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An Evaluation of County Comprehensive Plans in Virginia

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The study found that most of the comprehensive plans had an inventory, an assessment, and recommendations, although the assessments were mostly qualitative instead of analytical. Approximately one fourth of the plans reviewed contained recommendations limited to policies, rather than specific transportation infrastructure improvements. The comprehensive plans were in a wide variety of formats and styles, and some contained blatant inconsistencies between the transportation and the economic development sections.

This report also provides a list of modes for technical assistance by the Virginia Department of Transportation found in the comprehensive plans, guidance for VDOT staff regarding review of the plans, and a list of threats to the safety and operational integrity of the state highway system found in the comprehensive plans. The costs and benefits of the findings in this research are mainly related to staff time and better county comprehensive plan documents. The appendices provide a description of each plan and a template for the transportation element of a local comprehensive plan.

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FINAL REPORT

AN EVALUATION OF COUNTY COMPREHENSIVE PLANS IN VIRGINIA

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ABSTRACT

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INTRODUCTION

Legislative Overview

Localities in Virginia are required by the *Code of Virginia,* § 15.2-2223, to adopt a comprehensive plan. In 2004, the *Code* was amended to *require* the inclusion of a transportation element in local comprehensive plans, whereas previously it had been merely suggested that a transportation element be included:

> The comprehensive plan shall include a transportation element that designates a system of transportation infrastructure needs and recommendations that shall include, as appropriate, but not be limited to, roadways, bicycle accommodations, pedestrian accommodations, railways, bridges, waterways, airports, ports, and public transportation facilities. The Virginia Department of Transportation shall, upon request, provide localities with technical assistance in preparing such transportation element.[1]

In 2006, the General Assembly further amended the *Code* to require the inclusion of a transportation *plan* (rather than a transportation element), one noteworthy feature of which is that the plan should functionally classify roads:

> As part of the comprehensive plan, each locality shall develop a transportation plan that designates a system of transportation infrastructure needs and recommendations that may include the designation of new and expanded transportation facilities and that support the planned development of the territory covered by the plan and shall include, as appropriate, but not be limited to, roadways, bicycle accommodations, pedestrian accommodations, railways, bridges, waterways, airports, ports, and public transportation facilities. *The plan should recognize and differentiate among a hierarchy of roads such as expressways, arterials, and collectors.* The Virginia Department of Transportation shall, upon request, provide localities with technical assistance in preparing such transportation plan (emphasis added).[2]

This amendment also provides for extensive review of comprehensive plans and their required transportation plans by the Virginia Department of Transportation (VDOT):

> Prior to adoption of any comprehensive plan pursuant to § 15.2-2223, any part of a comprehensive plan pursuant to § 15.2-2228, or any amendment to any comprehensive plan as described in § 15.2-2229, the locality shall submit such plan or amendment to the Department of Transportation for review and comment if the plan or amendment will substantially affect transportation on state controlled highways as defined by regulations promulgated by the Department.

> Upon submission to, or initiation by, a locality of a proposed rezoning under § 15.2-2286, 15.2-2297, 15.2-2298, or 15.2-2303, the locality shall submit the proposal to the Department of Transportation within 10 business days of receipt thereof if the proposal will substantially affect transportation on state-controlled highways. Such application shall include a traffic impact statement if required by local ordinance or pursuant to regulations promulgated by the Department.
>
> The Department's comments on the proposed rezoning shall be based upon the comprehensive plan, regulations and guidelines of the Department, engineering and design considerations, any adopted regional or statewide plans and short and long term traffic impacts on and off site.[2]

Another amendment passed in 2006 requires that comprehensive plans include transportation maps and cost estimates that consider the future needs of the community and region:

> The plan shall include: a map that shall show road improvements and transportation improvements, including the cost estimates of such road and transportation improvements as available from the Virginia Department of Transportation, taking into account the current and future needs of residents in the locality while considering the current and future needs of the planning district within which the locality is situated.[3]

Original Project Proposal

The original proposal for this project, written after the 2004 amendments to the *Code,* described a variety of problems VDOT faced as a result of the 2004 amendments:

- Although the amended statute directs VDOT to provide assistance with the development of local transportation plans, VDOT did not at that time have a general policy for how to provide this assistance.

- At the time of the 2004 amendment, the staff of VDOT's Transportation and Mobility Planning Division (TMPD) determined that five counties and 48 towns (about 35 percent of the total) did not have a transportation element in their comprehensive plans. Of those that did, it was not known how many complied with the requirement that the transportation element designate "a system of transportation infrastructure needs and recommendations."

- The 2004 amendment did not provide guidance on how to designate the system of transportation needs and recommendations.

The amendments of 2006 added new elements to consider:

- The word *plan* was substituted for *element* in the requirements for comprehensive plans, without explanation. This change strongly suggests that the transportation plan be an actual plan and not a mere list. This is borne out by the 2006 amendment to Chapter 564, which requires "a map that shall show road improvements and transportation improvements, including the cost estimates of such road and transportation improvements" and that these should take into account "the current and

future needs of residents in the locality while considering the current and future needs of the planning district within which the locality is situated."

- The required transportation plans were to recognize and differentiate among a hierarchy of roads such as expressways, arterials, and collectors.

- Prior to the adoption of any comprehensive plan or any amendment to any comprehensive plan, the locality is required to submit such a plan or amendment to VDOT for review and comment if the plan or amendment will substantially affect transportation on state-controlled highways as defined by regulations promulgated by VDOT.

To address the issues raised in the 2004 legislation, the original proposal for this project included the following four tasks:

1. Identify the necessary and optional components of a local comprehensive plan, and develop a procedure for designating a system of transportation infrastructure needs and recommendations that VDOT staff could use to fulfill the obligations of the new statute.

2. Evaluate the current status of transportation elements in the comprehensive plans of Virginia localities.

3. Develop a "toolbox" of strategies, templates, and techniques that VDOT planning staff can use to assist localities in the development of transportation elements in their comprehensive plans.

4. Explore the integration of local transportation plans with VDOT land development services and transportation system operations through pilot studies with selected counties.

However, in the interim, Task 1 was accomplished by TMPD issuing a memorandum[4] to the planning staffs of VDOT and the Virginia Transportation Research Council (VTRC) regarding necessary and optional components of the transportation element of a comprehensive plan.

Task 2, the evaluation of the comprehensive plans, is the principal focus of this report. Plans were collected and evaluated against the necessary and optional components described in the TMPD memo. This included an identification of opportunities for VDOT to assist localities and comprehensive plan policies and recommendations that constitute a threat to the safety and operations of the state highway system.

Task 3, the development of a toolbox, was to entail testing and validating the strategies proposed. The time required to conduct detailed interviews with local staff and officials would be significant. Further, it is likely that a long-term observation of the practical implementation of any novel strategies would also be needed to determine how well the strategies functioned

under the variety of planning paradigms evidenced by minimally staffed rural counties and well-staffed urbanized counties. Therefore, instead of testing the strategies, the researcher compiled a list of strategies and goals found in the comprehensive plans reviewed in Task 2 and presented them in the Discussion section of this report as a temporary substitute for the toolbox, along with an expanded, annotated version of the 2004 TMPD memo,[4] which is the template provided in Appendix C. Although these goals and strategies were not evaluated by the researcher, they could still be of utility to local staff and planning commissions and to VDOT staff, providing them with technical assistance during the development of a transportation plan. The task of developing tools and techniques that localities can use when developing their comprehensive plan was also the subject of a concurrent master's thesis by Kump.[5] In this thesis, Kump cataloged the existing computer modeling programs and techniques (including those that are spreadsheet based) and tested a strategy for developing traffic forecasts when there is insufficient detail to perform a classical trip generation analysis using the procedures documented in Chapter 5 of the *Trip Generation Handbook.*[6] Kump's thesis is incorporated by reference into this document.

Task 4 involved the researcher observing the development of the transportation element of a comprehensive plan. The researcher attended meetings for the development of the transportation element of Prince George County's comprehensive plan and participated as a technical reviewer in a corridor study of U.S. 29 in Albemarle County, which will ideally be adopted into Albemarle County's comprehensive plan. However, these comprehensive plan update efforts were delayed beyond the control of the researcher and were not finished at the time of this writing; therefore, this study focused primarily on Task 2, the evaluation of the comprehensive plans.

PURPOSE AND SCOPE

The purpose of this project was to address the lack of information and standardization with respect to the current status and future development of transportation elements of local comprehensive plans. The objectives were as follows:

- Evaluate the current status of transportation elements in the comprehensive plans of Virginia's counties using the criteria provided by TMPD.
- Document the disparate organizational styles of transportation elements in the comprehensive plans.
- Catalog novel goals and strategies for coordinating land use and transportation that were found during the review of the comprehensive plans.
- Expand the 2004 TMPD memo on comprehensive plans into a template by combining it with novel goals and strategies found in comprehensive plans.

VDOT does not maintain roads in cities and generally does not review land development proposals on city streets; therefore, this study was limited to counties in Virginia. Towns were

not included because many are served by the VDOT Small Urban Area Studies and the remainder screened by the researchers generally had plans that were out of date and limited in scope compared to those of counties. Throughout the project timeline, the comprehensive plans of 59 of Virginia's 95 counties representing a variety of geographic and economic conditions were acquired and reviewed. The organization of the plans was studied, and the content and detail provided in the transportation element were evaluated using criteria developed by VDOT's TMPD.

METHODOLOGY

The researchers gathered comprehensive plans from county websites, VDOT archives, planning district commissions (PDCs), and the Internet. The researchers searched for the comprehensive plan for every county, but in some cases the plan was not found, the transportation element alone was acquired, or merely information about it was acquired. A slight majority of counties in Virginia make their comprehensive plans available on the Internet, and these reflect a variety of geographic and economic conditions. The plans, and especially the transportation elements, were examined in light of guidance provided by TMPD.

The TMPD guidance for evaluating comprehensive plans consists of the following criteria for the essential components of a transportation element:

1. *Inventory:* an inventory (written or graphic) of the existing transportation network. This does not imply that every facility within the jurisdiction must be identified. The inventory may be as simple as a paragraph or two describing the major facilities within the locality or as complex as a detailed network inventory with facility maps.

2. *Assessment:* an evaluation of the transportation system(s). In its most basic form, a transportation assessment would be a written or graphic representation of facility performance and/or condition. This assessment would identify specific deficiencies.

3. *Recommendations:* proposed improvements or additions to the transportation infrastructure. Recommendations should be specific enough that the location and nature of the proposed improvement are clear and understandable.

These three criteria are excerpted from a policy memorandum from the TMPD's Policy and Procedures Section to VDOT and VTRC planning staff dated September 10, 2004 (see Appendix A). While reviewing the comprehensive plans for consistency with the TMPD guidance, the researcher also noted the organizational style of the transportation element and other notable content that might be useful to include in comprehensive plans during their legally required 5-year review and revision (*Code of Virginia,* § 15.2-2223). The review of the comprehensive plans proceeded through the following tasks, the order of which sometimes varied based on the organizational style of the plan.

1. Examine the table of contents or scan the entire comprehensive plan to determine if the transportation plan is a separate chapter, integrated with the public facilities, or dispersed into planning areas such as magisterial districts.

2. Determine if the plan has an inventory.

3. Determine if bicycle and pedestrian accommodations are described as a separate mode, a separate plan is included or referenced, or bicycle and pedestrian facilities are mentioned.

4. Determine if the assessment is analytical, cartographic, qualitative, or non-existent.

5. Determine if the recommendations are for improvements to specific facilities, limited to changes in policy, or non-existent.

6. Make note of any opportunities for VDOT, such as modes of technical assistance, a county's willingness to support access management, and county policies that discourage sprawl or highway-oriented strip development. The reader should note that VDOT might not be able to use the opportunities found in comprehensive plans because of the limitations on funding and staffing levels.

7. Make note of any novel goals, policies, or strategies that could benefit other localities if they were to adopt them.

8. For those counties where the entire plan, rather than the transportation plan, was acquired, examine the land use and/or economic development portion of the plan to determine if it is consistent with the transportation plan, presents threats to the operational integrity of VDOT facilities, or supports sustainable mobility.

9. Create a template that VDOT staff can use when they are asked by a locality to assist with the development of a local transportation plan, by combining the 2004 TMPD memo[4] with novel goals, policies, or strategies that could benefit other localities if they were to adopt them.

RESULTS

Characteristics of Comprehensive Plans

The researcher evaluated 59 county comprehensive plans (of the 95 counties in Virginia) in light of the criteria provided by TMPD by reading either the plan or the information provided by staff of various PDCs. Eighteen of the 59 plans were under development, and of these, there was enough information to evaluate 14 by the TMPD criteria. For the 4 others, only a notice or announcement about the development of the comprehensive plan was found. Therefore, the evaluations of the 59 plans include 14 for which only draft materials were found and reviewed. The inventory, assessment, and recommendations of each county reviewed by the researchers are described in Appendix B, and the template is provided in Appendix C. The results of the comprehensive plan review are summarized here.

Of the 59 plans reviewed, 57 had a transportation inventory consistent with the criteria supplied by TMPD (see Table 1). In two of the cases when the researcher obtained only

Table 1. Attributes of Comprehensive Plan Inventories and Number of Reviewed Plans That Have Them

Inventory Attribute	Number of Plans
Included in plan	59
Undetermined	2
Includes functional classification	29
Includes bike/ped accommodations	34
Does not mention bike/ped accommodations	13
References separate bike/ped plan	9
Bike/ped treatment undetermined	3

summary information, the existence or absence of a transportation inventory could not be determined. Inventories varied widely, from a mention of major corridors or tabulation of mileage by system (i.e., primary, secondary) to road maps of the county or tables of road segments. Twenty-nine of the counties included functional classification, and of these, 6 explicitly related highway functional classification to land use.

The treatment of bicycle and pedestrian accommodations, if present, could be organized into two groups: (1) describing bicycle and pedestrian accommodations as it describes any other mode, or (2) including a separate bicycle and pedestrian plan either by reference or in a separate chapter. Thirty-four of the plans reviewed treated bicycle and pedestrian accommodations as another mode, such as rail, transit, or air transportation. Nine of the plans incorporated separate bicycle and pedestrian plans, and 13 plans did not mention bicycle and pedestrian accommodations at all. As with the presence or absence of inventory information, for three of the counties, the researcher could not obtain enough information to determine the treatment of bicycles and pedestrians in the plan.

The comprehensive plan assessments can be characterized in the following ways: qualitative, analytical, cartographic, none included, and undeterminable (see Table 2). A qualitative assessment would include travel patterns, traffic volume forecasts, and descriptions of geometrics but not level of service (LOS) or volume/capacity (V/C) ratios. An analytical assessment would include LOS or V/C ratios in addition to the measures included in the qualitative assessments. The counties with cartographic assessments included a map of transportation needs, which suggested that some analysis of the transportation system had been conducted before the map was prepared. As with the inventory, for particular counties, only summary information was obtained and the type of assessment could not be determined.

The comprehensive plan recommendations were characterized in the following ways: those that recommend improvements to specific transportation facilities, such as widening a particular road, and those that recommend changes to policies related to transportation, such as

Table 2. Styles of Comprehensive Plan Assessments and Number of Plans That Exhibit Them

Assessment Style	Number of Plans
Qualitative	36
Analytical	12
Cartographic	4
None	3
Could not be determined	3
Incorporates state plans by reference	1

land development review policies (see Table 3). One county's comprehensive plan, Alleghany,[7] lacked recommendations but incorporated by reference several studies and plans developed by VDOT and other public agencies.

Augusta County,[8] Henrico County (in the 2010 plan),[9] Prince Edward County,[10] and Spotsylvania County[11] included cost estimates for the transportation improvements recommended in their comprehensive plans. The comprehensive plans from other counties did not include cost estimates for each of the recommended improvements in their comprehensive plan if they recommended transportation project improvements rather than policy changes.

Chapter 564 of the *2006 Acts of the General Assembly of Virginia* included a requirement that localities must include a map showing proposed transportation improvements in their comprehensive plan. Approximately one third of the county plans reviewed did not include such a map.

Table 3. Styles of Comprehensive Plan Recommendations and Number of Plans That Had Them

Recommendation Style	Number of Plans
Both policies and specific facility or project improvements	42
Limited to policies	16
Incorporates state plans by reference	1

Transportation Element Configurations

Comprehensive plans exhibited a wide varity of organizational styles, levels of sophistication, and degrees of completeness. It took 3 to 4 hours for the researchers to review each comprehensive plan because of the inconsistencies. One reason for the lengthy review time was that many, but not all, localities included policies in the land use or economic development sections of the comprehensive plan that related to transportation, either positively or negatively. The following plan configurations or ways in which transportation issues were presented in comprehensive plans were found:

- *Aspects of the transportation elements are kept together as a separate chapter, part of the public facilities chapter, or separately published (on the county's website) document.* In some cases, the transportation element is a chapter of the comprehensive plan with the inventory, assessment, goals, objectives, strategies, and recommendations presented in approximately this order. This style of presentation best represents the concept of a transportation element or plan.

- *The transportation inventory and assessment are included in one chapter, adjacent to chapters for assessing other elements or planning disciplines such as affordable housing and public water.* The transportation recommendations are written as goals and strategies, and they appear in a different chapter with goals, objectives, and strategies for all planning disciplines.

- *The transportation inventory is* provided in a separate chapter from the assessment and the recommendations.

- *The county is divided into planning areas, typically similar to magisterial districts.* The comprehensive plan has county-wide chapters and multiple planning area chapters or miniature plans for each planning area. The county-wide portion of the comprehensive plan presents information on planning issues that affect the entire county, and more specific details are provided in neighborhood, area, service district, or magisterial district plans.

- *County-wide goals for all planning disciplines are provided in one chapter,* with the inventory, assessment, and recommendations for transportation and other disciplines provided later, each in a separate chapter.

- *County-wide goals for all planning disciplines are provided together,* with the inventory consisting of a map; the assessment provided as an appendix or separate chapter; and the recommendations provided elsewhere in the plan, typically in a series with other planning discipline recommendations, such as public facilities and land use.

Some comprehensive plans have a land use classification system similar to zoning but more general. In this planning paradigm, each parcel of land is assigned a comprehensive plan land use classification category. Other localities have comprehensive plans that specifically state that the land use classifications are not associated with individual parcels and their land use but instead are for planning the future development patterns in a general way.

