IMPACT ASSESSMENT OF THE VIRGINIA RAILWAY EXPRESS COMMUTER RAIL ON LAND USE DEVELOPMENT PATTERNS IN NORTHERN VIRGINIA

BASE LINE PHASE
1984 to mid-1992

Prepared for:

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16. Abstract

This is the first, or base line, report of a proposed two-phase study of the possible impacts on land use in suburban Northern Virginia which may be associated with the introduction of the new Virginia Railway Express (VRE) commuter rail system into the study area. This report identifies local data variables for study monitoring and future comparison. Future comparisons may help identify land use, employment, commuting, and related changes which have been influenced by introduction of the commuter rail system. The study monitors the years 1984 to mid-1992 for base line point and trend information. The study also relies upon information from the first VRE Ridership Survey to compare presumed ridership catchment area with actual catchment information derived from the survey. The study determined that housing location choices began to be based on future access to commuter rail the year system planning began and increased significantly as system opening approached. The potential area for residential development impacts was shown to be from five to ten miles from the station sites, depending upon the degree of suburban development as reflected in travel time and travel distance to commuter rail stations.

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EXECUTIVE SUMMARY

A new commuter rail system—the Virginia Railway Express (VRE)—began operations in Northern Virginia in mid-1992. The new VRE operated four trains each over two existing rail lines running through metropolitan fringe areas to downtown Washington, DC. Initial operations provided for one-way service during the morning and evening commuting hours. The system ran through a cross-section of suburban land use activities: rural areas, protected watersheds, typical 1960s-1980s suburban neighborhoods, small cities and towns, and densely developed urban areas.

Local officials and planners were interested in potential impacts that a new commuter rail system might have on highway congestion relief, land use changes and local economic development. Consultants and the federal transportation agencies could provide projections of traffic relief impacts, but they had no study data available on resulting impacts of new commuter rail systems on land activity and economic development in suburban areas. Thus, Northern Virginia provided an ideal setting in which to observe any land use and activity changes which might result from introduction of commuter rail into a developing suburban area. Information on land use-related changes derived from observations in Northern Virginia could benefit other suburban areas considering commuter rail systems in the future. The communities would better understand the potential linkages between commuter rail service, the attraction of the rail corridor, and the suburbanization process. This report may assist these communities to be better prepared to encourage or manage expected changes.

Logo of the Virginia Railway Express.

The purpose of this study is to establish the starting point, identify variables and document base conditions in Northern Virginia against which future conditions will be compared. The process requires a second step. A future Phase II will re-examine the same variables, make comparisons to the base line conditions, identify changes and attempt to determine the changes which resulted from introduction and operations of the VRE.

A series of basic questions were identified for guiding Phases I and II of this study process. Data variables relating to the questions were then selected for monitoring. The study process was organized around the hypothesis that introducing a new commuter rail system into a suburban setting may result in future land use-related changes which might not otherwise have occurred. A methodology was selected to help identify what those specific rail-related land use and land activity changes might be and how to monitor their geographic distribution.

Land use plans, land use acreage and densities, transportation policies, zoning amendment applications, new residential building permits, localized employment by SIC code and similar variables were identified for monitoring. The selected study methodology defined a series of three impact areas radiating from the 12 commuter rail stations. The purpose of the defined areas was to help track the geographical extent of resulting land use changes. Data from nine primary study area jurisdictions were collected for the period 1984 to mid-1992, the base period selected for establishing base line conditions or trends. Data were aggregated within the defined areas, where possible, to facilitate future comparisons. Surveys were used to obtain information on change decisions, on "impressions" of potential impacts, on commuter rail influence on home purchase decisions, and on actual VRE ridership characteristics compared to initial study hypotheses.

Major findings should not be expected from a "base line" study. The purpose of the base line study is to provide a basis against which to evaluate future conditions. Analysis of the point data, trend information and the "soft (qualitative) data" impressions obtained from survey results did enable certain implications to be drawn regarding the potential for land use changes from introduction of commuter rail in Northern Virginia. The base line data indicated the following preliminary implications:

- The size of ridership catchment areas is smaller in more densely developed suburban areas and increases in diameter toward the terminus points in the more rural areas, creating a "teardrop" shape. In this study area, a radius of five miles contained 80 percent of VRE ridership in more densely developed suburban areas. In less densely developed areas, a radius of 10 miles was necessary to contain 80 percent of VRE ridership.

- In surveys of persons familiar with the VRE, 34 percent indicated that two miles or less in distance was considered "near" a VRE station; an additional 36 percent felt up to five miles was "near." In the same surveys, 84 percent of respondents defined 15 minutes or less in travel time from a commuter station as "near." These distances and travel time have major implications for residential planning and development and their perceived accessibility to commuter rail services.

- Some home purchasers began to make housing location choices based on *potential* access to future commuter rail service the same year—1984—that the actions to begin system development were initiated.

- The influence of potential commuter service access on housing location choices increased as opening of the system approached. The percentage of surveyed home purchasers who stated that access to commuter rail had been either a "major" or "some" consideration in their housing location choice increased from six percent among surveyed purchasers in 1984 to 43 percent among surveyed home purchasers in 1992.

- The percentage of surveyed home purchasers whose locational choices were influenced by future access to commuter rail and who used the VRE were significantly higher—17 percent versus six percent—than for all home purchasers surveyed.

- Surveys of developers of new residential projects which used commuter rail access in their marketing programs showed their products were designed primarily for two-wage earner households with combined incomes of $75,000+ per year. This targeted purchaser profile showed that the private sector linked commuter rail usage more with above average income households than with commuter service for low- and moderate-income households.

- There was agreement by 77 percent of surveyed persons of various informed sectors that shuttle or feeder services to commuter stations would increase the attractiveness of nearby land for development purposes.

- The land use plans of cities with downtown commuter rail stations saw them as stimuli for attracting more customers to the downtowns and for generating new service businesses over the long term. The communities had first to provide the zoning, parking, and connecting infrastructure (sidewalks, signage, lighting, landscaping) between the stations and existing businesses

which would encourage commuters to stay and visit downtown.

- Development in Northern Virginia has tended to follow major highway corridors. Commuter rail has now been added in two of the major commuting corridors—the I-95/Route 1 corridor and parallel to the I-66 corridor. It will be difficult to clearly separate access corridor-induced development from the impacts of commuter rail-associated land use changes.

- Preliminary air quality emission reductions were calculated from changes shown in commuter travel modes from VRE Ridership Survey data of September 22, 1992. Based on those ridership levels, converting from single occupancy vehicle usage to use of the VRE showed preliminary reductions in carbon monoxide (CO) emissions of nine tons, in volatile organic compound (VOC) emissions of 0.4 tons and an increase in nitrogen oxide (NO_X) emissions of 0.6 tons for the day of the survey. (VOCs are the controlling pollutant in smog formation in the Washington metropolitan area.) Automotive reductions achieved in nitrogen oxide emissions were offset by higher levels of the same emission from the VRE locomotives.

- By the third month of VRE operations, approximately 63 percent of the 2,348 surveyed VRE riders were persons who had used single occupancy vehicles (SOVs) for much or all of their previous commutes; even more significantly, those shifts by previous SOV commuters were responsible for almost 92 percent of the above-cited reductions in automotive emissions.

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The following members of the Northern Virginia Planning District Commission staff cooperated in preparing the methodology and identifying, assembling, analyzing and preparing the data and survey information contained herein. They also prepared the Geographic Information System maps and publication graphics:

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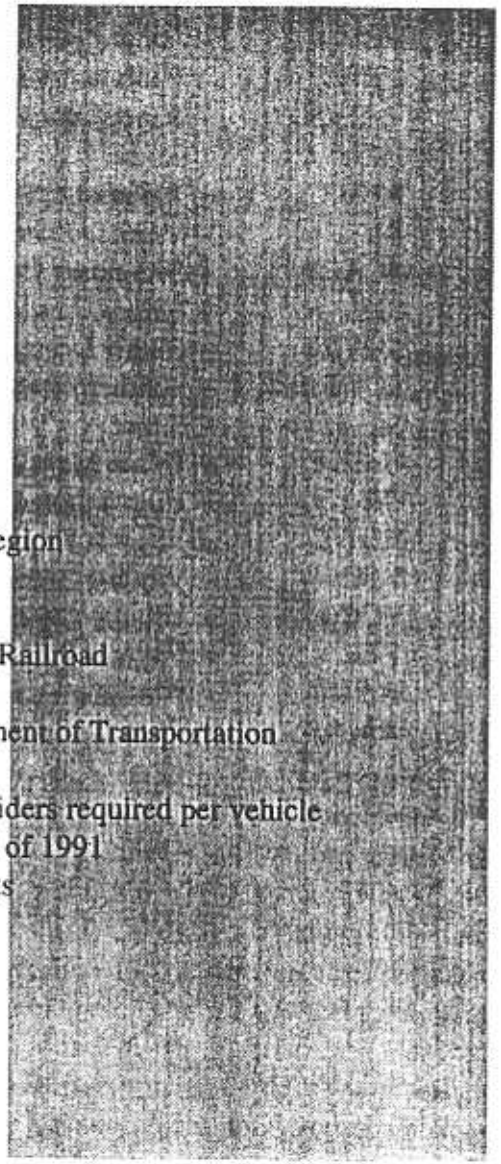
GLOSSARY OF ABBREVIATIONS



The following abbreviations are used in this study:

ADT	- Average Daily Traffic
CAAA	- Clean Air Act Amendments of 1990
CCA	- Control Catchment Area
CNVCR	- Comprehensive Northern Virginia Commuting Region
CO	- Carbon monoxide
Co.	- County
CSXT	- CSX Transportation Rail Line, former the RF&P Railroad
DC	- Washington, District of Columbia
FTA	- Federal Transit Administration of the US Department of Transportation
GIS	- Geographic Information System
HOV; HOV-3	- High Occupancy Vehicle; "-3" means 3 or more riders required per vehicle
ISTEA	- Intermodal Surface Transportation Efficiency Act of 1991
MWCOG	- Metropolitan Washington Council of Governments
NOx	- Nitrogen oxide
NO_2	- Nitrogen dioxide
NVPDC	- Northern Virginia Planning District Commission
NVTC	- Northern Virginia Transportation Commission
O_3	- Ozone

PCA(s)	- Primary Catchment Area(s)
POV(s)	- Privately Owned Vehicle(s)
PRTC	- Potomac and Rappahannock Transportation Commission
RADCO	- Rappahannock Area Development Commission
Rd.	- Road
RF&P	- Richmond, Fredericksburg & Potomac Railroad (now CSXT)
Rt.	- Virginia State Highway Route
SCA(s)	- Secondary Catchment Area(s)
SIC	- Standard Industrial Classification
SOV(s)	- Single Occupancy Vehicle(s)
SOUTHERN	- Southern Railroad (now Norfolk Southern Railway)
St.	- Street
UMTA	- Urban Mass Transit Administration (now Federal Transit Administration)
US	- United States, and in some cases, United States Highway Route
VDOT	- Virginia Department of Transportation
VEC	- Virginia Employment Commission
VOC(s)	- Volatile Organic Compound(s)
VRE	- Virginia Railway Express (commuter rail system)
W&OD	- Washington and Old Dominion Railroad
WMATA	- Washington Metropolitan Area Transit Authority

INTRODUCTION

I

A. Suburban Scenario

You finally have your share of the "American dream." You have a house in the Northern Virginia exurbs to get away from "inside the Beltway" congestion. You share the "bucolic countryside" and an exurban lifestyle with your neighbors. You have two cars, at least until the kids become drivers. You have become part of the community. It is expensive, but you have gotten more housing value for the price than was available closer to the metropolitan core.

However, it takes the incomes of two wage earners to support this "American dream." And the two jobs are not located in the bucolic countryside. One job is in Washington, DC and another is at Tysons Corner in Fairfax County, Virginia. It seems an acceptable price to pay, except when both of you are sitting in I-95 commuting traffic in your separate vehicles for what seems like interminable hours each day. And every year it seems to take longer to get to work. There seems to be at least one accident or vehicle breakdown on I-95 each day which ties up traffic somewhere along your route. Highway improvements create additional travel delays while they are under construction. When construction is finally completed, traffic relief is only temporary. You are not the only family to have moved to the exurbs, and the new lanes are soon overwhelmed again. Then the two of you are again creeping to work in your single occupancy vehicles (SOVs) on a wider highway with more lanes of solid traffic around you.

Driving the American Dream

Capital Beltway and Surrounding Land Uses.

The family does have some commuting options. Publicly- and privately-operated express commuter buses go through the county to Washington, DC. The wage earner working in Washington is able to take an express bus when regular work hours permit. Unfortunately, there is only limited regional commuter bus service that provides connections from the exurbs to suburban job locations, such as Tysons Corner, because your exurban location is not dense enough to support a regional transit system. When work hour flexibility is not necessary, you can sometimes carpool with neighbors who work near your office. But because you are not a regular in the carpool, there is not always space for you. Carpooling restricts opportunities to run errands at lunch or on the way home. Also, when you leave to catch a scheduled express bus or carpool, hints are dropped that you "are not showing the right team attitude" about working overtime as the company tries to be more productive with fewer resources. If either of you loses a job, your family will not be able to afford the "American Dream" of which you are a part.

Then you hear that a commuter rail system is going to be established through the county and will run to Washington. Commuting salvation is at hand. You will to be able to "have it all"—your current exurban life style and a convenient rail commute to the central city. Other people will move in along the entire length of the corridor, making the system viable and achieving an integrated land-use-transportation pattern. Commuter rail will benefit you, other drivers and the county as a whole. It will take you and many cars off the highway during commuting hours. It will allow riders to begin the day on a less stressful note. It will reduce air pollution from vehicle exhausts, and it reduce the seemingly unending need for highway improvement. Right?

B. Purpose of This Study

Maybe this will happen when a new commuter rail system is superimposed in a suburban-to-rural area. If the system uses existing freight tracks and no major construction impacts are required, maybe only positive results will follow from the new system. Or maybe a law similar to the law of physics—where every action also has an opposite reaction—will come into play and you gain a benefit but create an impact.

A new commuter rail system—the Virginia Railway Express (VRE)—began operations in Northern Virginia in mid-1992. The new VRE operated four trains each over two existing rail lines from metropolitan fringe areas to downtown Washington, DC. Initial operations provided only one-way service during the morning and evening commuting hours. The system ran through a cross-section of land use activities: rural areas, protected watersheds, typical 1960s-1980s suburban neighborhoods, small cities, and densely developed urban areas. Northern Virginia, therefore, provided an ideal setting in which to observe land use changes which

might be associated with introduction of the VRE commuter rail system. Finding out if land use-related changes associated with the introduction of commuter rail is the purpose of this two-phased study.

The linkages between highway construction and suburbanization are well documented, but the affects of commuter rail on contemporary suburbanization patterns are not well known. The Federal Transit Administration of the US Department of Transportation wanted to examine long-term changes in land use patterns which might result from a new commuter rail system beginning operations in a typical suburban-exurban metropolitan fringe area. Simply stated, would the new commuter rail service be an attractant for greater development along its corridors? The findings would enable the Federal Transit Administration to advise local governments seeking to establish future commuter rail systems of the impacts—particularly related to land use, real estate values, and economic development—which could be expected to follow introduction of a new system. Local governments would then be better informed and able to determine if changes in their land use management policies could reinforce the positive effects of such a system, that is, to encourage people to live, and business to locate, near the rail as well as to address impacts that could be expected to follow.

To study changes over time, a process is required which defines a *base year(s)* and which documents a *base line* of indicator variables. Phase I of this study will establish the base line conditions which existed prior to start of commuter system operations in mid-1992 in a suburbanizing region of Northern Virginia that is heavily dependent upon commuter travel. Phase II (probably 5-7 years into the future) will compare future conditions to the base line conditions to evaluate the types and amounts of land use-related change which occurred during the interval and which may be associated with commuter rail influence.

STUDY METHODOLOGY

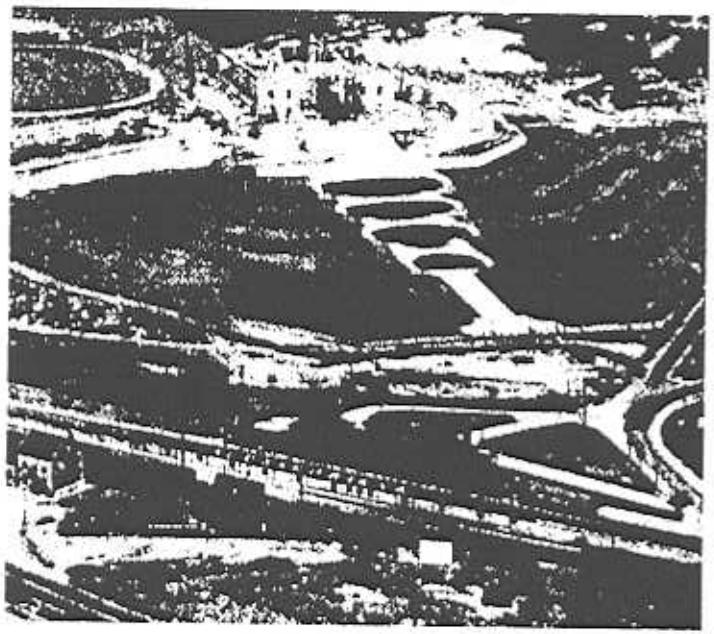
II

A. Chapter Summary

The concept for this two-phased study was organized around two hypotheses: 1) that introducing a new commuter rail system into a suburban setting may result in future land use pattern changes that might not otherwise have occurred, and 2) that the characteristics and intensity of these potential land use changes would decrease with distance from the rail stations. A series of basic questions were identified for guiding Phases I and II of the study process and for help in selecting data variables which would address the study questions.

This Phase I report would establish base line conditions for later comparison with future conditions to identify resulting changes. Data variables which reflect public- and private-sector land use activities were selected for long-term monitoring. Methodologies were chosen to help identify rail-related land use changes and to monitor them geographically.

Study boundaries were identified. A series of concentric impact areas were defined which radiated from the commuter rail stations. These were: Station Nodes, Primary Catchment Areas, and Secondary Catchment Areas. The purpose of the concentric areas was to focus data analysis and to help track the geographical extent of future land use changes. Land use plans, transportation policies, zoning amendments, new residential building permits, employment numbers and job categories, and similar variables were identified for monitoring. Data on



Defining and Measuring the Impact of VRE Commuter Rail

RF&P railroad and freight shed (1920s) near King Street in Alexandria. Background, construction of the Masonic Memorial and the West End School.

these variables were collected from each study area jurisdiction for the period 1984 to mid-1992, the years selected for establishing base line conditions or trends. Data were aggregated by concentric area to facilitate future comparisons. Surveys were identified as another means of obtaining potentially useful information on changes in commuter patterns, on private-sector land use change decisions and on "soft (qualitative) data impressions" of potential commuter rail impacts which might not be revealed through analysis of local data sources.

This study would not evaluate local decisions on land use planning or policy; these were taken as givens to be monitored over time. Also, the format of this "before and after" section of a study does not employ projections of land use change, economic costs or benefits, or of long-term environment results from potential land use changes occurring as a result of the new commuter rail system.

B. Study Hypotheses

1) Hypothesis—New Commuter Rail Service May Result in Future Land Use Changes - This study process began with the hypothesis that introduction of new commuter rail service into a metropolitan suburban area may influence certain future land use changes; land use changes which may not have occurred if the rail service had not been introduced.

A corrolary to the hypothesis was that if future rail-influenced land use changes did occur, they would be initiated by both the public and private sectors. Public sector actions would take the form of land use management activities (planning, zoning, provision of infrastructure) to either encourage certain land use activities or to prohibit others. The private sector, it was hypothesized, would anticipate or respond to market location opportunities which they saw as deriving from the new commuter rail service. The market opportunities would be created by a new transit alternative which would encourage house hunters to locate within the corridor, and allow the marketing of exurban living and metropolitan center employment, without the tensions and stress of daily SOV commuting on congested I-95 or I-66. Future two-way rail service could also provide a potential "critical mass" of commercial customers at rail station nodes, and offer the opportunity to locate office-related activities in suburban areas, with their attendant economic and "quality-of-life" perceptions. The private sector's activities would be reflected in land purchases, zoning amendment requests, new building permits or expansion of existing permitted land use activities.

2) Hypothesis—VRE-Influenced Land Use Changes will Decrease with Distance from Rail Stations - A second hypothesis—that rail service-associated land use changes would differ in character and decrease with distance from rail stations—guided the es-

tablishment of concentric areas around rail stations for purposes of monitoring land use changes. Three primary impact areas were established for purposes of data collection and comparison. The three impact areas were called: Station Nodes, Primary Catchment Areas and Secondary Catchment Areas. Because commercial uses would either be service commercial for rail users or, potentially, employment destinations if two-way service was instituted, commercial use was examined only in Station Node areas. A fourth concentric area was identified only for the purpose of defining the commuter market area for Northern Virginia and Washington, DC employment (see Chapter II.F). These impact areas were established and mapped early in the study process to guide data gathering. Results from the first VRE Ridership Survey of September, 1992 were used to compare ridership residential locations with the mapped areas of influence. Results of that comparison are discussed in Chapter VIII.B.

C. Study Questions

Seven questions were formulated around which potential land use changes or management actions could be identified. Potential variables and data sources were identified from which to establish base line conditions relating to these questions. Future comparisons of the same variables with the base line conditions would enable the seven questions to be answered. The basic questions were:

Question: *Have local governments made any land use changes in rail corridors in anticipation of or in response to potential impacts from commuter rail services? If so, what types and amounts of land uses have changed?*

Question: *Have developers shown by their new project locations that they believed their customers wanted to live, work, and have commercial uses close to commuter rail services? If so, has this activity led to changes in land use activity and patterns?*

Question: *Have buyers' residential choices indicated preferences to be near commuter rail services? If so, what was the primary radius of impact most affected?*

Question: *Has employment increased or decreased near commuter rail stations? If so, what types of employment changes occurred?*

Question: *What were the pre-opening regional paratransit and local commuter services, ridership levels, routes, pricing, and service frequencies in operation? What effects have there been on them and other transportation-related factors resulting from the new commuter rail services?*

Question: *Have there been any inter- or intra-jurisdictional transportation management policies introduced in anticipation of or in response to commuter rail services?*

Question: *What were the regional air emissions impacts resulting from introduction of commuter rail service?*

D. Selection of Data Variables

Four major concerns guided selection of data variables for the study: 1) would the variable help answer one or more of the basic questions; 2) availability of data—was it available from all jurisdictions in the study area now and would the same data records be maintained in the future; 3) was the compatibility of the data sought from multi-jurisdictional sources; and 4) was there a sufficient record of annual data to establish multi-year base line trends. Trends would prove more representative for future comparisons than reliance upon "snapshot" data from a single year, such as 1992.

The VRE commuter rail system operates through five counties, four cities, and two towns in Virginia and into the District of Columbia. Most of these jurisdictions maintain individual land use and zoning maps, records on local land use activities, real estate tax values, and similar records. A variety of multi-jurisdictional organizations in the VRE service area maintain their own data records. Variables were needed which would provide total study area coverage, if possible. At the very least, data had to provide sufficient area coverage that future changes could be considered representative of similar situations in the study area. Variables recorded by subareas within large jurisdictions were also sought. Subarea records would allow localized monitoring of land activity impacts which could differ from impacts on the overall jurisdiction; for example, land use changes in close proximity to commuter rail stations might vary in response to VRE influences from land use changes in the jurisdiction as a whole. Directly comparable or close surrogate data from all affected jurisdictions would provide the best comparisons for detecting similar changes or trend changes within the study area. Where directly comparable data were not available for all the jurisdictions, the potential findings would require more assumptions and be less certain.

The following variables and data sources were selected for use in establishing base line information to use in future change determinations:

Land use designations:

- adopted future land use plans for the jurisdictions and catchment areas
- adopted future land use acreage for the jurisdictions and catchment areas
- existing land use patterns in the Station Nodes
- existing land use acreage in the Station Nodes

Land development (activity) data:

- zoning amendment applications
- residential building permits issued
- local economic development policies

Transportation policies:

- local transportation plan policies for commuter rail
- local policies for public transit and commuter feeder services
- inter-jurisdictional transportation management plans and policies

Employment in Station Nodes:

- business identification surveys
- economic development projects and plans
- current employment in Station Nodes by Standard Industrial Classification (SIC) code

Commuting data:

- number of daily express commuter buses in operation
- number of daily express commuter bus riders
- number of registered carpools, vanpools and daily ridership
- number of vehicles and riders using high occupancy vehicle (HOV) lanes per day
- average daily traffic counts on major commuter routes in the study area
- location and percentage of occupancy of Park & Ride lots in the study area

Survey data:

- commuter rail ridership information on distances traveled, previous commuting modes, influence on housing location, travel times before and after using commuter rail
- VRE impacts on land use perceived by public officials and others

These particular variables and data sources were selected as being potentially available from all jurisdictions or other agencies in the study area. It was fairly certain that the same data would be maintained annually by jurisdictions or regional agencies into the future. While the transportation-related variables would not directly reflect land use changes, they would be indicators of study area population and traffic generation change. Surveys of perceived impacts were seen as providing qualitative dataa against which to compare future reality. Future comparisons would provide information on the success of local governments in anticipating and preparing for potential land use changes influenced by the new VRE. Surveys of VRE riders would provide data with which to compare study assumptions on potential impact areas made before the VRE began operations.

No one variable or set of variables may accurately define changes directly resulting from commuter rail influence. Many factors influence movements of people, changes in demographics, new land uses, and employment growth. However, only by examining a variety of data variables common to the jurisdictions in the VRE study area, can an attempt at understanding associated land use changes be made.

E. Establishing the Base Year(s)

Documented base line information provides the starting point from which to measure future change. That change may be indicated with numerical data—such as acres of land use change, employment increases by SIC code in Station Nodes, population, etc. A base year was required for which to document base line conditions. Further, identification of the "year of first substantial commitment to commuter rail development" was needed to enable the documentation of trends during the gestational period that preceded actual initiation of VRE service. The VRE began operations in June, 1992 on the Manassas line and in July, 1992 on the Fredericksburg line. Selection of 1992 as a base year would appear obvious. However, there were data collection problems associated with selection of a half-year as a base. (The mid-year data collection problems are discussed further in Chapter II.G - Study Caveats.)

Changes over time may also be reflected by differences in trend profiles. For example, the frequency of certain land activities, such as townhouse construction, may increase or decrease at a different rate over time near the rail than in the past, or at a different rate than that for the larger jurisdiction. Monitoring trends, especially for defined subareas, provides a better way to track changes than does reliance solely upon "snapshot" data. Land use-related point data may vary widely from year to year for any number of reasons and so give a false impression. Trend lines show annual variances. Therefore, they present a better understanding of activity over time.

Looking at trend lines would be particularly useful for the following reasons:

- Northern Virginia was still experiencing the effects of a national economic recession in 1992. The recession had significantly reduced land use-related activities for up to five years (see Chapter VII.C and VII.D). Trend information from 1984 to 1992 would reflect land use change and development activities in both active and recessionary periods. This trend data would enable future conditions to be analyzed more accurately.

- The study would use many indicator variables for which annual records were locally maintained. The Phase II study could plot the same variables for the interval between Phases I and II to compare annual land use-related activities as Northern Virginia came out of the recession and as the VRE commuter rail potentially influenced land use changes.

- Local data would enable some variables to be plotted for defined subareas, such as Station Nodes. Establishing subarea trends for these

variables would enable commuter rail-influenced changes to be compared more easily than from either point-in-time data or from jurisdiction-wide data.

The third phase of a commuter rail feasibility study for Northern Virginia was completed for the Metropolitan Washington Council of Governments in 1984. The study concluded the feasibility of commuter rail based on a projected daily ridership of 3,000 persons. Predicated on the findings of the 1984 study, the Northern Virginia Transportation Commission made the decision to move forward on developing a commuter rail system which became the Virginia Railway Express (VRE). Chapter III.F.2 - Chronology of the Northern Virginia Commuter Rail System, outlines major points and activities in development of the commuter rail system from 1964, to official acceptance of the feasibility study completed in 1984, through development and to opening of the VRE in 1992.)

The year 1984 was, therefore, selected as the year to begin documenting trends where data were available. The development sector was usually quick to position itself to take advantage of potential value enhancement opportunities. Creation of a new commuter rail system potentially offered such opportunities. By tracing land use activities from 1984 onward, it would be potentially possible to identify early private sector activities influenced by commuter rail which occurred prior to opening of the system. The time frame from 1984 to mid-year 1992 became the base line period for this study, and 1992 became the "snapshot" year for data presentation where earlier data were not available.

F. Geographical Influence Areas

After a literature review of various impact studies, a methodology was selected which used concentric impact areas for defining the potential extent of commuter rail influence on land uses. Similar study approaches have been used in projecting land use impacts and development potential around the Northern Virginia Metrorail stations[1] and other transit nodes.[2]

The Northern Virginia study area was divided into a concentric series of impact areas designated as: Station Nodes, Primary Catchment Areas, and Secondary Catchment Areas.

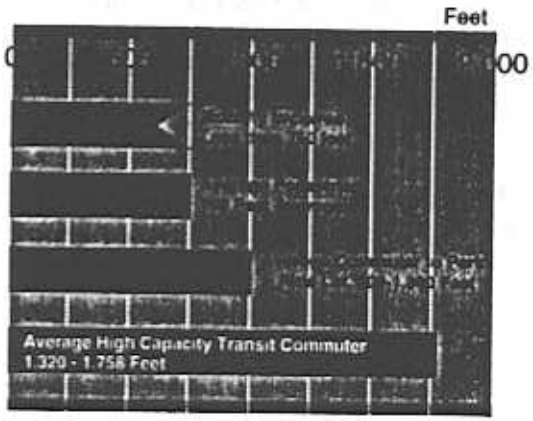
1) Station Nodes - *Station Nodes* were defined around each rail station planned for operation in 1992. The Station Node consisted of a 1500 foot radius from the center of the station site. This distance was slightly over one-quarter (1/4) of a mile. A one-quarter mile distance was recommended in the US Department of Transportation publication entitled *Guidelines for Transit-Sensitive Suburban Land Use Design* as the maximum pedestrian distance to rail stations.[3] This was also about mid-range of the distance determined as that which pe-

destrians of high capacity transit were willing to walk, as shown in a second US Department of Transportation document entitled *A Guide to Land Use and Public Transportation*[4] (Figure 1). Therefore, 1500 feet was selected as representing the approximate walking distance limit to or from a VRE rail station before people would want an alternate means of transportation.[5]

Land use activities that relied upon pedestrian access to or from rail stations would be expected to occur within the 1500 foot radius. Pedestrian access would make the locations attractive for residential, commuter convenience retail, office employment and high activity recreational or public uses. Because they represented locations which would be attractive for potential development or re-development, actual land use and employment conditions in the Station Nodes as of mid-1992 were documented to assist in monitoring change. Maps of the Station Node land uses are shown in Chapter VI.D on Figures 12, 13, 14 and 15.

Figure 1

Pedestrian Walking Distances Under Normal Conditions



Source: A Guide to Land Use and Public Transportation, U.S. Department of Transportation, pages 3-4.

2) Primary Catchment Areas (PCAs) - Beyond the 1500 foot radii of the Station Nodes, non-pedestrian modes of access would be required. This "ring" would accommodate convenient commuting and shuttle distances to rail stations. Within this second ring, potentially more extensive VRE-related land use changes might occur. The *Primary Catchment Areas (PCAs)* were conceived at the beginning of the study as those areas from which *the presumed majority* of VRE ridership would be drawn. The PCA boundaries ranged from 1-10 miles in distance around the rail stations, depending upon existing land development patterns, defined county data collection subareas, and the distance to alternative commuting routes or to locations for public transit connections. The accuracy of the initial PCA boundary delineations would be tested by comparison with commuter rail ridership surveys of home-to-station travel distances after rail operations began. The individual PCAs were grouped into four catchment areas (Fairfax, Prince William East, Prince William West and RADCO PCAs) and a "control" catchment area (Fairfax CCA) for purposes of data comparison. Alexandria and Arlington County were excluded because of the proxim-

Figure 2

VRE Primary Catchment Areas (PCAs)

ity of their VRE stations to the Metrorail stations with their much greater ridership. The five catchment areas are shown on Figure 2.

Census blocks and Fairfax County's defined "sub-census block" areas were used to delineate the actual boundaries of the PCAs. Census block identification would assist in disaggregating county data and would provide better monitoring of local indicator distribution. In the counties which did not maintain data by census blocks, it would be necessary to match individual addresses on applications or permits with county street maps to determine if the activity location lay within the census blocks comprising the PCAs. The 1990 census block numbers within the PCAs are identified in Appendix D.

The *Fairfax PCA* covered the southeastern portion of the county contained approximately 105 square miles, and comprised 26 percent of Fairfax County's land area. The Fairfax PCA contained the three initial commuter rail station sites in the county. Two VRE station sites planned for future construction were also within the PCA.

A second catchment area was defined in Fairfax County to serve as a comparison area for future trend change comparisons. It was called the *Fairfax Control Catchment Area (CCA)*. It was not selected as a "control" area in the classic method of scientific study selection; instead, it was selected to provide a related basis for comparison to the adjacent portion of Fairfax County which contained the commuter stations. One line of the proposed commuter rail ran through the CCA, but it did not contain a rail station for boarding purposes. It was bordered by I-66, a major commuting artery. Much of the CCA lay within a protected watershed where only low density development was allowed. It was intended to use as a comparison site to identify differences between base trends in PCAs with rail stations and what occurred in a similar area without immediate rail access. The Fairfax CCA contained 39 square miles, or approximately 10 percent of Fairfax County's land area.

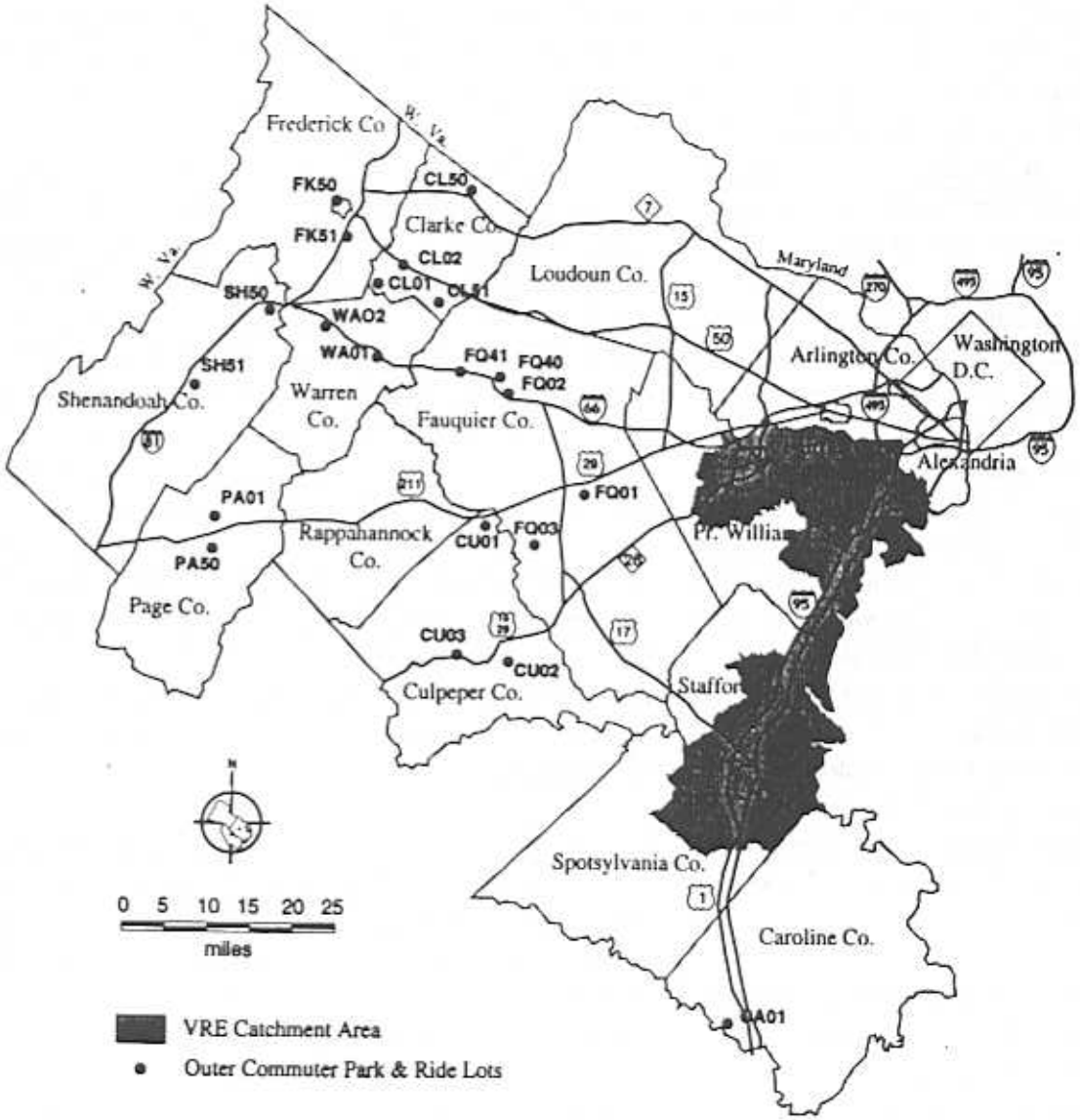
The *Prince William East PCA* focused on the I-95 corridor and the CSXT rail line commuter stations. It comprised 79 square miles, approximately 22 percent of the combined land area of Prince William County, Manassas, and Manassas Park. The towns of Dumfries, Occoquan and Quantico were located within this PCA.

The *Prince William West PCA* was organized around the Norfolk Southern Railway stations in the county and in the cities of Manassas and Manassas Park. The western PCA contained 68 square miles, or 19 percent of the combined area of Prince William County, Manassas and Manassas Park.

The PCA on the southern end of the CSXT line was called the *RADCO PCA*. The three VRE study jurisdictions comprising the PCA were members of the

Figure 3

Northern Virginia Commuting Region



RADCO Planning District Commission. The RADCO PCA comprised 38 percent of the combined land area of Stafford and Spotsylvania Counties and the city of Fredericksburg, and the following percentages of the three jurisdictions' individual land areas: Fredericksburg - 100 percent, Stafford County - 60 percent, and Spotsylvania County - 22 percent.

3) Secondary Catchment Areas (SCAs) - The third concentric area of potential land use impact consisted of the whole counties through which the commuter rail system was to operate. This tier of impact areas comprised the *Secondary Catchment Areas* (SCAs). (See Figure 2.) The SCAs consisted of *the Counties of Fairfax, Prince William, Stafford and Spotsylvania and their included Station Nodes and PCAs.* County-wide data would be used as trend indicators against which to compare changes in trends at the Station Node and PCA levels. The SCAs were initially expected to provide nearly all of the commuter rail system's ridership. Results of a rail ridership survey to be conducted after operations began would be used to verify the accuracy of this presumption. (See Chapter VIII.) The SCAs provided the study limits for monitoring land use and economic pattern changes.

Fairfax County was considered as a whole in developing SCA trend data. It was recognized, however, that portions of the County lying north of the Fairfax PCA and Fairfax CCA would not contribute riders to the proposed commuter rail system. The northern portion of Fairfax County had easier access to other public rail and bus systems for commuting and local travel.

4) Comprehensive Northern Virginia Commuting Region (CNVCR) - At its most comprehensive, the commuter rail region of influence included all the counties, independent cities and towns of Virginia from which commuters traveled daily to employment locations in the Washington metropolitan area. With only limited route exceptions from the northwest, most commuters on the major radials could alter travel patterns to reach commuter rail stations, if rail served their destinations. This most comprehensive region was identified, for purposes of this study, by the locations of Park & Ride lots for rideshare travel to metropolitan employment centers. Thus defined, the *Comprehensive Northern Virginia Commuting Region (CNVCR)* shown on Figure 3 included 14 counties, six independent cities and 28 towns. It covered a land area of approximately 5,040 square miles.

Identifying distances between a central feature, such as the Pentagon in Arlington County, and the outermost Park & Ride lot, provided a method of understanding the large geographical area involved in the CNVCR. The distances to the lots from the Pentagon ranged from 75 miles south to the Park & Ride lot in Caroline County, 62 miles southwest to the lot in Culpeper County, 78 miles west to the lot in Page

County, and 65 miles northwest to the Park & Ride lot in the city of Winchester. Commuting access from the counties generally lay in the I-95, US 1, I-66, US 50, US 29/211, Route 28 (south of I-66) and Route 7 radial corridors to Northern Virginia.

No data was obtained from these outlying counties, cities and towns as linkages between commuter rail influence and land use changes would be too tenuous to make. Only information on Park & Ride lot utilization was included from these jurisdictions.

G. Study Caveats

1) Local Governmental Land Use Decisions Were Not Evaluated - Local land use decisions—land use planning, Comprehensive Plan policies, zoning, zoning amendment decisions, etc.—are the prerogatives of local governments under Virginia law. These prerogatives were not evaluated or assessed in this study. Products of local decisions were examined for purposes of establishing base line parameters against which to compare future conditions. This study does not make any value judgments, recommend any actions or suggest any changes to local plans and policies. The data presented, and any implications to be drawn from the data, are for informational purposes only.

2) Two Study Phases are Required - It is important to note that this study is the first of an intended two phased process to monitor land use changes over time in Northern Virginia. This phase documents the base conditions against which future conditions will be compared. The second phase will follow after a period of time has transpired (estimated 5-7 years) with commuter rail in operation. It is intended that the Phase II study will gather and analyze the same variable data sources and *draw conclusions* as to what land use changes in the study area jurisdictions, if any, could be associated with commuter rail stimulus.

3) Statistical Validity of Base Line Data - Many factors—political, economic, locational and market driven—affect land use. National and regional conditions, especially economic cycles, influence local land use activity. Many of the contributing factors in individual land use decision making—particularly in the private sector—are not available as recorded data for analysis. Therefore, many assumptions as to particular influences have to be made when examining actual changes.

"Soft (qualitative) data"—interviews, newspaper articles, and informed opinions—may eventually provide more insights to the influences and impacts of the VRE on land use than will comparisons of quantitative data. Acknowledging this reality, this study was not oriented toward having all data be statistically valid when measured in terms of scientific accuracy. *Phases I and II of this study are expected to generate reasonably accu-*

rate and documented impressions of what happened with regard to land use, real estate values and economic development over time in Northern Virginia and whether commuter rail influenced any of those changes.

4) 1992 Mid-Year versus Annual Data - Base line data for this report should only reflect pre-VRE conditions. Mid-1992 should have been the cut-off point for all base line and base year data collection, since the VRE system was in operation during the second half of 1992. The study team's previous experiences with local data recording had shown that mid-year data would not be available "after the fact" for some variables and from all jurisdictions. Some jurisdictions maintained cumulative records. It was not always possible to accurately identify mid-year numbers from annual totals. In other cases, the effort to hand process large volumes of individual applications or permits to identify pre-opening data would have exceeded study resources. Annual data from 1992 was used, and is noted, where mid-year figures were not available.

5) Availability of Transportation Data - In collecting transportation data, it was found that certain "snapshots" were collected at less than yearly intervals. Available data closest to the years 1984 and 1992 had to be used in some cases. Further, the processing time for responsible-agency (e.g., VDOT) correlation, evaluation and publishing prevented some 1992 data from being available in time to be included in this report. In such cases, the latest data available prior to 1992 have been cited. (During Phase II, study researchers should attempt to update the Phase I database to incorporate missing 1992 data that subsequently have been published.)

H. Areas and Questions that *Were Not Addressed* in This Study

Contrary to most study formats, a base conditions study does not produce final answers. A subsequent comparative study will do that. In a similar manner, the observation and monitoring process approved by the Federal Transit Administration (a "before and after" study) was not the appropriate format for projecting future conditions or impacts. Other study formats provide more appropriate scenarios when forecasts are sought. It was necessary, then, to identify what topic-related areas *were not* considered appropriate to be addressed in this Phase I base conditions study and why they were excluded.

1) Fiscal Impacts from Land Use Changes - Public transit systems are rarely designed to be self-supporting from farebox collections. Federal, state or local subsidies—frequently all three—are needed to meet collection shortfalls. Any new development which follows as a consequence of transit service may help offset local subsidies. The offset will be indirect—through increased taxes, employee spending, local business expenditures, licenses and fees—and will benefit the lo-

cality as a whole. New development, then, can provide political and economic "offsets" against local transit subsidies.

Jurisdictions to be served by the VRE were interested in the long-term fiscal impacts that might be expected from VRE commuter service. They wanted to know if employment would increase or if commercial and residential development would follow. They asked what the fiscal comparisons would be if residential development occurred but new employment did not follow. It was conceivable that the VRE could attract residential development which would cost local governments more in infrastructure and services than would be returned through increased tax collections. In such circumstances, the VRE could create double fiscal impacts—local subsidies for VRE operations and greater costs for infrastructure and services to transit-induced new development that did not generate an equal amount in tax revenues.

These were very interesting and locally important questions. This study, however, was structured to monitor land use changes over time and not to project what impacts those changes would create. *This study does not project fiscal impacts of potential VRE-influenced land use changes.* A fiscal analysis study would be the appropriate format in which to address the potential economic impacts from the VRE.

2) Population, Land Use and Trip Generation Change Projections Resulting from VRE Service - *This study also was not designed to project future population, land use, or commuting implications, such as trip generation, from introduction of commuter rail services.*

3) Projections of Employment Changes Resulting from Land Use Changes - Just as this study does not project fiscal or land use changes, *it does not project employment changes that may be induced by commuter rail service.* Employment increases may be anticipated as new development occurs. New development may be commuter rail-induced, or it may be completely unrelated to commuter rail influences. New employment projections would appropriately be made in a fiscal analysis study, not in a land use study.

4) Air Quality and Environmental Impact Resulting from Land Use Changes - Chapter XII presents a generalized estimate of daily air quality impacts derived from results of a VRE Ridership Survey conducted in September, 1992. Computer model estimates were based on survey derived reductions in miles traveled in single occupancy vehicles (SOVs) by riders of the VRE. The reduction in SOV use translated into less vehicle emissions over pre-VRE conditions. *The computer model used ridership survey results. No projections of emission reductions based on future VRE ridership levels were made.* Achieving the air quality goals of the Clean Air Act Amendments of 1990 was much on the

minds of local elected officials at the time of this study. The generalized air quality impact estimate was included to indicate to local officials the extent to which the VRE and shuttle service to VRE stations could play a role in regional air quality programs, as well as in congestion relief programs.

Land use changes in themselves also produce environmental changes. The amount of environmental change is related to the amount of land development, site conditions prior to development, and the quality of site planning and design. Just as land use decisions are the prerogative of local governments, so local governments are also responsible for addressing the environmental affects of their decisions. *As this study does not make other projections, it also does not project environmental impacts that may result from future land use changes induced by VRE rail service.*

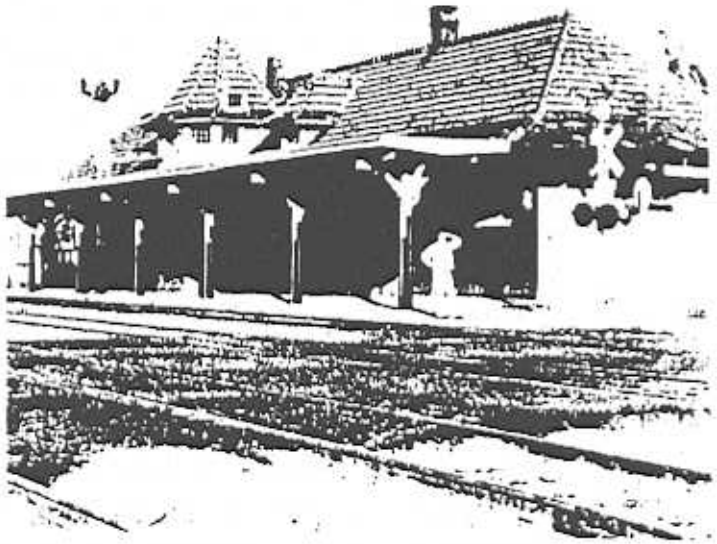
HISTORY AND BACKGROUND OF NORTHERN VIRGINIA COMMUTER SERVICES

III

A. Chapter Summary

It was somewhat ironic that in 1992 Northern Virginia was looking to commuter rail to help relieve rush-hour congestion. It was commuter rail that spurred suburban development in Northern Virginia in the first place. Establishment of frequent, clean and inexpensive electric trolley services between Washington, DC and Virginia led to explosive residential growth in Northern Virginia. Trolley service enabled many government workers to make "rural" Northern Virginia their residential choice.

Economic conditions and competition from automobiles ended the trolley and privately operated commuter rail eras in Northern Virginia in the 1930s and 1950s respectively. However, reactivating commuter rail service was being discussed only a decade after the last privately operated heavy rail commuting trains ceased operating. Discussions continued for over 20 years. A rapid rail system was planned for the metropolitan area that included commuter rail feeder service on two existing lines in Northern Virginia. Construction on the Metrorail system began in the 1970s, but the commuter lines were not funded. Finally, in 1984, commuter rail appeared financially feasible, and the decision to pursue development of a separate system was made. A summary of the activities which led to development of the VRE makes interesting reading, although it may discourage the faint-hearted who



Northern Virginia Commuter Rail: A History

Manassas Station

are seeking to create new commuter rail systems in their localities.

Northern Virginia's commuting alternatives in 1984 included some local bus services in the jurisdictions near Washington, the new Metrorail extensions into Arlington County, express commuter buses in the major corridors, a growing car- and vanpool system, and the SOV.

The same transportation modes—an enlarged Metrorail system, public bus services in the jurisdictions near Washington, express commuter buses, and car- and vanpools—were still being used to help relieve highway congestion in the study area in 1992. The most extensive public rail and bus system coverage was concentrated closest to the Washington core, with Alexandria, and Arlington and Fairfax Counties having both Metrorail and local coverage by multiple public bus systems.

The number and geographical coverage of commuter transit alternatives decreased rapidly toward the outer portions of the study area. Publicly and privately operated express commuter bus systems served the I-95 and I-66 corridors. Also, highly successful car- and vanpool programs operated in Prince William County and the counties to the south. There were no local or shuttle bus services in Prince William, Stafford or Spotsylvania Counties.

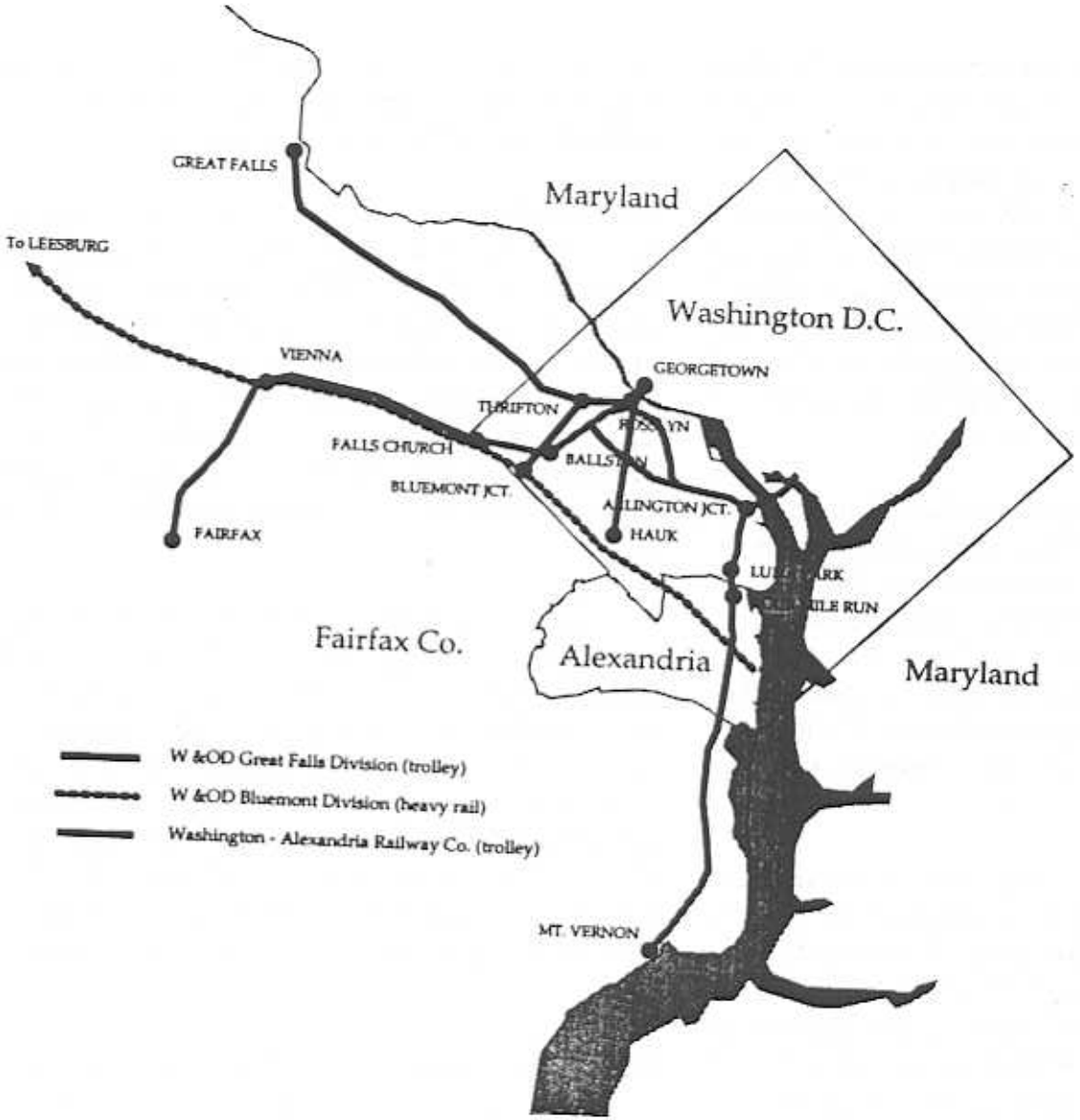
B. Commuting History

1) Trolley Commuting - The radial character of regional development was firmly established with construction of trolley lines connecting Washington, DC to the city of Alexandria and to Arlington and Fairfax Counties (Figure 4). Trolley services in Northern Virginia began in the 1890s with three lines; a fourth line was added in 1911.[8] These first "commuter lines" led to rapid land development and population growth. For example, the population of Arlington County increased by 149 percent (6,430 to 16,040 persons) between 1900 and 1920.[9] Trolley service provided a reliable transit means for living in the country and working in the city. That trolley companies were also land developers was no accident. Trolleys provided the access and travel convenience needed for the companies to market their lands in Northern Virginia; simultaneously, the resulting development built trolley line ridership.

By the early 20th century, development in Northern Virginia was closely tied to the trolley service provided by the two companies operating in the region. Trolley service was frequent, inexpensive, efficient, timely, and clean. Such service combined to make it convenient for people to live farther away from their work in downtown Washington and Alexandria and still be able to get there daily. The Washington Board of Trade, in an early publication entitled *The Book of Washington*, discussed the impact the trolley lines had on development

Figure 4

Early Commuter Rail Lines in Northern Virginia



Source: Richard T. Busch, unpublished thesis, 1991.

in Northern Virginia. In commentary about the Washington-Virginia Railway Company's line to Fairfax, Virginia, the book noted that before construction of the line in 1896, the population of that part of Northern Virginia was approximately 2,000 people. The population had subsequently grown to 30,000 by 1930 (an increase of 1400 percent in 30 years). According to the Board, the railway (trolley) service contributed more than any other factor to that growth. It handled two-and-a-half million passengers annually and generated a quarter of a million dollars in revenue each year.[10]

The trolley lines were very successful in promoting real estate development and in providing commuting, shopping and holiday travel services during the first two decades of this century. However, a combination of increased competition from individual automobile use, more highway construction, and loss of ridership during the early Depression years led to the closing of all of Northern Virginia's trolley lines between 1928 and 1932.

2) Heavy Rail Commuting - Three heavy rail lines also funneled through Northern Virginia in the first half of this century. The predecessors of two of these lines, the current CSXT (through Fredericksburg) and the Norfolk Southern Railway (through Manassas), had major roles in area Civil War battles as both the Union and Confederate armies sought to control rail routes for movements of troops and supplies. The battles of First and Second Manassas and the battles around Fredericksburg occurred near major rail junctions or routes which led into the Confederate heartland.

After the Civil War, the restored routes provided passenger and freight services for Northern Virginia. The Alexandria and Harper's Ferry Railroad was originally established in 1847, went bankrupt in 1878, was reorganized in 1900 and extended westward to Bluemont, Virginia. In 1912, the rail line was leased to the Washington and Old Dominion (W&OD) Railroad. This line carried freight and passengers from Leesburg and points westward to Alexandria on eleven round-trip trains per day.[11]

All three rail lines provided commuter and convenience travel from the outlying cities and towns. However, these passenger services came under increasing competition from the automobile. Privately operated commuter rail service in Northern Virginia originally ended in 1941 when the W&OD discontinued service. Commuter service was re-activated on the line during World War II as a fuel conservation measure. Ridership again declined after the war. The W&OD then ended the last privately-operated, heavy rail commuter service in Northern Virginia in 1951.

3) Metrorail Commuting - A series of studies commissioned by the National Capital Transportation Agency provided the groundwork for future rapid rail

and commuter rail systems to serve the Washington metropolitan area. A 1960 study proposed use of the Norfolk Southern Railway line for commuting purposes. The study also suggested a new commuter track be constructed parallel to the CSXT line (then the RF&P line) for similar purposes.[12] A 1963 study proposed a combination of commuter rail and rapid rail for the Washington metropolitan area.

In 1967, the Washington Metropolitan Area Transportation Authority proposed a combined 70 mile rapid rail system and a 90 mile commuter rail feeder system. Approximately 40 miles of the 90 mile commuter rail would be in Northern Virginia. Two railroad rights-of-way would be used. One route would use the then RF&P right-of-way from below Lorton to provide commuter service to Alexandria, the Pentagon and Washington, DC. A second commuter line would use the old W&OD right-of-way and run from Herndon, through the new development of Reston, through Falls Church, Arlington County and on to Washington. This line had been officially declared abandoned in 1965, and the right-of-way had been purchased by the Virginia Electric Power Company as a power line corridor.

Construction started in the 1970s on a revised 103 mile rapid rail system for Washington and the Virginia and Maryland suburbs. The system, called Metrorail, was planned for completion by the year 2001 and included three lines with service into Alexandria and the counties of Arlington and Fairfax. The Metrorail system had 18 stations in Northern Virginia in 1992, with one more planned—the Franconia-Springfield station in southern Fairfax County. Three Metrorail routes—the Orange, Yellow and Blue Lines—served the stations. Only two Metrorail stations—Dunn Loring and Vienna on the Orange Line in Fairfax County—were located outside the I-495 Beltway. The two stations were accessible to commuters on I-66. Average daily boardings from the 18 operating Metrorail system stations in Northern Virginia in 1992 were 120,500.[13]

The attraction of construction and operational funding requirements for the new Metrorail system pushed the commuter rail feeder components of the combined rapid rail-commuter rail system to a "back burner" as a congestion relief alternative. The decision not to proceed with simultaneous construction of a commuter rail link to Metrorail would not have had as much impact if the region had not experienced the explosive growth and extensive land development of the 1970s and 1980s. By the time commuter rail was again seriously considered, development had expanded rapidly outward and the W&OD right-of-way had been developed as a hiking, biking, equestrian linear park. The opportunity to have a grade-separated right-of-way on the old W&OD line for commuter rail purposes had been lost.

C. Existing Public Use Transit Systems

Three of the counties and three of the cities in the VRE study region in 1992 did not have public bus systems to provide local transit services. These localities were the Counties of Prince William, Stafford and Spotsylvania and the Cities of Fredericksburg, Manassas and Manassas Park.

There were a variety of large and small public transit systems serving Alexandria and the counties of Arlington and Fairfax. The systems provided inter-jurisdictional travel and feeder services to Metrorail and the two VRE stations in Alexandria and at Crystal City in Arlington County. The various systems were:

- the Alexandria *Dash* system which provided city-wide service in Alexandria;
- the Arlington Trolley which traveled a three-mile circuit and provided commuter rail connections in Crystal City;
- *Metrobus* provided extensive service in central Fairfax County, in Arlington County and in Alexandria; operated by the Washington Metropolitan Area Transit Authority, Metrobus also served Washington, DC and suburban Maryland;
- the Fairfax *Connector* was a public-private system which served southeast Fairfax County;
- the Tysons *Shuttle* served a nine stop circuit in the Tysons Corner area of Fairfax County;
- the Reston *RIBS* (Reston Internal Bus System) served the Reston planned community in Fairfax County;
- the City of Fairfax *Cue* provided limited route coverage in the City of Fairfax, and
- the *Link* Trolley was a cooperative venture providing free trolley transit between the central business district of the City of Fairfax and adjacent George Mason University.

D. Express Commuter Bus Services

Commuter express buses have provided a very important alternative to SOV commuting in Northern Virginia for many years. Most of the commuter expresses buses were initially privately owned and operated. These systems operated from as far away as Culpeper, Spotsylvania County, Warrenton and Manassas. They primarily traveled in the I-95 and I-66 corridors and provided service to the major employment concentrations at the Pentagon, Rosslyn, Crystal City and the Washington, DC mall area. Riders met the express buses at Park & Ride lots along the major corridors. From 11 private and one public express bus operators providing 43 round trips per day in the VRE study area in 1984, the system has increased to eight private and three publicly operated carriers providing over 128 round trips per day in 1992. These buses carried an average of 4100 round trip commuters per day. Express bus destinations in 1992 were basically the same as in 1984, but

included Fort Belvoir, Crystal City, the Pentagon and Navy Annex, and various points in Washington, DC. One bus also served the Navy Federal Credit Union complex in Vienna daily from Spotsylvania and Stafford Counties. The buses serving the I-66 corridor originated in Culpeper, Warrenton, Front Royal, and Manassas; destinations included Rosslyn, as well as Crystal City, the Pentagon/Navy Annex, and Washington, DC. Additional buses from Manassas also provided express access to the Vienna Metrorail Station. (See more detailed discussion in Chapter IV.E.)

E. Carpool and Vanpool Ridesharing

A matching service for commuters to the greater Washington area was started by the Metropolitan Washington Council of Governments (MWCOG) in 1974. By 1980, the carpool matching program was expanded to incorporate vanpools, buspools and mass transit matching. The emphasis changed to "ride sharing."[14] The advent of personal computers and interactive software technology led local governments to become interested in operating their own ride sharing programs to benefit their constituents.[15] The car- and vanpool programs in Northern Virginia grew to become among the most successful in the county in the 1980s. The availability of some High Occupancy Vehicle (HOV) lanes on I-95 and I-66 encouraged ridesharing as a means of providing access to these faster flowing commuter lanes. The ridesharing modes also provided the only alternative to SOV commuting from many parts of the VRE study area. (See Chapter IV.D and IV.E for more details on carpool and vanpool programs.)

