ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER I

LAND USE AND TRANSPORTATION

I. LAND USE AND TRANSPORTATION

A. ISSUES AND OVERVIEW

This Chapter considers the environmental aspects of land use and transportation, both separately and as they relate to each other from an environmental perspective.

According to the Fairfax County Comprehensive Plan, "If current trends continue, the supply of land presently planned for residential development will be all but exhausted shortly after the turn of the century [2000]."[1] As we approach this "buildout," the focus of land use across the county is shifting from new development to revitalization and redevelopment. Each acre in the county becomes more valuable every day. The desire to maximize land utilization or productivity puts a strain on all types of land, from residential to commercial to parkland.

While the amount of available land has decreased, the Plan potential has been increasing. The potential is the number of units that can be built in the county according to the current Plan. It changes as requests are evaluated and adopted by the Board. Since 1989, there have been 80,585 new townhouses and multifamily units added and 927 single family homes removed from the Plan. This clearly demonstrates the increased intensity planned for the county.

At the same time, transportation systems across the county and metropolitan region are becoming increasingly congested. During rush hour, most highways in the county receive a failing grade for peak hour level of service. Over the past 15 years, highway construction in the Washington area outpaced population growth[2], yet congestion has still increased. This is due to increased per capita vehicle mileage that puts severe strains on the transportation infrastructure. The cost of congestion in the region is estimated at $667 per person in 2001, up from $320 in 1991.[3]

The same study estimates that, without the Metro system, each person would incur an additional 13.7 hours of congestion/year. Metro carries nearly 20% of all rush hour trips in the Metropolitan area, with a carrying capacity equivalent to 1,400 miles of roads, or roughly 11% of the road capacity.[4] The limiting factors to expanded Metro service are convenient access to Metro stations and train capacity. Currently, most Metro parking lots in Fairfax County are full by 8:00 A.M.

The buildout of our land use plan combined with the overload of our transportation infrastructure will continue to increase as the county population increases. Fairfax County is currently home to over one million people. It is projected to increase by

[1] Fairfax County Comprehensive Plan, 2003 Edition, Land Use Chapter
[2] "Where We are Growing", Southern Environmental Law Center, 2002
[3] Texas Transportation Initiative, 2003 Urban Mobility Study
[4] Washington Metropolitan Area Transit Authority, www.wmata.com/about/metromattersfactsheet.pdf

another 15 percent between 2000 and 2010, and yet another five to seven percent between 2010 and 2020. This growth will present a challenge to the Comprehensive Plan goals of maintaining an "attractive and pleasant quality of life."

As noted throughout this Annual Report, pressures from growth throughout the county directly effect our environment and consequently affect our quality of life, health, and natural experiences. The Comprehensive Plan specifically calls out strategies and patterns that can address land use and transportation together. Mixed-use development is an important tool to combine residential and commercial development to "enhance the sense of community" and to "increase transportation efficiency." It provides an opportunity for residents to live and work in the same area, thus reducing transportation needs while increasing the population density to support local businesses and mass transit.

The Board of Supervisors highlighted the effects of growth and congestion in their vision paper: **Environmental Excellence for Fairfax County, A 20-Year Vision**. A variety of tools were specifically called out, including mixed use development and Low Impact Development (LID). In addition, problems that at first seem tangential to the environment, such as neighborhood disruption through tear-down development and low income housing, were raised. Teardowns are becoming more common across the county, as single family homes are replaced with larger homes. The lack of low-income housing means workers cannot afford to live and work in Fairfax County and need to commute from outside the county, which exacerbates problems of both pollution and congestion.

1. Trends and Concepts

Other concepts that begin to combine land use and transportation are sprawl, smart growth, and new urbanism. Sprawl is the unrestricted growth out from the core of a city or a county. In the 1970s, Fairfax was one of the nation's fastest growing counties. Today that rapid growth that is happening beyond Fairfax County, in Loudoun and Prince William Counties. Loudoun County is now the fastest growing county in the nation, averaging 12.6% growth per year. This outer county sprawl directly affects Fairfax County through increased road congestion, changing property values, and inefficient use of Fairfax infrastructure.

Smart growth is the antithesis of sprawl; it can be defined as environmentally-sensitive land development with the goals of minimizing dependence on auto transportation, reducing air pollution, and making infrastructure investments more efficient. The Coalition for Smarter Growth lists the following principles for Smart Growth:

- Mix land uses;
- Take advantage of compact building design;

- Create housing opportunities and choices;
- Create walkable communities;
- Foster distinctive, attractive communities with a strong sense of place;
- Preserve open space, farmland, natural beauty, and critical environmental areas;
- Strengthen and direct development toward existing communities;
- Provide a variety of transportation choices;
- Make development decisions predictable, fair, and cost-effective; and
- Encourage community and stakeholder collaboration in development decisions.

Reston and the Orange Line corridor through Arlington are good examples of smart growth.

New Urbanism is a design movement that is going beyond smart growth into community building based on traditional urban centers. New Urbanists are working to improve land use by focusing on walkable communities and town centers.[5]

An important New Urbanist concept to encourage consistent planned development in a community is called **Form Based Codes**. These codes define an appropriate form of development and provide incentives for developers to adopt them. They have been successfully adopted as part of the Columbia Pike revitalization in Arlington County. The community worked through a series of **charettes** with a planning consultant to create a vision for the new "pike." Form Based Codes provide clear direction on the adopted vision, while incentives encourage developers to adopt the form as the Pike is redeveloped.

Other concepts that combine land use and transportation provide less dramatic changes to traditional subdivision development. **Clustering** provides residential development that allows homes to be built close together with the remaining acreage left as open space in perpetuity. The challenge with clustering is the lack of public trust that the open space will remain open. **Low Impact Development** (LID) is an approach that reduces the impact of development on a site. For example, LID will reduce the amount of impervious surface on a site and reduce the impact on trees and natural features. **Infill** is the process of filling in larger lots with multiple dwelling units or larger housing.

2. Macro Considerations

The concepts above focus on density and impact of development. Non-development oriented concepts provide options by changing how the transportation system is used. **Telecommuting**, or **telework**, is an example that reduces or eliminates the traditional commute to the office. Teleworkers work

[5] Charter of the New Urbanism at: http://www.cnu.org/about/index.cfm.

from home or at local work centers that provide infrastructure for a community of workers. **Affordable housing** provides an option for low-income workers to live closer to their jobs. This becomes increasingly important as property values rise and large numbers of county workers seek housing options outside the county. Analysis of commuting patterns shows that workers coming into the county are primarily arriving from the outer counties. This incoming work force puts a strain on our transportation system. Fairfax County residents who work outside the county are primarily commuting into Washington, D.C.[6] and have the option of using Metro.

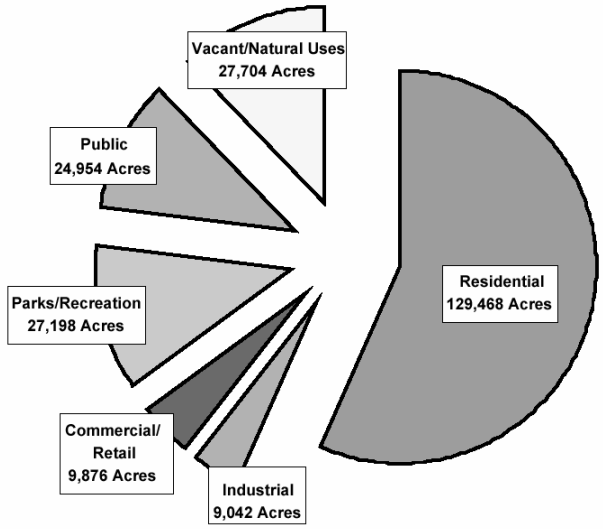
B. LAND USE

A prerequisite to understanding the interrelationship between land use and transportation is to first examine them separately. This section describes land use and land use decision-making in Fairfax County.

