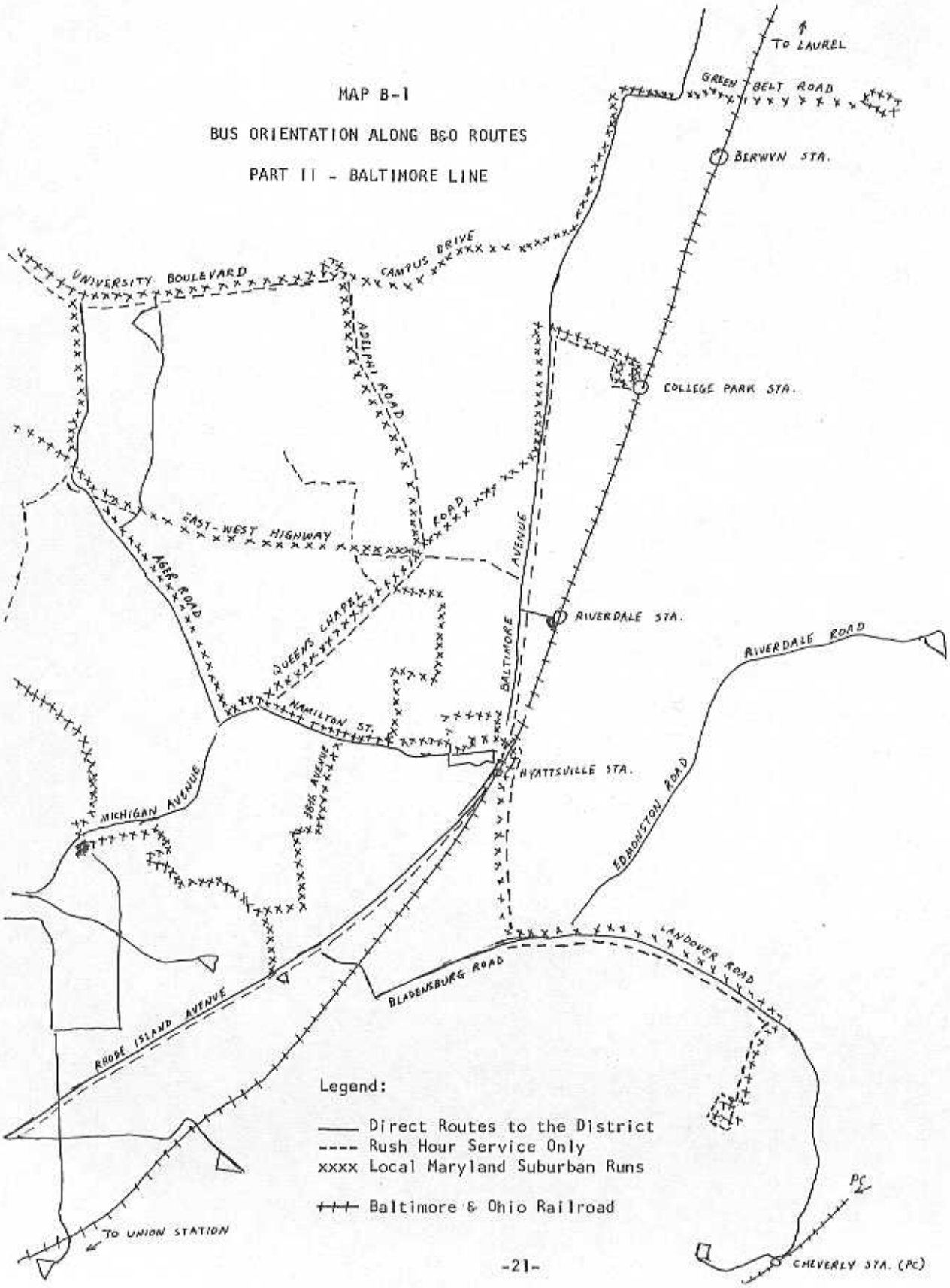
PART I - BRUNSWICK LINE



MAP B-1

BUS ORIENTATION ALONG B&O ROUTES

PART II - BALTIMORE LINE



Work Trips to Washington, D.C. Including L'Enfant Plaza (Continued)

Penn Central Railroad Baltimore Line, no reverse...1,400 to 2,250 (range)

Add 255 miscellaneous trips to 1,400 = 1,655 base

The composition of the base forecast is:

Odenton and South, work trips.....	1,075	
Frederick Road & Halethorpe ".....	35	
Edmondson Ave., Baltimore ".....	100	
Baltimore ".....	190	
Miscl Trips, Odenton and South.....	255	...Total 1,655

The present service is provided by two way-stopping commuter trains, each of which makes a round trip on weekdays.

If the Baltimore & Ohio Baltimore Line service were to be dropped, the increment to Penn Central would be about 175 riders each way on weekdays.

The gradual shift to Metroliners between Baltimore and Washington together with the Amtrak elimination of train 154 (5pm from Washington) as a main line express to Odenton and Edmondson Avenue will throw several hundred more passengers per day to a commuter service if and when it is established.

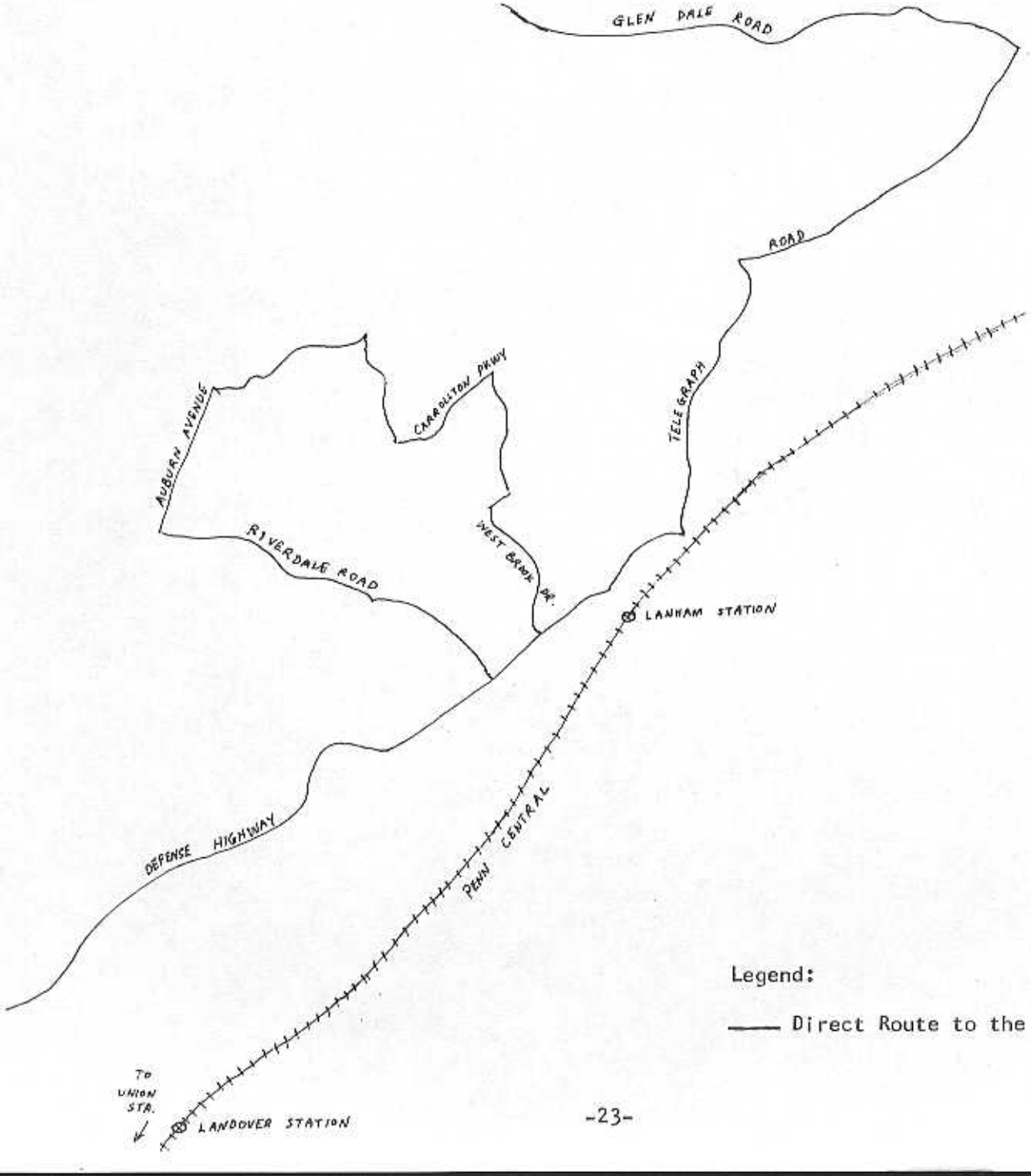
Maximizing of local ridership would require installation of substantial parking space at Bowie, Seabrook and Landover (or reasonable equivalent to Landover). Entry to the proposed new L'Enfant Plaza Station in Washington should be a major drawing card.

Bus penetration into Penn Central rider origin territory is considerably less than that into Baltimore & Ohio Baltimore Line areas. Schedules are slow, rush hour running times from Lanham to Farragut Square are about an hour. See Map B-2, page 23.

The estimated potential, considering all factors, is in the 3,200 to 5,500 range round trip (1,600 to 2,750 range each way).

MAP B-2

BUS ORIENTATION ALONG PENN CENTRAL



Legend:

—— Direct Route to the District

RF&P
SR

PARTIAL BREAKDOWN OF FORECAST DETAIL, BY LINE
SOUTH

The forecasts are keyed to the Washington Metropolitan Area Map (showing numbered origin districts) prepared by the Air Survey Corp. of Reston, Va. in 1968 for the Metropolitan Washington Council of Governments. The base map is too large to be redrawn to fit a standard report page.

Rider Origin District	Boarding Station	To Alexandria	To Crystal Cy	To L'Enfant	To Union Sta.	Work Total	Railroad(s)	Notes
231 Crystal City Eastern Half	Crystal City	--	--	17	3	20	RF&P/SR	
232 Crys Cy(West)	Crystal City	--	--	100	55	155	RF&P/SR	
341 Alexandria	Crys Cy/Alex	--	--	29	33	62	RF&P/SR	Heavy bus comp.
342 Alex W. of RR	Crys Cy/Alex	--	--	53	62	115	RF&P/SR	Heavy bus comp.
541 Belle Haven	Alexandria	--	2	31	10	43	RF&P/SR	Heavy bus comp.
551 S to Ft Hunt	Alexandria	--	41	226	78	345	RF&P/SR	Drive to Alex.
442 Cameron	Alexandria	--	10	173	10	193	RF&P/SR	Shirley comp.
The extent of discount from known work trips to rail-susceptible areas for 551 and 442 is severe. Trips to rail-served areas from 551 now exceed 4,500 daily; from 442, they are about 5,500.								
452 Bren Mar Pk	Springfield	--	10	34	7	51	SR	Shirley comp.
453 Edsall Park Clearfield	Springfield, Backlick Rd	--	18	90	22	130	SR	Shirley comp.
552 Franconia and South	Franconia Newington (?)	--	90	299	57	446	RF&P	Some Shirley
553 Springfield	Franc/Backlick	12	36	304	32	384	50% Ea.	Some Shirley
653 S of Burke	Burke/Franconia	7	4	68	12	91	50% Ea.	
654 S of Fairfax	Burke/Fairfax	9	33	134	41	217	SR	
554 Fairfax Hills	Burke/Backlick	4	7	87	7	105	SR	Heavy bus comp.
651 Ft Belvoir	Newington/Franc.	4	12	60	10	86	RF&P	
751 Belmont Bay	Newington/Franc.	1	2	17	2	22	RF&P	(estimates only)
655 Fairfax City	Fairfax/Burke	4	17	7	13	41	SR	Heavy discount
753-754 Clifton	Clifton/Fairfax	2	9	34	10	55	SR	(estimates only)
755 N of Manassas	Manassas/Clif/Fair	2	12	48	4	66	SR	
771 Woodbridge	Woodbridge	15	35	280	18	348	RF&P	
773 Dale City to Manassas	Woodbr/Manassas	8	11	105	42	166	2/3SR, 1/3RF&P	
774 Manassas	Manassas	10	15	119	33	177	SR	
Quantico, Dumfries	Quantico	4	6	68	17	95	RF&P	No COG data
	TOTALS	82	370	2,383	578	3,413		

Add 232 reverse movement to RF&P; 115 to SR for grand total of 3,760. See Summary Page for Off-Peak.

2607 - RF&P
+ 232
2839

NORTHWEST B&O

Rider Origin District	Boarding Station	To Union Sta.	To L'Enfant	To Crystal Cy	Work Total	Railroad	Notes
Districts 304,305,416 University and Takoma Park area with more than 7,500 commuters and one-third indicated transit usage not counted into rail potential. Journey too short, stations inadequate.							
415 Silver Spring	Silver Spring	55	51	8	114	B&O	Bruns Might be far more
414 Woodside Knolls	Silver Spring	35	82	20	137	B&O	" Not good location
515 Cameron Hts	Silver Spring	87	128	13	228	B&O	"
516 Four Corners	Silver Spring	44	22	7	73	B&O	" Discount for distance
514 Kensington Forest Glen	Forest Glen Kensington	53	107	6	166	B&O	" Parking critical
513 Kensington Wheaton	Kens. Randolph Rd, Garrett Pk	61	31	22	114	B&O	"
615 N of Wheaton	Kens. S. Sprg.	17	34	3	54	B&O	" Too far for good draw
613 Randolph Farms	Randolph Road	53	107	12	172	B&O	" Need Rand. Rd. Station
614 Rockville & N. Gaithersburg	Rockville & RRd	125	143	14	282	B&O	" Good potential
	Gaithersburg	89	133	4	226	B&O	" (estimates only, No COG)
	TOTALS	619	838	109	1,566		
ADD	way (local) riders				50		
	Brunswick - Germantown				115		
	Reverse				200		
	Off-peak				304		Total = 2,235 (one-way) 4,470 rd.

Notes: If station locations were better sited with respect to access roads and substantial parking were to be made available, the totals quoted could rise markedly. If the service is inaugurated, a long-range program of station development should be undertaken on a gradual, experimental basis.

NORTHEAST

Rider Origin District	Boarding Station	To Union Sta.	To L'Enfant	To Crystal Cy	Work Total	Railroad	Notes
According to the forecasting methodology employed for other lines, districts 422 and 423 which straddle the Baltimore Line of the B&O between Mt. Rainier and Bladensburg on the south and College Park on the north should produce 355 riders to Union Station; 272 riders to L'Enfant Plaza; 58 riders to Crystal City; for a total of 685 plus 27 non-commuter - grand total 712. Because of the heavy bus networking in the area, the freer moving arteries than to the Northwest, and the general proximity to work areas (4 to 9 miles with majority in lesser distance brackets), the maximum probable use is estimated to be 389 with varying distribution between College Park, Riverdale and Hyattsville. (389 work)							
422 District N to)	Hyattsville						
423 College Park)	Riverdale						
	College Park	233	113	43	389	B&O Balt.	See above
523 Greenbelt	Berwyn	25	17	9	51	B&O "	Reopen Beltsville ?
521 Beltsville	Berwyn	25	32	5	62	B&O "	Reopen Beltsville ?
621 Beltsville to Laurel W of RR	Laurel	90	36	1	127	B&O "	Reopen Beltsville ?
623 Beltsville to Laurel E of RR	Laurel	36	36	1	73	B&O "	Reopen Beltsville ?
	TOTALS	409	234	59	702		
	ADD Baltimore, St Denis				153		
	Elk Ridge, Jessup				20		
	Reverse				0		
	Off-Peak				0	Total = 875 one way (1,750 rd)	

Notes: The summarized forecastpage indicates an additional possible 125 riders. This add-on could include non-commuter type usage plus any possible increases because of adding L'Enfant Plaza to stations Baltimore area people could travel to. This add-on is possible but not too probable. The allowances for districts 422 and 423 may have been too generous despite the discounts taken. These districts' present travel to the District is approaching 12,000 per day; the present daily rail use from Hyattsville and Riverdale is less than 35 total.

Only with the establishment of substantial low-cost parking facilities and the addition of a fourth train could the market be expanded to begin to approach the above-forecast levels. This could prove to be an expensive service to establish and operate.

NORTHEAST PC

Rider Origin District	Boarding Station	To Union Sta.	To L'Enfant	To Crystal Cy	Work Total	Railroad	Notes
424 Cheverly to Carrolton W of RR	Landover Cheverly	168	79	7	254	PC	
425 Seat Pleasant, Palmer Park	Landover Cheverly	237	97	24	358	PC	
524 Seabrook	Seabrook Lanham	90	71	7	168	PC	
525 Glenarden	Seabrook Lanham	11	23	1	35	PC	Heavy discount
624 Bowie, Belair	Bowie	126	49	34	209	PC	
	TOTALS	632	319	73	1,024		

ADD	Odenton	51	Could grow fast
	Frederick Road and Halethorpe	35	
	Edmondson Ave., Baltimore	100	
	Baltimore	90	
	Miscellaneous trips Odenton & So.	255	Total 1,555 (3,110 per day)

A through connection, without change, to L'Enfant Plaza should substantially increase ridership if parking were to be available. A Bowie - Washington shuttle would help more. Aid would be required from the City of Bowie to set up a large enough parking area.