F. The Northern Virginia Commuter Rail System (the VRE)

Creating a multi-jurisdictional transit system is never simple. The VRE commuter rail system was no exception. Virginia's governmental structure which separates cities and counties required that multi-jurisdictional agencies take the development lead. Special Federal legislation and a Congressionally authorized insurance program were required to enable use of tracks and facilities owned by four existing railroad companies. Many hurdles had to be overcome, and public expectations waxed and waned during the process.

1) Governmental Jurisdictions - Counties and cities in Virginia have a unique relationship; counties and cities are truly independent jurisdictions. Even though completely surrounded by a county, an independent city is not part of that county. Its land area, population and tax base are not included in the totals of the surrounding county. Governments may maintain completely separate infrastructure systems or may participate in shared systems. Cities and counties may also participate in semi-autonomous service districts, commissions, or authorities organized to provide specific products or services. The participating members have established

oversight voting rights and financial support obligations in such organizations. Towns, however, are part of the county. Their populations and tax base are included in the county's base. Towns may participate as members in some multi-jurisdictional organizationsbut more frequently have the county representing their interests.

As proposed in 1984, the commuter rail system was to have stations in five Virginia counties—Arlington, Fairfax, Prince William, Stafford, and Spotsylvania; four Virginia cities—Alexandria, Fredericksburg, Manassas, and Manassas Park; two Virginia towns—Clifton and Quantico; and in the District of Columbia. In addition, the facilities of four railroad systems—the CSXT, Norfolk Southern Railway, Conrail and Amtrak—would be required. As planning for commuter rail progressed, two of the proposed commuter system jurisdictions, Clifton and Spotsylvania County, chose not to participate. Planned stations were eliminated from those two locations.

The multi-jurisdictional extent of the planned commuter rail system required a multi-jurisdictional organization for system development. The Northern Virginia Transportation Commission (NVTC)—established in 1964 and representing six local jurisdictions—initially spearheaded the effort to establish commuter service on existing rail lines. A new multi-jurisdictional organization, the Potomac and Rappahannock Transportation Commission (PRTC), representing the counties and cities not part of the NVTC but involved in the planned commuter rail system, was created in 1986 to function in a similar capacity to NVTC. The two multi-jurisdictional organizations became the co-developers and co-operators of the VRE system.

2) Chronology of the Northern Virginia Commuter Rail System - The VRE commuter system was the result of a long gestation period. The VRE Inaugural Program stated "...after nearly two decades of false starts, the commuter rail project finally began to take on a realistic shape."[16] The extended period over which VRE was created provided opportunities for jurisdictions, developers, and individuals to position themselves for its arrival. One of the goals of this study is to discern if and when land acquisition and housing purchase activities began which were based on this future rail service. How system planning and development activities, both positive and negative, affected public perception of the reality of coming rail may have affected timing of related land use and housing purchase activities. The following is a summary chronology from an NVTC annual report and the VRE Inaugural Program of highlights, low points and activities that occurred during the creation of what became the Virginia Railway Express commuter rail system.

1964 The Northern Virginia Transportation Commission (NVTC) was created by Virginia General Assembly.

1965 The Commission acted to oppose abandonment of the Washington and Old Dominion Railway because of its potential for regional transportation and sought financing to purchase the railroad for rapid rail and freight purposes, with emphasis on continued private enterprise operation.

During reconstruction of the Shirley Highway (I-395), Commissioners called for the use of the RF&P (Richmond, Fredericksburg & Potomac, now the CSXT) for experimental commuter rail service to relieve congestion. Self propelled, rail diesel cars (RDCs) were suggested, with service from outlying areas to connect with the planned subway system (Metrorail). The Commission voted to conduct discussions with the RF&P and hire staff to accomplish feasibility studies. Second-hand, good condition RDCs were located.

A consultant (the Transit Engineer for the City of Philadelphia) recommended initial service with RDCs and to accommodate future growth, diesel locomotive-hauled trains and ultimately electric trains. Initial service would include workday trips (and one Saturday trip) extending to Lorton and Woodbridge, and eventually to Quantico and Fredericksburg. Fares would be three cents per mile plus a 15 cent boarding charge (a trip to the current L'Enfant station from Franconia would have been about 50-cents one way).

The Commission also considered a proposal from an Alexandria company for a monorail connection for National Airport/Crystal City/Pentagon, estimated as a $5 million project.

Representatives of private bus companies (AB&W and D.C. Transit) agreed to cooperate in providing feeder bus service to commuter rail, using joint fares. A proposed train schedule was submitted to the RF&P. Federal agencies agreed to poll their employees to help NVTC estimate patronage.

The Commission urged Loudoun and Prince William Counties to join NVTC.

1966 Staff discussions with the RF&P continued. Possibilities of operating pooled service with the B&O Railroad, providing direct links between Franconia and Rockville, were explored. In response to many requests from Fairfax County residents, the scope of the study was expanded to include the [Norfolk] Southern Railway.

Commissioners suggested that commuter rail services could be integrated into the planning efforts of the Washington Metropolitan Area

Transit Authority [WMATA], which was created by Interstate Compact in that year.

The Commission voted to commend the RF&P for its "splendid cooperation" in preparing cost estimates and requested that the railroad help to provide a test train with borrowed RDCs from the B&O.

1967 Plans were discussed for a six-year demonstration of commuter rail service on the RF&P between Franconia and Washington, D.C., with one-third of the costs to come from local governments. Commuter rail service could be replaced by proposed rapid rail service at the end of the six-year period. NVTC requested that WMATA apply for a federal demonstration grant.

The Commission proposed a test network to be part of WMATA planning for three commuter rail lines: 1) RF&P, Franconia to D.C.; 2) Southern Railway, Alexandria to Sideburn in Fairfax County; 3) W&OD, on new and abandoned rights-of-way, between Crystal City and Herndon, Vienna and the city of Fairfax. Capital costs would have been $400 million, including rolling stock.

The Commission, noting great similarities between Northern Virginia and the Toronto Metropolitan Area, agreed to send observers to the initiation of GO-Transit commuter rail service.

The Commission approved the final report of its commuter rail consultant on feasibility of the RF&P project, and asked staff to continue discussions with the railroad to implement the service.

In a telegram to the Commission, the President of the RF&P objected to the proposal to bring freight and passenger trains from the W&OD right-of-way into Washington Terminal via the RF&P, and called the proposal "operationally unfeasible." The NVTC staff argued that about $20 million would be needed to upgrade the W&OD, but WMATA's General Manager put the figure at over $70 million, with an operating deficit per passenger of $1.25, and service inferior to the rapid rail service proposed by WMATA's consultants for that corridor. He went on to warn that if commuter rail service was provided by NVTC in the RF&P corridor, a 10-year delay in providing Metrorail service would result since the corridor would be given a lower rapid rail priority.

1968 The WMATA staff completed their evaluation of NVTC's proposed six-year commuter rail

demonstration on the RF&P. Capital costs would be $12.3 million, with a $4.6 million salvage value. Operating costs would total $14.7 million over six years, with passenger revenue less bus feeder costs totaling $5.4 million. The net project cost was estimated at $17 million, with trains at 15-minute headways over two-hour morning and evening rush periods, plus every 60 minutes mid-day, evenings and Saturday. The subsidy would be $1.23 per rider, for about 9,000 work day trips.

The WMATA staff warned that seeking federal funding for the six-year experiment could jeopardize funding for the proposed regional rapid rail system. The Commissioners responded that it was wise to experiment with commuter rail service while new rapid transit lines were being designed, financed and built. The initial cost of commuter rail was minimal compared to rapid transit, and it could be integrated with rapid transit and extended outward as demand grew. Consultants informed the Commission that at least two years would be required to order rolling stock, build stations and parking lots, and rearrange tracks.

Following extended discussions and public hearings, NVTC voted to support a regional transit system for Northern Virginia with rapid transit in the three proposed commuter rail corridors, and only interim commuter rail service. In adopting the regional system plan, the WMATA Board omitted the W&OD corridor but called for a staff study of interim commuter rail services.

1969 A Senate Public Works Committee report reiterated the feasibility of commuter rail service along the RF&P. The NVTC Commission voted to urge WMATA to "redouble" its efforts to investigate the integration of commuter rail service into its rapid transit network, since the Franconia/Springfield Metrorail station was not planned to open until 1978. The Commissioners continued to comment on the difficulties of simultaneously seeking federal funding for WMATA's rapid transit network and interim commuter rail service. The Commission formed a subcommittee to work with WMATA and the Transportation Planning Board to implement commuter rail service, and another to identify consultants to reconcile different conclusions of the Public Works Committee and WMATA regarding commuter rail costs.

1971 USDOT Secretary Volpe favored the use of existing rail rights-of-way for commuter rail service, and his staff undertook a feasibility study of such service in Northern Virginia and Southern Maryland.

1972 A consultant's study (the fourth in five years) was presented to the Commission. Four daily trains would carry 2,500 passengers in Virginia (and additional service would capture 4,200 daily riders in Maryland). By comparison, NVTC's Shirley Busway demonstration was carrying almost 18,000 daily riders at the time. Capital costs would be $9.5 million with used rolling stock, or $16 million with new, and first year net operating subsidies would be $500-750,000. It was reported to the Commission that the private railroads were not interested in undertaking such service.

1973 The Commission discussed $1.8 million appropriated by Maryland for state purchase of a commuter rail system. NVTC supported similar action in Virginia and asked the WMATA Board to report to NVTC by January, 1974 on the concept of including commuter rail service in its Mass Transit Plan, as was proposed in pending federal legislation.

1974 An Amtrak official contacted the Commission, suggesting that it was possible to obtain funding (one-third from Amtrak and two-thirds from the District of Columbia) for a rail line from Frederick, Maryland to Richmond, permitting commuter service in Virginia as far south as Quantico.

The Transportation Planning Board (TPB) staff urged NVTC to work with WMATA, Prince William County and environmental groups to provide a concrete proposal for commuter rail service to include in the TPB's plans and programs.

Prince William County officials developed a proposal for service on the (Norfolk) Southern Railway and the RF&P (CSXT) after speaking with the Presidents of those railroads. Both were believed to have surplus locomotives and railcars that could be refurbished. The County intended to seek $700,000 in grants to help buy rolling stock and finance parking lots and shelters. Operating costs would be met from passenger fares for the single daily round trip. Stops on the Manassas line would be at Clifton and Burke on the way to the District of Columbia. On the RF&P, service would originate at Quantico with stops at Woodbridge and one site in Fairfax County before reaching the District. An anticipated 600-800 daily riders would generate $1800-$2400 per day to cover the $1200-$1500 daily operating costs. If no capital grants were obtained and instead equipment was leased, fares would be $3.00 per round-trip to cover the $2.69 per passenger daily operating costs, assuming 90 percent of the available seats were filled.

Prince William County did not seek NVTC's support or participation.

Maryland initiated commuter rail service on the B&O's Brunswick Line.

1978 The Commission reviewed the status of commuter rail proposals. The RF&P was reported to be "totally disinterested" in any commuter rail service, in light of its heavy freight schedules. Also, difficulties in financing the Maryland system were cited as grounds not to proceed with further in-depth studies on this line. The Commission contacted the Norfolk Southern Railway regarding possible service from Culpeper, Manassas and Burke Centre to the King Street Metrorail station in Alexandria.

1980 Legislation providing a two percent motor fuels tax in member jurisdictions was approved to provide system funding for use by the NVTC.

1981 The State Rail Plan contained an element concerning commuter rail service for Northern Virginia. The TPB [Transportation Planning Board] asked NVTC to consider coordinating a further study, in light of indications from the Virginia Department of Highways and Transportation that the RF&P might now be amenable to allowing commuter rail service on its tracks. Proposals for additional passenger service to Newport News and Busch Gardens [at Williamsburg, Virginia] might lead to new opportunities for commuter service.

The Commissioners commented on the results of earlier studies that identified high costs of refurbishing rolling stock and entry into Union Station, as well as the reluctance of private railroads, as stumbling blocks. Staff was directed to update previous studies and report back to the Commission.

1983 The Metropolitan Washington Council of Governments (MWCOG) completed Phases I and II of a Northern Virginia commuter rail study, which analyzed travel demands, capital requirements, operations issues and institutional problems. Service contemplated in the study would link with outer Metrorail stations and not continue into the District of Columbia. MWCOG requested that NVTC and local governments express interest before Phase III of the study was undertaken. NVTC staff recommended against further study, citing opposition of the railroads and limited funds, among other reasons. Some Commissioners urged that the study proceed, since private conversations with rail officials indicated a willingness for further discussions.[17]

1984 The third phase of a state-sponsored commuter rail feasibility study, completed by R. L. Banks and Associates for the Metropolitan Washington Council of Governments, called for using new locomotives and railcars, with service terminating at Alexandria. About 3,000 daily riders were expected. The NVTC staff introduced the study concept to the Commission and a Prince William County member of the [Virginia] House of Delegates. The staff was directed to report back regarding the terms and conditions required by the RF&P and Southern [Railway]. [Acceptance of the study findings by NVTC and directions to their staff to initiate discussions with the RF&P and Norfolk Southern Railway began the final process which eventually led to creation and opening of the VRE. This action was selected as the "defining event" and 1984 as the anchor year for this study.]

1985 Monthly briefings were initiated for Commissioners by the NVTC staff. Representatives of the Virginia Department of Highways and Transportation reported that the RF&P was amenable to further discussions if no railroad subsidy would be required. In April, the NVTC staff proposed a two-year experimental service with used railcars and locomotives and with reduced crews at significant savings. A two-year budget was prepared, involving eight trains operating during rush hours. The NVTC endorsed the plan and provided staff's findings to a new State Legislative Subcommittee on Commuter Rail, to help determine the willingness of local jurisdictions and the Commonwealth to participate financially.

The Commission adopted a resolution approving a detailed scope of work to implement the commuter rail experiment.

The NVTC staff accompanied federal and state officials to examine used railcars and locomotives in Pontiac, Michigan and Toronto [Canada]. Suitable used railcars could not be located, although locomotives were readily available for rehabilitation.

A draft Master Agreement was negotiated with several local jurisdictions, and a basis for sharing costs and revenues was agreed to. Station sites were identified. Outlying jurisdictions discussed joining the NVTC.

1986 The Friends of the Virginia Railway Express, founded by an NVTC Commissioner, held a Rail Rally to drum up popular support on March 17, 1986.

In a June speech to the NVTC, Governor Baliles

committed the Commonwealth [of Virginia] to financial support of commuter rail.

In September, the General Assembly, acting in special session, substantially increased NVTC's transit assistance.

Insurance for the pilot train was not commercially available at any price. The experimental two-year run was delayed.

Work began on establishing a self-insurance trust, with a $5 million state contingent loan and a $150,000 grant.

New legislation created the Potomac and Rappahannock Transportation Commission (PRTC) and implemented a two percent motor fuels tax in its member jurisdictions to help pay for the commuter rail project.

1987 An accident between a Conrail locomotive and Amtrak train in Chase, Maryland called into question the enforceability of Amtrak's no fault insurance plan. Conrail withdrew its support for the project despite two years of active cooperation. A ridership study completed by R. H. Pratt raised earlier estimates to almost 4,000 daily, depending on the amount of parking, and provided station-specific estimates.

The NVTC and PRTC endorsed the Master Agreement in concept.

A detailed financial plan was developed with financial advisors, bond counsel and underwriters. A Commonwealth Transportation Board resolution provided a stable financial basis for planned borrowing by NVTC. An insurance broker of record was selected by the Commissioners.

Agreement was reached with Amtrak on an operating contract that provided modest crew reductions.

1988 The commuter rail project was officially named the "Virginia Railway Express." A distinctive, historical logo was adopted.

Financial advisors, bond counsel and bond underwriters advised the [NVTC and PRTC] Commissions on a financial plan and $79 million debt issue to purchase 38 railcars and 10 locomotives while funding the Self-Insurance Trust.

All six participating and contributing jurisdictions endorsed the Master Agreement and financial plan in concept. Fredericksburg decided not to participate.

Amtrak, the Southern Railway, the RF&P, and the Virginia Division of Risk Management agreed to the Self-Insurance Trust.

VRE's Operations Board was created, selected its officers, and began to meet monthly.

1989 In October, the Commissions voted to execute the VRE Master Agreement, Liability Insurance Management Agreement, and operating agreements with Amtrak, Southern Railway and the RF&P. The agreements were signed in a special ceremony and train ride on October 27, 1989.

1990 Following an exhaustive investigation of the low-bidder in the rail car procurement, the Commissions awarded the contract to Mitsui and Company (USA) Inc. and its Brazilian partner, Mafersa S.A. All railcars were promised in 24 months, with sufficient railcars to start service due by October, 1991.

The Commission's $79 million bond issue closed on February 7, 1990.

Fredericksburg and Manassas Park agreed to join PRTC and become full participants in the VRE project.

President Bush vetoed Amtrak's re-authorization, including Conrail indemnification for VRE. Congress failed to override. Shortly thereafter, a new bill passed and was signed by the President. The Conrail operating agreement was then executed.

1991 Deliveries of new railcars were delayed.

Rehabilitated locomotives were completed ahead of schedule by Morrison-Knudsen, and some were leased to other operators pending start-up of VRE service.

Serious negotiations began for up to 25 surplus stainless steel railcars from the Metropolitan Boston Transit Authority (MBTA). Discussions with the Urban Mass Transit Administration failed to yield a solution that would permit transfer of the railcars in time to meet the planned October, 1991 starting date. Late in the year, the MBTA agreed to sell 21 coaches to the Commissions. Morrison-Knudsen was chosen to rehabilitate the units in Hornell, New York.

Revised ridership estimates were provided by R. H. Pratt which increasing expectations to about 4,500 daily riders. JHK and Associates completed a survey research study that confirmed these estimates but suggested as many

as 13,000 riders might choose to use VRE each workday.

A staffing plan was approved for the VRE by the Commissions which provided up to 11 employees for the Operations Group. Management and policy making responsibilities were defined.

"The Express" was selected as a system nickname. The motto was "You've got a train to catch."

The Commissions agreed to help sponsor the new Crystal City Transit Store to sell VRE tickets and help respond to telephone inquiries.

1992 The first two Mitsui railcars arrived from Brazil in January and more followed later in the year.

Separate offices were established for the VRE Operations Group.

Staff prepared a $228 million six-year capital improvements program (CIP) including track improvements, additional rolling stock, new parking, and extended services. If the region determined that it wished to use VRE as part of an aggressive strategy to meet the federal Clean Air Act Amendment mandates, approximately 32,000 daily riders could be served as a result of the investments included in the CIP plan.

Opening dates were chosen: June 22, 1992 for the Manassas Line and July 20, 1992 on the Fredericksburg Line. The inaugural trip, including the Governor as special guest, was set for June 12, 1992, with local station celebrations preceding the openings.[18]

COMMUTING CONDITIONS BEFORE VRE COMMUTER RAIL SERVICE

IV

A. Chapter Summary

Northern Virginians still were following many of the travel routes in 1992 which were first laid down in Colonial days. Although those early patterns had been enhanced over some two hundred years of development, the Nation's capital and the central business district of Washington, DC remained the focus for a series of radial highway and rail routes which had become de facto the major commuting corridors of today. (The HOV lanes currently being extended in both the I-95 and I-66 corridors continue the effort to get ever more commuting value out of existing highway rights-of-way). The VRE became possible because of the pre-existing radial rail routes.

Patterns of employment, however, have been moving ever farther out from Washington, DC. In fact, the centroid of all employment in the DC metropolitan area now rests in Northern Virginia. The radial system of transportation facilities does not well serve this evolving trend. With the exceptions of uncompleted parkways in Fairfax and Prince William Counties, and the Route 28 North corridor, only an overloaded, thirty-year-old Capital Beltway (I-495/I-95) and an assortment of generally narrow and often unconnected former rural roads is now in place to support the ever-increasing demands for circumferential movement to support the new commuting patterns. Just the smallest token of transit services exists to assist this movement of suburb-to-suburb commuters.

Who Went Where: The Northern Virginia Commute Before VRE

Alexandria street scene during the early days of the automobile

The rate of regional growth has made it obvious that Northern Virginia can not—economically or environmentally—build its way out of growing highway traffic problems. Population and vehicle growth have exceeded the ability to provide the additional lanes and new routes needed to move both regional and through traffic without regular congestion and delays. ("Regional traffic" is defined as that with an origin and/or destination in the Washington metropolitan area, including commuters; "through traffic" is that passing through the area from outside the DC metropolitan area without stopping.) Comparisons of 1980 and 1990 traffic counts on the I-95, I-395 and I-66 routes indicate that traffic increases averaged 4-6 percent annually during the early 1980s. The annual traffic increases slowed significantly during the late 1980s and early 1990s, years which coincided with an economic recession.

In 1984, the Metrorail system was already operating in Arlington County. Construction was continuing to extend the lines. Public bus services were available in portions of the study area. Privately operated express buses and private and commercial car- and vanpools carried some commuters from the suburban and exurban counties.

By 1992, the Metrorail system in Northern Virginia was almost complete, and the VRE was finally about to overcome its last delays and initiate service at mid-year. Highway volume was significantly higher than in 1984. More public- and privately-operated express buses were in use in the study area. A successful ridesharing program was continuing to operate, although the highly-successful vanpool program that had evolved during the 1980's was declining in percentage of participation. High Occupancy Vehicle (HOV) lane extensions on both I-95 and I-66 were under construction. Park & Ride lots were heavily used. Even as population increased, however, the percentage of travelers using public transportation had decreased.

B. Major Commuter Routes

Land development in Northern Virginia basically has followed the radial road and rail patterns. It was originally focused along the major overland routes south and west from the ferries and bridges crossing the Potomac River and from the early port of Alexandria. The land use pattern began in the colonial era, south along the major route connecting the southern and northern colonies (generally following the current US Route 1 alignment) and west along the routes from the Virginia Piedmont and the Shenandoah Valley. Railroad and trolley system alignments subsequently reinforced the early road networks.

The historic routes remain major commuting corridors today. From the south, I-95 and US 1 continue as the primary access routes. From western Prince William, Fauquier, and Loudoun Counties, I-66, US 50, US 29,

Route 28, and Route 7 remain major commuting routes. Within Fairfax County, all the mentioned corridors, except Route 28, cross the Capital Beltway (I-495) into Alexandria, Arlington County and Washington, DC. (See Figure 3). The radial pattern is emphasized by the limited number of bridges crossing the Potomac River for travel into or through the metropolitan core. The Capital Beltway is the only major artery for circumferential traffic between Northern Virginia and Maryland.

Suburbanization is filling in the wedges between the radial corridors. The commuting pattern is changing in response to this suburbanization. The centroid of metropolitan employment has moved into Fairfax County from Washington, DC.[19] (See Figure 5.) An increasing number of Northern Virginia commuters are now traveling suburb-to-suburb to job locations within Northern Virginia and Maryland rather than into Washington. In 1990, 72 percent of Northern Virginia's workers were employed in Northern Virginia; only 21 percent worked in Washington, DC, and four percent in suburban Maryland.

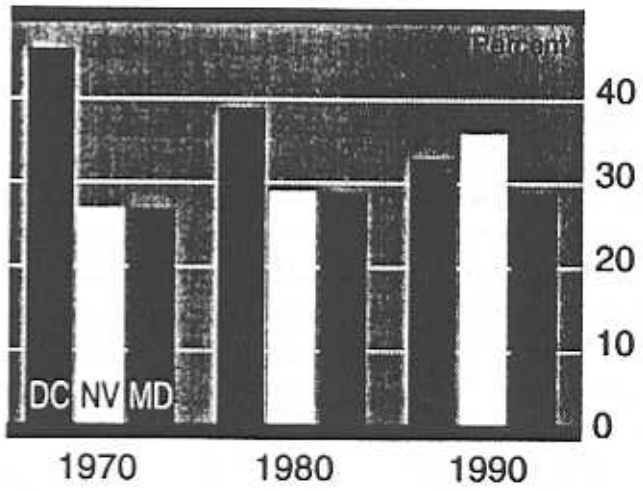
Nine percent of all workers living in Washington, DC and suburban Maryland traveled to jobs in Northern Virginia.[20] The limited number of major suburb-to-suburb transportation routes, both within Northern Virginia and to/from Maryland, required area workers to use the radial routes and the Beltway for much of their commuting and for business travel.

C. Comparative Traffic Counts on Major Commuter Routes

Comparison of traffic counts on selected highway segments between the commuter rail decision year (1984) and the rail opening year (1992) was undertaken as a descriptor of commuter behavior. The data source used was VDOT's Average Daily Traffic (ADT) Volumes on

Figure 5

Percentage of Metro Area's Total Workers in the District of Columbia, Northern Virginia, and Suburban Washington



Source: Washington Post, December 22, 1992

Interstate, Arterial and Primary Routes. This yearly document tabulates ADT counts on all segments of interstate and primary routes throughout the Commonwealth of Virginia; it typically is published about a year and a half after the year covered. (At the time of data collection for this study, neither the 1991 nor 1992 editions had become available. Thus, 1984 data necessarily was compared in this report with 1990 data, the latest available. For Phase II of the study, it is recommended that the 1990 data be updated/replaced by either 1991 or 1992 data, depending on which reflects the latest counts taken *before* the June 1992 startup of the VRE.)

In Table 1 and Figure 6 on the following pages, the 1984 and 1990 ADT counts on I-95/I-395 and I-66 are shown for selected segments that fall within the VRE Secondary Catchment Areas. (See Chapter II.F.3.) Selected primary road segments around Fredericksburg also were documented. Data tabulations for these segments provided, in addition to total vehicle counts, a subset for "Cars, Vans, and Light Trucks" (i.e., pickups) which generally can be categorized as "commuting-type vehicles." Unfortunately, VDOT did away with the separate counting category for buses between 1984 and 1990. It now includes buses in an undifferentiated ADT category with larger trucks; thus, no measure of bus operations is available any longer from ADT count data.

Along I-95, Table 1 (and its geographic presentation in Figure 6) shows that the largest *percentage* increase in vehicle counts occurred at Segment 3, which crossed the Stafford-Prince William County line about 30 miles south of the Fourteenth Street Bridge over the Potomac River into Washington. Percentage growth at Segment 3 was 88.1 percent for commuter-type vehicles, 77.6 percent for all traffic. Even though the percentage of traffic growth lessened on the closer-in segments, which passed through earlier developed portions of Prince William and southern Fairfax Counties, the *actual volume change* continued to increase approaching the I-495 Beltway, with the highest volume change (47,900 commuter-type vehicles, 54,780 total) occurring on Segment 8, between Springfield and the Beltway interchange. (The latter segment continued its dubious distinction of being the most heavily-traveled highway segment in all of Virginia.)

Between the Occoquan River crossing north of Woodbridge and the segment north of the Lorton exit (i.e., between Segments 5 and 6 in Table 1) there was a noticeable decrease in the growth of actual volume change. This indicates that a significant amount of the increasing traffic stream, from Prince William County and south, exited I-95 at the US Highway 1 and Lorton interchanges for work destinations in southeast Fairfax County (most notably Fort Belvoir), and to the free Park & Ride lot there from which the Fairfax Connector ran express buses directly to the Pentagon. After future completion of the Lorton VRE station, further decreases

Table 1

Average Daily Traffic Volumes on Selected Segments of I-95, I-395, and I-66: 1984 and 1990

SEGMENT LETTER	RT	BETWEEN						
I-95 OUTSIDE THE BELTWAY								
1	I-95	VA 207 E of Carmel Ch.	US 1 N of Massaponax	27,450	36,700	33.70%	34,975	46,450	32.80%
2	I-95	VA 3 W of Fredericksbg	US 17 W of Falmouth	38,900	59,200	52.20%	48,910	70,050	43.30%
3	I-95	VA 610 W of Aquia	VA 234 N of Dumfries	40,300	75,800	88.10%	48,030	85,280	77.60%
4	I-95	VA 619 W of Triangle	US 1 N of Woodbridge	46,200	82,700	79.00%	53,480	93,810	75.40%
5	I-95	VA 123 S of Occoquan	VA 617 near Newington	63,300	101,300	60.00%	70,520	110,660	56.90%
6	I-95	VA 642 Lorton	VA 644 Springfield	75,500	107,100	41.90%	86,770	123,570	42.20%
7	I-95	VA 617 near Newington	I-495/I-395	87,300	122,600	40.40%	100,310	139,600	39.20%
8	I-95	VA 644 Springfield	I-495/I-395	139,100	187,000	34.40%	154,020	208,800	35.60%
I-395 INSIDE THE BELTWAY								
9	I-395	I-95/I-495	VA 236 Lincolnia	111,800	145,200	29.90%	119,250	154,300	29.40%
I-66 OUTSIDE THE BELTWAY								
10	I-66	Rt. 29	Rt. 234	24,350	35,200	44.60%	26,930	39,270	45.80%
11	I-66	Rt. 234	Rt. 29 W of Centreville	36,900	53,700	45.50%	40,550	59,790	47.40%
12	I-66	Rt. 29 W of Centreville	Rt. 28	35,600	52,900	48.60%	38,740	58,420	50.80%
13	I-66	Rt. 28	Rt. 50	49,300	81,100	64.50%	52,650	86,960	65.20%
14	I-66	Rt. 50	Rt. 123	76,500	108,500	41.80%	83,010	116,800	40.70%
15	I-66	Rt. 123	Rt. 243 Nutley Street	80,500	115,000	42.90%	87,380	124,090	42.00%
16	I-66	Rt. 243 Nutley Street	I-495	111,300	152,100	36.70%	118,760	161,950	36.40%
I-66 INSIDE THE BELTWAY								
17	I-66*	I-495	Rt. 7	59800*	79200*	32.40%	60300*	79440*	31.70%
18	I-66*	Rt. 7	Rt. 29 West	69900*	85640*	22.50%	70360*	85640*	21.70%
19	I-66*	Rt. 29 West	Rt. 120	82800*	99490*	20.20%	83460*	99490*	19.20%
20	I-66*	Rt. 120	Rt. 29 East	76200*	98100*	28.70%	76850*	98100*	27.70%
21	I-66*	Rt. 29 East	District of Columbia Line	67980*	89740*	32.00%	68500*	89740*	31.00%
FREDERICKSBURG AREA								
a	US 1	VA 208 Four Mile Fork	S Cty Limit Frederick'bg	14,930	21,360	43.10%	15,650	22,400	43.10%
b	VA 2	VA 1301 Sylvania Hts	SE Cty Limit Frederick'bg	9,920	12,730	28.30%	10,650	14,055	32.00%
c	VA 3	VA 218 East Intersection	VA 218 E Fredericksburg	10,270	0	N/A	10,825	0	N/A
d	VA 3	VA 601 East Intersection	VA 3 Bypass Bridge	0	9,280	N/A	0	10,745	N/A
e	VA 3	VA 218 E of Fredericksbg	E Cty Lmt Fksbg-Sctt Br	23,670	26,290	11.10%	14,470	26,990	10.30%
f	US 1	US 17/VA 212 Falmouth	N Cty Lmt Fksbg-Cambr	24,660	29,880	20.20%	15,875	31,210	20.60%
g	VA 3	VA 610 Five Mile Fork	W Cty Lmt Fkbg-W I-95	22,050	29,320	33.00%	22,925	30,750	34.10%

* I-66 segments are HOV(3) only during commuting hours.

Source: Virginia Department of Transportation; O. Davis Brown, III, Transportation Consultant.

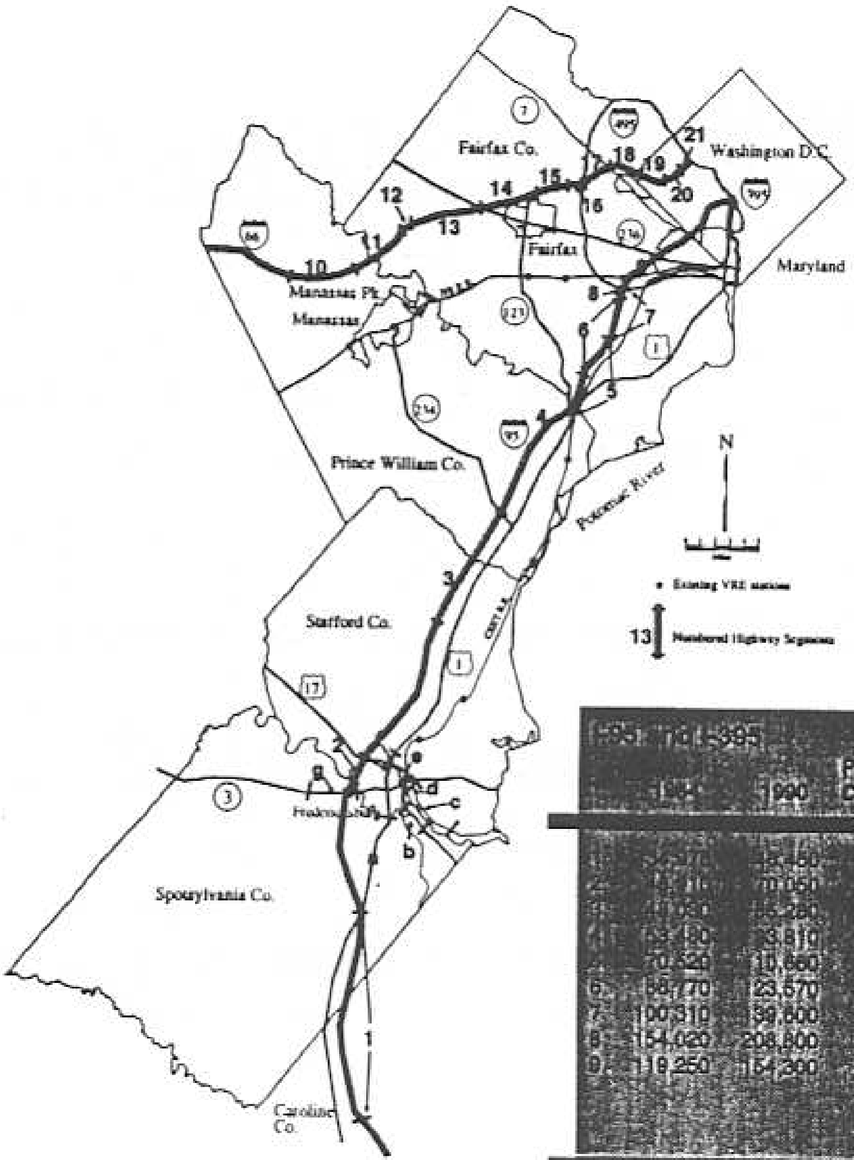


Figure 6

Average Daily Traffic Volumes on Selected Segments of I-95 and I-395, I-66, and Roadways in Fredericksburg for 1984 and 1990

Source: Virginia Department of Transportation

I-95 and I-395

	1984	1990	Percent Change
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	70,050	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	75.[illegible]
[illegible]	70,520	[illegible]	56.9
6	88,770	[illegible]23,570	42.4
7	100,310	[illegible]39,600	39.2
8	154,020	208,800	35.6
9	119,250	154,300	29.4

I-66

	1984	1990	Percent Change
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]
13	[illegible]	84,900	[illegible]
14	87,310	116,800	33.8
15	92,470	124,090	34.2
16	125,270	161,960	29.3
17	64,000	79,440	24.1
18	70,360	85,640	21.[illegible]
19	83,840	99,490	19.2
20	76,850	98,100	27.7
21	68,500	89,740	31.0

Fredericksburg

	1984	1990	Percent Change
a	[illegible]	[illegible]	[illegible]
b	[illegible]	[illegible]	[illegible]
c	[illegible]	[illegible]	N/A
d	[illegible]	[illegible]	N/A
e	24,470	[illegible]	[illegible]
f	25,875	31,210	[illegible]
g	22,925	30,750	[illegible]

in the volume of change could reflect additional cars diverting to the VRE at the Lorton exit.

Inside the Capital Beltway, where the I-95 radial commuter corridor became I-395, a drop was shown of 54,500 vehicles to a total of 154,300 from 208,800 in the previous segment (in 1990 daily volume). The drop reflected the large number of vehicles exiting from I-95 onto the Beltway for circumferential or through travel. Since a stream of inbound vehicles also *enters* I-395 here from the Beltway, the number of vehicles *leaving* I-95 at the Beltway actually must be significantly larger than 54,500.

On I-66 outside the Beltway, the largest *percent* change in commuter and total vehicle traffic between 1984 and 1990 occurred on Segment 13, approximately 17 miles west of the Theodore Roosevelt Bridge over the Potomac River. But as on I-95, the largest amount of *actual volume* change occurred on the segment just prior to the Beltway, where Segment 16 rose by 40,800 commuting-type vehicles and 43,190 total vehicles. As a comparative note, commuter-type vehicles arriving at the Beltway on I-66 were 34,900 (22.9 percent) less than the number arriving at the Beltway on I-95.

I-66 inside the Beltway is restricted during commuting hours to HOV-3 traffic only. Thus, the decline in total volume and change numbers for Segment 17 reflects the diversion of all truck and non-HOV-3 traffic onto the Beltway. (It must be assumed that the differences in both 1984 and 1990 between "Cars, Vans, and Lt Trucks" and "Total Vehicles" represents a combination of buses and HOV violators.)

Around Fredericksburg, vehicle counts were extracted for 1984 and 1990 on route segments of primary highways that led to its VRE station. As the terminus station of the CSXT line, this station drew from the widest geographical area.[21]

VDOT has estimated the percentage of I-95 "through traffic" (i.e., that traffic *not* having origins or destinations in the DC metropolitan area). In 1990, the percentage of through-traffic on I-95 at Woodbridge in Prince William County was 27.0 percent of the 110,660 daily vehicle traffic count. At the Springfield/Franconia interchange on I-95 in Fairfax County, the through-traffic percentage decreased to 21.4 percent while vehicle volume increased to 139,600.[22] VDOT recorded the following estimated annual rates of growth in through-traffic volume on I-95:

1980-1985	= 4 percent
1985-1989	= 6 percent
1989-1990	= 1 percent
1991+	= 3 percent annually [23]

A significant drop in regional traffic growth in the 1989-1990 period corresponded with the economic recession

which seriously affected the Northern Virginia economy. Zoning and building permit data presented later in this report show that the recession began locally as early as 1987. Construction activity and all its related support industries suffered major reductions during the recession. Retail activities slowed. Many businesses downsized employee forces, inventory orders, and business travel, while business bankruptcies and closings increased. Effects from the recession appear to have reduced the size of annual traffic volume increases—both regional and through traffic—compared to the active economic years preceding 1987.

D. 1984 Commuting Details

Commuters were clogging the traffic arteries of Northern Virginia in 1984. The ever-increasing congestion revived previous interest in commuter rail as a way to remove significant numbers of generally low-occupancy vehicles from local highways (particularly the overburdened I-95/I-395 and I-66 interstate corridors).

Existing HOV facilities on both interstate corridors, basically located inside the Beltway, were being used by an increasing number and variety of commuting vehicles. Private "commuter bus" systems were supplying some express services from outer jurisdictions in both corridors. (See Table 2.) Private carpools and vanpools had been growing ever since the HOV lanes were opened. In addition, by 1984 a significant number of vanpools were being operated commercially by entrepreneurs (often commuters themselves), who were inspired by available federal and local governmental subsidies to purchase and operate from one to a small fleet of the large 15-passenger vans on "door-to-door" routes that took maximum advantage of the HOV lanes. The various Northern Virginia jurisdictions, in conjunction with MWCOG, were actively encouraging all commercial and private ridesharing modes by helping match potential riders with available bus, carpool, and vanpool providers.

"Shirley Highway," the major north-south commuter corridor (I-95/I-395), provided a general-use, mostly-3-lane expressway in each direction, between Fredericksburg and the DC line. For the northernmost 11 miles into DC (from the Springfield ramps just outside the I-495 Beltway), between the north and south general-use lanes, a separate 2-lane reversible roadway provided a noncongested path for HOV-4 traffic (buses and all other vehicles carrying four or more people). The shoulder of I-95 in each direction, from north of the Occoquan River to Springfield, was being strengthened; when completed in 1985-86, these beefed-up shoulders would become interim peak-hour travel lanes, enabling the inner peak-direction lane to be designated a "diamond" lane for HOV-4 use only.

The 10-mile segment of I-66 inside the Beltway, the final stretch of the major east-west interstate which had been recurringly delayed by pre-construction contro-

versy during the 1970's and early 1980's, had finally opened in late 1982 as a two-lane-in-each-direction, significantly-restricted facility. Between the Beltway and the DC line, heavy trucks were prohibited at all times; HOV-4 was in effect for all peak-direction traffic—eastbound from 6:30 to 9:00 a.m. and westbound from 3:30 to 6:30 p.m. On January 3, 1984, a Congressional mandate reduced the HOV-4 restriction to HOV-3, and changed the restricted hours to 7:00-9:00 a.m. eastbound, 4:00-6:00 p.m. westbound. (The hours were to be changed yet again in 1986, to 6:30-9:00 a.m. eastbound and 4:00-6:30 p.m. westbound.) Also in 1984, the link inside the Beltway connecting I-66 to the Dulles Access Road was completed; passenger vehicles proceeding to/from Dulles Airport were permitted to use the restricted portion of I-66 at all times, regardless of the number of occupants.

A computerized Traffic Management System was being installed on both I-395 and I-66 inside the Beltway, which when opened in June 1985 would enable remote-TV surveillance of those interstate segments, electronic metering at ramp entrances, and computerized operation of variable message signs. Directional control for the I-395/I-95 reversible HOV lanes also was provided, through remote operation of directional entrance barriers and related signs/signals.

Parts of the planned 103-mile Metrorail system had been completed and were operating in 1984. In Northern Virginia, Arlington County (including National Airport) was being served. Construction was continuing on extensions—the Orange Line west from Rosslyn and Falls Church to Vienna, and the Yellow Line south from National Airport to Alexandria and Huntington. None of the stations operating in 1984 were designed to provide parking for "transitioning" commuters from the suburbs and rural jurisdictions (a feature of the new stations that would prove to be extremely popular).

The Metrobus system, formed by a merger of four prior DC and suburban bus systems, provided the primary metropolitan-wide "local" bus service. However, the Metrobus route structure was concentrated heavily inside the Beltway (I-495) and radially routed toward the Pentagon and DC. The limited service available outside the Beltway in Virginia consisted largely of "express" rush-hour-only commuter routes to focused destinations—in particular the Pentagon (where a transfer facility to Metrorail already was in operation).

For commuter rail advocates, 1984 became a watershed year. Decisions made and actions taken that year led—albeit down a twisting, turning roadbed—to implementation of service eight years later. MWCOG approved the final report in a series of commuter rail feasibility studies that dated back to the 1960's, and the Northern Virginia Transportation Commission (NVTC) directed its staff to begin talks with the involved railroad companies toward agreements to integrate commuter rail ser-

vice on their lines. This approval and NVTC follow-on actions now are identified as the "defining events" from which actions inexorably proceeded toward actual start-up in 1992 of the Virginia Railway Express (VRE).

E. Recent Trends and Commuting Details

Alternatives to commuting in SOVs did not keep pace with rapid suburban growth in the 1980s. Outward expansion surpassed the areas served by public and private commuter transit services. Decentralization of the job market exacerbated outward movement and suburb-to-suburb commuting. Fairfax County, for example, added 219,000 jobs during the 1980s, compared to 78,000 for Washington, DC. The Northern Virginia region had, by 1990, a larger percentage of regional jobs (36 percent) than Washington, DC (33 percent) or suburban Maryland (29 percent). (See Figure 5.) Also, according to the 1990 Census, 76 percent of workers who lived in Northern Virginia worked in suburban locations, as opposed to working in Washington, DC. In Prince William County, the share was 84 percent of workers.[24]

> The surge in jobs has added thousands of commuters in Northern Virginia, making traffic congestion there among the worst in the country...Commuting patterns in the suburbs have changed dramatically over the decade...Nearly twice as many Marylanders commute to Northern Virginia than the other way around. People from as far away as Baltimore are going to work every day in Fairfax County...The growth in jobs in the District [Washington, DC] is small compared with growth in the suburbs...which could have serious implications for the future of mass transit in the region. Metro [Metrorail], for instance, was designed primarily to move workers from the suburbs to the city...With all of our transit investment into the central area, we're only getting a small increase in employment there...[25]

Comparison of population growth to first time vehicle registration trends provides another indication of what was happening with transportation during the 1980s. The region's population increased 41.5 percent over the decade. As shown in Figure 7, first time vehicle registrations increased rapidly from 1984 to 1986 before starting to decline. There was a 32.8 percent increase in first time vehicle registrations between 1984 and 1986. *Between 1984 and 1986 average annual first time vehicle registrations were twice that of the average annual population growth rate.*

New vehicles were added by households and businesses, and people traded cars more frequently. These characteristics were indicative of strong economic conditions. Registration increases peaked in 1986. The trend through 1991 was sharply downward. New vehicle reg-

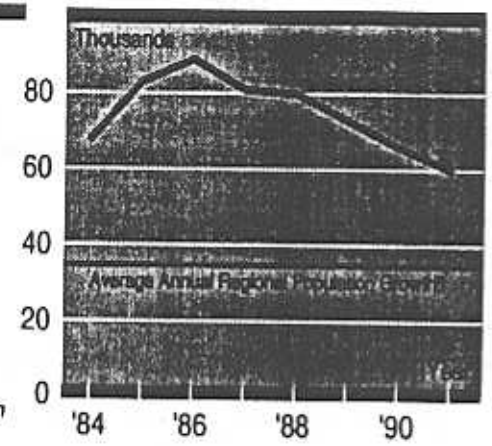
istrations peaked the same year that the number of building permits issued in the region also peaked in most study jurisdictions. This coincidence of trends suggests that the economic recession in Northern Virginia began as early as 1987, according to these study indicators. (See Chapter VII.) The recession was also reflected by smaller annual increases in traffic volume growth (see Section IV.C). (However, in absolute numbers, new vehicle registrations far outnumbered household growth throughout the period.)

The cited recessionary affects on vehicle registrations and traffic volume growth provided exceptions to the regional projections contained in the *Northern Virginia 2010 Transportation Plan*.[26] The Plan projected steady and continuous growth in all factors affecting transportation in Northern Virginia. The Plan projected a population increase of 50 percent, an 86 percent increase in local employment, an 88 percent increase in vehicle ownership, and over a 100 percent increase in vehicle miles of travel in the 25 years from 1985 to 2010.

More vehicles meant more vehicle miles traveled. Politico-economic decisions, coupled with the long lead time to design new or expanded highway capacity or new transit systems, resulted in vehicle and passenger capacity being added far slower than population growth and new vehicle registrations. Declining growth trends in new vehicle registrations, job creation and population gave the region some "breathing room" in which to address some of the problems created by the previous years' unprecedented growth.

Figure 7

First Time Vehicle Registrations Compared to Average Annual Population Growth1984-1992



Source: Virginia Automotive Dealers Association and the U.S. Bureau of the Census.

1) Commuter Modes - Table 3 and Figure 8 reveal that the only positive percentage changes in commuting modes between 1980 and 1990 were "Drive Alone" (up 11 percent) and "Worked at Home" (up one percent). The public transportation, ridesharing, and motorcycle/bike/walk modes all attracted declining percentages of commuters during this dynamic period of outward suburban expansion.

2) Commuter Express Bus Service - There were nine commuter express bus providers in the VRE study

Table 2

	1980	1990
	60%	71%
	28%	18%
	7%	6%
	4%	3%
	2%	3%

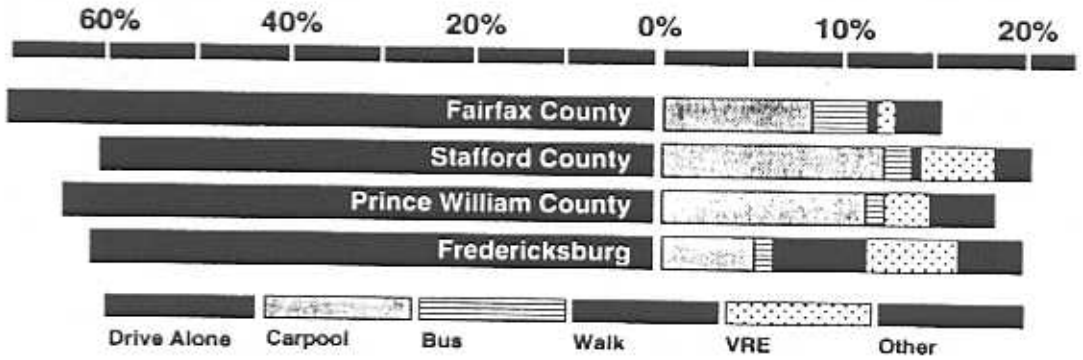
** Includes the cities of Manassa, Manassas Park and Fredericksburg and the counties of Fairfax, Prince William, Stafford, and Spotsylvania.*
Source: U.S. Bureau of the Census

region in 1992, six of whom were privately operated companies. The nine companies provided 130 daily round trips with a combined average daily round-trip ridership exceeding 4,100. The Potomac and Rappahannock Transportation Commission's CommuteRide service, with an average of 44 daily round-trips from Prince William County, was the largest provider of express commuter services. Table 2 lists all known public and private commuter bus providers in the VRE study area, the number of daily round-trips they provided, and the average number of daily riders carried in 1984 and 1992, and their 1992 fare structures.

A Washington Private Operators Council, in conjunction with and supported by the Private Providers Task Force of the Washington Metropolitan Council of Governments, is intended to represent private sector organizations that provide transit services (bus, taxi, etc.) in

Figure 8

Commuting Modes Used by Northern Virginians, 1990



Source: U.S. Bureau of the Census.

Table 3

Public and Private Commuter Express Bus Service in the VRE Study Region: 1984 and 1992

COMMUTER BUS & VAN PROVIDERS	ROUTE CORRI-DOR	SERVICE AREA	1984		1992	
			# of Daily Rd Trips	Avg Rd Trip Riders	# of Daily Rd Trips	Avg Rd Trip Riders
PRTC CommuteRide ATE Mgmt & Svc. Co.	I-95	Prince William to: Vienna Metro, Pentagon, Washington	0	0	37	1,370
National Coach Works of Virginia	I-95	Fredericksburg to: Crystal City, Pentagon, Washington	0	0	15	600
Quick-Livick Bus Svc.	I-95	Fredericksburg to: Crystal City, Pentagon, Arlington, Washington	0	0	14	560
White's Bus Service	I-95	Fredericksburg to: Pentagon, Washington	0	0	6	252
Lee Coaches	I-95	Fredericksburg to: Crystal City, Pentagon, Ft. Belvoir	2	N/A	6	276
Aries	I-95	Fredericksburg, Stafford, Sportsylvania to: Ft. Belvoir	3	112	2	75
ATW Bus Service	I-95	Dale City to: Washington	0	0	1	45
Metrobus	I-95	SE Fairfax Co. to: Pentagon	1	40	1	40
Gold Line	I-95	Montclair to: Washington	1	N/A	0	0
Lawson Transportation	I-95	Spotsylvania Co. to: Rosslyn, Pentagon, Washington	1	N/A	0	0
VIP	I-95	N/A	3	N/A	0	0
Trailways	I-95	Fredericksburg to: Washington	1	N/A	0	0
Washington Motor Coach	I-95	Dale City/Lake Ridge to: Pentagon, Washington	10	450	0	0
D & J	I-95	Fredericksburg to: Crystal City, Pentagon, Navy Annex	10	N/A	0	0
Greyhound	I-95	Fredericksburg to: Washington	1	N/A	1	N/A
Trailways	I-66	Warrenton/Fairfax City to: Washington	1	N/A	0	0
Washington Motor Coach	I-66	Manassas to: Pentagon, Crystal City, Washington	2	N/A	0	0
Tri-State Tours	I-66	Manassas, Fauquier Co. to: Washington	2	N/A	1	14
Franklin Bus	I-66	Fairfax City to: Pentagon, Washington	2	N/A	2	N/A
Gold Line	I-66	Fairfax City/Mantua to: Pentagon, Washington	3	N/A	0	0
TOTALS						

Note: N/A means information not available or not disclosed by owner

Sources: Interviews by O. Davis Brown, III, Transportation Consultant, and NVTC, Eigth Annual Report: Transportation Service Coordination Plan, September, 1992, pg. 50.

the metropolitan region. However, none of the six private commuter bus companies in Northern Virginia were members of either the Council or the Task Force. The Operators Council was on record as strongly supporting the VRE commuter rail. On its agenda, as a means of increasing private system services and ridership, is the encouragement of private operators to become involved in providing feeder services to the VRE stations.[27]

Figure 9 shows the major routes of most of the express buses using the I-95 and I-66 corridors in 1992. The patterns of travel for the buses show their focus on Pentagon, Crystal City and Washington, DC destinations. The figure also shows the general lack of express bus service to suburban employment locations outside the I-95/I-395/I-66 corridors. Exceptions, in the I-95 corridor, are service by private providers from Fredericksburg/Stafford/Prince William to Bailey's Crossroads and to the Navy Federal Credit Union complex in Vienna (one run each), and to Rosslyn (three runs). Exceptions in the I-66 corridor are four runs by private providers to the CIA complex in McLean. (Express bus services from Loudoun County and Reston to Rosslyn, the Pentagon and Washington, DC were not included because their routes lay outside the defined VRE study area.)

3) Local Bus Services To and From VRE Stations - There was no new feeder bus service implemented to coincide with the start-up of VRE commuter rail. However, within the defined VRE study area, the following pre-existing local bus systems provided some initial service to VRE stations:

Metrobus: The combined Burke Centre VRE station/Park & Ride lot was the southern terminus for the 26G/H line, which provided local service (generally paralleling the Beltway/I-495 corridor) north to the Dunn Loring Metro Station. Destinations accessible by this line included Northern Virginia Community College, Fairfax Hospital and the Merrifield business district.

The Backlick VRE station was served by the 26T line (converted soon after VRE start-up to a Fairfax Connector line). Destinations accessible on this line included Springfield Mall to the south and Annandale, Fairfax Hospital, Merrifield, Dunn Loring, and Tysons Corner to the north.

Also, the Burke Centre and Rolling Road stations were served by line 17L, and the Backlick station by Line 18E. Both of these Metrobus lines made local stops prior to reaching the VRE stations, and thus, theoretically, could drop commuters at the stations for a transition onto commuter rail. However, since both bus lines primarily were express routes to the Pentagon, they primarily represented competition to the VRE rather than feeder service.

The Alexandria VRE station was served by the 29-series lines, which provided local service westward along

Figure 9

Commuter Express Bus Routes - 1992

- VRE Stations
- Park & Ride Lots
- Commuter Bus Corridors
- VRE Catchment Area

the Duke Street/Little River Turnpike corridor.

Fairfax Connector: This system, operated by a private contractor for Fairfax County as a chosen replacement for 17 previous Metrobus routes[28], provided service in southeastern Fairfax County, and into the Alexandria central business district. Plans were proceeding to expand this service to other areas of Fairfax County.

The 110 line connected the Alexandria VRE/King Street Metro station complex with destinations that included the Hoffman federal complex, Huntington Metro station, Franconia and Springfield Mall.

While no other VRE station was served directly by the Connector at time of commuter rail start-up, both the Franconia/Springfield and Lorton future VRE stations will be in its service area.

Alexandria Dash: Various Dash lines offered feeder service to/from the Alexandria VRE/King Street Metrorail station transit center, providing extensive service within the "Old Town" section of Alexandria and to the city's other residential and major employment nodes.

Arlington Trolley: This county-sponsored line connected the Crystal City VRE station to employment, hotel, and residential condominium locations in the immediate Crystal City area adjacent to National Airport. Operating on a weekday "every 10 minute" schedule, the Trolley enabled VRE users to shuttle between rail station and origin/destination within 20 minutes maximum elasped time.

Other VRE Service Areas: At commuter rail start-up, there were no public or private feeder services to/from VRE stations in the Counties of Prince William, Stafford or Spotsylvania, nor in the Cities of Fredericksburg, Manassas or Manassas Park.

4) Carpools and Vanpools - The Northern Virginia region, as a whole, had one of the more successful ridesharing programs in the US. The inner jurisdictions (Alexandria and the Counties of Arlington and Fairfax) each had a Rideshare Program Coordinator, while the outer jurisdictions were served by area Coordinators (located at PRTC for Prince William County, and at RADCO Planning District Commission for the other locales). The Coordinator's role was to maintain a data base from which to help match persons willing to provide transportation with persons seeking rides. The Metropolitan Washington Council of Governments (MWCOG) assisted these Coordinators by providing a metropolitan-wide registry of potential riders and vehicle providers for rideshare matching. Additionally, many employers in the region supported vanpooling and/or carpooling efforts for their employees.

There was not any overall count available of the total

number of private and commercial car- and vanpools operating in the VRE study region in 1992. Rideshare Coordinators typically maintained registries only of those providers and potential riders who chose to contact them. When providers notified the registry of vacancies, a list of potential matches was sent to the provider. Potential riders were also provided a list of registered vanpool and/or carpool providers with seats available that best matched the rider's location and schedule preferences. The rider was responsible for making contact with the potential provider(s) and finalizing the match. When a match was made, the rider's name was removed if the registry was notified. Vanpool operators normally kept the registries informed when vacancies occurred, as a method of maintaining maximum paying ridership. Carpools were more casual in keeping registries notified of when they formed, had vacancies, or disbanded.

The PRTC Ridersharing Program (one of the largest in the area) provided an indication of the scale of these coordination efforts. In mid-1992, this Prince William area register contained an average active file of about 325 vanpools (commercial and private) and 145 carpools. These providers were estimated to be providing approximately 8,000 total daily passenger trips.[29]

5) High Occupancy Vehicle (HOV) Commuting Lanes - HOV lanes encourage ridesharing by providing faster travel during commuting hours on lanes reserved for vehicles with multiple occupants—commuter buses, carpools and vanpools. Commuter counts taken on existing HOV lanes show that "...the two HOV lanes on I-395 carry up to 1.6 times more passengers in the peak hour than its four conventional lanes. Even the two HOV-3 lanes on I-66 carry more persons than the four I-395 main lanes."[30] Construction was underway in 1992 to extend existing HOV lanes on I-66 and I-95 in Fairfax and Prince William Counties. The two HOV projects had long been sought by Fairfax and Prince William Counties and by carpool, vanpool and commuter bus operators. The planned I-95 HOV lane extensions, when completed, will provide 30 miles of barrier-separated HOV lanes from Washington, DC southward to Quantico.

In 1992, the only HOV lanes open and operating on I-66 were located inside the I-495 Beltway and were thus outside the defined VRE study area. However, an eight mile extension of the I-66 HOV lanes were under construction west of I-495 and were scheduled for opening in mid-1993. I-66 formed part of the boundary of the Control Catchment Area in Fairfax County and was the major commuting artery from the west whose traffic increase might be ameliorated by the implementation of commuter rail.

The HOV lanes, like VRE commuter rail, are intended to provide congestion relief by offering an alternative to driving a single-occupant vehicle. Thus, HOV and

VRE are considered complementary—not competing—modes. In Northern Virginia, HOV to date has evolved, and is continuing to do so, along the same two major commuting corridors now served by VRE: I-95/I-395, generally paralleling the Fredericksburg line from the south; and I-66, generally paralleling the Manassas line from the west. An important measure of commuter behavior for Phase II of this study will be the extent—albeit unintended and not necessarily desirable—that former HOV users have shifted to VRE. Ridership surveys could provide information on the number of riders switching to rail from previous use of car- and vanpools.

At various times since at least 1987, VDOT has conducted special HOV traffic counts at selected interstate locations. Some of these locations by 1992 had become regularized annual counting points. The visual counts that are made document the number of buses, the number of vans, the inclusive total number of vehicles in the HOV lane(s), and a best estimate of the total number of commuters using the lanes.

The most established, regularized HOV counting points as of 1992 were inside the Beltway. At stated above, there were no HOV lanes in operation on I-66 outside the Beltway. On I-95, there was one "diamond lane" counting point outside the Beltway, just south of the Springfield/Franconia (VA 644) interchange; however, data for it later than 1990 was not yet available.

The study team concluded that only the first counting point inside the Beltway on each of the two interstate corridors could possibly provide an indicator of commuter behavior in the area served by commuter rail. Any counting points closer to DC in either corridor would contain too many non-VRE factors to have any significance. Data for each of these "first inside the Beltway" count locations, plus the available count location outside the Beltway on I-95, are documented in Table 4.

By Phase II, it is hoped that the 1992 HOV "diamond lane" data for I-95 will have become available, as well as initial (1993) data for the new I-66 HOV "diamond lane" outside the Beltway.

6) Commuter Park & Ride Locations - Park & Ride lots have long been an important element of ridesharing programs in the commuting corridors in Northern Virginia. They are used as established pickup points for commuter bus routes, as well as assembly points for car- and vanpools. Most, but not all, of these commuter parking locations are free to the user. From an ownership or management standpoint, they fall into the two general categories of formal and informal, further defined by subgroups, as follows:

Formal lots: *Single Purpose*: Lots constructed and/or operated (typically by VDOT or a local government agency) for the sole purpose of commuter parking.

Joint Use: Lots primarily used for another purpose but which have excess daytime space during the work week, and which by formal agreement between the owner and the local ridesharing agency have an area, or certain number of spaces, allocated for commuter use. These lots may be public (such as parks, recreation centers, fire stations, or highway maintenance yards) or private (such as malls, shopping centers, single businesses, churches, community clubs, or vacant land).

Table 4

High Occupancy Vehicle (HOV) Lane Traffic Counts: AM Rush Hours (6-9 AM) 1990

LOCATION	# OF LANES	TOTAL AUTOS	TOTAL BUSES	TOTAL VANS	ESTIMATED TOTAL # OF COMMUTERS
ROUTE I-95					
S of VA 644 - Springfield/Franconia	1	3840	77	401	14,795
ROUTE I-66					
Between I-495 & VA 7 - Lee Hwy.	2	3357	24	62	7,198
Between Fairfax Dr. & Sycamore St.	2	6122	105	130	16,975
ROUTE I-395					
Ramps from VA 644 EB to I-395 NB	1	2172	62	93	9,728
Turkeycock S of Slip Ramp	2	3915	118	357	18,705
Slip Ramp of Turkeycock to HOV	1	1102	58	23	5,448

Source: Virginia Department of Transportation

Informal lots: *Tacit Agreement*: Areas typically similar in character to Formal Joint Use Lots, but where commuter parking has evolved over time without fromal agreement (yet without known objection from the owner). Formal agreements for some of these lots may be pending.

On-Street Parking: Habitual commuter parking areas alongside roadways, normally near bus/carpool/vanpool pickup points (may also include overflow from nearby formal or informal lots).