Content Found in Comprehensive Plans That Might Be Useful in Advancing Coordination of Land Use and Transportation Planning

As can be deduced from the results already presented, Virginia's county comprehensive plans vary greatly in their composition and content. Some localities included a bare minimum of information that could be widely construed as meeting the TMPD criteria. Other plans exceeded these criteria in their scope and level of detail, but most fell somewhere in between. This section describes content found in the comprehensive plans that exceeded the TMPD criteria and that might be useful in advancing the practice of coordinating land use and transportation.

Approaches to Concurrency

Concurrency in this context refers to a planning paradigm that strives to achieve equilibrium between the supply of public facilities and the demands of private development. For example, water and sewer concurrency can be approached by requiring private sector land developers to fund the construction of the water and sewer infrastructure needed to support their development. Land development and transportation concurrency can be achieved in many ways, as illustrated in the comprehensive plans reviewed during this project.

Many counties use their comprehensive plans to strive for the concurrent planning and development of land and transportation infrastructure; examples are Fairfax County,[12] Prince William County,[13] and Culpeper County.[14] One way to approach concurrency is to use LOS

standards for public services and infrastructure, not necessarily limited to roads in the comprehensive plan. These standards are often accompanied by policies and ordinances designed to ensure that the standards are attained as the county grows. Another approach to regional concurrency is exhibited in Montgomery County's transportation plan,[15] which recommends regional land development review among the county and its neighboring municipalities. This is in contrast to the standard practice of counties not including their neighbors on the review body (typically a planning commission) for land development proposals.

Several county comprehensive plans include the widths needed for highway right of way, usually organized by highway system (e.g., primary, secondary) or functional classification.

Official maps prevent the encroachment of development on land that will be needed for public uses, such as future right of way. Fairfax County[16] uses official maps to coordinate transportation and land use, and the comprehensive plans of other counties recommend the creation and adoption of official maps, e.g., Essex,[17] Hanover,[18] Henrico,[9] and Gloucester.[19]

Many county transportation plans included thoroughfare plans. Thoroughfare plans generally have one or more maps showing the existing and proposed roads and other facilities and often display attributes such as right-of-way widths, functional classifications, and operational measures of effectiveness. Because they are officially adopted by the county board of supervisors, they are easily confused with official maps, but they do not empower a county to prevent private sector construction on right of way needed for future transportation projects.

Approaches to Access Management

Thirty-five counties explicitly mentioned access management in their comprehensive plans, regarding either a corridor management plan or development review policies. These can be considered opportunities for VDOT assistance; e.g., VDOT could fund or undertake the development of corridor access management plans.

Several county comprehensive plans included language that encouraged inter-parcel connectivity, e.g., Stafford County,[20] Spotsylvania County,[11] Prince William County,[13] and Northumberland County.[21]

Of the 59 plans reviewed, 30 explicitly discouraged strip development or roadway-oriented sprawl, and others alluded to it in a negative sense. Fifteen of the plans that explicitly discouraged strip development were among the plans that included functional classification in their description of the highways in the county.

Modes for Improving the Practice of Local Planning

Four of the comprehensive plans reviewed revealed modes for VDOT to provide technical assistance beyond the development of a comprehensive plan's inventory, assessment, recommendations, concurrency, and access management. These modes include the development of a secondary road prioritization procedure[22] (James City County), outreach regarding VDOT funding programs[23] (King William County), assistance with the development of cooperative land

development review procedures (Montgomery),[15] and model ordinances (Roanoke).[24] Because of staffing and funding limitations, VDOT might not be able to take advantage of these opportunities.

Threats to the Transportation System

In contrast to the symbiotic relationship that many of the comprehensive plans shared with VDOT's roles and responsibilities, some included goals that, if achieved, would compromise the safety and operations of highways. Specifically, the comprehensive plans of seven counties recommended the construction of new interstate interchanges on substandard spacing. Those of other counties had economic development or land use sections that were inconsistent with the content of their transportation elements. These threats are described in more detail in the Discussion section.

DISCUSSION

With the exception of the inventory, the comprehensive plans did not lend themselves to a straightforward application of the criteria created by TMPD because many plans qualitatively described the facilities and made policy specific recommendations rather than providing a systematic evaluation of capacity and providing functional recommendations. A literal interpretation of the TMPD criteria would have noted many of these county plans as being substandard, but after discussions with TMPD staff, the researcher decided to evaluate the TMPD criteria more broadly, especially with regard to the assessment and recommendation sections.

In the descriptions and evaluations of the plans in Appendix B, the traffic volumes in a county comprehensive plan are sometimes mentioned in the description of the plan inventory. Other times, traffic volume growth is mentioned in the descriptions of the assessments. This inconsistency is a result of the inconsistencies in the comprehensive plans themselves. Some merely mention traffic volume as if it were a physical property of the roads, and others convey the *significance* of the traffic volumes. For example, plans that use the traffic volumes from the standpoint of an assessment describe the growth in traffic volumes or the relationship between the traffic volumes and land development trends.

Functional Classification

The *Code of Virginia,* in § 15.2-2222.1, exhorts localities to develop plans that "recognize and differentiate among a hierarchy of roads such as expressways, arterials, and collectors." This hierarchy is also known as *functional classification,* and about half of the comprehensive plans reviewed in this study included functional classification. Including functional classification is more than a legal requirement; by including it in a comprehensive plan, planners can see which roads are designed for access to commercial and residential property and which roads are designed to provide mobility for the citizens of the county to reach

work, shopping areas, or destinations out of the region. In this sense, functional classification is analogous to areas that are designated for commercial, residential, and agricultural uses by a comprehensive plan. As indicated in the Results section, six counties (Fauquier,[25] Gloucester,[19] James City,[22] New Kent,[26] Powhatan,[27] and Roanoke[24] associated highway functional classification with desired or appropriate forms and intensities of land development. In the comprehensive plans that paired functional classification and land use, it was either presented in a table or included the relationship in the discussion of either functional classification or types of land use, such as commercial, residential, industrial, etc.

If a clear discussion or table of functional classification and appropriate land uses or zoning classifications is included in the comprehensive plan, and if an applicant wishes to rezone a tract of land adjacent to a roadway, the proposed zoning classification and development plan described in the application would have to be consistent with the functional classification of the road. If the development proposal was not consistent with the pairing of functional classification and appropriate land use, the planning commission would have justification for recommending that the board of supervisors reject the development proposal, or the planning commission could request modifications because of the inconsistency with the comprehensive plan.

Bicycle and Pedestrian Accommodation

Many comprehensive plans were written before the successful implementation of the 2004 VDOT bicycle and pedestrian accommodation policy,[28] and in some cases, local planning staff was not aware of the latest developments that would have allowed them to include pedestrian and bicycle projects in their secondary six-year programs. In addition, many of the localities that included bicycle and pedestrian accommodations did so from a recreation rather than a transportation perspective. Despite financial shortfalls in county general funds and state transportation funding, a policy supporting bicycle and pedestrian accommodations for both transportation and recreation can still be useful. Including it in the comprehensive plan will set a framework and goals for the range of mobility options available to a community. Bicycle and pedestrian policies can also be reflected in the county zoning, subdivision, and site plan ordinances. In such cases, the comprehensive plan serves as the vision for how the bicycle and pedestrian facility network should be built.

Identification of Specific Deficiencies

The TMPD criteria recommend that plans have a qualitative, cartographic, or analytical assessment of the condition of the local transportation system that identifies specific deficiencies. However, in some cases, the researchers could not determine what type of assessment was in the comprehensive plan because only a description or summary of the plan was provided, rather than the actual plan. Many of the comprehensive plans reviewed had reasonably detailed qualitative analyses of their transportation infrastructure but did not identify specific deficiencies. As discussed previously, of the comprehensive plans reviewed, only 12 counties had analytical assessments that included measures such as LOS or V/C ratios. It was not within the scope of this study to evaluate why the majority of counties lack an analytical

assessment. But based on the researcher's experience as a VDOT residency planner, it is possible that counties lack the resources to conduct analytical assessments of their roads.

More than twice the number of counties had facility-specific recommendations rather than recommendations limited to policies. Although this satisfied a literal interpretation of the TMPD criteria, it might be more logical for counties to concentrate on policies that strive for concurrency between transportation and land use. This is because VDOT already assesses highways, plans improvements, and programs them according to priorities informed by local opinion. If a county's goal is economic development, it is more useful for the county to have its land development review policies and ordinances well constructed and in line with the existing and future capacity of the road system.

Although making economic development a prime goal of a comprehensive plan (coordinated with the transportation goals) makes sense from a county fiscal perspective, when considered from the perspective of public infrastructure, sustainable mobility is a better goal. Sustainable mobility entails three policies, each with multiple strategies that should be manifested not only in the comprehensive plan but also the zoning, site plan, and subdivision ordinances.[26] The three policies involve capacity management, travel demand management, and land use management, and they are illustrated with their respective strategies in Figure 1, the sustainable mobility triangle diagram from the New Kent County Comprehensive Plan.[26]

Focusing on sustainable mobility, especially by detailing travel demand management, land use management, and capacity management, in strategies and ordinances would also bring comprehensive plan transportation elements closer to the plans prescribed in Chapter 527 of the *2006 Acts of General Assembly of Virginia*.[2]

Another way to approach a transportation plan as opposed to element is to make the comprehensive plan relate to specific parcels rather than general tracts or areas. This is not to say the planning should be done parcel by parcel, but rather that citizens, property owners, or

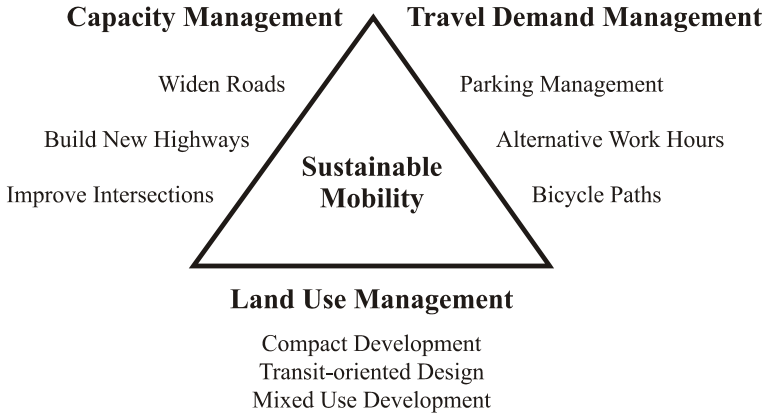

Figure 1. Sustainable Mobility Triangle,[26] showing policies and strategies a comprehensive plan should contain. The comprehensive plan implementation tools, zoning, site plan, and subdivision ordinances should also include the strategies in the diagram.

developers should be able to associate easily the comprehensive plan policies with his or her parcels. However, several county comprehensive plans mentioned that the land use plans were not parcel specific and were instead to be broad and general. This complies with the letter of the law (§ 15.2-2223 of the *Code of Virginia)*. But it might limit the utility of the comprehensive plan as a planning document.

For example, if a parcel exists on or near the boundary between land use policy areas in the comprehensive plan, such as "rural preservation" and "community scale development," a developer might choose whichever option would best serve his or her financial goals for the development of the parcel. In this example, the policy area boundaries defining development areas and preservation areas are vague in the comprehensive plan. The example development project (whether it involves rezoning, a site plan or a subdivision) might be approved as being in conformance with the comprehensive plan, rather than being rejected because of its inconsistency with the comprehensive plan.

On the other hand, if each parcel is associated with a land development policy in the comprehensive plan, in a similar fashion as parcels have a specific zoning, the applicants would definitively know whether or not a parcel could be expeditiously developed, regardless of the parcel's proximity to a land development policy area boundary. Further, if the proposed transportation improvements are shown on a map (as required by Chapter 564 of the *2006 Acts of the General Assembly of Virginia*[3]) and if the map is prepared with enough detail and spatial accuracy so as to make the relationship of the land use policies and transportation recommendations to parcels of land clear, this would make the goals of the comprehensive plan more achievable, especially through the development of land. This is because under this scenario, developers would expect the county to request them to contribute to the community infrastructure by donating land or constructing the facilities shown on the parcel-specific comprehensive plan maps.

The growth of a community occurs through the development of parcels of land. A comprehensive plan that is not parcel specific may be difficult to implement (i.e., it might not realize the community vision) if it does not relate to specific parcels. The transportation ramification of this is that if a non–parcel specific comprehensive plan includes different traffic impact mitigation policies, different access management policies, or different commercial development policies for various areas of the county, the least expensive transportation policies and strategies will be preferred by the developer. As such, the applicant might argue before the planning commission that the parcel proposed for development lies in the least conservative policy area and that the proposed development should be determined by the planning commission to be consistent with the comprehensive plan. If a development were to be approved under this scenario of a comprehensive plan without parcel specificity, the responsibility of coordinating transportation and land use would fall squarely upon the shoulders of VDOT and would have to be brought about through requirements and restrictions imposed on the entrance permit(s).

Another legislative requirement of 2006 was the need to include cost estimates in comprehensive plans. The researchers found that only Augusta,[8] Henrico,[9] Spotsylvania,[11] and Prince Edward[10] counties included such estimates in their comprehensive plans. The Henrico

cost estimates were found in the 2010 comprehensive plan.[9] The cost estimates in the Henrico County plan were most likely included because the county, not VDOT, is responsible for the county roads. The general lack of cost estimates in county comprehensive plans, coupled with VDOT's responsibilities for highways, suggests that county planners and officials do not have a sense of ownership of the roads in their county. By extension, if the roads are VDOT's concern, the county need not worry about the state's ability to pay for improvements necessitated by local land use decisions.

The TMPD guidance from 2004[4] suggests that the format of a transportation element is of no consequence. However the 2006 amendments to the comprehensive plan statutes in the *Code of Virginia,* § 15.2-2223, require the locality to develop a transportation *plan* that designates a *system* of transportation needs and recommendations. This suggests that the format does matter, insofar as the transportation needs, recommendations, maps, and costs estimates of transportation improvements should be in one chapter of the comprehensive plan, or in a stand-alone document. This format would also make it easier for VDOT staff to review the comprehensive plans, as is now required, because staff would not have to search through hundreds of pages for each county to find the transportation information they are legally obliged to review. On the other hand, if the comprehensive plans are not standardized as the cycles of 5-year updates progress, VDOT staff will need to budget between 3 and 5 hours for each county comprehensive plan they need to review.

Opportunities for VDOT Assistance

As discussed previously, county comprehensive plans in Virginia exhibit a wide range of sophistication and completeness, but most could benefit from some VDOT assistance. In addition to improving the features of local plans already discussed, particularly the transportation assessments, the following opportunities for VDOT assistance were found in the review of comprehensive plans.

Concurrency Strategies

As previously explained, concurrency in this context refers to a planning paradigm that strives to ensure an equilibrium between the supply of public facilities and the demands of private development. Specific goals, policies, and strategies that counties use to achieve concurrency were as follows:

- establishment of LOS goals
- inclusion of right-of-way widths
- use of official maps
- review of regional land development.

The efficacy of these strategies has not been evaluated in this report; instead this report catalogs the concurrency approaches found in the comprehensive plans that were reviewed.

Establishment of LOS Goals

The Fairfax County,[12] Prince William County,[13] and Culpeper County[14] comprehensive plans, and the plans of many other counties, strive for concurrent planning and development of land use and transportation infrastructure. One technique to concurrency is the establishment of performance or LOS goals, which require new developments to meet the performance goals if the parcel of land needs to be rezoned or if the comprehensive plan needs to be amended. The Fairfax County performance goals were incorporated into the draft of VDOT's *Guidelines for Land Development* as follows:

> The VDOT land development reviewer will establish performance goals, typically level-of-service for the intersections and roadway links in the study as described in the guidance below. Lower levels of service may be assigned to development centers and cores, where the growth may be concentrated whereas higher levels of service may be desired in outlying areas, where the spread of development is detrimental to an efficient transportation system. Applicants are required to demonstrate, in the traffic impact analysis, that their development proposals will meet the level of service designated for their area. The traffic impacts will be evaluated based on of the two policies, listed below:
>
> "Non-degradation" Policy: The "non-degradation" policy requires applicants to ensure that the transportation system affected by the application performs no worse after the project is developed than it would otherwise. This approach is primarily a performance based approach which requires applicants to provide improvements or other guarantees to maintain certain performance levels. These levels would be measured by levels of service or critical movement volumes or other measures as deemed appropriate by VDOT.
>
> "Offsetting Impact" Policy: The "offsetting impact" policy requires applicants to contribute to transportation improvements. The contributions would be proportional to the traffic generated by the project and the amount of transportation capacity required to accommodate that traffic, presumably based on lane-miles. However, this policy would not ensure that the localized performance of the transportation system would be maintained. Instead, it recognizes that in some instances, it may be impossible for performance to be maintained or for one individual applicant to provide the transportation improvements which may be needed.
>
> In general, the "non-degradation" policy will be pursued in reviewing development applications, with the "offsetting impact" policy employed in those instances where the "non-degradation" policy is not appropriate.[29]

In addition to the impact mitigation and non-degradation policies, the draft regulations (i.e., *Land Use Permit Manual,* currently 24 VAC 30-150) and draft *Guide to Land Development Review*[29] strongly advocate shared entrances and inter-parcel access connections.

Inclusion of Right-of-Way Widths

Several county comprehensive plans included the widths needed for highway right of way, usually organized by functional classification. If these right-of-way widths in the comprehensive plan are not accompanied by provisions in the subdivision ordinance, they are of little use. However, the *Code* allows localities to require the donation of right of way through the subdivision process if their ordinance is written in accordance with § 15.2-2241 of the *Code of Virginia.* VDOT staff working with these counties could encourage them either to include the width provisions in the subdivision ordinance or at least to have the ordinances reference the

comprehensive plan, as was done by Madison County.[30] In summary, the inclusion of right-of-way widths in a comprehensive plan accompanied by appropriate ordinance provisions is a way to coordinate land use and transportation through the review of land development proposals that do not need comprehensive plan or zoning amendments.

Use of Official Maps

An official map is a growth management tool that can be used to prevent the encroachment of development on right of way needed for future transportation improvements. Virginia localities are empowered to create them by the *Code of Virginia,* § 15.2-2233. They allow a locality to implement the transportation plan in the comprehensive plan by empowering the locality to deny building permit applications if the proposed structure will be located on land needed for right of way or another public purpose.

Fairfax County[16] uses official maps and the comprehensive plans of other counties (including Essex,[17] Hanover,[18] Henrico,[9] and Gloucester[19]) recommend their creation, but otherwise, official maps are a seldom used implementation strategy for local transportation plans. They are seldom used for two reasons: (1) they are expensive for localities to create, and (2) they commit a locality to purchasing right of way on a schedule that the locality does not control. The additional cost is incurred because official maps must be prepared with reference to permanent monuments. This means that the public area shown on the map, such as future right of way, must be located with accuracy approaching that of a real property survey. Future right of way shown on the official map is protected from encroachment through the denial of building permits by the locality.

