

License Plate Study

An Assessment of the Current State of License Plates and Their Potential to Promote Public and Highway Safety and to Contribute to Transportation Funding in Virginia

November 9, 2012

Virginia Department of Motor Vehicles

EXECUTIVE SUMMARY

At the request of the Chairmen of the Senate and House Transportation Committees, the Department of Motor Vehicles (DMV), in consultation with the Virginia State Police (VSP), convened a working group of interested stakeholders to assess the current state of license plates and their potential to address the concerns of highway and public safety and transportation funding.

As requested by the Chairmen, the study included:

- (i) options for improving the readability of license plates, including standards for design, display, and legibility, and the potential for the use of new technology for license plate production;
- (ii) methods for identifying, or helping to identify, illegible, obstructed, damaged, or improperly mounted license plates, including the possibility of a license plate check as part of the annual motor vehicle safety inspection process;
- (iii) the viability of a license plate replacement program;
- (iv) the implications of various options for the elimination of one or both decals on license plates; and
- (v) the implications of and options for the elimination of the front license plate for passenger vehicles, including statewide elimination, replacement of the plate with a windshield sticker, and the allowance for the display of a single plate for vehicles with no front mounting bracket.

The study also addressed the feasibility of issuing European-style license plates.

More than 35 stakeholders from state government and the private sector worked collaboratively with project staff to study the issues and develop recommendations through a series of meetings and other communications. Four committees facilitated work on the project: Plate Design, Number of License Plates, Plate Enforcement, and European Plate Design. Committees met between one and three times, following an initial kick-off meeting in April 2012.

The recommendations of the study are based on committee discussions, research and additional information gathered and provided by stakeholders. Of the recommendations, the most important are that Virginia retain its requirement of two license plates on vehicles and that Virginia maintain month and year decals on both plates. The law enforcement community's strong endorsement and rationale for maintaining two plates were instrumental to the team's decision. Having two plates increases their enforcement ability by providing a second opportunity to identify a vehicle, especially when the vehicle is carrying equipment, a plate frame, or any other device that obstructs the rear plate. In fact, intentional and unintentional obstructions, not legibility, are law enforcement's major concern.

Additionally, toll collectors and Commissioners of the Revenue were in favor of maintaining this practice, because the second plate increases their effectiveness as well. The American Association of Motor Vehicle Administrators (AAMVA) also supports the use of two license plates. With the decision to continue issuing two plates, research did not support eliminating or modifying expiration decals.

The study included the concept of using a windshield sticker to indicate expiration or as a substitute for a front plate. Using a windshield sticker was not recommended because of concerns with the cost, size and placement of the sticker, and unfamiliarity by law enforcement and customers.

Additional recommendations include:

1. Evaluating existing and new license plate designs, as appropriate, for conformance with select AAMVA plate design best practices.
2. Continuing to have VSP review new license plate designs to ensure that the license plate is readable on a vehicle, but enhancing that review to include evaluation of the plates under optimal conditions at a distance of no less than 75 feet in the daylight and at night using low beam headlights. In addition, the committee recommends that new plate designs be photographed using an automated license plate reader (ALPR) by both law enforcement and toll facilities prior to approval of the designs.
3. Continuing to research the feasibility and benefits of technologies, such as bar codes and radio frequency identification (RFID) tags, on license plates.
4. Reintroducing the “Illegible License Plate Notice” (form VSA-28) and process, which were created for law enforcement to use when a vehicle has illegible plates. Submitting this form to DMV places a stop on the DMV vehicle record, which prevents registration of the vehicle.
5. Reissuing stolen personalized plates only to the original owner, with a warning letter about the ramifications of having a plate that has been reported stolen.
6. Using the vehicle safety inspection program to identify illegible plates.

NOTE: VSP does not support this recommendation because inspecting license plates for appearance is subjective, and falls outside the scope of the inspection program, which is to ensure mechanical operation and equipment safety. VSP believes that this determination should be left to sworn law enforcement personnel.