Park & Ride lots were used to help define a "Comprehensive Northern Virginia Commuting Region" (CNVCR) for this study. The CNVCR in turn was used to define Northern Virginia's labor market boundaries. (See Chapter II.) The VRE study team undertook to identify and catalog the "farthest out" formal and infor-

mal Park & Ride locations being used in mid-1992 by persons commuting to the Washington metropolitan area. These locations were in Caroline County, 75 miles south of the DC line, and in Frederick, Shenandoah and Page Counties, about 90 miles west.

Further, it was considered important to collect detailed 1992 space availability and utilization data for all Park & Ride locations within the potential service area of the VRE. For this purpose, it was decided that the "VRE potential service area" would include all of the VRE Primary and Secondary Catchment Areas defined in Chapter II.F, plus the CNVCR extending south and west beyond the Secondary Catchment Areas.

Excluded from the Park & Ride Lot survey were Alexandria, Arlington County, Loudoun County, the northern area of Fairfax County (above the defined VRE catchment areas), and the extreme eastern part of Fairfax County (the Huntington/Mount Vernon area, generally east of Telegraph Road and north of Fort Belvoir). The inner jurisdictions were excluded because VRE was not designed nor intended to compete in those areas for commuter ridership; the Loudoun and northern/eastern Fairfax County areas, because the directions and distances required for commuters to reach VRE stations, and the costs vis-a-vis other alternatives, were deemed likely to preclude interest in using the new commuter rail.

No Metrorail parking areas were surveyed. All existing Metrorail stations in Northern Virginia were in the areas excluded above. Additionally, their typically large size and heavy utilization made it particularly unlikely that any changes in use influenced by VRE startup could be identified.

The number of spaces available and utilized at each lot was established from VDOT and/or local rideshare program records, supplemented as needed by on-site counts. At informal lots, the number of "spaces available" were considered to be those marked for, and/or those obviously being used by, commuters (in an area that could be distinguished from customer or other use); "spaces used" at those lots were the surveyor's count of the vehicles in the thus-established commuter parking area.

Within the potential VRE service area defined above, a total of 104 active Park & Ride locations, including 68 formal and 36 informal lots, were identified as of the time of VRE startup in mid-1992. Those inside the Secondary Catchment Areas are depicted geographically in Figure 9 and characterized more fully in Table 5; the remainder (those in the outer CNVCR jurisdictions) are depicted in Figure 10 and listed in Table 6.

Table 7 summarizes the data, by jurisdiction, from Table 5 and Table 6.

The tables show a grand total of 13,040 Park & Ride spaces identified as available in mid-1992. The large

Table 5

VRE Study Area Commuter Park and Ride Lots

COUNTY	LOT NUMBER	NAME OF P&R LOT	LOT OWNERSHIP	PARKING SPACES AVAIL	PARKING SPACES USED	PERCENT OF USE
PRINCE WILLIAM COUNTY	PW01	Dale City Commuter	VDOT	555	555	100%
	PW02	Gordon Blvd Commuter	VDOT	185	180	97%
	PW03	Hillendale	VDOT	238	200	85%
	PW04	Horner Rd Commuter	VDOT	378	375	100%
	PW05	NVCC Commuter	VDOT	226	150	66%
	PW06	Montclair Commuter	VDOT	97	85	88%
	PW07	Triangle Commuter	VDOT	35	35	100%
	PW08	Lindendale Commuter	VDOT	214	2	1%
	PW09	Lake Ridge Commuter	VDOT	200	200+	100%
	PW10	Brittany Neighborhd Pk	DEVELOPER	84	8	10%
	PW11	Old Bridge Festival	DEVELOPER	75	10	13%
	PW12	Potomac Mills	SHOP.CTR.	700+	700+	100%
	PW13	Pr. Wm. Square	SHOP.CTR.	45	45	100%
	PW14	PW County Admin Bldg	PR. WM. CO.	6	3	50%
	PW15	PW County Stadium	PR. WM. CO.	53	3	6%
	PW16	Bethel Methodist Church	CHURCH	60	60	100%
	PW17	Bridgewood Shop. Cntr	SHOP. CNTR.	300	300	100%
	PW18	Christ Chapel	CHURCH	300	3	1%
	PW19	Church of the Brethren	CHURCH	35	2	6%
	PW20	Featherstone Square	SHOP. CNTR.	18	2	11%
	PW21	Good Shepherd Meth Ch	CHURCH	40	40	100%
	PW22	Hechingers	BUSINESS	80	80	100%
	PW23	K-Mart, Dale City	BUSINESS	-200	200+	-100%
	PW24	Manassas Mall	SHOP. CNTR.	200	200	100%
	PW26	Marumaco Plaza	SHOP. CNTR.	200	80	40%
	PW27	K-Mart, Sudley Square	SHOP. CNTR.	-200	200+	-100%
	PW28	Tacketts Mill	SHOP. CNTR.	130	130	100%
	PW29	Harbour Restaurant	RESTAURANT	202	12	6%
	PW51	Dumfries Shop. Cntr.	SHOP. CNTR.	55	16	29%
	PW52	Independent Hill Fire St	PR. WM. CO.	28	15	54%
	PW54	Lake Ridge Swim Club	SWIM CLUB	97*	0*	0%
	PW55	Harbor Dr @ Swim Club	ST. ROW	10	4	40%
	PW57	Dale Blvd @ Princedale	ST. ROW	43	23	53%
	PW58	Harbor Dr/Lake Manor	ST. ROW	75	68	91%
	PW59	Davis Ford @ Old Brdg	ST. ROW	109+	109	-100%
	PW60	Lake Ridge Comm. Asso.	COMM. ASSO.	71*	0*	0%
	PW61	Oakwood Dr N of VA 641	ST. ROW	44	30	68%
	PW62	Cherrydale New Homes	Undeter.	80+	0	0%
	PW63	Cloverdale New Homes	DEVELOPER	50+	35	70%
	PW64	Princedale New Homes	DEVELOPER	40+	0	0%
	PW65	Mayflower Dr	ST. ROW	10+	3	30%
	PW66	Cherrydale @ Dale Blvd	ST. ROW	20	17	85%
	PW67	Kirkdale New Homes	Undeter.	31	31	100%
	PW68	Forestdale (West)	ST. ROW	6+	6	100%
			SUBTOTAL	5,802+	4,217+	73%

Table 5 (continued)

VRE Study Area Commuter Park and Ride Lots

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FAIRFAX COUNTY	FX02	Fairlanes Bowling Cntr	BUSINESS	133	14	11%
	FX03	Fair Oaks Shopping Cntr	SHOP. CNTR.	150	71	47%
	FX09	Burke Centre	FX CO.	400	50	13%
	FX10	South Run District Park	FX PARKS	324	16	5%
	FX11	Rolling Valley Mall	SHOP. CNTR.	418	558+	133%
	FX12	Canterbury Woods Park	FX PARKS	40	21	53%
	FX13	Wakefield Chapel Rec Ctr	FX PARKS	326	78	24%
	FX14	Ames Dept. Store	DEPT. STORE	50+	68	136%
	FX16	Springfield Plaza	SHOP. CNTR.	211	239	113%
	FX17	Springfield Meth. Church	CHURCH	89	112	126%
	FX18	Chi-Chi's Restaurant	RESTAURANT	82	108	132%
	FX19	MJ Design	BUSINESS	27	17	63%
	FX20	Holiday Inn	HOTEL	78	99	127%
	FX21	Lorton Commuter	VDOT	100	141	141%
	FX22	Hechinger	BUSINESS	55	43	78%
	FX23	Centreville Shopping Cntr	SHOP. CNTR.	200	10	5%
	FX24	Sully Station	DEVELOPER	140	8	6%
	FX25	Springfield Mall	SHOP. CNTR.	271	86	32%
	FX26	Parkwood Baptist Church	CHURCH	20	3	15%
	FX50	Wakefield Chapel Road	ST. ROW	25+	25	100%
	FX51	Little River Tpke Svc Rd	ST. ROW	13+	13+	100%
	FX52	Ridge Fork Drive	ST. ROW	30+	25	83%
			SUBTOTAL	3,182+	1,805+	57%

[illegible]

Table 5 (continued)

VRE Study Area Commuter Park and Ride Lots

COUNTY OR CITY	LOT NUMBER	NAME OF R & R LOT	LOT OWNERSHIP	PARKING SPACES AVAIL	PARKING SPACES USED	PERCENT OF USE
STAFFORD COUNTY	ST01	Rt. 17 (Falmouth)	VDOT	415	438	106%
	ST02	Rt. 630 (Stafford)	VDOT	539	539	100%
	ST03	Rt. 610 (Garrisonville)	VDOT	318	318+	100%
	ST51	Rt. 17N beyond VDOT lot	BUSINESS	58	32	55%
	ST52	Ames Dept Store	BUSINESS	112	95	85%
	ST54	St. Wm of York Church	CHURCH	52+	60	115%
	ST56	Aquia Hbr Soccer Field	COMM. ASSOC	36	33	92%
	ST57	Aquia Hbr Basketball Ct	COMM. ASSOC	75	28	37%
			SUBTOTAL	1,605	1,543	96%
SPOTSYLVANIA COUNTY	SP01	Rt. 208 Commuter	VDOT	260	260	100%
	SP02	Rt. 3 Commuter	VDOT	705	643	91%
	SP51	Zoan Baptist Church	CHURCH	54	21	39%
	SP52	Thornburg	PRIVATE	50	10	20%
			SUBTOTAL	1,069	934	87%
CITY OF FREDERICKSBURG	FR01	Westwood Shopping Cntr	SHOP. CNTR.	38	38	100%
			SUBTOTAL	38	38	100%
CITY OF MANASSAS	MS50	Man. Junction Shop Cntr	SHOP. CNTR.	84	44	52%
	MS51	Pr. Wm. Hospital	HOSPITAL	70	2	0%
			SUBTOTAL	154	46	30%
		VRE STUDY AREA TOTAL		11,850	8,583	~72%

NOTE: + indicates a lot with the number of commuter spaces [illegible] on street. R&R Number Code: first two letters indicate jurisdiction, following two numbers indicate [illegible]

- 01-39 Formal Park & Ride lot (single or joint use)
- 40-49 Lot in use/status undetermined
- 50-79 Informal lot

Table 6

Commuter Park and Ride Lots Outside the VRE Study Area

COUNTY	LOT NUMBER	NAME OF P&R LOT	LOT OWNERSHIP	PARKING SPACES AVAIL.	PARKING SPACES USED	PERCENT OF USE
CAROLINE COUNTY	CA01	Carmel Church	VDOT	43	14	33%
CLARK COUNTY	CL01	Double Tollgate	VDOT	30	3	10%
	CL02	Waterloo	VDOT	38	40	105%
	CL50	Berryville	Undeter.	8+	8	100%
	CL51	Paris Heights	Undeter	10+	10	100%
CULPEPER COUNTY	CU01	Amissville Road	VDOT	25	16	64%
	CU02	Brandy Station	Undeter.	22	12	55%
	CU03	Culpeper Town Mall	Undeter.	24+	8	-33%
FAUQUIER COUNTY	FQ01	Warrenton	VDOT	225+	250	-111%
	FQ02	Marshall	VDOT	75	13	17%
	FQ03	Route 29 & VA 651	VDOT	30	5	17%
	FQ40	Atoka Road	Undeter.	24+	8	33%
	FQ41	Markham	VDOT	60+	0	0%
FREDERICK COUNTY	FK50	Winchester	Undeter.	28	28	100%
	FK51	Winchester Airport	Undeter.	60	60	100%
PAGE COUNTY	PA01	Luray	VDOT	110	24	22%
	PA50	South Luray	Undeter.	25+	25	100%
SHENANDOAH COUNTY	SH50	Strasburg	Undeter.	11	11	100%
	SH51	Woodstock	Undeter.	12	12	100%
WARREN COUNTY	WA01	Linden	VDOT	40	49	123%
	WA02	Front Royal	WA CO.	154	105	68%
			TOTALS	1,040+	703	-68%

NOTE: + indicates [illegible] the number of commuter spaces estimated [illegible] ROW

Table 7

Park & Ride Lot Availability and Utilization

JURISDICTION	Total Lots	# of Spaces Avail.	# of Spaces Used	Formal Lots	# of Spaces Avail.	# of Spaces Used	Informa Lots	# of Spaces Avail.	# of Spaces Used
Fairfax County (partial)	22	3,182	1,805	19	3,114	1,742	3	68	63
Pr. William County	44	5,802	4,217	28	5,052	3,860	16	750	357
Stafford County	8	1,605	1,543	3	1,272	1,295	5	333	248
Spotsylvania Co.	4	1,069	934	2	965	903	2	104	31
Fairfax City	2	150	4	2	150	4	0	0	0
Fredericksburg	1	38	38	1	38	38	0	0	0
Manassas	2	154	46	0	0	0	2	154	46
TOTALS	83	12,000	8,587	55	10,591	7,842	28	1,409	745

JURISDICTION	Total Lots	# of Spaces Avail.	# of Spaces Used	Formal Lots	# of Spaces Avail.	# of Spaces Used	Informa Lots	# of Spaces Avail.	# of Spaces Used
Caroline County	1	43	14	1	43	14	0	0	0
Clarke County	4	86	61	2	68	43	2	18	18
Culpeper County	3	71	36	3	71	36	0	0	0
Fauquier County	5	400	378	4	390	368	1	10	10
Frederick County	2	88	88	0	0	0	2	88	88
Page County	2	135	49	1	110	24	1	25	25
Shenandoah Co.	2	23	23	0	0	0	2	23	23
Warren County	2	194	154	2	194	154	0	0	0
TOTALS	21	1,040	803	13	876	639	8	164	164

Source: O.Davis Brown, III, Transportation Consultant.

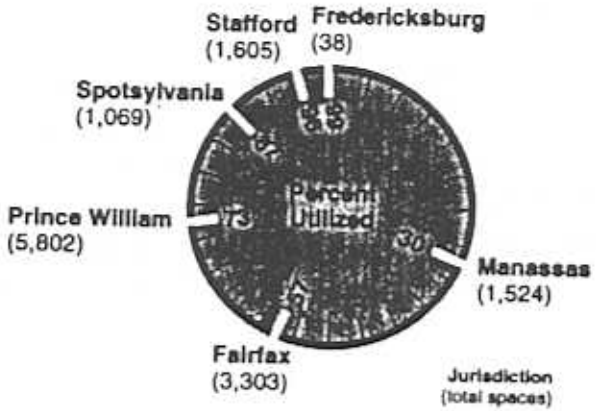
majority of the spaces (12,000) were within the VRE Secondary Catchment Areas (SCAs). Prince William County had the largest number of locations (44), spaces available (5,802), and spaces used (4,217). Fairfax County was second, with roughly half the number of lots, spaces available, and users.

Figure 11 shows the percentage of parking utilization in each of the four counties comprising the VRE SCAs. Stafford County, with over 96 percent of its spaces being used, showed that the commuting curve was moving south. Spotsylvania County too, at 87 percent, was demonstrating the need for additional facilities and/or alternatives. Prince William County's 73 percent overall utilization figure concealed the fact that all the more established lots in primary corridor locations were at or near capacity. Fairfax's lower utilization rate (57 percent) also disguised the specifics of a major, long-existing formal ridesharing effort that had succeeded in creating not only a number of large joint use lots (often overflowing), but also many smaller formal and informal locations that provided expansion room along most commuting routes.

In addition to the above-discussed 1992 data, a determined effort also was made to collect information for Park & Ride lots being used in 1984. Although the 1984 data was recognized as incomplete, the study team believes that it probably reflects about 80-90 percent of the total. The following comparisons of the 1984 and

Figure 11

Park & Ride Lot Utilization in VRE Study Jurisdictions



Source: O. Davis Brown Transportation Consultant

1992 aggregated totals (for inner, outer, and all jurisdictions) reflects the overall growth in rideshare commuting (87 percent more spaces available, 127 percent more being used) and its spread to ever-increasing distances (an almost tripling of outer jurisdiction spaces available, with nearly 500 percent growth in utilization). In all, over 6,000 additional Park & Ride spaces became available during the eight-year gestation period of the VRE, and more than 5,200 new ridesharers were using those spaces (see Table 8).

With the opening of the VRE stations in mid-1992, over 4,100 more commuter parking spaces at the new station lots became available. These spaces were intended for VRE riders; however, since they were publicly owned, there would be no prohibition against their use as meeting locations by car- and vanpools. Some of the VRE lots, including those in Fredericksburg, Manassas, and Prince William County were charging a daily parking fee, which could minimize the use of those lots by non-rail commuters. Also as of mid-1992, at least four other major projects involving expansion of commuter parking within the VRE service area were underway or planned.

In Fairfax County, construction was imminent on the Franconia/Springfield Transportation Center. An intermodal transfer facility, the center will include a 3,400 space structured parking garage to support a new VRE station, a new Metrorail station, a commuter and transit bus terminal, and a car and van pool assembly point. The VRE station and part of the parking are scheduled to open in 1994; full operation, including the Metrorail station, is planned for 1997.

A new 600 space Park & Ride lot is scheduled for construction inside the I-95 off-ramp loop at Route 123 in Occoquan in Prince William County, as part of the ongoing HOV lane extension project. This facility also will serve as a multi-modal transfer station for express bus service, car- and vanpool assembly, and proposed

local transit services to be provided by PRTC. This lot is scheduled to open upon completion of the HOV construction in 1996.

In Stafford County, the number of Park & Ride spaces at the existing I-95/Route 610 lot (ST03) was scheduled to be increased from 318 to 712 spaces by the end of 1992.

In Spotsylvania County, the VDOT Six Year Improvement Plan proposed an additional lot at I-95 and Route 3 to augment a nearby 705 space lot (SP02) which was nearly full. The new lot would provide 565 additional spaces for the rapidly growing area. No construction date had been set.

7) "Slug Line" Instant Carpools - Northern Virginia is one of two locations in the nation that has a large, unique and informally organized ridesharing concept in operation. This "casual carpool" or "instant carpool" concept is known locally, and affectionately by its riders, as the "slug line." Slug lines developed as a method

Table 8

Park & Ride Spaces in the Greater VRE Study Area

[illegible]	[illegible]		[illegible]		[illegible]			
	Avail.	Used	Avail.	Used	Number	Percent	Number	Percent
Inner Jurisdictions								
(those in Table 5)	6,688	4,008	12,000	8,587	5,312	79.4%	4,579	114.2%
Outer Jurisdictions								
(those in Table 6)	271	136	1,040	803	769	283.8%	667	490.4%
[illegible]	[illegible]		[illegible]		[illegible]			

Source: O. Davis Brown, III, Transportation Consultant.

of allowing use of the I-95 HOV lanes during commuting hours. Commuters, called "slugs," who want rides to major employment centers line up at Park & Ride lots. Drivers, called "body snatchers," wanting additional occupants to allow them to use the HOV lanes on I-95, drive up and indicate their intended locations to anyone in the slug line. The first two or three persons in line going to the stated location enter the vehicle. No return trip is implied. No fees are charged by the driver. Slug lines form in Washington and at the Pentagon in the evenings for reverse trips. Approximately 2,000 users participate daily in the slug lines. The slug lines have operated for years in Northern Virginia without any known security problems.[31] If no ride to the desired location is offered, the slugs use the express buses which serve the same Park & Ride locations as reliable backup.

Success of the slug lines is based on four general benefits:

- the process allows drivers of SOVs to obtain two or more passengers for access to the I-95 HOV lanes, resulting in generally quicker commutes for all participants;
- drivers charge no fees to riders;
- drivers are not committed to a return trip for the passengers; this provides the flexibility for drivers to participate as rideshare providers only when convenient to their schedules;
- there are back-up transit opportunities available should no rideshare match occur in the slug lines. Express commuter bus service is available from the Park & Ride locations and the destination locations.

Slug lines provide an additional commuting alternative from some locations in Northern Virginia. The practice reduces the number of SOVs on commuting routes. However, it also takes riders from public and private commuter transit services, thus reducing farebox income for support of these systems. The slug line users' reliance on a transit system backup is shown by the consistent need by CommuteRide, the largest express bus operator, to provide two more buses each evening than needed by morning commuters, largely to meet demand by returning commuters who had gotten morning "slug" rides.

EFFECTS OF THE VRE ON COMMUTERS WITH LOW- AND MODERATE-INCOMES

V

A. Chapter Summary

Title VI of the Civil Rights Act of 1964 requires that no person will be excluded on the gounds of race, color, or national origin from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. Since VRE operations are in themselves non-discriminatory, it was determined that an evaluation of the potential impact on lower-income persons would best meet the intent of Title VI. In Northern Virginia, 4.2% of all persons have annual household incomes below the proverty line, while 9.9% of Blacks, 7.4% of Asians, and 10.5% of Hispanic households are classified as living in poverty. Pursuant to Title VI requirements for this grant-funded study, the study examines the low- and moderate-income potential impact of the secondary influences from the VRE on minority populations and other populations in their commuting choices and employment location opportunities. The VRE could cause adverse impacts to lower-income minority populations if its competitive success results in the eventual reduction in the number of non-rail vehicles and service routes offering commuting choices to low- and moderate-income commuters in the VRE study area. The potential for adverse impacts would be especially significant if the VRE led to eventual reduction in lower priced commuting alternatives in the study area.

Commuting is expensive, whether via SOV or by rideshare/transit mode. It especially becomes expensive when distances traveled are long, as in much of the VRE study area. The costs of participating in ridesharing

modes—carpools, vanpools, express buses and the VRE—are such that low- and moderate-income commuters may not be able to participate for economic reasons. Persons residing in the suburban and exurban jurisdictions must maintain a vehicle because of the lack of intra-jurisdictional transit systems. The double costs of vehicle ownership and rideshare commuting are such that the combined costs of both may exceed the transportation budgets of low- and moderate-income households.

The Phase II study should compare the number of alternative modes, service routes and prices offered by public and private commuting mode alternatives in 1992 with those available in the Phase II year. (See Chapter IV.E.) The comparison should determine whether the VRE system led to a long-term reduction or an increase in available commuting alternatives and costs for intra- and inter-jurisdictional travel. In a related context, the study should examine new employment creation, especially in Station Nodes or areas served by future feeder services around VRE stations that provided new job opportunities—especially for low- and moderate-income workers—and which offered the opportunity of eliminating some need for long-distance commuting.

B. Low- and Moderate-Income and Minority Segments

The provision of transportation services to low- and moderate-income population segments, especially low- and moderate-income minority populations, is an important objective for public transit systems. Transit services especially benefit those economic segments when they are located in concentrated patterns, as in cities, where good public transit systems may substitute for auto ownership. When low- and moderate-income households are scattered within low-density suburban and exurban patterns, it is more difficult and much more expensive to provide public transit systems which can meet the full transportation needs of these households. Where commuter, feeder and intracounty transit systems are available, however, persons of low- to moderate-incomes can seek better employment opportunities elsewhere in the region which may provide the means to upgrade their income status.

Where local bus services do not exist, the dual costs of using a commuter transit service—such as the VRE or commuter express buses—and of maintaining an automobile for local travel requirements may be more than low- or moderate-income households can afford.

Overall, Northern Virginia was a wealthy region in both national and statewide comparisons. When comparing 1989 median household incomes, all the major jurisdictions in the VRE study area, with the exception of Fredericksburg, ranked within the top 115 in the United States. Fairfax County ranked first nationally with a median household income of $59,284.[32] The remaining jurisdictions, except for Fredericksburg, had median household incomes between $59,284 and $39,076. These incomes were well above the United States average of $30,056 per household. In comparison to juris-

dictions within Virginia, all but Fredericksburg were within the top 17 positions. The Virginia median household income was $33,328.[33]

The 1990 census showed that 4.1 percent of persons comprising the Northern Virginia Planning District Commission's member jurisdictions (which did not include Stafford and Spotsylvania Counties and Fredericksburg, but included Arlington and Loudoun Countise, and the cities of Alexandria, Falls Church and Fairfax) had incomes below the defined poverty level; 7.1 percent had incomes from 1.0 to 2.0 times the defined poverty level, and 88.8 percent had incomes in excess of 2.0 times the poverty level.[34]

Table 9 gives the 1990 census figures for the population and percentages in each VRE study area jurisdiction with incomes below the recognized poverty level limits. These were generally low percentages (less than five percent), except for Fredericksburg which had 12.3 percent of its population with incomes below poverty level.

Table 9 also shows the minority population segment percentages of Black, Hispanic and "Other" (a combined category) from the 1990 census. The percentages of the minority segments which had incomes below the poverty level are shown for comparison. The percentages of the minority segments with incomes below poverty level were generally small in comparison to the overall jurisdiction's population. The percentages below poverty level were also relatively small in comparison to the minority segments themselves, except among all segments in Fredericksburg, among Black and Hispanic segments in Spotsylvania County, among Hispanics in Stafford County, and in the Black segment in Manassas Park.

C. Commuting Alternatives and Their Costs

The metropolitan core area was well served in 1992 by public transit systems—both bus and light rail—operated by WMATA. (See Chapter IV.) These services extended into the Northern Virginia suburbs of Alexandria and the Counties of Arlington and Fairfax, where they were further augmented with local bus systems. They did not, however, serve localities in the VRE study area beyond Fairfax County. With the exception of Pentagon and metropolitan-bound commuter express buses, no inter- or intra-jurisdictional public transit services were available in the outer jurisdictions in 1992. Commuters from those jurisdictions, regardless of their income status, had to rely upon SOV use, private or commercial carpools and vanpools, public (CommuteRide) and private commuter express buses, or the new VRE commuter rail system.

Monthly commercial vanpool services in the study area ranged from $100-$120 per month for service from Fredericksburg to Washington, DC on a 15 passenger van. From the Manassas area, monthly vanpool costs were $80-$85. Cost differences in the same distance ranges depended upon size of the van,

age of the van, and whether the van had free parking in Washington.

The 1992 fare structures for the various commuter bus systems which operated in the VRE study area are shown in Table 2 (Public and Private Commuter Express Bus Services in the VRE Study Area). Depending upon particular origins and destinations, the daily, round-trip fares ranged from $4.10 to $15. One week, or 10-ride, fares ranged from $20-$45, and where offered, two week special fares ranged from $55-$75, again varying with distance traveled. Thus, four week bus ridership costs within the VRE service area would range from $80 to $150, depending upon the distance traveled.

The most expensive four week commuter bus fares within the VRE study area occurred from Fredericksburg to Washington and cost a commuter $150 (two 2-week fares on National Coach Works of Virginia). The maximum four week commuter bus fare from Manassas to Washington was $120 (four 10-ride fares on CommuteRide).

Commuters who rode the VRE from Fredericksburg to Union Station in Washington paid a monthly ticket price of $183. Rail commuters from the Broad Run and Manassas stations to Union Station paid a monthly VRE fare of $151.

Comparison of monthly vanpool costs to express bus fares showed that vanpool users paid approximately $30 per month less for service from both Fredericksburg to Washington and from Manassas to Washington than did express bus users. Further comparison of commuter bus versus VRE monthly ticket prices for the two lines showed a maximum $31-$33 per month premium for riding the VRE over express buses.

The VRE could adversely affect low- and moderate-income commuters if it results in the long-term reduction of less expensive commuting alternatives—express bus providers and service routes and in the number of private or commercial car- and vanpools. If, however, the VRE results in initiation of local transit and feeder services to VRE stations, Park & Ride lots and on local routes, the transportation needs of low- and moderate-income families could benefit from less dependence on an SOV for suburban travel demands. Also, if new job creation occurs as a result of VRE influence near station areas, these may offer local employment alternatives for currently low- and moderate-income persons which could reduce their need to commuter longer distances for employment.

The Phase II study should inventory and compare costs and frequency of services of local transit systems, public and private express bus providers, and car- and vanpools, between mid-1992, when the VRE began operations, and the Phase II year to determine affects of the VRE on commuting choices and costs. Phase II should also examine new employment opportunities which may be VRE-access influenced. Base employment conditions in Station Nodes in 1992 are discussed in greater detail in Chapter VI.E.

Table 9

1990 Population Percentages Below the Poverty Level for the VRE Study Area Jurisdictions

VRE STUDY AREA JURISDICTION	1990 POPU-LATION	POPU-LATION BELOW POVERTY LEVEL	TOTAL PERCENT BELOW POVERTY LEVEL	MINORITY SEGMENT	MINORITY PERCENT-AGE OF POPU-LATION	PERCENT MINORITY BELOW POVERTY LEVEL
FAIRFAX CO.	803,636	28,210	3.5 %	BLACK	7.7 %	7.9 %
				HISPANIC	6.3 %	10.0 %
				OTHER	11.0 %	7.0 %
PR. WILLIAM CO.	211,370	6,854	3.2 %	BLACK	11.6 %	8.1 %
				HISPANIC	4.5 %	4.9 %
				OTHER	5.0 %	4.0 %
STAFFORD CO.	58,972	2,399	4.0 %	BLACK	6.5 %	8.2 %
				HISPANIC	0.4 %	21.7 %
				OTHER	1.6 %	10.6 %
SPOTSYLVANIA CO.	56,851	2,809	4.9 %	BLACK	10.7 %	13.8 %
				HISPANIC	0.4 %	12.8 %
				OTHER	1.3 %	0.8 %
FREDERICKSBURG	16,673	2,049	12.3 %	BLACK	23.3 %	22.8 %
				HISPANIC	1.5 %	19.9 %
				OTHER	1.1 %	21.6 %
MANASSAS	27,098	1,028	3.8 %	BLACK	10.3 %	7.7 %
				HISPANIC	5.7 %	3.8 %
				OTHER	6.0 %	5.0 %
MANASSAS PARK	6,668	259	3.9 %	BLACK	7.3 %	14.2 %
				HISPANIC	4.7 %	4.4 %
				OTHER	4.0 %	9.0 %

Source: U.S. Bureau of the Census

A base line map was compiled from the individual Future Land Use Plans from all the localities in Northern Virginia. This GIS produced map provided proposed acreages for each locality and for the region in 16 land use categories. Comparison of a similarly compiled map of the adopted Future Land Use Plans during the Phase II study will enable public sector-approved changes in use, density and acreage to be determined for the period from 1992 to Phase II. The location and types of future changes may help identify those which resulted from VRE influence. Reference to this map (provided in the pocket) should be made during the reading of this section.

The actual 1992 land uses for each parcel in the twelve VRE Station Nodes were also surveyed and mapped. The acreage for each major land use category was established for each Station Node. Over 31 percent of Station Node acreage was classified as "undeveloped." This acreage is potentially available for development into uses which could benefit from commuter access. This base information will be useful in comparing future conditions to those from 1992 to identify development, land use and density changes in the immediate walking distances from the VRE stations.

A field survey of each employer in the twelve VRE Station Nodes was conducted in 1992. The list of employers was address-matched with employment reports from the Virginia Employment Commission. The results provided base line employment information by job classification and number of employees per classification for each of the twelve VRE Station Nodes. New employment and changes in types of jobs and numbers of employees per classification for each Station Node can be obtained by repeating the surveys and address matching during the Phase II study.

B. Commuter Rail Service in Local Comprehensive Plans—1984 and 1992

Comprehensive plans are required of Virginia jurisdictions by state law. At a minimum, they must consist of text which describes the "growth vision" of the jurisdiction and a future land use plan (in map form) to guide implementation of the vision. Comprehensive plans are required to be reviewed at least every five years and updated if necessary. These plans provide the legal basis for local zoning plans and governmental land use change decisions. All comprehensive plans of the study area jurisdictions contain transportation sections which define the goals, objectives and plans for transportation services and improvements in the jurisdiction.

The need for alternative commuting modes was emphasized in many of the transportation sections of the comprehensive plans in 1984. Jurisdictions through which the CSXT (then RF&P) and the Southern Railway (then the Southern) rail lines passed saw the potential of these lines for relieving some of the commuting congestion they were experiencing. Examination of the local com-

prehensive plans for the study years 1984 and 1992 indicated how individual governments saw the potential of commuter rail operations in their transportation planning.

The same examination also indicated the extent to which local planners and elected officials saw the potential for commuter rail impacts on land use patterns. If land use changes were anticipated as a result of commuter rail, the comprehensive plans should have indicated whether the governments proposed directing anticipated changes into new land use patterns, perhaps to encourage ridership, or whether they felt existing patterns were adequate.

1) Fairfax County

a) Summary of Fairfax County Plans for Commuter Rail—1984 and 1992

Comparison of the Fairfax County Comprehensive Plans applicable in 1984 and 1992 shows a definite transition in regard to commuter rail. From 1984 proposals for using existing rail lines for commuter purposes, the 1990 plan progresses to specific recommendations on how the rail-land use interfaces should occur at specific sites.

The 1984 Comprehensive Plan's Transportation Section makes interesting reading in hindsight. The plan said that *even with* the Dulles Metrorail extension, *with* commuter service on the VRE lines, and *with* an extensive feeder bus system to the stations, *the county's projected transportation demands could not be adequately met* [emphasis added].[35] It further stated that a VRE-type commuter rail system would help radial travel to and from Washington, DC, but it would not address the growing circumferential travel patterns. However, commuter rail on the Norfolk Southern lines was an essential element in helping address county transportation demands. To encourage more effective rail utilization, the Plan encouraged infill development at greater densities.

By time of the latest Plan adoption in 1990, VRE commuter rail was approaching reality. Thus, one element of the recommended rail and feeder services for Fairfax County was about to be accomplished. The transportation and land use sections of the Comprehensive Plan and the respective District Plans anticipated land use and access impacts around VRE station sites. Recommendations were included to provide direction for future zoning and subdivision decisions, identifying desired directions for land use changes and discouraging future uses considered incompatible with VRE stations. The Plans show the County's intentions of using the rail stations as hubs of future development at Franconia/Springfield and at Lorton. Positive steps were recommended for maximizing multi-modal interchanges between rail systems, buses, SOVs, bikes and pedestrian modes, especially at the strategic Franconia/Springfield multi-modal transit center location.

b) Fairfax County—1984

Fairfax County adopted a revised county-wide Comprehensive Plan and individual plans for four planning subareas in August, 1984. There were many references in the plans both to Metrorail, which was not yet in operation in Fairfax County, and to proposed commuter rail service. The 1984 Comprehensive Plan was astute in its transportation observations and projections. It recognized the changing land patterns in the county, the failure of the existing and planned transit systems to adequately serve these changing patterns, and the necessity of maximizing ridership on all planned transit systems in the face of projected growth. *However, even with implementation and construction of a whole series of called for improvements, the Plan stated that the County's projected transportation demands could not be adequately met.*

For the county's transportation goals to be achieved, high levels of transit ridership were required. The Plan called for the following transit programs to be undertaken: 1) extending Metrorail to the Franconia/Springfield station, and extending a new Metrorail line from West Falls Church to Dulles Airport to serve intermediate stops—including a deviation through Tysons Corner; 2) initiating commuter rail service on the Norfolk Southern and CSXT rail lines, and 3) by implementing a high level of express and feeder buses to Metrorail stations from areas not served by commuter rail. It assumed that most seats on the *completed* Metrorail system would be filled when the trains crossed the Beltway into Arlington County and Alexandria. It called for development of an extensive feeder bus network to serve the Metrorail stations. The Plan stated that failure to implement these multi-modal recommendations would result in decreasing the transit ridership levels on which the Transportation Plan was based. Even with a feeder bus network and heavier projected Metrorail ridership, the Plan stated:

> Transit will not...play a major role in the accommodation of work trips in the circumferential direction, trips for non-work purposes, or trips in outlying areas.[36]
>
> ...the magnitude of travel demand is so great that meeting it in its entirety does not appear to be economically feasible under present funding sources or environmentally sound. Faced with these issues, the reconsideration of alternative land use patterns at the regional and local level would appear to be warranted.[37]

The following transit-related concepts were organizing elements in developing the plans for each of the four subareas.

- Greater use of mass transit and small area transit systems to help protect and enhance the environment.

- Encourage compatible infill development at densities sufficient to encourage more mass transit ridership and small area transit system usage.
- Provide greater access to Metrorail stations and to commuter express buses to reduce through traffic from outside the sub-areas.
- Encouragement of radial movements on bus lanes, Metrorail, and by commuter rail was recommended in Area II (Upper Potomac, Bull Run and Pohick districts).
- Support and encourage public transit, including commuter rail.

The sub-area plans discussed the low level of bus service in some areas due to low densities and difficulties in using collector and arterial roadways. The Plan recommended several measures to increase public transit:

- provision of fringe parking lots;
- provision of feeder bus systems to provide access to Metrorail stations; and
- continuing investigations leading to establishment of commuter rail service on the Norfolk Southern Railway line. Fairfax Station (Clifton) was recommended as a commuter station site should commuter service begin.

The proposed site for the Springfield/Franconia Metro station received extensive discussion. (The discussion is also relevant for current VRE considerations.) Questions were raised as to the appropriateness of locating a commuter station at a designated regional commercial center. A multimodal transfer center was proposed adjacent to the Metrorail station to promote transfers between rail, local and feeder buses, bicycles, carpools, and pedestrian modes. The multimodal transfer center would attract large numbers of vehicles which, combined with those attracted to the Springfield Mall, could create serious local congestion problems. Recommendations included providing pedestrian and bicycle access linkages between the Metrorail station, commercial activities, and adjacent residential areas to reduce auto usage.

The 1984 Area IV Plan recommended a variety of commercial, office, service and residential uses in the Springfield sector. The following statement tied land use recommendations closely to the mass transit development schedule.

> Some uses and densities recommended for this sector are more intense than would be the case if transit related facilities were not planned for this area. Development of such uses and densities in those areas should wait until construction of Metro is sufficiently near to justify them. If a Metro station within the sector ever ceases to be in accord with County policy, Sector S7 will need to be replanned. Within that time frame, the area directly east and south of Springfield Forest ex-

tending to the RF&P [CSXT] Railroad should not be developed other than in residential uses.[38]

c) Fairfax County—1992

A new countywide Policy plan and area plans, which contained site-specific recommendations, were adopted for Fairfax County in 1990 and 1991 respectively. They were the adopted plans, as amended, in effect in 1992. The VRE commuter rail system was coming into being in 1990. The new plans and mass transit policies reflected that fact. The new Comprehensive Plan did not project the same sense of urgency regarding transportation problems and solutions that the 1984 Plan contained. Though many of the proposed transportation elements called for in 1984 were not implemented during the interim, the 1990 Plan did not indicate the effects that not being able to achieve all the earlier plans had on current and projected transportation congestion. Linkages between planned commuter rail and land use around station sites were clearly delineated, however. Specific recommendations were:

> Land use must be balanced with the supporting transportation infrastructure, including the regional network, and credibility must be established within the public and private sectors that the transportation program will be implemented. Fairfax County will encourage the development of accessible transportation systems designed, through advanced planning and technology, to move people and goods efficiently while minimizing environmental impact and community disruption. Regional and local efforts to achieve a balanced transportation system through the development of rapid rail, commuter rail, expanded bus service and the reduction of excessive reliance upon the automobile should be the keystone policy for future planning and facilities. Sidewalks and trails should be developed as alternate transportation facilities leading to mass transit, high density areas, public facilities and employment areas.[39]

The transportation element of the county-wide Plan placed maximum practical emphasis on alternatives to SOVs for peak-hour commuting.[40] The alternatives included use of primary highways, Metrorail, the proposed VRE, and HOV facilities to move inter-county and through trips. The Plan included a policy of providing feeder service between areas of medium to high-density residential development and trunk routes, including the Metrorail system. Feeder bus service to Metrorail and commuter rail from suburban neighborhoods was also to be considered.[41]

The Plan related transportation and land use by encouraging relatively high density residential development in mixed use centers to promote walking trips, enable more efficient transit service and to reduce SOV use.

The Plan further encouraged compatible and appropriate land uses—such as child care facilities—in close proximity to public transportation transfer points.

2. Prince William County

a) Summary of Prince William County Plans for Commuter Rail: 1984-1992

Comparison of the Prince William County Comprehensive Plans in effect in 1984 and in 1992 showed marked changes from consideration *of* transit to emphasis *on* transit alternatives in addressing travel demand. The former Plan identified a proven linkage between HOV lane accessibility and housing location decision-making (see quote below). The latter Plan recommended making the linkage between land use and traffic generation a major consideration in rezonings and in establishing density limits for large sites.

The current Prince William County Comprehensive Plan encouraged linkages between transit (including rail) and land use development. Three initial and one proposed VRE station sites (Broad Run/Airport, Rippon, Woodbridge and Cherry Hill, respectively) lay within the area subject to the Comprehensive Plan. The same policies and transit action strategies for land use and transportation linkages would apply to future transit feeder services or intra-county transit services when these commuting alternatives are established.

b) Prince William County—1984

Prince William County adopted a new Comprehensive Plan in 1982. It was the first countywide update since 1974. The county was experiencing rapid population growth and over 25,000 county residents were commuters to the Washington, DC area. The Plan stated a transportation goal of increasing opportunities for citizens to use transit for commuter trips as well as for intra-county trips.

The Plan discussed the effects of the I-95 HOV lanes on efficiently helping move traffic during commuting hours. While flow was still good on I-95 within Prince William County, capacity problems were already being felt south of Springfield in adjacent Fairfax County. The Plan urged construction of HOV lanes on all 35 miles of I-95 in Prince William County in anticipation of increasing commuting demands. Projections of levels of service without HOV lanes or other capacity improvements predicted major traffic flow, speed, and time impediments. The Plan referenced then current data on commuting relationships to residential choice that are still interesting from the perspective of land use and transportation planning:

> A recent I-95 HOV lane extension study found that 7 percent of those using I-95 are commuter bus passengers, and 28 percent are passengers in High Occupancy Vehicles. Thus, 65 percent

are regular lane users. This study found also that *44 percent of all HOV lane users reported that the existence of these lanes influenced their home location decision* [emphasis added]. The projected population growth of the county, along with this finding, strongly suggest that increased HOV lane usage by County residents can be anticipated.[42]

Ridesharing was the most actively used method of mass transit. Over 100 carpools had been formed through County coordination; 218 vanpools were carrying over 2,700 commuters daily. Commuter lots were nearing capacity, and the Plan called creation of over 1100 more spaces to encourage more ridesharing.

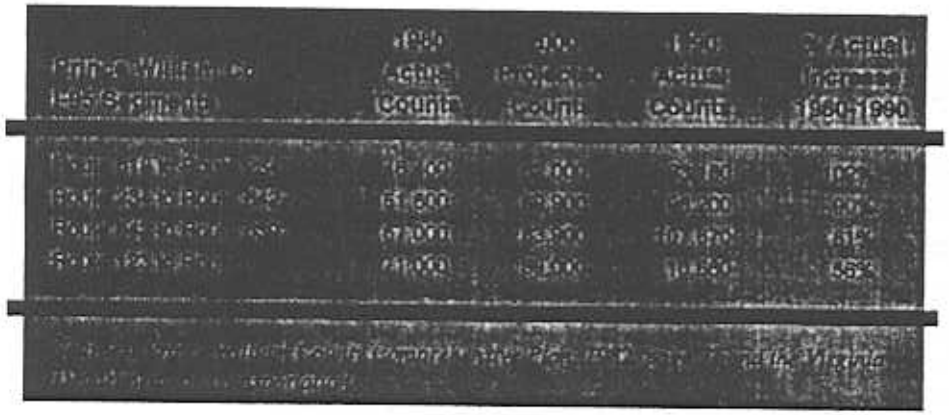


Table 10

Comparison of One-Way Vehicle Counts in Prince William County:
Actual 1980 and 1990; Projected 2000

The 1984 Plan stated that the possibility of commuter rail service had been "...pursued for more than fifteen years."[43] The existence of two active rail lines through the county appeared to make creation of a commuter rail system easy; however, the Plan stressed that technical, institutional, and fiscal issues posed complex problems. The Plan stated that even though Prince William County would continue to be interested in the possibility of commuter rail, the financial requirements necessary to establish and operate the system would probably exceed the amounts local governments would be willing to subsidize.

c) Prince William County—1992

The Comprehensive Plan Update adopted in February, 1991, provided the land use and transportation policies in effect in 1992. The County had experienced unprecedented local growth in the preceding decade. The resulting local transportation impacts of that growth, combined with increased through traffic, can be better understood by comparing I-95 average daily vehicle counts in Prince William County for 1980, the 1982 Plan's year 2000 projections, and actual 1990 average daily vehicle counts on the same segments, as shown in Table 10.

Projections made in 1982 of vehicle counts for the year 2000 were greatly exceeded by 1990. Congestion south of Springfield had become a reality. The differences in projected versus actual traffic counts indicate how quickly traffic from Prince William County, points south, and through-traffic grew during the 1980s.

The Plan continually stressed greater emphasis on alternatives to SOV use and the need for a public transit system. The Plan recommended that development adjacent to future transit corridors be planned in transit compatible ways. The Plan also suggested that incentives—such as density or intensity credits—be used to encourage ridesharing and flex time schedules. An intra-county bus system was recommended which would also provide feeder services to transit centers.

Clustering and higher density developments were encouraged along transit corridors to reduce the need to use SOVs. The linkage between land development and traffic generation was emphasized. Transportation impact analyses of large rezoning requests were required. Mitigation measures were urged to reduce traffic impacts identified by the analyses. The Plan recommended that density limits for large tracts be assigned after impacts, mitigation requirements, and other factors were known.

3. Stafford County

a) Summary of Stafford County Plans for Commuter Rail: 1984-1992

Stafford County's elected officials recognized its dependence on Northern Virginia and Washington, DC job markets. In its 1975 comprehensive planning process, the county sought to decrease the transportation and fiscal impacts of that dependence. The 1975 Plan recommended consideration of the rail for commuting purposes. However, since there was no active program to implement commuter rail service, the major recommendation for use of the rail was for alternative shipping access to designated industrial zones.

The Plan recommended continuance of privately operated commuter express bus services. The county Plan identified sites for development into Park & Ride lots to encourage more use of the existing private commuter bus services.

In 1992, the Comprehensive Plan adopted in 1988 was still the guiding land policy document. The Plan contained recommendations to develop alternative mass transit opportunities to serve commuting needs. Commuter rail was one of the alternatives supported. The recommendations supported those made in 1975 to obtain commuting benefits from the rail line running through the county.

b) Stafford County—1984

A 1979 update of the 1975 Comprehensive Development Plan was the guiding land use document for Stafford County in 1984. The 1975 Plan contained some interesting comments and projections, however, regarding the possibility of commuter rail. The 1975 Plan recognized Stafford County's location within commuting distance of major employment centers in Fredericksburg and Northern Virginia. The construction of I-95 through Stafford County in the 1960s made commuting into Northern Virginia possible. With a travel time of less than one hour into Washington, Stafford County was becoming "...an ex-urban part of Northern Virginia."[44] The impact of location and access were being felt in the increasing provision of housing for commuters. The county was experiencing the addition of approximately 500 families annually. However, the percentage of commuters to nearby Fredericksburg had actually declined by nearly half between 1960 and 1970, from 33.7 percent to 17.7 percent. The percentage commuting to Northern Virginia and Washington, DC, rose from 34 percent to 40 percent.

The 1975 Plan discussed the potential for implementing commuter rail services. It recognized the long lead time required to plan and prepare for commuter rail. The lead time was considered to be longer than the proposed five year horizon for the Comprehensive Plan. The Plan did recommend that the county continue to explore the possibilities for implementing commuter rail service.

Buses were identified as the most promising alternative for commuter service. Potential commuter bus routes were identified from various points in Stafford County to employment centers in Fredericksburg, Northern Virginia and to a Metro station for access to Washington, DC.

> ...Two specific transportation modes which should be further developed in the County are air transportation in the form of a general aviation airport, and commuter transit in the form of bus service and possibly at some future time, rail service.[45]

> Mass transportation alternatives must be explored and developed with primary emphasis on bus service.[46]

In 1979, out-of-county commuting was still a primary factor for the work force. The 1979 update of the Comprehensive Plan recognized the large gap that existed between the numbers in the work force and the availability of local jobs. The Plan stated that:

> Due to its location between Fredericksburg and Northern Virginia, it is likely that Stafford County will continue to be an exporter of labor for the foreseeable future.[47]

The transportation section of the 1979 Plan acknowledged the importance of private commuter buses which served Stafford County. The buses had high ridership levels; the Plan encouraged their continued availability. The Plan recommended providing publicly-owned commuter parking lots to encourage more bus usage. The Plan also encouraged the county to participate in development of proposed local bus service for the Fredericksburg area. Some of the proposed bus routes would serve the more heavily developed areas of Stafford County immediately north of Fredericksburg. The 1979 update did not repeat the 1975 Plan's recommendation to consider commuter rail use of the CSXT lines.

c) Stafford County—1992

A new Comprehensive Plan was adopted in 1988. Nine goals were included to guide development in the county. The first goal—"Promote and provide to the fullest, opportunities for commercial and industrial development"[48]—reflected continuing concern over the shortage of local employment opportunities. This shortage in employers offering these types of jobs placed an undue burden on residential property taxes to support public services demanded by a growing population seeking a rural lifestyle while commuting to work sites outside the county.

The county adopted a goal of providing transportation systems which will meet the needs of the expanding industrial, commercial, and residential areas of the county.[49] To achieve this goal, the Plan contained the following objectives:

> Support and maintain railroad facilities for freight, passenger, and commuter use.
>
> Develop alternative mass transit opportunities.[50]

Active efforts were underway to initiate commuter rail service in the region by 1988. The two objectives reflected a return to the 1975 Plan's recommendation for the county to participate in pursuing use of the CSXT line for commuter rail service. It also supported the county's desire to use rail service as an inducement for local job creation through industrial development requiring multimodal transit service. Rail service offered a "mass transit" alternative in addition to commuter bus services.

4. Spotsylvania County

a) Summary of Spotsylvania County Plans for Commuter Rail: 1984-1992

Although it was located in what many Northern Virginians would consider the very periphery of the metropolitan area, Spotsylvania County had been experiencing regional growth pressures for over a decade. Popu-

lation growth had exceeded projections, and residential development had taken advantage of lower housing costs and the I-95 and Route 1 corridors to core employment centers.

Spotsylvania County was aware of efforts to establish commuter rail service; however, the county did not experience the commuting congestion of localities closer to Washington. The Comprehensive Plan recommended that the county consider the initial investment and long-term financial obligations in relation to the number of local riders in weighing future participation in the commuter rail system.

The Plan discussed the linkages between transportation and growth impacts outside the county on the local infrastructure systems. It acknowledged that continued regional growth would result in continued local growth and would generate common problems for all effected jurisdictions. The Plan recommended that the county help plan for transportation needs through joint funding of a transportation planner position at RADCO Planning District Commission to address transportation demands from a combined regional perspective.

b) Spotsylvania County—1984

In 1980, the Board of Supervisors of Spotsylvania County adopted *Management Strategies: A Plan For Opportunity* as the guide for future development decisions. This document was still the official Plan for the county in 1984. The Plan recommended that 75 percent of projected growth be directed in a "concentrated corridor pattern" which would focus around the I-95 and Route 1 corridors in the northeast portion of the County. This concentrated corridor provided the maximum advantage for existing transportation access to local and regional transit. Secondary development would be planned for areas around existing community nodes.

The only references to rail in the 1980 document were not to passenger service but to the potential benefits for locating light- and heavy-intensity industrial uses along the existing CSXT rail line. No references were made in the 1980 Comprehensive Plan to the potential use of the CSXT line for commuter services.

c) Spotsylvania County—1992

The Spotsylvania County Board of Supervisors adopted a new comprehensive plan in September, 1987. This document remained the official Comprehensive Plan for the county as of 1992.

Between the 1980 and 1987 Comprehensive Plan adoptions, the County experienced an increase of 25,408 persons (79.4%). This addition exceeded population projections for 1990 by over 8400 persons. The first of the 1987 Comprehensive Plan goals was to achieve bal-

anced development patterns in a manner that maximized the efficiency and cost effectiveness of the transportation system.[51] The Plan also indicated the county would remain an active participant in discussions of regional transportation issues including commuter travel, air service, and regional highway planning.[52]

The Plan indicated that while high occupancy vehicle (HOV) lanes, public bus lines, and Metrorail had been developed to help take commuters out of SOVs in Northern Virginia, they would probably never be necessary from Spotsylvania County. Private car- and vanpools and privately operated commuter buses were already in operation from the county. The 1987 Comprehensive Plan contained the following discussion on the possibility of establishing commuter rail service on the CSXT line:

> Recently, there has been considerable activity promoting the establishment of commuter rail service between Fredericksburg and Washington, DC. Commuter rail is seen as one more alternative to offer commuters in order to remove some vehicles from the highway. One of the major stumbling blocks to the establishment of commuter rail is the significant operating deficit expected in the first years of operation. Localities being served by the rail line are being asked to commit to financing some share of the expected shortfall as well as the necessary capital costs to place the line in service. Spotsylvania County, as the other localities, must determine what kind of an investment it is willing to make to promote commuter rail. Future financing of commuter rail should be considered in light of the number of county residents expected to use the service, benefits to other commuters from reduced congestion on Interstate 95, other alternatives for moving commuter traffic and their costs, and *the possible impact of commuter rail on growth patterns* [emphasis added] in Spotsylvania County.[53]

The Plan went on to discuss the important linkage of transportation and growth impacts outside the county boundaries (i.e., regional population and employment growth) on the county's transportation infrastructure. The county was urged to continue participation in regional discussions on transportation issues, especially through helping fund a transportation planner position within the RADCO Planning District Commission and through discussions on establishing a regional transportation commission to "...act as a forum for discussion and as a mechanism for funding regional transportation projects."[54]

5. City of Fredericksburg

a) Summary of Fredericksburg Plans Related to Commuter Rail: 1984-1992

Fredericksburg identified linkages between commuter rail and land use near the station in its Comprehensive Plan of 1981. The Plan indicated that the potential for commuter services was not high. Should commuter rail become a reality, however, the Plan indicated that more commercial services and parking facilities would be needed. The benefits that commuter rail would provide in addressing residents' ties to the metropolitan job market were recognized in an adopted objective which called for the city to explore development of commuter rail.

The land use linkages identified in the 1981 Comprehensive Plan were addressed in detail in the city's 1992 *Railroad Station Area Plan*. This Plan was prepared especially to address the potential impacts of a downtown commuter rail station on residential property values, commercial services to commuters, parking needs, and to make recommendations for land uses within a buffer zone linking the rail station with the traditional downtown commercial area.

The Fredericksburg *Railroad Station Area Plan* was the only jurisdictional Plan to identify a potential for "gentrification" of its downtown residential units resulting from the new commuter rail service. This process could occur as metropolitan area employees recognized the attractiveness of living in historic Fredericksburg and having convenient commuter rail access to metropolitan work places. This process had the potential for creating housing demand which would increase local rents and housing prices, which in turn, would force out the low- and middle-income residents now occupying the downtown residential units. The Plan contained recommendations for controlling the gentrification process and maintaining affordable rents in some of its downtown residential units.

The 1992 Plan also contained recommendations for future commuter parking needs, addressed methods for providing commuters with commercial services at the rail station, and provided plans for long-term, compatible, in-fill development within a desired buffer zone between the station and existing commercial activities.

b) City of Fredericksburg—1984

The Comprehensive Plan of 1981 was the official planning document for Fredericksburg in 1984. Commuters from Fredericksburg traveled to both Richmond and Washington area employment centers. The growth of Fredericksburg was linked to the economic growth within the overall Washington-Richmond growth corridor.

The Plan contained the following discussion of the potential of establishing commuter rail service on the CSXT line. The discussion is worth quoting because it identified a potential land use change linkage between

the future commuting alternative and the area around the existing downtown rail station.

> At the time of this writing [June, 1981], a study funded by the Highway Department is being developed by the Metropolitan Washington Council of Governments. It will examine the rail commuter potential between Fredericksburg and Northern Virginia and is scheduled for completion in 1982. While the potential for a commuter train appears to be high, the outlook is not especially good. The Federal Government is proposing to reduce operating subsidies for Amtrak and to reduce the budget of the Urban Mass Transit Administration (UMTA). It is very unlikely that a commuter train will be provided in Fredericksburg before 1987.
>
> Should a commuter train become a reality, there will be some significant land use implications. More parking facilities near the train station will be required and commercial facilities for commuters may also be needed. Potential areas for commuter parking should be evaluated if commuter rail services become likely.[55]

The city adopted the following commuter-related objectives as part of the 1981 Comprehensive Plan:

> Explore the potential for development of commuter rail and local bus service for the area.
>
> Develop plans for existing transportation facilities which are scheduled for abandonment or termination.
>
> Designate commuter parking within the City.[56]

To help accomplish the referenced goals and objectives, the Plan included specific location recommendations for five commuter parking areas. It also recommended that the city work with the RADCO Planning District Commission and the Virginia Department of Highways to develop both local bus service and commuter rail service.

c) City of Fredericksburg—1987

Amended goals, objectives, and sub-area land use plans were adopted by the city in 1987 in response to enlargement of Fredericksburg through annexation. The annexed area was located to the west of the 1981 city boundary. The Plan amendments provided a capital improvements program and growth management plan for the annexed area. There were no additional plans or references for commuter service programs in the amendments. The 1987 amendments to the 1981 Comprehensive Plan remain the current overall Comprehensive Plan for the city.

d) City of Fredericksburg—1992

Fredericksburg anticipated impacts on its downtown as a result of having a VRE station at the east end of the central business district. A special management plan for a defined area of the downtown around the VRE station was adopted to guide decisions relating to future impacts from commuter rail operations.

The *Railroad Station Area Plan* was prepared in late 1991. Drafted in anticipation of the VRE startup, growth management plans and strategies were included for meeting potential land use and commuter facility needs from a new commuter attractant in the downtown area. The major issues addressed in the *Railroad Station Area Plan* were: land use, historic resources, parking, and housing/neighborhood conservation—issues that potentially could be most affected by increased commuter activities and demands.

Fredericksburg had a housing rehabilitation and infill program underway in the station area. The program had successfully rehabilitated residential units and kept them affordable for lower income residents. The city was concerned that improved commuter access would increase housing demand near the station. White collar commuters would displace residents as housing values and rents escalated in response to increased demand. However, use of state housing program funds allowed the City to control rent increases on rehabilitated and new infill units for 10 years. The Plan proposed expansion of the program to additional units to give the city more control over rent stability and to improve the quality and quantity of downtown housing.

The *Railroad Station Area Plan* recommended rezoning sections of downtown to strengthen residential redevelopment opportunities. The Plan recommended rezoning the CSXT station property to allow for commercial activity in the station. A strip of properties between the station and the downtown commercial area existed that was designated to serve as a buffer between the residential area to the east and the central retail area to the west. The Plan recommended that the buffer strip be designated as a "Railroad Station Overlay District." Recommendations on preservation and use of existing historic structures, parking lot design, commercial building re-use, preservation of scenic vistas, archeological investigations before construction, and streetscaping features were included which would create a better transitional zone by allowing for compatible infill as redevelopment eventually occurs.

Recommendations were also included to allow parking structures as special uses in certain districts. This provision may become important when future redevelopment in the Overlay District displaces surface commuter parking.

The city was concerned about adequate commuter park-

ing near the rail station and separation of neighborhood and commercial parking from commuter parking. Six potential sites were identified that could be converted to surface commuter parking. The *Railroad Station Area Plan* recommended short-term leases by the city of sufficient sites to meet initial commuter parking projections. Relocation of surface commuter parking to parking structures could occur when redevelopment of the parking sites became imminent. Providing commuter spaces in the Overlay District would keep the city from losing commercial spaces needed by downtown shoppers and would keep commuters from parking along residential streets.

Specific recommendations were also included in the Plan to provide the infrastructure (lighting, landscaping, security, parking permit system, bicycle racks, directional signage, handicapped spaces, etc.) needed to address the coming commuter parking and traffic demands on the downtown area.

6. City of Manassas

a) Summary of Manassas Plans for Commuter Rail: 1984-1992

Two rail-related activities were underway when Manassas updated its Comprehensive Plan in 1982. The Metrorail was providing rapid transit to the inner suburbs of Northern Virginia, and studies of the feasibility of commuter service on the Southern Railway line were again underway. With these two activities in mind, the Plan contained strong recommendations that Manassas orient its downtown business core planning around the fact of commuter rail service operating from the Southern/Amtrak station at some time in the future. This service was seen as providing a major stimulus for expanded activity in the central business district. It could also lead to expansion of the district south of the railroad tracks with new office and apartment development.

The policies contained in the Plan were specific in calling for the city to monitor the impacts of Metrorail and work for its extension toward Manassas, adopt a design plan for the downtown that anticipated rail transit, and establishment of some type of commuter service linking the city with Metrorail in Fairfax County, and/or Alexandria.

By 1992, Manassas had a VRE station within its city limits. The station in Old Town was again identified as a potential asset for stimulating commercial activity and development. A key element of achieving that potential would involve rehabilitation of the station into a multi-modal transit and tourist information center. The Downtown Plan included a number of recommendations for action, with responsibilities assigned to various local organizations or city government. The goal was to help downtown businesses add commuters and visitors to their customer base. The Plan foresaw use of VRE

capital projects (new parking lots, new sidewalks) as elements to help create a new focus for downtown activity that would "spill over" as increased commercial activity for all downtown businesses. (This directly reflected the 1982 Plan's recommendations.) The Plan recommended redevelopment of the station building into an attractive multi-modal transit and tourist information center which would further increase activity generated by the VRE and Amtrak.

b) City of Manassas—1984

The City of Manassas adopted an update to their 1975 Comprehensive Plan in 1984. Parts of the original plan were retained. Several new sections were added to address unforeseen circumstances:

> ...a number of other topics and problems have arisen which were not originally seen as problems. For example, problems with such things as...the need for mass transportation alternatives were not seen as high priority concerns in the early 1970s.[57]

A 1978 survey had shown that 69 percent of local residents worked in Manassas, Prince William County, Fairfax County, or the City of Fairfax. Only 13 percent worked in Washington and a total of eight percent worked in Alexandria or Arlington County. The only transit alternatives available consisted of three privately operated commuter bus systems. The three systems offered eight scheduled buses each morning and nine each evening running to Alexandria, Arlington County, the Pentagon or Washington, DC. The major mass transit need, however, was for local and suburb-to-suburb transportation.