The uncertain funding commitment is due to the legal requirement for the locality to compensate property owners whenever a building permit application is denied. It might be possible to overcome these obstacles if VDOT staff provides technical assistance with the drafting of the official map and advises the locality in the use of secondary road funds for debt service of bonds that fund the compensation of applicants for building permit denials. Official maps do not need to be developed and adopted for an entire county; instead they can be developed only for selected roads, corridors, or interchange areas.

Review of Regional Land Development

One county, Montgomery, included a goal for instituting a cooperative land development review process.[15] Although the comprehensive plan referred only to Montgomery County and its neighboring localities, the concept could be extended to any localities and its partners in the metropolitan planning organization (MPO) or PDC. The *Code of Virginia,* § 15.2-2219, allows joint review by empowering localities to form joint planning commissions with their neighbors. Doing so would discourage the approval of development proposals that provide one locality benefits and its neighbor costs, such as highway capacity degradation or exceeding the capacity of public schools.

Access Management

Many county comprehensive plans advocated access management through specific entrance spacing requirements for primary highway corridors, or through more general policies for land development review. At the time of this writing, VDOT was in the process of developing a comprehensive access management program, and one of the elements is to classify every road in such a way that standards can be applied to achieve a balance of access and mobility. The comprehensive plans offer a source of land use and growth policy information that can be used to develop the access management road classification levels.

Inter-Parcel Connectivity

Several county comprehensive plans included language that encouraged inter-parcel connectivity, e.g., Stafford County,[31] Spotsylvania County,[11] Prince William County,[13] and Northumberland County.[32] As a complement to the commercial interconnectivity that can be achieved though the requirement of new public streets as a condition for a signalized entrance, the researcher has proposed language in the subdivision chapter of the draft *Guide to Land Development Review*[29] that staff should check the potential for inter-parcel connections to adjacent parcels and developments. If it is topographically and operationally feasible, the applicant should construct connections to adjacent parcels or stub-outs of public roads so that the adjacent property developers can connect to the applicant's parcel.[7]

Discouragement of Strip Development

Thirty of the 59 comprehensive plans reviewed contain policies that either explicitly or implicitly discourage strip development. VDOT land development review staff can help these localities achieve the goal of controlling strip development through the permit review process. Strip development is associated with, if not dependent upon, signal proliferation and a lack of streets that are parallel with and perpendicular to the arterial highway. VDOT could use its police powers to limit the installation of signals to intersections of public streets, as opposed to commercial entrances, such as shopping center parking lots. An applicant who desires a signalized entrance could meet this requirement by constructing a new public street from the signalized development entrance, across the parcel, and terminating it at the opposite boundary of the parcel. Easements or dedicated right of way could then be granted to neighboring parcels so that the adjacent land owners could access the new public street. By doing this, the adjacent parcels would have access to the new public street and would not need another entrance on the regional highway.

Figure 2 illustrates this strategy and the more typical strip development pattern. The anti-strip development strategy involving public access to a signal desired by a shopping center developer is shown at the top of the diagram, and the commonplace pattern is shown at the bottom. With this strategy, all adjacent parcels can access the new public street and thence the highway through the easements and public streets deeded or constructed by the applicant; therefore, they would not need direct access to the highway. VDOT could then grant the controllers of adjacent parcels approval for an entrance on the newly constructed public street or,

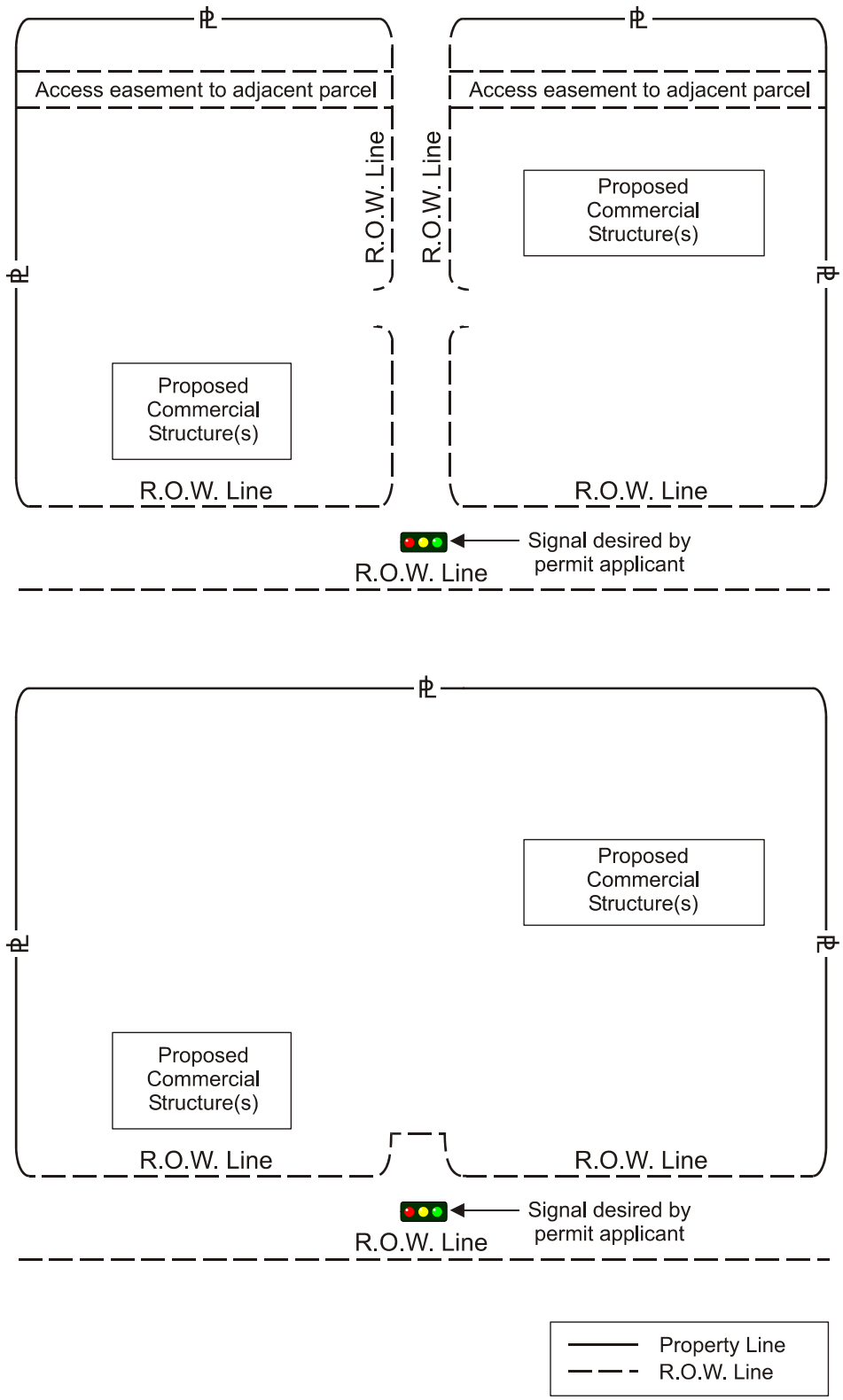

Figure 2. Comparison of strategy to avoid commercial strip development pattern (top portion) with current typical pattern (bottom portion). The core of the strategy is to approve permits for a signalized commercial entrance only if the applicant constructs a public street across his or her parcel and grants neighbors access easements to this public street. Adjacent parcels would then have access to the state system of highways through the new street and easements, and would not need a full-movement entrance on the arterial highway.

if necessary, an entrance on the highway that is limited to right-in, right-out movements. By using this strategy, VDOT staff can facilitate the access management strategies of long signal spacing and moderate to long median crossover spacing. This would preserve the functional purpose of the highway by allowing entrances on minor public streets but not directly to property.

Examples of Access Management Support in Comprehensive Plans

Including access management in a local comprehensive plan can improve the review of land development proposals and entrance permits, particular those subject to rezoning. For example, if the comprehensive plan contains policies about inter-parcel access, signal spacing, and entrance spacing, the policies can be applied by VDOT staff to the proposed development as technical design requirements of the entrance permit. Putting these policies or design guidance into the comprehensive plan allows different standards to be set for different areas of the county to facilitate the implementation of different growth management visions for different parts of the county.

The draft of the Prince George County[33] and the Madison County[30] comprehensive plans include specific, detailed entrance spacing policies that are developed to promote the access management strategy of conflict point separation. Including such specificity in a comprehensive plan is of questionable utility because the comprehensive plans are generally not enforceable to that level of detail. VDOT is also obliged to grant an entrance to every parcel of record. If a landowner subdivides a tract along the highway into parcels that are too narrow to locate entrances with the separation distance specified in the comprehensive plan, VDOT will still have to grant each parcel an entrance and the county cannot use the comprehensive plan to prevent the inadequate entrance spacing.

However, the best way for access management to be enacted by counties would be for counties to include the goals and recommendations for implementation in their comprehensive plan and then set out specific regulations in their zoning and subdivision ordinances that would consistently enact the comprehensive plan. These ordinances would take precedence over the comprehensive plan during zoning, site plan, or subdivision review and approval. Ordinances would also take precedence over the comprehensive plan if they were adopted but were silent or in conflict with the comprehensive plan on an issue such as access management.

The map in Figure 3 shows all the counties whose comprehensive plans were found by this study to support access management. It shows these localities in relation to each other and therefore illustrates opportunities for regional access management corridor studies that are supported by the localities that the corridor traverses. Some counties supported the implementation of completed corridor studies, and other comprehensive plans supported corridor preservation through corridor studies, ordinance revisions, and other strategies. A sample of the different access management support paradigms is provided as follows.

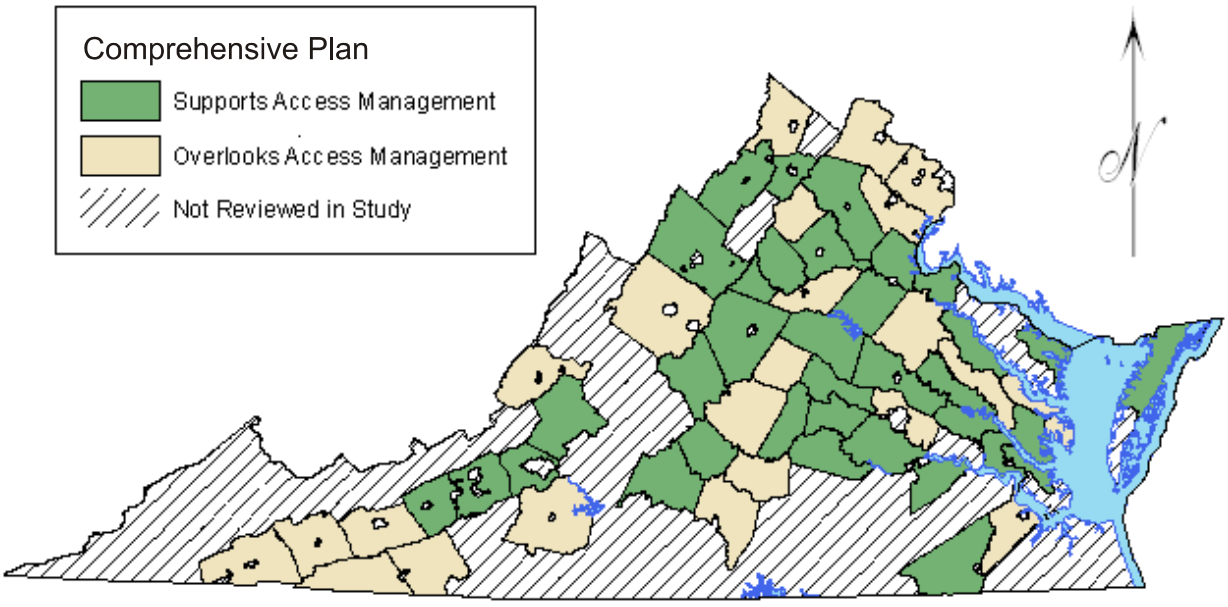

Figure 3. Access Management in Comprehensive Plans

Access Management Project Implementation Opportunities

- Accomack County has adopted the U.S. 13 access management corridor plan[34] and the county comprehensive plan expresses support for it,[35] even through the corridor plan was not completed prior to the comprehensive plan update. VDOT could demonstrate the benefits of access management on U.S. 13 to Northampton County by implementing the corridor plan in Accomack County.

- The Warren County comprehensive plan[36] mentions a county-funded access management study for U.S. 340. The VDOT staff could work with the county to implement the recommendations of this study.

Corridor Preservation Plan Opportunities

- The Botetourt County comprehensive plan[37] expresses a desire for well-managed access around the I-81 interchanges and along the primary road corridors. The plan recommends that access management techniques (e.g., medians, shared access, and turn lanes) be considered and/or required in the land development review process. VDOT staff could work with Botetourt County to develop access management plans that will coordinate these improvements that would otherwise occur in an uncoordinated fashion as individual site plans are reviewed.

- The transportation chapter of the Culpeper County comprehensive plan[14] explicitly links functional classification and parcel access, particularly for primary roads. The county might be positively receptive of VDOT corridor preservation plans for primary roads in Culpeper County.

- The Madison County comprehensive plan includes 900-foot and 600-foot entrance spacing standards for U.S. 29 and other primary roads, respectively.[30] This awareness of access management, coupled with the goal of avoiding strip development, suggests that Madison County might be amenable to an access management plan, especially if it were combined with properly spaced public road intersections that could spur economic development in a managed form.

- Northumberland County includes access management in the land use chapter of its plan and acknowledges VDOT's role.[21] The plan recommends that VDOT and the county work together to develop an access management plan for the primary corridors in Northumberland County.

- Powhatan County includes access management goals and ordinance actions in its comprehensive plan. These goals and actions are supported by the county ordinances, and Powhatan County might be positively receptive of an access management demonstration project.

- The draft of the Prince George County comprehensive plan includes an access management section, with an explanation of access management benefits and entrance spacing standards.[33] If the plan is adopted by the county board of supervisors, the county might be positively receptive of an access management demonstration project.

- The Shenandoah County comprehensive plan recommends the development and adoption of highway corridor overlay district ordinances for the U.S. 11 corridor.[38] VDOT planning staff could assist the county in this endeavor.

- VDOT could work with Spotsylvania County to develop an access management plan for Route 3 and other routes where the county is willing to apply access management principles and techniques during the land development review process.[11]

- Despite the inclusion of an inappropriate interstate access proposal for the sake of economic development, the York County comprehensive plan is supportive of access management and transportation/land use coordination.[39] VDOT staff could consider roads in the county for access management plans and projects.

Modes for Improving the Practice of Local Planning

The comprehensive plans revealed modes through which VDOT could assist localities in their planning processes. The reader should note that the following opportunities involve varying degrees of financial and employee resource commitments. Due to funding and staffing limitations, VDOT might not be able to take advantage of these opportunities.

- The James City County comprehensive plan recommends the development of a prioritization system for its secondary road projects.[22] VDOT staff could assist the

county and other counties with a similar desire by adapting the statewide prioritization tools that have already been developed by TMPD with assistance from researchers at the University of Virginia.[40]

- The King William County plan appears to confuse the VDOT Revenue Sharing Program with the Rural Additions Program and indicates that King William County has not participated in the Revenue Sharing Program in the past.[23] VDOT staff could clarify the two programs for the county.

- VDOT could monitor the attainment of the cooperative land development review goal stated in the transportation element of the Montgomery County comprehensive plan.[15] If successful practices are implemented by the localities, VDOT staff could share these with other localities, particularly those that are members of an MPO. The Montgomery County plan also recommends the development of a standardized proffer value system to be used among neighboring localities. VDOT could assist Montgomery County and its neighbors with the development of these guidelines using one of the VDOT planning grant programs.

- The Roanoke County comprehensive plan recommends that VDOT develop model ordinances that can be used to coordinate transportation and land use.[24] This could be undertaken as a future research effort by VTRC.

Threats to the State Highway System

Several comprehensive plans included recommendations for land use or transportation that, if followed, would degrade the operational conditions on state highway. Most of these threats to the state system are in the form of recommendations for new interchanges that the localities believe are needed for their economic development. These new interchanges are typically recommended at locations that would violate the AASHTO policy on interchange spacing.[41]

- The economic development section of the Alleghany County comprehensive plan recommends commercial development along the I-64 corridor, which may result in requests for new interchanges and access management problems at existing interchanges.[7] VDOT staff could work with county staff to minimize the deleterious effect of commercial development in this interstate corridor.

- The Smyth County comprehensive plan encourages commercial development around interchanges and intersections, with little consideration for transportation impacts.[42] VDOT could work with the county to ensure that economic development goals can be met with minimal transportation system degradation.

- The Washington County comprehensive plan recommends the construction of a new interchange on I-81, near mile marker 11.[43] It is unlikely that a new interchange at this location would be consistent with AASHTO's spacing guidelines.[41] VDOT staff

could work with Washington County to help them create the transportation system necessary for their economic development goals without creating substandard access points on the state transportation system.

- The Shenandoah County comprehensive plan recommends the construction of an additional interchange for the town of Woodstock.[38] However, Woodstock is a small town and already has an interstate interchange.

- The Pulaski County comprehensive plan recommends the construction of an additional interchange between the existing interchanges at mileposts 86 and 89.[44]

- The Frederick County comprehensive plan[45] recommends the construction of additional interchanges that might comply with the AASHTO guidelines for urban interchanges[41] but might induce congestion rather than economic development.

- The York County comprehensive plan specifically recommends the provision of commercial land development access to an existing interstate ramp at the I-64 interchange near milepost 243.[39] VDOT could identify how this proposal would degrade the capacity of the interstate and interchange and attempt to dissuade York County from their desire for additional interstate access.

CONCLUSIONS

- *County comprehensive plans exhibit a variety of styles, sophistication, and degrees of completeness. This will make it time-consuming for VDOT staff to fulfill their statutory obligation to review them.* However, the statutory amendments in 2004 and 2006 give VDOT a greater opportunity to influence the format and content of county comprehensive plans.

- *Two thirds of the comprehensive plans reviewed lacked an analytical assessment of the transportation network, around which the future land use is planned, and almost all lacked cost assessment information.* This suggests that localities need technical assistance from VDOT in the development of the transportation system needs assessments in their comprehensive plans and the cost estimation of transportation improvements.