See forecast summary page for details on other ridership totals.

Supplementary Note: Raise Baltimore to 190 and totals to 1,655 (3,310 per day) - immediate effect of May 1 Amtrak service changes since April, 1971 estimate compilation.

Part III - Other Background Information

New Work Locations; Reverse Movement Trends

There are a substantial number of high employment suburban work locations being developed outside the perimeters of the District of Columbia. Considering only those installations near rail lines, perhaps the most concentrated and the most accessible complex is that at Crystal City, Virginia. Nearby Washington National Airport also is a major employer. Other large centers have opened or are opening in the Rockville, Maryland area near the Brunswick Line of the Baltimore & Ohio; several also are located in the land strip between the Baltimore Lines of the Baltimore & Ohio and Penn Central Railroads.

Past experience for other cities has been that such decentralized areas' executive and middle-group office personnel generally adjust their home locations and commuting patterns to the new installations in such a manner that little if any rail commuting could or would take place. There always are some exceptions it should be noted. Sizable proportions of the clerical and back-up staff more frequently cannot afford to live in suburbia and therefore must commute outward from the city. If adequate on-the-scene local transportation can be arranged from rail stations to the outlying campus-type employment centers for such personnel, the opportunities appear to be good for generating a modest amount of reverse ridership of this type. In the New York Metropolitan Area, some employers have been forced to supply private bus service to and from rail stations in order to assure an adequate secretarial and clerical staff.

Accurate forecasts of reverse movement volume potential would not be possible unless a series of office-by-office interviews could be undertaken. COG people movement information has been used as a partial forecast means but it by no means can fill in (quantify) the gaps created by the personnel who would like to undertake suburban employment but lack the means of transportation.

Definite service patterns keyed to the most probable reverse movement demand times have been incorporated in the schedule designs of the trains which could serve Crystal City, Alexandria, Rockville and Gaithersburg.

Movements Across the District of Columbia

The movements onward to Crystal City occurring during commuter peak hours aboard trains approaching the District from the Baltimore and Brunswick Lines can be considered to be largely "across District" trips. The numbers are quantified by Maryland origin point in the detailed forecast chart pages. That portion of such moves taking place between the District and Crystal City would be included in the reverse movement totals for the carrier operating between these points.

Movements from Virginia points to Maryland points cannot be as clearly identified. They would be included in "Union Station" totals for the approach lines' trains and lumped in the estimated reverse totals for the outbound Maryland-destination segment of the trip.

The Shirley Highway

The development of rail ridership forecasts reflects a very sharp discount in the commuter potential for all zones which are subject to major competition from Shirley Busway operations. In such cases, only minimum rail usage has been projected. Generally the rail potential has been set at the 1 to 5% level (principally at the lower end of this range) of known journey-to-work travelers.

The rail ridership forecast allocations represent, essentially, two classes of potential riders:

1. Those who most likely would use the train because of more convenient terminal locations in terms both of origin and destination.

2. Those who would prefer train service to bus.

The fundamental assumption employed was that Shirley Busway service would be the prime mover from and to the areas within which it operates. Map C clearly delineates the neighborhood type of networking of Shirley and related bus routes throughout the pickup areas. The existence of this network should create and maintain a dominant position for bus operations unless possibly unanticipated service deficiencies should otherwise decrease the attractiveness of bus use.

Summary: Present Common Carrier Status of the Journey-to-Work Market

Current figures point to a movement of more than 200,000 people during rush hours into and from the District of Columbia's employment centers. Presently, about 70% of the travel is accomplished by private automobile with public transport accounting for the balance.

The rail share now stands at approximately one-half percent of the total movement and a mere 1.3% of the public transport segment. By comparison, public transport accounts for 90% of the journey-to-work movement in New York, 80% in Chicago, 75% in Philadelphia and 70% in Boston. In descending order of volume of commuters, the ranking of these five cities is: New York, Chicago, Philadelphia, Washington, Boston.

There are two substantial deterrents to maximizing the rail-borne commuter potential at present. One is the railroads' somewhat less than desirable in-city terminal locations coupled with the lack of connecting rapid transit; the other is the lack of fingers, i.e. radial rail networks projecting out to provide access to and from all major suburban residential areas.

In recent years, two electric railroads have been abandoned whose lines entered travel corridors that are of considerable people movement importance today. They were: the Washington & Old Dominion Railroad serving a path including Arlington, Falls Church and Vienna, Va., and the Chesapeake Beach Railway which ran east to Seat Pleasant and Marlboro, Md.

The railroads approaching Washington from the South possess somewhat of a route and mileage disadvantage for shorter-haul commuter journeys (see Map C) since their path, as compared to the more direct Shirley Highway, is that of the bow frame versus the bow string.

The consequence of the lack of comprehensive rail commuter service buildup in past years has been the creation of a suburban dispersal which has not followed development corridors which could be related to rail lines as has been the case in the Chicago, New York and Philadelphia regions. Instead, the general outward trend of development has been toward a circular scatter pattern which has not concentrated itself along clearly defined travel pathways which would have the potential to meet the railroads' basic requirements of a sizable volume of riders having relatively common origins and destinations.

It should be borne in mind that even if the type of suburban dispersal which is occurring is not adequately rail-oriented, it nevertheless would not inhibit the growth of special-route bus services designed primarily around journey-to-work movements. Map C clearly demonstrates this fact.

MAP C

BUS ORIENTATION IN SHIRLEY CORRIDOR

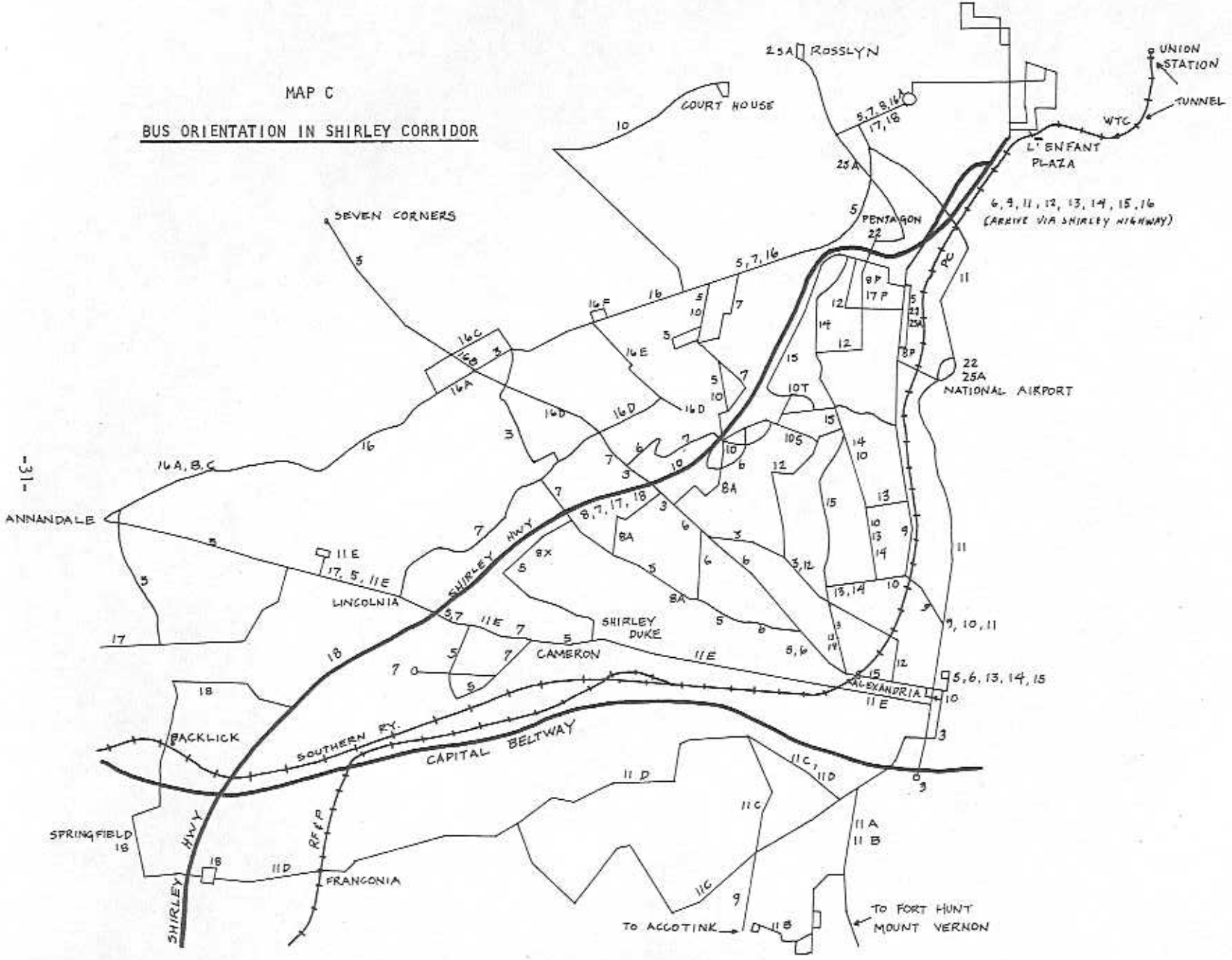


TABLE A

The National Capital Region
Population Projections
1970 - 2000

	1970	1980	1990	2000	Percentage Increase 1970 - 2000
Montgomery County	522,809	759,837	1,066,036	1,345,346	157.3
Prince Georges County	660,567	1,084,646	1,472,604	1,760,995	166.6
Maryland Suburbs	1,183,376	1,844,483	2,538,640	3,106,341	162.5
District of Columbia	756,510	843,839	916,391	1,012,709	33.9
Alexandria City	110,938	144,039	173,467	202,521	82.6
Arlington County	174,284	218,095	267,288	354,851	103.6
Fairfax City	21,970	42,627	66,468	89,279	306.4
Fairfax County	455,021	759,826	1,101,382	1,433,178	215.0
Falls Church	10,772	23,628	34,155	45,816	325.3
Loudoun County	37,150	62,846	91,630	130,006	250.0
Prince William County	111,102	176,146	266,683	387,302	248.6
Virginia Suburbs	921,237	1,397,207	2,001,073	2,642,953	186.9
Metropolitan Area	2,861,123	4,085,529	5,456,104	6,762,003	136.3

Sources: 1970 Census
Hammer, Greene, Siler Associates

TABLE B

The National Capital Region
Employment Projections
1970 - 2000
(Low Projection)

	1970	1980	1990	2000	Percentage Increase 1970 - 2000
Montgomery County	175,350	237,700	316,700	408,850	133.2
Prince Georges County	129,150	182,700	254,800	350,450	171.4
Maryland Suburbs	304,500	420,400	571,500	759,300	149.4
District of Columbia	657,500	796,100	913,800	1,011,100	53.8
Alexandria City	46,200	58,560	68,700	76,300	65.2
Arlington County	100,100	129,460	158,050	177,200	77.0
Fairfax City	6,600	9,810	13,040	16,330	147.4
Fairfax County	93,680	151,060	220,890	299,870	220.1
Falls Church	9,685	12,630	15,540	17,920	85.0
Loudoun County	14,510	26,180	45,540	79,250	446.2
Prince William County	22,425	44,500	79,040	133,130	493.7
Virginia Suburbs	293,200	432,200	600,800	800,000	172.9
Metropolitan Area	1,255,200	1,648,700	2,086,100	2,570,400	104.8

Source: Council of Governments

TABLE C

The National Capital Region
Labor Force Projections
1970 - 2000
(Low Projection)

	1970	1980	1990	2000	Percentage Increase 1970 - 2000
Montgomery County	207,107	299,400	375,500	465,600	124.8
Prince Georges County	300,765	455,600	533,600	617,900	105.4
Maryland Suburbs	507,872	755,000	909,100	1,083,500	113.3
District of Columbia	349,825	356,600	383,000	403,700	15.4
Alexandria City	48,109	54,800	63,600	69,800	45.1
Arlington County	75,013	75,000	87,800	113,800	51.7
Fairfax City	8,492	14,400	20,600	27,400	222.7
Fairfax County	167,526	282,300	360,300	459,000	174.0
Falls Church	6,229	8,900	12,400	17,300	177.7
Loudoun County	16,932	26,000	36,800	49,600	192.9
Prince William County	28,484	51,400	81,300	125,100	339.2
Virginia Suburbs	350,785	512,800	662,800	862,000	145.7
Metropolitan Area	1,208,482	1,624,400	1,954,900	2,349,200	94.4

Source: Hammer, Greene, Siler Associates

TABLE D

The National Capital Region
Projected Rate of Increase in Selected Characteristics
1970 - 2000

Percentage Increase

Subregion	Population	Employment	Labor Force	Households
District of Columbia	33.9%	53.8%	15.4%	18.9%
Maryland Suburbs	162.5%	149.4%	113.3%	174.6%
Virginia Suburbs	186.9%	172.9%	145.7%	203.1%
Metropolitan Area (SMSA Total)	136.3%	104.8%	94.4%	135.3%

Sources: Council of Governments
Hammer, Greene, Siler Associates

TABLE E

The National Capital Region
Percentage Distribution of Labor Force and Employment
1970 - 2000

Subregion	1970 Labor Force	1970 Employment	2000 Labor Force	2000 Employment
District of Columbia	28.9%	52.4%	17.2%	39.3%
Maryland Suburbs	42.0%	24.2%	46.1%	29.5%
Virginia Suburbs	29.0%	23.4%	36.7%	31.1%
Metropolitan Area (SMSA Total)	99.9% *	100.0%	100.0%	99.9% *

* Because of rounding, total does not equal 100%

Sources: Council of Governments
Hammer, Greene, Siler Associates

TABLE F

Selected Projections, 1970 - 2000

Washington, D.C.	1970	1980	1990	2000	Percentage Increase 1970 - 2000
Population	756,510	843,839	916,391	1,012,709	33.9
Employment:					
Government	264,200	327,400	373,000	405,000	53.3
Other	393,300	468,700	540,800	606,100	54.1
Total Employment	657,500	796,100	913,800	1,011,100	53.8
Average Household Income (1968 Dollars)	13,510	18,465	19,315	20,000	48.0
Washington SMSA					
Population	2,861,123	4,085,529	5,456,104	6,762,003	136.3
Employment:					
Government	445,600	594,100	744,100	899,700	101.9
Other	809,600	1,054,600	1,342,000	1,670,700	106.4
Total Employment	1,255,200	1,648,700	2,086,100	2,570,400	104.8
Average Household Income (1968 Dollars)	14,537	20,255	24,335	26,410	81.7

Sources: 1970 Census (1970 Population)
Hammer, Greene, Siler Associates "Low Projections"

TABLE G

Population Projections for the Areas Within the Immediate Influence of the Commuter Rail Lines

Railroad	Area Location	Regional Development Guide 1960	1970	1980	HGS/RDG Factor	Revised 1970 x f	1980 x f
Rich. Fred. & Potomac	Alexandria County	69,000	96,700	108,000	0.8172	79,000	88,300
	Fairfax County	57,600	87,000	123,600	1.3843	120,400	171,100
	Total	126,600	183,700	231,600		199,400	259,400
	% Change over 1960					57.5	104.9
Southern Ry.	Alexandria County	69,000	96,700	108,000	0.8172	79,000	88,300
	Fairfax County	51,600	97,500	140,600	1.3843	135,000	194,600
	Total	120,600	194,200	248,600		214,000	282,900
	% Change over 1960					77.4	134.6
Balt. & Ohio Brunswick Line	Prince Georges County	8,500	12,700	15,100	1.4726	18,700	22,200
	Montgomery County	177,000	254,500	318,700	1.2627	321,400	402,400
	Total	185,500	267,200	333,800		340,100	424,600
	% Change over 1960					83.3	128.9
Balt. & Ohio Baltimore Line	Prince Georges County	93,400	156,300	201,900	1.4726	230,200	297,300
	% Change over 1960					146.5	218.3
Penn Central	Prince Georges County	60,900	106,000	133,000	1.4726	156,100	195,900
	% Change over 1960					156.3	221.7

All numbers rounded to nearest 100

TABLE H

District of Columbia Employment
Central Business District
1970

Zone	District	Federal	Private	Total	1971 Estimated
34	76	-	57	133	-
35	-	-	15	15	-
36	2,526	589	33	3,148	5,000
37	835	222	443	1,500	2,100
38	-	6,967	167	7,134	8,800
43	5	-	32	37	1,000
51	214	946	2,412	3,572	7,900
52	681	490	2,542	3,713	7,130
53	1,372	586	293	2,251	3,890
54	34	1,083	8,543	9,660	11,170
55	419	1,077	16,971	18,467	19,760
56 - 59	740	21,855	7	22,602	23,500
61	-	-	1,838	1,838	5,820
62	391	10	2,212	2,613	4,960
63	-	5,007	6,205	11,212	12,150
64	-	-	208	208	320
65	65	2,186	2,336	4,587	3,930
66	383	1,860	11,829	14,072	13,370
71	-	-	-	-	-
72	-	1,583	-	1,583	1,200
73	-	1,848	1,227	3,075	4,300
74	-	7,164	1,265	8,429	9,400
75	-	9,905	4,641	14,546	11,800
76	-	11,808	274	12,082	9,910
77	5	422	2,257	2,684	4,050
81	29	181	6,181	6,391	6,700
82	-	3,322	11,184	14,506	14,100
83	-	510	4,443	4,953	3,450
84	34	1,535	12,890	14,459	12,000
85	90	1,604	11,327	13,021	12,200
86	-	36	4,051	4,087	6,400
87	15	3,528	8,176	11,719	5,700
88	17	-	1,606	1,623	2,040
89	-	-	290	290	500
TOTAL	7,931	86,324	126,255	220,510	234,460

Source: District of Columbia Motor Vehicle Parking Agency

Boundaries of Central Business District: (See Map A for Zones)

North	Massachusetts Avenue
East	Second Street, NW
South	Constitution Avenue
West	Twenty Third Street

CHAPTER III

OPERATIONAL STATUS OF THE RAILROADS

CHAPTER III

OPERATIONAL STATUS OF THE RAILROADS

Introduction

Ascertainment of the present operational status of the railroads required that extensive field checks be made of the various proposed rail commuter routes. The principal objective of the field trips was to determine such factors as:

The railroads' operational capabilities

The railroads' operational problems

Trackage-related facilities either available or required

Station needs; station potential

The inspections covered not only the actual rail routes concerned but also, to the extent required, an examination of adjoining yard operations. Throughout the course of the work, the railroad companies were uniformly cooperative in arranging field trips, supplying details of operations, and furnishing the back-up materials and observations required to verify the nature of the problems.