1. How Is Land Used In Fairfax County?

Land use in Fairfax County is analyzed yearly via the Urban Development Information System (UDIS). Fairfax County has 228,242 total acres of land, excluding areas in roads, water, or small areas of land unable to be zoned or developed. Those acres are organized into the following broad categories:

Figure I-1: Existing Land Uses in Fairfax County



Source: Fairfax County Department of Systems Management for Human Services, 2002.

Note: Land in Towns of Clifton, Herndon and Vienna included. Total acreage by year figures do not include areas in roads, water, or small areas of land unable to be zoned or developed.

[6] U.S. Census Bureau Commuting Patterns

- Residential—acres dedicated to living. Residential acres are measured by the number of dwelling units per acre (DU/AC). For example, a low-density neighborhood has a DU/AC from .1 to .5, a suburban neighborhood ranges from 1-20, and an urban center has a core DU/AC of 35-60.

- Commercial/Retail—acres developed for people to work or shop. Commercial space is measured by looking at the Floor Area Ratio (FAR), which is the ratio of gross floor area to the size of the lot. For example, an FAR of 0.5 means that a single story building can cover half the lot, a two-story building can cover ¼ the lot, and a four-story building can cover 1/8 of the lot. FAR does not include other impervious surfaces, such as parking lots.

- Industrial—acres zoned for industrial use. Industrial space is measured by FAR.

- Parks and Recreation—acres dedicated to public enjoyment and recreation.

- Public—acres owned by the public but not for parks or recreation, this includes: Fort Belvoir, Dulles Airport, the campus of George Mason University, county government facilities such as fire stations, landfills, police stations, training facilities, schools, and government centers; and other publicly-owned properties.

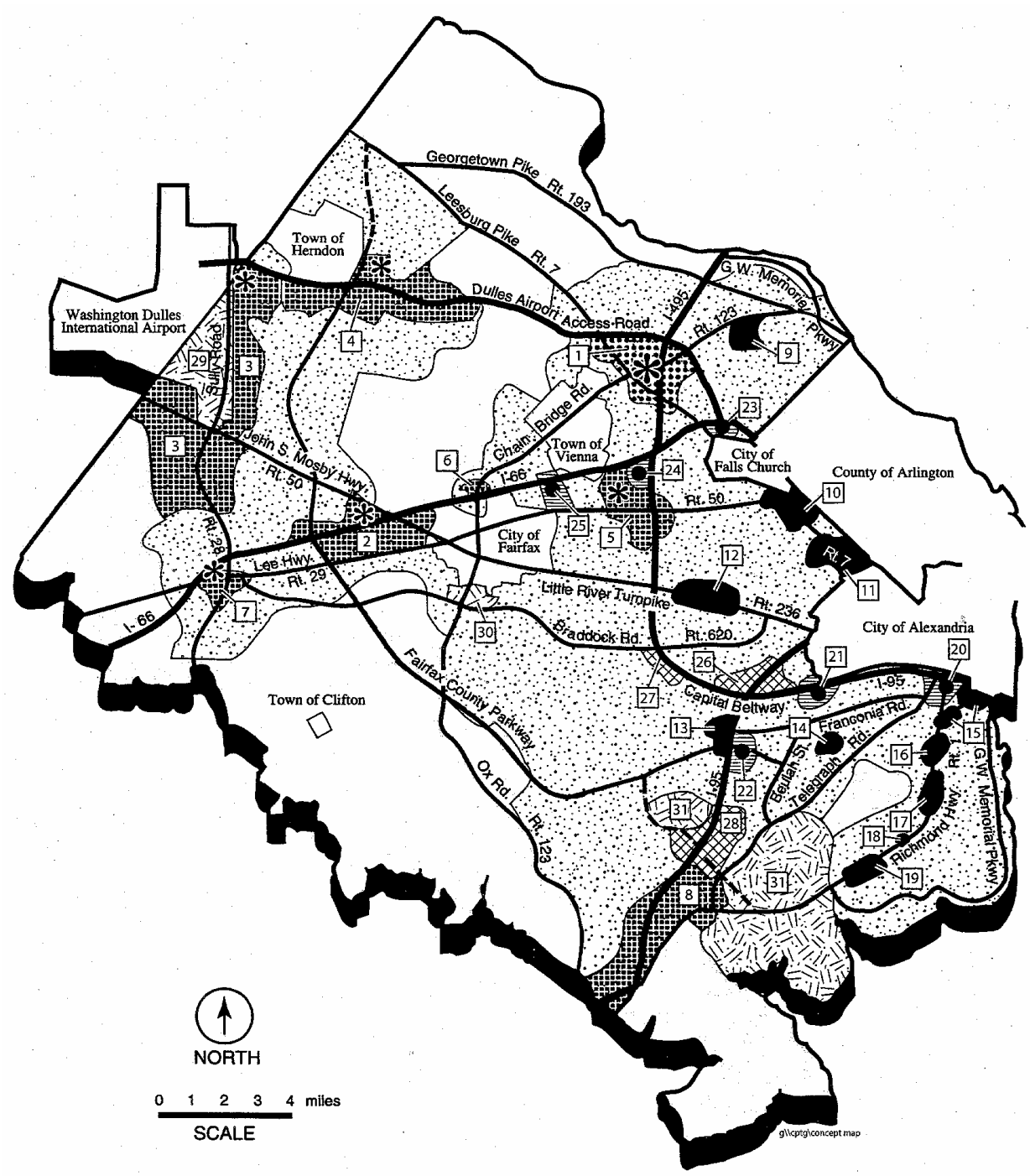
- Vacant—acres currently unused, either natural or vacant, but zoned for Residential, Industrial, or Commercial uses.

2. Land Use Planning

The Fairfax County Comprehensive Plan is a guide for making land use decisions in Fairfax County. The Plan was adopted in 1975 and revised in 1988 around 18 Goals for Fairfax County (a 19th goal was added later). The 2003 Edition consists of the Policy Plan plus the Area Plan for each of the four planning areas. The Policy Plan has ten functional sections. They are: Land Use, Transportation, Housing, Environment, Human Services, Public Facilities, Parks and Recreation, Revitalization, Economic Development, and Heritage Resources.

In 1990, the county's Concept Map for Future Development was developed. This map identified 31 mixed-use centers; the Concept Map has been revised slightly since then, but there are still 31 mixed-use centers shown (Figure 1-2). While the Concept Map was not formally adopted, it is an integral part of the Area Plans.

Figure I-2: Concept Map for Future Development



CONCEPT MAP FOR FUTURE DEVELOPMENT

CONCEPT MAP FOR FUTURE DEVELOPMENT

LOCATIONS OF MIXED-USE CENTERS

Urban Center
1. Tysons Corner Urban Center

Suburban Centers
2. Fairfax Center
3. Dulles (Route 28 Corridor)
4. Reston-Herndon
5. Merrifield
6. Flint Hill
7. Centreville
8. Lorton-South Route 1

Community Business Centers
9. McLean
10. Seven Corners
11. Baileys Crossroads
12. Annandale
13. Springfield (West)
14. Kingstowne
15. North Gateway and Penn Daw
16. Beacon/Groveton
17. Hybla Valley/Gum Springs
18. South County Center
19. Woodlawn

Transit Station Areas
20. Huntington Metro Station
21. Van Dorn Metro Station
22. Franconia/Springfield Metro Station
23. West Falls Church Metro Station
24. Dunn Loring Metro Station
25. Vienna Metro Station

LOCATIONS OF LARGE INSTITUTIONAL AND INDUSTRIAL AREAS

Industrial Areas
26. Beltway South
27. Ravensworth
28. I-95 Corridor

Large Institutional Land Areas
29. Washington Dulles International Airport
30. George Mason University
31. Fort Belvoir (Main Post and Engineer Proving Ground