A background paper on mass transportation prepared in 1980 for development of Comprehensive Plan policies stated:

> With a large amount of undeveloped land in the City, it is projected that the City will continue to grow throughout the 1980s. Because job opportunities within the immediate vicinity of the City will not grow as rapidly as residential units, future City residents will continue to have to commute to employment in other jurisdictions. Therefore, there will continue to be a need for mass transportation opportunities for the citizens of Manassas, particularly in view of the fact that few if any major new highways are currently being planned.[58]

Concern about future commuting requirements led the city to adopt long range goals and policies to address transportation and support of the central business district as key planning elements. The city's adopted policies regarding the railroad and its potential for commuter service were especially interesting. The auto-

mobile was the major transportation mode at the time. The Virginia Department of Transportation had the responsibility for upgrading and maintaining the highway network in and around the city. With this in mind, the Plan stated the following:

> Likewise, the railroad and rapid transit are transportation elements over which the town can exert only minimal influence...it [Manassas] can and must work toward the accomplishment of a [transportation] plan that is designed to take into consideration the external forces that are part of the total transportation goals of the City, and the program objectives spell out those actions which the City will take to achieve those goals.[59]
>
> Mass Transit Policy: It is the policy of the City of Manassas that mass transit service on the Southern Railway tracks is desirable, should be encouraged, and plans for the future of the City based on it. In addition, other forms of mass transportation should be examined and encouraged.[60]
>
> While rapid mass transit service to Manassas may be many years away, its likelihood should not be ignored. A transit terminal in the center of the Manassas business district will serve to reinforce the area-center role of the City business district and generate new economic dynamics that will enable the south side of the railroad tracks to redevelop into a new business, employment, and residential core. Of course, parking, loading and unloading ramps, and pedestrian circulation around a transit station must be well designed and provided for, but the effect of transit service both to and from the center of town will be to greatly expand the opportunities for activities in the Manassas center and should therefore be supported and promoted.[61]

The city adopted these related five-year program objectives to support its mass transit policies:

- Monitor the progress of the transit system [Metrorail], observe its needs and impacts in nearby jurisdictions, and work to have the service extend to Manassas as soon as possible.
- Adopt a detailed design plan for the Manassas downtown which will include an anticipation of rapid transit on the area.[62]
- Monitor the feasibility of establishing some type of commuter service between Manassas and the termination of rapid rail service in the inner suburbs.[63]

c) City of Manassas—1992

The *Comprehensive Plan for The City of Manassas*, adopted in February, 1989, was the official Comprehensive Plan in 1992. The "Mass Transit" section of the plan identified Manassas as a member of the Potomac

and Rappahannock Transportation Commission (PRTC). The purpose of the PRTC, as stated, was development of mass transit programs to serve its constituent member localities.

The Plan identified the development of a commuter rail system as the primary activity of PRTC at the time the Comprehensive Plan was prepared. Initial plans for the commuter rail system were to have three stations either in or adjacent to Manassas.

The Mass Transit recommendations of the Transportation Plan element were:

- The City, as a member of the Potomac and Rappahannock Transportation Commission, has an opportunity to establish several transportation options to single vehicle travel. The City should, through this Commission, develop a program for mass transit, including commuter and local bussing, commuter rail, van- and car-pool information exchange. At the same time, the necessary supporting facilities should be developed.[64]

- Establish a program for local bus service, commuter bus participation, including parking and sheltered stops, along with development of the proposed Commuter Rail program.

- Implement the planned Commuter Rail project.[65]

d) Manassas Downtown Plan—1992

The Future of Old Town Manassas - A Strategic Plan was completed in early 1992. The Plan was intended to create a vision for the central business district, known as "Old Town," with specific emphasis on identifying the impact of commuter rail on "Old Town." Of particular interest were the commuter rail issues, opportunities, and impacts that the Plan identified. The existing train station was seen as a potential multimodal transportation center to service VRE commuter rail, Amtrak and bus service. The station also had the potential to serve as a catalyst for new traffic and development in the downtown area. This potential objective was stated as:

> Acknowledge the importance of the historic railroad station as the center of Old Town Manassas and rehabilitate the station to better serve the public as an open train station and visitor/tourism center.

Historic Manassas, Inc. was assigned responsibility for preparation of a feasibility study of rehabilitating the old train station into a multi-use center for commuter rail and Amtrak passengers and to serve as the Manassas Visitors Center. Initial projections were for 400 commuters to depart and return to the station daily. (As of September 22, 1992, a little over one month after start of Manassas line operations, over 547 daily departures

and arrivals were using the Manassas station—27 percent of the Manassas line's ridership. That number was expected to increase as more commuters made the switch to commuter rail service.)

Commuter service was also anticipated to create some problems for Old Town Manassas. Some lots were being lost to reserved station parking that had previously provided employee and customer parking. This loss of 70 spaces would contribute to increased downtown parking shortages and competition between employees and visitor/shoppers.

Creation of new commuter parking lots and other street improvements around the rail station would provide better sidewalk and visual access between the downtown, the rail station/future visitors center and the Manassas Museum. The new linkage would provide more opportunities for pedestrian traffic into the center of Old Town. Thus, the rail station was seen as having the potential of becoming a focal point for new development and redevelopment in the downtown.

The Downtown Plan recommended that nearby commercial facilities emphasize their convenience to the station by creating attractive rear entrances and features to attract commuters to shop and eat in Manassas. Downtown shops were encouraged to adjust operating hours to accommodate commuter shopping and dining needs before and/or after their commutes. (This recommendation had been followed by some local businesses by 1993. The businesses had adjusted their operations hours to be open to commuters and were seeing increased business from commuters.)

7. City of Manassas Park

a) Summary of Manassas Park Plans Related to Commuter Rail: 1984-1992

Manassas Park did not foresee any commuter service benefits from the rail line in the city in 1984. However, by 1990 when amendments were made to the Comprehensive Plan, the commuter rail system was in development. A station was planned for Manassas Park, and commitments had been obtained for development of the station and parking facilities for the city as a proffer by the proposed developer of a recently annexed area near the station site.

The new land annexation and the proposed station provided an opportunity for the city to develop something it did not have—a town center. The location of the station would be within walking distance of the proposed residential and industrial tracts to the east and would provide a linking element to the built-out portions of the city to the west. The station would attract commuters through the city and provide local residents an alternative means of commuting. The activity created by the VRE station could be enhanced by development of adjacent retail and service businesses.

b) City of Manassas Park—1984

Manassas Park was incorporated as a city in 1975, and its first Comprehensive Plan was adopted in 1984. Although the Norfolk Southern Railway line ran through the eastern portion of the city, it played no role in the city's economic development or transportation system. There were no railway station nor industrial sidings in the city in 1984. The Comprehensive Plan contained no references to the potential use of rail for commuter services.

c) City of Manassas Park—1992

The 1984 Comprehensive Plan was amended in 1990. The amendments were in response to a recently completed large acreage annexation. The annexation extended the eastern boundary of the city and was located within close proximity to the proposed commuter rail station site on the Norfolk Southern Railway line. The Plan amendments included the following objectives and references to commuter rail service:

> Objective: To create a development focal point for community activities and city identity.[66]
>
> Strategy: Develop a city center area adjacent to the proposed commuter rail station utilizing a planned unit district concept incorporating a mix of commercial retail/office and residential uses.[67]

The city owned a 24-acre site which contained the VRE commuter rail station and parking lot. The site lay between industrial uses and the City Hall to the west and the annexed and undeveloped industrially, commercially and residentially zoned land to the east. The site itself and the land to the east were the only remaining large undeveloped tracts in the city. The city proposed to create a central focus element, a town center, adjacent to the VRE station. The site would unite the developed western portion of the city with the "to be developed" eastern section at the commuter rail station. The town center concept expressed in the amendments was to create "...civic/government, commercial retail and office, residential, commuter related, recreational and programmed community/festival type events."[68] Accomplishment of the objectives, however, will depend upon creative site design to overcome some difficult site slope and floodplain constraints.

It should be noted that the annexation to which the 1990 Plan was responsive provided Manassas Park with all the necessary elements to experience significant land use changes associated with the VRE. The recently annexed and undeveloped land is being provided with utilities and streets by the city. It has been zoned for industrial and residential uses. The city is actively marketing the developed residential sites to builders. The development area is within walking and easy biking distance of the VRE station. The annexed area will be surrounded on three sides by low density recreational

and residential portions of Prince William County. The future pace of development of this annexed land will provide an excellent indication of the influence of VRE proximity on residential and industrial development in a period of overall building recession.)

8. Town of Quantico

a) Summary of Quantico Plans for Commuter Rail: 1984-1992

Quantico had limited Amtrak passenger service in 1981. It did not, however, foresee the reality of commuter rail service in the near future when it adopted its Comprehensive Plan in that year. Prince William County would be the local lead jurisdiction should commuter rail be developed. An earlier study by the county had indicated that commuter rail would be too expensive to develop without financial assistance. In 1981, financial assistance for commuter rail from the federal and state governments did not appear forthcoming.

The town was interested in the improvement of transportation options for its people and their goods. The town's plan stated that development of commuter rail service would help improve public transit alternatives for its citizens. No specific policies or actions, however, were identified by which the town could work toward achievement of commuter rail as part of its transportation improvement goal.

b) Town of Quantico—1984

Quantico is the smallest governmental entity within the VRE commuter rail service region in terms of both acreage and population. The town, containing slightly over 40 acres and a 1990 census population of 670, is surrounded by the Quantico Marine Corps Military Reservation on three sides and the Potomac river on the fourth side. The CSXT right-of-way forms the western boundary of the town.

Quantico adopted its Comprehensive Plan in 1981. The Plan contained these statements regarding use of the CSXT for commuting purposes:

> According to a representative of VDHT (Virginia Department of Highways and Transportation), the State has no plans to develop a commuter rail service on the RF&P [now CSXT] tracks from Washington, DC to Fredericksburg. Prince William County explored the possibility sometime in the past, but found that the service would be too expensive.[69]
>
> Commuter rail service to Washington, DC is not likely in the near future.[70]

In 1981, Amtrak had six trains providing Monday through Saturday passenger service to the town and the military base and one passenger train providing Sun-

day and holiday service. The arrival and departure schedule did not make commuting to Washington by Amtrak feasible.

The Quantico Comprehensive Plan's transportation goal was "To provide a transportation system for the safe and convenient movement of people and goods."[71] A policy under that goal was "To improve public transportation, particularly commuter rail service to Washington, D.C."[72] No specific details on how the town was to help achieve this policy were described.

c) The Town of Quantico—1992

The Comprehensive Plan adopted in 1981 was still the official planning document for the Town of Quantico in 1992. No further amendments to it had been adopted.

C. Future Land Uses of the VRE Study Area Jurisdictions

1) Compiled Future Land Use Map - The base document developed against which to measure future land use policy changes was a compiled "Future Land Use Map for the VRE Study Area Jurisdictions" as of 1992. The regional map was compiled primarily from adopted future land use maps of each jurisdiction as of mid-1992. There were some exceptions. The map used for Dumfries was a proposed land use map that was up for adoption and which would become the first future land use map for the town. The Fredericksburg Land Use Plan was supplemented by zoning information to make it more reflective of the city's planned land use intentions for their recently annexed area. Land use maps of some jurisdictions, such as Fairfax County, included "overlay" provisions or "options" in association with certain districts which allowed more than one land use option or increases in threshold densities if specified development conditions were met. In such cases, the baseline densities were used.

The compiled Future Land Use Map for the VRE Study Area Jurisdictions was a graphic depiction of the patterns of land use that local decision-makers had adopted as the policy guidelines against which they evaluated land use change requests in their jurisdictions. During the Phase II study, the 1992 map will be compared to the then adopted future land use plans. Comparisons will show the types of planned land use changes, locations and acreage of land use changes that had been adopted by the localities since 1992.

The process of creating a compiled Future Land Use Map for the VRE Study Area Jurisdictions was complicated. Five county, six city and seven town land use plans were used in mapping the VRE study area. Individual land use category definitions were not common among the 18 localities. The 18 local maps had in excess of 107 individual land use categories. Depicting all of those on a regional map would have made land use comparisons exceedingly difficult.

Creating a "common language" of land use categories was considered a necessary requirement for developing a regional map. As a start, the local land use categories were initially defined by residential density ranges (in units per acre) or Floor Area Ratio (FAR) density where appropriate. Where plan definitions did not define density or FAR, the local Planning Department recommended the appropriate range based on local experience and usage. A new "language" of land use classifications was proposed which defined 16 land use categories based primarily on densities and FARs for retail, office, industrial and mixed uses. Categories for public (schools, civic facilities, parks) and quasi-public uses (country clubs, religious uses, environmental quality corridors, etc.) were also included. The 16 regional land use categories consisted of:

- five Residential use categories,
  - 0.1-1 DU/Ac
  - 1-5 DU/Ac
  - 6-15 DU/Ac
  - 16-36 DU/Ac
  - 36+ DU/Ac
- two Commercial use categories,
  - <1.0 FAR
  - >1.0 FAR
- two Industrial use categories,
  - <1.0 FAR
  - >1.0 FAR
- two Office/Business use categories,
  - <2.0 FAR
  - >2.0 FAR
- one Public use category,
- one Quasi-Public use category,
- two Mixed Uses categories
  - <2.5 FAR
  - >2.5 FAR
- one Open Water category,

A matrix was created in which each local category was grouped by density or FAR into its place within the 16 new categories. The matrix was reviewed by the local planning departments to verify placement of their land uses within the regional category context. (The categories used in the land use plans of three small towns—Clifton, Haymarket and Quantico—were not included on the matrix; however, the appropriate regional categories for the three towns were shown on the compiled land use plan.) (The land use category matrix is included in Appendix E.)

Upon completion of the matrix review, each local land use map was re-drawn as a work map using the new categories. The individual work maps were then digitized using a Calcomp 9500 digitizing board, a Macintosh computer system and a MapGraphix Geographical Information System (GIS) mapping program. Jurisdictional boundaries and highway networks were read into the GIS system from Bureau of the Census TIGER files. The TIGER files, while not perfect representations of all highway alignments, provided a suffi-

ciently accurate depiction around which to adjust individual land use boundaries. Drafts of the new land use maps for each jurisdiction, using the standardized categories and TIGER file street networks, were reviewed by the local planning departments. The jurisdictional maps were finally merged to form the compiled VRE regional land use map.

Using a GIS process to generate the compiled regional land use map provided the following study advantages:

- maps could be produced more quickly than could be drawn by hand;
- changes could be made to the data base quicker than to hand-drafted maps and new versions quickly re-plotted;
- the scale of the regional map could be changed at will, with rapid replication of the scale to the individual elements comprising the whole map; this capability allowed the user to "zoom in" on any area of the map and enlarge it to the size of the screen for detailed examination;
- jurisdictional maps could be reproduced as individual maps, or could be merged with maps of other localities to form a regional map;
- the acreage of the land use categories could be calculated for both individual localities and for the VRE study region as a whole; and
- future land use category changes can be made to the data base for comparison purposes, and the categories and acreage involved in the changes can be rapidly recalculated.

Table 10 presents the land use acreage by category generated from the GIS program for each of the counties, cities and towns whose land use maps were incorporated into the regional map. County totals are given both with and without the acreage from included towns. The acreage can be compared with future totals using the same use definitions. Changes by land use category will reflect adopted changes in local land use plans. Table 11 presents the acreage by percentage for each land use classification, jurisdiction and the study area.

There were small differences between land use acreage totals identified from the GIS program and the surveyed acreage in each jurisdiction. The GIS program used the Bureau of the Census TIGER file boundaries, whose acreage calculations vary slightly from actual acreage. The variances are very small however; 0.9-2.0 percent for the counties and cities. A large amount of this variance was created by the Potomac River embayment areas which are located within jurisdictional boundaries, but which were not included in the land use acreage calculations.

Variances were larger for the towns (Clifton, Herndon, Quantico and Vienna) whose boundaries were not included in the TIGER files and had to be drawn onto the base maps. Drawing boundary lines on the base maps introduced greater inaccuracies due to lack of defined

Table 11

Future Land Use Acreage by Categories

JURISDICTION	RESIDENTIAL					COMMERCIAL		INDUSTRIAL								
FAIRFAX COUNTY-																
(w/out Towns)	60594	75963	8293	3359	0	3297	5	4288	0	3393	0	63158	18125	7073	0	1570
HERNDON	0	1163	335	0	0	220	0	90	0	296	0	402	95	123	0	0
VIENNA	0	1951	61	23	0	133	0	100	0	0	0	233	183	15	0	0
CLIFTON	90	0	0	0	0	3	0	3	0	0	0	8	44	3	0	0
FAIRFAX CO. TOTAL	60684	79078	8689	3383	0	3653	5	4481	0	3689	0	63800	18448	7214	0	1570
FREDERICKSBURG	0	1815	60	207	0	686	0	851	0	393	0	1386	6	1280	0	0
MANASSAS	0	2447	593	0	0	40	373	1067	223	111	0	1551	12	0	0	0
MANASSAS PARK	0	455	395	0	0	425	0	376	0	0	0	330	1	39	0	0
PRINCE WILLIAM-																
(w/oUT Towns)	84279	34078	6535	1041	0	2078	1375	5048	2457	6073	4218	51869	16731	0	0	1884
DUMFRIES	0	288	84	0	0	252	0	41	0	0	0	178	97	66	0	0
HAYMARKET	0	61	43	0	0	66	0	45	0	0	0	63	0	0	0	0
OCCOQUAN	0	67	0	0	0	14	0	0	0	0	0	0	0	0	0	0
QUANTICO	0	0	0	13	0	7	0	5	0	0	0	10	0	0	0	0
PR. WM. CO. TOTAL	84279	34494	6663	1055	0	2436	1375	5138	2457	6073	4218	52119	16829	66	0	1884
STAFFORD CO.	100131	14970	2207	0	0	3627	0	8571	0	400	0	36470	15034	6198	0	1128
SPOTSYLVANIA CO.	166056	27009	26360	0	0	0	0	0	0	0	0	35795	0	0	0	6612
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
JURISDICTIONS OUTSIDE [illegible]																
ALEXANDRIA	0	2780	13	1557	436	452	137	552	244	327	76	1455	319	1309	0	12
ARLINGTON CO.	0	0	7741	1495	496	0	380	0	182	66	114	5283	566	0	386	0
FAIRFAX CITY	0	1916	382	0	0	0	537	169	0	98	0	531	306	66	0	0
FALLS CHURCH	0	730	54	86	0	122	0	21	0	73	0	107	36	43	0	0

From compiled Future Land Use Map of VRE Study Area Jurisdictions

points against which to "tie" the boundaries. Also, the TIGER street network was based on straight line segments. Aligning boundaries to these street segments introduced another source for acreage differences.

The GIS program indicated a total of 941,466 acres in the jurisdictions which comprised the defined VRE study area. This amounted to 1,471 square miles of land area.

Table 12

Future Land Use Acreage Percentage by Categories

FAIRFAX COUNTY- (w/out Towns)	24.32%	30.49%	3.33%	1.35%	0.00%	1.32%	0.00%	1.72%	0.00%	1.36%	0.00%	25.35%	7.28%	2.64%	0.00%	0.63%	
HERNDON	0.00%	42.69%	12.30%	0.00%	0.00%	8.07%	0.00%	3.30%	0.00%	10.87%	0.00%	14.74%	3.50%	4.53%	0.00%	0.00%	
VIENNA	0.00%	72.27%	2.27%	0.86%	0.00%	4.93%	0.00%	3.70%	0.00%	0.00%	0.00%	8.62%	6.79%	0.55%	0.00%	0.00%	
CLIFTON	60.00%	0.00%	0.00%	0.00%	0.00%	2.00%	0.00%	2.00%	0.00%	0.00%	0.00%	5.33%	29.33%	2.00%	0.00%	0.00%	
FAIRFAX CO. TOTAL	23.83%	31.05%	3.41%	1.33%	0.00%	1.43%	0.00%	1.76%	0.00%	1.45%	0.00%	25.05%	7.24%	2.63%	0.00%	0.62%	
FREDERICKSBURG	0.00%	27.15%	0.90%	3.09%	0.00%	10.26%	0.00%	12.74%	0.00%	5.88%	0.00%	20.74%	0.09%	19.16%	0.00%	0.00%	
MANASSAS	0.00%	38.13%	9.24%	0.00%	0.00%	0.62%	5.81%	16.63%	3.47%	1.72%	0.00%	24.18%	0.19%	0.00%	0.00%	0.00%	
MANASSAS PARK	0.00%	22.54%	19.53%	0.00%	0.00%	21.03%	0.00%	18.61%	0.00%	0.00%	0.00%	16.35%	0.03%	1.91%	0.00%	0.00%	
PRINCE WILLIAM- (w/out Towns)	38.72%	15.66%	3.00%	0.48%	0.00%	0.95%	0.63%	2.32%	1.13%	2.79%	1.94%	23.83%	7.69%	0.00%	0.00%	0.87%	
DUMFRIES	0.00%	28.64%	8.37%	0.00%	0.00%	25.00%	0.00%	4.08%	0.00%	0.00%	0.00%	17.65%	9.67%	6.59%	0.00%	0.00%	
HAYMARKET	0.00%	20.62%	14.43%	0.00%	0.00%	28.86%	0.00%	15.09%	0.00%	0.00%	0.00%	21.00%	0.00%	0.00%	0.00%	0.00%	
OCCOQUAN	0.00%	82.35%	0.00%	0.00%	0.00%	17.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
QUANTICO	0.00%	0.00%	0.00%	38.42%	0.00%	20.04%	0.00%	13.64%	0.00%	0.00%	0.00%	27.90%	0.00%	0.00%	0.00%	0.00%	
PR. WM. CO. TOTAL	38.47%	15.74%	3.04%	0.48%	0.00%	1.11%	0.63%	2.35%	1.12%	2.77%	1.93%	23.79%	7.68%	0.03%	0.00%	0.86%	
STAFFORD CO.	53.05%	7.93%	1.17%	0.00%	0.00%	1.92%	0.00%	4.54%	0.00%	0.21%	0.00%	19.32%	7.97%	3.28%	0.00%	0.60%	
SPOTSYLVANIA CO.	63.70%	10.24%	9.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	13.57%	0.00%	0.00%	0.00%	2.51%	

From compiled Future Land Use Map of VRE Study Area Jurisdictions.

Low density uses (agriculture and large lot single family residential) comprised the largest percentage of planned land uses. At 44 percent, this category had more than twice the acreage of publicly owned land, the second largest land use category, which comprised 20 percent of the planned acreage. Public land usage was especially high because of the large federal government properties in the study area. Quantico Marine Corps Base, Fort Belvoir Army Base, Manassas National Battlefield Park, Washington Dulles International Airport and Prince William Forest contributed a majority of the 191,000 acres in this use category. Planned residential use acreage in densities of 1-5 dwelling units per acre formed the third largest category at 17 percent. At 50,000 acres, quasi-public uses was the fourth largest planned use. The quasi-public category consisted of privately owned properties which belonged to membership groups—religious organizations, civic groups, private recreational facilities, etc.—or privately owned lands which had preservation restrictions placed on them to protect a "public good." Examples of the latter included privately owned floodplains, wetlands and steep slopes on which development was prohibited.

The map of Future Land Uses for the VRE Study Area Jurisdictions also showed planned land uses for Arlington County, and the Cities of Alexandria, Fairfax and Falls Church. The maps of these jurisdictions were included, and acreage obtained, to provide a 1992 base should this information be desired for analysis or comparison in the Phase II study.

2) Compiled Land Use Map versus Compiled Zoning Map - It may be argued that a compiled regional zoning map would have provided a better base line against which to measure future land use changes. The argument would state that zoning, as a major tool for implementing future land use plans, would provide a better indicator of change. Local zoning maps, however, change with each approved zoning amendment. Most jurisdictions in the VRE study region act on zoning amendment applications at least monthly. The biggest argument against the use of zoning as a base line indicator is the frequency of zoning map changes. Picking a point at which to "freeze" local zoning maps and determining how to factor in applications already in the review process would be difficult to coordinate among 18 jurisdictions. A second reason why a regional zoning map was not compiled involved the large physical task of digitizing local zoning maps versus local land use maps. Many more categories and many more separate parcels would have been involved. NVPDC determined that there were not sufficient resources available to allocate to that task effort. The preparation time between "freezing" local zoning maps and completion of digitizing and publication of a compiled zoning map would have made it outdated long before publication; as such, it would have had limited usefulness for local planning analysis. A compiled future land use map, which changes much less frequently, will allow individual jurisdictions to more meaningfully examine their plans in relation to those proposed by other jurisdictions.

PRIVATE SECTOR INITIATED LAND USE AND RELATED ACTIVITIES

VII

A. Chapter Summary

Zoning amendment applications were a direct reflection of land activity and desired land use change. They were the primary method used by the private sector to confirm a jurisdiction's Land Use Plan designations or to propose a "higher" or "better" use for a particular parcel of land. Residential building permits were an indication of market demand anticipation by the private sector. Zoning amendment applications and new residential building permits were selected, therefore, as major variables of private sector land use activity. Documenting trend conditions for these variables revealed comparative differences among the jurisdictions—differences in comparative amounts and locations of land use activity, indications of the scale of land use change involved, and reflections of the affects of economic conditions on land development activities which occurred during the study years.

Northern Virginia's population grew rapidly during the early 1980s. The rapid growth was reflected in the rezoning of large amounts of acreage and conversion of much of that acreage from agricultural and forested uses to suburban landscapes. Graphs of the zoning amendment applications from the period 1984 to mid-1992 reveal differences in numbers of amendment applications, acreage involved, acreage approved for rezoning, time of application submittals and similar items of data comparison. Sixty-nine percent of the 2,260 zoning amendment applications submitted in the VRE study area jurisdictions were

approved. The approvals provided for allowed the rezoning of 56,276 acres—the equivalent of 87.9 square miles of land—from 1984 to mid-1992. A majority of combined zoning amendment requests were for sites within the PCAs.

Comparison of graphs on new residential building permit trends among the jurisdictions reveals the amount of growth experienced by Fairfax County. These show interesting comparisons of the location of new residential construction in relation to the VRE catchment areas. Fairfax County's annual building permits exceeded the combined annual totals for all the other study area jurisdictions.

Table 13

Population Growth VRE Study Jurisdictions: 1980 and 1990

Fairfax County	595,754	818,584	37.40%
Prince William County	144,636	215,686	49.10%
Stafford County	40,470	61,236	51.30%
Spotsylvania County	31,995	57,403	79.40%
Fredericksburg	17,762	19.027	7.10%
Manassas	15,505	27,957	80.30%
Manassas Park	6,524	6,734	3.20%

Source: Northern Virginia Planning District Commission

Both variables—zoning amendment applications and building permits—show that the economic recession started in 1987 in most Northern Virginia jurisdictions. It was only beginning to show signs of improvement in 1992 after up to five years of declines in private sector development activity.

Existing land use and employment in the VRE Station Nodes also reflected private sector activities which were subject to monitoring as change indicators. Each ownership parcel was surveyed to determine its use as of mid-1992 in each of the Station Nodes.

Employment in the Station Nodes, as of mid-1992, was determined by comparing field surveys of individual business names with employment reports to the state. The major employment categories for each Station Node provide a basis for identification of future changes in employment numbers and job types at each location.

B. Regional Population Growth: 1980-1990

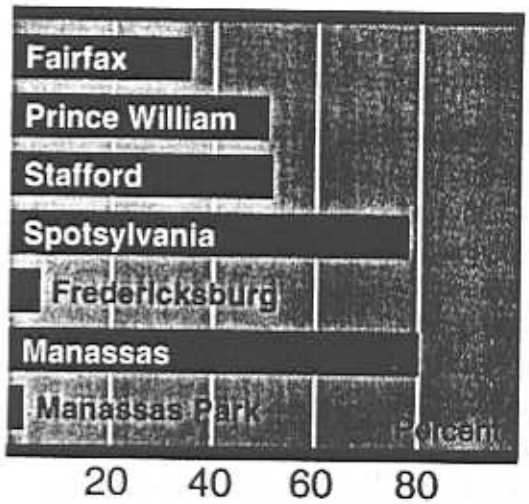
The VRE study area experienced extremely rapid growth during the 1980s. Total population increase in the study area jurisdictions was 41.5 percent, as shown in Table 13.[73] Four localities had even higher percentage increases as indicated on Table 13 and Figure 12. The populations of Spotsylvania County and Manassas almost doubled over the decade. The rapid population growth was accompanied by construction for related housing, schools, retail and support services, offices and industrial spaces. Demands of the increasing population led to extensive conversion of agricultural and forested acreage into new suburban landscapes.

C. Zoning Amendment Application Trends: 1984-1992

Zoning amendment applications or "rezonings" for development purposes flowed in continuous streams through local approval processes during much of the 1980s. The numbers and types of zoning applications which were requested provide important base lines against which to compare future conditions. Zoning amendment records from 1984 to 1992 were researched for each study area jurisdiction. Some jurisdictions maintained computerized records which could be accessed for specific information by subareas. Others did not. In the later, individual records or summaries were hand processed and their locations identified in relation to Station Nodes, PCAs or SCAs.

Figure 12

Population Growth of VRE Localities, 1980 to 1990



Source: U.S. Bureau of the Census

The Code of Virginia provides local governments with the authority to regulate local land use development. Comprehensive plans, zoning plans and subdivision ordinances are the primary tools provided for implementing this authority.[74] The comprehensive plan, consisting of a "Future Land Use Plan" and narrative text outlining goals and objectives for the future, tends to be more general in nature. The Future Land Use Plan is a

graphic depiction of the locality divided into proposed land use development categories. Specific regulations on land use are found in the Zoning and Subdivision Ordinances. The Zoning Ordinance is a set of guidelines on items such as allowable land uses, densities, setback requirements, site coverage, parking requirements, height limits, etc., which provide technical guidance for implementing the Comprehensive Plan's "vision."[75]

The Zoning Ordinance requires that an official Zoning Map of the jurisdiction be maintained. Over time, the local Zoning Map is amended to be composed of zoning districts which accurately implement the Future Land Use Plan categories. For example, a Future Land Use Plan may designate an area as future "Medium-Density Residential." The Land Use Plan definition of Medium-Density Residential may, for example, be 6-16 dwelling units per acre. The corresponding zoning districts for the same area may be "R-16" (16 units per acre, multi-family), "R-10" (10 units per acre, single-family attached) or "R-6" (6 units per acre, single-family detached). The community's Zoning Map will indicate specific planned locations for the R-6, R-10 and R-16 uses within areas designated on the Land Use Plan for "Medium-Density" residential.

Land may be developed, by right, under its existing zoning, even if the Comprehensive Plan recommends a different use or intensity. The approval process involved when Land Use Plan and Zoning Map are not consistent and a zoning change is sought is more extensive. For example, if a builder wished to construct an apartment project that averaged 16 units per acre, the particular site may or may not be zoned to allow that density. If it was zoned "R-10" (10 units per acre, single-family attached) or "Agriculture," but shown on the Future Land Use Plan for "Medium-Density Residential," the developer would apply for a *zoning map amendment* or *rezoning* and the merits of the application would be weighed against the Land Use Plan and Comprehensive Plan recommendations for the particular site. If the builder wanted to construct the apartment project on land zoned "Agricultural" and shown on the Land Use Plan as "Commercial," the developer would need approval of both a Comprehensive Plan amendment and a zoning amendment changing the recommended use from "Commercial" to "Medium-Density Residential."

Zoning amendment applications are a direct reflection of desired land use change. A zoning amendment application begins the process of changing the official Zoning Map of a jurisdiction. It may also initiate a request for change in the Comprehensive Plan if the change requires a corresponding change to the adopted Land Use Plan. The zoning amendment process is used by both public and private sectors when a land use change is sought.

The zoning amendment application initiates a staff re-

view of the request. The review examines justification for the proposed change, appropriateness of the change, and impacts from the change. Staff recommendations from the review are submitted to the local Planning Commission, a body appointed to advise the elected governing body on land use issues. Public hearings on the application are required before the Planning Commission. The Planning Commission makes a recommendation on the application to the governing body. The governing body also holds a public hearing on the application and makes a final decision. Appeals from the decisions of the governing body are to the Circuit Court. In Virginia, the process may also involve negotiations of "proffers"—contributions to support public services, land for public use, utility or transportation improvements, etc.—which an applicant may offer to help offset impacts on service and infrastructure costs which would result from development of the site under the sought zoning classification.[74]

A zoning amendment application may represent one of two market sector opinions of the locally adopted land use and zoning plans. It may represent confirmation that the planned land use is appropriate to the site and the application is meant to bring the zoning use into conformity with the planned land use. Or, an application may also represent the market sector's opinion that there are more appropriate uses for the land than has been planned or zoned by the public sector. These two opinions may change in response to new circumstances which add or reduce development value of the site.

The first half of the 1980s saw a Northern Virginia real estate market that might be described as "frenzied." Extensive amounts of undeveloped land were being purchased or optioned for site plan amendment (rezoning) or site plan approval. An approved rezoning or site plan enhanced the economic value of the site. "Flipping"—the optioning of land contingent upon rezoning or site plan approvals, enhancement of value through rezoning or site plan approval, and resale of the option at the site's enhanced value prior to required closing on the original option contract—was extensive. Other sites were rezoned for specific development purposes.

Zoning amendment summaries from 1984 to 1992 for the jurisdictions in the VRE study area are shown in Table 14. There were a total of 2,260 zoning amendment applications filed in the jurisdictions of the VRE study area. Of the total zoning amendment applications processed, 69 percent (1,561) were approved, six percent were denied, 16 percent were withdrawn by the applicants, and seven percent remained pending final resolution. Two percent represented actions to change "proffer" conditions on amendments approved at an earlier date or to assign special zoning designations to sites—such as an "Historic District" designation. The following summary provides more information on the 2,260 zoning amendment applications filed over the eight year period in the study area jurisdictions.

Table 14

Zoning Amendment Applications for Jurisdictions of the VRE StudyArea

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Apprv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	PCA/CCA West	Nodes
Fairfax County	863	32	831	729	18,391	609	14,193	30	139	111	673	146	38	6
Prince William Co.	565	30	535	484	65,163	413	23,816	11	123	14	157	235	162	0
Dumfries	11	0	11	8	157	3	5	8	0	0	-	11	-	-
Manassas	64	10	54	52	993	55	798	3	6	1	-	-	55	7
Manassas Park	11	5	6	8	276	10	273	1	0	0	-	-	9	2
Fredericksburg	58	1	57	50	1,398	44	1,275	7	4	0	-	48	-	7
Stafford County	424	3	421	372	16,482	276	10,641	37	65	12	25	364	-	1
Spotsylvania County	264	8	256	245	15,248	151	5,275	45	19	17	65	173	-	-
[illegible]	[illegible]													

1) Public Vs Private Applicants

Only four percent of zoning amendment applications were filed by governments or governmental agencies, such as school districts and public works departments. The remaining 96 percent were filed by private sector applicants.

2) Applications Requesting Higher Density

Eighty-six percent of all applications were requests for rezoning which would allow higher density development of the subject properties. The remainder were requests for lower density rezonings or for an overlay district zoning which did not affect density—such as overlaying a Historic District Zone over the existing use zoning.

3) Acreage of Zoning Amendment Applications

The combined zoning amendment applications from 1984 to mid-1992 totaled 118,108 acres, or a combined total of 184.5 square miles of land area. The 1,561 approved rezoning applications affected 56,276 acres—the equivalent of 87.9 square miles of land. The acreage which was approved for rezoning was 48 percent of the total acreage in all the requested applications. The applications which had been withdrawn, denied or which were still pending action represented nearly 62,000 acres, or 52 percent of the total application acreage (see Figure 13).

Prince William County, with 23,816 acres of zoning amendments applications approved (a combined equivalent of 37.2 square miles), had nearly twice as much acreage approved for zoning changes as did Fairfax County, at 14,193 acres, or Stafford County at 10,641 acres. Spotsylvania County—four counties removed from Washington, DC and thus a metropolitan fringe location—still had 5,275 acres of approved zoning changes between 1984 and 1992—a combined area equal to eight square miles.

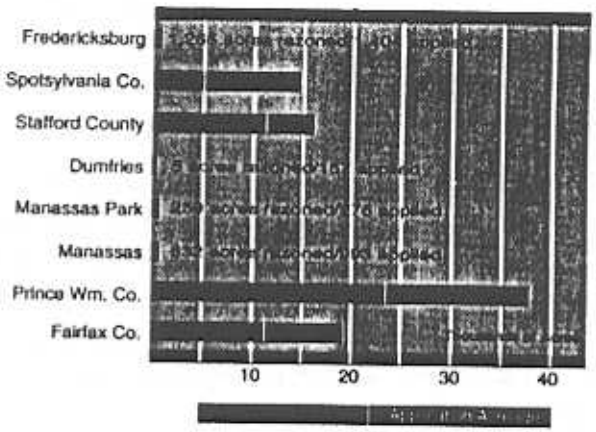
4) Zoning Amendment Application Approval Percentages

Dumfries had the lowest rate of zoning amendment approvals at 27 percent of applications. Spotsylvania and Stafford Counties followed at 57 and 65 percent respectively. Manassas Park, at 92 percent, had the highest percentage of zoning amendments approved, based on 10 approvals out of 11 applications submitted.

Figure 13

Acreage Submitted for Rezoning andAcreage Approved for Rezoning

VRE Study Region Jurisdictions, 1984-1992



1992 figure is for January to June only

Source: Local governments.

5) Location of Zoning Amendment Applications

A majority of the regional applications, 57 percent, involved tracts inside a PCA; 42 percent were outside PCAs or Station Nodes; and only one percent were located in Station Nodes. The one percent of applications in Station Nodes totaled 23 applications: 14 were within the Cities of Fredericksburg, Manassas or Manassas Park; one was in Stafford County; and the remaining six applications were in Station Nodes in Fairfax County.

The Fairfax PCA had applications representing 18 percent of total applications in the county. The 38 applications in the CCA were only 4 percent of county totals. Those percentages represented considerably less than the percentage of county land area comprised by their respective acreages. Of the six applications affecting sites in Station Nodes, three received approvals for higher residential densities than their previous residential zoning allowed, one changed from residential to commercial, one from a lower to a higher industrial classification, and one application was denied.

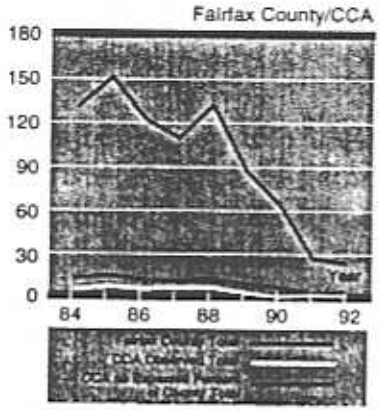
There were a combined total of 638 zoning amendment applications within Prince William County, Manassas, Manassas Park and Dumfries over the base time period. Of the total, 39 percent were for sites within the eastern PCA, and 37 percent occurred within the western PCA. Slightly over one percent of all applications were for sites within one of the six Station Nodes located in these jurisdictions.

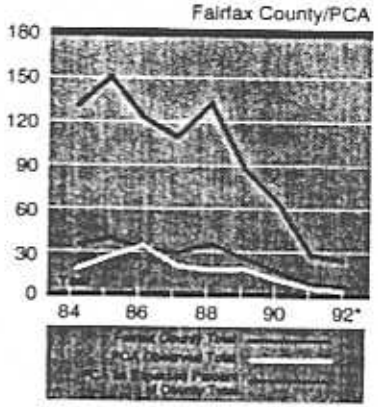
Five of the approved applications for change in the Manassas Station Node involved changes from residential to business uses; one went from lower to higher density residential, and one representated a Historic District overlay which did not change use. The approved changes totaled a combined 5.24 acres. Manassas Park had two applications approved for sites within their Station Node. The two represented changes from low-density residential to industrial (86 acres) and to Planned Unit Development (37 acres) zoning.

The one application for zoning amendment change in a Stafford County Station Node was for a 685 acre tract. The request to change from agricultural and manufacturing to Planned Development was denied.

6) Trend Comparisons

Annual zoning amendment data in PCAs was compared to activity to county trends as a whole. Figure 14 graphically displays the observed zoning amendment application trends for counties and their PCAs. The individual graphs include the trend lines that would occur if the PCAs had the same percentage of applications as was reflected by their percentage of county land area (the "expected" total). This additional comparison shows whether activity was greater or less than would be reflected by the PCAs' geographical sizes based on equal distribution of zoning amendments. PCA activity was higher than its proportional share in the I-95 corridor PCAs and in the Prince William West PCA, which included Manassas and Manassas Park activity.





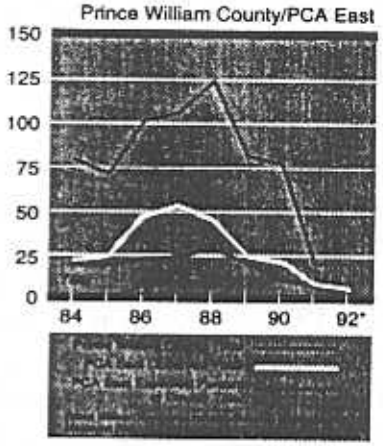
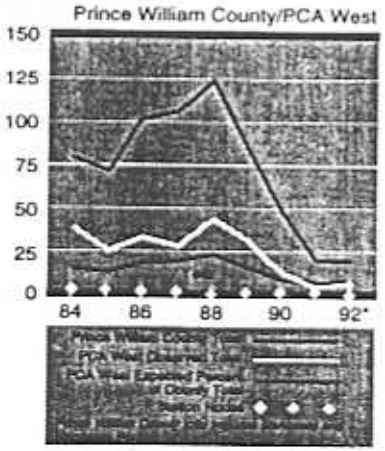
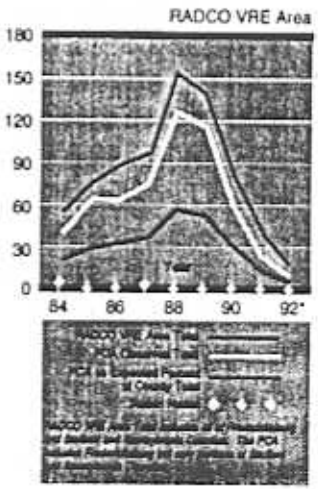


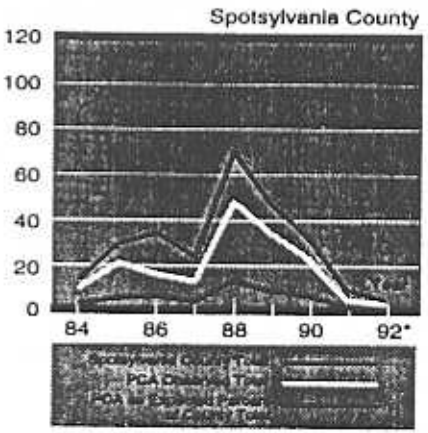
Figure 14

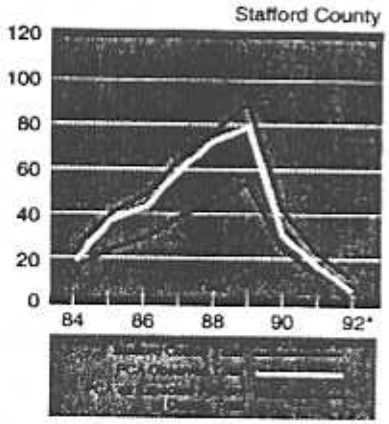
Zoning Amendment Applications: 1984-1992

* *1992 data are for the first half of the year only.*









These trends indicated the attractiveness of the highway corridors for development which preceeded the VRE system.

The Fairfax County PCAs' annual zoning amendment applications are compared to those of the county as a whole in Figure 14. Annual activity in the PCA was often counter to what was happening in the county. Activity from 1984 to 1985 was identical. Whereas the county as a whole showed a significant drop in 1986, activity in the PCA continued to rise. A downward trend began for the PCA in 1987 that continued until the first half of 1992. The county as a whole dropped in 1986 and 1987, rose sharply in 1988, and then began a steep decline through 1991.

Application activity began climbing again in the first half of 1992. Comparing the PCA observed trend line to that of the "expected" line representing its 26 percent share of county activity shows a fairly close correlation. With some variations in 1984, 1986 and 1988, the trend lines are very similar. This similarity shows that zoning amendment applications in the PCA were closely representative of county-wide share of activity distribution.

Figure 14 also compares the trend lines for the Control Catchment Area (CCA) to Fairfax County activity. The CCA represented 10 percent of County land area. The trend lines for the CCA correspond very closely, although slightly lower than an expected 10 percent share of county-wide applications. This close similarity between actual and expected lines is surprising considering that the CCA is composed of large parts of land restricted to large lot zoning to help protect the Occoquan Watershed. Large portions of the county outside the CCA allow much higher zoning densities. Presumably a greater disparity would have been seen between the CCA and the expected rezoning application trend lines as developers sought more rezoning of sites outside the CCA which allowed for greater density and variety of development.

A completely different picture occurs when examining zoning amendment trends for Prince William County and its PCAs, as shown on Figure 14. In these figures, annual applications from Manassas, Manassas Park and Dumfries were added to those of Prince William County to establish the annual "County" total. Both figures show that observed application activities in the East and West PCAs were higher than indicated by their percentage of the county total land area based on equal distribution. Observed activity in the East PCA started and ended equal to its expected share of county activity (23 percent). However from 1985 to 1990, zoning amendment applications were significantly higher than if activity was uniformly distributed throughout the county. One noticeable difference was that application activity peaked in the PCA in 1987 and declined through mid-1992. In the county, however, it continued to increase

until 1988. It then dropped sharply until 1991. Zoning applications in the County in the first half of 1992 were equal to those of all of 1991, indicating, as with Fairfax County, that a positive trend may have resumed.

Only in 1990 did observed application activity in the West PCA correspond with the expected trend at 19 percent of county activity. In all other years it was higher. The PCA trend was less dramatic in its annual activity than was county activity. The observed PCA trend showed an annual up-and-down pattern until 1989, when the trend continued downward. For both county and PCA, 1988 was the year of peak application activity. The West PCA was showing positive increases by mid-1992 over the 1991 yearly total.

Figure 14 also shows the observed annual trend line for zoning amendment applications within the three Station Nodes of the West PCA. All these applications were for properties within Manassas and Manassas Park. The trend line shows few annual zoning amendments for sites in Station Nodes between 1984 and 1992.

Examination of zoning amendment locations in the RADCO area jurisdictions indicates that most zoning amendment activity occurred within the PCA. The annual level of application activity in the PCA was far higher than would be expected based on equal distribution throughout the counties. (This pattern shows that the I-95/US 1 corridor was the major development attractant. It provides the primary north-south access to regional job markets and for local travel.) While the PCA covered only 38 percent of the combined land area of Stafford and Spotsylvania Counties and Fredericksburg, it covered 60 percent of Stafford County and 100 percent of Fredericksburg. It covered only 22 percent of Spotsylvania County. Figure 14 also presents the trend line for amendment applications in the RADCO Station Nodes. This activity was minimal, with most of it occurring in the City of Fredericksburg.

Comparisons of observed zoning amendment applications to expected levels show the same pattern of activity within the PCA areas to county totals for Stafford and Spotsylvania Counties. Again, Figure 14 shows that most of these counties' applications occurred within their portions of the PCA area. Observed annual activity far exceeded that representing the expected percentage of equally distributed zoning amendment applications. Another way of explaining the trends would be that activities within the two PCA areas determined the trends for the two counties. In Stafford County, the PCA and county totals were almost identical.

The RADCO PCA and county rezoning application trends indicate that it will be difficult to separate VRE influenced land activity from I-95/US 1 highway corridor-related development in the future. Access is the key determinant, and all the routes—I-95, US 1 and VRE—occupy the same corridor.

7) Local Zoning Amendment Applications: 1984 to mid-1992

A summary of annual zoning amendment applications for each jurisdiction in the VRE study area from 1984 to mid-1992 is presented in Table 15.

D. New Residential Building Permit Trends: 1984 - 1992

If VRE commuter service acts as an attractant, that fact should eventually be reflected in demand for residential units convenient to VRE stations. Residential demand tracking can rely upon building permit data and housing sales data. Residential zoning amendment applications can provide indications of future housing construction plans to meet perceived market demands.

The number of annual residential building permits issued by study area jurisdictions was examined to establish base trends from 1984 to 1992. The relationships between county-wide residential building permits and PCA residential building permits provide a base for future comparisons. Future changes (increases or decreases) in the number of permits issued could reflect changes in land use in the areas surrounding VRE stations. Such changes may follow the rezoning of properties. Changes to residential from non-residential zones or to higher density residential zones may represent an increased demand for residences adjacent to stations which may not have occurred without VRE service.

The annual residential building permits issued were sorted into those located within PCAs and SCAs.

Figure 15

Building Permit Issuance 1984-1992*

* *1992 data are for the first half of the year only*

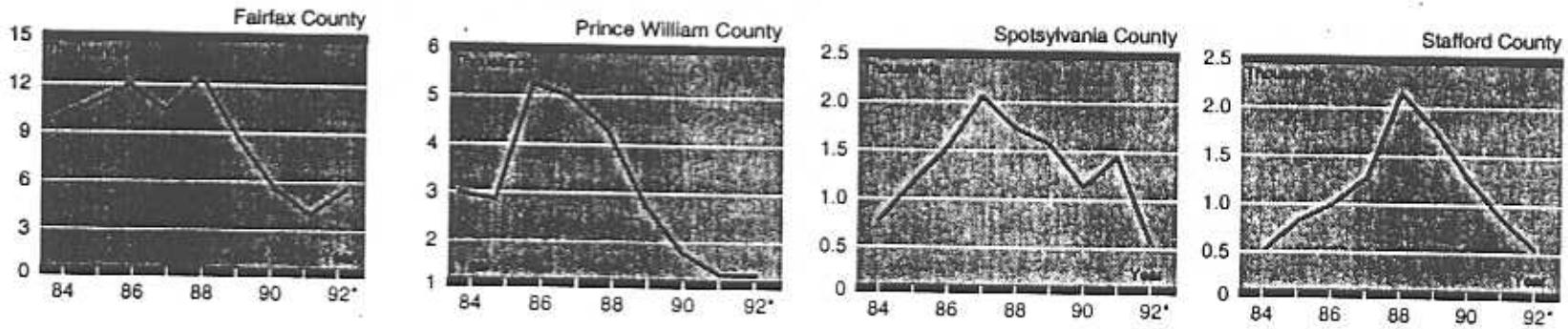


Table 15

Annual Zoning Amendment Applications by Jurisdiction

[illegible] AMENDMENT [illegible]
[illegible] COUNTY

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Apprv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	CCA West	Nodes
1984	131	2	129	120	2,912	105	2,428	3	24	1	109	17	5	0
1985	151	2	149	132	2,988	123	2,506	10	22	3	118	25	8	0
1986	123	3	120	102	4,156	99	3,821	3	19	5	83	32	6	2
1987	110	5	105	103	1,785	83	1,350	7	22	5	83	18	7	2
1988	133	6	127	110	1,980	91	1,252	3	25	18	109	16	7	1
1989	88	4	84	73	1,545	48	802	3	14	24	67	17	3	1
1990	65	2	63	43	764	35	404	0	13	18	54	11	0	0
1991	28	3	25	22	537	19	354	1	0	9	22	5	1	0
1992*	34	5	29	24	1,724	6	1,276	0	0	28	28	5	1	0
TOTAL	863	32	831	729	18,391	609	14,193	30	139	111	673	146	38	6

ZONING AMENDMENT APPLICATIONS
PRINCE WILLIAM COUNTY
[illegible]

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Apprv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	PCA West	Nodes
1984	59	0	59	53	2,561	55	2,296	2	12	0	16	22	21	0
1985	59	3	56	54	3,313	52	2,644	0	7	0	15	27	17	0
1986	81	4	77	72	3,722	59	2,540	2	18	0	19	42	20	0
1987	95	11	84	76	6,013	76	3,807	2	16	0	24	52	19	0
1988	110	4	106	103	7,458	78	5,833	4	28	0	36	40	34	0
1989	81	2	79	75	3,098	50	3,458	1	24	0	26	26	29	0
1990	43	3	40	33	2,714	26	2,719	0	13	0	13	21	9	0
1991	16	2	14	11	520	10	202	0	5	0	5	7	4	0
1992*	11	3	8	7	379	2	317	0	0	0	4	1	6	0
TOTAL	555	32	523	484	29,777	408	23,816	11	123	0	158	238	159	0

Table 15 (continued)

Annual Zoning Amendment Applications by Jurisdiction

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Apprv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	PCA West	Node
1984	20	2	18	16	254	18	145	1	1	0	0	-	19	1
1985	8	4	4	5	92	6	83	0	2	0	0	-	7	1
1986	10	2	8	9	68	6	19	1	3	0	0	-	8	1
1987	6	1	5	4	393	6	393	0	0	0	0	-	5	1
1988	10	0	10	9	80	9	79	1	0	0	0	-	10	0
1989	4	0	4	4	25	3	3	0	1	0	0	-	3	1
1990	3	0	3	2	4	2	0	0	0	1	0	-	3	0
1991	4	1	3	3	78	4	76	0	0	0	0	-	3	1
1992*	0	0	0	0	0	0	0	0	0	0	0	-	0	0
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
TOTAL	65	10	55	52	993	54	798	3	7	1	0	-	58	6

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Apprv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	PCA West	Node
1984	0	0	0	0	0	0	0	0	0	0	0	-	0	0
1985	2	1	1	1	95	2	95	0	0	0	0	-	1	1
1986	3	2	1	1	17	2	14	1	0	0	0	-	3	0
1987	5	2	3	5	127	5	45	0	0	0	0	-	5	0
1988	0	0	0	0	0	0	0	0	0	0	0	-	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	-	0	0
1990	1	0	1	0	37	1	119	0	0	0	0	-	0	1
1991	0	0	0	0	0	0	0	0	0	0	0	-	0	0
1992*	0	0	0	0	0	0	0	0	0	0	0	-	0	0
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
TOTAL	11	5	6	7	276	10	273	1	0	0	0	-	9	9

Table 15 (continued)

Annual Zoning Amendment Applications by Jurisdiction

[illegible]

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Approv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	PCA West	Node
1984	15	1	14	15	70	13	48	2	0	0	0	11	-	4
1985	6	0	6	6	7	3	3	3	0	0	0	6	-	0
1986	6	0	6	4	101	4	66	0	1	0	0	4	-	1
1987	8	0	8	7	201	5	157	2	1	0	0	7	-	0
1988	6	0	6	6	71	6	48	0	0	0	0	6	-	0
1989	3	0	3	3	614	3	614	0	0	0	0	3	-	0
1990	7	0	7	5	72	5	71	0	2	0	0	6	-	1
1991	5	0	5	3	265	3	265	0	0	0	0	3	-	0
1992*	2	0	2	1	4	2	4	0	0	0	0	2	-	0
TOTAL	58	1	57	50	1,404	44	1,276	7	4	0	0	48	-	6

[illegible]

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Apprv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	PCA West	Nodes
1984	14	0	14	13	393	10	144	1	2	1	4	10	-	0
1985	29	1	28	28	302	21	224	5	1	1	7	21	-	0
1986	34	0	34	19	498	17	415	5	1	0	9	16	-	0
1987	24	1	23	15	94	8	83	5	1	2	6	13	-	0
1988	70	3	67	56	1,073	38	423	14	3	5	13	48	-	0
1989	47	2	45	46	12,249	29	3,723	9	7	2	13	34	-	0
1990	32	0	32	28	579	20	231	6	2	3	8	23	-	0
1991	9	1	8	36	23	6	17	0	1	1	3	5	-	0
1992*	5	0	5	4	36	2	15	0	1	2	2	3	-	0
TOTAL	264	8	256	245	15,248	151	5,275	45	19	17	65	173	-	0

Table 15 (continued)

Annual Zoning Amendment Applications by Jurisdiction

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Apprv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	PCA West	Nodes
1984	26	0	26	18	196	15	101	2	4	0	2	19	-	0
1985	40	0	40	39	885	28	181	5	6	0	2	37	-	0
1986	49	0	49	45	772	34	321	6	8	0	4	43	-	0
1987	65	0	65	62	2,129	42	747	5	11	4	2	59	-	1
1988	77	0	77	73	2,911	56	1,973	5	15	0	3	73	-	0
1989	90	1	89	88	8,185	65	6,514	9	11	4	10	79	-	0
1990	42	1	41	33	817	21	416	4	7	0	2	31	-	0
1991	23	1	22	17	599	11	378	1	3	2	0	17	-	0
1992*	12	0	12	6	81	4	10	0	0	2	0	6	-	0
TOTAL	424	3	421	381	16,574	276	10,641	37	65	12	25	364	-	0

Locality	No. of Applic.	Applicant		Density Incr.	Applic. Acreage	Applic. Apprv'd	Approved Acreage	Applications			Site Location			
		Gov't	Private					Denied	Withdwn	Pending	County	PCA East	PCA West	Nodes
1984	0	0	0	0	0	0	0	0	0	0	0	0	-	-
1985	2	0	2	1	3	1	1	1	0	0	0	2	-	-
1986	4	0	4	3	16	2	4	2	0	0	0	4	-	-
1987	1	0	1	0	9	0	0	1	0	0	0	1	-	-
1988	4	0	4	4	129	0	0	4	0	0	0	2	-	-
1989	0	0	0	0	0	0	0	0	0	0	0	0	-	-
1990	0	0	0	0	0	0	0	0	0	0	0	0	-	-
1991	0	0	0	0	0	0	0	0	0	0	0	0	-	-
1992*	0	0	0	0	0	0	0	0	0	0	0	0	-	-
TOTAL	11	0	11	8	157	3	5	8	0	0	0	9	-	-

* Through June, 1992

Sources: Compiled from zoning amendment records of each jurisdiction.

Dumfries, Fredericksburg, Manassas and Manassas Park were located totally within PCAs; therefore, all permits they issued were for sites within PCAs. The Fredericksburg station's portion of the RADCO PCA occupied a portion of Spotsylvania County, even though no VRE station was located in the county. The annual residential building permit trends for the study area jurisdictions are shown on Figures 19 and 20.

1) County New Residential Building Permit Trends - The following are observations made from comparisons of the four county trend lines (Figure 15):

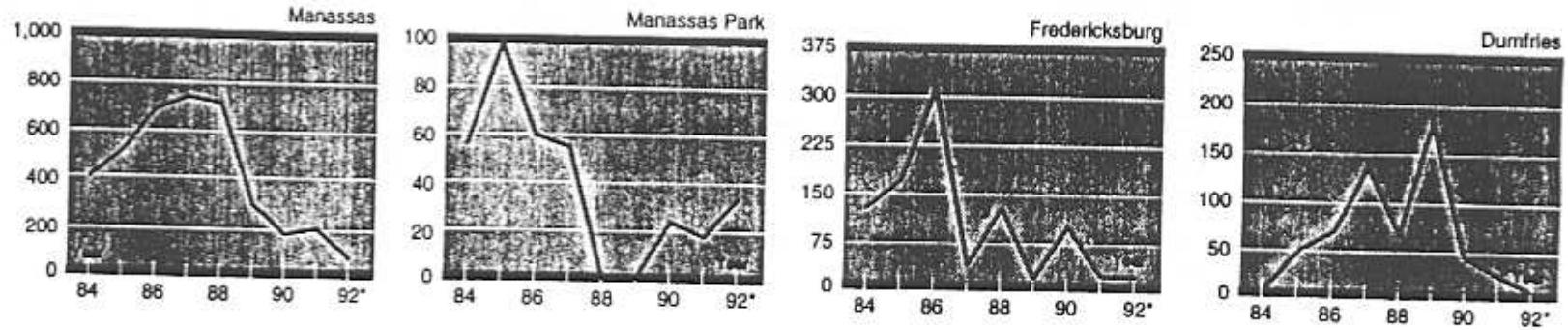
- the number of annual permits issued varied extensively between the counties and the smaller jurisdictions. Fairfax County's annual permits exceeded the combined annual totals for all the other jurisdictions;
- the peak years of activity varied between 1986 and 1988; trends were downward from thereon, except in Fairfax County, which was experiencing a positive trend in 1992;
- the drop in annual residential building permits from the peak years was significant;
- there was a sharp drop in permits issued in 1989 for all the counties except Spotsylvania which experienced a slightly steeper decline than experienced the two previous years. The same drop was also evident in the small jurisdictions. Only Dumfries experienced an increase in 1989, and that represented a total of less than 200 permits.

2) City and Town New Residential Building Permit Trends - Examination of the trends for the cities

Figure 16

Building Permit Issuance 1984-1992*

** 1992 data are for the first half of the year only.*



and the Town of Dumfries reflects much more irregular activity. (See Figure 16.) Because the base of annual permits is relatively small, annual differences tend to create an exaggerated pattern. Also, two of the jurisdictions—Dumfries and Manassas Park—had very little residential land remaining for development. By 1987, Manassas Park was essentially "built-out." New residential building permit activity only commenced again when Manassas Park completed its annexation of over 460 undeveloped acres in April, 1990.

The high point in local permit issuance for the cities and town occurred in different years. Manassas Park issued more permits in 1985; in Fredericksburg, the peak year was 1986. Manassas experienced increasing permit issuance until 1987 had a very slight decrease in 1988 and had a precipitous decline in 1989. Fredericksburg's trend resembles a chain of mountains, up-down, up-down in alternating years. Fredericksburg completed a large annexation in 1987 which gave it more land for future development. As previously mentioned, 1989 was the year in which Dumfries issued its largest number of building permits.

Only Manassas Park experienced an increase in the number of residential building permits issued during the first half of 1992. The gain occurred with construction of the Belmont Station townhouse development. The project was just outside the VRE Station Node and it should be noted that sales were reported as benefiting from the attractiveness of commuter rail access to prospective purchasers.

3) <u>New Residential Building Permit Trends in PCAs</u>
Trends for residential building permits issued for sites within the PCAs generally reflected the county-wide permit trends as shown in Figure 21. The major exception was in Fairfax County. The Fairfax County PCA and the CCA occupied smaller percentages of Fairfax County than did the PCAs in the other three counties. The Fairfax PCA and CCA included portions of the Occoquan watershed, which had large lot zoning to limit development in the watershed of a major water supply source for Northern Virginia. Residential development in the watershed tended to be single units or small projects rather than large residential developments with high density. The northern half of the PCA had been previously developed, and only limited tracts of raw land were available. Most of the residential development in the northern portion of the PCA represented infill or redevelopment.

The Fairfax PCA showed a decline in building permit activity beginning in 1986. It experienced a brief respite in 1988, which reflected overall County experience. The CCA, on the other hand, experienced a continuous increase in annual permits issued until 1989. Permits in the PCA rose slightly in 1991, which was counter to the continuing county and CCA trends.