Trackage Segments Inspected and Studied

Five principal trackage segments have been under consideration either for installation of, expansion of, or contraction of rail commuter operations. All were carefully inspected. They are:

(1) Baltimore & Ohio Metropolitan Branch (called "Brunswick Line" in the text) - Washington to Gaithersburg, 21 miles; Brunswick, Md. 49 miles; and Martinsburg, W. Va., 73 miles.

(2) Baltimore & Ohio Washington Branch (called "Baltimore Line" in the text) - Washington to Laurel, Md., 18 miles and Baltimore, Camden Station, 37 miles.

(3) Penn Central Chesapeake Division Main Line (called "Baltimore Line" in the text) - Washington to Bowie, Md., 15.3 miles and Penn Central Station, Baltimore, 40 miles.

(4) Richmond, Fredericksburg & Potomac Main Line to Woodbridge, Va., 24.1 miles and Quantico, 34.7 miles.

(5) Southern Railway Main Line - Washington to Backlick Road (Springfield, Va.) 15.2 miles and Manassas, 32.6 miles.

Considering Baltimore, Brunswick, Manassas and Quantico as the outer limits for the proposed commuter operations, the total route mileage under consideration would be almost 154.

Output Desired from the Field Work; An Important Observation

An important facet of the field study's examination and consideration of the railroads' operating patterns and associated physical problems was the ascertainment of their current trackage throughput capabilities, particularly at peak commuter train demand times.

The steps necessary for determination of track capacity required inclusion of a detailed examination of Washington Union Station trackage. They also required the evaluation of the impact of Potomac Yard freight operations at various potential trouble spots both in the vicinity of the Yard and upon its approaches.

One key observation, critical to the viability of the present commuter service proposals, became quite apparent at an early stage in the conduct of the field work. The effective throughput capacity of the majority of routes studied definitely has declined in recent years. This reduction in flexibility has occurred despite a substantial decrease in the number of through-train movements, both passenger and freight, during the past decade.

Why Has the Effective Trackage Throughput Capacity Diminished?

Subsequent to the major decline of passenger train operations, the railroad companies obviously have reexamined the availability periods of through running track facilities in order to increase their productive utilization. The guiding forces were certain changes in the fundamental nature of freight train make-up and operation, particularly as related to serving metropolitan areas.

The growth of piggyback which requires cars of double the normal length demanded special new terminals and greatly augmented track footage for train make-up. The increasing shift of industrial traffic from downtown freight sidings, which could be switched from already-existing service tracks, to suburban industrial parks lacking the desirable network of expensive service tracks, further added to the requirements for substantial new capital outlays for changed facilities.

Accordingly, where present greatly lowered through train densities would permit it, the new specialized freight operations have been making use, during otherwise idle periods, of certain main line track segments. These usages include: the assembly (or break-up) of piggyback trains, supply of relief trackage for putting together long road freight trains, and temporary main-track parking for local freight trains serving the new, restricted trackage suburban industrial center complexes. Considerable use also is made, where applicable, of main running tracks to help accommodate the volume of switching required for major new assembly plants such as those for automobiles.

The net effect of this retailoring of operations schematics has been to convert track utilization, especially in nearby suburban areas, to a new type of non-moving trackage occupancy pattern for hours at a time. On two routes, the attempt to squeeze in a pattern of commuter trains could cause serious disruption of freight service activities.

Can the Needed Trackage Capacity be Restored?

Restoration of equivalent prior years' passenger train throughput capability probably could be accomplished, under most circumstances, if sufficient funds were available. There is a definite question whether the magnitude of capital outlays required to construct runaround tracks and signalling changes for the two most affected routes would be compatible with the economics of the indicated ridership and revenue potential. In the case of the Southern Railway main line and the Baltimore & Ohio Baltimore line, there probably would be minimum justification unless compelling social factors, rather than economic, should make the services necessary.

The Field Inspection

Baltimore & Ohio Metropolitan Branch

This is a double track line between Washington, Gaithersburg, 21 miles (outer limit of volume commuter ridership), Brunswick, 49 miles, and Martinsburg, 73 miles. The maximum speeds permitted in unrestricted territory are 70 mph for passenger trains. Single car Budd RDC passenger trains must reduce speed to 30 mph over each of 7 grade crossings between Forest Glen and Gaithersburg plus Chestnut Avenue on the west side of Gaithersburg.

Three passenger train round trips currently are operated in the territory between Brunswick and Washington during commuter demand times. Two of the three pairs of commuter trains are in Brunswick-Washington service, the third pair runs between Martinsburg and Washington. The Martinsburg train makes a 10-minute stop at Brunswick, coming east, to add a car. No commuter trains operate on this line during weekends or holidays.

Between Washington and Gaithersburg there are 8 intermediate stops; between Gaithersburg and Brunswick, 6. There is an excellent station building at Silver Spring; fair structures at Rockville, Gaithersburg and Brunswick. Parking at present is not too great a problem except at Silver Spring (too few spaces), Kensington (lack of land and street availability), and at Rockville, insufficient spaces.

Practically all station platforms except at the larger stops would require lengthening and rehabilitation; better shelters also would be required. The existing parking facilities are largely rudimentary in condition and generally lack both paving and a method of efficient layout. A neat, small facility exists at Garrett Park. A major expansion in parking facilities would be required if service were to be improved and new riders sought.

Trailing point crossovers are installed at Silver Spring and Kensington, there is a facing point crossover at Georgetown Junction (Woodside), facing and trailing point crossovers at Rockville and a trailing point crossover at Gaithersburg. All crossovers are controlled by electric time delay locks; the crossover at Gaithersburg requires 8 minutes' wait before a movement can be made from #2 track (westbound main) backward onto #1 track (eastbound main).

The most serious operational problem exists in the area between QN Tower and University Station, about nine-tenths of a mile. QN Tower is located at the westerly end of the connector loop to the Baltimore Line. It handles freight trains coming around this loop plus freight trains entering or leaving nearby Eckington Yard. Certain through freight trains between Baltimore and the West stop on the main tracks to set off Washington area destined freight cars. A new pair of crossover(double) switches should be installed between tracks #1 and #2 west of University Station so as to enable passenger trains to run around the freight trains. Reverse signalling would be required between QN and the double crossovers.

Rearrangement of signalling at Gaithersburg would be required if this station is to be the turnaround point for either peak or off-peak commuter trains. The storage siding south and west of the station also would need rehabilitation.

Traffic congestion i.e. interference by other trains, is not too much of a problem over most of the route during regular commuter hours. Care would have to be exercised during off-peak periods to schedule a type of operation which could provide sufficient open slots both for through freight and local freight train movements.

Consideration should be given to dropping the following stations: (mileages given are distance from Washington)

University, 3 miles	Boyd, 29 miles
Takoma Park 6 miles	Buck Lodge, 30 miles
Washington Grove 20 miles	Barnesville, 33 miles

A new station should be considered at Randolph Road which is between Garrett Park, 12 miles and Rockville, 16 miles.

Baltimore & Ohio Washington Branch

This is a double track line between Washington, Laurel, 18 miles, and Camden Station, Baltimore, 37 miles. There are numerous speed restrictions. In unrestricted territory, passenger train speeds of 70 mph are authorized. Single car Budd RDC passenger trains must reduce speed to 30 mph over each of five street-grade crossings in Baltimore plus nine additional grade crossings between Hanover and Hyattsville.

Four passenger train round trips are operated on weekdays and one on weekends and holidays. Three round trips are in commuter service to and from Washington; one round trip handles commuters to and from Baltimore.

Between Baltimore and Washington there are nine intermediate station stops of which only four provide appreciable rider volume. Open station buildings are maintained at St Denis and Laurel. Practically all platform facilities are in need both of rehabilitation and lengthening if service were to be stepped up. Shelters also would have to be constructed. Parking space availability generally is satisfactory for the present small ridership but would require major expansion and face-lifting if new ridership were to be solicited; a new Beltsville station and parking facility also would be necessary.

The line is an older-type operation which generally lacks the signal spacing and the remote-controlled power crossovers needed to achieve peak throughput capacity. A considerable volume of freight movement takes place during the daytime; open slots for passenger trains could not be assured except during commuter rush hours. Any attempt to establish a substantial off-peak operation would run into serious problems of dependability.

All the present crossovers must be manually operated and have 5 to 8 minute time delay locks except for the interlocking at Alexandria Junction (just north of Hyattsville) which is controlled by JD Tower at Riverdale. Except at Dorsey and Halethorpe, the manually-thrown crossovers are of the trailing point type, i.e. a train must back through them to get over to the parallel track.

Between Fort Meade Junction, 21 miles, and Jessup, 23 miles, new power crossover installations and control signalling are being installed to permit freight trains to switch a major automobile assembly plant located to the east of this trackage. It is expected that the volume and timing of this switching activity, which must be fairly constant in order to care for the flow of assembly work, will pose additional difficult problems for any attempts to schedule midday passenger train runs through this area.

Another point where considerable interference is caused by freight trains is Alexandria Junction. Twelve or more freight movements per day cross over the passenger mains to turn onto the bypass connector route to Potomac Yard. Trains headed west (by timetable direction) must cross both passenger mains; also trains from Baltimore to Potomac Yard. Lengthy tie-ups can and do occur here.

Penn Central Chesapeake Division Main Line

This is a high speed double track line between Washington, Bowie, 15.3 miles, and Penn Central Station, Baltimore, 40 miles. Tracks 2 (northward main) and 3 (southward main) are designed and signalled for 125 mph running in unrestricted zones. The speed limit has been reduced to 100 mph recently. These speeds apply to Metroliner trains with standard passenger trains' ratings being set at somewhat lesser levels. A third track (track #1) parallels the easterly side of the right of way between Landover, 7 miles, and Bowie, 15.3 miles. This is a connector lead to and from the Magruder Branch which swings off at Landover to circle the east side of Washington enroute to Long Bridge and Potomac Yard. Track #1 is in just fair condition and has a 40 mph speed limit.

Present schedules call for 46 passenger trains per day over this stretch plus two additional in the winter season. Four of the trains (two round trips) are in local commuter service. In addition, there are between 14 and 20 freight movements per day.

Between Baltimore and Washington there are 10 intermediate stops employed for commuter service, 4 of which have very little ridership. Certain through trains stop at Capital Beltway, a station which is not used by the commuter trains. There are no station facilities except at Odenton, 22.2 miles. Practically all platforms need considerable improvement plus installation of shelter facilities. Sufficient parking space is generally available for the movements now prevailing but major expansion and rehabilitation would be required if rider volumes were to be increased. Bowie's station requires better street access or relocation depending on land availability.

Computer studies recently were undertaken in connection with the Friendship Airport Connector studies to determine if shuttle trains could be run every 15 minutes on the line. The advice concerning the possibilities varies greatly depending upon the source. A prime need to make the line more useful to the commuter group would be a turnback facility at Bowie. A holding track and turnouts to it would have to be constructed. Presently scheduled northward departures from Washington to New York @6:15am (Silver Meteor), 6:55am, 7:20am (Champion), 7:30am (Metroliner), 8:30am (Metroliner) and 8:40am would create a tight situation in planning reverse movement equipment turns to Bowie during the morning commuter rush. Southward, except for freight movements, there is little activity at morning commuter hours. The through Florida trains frequently are somewhat off schedule resulting in a compounding of the difficulties. The evening pattern would be rather tight in both directions for turnaround operations.

It should be noted that passenger and freight train densities on this line were about double the present count as recently as 1950.

The line is electrified to Union Station, Washington and, via the Magruder Branch, to Potomac Yard, Virginia. There is a break in the electrification on the passenger route for one mile in Washington - the First Street Tunnel from Union Station to Virginia Tower. At present, Penn Central would have no additional electrically-propelled passenger equipment available for use if service should be expanded. The equipment situation is quite critical.

Richmond, Fredericksburg & Potomac Main Line

Joint Service Trackage Route Southward from Union Station

Between Union Station and RO Tower, 3.5 miles, two different operators own and maintain the trackage. From Union Station to Virginia Tower, about 1 mile, the track through the First Street Tunnel under Capitol Hill is owned by the Washington Terminal Company. It is double-track, reverse-signalled and non-electrified.

At Virginia Tower, the Magruder Branch of Penn Central is joined. This branch is the freight bypass around Washington for both the Penn Central and the Baltimore & Ohio. The trackage is electrified between Landover, Md., Virginia Tower and Potomac Yard. Penn Central ownership of the passenger segment of the route extends for 2.5 miles between Virginia Tower and RO Tower at the southern end of Long Bridge across the Potomac River. Passenger train speed limits, subject to temporary reductions, are 40 mph between Virginia Tower and the bridge; 45 mph across the bridge.

The busiest trackage segment is between Virginia Tower and RO Tower. This section is jointly used by passenger trains of the RF&P (8 daily in winter, 6 in summer), Southern (8 daily including a pair of mail trains), Chesapeake & Ohio (2 daily). In addition there are up to 24 Penn Central freight movements and 12 Baltimore & Ohio freight movements either to or from Potomac Yard. Some local switching also is handled to the government heating plant located behind the Bureau of Engraving and Printing.

At RO Tower, the southward freight trains enroute to Potomac Yard diverge and pass beneath tracks #2 and #3 the passenger mains. The decline in passenger service has given rise to some consideration by the RF&P of the merits of eliminating the Potomac Yard approach underpass ("duck under") in the interest of improving the utilization of the abutting land. No definite plans have yet been made for such a change which would involve crossing the northward passenger main at level grade.

Opposite L'Enfant Plaza, which is approximately midway between Union Station and RO Tower and is the proposed site for the Southwest Area Railroad Stop, the Penn Central trackage is four wide. This is to allow for the northward approach to and southward exit from the Union Station Tunnel and Magruder Branch connections at Virginia Tower.

Joint passenger train usage of the RF&P tracks by the Southern and Chesapeake & Ohio Railways extends southward from RO Tower, 3.5 miles, to Alexandria Union Station, 8.2 miles, and AF Tower, 9.1 miles where the Southern Railway's main line diverges. This is double track signalled for reverse running.

At North Alexandria, a half mile north of Alexandria Union Station, a lead from Potomac Yard enters northbound passenger main #2. Presently, because of trackage needs to dispatch two fast, scheduled freight trains southward at about 9am each morning, meanwhile receiving a northward arrival, Southern Railway freight train #153 pulls out on and uses northward passenger main #2 for from 40 to 50 minutes during what would be the latter portion of the key commuter train time period. The schedules of both Southern #153 and similarly-timed RF&P #105 must be adhered to since each train networks with connecting and diverging freight trains at key junction points.

Any delay to SR #153 and RF&P #105 would cause a shock wave effect at principal interchange points throughout the major portion of their respective routes to New Orleans and Jacksonville. Altogether, there are 7 scheduled freight train departures southward from Potomac Yard between 6am and 10am. It should be noted that there is a double track freight lead between Potomac Yard and AF Tower. This lead is signalled for two-direction movement. Both tracks could be used simultaneously for southward departures except when necessary to keep one open for northward arrivals.