LEGEND

Suburban Neighborhoods (Residential density ranges defined in Area Plans; 0.15-0.25 FAR* for neighborhood-serving non-residential use)

Low Density Residential Areas (Residential density of 0.1 to 0.5 du/ac **, specific density ranges in Area Plan; Non-residential use intensity 0.05 to 0.1 FAR)

Tysons Corner Urban Center
Core (1.0-1.65 FAR; 35-60 du/ac)
Non-Core (0.25-1.0 FAR; 8-45 du/ac)

Suburban Centers
Core (0.3-0.8 FAR; 15-35 du/ac)
Non-Core (0.15-0.30 FAR; 5-25 du/ac)

Community Business Centers (0.20-0.50 FAR; 5-25 du/ac; if a core is designated, intensities of up to 0.70 FAR may be allowed)

Transit Station Areas (0.30-1.00 FAR; 8-45 du/ac)

Industrial Areas (0.25-0.50 FAR for Industrial Uses)

Large Institutional Land Areas

* FAR - floor area ratio
** du/ac - dwelling units per acre

In 1995, a study of the Plan was prepared entitled: State of the Plan, An Evaluation of Comprehensive Plan Activities Between 1990-1995 with an Assessment of Impacts Through 2010. This study outlined a series of recommendations for the county to improve its ability to meet the Plan goals. Many of those recommendations are still applicable.

Currently, the Policy Plan is reviewed by functional sections. The Parks and Recreation section was reviewed in 2003. The Transportation Section is being reviewed in 2004 and 2005. A comprehensive review of the complete Policy Plan is not anticipated in the future due to the overall complexity of the complete document. The Area Plans are reviewed regularly. The North County Area Plan Reviews started in 2004. The South County Area Plan Review process will start in 2005.

Another important ordinance that affects land use is the county's Chesapeake Bay Preservation Ordinance and amendments adopted on November 18, 2003 by the Board of Supervisors. This Ordinance codifies the county commitment to protect the Chesapeake Bay. An important aspect is the designation of Resource Protection Areas (RPAs) around all water bodies with perennial flow. RPAs are the corridors of environmentally sensitive land that lie alongside or near the shorelines of streams, rivers and other waterways. They include any land characterized by one or more of the following features:

(1) A tidal wetland;
(2) A tidal shore;
(3) A water body with perennial flow;
(4) A nontidal wetland connected by surface flow and contiguous to a tidal wetland or water body with perennial flow; and
(5) A buffer area that includes any land within a major floodplain or any land within 100 feet of a feature listed in (1)-(4).

The 2004 proposed Chesapeake Bay Supplement provides an excellent overview of land use factors in Fairfax County that affect the Chesapeake Bay.

The Comprehensive Plan plus the Chesapeake Bay Preservation Ordinance provide an outline for how and where development is planned to occur in Fairfax County. They can be used to analyze the **potential** development that can occur within the county. The **realization** of that potential is subject to many external variables.

3. Land Use Monitoring

Information on land use is primarily tracked using the Urban Development Information System (UDIS), which was developed in the 1970s. Background information on UDIS from the 1995 State of the Plan explains, "the Comprehensive Plan had detailed guidance for residential development, with a

dozen residential density ranges, but lacked guidance for the appropriate intensities (FAR) for non residential development… Since the 1970's UDIS has remained relatively unchanged with regard to Plan quantification capability. The Plan has, however, become increasingly complex, with intensity recommendations for most non residential areas."

Recommendations to improve UDIS from the 1995 State of the Plan have not been implemented, and it is still the basis of the county's land use information as presented in Demographic Reports for 2002. Technologically, UDIS has not kept pace with other county systems that have migrated off the mainframe. Feeder systems that provide data for UDIS are at risk of not being able to provide the correct type and format of data. The county is currently stabilizing UDIS and preparing to review the business requirements for a future upgrade. This is a critical tool for understanding how land is used, and additional capabilities to better categorize and understand the ground truth should be added.

4. Land Use History and Buildout Projections

The Comprehensive Plan contains land use recommendations for all of the land in the county. As a practical tool, however, it is most effective when there is significant vacant land to be developed. That vacant land has been steadily decreasing as shown in Table I-1:

Table I-1
Vacant Land in Fairfax County

Year	Vacant Land (acres)	Total Planned Land (acres)	% Vacant
1980	75,550	234,744	32%
1985	66,685	232,941	29%
1990	45,042	230,678	20%
1995	37,006	229,366	16%
2000	29,529	228,541	13%
2002	26,258	228,242	12%
Planned land does not generally include public roads and water			
Source: Fairfax County Demographic Reports, 2002			

In 1990, when the Concept Map was created, approximately 20% of the county was vacant. This gave some flexibility to the planners. In 2002, with only 12% vacant and much of that fragmented, the decisions are much more constrained. Significant planning changes require interventions that will most likely affect existing developed land.

The current land use categories are shown in Table I-2 below:

Table I-2 Existing Land Uses		
Land by existing use	**Acreage**	**Percent of total**
Residential	129,468	56.7%
Industrial	9,042	4.0%
Commercial/ Retail	9,876	4.3%
Parks and Recreation	27,198	11.9%
Public	24,954	10.9%
Vacant & Natural	27,704	12.1%
Total	228,242*	100.0%
*Does not generally include public roads and water		
Source: Fairfax County Demographic Reports 2002		

Currently, 56% of the county land is developed for residential use, with 4.3% for Commercial/Retail. These numbers show the footprint of each use type, but they do not show the corresponding density. Commercial/Retail acreage in the county has a higher density than residential. It is difficult to determine the footprint of mixed-use acreage given the current data. It is also difficult to determine mixed-use density, and whether it is a function of DU/AC or FAR, or both.

As the current Plan is exercised and the county reaches build-out, the planned land use acreage is shown in Table I-3.

Table I-3 Planned Land Uses				
Land Use	**Planned Acreage**	**Percent of Total Land in the County**	**Vacant/Underutilized Land**	**Vacant Land as a percentage of Planned Acreage**
Residential	143,493	62.9%	24,225	17%
Industrial	8,310	3.6%	2,511	30%
Commercial	5,282	2.3%	804	15%
Public Facilities	27,225	11.9%	1,733	6%
Parks, Recreation, and Floodplains	43,788	19.2%	3,929	9%
Vacant and Natural	-	0.0%		
TOTAL	228,098	100.0%	33,202	15%
Source: Fairfax County Demographic Reports, 2002				

All vacant and natural land will be developed or become parkland. The ratios between the types will change with the residential increasing to 62% overall.

The table also includes an estimate of the vacant or underutilized acreage within each type. "Because of the complexities involved in determining whether nonresidential land is underdeveloped, estimates of underdeveloped acreage are only made for residential land."[7]

5. Plan Density Increases

The aggregate acreage available in the county is relatively constant, with occasional changes as land is converted to other uses, such as roads and drainage ponds. The Comprehensive Plan capacity, however, is constantly increasing as new density is allocated across the county. For purposes of allowing for a comparison of existing and planned development levels, Table I-4 shows the "existing conditions" for both nonresidential and residential development as they existed in Fairfax County in the years 1990, 1994, and 2002.

Table I-4
Existing Land Uses in Fairfax County: 1990, 1994, and 2002

Land Use	1990	1994	2002
Nonresidential (figures given in square feet of floor space, rounded to the nearest million)			
Office	67,000,000	75, 000,000	98, 000,000
Retail	33, 000,000	39, 000,000	47, 000,000
Institutional	29, 000,000	31, 000,000	37, 000,000
Industrial	34, 000,000	36, 000,000	40, 000,000
Total Nonresidential	**163,000,000**	**182,000,000**	**221,000,000**
Residential (figures given in dwelling units, rounded to the nearest hundred)			
Single Family Detached	163,000	169,700	184,200
Single Family Attached (e.g., Townhouses)	67,300	74,600	90,500
Multifamily	72,100	77,700	96,000
Total Residential	**302,500**	**322,000**	**370,600**

Source: Fairfax County Department of Planning and Zoning, 2004

[7] Fairfax County Demographic Reports, 2002

Residential and nonresidential growth in Fairfax County is expected to continue, and the county's Comprehensive Plan anticipates and guides this growth. Table I-5 presents one potential Comprehensive Plan "buildout" scenario based on Comprehensive Plan options that would serve to maximize residential development (as opposed to options that would maximize nonresidential development) in mixed use employment centers. This scenario is presented applying Comprehensive Plan guidance as it existed in 1989, 1991, 1995, and 2003. Prior to the Area Plan revisions in 1991, nonresidential potential could not be quantified due to lack of specific nonresidential development intensity guidance in the Comprehensive Plan; as such, nonresidential Plan capacity information is not provided for the year 1989.

