
ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER II

**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 the county approaches 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 over 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 growth², yet congestion has still increased. This is due to increased per capita vehicle mileage that puts severe strains on the transportation infrastructure. According to the Texas Transportation Initiative, the Washington, D.C. region is the second most congested in the country. In 1982 the average metropolitan resident spent 16 hours in congestion, by 2005 that ballooned to 60 hours wasted in congestion. That can be translated into roughly \$2,331,000,000 of lost productivity and wasted fuel.³

Public transportation systems are becoming increasingly important to the county and region. Metrorail is the second largest rail transit system and Metrobus is the fifth largest bus network in the nation. Every day Metro carries nearly 20 percent of all rush-hour trips in the metropolitan area, carrying as many people each day as 1,400 miles of new traffic lanes — equivalent to an 11 percent expansion of the region’s road system. From a purely environmental standpoint, Metrorail and Metrobus eliminate more than 10,000 tons of pollution each year and save the

¹ Fairfax County Comprehensive Plan, 2003 Edition, Land Use Chapter

² “Where We are Growing”, Southern Environmental Law Center, 2002

³ Texas Transportation Initiative, 2007 Urban Mobility Study

region from using 75 million gallons of gasoline each year.⁴ Public transit is clearly an important part of the future.

The buildout of the county's land use plan combined with the overload of the transportation infrastructure will continue to increase as the county population increases. In 2006 the county released a comprehensive demographic study, *Anticipating the Future: A Discussion of Trends in Fairfax County*. The report presents much needed data to plan for the future and incorporate future population and trends. It clearly points out that higher density residential development in Fairfax County and its neighboring jurisdictions will increase traffic congestion. This density, however, will make public transportation alternatives more viable.

As noted throughout this Annual Report, pressures from growth throughout the county directly effect the environment and consequently affect the 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 its 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. 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.

The county faces great challenges from the combined effect of:

- Land use constraints that result from reaching build-out and transitioning from a growth focus to redevelopment.
- Transportation systems strained by congestion and getting further constrained by sprawl beyond the county.
- Population growth that will require additional residential and commercial facilities and transportation options.

⁴ Washington Metropolitan Area Transit Authority, www.wmata.com/about/metro_matters/MMfactsheet.pdf

Due to a variety of reasons, land use and transportation decisions in the county have become separated. The county and individual landowners have primary authority for land use while the state has primary authority for transportation. The proposed HOT Lanes for the Beltway introduce yet another wrinkle with a private corporation building a significant for-profit component to our infrastructure.

With increased population and density in the county, the two domains need to be brought closer together. Land use decisions directly affect transportation needs. Transportation systems enable people to move about but need to be deployed in relation to planned population centers.

By planning and learning from the past and from other communities, we can face these challenges and continue to have a high quality of life that includes a healthy environment with natural resources and experiences that are treasured by the county residents.

1. Trends and Concepts

Important 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 is happening beyond Fairfax County, in Loudoun and Prince William Counties. As of 2003, Loudoun County was the fastest growing county in the nation, averaging 12.6 percent growth per year. This outer county sprawl directly affects Fairfax County through increased road congestion, changing property values and inefficient use of Fairfax County's 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.
- 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 A walkable community reduces the distance between where people are and where they want to go.

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 **charrettes** 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. In particular, developers who follow the codes have an expedited review and approval process.

Infill is the process of filling in larger lots with multiple or larger housing and is a key component to reducing urban sprawl.⁶ Infill development can provide new housing or commercial development on vacant or underutilized sites within developed areas, taking advantage of existing infrastructure. While infill provides increased land utilization, it also has the potential to increase the environmental impact upon the infilled community. Particular concern should be paid to the impacts of infill, such as increased stormwater runoff due to additional impervious surface and loss of tree canopy.

Transit Oriented Development or Design is another approach to creating walkable, livable communities. TOD encourages increased multi-use density around transit centers. The goal of TOD is to promote walking, biking or transit as a means of getting to work or the store instead of by car. By focusing development around transit centers, ideally communities will have increased transit ridership, less traffic, reduced pollution and a better quality of life.

Transportation Demand Management is typically associated with a TOD proposal. TDM is a plan to reduce automobile trips that cause congestion. Some elements of a TDM plan include easier and safer pedestrian access, local amenities and shuttle service.

Other concepts that combine land use and transportation provide less dramatic changes to traditional subdivision development. **Clustering** provides residential

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

⁶ Greenbelt Alliance, Smart Infill: Creating More Livable Communities in the Bay Area, at http://www.greenbelt.org/downloads/resources/report_smartinfll.pdf

development that allows homes to be built close together with the remaining acreage left as open space in perpetuity. Generally, homes are sited on smaller lots, with the remaining land dedicated to open space. In most cases, the density of homes in a cluster development is the same as what would have been built on the entire site; the development is just configured differently. The challenge with clustering is the lack of public trust that the open space will remain open.

Low Impact Development is an approach that reduces the impact of development on a site. The goal of LID is to better integrate the natural environment with the built environment. LID techniques are intended to mimic an area's natural hydrology to manage stormwater on site, thereby reducing adverse downstream impacts.⁷ For example, LID will reduce the amount of impervious surface on a site and reduce the amount of stormwater runoff leaving the site. LID tends to be relatively economical and is flexible enough to be applied to different types of landscapes.

Green Building is another approach to lowering the impact of development by designing structures to conserve resources and using technology that is more efficient. Green roofs can be built with succulent plant gardens that absorb water during rain storms and gradually release it back to dramatically reduce runoff and stream pollution. The county has installed one such roof at the Providence District office to demonstrate feasibility, and a very successful and attractive green roof has been installed at the Yorktowne Square Condominiums⁸ in Merrifield. Highly efficient and solar energy systems also minimize the environmental impact.

High Occupancy Toll Lanes are a tool to ease traffic congestion in urban areas. The idea behind HOT lanes is to open High Occupancy Vehicle lanes up to single occupant vehicles that pay a toll. The price of the toll varies, depending on the time of day and amount of traffic. An additional benefit of HOT lanes is that they can provide additional revenue to pay for other transportation improvements.⁹

2. Macro Considerations

Many decisions in the county that affect land use and transportation are made on a micro level. That is, they affect a single parcel or neighborhood. The macro effect of many small changes has a great impact on the county environment. These macro consequences are lost in the day-to-day planning and construction that happens across the county. As higher densities and infill occur, their effect is cumulative and significant. For example:

⁷ Low Impact Development Center at: <http://www.lid-stormwater.net/intro/background.htm>

⁸ <http://www.fairfaxcounty.gov/nvswcd/newsletter/greenroof.htm>

⁹ U.S. Department of Transportation, Federal Highway Administration, [A Guide for Hot Lane Development at http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE/13668.html](http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE/13668.html)

- Small neighborhoods with a stable environmental footprint are being transformed with larger houses. These newer houses bring additional impervious surface through larger roofs and additional pavement. They also displace trees that protect the parcel with a green canopy and provide haven for birds and wildlife. While the effect of a single home is small, the macro effect on community channels more runoff and pollution into the watershed, increases the ambient temperature and displaces wildlife.
- Large scale development, such as the Tysons Corner Urban Center and other Suburban Centers, bring additional residential density to a region. This induces disproportionate transportation needs that can lead to congestion and the associated increase in air pollution and vehicular waste.

a. Understanding Macro Changes

These macro effects are going to become more pronounced with the county build out and change from development to redevelopment. The infrastructure to sufficiently understand and model their effects is lacking across the county systems. Up to now, regional aggregations and averages were sufficient to predict development impacts. The Concept Map for Future Development has done a good job guiding decisions and projecting impact at a broad macro level. Moving into the future, tools are necessary to provide a finer resolution of real time changes that can be quickly aggregated into a macro view.

These new tools should combine the county GIS capability with the existing planning and zoning databases. The data are readily available at a parcel level, but the ability to view the data and use the data to model macro effects is not possible. Understanding and modeling the macro changes happening across the county will help provide insight to the Board of Supervisors and Planning Commission as they deal with micro decisions.

b. Creative approaches

The county also needs to consider creative approaches to address these macro effects. One way to avoid macro consequences is to reduce the impact of micro decisions. For example:

- Modifying the Public Facilities Ordinance to encourage Low Impact Development can protect streams and mitigate the micro impact of infill development.

- Providing incentives for Green Building can protect streams and decrease heat generation from asphalt roofs. This encouragement will be a win-win for the county and for developers.
- High density development should have an effective Transportation Demand Management plan. This should be part of any submission and include future monitoring with options in case the plan deviates from reality. The recent Plan Amendment for Fairlee/Metro West includes TDM as an important element of the development plan.