Adopting and implementing these recommendations will enable Virginia to continue to use license plates to promote public and highway safety and to contribute to transportation funding throughout the Commonwealth.

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I. INTRODUCTION

A. Background

Every registered vehicle must display license plates. More often than in any other state, citizens of the Commonwealth express themselves through their choices of plate designs and personalization. As license plates have become the key to vehicle identification by law enforcement, toll operators, and even local Commissioners of the Revenue, those same choices have a bigger impact. With the expanded use of optical recognition technologies, such as those used in automated license plate readers (ALPRs), designs and personalization can hinder vehicle identification. Using license plates as vehicle identifiers is a key component to both improving public and highway safety and ensuring proper collection of toll revenue, itself a key component of the Commonwealth's long-term transportation plans.

In general, beyond the safety implications or the meaning of a license plate, license plates are most often associated with money. The Virginia General Assembly frequently considers license plate bills, nearly all of which are intended to either generate revenue or save the Commonwealth money. Most license plate bills authorize special license plates, which generate revenue for the Commonwealth and, in many cases, eligible non-profit organizations. Many years also see the introduction of bills to eliminate the front license plate for passenger vehicles, mainly to reduce the cost of plate production. However, eliminating the front plate sparks discussions about the importance of license plates to public and highway safety. That discussion arose again in 2012 with the introduction of three bills to eliminate the front license plate.

With the renewed discussion of the use of a single license plate, the vital role toll roads will play in the future of transportation in the Commonwealth, and the expanding use of ALPR and other technologies by law enforcement, toll collectors and others, the Chairs of the Senate and House Transportation Committees, Senator Stephen Newman and Delegate Joe May, recognized an opportunity for Virginia to examine license plates more closely.¹ To that end, the Chairmen directed the Department of Motor Vehicles (DMV), in consultation with the Virginia State Police (VSP), to convene a working group of interested parties to study the issues.

B. The Study

Senator Newman and Delegate May requested that the working group consider the following issues:

- i. Options for improving the readability of license plates, including standards for design, display, and legibility and the potential for the use of new technology for license plate production;
- ii. Methods for identifying, or helping to identify, illegible, obstructed, damaged, or improperly mounted license plates, including the possibility of a license plate check as part of the annual motor vehicle safety inspection process;
- iii. The viability of a license plate replacement program;

¹ See Appendix A for charge letters.

- iv. The implications of various options for the elimination of one or both decals on license plates; and
- v. The implications of and options for the elimination of the front license plate for passenger vehicles, including statewide elimination, replacement of the plate with a windshield sticker, and the allowance for the display of a single plate for vehicles with no front mounting bracket.

The study also included an assessment of the feasibility of issuing European-style license plates.

In April 2012, DMV held a kick-off meeting for the study. Direction and oversight for the study was vested in an Executive Oversight Team led by the DMV Commissioner with representatives from DMV, the Office of the Secretary of Transportation, the Virginia Department of Transportation (VDOT), VSP and Virginia Correctional Enterprises (VCE; the Commonwealth's license plate producer). Staff from DMV provided ongoing day-to-day project management. More than 35 stakeholders from state government and the private sector were brought together in a series of meetings between May and August 2012. In addition to staff from the agencies represented on the Executive Oversight Team, stakeholders included the Commissioners of the Revenue Association of Virginia, Drive Smart Virginia, the Virginia Motorcycle Dealers Association, the Richmond Metropolitan Authority (RMA), Transurban, the Virginia Treasurers' Association, the Virginia Automobile Dealers Association (VADA), the Virginia Independent Automobile Dealers Association (VIADA), the Virginia Trucking Association (VTA), the Virginia Sheriffs' Association (VSA), the Virginia Association of Chiefs of Police (VACP), and 3M (Virginia's license plate supplies vendor).²