Table I-5
Comprehensive Plan "Buildout" Capacity in Fairfax County Applying a Residential Plan Option Maximization Scenario

Land Use	1989	1991	1995	2003
Nonresidential (figures given in square feet of floor space, rounded to the nearest million)				
Office	-	158,000,000	182, 000,000	185, 000,000
Retail	-	48, 000,000	56, 000,000	65, 000,000
Institutional	-	37, 000,000	42, 000,000	44, 000,000
Industrial	-	74, 000,000	75, 000,000	70, 000,000
Total Nonresidential	**-**	**317,000,000**	**355,000,000**	**364,000,000**
Residential (figures given in dwelling units, rounded to the nearest hundred)				
Single Family Detached	216,100	212,200	212,800	215,200
Single Family Attached (e.g., Townhouses)	78,600	82,700	86,200	88,900
Multifamily	83,200	114,400	140,600	153,500
Total Residential	**377,900**	**409,300**	**439,600**	**457,600**

Source: Fairfax County Department of Planning and Zoning, 2004

The Comprehensive Plan is not a static document; major revisions to the Area Plans were adopted in 1991, and the Plan has been amended numerous times both through the Area Plans Review (APR) process and through Out-of-Turn Plan Amendments since that time. As can be seen in Table I-5, the general effect of these Plan amendments has been to increase potential development in Fairfax County; the "buildout" levels of total residential and total nonresidential development under the scenario presented in Table I-5 have increased since 1991.

The increase in buildout planned residential development levels, under the scenario presented in Table I-5, is summarized in Table I-6:

Table I-6
Residential Development: Plan Build Out, 1989-2003

Land Use	1989 Plan	1991 Plan	1995 Plan	2003 Plan	1989 - 2003 Change	1989 - 2003 Percent Change
Single Family Detached	216,100	212,200	212,800	215,200	(900)	**-1%**
Single Family Attached	78,600	82,700	86,200	88,900	10,300	**13%**
Multifamily	83,200	114,400	140,600	153,500	70,300	**84%**
Total	**377,900**	**409,300**	**439,600**	**457,600**	**79,700**	**21%**

Table I-6 clearly shows that the residential units are:

1. increasing in total number—as the population grows, Fairfax County is able to expand through Plan changes that increase the number of potential units; and

2. getting closer—the trend is to add more multi-family units (an 84% increase since 1989) while maintaining a consistent number of single family detached homes.

C. TRANSPORTATION

This section examines transportation and transportation decision making in Fairfax County.

1. How do People and Things Move About Fairfax County?

There are numerous options for people and things to move about the county.

- **Private, motorized transportation** is one of the most significant elements of transportation that has a major effect on the environment and is most closely related to land use and development. In modern times people have become more reliant on the use of automobiles for business, pleasure, and various daily functions and activities. The urban sprawl we have experienced in Fairfax County has greatly influenced this problem, causing major congestion on roadways, particularly during rush hour as many individuals are commuting long distances to and from their jobs.

- **Rail and rapid bus transit** has long been looked upon as a means of reducing traffic congestion and thereby creating a positive impact on

pollution and air quality. It also has a direct relationship to land use planning and development because rail transport centers are ideal locations for business, commercial and housing developments. There are numerous projects that have long been in the planning phase; due primarily to budget constraints, however, virtually none of them have reached the actual development phase.

- **Commercial vehicular transportation**, mainly trucks and buses, are another serious factor impacting our environment. Trucks, whether they are local, inter-county, or interstate, are serious contributors to our environmental crisis. In addition to many of them using "dirty" diesel fuel, they also have a negative impact on traffic congestion. Bus traffic includes school buses, most of which are transporting students during the morning rush hour. Many of these buses are old and are a hazard to the environment, again because of the type of fuel they use. In September, 2003, the Board of Supervisors approved a carryover of $2 million to begin the retrofitting of all county and Fairfax County Public School diesel vehicles such that they will burn fuel more cleanly.

- **Non-motorized transportation**, namely walking and biking, have been looked upon as viable alternatives for reducing traffic congestion and improving air quality. Not having sufficient infrastructure for walking and biking is a major deterrent to that form of transport, not to mention the frame of mind of the general public that has become automobile-dependent over the years, even for short trips. This component has an important relationship to land use planning and development in order to ensure that adequate facilities (walking and biking trails) are included in the plans.

- **"Virtual transportation"** has surfaced in recent years as another viable alternative to motorized transportation. Modern technology has created opportunities for people to work out of their homes using computers for telecommuting and e-commerce to perform their jobs. If these techniques become more widely accepted means of performing one's job, it would have a significant positive impact on reducing pollution and improving air quality.

  Fairfax County is a leader in this field with the Fairfax County Government Telework Program.

a. Vehicular Congestion and Volume to Capacity Ratio Maps

This section examines vehicular transportation options and the associated congestion that is experienced every day by drivers. Vehicle congestion on roadways is typically measured by volume to capacity (V/C) ratio. The Fairfax County Department of Transportation's Planning Division created a map for this report that shows the current and projected V/C ratios on major Fairfax County roadways. As V/C increases from zero to one, the volume approaches the road capacity. Over one, there is more volume than the road

can support. The Level of Service (LOS) is a measure of congestion; once V/C reaches one, the road is fully saturated, and the LOS is graded an F for failing.

Current V/C ratios on county highways are shown in Figure I-3. Major portions of the Beltway, I-66, and the Fairfax County Parkway already have a failing LOS.

Projected V/C ratios for 2025 are shown in Figure I-4. This information considers population growth and settlement projections. Comparing the current V/C ratio map with the future V/C ratio map provides many insights into how the transportation infrastructure grows with population. Some observations:

(i) The failing Highways are still failing, some much worse and others actually better:

- I-66 West of the City of Fairfax will get increasingly more congested, while I-66 east of Fairfax will get less congested.

- The Beltway will become considerably more congested, with V/C ratios ranging from 1.5 to over two. Congestion in the "mixing bowl" area (the I-95/I-395/I-495 interchange area) will continue to get worse. The impacts of the reconstructed mixing bowl are not yet factored into the model; however, interchanges are modeled separately from segments and the data may not reflect the current improvements.