Planning for large scale redevelopment, such as county Urban and Suburban Centers, has been a useful forum to consider macro effects. These task forces grapple with all aspects of the Urban and Suburban centers, including land-use, transportation and environmental impact. The residential commitment and input to these studies is commendable. They provide a long range vision and plan in harmony with the community vision. These studies and reports complement the Area Plan Review process that focuses on micro changes to the comprehensive plan.

The focus on **Transit Oriented Development**, especially at Metro stations and future stations along the Dulles Rail corridor and Tysons Corner, maximizes the county investment in multi-modal transportation. The Board of Supervisors-appointed Tysons Land Use Task Force has a very ambitious charge to consider the redevelopment of the “Downtown” for Fairfax County. The county has a significant interest in getting Tysons Corner right. Such a large project will demand better tools to envision, model and explain the plan to residents and business owners. It will require substantial community outreach and participation. It will need to be codified into a workable Comprehensive Plan amendment that encourages and monitors the vision. And it will require better macro management and mitigation of changes to this important region.

c. **Non-obvious Macro Considerations**

The sections above focus on changes caused by development and redevelopment. There are also macro effects generated by non-development changes, such as work patterns, mixed use opportunities and economic considerations that effect the county environment.

Telecommuting, or **telework**, reduces or eliminates the traditional commute to the office. Teleworkers work from home or at local work centers that provide infrastructure for a community of workers. This reduces pressure on the transportation network without building physical infrastructure. The county has an aggressive telework program in place for county employees.

Mixed use development brings work, play and home closer together, reducing the distance for trips and commutes. Mixed use is proliferating across the county, providing economic growth with less congestion than traditional separated communities.

Economic factors, such as increasing property values, also affect the overall county environment. Low-income residents are struggling to find affordable housing near their jobs in the county and frequently choose to live outside the county. This negatively impacts the transportation system. As property values rise, homeowners choose to expand their residences rather than relocate, which changes the impervious nature of communities.

The Board of Supervisors has specifically raised affordable housing and infill development as an environmental concern in their Environmental Vision.

Macro considerations need to be better understood and modeled as the county increases in density. Traditional models did not need to consider macro changes, and the resolution and quality of data is insufficient for planning and protecting the environment. Dealing with the proliferation of small changes across the county will take creative approaches using all available tools, including the Comprehensive Plan, the Public Facilities Manual, special ordinances and public outreach.

B. TECHNOLOGY TO UNDERSTAND THE COUNTY

Fairfax County has created an impressive Information Technology infrastructure to help understand the county and the 395 square miles of land it contains. The Geographic Information System provides a capability to “see” the county through maps, imagery and other geospatial data. GIS is a technology that allows the county to visualize relationships between data that may not be apparent by merely looking at a map. The GIS system has received numerous awards for expanding public access the geospatial data and leveraging that data to enhance productivity. EQAC commends the county for making the investments in IT and GIS that are paying dividends in increased productivity and visibility.

Through work with the county’s Department of Information Technology, EQAC has become more familiar with capabilities and possibilities for using technology. There are three basic attributes that must be in place for the technology to be effective:

- The GIS capability—these are the technical systems that move, manipulate and display information based on geographic location. It also includes staff familiar with the systems. The county IT and GIS staffs are experts on this technology.

- Data that are geographically located, in other words, spatial data—this is an expensive component that needs to be constantly updated as the county changes. There are many sources of data, from aerial imagery to U.S. census data to county records, that need to be transformed into useable information.
- Models and applications that can use the data to make projections about the future—these are becoming increasingly important.

Over the past several years, EQAC has advocated for an enhanced IT capability for tracking land use. EQAC has previously recommended that the county adopt a new parcel-based system that would track the full lifecycle of each parcel in the county. This new system, called the Integrated Parcel Lifecycle System, is now being implemented. This is an important step towards better understand how land in the county is used and how it changes over time.

This information managed by IPLS includes population and housing unit estimates and forecasts, which are used by the county to help determine services and service provision levels, respond to state and federal reporting requirements and respond to regional initiatives such as transportation planning, air quality modeling and other programs of regional significance. Other data include: real estate information including land and improvement characteristics, sales information and existing land use; planning data such as planned land use and plan options; proposed and approved rezonings; proposed and approved development plans; and building permit information. County staff is now able to evaluate 30 year demographic forecasts including low, high and “most likely” estimates. Staff is also able to produce reports in a GIS environment using user defined geographies. Reports can be generated for population density, population forecasts, housing starts and completions, vacant land and underutilized land.

As staff considered the IPLS requirements, an informal survey was conducted of the GIS users who would benefit from the parcel based system and additional data about the parcels. Over 38 users from across the county responded indicating a critical need for the system and more data. Some examples:

- Board of Supervisors—resident concerns and land use issues
- Parks—development planning, natural and cultural resource inventory
- Department of Planning and Zoning—evaluation, enforcement, appraisal, plan reviews
- Public Safety—planning for fire and rescue, hazardous spill impacts, crime mapping, improved dispatch
- Public Works—project design and evaluation, stormwater runoff calculation, flood and dam breach emergency plans, solid waste services
- Transportation—pedestrian planning, VDOT permit applications

Although not all of these datasets are available in IPLS currently, if any of these data are loaded into the county's GIS, they can be utilized within the IPLS data warehouse.

The uses of these data clearly go beyond the scope of EQAC but illustrate the interconnectedness of the systems. EQAC's recommendation was narrowly focused on improving the county's land use planning capability to enable better integration of land use and transportation. It turns out that many other organizations and departments also benefit from this capability.

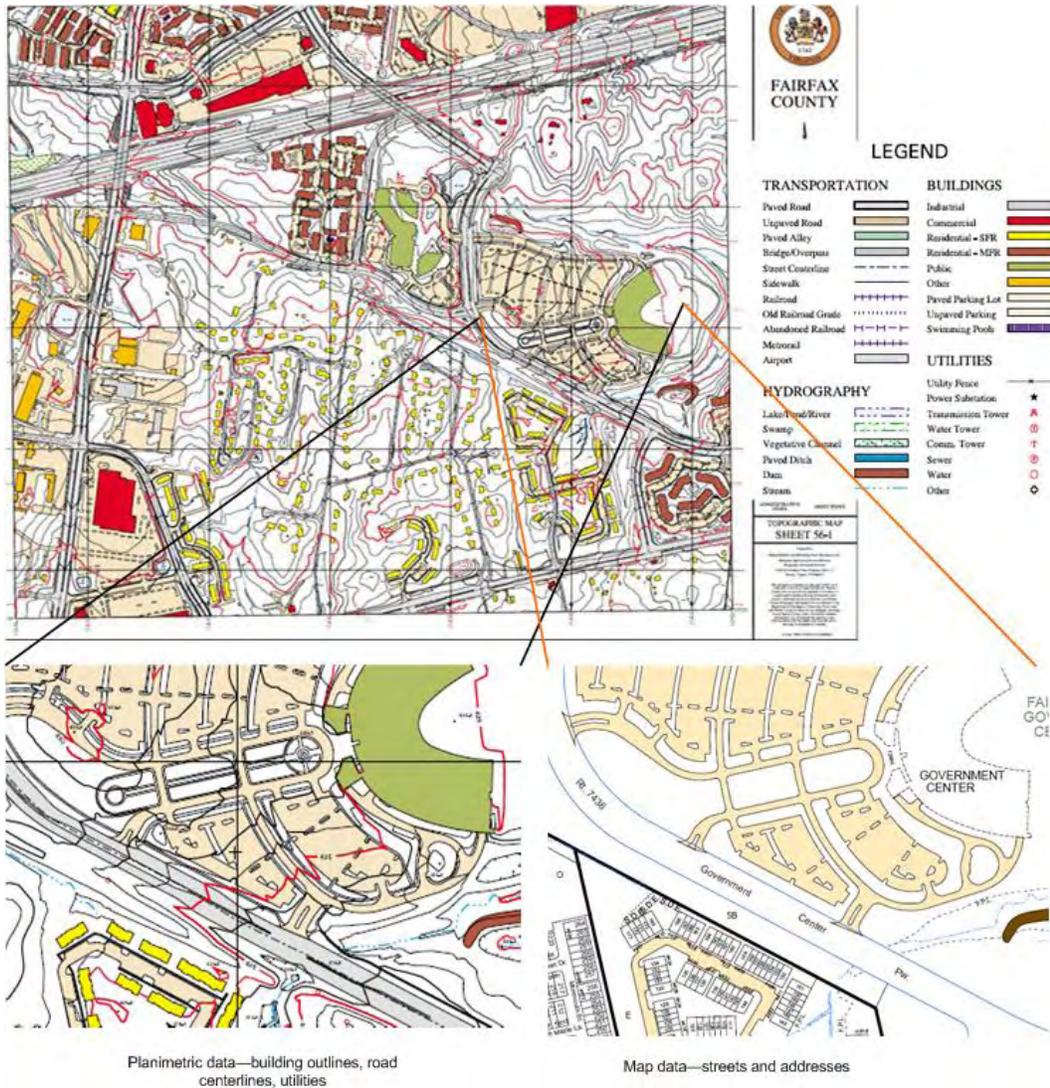
EQAC commends the county for its leadership in adopting technology and, more importantly, for using it to improve service. With the IPLS implementation underway, EQAC is focusing on the data, models and applications that will improve the county's land use and transportation planning capability. The four areas EQAC is most concerned with are:

- Planimetric data—features you can see, such as buildings, driveways, pools, railroads, ponds, trees.
- Oblique imagery—creating three-dimensional images and incorporating them into the planning process.
- Models—leveraging planimetric and oblique data with models that analyze the data and provide valuable information.
- Natural Resource data – identification of resources that should be considered during environmental and conservation planning efforts.