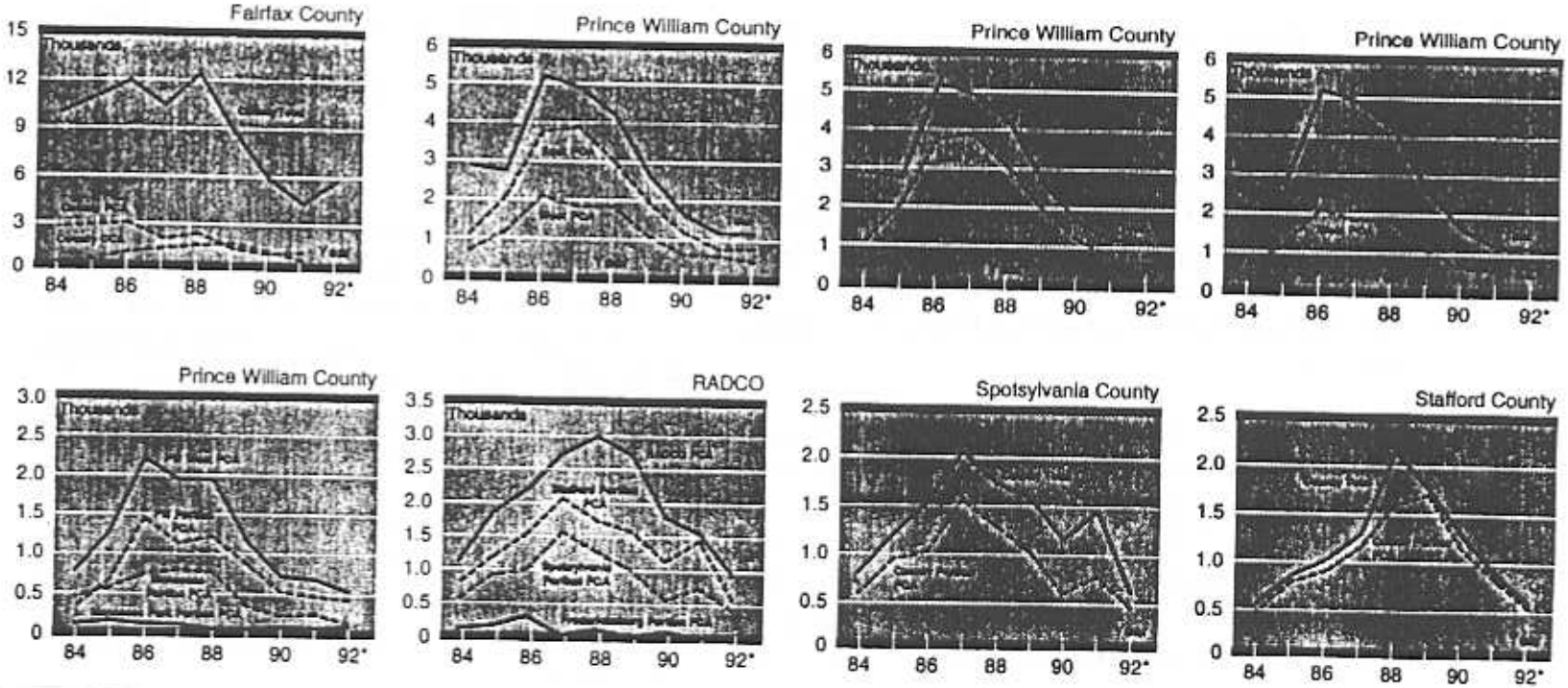
E. Factors Affecting Building Permits

The annual building permit graphs suggest that 1987 represented the start of an economic recession in construction activity in Northern Virginia. The subsequent declines in permit activity reflected drops in housing demand. Money supply problems affecting construction were simultaneously felt; the financing problems were to a large extent a result of the national savings and loan scandals involving bad real estate loans and investments.

Figure 17

Comparative Trends in Building Permit Issuance: 1984-92*

**1992 data are for the firt half of the year only.*



The downward trend among three of the counties continued through the first half of 1992.

With the exception of Manassas Park, there is no suggestion that the coming commuter rail service had a noticeable affect on local building permit issuance. The combination of a major recession already in its fifth year, a constricting regional job market, a continued weak residential market, and difficulty in obtaining construction funds for land acquisition and new housing development were not being fully countered by very favorable mortgage finance rates for home purchasers and the opening of commuter rail service.

F. Existing Land Uses at Station Nodes—1992

Planning theory recommends concentration of activities at transportation nodes.[77] Concentration allows more pedestrian access and reduces the need for driving and large parking facilities. Concentration of compatible activities produces a larger customer base for local businesses and for the transit system, thus increasing potential farebox revenues and lowering operating subsidies.

The development potential of VRE Station Nodes will vary with the availability of two-way service, location, surrounding development, available land and local land management policies. Residential uses could take immediate advantage of Station Node commuting opportunities. Such uses could be marketed to downtown workers or to commuters using I-95, US 1 and I-66. Convenience services could be provided from new or existing buildings. Existing businesses could provide mobile services to station users.

As of late 1992, downtown Manassas businesses were already furnishing services to morning and evening commuters using the VRE station. Nearby businesses had responding by extending business hours to provide breakfasts, convenience purchases and evening meals. They had created business entrances in what were the rear of buildings—secondary entrances which then opened directly to the VRE station. Mobile snack services were being provided to stations during commuting hours by VRE contractors. Mobile services could expand to provide the same types of conveniences now available at some Metrorail stations—laundry and dry cleaning pickup, daycare services for children or "personal" shopping services.

Two-way VRE rail service on a more frequent schedule would increase the attractiveness of station nodes for office, commercial or mixed uses. Two-way service would expand the drawing area of prospective ridership. Metrorail and Metrobus connections to the VRE would make Station Node locations accessible to commuters from the metropolitan areas in and around Washington. Office/commercial/industrial firms located at Station Nodes could then draw employees and customers by rail from throughout the metropolitan region over public transit, rather than just from outlying Northern Virginia, as is the case with the current one-way service.

The GIS was able to calculate land use acreage to an accuracy of 161.35 acres (versus 162.27 acres mathematically) for a circle with a radius of 1500 feet. Tables 16 and 17 present 1992 land use acreage and land use percentages by category for each of the Station Nodes.

Station nodes with the most vacant land or with sizable percentages of existing acreage in commercial and service uses provide the best opportunities for VRE-related development and re-development to occur. The Station Nodes with the largest percentages of vacant or commercially used acreage were:

Percentage of Vacant Acreage

Rippon (Prince William County)	- 77.5%
Leeland Road (Stafford County)	- 71.6%
Brooke (Stafford County)	- 56.9%
Broad Run/Airport (Pr. Wm. Co.)	- 55.9%
Manassas Park (Manassas Park)	- 48.7%

Percentage of Commercial/Service Acreage

Woodbridge (Prince William Co.)	- 30.2%
Manassas	- 15.9%
Backlick Road (Fairfax County)	- 15.5%
Fredericksburg	- 13.1%

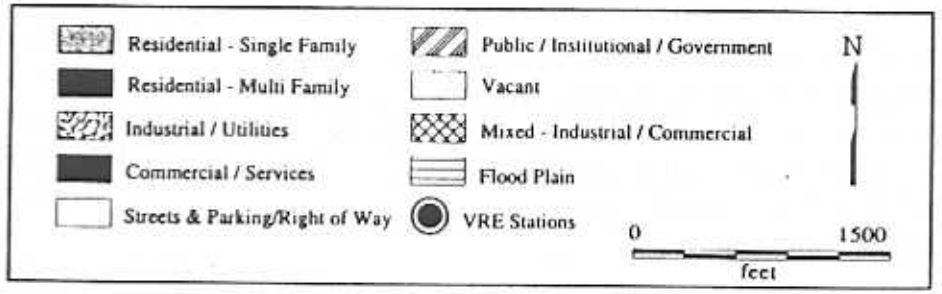
The Stafford County nodes were basically rural sites with little development immediately surrounding them. Neither Station Node had public sewer or water services available which would have encouraged more intense development. Stafford County was in the process of preparing plans to guide future development around their Station Nodes.

The Rippon Station Node had utility services available. The Rippon site contained undeveloped land on the west that adjoined residential developments. The undeveloped land on the west had fairly recently been sold from federal into private ownership, which explained why development had not occurred. The land to the east of the station site was at a lower elevation than the western portion of the Node. The acreage to the east had potential for change; however, no streets had been extended into the property. Also, part of the acreage was located in a flood plain which will preclude its development.

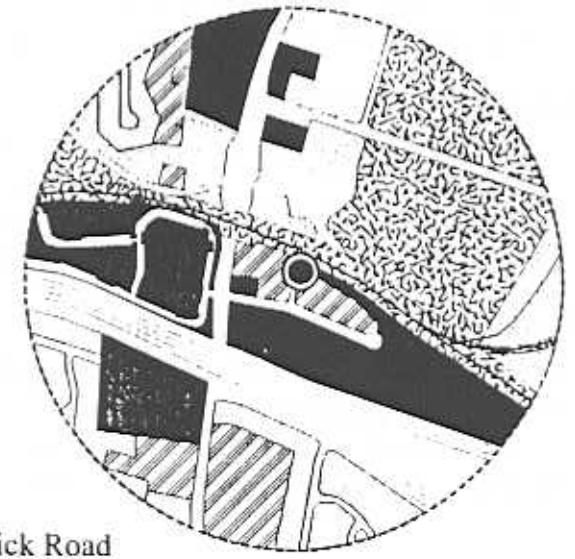
The Broad Run/Airport Station Node was located at the edge of a business and industrial park and adjacent to the Manassas Municipal Airport. The airport was viewed as a major stimulus for future development in the business/industrial park. The undeveloped acreage in the Manassas portion of the node was zoned for business/industrial purposes. About 5.5 acres of mixed commercial/industrial uses had been built in the Station Node. A portion of the Station Node also consisted of agricultural land, proposed for industrial development, lying in Prince William County. Thirty-one percent of the Node was occupied by airport or VDOT property, and these uses were not expected to change.

Burke Centre

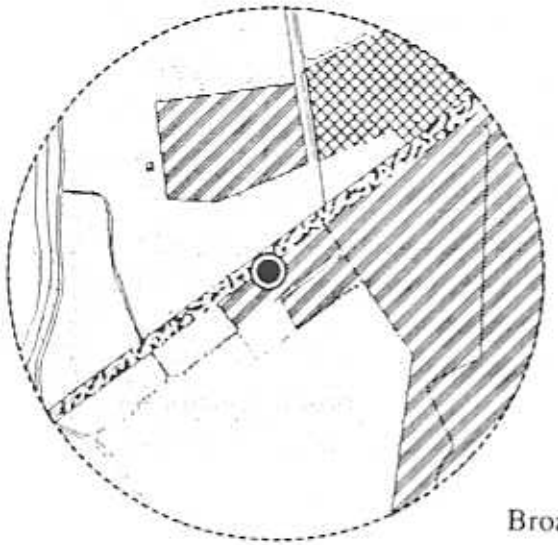
Figure 18: Existing Land Use at Station Nodes 1992
Burke Centre, Rolling Road, Backlick Road



Rolling Road



Backlick Road



Broad Run

Figure 19: Existing Land Use at Station Nodes 1992

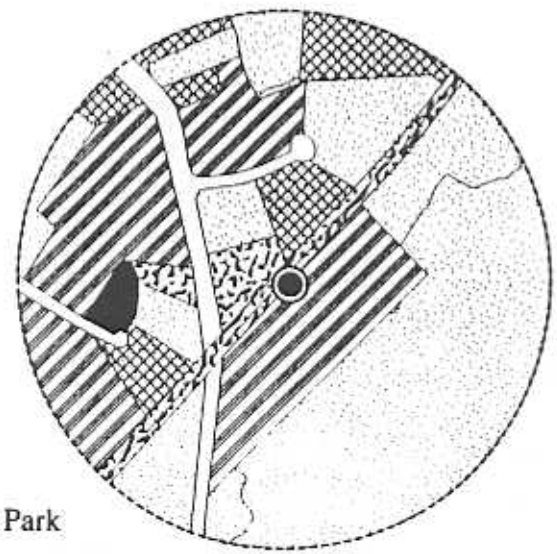
Broad Run, Manassas, Manassas Park

- Residential - Single Family
- Residential - Multi Family
- Industrial / Utilities
- Commercial / Services
- Streets & Parking/Right of Way
- Public / Institutional / Government
- Vacant
- Mixed - Industrial / Commercial
- Flood Plain
- VRE Stations

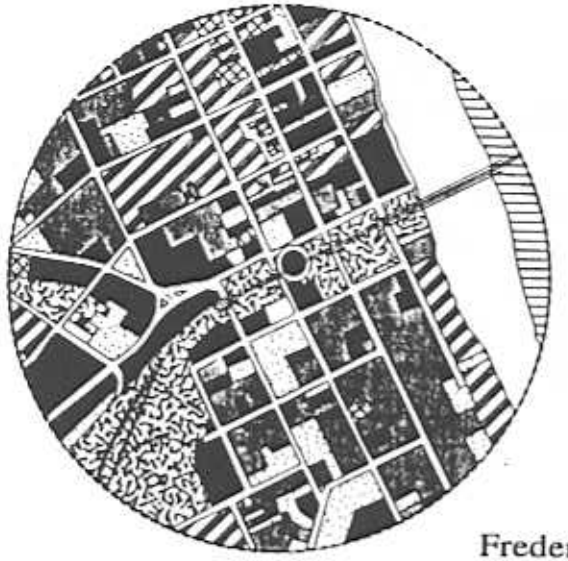
N

0 1500 feet

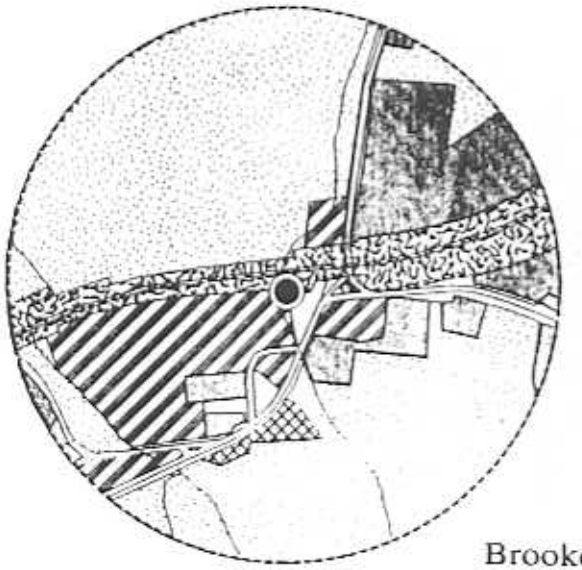
Manassas



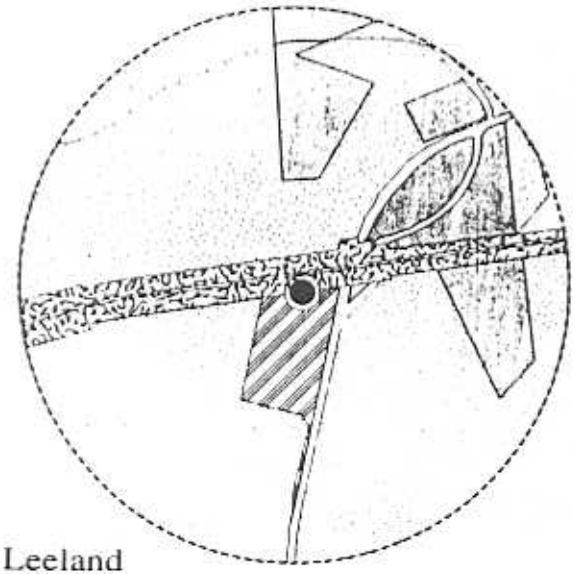
Manassas Park



Fredericksburg



Brooke



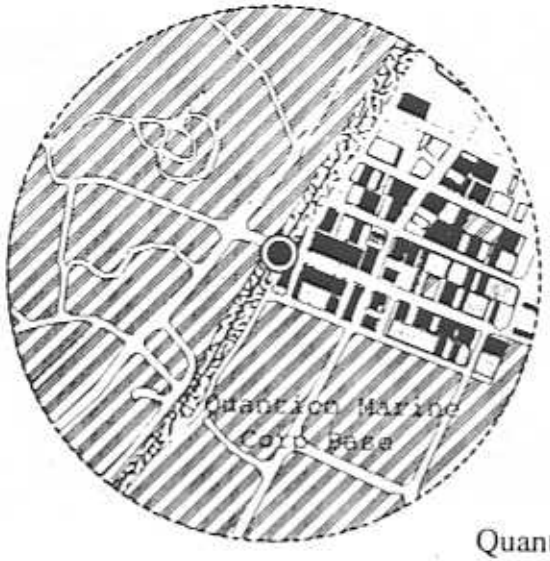
Leeland

Figure 20: Existing Land Use at Station Nodes 1992
Fredericksburg, Brooke, Leeland Rd.

- Residential - Single Family
- Residential - Multi Family
- Industrial / Utilities
- Commercial / Services
- Streets & Parking/Right of Way
- Public / Institutional / Government
- Vacant
- Mixed - Industrial / Commercial
- Flood Plain
- VRE Stations

N

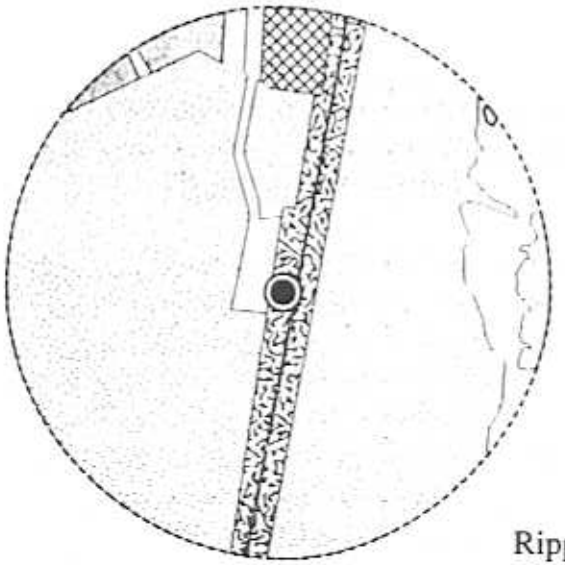
0 1500
feet



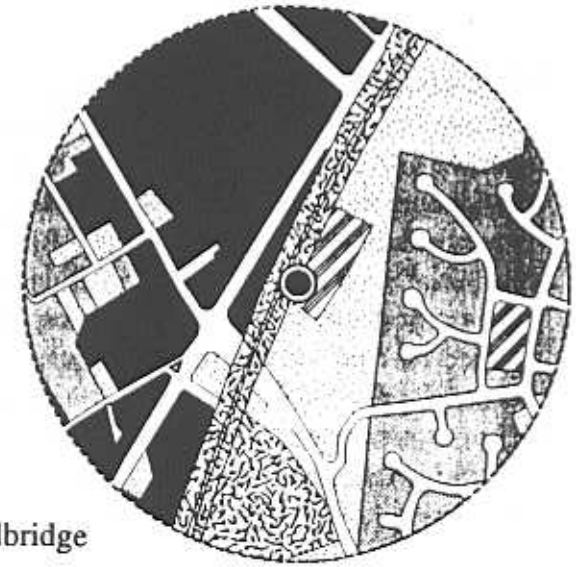
Quantico

Figure 21: Existing Land Use at Station Nodes 1992
Quantico, Rippon, Woodbridge

Residential - Single Family
Residential - Multi Family
Industrial / Utilities
Commercial / Services
Streets & Parking/Right of Way
Public / Institutional / Government
Vacant
Mixed - Industrial / Commercial
Flood Plain
VRE Stations
N
0
1500
feet



Rippon



Woodbridge

Table 16

Existing Land Use Acreage in VRE Station Nodes - 1992

(1500 Foot Radius)

Fredericksburg	32.02	6.27	20.12	21.06	18.45	16.92	2.72	20.38	23.41	161.35
Leeland Road	22.37	0	12.89	0	6.09	115.52	0	4.48	0	161.35
Brooke	22.16	0	15.30	0	19.90	91.82	1.62	10.55	0	161.35
Quantico	6.74	4.40	7.72	3.36	101.59	7.81	0	29.73	0	161.35
Rippon	3.58	0	18.58	0	0	124.96	0	4.56	9.67	161.35
Woodbridge	37.41	0	19.30	48.69	4.51	29.26	0	22.18	0	161.35
Broad Run	0	0	0	0	50.18	90.30	9.02	11.85	0	161.35
Manassas	31.14	7.53	12.62	25.70	32.46	17.39	0	34.51	0	161.35
Manassas Park	0	0	12.33	1.84	45.70	78.65	13.88	8.95	0	161.35
Burke Centre	10.35	44.37	10.64	1.01	12.38	15.44	0	25.05	42.11	161.35
Rolling Road	81.35	9.81	8.76	0	4.77	4.30	0	24.99	27.37	161.35
Backlick Road	6.81	18.33	44.46	24.99	12.74	22.09	0	31.93	0	161.35

* Mixed Uses - see individual maps for types of mixed uses

** Flood plain and surface water bodies

Manassas Park was in the process of providing infrastructure—streets and utilities—to a City-owned tract known as Bloom's Crossing. The city was preparing residential lots for sale to builders. Belmont Station, a townhouse development near the VRE station offered its initial units in 1991 and was selling well, in spite of the on going recession. The Station Node also contained land with utilities and approved zoning for industrial and mixed commercial-residential uses. The city, in cooperation with Prince William County, had provided the special exceptions required for future development of a golf course on city- and county-owned lands north of Bloom's Crossing and bounded by historic Bull Run. Part of the future golf course site was located within the 1500 foot Station Node.

The Woodbridge Station Node had the largest amount of acreage devoted to commercial/service uses. These consisted of shopping center and individual commercial sites. Unfortunately, US 1 provided a physical barrier to convenient pedestrian access between the commercial uses and the VRE station. There was some vacant land surrounding the VRE station site on the east. This acreage abutted a single-family detached neigh-

Table 17

Existing Land Use by Percentage in VRE Station Nodes - 1992

(1500 Foot Radius)

STATION NODE	PERCENTAGE OF ACREAGE									
	Residential		Indust Util	Comm Svc	Public Inst	Vacant	Mixed Uses*	St/Pk ROW	Fldpl Water**	TOTAL
	SF	MF								
Fredericksburg	13.85	5.83	12.47	13.05	11.43	10.49	1.50	12.63	14.51	100%
Leeland Road	11.83	0	7.33	0	3.77	71.60	0	2.78	0	100%
Brooke	13.73	0	9.42	0	12.33	56.91	1.00	6.54	0	100%
Quantico	4.18	2.13	4.76	2.08	62.96	4.94	0	18.43	0	100%
Rippon	2.22	0	11.52	0	0	77.45	0	2.83	5.99	100%
Woodbridge	23.19	0	11.96	30.18	2.53	18.13	0	13.75	0	100%
Broad Run	0	0	0	0	31.10	55.97	5.59	7.34	0	100%
Manassas	19.30	4.67	7.82	15.90	20.12	10.78	0	21.39	0	100%
Manassas Park	0	0	7.64	1.14	26.32	48.74	8.60	5.55	0	100%
Burke Centre	5.41	27.50	6.53	0.63	7.67	9.57	0	15.53	26.10	100%
Rolling Road	50.42	6.06	5.43	0	2.95	2.67	0	15.49	16.96	100%
Backlick Road	4.22	11.36	27.56	15.43	7.90	13.59	0	19.79	0	100%
TOTALS	13.11	4.83	9.44	8.54	13.95	31.24	[illegible]	[illegible]	[illegible]	[illegible]

* Mixed uses - see previous maps for types of mixed uses

** Flood plain and surface water bodies

borhood and would require an at-grade rail crossing for vehicular access from U.S. 1. A large, mixed-used residential/employment project located very close to the Station Node, called Belmont Bay, had been proposed for rezoning by Prince William County. If the Belmont Bay project was approved, it would be convenient to provide future shuttle service for residents and those employed within the development to the nearby Woodbridge VRE station.

Rolling Road Station Node had the largest amount of residential development at 56 percent of acreage. The predominantly residential character of the Node does not portend any use changes; these residences may be considered more desirable.

Burke Centre had an undeveloped tract located near the station site which would provide development opportunities. The tract was zoned for commercial uses. Pedestrian access was impeded by the elevated right-of-way of the Norfolk Southern Railway track. Use of the highway underpass would place pedestrians in conflict with vehicle traffic. A safe pedestrian solution would be necessary for linkage of future commercial activities with station users.

Based on existing tax parcel usage, 31.7 percent, or 614 acres, of total Station Node acreage was classified as vacant, and thus, was potentially available for development into uses which could benefit from commuter access.

G. Employment in VRE Station Nodes—1992

Employment profiles are an indicator of economic development. VRE Station Nodes provide good locations for monitoring changes in employment profiles. Monitoring will indicate changes in numbers, in job categories and in new businesses, especially VRE-related changes.

Base line employment numbers and job categories were established for monitoring future changes in the Station Nodes. Differences between base line and future employment will provide information on changes resulting from: new employers, expanded employment or loss of existing employers. Changes may indicated the attraction of commuter rail access or its user market for particular types of employers.

A replicable process was needed for monitoring future employment at Station Nodes. The most consistently maintained employment records were those of the Virginia Employment Commission (VEC). Most employers were required to file quarterly reports with employee and job information; therefore, VEC data was selected to provide the base line employment data for 1992. VEC employment data was not complete, however. The following were some of the reasons why VEC data did not provide a fully accurate employment profile for all locations:

- single proprietor businesses were not required to file VEC reports;
- military personnel and civilian employees on military bases were not counted (this would have increased the employment numbers for the Quantico Station Node);
- agricultural employees were excluded;
- railroad employees were excluded;
- non-profits had the option of filing quarterly reports on their employees;
- part-time employees were recorded differently and projections were made to arrive at equivalent full-time positions;
- some businesses failed to file their required reports regularly;
- some businesses with multiple offices listed all employees at one headquarters location; and
- some businesses located in Station Nodes had other mailing addresses, such as a Post Office box number, which could not be matched to business street addresses.

A field survey was conducted in each Station Node to identify existing businesses and firms. An address match was made with VEC data using the Census TIGER file

street network. The only TIGER file street network available for this cross-matching was based on 1980 street data. Many new streets were added locally after 1980. Where a business address was on a street that did not exist in 1980, no match was made. While the process did not have a high degree of address matching success—between 33 and 100 percent per location (see Table 18)—it used standardized quarterly VEC reports which should also be available when Phase II is conducted. The same process of surveying businesses and matching addresses to then current VEC data can be duplicated in Phase II to determine changes in employment numbers and SIC codes in each Station Node.

VEC quarterly report data was matched to street addressed to establish the number of recorded employees by Standard Industrial Classification (SIC) code for each Station Node. The SIC code was a numerical code used by Federal, state and local agencies and assigned to each industrial, professional or other job type. The codes were arranged in two-digit major groups, three-digit industry groups, and four-digit job classifications within industry groups. Four-digit job classifications were used to establish specific employment base lines; however, to protect the identity of individual employers, employment for this study was aggregated by two-digit major SIC groups. The small number of employers and employees at some Station Nodes required the discussion of data by major group classifications to avoid identifying specific employer-employee relationships. A sum-

Table 18

SIC Codes and Employment Totals at VRE Station Nodes - 1992

(1500 Foot Radius)

STATION NODE	SIC CODES REPRESENTED	TOTAL EMPLOYMENT	BUSINESS ADDRESS MATCHED
Backlick Road (Fairfax Co.)	31	2,572	57%
Burke Centre (Fairfax Co.)	2	***	100%
Rolling Road (Fairfax Co.)	0	0	---
Manassas	41	1,313	40%
Manassas Park	24	458	62%
Quantico (Pr. William Co.)	9	171	33%
Woodbridge (Pr. William Co.)	21	525	39%
Broad Run (Pr. William Co.)	3	183	50%
Rippon (Pr. William Co.)	1	***	100%
Fredericksburg	40	624	38%
Brooke (Stafford Co.)	1	***	100%
Leeland Road (Stafford Co.)	0	0	---
TOTAL	**		

* Identified through VEC quarterly report data and business address matching

** Total does not equal summation due to duplication of SIC codes at many Station Nodes

*** Not shown to maintain employer-employee information confidentiality

mary of total employment by major SIC group codes as reported to the VEC for the combined Station Nodes is shown in Table 15. Table 16 shows employment at each Station Node by major SIC group classification.

Service employment provided the greatest number of jobs in the combined Station Nodes with 2,058, or 35 percent, of total employment. Manufacturing provided the second largest combined employment sector with 1,416, or 24 percent. The construction and retail trade sectors were tied for third at 13 percent each, with 775 and 770 employees reported to the VEC, respectively.

Individual Station Node employment was highest at Backlick Road with 2,572 reported. The largest number of employees reported belonged to a utility company. Other large employment classifications also included: printing and publishing, engineering and management services, building materials services, and wholesale trade in non-durable goods. The distribution of SIC codes was typical of a mixed commercial, industrial and office employment node. Personal services and restaurant employment were well represented in the employment mix.

The Manassas Station Node had the second largest concentration of employment at 1,313 and reflected its downtown location with a mixed SIC profile. The largest employment category consisted of over 700 elementary and secondary school employees. Communications, restaurant jobs, legal services, printing and publishing, and business services contained large numbers of workers. Manassas, with 41, had the largest number of four-digit job classifications reported. The distribution of job classifications was typical of a mixed downtown center.

The Fredericksburg Station Node was also located at the edge of a downtown commercial district. The Station Node had 40 SIC codes reported with the VEC. These represented a combined employment of 624. The services sector provided half of this employment, with business services and social services classifications containing 114 and 170 respectively. The retail trade group contained 151 workers, with a majority of these employed in restaurant services. Wholesale trade in durable goods employed 44 and manufacturing employed 26. The remaining job classifications were indicative of those found in a mixed use commercial area.

Manassas Park Station Node contained a large number of construction (45 percent) and services-related employment (18 percent). Auto repair services, a services-related classification, had 458 reported workers. The largest number of employees were in the concrete work classification, with general government employment following closely. Since the City Hall is in the Station Node, the reason for the latter concentration is obvious. Landscape and gardening services were well represented, with the remainder of employment scattered in the retail and wholesale trades and in manufacturing.

Table 19

Total Reported Station Node Employment by SIC Major Group Codes

AGRICULTURE, FORESTRY, AND FISHING	TOTAL:	35
7 Agricultural Services		35
CONSTRUCTION	TOTAL:	415
15 General Building Contractors		14
17 Special Trade Contractors		401
MANUFACTURING	TOTAL:	775
23 Apparel and Other Textile Products		5
24 Lumber and Wood Products		9
27 Printing and Publishing		522
28 Chemical and Allied Products		16
33 Primary Metal Industries		3
34 Fabricated Metal Products		18
35 Industrial Machinery and Equipment		176
39 Miscellaneous Manufacturing Industries		26
TRANSPORTATION AND PUBLIC UTILITIES	TOTAL:	1416
42 Trucking and Warehousing		44
47 Transportation Services		4
48 Communications		88
49 Electric, Gas, and Sanitary Services		1280
WHOLESALE TRADE	TOTAL:	1286
50 Wholesale Trade - Durable Goods		126
51 Wholesale Trade - Nondurable Goods		85
RETAIL TRADE	TOTAL:	770
52 Building Materials and Garden Supplies		116
53 General Merchandise Stores		5
54 Food Stores		18
55 Automotive Dealers and Service Stations		166
56 Apparel and Accessary Stores		48
57 Furniture and Homefurnishings Stores		9
58 Eating and Drinking Places		322
59 Miscellaneous Retail		86
FINANCE, INSURANCE, AND REAL ESTATE	TOTAL:	132
60 Depository Institutions		54
62 Security and Commodity Brokers		8
63 Insurance Carriers		27
64 Insurance Agents, Brokers, and Service		31
65 Real Estate		12
SERVICES	TOTAL:	2058
70 Hotels and Other Lodging Places		25
72 Personal Services		135
73 Business Services		226
75 Auto Repair, Services, and Parking		32
76 Miscellaneous Repair Services		25
78 Motion Pictures		11
79 Amusement and Recreation Services		86
80 Health Services		112
81 Legal Services		83
82 Educational Services		756
83 Social Services		181
86 Membership Organizations		25
87 Engineering and Management Services		361
PUBLIC ADMINISTRATION	TOTAL:	115
91 Executive, Legislative, and General		115

Table 20

Employment by SIC Codes by Individual Station Nodes

CONSTRUCTION	**TOTAL:**	**36**
17 Special Trade Contractors		36
MANUFACTURING	**TOTAL:**	**476**
27 Printing and Publishing		467
34 Fabricated Metal Products		9
TRANSPORTATION AND PUBLIC UTILITIES	**TOTAL:**	**1281**
7 Transportation Services		1
49 Electronic, Gas, and Sanitary Services		1280
WHOLESALE TRADE	**TOTAL:**	**79**
50 Wholesale Trade - Durable Goods		10
51 Wholesale Trade - Nondurable Goods		69
RETAIL TRADE	**TOTAL:**	**218**
52 Building Materials and Garden Supplies		98
55 Automotive Dealers and Service Stations		33
57 Furniture and Homefurnishings Stores		3
58 Eating and Drinking Places		43
59 Miscellaneous Retail		41
FINANCE, INSURANCE, AND REAL ESTATE	**TOTAL:**	**4**
64 Insurance Agents, Brokers, and Service		3
65 Real Estate		1
SERVICES	**TOTAL:**	**478**
72 Personal Services		30
73 Business Services		21
79 Amusement and Recreation Services		4
80 Health Services		91
81 Legal Services		2
86 Membership Organizations		23
87 Engineering and Management Services		307
TOTAL BACKLICK STATION:		**2572**

CONSTRUCTION	**TOTAL:**	**128**
17 Special Trade Contractors		128
WHOLESALE TRADE	**TOTAL:**	**55**
50 Wholesale Trade - Durable Goods		55
TOTAL BROAD RUN:		**183**

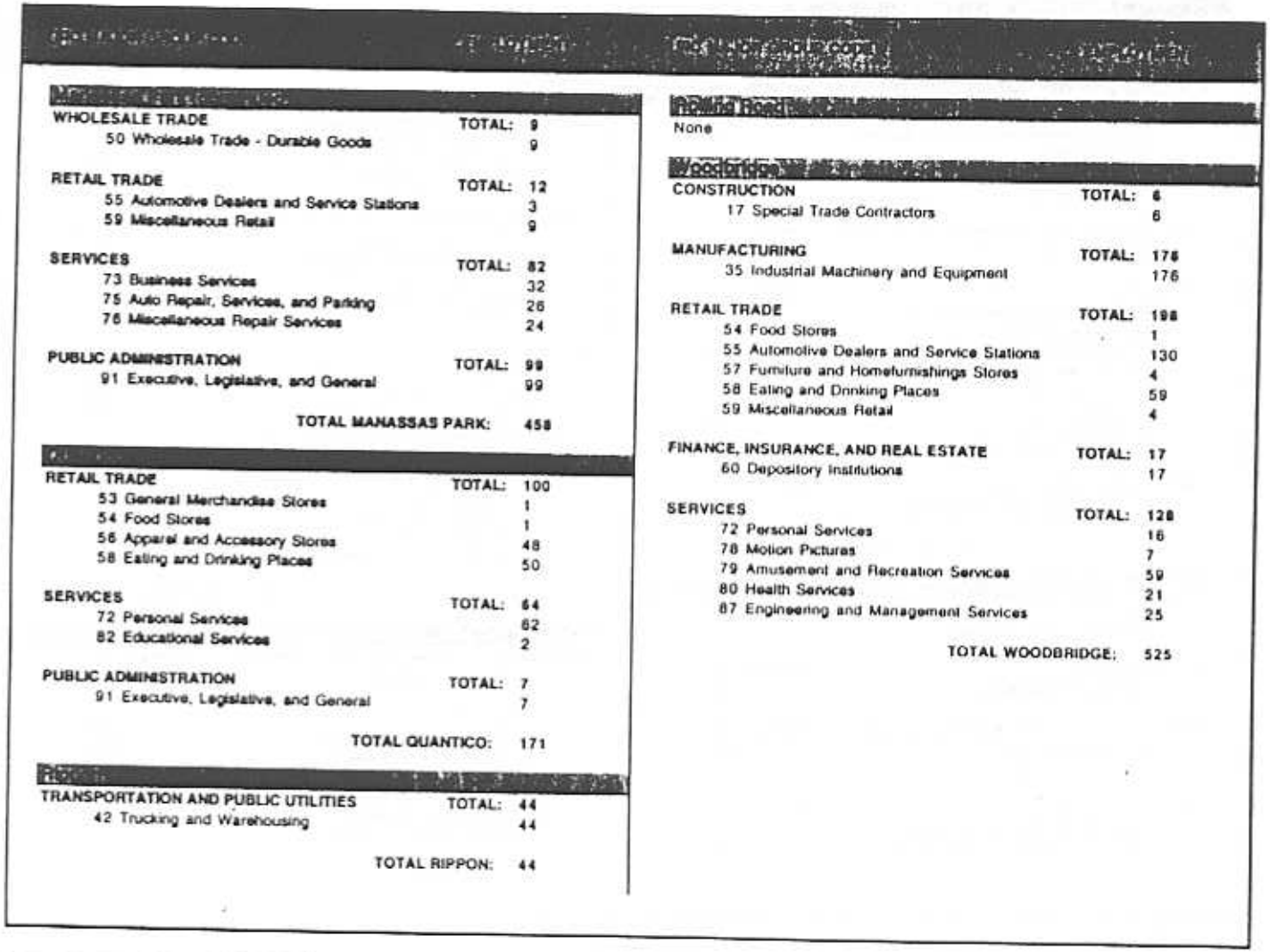
MANUFACTURING	**TOTAL:**	**16**
28 Chemicals and allied Products		16
SERVICES	**TOTAL:**	**8**
79 Amusement and Recreation Services		8
TOTAL BURKE STATION:		**24**

CONSTRUCTION	**TOTAL:**	**16**
15 General Building Contractors		8
17 Speical Trade Contractors		8
MANUFACTURING	**TOTAL:**	**48**
23 Apparel and Other Textile Products		5
24 Lumber and Wood Products		9
27 Printing and Publishing		5
33 Primary Metal Industries		3
39 Miscellaneous Manufacturing Industries		26
WHOLESALE TRADE	**TOTAL:**	**47**
50 Wholesale Trade - Durable Goods		44
51 Wholesale Trade - Nondurable Goods		3

SIC Division/Group Code	Number
Fredericksburg (continued)	
RETAIL TRADE	**TOTAL: 151**
52 Building Materials and Garden Supplies	18
54 Food Stores	13
58 Eating and Drinking Places	109
59 Miscellaneous Retail	11
FINANCE, INSURANCE, AND REAL ESTATE	**TOTAL: 5**
65 Real Estate	5
SERVICES	**TOTAL: 348**
70 Hotels and Other Lodging Places	2
72 Personal Services	8
73 Business Services	114
75 Auto Repair, Services, and Parking	1
81 Legal Services	23
83 Social Services	170
86 Membership Organizations	2
87 Engineering and Management Services	28
PUBLIC ADMINISTRATION	**TOTAL: 9**
92 Justice, Public Order, and Safety	9
TOTAL FREDERICKSBURG:	**624**
Manassas	
CONSTRUCTION	**TOTAL: 22**
17 Special Trade Contractors	22
MANUFACTURING	**TOTAL: 45**
27 Printing and Publishing	45
TRANSPORTATION AND PUBLIC UTILITIES	**TOTAL: 91**
47 Transportation Services	3
48 Communications	88
WHOLESALE TRADE	**TOTAL: 21**
50 Wholesale Trade - Durable Goods	8
51 Wholesale Trade - Nondurable Goods	13
RETAIL TRADE	**TOTAL: 88**
53 General Merchandise Stores	4
57 Furniture and Homefurnishing Stores	2
58 Eating and Drinking Places	61
59 Miscellaneous Retail	21
FINANCE, INSURANCE, AND REAL ESTATE	**TOTAL: 106**
60 Depository Institutions	37
62 Security and Commodity Brokers	8
63 Insurance Carriers	27
64 Insurance Agnets, Brokers, and Service	28
65 Real Estate	6
SERVICES	**TOTAL: 840**
70 Hotels and Other Lodging Places	23
72 Personal Services	19
73 Business Services	59
75 Auto Repair, Services, and Parking	5
76 Miscellaneous Repair Services	1
79 Amuseument and Recreation Services	9
81 Legal Services	58
82 Educational Services	754
83 Social Services	11
87 Engineering and Management Services	1
TOTAL MANASSAS:	**1313**
Manassas Park	
AGRICULTRUE, FORESTRY, AND FISHING	**TOTAL: 35**
7 Agricultural Services	35
CONSTRUCTION	**TOTAL: 207**
15 General Building Contractors	6
17 Special Trade Contractors	201
MANUFACTURING	**TOTAL: 14**
27 Printing and Publishing	5
34 Fabricated Metal Products	9

Table 20

Employment by SIC Codes by Individual Station Nodes (continued)



WHOLESALE TRADE	TOTAL:	9
50 Wholesale Trade - Durable Goods		9
RETAIL TRADE	TOTAL:	12
55 Automotive Dealers and Service Stations		3
59 Miscellaneous Retail		9
SERVICES	TOTAL:	82
73 Business Services		32
75 Auto Repair, Services, and Parking		26
76 Miscellaneous Repair Services		24
PUBLIC ADMINISTRATION	TOTAL:	99
91 Executive, Legislative, and General		99
TOTAL MANASSAS PARK:		458

RETAIL TRADE	TOTAL:	100
53 General Merchandise Stores		1
54 Food Stores		1
56 Apparel and Accessory Stores		48
58 Eating and Drinking Places		50
SERVICES	TOTAL:	64
72 Personal Services		62
82 Educational Services		2
PUBLIC ADMINISTRATION	TOTAL:	7
91 Executive, Legislative, and General		7
TOTAL QUANTICO:		171

TRANSPORTATION AND PUBLIC UTILITIES	TOTAL:	44
42 Trucking and Warehousing		44
TOTAL RIPPON:		44

None

CONSTRUCTION	TOTAL:	6
17 Special Trade Contractors		6
MANUFACTURING	TOTAL:	176
35 Industrial Machinery and Equipment		176
RETAIL TRADE	TOTAL:	198
54 Food Stores		1
55 Automotive Dealers and Service Stations		130
57 Furniture and Homefurnishings Stores		4
58 Eating and Drinking Places		59
59 Miscellaneous Retail		4
FINANCE, INSURANCE, AND REAL ESTATE	TOTAL:	17
60 Depository Institutions		17
SERVICES	TOTAL:	128
72 Personal Services		16
78 Motion Pictures		7
79 Amusement and Recreation Services		59
80 Health Services		21
87 Engineering and Management Services		25
TOTAL WOODBRIDGE:		525

Table 20

SIC Codes by Individual Station Nodes (continued)

The Woodbridge Station Node had a total of 525 employees reported to the VEC. Ninety-six percent of employment was concentrated in three major groups—manufacturing, retail trade and services. Automobile dealership employment, restaurant employment, industrial machinery, and amusement/recreation center employment provided the largest individual components.

The Broad Run Station Node had 183 reported persons employed in construction or wholesale trade-related positions. The reported employees were working in painting and wallpaper, carpentry, and lumber-related classifications.

The relationship of Quantico to the surrounding Marine Corps base was reflected in the services-related employment listed with the VEC. Apparel stores, restaurant jobs, and laundry and dry cleaning employed 94 percent of the reported 171 workers. Government had four percent of reported employment. The remaining two percent were scattered among three job classifications. Military positions and civilian employees of the Quantico Marine Corps Base were not included in VRE records for Quantico.

All reported employment in the Rippon Station Node was related to transportation and warehousing employment.

Employment in the Burke Station Node was contained in two groups—chemicals and allied products and in amusement/recreation services.

There were two commercial retail activities within the Brooke Station Node. Their reported employment was very small, thus Brooke Station Node Employment is not shown on Table 16 to protect employer-employee confidentiality.

There were no employment activities within the 1500 foot radius of the Leeland Road VRE station nor in the Rolling Road Station Node. Both stations were surrounded by residential land uses.

VRE RIDERSHIP SURVEY

VIII

A. Chapter Summary

The first survey taken of VRE riders occurred on September 22, 1992, three months after initiation of commuter rail service. The survey was prepared and conducted by the VRE for purposes of obtaining attitudinal and statistical information on its new ridership. The VRE included some questions in the survey that were specifically requested to provide information for this study. Over 2,200 responses were returned. The responses showed that the VRE was cutting commuting time for almost all riders. The survey also showed that a majority of riders lived within two miles of the VRE stations on the Manassas line, and within a distance of slightly over five miles on the Fredericksburg line. Approximately 80 percent of Manassas line riders lived within five miles, while it took a 10 mile radius to capture this percentage on the Fredericksburg line. A large majority of riders lived within 15 minutes travel time of their VRE stations.

Over 51 percent of VRE riders had switched from total or partial use of some other ridesharing mode for commuting purposes. Thirty-seven percent had switched from total reliance on SOV commuting, with an additional 15 percent having previously driven in SOVs to Metrorail stations.

Most importantly for this study, thirty-four percent of VRE riders said that potential use of commuter rail had played a "major" or "some" consideration in their choice of housing location.

B. VRE Ridership Survey Results

A survey of VRE ridership was one method of testing the validity of the study's early assumptions on catchment area delineations. The VRE conducted its first ridership survey on all morning commuter trains on September 22, 1992. The survey was intended to obtain attitudinal and statistical information from riders after three months of commuter rail operations. The morning trains carried 2,348 passengers who provided 2,207 valid responses to the survey, a response rate of 94 percent. Surveys from out-of-state passengers and those in which fewer than 50 percent of the questions were answered were considered invalid. The VRE included 11 questions on the survey specifically requested to provide information for this study.

Some general findings from the survey were:

- a large majority of passengers used the VRE five days per week;
- a majority of the passengers lived under three miles from their rail stations;
- a measurable percentage of passengers lived in outlying and non-participating counties and jurisdictions, (in terms of VRE operations and local financial support);
- the total commute time for many passengers was surprisingly long, both before and after the advent of VRE commuter rail service. Use of the VRE reduced almost every rider's total daily commuting time;
- use of SOVs for the total trip was the largest previously used single mode of commuting, at 37 percent; however, other previously used modes also relied upon SOV use for part of the commute to Park & Ride lots and Metrorail statons; and
- there was a high percentage of stated desire for and intent to use additional mid-day, late evening, weekend and holiday rail services when these could be added.[78]

The following specific questions were included in the VRE ridership survey to assist with this study. The responses received are discussed after the questions.

Question: *Before you began using The Express, what was the average total time it took you to commute door-to-door one way (from leaving home to arriving at your destination)?*
_____hour(s)_____minutes

Question: *Now, including your use of The Express, what is the average total time it takes you to commute door-to-door one way (from leaving your home to arriving at your destination)?*
_____hour(s)_____minutes

Figure 22 shows the travel time comparisons graphi-

cally. The figure show increases in ridership percentages for all commuting time periods up to 70 minutes; beyond 70 minutes, all travel time percentages are lower. The percentage of riders commuting less than 70 minutes increased 11 and 9 percent respectively on the Manassas and Fredericksburg lines. The percentage of riders with travel times greater than 70 minutes decreased correspondingly on both lines.

Table 20 provides a summary of the survey responses to the two questions. Table 21 gives a more detailed breakdown of responses and divides the percentage of riders according to their one-way commuting times before VRE and using VRE. The table also provides cumulative commute time columns. Comparing before and after cumulative columns for each commuter line on Table 21 indicates a time savings being realized by most riders. More riders on the Manassas line completed their commutes in under one hour—44.4 percent versus 35.9 percent previously. The cumulative percentage of commuters traveling 80 minutes or less increased to 75.2 percent from the previous 63.2 percent. Fewer riders, therefore, were spending more than 80 minutes commuting than before they began riding the VRE, 24.8 percent versus 36.8 percent.

Comparisons for the Fredericksburg line show similar but less dramatic travel time savings. The percentage of VRE riders completing their one-way commutes in less than one hour increased from 18.2 percent to 25.3 percent. The survey showed that cumulatively 54.9 percent of riders commuted less than 80 minutes using the VRE, compared to 46.1 percent who previously did so. Before the VRE, 53.9 percent of those surveyed spent more than 80 minutes in one-way commuting. With VRE, only 45.1 percent now required beyond 80 minutes per commute. Fredericksburg was farther from the Pentagon and Washington, DC than was Manassas. Therefore, longer commuting times would be expected by riders from Fredericksburg and the surrounding counties.

Figure 22

Comparisons of Commuting Times on the Manassas and Fredericksburg Lines - Before and with VRE

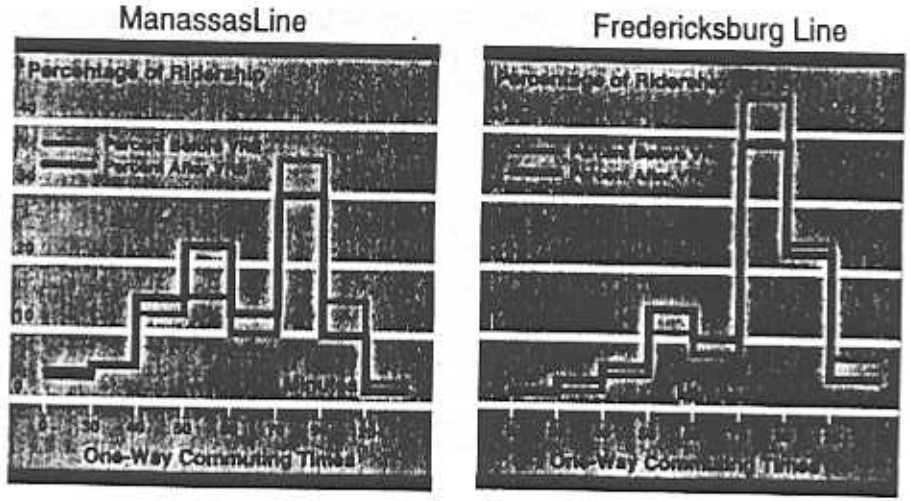


Table 21

One-Way Commuting Times - Before and Using VRE
VRE Ridership Survey Results

< or = 30 Minutes	2.10%	2.70%	0.90%	1.20%
31-40 Minutes	5.30%	5.20%	1.20%	3.10%
41-50 Minutes	12.40%	14.80%	5.10%	7.00%
51-60 Minutes	16.10%	21.70%	11.00%	14.00%
61-70 Minutes	10.00%	12.80%	8.00%	9.70%
71-90 Minutes	35.30%	30.40%	43.40%	38.60%
91-120 Minutes	14.80%	1.60%	23.10%	22.70%
> 120 Minutes	3.70%	1.60%	7.60%	3.70%

* Total does not equal 100% due to rounding

Source: VRE Ridership Survey, September 22, 1992.

2,180 riders, 63.4 percent thought the fares were reasonable; 36.5 percent felt the fares were too high, and 0.1 percent believed the fares were too low for the service offered. Savings in commuting time and stress can counter farebox costs, especially if the full commuting cost of auto ownership and use are used in comparison to VRE fares.

The VRE commuter rail will be successful to the degree that commuters perceive it as offering savings in commuting time, commuting stress and commuting costs. The more successful it is in those terms, the greater will be the potential that land use changes will occur in response to additional commuters' desires to have access to it. The VRE ridership survey did not ask any questions which directly addressed the stress factor; however, there was a question asking respondents' opinions of the fare structure. Of the responses from

Question: *How long does it take you to get to The Express station from your home in the morning?*

	Manassas	**Fredericksburg**
Base # of responses:	*(1020)*	*(1184)*
< 15 minutes	82.7%	54.4%
15-29 minutes	14.1%	40.5%
30-44 minutes	1.7%	3.7%
45-60 minutes	1.0%	1.0%
> 1 hour	0.5%	0.4%

COMMUTING TIME	MANASSAS LINE				FREDERICKSBURG LINE			
	% BEFORE	CUMULATIVE	% AFTER	CUMULATIVE	% BEFORE	CUMULATIVE	% AFTER	CUMULATIVE
0-10 Min	0.20	0.20	0.30	0.30	0.00	0.00	0.10	0.10
11-15 Min	0.10	0.30	0.10	0.40	0.10	0.10	0.10	0.20
16-20 Min	0.20	0.50	0.10	0.50	0.10	0.20	0.00	0.20
21-30 Min	1.60	2.10	2.20	2.70	0.70	0.90	1.00	1.20
31-40 Min	5.30	7.40	5.20	7.90	1.20	2.10	3.10	4.30
41-50 Min	12.40	19.80	14.80	22.70	5.10	7.20	7.00	11.30
51-60 Min	16.10	35.90	21.70	44.40	11.00	18.20	14.00	25.30
1 Hr -1:10	10.00	45.90	12.80	57.20	8.00	26.20	9.70	35.00
1:11-1:20	17.30	63.20	18.00	75.20	19.90	46.10	19.90	54.90
1:21-1:30	18.00	81.20	12.40	87.60	23.50	69.60	18.70	73.60
1:31-1:40	2.60	83.80	2.40	90.00	3.30	72.90	4.90	78.50
1:41-1:50	6.30	90.10	4.90	94.90	9.70	82.60	9.30	87.80
1:51-2 Hrs	5.90	96.00	3.30	98.20	10.10	92.70	8.50	96.30
2 Hrs- 2:10	0.40	96.40	0.60	98.80	0.80	93.50	1.20	97.50
2:11-2:20	1.20	97.60	0.40	99.20	3.00	96.50	0.90	98.40
2:21-2:30	1.10	98.70	0.10	99.30	2.60	99.10	0.80	99.20
2:31-2:40	0.00	98.70	0.10	99.40	0.10	99.20	0.10	99.30
2:41-2:50	0.30	99.00	0.00	99.40	0.30	99.50	0.20	99.50
2:51-3 Hrs	0.20	99.20	0.20	99.60	0.40	99.90	0.10	99.60
3 Hrs-3:10	0.10	99.30	0.10	99.70	0.00	99.90	0.00	99.60
3:11-3:20	0.00	99.30	0.10	99.8*	0.20	100.1*	0.20	99.80
3:21-3:40	0.10	99.40	0.00		0.10	100.2*	0.20	100.00
3:41-4 Hrs	0.20	99.60	0.00		0.10	100.3*	0.00	
4 Hrs-4:20	0.00	99.60	0.00		0.00		0.00	
4:21-4:40	0.00	99.60	0.00		0.00		0.00	
4:41-5 Hrs	0.00	99.60	0.00		0.00		0.00	
5 Hrs-5:30	0.00	99.60	0.00		0.00		0.00	
5:31-6 Hrs	0.10	99.7*	0.00		0.00		0.00	
Valid Survey Resp. Basis	912		994		1065		1153	

* Totals do not equal 100% due to rounding

Table 22

Commuting Times - Before and With VRE Service

Source: VRE Ridership Survey, September 22, 1992.

Question: *How far is it from your home to The Express station where you get on the train?*

Base # of responses:	Manassas *(1011)*	Cumulative %	Fredericksburg *(1146)*	Cumulative %
< 1/2 mile	11.1%	11.1%	4.5%	4.5%
1/2 - 2 miles	38.5%	49.6%	14.9%	19.4%
2 - 5 miles	29.7%	79.3%	26.5%	45.9%
5 - 10 miles	12.8%	92.1%	34.0%	79.9%
11 - 15 miles	3.7%	95.8%	11.3%	91.2%
16 - 20 miles	1.8%	97.6%	5.0%	96.2%
21 - 25 miles	0.6%	98.2%	1.3%	97.5%
26 - 30 miles	0.5%	98.7%	1.0%	98.5%
31 - 35 miles	0.3%	99.0%	0.2%	98.7%
36 - 40 miles	0.2%	99.2%	0.2%	98.9%
41 - 45 miles	0.1%	99.3%	0.2%	99.1%
46 - 50 miles	0.4%	99.7%	0.3%	99.4%
51 - 55 miles	0.1%	99.8%	0.3%	99.7%
56 - 00 miles	0.3%	100.1%*	0.1%	99.8%
> 60 miles	0.1%	100.2%*	0.3%	100.0%

* Exceeds 100% due to rounding

The preceding two survey questions revealed that the majority of VRE riders lived within five miles of the Manassas line stations and within 10 miles of the Fredericksburg line stations. The percentage traveling less than 15 minutes was far higher on the Manassas line than on the Fredericksburg line. The Manassas line had stations in Manassas, Manassas Park and in more highly developed Fairfax County. Average travel distances to stations tended to be much shorter. The northern limits of the PCA in Fairfax County reflected the option of many county commuters to reach other transit choices—Fairfax Connector bus, Metrobus, Metrorail—if travel times were much longer. The Fredericksburg line served a much more rural area and riders had to travel farther. The survey questions were intended to provide one-way travel distances and times; however, as shown on Table 21, a small percentage of riders on each line indicated they were spending over three hours in commuting to their jobs. These times appear excessive for one-way travel and probably represent a misunderstanding of the question, with the results being total daily commuting time and not one-way commuting time.

The survey results provided good information against which to compare the PCA boundaries defined at the beginning of the study. Figure 23 graphically compares the initially defined PCAs and cumulative percentages of VRE riders by their distances from the VRE stations on each line. The initial presumptions on which the PCA boundaries were established proved fairly accurate. It was initially presumed that the *majority* of VRE riders would be drawn from the PCAs. The survey showed that approximately 79 percent came from a radius that slightly exceeded the PCAs. The RADCO PCA boundary was larger in recognition of the need to draw from a larger, less densely developed area to encompass a majority of line ridership. It was also expected that the willingness to drive a distance to a train station would increase with overall commute distance;

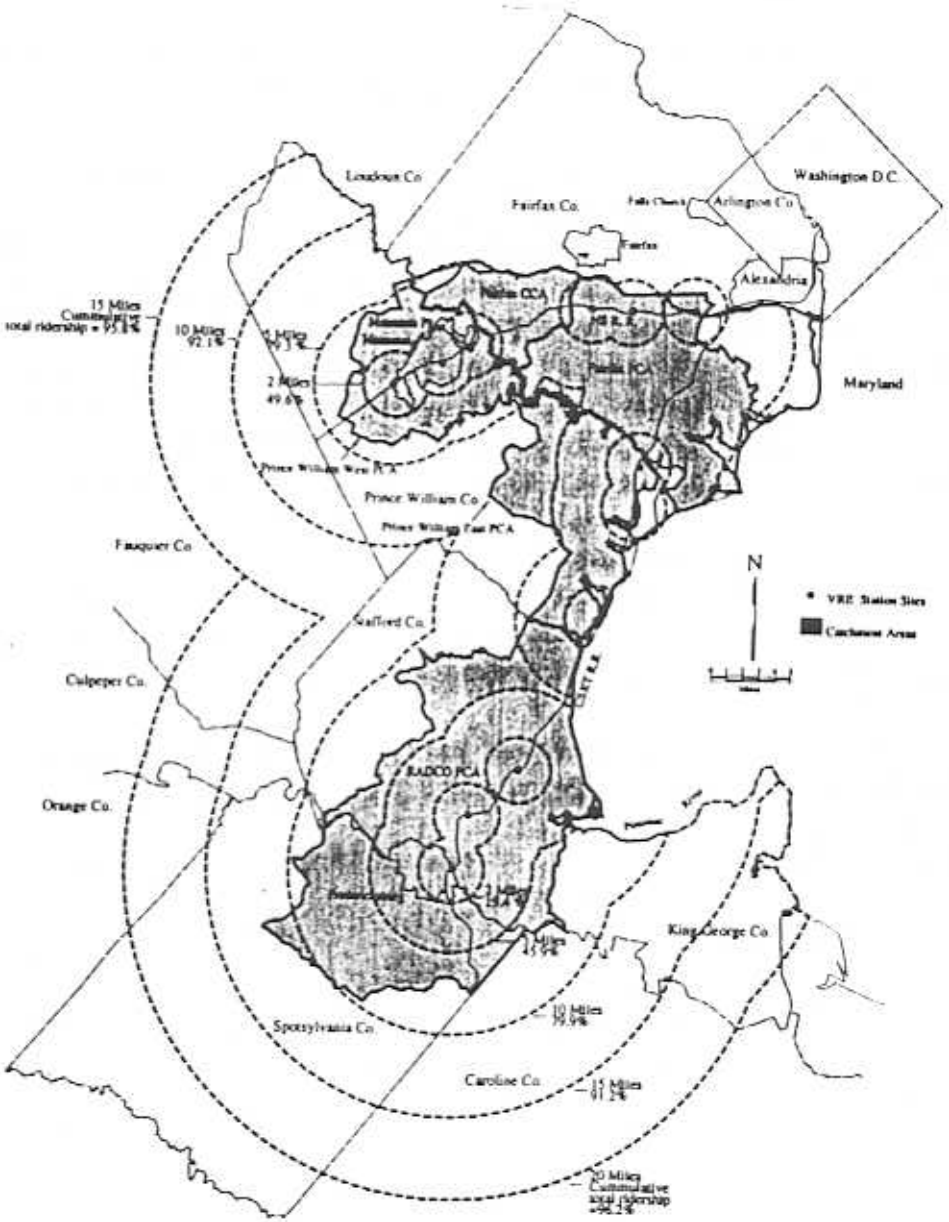


Figure 23

Study Catchment Areas Compared to Survey Catchment Areas

Source: VRE Ridership Survey, September 22, 1992.

that is, 20 minutes to a train station is not bad with an hour-and-a-half commute. The survey results showed the initial PCA boundary assumptions achieved approximately 50-60 percent of Fredericksburg line ridership.

Nearly 50 percent of riders on the Manassas line lived within two miles of their stations. On the Fredericksburg line, only 19.4 percent lived within two miles, and only 45.9 percent lived within five miles of a station. Over 92 percent of riders on the Manassas line lived within 10 miles of VRE stations; it took a radius of 15 miles from the Fredericksburg line's stations to reach the homes of 91.2 percent of its ridership.

The Secondary Catchment Areas (SCAs) comprised the counties in which the PCAs were located. Another initial presumption had been that almost all VRE ridership would be drawn from the SCAs. Figure 23 indicates that the assumption regarding the SCAs was underestimated. A 20 mile radius accounted for 96.2 percent of VRE ridership residential locations on the Fredericksburg line. This radius included all of Stafford and large portions of Spotsylvania, Caroline, King George, and Fauquier Counties, as well as small portions of Culpeper and Orange Counties. Fauquier County also comprised a large portion of the 15 mile radius needed to contain 95.8 percent of the residential locations of the Manassas line's ridership. The survey responses showed that radii of 35 miles on the Manassas line and 45 miles on the Fredericksburg line were necessary to contain 99 percent of the homes of those responding to the first VRE ridership survey.

These survey results have potentially significant land use planning implications. Planners cannot expect all rail-influenced residential development to be focused immediately adjacent to commuter rail stations. The survey shows that most of the VRE's ridership lived within 10-15 miles. If these commuters were able to travel to the stations, use the VRE, and still achieve savings in daily commuting times, these results will be made known to co-workers, potential home buyers and real estate developers. The 10-15 mile distances then become reasonable radii in which to expect new home developments which market the benefits of the VRE as a travel alternative for reducing commuting time, stress and net vehicle use costs.

Question: *Before you began using The Express, what was your usual way of commuting?*

	Manassas	**Fredericksburg**	**Combined**
Base # of responses:	*(991)*	*(1157)*	*(2148)*
Drove by myself	34.0%	39.5%	37.0%
Car-Metrorail	25.4%	5.8%	14.9%
Carpool	11.4%	13.5%	12.5%
Bus-Metrorail	10.7%	2.4%	6.2%
Bus	4.3%	15.3%	10.2%
Vanpool	3.3%	11.7%	7.8%
Other	10.8%	11.8%	11.4%

Nearly 52 percent of VRE riders responding to the survey had switched from total or partial use of another ridesharing mode—buses, Metrorail, car- or vanpools. Metrorail use suffered the highest percentage of lost ridership, with 21 percent of VRE riders having switched from previous Metrorail use. Buses suffered the second largest percentage of loss—16.4 percent, or 352 of surveyed riders. While the survey did not ask which bus systems had previously been used, the heavy reliance upon PRTC's CommuteRide and the privately operated express commuter buses which served the I-95 and I-66 corridors would be those most expected to have suffered ridership losses.