The freight train interference problem currently does not materially hamper through passenger train operations. Northbound morning passenger trains arriving at Alexandria can use the southward passenger main for their movements. With the exception of a non-passenger carrying Southern Railway mail train, no southward scheduled passenger trains are due through Alexandria, at present, until after 2pm. When and if commuter train service should be installed, the need for accomplishing fast reverse movements would render imperative the requirement for use of both passenger tracks during rush hours.

RF&P Trackage Southward from AF Tower - Sole RF&P Operation

Southward from AF Tower, 9.1 miles, where Southern and Chesapeake & Ohio passenger and freight trains diverge, the RF&P is triple track to a point a mile south of Franconia for a total of 6 miles. The remaining 19.5 miles to Quantico are double track. On the triple track section, track #3, the southward main, track #2, the center main, and track #1, the northward main, are signalled for traffic in both directions. The customary use for track #1 is as an approach and holding track, when necessary, for northward freight trains entering Potomac Yard. Both AF Tower Interlocking and that of RO are remote-controlled from Acca Yard, Richmond.

Total movements over the trackage between AF and Quantico are much less than half of what they were a few years ago. Presently there are 8 passenger trains in winter and 6 in the summer. Freight movements are on the order of 14 to 16 per day including both through and local freight trains. At certain seasons of the year, the number of freight train movements increases slightly.

Remote-controlled power crossovers are located at AF; at the end of triple track 6 miles south of AF; at North Possum Point 23 miles south of AF; and at Possum Point 25 miles south of AF. The first three crossovers are both facing and trailing point; the Possum Point crossover is trailing point only. There also are trailing point, manual-thrown crossovers at Newington Station, 17.8 miles, and at a point several hundred feet south of Quantico Station. These manual crossovers have electric time delay locks. A northward passing track is installed between Possum Point and North Possum Point.

Only three station facilities are available: Union Station in Alexandria, Newington (formerly Accotink), and Quantico. Newington lacks a southward platform. Quantico station is a very modern structure in excellent condition. The Quantico agency recently was closed and the building now is posted for rental. It probably is the most attractive way station in the entire Metropolitan Area. There are three sets of sidings at Quantico which variously could be adapted for holding or storing passenger trains.

Stations would have to be constructed at Crystal City, Franconia Road, and possibly at Van Dorn. The site at Crystal City would permit nothing more than a platform working inward from the west side and a satisfactory shelter. There would be no access for automobile parking other than the pay lots now incorporated within the Crystal City complex. The site at Franconia Road straddles a cut which the railroad occupies as it passes beneath Franconia Road. The station probably would have to be on the westerly side to provide access to tracks #3 and #2. On the easterly side, track#1's primary freight use probably would be a controlling factor. The land sites discussed in WMATA reports for their proposed Franconia facility lie on the east side of the track.

There is no specified parking area at Quantico, at present, other than the limited-time area for cars to wait and meet trains. There does appear to be sufficient land in the vicinity to allow for construction of a good facility.

The Woodbridge location would require considerable local traffic-flow type planning to determine the best siting. This should be more than a station, a major drive-in facility should be planned. The RF&P tracks cross Occoquan Creek on a high bridge, approaching Woodbridge on a right of way which borders, and is east of, U.S. Highway #1. At the north end of Woodbridge, the tracks swing southeast away from the highway. Presently a pair of side tracks are located here for pulpwood loading. This might be the best possible site since the tracks quickly swing well east of Woodbridge, generally on a high and inaccessible fill. Land availability would be somewhat tight unless demolition of old buildings were to be undertaken. Another site which was locally proposed lies north of Occoquan Creek. It would be about three-quarters of a mile north of the nearest-to-Woodbridge site. There are certain advantages in terms of land availability and possible better highway access. Woodbridge, itself, and neighboring communities are spread out for nearly three miles south of the pulpwood track site. Automobile approach would be necessary for any area stop.

The Van Dorn location would be open to question. Approach from the north would be over a level grade crossing of the Southern Railway main line. Blockages at the crossing are both frequent and severe with sufficient interference at commuting times to create serious problems for passengers driving to the RF&P station. The RF&P track is grade separated on a right of way with steep banks and generally poor access for a station which could supply adequate parking. Further consideration would be required since WMATA transit plans envision a future Van Dorn stop.

A Woodbridge location, involving train turnbacks, would require power crossovers to be installed, a holding track, rearrangements in the CTC and signal systems; also telephone communication with the dispatcher in Richmond.

Southern Railway Main Line

The shared portion of Southern's passenger route between Washington and AF Tower, Alexandria, 9.1 miles, was discussed in the RF&P section of this chapter.

The 23.5 miles between AF Tower and Manassas, 32.6 miles from Washington, are double track, CTC-controlled with reverse signalling. In unrestricted territory, the passenger train speed limit is 79 mph.

The average daily train movement through this territory consists of 3 Southern Railway and 1 Chesapeake & Ohio passenger trains in each direction plus a round trip mail and piggyback train on the Southern; 7 scheduled freight trains each way, 5 Southern, 2 Chesapeake & Ohio, plus 2 Southern local freight trains each way. Extra freight trains are operated as needed. In addition, there are a number of switching moves in the area between Van Dorn and the Southern Railway's freight yard in Alexandria.

A few years ago, before local passenger train services were discontinued, there were 6 intermediate stations between Alexandria and Manassas. A manned agency still exists at Fairfax. The locations of all the enroute stops were poor in relation to access roads and the physical position of the stations. There has been no improvement in highway access to these stations in recent years.

There are 5 remote-controlled power crossovers along the track segment under consideration. They are located at CR Tower, 10.6 miles from Washington (1.5 miles west of AF Tower), Edsall, 12.9 miles, Burke, 19.9 miles, Clifton, 26.8 miles, and at Bristow, 36.6 miles (4 miles west of Manassas).

Occupancy of the trackage facilities is at a considerably higher and more prolonged level than the number of scheduled movements might tend to indicate. A new piggyback facility east of Van Dorn Road and south of the main line requires lengthy occupancy of main running tracks both when piggyback cars are being set off into the yard, or are being picked up. There are frequent switching movements between this piggyback yard and both the Southern's downtown freight yard in Alexandria and Potomac Yard. Local freight trains hold main tracks for protracted periods not only as they work sidings near Van Dorn but also at the very busy new Springfield, Va. industrial park.

It is possible to work a limited number of trains around occupied tracks through use of the crossovers. The morning of the field inspection, the northbound Southern Crescent, train 2, made 4 crossovers enroute between Bristow and CR Tower. For a commuter service demanding split-second dependability and turnback scheduling, such moves would be too time-consuming.

Additional problems would be created in trying to work a commuter train fleet, from or for either the Southern or the RF&P, past AF Tower where the two railroads join for the 9.1 mile run to Washington. The average number of movements, of all types, past AF Tower now is on the order of 70 daily.

A number of days' Train Movement Tabulations, as taken from the CTC Graph, were furnished by the Southern Railway for review. A typical track occupancy sample of two of the areas between power crossovers is tabulated below:

Times shown are periods during which the track was occupied. Both segments are for the same day in January, 1971.

CR Tower to Edsall (2.3 mi.)		Edsall to Burke (7.0 mi.)	
Track #2	Track #1	Track #2	Track #1
640-644am	644-722am	644-808am	751-802am
	725-751am		810-820am
819-826am	819-1207pm		837-846am
904-909am		909-1104am	1122-1134am
918-921am		1207-1215pm	
	1258-103pm	103-114pm	
	240-242pm	242-251pm	
	318-322pm		308-318pm
	428-430pm		420-428pm
458-500pm	503-506pm		456-503pm
	702-707pm	500-508pm	
			649-702pm

When the foregoing sample is combined with occupancy in other track segments not shown, the picture becomes one of limited track capacity at best. There are days when total occupancy proportions are even greater; the sample chosen was an average one.

The suggested station stops would be: Backlick Road, Burke, possibly Fairfax, and Manassas. At Backlick Road, the access is poor; most of the land appears to have been sold for other uses since the first plans for a WMATA terminus were developed several years ago. Turns off Backlick Road would be difficult to arrange because of the heavy traffic flow on this four-lane, divided highway. Major study would be required to work out a suitable station site. Throughout the area, the rail trackage swings through a series of gentle reverse curves. For a considerable distance on either side of Backlick Road there would be no spot where a train's engineer would have an unobstructed view of any proposed station area. Due to the Southern's practice of reverse-track running, a passenger train could be on either one of the two tracks when arriving. From a safety standpoint, considerable risk would attach to construction of any station within several thousand feet of Backlick Road, either side. The site is not recommended and, there are no alternatives with equally good highway access.

Fairfax Station is at the foot of a hill in a deep rail cut. Access is across a daily-use freight siding to a small land strip squeezed in between a mill and the depot. There are no facilities for parking. The station lies on a curve, again reducing visibility and raising safety problems if reverse running should be practiced.

Manassas has a good station building with a fair amount of ground to the south which can be converted to parking. Access through the town, by street, presently is both slow and complicated due to a non-coordinated series of stop streets and traffic lights. There presently are

no spare track facilities which could be converted either to train storage tracks or holding tracks. Freight trains for the branch to Front Royal and Harrisonburg require all available track. There are ways to construct the needed facilities but they would be expensive and not well located. The only crossovers in the station area are hand-thrown trailing point with time delay locks.

Washington Union Station

The through tracks which provide a connection between the tunnel under Capitol Hill for trains from the South and trains to the North and West, are located on a lower level at the easterly side of the Terminal. At present, one track is used for parked trash gondolas, either 4 or 5 are allocated for stored equipment for through trains to the South and 2, sometimes, 3 are in use for train arrivals and departures. For the commuter service, at least three tracks would be needed, two of which preferably would be side-by-side.

The degree of track availability should improve after the Amtrak service cuts are effective. Penn Central currently is using lower level tracks for a few of its Washington-New York passenger trains, other than Metroliner types.

An ultimate allocation of four tracks for commuter service would be desirable - three for arrivals and departures and one for holding trains. If possible, commuter operations should be coordinated on lower level tracks, not using any of the upper level stub platform tracks.

A problem is what to do with Penn Central commuter trains since, if self-propelled equipment is to be used, the mile stretch through the tunnel to Virginia Avenue is not electrified. It would be highly desirable to have the tunnel trackage electrified in order to move PC trains onward to L'Enfant Plaza, a potentially key rider-generating stop. If electrification cannot be installed, PC trains may have to transfer their L'Enfant Plaza passengers to other trains which are proceeding to that point. The need for transfers always reduces the ridership potential.

Penn Central can, if willing, operate diesel or turbine powered trains directly to and from L'Enfant Plaza.

Summary

Operationally, the following lines appear to have the capabilities of providing facilities both for peak hour and off-peak rail commuter operations without requiring excessive capital expenditures for developing them:

1. Baltimore & Ohio — Washington - Gaithersburg - Brunswick
2. Penn Central — Washington - Bowie - Baltimore
3. Richmond, Fredericksburg & Potomac — Washington - Woodbridge - Quantico

Serious drawbacks appear to militate against installation of, or stepping up of, commuter operations on:

1. Baltimore & Ohio — Washington - Laurel - Baltimore

   Lack of off-peak capability; lack of capacity for peak hour turnbacks needed to build good service pattern.

2. Southern Railway — Washington - Backlick - Manassas

   Lack of track throughput capacity due to major freight train interference; unsatisfactory physical locations for stations; inherent dangers of operating commuter service under conditions of substantial reverse-track running.

Accomplishment of the desired pattern of service by the three railroads selected (on operational basis) would require solution of two special problems:

1. Development of a way to dispatch Southern's scheduled freight #153 from Potomac Yard each morning without blocking northward RF&P passenger main #2 at North Alexandria.

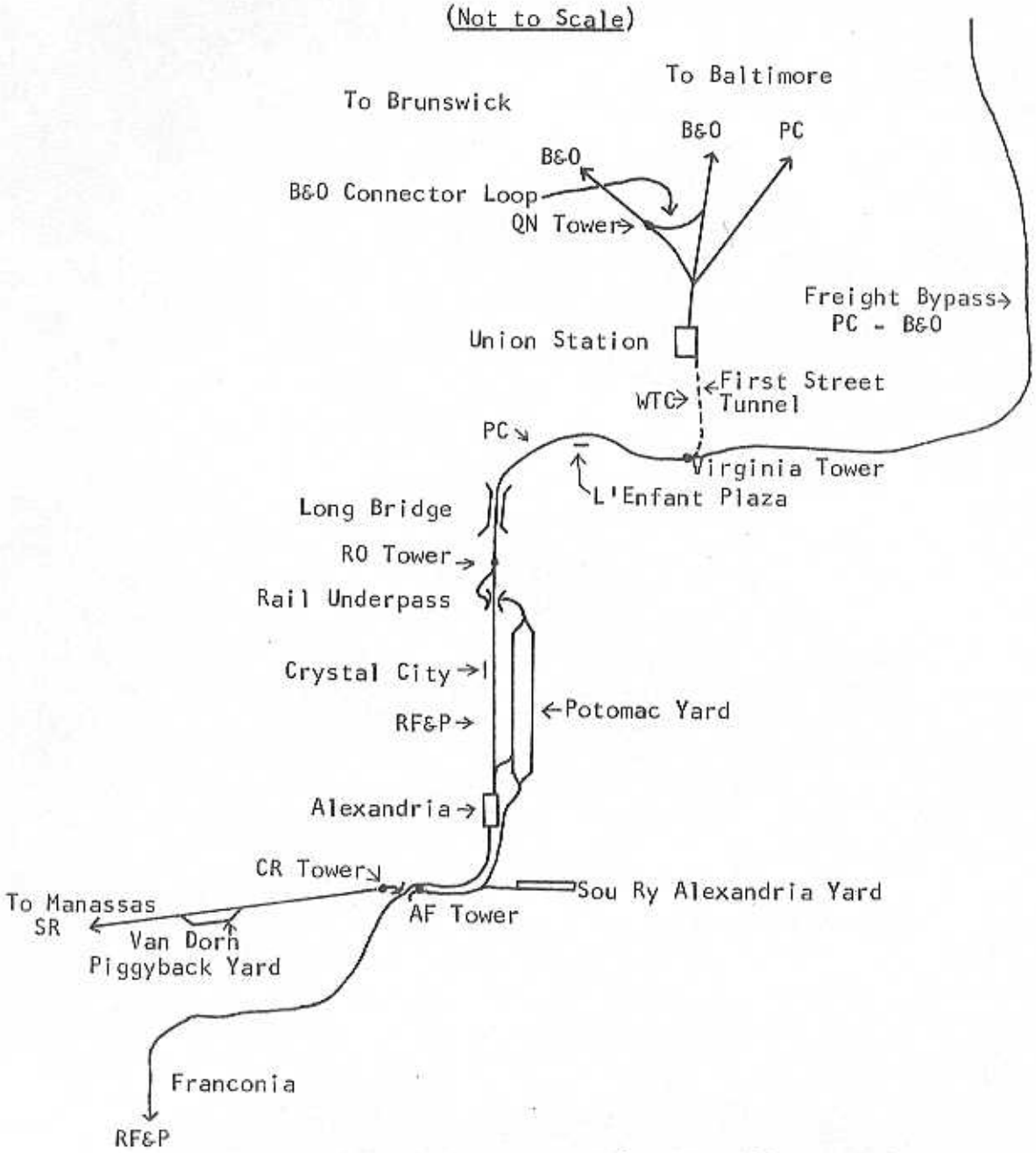
2. Electrification, if possible, of the mile-long passenger train tunnel under Capitol Hill so that Penn Central trains could serve L'Enfant Plaza without the need to transfer passengers at Union Station.

   If electrification were not possible, a speedy turn-back push-pull operation involving either diesel or turbine-powered equipment would be a fundamental requirement for establishing through Penn Central service to and from L'Enfant Plaza.

MAP D

SCHEMATIC - RAILROAD OPERATIONAL FUNCTIONS

(Not to Scale)

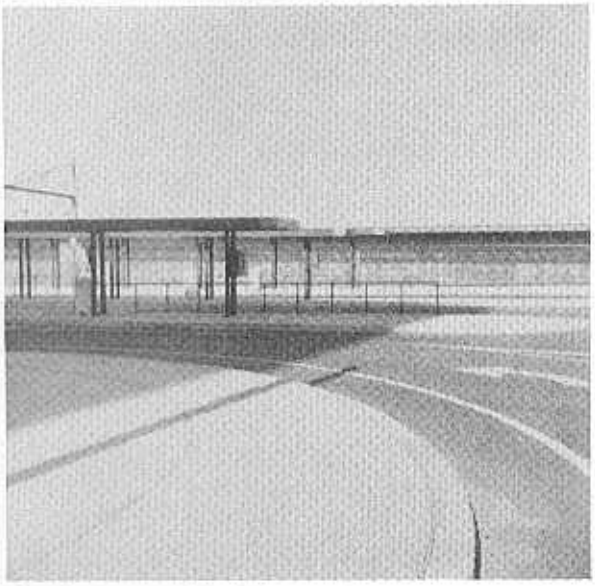


Southward Mileages

Un. Sta - Alexandria	8.2 mi.
Alexandria - AF	.9 mi.
AF Tower - RO Tower	1.6 mi.