1. Planimetric Data

Planimetric data are the features that can be seen. These data typically come from an aerial image or photograph of the county. The image is analyzed by a specialized contractor to extract features for the GIS system. The current planimetric database was created from imagery gathered in 1997. The following GIS pictures show a map around the county's Government Center with planimetric data and a blowup of some types of information it portrays. It is contrasted with a normal map that has streets and addresses. The planimetric data show the reality of the building outlines and the actual road path. It correlates the data on the map with the actual data and adds additional information not shown on a map.

**Figure II-1. Planimetric Information—
Fairfax County Government Center**



The county is planning another round of planimetric data gathering and is considering adding additional feature extraction to include driveways, sidewalks, pools, patios, decks, sheds and tennis courts. These impervious surfaces are of interest in modeling the effects of property improvements and calculating the effects that increasing small scale imperviousness have on a macro level.

2. Oblique Imagery

Oblique imagery is taken from an aircraft at an angle rather than straight down. The images can then be processed by software to show the sides of buildings and structures and measure their heights. The primary users of the oblique

imagery are agencies such as the Department of Public Works, the Department of Tax Administration and public safety agencies to reduce field time in assessing and planning. The image below is a sample oblique image of the Government Center:

Figure II-2: Oblique Imagery—Fairfax County Government Center



EQAC believes this imagery will prove very useful in land use and transportation planning. It begins to enable three-dimensional models and can have wide applicability beyond the county operations to public participation. In particular, the Area Plan Review process can benefit from better understanding three-dimensional areas around sites subject to proposed amendments.

Looking into the future, it is possible to begin accepting Land-Use proposals with three-dimensional Computer-Aided Design and Drafting data. The CADD models can be combined with oblique data to provide accurate 3D representations of the changes. In effect the county can begin examining proposals using fly-through technology overlaid on ground truth. This will be much more illustrative than artistic interpretations.

The county has oblique imagery collection in the current IT plan. EQAC recommends that the county continue to gather these data and to expand the use of 3D analysis in planning.

3. Models and Projections

While the GIS system and new data provide valuable insight by which to view the county, they do not necessarily provide new information about the county. Models are computer programs that analyze the data and create reports or projections. The county regularly uses transportation and traffic models to analyze congestion. Some of this information is reviewed in this chapter. As the data warehouse expands, it becomes important to use models to comb through the data and extract information that would otherwise be unattainable.

EQAC realizes that models are complicated and expensive. EQAC recommends that the county begin exploring and evaluating GIS models.

4. Ecological Resource Data

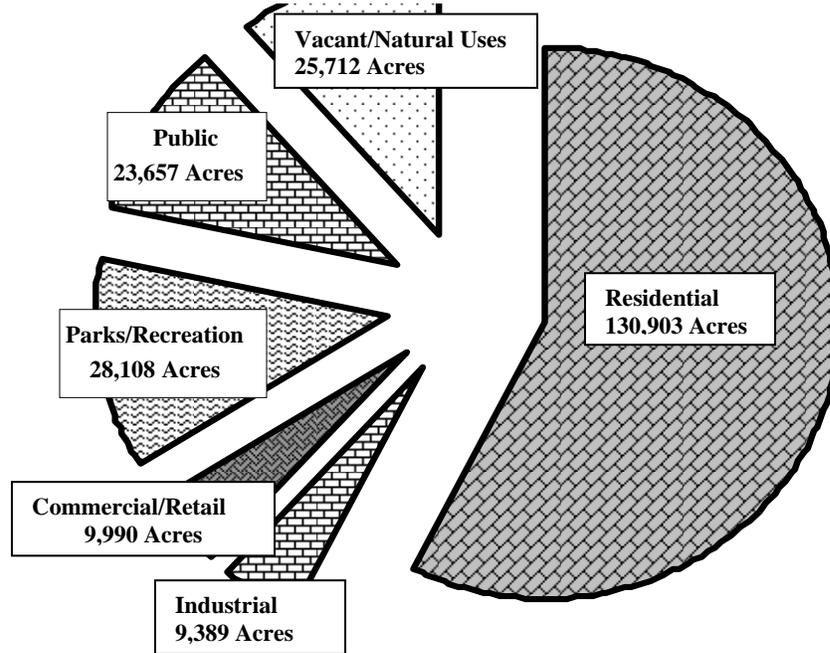
In 2006, county staff began a series of discussions to determine which agencies currently possess ecological data and whether or not other agencies could utilize various ecological data as a shared resource. These data include Resource Protection Areas, wetlands, vegetative communities, hydric soils, tree cover and open space as well as archaeological and cultural resources. The Park Authority has spearheaded the effort to identify data resources and to develop analysis models to evaluate these data. Once appropriate models and protocols have been developed, they may be used in the future to identify areas that could be targeted for conservation or protection. Currently, the final product of this endeavor is envisioned as a model that will allow county staff to evaluate ecological resources. Also included will be a detailed report listing data sources needed and a plan to consolidate these data and recommendations on the applicability and appropriateness of the model and its limitations.

C. 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 and, going forward, will be captured in the Integrated Parcel Lifecycle System. This section uses 2004 data from UDIS. Fairfax County has 227,751 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 II-3: Existing Land Uses in Fairfax County

Source: Fairfax County Department of Systems Management for Human Services, 2004.

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

- Residential—acres dedicated to living. Residential acres are measured by the number of dwelling units per acre. 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, 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 1/4 of 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. Major Plan revisions took place in 1975 and 1991. The 1991 Plan, that is the foundation for the current 2003 edition, was developed 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 plus a Chesapeake Bay Supplement. The functional sections are: Land Use, Transportation, Housing, Environment, Human Services, Public Facilities, Parks and Recreation, Revitalization, Economic Development and Heritage Resources.