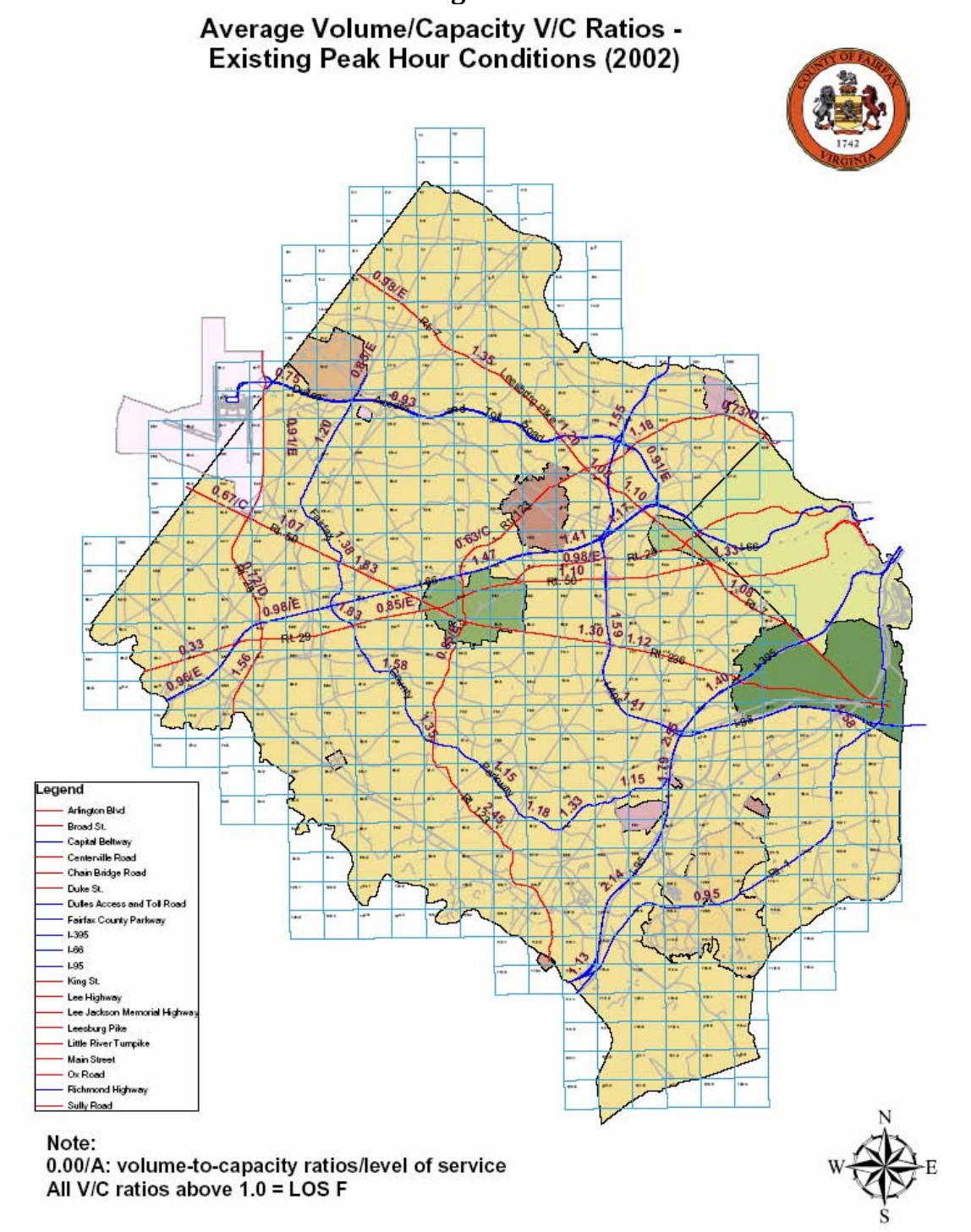
- I-95 outside the Beltway will get significantly worse, with V/C ratios increasing from 1.01-1.04 to 1.76 or greater.

(ii) Major roads closer to Washington D.C. will not change considerably over this period. This includes Route 29, Route 50, and Route 7 in and east of Tysons Corner. The current congestion has stabilized and increased volumes are not expected on these roads.

(iii) Major roads in the western part of the county will get more congested; this includes portions of Routes 28, 123, and 7 west of Reston. This will primarily be induced by commuters from outside the county.

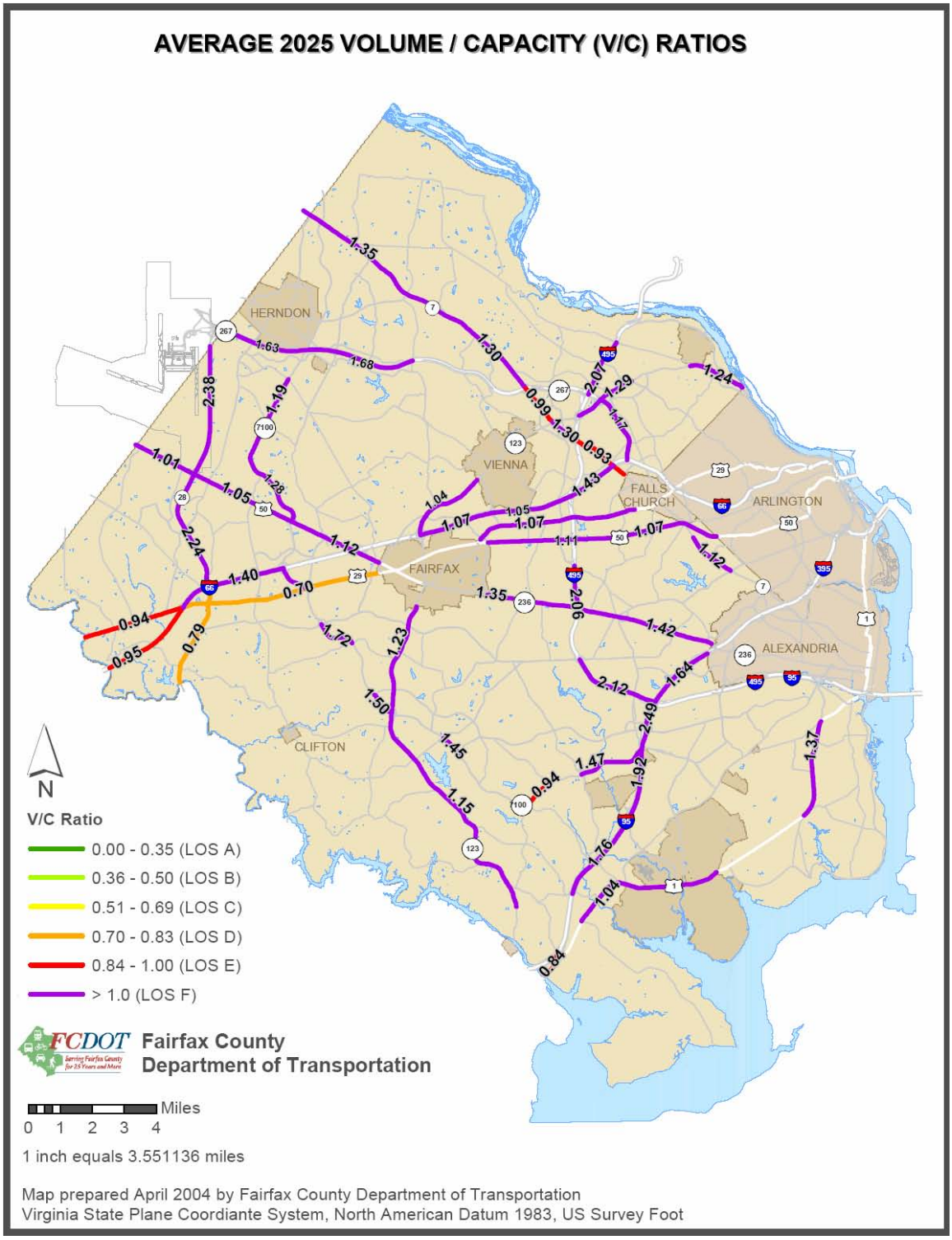
The maps do not include potential improvements from mass transit. In particular, the Dulles Rail extension will impact congestion in the Tysons Corner area, and an Orange Line extension to Centreville will impact congestion along I-66 throughout the county. The maps also do not show changes from the proposed High Occupancy Toll (HOT) lanes on the Beltway.