Southward Trackage Ownership

First St. Tunnel	Wash. Term. Co.
Va. Tower - RO	Penn Central
RO Tower - AF	Rich. Fred. & Pot.



(1)
L'Enfant Plaza Bus Terminal. PC Railroad Below Slope in Background

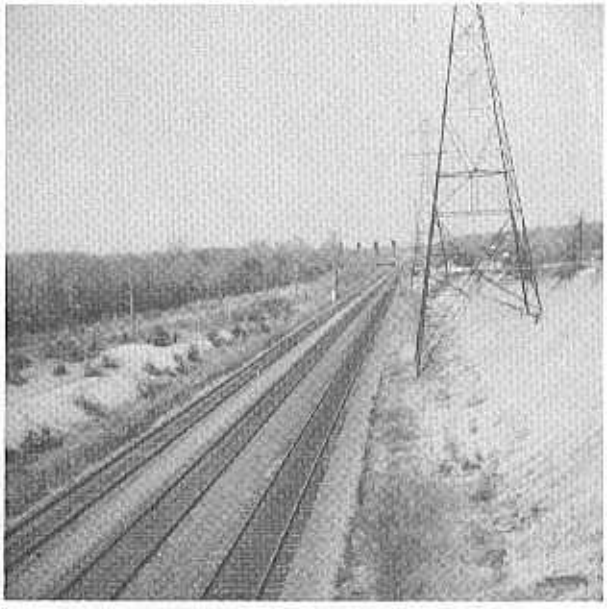
(2)
Crystal City (RF&P) Looking North Possible Station Site

(3)
Roberts Lane, Alexandria (RF&P) Looking West

(4)
Van Dorn (SR) Looking East. Piggyback Yard to Right (Empty at Midday)

(5)

Van Dorn (RF&P) Looking East. Only Possible Station Site on Left



(6)

Franconia (RF&P) North From Highway WMATA Site on Right, Station Left

(7)

Newington (RF&P) Looking North. Formerly Accotink Station

(8)

Beneath Backlick Road (SR) Looking East. Swamp Left, Shop Center Right

(9)

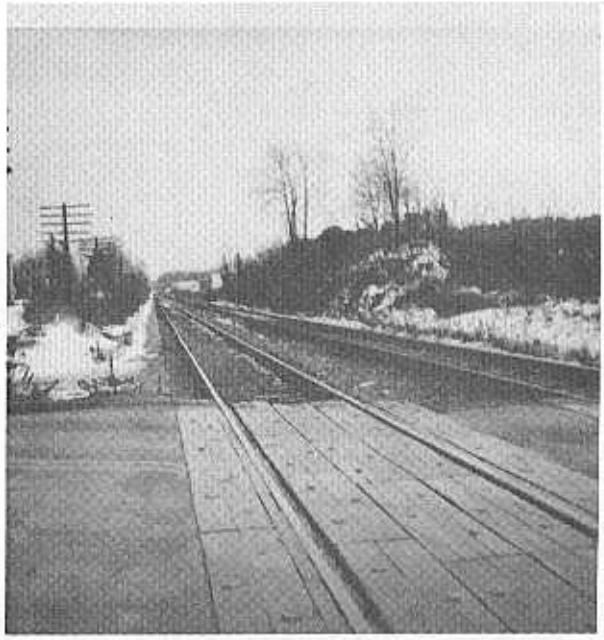
Looking West to Silver Spring Station (B&O) from Georgia Avenue Bridge

(10)

Team Tracks at Silver Spring (B&O). Possible Area for Parking Expansion

(11)

Garrett Park (B&O) Looking East. Limited Parking on Right



(12)

Randolph Road Crossing (B&O) Looking East. Possible New Station Site

(13)
Rockville (B&O) Showing Limited Parking in Rear of Station

(14)
Gaithersburg (B&O) Looking West. Storage Track to Left in Distance

(15)
Present Gaithersburg Parking Facility About 40 Cars

(16)
College Park (B&O) Looking North. Note Short Platforms, No Shelter

CHAPTER IV

THE MODEL

CHAPTER IV

THE MODEL

Introduction, Concepts, Schedule Design Criteria, Schedules, Equipment and Facilities Required, Physical Changes Needed, Use of Union Station

Introduction

The design of the proposed service model, presented in this chapter, provides the median viable density of peak period train service required to inaugurate a satisfactory level of journey-to-work movement by rail. It recognizes the severe scheduling problem created by the narrow time span of the Metropolitan Area's rider peaks - a time span which, by comparison with other cities' rail commuter services, is perhaps the narrowest of all.

The design understandably will be subject to considerable pro or contra discussion concerning not only the orientation of the schedule time slots employed but also because of the inter-railroad nature of the operation specified.

It would not have been possible to develop the relatively full coverage rush hour schedule patterns which are presented if each railroad were to be forced to rely solely upon turnbacks of its own equipment to cover second runs. The interline operation of trains also substantially reduces the scale of equipment purchase which otherwise would have been required for the type of service pattern set forth. From a conceptual standpoint, the across-Metropolitan Region through service link represents a first of its type in commuter transport experimentation. Direct, no-change peak period runs would be furnished in both directions not only to the new L'Enfant Plaza stop but also to such reverse commutation points as Crystal City, Virginia and Rockville, Maryland.

The "pass through" operations at Washington Union Station should afford a practical basis for renegotiation of charges to levels commensurate with the economics of a commuter service.

The Importance of a L'Enfant Plaza Station Location

A fundamental requirement for achieving desirable rail commuter ridership levels would be the addition of an improved commuter-stop station location withing the District of Columbia.

Until the coordinated Metro Service becomes available at Union Station, the locational disabilities of the present single arrival/departure point, Union Station, are presumed to outweigh the majority of advantages that a rail commuter operation otherwise could benefit from.

The maximizing of the Model's ridership and revenues would be substantially dependent upon the establishment of rail service connections to and from a new, centrally located stop in the Southwest Area, L'Enfant Plaza. This stop not only is within walking distance of a growing area of

major employment but also has a special, off-street bus plaza facing the site proposed for the rail stop. Peak hour bus collection and distribution facilities would be available at the doorstep of arriving or departing trains.

A Transit-Type Market Is Not Sought

By contrast with recent years' planning considerations for suburban rail operations in the Washington Metropolitan Area, the Model is not designed to act as a rapid transit substitute. It does not contemplate or arrange for volume movement of people living within a transit radius of the Washington CBD. The principal service areas would begin outside the mass transit zone as outlined by a circular arc encompassing distances equivalent to those to points lying beyond Alexandria and Silver Spring. The review of preliminary COG people movement data, coupled with a careful analysis of employment locations, modal travel time and door-to-door type bus services has led to this decision.

The true fit of the Washington Metropolitan Area rail commuter operation, over the long term, would be as a vitally important outer peripheral feeder to an internal transit system.

The redesign and reconstruction of area rail segments to convert them to high-density, short-haul transit links would be a costly and only partly satisfactory proceeding. The order of magnitude of probable capital outlays and subsequent subsidies could not be justified now that major investments in a Metro System are underway.

Design Criteria for the Model

The present design calls for operating two sets of equipment for each railroad concerned. In effect that means "two crew starts" in the morning and "two crew quits" in the evening. The equipment is recycled as quickly as possible in the morning and evening peak periods to provide the broadest feasible time-span coverage of rush hour movements.

Additional starts could be put on if business expands. They are not suggested for consideration until the rail commuter operation has undergone a reasonable test of time and special needs become known. Each additional start, on a day's use basis, could be calculated to increase operating costs by a quarter million or more dollars per year solely for extra wages and equipment maintenance costs. This would not include the expanded capital outlays required for a start's cars and motive power. The presently suggested starts and scheduling are based on evaluation of the projected costs and revenues to establish an optimum situation.

Very early morning runs, likewise late evening runs, are not suggested. For example, the present B&O 650am arrival from Brunswick has been dropped from the plan. This train has generally stayed in the low 50 (or less) ridership bracket for ten years. Its present ratio of basic operating expenses to revenues is running between 3 to 1 and 4 to 1. The experience of most rail commuter operations has been that the earliest morning arrivals are tapering in volume despite growth at other hours.

Presentation of the Model

The proposed Service Model is presented in two sections:

1. A coordinated end-to-end service operating during rush hours between Gaithersburg, Maryland, Washington, D.C. and Quantico, Virginia via the Baltimore & Ohio and Richmond, Fredericksburg & Potomac Railroads.

   Off-peak service would involve turnbacks at Washington for each railroad's equipment. This feature was included to (a) best match the estimated markets at midday and (b) to provide opportunities for equipment servicing and equipment assignment exchange.

2. A separate Penn Central model based on a Baltimore - Bowie - Washington service. Dependent upon the prospects of electrifying the First Street Tunnel under Capitol Hill, the operation would either be direct to and from L'Enfant Plaza or would employ trainside connections at Union Station to care for L'Enfant Plaza riders.

   In the event that electrification of the tunnel is not feasible, equivalent operations can be established by push-pull diesel or turbine-powered trains.

The Model's scheduling assumes that a limited number of reverse direction train movements can be accomplished during rush hours without materially impeding freight operations. The Baltimore & Ohio, in particular, would like to hold its rush-hour reverse movements to a level of one. The model proposes three closely-spaced B&O reverse moves in the morning and two in the evening. Both sets of movements bracket the time slots of through passenger schedules which existed prior to the May, 1, 1971 Amtrak inauguration.

THE MODEL

EAST AND SOUTHBOUND

Equipment Cycle Crew & Equipment		A B&O	Note 1 B&O	B B&O	C RF&P	D RF&P	A B&O	A B&O	D RF&P	A B&O	C RF&P	D RF&P	B B&O	C RF&P
Miles & Station														
		AM	AM	AM	AM	AM	AM	PM	PM	PM	PM	PM	PM	PM
21	Gaithersburg	646	(719)	725	805	900	1000	130	...	330	...	503	543	...
16	Rockville	653	...	733	812	907	1007	137	...	337	...	510	550	...
13.5	Randolph Road	657	...	737	...	911	1011	...	...	...	...	...	...	...
12	Garrett Park	701	...	741	818	915	1015	143	...	343	...	...	...	...
10	Kensington	705	...	745	822	919	1019	147	...	347	...	...	...	...
9	Forest Glen	708	...	748	...	922	1022	...	...	350	...	...	...	...
7	Silver Spring	712	(737)	753	828	927	1027	153	...	354	...	522	602	...
0	Union Station	725	(750)	806	841	940	1040	205	...	407	...	535	615	...
0	Union Station	725	(750)	807	841	940	1040	205	210	407	455	535	615	...
1.8	L'Enfant Plaza	730	(755)	812	846	945	1045	210	215	412	500	540	620	635
4.5	Crystal City	735	...	817	...	950	...	...	220	417	505	545	...	640
8.2	Alexandria	743	...	825	...	958	...	...	228	425	513	553	...	648
15	Franconia	...	...	...	...	s	...	...	s	s	s	s	...	s
24.1	Woodbridge	759	...	841	...	1018	...	...	248	445	533	613	...	708
34.7	Quantico	...	...	853	...	1030	...	...	300	...	545	625	...	720

RF&P Equipment C releases at L'Enfant Plaza at 859am; resumes at Union Station at 455pm.
B&O Equipment B releases at Union Station 950am; resumes at L'Enfant Plaza at 450pm.
(The cycling can be changed daily to care for shopping and servicing)

Note 1 Special B&O service from west of Gaithersburg. Stops only to discharge at Gaithersburg and Silver Spring.

s = stop made

B&O Mileage	214 (excl special)
RF&P "	238

THE MODEL

NORTH AND WESTBOUND

Equipment Cycle Crew & Equipment	C RF&P	D RF&P	A B&O	B B&O	A B&O	D RF&P	A B&O	D RF&P	B B&O	Note 2 B&O	A B&O	B B&O	C RF&P
Miles & Station													
	AM	AM	AM	AM	AM	PM	PM	PM	PM	PM	PM	PM	PM
34.7 Quantico	638	725	...	900	...	105	...	330	...	...	...	...	550
24.1 Woodbridge	650	737	805	912	...	117	...	342	...	...	452	...	602
15 Franconia	s	s	s	s	...	s	...	s	...	...	...	...	...
8.2 Alexandria	710	757	825	932	...	137	...	400	...	...	512	...	618
4.5 Crystal City	718	805	833	940	...	145	...	408	...	...	520	...	623
1.8 L'Enfant Plaza	723	810	838	945	1100	150	230	413	450	(515)	525	625	628
0 Union Station	727	815	845	950	1105	155	235	418	455	(520)	530	630	...
0 Union Station	727	815	845	...	1105	...	235	418	455	(520)	530	630	...
7 Silver Spring	740	828	858	...	1118	...	248	431	508	(534)	544	643	...
9 Forest Glen	...	...	903	...	...	...	253	436	513	...	549	...	...
10 Kensington	...	...	906	...	1124	...	256	439	516	...	552	649	...
12 Garrett Park	...	...	910	...	1128	...	300	442	520	...	556	653	...
13.5 Randolph Road	...	...	914	...	...	...	304	...	524	...	600	657	...
16 Rockville	754	839	918	...	1134	...	308	448	528	...	604	701	...
21 Gaithersburg	758	846	925	...	1141	...	315	455	535	(552)	611	708	...

RF&P Equipment C releases at L'Enfant Plaza at 859am; resumes at Union Station at 455pm.
B&O Equipment B releases at Union Station at 950am; resumes at L'Enfant Plaza at 450pm.
(The cycling can be changed daily to care for shopping and servicing)

Note 2 Special B&O service to points west of Gaithersburg. Stops only to receive at Silver Spring and Gaithersburg.

s = stop made

B&O Mileage 216 (excl special)
RF&P " 235

THE MODEL

PENN CENTRAL

Equipment Cycle		A	B	A	B	A	A	A	B	A	B
Miles & Station											
		AM	AM	AM	AM	AM	PM	PM	PM	PM	PM
40.3	Baltimore	630	655	...	...	...	...	302	402	...	...
37.7	Edmondson Ave.	635	700	...	...	...	...	307	407	...	...
22.2	Odenton	650	715	...	...	...	...	322	422	...	...
15.3	Bowie	658	723	800	830	1030	1230	330	430	510	540
11.1	Seabrook	703	728	805	835	1035	1235	335	435	515	545
9.7	Lanham	705	730	...	...	...	...	...	...	...	...
7.2	Landover	709	734	811	841	1041	1241	341	441	521	551
5.6	Cheverly	711	736	813	843	1043	1243	343	443	...	...
0	Union Station	720	745	822	852	1052	1252	352	452	531	601
1.8	L'Enfant Plaza	725	750	827	857	1057	1257	357	457	536	606
1.8	L'Enfant Plaza	730	800	840	915	1150	150	435	505	545	615
0	Union Station	735	805	845	920	1155	155	440	510	550	620
5.6	Cheverly	...	...	...	...	...	...	449	519	559	629
7.2	Landover	...	815	855	930	1205	...	451	521	601	631
9.7	Lanham	...	...	...	...	...	...	455	525	605	635
11.1	Seabrook	...	820	900	935	1210	...	457	527	607	637
15.3	Bowie	750	825	905	940	1215	210	502	532	612	642
22.2	Odenton	...	...	...	948	...	218	...	...	620	650
37.7	Edmondson Ave.	...	...	...	1003	...	233	...	...	635	705
40.3	Baltimore	...	...	...	1008	...	238	...	...	640	710

Connections are made at L'Enfant Plaza with rush hour trains to and from Crystal City and Alexandria

Suggested that the following stations be dropped: Frederick Road, Halethorpe, Jericho Park.

Mileage 506

Considerations Behind Scheduling and Crewing

The majority of turnarounds are set for close timing; few in the rush hours exceed ten minutes, many are less. This is based on field observations of actual turnarounds on both the Milwaukee Road and the Chicago & Northwestern at Chicago.

The Milwaukee schedules inbound Elgin train 206 to arrive at Union Station, Chicago at 712am and to depart at 715am for Bensenville. The train is due Bensenville at 740am and back out at 745am. This is a four-car bilevel with a diesel locomotive. On the day of a snowstorm, the train arrived in Chicago a few minutes late with a load of almost 900 (640 seats). It required 3 minutes to unload and 45 seconds more to turn and leave. At Bensenville, the elapsed time from when the train stopped until it was moving again in reverse direction was 45 seconds by stopwatch.

ICC exceptions on brake tests have been secured to permit what is called a "rear end set and release" instead of a full brake test and inspection. This is assumed to be the procedure to be followed for Washington, D.C. area operations.

The service patterns have been shown in the timetables. There are ways that the companies can make minor adjustments in order to swap equipment around and, likewise, crews. Time out is allowed each day for the equivalent of one side of equipment to be thoroughly serviced.