- *Of the 59 plans reviewed, approximately one half explicitly discouraged strip or roadway-oriented sprawl development.* Of the plans that did not, most alluded to the possibility of sprawl as a form of negative development. But there was one exception; the Mathews County comprehensive plan encourages development along highways and at intersections.[46]

- *Comprehensive plans indicate localities and corridors where access management pilot projects would likely be accepted by the locality.* A key part of access management relates to land development along a highway, and the comprehensive plans indicate which

localities would make land use decisions that would be consistent with an access management corridor plan.

- *Comprehensive plans can serve to provide a warning to VDOT staff of additional operational degradation attributable to local land use policies and decisions. Several comprehensive plans had economic development goals that were inconsistent with their transportation goals.* Many county comprehensive plans explicitly recommended that additional interstate access points be constructed in the locality, in some cases at locations that would not comply with the AASHTO recommendations for interchange spacing.[41]

- *Comprehensive plans can be a source of information about ways in which VDOT can provide assistance to localities.* The modes of technical assistance found in this study include the development of model ordinances for transportation and land use coordination, procedures for regional development review, assistance with official maps, and secondary six-year program prioritization.

RECOMMENDATIONS

The following recommendations offer suggestions to VDOT staff for ways to use the information that counties publish in their comprehensive plan. Throughout most of the Commonwealth, the "VDOT staff" mentioned in these recommendations would be residency administrators/resident engineers or district planners. But in some districts, the VDOT staff refers to the district land development manager and his or her staff or the regional traffic engineer and his or her staff. The exact work unit that could implement these recommendations varies among the nine districts, so readers will need to consider both the nature of the recommendation and the organization of the district to determine the specific individuals and organizational units that could make use of the recommendation(s).

1. *Comprehensive plans should be standardized.* In order to standardize comprehensive plans as they are revised on their 5-year cycles, VDOT staff should consider a template such as the one provided in Appendix C when assisting localities with the development of their transportation plan. When reviewing local comprehensive plans, VDOT staff should consider the following steps in addition to the review guidance provided by TMPD so as to improve the practice of local transportation plan development.

    - Determine if the plan has an inventory and if the inventory of the transportation plan contains a map of the roads in the county that are either mapped or described in terms of functional classification.

    - Determine if the functional classification levels relate to land use policies in the comprehensive plan.

- Determine if bicycle and pedestrian accommodations are described as a separate mode, if a separate plan is included or referenced, or if bicycle and pedestrian accommodations are not mentioned.

- Determine if the assessment is analytical, cartographic, qualitative, or non-existent.

- Determine if the recommendations are for improvements to specific facilities, limited to changes in policy, or non-existent.

- Determine if the recommendations are accompanied by cost estimates.

- Determine if the economic development and land use sections of the comprehensive plan are consistent with the transportation plan.

- Determine if the comprehensive plan land use policies are consistent with zoning, site plan, and subdivision ordinances.

- Examine the land use and/or economic development portions of the plan to determine if they present threats to the operational integrity of VDOT facilities or if instead they support sustainable mobility.

- Make note of any opportunities for VDOT, such as specific technical assistance, willingness to support access management, and policies that discourage sprawl or highway-oriented strip development.

2. *VDOT should proactively offer analytical support to localities for the development of their transportation plan.* At the time of this writing, TMPD is preparing to distribute a simplified version of the SPS to localities, accompanied with geospatial information. SPS can perform highway capacity calculations en masse for all roadways in a county; however, the version that will be distributed (SPS Light) will not have this capability. TMPD should either include the analytical capabilities with SPS Light or include pre-made static reports of capacity and LOS that could be used during the development of a local transportation plan.

3. *VDOT should help localities prevent roadway-oriented strip development.* This report identifies many counties that are opposed to strip development patterns. VDOT should use its full powers to regulate commercial entrance permits and place conditions and restrictions on them such that suburban development results in an interconnected, walkable environment. Chief among these permit conditions and restrictions should be inter-parcel connections and limiting signals to public streets.

4. *VDOT should use the information in the comprehensive plans to select corridors for access management studies and projects.* Many of the comprehensive plans recommended access management, some for specific corridors and others for the entire county road network. These localities are likely to conduct land development

review in a way that supports access management and therefore complements VDOT's efforts to manage the travel demand on the corridor.

5. *VDOT should develop and/or adopt clear policies for interchange spacing, inform the public of the policies, and abide by them despite pressure to grant exceptions.* In so doing, VDOT would be heeding the warnings manifested in comprehensive plans that seek additional interstate interchanges, as documented in this study.

6. *VDOT should develop ways to support the development of official maps and to conduct secondary road program prioritization.* This support could include technical services, such as VDOT staff drafting the maps or a grant program to fund the development of official maps. Such support could also help develop the competencies of resident administrators such that they can advise localities on the use of secondary road program funds to service the debts incurred for bonds that are used to acquire right of way through the official maps. VDOT staff could also adapt the statewide prioritization program such that is usable for secondary roads and offer it to localities or help localities apply it.

BENEFITS AND RISKS ASSESSMENT

The expected benefit of standardizing local transportation plans is increased staff efficiency during the mandatory review. The anticipated cost and risks are related to the time needed by staff to guide localities in the development of transportation plans in a standard fashion.

The expected benefits of preventing strip development would be the same as the benefits of access management. The benefits would be increased safety attributable to a reduction in conflict points and speed differentials and the improved mobility that is typically observed on facilities with few entrances and widely spaced signalized intersections. The risks might be opposition from pro-development lobbyists and additional demands on construction program funds. Alternatively, this fiscal cost might go to localities if they were required to construct the perpendicular roads with their secondary construction program funds.

The expected benefits of developing and publishing clear policies and procedures for limited access disposal are that localities and developers would have a firm understanding of the review process and an ability to predict the approval or denial of their access break request. The risk of clearly publishing access break policies and procedures is that VDOT's Chief Engineer might be forced to approve an interchange or access break that violated the documented procedures or sound engineering principles but was backed by politically powerful interests.

The expected benefits of supporting the development and approval of official maps are the coordination of transportation and land development. Official maps coordinate transportation and land use by preventing the construction of structures on land that will be needed for right of way in the future, and they facilitate advance acquisition of vacant land for right of way at a

lower cost that would be incurred if the acquisition were delayed and the cost included both land and structures. The risks of supporting the development of official maps are that it would require staff time from both central office TMPD and the residency responsible for the locality in questions. The advance acquisition of right of way might also complicate the programming process.

The benefits of adapting the prioritization tools to a local secondary road network are that project programming could be based on an analytical process rather than political caprice or the order in which improvements were requested. The costs involved with adapting the prioritization tools would be limited to the staff time needed to accomplish the task.

SUGGESTIONS FOR FUTURE RESEARCH

Highway Corridor Overlay Districts

Highway corridor overlay districts (HCOD) are recommended by many local comprehensive plans. They are generally not a part of a comprehensive plan but rather are an overlay zone in the zoning ordinance. HCODs can be used to establish access management and architectural design requirements for parcels adjacent to a primary highway or other designated corridor. Although they are typically part of a zoning ordinance, they govern parcels developed without a rezoning because parcels developed under subdivision and site plan regulations must comply with the zoning ordinance. In effect, HCODs are tools for achieving the corridor preservation and access management goals of the comprehensive plan's transportation plan.

VDOT should consider developing model Highway Corridor Overlay District ordinance language and policies developed in the context of the *Code of Virginia* that localities could adopt. The expected benefits of developing this would be that localities might be more willing to consider an ordinance that was pre-drafted. This is especially true of localities with limited planning staff that might not have the time to draft the ordinance without a model. Counties with few planning staff tend to be those that are most in need of transportation and land use coordination assistance. The most probable costs would be the staff time needed to develop the ordinance language, and there is a risk that the model ordinances would not be used by localities.

Neotraditional Street Design Guidance

Although the *Subdivision Street Requirements* (24 VAC 30-91) allow flexibility in residential street design, there are as yet no standards or design templates. VDOT should consider developing context-sensitive design standards so that developers and localities that desire a neotraditional development pattern have both initial design concepts and an understanding of what VDOT would accept into the state system. The expected benefits of design standards for neotraditional neighborhood designs are that the current iterative review process that VDOT resident engineers and staff work through with applicants could be

shortened. The costs associated with this recommendation would be the staff time required to develop the standards.

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APPENDIX A

TMPD MEMORANDUM REGARDING COMPREHENSIVE PLANS

TO: VDOT Transportation Planning Staff, Virginia Transportation Research Council

FROM: Transportation and Mobility Planning Division – Policy and Procedures Section

APPROVED: Marsha C. Fiol – 09/10/2004

SUBJECT: Interpreting § 15.2-2223 of the Code of Virginia – Guidance for VDOT Planners

During the 2004 General Assembly Session, Senator Houck introduced Senate Bill 353, which aimed to strengthen the planning requirements of local governments. This bill passed both houses and was signed into law by the Governor, effective July 1, 2004. Specifically, this legislation requires each local government to have a comprehensive plan that:

> *"…shall include a transportation element that designates a system of transportation infrastructure needs and recommendations that shall include, as appropriate, but not be limited to, roadways, bicycle accommodations, pedestrian accommodations, railways, bridges, waterways, airports, ports, and public transportation facilities. The Virginia Department of Transportation shall, upon request, provide localities with technical assistance in preparing such transportation element."*

The Research Council has requested an official interpretation of this code section to facilitate a current research project to develop a template that can be used by VDOT planning staff when assisting local governments with the development of their transportation element. As part of this research effort, VTRC is compiling local comprehensive plans throughout the state to evaluate the sufficiency of these planning documents in meeting the new language in the Code of Virginia. The requested interpretation will assist in determining the adequacy of each local comprehensive plan in addressing transportation.

While the Office of the Attorney General is responsible for developing official interpretations of state law, we believe it is appropriate to develop and utilize an unofficial internal interpretation. Given the likelihood that localities will increasingly request VDOT's assistance with local planning initiatives as a result of this new law, this interpretation and associated guidance should serve as a guide for all planning staff.

INTERPRETATION OF § 15.2-2223

"The comprehensive plan shall include a transportation element…"

Assuming there is an official and adopted comprehensive plan by the local governing body, as required by state law, this means that the comprehensive plan will include a specific section(s) dedicated to transportation or will make a reference to a separate document that serves

as the transportation element. The referenced document may be an official transportation plan adopted by the locality.

"... that designates a system of transportation infrastructure needs and recommendations…"

The transportation element specifically identifies and outlines capital and/or service needs for transportation. There are no requirements identified or implied on how these needs and recommendations must be presented. A locality may choose to present needs and recommendations by managerial district or at the county level. The focus of this code section is on the content of the transportation element, not the format or presentation. In § 15.2-2200 of the Code of Virginia, the General Assembly provides some helpful clarification of legislative intent regarding comprehensive planning. This section states:

"This chapter is intended to encourage localities to improve the public health, safety, convenience and welfare of its citizens and to plan for the future development of communities to the end that transportation systems be carefully planned;..."

Careful planning for transportation requires an assessment of current and expected future conditions. This assessment facilitates the identification of transportation needs, or deficiencies. These needs (deficiencies), both current and within the planning horizon, should be based on tangible factors such as congestion, mobility, safety, environmental or community impacts, etc. Needs may also be based on transportation system improvements needed to support expected growth/development patterns, land use goals and public services outlined in the comprehensive plan. The needs identified serve as the basis for proposing transportation infrastructure improvements and may also include transportation service needs such as transit and paratransit.

These recommendations are specific and are based on an identified need. An appropriate highway recommendation will identify the following:

- specific route or corridor (or a general location if it is a new facility)
- general (e.g. Widen) or detailed (e.g. Rural 4-Lane Divided) description of the proposed improvement, and
- specific or approximate termini

"... that shall include, as appropriate, but not be limited to, roadways, bicycle accommodations, pedestrian accommodations, railways, bridges, waterways, airports, ports, and public transportation facilities."

Not all localities have waterways, ports, or airports. For this reason, "as appropriate" was added to the legislation. A transportation element should identify needs and specific recommendations for all applicable modes within its local boundaries.

"The Virginia Department of Transportation shall, upon request, provide localities with technical assistance in preparing such transportation element."

If requested by a locality, VDOT will provide technical assistance to help in the preparation of a locality's transportation element.

Technical assistance may include:

- Providing roadway inventory data
- Providing traffic data
- Providing recommendations and analysis from State Highway Plan and Statewide Planning System
- Identifying areas where bicycle and/or pedestrian facilities are warranted
- Identifying potential environmental impacts
- Collecting GIS layers or creating maps
- Assisting with highway capacity analysis
- Estimating potential impacts of land use decisions on the highway system
- Recommending roadway improvements
- Coordinating with other modal agencies (public transit, ports, airports, rail, etc.)
- Suggesting changes to local ordinances
- Drafting chapters or sections of the transportation element
- Providing cost estimates for proposed roadway improvements

REVIEWING A LOCAL TRANSPORTATION ELEMENT

When reviewing a local transportation element of a localities comprehensive plan, the following criteria should be used to determine whether or not it is adequate and meets the provisions of § 15.2-2223.

Adequacy Test – Three Essential Components of a Transportation Element

1. Inventory – an inventory (written or graphic) of the existing transportation network. This doesn't imply that every facility within the jurisdiction must be identified. It may be as simple as a paragraph or two describing the major facilities within the locality or as complex as a detailed network inventory with facility maps.
2. Assessment – an evaluation of the transportation system(s). In its most basic form, a transportation assessment would be a written or graphic representation of facility performance and/or condition. This assessment would identify specific deficiencies.
3. Recommendations – proposed improvements or additions to the transportation infrastructure. Recommendations should be specific enough that the location and nature of the proposed improvement are clear and understandable.

The guidance does not constitute a standard or regulation. Failure to meet the guidance does not indicate a failure to comply with state law. Additional guidance will be prepared in the coming months related to local comprehensive planning and VDOT's role in providing assistance to local governments.

APPENDIX B

EVALUATION OF COMPREHENSIVE PLANS

Arlington County

The Arlington County planning website has information about the designated planning areas in the county, a bicycle/pedestrian plan, and a description of the transportation plan, which includes bicycle, pedestrian, transit, and streets. However, the description of the transportation plan was not sufficient to allow an evaluation of the plan using the TMPD criteria.[1]

Accomack County

The transportation element of the Accomack County comprehensive plan is dated 1997 and is divided among the other sections of the plan, which are individually available on the county's website.[2]

Inventory

The transportation inventory, focusing on U.S. 13, is included in Chapter 3. VDOT corridor planning efforts for US 13 are acknowledged, and the LOS for U.S. 13 between the Chesapeake Bay Bridge Tunnel and the Maryland state line is included. Chapter 3 also discusses the secondary system, bus service, a bicycle and pedestrian trail, and the airport.

Assessment

The assessment is divided between Chapter 3 and Chapter 4 and describes the deleterious effects of strip development and other conventional land use patterns. It also recommends increased setbacks and clustered commercial development.

Recommendations

There are no facility-specific transportation recommendations in the section on goals, objectives, policies, and recommended action. However, the recommendations involve zoning, subdivision, and sign ordinance revisions that would reduce the effects of land development on the roads, particularly U.S. 13. In addition, VDOT and regional U.S. 13 corridor planning is acknowledged, and Accomack County is one of the few localities on Virginia's Eastern Shore that has adopted the U.S. 13 Access Management Plan[3] and its recommendations.

In what seems to be a contradiction, the recommendations in Chapter 5 also include the statement: "Local regulations can impact existing businesses and desirability of the area for new businesses. The county should be careful to consider potential economic impact of any new regulations." This places the county's goals for economic development in conflict with its goals for infrastructure.

Albemarle County

The comprehensive plan is available on the county's website. The transportation element is dated 2006 and provides county-wide goals, identifies existing infrastructure, discusses the roles of the various planning bodies with respect to transportation, and references the metropolitan planning organization's (MPO) plan and several VDOT corridor studies.[4] The plan explicitly acknowledges the interdependence of transportation and land use. The inventory and assessment are discussed together for each mode, and the recommendations for each mode are enumerated in a separate section following the inventory and assessment of each mode. At the time of this writing, a corridor study for U.S. 29 was underway, which will include transportation and land use recommendations. It will also include an access management plan and is expected to be adopted as an amendment to the comprehensive plan.

Inventory

The transportation chapter includes a list of primary corridors and a discussion of U.S. 29 and U.S. 250, the major arterial corridors in the county. The Charlottesville Transit Service, the University of Virginia Transit Service, and the Jaunt paratransit service are described. Pedestrian and bicycle access is described in general, and a bicycle plan is published under separate cover.[5] Air and rail service is discussed from a planning perspective. The chapter also includes general design "standards" (guidelines) for roads, including guidelines related to access management such as shared access recommendations and crossover spacing standards from the 1996 VDOT *Road Design Manual*.

Assessment

The assessment in the transportation chapter is generally limited to aspects related to land use, such as the identification of commercial development trends along arterial corridors and the provision of service or access. Rail and air facilities are discussed in slightly more detail.

Recommendations

The transportation chapter includes general recommendations, organized by mode. However, detailed transportation recommendations are made in the section for each neighborhood plan, which represents a set of geographically small comprehensive plans.

Alleghany County

The comprehensive plan available on the county's website is dated 2002.[6] The Alleghany County comprehensive plan acknowledges the VDOT improvement recommendations for U.S. 60, U.S. 220, and various bridges. It also describes I-64 truck route alternatives and the TransAmerica Corridor Feasibility Study. Commuting patterns from the 1990 U.S. Census for travel in and out of Alleghany County are presented.

The transportation element concludes with a discussion of the following issues and opportunities: aging of the population, increased tourism, increased government devolution and a trend toward regionalism, the global economy, and increased public advocacy and public participation.

The economic development section includes an objective to encourage development of land along I-64, which may present challenges to the management of access, especially near existing interchanges. The objective may also be manifested in policies or initiatives that also target other highways for development. The plan's acknowledgment of various VDOT studies and plans represents the assessment and recommendation component, which is augmented by the detailed population-transit analysis.

Inventory

The transportation inventory is provided by way of interstate and primary traffic counts (from 1989, 1994, 1999) and descriptions of and excerpts from VDOT planning documents. Rail, air, and bus service are also described, including data tables presenting population trends that suggest a need for more transit and transit service.

Assessment

The researchers did not find any analysis of facility performance or condition or identification of specific deficiencies.