Figure I-3



Source: Fairfax County Department of Transportation

Figure I-4


AVERAGE 2025 VOLUME / CAPACITY (V/C) RATIOS
HERNDON
VIENNA
FALLS CHURCH
ARLINGTON
FAIRFAX
ALEXANDRIA
CLIFTON
N
V/C Ratio
0.00 - 0.35 (LOS A)
0.36 - 0.50 (LOS B)
0.51 - 0.69 (LOS C)
0.70 - 0.83 (LOS D)
0.84 - 1.00 (LOS E)
> 1.0 (LOS F)
FCDOT
Fairfax County
Department of Transportation
Miles
0 1 2 3 4
1 inch equals 3.551136 miles
Map prepared April 2004 by Fairfax County Department of Transportation
Virginia State Plane Coordiante System, North American Datum 1983, US Survey Foot

Both of these improvements have a dynamic component and are more difficult to model accurately. One of the recommendations of this Chapter is to continue studies to better model the effect of transit on congestion and other dynamic aspects of a modern transit system. These modeling improvements are being considered as part of the Transportation Section review of the Comprehensive Plan that is currently under way; the improvements need to be implemented to provide the Board with better data to make future transportation decisions.

b. Residential Commuting

An interesting statistic on commuter patterns is that over 50% of the residents in Fairfax County work in Fairfax County (see Table I-7), with another 17% working in the District of Columbia. Similarly, most of the workers in Fairfax County live in Fairfax County (see Table I-8); however over 80,000 workers commute to jobs in Fairfax County from Prince William and Loudon Counties. Only 12,000 workers commute to the county from the District of Columbia.

Table I-7
Where do Residents of Fairfax County Go to Work?

Destination	Number of Commuters from Fairfax County	Percent of Total Commuters from Fairfax County
Fairfax Co, VA	278,064	52.72%
District of Columbia	88,908	16.86%
Arlington Co, VA	48,670	9.23%
Alexandria City VA	27,641	5.24%
Montgomery Co, MD	16,943	3.21%
Loudoun Co, VA	16,420	3.11%
Fairfax City, VA	15,741	2.98%
Prince George's Co, MD	9,594	1.82%
Prince William Co, VA	7,013	1.33%
Falls Church City, VA	4,061	0.77%

Source: U.S. Census Bureau, Commuting Patterns of Fairfax County, Virginia Residents, 2000[8]

c. Transportation Options

Just as the Land Use plan has increased capacity in the same footprint through higher density, the transportation plan needs to accommodate more commuters through denser transportation options. Metro is a good example of denser transportation in a smaller footprint.

[8] http://www.fairfaxcounty.gov/comm/demogrph/publist.htm

Table I-8 Where to Workers in Fairfax County Come From?	
Origin	**Number of Commuters**
Fairfax Co, VA	278,064
Prince William Co, VA	44,322
Loudoun Co, VA	35,933
Montgomery Co, MD	22,148
Arlington Co, VA	20,476
Prince George's Co, MD	18,258
Alexandria City, VA	14,643
District of Columbia	12,244
Stafford Co, VA	7,249
Fauquier Co, VA	5,499
Manassas City, VA	5,145
Source: U.S. Census Bureau, Commuting Patterns of Fairfax County, Virginia Residents, 2000	

As a simple example of the space required for vehicular traffic, consider the Fairfax County Parkway. The 35 miles of roadway consume roughly:

35 miles * 4 lanes * 14 ft/lane = 237 acres

The Pentagon site covers a total of 583 acres, while the building itself sits on 29 acres. This does not count medians or access roads. A similar Metro right of way is a much denser alternative with higher capacity. As the county continues to grow, a multi-modal network that continues to increase density and maximize existing infrastructure is needed.

One successful multi-modal option that is already making a difference is the Burke Virginia Railway Express (VRE) subscription bus route. This is a subscription service that picks up commuters and gets them to the VRE station. The key to such a service is that it makes connections and is consistent.

Additional options that utilize creativity and provide effective multi-modal options are needed across the county. Combining multi-size buses, pedestrian options, and public outreach into a systematic plan will be needed to keep the county moving.

2. Transportation Decision Making

Management of transportation to maximize its usefulness and minimize its adverse impact on the environment is made very difficult because of the complex interrelationships of federal, state, regional, sub-regional and local entities that are all involved in Fairfax County transportation planning and funding. Local initiative in addressing transportation needs is further limited

because the State of Virginia owns and maintains every road in the county. Even subdivision cul-de-sacs are State roads.

The complexity of solving transportation problems in Fairfax County and mitigating the adverse environmental impact of inadequate or less than optimum projects can be better visualized by reading the Northern Virginia Transit Funding Resource Guide issued by the Northern Virginia Transportation Commission. This Resource Guide describes the many sources of funds that are available for transit projects and lists over 50 federal and 30 state and local funding programs. However, with governments at all levels being faced with a severely reduced capability to fund projects, they cannot provide funding levels to qualify for matching grants of funds from many of these sources.

A variety of funds are available from the Federal Government, but they all come with strings attached. Federal regulations, standards, and guidance must be met before consideration will be given as to whether Federal share contributions will be made available toward transportation needs.

In Virginia, the Commonwealth Transportation Board (CTB) has final approval authority over the six-year transportation program for the entire State. Under guidance of the CTB, the Virginia Department of Transportation (VDOT) is responsible for building, maintaining, and operating the State's roads, bridges, and tunnels.

For Fairfax County, the transportation goals are included in, and promulgated through, the Fairfax County Comprehensive Plan. Those projects that are to be funded by county resources are included in the county's Capital Improvement Program. However, transportation projects that are to be funded through State and Federal funding are included in the VDOT Six Year Transportation Program.

The Northern Virginia Transportation Coordinating Council has developed a Northern Virginia 2020 Transportation Plan, which is a comprehensive study identifying a multi-modal transportation solution to provide safe, efficient and economical choices for travel and transport of goods. The Plan has become part of the broader planning effort of the Transportation Planning Board of the Council of Governments (TPB of COG). Specific projects will be submitted by the Commonwealth of Virginia for inclusion in Washington region's financially Constrained Long Range Plan (CLRP) as funding streams open up.

A further description of the interplay of planning and funding of projects between agencies in the Metropolitan Washington area can be found in A Citizens Guide to Transportation Decision-Making in the Metropolitan Region, which is available from the TPB of COG.

An example of a coordinated project is the Pike Transit Initiative, which is a 12-month study effort sponsored by the Washington Metropolitan Area Transit Authority (WMATA). The study will analyze alternatives for a new high-capacity and environmentally friendly transit service along Columbia Pike from the Pentagon/Pentagon City area to Baileys Crossroads. Working closely with local jurisdictions, neighborhoods, and community groups, the study team will develop a preferred transit investment (e.g., light rail, streetcar, or bus rapid transit) for the corridor that will support the county's redevelopment initiatives.

3. Programs, Projects, and Analyses

a. Walking and Biking Facilities

There are many potential environmental improvements that can be brought about by providing greater opportunities for non-motorized means to commute, travel, or obtain recreation. They include reducing air pollution caused by traffic congestion; reducing water pollution caused by roadway and parking lot construction made necessary by traffic demands; reducing noise pollution caused by on-road vehicles; and reducing energy consumption required to operate motorized vehicles.

Improved non-motorized transit access by connecting hike/bike paths to the Metro stations and bus stops was one of the major considerations for the 2002 update of Fairfax County's Countywide Trails Plan. The Non-Motorized Transportation (Trails) Committee continues to improve the trail connections to transit facilities by working with Metro (WMATA), the Virginia Department of Transportation (VDOT), and the county's Department of Transportation (FCDOT), and will review and provide comments during the Dulles Corridor rapid transit stations access planning process. In addition, the FCDOT is conducting a study to inventory and improve bus stop access and safety. The county's Pedestrian Program Manager should review and comment on Metro station studies and the related rezoning and special exception applications to improve the pedestrian access and safety to those facilities. Convenient and safe pedestrian access will encourage more people to use transit facilities, therefore reducing vehicular usage and related pollution in the environment.

The Fairfax County Pedestrian Task Force was established with a mission to develop a plan for implementing safe and effective pedestrian facilities and to develop a coordinated and collaborative education/outreach program. The Task Force was to have begun its work in 2004.