To facilitate work on the project, four committees were formed: Plate Design, Number of License Plates, Plate Enforcement, and European Plate Design. Stakeholders could participate in any of the committees of their choosing. Each committee was tasked with examining one or more of the issues raised by the Chairmen in their charge letters:

- The Plate Design committee examined options for improving the readability of Virginia's license plates by modifying current plate design standards, including background colors, lettering, and logo location, and assessments of options for new approaches in design and production and the availability and feasibility of new license plate design and production technologies, such as the use of bar codes or embedded radio frequency identification (RFID) tags (Charge i).
- The Number of License Plates committee reviewed current practices for license plates and decals to determine the options and implications for the use of one or two license plates and the number and type of decals issued to indicate registration, including the potential for the use of a windshield sticker (Charges iv and v).
- The Plate Enforcement committee examined license plate enforcement and replacement processes as they relate to obscured and illegible plates, whether intentional, due to age, or other factors, in order to outline recommendations for

² See Appendix B for the Project Structure and a complete list of study participants and Appendix C for the Project Timeline.

identifying illegible, obstructed, damaged or improperly mounted plates, and assessed the potential for a plate replacement program (Charges ii and iii).

- The European Plate Design committee assessed the feasibility of and rationale for the production and issuance of European-style license plates.

C. Scope of the Report

The following report offers and explains the recommendations of the 2012 Commonwealth of Virginia License Plate Study committees. While the study addressed most elements of license plates and their use in Virginia, it did not address, and the recommendations do not apply to, Temporary Tags and Transport Tags issued by DMV and motor vehicle dealers, Farm Use Plates, Antique Plates, Permanent Truck and Trailer Plates or government-use plates.

D. Review

This report and its recommendations have been reviewed and approved, unless otherwise noted, by the License Plate Study stakeholders and Executive Oversight Team.

II. VIRGINIA'S LICENSE PLATES

A. Standard Plates

Modern Virginia license plates are quite different from the license plates first issued in the Commonwealth in 1906.³ Black and white porcelain plates have evolved into blue and white reflective sheeting fused to aluminum blanks. Along the way, a variety of different materials were used. Despite some failed, but necessary, experiments, such as fiberboard plates that were popular snacks for goats, solid ceramics and metals have been predominant since the beginning. Virginia has used only aluminum for its license plates since 1973. All of the Commonwealth's plates, regardless of the material used, have been embossed and, in all but six years, Virginia has issued two license plates for most vehicles.⁴

From 1906 until 1971, license plates in Virginia were painted and non-reflective. In 1971,⁵ the switch to reflective sheeting, similar to that used for highway signs, was an important step towards improving highway safety and vehicle identification.

Early plates across the country came in a variety of sizes, but it was not until 1928 that the first official recommendation for the current standard 6-inch-by-12-inch license plate size appeared. Virginia adopted that size for its plates in 1950 and it became the North American standard following a 1956 agreement among automobile manufacturers and the governments of the United States and Canada. A uniform plate size allowed for the standardization of vehicle parts across the region and encouraged the development of new technologies and competition in license plate manufacturing. These new technologies promoted and facilitated using plates to identify the vehicle, protect public safety, and fund an expanding and evolving transportation infrastructure. Current Virginia plates are issued in two sizes, 6 inches by 12 inches for most vehicles and 4 inches by 7 inches for motorcycles and small trailers.

Today, standard Virginia license plates come in 49 different plate designs, which are assigned based upon the type of vehicle being registered. Several older designs of standard plates are fully embossed, meaning that all elements of the plate, including the state name, have been stamped, or include stacked characters that are part of the license plate number. Leading up to the 400th anniversary of the Jamestown Settlement in 2007, Virginia added commemorative banners, both red and multicolored, to its standard passenger car plate, marking the first significant design change to those plates; however, the blue and white design returned in 2008.