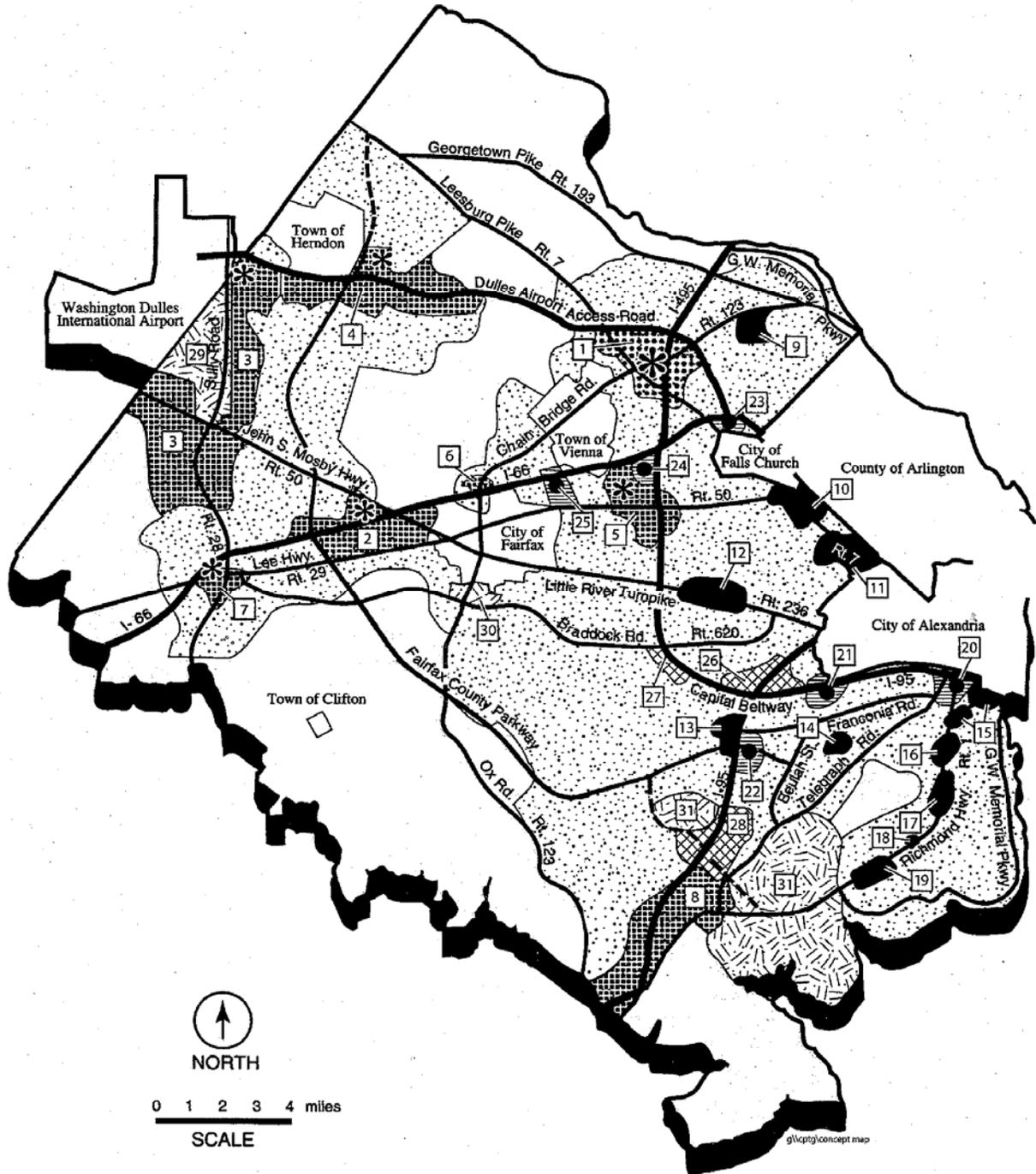
a. Concept Map for Future Development

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 II-4). While the Concept Map was not formally adopted, it is an integral part of the Area Plans.

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 was reviewed in 2005 with recommendations presented in 2006. A comprehensive review of the complete Policy Plan is not anticipated in the future due to the overall complexity of the complete document.

Figure II-4: 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 Dom 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

b. Area Plan Review

The Area Plans Review process is a community-wide review of site specific changes proposed to the Area Plan volumes of the Comprehensive Plan. The APR process is organized by the Supervisor Districts. The northern portion of the county, which includes Dranesville, Hunter Mill, Providence and Sully districts, was reviewed in 2004-2005. The southern portion, which includes Braddock, Lee, Mason, Mount Vernon and Springfield districts, was reviewed in 2005-2006.

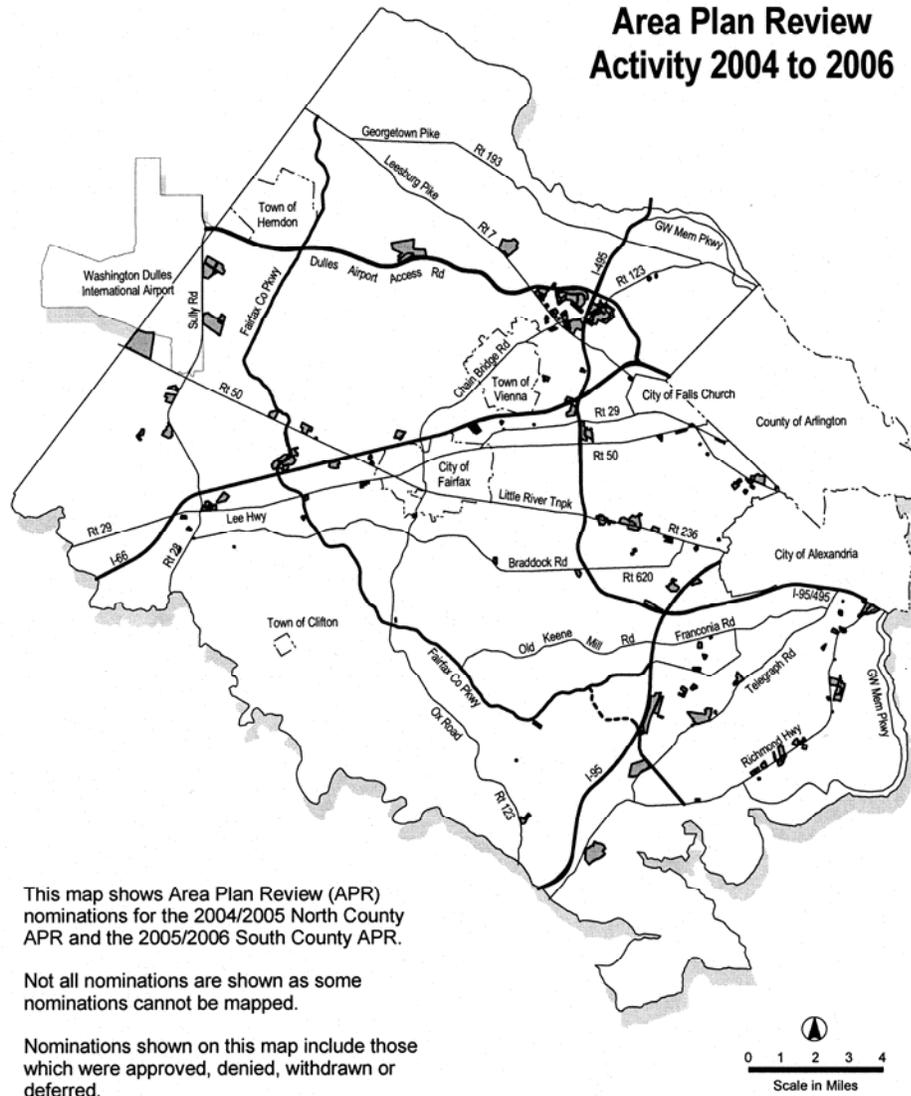
The APR task force for each district is appointed by the district supervisor. Each task force reviews proposed changes at a public hearing and submits a recommendation to the Planning Commission. This is accompanied by a staff recommendation that may or may not concur with the task force recommendation.

Figure II-5 provides an overview of the Area Plan Review activity for the most recent North County and South County APR processes. The nominations span the county. Whereas the plans for Urban, Suburban and Transit Stations are comprehensive in scope, the APR nominations are opportunistic. Each nomination is analyzed thoroughly by staff to consider factors such as impact on transportation, education and environmental resources of the individual nominations. The cumulative effect, however, is not analyzed. Such a concern was the motivation to defer nominations in Tysons Corner and appoint a task force to look at comprehensive changes.

c. Lee District Planning Process

The Lee District planning process is a unique review process that has been in place since 1976. This interjects a step before the public hearing at the Fairfax County Planning Commission. All land use cases (rezonings, special exceptions and changes to the Comprehensive Plan) are presented to the Lee District Land Use Advisory Committee. The committee asks questions, makes comments, etc. When all the information is available, the committee votes to either recommend approval or denial of the application. The Lee District Planning Commissioner participates in these meeting and typically supports the committee decision at the Planning Commission public hearing.

Figure II-5.



d. Chesapeake Bay Preservation Ordinance

Another important ordinance that affects land use is the county's Chesapeake Bay Preservation Ordinance. Amendments to this Ordinance were 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 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:

- A tidal wetland.
- A tidal shore.
- A water body with perennial flow.
- A non-tidal wetland connected by surface flow and contiguous to a tidal wetland or water body with perennial flow.
- A buffer area that includes any land within a major floodplain or any land within 100 feet of a feature listed in the four bullets above.

The Chesapeake Bay Supplement, which was incorporated into the Policy Plan in 2004, 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 History and Buildout Projections

The Comprehensive Plan contains land use recommendations for all of the land in the county. When the concept plan was conceived in 1990 there was a significant amount of vacant land so it could address changes across the county. That vacant land has been steadily decreasing as shown in Table II-1. In 2004, with only approximately 11% vacant and much of that fragmented, the decisions are much more constrained. Significant planning changes require decisions that will most likely affect existing developed land.

Table II-1 Vacant Land in Fairfax County			
Year	Vacant Land (acres)	Total Planned Land (acres)	Percent Vacant
1980	75,550	234,744	32.2 percent
1985	66,685	232,941	29.2 percent
1990	45,042	230,678	19.5 percent
1995	37,006	229,366	16.1 percent
2000	29,529	228,541	12.9 percent
2004	24,307	227,751	10.7 percent
Planned land does not generally include public roads and water			
Source: Fairfax County Demographic Reports, 2004			

The current land use categories are shown in Table II-2 below. Currently, 57.5 percent of the county land is developed for residential use, with 4.4 percent for commercial. These numbers show the land devoted to 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.