Car- and vanpools had previously transported 20.3 percent, or 436, of surveyed VRE riders. This switch might be attributed to drivers who preferred to save driving stress and wear-and-tear on their vehicles, to pool riders who found that VRE provided a better schedule match, or by those who preferred the reliability of train service to more conventional ridesharing modes. As discussed earlier, most VRE riders were saving time over previous mode commuting times.

Question: *Did the potential of access to the Virginia Railway Express commuter rail service play any part in the choice of your present home location?*

	Manassas	Fredericksburg	Combined
Base # of responses:	*(999)*	*(1171)*	*(2170)*
Major consideration	14.9%	20.7%	18.0%
Some consideration	16.2%	16.6%	16.4%
Did not know about The Express at the time	59.1%	48.2%	53.2%
Knew about Express but was not influenced	9.8%	14.5%	12.4%

This question was included in the ridership survey for the specific use of this study. The results were unexpected. A combined 34.4 percent of all riders responding, 746 out of 2,170, indicated that the potential of VRE commuter rail played a "major" or "some" consideration in their choice of housing location. This was far higher than expected due to the very recent opening of the VRE. The results showed that many riders had purchased homes *in anticipation* of using the VRE. Equally surprising was that nearly 50 percent of all respondents knew about the VRE when they purchased their homes. As outlined in Section III.F, commuter rail was in active development since 1984. It experienced many "ups and downs" during the development period, which could equally have discouraged as well as encouraged people about commuter rail becoming a reality. Of all riders surveyed who knew about future commuter rail service when they made their housing location decisions, only 26.5 percent (269 out of 1,016) were not influenced by access to commuter rail service in their locational choices.

HOME PURCHASER SURVEY

IX

A. Chapter Summary

The VRE Ridership Survey indicated a large percentage of housing location choices had been influenced by future access to commuter rail service. This finding raised the question, "When did home purchasers feel optimistic enough about the future of commuter rail service to let it influence their housing location decisions?" The answer to that question would show how early into the process of developing a new commuter mode potential land use impacts and existing land use management plans should be examined. A related area of interest was to know how many persons who made housing location decisions in advance of commuter rail were using it regularly after service began. The VRE Ridership Survey did not included questions which provided those answers.

A simple return-mail survey was prepared to obtain answers to the follow-up questions arising from the VRE Ridership Survey results. Eighteen-hundred survey cards added by year of purchase and jurisdiction, were sent to randomly selected home owners who purchased between 1984 to 1992 and whose addresses were in the PCA areas. Three survey questions were asked. A 39 percent survey response was received.

The major findings from the Home Purchasers Survey were: 19 percent of all respondents had been influenced by future commuter rail in their home location selection; the percentages ranged from five per-

cent of surveyed purchasers in 1984 to 43 percent of surveyed purchasers in 1992; the percentage of purchasers who knew that commuter rail was coming when they made purchase decisions increased from 25 percent in 1984 to 84 percent in 1992; nearly 70 percent of respondents lived within 15 minutes travel time of a VRE station, and while six percent of the total respondents used the VRE for commuting, the percentage rose to 17 percent among those whose locational choice had been influenced by potential commuter rail service.

B. Home Purchaser Survey Results

A simple return-mail survey was conducted to obtain some "feel" for the questions raised by the VRE Ridership Survey results. Home purchasers for each year from 1984 to 1992 were arbitrarily selected from tax records from the Counties of Fairfax, Prince William, Stafford and Spotsylvania and from the City of Fredericksburg. Those surveyed were selected from the PCAs in the four counties.

Fifty home purchasers per year were selected from Fairfax, Prince William and Stafford Counties—a total of 450 per locality. Twenty-five home purchasers per year were selected from Fredericksburg and Spotsylvania County, for a total of 225 each. A total of 1,800 surveys were mailed. A cover letter explaining the survey and a stamped postcard with three questions were sent to the identified home purchasers. The first two questions were identical to questions asked on the VRE ridership survey, to provide for comparison of responses. Each survey postcard was identified by the initials of the county or city in the upper left corner. Also, each year of the survey was color coded to allow responses to be sorted by year of recorded home purchase. No means of individual respondent identification was provided to encourage greater survey participation. There was an overall 39 percent response to the survey. The returns were basically equal for each year from 1984 to 1992. The return percentages by locality were:

Fairfax County	47%
Spotsylvania County	30%
Prince William County	37%
City of Fredericksburg	38%
Stafford County	39%

The three questions and summaries of their survey responses follow.

Question: *Did the potential of the Virginia Railway Express (VRE) service play any part in selection of your present home location?*

_____ *Major consideration*
_____ *Knew about VRE but was not influenced*
_____ *Some consideration*
_____ *Did not know about VRE at the time*

The land use implications of this question were of particular interest for this study. The findings showed that

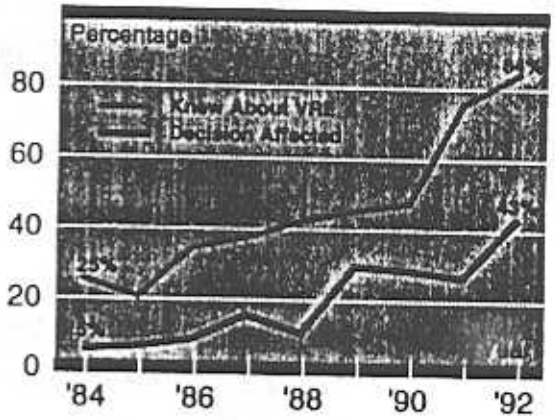
potential commuter service already had a small influence in 1984. Five percent of responding purchaseres in 1984 said it played a "major" or "some" consideration in their decisions. The influence increased to 43 percent of 1992 home purchase respondents, with slight drops noted in 1988, 1990 and 1991, see Figure 25. Of the 1992 home purchase respondents, 14 percent reported the VRE had a "major" influence, and 29 percent said it had "some" influence in their locational choices.

Active plans for commuter rail began in 1984. The percentage of surveyed home buyers who were aware of the coming commuter rail has grown rapidly ever since. The percentage of survey respondents who knew about coming commuter rail service increased from 25 percent in 1984 to 84 percent among 1992 purchasers. Interest, extensive media coverage, and real estate marketing which referenced rail service undoubtedly contributed to this increase. Knowledge of coming commuter rail service rose noticeably from 1990 to 1992. That period coincided with station site purchases, rail car orders, and station construction plans which became frequent items in local news sources.

Awareness of coming commuter rail among respondents increased with distance from the metropolitan core (see Table 22). Awareness increased regularly as the survey extended outward from the Counties of Fairfax (34 percent) to Prince William (46 percent) to Stafford (53 percent) and to Spotsylvania (55 percent) and to the City of Fredericksburg, which at 64 percent had the highest percentage of knowledgeable respondents. This finding might indicate that those persons who lived farther from core employment locations and who spent the greatest time commuting were more interested in potential commuting alternatives. A second possible reason for the finding might be that home purchasers went farther into the exurbs were willing to exchange longer commutes to benefit from greater land and housing val-

Figure 24

Percentage of Purchasers Whose Housing Location Decision was Affected by VRE



Source: NVPDC Home Purchasers Survey, 1993.

Table 23

Affect of VRE on Housing Location Choice

[illegible]										
[illegible]										
Fairfax County	0	0	0	1	1	1	0	1	2	6
Pr. William County	0	0	0	0	1	1	2	3	3	10
Stafford County	1	0	1	0	2	0	3	0	5	12
Spotsylvania County	0	1	0	0	0	1	0	0	0	2
Fredericksburg	0	0	1	0	1	1	2	1	1	7
Sum	1	1	2	1	5	4	7	5	11	37
Percent of Subtotal										
Percent of Annual Total										
Fairfax County	2	1	2	6	0	4	2	3	3	23
Pr. William County	0	0	0	4	1	5	4	3	8	25
Stafford County	1	2	1	0	0	5	7	4	8	28
Spotsylvania County	0	0	1	0	0	1	0	1	1	4
Fredericksburg	0	1	0	1	0	0	4	5	2	13
Sum	3	4	4	11	1	15	17	16	22	93
Percent of Subtotal										
Percent of Annual Total										
Fairfax County	1	3	2	3	3	2	5	12	9	[illegible]
Pr. William County	1	2	2	2	6	2	4	12	9	40
Stafford County	5	5	7	3	4	4	6	7	8	49%
Spotsylvania County	4	1	4	4	4	1	6	2	5	[illegible]
Fredericksburg	4	2	4	5	3	1	5	7	1	[illegible]
Sum	15	13	19	17	20	10	26	40	32	[illegible]
Percent of Subtotal										
Percent of Annual Total										
Fairfax County	21	21	18	17	17	16	11	7	6	[illegible]
Pr. William County	17	19	11	11	6	9	10	4	1	[illegible]
Stafford County	10	18	10	14	5	6	10	5	2	[illegible]
Spotsylvania County	5	7	1	4	3	3	2	2	3	[illegible]
Fredericksburg	3	5	8	3	5	2	2	1	0	[illegible]
Sum	56	70	48	49	36	36	35	19	12	[illegible]
Percent of Subtotal	[illegible]									
Percent of Annual Total	[illegible]									
ANNUAL TOTALS	[illegible]									

Source: NVPDC Home Purchaser's Survey, 1993.

ues, knowing they would have an efficient commuting alternative to the automobile.

Question: *How far is the nearest VRE station from your home?*

Miles ____<2 ____2-5 ____ 5-10 ____ 11-15 ____ 16-20 ____>20

Minutes____<15 ____ 15-29 ____ 30-44 ____ 45-60 ____>60

Survey responses to this question reflected local land use patterns. Fewer respondents lived within five miles of a rail station the farther south the respondent lived from Washington. The percentages dropped from 72 percent in Fairfax County, to 61 percent in Prince William County, to 40 percent in Stafford County, and to 24 percent in Spotsylvania County. The size of Fredericksburg resulted in all respondents living within five miles of the station. The survey pattern paralleled the general pattern of suburban-exurban density in the counties of the study area.

Table 23 shows that 27 percent of respondents lived within two miles of a VRE station; 33 percent lived from 2-5 miles from a station and 27 percent lived between 5-10 miles from a commuter station. A total of 13 percent lived from 11-20 miles from a rail station, and only one percent lived beyond 20 miles. Travel time was much more concentrated, with 69 percent living within 15 minutes driving time of a station, and another 25 percent within 15-29 minutes from their VRE station. These distances reflected selection of survey participants from within the general areas comprising the PCAs.

Question: *What is your primary mode of transportation to work?*

___ drive alone ___ car/vanpool ___ bus ___ walk ___ VRE ___ other

Influence of commuter rail on housing location decision and actual use of the VRE showed a correlation. The summary on Table 23 shows that *overall* six percent of survey respondents used the VRE. This percentage increased to 17 percent, *nearly three times higher*, for purchasers for whom rail had played a "major" or "some" consideration in their locational decision making.

It might be asked whether the VRE ridership percentage among those who were positively influenced in their housing location choices should have been higher than 17 percent. Why did not more purchasers use the VRE who were influenced in housing location choice by commuter rail access? The question was not asked, but there are several potential reasons why it may not have been higher. With equal suburban housing choices located near or away from VRE access, the purchasers may have opted to locate where VRE could potentially enhance future housing values and provide future sales advantages. (One respondent added that specific comment to

	FAIRFAX COUNTY									PRINCE WILLIAM COUNTY									STAFFORD COUNTY								
Consideration in Home Location																											
Major Consideration	0	0	0	1	1	1	0	1	2	0	0	0	0	1	1	2	3	3	1	0	1	0	2	0	3	0	5
Some Consideration	2	1	2	6	0	4	2	3	3	0	0	0	4	1	5	4	3	8	1	2	1	0	0	5	7	4	8
Not Influenced	1	3	2	3	3	2	5	12	9	1	2	2	2	6	2	4	12	9	5	5	7	3	4	4	6	7	8
Didn't Know-VRE	21	21	18	17	17	16	11	7	6	17	19	11	11	6	9	10	4	1	10	18	10	14	5	6	10	5	2
TOTAL	24	25	22	27	21	23	18	23	20	18	21	13	17	14	17	20	22	21	17	25	19	17	11	15	26	16	23
Distance from Home to VRE Station																											
<2 Miles	7	9	8	12	6	7	3	4	4	3	2	1	3	2	3	3	3	6	2	7	4	0	2	1	3	2	4
2-5 Miles	11	10	8	6	10	7	7	8	5	7	13	6	5	7	6	9	10	9	3	2	6	3	4	6	8	4	6
5-10 Miles	3	2	4	2	4	5	5	7	6	5	5	2	6	3	7	5	8	4	6	8	5	9	4	7	8	7	9
11-15 Miles	2	1	0	3	0	2	0	3	1	1	2	1	2	1	0	2	0	0	5	4	4	2	1	1	3	2	2
16-20 Miles	1	1	0	1	0	0	0	0	1	0	0	3	1	1	1	1	0	0	1	4	0	3	1	0	1	0	1
>20 Miles	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1
TOTAL	24	23	20	24	20	22	16	22	17	16	22	13	17	14	17	20	21	19	17	25	19	17	12	15	25	16	23
Travel Time from Home to VRE Station																											
<15 Minutes	10	6	7	10	8	7	2	6	4	4	5	3	6	4	7	3	5	9	5	11	6	3	4	5	7	4	9
15-29 Minutes	4	1	1	2	2	2	3	3	3	3	4	1	2	1	2	0	4	1	3	4	4	3	3	0	6	3	0
30-44 Minutes	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	2	1	0	0	1	1	2	1	0	1	1	1
45-60 Minutes	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 60 Minutes	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
TOTAL	14	8	8	13	10	10	6	9	9	7	9	5	8	5	9	5	10	10	8	16	11	8	8	5	15	8	10
Mode of Commute																											
Drive Alone	16	24	13	17	17	15	9	17	13	9	13	11	11	11	7	12	13	12	12	16	10	13	8	8	15	12	15
Car- or Vanpool	2	0	3	7	2	6	6	4	3	6	6	2	4	2	6	2	6	5	3	5	5	4	4	4	7	3	2
Bus	3	1	2	1	0	1	1	1	2	0	0	0	0	0	1	2	1	0	0	0	2	0	0	0	2	0	0
Walk	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
VRE	0	0	2	0	2	0	0	1	0	1	2	0	1	0	1	4	1	4	1	2	1	0	0	0	1	0	6
Other	2	0	2	2	0	1	2	0	1	2	1	0	1	1	1	0	1	0	1	2	1	0	2	1	2	1	0
TOTAL	24	25	22	27	21	23	18	23	20	18	22	13	17	14	17	20	22	21	17	25	19	17	12	13	27	16	23

NOTE: Not all respondents answered all questions.

Table 24

Summary Results of Home Purchaser Survey Responses

Source: NVPDC Home Purchaser's Survey, 1993.

	SPOTSYLVANIA COUNTY										CITY OF FREDERICKSBURG										TOTAL	
	'84	'85	'86	'87	'88	'89	'90	'91	'92	Sum	'84	'85	'86	'87	'88	'89	'90	'91	'92	Sum		*
Consideration In Home Location																						
Major Consideration	0	1	0	0	0	1	0	0	0	2	0	0	1	0	1	1	2	1	1	7		
Some Consideration	0	0	1	0	0	1	0	1	1	4	0	1	0	1	0	0	4	5	2	13		
Not Influenced	4	1	4	4	4	1	6	2	5	31	4	2	4	5	3	1	5	7	1	32		
Didn't Know-VRE	5	7	1	4	3	3	2	2	3	30	3	5	8	3	5	2	2	1	0	29		
TOTAL	9	9	6	8	7	6	8	5	9	67	7	8	13	9	9	4	13	14	4	81		
Distance from Home to VRE Station																						
<2 Miles	0	0	0	0	0	1	0	0	0	1	7	5	9	7	6	4	8	13	4	63		
2-5 Miles	4	1	0	2	0	2	2	1	2	14	0	3	3	3	3	0	5	1	0	18		
5-10 Miles	4	4	5	2	4	3	4	2	5	33	0	0	0	0	0	0	0	0	0	0		
11-15 Miles	1	2	1	2	2	0	0	2	2	12	0	0	0	0	0	0	0	0	0	0		
16-20 Miles	0	1	0	0	0	1	1	0	0	3	0	0	0	0	0	0	0	0	0	0		
>20 Miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
TOTAL	9	8	6	6	6	7	7	5	9	63	7	8	12	10	9	4	13	14	4	81		
Travel Time from Home to VRE Station																						
<15 Minutes	1	2	0	1	0	0	0	0	3	7	6	5	9	8	8	4	11	13	4	68		
15-29 Minutes	0	2	2	2	2	3	2	2	3	18	0	1	0	0	0	0	0	0	0	1		
30-44 Minutes	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0		
45-60 Minutes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
> 60 Minutes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
TOTAL	2	5	2	3	2	3	2	2	6	27	6	6	9	8	8	4	11	13	4	69		
Mode of Commute																						
Drive Alone	7	6	3	6	5	5	5	3	7	47	4	5	7	6	8	4	8	11	2	55		
Car- or Vanpool	1	1	2	2	1	0	0	1	1	9	2	0	2	1	0	0	2	1	0	8		
Bus	0	1	1	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	1	1		
Walk	0	0	0	0	0	0	0	0	0	0	0	1	0	3	2	0	1	0	0	7		
VRE	0	0	0	0	1	0	0	0	0	1	0	0	2	1	0	1	1	1	1	7		
Other	1	1	0	0	0	2	1	1	1	7	0	2	2	0	0	0	0	1	1	6		
TOTAL	9	9	6	8	7	7	7	5	9	67	6	8	13	11	10	5	12	14	5	84		

NOTE: Not all respondents answered all questions.

* Percentage rounded to nearest whole number

Table 24

Summary Results of Home Purchaser Survey Responses (continued)

the survey card.) The VRE also provided a "safety net," a travel alternative should fuel shortages, increased fuel prices, or increased congestion make SOV use more unattractive in the future. The one-way schedule of the VRE also provided a constraint on potential users who might have to get home during mid-day for emergency purposes—parents with children in daycare or school, for instance. A mid-day emergency would require a long and expensive taxi ride to reach the commuter's car at a VRE station or their child's school to respond to emergency situations. Some home purchasers may have been waiting for mid-day service or a guaranteed-ride-home program before committing to regular VRE usage. Finally, flexibility in future employment choices might also have played a role.

The number of survey respondents who used the VRE was almost the same in Prince William, Stafford, and Fredericksburg, with 7-9 percent indicating use. Two percent of respondents in Fairfax County rode the VRE. The difference may reflect that there were no operating VRE stations in Fairfax County in the heavily congested I-95 commuting corridor. The proposed Lorton and Franconia/Springfield stations await future construction. The shorter distances to the local and Washington employment centers may also have been factors in Fairfax County survey respondents having chosen other modes for commuting.

Detailed analysis of survey responses showed that those who rode the VRE generally lived within two miles of the rail stations. Analysis also showed that those who had been living in their homes for less than three years were more likely to ride the VRE. Fifty percent of all persons who stated that the VRE had influenced their home location decisions and who commuted via the VRE had purchased their homes in 1992. It follows that more of the VRE users moved into the study area about the time the VRE system was approaching operations.

The overall results to this question were generally similar to that of pre-VRE commuting modes indicated by the VRE Ridership Survey. Sixty-five percent of home purchase survey responders commuted by SOV; 18 percent used carpools or vanpools; and only three percent used buses. SOV use was about 14 percent higher than it had been among surveyed VRE riders. Car- and vanpool usage reflected very close percentages to that previously used by VRE riders surveyed. Bus use was considerably lower than the 16 percent previously used by surveyed VRE riders.

In summary, the VRE had an impact on the study area landscape, primarily in housing location decisions, since 1984 and in commuting choices since 1992. The impact may have been greater, however, had an economic recession not slowed housing construction and sales during the primary influence period of 1987-1992. Based on the survey result trends, VRE access

may play an even larger role in future residential locational choices, now that it is in operation.

Some survey respondents added comments to their return cards. One response stated "[VRE was the] determining factor [in our housing location decision]." Three comments addressed future stations, "We moved because of the proposed station in Wide Water area," "...some consideration but I was hoping for a Newington/ Lorton station," and "...would use VRE when Widewater station opens." One returned comment addressed the issue of locational choice and non-use of the VRE; the respondent said "...[bought near VRE] for resale value."

SECTOR SURVEYS

X

A. Chapter Summary

The study team wanted to test the basic hypothesis that the VRE might lead to land use changes against a cross-section of public and private sector individuals involved with land use activities. Perceptions by informed individuals might provide insights into the complex system of rail-land use inter-relationships. The study team felt that certain sectors would be well positioned to experience rail-related affects on particular real estate markets or related activities. Nine business and/or political sectors involved with land use activities were selected that might have special awareness of the actual or potential impacts of the VRE on local land use. A set of nine surveys was developed to collect a base of informed perceptions to be used for comparisons when the Phase II study is conducted. Each survey contained a core of six common questions. Additional questions were tailored to each sector's particular area of expertise to identify unique impacts, observations or projections. A total of 1,213 surveys were mailed and 178 were returned. The overall response rate was 15 percent, although indiviudal sector response rates varied.

What definition of distance the respondents considered "near" to a VRE station was important to the survey. The definitions had land use planning and impact management implications when compared with the VRE Ridership Survey responses and the Home Purchasers' Survey responses. Seventy percent of 167 respondents defined "near" as five miles or less from a station. The 70 percent were almost equally di-

vided between definitions of less than two miles and "2-5 miles." There were 22 percent (37 respondents) who defined "near" as up to 10 miles, and eight percent whose answers ranged from 10 to greater than 20 miles. The definitions reflected locational differences, with respondents from the more exurban areas having definitions which included greater distances.

A pair of questions asked if the respondent had noticed greater land use activity near VRE stations, and if so, did the respondent attribute the greater activity to VRE influence. A majority of respondents answered affirmatively to both questions, although 27 percent (49 respondents) did not believe the VRE was the cause of the increased real estate activity.

An overwhelming majority, 77 percent of 182 respondents, believed that instituting feeder or shuttle services to VRE stations would stimulate real estate activity in areas near VRE stations. The various sectors generally agreed that increased density, mixed uses, and employment zoning were land uses they would prefer to see designated near VRE stations.

Assessor/Appraiser sector respondents had noticed some sales price changes in properties near VRE stations. They did not, however, attribute the price changes to demand generated by rail access.

B. Survey Goal and Identification of Sectors

The primary goal of the surveys was to solicit opinions from individuals, groups or business sectors within the VRE study area. Sector representatives were sought who were judged to have informed knowledge of and opinions on the potential influences of the VRE on land use patterns, real estate values and economic development. Nine sectors were identified to be surveyed and/or interviewed:

- local elected officials, especially those representing electoral districts in the various PCAs;
- local Planning Commission members of VRE study area jurisdictions;
- senior planning and zoning staff persons of VRE study area jurisdictions;
- directors of Economic Development Offices of VRE study area jurisdictions;
- real estate appraisers;
- local Chambers of Commerce officials;
- professional Realtors and agents specializing in resales of existing houses;
- on-site and/or new home sales agents (real estate agents or employees of home building companies), and
- real estate developers and home builders.

Individuals from each sector were identified who conducted business activity in, represented, or worked for

localities which were part of the VRE study area. NVPDC identified elected and staff individuals from local governments comprising its member jurisdictions. The RADCO Planning District Commission provided names of local officials, real estate agents and developers within Fredericksburg, and Stafford and Spotsylvania Counties. The Appraisal Institute's Washington area chapter provided names of its members. Appraisers with zip codes within the PCAs were identified for survey. Real estate offices and new homes communities within defined PCAs were located with the assistance of the local Associations of Realtors, home builder associations, and Housing Data Reports of Washington, DC.

C. Survey Forms

Individual survey forms were developed for each sector. A core of six common questions were included in each sector survey; however, the remaining questions differed depending on the specific information being solicited from each group see (Appendix B). A small number of persons in each sector were surveyed by telephone, and an even smaller number of individuals were surveyed in person.

D. Size of Surveyed Sectors

A total of 1,213 surveys were sent to individuals in the nine sectors. The largest group of surveys was sent to real estate agents, with 822 surveys being sent through 274 real estate offices from Fairfax County to Spotsylvania County. Fifty-seven surveys were sent to local elected officials, 71 to Planning Commissioners, and 21 to senior staff persons of local planning and zoning departments. Ninety-nine residential appraisers and assessors were surveyed. Sixty-four surveys were sent to new homes and on-site sales agents. Sixty-eight real estate developers and home builders were sent surveys. Surveys were also sent to the Economic Development office directors of the five study counties and to the five senior officials of the Chambers of Commerce in the study area. Some of the sectors were not sufficiently large to form a valid survey; however, each sector was felt to have the potential of providing a unique perspective on the perceived and projected impacts of the VRE. Phase II surveys to the same sectors or executive director positions might provide interesting comparisons of impacts which might not be revealed through the variables described earlier in this study.

There were 178 responses to the 1,213 surveys sent out—an overall response rate of 15 percent. Many of the respondents did not answer each question.

E. Core Questions

A core of common questions was included in the surveys to all sectors. The six questions had been included in the VRE Ridership Survey. Answers to the six questions would identify similarities or differences, opin-

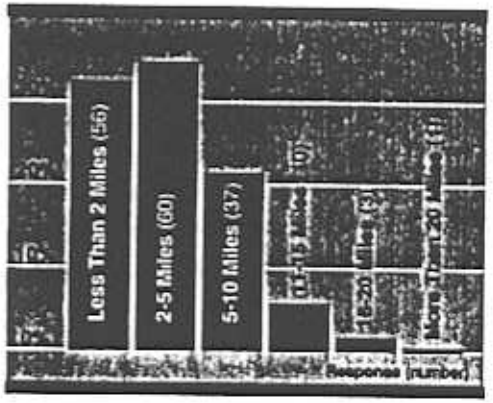
ions, and predictions of the effects of the VRE on the various sectors. A discussion of the six core questions and their responses follows.

1. *What would you consider "near" to a VRE station when you are considering the impact of development? (Check One Each Row)*
   Miles ___0-2 ___2-5 ___5-10 ___11-15 ___16-20 ___ ≥20
   Minutes ___<15 ___15-29 ___30-44 ___45-60 ___>60

sponses to the first part of this question. The majority defined "near" *in distance* as fewer than five miles from a station. Thirty-four percent felt that "near" had to be defined as fewer than two miles from a rail station; 36 percent felt that "near" could be from two to five miles from a station (see Figure 25). Twenty-two percent of respondents answered that "near" could be from 5-10 miles from a VRE station. Much smaller percentages felt that "near" could be greater than 10 miles. Six percent said 11-15 miles; two percent answered 16-20 miles. Only one person thought "near" could exceed 20 miles.

Figure 25

"In miles, what would you consider 'near' to a VRE station when you are considering impact on development?"



Source: NVPDC Sector Survey, May, 1993.

Some locational differences in defining "near" were apparent among real estate agents. Those agents closer to the I-495 Beltway had a stricter interpretation of "near." Fairfax County's real estate participants were divided into two divisions similar to the PCA and CCA locations. Of the 33 respondents from both divisions, 19 felt that "near" should be defined as fewer than two miles, and 12 felt that "near" could be defined as up to five miles away from a VRE station. Only two respondents, both in the western division of the Fairfax survey, felt that "near" could be greater than five miles.

The interpretation of what is considered "near" to VRE by all those surveyed was a means of gauging the perceived VRE "sphere of influence." There were 167 re-

In both east and west survey divisions of Prince William County, the numbers from real estate agents reflected a more liberal definition of "near." Eight answered that fewer than two miles was "near," with 10

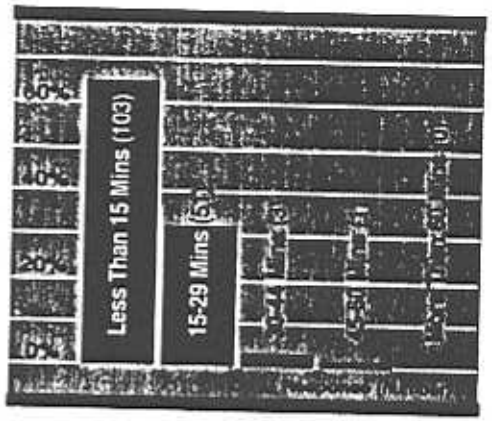
choosing 2-5 miles, and 13 answering up to 10 miles. In eastern Prince William, only two respondents answered that more than 10 miles was "near." The more liberal definition of the western division respondents may have reflected the lack of geographical constraints to travel and access to their VRE stations. The eastern division had the Potomac River as a boundary and the large Prince William Forest and Quantico Marine Corps Base forming barriers which kept travel to I-95 and VRE stations relatively confined in terms of distance.

In the Fredericksburg survey area, the majority of real estate agents felt that "near" should be defined as between 2-5 miles. The other options were answered evenly with two responses each.

Among the other sectors there were no strong differences in interpretation of "near" in distance. Instead, the patterns were very consistent among the remaining sector responses.

The interpretation of "near" *in time* to a VRE station was more uniform throughout the study area. (See Figure 27.) Sixty-five percent—158 respondents—answered less than 15 minutes from a station was "near." Thirty-two percent of the respondents felt that up to 29 minutes was "near." Two percent said that "near" could be between 30-44 minutes away, and less than one percent said up to 60 minutes travel time was "near."

Figure 26



"In minutes, what would you consider 'near' to a VRE station when you are considering impact on development?"

Source: NVPDC Sector Survey, May, 1993.

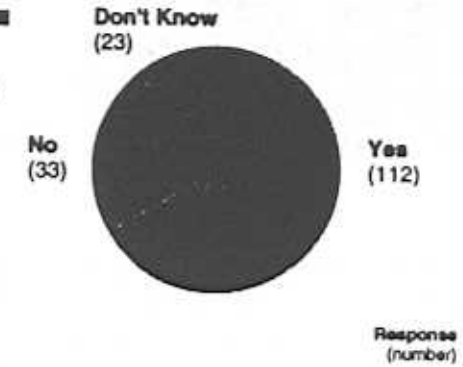
2. *Have you noticed any increased activity (business inquiries, land use applications, construction) by individuals (home buyers, landowners), real estate agents (residential, commercial), home builders and/or developers, or other businesses "near" VRE stations? Yes___ No___ Don't Know____*

Answers from 168 respondents were received to this question. Two-thirds of respondents stated that they had seen increased interest in properties near VRE stations. Twenty percent answered "No," and 14 percent answered "Don't Know." This distribution was consistent throughout most of the surveyed sectors, except for new homes agents and developers/builders. Twenty new homes agents answered this question. Nine said "Yes," eight said "No," and three answered "Don't

Know." Fourteen developers and builders answered this question. Only two said "Yes," nine answered "No," and three did not know (see Figure 28). The answers may reflect sector interests, with the observed activity showing up more in individual home or lot sales than in large scale development or construction activity of interest to builders.

Figure 27

"Have you noticed any increased activity by individuals, real estate agents, homebuilders and/or developers, or other businesses 'near' VRE stations?"



Source: NVPDC Sector Survey, May, 1993.

3. *Do you relate this increased interest primarily to VRE commuter access?* (See Question 2, above)
Yes____ No____ Don't Know____

When asked if the increased interest in properties near VRE was attributable to VRE, as asked in Question 2, the majority of respondents answered in the affirmative, but not as overwhelmingly as those who had seen such an increase (see Figure 28). Of the 147 responses, 52 percent answered "Yes"; 27 percent answered "No," and 20 percent answered "Don't Know." The distribution of responses throughout the surveyed sectors and throughout the survey area was generally consistent. There was only one sectoral difference. The Developers/Builders differed from the overall pattern. Only two of the 14 Developer/Builder respondents felt that they could attribute what increased interest they had seen to VRE influence. Nine said "No," and three answered "Don't Know."

4. *Would the availability of bus or shuttle service to a VRE station increase interest?* (See Question 2, above)
Yes____ No____ Don't Know____

Of those surveyed, 155 responded to this question. A large majority answered that such a shuttle service could make a major difference (see Figure 29). Seventy-seven percent answered "Yes;" they felt that feeder service could increase interest in those areas and properties near VRE. Only five percent answered "No," and 18 percent said "Don't Know." Survey support for the concept of shuttle service was indicated among all the sectors and throughout the survey area.

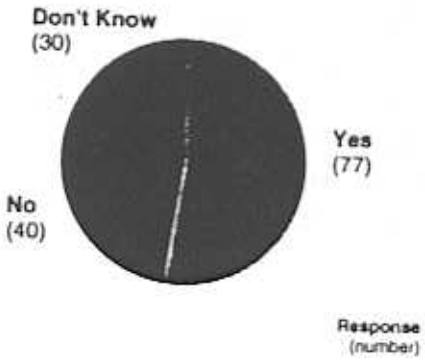
5. *How do you compare interest in properties near VRE stations to locations which are not near VRE sta-*

tions? (Check One)
Significant____ Moderate____ Minimal____
Don't Know____

One-hundred-seventy respondents answered this question (see Figure 30). The largest group, 44 percent, felt that the interest in properties near VRE was "Moderate" compared to locations not near commuter rail access. However, 26 percent said there was "Significant" interest in being near the VRE. Eighteen percent felt there was "Minimal" interest.

Figure 28

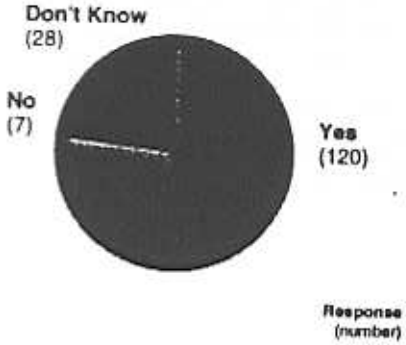
"Would you relate this increased interest primarily to VRE commuter access?"



Source: NVPDC Sector Survey, May, 1993.

Figure 29

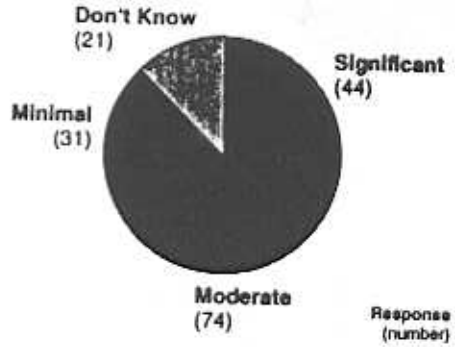
"Would the availability of bus or shuttle service to a VRE station increase interest?"



Source: NVPDC Sector Survey, May, 1993.

Figure 30

"How do you compare interest in properties near VRE stations to locations which are not near stations?"

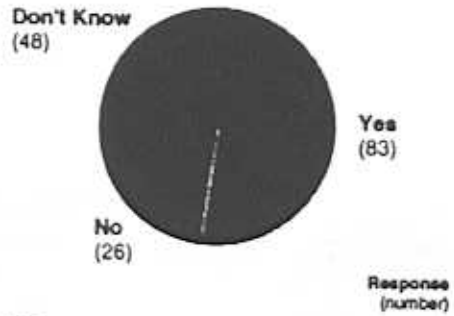


Source: NVPDC Sector Survey, May, 1993.

6. *VRE presently offers 4 inbound morning trains from Manassas and Fredericksburg into Washington and 4 outbound trains in the afternoon. Would expanded two-way service on VRE increase interest more than you have already discussed.* (Note. This question was not directed to Appraisers/Assessors)
Yes____ No____ Don't Know____

Figure 31

"Would expanded two-way service on VRE increase interest more than you have already discussed?"



Source: NVPDC Sector Survey, May, 1993.

This question related to a policy and operations question under consideration by the VRE and its sponsoring agencies. The focus of the survey question was on the effect of two-way rail service on generating greater real estate interest. Greater interest would indicate the potential for more land use change. This question was answered by 157 respondents. Fifty-three percent said "Yes," expanded service would increase real estate interest (see Figure 31). Seventeen percent said "No," and 31 percent did not know. Comments offered by the respondents indicated that they had differing ideas of what expanded service should be. Many said that more trains and a better schedule were needed for inbound trains in the morning and outbound in the afternoon. Only a few respondents indicated in attached comments that two-way service, both in the morning and afternoon, was warranted.

F. Summary of Survey Responses by Sector

In addition to the six core questions, other study-related questions were included in the nine sector surveys. The additional questions were tailored to solicit information that would be relevant to the particular sector's knowledge or activities on which the VRE could have an influence. A summary of individual sector results from the survey are contained in Appendix B.

SURVEY COMPARISONS

XI

A. Chapter Summary

Comparing results from the VRE Ridership Survey, the Home Purchasers Survey and the Sector Surveys (Chapters VIII, IX, and X) provides an opportunity to see how well some of the qualitative data perceptions compare to VRE Ridership and Home Purchasers Survey results. Comparisons of the surveys show that half of VRE riders lived within two miles of their station in more developed areas and within five miles in less developed jurisdictions. Eighty percent of riders were contained in five and 10 mile radii, in the more developed and the less developed jurisdictions, respectively, of the study area. Most home purchasers surveyed who rode the VRE also lived within two miles of their stations.

The cumulative ridership percentages from the VRE Ridership Survey corresponded very closely with definitions from the Sector Surveys of "near" in both distance and travel time to VRE stations. A large majority responding to the Sector Surveys defined "near" as under five miles, with about equal divisions between definitions of "<2 miles" and "2-5 miles." Actual VRE ridership results showed nearly 80 percent within five miles of stations on the Manassas line and 46 percent within five miles of the Fredericksburg line stations. By almost two-to-one, travel times of less than 15 minutes were considered "near." The majority of VRE riders on both lines indicated travel times of less than 15 minutes to their VRE stations. Sixty-five percent of Sector Survey respondents defined travel times under 15 minutes as "near."

Appreciable percentages of surveyed VRE riders and home purchasers were influenced by commuter rail access in making housing location choices. While the overall average of home purchasers who were influenced was 19 percent, it had shown steady increases from five percent in 1984 to 43 percent of survey respondents in 1992; 34 percent of all VRE riders responding said their home locations had been influenced by future rail service.

The VRE was used by 17 percent of home purchasers who were influenced by future rail access in their locational choices. This was a much higher percentage of use than the six percent recorded among all surveyed home purchasers. The SOV was still the commuting vehicle of choice for the vast majority of surveyed home purchasers, just as it was for VRE riders before commuter rail service began.

B. Survey Comparisons

1) VRE Station Influence Areas - The VRE Ridership Survey showed that 50 percent of Manassas line riders lived within two miles and nearly 80 percent lived within five miles of the VRE stations. On the Fredericksburg line, 19 percent lived within two miles, 46 percent within five miles, and 80 percent within 10 miles. The largest percentage of VRE users who responded to the Home Purchasers Survey also lived within two miles of the stations. The percentage of home purchasers who were also VRE riders dropped significantly among those who lived beyond two miles. In Prince William County, 19 percent of those surveyed who lived within two miles rode the VRE; eight percent rode the train who lived "2-5 miles" from the station, and only four percent who lived beyond five miles. A similar result was found among Stafford County home purchasers surveyed. There, 12 percent rode VRE who lived within two miles, five percent who lived from "2-5 miles," and eight percent who lived beyond five miles from a VRE station.

These comparisons tend to show that in more developed suburban areas, such as Fairfax County and the Manassas area, travel distances beyond two miles from a VRE station cause more commuters to use other travel options. Only 20 percent of home purchasers surveyed who lived more than two miles from a station in the more urbanized areas used the VRE. Even in areas with few commuting alternatives, distance from a station appeared a major factor in deciding against train use.

The distance expanded in less densely developed areas. Only 20 percent of Fredericksburg line riders were drawn from beyond a 10 mile radius of the stations. The Home Purchasers Survey supported this finding of the VRE Ridership Survey. The percentage of Fredericksburg line riders living between 5-10 miles from the station was larger than in either Fairfax or Prince William Counties.

2) "Near" in Terms of Travel Distance - Thirty-nine percent of elected officials supported the smallest radius, less than 2 miles, in defining what is "near" to a VRE station; 28 percent defined "near" as between "2-5 miles." A total of 33 percent expanded "near" to beyond five miles, 22 percent selected "5-10 miles" and 11 percent chose "11-15 miles" as defining "near" in relation to a VRE station. Responses from elected officials in Stafford and Spotsylvania Counties reflected the greater distances driven by commuters and VRE riders surveyed.

Among Sector Survey respondents, the largest percentage selected "2-5 miles" as their definition of "near." The percentages were close, with 36 percent indicating the stated definition, while 34 percent chose less than two miles. A large 22 percent preferred 5-10 miles, while the remaining nine percent indicated choices greater than 11 miles. Sector respondents tended to support the more generous definitions preferred by various survey respondents from more rural Stafford and Spotsylvania Counties.

3) "Near" in Terms of Travel Time - All three surveys were consistent in showing that travel times of less than 30 minutes were considered "near" to VRE stations. Among the home purchasers surveyed, a combined 94 percent indicated this definition for "near," with 69 percent selecting "<15 minutes" as their choice. Among VRE riders, 96 percent reach their stations in less than 30 minutes, with 68 percent doing so in less than 15 minutes. Those indicating less than 30 minutes as "near" in the Sector Surveys was 97 percent; with 65 percent indicating "<15 minutes" and 32 percent selecting "15-29 minutes." These three survey results are almost identical in their percentage choices.

4) Housing Location Decisions based on Commuter Rail Access - Both the VRE Ridership Survey and the Home Purchaser Survey showed sizeable percentages (34 and 19 percent respectively) of persons making housing location choices with VRE access as a factor. The percentages shown in the Home Purchaser Survey increased annually as the VRE neared completion. Based on real estate and on-site sales agent survey responses, a high level of interest in VRE access was continuing among prospective and actual home purchasers. This trend will probably continue among commuters with job locations accessible by VRE or Metrorail transfer. The jurisdictions, the VRE and developer/builders could plan for this market niche by providing residential opportunities with convenient access to VRE stations. Market studies could determine the types of housing, price ranges based on core area salary ranges, and similar profile preferences which would encourage more VRE use by clustering residential development conveniently near to commuter stations to make possible alternative access by bike, walking or shuttle services.

Responses from the real estate and on-site sales Sector Surveys indicated that potential home purchasers were expressing strong interest in access to the VRE. These results indicated that VRE ridership should continue to grow as more people locate in the study area. If the percentage of VRE users among future home purchasers who expressed interest in the VRE continues the trend found in the Home Purchasers Survey, the potential number who could be coaxed away from SOV commuting by schedule and mid-day service additions appears to be high.

Neither the Home Purchasers Survey nor the VRE Ridership Survey asked respondents whose home purchase decisions had been influenced by potential access to commuter rail whether the moves represented housing relocations from within Northern Virginia or the metropolitan region, or were they new arrivals to Northern Virginia. This question would have interesting land use and planning implications that could be pursued during the Phase II study.

5) Commuting Mode Choices - The Home Purchaser Survey showed that the SOV was the commuting mode used by 65 percent of respondents. The VRE Ridership Survey results indicated that SOV use had been the mode favored by VRE riders before start of the VRE. Ridesharing choices—carpools, vanpools, buses, the VRE, Metrorail—had all captured far smaller individual percentages of commuting workers. Among home purchasers who indicated that the VRE had played either a "major" or "some" influence in their housing location decision, 17 percent used the VRE. It appeared that available public and private rideshare alternatives did not capture much of the suburban commuting market. These findings do not bode well for future traffic congestion relief or environmental quality concerns. It would appear that either ridesharing modes must be made more attractive to potential users, required for certain large employment centers, or that suburban growth patterns must be changed if traffic congestion is not to continue increasing faster than highway capacity can be provided to handle it effectively.

NET VEHICLE EMMISSIONS RESULTING FROM COMMUTER RAIL SERVICE

XII

A. Chapter Summary

Replacement of SOV commuting with VRE use has air quality benefits. Reductions in SOV miles traveled translate into less vehicle emissions. The VRE Ridership Survey provided some preliminary information from which mileage reductions could be calculated. The mileage calculations could then be used as data inputs for an air quality model assessment. The results of this process must be understood to be both *preliminary* and *generalized*. The survey data on which they are based were not designed to elicit specific air quality model input.

Based on the derived model input data, MOBILE 4.1 model analysis showed that the net result of VRE operations and ridership use resulted in a decrease of nine tons of carbon monoxide (CO) emissions, a reduction of 0.4 tons in the controlling pollutant of volatile organic compounds (VOCs) emitted, and a gain of 0.6 tons of nitrogen oxide emissions over pre-VRE conditions for the day the VRE ridership was surveyed. The results show that increasing the ridership on the VRE produces positive air quality benefits by removing vehicles, especially SOVs, from the study area highways. The generalized air quality estimates may help local officials better determine a role that commuter rail service can play in helping achieve regional air quality programs, as well as in congestion relief programs.

B. Methodology for Converting Survey Results into Model Inputs

The Washington Air Quality Attainment Area—comprising Washington, DC, and large parts of surrounding Maryland and Northern Virginia—is classified as a non-attainment area for exceeding ozone standards every year since 1980. Federal health standards are exceeded when air contains more than 0.120 parts per million of ozone, averaged over one hour, for more than one occurrence per year. Violation days have ranged from a low of two in 1986 and 1992, to a high of 26 in 1988.[79] The number of annual violation days has averaged 10.25 since 1980. The Clean Air Act Amendments of 1990 (CAAA) require that the metropolitan region significantly improve its air quality.

Nitrogen oxide (NOx) and volatile organic "hydrocarbon" compounds (VOCs or HCs) are the two pollutants which contribute to ozone (O_3) formation. According to Blumenthal, ozone

> ...is a poisonous form of pure oxygen and the principal component of modern smog...Ozone and other oxidants...are not emitted into the air directly. They are formed by chemical reactions in the air from two other pollutants, hydrocarbons and nitrogen oxides. Energy from sunlight is needed for these chemical reactions...[80]

Ozone attacks synthetic rubbers and the cellulose in textiles. The oxidant components cause severe eye irritation, and in combination with ozone, they can irritate the nose and throat, cause chest constriction, and at high concentrations, produce severe coughing and the inability to concentrate.[81]

Carbon monoxide (CO) "...is a colorless, odorless, poisonous gas formed when carbon-containing fuel is not burned completely. It is by far the most plentiful air pollutant."[82] Carbon monoxide does not remain long in the atmosphere (2-4 months), but it can reach dangerous levels in local areas. Carbon monoxide is an asphyxiate that binds with hemoglobin in the blood and displaces oxygen from the red blood cells. At relatively low levels of exposure (79 to 97 mg/m^3 for one hour), CO decreases exercise tolerance for persons with coronary artery disease. In high concentrations, it is rapidly fatal.[83] "More than 75 percent of the CO emitted comes from road vehicles."[84]

Nitrogen oxide (NO_X) and nitrogen dioxide (NO_2) are major air pollution indicators. Neither causes direct material damage; however, NO_2 reacts with moisture in the atmosphere to form nitric acid, which causes metallic corrosion and kills plants and fish. NO_2 can be an acute irritant. At concentrations found in the atmosphere, NO_2 is only potentially irritating and potentially related to chronic pulmonary fibrosis. Some increase in bronchitis in children (2-3 years old) has

been observed at concentrations below 0.01 parts per million.[85]

VOCs are various types of hydrocarbons which are chemically reactive in the air near the ground and consist of such products as gasoline, solvents and paints, and by-products of burning gasoline, oil, coal, wood or trash.[86] Some VOCs are known carcinogens; others are major factors in the formation of smog.[87] The 1990 adjusted base year VOC emissions for the Washington Air Quality Attainment Area was 464 tons per day. Mobile sources, such as vehicles, produced 39 percent, or 179 tons per day, of the VOC emissions.[88] By 1996, the Washington Air Quality Attainment Area must reduce VOCs from the 1990 base year total by 15 percent, 24 percent by 1999, and maintain the reduced level thereafter. Projections are for uncontrolled VOCs to increase to 527 tons per day by 1996, requiring a net reduction of 133 tons per day to meet CAAA requirements.

C. Air Quality Model Results of VRE Operations

The VRE Ridership Survey of September 22, 1992 was not designed to provide data for air quality modeling; however, commuter mode-shift and related data from the VRE Ridership Survey allowed some preliminary calculations on air quality impacts resulting from VRE commuter use. *The calculations must be considered as very preliminary.* More exact travel mode and distance data are needed before an air quality impact assessment can be made which accurately determines the VRE's impact on regional air quality. Data derived from the survey results included: miles traveled in POVs before using commuter rail, miles traveled to and from commuter stations and home, and reduction in miles traveled in POVs by use of VRE commuter rail. The University of Texas Center for Transportation Research converted the survey data into mode shift and VOC generation components for use in an air quality computer model. Computation of automotive emissions was accomplished using the US Environmental Protection Agency's MOBILE 4.1 model. VRE locomotive emissions were computed using equations published by the Research and Test Department of the Association of American Railroads. Data on hours of locomotive use, engine operating modes, trip mileage, etc. were provided by the VRE. Table 24 summarizes the model results.

Based on the survey derived calculations, the MOBILE 4.1 model calculations showed a net reduction in CO for the survey date of over nine tons (18,122 pounds), and a lesser, but still significant, net reduction in the controlling pollutant VOCs of 745 pounds (0.37 tons). Conversely, generation of NOx increased by a net 1,208 pounds (0.6 tons) on that day. The latter was a not unexpected result of the NOx producing propensity of diesel locomotives vis-a-vis gasoline fueled engines. It

should be noted that the NO_x emissions from the engines would remain static as ridership increased. The overall net reduction of the three combined pollutant sources for the day of the survey was calculated at nearly nine tons (17,660 pounds). The methodology employed to convert the VRE Ridership Survey data into model input data is presented in Appendix C.

Table 25

Net Emission Changes by Commuter Mode Shift from POV to VRE Commuter Rail

Reduction from Prior POV Mode	(22,436)	(990)	(96)
Addition by VRE Commuter Rail	4314	245	1305
			tons/day

Note: (---) indicates a reduction in emissions

Sources: Robert Harrison, University of Texas Center for Transportation Research, and O. Davis Brown, III, Transportation Consultant.

FINDINGS, IMPLICATIONS AND ISSUES FOR COMPARISON IN PHASE II

XIII

A. Findings and Implications

Major findings should not be expected from a "base line" study. The purpose of this base line study was to establish criteria against which to evaluate future conditions. Analysis of the point data, trend information and the "soft" or qualitative data obtained from survey results during the base study did, however, enable certain implications to be drawn regarding the potential for land use changes from introduction of commuter rail in Northern Virginia:

- The size of ridership catchment areas is smaller in more densely developed suburban areas and increases in diameter toward the terminus points in the more exurban areas, creating a "teardrop" shape. In this study area, a radius of five miles contained 80 percent of VRE ridership in more densely developed suburban areas. In less densely developed exurban areas, a radius of 10 miles was necessary to contain 80 percent of VRE ridership.

- In surveys of persons familiar with the VRE, 34 percent indicated that two miles or less *in distance* was "near" a VRE station; an additional 36 percent felt up to five miles was "near." Among the same persons, 84 percent defined 15 minutes or less *in travel time* from a commuter station as "near." These

distances and travel time, then, have major implications for residential planning and development and their perceived accessibility to commuter rail services.

- Home purchasers began to make housing location choices based on *potential* access to future commuter rail service the same year—1984—that the actions to begin system development were initiated.

- The influence of potential commuter service access on housing location choices increased as opening of the system approached. The percentage of surveyed home purchasers who stated that access to commuter rail had been either a "major" or "some" consideration in their housing location choice increased from six percent of surveyed purchasers from 1984 to 43 percent among surveyed home purchasers in 1992.

- The percentage of surveyed home purchasers whose locational choices were influenced by future access to commuter rail and who used the VRE was significantly higher—at 17 percent—than the six percent for all home purchasers surveyed.

- Surveys of developers of new residential projects which used commuter rail access in their marketing programs showed their products were designed primarily for two-wage earner households with combined incomes of $75,000+ per year. This targeted purchaser profile showed that the private sector linked commuter rail usage more with above-average-income households than with commuter service for low- and moderate-income households. This is consistent with the fare structure of the VRE.

- There was agreement by 77 percent of surveyed persons of various informed sectors that shuttle or feeder services to commuter stations would increase the attractiveness of nearby land for development purposes.

- The land use plans of cities with downtown commuter rail stations saw them as stimuli for attracting more customers to the downtowns and for generating new service businesses in the long term. The communities had first to provide the zoning, parking, and connecting infrastructure (sidewalks, signage, lighting, landscaping) between the stations and existing businesses which would encourage commuters to stay and visit the downtowns.

- Development in Northern Virginia has tended to follow major highway corridors. Commuter rail has now been added in two of the major

commuting corridors—the I-95/Route 1 corridor and parallel to the I-66 corridor. It will be difficult to clearly separate access corridor-induced development from the impacts of commuter rail-associated land use changes.

- Preliminary air quality emission reductions were calculated from changes shown in commuter travel modes from VRE Ridership Survey data of September 22, 1992. Based on those ridership levels, converting from single occupancy vehicle usage to use of the VRE showed preliminary reductions in carbon monoxide (CO) emissions of nine tons, in volatile organic compound (VOC) emissions of 0.4 tons and an increase in nitrogen oxide (NO_X) emissions of 0.6 tons for the day of the survey. (VOCs are the controlling pollutant in smog formation in the Washington metropolitan area.) Automotive reductions achieved in nitrogen oxide emissions were offset by higher levels of the same emission from the VRE locomotives; however, the locomotive emissions would remain static with increased ridership until new trains are added.

- By the third month of VRE operations, approximately 63 percent of the 2,348 surveyed VRE riders were persons who had used single occupancy vehicles (SOVs) for much or all of their previous commutes; even more significantly, those shifts by previous SOV commuters were responsible for almost 92 percent of the above-cited reductions in automotive emissions.

The time period covered in establishing the study's base line conditions—1984 to mid-1992—began during a very active growth period in Northern Virginia and concluded as the study area was emerging (hopefully) from a five year recession. The recession years coincided with final development of the VRE commuter rail system. The influence that commuter rail may have had on land use changes—acquisition, development and building construction—in a non-recessionary period were not experienced in Northern Virginia. Whether the minimal land use change activity in Station Nodes was due to: 1) the significant reduction in development caused by the recession, 2) to lack of developer/builder belief that the commuter rail alone would provide a sufficient marketing incentive, or 3) to non-availability of two-way rail service throughout the day, could not be determined from the data. Potential residential buyers were expressing interest in commuter rail in discussions with sales agents, but builder/developer survey responses did not show convincing interest in the attractiveness of sites near commuter rail stations versus sites away from convenient VRE access.

Surveys of knowledgeable public and private sector individuals consistently indicated that station areas should be developed to include more mixed use

projects, higher densities, more office/business and more commercial uses.

B. Issues for the Phase II Study

1) Real Estate Value Trend Assessment - Examination of residential real estate tax assessment values from 1984 to the Phase II study period would be very useful in determining the influence of commuter rail on nearby real estate values. This analysis was not undertaken in the base study after examination of local tax assessment data formats. A large number of individual properties would have had to be identified and monitored in subareas near and away from commuter stations in several jurisdictions. This could have been accomplished with computerized tax assessment data maintained on a subarea basis. However, at the time of the study, not enough tax records of the study area jurisdictions were maintained in subarea formats which would have made this analysis possible within the constraints of the study.

Analysis of real estate value trends by subareas within various study jurisdictions may be possible in the future as older tax records are computerized, programs developed which allow defined subarea data to be withdrawn, and programs or interfaces developed which allow analysis of local tax data bases on personal computers. This capability may be available when the Phase II study is undertaken. The purpose of such an analysis would be to determine if property values close to VRE stations *increased at a faster rate* than did those for similar types of properties and neighborhoods located away from commuter rail stations. If the findings are affirmative, they could indicate a real estate value increment attributable to commuter rail access.

2) Relocations versus New Locations Influenced by the VRE - The Phase I surveys indicated a positive relationship in the study area between a growing annual percentage of new home purchases and access to the VRE. It would provide useful information if the Phase II study included surveys which determined whether new home purchases influenced by VRE access were the result of relocations by persons already residing in the study area or the metropolitan area, or whether they primarily represented new arrivals into the metropolitan area. A corollary item of useful information would be to ask the same survey sample if the new home purchase was occasioned by a change of jobs which required commuting to the metropolitan core.

3) ISTEA and CAAA - Northern Virginia jurisdictions are just beginning to understand the land use and transportation linkage implications of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the air quality linkages with the Clean Air Act Amendments of 1990 (CAAA). The ISTEA law stresses, for the first time, the crucial linkage between

land use and traffic generation. The law changes the process by which transportation projects are planned, approved and scheduled for funding. The law emphasizes the movement of people rather than the movement of vehicles as a priority. The CAAA requirements were described previously in Chapter XII. The two federal laws have the potential for causing major changes in the way Northern Virginia localities have traditionally made land use and transportation decisions. These laws say, in effect, that "...business as usual will not work."[89] There will have to be far greater emphasis on reducing the use of SOVs for commuting and non-business travel, especially from new development. Transit systems will have to play greater roles in moving people throughout the metropolitan region and seeing that convenience and area coverage respond to demand in the most cost effective ways.

The Phase II study should identify the local regulations, regional agreements, and metropolitan wide actions adopted in efforts to meet the mandates of the two laws, especially as they include the VRE, and to improve regional travel movement and quality of life standards. Many of the actions taken to achieve the goals of the two regulations will probably have major land use and transportation-linkage elements. The land use planning and development policy changes will be reflected in local Comprehensive Plans, subdivision and zoning regulations, and in regional transportation and land use planning cooperation. The long-term implications of these two laws could force major changes in the way local governments regard land use and development, especially around VRE transit stations. New Special Area Management Plans may be prepared for these locations and should be analyzed during Phase II as indicators of public sector-initiated land use changes.

4) Do Definitions of "Near" Change - The surveys showed that people tended to define "near" based on their local travel experiences. There are definite planning implications for land use and encouragement of transit use based on these findings. Based on the survey results, in more developed areas, residential development should be encouraged within a two mile radius and a 15 minute drive to create the strongest linkages with VRE access and use. Also, as shown by the survey results, a five mile radius and a maximum 30 minute drive from rail stations will provide the great majority of rail system ridership. This radius expands to 10 miles in the more exurban locations, but still maintains a 30 minute driving time.

What happens as development fills in near stations in exurban areas? The travel time to stations will increase. Instead of 15-20 minutes, the same trip may take 30-40 minutes as more local traffic, traffic lights and intersections are added to the street network. Will the definitions of "near" begin constricting? The survey results tend to so indicate. Will commuters who are now in the

20 percent traveling the longer distances and times then become discouraged and again revert to SOV use?

The less densely developed jurisdictions—Stafford, Spotsylvania and western Prince William Counties—should be aware of this potentiality. Providing preemptive feeder service to station areas might keep commuters from reverting to SOV use as local travel times slow with increased development. Encouraging attractive and functional new neighborhoods within five miles of rural stations might also encourage rail users to locate closer to stations for ease of access. The new neighborhoods would have to be designed to maintain the suburban feel that the people seek in locating to these jurisdictions.

The Phase II study should investigate if these actions have begun to occur in the Northern Virginia study area and the reactions of local jurisdictions, planners and commuters to increasing highway congestion between the commuters' homes and the VRE stations.

5. Impacts on low- and moderate-income commuters if lower cost alternative choices are reduced as a result of the VRE - The Phase II study should compare the number of alternative modes, service routes and prices offered by public and private commuting mode alternatives in 1992 with those available in the Phase II base year. The comparison should determine whether the VRE system led to a long-term reduction or an increase in available commuting alternatives and costs for intra- and inter-jurisdictional travel. In a related context, the study should examine new employment creation, especially in Station Nodes or areas served by future feeder services around VRE stations that provided new job opportunities—especially for low- and moderate-income workers—and which offered the opportunity of eliminating some need for long-distance commuting.

6. Development of new land uses around proposed VRE commuter rail stations - Additional commuter rail stations were planned which were not constructed as part of the initial service on the VRE. These station locations were: Fairfax Station (Clifton), Franconia/Springfield and Lorton in Fairfax County; Cherry Hill in Prince William County; Widewater/Arkendale in Stafford County and Spotsylvania Station in Spotsylvania County.

Examination of these sites during the Phase II study will indicate whether the VRE system expanded the number of its stations; whether adjacent land use activity occurred since 1992 which could be considered rail-influenced; what types of land uses and employment may have followed as a result of the new rail stations, and whether local public planning and zoning policies were used to encourage or restrict development at these proposed station sites. Aerial photography, taken on two year cycles by Fairfax and Prince William Counties and periodically by Stafford County, could provide information on the timing and amount of land use changes which occurred at the sites since 1992. Quar-

terly VEC employment data can provide information on new employment by categories and changes in existing employment over the same time frame for the proposed station sites.

C. Conclusion

If the basic study hypothesis is true that a new commuter rail service may affect future land use changes, the challenge becomes that of understanding the potential changes in advance. Once the changes are understood, local governments can update land use management plans and policies and become proactive in directing when and where associated changes occur. The objectives should be four fold:

- maximize the benefits offered by a publicly financed rail system to remove existing SOV traffic from local highways;
- provide the infrastructure and land use plans which will allow more concentrated, pedestrian- or transit-oriented, mixed use developments near rail stations. These patterns will reduce the typical suburban reliance upon SOV use for most travel and commuting requirements;
- encourage or mandate ride-sharing or non-vehicular alternatives (shuttle services, public buses, bike or pedestrian paths) to commuter rail stations and commercial nodes from new developments "near" commuter rail stations as part of a suburban transportation demand management program; and
- provide the plans, policies and infrastructure necessary to allow the types of land uses near rail stations which provide increased tax base and employment opportunities to help offset local commuter rail subsidy costs and to reduce the need for long commuting trips to employment centers.

A new public or commuter rail system offers many positive transportation and environmental benefits for suburban areas. The focus on new commuter system planning should be to incorporate land use planning into the process of system planning to maximize the potential changes and benefits for the community.

FOOTNOTES

XIV

1 Northern Virginia Planning District Commission and Gladstone Associates, Northern Virginia Metro Station Impact Study, Phases I-IV, 1973-1974.

2 Northeastern Illinois Planning Commission, Land Use in Commuter Rail Station Areas: Guidelines for Communities, 1992.

3 Beimborn, E., Rabinowitz, H. with Gugliotta, P, Mrotek, C. and Yan, S., Guidelines for Transit Sensitive Suburban Land Use Design, by Center for Urban Transportation Studies and School of Architecture and Urban Planning, University of Wisconsin-Milwaukee, for U.S. Department of Transportation, Office of Technical Assistance and Safety, Urban Mass Transportation Administration, 1991, page 35.