Recommendations

The researchers did not find any recommendations for specific transportation improvements other than the acknowledgment of VDOT and other agency-sponsored studies.

Amelia County

The comprehensive plan, dated 2000, is available on the county's website.[7] Much of the transportation discussion is in the context of improving the existing land development processes. Strip commercial development along the U.S. 360 corridor is decried, yet the plan recommends that sewer lines along U.S. 360 be constructed to serve development.

Inventory

A figure identifying corridors and their functional classification complements the descriptive summary of the road network. The Norfolk Southern rail line is described. Neither air, transit, not paratransit is discussed in the plan, and no bicycle plan is provided.

Assessment

Traffic projections from the Statewide Highway Plan (SHP) are included. Land use trends that may accelerate the traffic volume growth identified in the SHP are identified, and the potential need for the SHP improvements is acknowledged. Strip subdivision activity patterns are identified as being detrimental to the transportation network.

Recommendations

The recommendations include both general policies, including support for access management, and specific policies for the U.S. 360 corridor. The transportation action plan contains specific recommendations and tasks appropriate for VDOT planning staff and land development process improvements to be undertaken by the county. The comprehensive plan recommends that a rail stop on the Trans Dominion Express be planned for somewhere in Amelia County.

Amherst County

As of January 2006, the county website describes the comprehensive plan as being under development.[8]

Appomattox County

The comprehensive plan on the county's website is a pre-adoption draft from 2003.[9]

Inventory

The inventory consists of descriptions of individual U.S. highway and Virginia primary corridors in the county and a general description of the secondary roads. Existing four-lane sections are identified. The air transportation section of the inventory consists of descriptions of regional and general aviation airports within a reasonable driving distance. Norfolk-Southern and CSX have rail lines in Appomattox County, but the plan notes that no freight or passenger service is provided. Bus service is described, and paratransit services are discussed.

Assessment

The plan presents traffic counts and accident data as an assessment of the roads in the transportation system. Previous planning deficiencies and the lack of transportation planning/land use coordination are identified in a brief assessment of prior planning efforts, with a commitment to improve planning efforts.

Recommendations

The recommendations are provided as goals, objectives, and strategies detailed with specific implementable tasks. They include bicycle and pedestrian accommodations. Examples of tasks[9] from *different* strategies are as follows:

> Establish traffic design standards to mitigate the number of crossovers and curb cuts along primary routes and heavily traveled secondary routes.
>
> With the assistance of VDOT, direct the Road Viewing Committee to research and identify a prioritized list of the most hazardous roads, intersections, and grade crossings in the county and their recommendations for improvements.
>
> Assist in the development, or in the case of the Prince Edward Rural Transit, the continuation, of transportation services for the elderly, handicapped, or other transportation-disadvantaged citizens.

As shown, the recommendations cover many aspects of transportation planning and improvement, including capacity and safety improvements, coordination with land use planning, transit, and freight services. The detailed recommendations in the economic development plan are not contrary to those in the transportation plan.

Augusta County

The comprehensive plan is currently under development and will be dated 2005–2025.[10] However, many sections and draft sections were available on the county's website at the time of this writing. These materials were evaluated using the TMPD criteria.

Inventory

Pedestrian and bicycle accommodations are identified, along with regional bicycle and pedestrian planning efforts that are underway at the Central Shenandoah PDC. Low-volume rural secondary roads are described as acceptable routes for Class A cyclists.

The highway portion includes an idealized discussion of functional classification and the classic S-shaped curve that is used to illustrate the concept of functional classification. For the interstates, current traffic volumes and travel patterns are discussed and their use for local trips is noted. Primary corridors are generally described, and a table mileage per functional classification is presented. The network of secondary roads is described in a similar fashion, with a separate table of mileage. The VDOT Rural Rustic Roads Program and Pave in Place Program are explained, and the scenic routes of Skyline Drive and the Blue Ridge Parkway are described.

Passenger (Amtrak) and freight rail service (CSX and Norfolk Southern) are mapped and described. The Shenandoah Valley Short Line railroad is also described, by both its route and connections and its use for tourist as an excursion service. The two airports in Augusta are described in terms of physical facilities and number of flights.

Assessment

The relationship between traffic volume growth and land use patterns is noted. According to the draft comprehensive plan, 2003 traffic volumes on sections of the interstates are identified, and capacity is discussed. The interstates in Augusta County are generally considered to be operationally acceptable except during inclement weather and incidents.

Primary roads are described as being frequently geometrically deficient, with substandard travel lane widths. Little assessment information is provided for secondary roads save that the current traffic volumes are less than theoretical capacities. A summary of incidents and VDOT response efforts in Augusta County is also provided.

Recommendations

The draft comprehensive plan includes excerpts from various VDOT and VDRPT plans. The consultant team working on the plan identified two future scenarios for Augusta County and detailed them with goals and strategies. It is expected that the final adopted plan will include coordinated transportation–land use recommendations and automobile facility–specific recommendations.

Bath County

The comprehensive plan was not available on the Internet.

Bedford County

The 1988 comprehensive plan is available on the county's website[11] however, because of its age, it is not reviewed here because an update was underway at the time of this writing. No drafts are posted on the website.

Bland County

The comprehensive plan was not available on the Internet.

Botetourt County

The comprehensive plan available on the county's website is dated 2004[12] It is divided into three major parts:

1. existing conditions analysis
2. goals objectives and policies
3. technical appendices.

Each part has chapters or maps for the various planning disciplines such as public facilities, economic development, and transportation.

The economic development chapter of Part 1 does not mention commercial or retail development but instead concentrates on having land available for new industrial development and the expansion of existing facilities. Transportation is mentioned only in passing, such as the statement that a particular industrial park is located on a particular primary road.

The land use chapter of Part 1 specifically states that it is not intended to be parcel specific. It has seven land use categories and presents maps of the county showing existing and desired development in terms of these land use categories. The chapter also states that any mix of land uses might be found or approved on land that the comprehensive plan designates as any one of the seven land use categories.

The special policy areas chapter of Part 1 is essentially a series of policy overlays that strive for the coordination of land development with transportation or land development with environmentally sensitive lands such as mountain sides. It acknowledges VTRC and VDOT planning efforts in the vicinity of I-81, Exit 150. It also incorporates a Roanoke Valley Alleghany Regional Commission (the PDC) study that evaluated the other interchanges in Botetourt County on I-81 and the development of adjacent land. The policy areas for Exits 156, 162, 167, and 168 designate the development potential of land around the interchanges as being primary, secondary, or restricted. However, most of the maps showing these interchanges designate the land immediately adjacent to the interchange ramps as being "primary" rather than "restricted." The chapter does mention that land around the interstate interchanges must demonstrate carefully designed access, and it recommends adequate turn lanes and inter-parcel access while discouraging strip commercial development.

In addition to the interchanges and environmentally sensitive areas, the special policy areas chapter of Part 1 serves as another transportation element, focused on primary corridors. The primary roads are identified, broken into logical segments, and qualitatively evaluated considering the existing and future land use. Strip development is discouraged, and properly designed access and the preservation of highway capacity are encouraged.

Inventory

The transportation chapter of Part 1 of the plan describes air transportation, the lack of passenger rail, and bicycle facilities. Of these modes, the bikeway discussion is the most detailed, and it references studies conducted by the PDC. I-81, primary corridors, and the secondary network are mentioned and mapped.

Assessment

A detailed qualitative assessment of primary corridors is provided in the special policy areas chapter in Part 1. Each I-81 interchange is discussed in terms of adjacent land use, and the primary corridors are divided into logical segments. The presence or absence of a median, the proliferation or lack of curb cuts, and the relative spacing of traffic signals are all mentioned.

Recommendations

The comprehensive plan recommends against the construction of I-73 but does not emphasize the construction of any specific road improvements. However, the special policy areas chapter provides many access management and concurrency recommendations for the highway segments on which it focuses. Examples of these recommendations are inter-parcel access, turn lanes, and medians.

Brunswick County

The comprehensive plan was not available on the Internet.

Buchanan County

The comprehensive plan was not available on the Internet.

Buckingham County

The comprehensive plan was not available on the Internet. Research staff examined the copy of the plan on file at the offices of the Piedmont PDC. It is dated 2001 and devotes little attention to transportation. It does have transportation-related goals, objectives, and policies that encourage the coordination of transportation and land use as well as non-automobile transportation.[13]

Campbell County

The comprehensive plan is available on the county's website. The introduction suggests that the plan was adopted in late 2002 or early 2003.[14] The land development portion of the plan discourages strip development, discusses commercial development control consistent with access management principles, and encourages residential development that minimizes the impacts to existing roads. However, specific strategies to achieve these goals are not mentioned.

Inventory

The transportation inventory portion of the comprehensive plan consists of descriptions of all primary roads and a tabulation of road surface mileage, as is typically found on VDOT county maps. Average annual daily traffic (AADT) is also provided for sections of U.S. 29 and U.S. 460. Rail, air, and truck transportation services and facilities are described.

Assessment

An assessment of U.S. 29, and to a lesser extent U.S. 501, Route 43, and Route 24, is provided in conjunction with the specific improvement recommendations.

Recommendations

The VDOT FY 2000–2005 Six Year Plan and the 2001 U.S. 29 Corridor Management Study are included as attachments. Specific recommendations for U.S. 29, U.S. 501, Route 43, and Route 24 are provided. The comprehensive plan also includes support and acknowledgement of VDRPT plans and studies, and the comprehensive plan recommends the provision of additional rail passenger service. The development of a new bicycle plan is also recommended.

Caroline County

The transportation element of the Caroline County comprehensive plan was developed with significant support provided through a longstanding relationship between the county staff and the planning staff of VDOT's Fredericksburg District. It is available on the county's website.[15]

Inventory

The transportation plan includes descriptions of the air service available and planned in other Virginia localities and metropolitan regions. The plan describes the freight and passenger rail service available in or near Caroline County and the port facilities within a 3-hour drive of Caroline County. The road inventory consists of a description and tabulation of miles of road, classified by both surface treatment and functional classification. The plan also shows the functional classification of roads on a map.

Assessment

The plan describes development trends that will reduce the capacity of primary roads while increasing single-occupant vehicle usage. It also describes the inadequate geometrics of the secondary roads and limited funding resources available for transportation.

Recommendations

The comprehensive plan describes the primary, urban, and secondary programs and lists specific projects in Caroline County that were in these programs in 2004. The plan also describes additional projects that are not yet in any of the VDOT-administered programs.

Carroll County

The Carroll County comprehensive plan was not available on the Internet. However, the Mount Rodgers PDC provided the researcher a copy of the transportation element of the 1999 comprehensive plan.[16]

Inventory

The inventory describes the topology of the primary road network in the county, making note of I-77, which was not completed when the plan was written.

Assessment

Following the description of the network, the safety and operations of the roads are described. The assessment is qualitative and mentions specific deficiencies. It relates land use, terrain, and truck traffic to the adequacy of the primary road segments.

Recommendations

The recommendations are limited to land use plans and polices for areas near I-77 interchanges. In general, the comprehensive plan strives to use the traffic on I-77 for economic development while being careful not to jeopardize operations on the roads around interchanges.

Charles City County

The comprehensive plan was not available on the Internet.

Charlotte County

The 1997 comprehensive plan is available on the county's website, which also indicated that at the time of this writing, the plan is being updated.[17] The evaluation provided here refers to the 1997 comprehensive plan. The economic development portion has an objective of using soil study information in the land development decision-making process, but it does not mention considering transportation. The land use goals, objectives, and policies also mention the use of soil suitability in land use decision making, but not highway capacity. This means that the county policy, as documented in the comprehensive plan, is to consider the environmental but not the transportation impacts of development. Further, the policies in the land use section plan suggest that the county is not eager to use police powers to enforce land use patterns through the zoning ordinance. However, one of the goals in the transportation section mentions preserving the efficiency of the roads by controlling development adjacent to roads.

Inventory

The transportation section describes functional classification and presents a table of route numbers and recommended right-of-way widths per functional classification category. Regional bus, truck freight, and rail freight service is described as well as the air service outside the county.

Assessment

The researchers did not find an assessment of transportation facilities in the comprehensive plan. But there was no indication regarding whether an assessment would be included in the updated plan, under development at the time of this writing.

Recommendations

The recommendations are policy related and do not include specific improvements to the transportation system. However, they do recommend expanding passenger bus and retaining the existing freight rail service, expanding it as necessary.

Chesterfield County

Available on the county's website, the 2004 Public Facilities Plan component of the comprehensive plan is divided into four planning areas (Northern, Central, Eastern, and Southern), which are further divided into separately adopted component plans.[18] It also includes corridor plans and county-wide plans for public facilities and bikeways. The public facilities chapter of the comprehensive plan references a separate county airport plan that contains the inventory, assessment, and recommendations for the air mode of transportation.

Inventory

The public facilities chapter contains a table of highway mileage by system type (i.e., primary, secondary) and descriptions of the system. The thoroughfare plan presents the functional classification of the roadways and the right-of-way width they should have.

Assessment

The public facilities plan states that in 2000, 28 percent of the roads in the county were operating at LOS E or F; it projects future failing conditions and states the number of miles of unsafe roadway segments. According to the comprehensive plan, the county transportation department uses a computer model to plan road improvements.

Recommendations

The thoroughfare plan shows existing and proposed collectors and arterials and the right of way these facilities should have. Some of the geographic area plans recommend highway corridor overlays as a way to implement access management. Some of the geographic area plans also recommend clustering development to reduce access points.

Clarke County

The comprehensive plan was not available on the Internet.

Craig County

The comprehensive plan was not available on the Internet.

Culpeper County

The comprehensive plan is available on the county's website and was approved in 2005.[19] It describes the relatively high growth rate since 2000 and the need to manage growth by directing it to village centers (planning areas designated in the comprehensive plan) and around the Town of Culpeper. The effects of roads and road improvements on land development are

identified, and the negative implications of strip commercial development are mentioned in the land use chapter. The county's understanding of the adverse effects of strip development can also be inferred by the section describing the need for traffic impact studies. The transportation section includes a separate bicycle plan, which emphasizes both recreation and transportation.

Inventory

Functional classification is explained, and a map showing functional classification is provided. The functional class map is augmented by arterial plans for the U.S. and state primary highways. Scenic roads and official Scenic Byways are identified separately. The regional transit, airport, and rail service is also described.

Assessment

LOS and volume/capacity (V/C) ratios for selected arterial and minor arterial segments in 2002 and 2025 are presented in a table. These assessment data are augmented with the corridor plans. The adequacy of the regional airport, much of which is owned by Culpeper County, is discussed in detail.

Recommendations

The corridor plans provide specific recommendations for the various routes. The plan also includes plans for selected areas into which future growth should be channeled. A summary of the separate Airport Plan, with specific recommendations for improvement, is provided.

Cumberland County

The comprehensive plan is currently under revision, but a 73-page draft dated 2005–2010 is available on the county's website.[20] The plan describes functional classification categories and VDOT's relationship with the county, including the programs and plans. Access management is mentioned, but commercial development is encouraged to locate along primary corridors, with few details on how to avoid degrading the operations of the roads by using access management techniques.

Inventory

The inventory describes the primary routes in Cumberland County, notes the lack of transit, and provides detailed information about the regional airport.

Assessment

Aside from a noted lack of transit, the draft plan does not include qualitative or analytical assessments of the transportation facilities.

Recommendations

The recommendations are in the form of one transportation goal (provide an effective system); objectives for highway, bicycle/pedestrian, and air modes; and policies for each objective that promote improvements, in some cases specific, for the various modes.

Dickenson County

The comprehensive plan was not available on the Internet.

Dinwiddie County

The comprehensive plan was not available on the Internet.

Essex County

The comprehensive plan was not available on the Internet, but a copy, dated 1998, was obtained from the Middle Peninsula PDC.[21] The inventory and assessment are provided in a different section than is the transportation plan section. The plan includes land use objectives that discourage strip development and encourage the provision of adequate public facilities.

The transportation objectives and implementation strategies recommend access management, land use/transportation coordination, and adequate public facilities. The plan acknowledges the need to support these initiatives with zoning, subdivision, and site plan ordinances. It also serves to identify transportation needs that could be provided with proffers from rezoning.

Inventory

Primary roads are discussed and traffic statistics are given by segment. The secondary network is described in general, and transit, waterways, railways, and the air service in Tappahannock are also described. A map showing the functional classifications of the roads in Essex County is provided with a textual identification of arterials and major collectors. The availability of regional bus service is noted.

Assessment

AADTs for 1981 and 1998 and projections for 2010, along with percentage change, are provided in tabular form. A general assessment of acceptable LOS of the roads in the county is provided, qualified by the acknowledgment that continued growth will create a need for improvements.

Recommendations

The plan includes support for a U.S. 17/360 bypass around the town of Tappahannock and objectives supporting access management and discouraging strip development. Highway enhancement corridors are established along U.S. 360 and 17, which are intended to protect future right of way, promote service roads for managing access, and improve the visual appearance. Recommendations about the Tappahannock airport regarding its relocation to the county are provided. The plan recommends platting new right way in the manner of an official map.

Fairfax County

The 2003 comprehensive plan is available on the county's website and consists of the following elements: the Policy Plan, the Chesapeake Bay Supplement, four area plans, a glossary, and maps.[22]

The land use chapter of the policy plan mentions the degrading effect that growth has had on the road system in Fairfax County, particularly the typical separation of housing and employment. The introduction to the transportation chapter of the policy plan includes a general assessment about transportation trends. It mentions demand management and land use management to improve or mitigate the transportation problem. The transportation chapter also includes a relatively significant number of travel demand management and land use management policies.

The overview of the area plans contains policies for preventing or mitigating transportation impacts of new development. The area plans are divided into smaller planning areas that provide details about the relationship between the existing and proposed transportation facilities and the nearby parcels and land use. In some cases, they include large scale maps.

Inventory

Maps of the transportation system are provided in the transportation chapter of the policy plan. The maps show functional classification, right-of-way requirements, transit facilities, and non-motorized systems. The chapter also lists road segments and their functional classification with a disaggregation of the "Minor Arterial" classification. This chapter also discusses bicycle and pedestrian facilities.

Assessment

Many roads and corridors are generally noted as being congested because of factors such as commuting routes and land development patterns. However, no systematic facility-specific assessment comparable to the scale and detail of the recommendations was noted.

Recommendations

The thoroughfare plan, which is a separately adopted element of the comprehensive plan, is detailed and shows both existing and proposed transportation facilities. Proposed transit lines, stops, and stations; streets and roads (including number of lanes); interchanges; grade-separated road crossings; commuter lots; and priority multi-modal transportation corridors are all depicted on the map, which is scaled at 1 inch to 4,000 feet.