Until 1973, the Commonwealth produced license plates with embossed years, which required annual replacement. In 1973, the first blue and white Virginia plates were issued with decals indicating the month and year of expiration, which, for the first time, allowed vehicle owners to keep the same plates for multiple years. Despite DMV's encouragement to replace fading plates as they age, many license plates remain in use for 10 years or more.

³ For a more detailed history of license plates in Virginia and throughout North America, see Appendix E.

⁴ Virginia issued one license plate from 1906 to 1909. Starting in 1910, Virginia made many changes including making plates out of steel and issuing two plates. The only other time Virginia issued one plate was in 1945 and 1946 due to a wartime shortage of many metals.

⁵ Virginia introduced reflectorized plates in 1971; however, complete reflectorization did not occur until 1979 when reflectorized aluminum plates were issued with white and blue letters and numbers.

B. Personalized and Special Plates

The issuance of renewable plates in 1973 also brought about the introduction of the first reserved license plate numbers, commonly seen today as “low-number” and “personalized” plates issued through DMV’s Communiplate Program. In 1976, Virginia’s U.S. Bicentennial license plates were the precursor to the current array of special license plates with unique sheeting designs. The Bicentennial plates were popular, but it was not until the 1980s that today’s special license plate program developed.

Virginia has the premier special license plate program in the nation. While the Commonwealth cannot claim the largest variety of available plates, it boasts the highest saturation rate of special plates of all states. Nearly 20 percent of all license plates on Virginia’s roads are special plates, personalized plates, or both. As of July 1, 2012, special license plates come in more than 250 different plate designs. In general, special plate designs are classified according to the placement of the image on the plate: Left Logo, Center Logo, Right Logo, and Full Background. Only a few special plates are fully embossed or feature stacked characters. Thirteen special plates are available for motorcycles, while only one is available for trucks. Unlike standard plates, special plates are subject to redesign and discontinuance. When that happens, DMV allows vehicle owners to continue to renew plates with the old design instead of recalling them.

Virginia’s selection of both standard and special plates is diverse, with approximately 300 designs currently available and 600 total designs in use on vehicles across the Commonwealth. The numbers continue to grow.

III. PLATE DESIGN

A. Objective

The Plate Design committee was charged with making recommendations to improve the readability of Virginia's license plates by modifying current plate design standards, including background colors, lettering, and logo location, and assessing both options for new approaches in design and production and the availability and feasibility of new license plate design and production technologies, such as the use of bar codes or embedded RFID transmitters.

To accomplish its task, the committee reviewed current design and material standards for Virginia license plates and available national best practice recommendations for license plate design, reviewed and considered options for standardizing license plate designs and new materials to improve readability of plates, and identified and reviewed feasibility and costs to the Commonwealth of both potential and recommended changes.

B. Recommendations

The Plate Design committee evaluated the issues presented and made recommendations based on a comparison of Virginia's current practices against newly-released best practices for license plate design developed by the American Association of Motor Vehicle Administrators (AAMVA).⁶ A summary of the best practices and the status of Virginia's conformity are provided in Appendix G.

The committee recommends the following:

1. The evaluation process for new plate designs should be improved. DMV should continue to send new plates to VSP for their review of the plate design and VSP should ensure that the license plate is readable on a vehicle in the daylight and at night using low beam headlights, under optimal conditions at a distance of no less than 75 feet. VSP should also obtain an ALPR image during their testing to ensure readability. In addition, at least one toll facility should be asked to obtain an ALPR image of the plate so that they can evaluate readability.
2. New license plate designs should be evaluated against AAMVA best practices as part of the development process. Existing license plate designs should be evaluated against AAMVA best practices when possible at the time new stock is needed or a redesign is requested; however, no plates should be recalled as part of this process.
3. DMV and its plate production partners should set additional limits on the options for colors that can be used behind the license plate number, including, but not limited to, the choice and intensity of the colors.
4. Logos that look like letters should be used only on the left side of the license plate.