Table II-2 Existing Land Uses		
Land by existing use	Acreage	Percent of Total
Residential	130,903	57.5 percent
Industrial	9,389	4.1 percent
Commercial	9,990	4.4 percent
Parks and Recreation	28,108	12.3 percent
Public	23,657	10.4 percent
Vacant & Natural	25,712	11.3 percent
Total	227,759*	100.0 percent
*Does not generally include public roads and water		
Source: Fairfax County Demographic Reports 2004		

As the current Plan is exercised and the county reaches build-out, the planned land use acreage is shown in Table II-3. All vacant and natural land will be developed or become parkland. The ratios between the types will change, with the residential increasing to 63 percent 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.”¹⁰

4. 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

¹⁰ Fairfax County Demographic Reports, 2004

Table II-3 Planned Land Uses				
Land Use	Planned Acreage	Percent of Total Land in the County	Vacant/Underutilized Land	Vacant Land as a percent of Planned Acreage
Residential	143,496	63.0 percent	22,505	15.7 percent
Industrial	8,290	3.6 percent	2,326	28.1 percent
Commercial	5,259	2.3 percent	710	13.5 percent
Public Facilities and Mixed Use	26,725	11.7 percent	1,356	5.1 percent
Parks, Recreation, Floodplains	43,852	19.3 percent	3,779	8.6 percent
Vacant and Natural	-	-		
TOTAL	227,622	100.0 percent	30,676	13.5 percent
Source: Fairfax County Demographic Reports, 2004				

allowing for a comparison of existing and planned development levels, Table II-4 shows the “existing conditions” for both nonresidential and residential development as they existed in Fairfax County in the years 1990, 1994 and 2002.

Residential and nonresidential growth in Fairfax County is expected to continue, and the county’s Comprehensive Plan anticipates and guides this growth. Table II-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.

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 process and through Plan amendments and land use studies authorized by the Board of Supervisors, since that time. As can be seen in Table II-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 II-5 have increased since 1991.

Table II-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			

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

Table II-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 percent
Single Family Attached	78,600	82,700	86,200	88,900	10,300	13 percent
Multifamily	83,200	114,400	140,600	153,500	70,300	84 percent
Total	377,900	409,300	439,600	457,600	79,700	21 percent

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

- Increasing in total number—as the population grows, Fairfax County is able to expand through Plan changes that increase the number of potential units.
- Getting closer—the trend is to add more multi-family units (an 84 percent increase since 1989) while maintaining a consistent number of single family detached homes.

D. 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 that has been 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 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 the environment. Trucks, whether they are local, inter-county or interstate, are serious contributors to the 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 rush hour periods. Many of these buses are old and are a hazard to the environment, again because of the type of fuel they use.
- Non-motorized transportation opportunities, 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 a 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.

2. 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 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 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 II-6. 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 II-7. 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:

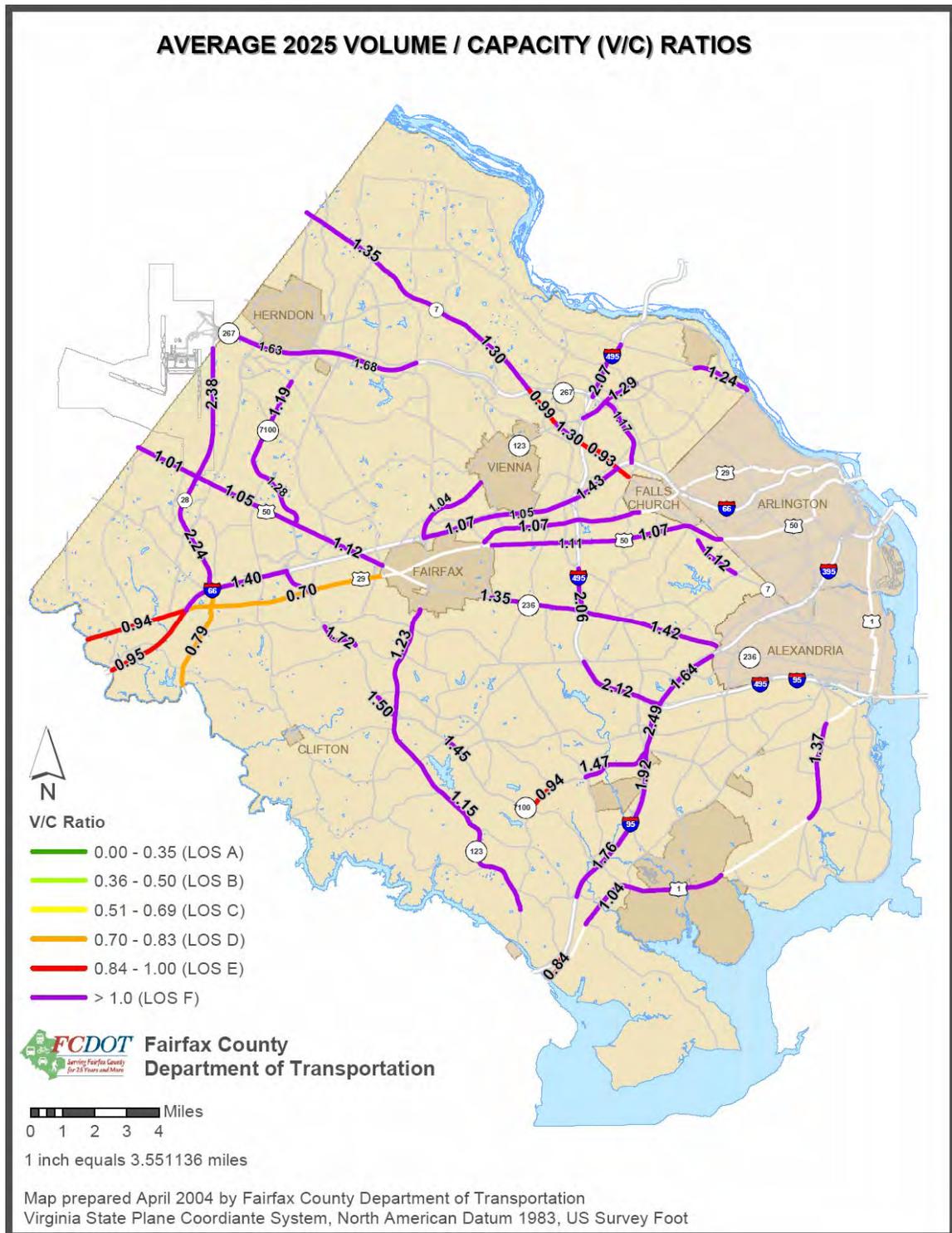
- The failing highways are still failing, some much worse and others actually better:
 - I-66 West of the City of Fairfax will get increasingly more congested, while I-66 east of Fairfax will get less congested.
 - The Beltway will become considerably more congested, with V/C ratios ranging from 1.5 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.
- 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.
- 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.

Figure II-6.
Average Volume/Capacity V/C Ratios -
Existing Peak Hour Conditions (2002)



Source: Fairfax County Department of Transportation

Figure II-7.



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 HOT lanes on the Beltway.

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 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.

Frequently the focus of transportation congestion is on big projects, such as the mixing bowl or HOT lanes. This needs to be balanced with regular maintenance of the existing infrastructure. An important policy identified by the Coalition for Smarter Growth is “fix-it-first” to ensure that all state maintenance needs are met and to direct funding to fixing problems on existing roads and transit prior to funding new construction.¹¹ As infill becomes the primary mode of development, the existing infrastructure will demand more resources to accommodate denser developments.

3. Residential Commuting

An interesting statistic on commuter patterns is that over 50 percent of the residents in Fairfax County work in Fairfax County (see Table II-7), with another 17 percent working in the District of Columbia. Similarly, most of the workers in Fairfax County live in Fairfax County (see Table II-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.

4. 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.

¹¹ <http://www.smartergrowth.net/vision/regions/region.html>

Table II-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 percent
District of Columbia	88,908	16.86 percent
Arlington Co, VA	48,670	9.23 percent
Alexandria City VA	27,641	5.24 percent
Montgomery Co, MD	16,943	3.21 percent
Loudoun Co, VA	16,420	3.11 percent
Fairfax City, VA	15,741	2.98 percent
Prince George's Co, MD	9,594	1.82 percent
Prince William Co, VA	7,013	1.33 percent
Falls Church City, VA	4,061	0.77 percent
Source: U.S. Census Bureau, Commuting Patterns of Fairfax County, Virginia Residents, 2000 ¹²		

Table II-8	
Where Do 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 paved roadway consume roughly:

$$35 \text{ miles} * 5,280 \text{ ft/mile} * 4 \text{ lanes} * 14 \text{ ft/lane} = 10,348,800 \text{ ft}^2 = 237 \text{ acres}$$

This does not count medians or access roads. For comparison, the Pentagon covers 29 acres, or 1/10th the total paved surface of the Parkway. A similar Metro right of way is a much thinner with a higher peak capacity. As the

¹² www.fairfaxcounty.gov/comm/demogrph/publist.htm

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 Centre Virginia Railway Express 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 use 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.