The actual crew assignments will be a company prerogative. Whereas the schedules and subsequent costing sheets refer to "crew equivalents" the companies and the unions may prefer to reduce the assignments somewhat - perhaps 3 crews instead of 4 in order to provide more "money jobs" as the men call them rather than the less attractive "day's pay" jobs. The net cost to the managing authority would be no more; perhaps a slight amount less.

The Richmond, Fredericksburg & Potomac practices a rotation of crews - each trip is on a different pair of trains during the work week. The men can arrange that if they wish so that one day will be a short day, the next a long. It is possible that the longer assignments contained in the schedule pattern will be similarly treated.

No Saturday or Sunday runs are contemplated. If existing guarantees call for payment for either 6 or 7 days, the railroads could, at their option, operate "already paid for" runs if prime demand times exist which would generate adequate fare receipts.

Fare Collection

The operation is too small to permit any so-called automation. However, it is suggested that the Chicago system of fare check exhibition be followed, i.e. all tickets be left in seat-front clips until the end of the journey. Under such conditions, crewmen can work a busy train with little loss of revenue.

Financial Status of Baltimore & Ohio Commuter Service

The 1970 gross revenues from commuter service operations were $432,662. The direct expenses during the year were $1,246,621 excluding approximately $70,000 of solely related station maintenance and tax accruals but including $49,231 for depreciation.

The net deficit, therefore was $813,959 employing the preceding figures. The loss amounted to $1.88 for every dollar of revenue received.

Basically the operation is a high mileage, low aggregate revenue function which is dependant on expensive, overage equipment to perform the service. It is saddled with a lop-sided terminal expense in Washington which, at $211,930 in 1970, consumed 49% of the gross commuter train revenues.

Unless the lowest-volume segments can be pruned away and the efforts reconcentrated on developing the mass market potential, further continuance of the operation has no financial justification.

Conclusions Developed Concerning Service Continuance

The one market that would appear to offer an opportunity to develop substantial volume is that lying between Gaithersburg, Maryland and Washington on the Brunswick Line. A modicum of business exists west of Gaithersburg but requires too much daily train mileage to obtain it.

The Baltimore - Washington commuter rider market via the B&O has been gradually declining. The two principal rider sources are (1) within 8 miles of Baltimore and (2) Laurel, 18 miles from Washington. Otherwise, use of the line is practically dormant. The lower end of the route is heavily interlaced by rush-hour bus routes feeding the Business District of Washington, D.C.

Crew wages alone on the Baltimore - Washington runs consume practically all the passenger revenue leaving nothing to cover what amounts to the remaining two-thirds of direct costs. The operational problems, i.e. trackage throughput capability, do not point to a desirable opportunity to expand service in attempt to develop added volume. In addition, the ridership forecasts are not promising even if added service should be installed.

Except for Laurel riders, which amount to a little more than two bus loads daily, there would be no major inconvenience if the line were to be dropped from the commuter service roster. Good, duplicate service between the Baltimore and Washington area exists via Penn Central. It would not make good sense to attempt to underwrite two, somewhat duplicatory, operations.

The runs west of Gaithersburg, including Brunswick, Maryland and Martinsburg, West Virginia, serve a light density territory which lacks both bus service and good, through highways. A strong social need exists to preserve a modest service. There is, at present, no evident manner in which such a service can be operated for much less than $2 cost per $1 in revenue, even if condensed to one daily round trip at prime demand time. The demand is absent for midday off-peak use; inbound morning crews therefore must go into overtime pay conditions while waiting to take evening trains out.

It is estimated that the "special train" shown in the Model, would attract about 90 passengers each way. This would indicate the use of an RDC car. Annual revenue realization would be in the area of $55,000 to $60,000 maximum. At $1.50 per mile (146 miles round trip Martinsburg - Washington) revenue, the train would be up against a present cost of about $5 a mile for such an operation. Even if Union Station charges were to be reduced (the current rate would be the equivalent of about $23,000 per year), the train still would be hopelessly in the red.

The high cost per mile occurs partly because of overtime pay and also because of a partial crew change which is compulsory at Brunswick. Expenses could be reduced, somewhat, if opportunities existed for compensatory off-peak runs during the middle of the day. Ridership on pre-Amtrak midday trains Washington-Brunswick and west was at ridiculous levels - seldom a half dozen passengers.

Continuance of this service would appear to dependent upon some special type of enabling legislation by Maryland and West Virginia to procure funds to support the operation. The estimated annual support costs would be on the order of $125,000 based on present wage costs.

Ridership Checks on the Baltimore Line of the B&O

Ridership samples are taken twice annually during so-called median ridership months. The results of recent checks are shown below:

Baltimore to Washington

Boarding Stations	10/16/69	4/8/70	10/7/70	3/24/71
Baltimore, St Denis, Elkridge	178	185	168	178
Jessup, Ft Meade, Berwyn, College Park, Riverdale, Hyattsville	100	99	86	70
Laurel	133	153	117	109
Total	411	437	371	357

Washington to Baltimore

Off At				
Jessup-Hyattsville	81	68	57	66
Laurel	139	131	114	105
Baltimore Area	177	185	189	164
Total	397	384	360	335

Trains operated: 6, 3 in each direction at demand times.

Checks made during similar periods on the Brunswick Line point to a growth pattern. The discrepancy between morning and evening ridership can be accounted for by the lack of an earlier departure than 500 pm from Washington. If an earlier departure were to be available, a further growth pattern could be expected both in the morning and evening as more regular round trip riders would join the ranks.

The figures for Harpers Ferry and Martinsburg also include ridership on the Capitol Limited. (Now discontinued)

	Martinsburg to Washington				
Boarding Stations	10/15/69	4/8/70	10/7/70	3/24/71	
Martinsburg - Harpers Ferry	39	59	48	63	
Brunswick - Germantown	83	73	83	94	
Gaithersburg - University	460	535	547	556	
Specific Stations Show:					
Gaithersburg	75	92	106	107	
Rockville	117	141	135	175	
Takoma Park	3	4	1	2	(should drop)
University	0	0	0	0	" "
Off At	Washington to Martinsburg				
University - Gaithersburg	452	476	462	508	
Germantown - Brunswick	61	74	65	91	
Harpers Ferry- Martinsb'g	54	50	46	64	
Specific Stations Show:					
University	0	0	0	0	
Takoma Park	7	2	0	2	
Rockville	121	105	117	151	
Gaithersburg	56	89	78	93	

Redefining the B&O Brunswick Line's Commuter Zone (Reducing the Scope)

Considering the overall relationships of market potential to projected operational expenses, the Baltimore & Ohio Brunswick Line commuter operation's main thrust probably should be confined to a zone extending 21 miles from Washington to Gaithersburg.

At present, there are three general rider zone groupings on the Brunswick Line. Their proportions of revenue ridership are:

Zone and Mileage from DC	Eastward Riders (April 1971)		Westward Riders	
Washington - Gaithersburg 7-21 miles	556	78.0%	508*	76.6%
Germantown - Brunswick 26-49 miles	94	13.2%	91	13.7%
Harpers Ferry - Martinsburg 55-73 miles	63**	8.8%	64**	9.7%

Notes:

* Lower west than east because of present lack of pre 5pm departure. Believed to ride in automobile pools.

** A substantial share of these riders use through, east-west trains which have been eliminated by Amtrak. Some of this market may disappear.

Examining the ridership forecasts for the future, which are based on a limited expansion of service plus the institution of the through L'Enfant Plaza, Crystal City peak hour runs, the projections were:

(for one direction only, double for round trip)

Washington - Gaithersburg	2,120	92.8%
Germantown - Brunswick	115	5.0%
Harpers Ferry - Martinsburg	50	2.2%

A reasonable assumption would be that it would require two daily services each way to produce the Harpers Ferry - Martinsburg totals and at least three services each way to develop the Germantown - Brunswick potential.

Reconciling the required mileages for the Brunswick segment, alone, and relating them to prevailing day's pay agreements with engine crews @ 100 miles and train crews @ 150 miles, the equivalents would be:

Round trip Washington - Gaithersburg	28% of a basic train crew day 42% of a basic engine crew day
Round trip Washington - Brunswick	65.3% of a basic train crew day 98% of a basic engine crew day

It is evident that operation of a commuter shuttle to and through Washington which would be based on Brunswick would nearly double the aggregate crew expenses and equipment mileage without affording much in the way of compensating increases in gross ridership.

It is suggested, however, that a special round trip train be considered for performing an express service between Brunswick and Washington or between Martinsburg, Brunswick and Washington. Since this train could not possibly meet its expenses, a special account should be set up to handle it on the basis of some type of state and local participation. The area does lack both highway connections and bus service to Washington.

A schedule which should meet the optimum needs and attract a good portion of the potential ridership would be:

0	Lv. Martinsburg	610 am	
18	Lv. Harpers Ferry	635 am	
24	Lv. Brunswick	645 am	
31	Lv. Point of Rocks	655 am	
38	Lv. Dickerson	704 am	
52	Ar. Gaithersburg	719 am	stop only to discharge
66	Ar. Silver Spring	737 am	" " " " "
73	Ar. Union Station	750 am	
74.8	Ar. L'Enfant Plaza	755 am	
	Lv. L'Enfant Plaza	515 pm	
	Lv. Union Station	520 pm	
	Lv. Silver Spring	534 pm	stop only to receive
	Lv. Gaithersburg	552 pm	" " " " "
	Ar. Dickerson	606 pm	
	Ar. Point of Rocks	615 pm	
	Ar. Brunswick	625 pm	
	Ar. Harpers Ferry	635 pm	
	Ar. Martinsburg	700 pm	

The eastward Gaithersburg stop would be to set down passengers enroute to way points; westward to pick them up. There is a growing movement to Gaithersburg, Rockville and Garrett Park. Close connections with local trains would be made at Gaithersburg.

At present, a partial crew change is required at Brunswick for a similar operation. The net effect is a 24 mile run then a full day layover (much of which is on overtime) followed by an evening return. When the twelve hour day goes into effect, it may be possible only to schedule that portion of the run between Brunswick and Washington.

The schedule shown would require use of signal-shunt equipped RDC cars if only one car were to be used. Otherwise, 5 minutes would have to be added to the running time because of grade crossing speed restrictions now applying to single car RDC trains.

Off-Peak Schedules

The design of the off-peak schedules recognizes such controlling factors as the low outbound ridership that normally prevails from the central city between 9am and 1pm. Outbound schedules from Washington, D.C., except for necessary equipment turns, therefore are set at a low level during this period.

Wherever possible, schedule starts are not made during the noon hour, 12 noon to 1 pm.

The after peak morning inbound trains are intended to act as (a) clean-up trains for late arrivals and (b) as a means for encouraging shopper trips to the city.

Reverse Movements

The reverse movements during peak periods to such points as Crystal City and Rockville are accomplished through utilization of fast equipment-return runs. These runs should provide service at the hours of maximum demand between the CBD and suburban employment areas.

The first reverse movement after the morning peak is over is set up to make local stops. The intent is that such a movement will draw patronage from the outbound journey-to-work movements of domestics. This is a characteristic of similarly-timed schedules in other major cities.

The first city-bound movement in the late afternoon is intended to be the return vehicle for such patronage. Some experimenting may be necessary to see what schedule performs the best.

Quantico as an Outer Terminal

The basing of RF&P commuter trains on Quantico is aimed at:

1. Taking full advantage of certain basic station and track facilities which already exist at Quantico.

2. The acquisition of a local full-fare movement between Quantico and Washington which is estimated to have considerable potential.

Future Expansion of the Service; Example of an Added Start

There are two ways to schedule added starts:

1. Establishment at the period of peak demand which would mean the capability to operate only one added revenue trip in the morning and one at night, or

2. As an add-on at the leading edge of the peak cycle in order to achieve more than one revenue run per daytime peak period.

Employing option (2) as an example, the addition of an extra start to the B&O Brunswick operation would make the following changes possible:

Morning Departure From Gaithersburg -

The Model as presented	646am	725am	805am	900am	1000am
With an Added Start	612am	704am	723am	745am	835am	1035am

The consequent regional recycling would enable the RF&P to provide:

Morning Departure From Woodbridge -

The Model as presented	650am	737am	805am	912am
With an Added Start(B&O)	625am	700am	740am	805am	910am

Evening Departure from Union Station for Gaithersburg

The Model as presented	418pm	455pm	530pm	630pm
With an Added Start	400pm	430pm	500pm	530pm	615pm

Facilities Required

Baltimore & Ohio

Storage Yard and Final Terminal to be set up at or near Gaithersburg. Fueling facility optional; Union Station facilities may be employed.

Station Platforms to be lengthened to 5 to 7 car-length, and otherwise improved, at Gaithersburg, Rockville, Garrett Park and Kensington. Also Forest Glen if it is to be retained.

Possible new station stop to be constructed at Randolph Road (located between Rockville and Kensington).

Station buildings at Gaithersburg and Rockville to be rehabilitated; shelters to be installed at other stops; radiant heat to be incorporated in shelters for winter use. Silver Spring station satisfactory as is.

Power crossovers and signalling adjustments to be installed at Gaithersburg to permit fast crossovers and turnbacks.

Power crossovers together with reverse signalling to be installed west of University Station. Signalling would apply between QN Tower and University, nine tenths of a mile.

Intercom system for enroute stations - either theft-proof PA system cut into dispatcher's office or some type of call-box arrangement. For passenger use when delays occur.

Parking An ultimate quota would be:

Gaithersburg	200 spaces now; find land for 150 more
Rockville	150 spaces
Randolph Road	100 spaces (plus room for expansion)
Garrett Park	50 spaces (more if zoning permits)
Kensington	100 spaces (available land is scarce)
Forest Glen	For discussion; bad location for space
Silver Spring	100 or more premium-charge spaces if freight tracks can be acquired.

Penn Central

Holding track and remote-controlled power crossover at Bowie.

Station Platforms to be improved and lengthened to 4 to 5 car-length at Bowie, Seabrook, Landover and Cheverly. Lanham optional depending upon retention or closing.

Rehabilitate present long platforms at Odenton; clean up and rehabilitate Edmondson Avenue Station, Baltimore.

Construct station stop at L'Enfant Plaza laid out to use track #2 and secondary track #1. Lay down platform ribbons parallel to and south of secondary track #1 and between that track and track #2. Construct steps in embankment facing bus

terminal (wide, bench-type steps). Design access platforms for ten car-lengths. Erect butterfly type shelters at south edge of tracks; incorporate windbreaks and radiant heat. Build small ticket-selling facility; rest rooms.

Further consider and examine electrification of First Street Tunnel between Union Station and Virginia Tower.

Arrange for possible temporary holding track use of #4 Secondary Track provided that periods of use for switching can be set aside. (Coal to Government Heating Plant).

Parking Space Construction

Cheverly and Landover - 250 spaces divided as land availability enables construction

Seabrook - 50 spaces now; acquire land for 100 more.

Bowie - ultimate 250 spaces or more required. May force relocation of station if (a) access streets are too difficult to use and (b) buildings cannot be acquired and demolished for parking area construction.

Odenton - adequate space now. Future needs may be for an added 50 to 100.

Richmond, Fredericksburg & Potomac

Develop Storage Yard and Final Terminal facilities at Quantico. Utilize existing trackage to the extent possible.

Install remote-controlled power crossovers at Quantico unless it is felt that turnback trains can be run against the current of traffic from Possum Point.

Install remote-controlled power crossovers at Woodbridge plus a power turnout to a holding track. Cut into signal system.

Construct station platforms and shelters at Woodbridge, Franconia (along westerly side of tracks serving tracks 2 and 3) and possibly Van Dorn, eight car-lengths.

Construct access to Franconia platform from Franconia Road. Auto entry if possible; stairs otherwise. Consider building high level pedestrian bridge over tracks from easterly side where parking now is possible (proposed WMATA parking lot). Coordinate any construction here with WMATA planners.

Intercom system for enroute stations - either theft-proof PA system cut into dispatcher's office or call box arrangement. For passenger use when delays occur.

Parking

Quantico - arrange with city for land allocation.

Woodbridge	200 spaces with option for 100 additional
Franconia	150 - 200 spaces now but coordinate with WMATA plans for much larger lot.
Van Dorn	Open to discussion.
Alexandria	Acquire and use land owned by Washington Southern Railroad lying west of tracks and south of station to Duke Street for pay parking. Both WMATA and the RF&P have uses in mind for the old freight yard land to the east of the station. Spaces needed now are 200 to 250.

Construct station stop along west side of tracks at Crystal City. Platforms to be laid between tracks as well as to west of tracks. Design for 8 car-lengths. Develop shelters and arrange entry-ways through fencing to Crystal City complex. Widen parallel roadway berm, if possible, to allow space for automobiles to pull off and unload. Exact location to be decided after check with Crystal City management groups. No parking here other than pay lots which form a part of the building complex.

Joint Requirements

Equipment servicing arrangements and facilities - probably at Ivy City shops of Washington Terminal Company. Likewise, probable joint fuel, water and related facilities. Crew restrooms and lockers.

Open Agencies

B&O to maintain present duty agent tricks at Rockville and Gaithersburg, to have at least single trick at Silver Spring if business warrants.