The Countywide Trails Plan added on-road bike routes as a new category of trails. These trails are proposed along routes suitable for commuting, and for travel to places for recreational purposes. It is expected that the planned on-road bike routes will be installed with future highway improvements

according to the Trails Plan. Currently, there are on-road bike lanes located on Dranesville Road and sections of Beulah Road and Telegraph Road.

The Countywide Trails Plan is developed to provide the general locations of the proposed trails. It does not provide details such as intersection design or mid-block crossing of the street. Those details are examined during the site plan or subdivision plan review process. The site reviewer may need additional training to better detect more of the needs for safe crossing, or seek advice from the county's Pedestrian Program Manager.

The dream of a multi-use trail crossing Fairfax County from the Occoquan River near Route 123 to the Potomac River at Great Falls is becoming a reality. The Cross-County Trail (CCT) will ultimately be 34 miles long and is 90% complete, missing a few sections, mostly in the northern part of the county. The commuting routes are complete except for the section between King Arthur Road and Route 236 in Fairfax. The connections to the Washington & Old Dominion trail – a great regional transportation and recreation trail – and to the Vienna Metro Access trail at the City of Fairfax, will provide vital links to transportation systems across the region. A link is also provided to the Franconia-Springfield Metrorail station. Other connections, such as to the Fairfax County Parkway trail, the Reston trail system, and various roadside trails will allow trail users to reach work, shopping, recreation, and school destinations without resorting to the automobile.

The Non-Motorized Transportation (Trails) Committee has been severely hampered in carrying out its mission by lack of funding. $1,000,000 was authorized for Trails and Sidewalks improvements by the Board of Supervisors in FY 1998, but nothing was provided in FY 1999. In FY 2000, the Board authorized $2,500,000, then funding went down to $1,000,000 for FY 2001 and was cut to zero for FY 2002, 2003 and 2004. The funding level has been restored to $2,500,000 for FY 2005. The program requires regular funding in order to assist the county in meeting its environmental goals.

b. Employer Services Program

Fairfax County has a teleworking option for the county staff. An even more significant application of teleworking or telecommunication is part of the county's Employer Services Program. The Fairfax County Employer Services Program (ESP) was established in 1997; its basic purpose is to work with employers to provide alternative means of commuting to their places of employment. These alternatives include Metro/rail, bus services, carpooling, vanpooling, telecommuting, bicycling, and walking. ESP provides various services to employers to enable them to implement any of the above-mentioned alternatives.

The Fairfax County government marked two years of telework expansion with an expo on October 23, 2003, at the Government Center. Over 500 employees dropped by to view the displays, try the technology at the Cyber Café, and talk to teleworkers, telemanagers, and information technology (IT) experts. Marketing opportunities, such as the Expo, spike an interest in telework that is then followed by an increase in the number of employees who sign-up for telework. Articles about telework are also included in the employee newsletter, the Courier, with a similar result.

The increased publicity on teleworking has resulted in more than a quadrupling of the number of teleworkers, from 138 in December 2001 to over 730 today. The county has passed the three-quarters mark towards its goal of 1,000 teleworkers (a number that is based on the Council of Government's goal of 20% of the regions' eligible workforce teleworking by 2005). When Fairfax County reaches that goal, it is estimated that county teleworkers will save 59,000 commuting hours and 1.8 million commuting miles in a year.

As a result of aggressive marketing and on-going training, teleworkers are now found in almost every county department. Using CITRIX technology, employees can securely access most of the computer applications that they use at the office. Job categories are increasingly varied. Sample job titles for county teleworkers include analysts of all types, administrative assistants, accountants, programmers, social workers, inspectors, engineers, detectives, crime analysts, deputy sheriffs, and recreation and park specialists. Directors and assistant directors telework. The range of jobs widens as more employees discover that there are at least eight hours of work they can do from another location ---once a week or every other week.

Fairfax County government is an active participant in regional efforts to increase the number of teleworkers to meet the 2005 goal. The county's Department of Transportation—Employer Services Section, in partnership with the COG, maintains an aggressive program of outreach to Fairfax County employers who are looking to offer commuting alternatives to their employees. A description of the Employer Service Program can be found on the county's Web site at:
http://www.fairfaxcounty.gov/fcdot/Employer.htm.

The support from the Board of Supervisors and the County Executive, plus the marketing and training campaign and technology enhancements, are working. Increased interest in telework is evident in the number of employees who participated in the Expo and who attend training sessions, ask for information via email and phone, and sign up for telework. There are now teleworkers in departments that previously had none. Managers have expressed an interest in telework as a way to continue business operations during inclement weather or emergencies. The county's active

partnership in regional efforts to expand telework keeps it current on best practices and identifies the county as a resource for other businesses on teleworking.

D. THE INTERRELATIONSHIP BETWEEN LAND USE AND TRANSPORTATION

1. How are Land Use and Transportation Interrelated?

The above discussion presented land use and transportation as separate environmental issues. This section outlines projects that have combined elements of both via special studies or revitalization districts that incorporate mixed use.

2. Programs, Projects, and Analyses

Fairfax County has adopted numerous overall objectives and policies for implementing the interrelated goals it has established for land use and transportation. The establishment of Urban Centers, Suburban Centers, and Transit Station Areas in critical locations in the county is a fundamental prerequisite to achieving many of those objectives. Beginning with the establishment of the Tysons Corner Urban Center and continuing through the recent establishment of the Reston-Herndon Suburban Center and Transit Station Areas and the Merrifield Suburban Center, the county is making some progress toward the ultimate achievement of its interrelated transportation and land use goals.

a. Tysons Corner Urban Center

Over the last several decades, Tysons Corner has evolved from a rural crossroads into a substantial suburban business center. The Comprehensive Plan recognizes Tysons Corner as the only area in Fairfax County that is classified as an Urban Center. The Comprehensive Plan envisions a Tysons Corner Urban Center that contains a mixture of high density office, retail, and residential uses and parks (including urban parks and active recreation facilities) in a pedestrian-oriented urban environment. As envisioned in the Comprehensive Plan, the highest development intensities and the most "urban" areas of Tysons Corner will be located within walking distance of future rail stations. Under the Comprehensive Plan, locating rapid rail transit stations in Tysons Corner will allow increased intensity for non-residential and residential development for areas in proximity to each station.

The Dulles Corridor Rapid Transit Project is discussed in Section d. Alternatives evaluated in the Draft Environmental Impact Statement for that project would place none, three, four, or six rail stations in Tysons Corner. The Comprehensive Plan acknowledges that road improvements alone are not adequate to achieve the urban design goals established for Tysons Corner. Rapid rail transit, circulation systems to interface with rail transit, High Occupancy Vehicle (HOV) facilities, and transportation demand management are all critical to developing Tysons Corner. While it is obvious that Tysons Corner is yet to fully achieve the urban environment that is envisioned, the integration of land use and transportation planning that is reflected in the Comprehensive Plan provides the means by which that vision might be realized. That vision will not be realized if rail service is not brought to Tysons Corner.

b. Reston-Herndon Area Suburban Center and Transit Station Areas

On May 21, 2001, the Board of Supervisors adopted an amendment to the Comprehensive Plan that created the Reston-Herndon Suburban Center and Transit Station Areas. The Reston-Herndon Suburban Center surrounds the Dulles Airport Access Road from Hunter Mill Road to Centerville Road. The Suburban Center includes three of the four Transit Station Areas in the Dulles Corridor (i.e., the Wiehle Avenue Station, the Reston Parkway Station, and the Herndon-Monroe Station). As set forth in the Comprehensive Plan, the concept for future development of this Suburban Center envisions a mixed use employment center. The purpose of the new plan for the Suburban Center area is to encourage a more urban and transit-oriented development pattern. The objective is to create, at each Transit Station Area in the Suburban Center, a pedestrian-oriented core area consisting of mixed-use development that includes support services while maintaining transitional areas at the edges of the Transit Station Area.