5. 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 commonwealth of Virginia owns and maintains every public 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.¹³ 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 has final approval authority over the six-year transportation program for the entire state. Under guidance of the CTB, the Virginia Department of Transportation is responsible for building, maintaining and operating the state's roads, bridges and tunnels.

¹³ Northern Virginia Transportation Commission Web site: <http://www.thinkoutsidethecar.org/nvtc.asp>
Funding Resource Guide:
<http://www.thinkoutsidethecar.org/pdfs/September%202029,%202003%20Revised%20Transit%20Funding%20Resource%20Guide.pdf>

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 Metropolitan Washington Council of Governments. Specific projects will be submitted by the commonwealth of Virginia for inclusion in Washington region's financially Constrained Long Range Plan 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.

The Columbia Pike Transit Alternatives Analysis (Pike Transit Initiative)¹⁴ is a study sponsored by the Washington Metropolitan Area Transit Authority in conjunction with Arlington County and Fairfax County. The study analyzed 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 developed a preferred transit investment for the corridor that will support the county's redevelopment initiatives.

The Columbia Pike Transit Alternatives Analysis describes the preferred "modified streetcar" alternative – an initial streetcar line with supporting bus service – recommended by the study team to be carried forward into the next phase of the project development process. On April 26, 2006, the Arlington County Board unanimously endorsed the Modified Streetcar Alternative as the preferred transit alternative for the Columbia Pike corridor. The Fairfax County Board of Supervisors also endorsed the Alternative on May 1, 2006. These actions permit the project to advance into the next phase of development, which includes environmental documentation, development of a financial strategy and conceptual system design. Currently, the study team is analyzing the funding sources and financing options available to support the proposed transit improvements in the Columbia Pike corridor.

¹⁴ Columbia Pike Transit Initiative: <http://www.piketransit.com/>

6. 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 Trails and Sidewalks Committee continues to improve the trail connections to transit facilities by working with Metro, the Virginia Department of Transportation and the Fairfax County Department of Transportation. The committee 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.

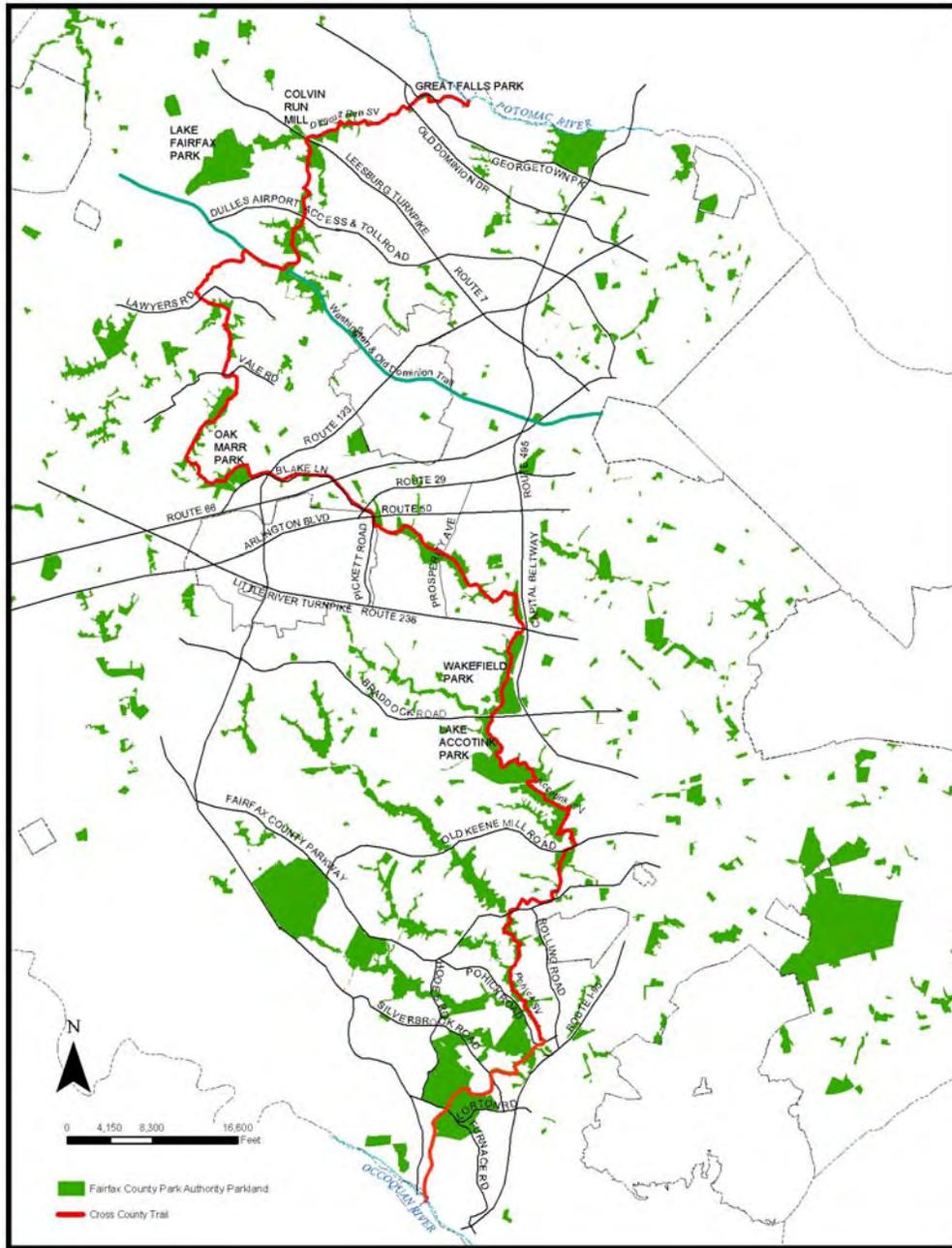
The Countywide Trails Plan added on-road bike routes as a new category of trails. These trails are proposed along routes suitable for commuting and for travel to places for recreational purposes. It is expected that the planned on-road bike routes will be installed with future highway improvements according 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 to 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 now a reality. After six years of work the Cross County Trail (Figure II-8) was completed in December 2005. This milestone project was celebrated at Trailfest on

May 6, 2006 with more than 10,000 residents participating in the day-long festivities.

Figure II-8: Cross County Trail



Source: Fairfax County Park Authority

It is difficult to predict how many commuters will use the trail, but the trail's completion makes possible connections to Metro stations as well as local trips for areas of shopping, some schools and other trails. With high gasoline prices, more residents are expected to turn to bicycles and other alternative modes of transportation in the future.

The Board of Supervisors' FY 2005 Four-Year Transportation Program funded nearly \$11 million for pedestrian projects. The FY 2007 Budget funded \$2.5 million for bus stop pedestrian projects. The proposed 2007 Transportation Bond will fund \$15 million for additional pedestrian projects and nearly \$8 million for additional bus stop projects. This and other programmed funding totals approximately \$37 million towards the Pedestrian Task Force's 2006 Ten-Year Funding Goal of \$60 million. Construction was recently completed on significant sidewalk segments on Richmond Highway, Little River Turnpike and in Reston. Separately, Fairfax County provided funding to VDOT to install countdown pedestrian signals at over 110 priority intersections. These signals have high visibility lighting and display the walk interval in seconds. Also, the Board of Supervisors approved changes in the Public Facilities Manual, which requires sidewalk construction on both sides of roadways in almost all new subdivisions.

The Transportation Demand Management Proffer Coordinator position was established and filled. TDM proffers decrease single occupant vehicle trips by recording commitments during the land development process to encourage use of car pools, mass transit, walking and bicycling. In addition to promoting alternatives to single occupant vehicle trips, TDM proffers can contain goals for percentage reductions in vehicle trips. These goals can be backed-up by remedies and penalties. This position will oversee TDM proffers and special conditions development, coordinate with developers and staff to create proffers that reduce reliance on single occupant vehicle trips and monitor and evaluate proffer and special condition implementation. FCDOT is also undertaking a consultant study, with a best practices review, to increase the effectiveness and efficiency of the TDM proffer process.