PC to establish joint-sale facility and agent at L'Enfant Plaza.

RF&P to have small station facility at Woodbridge and to consider possibilities of restoring a single-trick agent at Quantico.

All roads to supplement agencies with a "ticket-by-mail" sales program.

Amenities

Commuter area timetables incorporating all routes in a single, joint timetable. Principal bus connections to be listed. Special shopper and one-day tickets to be sold on off-peak trains. Develop common, simplified cash fare form for ticket sales on trains. Consider an experimental telephone answering service at the commencement of service; continuance to be dependent upon use.

Cooperate with local area committees to develop feeder bus loops, work out possibilities that suburban area employers can have trains met and employees brought to work (and vice versa).

Appoint a joint commuter service officer to supervise the service.

Equipment Required (Equivalents)

For the Baltimore & Ohio and the Richmond, Fredericksburg & Potomac

Sufficient coaches to seat 3,000 riders. Employing 100 to 106 seat converted main line coaches such as utilized by Penn Central's Harlem and Hudson Divisions, this would mean 30 coaches with 2-2 seating; 23 with 3-2 seating.

The coaches should be equipped with circuitry for push-pull operation. To allow for easy shortening of trains, 8 of the coaches should have control cabs.

Diesel locomotives equipped for push-pull operation - 4 locomotives plus 2 spares.

For the Penn Central

Preferably multiple unit electrically propelled coaches providing a seating capacity of 1,000. If Silverliner types were available, this would mean 8 cars plus spares.

Desirable Specifications Would Include:

Locomotive hauled cars preferably would be equipped with electric heat, commuter couplers, push-pull circuitry, plug-in electricity jacks for night standby.

Locomotives preferably would be equipped with alternators for electricity generation (heat or air-conditioning) and push-pull controls.

Multiple-unit cars preferably would be equipped with commuter couplers.

Equipment Sources

The sources of equipment are: new from manufacturers; used - purchased from railroads and rehabilitated; lease, if available. For alternatives, new vs used, refer to Chapter V, Capital Costs.

The present B&O fleet of 11 RDC cars (no spares) provides approximately 900 seats. Because of age and obsolescence, maintenance costs are increasing annually at a rapid rate. During 1970, the estimated cost of maintenance on a per-mile operated basis exceeded $1.40 which is considerably more than a rehabilitated standard coach would cost. In addition, the forecast looks to trains of 6 to 8 cars' length on a 100-seat basis. Using the lower capacity RDC's would mean trains of up to 9 cars' length. The present rule of thumb is that a 3-car RDC train and a 3-car standard train with locomotive cost about the same amount to operate and service. As the number of RDC's in a consist climbs, the RDC train's expense per mile increases at a much faster rate than for standard trains, after the three-car limit is passed.

The decision therefore was made to look elsewhere than to the B&O RDC's for equipment to be put into the operation. A partial mix would not be too satisfactory - standards and RDC's - because of difficulties in assigning trains and maintenance.

Leaving discussions of new equipment sources to Chapter V, the immediate problem is to determine sources for sufficient good used lightweight mainline coaches to fill out the operation.

The Baltimore & Ohio and the Chesapeake & Ohio together have 19 Chessie-type coaches which had their girder sheets replaced and were otherwise reconditioned in 1967-1968. Of these cars, 10 have "soft" springs which would require build-up for use on the B&O property and 9 have springing which is suitable. All have center-coach dividers which could be removed when the interior was reseated and rearranged since there are no bearing columns associated with these areas.

Half or more of this equipment, including all the B&O cars, should be released after the August 1st Amtrak deadline. Some additional cars from the C&O - B&O fleet, which may be satisfactory for conversion, might also become available.

Amtrak has attempted to tentatively earmark the larger part of the remaining better-grade coaches, especially where composite groups of similarly built and equipped cars can be obtained. This leaves few, if any "fleets" to choose from. The Union Pacific probably will have about two dozen aluminum body, lightweight streamlined coaches which can be acquired. These cars are in good condition and are not suffering from the electrolytic corrosion that so many aluminum cars have experienced.

The locomotive market is less certain at present. It is beginning to appear that those roads whose spare passenger power is in good condition generally will transfer it to some other use rather than dispose of it. Those roads which will not have too much use in the future for passenger power, and lack cash for rehabilitation, have been letting their remaining locomotives deteriorate badly rather than spend much needed funds to keep them in shape until May first.

Under the circumstances, a copy of the recently prepared summary of passenger locomotives for Amtrak consideration should be kept as a guide to making the necessary approaches at the time that a passenger operation for the commuter area becomes a serious consideration. Until then, other than noting that the needed locomotives undoubtedly can be found, specifications as to location are best left out.

Car Shop Facilities

With the sharp curtailment of the nation's passenger car service, the costly shop facilities associated with the operation are being closed down on a majority of railroads. Good shop facilities to accomplish conversions may become a major problem. Unfortunately, the private sources also are limited in scope and costs generally are higher. Planning for rehabilitation, if this is to be the course, should be accomplished even before the car shells are bought for conversion.

Washington Union Station

The commuter rail operations should be geared as much as possible to through running with no switching work to be accomplished in the Terminal unless an equipment failure necessitates it.

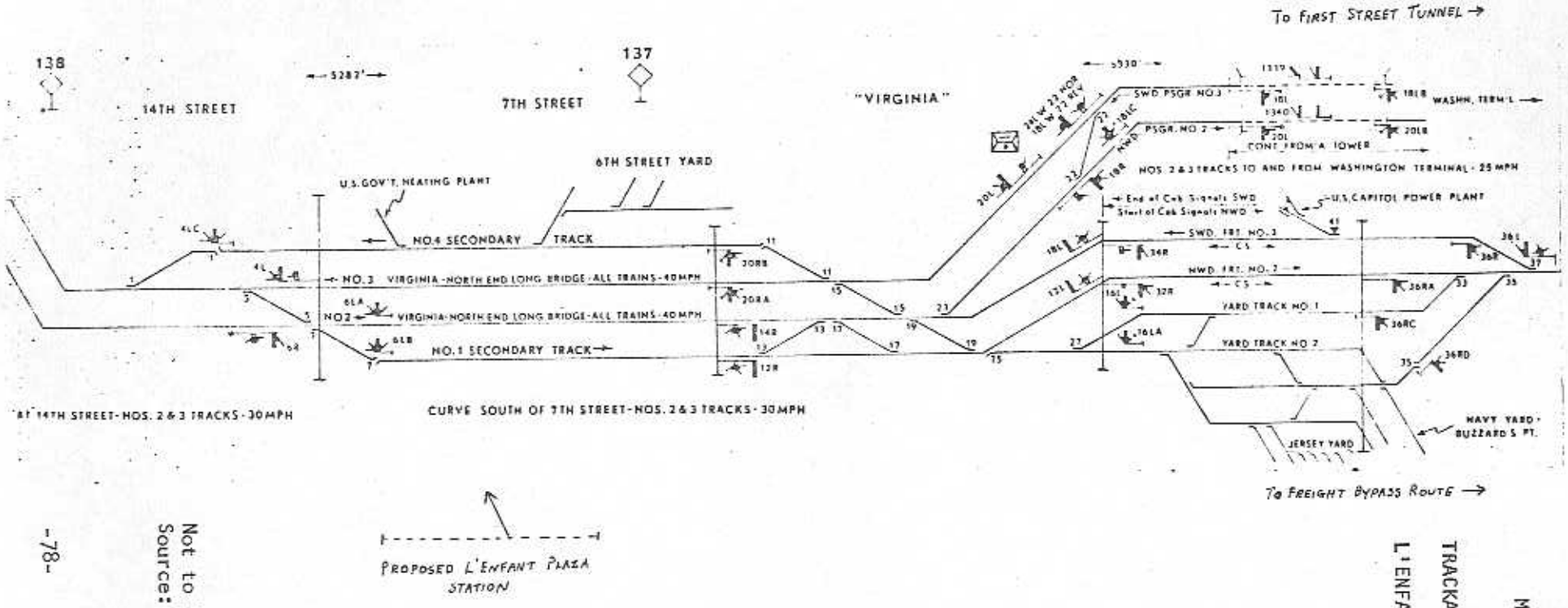
It would be highly desirable that push-pull trains enroute to the Ivy City shops (if they are to be used) proceed under their own power. Presently this would not be allowed under the work rules extant. It may be, however, that if an Authority controls the commuter operation, new rules can be implemented in the name of the Authority.

Fueling and watering, supply of sand, etc., either could be accomplished at the home terminals or at the Union Station facilities dependent in part on how the operating railroads feel about the proper location for this type of activity.

The notification of train gates - arrivals and departures - could either be incorporated into a Solari Board setup such as is used in Grand Central Terminal or could be superimposed in the closed circuit TV equipment now employed at Union Station. Illuminated, automatically-changed, gate signs should be installed to take the place of the cumbersome painted signs now hauled manually from gate to gate.

The commuter trains would require a small share of ticket-selling activities, comfort facilities, waiting room space.

A major problem at Union Station would be to secure a release from the ICC specifications requiring airbrake tests for all departing trains. This would have to be done; the trains being treated for what they are - enroute type operations which already have had airbrake tests. Of course, for those trains which are parked at Union Station and make their first departure therefrom, the tests would continue to apply. A request for lifting the regulation in the case of through trains which do not change crews would have to be made to the ICC well in advance of the commencement of the proposed operation, should it be authorized.



Not to Exact Scale
Source: Penn Central

MAP E
TRACKAGE SKETCH
L'ENFANT PLAZA

CHAPTER V

CAPITAL AND OPERATIONAL COSTS

Introduction

The guiding principle for preparing both the capital and operational cost portions of the budget is the establishment of a rail commuter service in the Washington, D.C. Metropolitan Area under conditions of the lowest possible outlays consistent with safe operating practices and a customer-oriented service approach.

The parking facilities, for example, are considered on the basis of being neat, utilitarian, but not ornate. Station facilities, other than at a few ticket sales points, would consist principally of modern, protected shelters equipped with infra-ray lights for winter heating.

Actual operational functions contemplated would be stripped of unnecessary extras, only the most utilitarian features being retained. Ticket sales and on-board ticket collections would be simplified to avoid waste of human effort; the Rock Island - Burlington - Northwestern - Milwaukee Road methodology of keeping tickets visible in a holder until the end of the journey would be utilized to protect revenue collection yet hold down the time required to do so.

The type of equipment recommended would possess resale value well in keeping with its initial purchase price.

Check List of Capital Outlays Required

Parking Spaces

B&O	600 x $300 (Silver Spring excl).....	$ 180,000
B&O	100 x $350 Silver Spring.....	35,000
PC	550 x $300.....	165,000
RF&P	550 x $300.....	165,000
Land Acquisition.....		1,200,000
Grading, drainage, lighting as needed.....		250,000
	Total Parking	$1,995,000

Operational Facilities - Baltimore & Ohio

Equipment Storage Facility, Gaithersburg.....	$ 300,000
Power Crossovers, Gaithersburg.....	100,000
Power Crossovers, University; Reverse Signals QN Tower - University.....	200,000
Platform Work.....	50,000
Modest Rehabilitation, Gaithersburg & Rockville Stations.....	25,000
Shelters and infra-ray heat lamps.....	15,000
Intercom System.....	40,000
Total B&O Facils.	$ 730,000

CHAPTER V

CAPITAL AND OPERATIONAL COSTS

Operational Facilities - Penn Central

L'Enfant Plaza platforms, shelters, ticket sales and rest room facilities.....	$ 100,000
On-line platform improvements.....	40,000
On-line shelters.....	12,000
Total PC Facilities	$ 152,000

Operational Facilities - Richmond, Fredericksburg & Potomac

Quantico Train Storage Terminal.....	$ 175,000
Crossovers, Quantico.....	100,000
Crossovers, Woodbridge plus turnout and siding.....	150,000
Platforms - Woodbridge.....	30,000
Franconia.....	60,000
Crystal City incl new fencing..	40,000
Optional PA System.....	40,000
Shelters.....	25,000
Total RF&P Facilities	$ 620,000

Other Project Work - All Railroads

Other project work including engineering, items not apparent now, possible minor switch rearrangements in Potomac Yard, etc. Estimated not to exceed.....	$ 750,000

Grand Total, all Facilities..... $4,247,000

+ + + + + + +

Rehabilitated, Used Locomotives and Coaches - B&O, RF&P, PC

8 Passenger Locomotives, diesel, equipped with Alternators for electric power generation, push-pull controls, commuter couplers @ $175,000.....	$1,400,000
40 Lightweight Coaches purchased ($5-10,000), converted to 2-2 commuter seating with 104-108 seats ($40,000), electric heating and commuter couplers ($25,000) @ $75,000....	$3,000,000
Additional charge for installing push-pull cabs in 10 coaches @ $45,000.....	$ 450,000
Total Cost	$4,850,000

If 3-2 seating were to be acceptable, the coach requirements could be reduced to 32 @ $77,000. The Revised Cost Would Be $4,314,000

Conventional Types of New Equipment - B&O, RF&P, PC

7 Diesel Passenger Locomotives equipped with Alternators and push-pull circuitry @ $385,000.....	$2,695,000
40 Coaches (38 + 2 spares) with electric heating and commuter couplers, 2-2 seating	
30 trailers, 108 seats, @ $192,000	$5,760,000
10 cab cars, 104 seats, @ $230,000	$2,300,000
Extras including standby diesel (old), cab signals, etc.....	$ 245,000
Total Cost	$11,000,000

If 3-2 seating were to be acceptable, the coach requirements could be reduced to 32. The revised cost would be $ 9,500,000

The new equipment proposed above generally embodies the specifications employed by the State of New Jersey to purchase 23 diesel locomotives, 71 trailer coaches and 24 cab cars for use on the Erie-Lackawanna Railroad. The equipment is air-conditioned, has electric heating, a full public address system and 2-2 seating which provides 108 seats in trailer cars and 104 seats in cab cars. The locomotives are six-axle, 3,430 HP geared for top speeds of 80 mph.

The new costs paid by the State of New Jersey (before adjustments and change orders) were:

Locomotives	$333,100
Trailers	$166,400
Cab Cars	$198,700

Discussion Notes

The gross cost of rehabilitated equipment could be reduced by approximately $1 million if electric heating and commuter couplers were not be be installed. The continued use of steam heat would raise operating costs over the span of use (estimated to be 6 to 10 years) but perhaps not exceeding the savings. The principal disadvantage stemming from the retention of steam heat and standard couplers would be a sharp reduction in operational flexibility.

New equipment costs are based on first-quarter, 1971 indicated prices by United States builders. They would be subject to minor differentials based on quantity or changes in individual specifications. Overseas purchase costs would be somewhat lower for certain major components. The problems of stocking spares and of equipment resale value should be considered carefully, in the light of what would be a relatively small order, before investigating overseas sources.

Another Possibility - Turbo Train Equipment

Research and Development work with turbine-powered trains has reached the point that more than 30 daily schedules now are being run by such equipment in France. The test operations between New York and Boston appear to have settled down into a pattern of satisfactory performance dependability. Continuing R&D and design work have solved the majority of problems with troublesome components. The specifications for a proposed Commuter version of the turbo train are:

Turbo Train (Commuter Type)	TMT 5-D		TMT 7-D
No of cars and doors (center)	5		7
Seating Capacity 2-2	346		480
Seating Capacity 3-2	410		576
Length Overall	317 feet		430 feet
Horsepower	1,000 or 1,200		2,400
Auxiliary Power Units	300 HP + 1 spare		300 HP + 1 spare
Maximum Speed	100mph(1,000 HP)		125 mph
Maximum Speed, 1 engine out	80 mph		112 mph
Maximum Grade, 1 eng. out (2%)	15 mph		28 mph
Weight/Seat 3-2	675 lbs		608 lbs
Lavatories	2		2
Axles	8		10
To 70mph w/80 mph gearing	145 sec	w/100 gear	77 sec
To 70mph w/100 mph gearing	182 sec	w/125 gear	96 sec

The estimated cost for the TMT 7-D is on the order of $1.25 million in a production run lot. Seven trains would be required.

7 TMT 7-D bi-directional turbo trains @ $1.25 million....$8,750,000

Note: Turbo train costs are estimates subject to further research.

Commuter Service Start-up Costs (Included with Capital Costs)

Training and qualifying engine and train crews, trial runs, last minute changes.....	$ 250,000
Modest Promotional Program.....	$ 100,000
Total Cost	$ 350,000

Summary - Various Capital Cost Alternatives

Each of the following cost alternatives includes facilities @ $4,247,000 and start-up @ $350,000 totalling $4,597,000.