Fauquier County

The 2005 comprehensive plan, available on the county's website, has chapters that describe planning topics such as land use, transportation, and public facilities for the entire county as well as service district chapters. Each service district chapter presents detailed information for a smaller planning area of the county.[23] The transportation chapter emphasizes the role of roads in the development of the county. It includes functional classification (not the same as the functional classification used by VDOT) and related design policies and summarizes the transportation recommendations from the service districts. The county bicycle and pedestrian plan is incorporated by reference. The transportation plan also includes design policies for roads, organized by functional classification, and they include access management strategies such as crossover spacing and right-of-way width or setbacks.

Inventory

A specific inventory of transportation facilities (other than the secondary road network) is provided in the chapter about county-wide transportation, including rail, air, commuting services, and primary corridors. Secondary road facilities are described in the various service district plans.

Assessment

The transportation chapter provides a limited evaluation of rail service and a more detailed evaluation of the county-owned airport. An assessment of specific primary route corridors is also provided, with references to the details in the service district plans. However, neither the transportation chapter nor the selected service district plans reviewed for this report contain a systematic evaluation of the network using LOS, accident statistics, or V/C ratios.

Recommendations

Specific recommendations are provided in the transportation chapter of the comprehensive plan and in the service district plans. They include improvements and additions to the road network, commuter rail or express bus service, and airport improvements. A U.S. 29 corridor crossover safety study conducted by VDOT is incorporated into the Fauquier county comprehensive plan by reference.

Floyd County

The comprehensive plan was not available on the Internet.

Fluvanna County

The comprehensive plan, dated 2000, is available on the county's website.[24] The economic development chapter is neutral to the transportation system, except to tout the regional access provided by I-64 and U.S. 15.

Inventory

The inventory describes the primary corridors individually and the secondary roads generally, with a few secondary roads mentioned specifically. A map of the road network is provided, and a separate map shows the bicycle facilities and park-and-ride lots. The availability of paratransit service is noted, as well as the railroad.

Assessment

Present and future transportation needs, including intersections and corridor improvements, are shown on the road network map. In the descriptions of these routes, areas with sub-standard geometrics are noted. This is an example of a cartographic assessment.

Recommendations

The transportation goals focus on the road system, although the need for improved pedestrian and bicycle accommodations and paratransit is mentioned. Specific improvements, mainly for safety purposes, are also mentioned in the goals portion of the comprehensive plan.

Franklin County

At the time of this writing, the comprehensive plan was under development; however, several draft sections are available on the county's website.[25]

Inventory

A map of primary and major secondary roads is provided.

Assessment

The draft material on the county's website did not include transportation assessment information.

Recommendations

The goals and strategies reference specific improvement projects and studies, some of which are also shown on the transportation maps. Goals and strategies for paratransit service and bicycle/pedestrian accommodations, especially for recreation, are presented. A proposed general aviation airport and the existing Norfolk Southern railroad are also shown.

Frederick County

The 2003 comprehensive plan is described on the county's website.[26] Interstate and primary road corridors are mentioned in this description of the plan. The website describes the transportation element of the comprehensive plan as including new and proposed roads, including a separate section describing specific needs for road improvements.

Giles County

At the time of this writing, the county's website indicates that the comprehensive plan is currently under revision.[27]

Gloucester County

The comprehensive plan, amended in 2001, is available on the county's website.[28] The land use goals indicate opposition to strip development, and the transportation goals include the need to improve coordination of transportation and land use by way of developer contributions to the transportation infrastructure. The land use plan discourages strip development and encourages new developments to be located on relatively "deep" lots along the U.S. 17 corridor and near existing or future public road intersections. Support for shared entrances is also mentioned. The transportation plan mentions the county role in the transportation planning process through its land use policies and ordinances and explains the role of access management in growth management. The transportation element also describes the functional classification system and the ideal relationship between each classification level and land development. A number of detailed policies that strengthen the coordination of land use and transportation are included in the transportation element.

Inventory

A map of the roadway network, showing functional classification and traffic volumes, is provided. Commuter facilities are also shown on a map. Intercity bus, rail, air, and water (freight and recreational) transportation opportunities are described.

Assessment

The traffic volumes from 1982 and 1987, percent growth, and future traffic projections are provided for the primary roads by segment. V/C ratios for primary road segments are

provided, and the roadway needs, both capacity and safety, are shown on a map. Accident rates are tabulated and discussed for selected road segments, and commuting patterns are described.

Recommendations

A map showing road widening, new facilities, new commuter lots, study corridors, and a new river crossing is provided. The plan also recommends the platting of future right of way, in the method of an official map.

Goochland County

The comprehensive plan available on the county's website is dated 2003.[29] The county's access management standards are mentioned in the land use chapter and published in a separate document.[30] The land use chapter also acknowledges the detrimental effect of rampant growth on transportation systems.

Inventory

The inventory is provided by way of a map that shows existing and proposed roads.

Assessment

The descriptions of the recommended projects are accompanied by qualitative assessments of the existing condition in order to justify the need for the project.

Recommendations

Recommendations such as widening, intersection realignment, and enforcement of access management standards are provided for specific roads. Proposed new roads and improvements to existing roads are provided in a map.

Grayson County

The comprehensive plan, available on the county's website, was adopted in 2004.[31] It has a transportation chapter, which presents the inventory and assessment in a section entitled "Challenges." Recommendations are included in the concluding chapter of the comprehensive plan. The roadway portion of the transportation chapter includes right-of-way standards that are presented as a guideline for land development review. VDOT programs are described, including primary and secondary allocations, and the Rural Rustic Roads Program. The comprehensive plan also mentions secondary projects constructed by the county or developers that are built to a lesser design standard than currently required on VDOT projects. Many transportation facilities that serve the region but are not within Grayson County are discussed in the plan. The land use portion of the plan notes the importance of good land use planning so as to protect transportation investments, and the goals and objectives portion mentions avoiding strip commercial development.

Inventory

Interstate, primary, and secondary roads are described in terms of both design characteristics and corridor length. The plan includes a discussion and table of 2001 AADT volumes for interstate, primary, and selected secondary road segments. It also supports the Route 58 Corridor Program.

Six airports are described, including four that are neither located in nor owned by Grayson County: Charlotte/Douglas International, Piedmont Triad International, Roanoke Regional, and Tri-Cities Regional.

The lack of rail passenger and freight service in Grayson County is noted, and local transit, taxi, and regional bus service is described. Several pedestrian and bicycle recreational trails are described.

Assessment

With the exception of the traffic volumes presented in the descriptions of the road system, the assessment is limited to the following statements:

- Grayson County does not have a four-lane connection through the county.
- Safety concerns are present on many roadways, such as line-of-sight problems.
- The current transportation system does not include safe networks for pedestrians and bicycles.

Recommendations

The transportation objectives in the plan relate to access management and land development, such as access roads, subdivision design, and building setbacks. The recommendations include specific highway corridor improvements, planning initiatives, bicycle accommodations, and county airport upgrades and service improvements.

Greene County

The comprehensive plan, available on the county's website, is dated 2004.[32] The introduction mentions that economic development should consider transportation impacts. It also discusses the relationship between the commercial development at the crossroads of U.S. 29 and U.S. 33 (Ruckersville) and the traffic operations on these routes. The comprehensive plan describes a 1999 access management plan and proposes ways to improve it.

Inventory

The inventory is limited to general descriptions of U.S. 29, U.S. 33, Route 230, and the secondary road network.

Assessment

Assessments are provided by way of justification for the "key issues" and recommendations.

Recommendations

The goals focus on travel demand reduction, pedestrian/bicycle accommodations, and coordinated land use and transportation infrastructure. Specific objectives are provided for access management, land development, and the transportation networks in growth areas of the county. The recommendations are also provided cartographically in maps of proposed road improvements.

Greensville County

The county's website indicates that the comprehensive plan is currently under revision.[33]

Halifax County

The comprehensive plan was not available on the Internet.

Hanover County

The comprehensive plan was adopted in 2003 and is available on the county's website.[34] The land use section describes the undesirable development patter of "road stripping," where adjacent commercial or residential units are developed along the frontage of an existing state road. The county seeks to change this development pattern to one that involves intense development nodes at the intersections of major thoroughfares (such as primary roads and important secondary roads, and interstate interchanges).

The transportation portion consists of goals, objectives, and strategies, as well as a thoroughfare plan. It contains right-of-way width requirements for functional classification levels, from interstate to minor collector. The Major Thoroughfare Plan is a map of the county showing proposed road improvements, color coded to represent their intended functional classification and right-of-way width.

Inventory

The road inventory is presented both cartographically and as descriptions of major corridors. The comprehensive plan recommends the development of access management plans for arterials, particularly when their traffic volume approaches capacity. The lack of public transit service and limited availability of freight rail are noted.

Assessment

The assessment of highway corridors is provided with the inventory in the descriptions of each corridor. The airport section not only lists the available facilities and runway lengths but also discusses the operational role of the airport with respect to Richmond International and the economic benefits of the airport to the county.

Recommendations

General recommendations in the form of strategies are provided in the transportation chapter (as opposed to the thoroughfare plan) of the comprehensive plan. These typically relate to the orderly development of land and provision of a safe transportation network to support the vision of the land use portion of the plan. Specific recommendations for new roads are provided, along with schematics of roadway cross sections. The recommended improvements are cartographically presented on the Major Thoroughfare Plan map.

General recommendations for improvements to the airport are provided, and the Master Plan for the Municipal Airport is mentioned as the source for specific detailed assessment and improvement recommendations.

Henrico County

The currently adopted (dated 2010) comprehensive plan and the 2026 plan currently under development are available on the county's website.[35] The 2026 plan has "working papers," which contain background information such as existing land use and public facilities condition. The plan documents mention that the network of secondary roads is planned and constructed to serve the current and future land use needs, rather than the land development patterns being controlled and subservient to the transportation system.

Inventory

The interstate, U.S., and state primary routes under VDOT's jurisdiction are listed in a table. This inventory is complemented by a funding allocation schedule and county budget for the secondary roads controlled by Henrico County. The secondary road projects currently in Henrico County's Capital Improvement Program are listed, along with financial data. Transit, air, and rail service is described, and a multimodal map is provided. Henrico County has an adopted thoroughfare plan.

Assessment

Selected capacity constraints are identified in the working paper on public infrastructure, which also mentions work underway by consultants to evaluate the capacity and operations of the road system.

Recommendations

A list of proposed improvements is provided.

Henry County

The comprehensive plan was not available on the Internet.

Highland County

The comprehensive plan was not available on the Internet.

Isle of Wight

The comprehensive plan is summarized on the county's website and is dated 2001.[36] Although the summary does not include an inventory, assessment, or specific facility recommendations, it does have general transportation recommendations, many of which relate to land use.

James City County

At the time of this writing the 1997 comprehensive plan is available on the county's website, while a revision is underway.[37] The land use section indicates that the citizens involved in the development of the plan are opposed to the typical strip pattern of commercial development. It goes on to suggest that county policy is supportive of this public opinion and of access management. It does identify interchanges and major intersections as prime locations for business and industry, but the transportation section emphasizes the need to coordinate transportation and land use carefully. The land use chapter relates the various land use types (community commercial, industry, etc.) to functional classification.

Inventory

Roadways are detailed on a thoroughfare plan. The comprehensive plan also includes a summary of non-roadway components, including sidewalks, bikeways, transit, rail, water, and air facilities.

Assessment

The thoroughfare plan in the county comprehensive plan consists of a table of road sections, with 1994 and future typical section 1994 and 2015 AADT, V/C ratios, prioritization, and recommended improvements.

Recommendations

The thoroughfare plan contains specific recommendations as well as proposed new facilities.

King George County

The 2000 comprehensive plan is available on the county's website.[38] Two of the six transportation goals explicitly support access management. The growth management portion of the plan lists the deleterious effect of frequent driveways and entrances along with other problems with dispersed development.

Inventory

The inventory is provided by a map of roads in the county. It is labeled as a functional classification map, but the legend and color schemes used for roads depict the categories of U.S. highway, state highway (primary), and local (secondary) roads, rather than federal functional classification levels.

Assessment

A detailed assessment is provided in a separate section from the goals and recommendations. It includes traffic volume growth rates for many road segments and future LOS projections and is augmented by multiple maps whereon this information is depicted.

Recommendations

The recommendations include specific road improvements, new facilities, interchanges, and general strategies to maintain or improve regional coordination and the coordination of land use and transportation. Strategies and techniques related to access management comprise a significant portion of the transportation recommendations. The plan recommendations include the provision of transit, bicycle, and pedestrian services and amenities.

King and Queen County

The comprehensive plan was not available on the Internet. A copy of the 1994 comprehensive plan was obtained from the Middle Peninsula PDC.[39] The economic development chapter expresses a strong desire for increasing the employment and commercial base, in part because of the inability of property taxes to fund schools and other public services adequately. The primary routes of U.S. 360 and State Route 33 are designated as prime areas for the desired development. However, the plan contains goals regarding the use and improvement of local ordinances to ensure that "quality" development occurs along these highways. Corridor overlay zoning provisions are discussed for U.S. 360 and State Route 33, but the overlays

described in the comprehensive plan are focused on economic development rather than capacity preservation.

The comprehensive plan states that it is for the purpose of helping the county plan for roads improvements to be constructed in the secondary six-year plan. It differentiates the secondary roads as being "principal secondary" roads or "other." This includes secondary roads that could be considered principal secondary roads when the plan was written and roads to be improved to become principal secondary roads. It is essentially the county's own functional classification system.

Inventory

An inventory of the primary system (U.S. 360, State Routes 14 and 33) and selected secondary roads is provided. The secondary roads are mentioned because of their importance to travel within the county. The airport is mentioned, and is shown on the map, in addition to the roads and boat landings.

Assessment

The travel patterns and economic development conditions along the roads in the county are described. A map showing AADT (undated) is provided. In some cases, geometric inadequacies are mentioned. The detrimental effect of residential strip development is noted, and policies are set forth for the prevention of strip residential development along the primary corridors and secondary roads.

Recommendations

Proposed widening and other improvements are shown on a map of the roads in the county.

King William County

The 2003 comprehensive plan is available on the county's website.[40] Transportation is included in a chapter about all public facilities. The plan appears to confuse the VDOT Revenue Sharing Program with the Rural Addition Program and indicates that King William County has not participated in the Revenue Sharing Program in the past. The growth management chapter discourages strip development along roadways and encourages inter-parcel access in between new and existing developments. The growth management element also encourages access management, specifically the consolidation of existing entrances along designated corridors and provision of reverse frontage roads.

Inventory

The transportation section of the community assets chapter includes a description of the primary corridors and secondary network in the county. The plan describes the available rail

service (freight and passenger), air service (outside of the county), and water transportation facilities.

Assessment

Limited right-of-way and road width throughout the county is identified as a transportation issue.

Recommendations

The recommendations are generally policy oriented, such as using the land development process and controls to protect operations on the primary corridors, and support VDOT efforts to relive congestion and improve safety.

Lancaster County

The comprehensive plan was not available on the Internet.

Lee County

The comprehensive plan was not available on the Internet.

Loudoun County

The 2001 Loudoun County transportation plan and other comprehensive plan documents are available on the county's website.[41] One of the transportation plan's goals is to integrate transportation and land use planning, both policies and project development. A bicycle and pedestrian plan is published as a separate document,[42] however, bicycle/pedestrian policies and goals are included in the general county transportation plan. The plan establishes LOS D as a minimum condition for roadside development. Development is discouraged on roads where operations are at a lower LOS.

Inventory

Transit corridors are described, and the land use implications of transit service are discussed. Roads are presented on a map showing functional classification.

Assessment

The county transportation plan (the transportation element of the comprehensive plan) does not contain a systematic assessment of transportation facilities, although deficiencies for specific facilities are mentioned throughout the document. However, the plan does mention that a transportation needs assessment study was conducted by a consultant retained by the county

and that the information developed by the consultant would be used in the transportation plan, particularly the funding and implementation of the plan recommendations.

Recommendations

Road improvements are shown on a map, and the most important and capital-intensive projects are described in detail. The plan also includes an implementation chapter that contains a table of proposed transportation improvements, related objectives, and specific implementation tasks such as the design of interchanges.

Louisa County

The 2003 comprehensive plan is available on the county's website.[43] The comprehensive plan designates growth areas, typically around interchanges and primary road intersections, and emphasizes the need for conservation elsewhere in the county. The plan includes street design standards that are based on smart growth principles and literature and generally show streets with a narrower width than VDOT typically requires.

Inventory

The inventory describes the interstate and its interchanges, primary corridors, paratransit, park and ride, and air and rail freight service available in Louisa County. Maps of these facilities are also provided. VDOT and PDC studies relevant to the county are described. The interstate bicycle Route 76, which passes through Louisa County, is described, and the lack of other bicycle and pedestrian facilities (outside the towns) is noted.

Assessment

Primary corridors and sections of secondary roads that need improvement to maintain LOS C based on the VDOT 1994–2015 statewide plan are listed; the comprehensive plan refers to this list as an "inventory."

Recommendations

The transportation goals of the Louisa County comprehensive plan incorporate projects in VDOT sponsored programs, along with additional specific road improvement projects that the county board of supervisors would like to be programmed and constructed. Needs and recommendations from a 2015 PDC transportation study are also included in tabular form. The plan includes maps of transportation needs, both for vehicles and bicycles.

Lunenburg County

The comprehensive plan was not available on the Internet.

Madison County

The 2001 comprehensive plan is available on the county's website.[44] The demographics section contains a table of commuting patterns, which are predominantly out of the county. The land use goals refer to a development potential study conducted by the planning commission that identifies the U.S. 29 corridor as ideal for development. The plan advocates channeling growth to the U.S. 29 corridor but avoiding strip development.

Inventory

Primary corridors are identified, and the secondary system is described. AADT and vehicle miles of travel (VMT) are provided from 2000 for segments of the primary corridors. The availability of paratransit service is noted, as is the lack of rail and aviation facilities.

Assessment

The assessment consists of the tables of AADT and growth in AADT and a description of the deleterious effect of commercial strip development along highways.

Recommendations

Although strip development is decried, economic development and the infrastructure to support it, such as water and sewer, are goals for the U.S. 29 corridor. However, the application of entrance spacing standards along primary highways is promoted. The goals for transportation include the consideration of highway operations in zoning applications and the use of service or frontage roads to maintain long access spacing. The comprehensive plan specifies the entrance spacing as 900 feet for U.S. 29 and 600 feet for other primary roads. These spacing policies are supported in the county subdivision ordinance.