4 Snohomish County Transportation Authority, A Guide to Land Use and Public Transportation, for the U.S. Department of Transportation, 1989 page 3-4.

5 U.S. Department of Transportation, A Guide to Land Use and Public Transportation, December, 1989, page 3-4.

6 Northern Virginia Transportation Commission, Eighth Annual Report: Transportation Service Coordination Plan, September, 1992, page C-5.

7 The Virginia Railway Express.

8 Busch, Richard T., Commuter Rail in Northern Virginia: An Important Urban Transportation Link Returns, unpublished thesis for Master of Urban and Regional Planning Degree, George Washington University, February, 1991, pages 25-28.

9 Ibid, page 28.

10 Ibid, page 35.

11 Ibid, page 27-1.

12 Smith, Arthur J., Commuter Rail Service in the National Capital Region, Urban Transportation Center, Consortium of Universities, Washington, D.C., 1971, page 59.

13 Northern Virginia Transportation Commission, Eighth Annual Report: Transportation Service Coordination Plan.

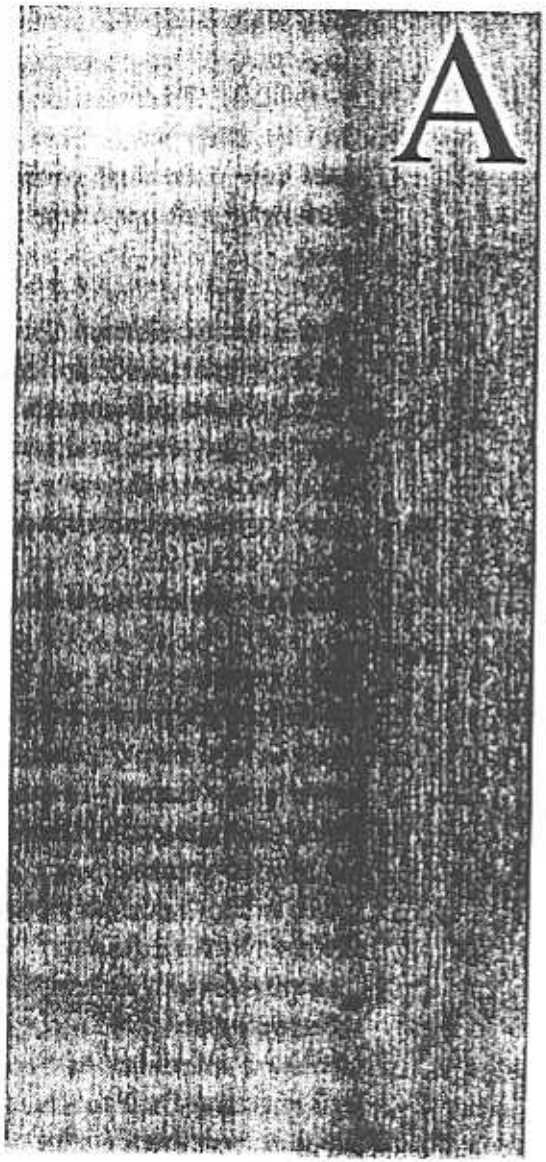
14 Alves, Buddy, Washington Metropolitan Council of Governments, article in Chesapeake ACTivities, newsletter of the Chesapeake Chapter of the Association of Commuter Transportation, Summer (August) 1993, page 7.

[15] Ibid, page 7.
[16] The Virginia Railway Express, Virginia Railway Express Inaugural Ceremony and Train Ride Program, June 12, 1992, page 4.
[17] Taube, Rick, Eighth Annual Report: Transportation Service Coordination Plan, Northern Virginia Transportation Commission, pages E-4 to E-8.
[18] The Virginia Railway Express, Virginia Railway Express Inaugural Ceremony and Train Ride Program, compiled by Rick Taube, Northern Virginia Transportation Commission, June 12, 1992, pages 4-7.
[19] Cohn, D'V., The Washington Post, December 22, 1992, page A1.
[20] Ibid, page A14.
[21] Similar segment counts could be developed for roads approaching other VRE stations, including those in the Manassas area. However, the information on state secondary and city roads must be obtained from individual VDOT district and city transportation departments, an effort not pursued in Phase I of this study. Should Phase II data around Fredericksburg prove interesting enough, the data around other stations (and secondary roads around Fredericksburg) may be obtained from locally-archived records.
[22] Mann, William W., Northern Virginia Regional Office, Virginia Department of Transportation, telephone conversation, April 9, 1993.
[23] Ibid, April 9, 1993.
[24] Cohn, D'V., The Washington Post, Dec. 22, 1992, pages A1 and A14.
[25] Ibid, page A1.
[26] The Virginia Department of Transportation and the Policy and Technical Committees and the Citizens Advisory Committee of the Northern Virginia Sub-Regional Transportation Planning Process, Summary Report, Northern Virginia 2010 Transportation Plan: Facilities, Financing, Continuing Process; updated January 27, 1989, page 5.
[27] Information provided by Kenneth Butler, Executive Director, the Washington Private Operators Council.
[28] The Washington Post, April 15, 1993, Fairfax Section, pages 1 and 2.
[29] Lauretta Ruest, Potomac and Rappahannock Transportation Commission Rideshare Coordinator, May 1992.
[30] Schwartz, E., and Callow Associates, Inc. for A. J. Dwoskin and Associates, Inc., A Solvable Problem: Transportation in Northern Virginia, 1987, page 55.
[31] Information obtained by NVPDC during discussions with the Potomac & Rappahannock Transportation Commission.
[32] Northern Virginia Planning District Commission, Northern Virginia Databook, 1993, page 95.
[33] Ibid, page 95.
[34] Ibid, page 100.
[35] The Comprehensive Plan for Fairfax County, Office of Comprehensive Planning, Fairfax, VA, 1984, page 19.
[36] The Comprehensive Plan for Fairfax County, Office of Comprehensive Planning, Fairfax, VA, 1984, page 19.
[37] Ibid, page 19.
[38] Ibid, page 430.
[39] Office of Comprehensive Planning, Policy Plan: The Countywide Policy Element of the Comprehensive Plan for Fairfax County, Virginia, 1990, page 52.
[40] Ibid, page 52.
[41] Ibid, page 57.
[42] Ibid, page 109.
[43] Ibid, page 107.
[44] Stafford County Planning Commission, County Planning Office, and Baldwin and Gregg, Ltd., Stafford County Comprehensive Development Plan; 1975, page 22.
[45] Ibid, page 104.
[46] Ibid, page 108.
[47] Stafford County Planning Commission, Stafford County Comprehensive Plan Update.,1979, page 13.
[48] Department of Planning and Community Development, Stafford County, Virginia Land Use Plan, 1988, page 5.

[49] Ibid, page 10.
[50] Ibid, page 10.
[51] Spotsylvania County Comprehensive Plan, September, 1987, page 19.
[52] Ibid, page 44.
[53] Ibid, page 50.
[54] Ibid, page 51.
[55] Ibid, page 70.
[56] Ibid, page 87.
[57] Department of Planning, A Guide for the Future, The Comprehensive Plan for the City of Manassas, 1975 and 1982, page 8.
[58] Manassas Department of Planning, Background Paper on Mass Transportation, August 20, 1980, page 2.
[59] Ibid, page 20.
[60] Ibid, pages 22-23.
[61] Ibid, page 22.
[62] Ibid, page 22.
[63] Ibid, page 23.
[64] Comprehensive Plan for The City of Manassas, 1989, page 9.
[65] Ibid, page 10.
[66] City of Manassas Park, Amendments to the Comprehensive Plan, 1990, page 3.
[67] Ibid, page 3.
[68] Ibid, page 8.
[69] Quantico Planning Commission and the Virginia Department of Housing and Community Development, Comprehensive Plan, Town of Quantico, Virginia, 1981, page 20.
[70] Ibid, page 21.
[71] Ibid, page 52.
[72] Ibid, page 53.
[73] Beimborn, E., Rabinowitz, H., Gugliotta, P., Mrotek, C. and Yan, S., Guidelines for Transit Sensitive Suburban Land Use Design, for the Department of Transportation, Office of Technical Assistance and Safety, by the Center for Urban Transportation Studies and School of Architecture and Urban Planning, University of Wisconsin-Milwaukee, pages 66-72, 118-139.
[74] Northern Virginia Planning District Commission, "Population Growth in Virginia Localities and PDC's: 1980-1990," 1991, pages 1-3.
[75] Prince William County Planning Office, "Overview: Planning and Zoning Process," page 1.
[76] Ibid, page 1-2.
[77] Ibid, pages 2-3.
[78] The Virginia Railway Express, "Summary of Sept. 22, 1992 Virginia Railway Express Passenger Survey," pages 3-4.
[79] "Challenges of the Clean Air Act" Background and Overview, presentation to the Northern Virginia Planning District Commission by the Department of Environmental Programs, Metropolitan Washington Council of Governments, February, 25, 1993, page 8.
[80] Blumenthal, D. S., M.D., Editor, and Greene, M., Introduction to Environmental Health, Springer Publishing Company, New York, N.Y., 1985, page 126.
[81] Wark, K. and Warner, C. F., Air Pollution—Its Origin and Control, Harper & Row, New York, N.Y., 1981, page 31.
[82] Blumenthal, D.S., M.D., Editor, and Greene, M., Introduction to Environmental Health, Springer Publishing Company, New York, N.Y., 1985, pages 127-128.
[83] Ibid, page 128.
[84] Ibid, page 128.
[85] Ibid, page 30-31.
[86] Ibid, page 9.
[87] Ibid, page 130.
[88] Metropolitan Washington Council of Governments, Proposed State Implementation Plan Revisions to Achieve a Fifteen Percent Reduction in Volatile Organic Compound Emissions for the Washington, DC-MD-VA Non-Attainment Area, October 15, 1993, page 23.
[89] Partnership for Regional Excellence, Draft Copy of The Report of the Partnership for Regional Excellence, presented to the Metropolitan Washington Council of Governments, July 14, 1993, page 1.

APPENDICES

COMMUTER RAIL SERVICE IN LOCAL COMPREHENSIVE PLANS 1984 AND 1992



A. Local Comprehensive Plans

Comprehensive Plans are required of Virginia jurisdictions. As a minimum, they must consist of text which describes the "growth vision" for the jurisdiction and a future land use plan (in map form) to guide implementation of the vision. Comprehensive Plans are required to be reviewed and updated if necessary at least every five years. Comprehensive Plans provide the legal basis for local zoning plans and land use change decisions.

B. Commuter Rail Service in Local Comprehensive Plans—1984 and 1992:

The last privately operated commuter rail service in Northern Virginia—on the Washington and Old Dominion (W&OD) line—was discontinued in 1951. Two rail lines, the CSXT (then the RF&P) and the Norfolk Southern (then the Southern), continued in use for freight and Amtrak passenger service. Two decades of talk about restoring commuter service on the existing lines moved into the development phase in 1984.

The need for alternative commuting modes was emphasized in many of the transportation sections of local comprehensive plans. Jurisdictions through which the CSXT line and the Norfolk Southern Rail-

way passed saw the potential of these lines for relieving some of the commuting congestion they were experiencing. Examination of local comprehensive plans for the study years 1984 and 1992 provided insights into how individual governments saw the potential of commuter rail operations in their transportation planning.

The same examination also indicated the extent to which local planners and elected officials saw the potential for commuter rail impacts on land use patterns. If land use changes were anticipated as a result of commuter rail, the comprehensive plans should have indicated whether the governments proposed directing anticipated changes into new land use patterns, or whether they felt existing patterns were adequate.

Comparison of 1984 and 1992 comprehensive plans revealed if local transportation policies and land use linkages moved from "generalities," when commuter rail was "in the future," to more specific policies as commuter rail approached reality. The transition from generalities to specifics was especially reflected in the 1992 plans of Fredericksburg, Manassas, Manassas Park, and Prince William County. These jurisdictions had the potential for new development near their stations. Their comprehensive plans and special area management plans reflected intentions to minimize the impacts of commuter demand and to direct patterns of potential development near station sites.

Fairfax, Prince William, Spotsylvania, and Stafford Counties and the cities and towns of Fredericksburg, Manassas, Manassas Park, and Quantico were directly affected by VRE lines and stations. Their comprehensive plans in effect in 1984 and 1992 were examined. The transportation and land use plans, references and policies reflecting on commuter rail and land use relationships are summarized below.

1. Fairfax County

Fairfax County had three of the initial VRE stations (Burke Center, Rolling Road and Backlick Road) on the Norfolk Southern Railway line located in the southern portion of the county. Fairfax County was also the site of two proposed VRE stations (Franconia/Springfield and Lorton) on the CSXT line in the southeastern portion of the county. Planned extension of Metrorail's Blue Line will terminate at the proposed Franconia/Springfield transit center in southeastern Fairfax County in 1997. This proposed transit center will provide Fredericksburg line riders with their first opportunity to transfer to Metrorail, the Fairfax Connector bus system or to taxicabs to reach local destinations.

a) Fairfax County—1984:

In August, 1984, Fairfax County issued its Comprehensive Plan with all adopted amendments. The Plan contained the county-wide plan and individual plans for

four planning subareas. These five plans had each been adopted in 1975 and subsequently amended. There were many references in the plans both to Metrorail, which was not yet in operation in Fairfax County, and to proposed commuter rail service.

A major component in the transportation element of the county-wide Plan was based on achieving higher levels of transit ridership than that projected by Metrorail's operator. The proposed transit ridership would be achieved by: 1) extending Metrorail to the Franconia/ Springfield station, extending a new line from West Falls Church to Dulles Airport to serve intermediate stops, and including a deviation through Tysons Corner on the Dulles line; 2) initiating commuter rail service on the Norfolk Southern Railway and CSXT lines, and 3) implementing a high level of express and feeder buses to Metrorail stations from areas not served by commuter rail. It assumed that most seats on the completed Metrorail system would be filled when the trains crossed the Beltway into Arlington County and Alexandria. It called for development of an extensive feeder bus network to serve the Metrorail stations. The Plan stated that failure to implement these multi-modal recommendations would result in decreasing the transit ridership levels on which the Transportation Plan was based. Even with a feeder bus network and heavier projected Metrorail ridership, the Plan stated:

> Transit will not...play a major role in the accommodation of work trips in the circumferential direction, trips for non-work purposes, or trips in outlying areas.[1]
>
> ...the magnitude of travel demand is so great that meeting it in its entirety does not appear to be economically feasible under present funding sources or environmentally sound. Faced with these issues, the reconsideration of alternative land use patterns at the regional and local level would appear to be warranted.[2]

The following transit-related concepts were organizing elements in developing the plans for each of the four subareas.

- Greater use of mass transit and small area transit systems to help protect and enhance the environment.
- Encourage compatible infill development at densities sufficient to encourage more mass transit ridership and small area transit system usage.
- Provide greater access to Metrorail stations and to commuter express buses to reduce through traffic from outside the sub-areas.
- Encouragement of radial movements on bus lanes, Metrorail, and by commuter rail was recommended in Area II (Upper Potomac, Bull Run and Pohick districts).
- Support and encouragement of public transit, including commuter rail.

The Area II plan discussed the low level of bus service in that area due to low densities and difficulties in using collector and arterial roadways. The Plan recommended several measures to increase public transit:

- provision of fringe parking lots;
- provision of feeder bus systems to provide access to Metrorail stations; and
- continuing investigations leading to establishment of commuter rail service on the Norfolk Southern Railway line. Fairfax Station (Clifton) was recommended as a commuter station site should commuter service begin.

The Area IV Plan (Springfield, Rose Hill, Mount Vernon and Lower Potomac sectors) proposed four Metro stations. The Plan recommended access control to stations to reduce congestion and air pollution. Special attention was called to the need:

> ...to plan the use of land around station sites, where to locate new planned development centers for Metro access with minimum outside disruption, and how to design new centers to encourage pedestrian and bicycle movement within them and between the centers and the stations.[3]

The undeveloped tract currently proposed for the Lorton Station VRE site was recommended in 1984 for either residential, as a continuation of adjacent uses, or for industrial development because of its long CSXT rail frontage.

The proposed site for the Springfield/Franconia Metro station received extensive discussion. Questions were raised as to the appropriateness of locating a commuter station at a designated regional commercial center. Rail service would be used primarily by passengers not encumbered with packages. The Metrorail station would attract large numbers of vehicles, which combined with those attracted to the Springfield Mall, could create serious congestion problems. Recommendations included providing pedestrian and bicycle access linkages between the Metrorail station, commercial activities, and adjacent residential areas to reduce auto usage. A multimodal transfer center was proposed adjacent to the Metrorail station to promote transfers between rail, local and feeder buses, bicycles, carpools, and pedestrian modes.

The 1984 Area IV Plan recommended a variety of commercial, office, service and residential uses in the Springfield sector. The following statement tied land use recommendations closely to the mass transit development schedule.

> Some uses and densities recommended for this sector are more intense than would be the case if transit-related facilities were not planned for this area. Development of such uses and densi-

> ties in those areas should wait until construction of Metro is sufficiently near to justify them. If a Metro station within the sector ever ceases to be in accord with County policy, Sector S7 will need to be replanned. Within that time frame, the area directly east and south of Springfield Forest extending to the RF&P [CSXT] Railroad should not be developed other than in residential uses.[4]

The Transportation Plan identified long-term roles for commuter and feeder buses. Initially they should serve partial line-haul services of moving people to Metro stations where Metro would then complete the line-haul function. But as the Metro system expanded outward, the buses should be "re-oriented to feeding the rail stations and providing cross-County transit access. At the same time, the line-haul transit function should be substantially assumed by the rail system."[5] (The same type of consideration could equally apply to feeding the VRE commuter rail system.)

Two county-wide commuter rail recommendations were of particular interest from Fairfax County's 1984 Comprehensive Plan. Recommended were: (1) continuation of the Metro system in the median of the Dulles Airport Access Road from West Falls Church to Dulles Airport. The line was recommended to include rail stations in the interior of the Tysons quadrangle, at Wolf Trap Farms, and at Reston; (2) commuter rail service on the CSXT and the Southern Railway lines should be pursued because of the potential commuter carrying capacity the lines represented.

b) Fairfax County—1992:

New area plans and a new county-wide Policy Plan were adopted for Fairfax County in 1990 and 1991. They were the adopted plans in effect in 1992. The VRE commuter rail system was coming into being. The new plans and mass transit policies reflected that fact. Portions of the County's new transportation goals which included references to commuter rail are identified in the following selected policies and objectives:

County-wide Policies: The County Board of Supervisors adopted the following overall goal to guide their integrated transportation and land planning policies:

> Land use must be balanced with the supporting transportation infrastructure, including the regional network, and credibility must be established within the public and private sectors that the transportation program will be implemented. Fairfax County will encourage the development of accessible transportation systems designed, through advanced planning and technology, to move people and goods efficiently while minimizing environmental impact and community disruption. Regional and local efforts to achieve

a balanced transportation system through the development of rapid rail, commuter rail, expanded bus service and the reduction of excessive reliance upon the automobile should be the keystone policy for future planning and facilities. Sidewalks and trails should be developed as alternate transportation facilities leading to mass transit, high density areas, public facilities and employment areas.[6]

The transportation element of the county-wide Policy Plan contained many objectives and policies which addressed commuter rail and related mass transit/land use planning considerations. Some of the relevant objectives and their supporting policies were:

Objective 1: Fairfax County should provide for both through and local movement of people and goods through a multi-modal transportation system that places the maximum practical emphasis on alternatives to the single-occupant automobile for peak-hour commuting.[7]

Policy c. Accommodate inter-county and through trips with the Interstate and Primary Highway Systems, Metrorail, the Virginia Railway Express, and high occupancy vehicle facilities.[8]

Objective 2: Fairfax County should seek to increase the number of commuters using non-motorized transportation and public transportation (i.e., rail, bus, carpooling and vanpooling)...

Policy a. Support the completion of the 103-mile Metrorail system, including the extension to Springfield/Franconia.

Policy b. Provide mass transit facilities (such as rail transit, commuter rail, and/or HOV lanes) in other major commuter corridors including the Shirley Highway, I-66, the Beltway, and the Dulles access/toll road. Preserve rights-of-way for track and station sites where appropriate.[9]

Policy d. Establish park-and-ride lots along major commuter routes and at potential future modal transfer points, such as rail stations, in order to promote transit and HOV usage...

Policy j. Provide feeder service between areas of medium to high-density residential development and trunk routes, including the Metrorail system. Feeder bus service to Metrorail and commuter rail from Suburban Neighborhoods will also be considered...[10]

Policy u. Provide non-motorized access (e.g., sidewalks, pedestrian crosswalk signals and markings, trails, and secure bicycle parking) and user amenities (e.g. paved waiting areas, bus shelters and

route/schedule information) to make transit services and facilities more convenient and attractive.

Policy v. Enhance coordination with neighboring jurisdictions to promote public transit and high occupancy vehicle (HOV) usage and minimize single occupant vehicle travel.

Objective 5: The programming of improvements to the transportation system should be based upon considerations of cost-effectiveness, should be sensitive to the County's environmental, social, land-use, economic, and other goals and objectives, and should reflect an overall goal of reducing reliance on the single-occupancy automobile as far as is reasonably possible.

Policy a. Give priority to the programming of transit improvements that assist in accomplishing the County's land use goals and objectives, particularly the encouragement of transit-oriented development in the cores of the Urban and Suburban Centers by providing a focus of transit service into the cores and by planning future rail stations and bus transit centers in these core areas, with congestion-free transit access to the extent feasible.[11]

Objective 7: Fairfax County should work to ensure adequate financing for its transportation system...

Policy b. Pursue increased state and federal support for the Interstate and Primary Highway Systems, Metrorail and Virginia Railway Express.[12]

Objective 10: Fairfax County's land use and transportation policies should be complementary.

Policy a. Encourage relatively high density residential development in mixed use centers to promote walking trips, enable more efficient transit service and to reduce single occupant vehicle use...

Policy c. Encourage compatible and appropriate land uses such as child care facilities in close proximity to public transportation transfer points...

Objective 11: Preserve land needed to accommodate planned transportation facilities.[13]

Policy c. Establish right-of-way requirements and preserve the land for future interchanges, rail stations, rail line rights-of-way in the Enhanced Public Transportation Corridors (I-66, I-95, Dulles Toll Road, and I-495)...[14]

Policy e. (Objective 13) Consider regional travel patterns when formulating and implementing the County's transportation plan.[15]

Area Policies: Fairfax County's 1990 Comprehensive Plan included four "area" plans comprising 14 "planning districts." The planned VRE rail network would pass through five of the planning districts: Pohick, Annandale, Springfield, Lower Potomac and Rose Hill. Portions of those district plans which were directed toward commuter rail and related planning considerations are discussed below.

The Pohick District Plan recommended:

- initiation of commuter rail service on the Southern Railroad line;
- construction of three VRE rail stations at Fairfax Station (Clifton), Burke Centre, and Rolling Road; and
- construction of parking facilities (at VRE stations) to have 200, 440, and 400 spaces, respectively.

The Annandale District Plan recommended a commuter rail station at Backlick Road. The recommended site was within an industrial area.

The Plan contained land use guidelines for "transit station areas," recommending higher density mixed land uses around commuter transit stations. Industrial uses were discouraged as incompatible with the preferred land uses around stations. Where industrial uses currently existed in transit station areas, as at Backlick Station, compatible redevelopment into mixed uses should be encouraged.

The Springfield Planning District was crossed by both the Southern Railroad and CSXT lines. The Plan recommended that commuter service be initiated on both lines. The district contained the proposed site for the future Springfield/Franconia Metro and VRE stations, which would form two elements of a new transportation center with bus bays and commuter parking. The site would be a multimodal center linking VRE, Metro, feeder buses, ridesharing, taxi service, single occupancy vehicles, bike and pedestrian modes, and parking for 3600 vehicles.

The Lower Potomac District Plan showed a major land use change recommendation affecting the selected site of the future Lorton commuter rail station. This 232+ acre site had been recommended for industrial uses in 1975 because of its extensive rail frontage. With the commuter rail focus, a "town center" land use was now proposed. The town center would include commercial, office, residential and open spaces uses. The plan recommended that the site be developed as a high-quality, unified project. The commuter rail station was to be integrated into the overall project design. It should be connected by vehicular, bicycle and pedestrian access to nearby residential and industrial neighborhoods.

c) Summary of Fairfax County Plans for Commuter Rail—1984 and 1992:

Comparison of recommendations regarding commuter rail contained in the Fairfax County Comprehensive Plans applicable in 1984 and 1992 shows definite movement. From 1984 proposals for using existing rail lines for commuter purposes, the 1990 plan progresses to specific recommendations on how the rail-land use interfaces should occur at specific sites. The 1984 Comprehensive Plan's transportation section makes interesting reading in hindsight. The Plan said that *even with* the Dulles Metrorail extension, *with* commuter service on the VRE lines, and *with* an extensive feeder bus system to the stations, *the County's projected transportation demands could not be adequately met* (emphasis added). A VRE-type commuter rail system would help radial travel to and from Washington, DC, but it would not address the growing circumferential travel patterns. However, commuter rail on the Norfolk Southern and CSXT lines was an essential element in helping address county transportation demands. To encourage more effective rail utilization, the Plan encouraged infill development at greater densities.

By time of plan preparation and adoption in 1990, the VRE commuter rail was approaching reality. Thus, one element of the recommended rail and feeder services for Fairfax County was about to be achieved. The transportation and land use sections of the Comprehensive Plan and the respective district plans anticipated land use and access impacts around VRE station sites. Recommendations were included to provide direction for future zoning and subdivision decisions, identified desired directions for land use changes and discouraged uses considered incompatible with VRE stations, even it they already existed. The plans showed the county's intentions of using the rail stations as hubs of future development at Franconia/Springfield and at Lorton. Positive steps were recommended for maximizing multi-modal interchanges between rail systems, buses, SOVs, bikes and pedestrian modes, especially at the strategic Franconia/Springfield multi-modal transit center location.

2) Prince William County

a) Prince William County—1984:

In 1982, Prince William County adopted a new comprehensive plan. It was the first countywide update since 1974. The county was experiencing rapid population growth and development, fueled heavily by workers who commuted to employment in other areas of Northern Virginia and in Washington, DC. The Plan consisted of three time-frame components—a "Long Range Policy Plan" for policy formulation, a "Mid-Range Facilities Plan" for management of development, and a "Short Term Land Use Plan" for addressing current issues.

The transportation section of the Plan contained the fol-

lowing goals for public transit:

> To increase the opportunities for citizens to use transit for commuter trips as well as intra-county trips.
>
> To provide facilities—such as commuter parking lots and bikeways—that contribute to an integrated, balanced transportation system.[16]

The Plan discussed the effects of the I-95 HOV lanes on efficiently moving traffic during commuting hours. As of 1980, the levels of service (LOS) on I-95 during commuting periods were acceptable (LOS A and B). However, capacity problems were already being felt south of Springfield (in adjacent Fairfax County). The Plan urged construction of HOV lanes on all 35 miles of I-95 in Prince William County in anticipation of increasing commuting demands. Without I-95 HOV lanes or other capacity improvements, projections of levels of service were primarily in the LOS D, E, and F ranges, indicating major traffic flow, speed, and time impediments.

The Plan cited benefits that HOV lanes would provide. The same benefits are those still being sought through current multi-modal transit alternatives, such as VRE commuter rail. The benefits cited were:

- encouragement of ridesharing
- energy conservation
- reduced traffic volumes on adjacent and connecting roads
- improved levels of service during peak hours
- increased passenger miles

(Part of the HOV lane extensions recommended in the 1982 Plan were under construction on I-95 in 1992. They were expected to be phased into use between 1994 and 1996.)

The decade of the 1980s saw unprecedented growth and development in the VRE study area. The resulting local transportation impacts of that growth (combined with growth in through traffic) can be better understood by comparing average daily vehicle counts in Prince William County on I-95 for 1980, the 1982 Plan's year 2000 projection of vehicle counts, and actual 1990 average daily vehicle counts on the same segments, as shown in Table A1.

Projections made in 1982 of vehicle counts on I-95 for the year 2000 were already greatly exceeded by 1990. Congestion south of Springfield had become a reality. The differences in projected versus actual traffic counts indicated how quickly traffic from Prince William County, points south, and through-traffic grew during the 1980s. It also indicated how difficult it was for local and state planners to attempt to keep pace with infrastructure demands during periods of exceptional growth.

In 1984, the county's involvement in commuter transit included providing financial support for a ridesharing program, administering a grant promoting express bus service, supporting WMCOG's commuter rail feasibility study, and supporting extension of the I-95 HOV lanes.

The county did not directly provide transit services in 1984. However, in that year it did initiate its first contract with a private provider to subsidize commuter express bus operations. (This followed the bankruptcy/ demise in 1983 of the then-primary private express bus provider, with resulting chaos for many county commuters.) Other smaller private bus operators, and an increasingly large number of car- and vanpools (many spawned by the 1983 turmoil), attempted to provide commuting alternatives. (Ups and downs in the quality and quantity of contracted bus services continued to plague the county until 1989, when the county contracted with the newly-formed Potomac and Rappahannock Transportation Commission [PRTC] to manage all county bus operations.)[17]

Mass transit elements considered in the Plan were: (1) commuter parking, (2) commuter bus, (3) commuter rail, (4) ridesharing, and (5) elderly and handicapped services. At the time of plan preparation, there were five official commuter lots located in the I-95 corridor. Four of the lots were approaching capacity, and an additional one was scheduled to open in 1982. The Plan described the rationale behind providing commuter lots, and it proposed additional locations for four small satellite lots totaling 325 spaces and three large transit-served lots

Table A1

Comparison of I-95 Vehicle Counts in Prince William County-Actual 1980 and 1990 Counts Compared to Year 2000 Projections

PRINCE WILLIAM CO I-95 SEGMENTS	1980 ACTUAL COUNTS	YR 2000 PROJECTED COUNTS	1990 or ACTUAL COUNTS	% ACTUAL TO PROJ.
Rt. 619 to Rt. 234	46,400	62,000	93,810	102%
Rt. 234 to Rt. 642	51,600	69,900	98,200	90%
Rt. 642 to Rt. 639	67,000	83,900	107,670	61%
Rt. 123 to Rt. 1	71,000	89,000	110,660	56%

** Prince William County Comprehensive Plan, August, 1982, page 77.*
*** Virginia Department of Transportation*

on I-95 and I-66 totaling 800 spaces.

There were four private commuter bus services operating in Prince William County in 1981. The Plan stated that they originated a total of 39 morning trips to the Pentagon, Rosslyn, and Washington, DC.[18] Bus ridership had declining in 1981 to just over 1,000 riders as a result of fare increases and frequent equipment problems. The Plan referred to a recently completed mass transit study that identified four levels of commuter bus service which were feasible, with Prince William County's financial participation. Without public funding, the Plan predicted, existing providers would eventually cease operations from declining revenues and increasing costs. No selection among the four was recommended in the 1982 Plan.

The Plan indicated that the possibility of commuter rail service had been "...pursued for more than fifteen years."[19] The existence of two active rail lines through the county appeared to make creation of a commuter rail system easy; however, the Plan stressed that technical, institutional, and fiscal issues posed complex problems. The Plan referred to MWCOG's study which confirmed the travel demand feasibility of using the tracks for commuter rail. The Plan stated that even though Prince William County would continue to be interested in the possibility of commuter rail, the financial requirements necessary to establish and operate the system would probably exceed the amounts local governments would be willing to subsidize.

When the 1982 Comprehensive Plan was prepared, over 25,000 county residents were commuting daily to the Washington, DC area. The Plan referenced recent data on commuting mode profiles and commuting relationships to residential choice that were interesting observations from the perspective of land use and transportation planning:

> A recent I-95 HOV lane extension study found that 7 percent of those using I-95 are commuter bus passengers, and 28 percent are passengers in High Occupancy Vehicles. Thus, 65 percent are regular lane users. This study found also that *44 percent of all HOV lane users reported that the existence of these lanes influenced their home location decision* [emphasis added]. The projected population growth of the County, along with this finding, strongly suggest that increased HOV lane usage by County residents can be anticipated.[20]

Ridesharing was the most actively used method of mass transit. The county had obtained a grant to coordinate a vanpool/ridesharing program. Over 100 carpools had been formed through county coordination and were among the 560 carpools counted entering I-95 daily in Prince William County. Two-hundred-eighteen (218) vanpools were carrying over 2,700 commuters daily,

and the county had established a revolving loan fund to help individuals purchase vans for vanpool use.

b) **Prince William County—1992:**

Prince William County has a comprehensive plan update process that functions on a two-year cycle. Needed amendments to the Plan are identified, reviewed at public hearings and adopted by the elected Supervisors to keep the Plan as current as possible. The Comprehensive Plan Update adopted in February, 1991 provided the land use and transportation policies in effect in Prince William County in 1992. The transportation element of the Plan contained maps of proposed transit improvements and a future transit network for the county. The maps identified existing and future commuter bus routes, route improvements, VRE station sites, commuter parking lots, proposed locations for additional parking lots, and a location for a proposed multi-purpose transit center.

There were four VRE commuter rail station sites proposed in Prince William County. They included stations at Quantico, Rippon and Woodbridge on the CSXT line and the Broad Run (Airport) station on the Norfolk-Southern line. The Broad Run station site was the terminus station on the Norfolk-Southern line. It was to be located immediately north of the planned storage yard for that rail line. It would provide the initial station for commuters from western Prince William County, from Fauquier County and points westward. Central and western Prince William County commuters would also have access to proposed VRE station in Manassas and Manassas Park.

The 1991 Comprehensive Plan Update also contained a proposed future site near the intersection of I-66 and Route 29 in the northern portion of the county on a branch rail line running westward from Manassas to Strasburg. This latter station site and its rail line were not among the sites or lines initially proposed and under development as part of the Virginia Railway Express commuter system. The additional stations would support concentrations of office-business and industrial land uses proposed in the future land use plan.

Specific policies and action strategies were adopted within the Plan to guide transportation and land use decision-making. Policies and action strategies relating to transit or commuter rail and land use were:

TR-Policy 1: Improve service levels of all transportation modes throughout the county.

Non-motorized Action Strategies:

N1.2. Plan and promote the development of pedestrian/bike compatible roadway facilities for all new arterial and collector roads.

Transit Action Strategies:

T1.1. Plan for *greater emphasis on transit* [emphasis added] within Concept Areas I, II and III...

T1.2. Plan and ensure that new transit facilities, as reflected in the Proposed Transit Improvements Map...can offer safe and efficient mobility to the elderly and handicapped.

T1.3. *Encourage land developments adjacent to future transit corridors* as reflected by the Future Transit Corridor Network Map...*to develop in a transit compatible manner* [emphasis added].

T1.5. *Emphasize paratransit programs, such as Rideshare and Vanpool, as an alternative form of transportation* [emphasis added].

TR-Policy 2: Promote new methods of increasing the capacity of the existing transportation system in addition to expanding facilities.

Roads Action Strategy:

R2.1. Pursue increased federal and state funding for the completion of permanent HOV facilities on I-95 and to speed up the completion of VDOT's I-66 HOV preliminary engineering plans to the Route 29 interchange.

R2.2. Develop a County Transportation Demand Management Plan reflecting density/intensity credits for transit and flex time in order to reduce peak hour trips.

Transit Action Strategies:

T2.1. Evaluate and market an intra-County bus system consistent with the 'Future Transit Corridor Network Map'...to interconnect residential, employment, retail and recreational areas within Concept Areas I, II and III as reflected by the Long Range Concept Area Map.

T2.2. Pursue the extension of METRORAIL within the I-66 and I-95 corridors.

T2.3. Develop a Long Range Mass Transit Plan consistent with the Long Range Future Land Use Map.

T2.4. Promote an efficiently designed *feeder network to commuter rail stations and other transit centers* [emphasis added].

TR-Policy 3: Minimize the adverse impacts of the transportation system on the County's environmental and cultural resources.

Transit Action Strategies:

T3.1. Continue to promote the utilization of transit vehicles which are designed to reduce impacts on air quality and to reduce noise pollution.

TR-Policy 4: Encourage compatible and appropriate transportation facilities to guide development into areas where public facilities exist and/or to areas where new urban and suburban type of development has been targeted as reflected by the long range future land use plan map.

Transit Action Strategies:

T4.1. *Encourage cluster and higher density development along transit corridors* reflected in the Future Transit Corridor Network Map *when said developments are otherwise consistent* [emphasis added] with the other relevant components of the Comprehensive Plan.

T4.2. *Plan for and develop transit and paratransit related facilities to accommodate and encourage the use of alternatives to the automobile, including commuter rail stations* [emphasis added], the bus terminal facility, commuter parking lots and bus stops.

Non-Motorized Action Strategies:

N4.1. Assure that sidewalks or pedestrian/bike trails are available to all transit facilities.

TR-Policy 5: Encourage planned transportation employment/economic development centers which provide opportunities for public/private partnerships and enhance the functional marketability of adjacent lands for their intended use(s).

Transit Action Strategies:

T5.1. Aggressively plan, market, and implement multi-purpose transit centers which can integrate with private development and improve the marketability of higher density land use centers.

T5.2. Aggressively market and monitor the placement of Rideshare lots in commercial centers.

TR-Policy 6: Explore and promote innovative mechanisms of funding transportation system improvements.

Transit Action Strategies:

T6.1. Establish criteria for acquiring voluntary transit and Rideshare improvements as part of development along the Future Transit Corri-

dor Network Map.[21]

Linkage between land development and traffic generation was emphasized in the Plan's discussion of "Development Evaluation Criteria." Transportation impact analysis studies of proposed large rezoning requests were required. Mitigation measures were urged to reduce traffic impacts identified by the analysis studies. Large site density limits should only be established following site impact and mitigation comparisons and consideration of additional criteria. The following is a summary of the additional criteria that the Prince William County Plan recommended should be used in determining density decisions:

- Location: Is the site within walking distance of employment centers and shopping areas?
- Proximity to transportation facilities: Is the site on or close to routes that can carry the additional traffic loads, now or when budgeted improvements are completed?
- Transportation capacity: Can the transportation system absorb the anticipated traffic? If not, what mitigation measures are proposed to reduce traffic or improve carrying capacity?
- Transportation systems management: Are multiple approaches proposed to help address transportation issues?
- Transit: Is public transit within walking distance of the proposed site? Are public transit facilities being incorporated into the proposed project?
- Non-motorized facilities: Are internal non-motorized facilities included to help reduce internal trips, and do they link to external non-motorized facilities?

Evaluation of projects against these transportation criteria will help the county determine the potential impacts, public cost, required mitigation and specific appropriateness of the proposed rezoning on the county's transportation network.

c) Summary of Prince William County Plans for Commuter Rail: 1984-1992

Comparison of the Prince William County Comprehensive Plans in effect in 1984 and in 1992 showed marked changes from *consideration of transit* to *heavy emphasis on transit alternatives* in addressing travel demand. The former Plan identified a proven linkage between improved transit alternatives (HOV in that case) and housing location decision-making (see quote on page A-12). The latter Plan made the linkage between land use and traffic generation a major consideration in rezoning and large site density limits. The latter Plan also recognized the implications contained in Table A1 that transportation infrastructure, especially for single occupancy vehicle usage, could not keep pace with travel demand in periods of rapid population/commuting growth.

As an illustration of the above, the combined populations of Prince William, Stafford, and Spotsylvania Counties grew by 54 percent between 1980 and 1990. (See Table 17 in report text.) The total daily traffic volume counts on segments of I-95 through those jurisdictions increased an average of 51.1 percent over the same period, while average light vehicle traffic increased by 54 percent. Through-traffic on I-95 was approximately 24 percent of total volume and had increased by 46 percent since 1980. (See Chapter 4.E - 1992 Additional Commuting Details.)

The Prince William County Comprehensive Plan encouraged the linkage between transit (including rail) and land use development. Two existing and one proposed VRE station sites (Rippon, Woodbridge and Cherry Hill, respectively) were within the area directly subject to the Comprehensive Plan. The town of Quantico was within the county and had a VRE station, but the town also had its own comprehensive plan. The VRE stations in the cities of Manassas and Manassas Park would attract county commuters and might induce development in nearby portions of the county. The same policies and transit action strategies for land use and transportation linkages would apply to future transit feeder services or intra-county transit services when these planned commuting alternatives are established in the future.

3. Stafford County

a) Stafford County—1984:

A 1979 update to the 1975 Comprehensive Development Plan was the guiding land use document for Stafford County in 1984. The 1975 Plan, however, contained some interesting comments and projections regarding the possibility of commuter rail in helping address identified highway capacity problems. A brief summary of the 1975 Plan's references to commuting problems and potential alternatives is worth including here.

The 1975 Comprehensive Plan recognized Stafford County's location within commuting distance of major employment centers in Fredericksburg and Northern Virginia. The construction of I-95 through Stafford County in the 1960s made commuting into Northern Virginia possible. With a travel time of less than one hour into the District of Columbia, northern Stafford County was becoming "...an ex-urban part of Northern Virginia."[22] The impact of its location and access were being felt in the increasing provision of housing to serve workers desiring to live in and willing to commute from a more rural location. The county was experiencing the addition of approximately 500 families annually. The percentage of county residents commuting to employment in Fredericksburg had declined by nearly half between 1960 and 1970, from 33.7 percent to 17.7 percent, while the percentage commuting to Northern Vir-

ginia and Washington, DC rose from 34 percent to 40 percent.

Transportation in Stafford County in 1975 was highway oriented. Commuter services were limited to private sector buses operated by Colonial Transit traveling to Springfield, the Pentagon, and to the Dahlgren Naval Weapons Laboratory in King George County. Rail passenger service was available in Fredericksburg on Amtrak which used the CSXT rail lines. The route schedules did not support regular commuter usage.

The 1975 Comprehensive Plan discussed the potential for implementing transit services. It recognized the long lead time required to plan and prepare for commuter systems. The lead time was considered to be longer than the proposed five year horizon for the comprehensive plan. The Plan did recommend that the county continue to explore the possibilities for implementing commuter rail service.

Buses were identified as the most promising alternative for commuter service. Potential commuter bus routes from various points in Stafford County to employment centers in Fredericksburg, Northern Virginia and to a Metro station for access to Washington, DC were identified.

The Plan addressed rail primarily as a benefit for attracting industrial development to the county; however, the following accurate forecast was made:

> Existing rail passenger service for the County's residents, which is available in Fredericksburg, probably cannot be feasibly expanded during the planning period. At some future time commuter stations may become feasible, most likely in the vicinity of a proposed industrial park on Leeland Road.[23]

The following items were included as part of transportation improvements needed to accommodate projected growth and land use development:

> ...Two specific transportation modes which should be further developed in the County are air transportation in the form of a general aviation airport, and commuter transit in the form of bus service and possibly at some future time, rail service.[24]
>
> Mass transportation alternatives must be explored and developed with primary emphasis on bus service.[25]

The 1979 Update to the 1975 Comprehensive Plan was prepared in response to changed conditions which affected previous county plans. Construction of a new wastewater treatment plant was delayed; a new sanitary district was created in the county; a Highway Department transportation plan of road construction priorities for the county was delayed, and the decision to

build a new water supply facility all had the potential for directing development into patterns not consistent with the 1975 Plan.

In 1979, out-of-county commuting was still a primary factor for the work force. The document recognized the large gap that existed between the numbers in the work force and the availability of local jobs. Local efforts at recruiting new industry and commercial activity had kept the gap from growing larger than existed in 1975; however, the Plan recognized that "Due to its location between Fredericksburg and Northern Virginia, it is likely that Stafford County will continue to be an exporter of labor for the foreseeable future."[26]

The transportation section of the 1979 Plan recognized the importance of private commuter buses which served Stafford County. The buses had high ridership levels; the Plan encouraged their continued availability. The Plan recommended providing publicly-owned commuter parking lots to encourage more bus usage. Four specific commuter lot locations were identified for acquisition and development by the county or by VDOT. The Plan also encouraged the county to participate in development of proposed local bus service for the Fredericksburg area. Some of the proposed bus routes would serve the more heavily developed areas of Stafford County immediately north of Fredericksburg.

The major recommendation affecting mass transportation in the 1979 Comprehensive Plan was to urge support and encouragement of bus service for the Fredericksburg area and for commuter usage. The 1979 update did not repeat the 1975 Plan's recommendation to consider commuter rail use of the CSXT lines.

b) Stafford County—1992:

A new comprehensive plan was adopted in 1988. Nine goals were included to guide development in the county. The first goal—"Promote and provide to the fullest, opportunities for commercial and industrial development"—reflected continuing concern about the lack of local employment opportunities. The local job shortage placed an undue burden on residential property taxes to support public services demanded by a growing population seeking a rural lifestyle while commuting to work sites outside the county.

This concern was reflected in the Plan's Goal Eight:

> Provide transportation systems which will meet the needs of the expanding industrial, commercial, and residential areas of the County.[27]

The Plan listed a number of objectives for achieving Goal Eight. Two of the objectives involved rail:

Support and maintain railroad facilities for freight, passenger, and commuter use.

Develop alternative mass transit opportunities.[28]

Active efforts were underway to initiate commuter rail service in the region by 1988. The two objectives reflected a return to the 1975 Plan's recommendation for the county to participate in pursuing use of the CSXT line for commuter rail service. It also supported the county's desire to use rail service as an inducement for local job creation through industrial development requiring multimodal transportation services. Rail service offered a "mass transit" alternative in addition to proposed local and existing commuter bus services.

c) Summary of Stafford County Plans for Commuter Rail: 1984-1992

Stafford County's elected officials recognized its dependence on Northern Virginia and Washington, DC job markets. In its 1975 comprehensive planning process, the county sought to decrease the transportation and fiscal impacts of that dependence. The county's plans and policies encouraged more local job creation through increased business/industrial zoning for economic development. More local jobs would decrease commuting demands. Industrial zones were proposed which offered rail as a shipping alternative to highways.

The 1975 Plan recommended consideration of the rail for commuting purposes. However, since there was no active program to implement commuter rail service at the time, the major recommendation for use of the rail was as an alternative shipping mode to the designated industrial zones.

The county recommended continuance of privately operated express bus services for commuting workers. The county plan identified sites for development into Park & Ride lots to encourage more use of private commuter bus services. The county was also encouraged to take active participation in development of proposed local bus service for the Fredericksburg area. The proposed routes would serve portions of the county immediately north of Fredericksburg.

In 1986, Stafford County became a founding member of the Potomac & Rappahannock Transportation Commission (PRTC). Enabling legislation allowed PRTC to levy a two percent motor fuels tax for funding commuter rail services. PRTC joined with the Northern Virginia Transportation Commission to become co-operators of the commuter rail system which was then in development. Success on establishing commuter rail was achieved with the opening of the Virginia Railway Express through Stafford County in July, 1992.

4. Spotsylvania County

a) Spotsylvania County—1984:

In 1980, the Board of Supervisors of Spotsylvania County adopted Management Strategies: A Plan For Opportunity as the Comprehensive Plan for guiding future development decisions. This document was still the official document for the County in 1984.

Spotsylvania County had a population of 34,435 in 1980. Over the previous decade it had the fastest county growth rate in the Commonwealth. The Plan projected a population increase to 51,400 by the end of 1990. The development concept recommended in the Plan was that 75 percent of projected growth be directed in a "concentrated corridor" pattern which would focus around I-95 and the Route 1 corridors in the northeast portion of the county and around the east-west crossings of the corridor by Routes 3, 208, 17 and the Route 17 Bypass. This concentrated corridor provided the maximum advantage for existing transportation access to local and regional transit. Secondary development would be planned for areas around existing community nodes.

The only references to rail in the 1980 document were not to passenger service but to the potential benefits for locating light- and heavy-intensity industrial uses along the existing CSXT rail line. No references were made in the 1980 Comprehensive Plan to the potential use of the CSXT line for commuter services.

b) Spotsylvania County—1992:

The Spotsylvania County Board of Supervisors adopted a new comprehensive plan in September, 1987. This document remained the official comprehensive plan for the county as of 1992.

Between the 1980 and 1987 Comprehensive Plan adoptions, the county experienced continued rapid growth. Population increased by 25,408 persons (79.4 percent) over the decade of the 1980s. This addition exceeded population projection for 1990 by over 8400 persons, or 16 percent.

The 1987 Comprehensive Plan anticipated further high levels of growth and offered new strategies to accommodate anticipated development. While the rapid pace of development began to slow in 1990 with the effects of recession, the adopted policies remain in effect to guide development as the county comes out of the recession.

The first of Spotsylvania County's community development goals was to achieve balanced development patterns. The first land use objective identified to help attain the goal was:

> Encourage the distribution of intense community development activity in a manner that maximizes the efficiency and cost effectiveness of the transportation system, utility services and community facilities.[29]

The county adopted as its transportation goal:

> To provide an adequate transportation system for the efficient and safe movement of citizens, goods, and services within the county and the region.[30]

One of the five supporting objectives to the transportation goal was:

> To remain an active participant in discussions of regional transportation issues including commuter travel, air service, and regional highway planning.[31]

The Comprehensive Plan contained a discussion on the commuting impacts and needs of many of Spotsylvania County's citizens. The 1980 Census had shown that 22 percent of the county work force was employed in Northern Virginia or Washington, DC. The Plan projected that the number of daily commuters would probably double by the year 2000. Statements were included about the normal one hour mid-day trip to Washington requiring several hours during traditional commuting periods. The Plan indicated that while high occupancy vehicle (HOV) lanes, public bus lines, and Metrorail had been developed to help take commuters out of single occupancy vehicles (SOVs) in Northern Virginia, they would probably never be necessary from Spotsylvania County. Private car- and vanpools and privately operated commuter buses were already in operation from the county, and VDOT's construction of Park & Ride lots (as on Route 3) would prove helpful. The county's comprehensive planning process was identified as an appropriate process for locating additional sites for future Park & Ride facilities.

The 1987 Comprehensive Plan contained the following discussion on the possibility of establishing commuter rail service on the CSXT line:

> Recently, there has been considerable activity promoting the establishment of commuter rail service between Fredericksburg and Washington, DC. Commuter rail is seen as one more alternative to offer commuters in order to remove some vehicles from the highway. One of the major stumbling blocks to the establishment of commuter rail is the significant operating deficit expected in the first years of operation. Localities being served by the rail line are being asked to commit to financing some share of the expected shortfall as well as the necessary capital costs to place the line in service.

> Spotsylvania County, as the other localities, must determine what kind of an investment it is willing to make to promote commuter rail. Future financing of commuter rail should be considered in light of the number of county residents expected to use the service, benefits to other commuters from reduced congestion on Interstate 95, other alternatives for moving commuter traffic and their costs, and the *possible impact of commuter rail on growth patterns* [emphasis added] in Spotsylvania County.[32]

The Plan went on to discuss the important linkage of transportation and growth impacts outside the county boundaries (i.e., regional population and job creation growth) on the county's transportation infrastructure. Regional growth would create similar problems for all affected localities. The county was urged to continue participation in regional discussions on transportation issues, especially through helping fund a transportation planner position within the RADCO Planning District Commission and through discussions on establishing a regional transportation commission to "...act as a forum for discussion and as a mechanism for funding regional transportation projects."[33]

c) Summary of Spotsylvania County Plans for Commuter Rail: 1984-1992

Although it was located in what many Northern Virginians would consider the far periphery of the Washington metropolitan area, Spotsylvania County had been experiencing pressures related to regional growth for well over a decade. Population growth had exceeded projections. Residential development had taken advantage of favorable land prices and the I-95 and Route 1 access corridors to metropolitan employment centers.

Spotsylvania County was well aware of the regional efforts to establish commuter rail service. The terminus station on the CSXT line was planned for a location in the county. The county was concerned, however, by the costs and benefits of participation in the commuter system. The county did not experience the rush hour traffic congestion of localities closer to Washington. Neither did the county think enough of its residents would use the system to justify the financial obligations to the county of VRE system participation.

The Comprehensive Plan did not recommend a position for the county in regard to commuter system participation. It recommended that the county consider the initial investment and long-term financing in relation to system riders in weighing future system participation.

The Plan did discuss the linkage between transportation and growth impacts outside the county on the local infrastructure systems. It acknowledged that continued regional growth would result in continued local

growth and generate common problems for all affected jurisdictions. The Plan recommended that the county help plan for transportation impacts through joint funding of a transportation planner position at RADCO Planning District Commission to address impacts from a combined regional perspective.

5. City of Fredericksburg

a) City of Fredericksburg—1984:

The Comprehensive Plan of 1981 was the official planning document for Fredericksburg in 1984. The Plan addressed projected growth needs for a 10 year period (1980-1990). Commuters from Fredericksburg traveled to both Richmond and Washington employment centers. Occupying an important location in the urbanizing corridor along I-95 and I-64 linking Washington, Richmond, and the Virginia Beach area, the growth of Fredericksburg was linked to the economic growth within that long-term metropolitan growth corridor.

Existing rail service was described in the transportation section of the Plan:

> Passenger service to Fredericksburg is provided by Amtrak, which operates over the RF&P (now CSXT) line. Six trains serve the City daily, but the schedules of these trains are such that they would not meet commuting requirements for most area residents working in Washington or Northern Virginia.[34]

The Plan contained the following discussion of the potential of establishing commuter rail service on the CSXT line. The discussion is worth quoting because it identified a potential land use change linkage between a new commuter alternative and the area around the existing downtown rail station.

> At the time of this writing [June, 1981], a study funded by the Highway Department is being developed by the Metropolitan Washington Council of Governments. It will examine the rail commuter potential between Fredericksburg and Northern Virginia and is scheduled for completion in 1982. While the potential for a commuter train appears to be high, the outlook is not especially good. The Federal Government is proposing to reduce operating subsidies for Amtrak and to reduce the budget of the Urban Mass Transit Administration (UMTA). It is unlikely that a commuter train will be provided in Fredericksburg before 1987.
>
> Should a commuter train become a reality, there will be some significant land use implications. More parking facilities near the train station will be required and commercial facilities for commuters may also be needed. Potential areas for

commuter parking should be evaluated if commuter rail services become likely.[35]

A bus system to serve the Fredericksburg area was seen as a potential benefit to the downtown (and could offer some local commuting alternatives); however, the economic feasibility of establishing such a system was judged remote.

The city adopted the following commuter-related goals and objectives as part of the 1981 Comprehensive Plan:

Goal: Develop a transportation network which enhances existing commercial and other economic resources."[36]

Objectives for achieving the goal included:

Explore the potential for the development of commuter rail and local bus service for the area.

Develop plans for existing transportation facilities which are scheduled for abandonment or termination.

Designate commuter parking within the City.[37]

To help accomplish the referenced goals and objectives, the Plan included specific location recommendations for five commuter parking areas. Development of a bicycle path throughout the city was recommended within the 10 year horizon of the Plan. It also recommended that the city work with RADCO Planning District Commission and the Virginia Department of Highways to develop both local bus service and commuter rail service.

b) City of Fredericksburg—1987:

Amended goals, objectives, and sub-area land use plans were adopted by the city in 1987 in response to enlargement of Fredericksburg through annexation. The annexed area was located to the west of the 1981 city boundary. The Plan amendments provided a Capital Improvements Program and growth management plans for the annexed area. There were no additional plans or references for commuter service programs in the amendments. The 1987 amendments to the 1981 Comprehensive Plan remain the current overall Comprehensive Plan for the city.

c) City of Fredericksburg—1992:

Fredericksburg anticipated impacts on its downtown as a result of having a VRE station at the east end of the central business district. A Special Area Management Plan for a defined area of the downtown around the VRE station was felt necessary to help guide decisions relating to future impacts from the commuter rail service.

The Railroad Station Area Plan was prepared by the Fredericksburg planning office in late 1991. Drafted in anticipation of the Virginia Railway Express startup, growth management plans and strategies were included for meeting potential land use and commuter facility needs that could arise as a result of having a new commuter rail station in the downtown area. The following are major issues addressed in the Railroad Station Area Plan: land use, parking, housing/neighborhood conservation, and historic resources—issues that would potentially be most affected by increased commuter activities and utilization demands.

Fredericksburg had a housing rehabilitation and infill program underway in the station area. The program had successfully rehabilitated residential units and kept them affordable for lower income residents. The city was concerned that improved commuter access would increase housing demand near the station. White collar commuters would displace existing residents in these units as housing values and rents escalated in response to increased demand. The use of grant programs for the rehabilitations, however, allowed the city to control rent increases for rehabilitated and new infill units for 10 years. The city adopted rent control meansures. The Plan proposed expansion of the program to additional units to give the city more control over rent stability and to improve the quality and quantity of downtown housing.

The Railroad Station Area Plan recommended rezoning sections of downtown to strengthen residential redevelopment opportunities. It also recommended rezoning the rail station property itself (whose zoning did not permit retail uses) to allow greater flexibility for commercial and office uses in the station. A buffer strip of properties between the station and the downtown commercial area existed that was zoned "C-T" (commercial-transitional). Established to serve as a buffer between the residential area to the east and the central retail area to the west, the C-T zoning allowed offices, day care centers, restaurants, parking lots, and residential uses (by Special Use Permit).

The Plan recommended rezoning the CSXT station property to C-D (commercial-downtown) to allow for commercial activity in the station itself. The recommendation would still provide a buffer zone between the commercial core and the residential area while allowing commuter-responsive commercial and tourist activities in the station building.

The Plan also recommended that the buffer strip between the station and the central retail area be rezoned to a Railroad Station Overlay District. Recommendations on preservation and use of existing historic structures, on parking lot design, on commercial building re-use, preservation of scenic vistas, archeological investigations before construction, and streetscaping features were included which would create a better transi-

tional zone by allowing for compatible infill as redevelopment eventually occurs.

Recommendations were also included to allow parking structures as special uses in certain districts. This provision may become important when future redevelopment in the Overlay District displaces surface commuter parking.

The city was concerned about adequate commuter parking near the rail station and separation of neighborhood and commercial parking from commuter parking. Six potential sites were identified that could be converted to surface commuter parking. The Railroad Station Area Plan recommended short-term leases by the city of sufficient sites to meet initial commuter parking projections. Relocation of surface commuter parking to parking structures could occur when redevelopment of the parking sites became imminent. Providing commuter spaces in the Overlay District would keep the city from losing commercial spaces needed by downtown shoppers and would keep commuters from parking along residential streets.

Specific recommendations were also included in the Plan to provide the infrastructure (lighting, landscaping, security, parking permit system, bicycle racks, directional signage, handicapped spaces, etc.) needed to address the coming commuter parking and traffic demands in the downtown area.

d) Summary of Fredericksburg Plans Related to Commuter Rail: 1984-1992

Fredericksburg identified the linkage between commuter rail and land use implications in its Comprehensive Plan of 1981. The Plan indicated that the potential for commuter services was not high. Should commuter rail become a reality, however, the Plan indicated that more commercial service and parking facilities would be needed to meet commuter needs. The benefits that commuter rail would provide in addressing residents' ties to the metropolitan job market were recognized in an adopted objective which called for the city to explore development of commuter rail and local bus services.

The land use linkages identified in the 1981 Comprehensive Plan were addressed in detail in the city's 1992 Railroad Station Area Plan. This Plan was prepared especially to address the potential impacts of a downtown commuter rail station on residential property values, commercial services to commuters, parking needs, and contained long-term recommendations for development within a buffer zone linking the rail station with the traditional downtown commercial area.

The Railroad Station Area Plan was the only jurisdictional document to identify a potential for "gentrification" of its downtown residential units. This process could occur as metropolitan area employees recognized the attractiveness of living in historic

Fredericksburg and having convenient commuter rail access to their work places. This process had the potential for creating housing demand which would increase local rents and housing prices, driving out the low- and middle-income residents now occupying the downtown residential units. The Plan contained recommendations for controlling the gentrification process and maintaining affordable rents in some of its downtown residential units.

The 1992 Plan also provided for future commuter parking needs, addressed methods for providing commuters with commercial services at the rail station, and provided for long-term, compatible, in-fill development within a desired buffer zone between the station and existing commercial activities.

6. City of Manassas

a) City of Manassas—1984:

In 1984, the city of Manassas adopted an update to their 1975 Comprehensive Plan. Parts of the original plan were retained. Several new sections were added to address:

> ...a number of other topics and problems have arisen which were not originally seen as problems. For example, problems with such things as...the need for mass transportation alternatives were not seen as high priority concerns in the early 1970s.[38]

The railroad had played a major role in the history of Manassas. The Plan stated that the railroad was the city's "original reason for being." The city's location occurred at the junction of two rail lines. This location was a major factor in the nearby area being the site of the first major Civil War battle and a subsequent battle a year later. The railroad remained the city's prime economic link with the region in the decades after the war.

In the early 1950s, "...workers employed in the metropolitan Washington area began to discover that the Manassas area was a good place to live, with relatively low living costs, and not an intolerable commuting distance." The city's attraction continued into the 1980s, with the number of households increasing by 93 percent between 1970 and 1980.

A 1978 survey had shown that 69 percent of local residents worked in Manassas, Prince William County, Fairfax County, or the city of Fairfax. Only 13 percent worked in Washington and a total of eight percent worked in Alexandria or Arlington County. The only mass transit alternatives available to residents consisted of three privately operated commuter bus systems. The three systems offered eight scheduled buses each morning and nine each evening running to Alexandria, Arlington County, the Pentagon or Washington, DC. The major mass tran-

sit need was for local and suburb-to-suburb transportation, and Manassas to central Washington addressed only a small percentage of commuting needs.

Amtrak had two scheduled trains from Manassas which had the potential for commuter services; however, because of unreliability in meeting the schedules and the high one way fare ($4.05), few people used Amtrak for commuting purposes.

A background paper on mass transportation prepared in 1980 for development of comprehensive plan policies stated:

> With a large amount of undeveloped land in the City, it is projected that the City will continue to grow throughout the 1980s. Because job opportunities within the immediate vicinity of the City will not grow as rapidly as residential units, future City residents will continue to have to commute to employment in other jurisdictions. Therefore, there will continue to be a need for mass transportation opportunities for the citizens of Manassas, particularly in view of the fact that few if any major new highways are currently being planned.[39]

Concern about future commuting requirements led the city to adopt long range goals and policies to address transportation and maintenance of the central business district as key planning elements. The policy was adopted regarding the historic commercial center of the city.

> Central Business District Policy: "It is the policy of the City of Manassas that an economically healthy and strong Central Business District be encouraged to contain offices, motor hotels, shops and civic, cultural, and social institutions."[40]

New suburban shopping centers had begun to drain the economic vitality from the city's historic commercial center. It was decided to maintain this center, lying parallel to the Southern Railway, and to expand it to the south side of the railroad tracks with the addition of offices and apartments. The Amtrak terminal would be the link between the new activities planned for south of the tracks and the existing central core on the north.