A number of programs are underway as part of the county's Bicycle Initiative:

FCDOT is coordinating with VDOT to re-stripe priority roadway segments for bike lanes as part of several overlay/paving projects. FCDOT is also coordinating with Facilities Management to re-evaluate county facilities in order to make them more bike friendly and accessible.

Work has been initiated to define potential areas for an Interconnected Network Pilot Bicycle Program. Potential sites include Vienna-Dunn

Loring-Merrifield Town Center, Tysons Corner and Seven-Corners-East Falls Church Metro.

A Bicycle Rental Program has been established with ten lockers available at both the Reston East and Herndon Monroe Park-and-Ride lots.

A telephone line (703-324-BIKE), Web page and e-mail box (bicycleprograms@fairfaxcounty.gov) are now operational.

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. This program partners with area businesses to facilitate the creation and implementation of Commuter Programs. Commuter Programs have been shown to improve productivity, make recruitment and retentions easier and improve morale. The Employer Services Program also partners with businesses and the state and federal governments to encourage telecommuting and the use of mass transit, carpools, vanpools, biking and walking instead of drive alone commuting.

A description of the Employers Service Program can be found on the county's Web site at: 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 participate in 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.

With respect to the county's telework program, the increased publicity and organizational focus on teleworking has resulted in an increase in the number of teleworkers, from 138 in December 2001 to 1,175 in 2006. By the end of 2005, the county had met its goal of 1,000 teleworkers (a number that is based on the Council of Government's goal of 20 percent of the regions' eligible workforce teleworking by 2005). By meeting this goal, it is estimated that county teleworkers potentially saved 59,000 commuting hours and 1.8 million commuting miles in a year. The county will continue to increase the number of county workers who telework and will emphasize telework as an important component of its Continuity of Operations Planning.

c. Community Residential Services Program

This program partners with multi-family complexes, area developers and civic organizations to facilitate the creation and implementation of Community Transportation Programs. These programs have been shown to increase the attractiveness of a residence and impact decisions on where to live. The Community Residential Program promotes telecommuting and the use of mass transit, carpools, vanpools, biking and walking instead of drive-alone commuting.

E. THE INTERRELATIONSHIP BETWEEN LAND USE AND TRANSPORTATION

The above sections presented “Land Use” and “Transportation” as separate environmental issues. The focus of this section is on the interrelationship between land use and transportation. Throughout this chapter, three fundamental observations about Fairfax County have been examined. They are:

- The county is rapidly approaching build-out and is transitioning from a growth focus to redevelopment.
- The county transportation systems are strained by congestion and getting further constrained by sprawl beyond the county.
- The county will continue to grow in population and prosperity. It needs to provide residential, commercial and transportation options for more people.

As the concept plan becomes realized, the transportation infrastructure must be in place to accommodate those new living and working populations. With the county reaching build-out, the transportation options are constrained. Dense options, such as Metro and HOV, are enablers of future growth. Alternatives and choices, such as mixed use development, transit oriented development, telecommuting and flex-work, reduce the amount of transportation that is required.

Combining the land use projections with transportation planning is essential for the county to continue to grow and prosper. By considering the land use and transportation facets of future decisions together, the county can continue to maintain a high quality of life. Conversely, when land use or transportation decisions are made in isolation, they will exacerbate the problems of build-out and congestion and negatively impact quality of life.

The county has already started along this path with the designation of Urban, Suburban and Transit centers. The Board of Supervisors has adopted Comprehensive Plan guidance for several such areas based on the recommendations of board-appointed task forces. The comprehensive results of these efforts have

been impressive, and EQAC anticipates similar results from ongoing and future task force efforts. Equally important are policy changes that encourage more comprehensive planning, such as Transportation Demand Management.

1. Programs, Projects and Analyses

This section outlines projects that have combined elements of land use and transportation via special studies or revitalization districts that incorporate mixed use and transit oriented development.

The establishment of Urban Centers, Suburban Centers and Transit Station Areas (as shown in the Concept Map for Future Development) in critical locations in the county is a fundamental prerequisite to achieving many of those objectives. Significant effort is now focused on the Tysons Corner Urban Center, where plans call for four additional Metro stations. By preparing and planning for future development, the county is making progress towards integrating land use and transportation.

a. Tysons Corner Urban Center

The Comprehensive Plan classifies Tysons Corner as the only Urban Center in Fairfax County: an urban center that is planned for 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.

In March 2005, the Fairfax County Board of Supervisors created the Tysons Land Use Task Force to consider the impacts of the four planned Metrorail stations in Tysons Corner. The mission of the Task Force is to gather community input and recommend updates to the Comprehensive Plan for this area. The task force is a 36-member group representing residents, businesses, major employers and community and civic organizations. The task force and the county are working together with the community to create a collective vision for a positive and exciting future for Tysons Corner.

The task force's first task was to study the 1994 Fairfax County Comprehensive Plan and issues related to planning for growth and transit-oriented design. The task force then sought extensive public input to identify key values and concerns for the future of Tysons Corner. In January and February 2006, the task force talked with 424 people – via 20 dialogues and on-line comments – who identified a wide variety of important community values, issues and concerns regarding Tysons' future. These values included creating an increased sense of place in Tysons Corner, improving traffic conditions, protecting surrounding communities, increasing residential options and managing growth, among others.

After considering all of the values and issues raised by the community, the task force identified a set of draft guiding planning principles to provide clear and fundamental direction for planning a future model of Tysons. The Guiding Planning Principles were finalized in October 2006, and can be found at the Tysons Web site. In March 2007, over 300 Tysons area stakeholders participated in six task force workshops to provide input on how future development should be allocated in Tysons Corner and what would make a future Tysons a more livable community. Stakeholders identified the desire for more green space and civic uses; increasing the ability to move around within Tysons; focusing growth at transit stations; achieving higher density around stations; and ensuring lower density on the edge of Tysons. In July, 300 stakeholders attended several public workshops and employee meetings to talk about how these desires might be incorporated into test scenarios at different levels of density which further reinforced issues important for revisions to the Comprehensive Plan. In early 2008, this input will be used to develop two advanced alternatives which will be vetted in public workshops before final recommendations are developed and presented to the Board of Supervisors.

While the Tysons Land Use Task Force is coordinating revisions to the Comprehensive Plan dealing with land use, the project to extend rail into and through Tysons Corner is moving forward. These two projects are closely related, but are not working together because they report to two different authorities. The current schedule for the aerial rail alignment calls for utility relocation to start in fall 2007 with completion by 2012.

b. Dulles Corridor Metrorail 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. 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.

The Dulles Metrorail is a new 23-mile Metrorail line, extending service from the existing Orange Line at the East Falls Church station to Route 772/Ryan Road in Loudoun County. The project environmental reviews are completed and the Virginia Department of Rail and Public Transportation has begun the preliminary engineering process. Construction is expected to start in 2007.

c. Suburban Centers

The county has designated seven areas as Suburban centers. These contain a complementary mixture of office, retail, residential uses and parks (including Urban Parks and active recreation facilities) in a cohesive, moderate intensity setting. The Reston and Merrifield Suburban centers are presented as representative of the comprehensive approach at each area.

Reston Suburban Center: The purpose of the plan for the Reston Suburban Center area is to encourage a more urban and transit-oriented development pattern. The objective is to create, at each Transit Station Area, 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.

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 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.*

The Merrifield plan is in the midst of becoming reality. The Merrifield task force spent two years developing the plan as adopted by the county. Between 2001 and 2005 changes in Merrifield were minimal. In 2005 and 2006, significant construction began and there are several large projects currently underway.

The task force approached the plan changes in a new way. It started with the zoning as it existed and created a by-right baseline for what could be constructed. It then had a traffic model constructed based on the by-right baseline. The induced traffic would clearly overwhelm the transportation system. With that knowledge, they created a vision for a workable integrated district. The result is the dual core plan with density around the transit station and a town center away from the transit station connected by a main street. The main street allows traditional moderate rent-based suburban businesses to remain in the district as intense economic development occurs in the new core areas.

The lessons from the Merrifield task force include:

- Understanding the by-right baseline
- Modeling transportation demand and integrating land use and transportation
- Comprehensive land use planning to include community concerns, mixed uses, affordable housing, business stability and economic growth
- Comprehensive transportation planning to include transit oriented development, street grids, pedestrian access, mass transit.

d. Transit Station Areas

The county contains six Metro transit stations with four more slated for Tysons Corner and additional stations stretching through Dulles Airport along the Orange Line. These Metro stations are evolving into the transportation hubs for the county. Redevelopment can be seen at each Metro station. At both the Vienna and Dunn Loring-Merrifield Metro

stations, the Washington Metropolitan Area Transit Authority is in the process of selling land adjacent to the stations to be transformed into transit oriented developments. These transit oriented projects provide the density for future growth with a smaller per-person traffic demand than single family housing that is typical in the county.