Rehabilitated 3-2 seat equipment and locomotives.....$ 8,911,000
Rehabilitated 2-2 seat equipment and locomotives.....$ 9,447,000

New, Conventional 3-2 seat equipment and locomotives.....$14,097,000
New, Conventional 2-2 seat equipment and locomotives.....$15,597,000

Turbo Train Equipment (subject to verification).....$13,347,000

Estimated Costs of Operation

The estimated costs are based on certain criteria which, possibly, could be adjusted and negotiated to slightly lower the initial levels of cost. The criteria are:

For the B&O and RF&P

Equivalent of 8 two-man engine crews, 261 days

Equivalent of 8 three-man train crews, 261 days

Average train 7 cars with cycles:

A = 272 miles x 7 cars = 1,904 car miles
B = 159 miles x 7 cars = 1,113 car miles
C = 179 miles x 7 cars = 1,253 car miles
D = 292 miles x 7 cars = 2,044 car miles

Car miles are figured on basis of 255 days per year for a total of 6,314 per day x 255 = 1,610,070 miles per year.

Locomotives are figured at 902 miles per day x 255 days = 230,010 locomotive miles per year.

Based on the foregoing criteria, the operational costs of the trains would be: (B&O and RF&P joint operation only)

Equivalent of 8 engine crews @ $80 = $640 x 261 = ...$167,040

Equivalent of 8 three-man train crews @ $120 = $960 x 261 = ...$250,560

Operation of 1,610,070 car miles/year @ 22¢.....$354,215

Operation of 230,010 locomotive miles/year @ 75¢.....$172,508

Fuel & supplies @ $1 per train mile, 902 x 255 = ...$230,010 (includes car cleaning)

Partly common costs - traffic superintendence $80,000; station & other employees related to operations, $140,000; proportion of revenue accounting $20,000; claims $10,000.....$250,000

Station maintenance, utilities, solely related railway tax accruals, estimated.....$100,000

Time costs, equipment (set low because supplied) @ approx $5,000/yr for coach, $9,000/yr, locomotive $200,000

Maintenance of Way est. 112 track miles @ $6,000/yr = $672,000 gross @ 10% for wheelage charge..... $ 67,200

Total, this page $1,791,533

Operational Costs, B&O and RF&P (continued)

Carried forward from preceding page.....	$1,791,533
Washington Union Station allocation; also Virginia Tower trackage passing charge	
Suggested payment $600/day x 255 days.....	$ 153,000
Total	$1,944,533

The foregoing allocations and allowances do not include a management charge for use of facilities. This would have to be negotiated. The owner railroads may accept, in lieu of a management charge, a reasonable contribution toward so-called common expenses...costs for example of track and signal facilities which would be required whether passenger operations took place or not.

Possibilities for Economies

Train operations are costed out on the basis of no reductions in consist during offpeak periods. The use of 2 commuter coupler-equipped cab control cars, properly spaced in each of the longer rush-hour trains, would facilitate quick uncoupling and set-off of 50% or more of the average train's consist during offpeak hours. This action would substantially reduce the annual car mileage costs. The capital budget makes provision for the purchase of the needed extra cab control cars.

Relating Costs to Conventional "Per Mile" Figures

Employing the sum of the first five cost components, plus the item for "time" costs, appearing on the preceding page shows an annual operating expense of $1,374,333 for 230,010 train miles. The resultant cost figure would be approximately $5.98 per train mile. Exclusive of crew expense, maintenance and operation @ $956,733 would be equivalent to about $4.16 per train mile.

Revenue Projections - B&O and RF&P

First-year targets call for working up to a rate of ridership on the Baltimore & Ohio Gaithersburg Line and the Richmond, Fredericksburg & Potomac Quantico Line as follows:

B&O estimated range 1,800 to 2,000

RF&P estimated range 2,250 to 2,500

The mean achievable revenue, equated to a monthly basis, is considered to range between $25 and $30. Within the limits of the commuter operation, monthly tickets should be brought up to a minimum charge of about $25 per month. The outer radius charges should be about $35 on the B&O and $40 on the RF&P.

On the foregoing basis, several estimate ranges have been prepared:

B&O:

1,800 x $25 x 12 = ...$540,000
2,000 x $25 x 12 = ...$600,000

1,800 x $30 x 12 = ...$648,000
2,000 x $30 x 12 = ...$720,000

RF&P:

2,250 x $25 x 12 = ...$675,000
2,500 x $25 x 12 = ...$750,000

2,250 x $30 x 12 = ...$810,000
2,500 x $30 x 12 = ...$900,000

Employing the minimum and maximum ranges of the $30 fare base, the total range would be, both roads combined:

Minimum $1,458,000
Maximum $1,620,000

The ridership estimates (available potential) call for more riders than are employed for the foregoing calculations which are considered to be on the conservative side.

Important Relationships: Revenue Generation Potential to Costs

The labor intensive, i.e. ratio of manpower required to produce units of transportation, is estimated to be within equilibrium limits. Simply stated, this means that normal wage increases can be passed along as modest fare increases which would be in keeping with the trend and would not exceed demand levels (customer willingness to buy). This also means that the operation would not have runaway characteristics - loss of cost control versus revenue potential - that have beset certain rail commuter operations.

Estimated Costs of Operation - Penn Central

Penn Central calculations are not lumped with those of the other two railroads since interline runs will not be made and shorter trains will be operated.

Penn Central costs are based on:

544 train miles per day, 255 days (261 days' pay)
Average 3-car trains (up to 5 in rush but set-off made in offpeak)
4 four-man crews, engineer, fireman, 2 trainmen
Estimated car miles, accounting for midday reduction, 1,000

4 engine crews @ $80 = $320 x 261 = ...	$ 83,520
Over miles, engine crews @ 144 x 80¢ x 261 = .	$ 10,068
4 two-man train crews @ 8 x $40 x 261 = ...	$ 83,520
Operation of 255,000 car miles/year x 22¢ = ..	$ 56,100
Operation of 129,030 loco miles/yr x 75¢ = ...	$ 96,772
Fuel & supplies @ 75¢/train mile (incl. car cleaning).....	$ 96,772
Time costs, $5,000/yr coach; $9,000/yr loco...	$ 68,000
Operating Costs	$494,752
Partly common costs - superintendence $40,000, station employes $70,000, revenue accounting $10,000, claims $10,000.....	$130,000
Station maintenance, utilities, solely related railway tax accruals.....	$ 25,000
Maintenance of Way - 84 track miles @ $7,500 per year = $630,000 @ 5% wheelage charge....	$ 31,500
Union Station and Virginia Tower passings - suggested payment $460 day x 255 days.....	$117,300
Total, all Costs	$798,552

No management charge included. See note under preceding B&O-RF&P Cost Resume.

If the operation were electrified and could use multiple-unit equipment, the estimated annual expense would be $648,864.

Revenue Projections - Penn Central

The forecast calls for up to 2,600 riders each way if the Baltimore & Ohio drops its Baltimore commuter service.

Employing a conservative number of 2,200 riders @ $30 per month yield (high rate Baltimore included) = 2,200 x $30 x 12 =

Revenue Projection $792,000

The success of the Penn Central service would be dependent upon the B&O and RF&P operational segments also being undertaken.

Turbo Train Operational Costs - Estimates

The round-number estimates for cost of operating Turbo Trains range between $2.75 and $3 per train mile. These estimates include maintenance, fuel and supplies, car cleaning and time costs.

Comparing these figures with those developed in the estimates, the following comparisons would take place:

Turbo Trains on B&O and RF&P versus conventional equipment, all costs -

Turbo @ $2.75/mile = $1,620,327 per year Standard trains = $1,944,533
Turbo @ $3.00/mile = $1,677,830 per year Standard trains = $1,944,533

Turbo Trains on Penn Central versus conventional equipment, all costs -

Turbo @ $2.75/mile = $ 835,740 per year Standard trains = $ 798,552
Turbo @ $3.00/mile = $ 867,998 per year Standard trains = $ 798,552

Overall, if turbo trains were pooled among the different railroads, the gross operating costs would be slightly less than for standard trains. No attempt has been made to relate turbo car counts to possible demands for added crewmen. A smaller turbo could be used on Penn Central (the estimates covered the larger 7-D) at a modest saving in the costs shown above.

Totalling aggregate costs, all roads, turbo versus standard trains, the following figures are developed:

Turbo @ $2.75/mile = $2,456,067 per year Standard trains = $2,743,085
Turbo @ $3.00/mile = $2,545,828 per year Standard trains = $2,743,085

Summary - Estimated Operational Expenses versus Revenues

B&O, RF&P	Est. Operating Expenses	$1,944,533	Est. Revenues	$1,575,000
PC	Est. Operating Expenses	$ 798,552	Est. Revenues	$ 792,000
		$2,743,085		$2,367,000

Indicated Deficit = $367,085

If turbo trains could be operated for the estimated costs without addition of extra crewmen or other special conditions, they would be able to reduce the deficit $287,018 @ $2.75/mile cost or $197,257 @ $3.00/mile cost.

If the tunnel could be electrified, Penn Central trains could operate in the black by $143,136 if expected ridership were to be realized.

Support Payments

The anticipated first year support payment requirements are estimated to range between $500,000 and $750,000 depending largely on how quickly the desired business volume would be realized.

Terminal Costs

Washington Union Station probably is the most costly operation of its type in the nation. Despite major economies introduced in 1970, terminal expenses recommenced their upward spiral to about the highest limits yet recorded in terms of per-entry user charges. These charges, recently, were approximating $45 per car and per locomotive in a train either for entry or exit. In terms of present B&O commuter trains, these charges are at a level equivalent to about 50¢ per seat provided. In the case of the Richmond, Fredericksburg & Potomac, terminal expenses in some months consume as much as 50 to 75% of the railroad's gross passenger revenues.

In 1970, the Baltimore & Ohio commuter service paid $211,930 for terminal charges versus a commuter gross of $432,662. Terminal charges consumed about 49% of the Baltimore & Ohio commuter revenues.

By contrast, the tremendous commuter fleet of the Chicago & Northwestern Railway is assessed only about $350,000 per year as its share of terminal expenses in Chicago. The Northwestern is handling more than 67,000 passengers a day or over $1\frac{1}{2}$ times what the B&O handles in an entire month. Northwestern revenues are well over $20 million.

The South Shore Line pays the Illinois Central slightly less than $500,000 per year for the use of three downtown terminals in Chicago plus operation over 15 miles of electrified trackage including the power required. This is an 8,000 or more riders per day carrier.

Even the cost of St Louis Union Station, now a huge mausoleum with 32 tracks, has been reduced to $1,560,000 a year. Union Station, Washington, had a payroll alone at the end of 1970 of around $8.5 million. Total operational costs are far in excess of that sum at $ 14,000,000.

There is a large area of uncertainty at the moment in attempting to develop a solid picture as to what the future holds in costs of the Union Station. The Visitor Center construction is yet to come and with it, substantial savings in terminal costs.

Union Station is beset with make-work rules and practices which help multiply its unfavorable economic impact. For example, if two B&O RDC, self-propelled cars, are sitting a foot apart with engines running, the engineer is not permitted to back one car up to make what would be an automatic coupling. A switch engine with a 5-man crew must be sent for, an adaptor block is fitted in the RDC coupler, and then the two cars are pushed together. Similar steps must be taken to uncouple. No trains can be moved under their own power.

In the final analysis, the only hope for providing a DC rail commuter service would be to establish it under the arms of an Authority and thereby attempt to negotiate a new set of terms commensurate with the operation's gross earning power. The service design submitted has attempted to eliminate any and all moves in the Terminal area which could be subject to the cost-creating conditions. It is on that basis that a payment schedule has been budgeted.

The owner roads of the Terminal will not be pleased to see reductions made in payment schedules for they now are compelled to underwrite the runaway costs.

Discussions With The Brotherhoods

A series of discussions concerning the commuter operations' possibilities were held on an informal basis with the Legislative Representatives, General Chairmen and Local Chairmen of the Brotherhood of Locomotive Engineers and the United Transportation Union (Firemen, Conductors, Brakemen, Trainmen, Switchmen).

The atmosphere was pleasant and understanding. There is an evident interest in seeing that the operation be inaugurated and that it be successful. On a fair basis, certain arrangements probably could be arrived at to mitigate portions of agreements that would stand in the way of developing a reasonably viable operation.

It should be understood that neither side was in a position to make any commitments since all talks were exploratory.

One of the most difficult problems, the fact that Alexandria is a "home terminal" for Southern Railway engineers and firemen, might be solved if an Authority were to operate commuter service on the Southern. At present, engine crews change at Alexandria, i.e. one crew takes the train from Union Station to Alexandria where a road crew takes over. In the case of a commuter operation, this would impose not only a difficult financial penalty but also an impossible loss of time from tight schedules. It appeared that no change could be made if the commuter service were to be a railroad-sponsored enterprise.

All parties concerned received copies of the "interline service" type of operation which is proposed. No protests were registered as long as reasonable equalization of jobs took place and no one road was discriminated against.

CHAPTER VI

IMPLEMENTATION OF THE MODEL

CHAPTER VI

IMPLEMENTATION OF THE MODEL

Possible Management

There are four possibilities for management of the Commuter Rail Network.
They are:

1. The Washington Metropolitan Area Transit Authority (WMATA)

2. The Metropolitan Washington Council of Governments (COG)

3. A new public authority or agency possibly combining the efforts of Maryland, Virginia and the District.

4. A subdivision of Amtrak (National Railroad Passenger Corporation)

Choosing between the options requires the consideration of several factors which would have an important bearing on the decision:

1. The changes in legislation, including bonding power, that might be required for WMATA. WMATA authority extends southward to the Occoquan River just north of the RF&P Woodbridge terminus; westward to include Gaithersburg on the B&O; northeast along the PC to include Bowie but not the balance of the Baltimore run.

2. The difficulties in the way of creation of a new body including the numerous probable delays to develop an organization and its procedure.

3. The act that established Amtrak specifically exempts commuter operations; Amtrak presumably is overloaded with problems without adding more.

4. Selection of that body or group which could and would secure the fullest cooperation of government bodies, management and labor.

5. The ability to raise capital funds and to finance ongoing deficits.

6. The inter-relationships of the agency to be chosen with other agencies and governing bodies.

Community Cooperation

Actual organization of community cooperation could not take effective form until and unless a decision is made to go ahead with the commuter rail project. During the formative stages of the study project, cooperation tended, understandably, to veer more toward pressures for special considerations than to direct itself as a component of a regional effort.

Interested cooperation by all affected communities will be vital to the success of the rail project. It is particularly important that aid be forthcoming in developing parking lot layouts, station approaches and similar amenities which would have a critical impact on the promotion of rail use. The best probable approach toward securing such aid would be to attempt to organize local action committees within the communities slated to receive rail service if the decision is made to go ahead.

A Suggested Timetable

First, of course, the project should be authorized, a management agency chosen and a funds availability schedule worked out. Getting the project underway then would depend, in good part, on important human factors. Examples are: do the railroads really wish to cooperate and to be committed? how quickly can the various guiding groups within the area settle differences of opinion and arrive at a common understanding?

A competent, rail operations oriented manager should be appointed; UMTA should delegate representation to work closely. The railroads should be solicited to furnish a steering committee empowered to render day-to-day decisions.

The component elements of the project's acquisition and construction phases should be listed and classified by action areas and the railroad companies or communities involved. Since some of the needs are complicated - decisions as to trackage rearrangements, specifications for rail equipment acquisition, discussions as to work rules and procedures - reference should be made to the considerable body of precedent which is available from completed rail projects elsewhere. An exchange of ideas, particularly at UMTA level, would be useful to help guide the efforts.

The first action would be to formulate decisions as to facility and equipment acquisition. New equipment acquisition, though requiring great care in setting specifications, should be progressed as quickly as possible since this phase will account for the largest portion of the preparatory time. New equipment deliveries seldom can be achieved in less than a year; often the interval is closer to two years after orders are placed.

If the decision is made to use rehabilitated railroad equipment, the first steps would be to secure the check lists of available cars and locomotives which have been prepared for Amtrak. Dependent upon car shop availability (extremely tight at present), equipment could be rehabilitated in as little as six months after being turned over for necessary work.

Special assistance probably should be enlisted to deal with the Union Station problem; this effort should not be deferred until later in the course of the project.

It is conceivable that a schedule could be planned which actually would see the commuter operation become a going entity within a year's time or very little more. This could not be implemented unless a good manager, backed by a strong agency, accomplished a detailed organizing effort at the very beginning and then closely monitored the results.

Bus Carrier Cooperation

Those bus carriers now having express service to the CBD generally will not be desirous of risking the siphoning off of some of their business through the means of providing feeder routes to railroad stations.

Local type bus operations (routes) usually will make needed minor adjustments to service train connections if this can be accomplished through the means of present operations rather than special efforts.

Present D.C. Transit discounts which could be offered for joint bus-rail movements are too small to be attractive. The negotiations for a possible better arrangement would have to be worked out at a local level.

The actual utilization of the buses now leaving L'Enfant Plaza with "Out of Service" signs will have to be arranged directly with the operators. Some tentative interest has been manifested in the new station's potential but no commitments have been made. Problems of franchise limitations and area street capacity will require consideration and action.

In terms of the total outlook, the rider potential which can be funneled to and from buses at L'Enfant Plaza appears to be desirable. The majority of the riders, both morning and evening, will be traveling in a reverse direction to the major flows. They thus will provide a profitable addition to the operators' routes through the area.