The city's adopted policies regarding the railroad and its potential for commuter service were especially interesting. The automobile was the major transportation mode at the time. The Virginia Department of Transportation had major responsibilities for upgrading and maintaining the highway network in and around the city. With this in mind, the Plan contained the following:

> Likewise, the railroad and rapid transit are transportation elements over which the town can ex-

ert only minimal influence...it [Manassas] can and must work toward the accomplishment of a [transportation] plan that is designed to take into consideration the external forces that are part of the total transportation goals of the City, and the program objectives spell out those actions which the City will take to achieve those goals.[41]

Railroad Policy: "It is the policy of the City of Manassas that it will work with the railroad to maximize the benefits to be gained from its presence in the City while seeking to ameliorate those adverse impacts such as noise, dust, vibration and unsightliness that derive from its passage through the City."[42]

Mass Transit Policy: "It is the policy of the City of Manassas that mass transit service on the Southern Railway tracks is desirable, should be encouraged, and *plans for the future of the City based on it* (emphasis added). In addition, other forms of mass transportation should be examined and encouraged."[43]

While rapid mass transit service to Manassas may be many years away, its likelihood should not be ignored. A transit terminal in the center of the Manassas business district will serve to reinforce the area-center role of the city business district and generate new economic dynamics that will enable the south side of the railroad tracks to redevelop into a new business, employment, and residential core. Of course, parking, loading, and unloading ramps, and pedestrian circulation around a transit station must be well designed and provided for, but the effect of transit service both to and from the center of town will be to greatly expand the opportunities for activities in the Manassas center and should therefore be supported and promoted.[44]

Some related five year program objectives were adopted to support the mass transit policies:

> It is intended that the City will monitor the progress of the transit system [Metrorail], observe its needs and impacts in nearby jurisdictions, and work to have the service extend to Manassas as soon as possible.
>
> It is intended that the City adopt a detained design plan for the Manassas downtown which will include an anticipation of rapid transit on the area.[45]
>
> Other forms of Mass Transportation should be studied in order that Manassas residents will not have to be solely reliant on the automobile for their work trips and other transportation needs.

> Monitor the feasibility of establishing some type of commuter service between Manassas and the termination of rapid rail service in the inner suburbs.[46]

The 1982 update of the Comprehensive Plan contained a transportation plan element; however, the element focused solely on highway needs and contained no mention of rail or other mass transit alternatives.

b) City of Manassas—1992:

The Comprehensive Plan for The City of Manassas, adopted in February, 1989, was the official Comprehensive Plan in 1992. The "Mass Transit" section of the plan identified Manassas as a member of the Potomac and Rappahannock Transportation Commission (PRTC). The purpose of the PRTC, as stated, was principally the development of mass transit programs to serve its constituent member localities.

The Plan identified the development of a commuter rail system as the primary activity of PRTC at the time the comprehensive plan was prepared. Initial plans for the commuter rail system were to have two stations within the boundaries of Manassas.

The city was then investigating the financial feasibility of local bus service for Manassas and Manassas Park. (The study found that a local bus service would not be economically viable at that time.) The city was, however, entering into participation in the Prince William County CommuteRide Bus Program. The significant amount of commuting from Manassas to work locations in other Northern Virginia and Washington, DC locations was indicated by the city's creation of a commuter Park & Ride lot for use by the CommuteRide Bus service, carpools, and van pools. The Comprehensive Plan suggested that additional park and ride facilities might be needed in the future.

The mass transit recommendations of the transportation plan element were:

> The City, as a member of the Potomac and Rappahannock Transportation District, has an opportunity to establish several transportation options to single vehicle travel. The City should, through this Commission, develop a program for mass transit, including commuter and local bussing, commuter rail, van- and car-pool information exchange. At the same time, the necessary supporting facilities should be developed.[47]

The Mass Transit policies recommended were:

> Establish a program for local bus service, commuter bus participation including parking and sheltered stops along with development of the proposed Commuter Rail program.

> Implement the planned Commuter Rail project.[48]

c) Manassas Downtown Plan—1992:

The Future of Old Town Manassas - A Strategic Plan was completed in early 1992. The special area management plan was the latest in an on-going series of studies, plans, and actions intended to help in the long-term physical and economic revitalization of the traditional business district of the city. The Plan was intended to:

- create a vision for the central business district, known as "Old Town";
- identify critical issues, including the impact of commuter rail;
- assign responsibilities for addressing the identified issues; and
- obtain the involvement of all affected parties in the identification of issues, programs, and responsibilities for resolving the issues.

Of particular interest were the commuter rail issues, opportunities, and impacts that the Plan identified. The existing train station was seen as a potential multimodal transportation center to service VRE commuter rail, Amtrak, and bus service. The station also had the potential to serve as a catalyst for new traffic and development in the downtown area. This potential was translated into a goal with implementation strategies. The goal was stated as:

> Acknowledge the importance of the historic railroad station as the center of Old Town Manassas and rehabilitate the station to better serve the public as an open train station and visitor/tourism center.[49]

Two strategies were identified that would help realize the stated goal:

- Complete a feasibility study to rehabilitate the train station as a visitor and tourism center with office and display space, as well as amenities such as public restrooms and a waiting room for train passengers.

- Apply for any and all grants possible to ensure that rehabilitation of the train station can move forward despite the lack of municipal funds for capital projects.[50]

Historic Manassas, Inc. was assigned responsibility for preparation of a feasibility study of rehabilitating the old train station into a multi-use center for commuter rail and Amtrak passengers and to serve as the Manassas Visitors Center. Initial projections were for 400 commuters to depart and return to the station daily. (As of September 22, 1992, a little over one month after start of Manassas line operations, over 547 daily departures

and arrivals were using the Manassas station - 27 percent of the Manassas line's ridership. That number is expected to increase as more people make the switch to commuter rail service.)

Commuter service was also anticipated to create some problems for Old Town Manassas. Some lots were being lost to reserved station parking that had previously provided employee and customer parking. This loss of 70 spaces would contribute to increased downtown parking shortages and competition between employees and visitor/shoppers. The city was attempting to develop a permit parking lot for employee parking that would free curbside parking for visitors and shoppers.

Creation of the commuter parking lots and other street improvements around the rail station would provide better sidewalk and visual access between the downtown, the rail station/future visitors center and the Manassas Museum. The new linkage would provide more opportunities for pedestrian traffic into the center of Old Town. The rail station was seen as having the potential of becoming a focal point for new development and redevelopment in the downtown.

The Downtown Plan recommended that nearby commercial facilities emphasize their convenience to the station by creating attractive rear entrances and features to attract commuters to shop and eat in Manassas. Downtown shops were encouraged to adjust operating hours to accommodate commuter shopping and dining needs before and/or after their commutes.

d) Summary of Manassas Plans for Commuter Rail: 1984-1992

Two rail-related activities were underway when Manassas updated its Comprehensive Plan in 1982. The Metrorail was providing rapid transit to the inner suburbs of Northern Virginia, and discussions and studies of the feasibility of commuter service on the Southern Railway line were again underway. With these two activities in mind, the Plan contained strong recommendations that Manassas orient its downtown business core planning around the fact of commuter rail service operating from the Southern/Amtrak station at some time in the future. This service was seen as providing a major cause for expanded activity in the central business district. It could also lead to expansion of the district south of the railroad tracks with new office and apartment development.

The policies contained in the Plan were specific in calling for the city to monitor the impacts of Metrorail and work for its extension toward Manassas, adopt a design plan for the downtown that anticipated rail transit, and establishment of some type of commuter service linking the city with Metrorail in Fairfax County, Alexandria and Arlington County.

By 1992, Manassas had a VRE station within its limits. The station in Old Town was again identified as a potential asset for stimulating commercial activity and development. A key element of achieving that potential would involve rehabilitation of the historic station into a multi-modal transit and tourist information center. The Downtown Plan included a number of recommendations for action, with responsibilities assigned to various local organizations or city government, to help downtown businesses add commuters and visitors to their customer base. The Plan foresaw use of VRE capital projects (new parking lots, new sidewalks, use of the existing station platform) as elements to help create a new focus for downtown activity that would "spill over" as increased commercial activity for all downtown businesses. (This directly reflected the 1982 Plan's recommendations.) The Plan recommended redevelopment of the station building into an attractive multi-modal transit and tourist information center that would further increase the activity generated by VRE and Amtrak rail activity.

7. City of Manassas Park

a) City of Manassas Park—1984:

Manassas Park was incorporated as a city in 1975, and its first comprehensive plan was adopted in 1984. Although the Southern Railway line ran through the eastern portion of the city, it played no role in the city's economic development or transportation system. There were no railway stations nor industrial sidings in the city in 1984. The Comprehensive Plan contained no references to the potential use of rail for commuter services.

b) City of Manassas Park—1992:

The 1984 Comprehensive Plan was amended in 1990. The amendments were in response to a recently completed annexation. The annexation extended the eastern boundary of the city and was located within close proximity to the proposed commuter rail station site on the Southern Railway line. The Plan amendments included the following objectives and references to commuter rail service:

> Objective #3: To create a development focal point for community activities and city identity.[51]
>
> Strategy: Develop a city center area adjacent to the proposed commuter rail station utilizing a planned unit district concept incorporating a mix of commercial retail/office and residential uses.[52]

The city owned a 24-acre site which would contain the VRE commuter rail station and parking lot. The site lay between industrial uses and the City Hall to the west and the recently annexed and undeveloped industrially, commercially, and residentially zoned land to the east.

The site itself and the land to the east were the only remaining large undeveloped tracts in the city. The city proposed to create a central focus element, a town center, adjacent to the VRE station. The site would unite the developed western portion of the city with the "to be developed" eastern section at the commuter rail location. The town center concept expressed in the amendments was to create "...civic/government, commercial retail and office, residential, commuter related, recreational and programmed community/festival type events."[53] Accomplishment of the objectives, however, will depend upon creative site design to overcome some difficult site slope and floodplain constraints.

The transportation section of the 1990 Plan amendments also contained a statement that the proposed commuter rail station would provide a mass transit alternative for local commuters and for general purpose travel within the Washington region.

c) Summary of Manassas Park Plans Related to Commuter Rail: 1984-1992

Manassas Park did not foresee any commuter services benefits from the rail line in the city in 1984. However, by 1990 when amendments were made to the Comprehensive Plan, the commuter rail system was in development. A station was planned for Manassas Park, and commitments had been obtained for development of the station and parking facilities for the city as a proffer by the proposed developers of the recently annexed area near the station site.

The new land annexation and the proposed station provided an opportunity for the city to develop something it did not have—a town center. The location of the station would be within walking distance of the proposed residential and industrial tracts to the east and would provide a linking element to the built-out portions of the city to the west. The station would attract commuters through the city and provide local residents an alternative means of commuting. The activity created by the VRE station could be enhanced by development of adjacent retail and service businesses.

Manassas Park, of all the VRE station sites, has all the necessary elements in place to experience significant land use changes. The recently annexed and undeveloped land is being provided with utilities and streets by the city. It has been zoned for industrial and residential uses. It is within easy walking and biking distance of the VRE station, and it will be surrounded on three sides by low density recreational and residential portions of Prince William County. Following the pace of development of the annexed land will provide an excellent opportunity to examine the influence of VRE proximity on residential and industrial development in a period of overall building recession.

8. Town of Quantico

a) Town of Quantico—1984:

Quantico is the smallest governmental entity within the VRE commuter rail service region in terms of both acreage and population. The town, containing slightly over 40 acres and a 1990 census population of 670, is surrounded by the Quantico Marine Corps Military Reservation on three sides and the Potomac river on the fourth side. The CSXT right-of-way forms the western boundary of the town.

Quantico adopted its Comprehensive Plan in 1981. The Plan contained these statements regarding use of the CSXT line for commuting purposes:

> According to a representative of VDHT (Virginia Department of Highways and Transportation), the State has no plans to develop a commuter rail service on the RF&P [now CSXT] tracks from Washington, DC to Fredericksburg. Prince William County explored the possibility sometime in the past, but found that the service would be too expensive.[54]
>
> Commuter rail service to Washington, DC is not likely in the near future.[55]

In 1981, Amtrak had six trains providing Monday through Saturday passenger service to the town and the military base and one passenger train providing Sunday and holiday service. The arrival and departure schedule did not make commuting to the Washington area by Amtrak feasible.

The Quantico Comprehensive Plan's transportation goal was: "To provide a transportation system for the safe and convenient movement of people and goods."[56] Development of commuter rail service to Washington, DC as a means of improving available public transportation, was a policy specified within the Plan. No specific details on how the town was to help achieve this policy were described.

b) The Town of Quantico—1992:

The Comprehensive Plan adopted in 1981 was still the official planning document for the Town of Quantico in 1992. No further amendments to it had been adopted.

c) Summary of Quantico Plans for Commuter Rail: 1984-1992

Quantico had limited Amtrak passenger service in 1981. It did not, however, foresee the reality of commuter rail service in the near future when it adopted its Comprehensive Plan in that year. Prince William County would be the local lead jurisdiction should commuter rail be developed. An earlier study by the county had indi-

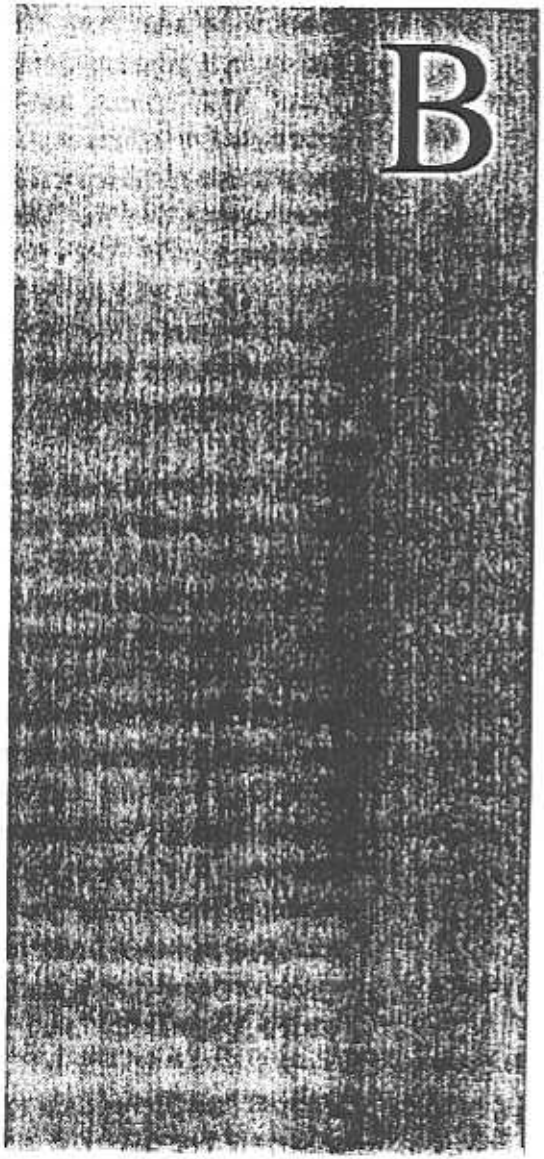
cated that commuter rail would be too expensive to develop without financial assistance. In 1981, financial assistance for commuter rail from the federal and state governments did not appear forthcoming.

The town was interested in the improvement of transportation options for its people and their goods. The town's plan stated that development of commuter rail service would help improve public transit alternatives for its citizens. No specific policies or actions, however, were identified by which the town could work toward achievement of commuter rail as part of its transportation improvement goal.

1 Office of Comprehensive Planning, The Comprehensive Plan for Fairfax County, 1984, page 19.
2 Ibid, page 19.
3 Ibid, page 355.
4 Ibid, page 430.
5 Ibid, page 439
6 Office of Comprehensive Planning, Policy Plan: The Countywide Policy Element of the Comprehensive Plan for Fairfax County, Virginia, 1990, page 52.
7 Ibid, page 52.
8 Ibid, page 56
9 Ibid, page 56
10 Ibid, page 57.
11 Ibid, page 59.
12 Ibid, page 60.
13 Ibid, page 62.
14 Ibid, page 63
15 Ibid, page 64
16 Prince William County Planning Office, Prince William County Comprehensive Plan, A Guide for Land Use Management; adopted August 3, 1982, amended March 5, 1985; page 72.
17 From interviews by O. Davis Brown, III, with Mr. Robert Lynch, VP/General Manager in 1984 for Washington Motor Coach Company, and Mr. Dave Dell, previously with Colonial Transit.
18 Prince William County Planning Office, Prince William County Comprehensive Plan, A Guide for Land Use Management; adopted August 3, 1982, amended March 5, 1985; page 106.
19 Ibid, page 107.
20 Ibid, page 109.
21 Ibid, pages TRP18-22.
22 Stafford County Planning Commission, County Planning Office, and Baldwin and Gregg, Ltd., Stafford County Comprehensive Development Plan, 1975, page 22.
23 Ibid, page 61.
24 Ibid, page 104.
25 Ibid, page 108.
26 Stafford County Planning Commission, Stafford County Comprehensive Plan Update, 1979, page 13.
27 Department of Planning and Community Development, Stafford County, Virginia Land Use Plan, 1988, page 5.
28 Ibid, page 10.
29 Ibid, page 10.
30 Spotsylvania County Comprehensive Plan, September, 1987, page 19.
31 Ibid, page 44.
32 Ibid, page 44.
33 Ibid, page 50.
34 Ibid, page 51.
35 Fredericksburg, Virginia Comprehensive Plan, 1981, page 69.
36 Ibid, page 70.
37 Ibid, page 87.
38 Ibid, page 87.
39 Department of Planning, A Guide for the Future, The Comprehensive Plan for the City of Manassas, 1975 and 1982, page 8.
40 Ibid, page 3.
41 Manassas Department of Planning, Background Paper on Mass Transportation, August 20, 1980, page 2.
42 Department of Planning, A Guide for the Future, The Comprehensive Plan for the City of Manassas, 1975 and 1982, page 13.
43 Ibid, page 20.
44 Ibid, page 21.
45 Ibid, pages 22-23.

[46] Ibid, page 22.
[47] Ibid, page 22.
[48] Ibid, page 23.
[49] Comprehensive Plan for The City of Manassas, 1989, page 9-7.
[50] Ibid, page 10-10.
[51] City of Manassas Park, Amendments to the Comprehensive Plan, 1990, page 3.
[52] Ibid, page 3.
[53] Ibid, page 8.
[54] Quantico Planning Commission and the Virginia Department of Housing and Community Development, Comprehensive Plan, Town of Quantico, Virginia, 1981, page 20.
[55] Ibid, page 21.
[56] Ibid, page 52.

SUMMARY OF SURVEY RESPONSES BY SECTOR



Additional questions relevant to each sector on potential VRE impacts and observations were included with the six core questions distributed to sector survey participants. The additional questions were tailored to solicit information from each sector's particular knowledge or activities on which the VRE could have an influence. The following presents a summary of survey results which differ from or expand upon the survey results on the six core questions discussed in Chapter 10.

1) Local Elected Officials

Surveys were sent to 57 local elected officials from electoral districts in the VRE study jurisdictions. There were 21 survey responses, or a 37 percent return rate. Responses to Question 1 on definitions of "Near" to VRE followed the overall response definitions. More responses selecting five miles or greater came from Prince William, Stafford and Spotsylvania County officials. While it could be expected that the more rural counties would perceive "Near" as encompassing a larger travel distance, one Fairfax County elected also felt that up to 15 miles qualified as "Near."

Twelve of 19 respondents defined "<15 minutes" as "Near" in driving time. The remaining seven indicated "15-29 minutes" as "Near." Locational differences were noted, with all those selecting the latter travel time definition being located outside Fairfax County.

Elected officials from Manassas and Stafford County had noted increased activity or interest in properties "near" VRE access, and they attributed the increased interest to the influence of VRE access. Responses from the electeds of other localities were varied, with the majority saying "No" or "Don't Know" in response to the question.

Eighty percent of the electeds responding indicated that shuttle or feeder service would increase property interest near VRE stations.

Responses from the elected officials were almost evenly divided between those who felt that developer interest in properties near VRE stations would be "Moderate" or "Minimal" and those who felt it would be "Significant." Responses from the Fairfax County electeds were evenly divided between the four choices. Responses were divided evenly between "Significant" or "Minimal" among responses from the Prince William County electeds. Stafford and Fredericksburg officials' responses strongly favored the "Significant" choice, while Manassas and Spotsylvania electeds divided evenly between "Significant" and "Moderate" choices. It appears that electeds from the jurisdictions with the most vacant or developable land in their station nodes tended toward "Significant" and "Moderate" choices.

Stafford and Spotsylvania County electeds responding answered that they had not planned for or considered future development around their stations. (This was understandable for Spotsylvania County since they choose not to have a station built in their County or to participate in the VRE system.) Thirteen of the 21 electeds responding said they *had* encouraged growth in their plans; the remainder of respondents said they did not encourage growth or did not know whether it was encouraged or discouraged in their plans.

When asked to select the types of land uses they thought *their communities* would like to see around VRE stations, the elected responding overwhelmingly selected "More Office/Employment," "Mixed Uses" and "More Retail." These choices related to more economic development, more local employment and increased tax producing land uses. Only four of 66 choices (they could indicate top five choices) wanted land uses to "Stay the Same," and only one wanted "Lower Density."

2) Local Planning Commissioners

Responses from the Planning Commissioner sector reflected the answers received from the local Elected Officials, although slightly more positive toward perceived VRE influences. In answer to whether their localities were considering starting feeder transit to VRE stations, the answers were equally divided. Commissioners from PRTC member jurisdictions reflected knowledge of the planning that PRTC has underway to institute this type of feeder service.

After the question on ranking the five land uses they would most like to see around VRE stations, a question was asked if they felt their local elected officials would work with the private sector to incorporate these selected uses into local plans and zoning regulations. Sixty-six percent answered "Yes," while 33 percent answered "Don't Know." Fourteen percent of Planning Commissioners felt that expanded VRE service would increase private sector interest in properties near VRE stations.

3) Chief Planning and Zoning Staff Personnel

This sector generally reflected the answer distribution of the elected officials and Planning Commissioners. Sixty percent had seen increased activity around VRE stations, but 40 percent had not. The majority (60 percent) *did not* attribute this increased activity to VRE influence. The planning and zoning staff responses differed from the elected and Planning Commissioners on types of land uses they would like to see around VRE stations. The planners' top choices were: "Mixed Uses," "Higher Density" and "More Multi-family," then came "More Office/Employment." These choices reflected more residential development versus strictly economic development choices. The choices may also have reflected the staffs' opinions on what community residents would most readily accept in their neighborhoods. Changing existing patterns faces much difficulty when the community perceives the uses as "incompatible" with current uses or densities. The staffs unanimously indicated that they felt the electeds would work with the private sector to rezone or plan for the uses they (the Planning and Zoning staff respondents) thought were most appropriate for VRE station areas. The majority of staff responses indicated that developer interest was "Moderate" near station sites.

4) Economic Development Office Officials

Surveys were sent to five local Economic Development offices. Responses were received from four. The officials were asked to consider the survey questions in light of economic development issues. Three respondents had noticed increased interest or activity in properties around VRE stations. One respondent thought there was "Significant" development sector interest; two said "Moderate," and one said "Minimal" interest in properties near stations.

Economic Development officials wanted the same land uses around stations as expressed by the electeds, except that "More Flex-Industrial" tied with "More Retail" as second choice behind the top choices—"Mixed Use" and "More Office/Employment."

The Economic Development survey contained this added question:

> *Since 1984, has your jurisdiction prepared any economic development plans, rezoned proper-*

ties, developed or completed any projects, or actively solicited new business to sites which are accessible to a VRE station?

Three said "Yes;" one said "No." When asked the number of such projects, one positive response was received for each of the following choices: "1-5," "11-15" and "26-30." When asked to indicate the distance of these projects from VRE stations, 16 were less than two miles from a station, and 20 were between 5-10 miles. The respondents were unanimous in their beliefs that increased frequency of VRE service would increase economic development-related interest in properties with convenient VRE access.

5) Chambers of Commerce Officials

Only one survey response was received from the five sent. The respondent noted increased interest in properties near VRE stations. The increased interest was not attributed to VRE-related influences. The respondent's definition of "near" was "16-20" miles from a station, and within "15-20 minutes" in driving time, not necessarily compatible answers in a suburban setting. Shuttle or feeder services to VRE stations was perceived by the respondent as increasing property interest in proximity to VRE stations. The respondent felt that interest from the development sector was "Moderate" in properties with VRE proximity versus those without reasonable proximity.

The one responding Chamber of Commerce official said the local government had actively planned or consider future development that might be influenced by the VRE. The respondent felt the planning neither "encouraged" nor "discouraged" growth in their station areas. The respondent provided the most "conservative" choices in identifying the five choices he/she would recommend for station area land uses. The choices were: "Stay the same," "Lower density," "Mixed uses," "More single family" and "More townhouses." None of these choices reflected what could be considered the more economic development-oriented choices which produced jobs or major tax base additions. The respondent indicated that his/her community had been involved in one economic development-related project on a site accessible to VRE.

6) Real Estate Appraisers/Assessors

There were 11 surveys returned from 99 sent to appraisers/assessors with Zip Code addresses within the VRE study area. While this sector would not be expected to have the same access to information or observations on certain questions asked about development sector activity or interest, the study was interested in obtaining perceptions of VRE influence on real estate value change.

Five of the 11 had noted increased interest in properties around VRE stations. Only four respondents attributed this increased interest to VRE influence.

While seven out of 11 respondents believed that shuttle or feeder service would increase interest in station area properties, only one response felt it would increase interest over the current levels already being exhibited.

No appraiser felt that there was "Significant" development sector interest in VRE area properties as compared to those without convenient VRE access. Six respondents thought development sector interest was "Moderate" in comparison.

Responses from the few appraisers returning the surveys indicated higher agreement on the narrowest definitions for "Near" a VRE station, i.e., "< 2 miles" and "< 15 minutes" driving time. These responses may indicate a far smaller "sphere of economic value enhancement" for residential properties as seen by appraisers than as perceived or marketed by real estate agents.

Some real estate value questions were added to this sector survey that were not included in the other sector surveys. Within allowed professional limits of response, those surveyed were asked if they had noticed any increase in sales or asking prices of residential units near the VRE in comparison to those not near VRE. Only one respondent answered positively; four indicated no notice of increased prices, and seven did not know if comparative residential unit prices had increased since VRE started.

A follow-up question to that on price increases was to identify the range of any noted sales/asking price changes for residential units. Only four choose to answer this question. Three noted sales/asking price increases in the "0-4%" range, and one noted an "8-10%" increase. The same question was asked in response to noted price range increases for finished lots or raw land. Again, three noted increases in land prices in the "0-4%" range and one noted a "5-7%" increase. Eight appraiser respondents chose not to answer the above two questions.

Comparing the preceding questions, it would appear that what price increases that had been noted by appraisers were not attributable to greater demand generated by VRE access. The increases appeared to be based on other, unrelated factors.

When asked if they expected property values to increase faster near VRE stations than away from them, seven of the 11 responded affirmatively.

The following three questions were then asked:

Would you expect an identical rate of increase for:

- *Single family and townhouse projects?*
- *Rental units vs. owned residential properties?*
- *Commercial and industrial properties?*

The purpose of the three comparisons listed above was to determine if real estate value changes near a VRE

station would be uniform in application, or would they be selective, based on certain uses generating higher demand, and thus higher sales prices and value changes.

In response to "Single family and townhouse projects," seven of 11 answered "Yes," rates of increase would be equal. Three said "No." The percentages changed slightly for "Rental units vs. owned residential properties." Five answered in the affirmative, while four of 11 indicated "No." The answers completely switched for "Commercial and industrial properties." Eight of 11 answered in the negative, and two answered affirmatively. It would appear that employment uses will change value at differing rates, but that residential uses will probably change uniformly, with the possible exception being between owned and rental residential properties, on which professional opinions were nearly evenly divided.

7) Realtors and Real Estate Agents

Real estate sector was presumed to be able to identify value changes early, notice interest in VRE access expressed by potential buyers, know if developers and builders were attempting to build for a commuter market, and similar study-related issues. Because real estate agents tend to concentrate on markets in relatively confined geographical areas, more surveys were sent to this sector to enable a broader cross-section of the VRE study area to be included in survey responses. Responses were tabulated by separate east and west survey areas for Fairfax and Prince William Counties to determine if any perception differences existed between the eastern I-95/Fredericksburg line corridor and the western I-66/Manassas line corridor.

A total of 804 surveys were sent to agents in this sector; 82 were returned—an overall response rate of 10 percent. Return percentages increased the farther south they were sent: Fairfax County - seven percent, Prince William County - 14 percent, and Fredericksburg area - 50 percent.

The interpretation of what is considered "near" to a VRE station by the real estate agents in the various survey areas was of interest to this survey. The majority defined "near" *in distance* as fewer than five miles from a station, but this interpretation varied greatly depending upon the area surveyed. Of all the respondents, 29 stated "near" as "0- 2 miles," 31 stated "2-5 miles," 17 identified "5-10 miles," four selected "11-15 miles," and one felt "16-20 miles" was "near."

The survey could identify differences based on location of real estate offices (urban vs. rural). As expected, agents closer to the I-495 Beltway had a stricter interpretation of "near." In Fairfax County, 19 respondents felt that "near" should be defined as less than two miles, with 12 feeling that "near" could be defined as up to five miles from a VRE station. Two respondents in west-

ern Fairfax felt that "near" could be a greater distances. Review of responses by survey division within Fairfax County was interesting on this question. In western Fairfax County, 14 agents selected "<2 miles," while only five in the eastern survey division made this selection. The differences could probably be accounted for by the fact that the three operating VRE stations in Fairfax County were located in the western survey division. Two proposed VRE stations on the CSXT line in Fairfax County will open at future dates. Therefore, agents marketing VRE to clients in the eastern division know their clients will have to travel to Woodbridge in Prince William County or to Alexandria to use VRE. It is likely that after the two CSXT line stations open, the definition of "near" in the eastern division will constrict in response to actual shortened travel distances to stations.

In both survey divisions of Prince William County the numbers reflected a somewhat more liberal interpretation of "near." Fifty percent of agents in the eastern division choose distances less than five miles; 42 percent listed "5-10 miles" as their choice, and eight percent selected distances greater. In the western survey division, 33 percent selected "5-10 miles," while 67 percent chose lesser distances. There were no selections farther than 10 miles. Both survey divisions in Prince William County contain three VRE stations. The station sites in the eastern division are located at the extreme eastern portion of the survey division (east of I-95), while the majority of the residential development is west of I-95, so travel distances can be longer. The stations on the Manassas line are centered in relation to surrounding residential areas, so travel distances tend to be shorter for most persons looking for new home locations.

Eleven of 20 agents in the Fredericksburg region felt that "near" should be defined as between "2-5 miles." The other responses were fairly evenly divided between "< 2 miles," "5-10 miles," and "11-15 miles."

The interpretation of "near" *in time* to a VRE station was somewhat more uniform for real estate agents throughout all the study area. Among respondents, 69 percent answered that less than 15 minutes from a station was "near." The remainder felt that between 16-29 minutes could be considered "near."

Eighty-five percent of the 82 respondents stated that they had seen increased interest in properties near the VRE. Only 10 percent answered "No," and remaining five percent selected "Don't Know." In the Fredericksburg area, all real estate agents responding answered in the affirmative. The greater interest observed by Fredericksburg area real estate agents could be an indication of greater commuter interest, since the area is farther from Washington than is Manassas. It may also reflect persons seeking the greater housing values in Stafford and Spotsylvania Counties who want

to couple suburban living with commuter rail access to the job markets in Washington and Northern Virginia.

When asked if the increased interest in properties near VRE was attributable to the VRE, the majority of real estate agents answered in the affirmative, but not in as great of numbers. Fifty of 82 answered "Yes," 16 answered "No," and 16 answered "Don't Know." Distribution throughout the survey areas was consistent and did not appear to indicate any regional differences.

Most of the real estate agents responding felt that provision of shuttle service to VRE stations would increase property interest in areas near the VRE. Only three did not feel this would be the case.

When asked to compare interest in properties "near" VRE stations versus those "not near" (using their own interpretation of near), 49 percent of the 82 felt there was "Moderate" interest. About equal numbers felt there was "Significant" interest and "Minimal" interest. Six percent answered "Don't Know," The majority of respondents felt that expanded VRE service would increase interest in properties near VRE. Forty-six agents answered "Yes;" 12 answered "No," and 23 answered "Don't Know." Distribution was evenly spread throughout the survey areas.

Comments offered by the respondents showed that more than four trains in and four out were needed for the service to be more convenient. They felt that the early hours and the number of trips were limiting for commuters who might not have a set schedule. One agent in eastern Prince William County stated that one of her customers had "stopped using the train because it was not convenient." Another agent in the same area stated that four trains per day created a "commuter cult," and that you need 20-40 trips per day to truly create a transportation system. Others felt there needed to be additional services—such as weekend trains and trains to the Baltimore Orioles baseball games. No agent stated that there was need for two-way service during the day. This was a particularly interesting response coming from real estate agents. Expanded one-way service would still be primarily a commuter service and would not foster economic development, with its associated increased housing demand. It was interesting that this relationship was not considered important by the real estate agent respondents.

The real estate agents' survey contained several questions regarding interest in VRE access which they might have noted from potential home purchasers. The following summaries address responses to those questions.

Thirty-four of the 82 responding real estate agents felt that less than 20 percent of their potential clients had expressed an interest in locating near VRE. An almost equal number, 33, felt that between "20-40%" of their potential clients had expressed an interest. Thirteen

agents stated that between "40-60%" of their potential buyers/renters had indicated an interest in being near the VRE, and six agents said that "60-80%" had expressed an interest to them. These numbers would appear to show that the VRE is having a strong influence on residential location decisions.

When asked what interest in locating near VRE was expressed by actual buyers—a "closed" sale—67 percent of the 82 respondents stated that "<20%" of actual buyers expressed an interest in VRE. Eighteen percent answered that "20-40%" of closed sale buyers had expressed an interest; eight percent indicated "40-60%," and six percent selected "60-80%" as having shown an interest in being near a VRE station. One agent (of 84) said that "80-100%" of his/her buyers were interested in VRE access. The percentages changed when comparing interest by actual purchasers versus potential purchasers. The percentages of purchasers indicating an interest in VRE in relation to their decisions was lower than it was among potential purchasers. The results do show that interest in the VRE is carrying over to actual residential purchase decisions. It would appear from the agents' estimates that a relatively large percentage of purchasers do want access to commuter rail service.

Another set of questions asked about observed sales/rental price increases near VRE stations compared to properties away from stations. A large majority of the 82 respondents, 67 percent, responded that they *had not* seen an increase in sales prices for properties near the VRE compared to those not near the VRE. Twenty percent said they *had* seen increased sales prices; 15 percent did not know if prices between locations had changed.

When asked to indicate observed price or rental range increases, 39 of 82 respondents did not answer this question. Of those answering, 33 noted sales price increases between "0-4%," seven listed increases between "5-7%", and three said they had seen sales price increases ">10%." The responses regarding rental increases were very similar with 34 of 43 observing rental increases in the "0-4%" range; five saying rents were up "5-7%," one saying "8-10%," and two respondents selecting ">10%." Many of those who did answer this question noted that what increases they had seen were the result of a slow improvement in the economy after the recession, and they could not truly attribute the increases to VRE-related influences.

The survey of real estate agents also asked several questions regarding their sales marketing and its relationship to the VRE. Sixty-seven of 82 respondents stated that they did use the VRE as a marketing tool. Only four said they did not, and the same number did not know if it was used in their project advertising. The distribution of responses was consistent throughout the study area.

The purpose of a question to define the maximum distance and travel time from a VRE station for which the agent would consider using the VRE as a marketing tool was to compare the real estate agent's interpretation of "near" from Question 2 with what they would define as "near" for marketing purposes. When asked what maximum distance they would consider using the VRE as a marketing tool for a property they had listed, 15 of 84 indicated "< 2 miles." This compared to the 29 in Question 2 who felt "< 2 miles" was "near." Thirty-one said they would use the VRE as marketing tool for properties up to "2-5 miles" away. This compared equally to the 31 who felt "2-5 miles" was near in Question 2. Twenty-four said they would use VRE for marketing properties "5-10 miles" away, while only 16 chose this distance in Question 2. Six indicated "11-15 miles" away, four said "16-20 miles," and two opted for "20+" miles. These numbers corresponded closely to those answers in Question 2.

The answers regarding maximum travel time from the VRE for marketing purposes corresponded to the answers real estate agents gave to Question 2. The responses from Question 2 and from this question showed that real estate agents tended not to exaggerate VRE proximity in travel time in their marketing presentations over their own personal definitions of proximity.

When asked to identify an age and household income profile of the prospective buyers who had expressed interest in VRE when discussing home purchases, most agents did not answer this question or felt they had insufficient information. Those who did answer usually added a note that the data was only a guess. Thirteen agents from Fairfax County indicated that about 1/3 each of their potential buyers were in the age groups 25-29, 30-39, and 40-49 respectively. Seventy-five percent of their potential buyers were double income families according to these respondents.

Twenty-three agents in Prince William County responded to this question. Approximately 15 percent of their potential buyers were ages 25-29, 50 percent were ages 30-39, 25 percent between 40-49, with the rest distributed among the under 24 and over 50 age choices. Seventy-five percent of their potential buyers were double income families.

Eight respondents in the Fredericksburg area answered this question. Approximately 15 percent of their potential buyers were between 25-29 years of age, 35 percent between 30-39, 35 percent between 40-49, with the rest distributed under 24 and over 50. Seventy-five percent were double income families.

8 On-Site Residential/New Home Sales Agents

Some new residential projects maintain on-site marketing offices and staffs; others used real estate agents or brokers who specialized in new home sales, but oper-

ated from off-site real estate offices. On-site/new home sales agents were seen as another source of information on interest in VRE access expressed by prospective home purchasers/renters at their projects. As noted in the local newspapers, many new residential projects were using VRE access in their marketing ads. By including those projects with on-site marketing staffs, it was hoped the study might obtain good information on the role that the VRE played in prospective home buyers' locational searches.

New home communities were identified within the catchment areas from newspaper advertisements. A preliminary survey was also conducted by the publishers of Housing Data Reports to determine if a managing agent for a new home development felt that the VRE had indeed had an impact on their sales. These agents and contact persons were than sent the sector survey. Sixty-four surveys were sent to on-site/new homes sales agents or offices in the VRE study area. The return rate was 30 percent.

Single family detached projects accounted for 15 of the 21 projects represented by survey responses. Five were townhouse developments, and one was a condominium apartment project. All the developments represented "for sale" and not rental projects.

Twelve of the projects were located from 2-5 miles from the closest VRE station. Two were within two miles, and five were between 5-10 miles. Seven of the respondents stated that their projects were approximately 10 minutes travel time from the closest VRE station. Three said a station was five minutes away, two said up to 15 minutes, and six said the closest station was 20 minutes away.

The "Yes" and "No" answers were divided nine to eight respectively on the question of increased customer interest in the agent's project due to accessibility to commuter rail. Three stated that they did not know.

When asked to compare the interest in their project to those not influenced by VRE, most respondents (nine) answered "Moderate." Two said "Significant;" two said it was "Minimal," and seven said that they did not know.

Eleven respondents felt that expanded VRE service would increase interest in their projects above that shown to projects outside the area of influence of VRE access. Three agents did not think there would be an increase, and six said they did not know. However, thirteen answered "Yes" when asked if feeder or shuttle service to a VRE station would increase buyer interest in their projects. There were no negative answers, although seven did not know if such service would help sales or site visits. None of the projects were providing shuttle service to a VRE station as a project inducement or as a Homeowners Association service.

Project sales prices are not higher than before the opening of the VRE said 13 of the on-site agents; four noted higher project prices, and two did not know if prices had changed. One of the respondent who answered "Yes" said the price increases were the result of an increase in the cost of materials, such as timber, rather than demand generated by the VRE. The price increases were in the range of 0-4 percent.

Fifteen respondents stated that they did use convenience to VRE in promoting their projects. Five respondents did not. Eleven said there was increased interest in their projects because they used VRE access in their promotions. Four said they had not seen increased interest, and five did not know if there was a noticeable difference.

In spite of the above indicated interest generated by VRE access, only 10 respondents answered that VRE access was being used in their projects' printed advertisements. Eight said "No," and two did not know. The answers tended to show that marketing materials were not changed to reflect interests expressed by visitors to on-site sales offices, or that on-site agents/new home sales agents did not participate in design of the project marketing materials.

The on-site/new homes agents were asked the maximum distance from a VRE station that they would consider as linking commuter accessibility with their project. One respondent answered "< 2 miles"; seven said "2-5 miles"; eight answered between "6-10 miles," and one answered ">20 miles." Seven respondents felt that the maximum travel time to a VRE station should be less than 15 minutes; 10 said between "16-29" minutes; three said between "30-44" minutes, and one indicated up to an hour in linking their project with a VRE station for marketing purposes.

In response to a request to identify a general profile of their prospective on-site visitors, most agents did not answer the question or felt that they had insufficient information. Those that did answer usually added that the data was only a guess. Those answering indicated that about 1/3 each of their potential buyers were in the age groups "25-29," "30-39," and "40-49," respectively. Those responding estimated that 90 percent of their on-site project visitors were two-income families.

On the question of potential buyers since June, 1992, (opening date of VRE operations) who had expressed interest in VRE access during project discussions, nine respondents said that "<20%" of their prospective buyers expressed interest; six said between "20-40%," two said "40-60%" were interested, and one said between "60-80%."

Percentages of buyers who had expressed interest in access to VRE and who then actually purchased homes/units from the on-site sales agents were much smaller.

Thirteen of 19 agents responded that "< 10%" of their actual buyers had expressed an interest in VRE; two agents indicated that "< 20%" of their buyers had previously been interested in VRE access, and two agents said that "< 30%" of their buyers had expressed interest in VRE access. The on-site agents' experiences with actual purchasers who were interested in VRE access was much less than that of real estate agents in general.

9) Real Estate Developers/Home Builders Survey

Developers and builders operating in the VRE study area were identified with the assistance the Northern Virginia Building Industry Association and the RADCO Planning District Commission. Individual companies building within the PCAs were selected, and officers of those companies were surveyed. Seventy-one surveys were sent out, and 14 replies—a 20 percent response—were received.

Planning for VRE began in 1984. Asked if any of their planning or selection of site(s) for development or sale since 1984 had been influenced by VRE accessibility, the respondents were almost evenly divided in answering. Seven stated "Yes"; six answered "No," and one did not know. A few respondents said that either they already had land holdings along or near the rail lines or that the two VRE corridors coincided with the I-66 and I-95 corridors, which were natural pathways for residential growth anyway.

Developers/builders' definitions of "near" to a VRE station were similar to the other sectors' answers. Nine respondents felt that "2-5 miles" from VRE should be considered "near." Three said fewer than two miles, and two said up to 10 miles. Twelve of the 14 respondents felt that less than 15 minutes travel time was "near" a VRE station.

Three survey respondents said they had no projects near VRE stations. Four answered that they had one project each near a station. Three said they had two projects. One each said they had three, four, and five projects, respectively. One respondent, the RF&P Corporation, had seven projects. RF&P, now a land holding and development company, was former owner of the CSXT rail line and retained large land holdings along the line when they sold the tracks and right-of-way to CSX Transportation. Ten projects were within two miles of a VRE station, 14 between 2-5 miles, and five between 5-10 miles.

Nine developer/builders said they were using VRE access in marketing their projects. Two said "No," and three did not know if their marketing firms were linking projects with VRE access.

One survey response said less than two miles was the maximum distance for marketing a project as having VRE access. Seven felt between 2-5 miles was the maximum acceptable distance. However, five said that

up to 10 miles was the maximum, and 15 miles was acceptable for one respondent. Maximum travel time to reach a VRE station from their project for marketing purposes was not as varied. Seven said it had to be less than 15 minutes, and three felt it could be up to 30 minutes.

Nine respondents of the 14 said they had not seen an increase in land prices near VRE stations. Only two said that they had seen increases. One of these respondents felt that it was mostly the result of pent-up demand after three years of recession. However, the developer of Lee's Hill, south of Fredericksburg, noted strong interest and buying since the VRE opened. Of the two developer/builders who did note price increases, the Lee's Hill developer noted increases of 10 percent, while the other noted between "0-4 percent." The two respondents attributed the increases to VRE influence.

Improving access to the VRE, through the provision of bus or shuttle service, changed the mind of some of the developer/builder survey respondents on whether or not this would influence their prices. Eight said "Yes;" one said "No," and five were unsure.

Most sector respondents felt there was substantial interest in their properties near VRE compared to other properties. Five said the interest was "Significant;" six answered "Moderate," and one said "Minimal." Two did not answer. Most respondents felt that expanded VRE service would increase interest in their properties. Some respondents commented that increased service—more trains in and out and mid-day service—was needed more than full two-way service. One respondent said that more high speed, inter-city service to the south (to Richmond, etc.), such as offered by Amtrak, was needed if employment centers were to be created.

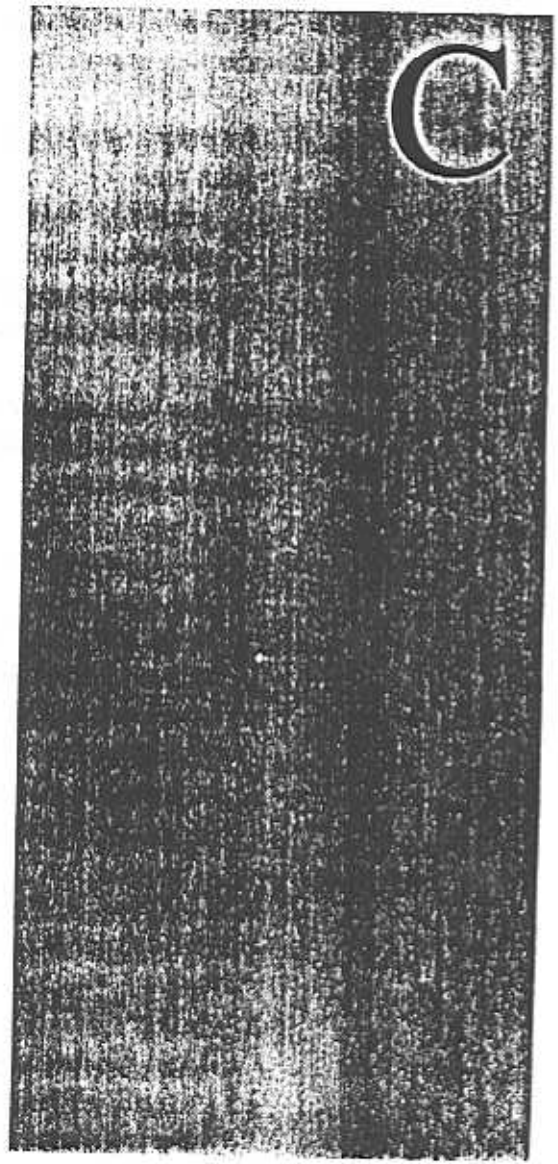
The developer/builders, much more than real estate agents or on-site sales agents, supplied specific profiles of the markets for which they were building residential projects. Ten respondents supplied detailed percentages. The largest segment of the builders' target market, in terms of age, was between "30-39." The "25-29" group accounted for 17 percent; the "30-39" group made up 36 percent, and the "40-49" aged group was 27 percent of indicated markets. The "50-59" aged group accounted for 14 percent, while those under age 25 comprised only three percent of the market of these builders. Older persons (over 60) made up only one percent of the targeted market.

Eleven of the 14 developer/builder respondents were marketing to two-income households. Household incomes above $55,000 were the primary market targeted. The "$55,000-65,000" range comprised about 24 percent; the "$65,000-75,000" range about 22 percent, and above $75,000 was sought by 25 percent of builder respondents.

When asked which recommendations for land use changes they would like to see occur near VRE stations, the majority of sector respondents wanted to see "Higher Densities" and "Mixed-use" developments, which would include "Townhouses," "Multi-family," and "Offices/employment" centers. Additionally, "Industrial" and "Flex-industrial" were cited by some of the respondents as desired land uses near rail stations.

The developer/builder sector was about equally divided as to whether local governments would be cooperative in adopting their recommended land use choices near VRE stations. Four felt that local governments would be cooperative. Five answered "No," and five answered "Don't Know". One respondent called local government "sympathetic" to most of their interests and concerns. Yet, he/she acknowledged the process a community must go through when it is growing to provide for services and for the citizenry to accept increased growth. Others said that the localities should look at planning for growth near facilities such as VRE stations.

METHODOLOGY FOR CONVERTING SURVEY DATA INTO AIR QUALITY MODEL INPUTS



The methodology employed to convert the VRE Ridership Survey results into data for the MOBILE 4.1 air quality modeling program proceeded through four basic steps:

1. Derivation of daily automotive Vehicle Miles Traveled (VMT) attributable to the commuters who have become VRE riders:
   a. the vehicle miles traveled (VMT) generated in their previous mode of home-to-work commuting (prior to riding VRE), and
   b. the continuing VMT necessary for the home-to-station segment of their current VRE commute.

2. Computation of the daily amount of specified automotive vehicle emissions that were produced by the VRE riders' previous modes of commuting.

3. Computation of the daily sum of the specified emissions still produced by the VRE riders' current modes of commuting:
   a. automotive (home-to-station segment), and
   b. locomotive (diesel engines of the VRE trains).

4. Calculation of the daily net change in the specified emissions resulting from the mode shift of commuters to VRE.

The steps used to derive adjusted VMT values from the VRE Ridership Survey data were:

1. develop a matrix of distances between VRE stations that:
   a. provided station-to-station "line segment" mileage, and
   b. established station nodes for consistent abbreviated reference;

2. build a ridership model for each line that provided number of riders boarding and departing at each station;

3. develop ridership adjustment factors that:
   a. adjusted subset rider responses to total exactly 100 percent within each question;
   b. adjusted data for frequency of use ("days per week you use VRE...") responses to Survey Question 26;
   c. adjusted data for mode of travel responses to Survey Questions 34 and 36;

4. build a riders-by-line-segment model that totaled the daily number of riders on board all AM and PM trains for each station-to-station line segment:
   a. using "riders boarding/riders departing" data from the ridership models;
   b. relating VRE line segments to LOS on parallel segments of I-95, I-395, etc.;
   c. using output for computation of previous mode VMT;

5. from the above models and adjustment factors, develop VMT totals for:
   a. current mode home-to-station travel (from Question 34);
   b. previous mode home-to-work travel (from Question 36), based on assumption (3).

Certain assumptions were necessary where the survey data available did not provide sufficient information for model or table construction. While these assumptions provide adequate accuracy for the task of broad, generalized calculations, it is acknowledged that various corrections and/or refinements of detail would be appropriate for more detailed analysis. The following assumptions were used:

1. Percentage-to-Person Conversions: Only the summary data of the VRE Survey was available. Question 1 of the Survey Summary provided the actual count of total passengers boarding on September 22, 1992 (AM runs) for each of the two VRE lines. All subsequent questions in the Survey Summary expressws data in "percentages of respondents" of those total AM riders on the day of survey. To derive actual "number of riders" for the various subset situations, the percentages reported were applied to the appro-

priate "Total Passengers...." number. Further, in some questions those percentages added to more or less than 100 percent. In such cases, an adjustment factor was applied equally to each subset percentage so that the total equaled 100 percent (of the respondents to that particular question). Additionally, better overall accuracy was maintained by carrying the "reconstructed" ridership numbers to two decimal places, rather than attempting to round to the integers ("whole persons") that would exist in the original raw data. Finally, since the survey provided rider counts for AM runs only, it had to be assumed that AM and PM ridership was equal.

2. Rider Origins and Destinations: Survey Questions 28-31 provided percentages of total riders on each line who boarded and departed at specified stations. However, the survey did not provide the more detailed percentage spread of riders departing at each station keyed to station of origin. To complete the matrices in the Ridership Models, it was assumed that riders who boarded at any given station had destinations in the same percentage ratios as provided by Questions 29 and 31 for destinations of all riders (regardless of origin).

3. Previous Mode Round-Trip VMT: The daily round-trip home-to-work VMT by a VRE rider in his/her prior commuting mode was assumed to approximate current mode home-to-VRE station VMT, plus 105 percent of the track distance along the VRE line between origin and destination stations (adjusted for frequency of use and mode of travel). This presumed that the added five percent highway mileage, plus the varying geographical relationships of home and station (i.e., some homes nearer to work than station, some more or less equidistant, and some at varying distances farther away), generally compensated overall for the destination station-to-work segment, for which no distance data were available.

4. Frequency of VRE Use: In Question 26, the "Other (includes occasional usage)" category was assumed to reflect an average of one round-trip every two weeks.

5. Modes of Travel: In Survey Question 34 (current home-to-station mode of travel) and Question 36 (previous mode of commuting), it was assumed that 75 percent of the "Other" category of respondents used motorcycles, while the remaining 25 percent used some unspecified non-motorized mode.

6. Motor Vehicle Requirement per VRE Rider: Knowledge gained from prior VRE-related analysis and other experiences in Northern Virginia

were used by the consultant to estimate vehicle occupancy factors for the various Mode of Travel categories in Survey Questions 34 and 36.

7. Station Area LOS: No directly-relatable data were available on average LOS surrounding the various VRE stations. An LOS for each station area was assigned based on the consultant's knowledge of the Northern Virginia highway network.

8. Boarding and Departing Stations: The survey provided data on only certain boarding and departure points. Just three stations on the two lines had data for both boardings and departures. It was assumed that the data represented total boardings and departures on the day of the survey, even though the capability to either board or depart a train existed at each station.

9. General Commuting Characteristics: Where not otherwise delineated, general commuter and commuting characteristics were assumed to be homogeneous within the service area for each VRE line.

LIST OF REFERENCES

The following materials were used as data/reference sources:

Summary of September 22, 1992 Virginia Railway Express Passenger Survey; Springfield, VA; Virginia Railway Express, A Transportation Partnership, 1992.

Track Mileage Between Stations on Virginia Railway Express (unpublished data obtained by NVPDC from VRE staff, April 1993).

Table II-5, "Level of Service Characteristics by Highway Type" (pages 90-91); A Policy on Geometric Design of Highways and Streets; Washington, DC; American Association of State Highway and Transportation Officials, 1990.

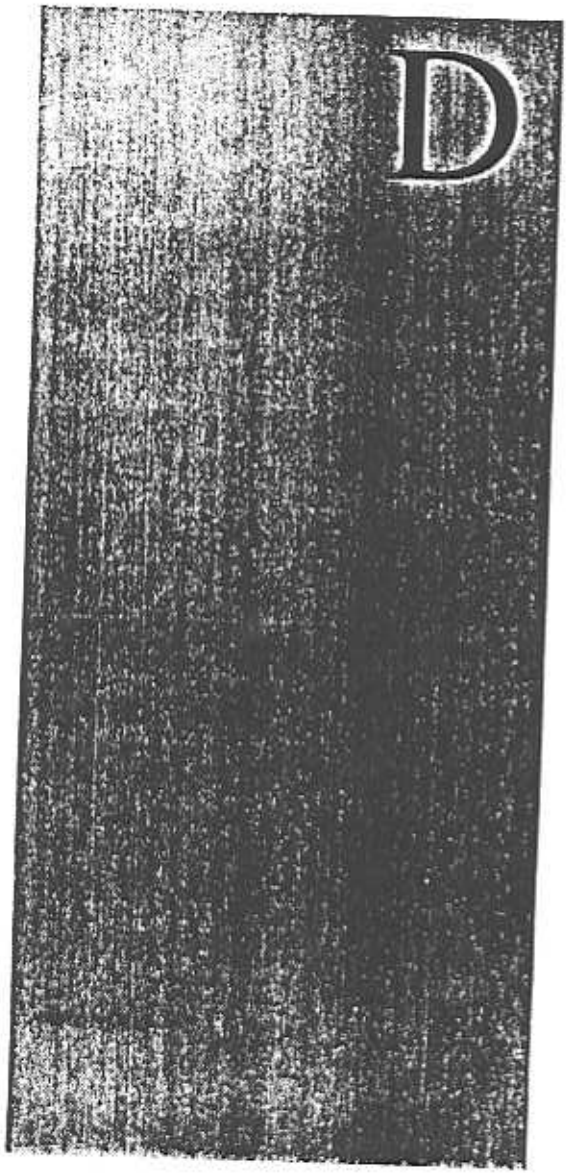
1990 (latest available) Level of Service Data for I-66 and I-95 Interstate Corridors (obtained by phone from Mr. Bill Mann, Northern Virginia District, Virginia Department of Transportation, April 30, 1993).

Clifford , Michael J; Meeting Clean Air Requirements; Washington, DC; Metropolitan Washington Council of Governments, Department of Transportation Planning; November 1991.

Untitled pages regarding VRE Locomotive Equipment, Operations, and Safety (untitled page extracts obtained by NVPDC from VRE staff, April 1993).

Seshadri, Solminihac, and Harrison; Modification of the QUEWZ Model to Estimate Fuel Costs and Tailpipe Emissions; Austin, Texas; University of Texas, Center for Transportation Research; (paper presented at 71st Meeting of Transportation Research Board, Washington, DC, January 1993).

FUTURE LAND USES IN THE VRE STUDY AREA



Land Use Plan Adoption Year:		1990	1992/1993	1992	1991	1992	1988	1988	1989	1984/1990	1993	1990	1986/1988	1981	1989/1992
REGIONAL AND LOCAL LAND USE CLASSIFICATIONS:		ARLINGTON COUNTY	FAIRFAX COUNTY	LOUDOUN COUNTY	PR WILLIAM COUNTY	ALEX-ANDRIA	FAIRFAX	FALLS CHURCH	MANASSAS	MANASSAS PARK	DUMFRIES	HERNDON	LEESBURG	QUANTICO	VIENNA
RESIDENTIAL:															
Ag/Estate	.1 Du/ac				X										
Rural Resid	1-.2 Du/ac		X		X							X			
Residential	.2-.5 Du/ac		X												
Semi-Rural	.2-.1 Du/ac				X										
Residential	.5-1 Du/ac		X												
Residential	1-2 Du/ac		X												
Suburb-Lo	1-4 Du/ac				X			X	X						X
Residential	1.6-3 Du/ac														
Residential	1.6-4 Du/ac														
Low	2-3 Du/ac		X								X				
Medium	2-4.5 Du/ac														
SF	2-5.5 Du/ac					X									
Residential	3-4 Du/ac		X								X				
Residential	4-5 Du/ac		X									X			
Neigh Conserv															
Suburb-Mod	4-8 Du/ac				X				X						
Residential	5-8 Du/ac		X					X			X				
Low	1-10 Du/ac	X													
High	8-10 Du/ac							X							X
Residential	8-12 Du/ac		X												
Suburb-Hi	8-15 Du/ac				X				X		X				
MF Resid	8-21 Du/ac														
SF,2 Fam,TH	8-17.5 Du/ac					X									
Low	11-15 Du/ac	X													
Residential	12-16 Du/ac		X												
Neigh Conserv															
												X			

LAND USE CLASSIFICATIONS:		Arlington Co.	Fairfax Co.	Loudoun Co.	Pr. Wm. Co.	Alexandria	Fairfax	Falls Church	Manassas	Manassas Pk.	Dumfries	Herndon	Leesburg	Quantico	Vienna
Urban	15-30 Du/ac				X										
Residential	16-20 Du/ac		X												
Low Med.	16-36 Du/ac	X													X
Residential	20+ Du/ac		X											X	
TH & MF	22-30 Du/ac					X									
Med-Hi Apt	35-100 Du/ac					X									
Medium	37-72 Du/ac	X													
High Med	3.24 FAR	X													
High	4.8 FAR	X													
COMMERCIAL:															
Neigh Com					X										
Conven Com					X				X		X			X	
Comm Com					X										
Retail			X												X
Neigh Com	0.35-1 FAR														
Conven Com	0.35-1 FAR														
CC, CSL & CG	0.5 FAR														
CL	0.5-0.75 FAR					X									
CR	1.0 FAR					X									
						X									
Reg. Mall					X										
Gen Com		X													
City Ctr Com									X						
Service Com	<1.5 FAR	X							X						
CD & CO-X	1.5-2.5 FAR					X									

LAND USE CLASSIFICATIONS:		Arlington Co.	Fairfax Co.	Loudoun Co.	Pr. Wm. Co.	Alexandria	Fairfax	Falls Church	Manassas	Manassas Pk.	Dumfries	Herndon	Leesburg	Quantico	Vienna
INDUSTRIAL:															
Lt. Ind/Flex			X												
U/T	0.25-0.5 FAR					X		X	X						X
Gen. Ind.	0.3-0.4 FAR													X	
Lt. Ind/Flex	.4-1 FAR				X										
Service Ind												X			
Heavy Ind.	4-1 FAR				X										
Industry											X				
General Ind															
I. (Ind)	.85-1.25 FAR								X						
Service Ind	1.5 FAR	X				X									
OFFICE/BUSINESS:															
Trans. Off															
Office			X		X			X							
Profess/Bus									X						
Regional Off.	0.4-1 FAR														
Off/Flex	40 Du/1.0 FAR	X													
Off. Com(L/M	54 Du/ <1.5 FAR					X									
Low	72Du/ 1.5 FAR	X													
Off/Flex					X										
Reg Emp Ctr															
Med	115 Du/ 2.5 FAR	X													
Off Comm Hi	54Du/2-3 FAR					X									
High	46 Du/ 3.8 FAR	X													

LAND USE CLASSIFICATIONS:		Arlington Co.	Fairfax Co.	Loudoun Co.	Pr. Wm. Co.	Alexandria	Fairfax	Falls Church	Manassas	Manassas Pk	Dumfries	Herndon	Leesburg	Quantico	Vienna
PUBLIC/QUASI-PUBLIC:															
Public	pks, schools,hosp	X			X				X					X	
Pub Forest	Pr Wm Forest				X										
Govt	comm facility	X	X									X			X
Cult. Resour					X										
Floodplain					X	X		X			X			X	
Comm Facilit			X					X				X			
Parks/O.S.			X		X	X		X	X						X
Institutional	public facilities		X			X									
Institutional	church, pr school					X									X
Semi-Public	CC,pri sch, ch	X						X							
Private Rec			X												
Private O.S.	Envir. Corridors		X												
MIXED USES:															
Mixed Use								X							
Reg Plan Com															
Transitional	Off, 8-10 Du/ac							X							X
Mixed Use Ctr								X							
Reg Com Ctr					X										
Downtown												X			
Adaptive Area												X			
Mixed Use	<1.0 FAR		X												
Com Emp Ctr	0.4-1.5 FAR				X										
CBMU-L	1.5 FAR					X									
Reg Empl Ctr	1-2 FAR				X										
CBMU-M/W1	2.0 FAR					X									
Waterfr MU	2.0 FAR					X									
CBMU-H &-X	2.5 FAR					X									
CDO (lg sites	Variable FAR					X									
Altern Uses			X												
Med Den MU	3-4 FAR	X													
Hi Den MU	3.24 FAR	X													
Coord MU	3-6 FAR	X													