Mathews County

The 2000 comprehensive plan is available on the county's website.[45] The land use portion of the plan recommends concentrating development along primary highway frontage as well as proposed "waterfront gateway" areas along the shoreline. Development is particularly encouraged near important crossroads or intersections, and capacity preservation is not mentioned.

Inventory

The inventory consists of a description of primary and secondary roads, transit, and the location (outside the county) of fright rail service and passenger service by air and rail. These descriptions are augmented by maps showing the road network in the county. Selected primary roads are mentioned as being ideal for development.

Assessment

Traffic growth on selected roads is described, and 1999 traffic volumes are depicted on a map.

Recommendations

The comprehensive plan describes and maps VDOT plans and programs. Specific sections of road that are not currently in VDOT improvement programs are recommended for future improvement.

Mecklenburg County

The comprehensive plan was not available on the Internet.

Middlesex County

The 2001 comprehensive plan is available on the county's website.[46] The land use/growth management chapter decries strip development along highways.

Inventory

Primary corridors and the secondary road network are described. The availability of freight trucking service and lack of railway service are noted. The existing airport and water facilities are described.

Assessment

Traffic volumes for selected highway segments are tabulated to show the growth in traffic from 1950 to 2000. Traffic volume growth for selected segments is also described. Travel patterns and substandard geometrics on selected roads are described. The plan notes that roads in the county are generally considered adequate for current and future needs but that regional and state concerns may warrant upgrades to the primary roads traversing the county.

Recommendations

The plan recommends improvements to specific primary roads, the provision of transit service, and transportation-related changes in the zoning ordinance and development policies. Bicycle facilities are described and presented on a map, which essentially shows roads that either are suitable or need improvement to become bicycle routes. The provision of pedestrian accommodations is mentioned in the context of development policies.

Montgomery County

The 2004 comprehensive plan is available on the county's website.[47] The first goal of the transportation plan is to coordinate transportation and land use, and it is followed by details on how to achieve this coordination, including regional land development review. The plan recommends the institution of a cooperative land development review process with the MPO and adjacent localities for land development projects that might have significant transportation impacts. The plan discourages strip development but encourages shared access and interconnected subdivision street networks and the development of a regionally standard proffer system such that the value of cash proffers would be similar among the New River Valley region.

Inventory

A map of the road system showing functional classification supplements the description of particular road corridors. Mass transit and air service are briefly described. Bicycle and pedestrian facilities are briefly discussed in the transportation resources chapter, and additional detail is provided in a separate chapter that serves as the bicycle and pedestrian plan.

Assessment

VMT growth between 1975 and 2001 for Montgomery County and adjacent localities is charted and described. AADT per mile and its growth between 1975 and 2001 are also charted. Commuting patterns throughout the region are described and mapped, including typical work-trip departure times.

Recommendations

In addition to the coordinated development goal, the plan recommends a number of strategies to enhance the coordination of land use and transportation, including access management. The comprehensive plan includes a corridor plan for Route 177. The bicycle/pedestrian plan provides descriptions and maps of specific facility improvements to improve bicycle and pedestrian accommodations.

Nelson County

The 2002 plan is available on the county's website.[48] The plan divides the county into designated growth areas and devotes a section to each. The county-wide goals include the avoidance of strip development and adherence to access management principles and corridor study recommendations. The land use goals of the plan promote growth in designated development areas and discourages growth in areas designated for rural preservation. The need to consider the transportation system when making land use decisions is mentioned in the introduction to the transportation element. A county-wide bicycle/pedestrian plan and greenway plan are provided in addition to the transportation material in the growth area plans.

Inventory

Paratransit routes, state roads, and commuter lots are shown on a network of existing facilities and transportation needs. Bicycle and pedestrian facilities are described in a separate section. All of these transportation network elements as well as rail service availability are described in more detail in an appendix to the plan.

Assessment

Present and future transportation needs are shown on the map mentioned previously.

Recommendations

The map of the county-wide transportation system constitutes both the inventory and the recommendations, although the details of the improvements shown on the map are not discussed. Separate specific bicycle/pedestrian and greenway recommendations are provided in other county-wide sections.

New Kent County

The 2003 comprehensive plan is available on the county's website. It includes a description of functional classification that relates the categories to land use and mentions the adverse effect of driveways on highway capacity.[49] The practice of access management is described, and a "sustainable mobility" triangle diagram is presented that illustrates the relationship among land use management, capacity management, and travel demand management. The land use portion of the plan describes the deleterious effect of both residential and commercial strip development.

Inventory

Many road corridors are described in terms of their functional classification, and the plan includes a table of 2001 ADTs for many roadway sections. Water, rail, and air transportation services and bicycle and pedestrian facilities are described.

Assessment

The existing road system is described as being below capacity, although the plan does recognize that New Kent County might be the location of bottlenecks on I-64 between Richmond and Hampton Roads.

Recommendations

Passenger rail service is recommended and a location for a future station is proposed in the plan. The goals, objectives, and strategies include improvements to transportation facilities for capacity, safety, and aesthetics. Access management is recommended, as is the use of traffic

impact studies to inform the coordination of transportation and land use. The development of passenger rail service and bicycle/pedestrian accommodations is recommended.

Northampton County

The comprehensive plan was not available on the Internet.

Northumberland County

The 1996 and draft 2006 comprehensive plans are available on the county's website.[50] The second chapter of the 2006 plan contains issues, goals, and strategies for all planning disciplines over the entire county, and it includes a strategy for reducing commercial sprawl development along highways. The land use chapter encourages the platting of new residential lots such that they front on new subdivision streets, rather than along the existing state road. It also discourages a sprawling pattern of commercial development along highways, even in areas designated as enterprise zones by the Commonwealth of Virginia. The operational problems of non-parallel on-street parking in commercial areas along state highways are noted in the land use chapter.

Inventory

The issues, goals, and strategies chapter includes a list and discussion of the primary routes that traverse the county. The transportation section in the public facilities chapter describes the primary road corridors and county secondary road system. They are presented on a map, with the roads color coded to show 2003 AADT. A separate map is provided showing the typical sections of the primary and secondary roads. The existing paratransit service is briefly described, and the bicycle facilities in the county are mapped and described.

Assessment

Bottlenecks in the existing highway system are identified, and travel patterns on primaries and secondary roads throughout the county are described.

Recommendations

The plan recommends the development of highway corridor overlay policies and ordinances and suggests that the VDOT and the county work together to develop an access management plan for the primary corridors in Northumberland County. It describes the VDOT planning and programming paradigm and recommends specific improvements to various roads, such as widening a two-lane section to four lanes.

Nottoway County

The comprehensive plan was not available on the Internet.

Orange County

The comprehensive plan available on the county's website is dated 2005 and is a draft that was approved by the planning commission but at the time of this writing not yet adopted by the board of supervisors.[51]

Inventory

A description of the primary route corridors that traverse the county is provided, and AADT growth between 1999 and 2003 is tabulated by segment. The secondary network is described in general, and recently completed improvement and safety projects for the primary and secondary systems are listed. Regional (private) passenger bus service and freight rail service are described. The two general aviation airports in Orange County are discussed in detail, including existing and proposed facilities, and cost estimates for airport improvements are provided.

Assessment

Accidents that occurred in 2003 on primary and secondary roads in Orange County are tabulated. A general needs assessment based on demographic projections is provided and indicates the future need for services for citizens unable to drive themselves.

Recommendations

The plan recommends unspecified improvements to segments of primary road in Orange County and a general recommendation that roadway safety be considered and safety projects programmed and constructed. The plan also recommends feasibility analysis of regional non-auto transportation infrastructure such as bus services and coordination with VDOT on corridor studies and road system planning.

Page County

The comprehensive plan was not available on the Internet.

Patrick County

The comprehensive plan was not available on the Internet.

Pittsylvania County

The comprehensive plan was not available on the Internet.

Powhatan County

The 2003 comprehensive plan is available on the website of the Richmond Regional PDC.[52] It is actually an updated version of the 1998 comprehensive plan, with the changes shown in a different color text. However, the transportation section does not appear to have been updated to reflect the near completion of State Route 288 when the update was done in 2002.

The executive summary of the plan notes the advantages and disadvantages of public water and sewer, which the county did not have at the time the plan was written, and it also decries strip commercial development. Commuting patterns are described in the introduction. The section on land use opportunities describes rural roads as a resource to be preserved and the strategies of reverse frontage lots and inter-parcel connections as means to preserve them. The need for access management on U.S. 60 is also mentioned in the section. The section on land use patterns notes the link among primary road access, the provision of public water and sewer, and commercial growth. The transportation section frequently relates transportation improvements to development patterns. Air, rail, and freight truck transportation are not mentioned, most likely because these modes are not available or commonly used in Powhatan County.

Inventory

Traffic volume growth from 1975 to 1995 on U.S. 60, U.S. 522, and State Route 13 is presented by segment, and its relationship to land development changes is described. Traffic volume growth on secondary roads is described, and the pattern of traffic volume growth is assessed. A thoroughfare plan that shows the present and future functional classification of roads is included as the county-wide transportation inventory.

Assessment

The comprehensive plan includes a qualitative assessment of the road network in the county, particularly important corridors and the effect of State Route 288. The assessment is fairly detailed in that many corridors are considered and the travel and land use patterns are discussed.

Recommendations

The thoroughfare plan shows the facility-specific recommendations that are interspersed with the assessment and inventory sections of the comprehensive plan. Transportation policy recommendations are presented for each land use policy, e.g., rural preservation, village service areas, etc. These planning area policies frequently recommend interconnected streets. A bicycle and pedestrian trail is also recommended. The land use policy sections treat bicycles and

pedestrians as modes that should be accommodated by the design of the roads, including the interconnectivity.

Prince Edward County

The 1997 comprehensive plan is available on the county's website.[53]

Inventory

Secondary roads are described generally, and primary corridors are described individually. Pubic transit, air, and freight rail transportation are all described as well. Pedestrian accommodations are mentioned in the public facilities sections.

Assessment

The descriptions of the primary corridors include basic qualitative assessments.

Recommendations

A list of planned road improvement projects, including reconstruction and bridge replacement, is provided along with cost estimates. These cost estimates are rare but as of 2006 are a legally required component.

Prince George County

At the time of this writing, the Prince George planning commission and citizen volunteers were developing a new comprehensive plan and its transportation plan, and they provided the researcher with a draft of the transportation plan.[54] The researcher was an observer at several of the plan development meetings and was copied on electronic correspondence regarding the transportation plan development. The committee members discussed and considered official maps, access management, and the legislation regarding local comprehensive plans and their transportation plans.

The draft plan includes a map of the region in which the county is situated, and the economic development portion of the plan describes commuting patterns in, out, and within the county. The special policy areas chapter states that the zoning, subdivision, and site plan ordinances will need to be revised to be consistent with the updated comprehensive plan. Transportation is described as an area in the special policy areas chapter.

Inventory

The inventory describes the highway, transit, paratransit, waterway, rail, and air transportation options available to county residents. The highways are also presented on a map of surface conditions and typical sections. A separate bicycle plan is referenced.

Assessment

An analytical assessment of the highway network was conducted for the county by VDOT staff who served as technical assistants to the committee developing the transportation plan. In addition, the 2004 AADT and 2030 project AADT for important road segments is tabulated.

Recommendations

Recommended, planned, and programmed improvements to highways are shown on a map. In addition, a detailed discussion of county access management policies is provided that includes specific strategies and tasks the county can employ, especially in the context of land development review. Right-of-way requirements for various classifications of roads are tabulated. The comprehensive plan states that the county will support the construction of bicycle lanes in conjunction with road projects.

Prince William County

The 2003 comprehensive plan is available on the county's website.[55] The introduction discusses LOS standards and provides guidance on what should be included in a traffic impact study. The county-wide comprehensive plan includes chapters on economic development, transportation, libraries, housing, and fire and rescue and divides the county into geographic sectors, each of which has its own planning document. The county-wide economic development chapter promotes increased transit and ridesharing, pedestrian facilities, and inter-parcel access. It also recommends travel demand management techniques such as telework centers and the clustering of these centers with services that might be needed on a work day, such as dry cleaning. The land use chapter recommends transit-oriented/transit-ready development travel demand management and prohibits the approval of developments that do not meet the LOS standards The transportation chapter describes current VDOT corridor studies of roadways traversing Prince William County.

Inventory

The inventory is provided by a thoroughfare plan map. It shows the functional classification and recommended number of lanes for roads in the county that are classified as collectors and higher classifications. The map is accompanied by a table that presents the same information, i.e., functional classification, recommended typical section, recommended right of way, and the existence and type of parallel bicycle and pedestrian facilities. A transit improvement plan map, which shows existing facilities and services, is included.

Assessment

A systematic assessment of transportation facilities in the county is not provided; however, some of the recommended improvements are justified in the narrative through

describing the need for the improvement. The transportation chapter recommends the development of a modeling system that can produce county-wide LOS maps.

Recommendations

The plan provides narratives for the roads on the thoroughfare plan map. These narratives explain the recommendations and describe any necessary interchanges or intersection improvements. The map and narratives provide specific improvement recommendations to the road network. The transit improvement plan map shows proposed facilities and services, and a list of proposed bicycle and pedestrian accommodation improvements is included.

Pulaski County

The comprehensive plan is available on the county's website.[56] A publication or adoption date was not found; however, the plan references citizen comment meetings held in 1999 and 2000. The economic development portion of the plan includes a cartographic depiction of commuting patterns. Strip commercial development along highways is discouraged. The plan divides the county into four planning areas, each with transportation policies and an action plan. The planning area action plans mention the establishment of an "arterial concept" along existing and proposed roads; however, the researchers did not find an explanation of the arterial concept.

Inventory

A table of selected secondary route segments, traffic volumes, and segment lengths is provided. The airport, lack of transit, and selected segments of the primary system are mentioned in the transportation element goals, objectives, and strategies.

Assessment

A systematic assessment of the transportation facilities was not found in the material available on the county's website.

Recommendations

In addition to being in the transportation chapter, specific improvements to existing roads and the construction of new roads are recommended in the action plans for the planning areas. The projects in the secondary six-year program are tabulated, and a "waiting list" of road projects for future six-year programs is provided. Access management and the coordination of land use and transportation are encouraged.

Rappahannock County

The 2004 comprehensive plan is available on the county's website.[57] The plan notes the five unincorporated villages in the county and describes the incorporated town of Washington.

Inventory

Each section describing a village contains a table of roads and their widths and surface conditions. The transportation section of the plan describes each primary road corridor that traverses the county as well as the secondary network. The lack of rail, air, and regional bus service in the county is noted, but the availability of these services in adjacent localities is described.

Assessment

Road segments are tabulated with traffic volumes and growth in traffic volumes from 1996 to 2002. The low volumes (less than 100 vehicles per day) are mentioned as an indicator of the adequacy of the road network. Commuting patterns to destinations outside the county are described.

Recommendations

The comprehensive plan references the county's secondary six-year program as part of its transportation recommendations. It also recommends transportation options other than roads, such as bus service, trams, and bicycle and pedestrian facilities.

Richmond County

The comprehensive plan was not available on the Internet.

Roanoke County

A draft of the 2005 comprehensive plan is available on the county's website.[58] The plan includes county-wide chapters for various planning disciplines, such as public facilities, and land use. It also has a section that divides the county into planning areas and maps and analyzes each one.

The transportation element of the plan discusses functional classification, the balance of accessibility and mobility, and the land use implications of transportation. A table that pairs land use designation and functional classification is provided; however, the matching of land use categories to functional classification is specifically not intended to serve as a deterrent to development, even if the development degrades highway capacity. A table of LOS for functional classification and land use is provided. The plan recommends the development of ordinances that facilitate the coordination of land use and transportation. The plan contains access management objective and strategies and describes the benefits of access management. A transportation element implementation schedule is provided.

Inventory

The plan references a regional bicycle plan, a regional greenway plan, and the 2003 VDOT bicycle and pedestrian accommodation policy. The regional bus service is described, the Roanoke Regional Airport is described, and the lack of passenger rail service is noted. However, neither a tabular nor cartographic inventory of transportation facilitates was provided in the materials available on the county's website at the time of this writing.

Assessment

A systematic assessment of transportation facilities in the county is not provided, but the chapter that presents an analysis of each planning area occasionally mentions deficiencies with regard to specific roadways.

Recommendations

A table of recommended improvements, excerpted from the Roanoke Valley MPO 2025 Plan, is included and serves as the plan recommendations for road improvements. The plan also includes a list of recommended travel demand management strategies. Recommendations related to the Roanoke Regional Airport are provided, and the provision of mass transit to areas close to Roanoke City is recommended.

Rockbridge County

The comprehensive plan was not available on the Internet.

Rockingham County

The 2004 comprehensive plan is available on the county's website.[59] The plan includes policies for coordinating transportation and land use that begin by designating a set of 10 general land use categories. For each category, the plan describes the suitable land use and transportation system design (bicycle/pedestrian accommodations, interconnectivity, street width, etc). Maps of recommended transportation improvements are included in the plan, as well as proffer guidelines that nearly require all zoning applicants to construct any public facilities shown in the comprehensive plan on the tract to be rezoned. This approach could make the comprehensive plan nearly as effective as an official map for coordinating transportation and land development. The plan treats buggies as an alternate mode in the same fashion as bicycle and pedestrian accommodations.

Inventory

A series of maps, each covering a different area of the county, shows the road network currently and in the future. Functional classification is shown on these maps. The maps are

complemented with descriptions of transit and paratransit services and bicycle/pedestrian accommodations.

Assessment

Issues (or deficiencies) with the existing transit, paratransit, bicycle/pedestrian, and buggy accommodations are provided, which serve as an assessment. Issues for the road network are also described, and references are made to VDOT studies.

Recommendations

The Harrisonburg Area Transportation Study, which is the MPO plan that includes areas in Rockingham County that are near the city of Harrisonburg, is incorporated into the comprehensive plan by reference. The MPO plan was made using the comprehensive plan as input. The mapped improvements are complemented by a list of policies and actions that are further detailed in a list of prioritized projects. These are programmed on an action item agenda that covers 2004 through 2020. The comprehensive plan also recommends access management.

Russell County

The comprehensive plan was not available on the Internet.

Scott County

The comprehensive plan was not available on the Internet.