Options for development in the Transit Station Areas allow higher intensities based upon compliance with specified conditions. Those options are designed to be site specific. Agreement on funding to design and build the Bus Rapid Transit phase of the Dulles Corridor Rapid Transit Project, including funding for construction of transit stations in the median of the Dulles Airport Access Road, will allow consideration of the transit-oriented options. The rail-oriented mixed-use options, which allow the highest intensities in the Transit Station Areas, may be considered once a Full Funding Grant Agreement or comparable funding agreement to design and build the rail phase of the Dulles Corridor Rapid Transit Project has been executed. The three transit stations in this Suburban Center are located in the median of the Dulles Airport Access Road. The physical locations of these stations provide a unique opportunity to bring people and activities into closer proximity to the transit station platforms by developing mixed use projects in the air rights over the stations. The Comprehensive Plan

does not include any specific land use recommendations for air rights development. It does, however, recognize the potential value of such development and recommends that appropriate level of land use planning for future air rights development be explored.

c. The Merrifield Suburban Center

On June 11, 2001, the Board of Supervisors adopted an amendment to the Comprehensive Plan that created the Merrifield Suburban Center. The area of the Merrifield Suburban Center is located approximately south of I-66, north of Woodburn Road, west of Holmes Run, and east of Long Branch Stream Valley and Prosperity Avenue. The area is served by the Dunn Loring – Merrifield Metro Station and has regional and local access from I-66, I-495, Route 29, Route 50, and Gallows Road. As set forth in the Comprehensive Plan, the vision for the Merrifield Suburban Center includes two core areas: one focuses on development near the transit station and the second is planned to evolve into a town center. A new "Main Street" would connect the two core areas. The interrelationship of transportation and land use is evident in the Comprehensive Plan for this Suburban Center, particularly in the following planning objectives for the Suburban Center:

(a) Encourage revitalization and redevelopment of portions of the Merrifield Suburban Center to create more attractive and functionally efficient commercial and residential areas with pedestrian-friendly and transit-oriented environments.

(b) Encourage mixed-use development that includes pedestrian and auto circulation systems that integrate the development both internally and externally, resulting in transit-oriented and pedestrian-friendly environments.

(c) Encourage the development of additional housing (including affordable dwelling units) in the Merrifield Suburban Center so that employees may live near their workplace and transit services, in order to reduce the number and length of commuter auto trips.

(d) Develop a cohesive roadway system that provides a more extensive grid of streets to serve the town center, Transit Station Area, and the area between.

(e) Develop a cohesive pedestrian circulation system linked to open spaces such as plazas, courtyards, greenways, and parkland in order to facilitate walking and reduce reliance on private automobiles.

(f) Develop mass transit options, transportation strategies and planned highway improvements to mitigate traffic impacts in the Merrifield Suburban Center and in adjacent residential neighborhoods.

d. Dulles Corridor Rapid Transit Project

Rail service has been envisioned in the Dulles Corridor since construction of Washington Dulles International Airport in the late 1950s, when the right-of-way for future rail was reserved in the median of the Dulles Airport Access Road. As discussed earlier in this section of the report, the Fairfax County Comprehensive Plan integrates land use and transportation planning for the area from Tysons Corner to Dulles Airport based on the expectation that rail service through Tysons Corner to Dulles Airport will be constructed. It is critical that the Dulles Rail project be funded and constructed if those plans are to be realized.

The Draft Environmental Impact Statement (EIS) for the Dulles Corridor Rapid Transit Project includes an option to commit to rail service in the corridor without interim steps, including bus service in lieu of rail. The Draft EIS also includes options for serving Tysons Corner with rail, while the bus rapid transit options would bypass Tysons Corner. It is essential that, if the land use and transportation objectives for this critical corridor are to be realized, rail service must be provided and Tysons Corner, as the designated urban center of Fairfax County, must be served by that rail service. While it is important to implement rail service in the corridor, it is also important that issues that were overlooked or not fully evaluated in the Draft EIS be considered and resolved in a manner consistent with the goals and objectives of the Comprehensive Plan. The issues that need further evaluation and consideration include: (a) the noise that will be generated from rail service, especially at elevated tracks, as well as from the additional vehicular traffic that will be generated along the corridor; (b) the increased need for feeder bus service centering on the transit stations; (c) the impact on surrounding neighborhoods of increased densities that can be granted in the vicinity of rail stations; (d) the increased traffic, and its impact, from development generated by the availability of rail service; and (e) adequate provision for pedestrian access to transit stations.

E. RECOMMENDATIONS

1. Land Use

a. As the county approaches build out, it is important to review the goals and direction of land use policies as directed in the Comprehensive Plan. EQAC recommends that the county produce an updated version of the State of The Plan, An Evaluation of Comprehensive Plan Activities between 1990-1995 with an Assessment of Impacts through 2010 (originally published in 1996) to reflect current population shifts, build-out, and infill development.

b. EQAC recommends that the county continue the process to upgrade or replace the Urban Development Information System (UDIS), which was developed in the 1970s and is still the primary information system for mapping land use. The new system should apply current technology in a manner that will improve the county's ability to evaluate planning and development issues, to better account for Comprehensive plan options, to capture real time plan changes, and to include additional data to plan and manage development and growth, such as:

   i. Existing and Planned Commercial and industrial intensity;
   ii. Existing and Planned Mixed-use types and intensity;
   iii. Vacant and underused lots with redevelopment potential; and
   iv. Environmental data such as impervious surfaces.

c. EQAC recommends that the BOS and the county's Department of Planning and Zoning continue to consider land use AND transportation together when revising the Comprehensive Plan. To start this process the county should develop and collect data that allows analysis of the macro effects of land use and transportation decisions.

   These data should support models that integrate congestion, air quality, commuting patterns, and health effects for use in future decisions.

d. EQAC recommends that the BOS consider mixed-use principles when locating future public facilities such as libraries and recreation centers, so they are within walking/biking distance of major population centers.

2. Teleworking

a. EQAC commends the Board of Supervisors for actively supporting teleworking among the county staff. We are encouraged that the county is steadily increasing participation toward twenty percent. We urge that the Board continue to aggressively support the program.

b. EQAC recommends that the Board of Supervisors maintain its leadership role in improving the environment through greater use of teleworking by establishing

an aggressive program directed at encouraging employers in the county to adopt or expand telework opportunities.

c. EQAC recommends that the Board of Supervisors work with the Federal government to encourage an increase in teleworking. Further, we recommend the BOS work closely with the Virginia Congressional Delegation to secure resources to establish teleworking sites within the county.

3. Transportation

a. EQAC commends the Board of Supervisors for funding the Non-Motorized Transportation (Trails) Committee in FY 2005. EQAC recommends that the Board continue to provide annual funding to this Committee to implement those projects that have the greatest potential for increasing non-motorized methods of transportation within the county.

b. EQAC is looking forward to the results of the 2004 Transportation Update to the Master Plan. We recommend that direction be given to model transit improvements as well as dynamic attributes such as HOT lanes.

c. EQAC recommends that the county focus on improving transit utilization through a systematic plan that focus on multiple options within a community. For example, the Virginia Railway Express (VRE) Burke EZ Bus provides a convenient alternative to commuting to the Burke VRE station. This can be combined with pedestrian improvements, more connector bus options, and biking trails that together provide a diverse transportation plan.

d. EQAC recommends that the county instruct the Health Department and the Public Affairs Office to produce and disseminate brochure(s) explaining the interrelationship between commuter choices and public health. This should include information about the various alternatives discussed in this chapter.

e. EQAC recommends that the Board of Supervisors urge the State Police to fully enforce HOV restrictions and to increase the penalty for HOV violations. EQAC recommends that the Board request that HOV fines be increased to $500 for the second offense, with 50% of the fine returned to the respective county.

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OTHERS

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