Some of the important lessons from the Fairlee development proposed adjacent to the Vienna Metro include:

- Metro Capacity—the Metro system needs to expand to support new riders at these denser developments. Consideration is needed for both additional Metro cars and bottlenecks in the system, such as the Rosslyn tunnel.
- Replacement of Metro Parking—as redevelopment occurs at the transit stations, existing commuters need to be accommodated.
- School Capacity—as density increases, public facilities and schools need to be enhanced and expanded to support new residents.
- Transportation – Transportation Demand Management needs to be in place to verify transportation projections are in line with the development reality and mitigation plans need to be approved in advance. The Fairlee project highlighted the need for better TDM across the county.
- Environmental Issues—include protecting the environment and providing environmental or natural space for residents. Environmental protection includes stormwater management as well as preserving air quality, managing waste, recycling and “green” building to minimize energy consumption. Environmental opportunity means that additional open space needs to be preserved for a denser human population.
- Mix of Uses—the mix of uses should help to create a synergy of uses resulting in an opportunity for both current and new residents to walk to shopping and other services in their neighborhood.
- Protection of Stable Neighborhoods— any increased density should be focused and constrained in a core area of the Metro station platform. The purpose of focusing density is twofold: first, TOD studies show that the highest percentage of transit ridership is generated by development within ¼ mile of the platform and that transit ridership drops off past the quarter mile. Secondly, the protection of stable neighborhoods requires that higher density be constrained and that density does not creep beyond clear, logical boundaries.

These lessons were specifically identified in the Fairlee Comprehensive Plan motion with specific language written into the Plan amendment to address them. As other transit stations are developed, similar consideration will be required.

e. Summary

With the advent of build-out and the continued growth within the county, new development will be much more complicated than the initial development within the county. There will be changes imposed on existing residents and businesses and impacts that are both real and perceived. Integrated land use and transportation planning is essential to maintain our quality of life into the future.

From an environmental perspective, the initial development of the county created a baseline that currently exists. As redevelopment occurs, be it at higher density or simply expanding existing development, the county goal should be to improve the existing baseline. There is no need for any further environmental degradation.

By continuing to integrate land use and transportation planning, the county can change and grow without sacrificing our quality of life.

F. ACCOMPLISHMENTS

Over the past years, Fairfax County has made changes to improve the county’s ability to integrate land use and transportation.

- Adopting the Board of Supervisors Environmental Vision and creating the Environmental Improvement Plan to achieve that vision.
- Implementation of the Integrated Parcel Lifecycle System, which replaced UDIS and integrates land use data into the county’s award winning GIS.
- Completing the demographic survey, which collects important data about future projections for the county population and residents’ issues through 2025.

The county has also initiated several studies and task forces working on specific land use and transportation projects:

- The Tysons Land Use Task Force charged with providing recommendations to update the 1994 land use plan for Tysons Corner.
- The Planning Commission work on Transit Oriented Development, Low impact Development standards and Transportation Demand Management.

- The GIS Outreach Committee to better understand residents' needs and concerns for GIS information.

Several lessons have also been incorporated into the county planning process and the Area Plan reviews. Every proposed project includes staff analysis of induced transportation, educational and environmental impacts. This systematic modeling is an accomplishment and EQAC encourages continued incorporation of new modeling information for proposed projects.

The county also achieved the significant goal of 20 percent staff participation in telework.

G. COMMENTS AND ONGOING CONCERNS

1. Build on the County's Successes

EQAC commends the Board of Supervisors for actively supporting teleworking among the county staff and by employers throughout the county and for reaching its goal of 20 percent participation by county staff. EQAC encourages the county to publicize this success, publish the best practices and lessons learned and encourage others to follow. The county should also continue to work with the federal government and other jurisdictions to encourage them to set similar goals, and the county should work with the Virginia Congressional Delegation to secure resources to establish teleworking sites within the county.

2. Improve Transit Utilization

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

3. Comprehensive Understanding

The county is very good at understanding micro changes in the county. EQAC is concerned that the county is missing the macro effects of these micro changes. The new IPLS system provides a base capability to capture and analyze the changes. EQAC's recommendations in the past to replace UDIS identified specific benefits. EQAC will continue to work with staff as IPLS evolves to realize those benefits:

- Evaluate planning issues and development options, account for Comprehensive Plan changes and capture real time plan changes.

- Facilitate public safety and plan for emergency preparedness.
- Forecast future growth.
- Understand and analyze land use at a finer resolution and provide information on mixed use.
- Evaluate the environmental effect of each parcel and provide data necessary for modeling and understanding the cumulative effect of development.

EQAC commends the county for its decision to acquire a full set of planimetric data and oblique imagery. The full planimetric data layer is an important addition to the gathering of base land use data. Oblique imagery is just starting to be leveraged, but it can transform the way the county plans land use.

4. Disparate Authorities

EQAC is concerned that the county does not have sufficient authority over transportation decisions that are in the county's best interest. The Governor's decision on the Tysons Corner aerial rail alignment, even though all parties agreed the tunnel was preferable, shows how conflicting goals will result in inferior results. The aerial route will create less efficient transportation around the rail pillars, resulting in more air pollution in the urban core, less available surface area to manage and mitigate environmental impacts and inefficient entrance and egress at stations disconnected from the surrounding buildings.

The Virginia HOT Lane project is also of concern and needs to be monitored closely. This project directly impacts the county but is being managed by VDOT with two private companies, Fluor and Transurban.

5. Green Buildings

The county is making strides to encourage green building in new developments. EQAC commends this effort and encourages the county to expedite policies that encourage green building and energy conservation practices as part of the land use planning process.

H. RECOMMENDATIONS

1. Land Use and Transportation Vision and Assessment

The current Fairfax County Comprehensive Plan traces its roots back to the Planning Land Use System program that culminated in 1975 and the "Goals for Fairfax County" adopted in 1988. Numerous reviews and regular updates have occurred over the past 30 years, yet as stated in the current Plan: "Many of the key components of the 1975 Plan remain in the revised Plan, such as the emphasis on focusing growth in "Centers"; decreasing automobile dependency;

and protecting environmentally sensitive areas and stable neighborhoods. What has changed are some of the means to achieve these ends.”

As the county approaches build out, EQAC recommends that the county:

- a. Evaluate the State of the Plan and publish 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 (published in 1996) to cover plan activities between 1995-2005 and assess impacts through 2025. The current process of reviewing each section does not provide a comprehensive review of the interrelationships between sections, especially Land Use and Transportation, and does not review the underlying principles of the Plan.
- b. Assess the state of the county with respect to the Planning Land Use System Principles set forth in 1975 and the reality 30 years later. The PLUS Principles and planning approach were designed to achieve the following:
 - To increase local employment (in a period when Fairfax County was still primarily a bedroom suburb on the fringe of the urban core).
 - To decrease reliance on the private automobile by reducing the length of work trips and making mass transit facilities more easily accessible.
 - To reduce pressure for development in environmentally sensitive areas.
 - To preserve stable neighborhoods.
 - To lower costs by more efficient provision of public services.

The Comprehensive Plan provides guidance to balance these competing goals. This assessment will help clarify the historical lessons learned and identify areas that have proven successful at a macro level across the county and where it needs to be strengthened for a future vision.

2. Data and Modeling

- a. As noted throughout this chapter, EQAC commends the county for developing the GIS and data infrastructure necessary to integrate Land Use and Transportation planning and modeling. EQAC recommends that these tools and capabilities continue to be pushed out for use by the general public. EQAC understands that there are financial and training costs associated with these advanced technologies, but EQAC recommends that the county find ways to further empower the public and leverage its existing investments.
- b. EQAC recommends that the county begin leveraging three-dimensional models in the planning process. The first step is to maximize the use of

oblique data in the planning process, especially the Area Plans Review process. New proposals should include three-dimensional data that can be overlaid with county data to create realistic models.

- c. EQAC recommends that the county invest in models that leverage GIS capabilities and county data. This includes:
- Runoff models that use impervious surface data.
 - Improved transportation models that incorporate multi-modal systems.
 - Analysis of the macro effects of land use and transportation decisions.

These models should highlight congestion, air quality, commuting patterns and health effects for use in future decisions.

Such information is necessary as the county becomes more complex and densely developed. The county should also require Transportation Demand Management studies and plans for significant new development projects.

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An excellent bibliography of additional resource materials on the land use and transportation can be found at the Web site of the Washington Regional Network for Livable Communities: <http://www.washingtonregion.net/programs/index.html>