Shenandoah County

The 2005 comprehensive plan is available on the county's website.[60] The chapter about the county's economy describes the commuting patterns of county workers. The transportation chapter summarizes and incorporates by reference the Old Valley Pike (U.S. Route 11) Corridor Study, which includes access management recommendations.

Inventory

The existing transportation system is described and shown on a map, which displays roads and a rail line. Functional classification is described for roads in Shenandoah County and shown on a map. Bicycle and pedestrian accommodations, paratransit, rail, and air transportation are also described.

Assessment

VMT growth from 1980 through 2000 is tabulated, along with other indicators such as population and registered vehicles. AADT and its growth from 1980 through 2000 are also tabulated for interstate and primary road segments, with similar traffic count information shown in a separate table for secondary roads.

Recommendations

The comprehensive plan recommends developing highway corridor overlay district ordinances for U.S. 11, as per the corridor study recommendations. Road improvement needs are summarized and mapped, and a regional bicycle and pedestrian plan is noted for future adoption once it is finished. Recommended improvements to the rail mode are briefly described.

Smyth County

The 2005 comprehensive plan is available on the county's website.[61] The economic development portion of the plan includes a description of commuting patterns, and the language of this portion suggests that transportation capacity, particularly around interchanges and intersections, may be sacrificed for the sake of commercial development. The land use chapter of the plan notes the detrimental pattern of residential strip development along roads and acknowledges that it has been exacerbated with recent amendments to the subdivision ordinance that were intended to encourage the construction of housing.

Inventory

I-81 and the primary roads in the county are described, and the secondary system is described in terms of both surface treatment for the entire network and traffic patterns for selected segments. Air service and facilities, freight rail, regional bus, and paratransit are described. Bicycle and pedestrian opportunities are also described.

Assessment

Traffic growth from 1981 through 2001 is tabulated for several segments of I-81, for primary roads, and for selected secondary roads. The transportation chapter includes a section that summarizes transportation problems and opportunities, with the road portion focusing on safety, maintenance, and access. It also describes inadequacies with the local airport, the lack of passenger rail service, and the need for improvements in paratransit, bicycle, and pedestrian accommodations.

Recommendations

The economic development section recommends the study and development of an intermodal transportation facility. The goals, objectives, and strategies comprise the recommendation, and for roads they include policy changes, evaluations and studies (such as

identifying safety problems), improvements to existing roads, and new facilities. The plan includes similar recommendations for rail, air, transit, and bicycle and pedestrian accommodations.

Southampton County

The 2000 comprehensive plan is available on the county's website.[62]

Inventory

The inventory mentions each primary road corridor traversing the county, selected secondary road corridors, and the remainder of the secondary system en masse. The transportation chapter decries strip development, which in Southampton County has been more residential than commercial.

Assessment

The growth in AADT from 1992 through 1997 is tabulated for selected primary road segments. Transportation deficiencies identified at community public hearings about the comprehensive plan are listed by county planning area. These needs are both specific, such as an unsafe location, and general, such as a need for better maintenance.

Recommendations

The goals and implementation strategies include the coordination of transportation and land development and access management on important highway corridors. The goals and implementation strategies include general support for road and other modal system improvements, but specific improvements are not included as recommendations.

Spotsylvania County

The 2002 comprehensive plan is available on the county's website.[63] One chapter describes the division of the county into planning districts, each of which has a set of planning policies and objectives promoting a particular land use. When describing the primary settlement district, the plan acknowledges the radial network of two-lane secondary roads that emanate from the City of Fredericksburg and the deleterious effect that residential subdivisions with one or two entrances and many cul-de-sacs have had on these roads. The transportation policies of the development districts wherein development is encouraged mandate inter-parcel connections, interconnected subdivision street patterns, and traffic impact mitigation. The development district chapter also mentions roads that support each district's desired land use pattern, assesses the relationship between the existing and desired development on these roads, and recommends specific improvements.

In addition to the specific planning districts, the plan includes a chapter on special planning areas, which are within or span multiple planning districts, such as corridor plans for State Routes 3 and 208.

Inventory

The transportation chapter of the comprehensive plan, hereafter referred to as the transportation plan, describes the proximity to commuter rail, commuter bus services, local bus services, park-and-ride lots, bicycle and pedestrian facilities, telecommuting centers, and the ride sharing services provided by the PDC. The transportation plan describes the concept of functional classification and presents a table of roads in the county and their corresponding functional classification. The transportation plan also presents the functional classification of the roads on a map.

Assessment

Although the comprehensive plan includes maps of the existing transportation system and proposed improvements, the researchers did not find a written or graphic representation of facility performance and/or condition that systematically identified specific deficiencies.

Recommendations

The transportation plan includes a countywide map of specific transportation improvements and a spreadsheet that provides details including cost estimates for each one. The plan also includes a railways plan map that presents specific recommendations, and recommended improvements for other modes are briefly mentioned with their description if applicable.

Stafford County

The comprehensive plan is available on the county's website[64] and is divided into separate plans for land use, community facilities, transportation, and other planning subject areas. The land use plan is dated February 2004; however, the transportation plan was adopted by resolution of the board of supervisors on April 16, 1996. The land use plan includes an objective of developing a highway corridor overlay district zoning classification, establishes a policy framework for the coordination of transportation and land use, and requires the preparation of traffic impact statements for comprehensive plan amendments. It also discourages strip development and recommends access management techniques such as shared access points and parcels sized and shaped to benefit from reverse frontage roads. The comprehensive plan contains a separate bicycle and pedestrian accommodations plan, which was adopted in 1996, which contains recommendations for specific improvements.

Inventory

The transportation plan describes a county-wide transportation computer model and sometimes refers to it as a simulation model. According to the comprehensive plan, this model

includes all roads in the county except some roads functionally classified as locals and is used to develop recommended improvements that will achieve a minimum LOS of C for the all roads in the county. The land use plan and transportation plan mention many specific roads throughout the text, and the transportation plan describes the interstate and primary roads that traverse the county. Bus, commuter rail, ridesharing, telecommuting, and commuter lots are all described.

Assessment

The transportation plan describes several areas and roads that are associated with problems because of poor operations, safety problems, or a general inadequacy to support the land use goals for the area.

Recommendations

The plan provides a list of recommended improvements and proposed new roads, organized by typical section. The plan also recommends the construction of the Fredericksburg-Stafford Regional Airport, which was in operation at the time of this writing.

Surrey County

The comprehensive plan was not available on the Internet.

Sussex County

The comprehensive plan was not available on the Internet.

Tazewell County

The comprehensive plan was not available on the Internet.

Warren County

The 2005 comprehensive plan is available on the county's website.[65] The land use portion of the plan discourages strip development and encourages the coordination of transportation and land use through proffers and other concurrency strategies. The transportation section of the plan includes a discussion of functional classification.

Inventory

The comprehensive plan includes a map of roads, with the functional classification, which serves as the inventory for roads. The plan describes other modal facilities, such as rail and airport, as well as the lack of a transit service.

Assessment

The transportation section of the infrastructure chapter describes AADT growth for interstate and primary road segments from 1993 through 2003. The infrastructure and land use chapters describe the commuting patterns, particularly the home-based work trips to the Washington, D.C., metropolitan region.

Recommendations

The transportation section of the infrastructure chapter contains primary road recommendations, references a U.S. 340 access management plan funded by the county, and includes a table of projects in the secondary six-year program. These road improvements are also shown on a map. The plan provides detailed, but not location-specific, access management recommendations that are related to site development patterns. It also recommends right-of-way preservation but does not mention official maps.

Washington County

The 2002 comprehensive plan is available on the county's website.[66] The land use recommendations effectively promote commercial development along highways, which could result in strip development patterns along Routes 11, 19, and 58 and congested situations near I-81 interchanges.

Inventory

The transportation section of the plan provides an inventory of transportation facilities by listing the interstate and primary corridors, selected secondary roads, and available air and rail service.

Assessment

The plan describes the transportation needs and presents them on a map.

Recommendations

The description of the transportation needs implies that they are all recommended improvements. One of the recommendations is for a new interchange on I-81, at mile post 11, which would constitute a spacing of rural interchanges far less than that recommended by AASHTO.[67]

Westmoreland County

The comprehensive plan was not available on the Internet.

Wise County

The comprehensive plan was not available on the Internet.

Wythe County

The county's website indicates that the plan is currently under development, with public meetings and hearings being held in the spring of 2006.[68] The Mount Rodgers PDC provided the researcher a copy of the transportation element of the 1998 comprehensive plan.[69]

Inventory

The inventory briefly mentions the roads in the county and uses terms such "arterial," "local," and "collector." For example: "In addition [to arterials] the County road system consists of several rural routes that are designated as local and rural collectors. These include State Routes 90, 94, 100, and 121." The Mountain Empire Airport, which is located in adjacent Smyth County but partially controlled by Wythe County, is described. Rail, regional bus, and local paratransit are described.

Assessment

The assessment concentrates on the growth in interstate AADT since I-77 was completed. It describes the system interchange of I-77 and I-81 as being a bottleneck and tabulates traffic volume growth for segments of the interstates, primary, and selected secondary roads in the county.

Recommendations

The introductory statements preceding the recommendations mention all modes, including bicycling and walking; however, the actual recommendations are limited to specific road improvement projects.

York County

The 2005 comprehensive plan is available on the county's website.[70] The economic development chapter describes the commercialization of the U.S. 17 corridor and the need for public water and sewer service to selected under-developed segments along U.S. 17. The transportation chapter groups the inventory, assessment, and recommendations for transportation facilities by mode, and it includes goals, objectives, and implementation strategies. The roadway section describes functional classification, highway capacity analysis, and the federally mandated regional congestion management system. The roadway section of the transportation chapter advocates access management, interconnected subdivision streets, concurrency, and intelligent transportation systems deployment. However, it does not recommend any specific facilities where these techniques can be applied.

Inventory

The first mode mentioned in the detailed sections of the transportation chapter is air travel, with most of the detail devoted to the Newport News/Williamsburg International Airport, which is located partly in York County. The plan describes the regional bicycle plan and lists bicycle facilities, including bicycle lanes along roadways. The plan also describes freight and passenger rail services. The transportation chapter briefly describes transit, walking, and waterway facilities.

Assessment

The plan provides a detailed assessment of the existing facilities and services of the Newport News/Williamsburg International Airport but does not provide a detailed assessment of the bicycle facility network. However, the plan includes a regional bikeway map, with links color coded to represent the type of bicycle facility (e.g., shared use path or bicycle lane).

The plan describes the existing capacity and use of the rail corridor and recent planning efforts undertaken by the Department of Rail and Public Transportation. The roadway section of the transportation chapter describes commuting trends and the increasing reliance on single-occupant vehicles for home-based work trips. The plan presents a table and maps of existing and future congested roads in York County, which are excerpted from the congestion management system reports. It also presents safety trends, in terms of the number of crashes that occurred in York County from 1993 through 2003. The transportation chapter also identifies deficiencies in transit, walkway, and waterway facilities.

Recommendations

The airport, bike way, and rail sections of the plan describe improvements listed in separate plans prepared by other entities, such as the Peninsula Airport Commission or the Hampton Roads PDC. The plan also describes primary and secondary road projects in VDOT plans or programs and future projects that the county recommends that are not in any of VDOT plans or programs. The roadway recommendations are mapped, and the plan includes detailed discussions of road improvements and land developments, grouped by the area of the county surrounding a proposed road improvement.

These transportation land development recommendations include a recommendation to provide direct access from more than 200 acres of prime undeveloped commercial land to a ramp of the I-64 interchange at mile post 243. The transportation chapter makes general, and a few specific, recommendations for transit, walking, and water modes. This is inconsistent with the other policies and recommendations of the York County comprehensive plan and represents a threat to the operations in an already deficient region.

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APPENDIX C

TEMPLATE FOR A COMPREHENSIVE PLAN

One way to approach a standardized format for a comprehensive plan, and to reduce the time VDOT needs to fulfill the legal obligation to review them, is for TMPD to provide more detailed guidance or a template to the staff of VDOT and the PDCs who would be involved with local comprehensive plans. At the time of this writing, this effort was underway, including the development of a simplified version of the Statewide Planning System (SPS) software program, which will be called SPS Light.

The VDOT planning staff has the technical training and should have the tools (such as GIS software and access to the full version of the SPS needed to assist localities in the development of their transportation plans. The inventory and assessment are less subjective and policy dependent that the recommendations and therefore are ideal components of a transportation plan for VDOT staff to draft.

A local transportation plan should not be a group of separate plans for sub-locality areas (e.g., magisterial districts or planning areas) but instead should consider the county as a whole and its context in the region. Based on the *Code of Virginia* §15.2-2223 and the criteria provided by TMPD,[1] a local transportation plan should include an inventory of transportation facilities and services, a transportation needs assessment, and recommendations to rectify the identified problems. The inventory is an objective observation of what is constructed, and the assessment is an analytical evaluation of the facilities using repeatable methods such as those found in the *Highway Capacity Manual*,[2] but the recommendations are dependant on the vision of the community and the policies developed by the planning commission and board of supervisors. These sections are discussed in more detail here.

Inventory

As of 2006, the *Code of Virginia,* §15.2-2223, recommends that local transportation plans consider a hierarchy of roads, i.e., functional classification. The inventory portion of the comprehensive plan may then consist of only a map of local roads, color coded to show functional classification. The functional classification is best used in local planning and land development review processes if the comprehensive plan includes a table that relates functional classification to appropriate land uses. An additional map showing transportation facilities for other modes can complement the functional classification map and complete the inventory.

The inventory could be enhanced by maps or descriptions of traffic volumes, typical geometrics (such as circuitous secondary roads), an acknowledgment of land use trends that will exacerbate development, and right-of-way requirements for various roads. The coordination between transportation and land use can be improved if appropriate land uses are listed for each category in the functional classification system as previously mentioned. An example of pairing appropriate land use designations to functional classification is shown in Table C-1, taken from the Roanoke County comprehensive plan.

Table C-1. Functional Classification Paired With Land Use Designation

Functional Street Classification	Applicable Land Use Designations
Rural Principal Arterial	Rural Preserve Rural Village Village Center
Rural Minor Arterial	Rural Preserve Rural Village Village Center
Rural Major Collector	Rural Preserve Rural Village
Rural Minor Collector	Rural Preserve Rural Village Conservation
Rural Local	Rural Preserve Rural Village Conservation
Urban Principal Arterial	Transition Core Principal Industrial
Urban Minor Arterial	Transition Core Development
Urban Collector	Neighborhood Conservation Transition Development
Urban Local	Neighborhood Conservation Development

Source: Roanoke County Comprehensive Plan.[3]

Needs Assessment

A needs assessment may require the acknowledgment of current travel patterns, especially commuting, freight movements, and the forecasting of traffic volumes for future years. Traffic forecasts could be conducted by using the SPS software that TMPD has developed, the traffic forecasting performed for a metropolitan statistical area, a regression analysis of previously collected data, (not necessarily *linear* regression), or the ITE Generalized Trip Generation method,[4] using local computer-assisted mass appraisal data as input. Once the forecasts are developed, the capacity of the roads should be evaluated with the existing and future traffic volumes. LOS measures, V/C ratios, and accident statistics can then reveal the location of deficiencies and the need for improvements. The SPS can be used to develop the information needed for a county-wide needs assessment, and this information can be shown cartographically. At the time of this writing, the ability of SPS Light to perform forecasting or capacity analysis was in question. This deficiency might need to be fixed, even if static data are included in the SPS Light distribution.

In addition to the needs assessment, which identifies areas where land development should not occur unless the transportation infrastructure is improved, an opportunities assessment could be conducted. Using the same data from the LOS or V/C ratio calculations, areas of the county can be identified where the transportation system has either adequate capacity to support

new development or the improvements needed to support development are within the scope of a developer's proffer. This approach might foster a development pattern of disconnected nodes, and it might not be applicable to localities that are mostly suburbanized; however, it is an approach that could be useful if applied with discretion.

Recommendations

The full version of SPS can provide recommendations to ameliorate the deficiencies it identifies, but planning judgment should be used to make sure that the recommendations are consistent with the land use portion of the comprehensive plan. For example, SPS recommends that Route 637 in Fluvanna County, (a major collector) be reconstructed to improve the sight lines and geometrics and to provide shoulders that are 6 feet wide. The Fluvanna County land use portion of the comprehensive plan designates the land along the Route 637 corridor as being one of a few primary residential areas in the county.[5] In order to coordinate the land use objective of the Fluvanna County comprehensive plan with the transportation need, the design of any improvements to Route 637 in Fluvanna should discourage high speeds and the shoulders should be surfaced to provide a pedestrian/bicycle accommodation for the residents. Again, the light version of SPS might not have had this functionality at the time of this writing.

Optional Plan Components

In addition to the inventory, needs assessment, and recommendations, optional elements may help coordinate land use and transportation. The following elements of a local transportation plan were found in one or more of the county plans reviewed; however, their efficacy has not been evaluated. Based on the review of the physical planning documents (comprehensive plans) as opposed to the practice of planning, one general principle is to ensure that the comprehensive plan is internally consistent. The review of the county comprehensive plans revealed many localities where the economic development portion of the plan was not consistent with the transportation element. Economic development requires public infrastructure, which is a cost to the county and state. Because the funds needed to construct the public facilities needed to support the economic development goals in the comprehensive plan are limited, the economic development goals should be scaled back or modified so as to maintain concurrency with the public infrastructure.

The public funds available to construct public infrastructure can be augmented with proffers from developers related to the impact of a proposed development on the public facilities. Guidelines for determining proffer amounts can be included in a comprehensive plan, and in particular, transportation LOS policies such as those previously discussed can be included as in the Fairfax County comprehensive plan.[6] Right-of-way requirements can also be included, which indicate how much right of way should be dedicated by applicants that must seek planning commission and board of supervisor approval for their development applications. Rockingham County uses the comprehensive plan in this manner; any rezoning must include dedication the right of way indicated on the comprehensive plan regardless of traffic impacts.[7]

An access management section can be added to the transportation plan. In order for specific entrance and traffic signal spacing in the comprehensive plan to be implemented in the land development process, it must also be in the subdivisions ordinance. It may be possible to write the subdivision ordinance such that it references the spacing requirements in the comprehensive plan. Regardless of whether both the comprehensive plan and subdivision ordinance have the spacing standards or only one or the other has them while the other references them, the subdivision ordinance and comprehensive plan must be coordinated. This need for coordination between the two extends beyond access management; a subdivision ordinance is one of the suggested implementation elements of the comprehensive plan, and in order to implement the land use and transportation visions espoused by a comprehensive plan effectively, the subdivision ordinance must be coordinated with it.

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