⁶ Best Practices Guide for Improving Automated License Plate Reader Effectiveness through Uniform License Plate Design and Manufacture, American Association of Motor Vehicle Administrators, July 2012.

5. Plates with plate number characters that are stacked should be evaluated for conformity with AAMVA standards. As appropriate, non-conforming characters should be replaced with conforming stacked characters or non-stacked characters, or moved to make them more apparent.
6. Plates with logos that contain characters used in the plate number should be updated to improve readability. Recommended approaches are: a) Moving the letters out of the logo and printing them as part of the plate number, or b) Keeping the letters as part of the logo, but assigning a new plate number series that does not include those letters. Law enforcement and toll facilities should be educated on the presence of these plates and how to read them.
7. DMV should educate law enforcement and toll operators on how to read and inquire upon license plates with low plate numbers.
8. Law enforcement should advise DMV quickly of any potential problem plates officers identify.
9. The Commonwealth and stakeholders should continue to research the feasibility and benefits of technologies, such as bar codes and RFID tags, in license plates.

A discussion of the issues and these recommendations follows.

C. The Current State of Virginia License Plate Design

Since 1973, the standard plate design has been blue lettering on a white background. The word “Virginia” appears at the top center of the plate. The word “month” appears in the top left corner and the word “year” appears in the top right corner. The actual month and year appear on decals to be affixed over the words. Standard plates are issued according to vehicle type and usage, which results in 49 distinct designs used for the plates. License plates are produced in two sizes, 6 inches by 12 inches for most vehicles and 4 inches by 7 inches for motorcycles and small trailers.

For more than 30 years, the Commonwealth has issued license plates with graphics, known as special plates, most of which require a fee in addition to typical vehicle registration fees. The graphics are printed directly onto the reflective sheeting that is used to make the plates. Early examples of special plates include the Bicentennial and Great Seal plates. More recent examples are special plates promoting the James River Park System and tourism on the Northern Neck. Since 1995, the General Assembly has maintained responsibility for the authorization of new special plate designs.

Special license plates are generally classified according to the placement of the graphics on the plate: Left Logo, Center Logo, Right Logo, and Full Background. Logos are limited to 2.25 inches wide by 3 inches high, but may be accompanied by a legend that describes the plate or the organization associated with it. Full background plates may also include a logo and are designed to limit interference with the license plate number.

D. Virginia Code on License Plate Design

Va. Code § 46.2-712 controls the basic design of license plates, requiring every license plate to display the assigned registration number, the name of the Commonwealth (either spelled out or abbreviated) and the year or month and year (which may be on decals). All other design aspects – the letters, the numerals, the decals and the color of the plate, letters, numerals and decals – are within the discretion of the DMV Commissioner, subject to the need for legibility. The overall plate design is also with the Commissioner’s discretion.

The Commissioner does not authorize new license plates. In 1995, the Virginia General Assembly assumed responsibility for the authorization of new special license plates under *Va. Code* § 46.2-725. The General Assembly uses the rules established in that section to enact individual or group license plate authorizations. Many of these authorizations are found in the sections following § 46.2-725; however, in recent years, most special plate authorizations appear only in the Acts of Assembly for the session of the General Assembly in which they were enacted. Special plate authorizations are important to plate design because they often include elements that must be included on the plates, such as legends or letter combinations. Fees for special plates are set by either § 46.2-725 or the applicable authorizations. The fees for special plates range from \$10 to \$25, and can be a one-time or annual fee. The special plate fees are paid in addition to the regular vehicle registration fees.

Many of these special plates are authorized for the purpose of sharing revenue with entities or organizations that provide to the Commonwealth or its citizens a broad public service that is funded, in whole or in part, by the shared revenue. A revenue-sharing recipient must be a nonprofit corporation, as defined in § 501(c)(3) of the United States Internal Revenue Code; an agency, board, commission, or other entity established or operated by the Commonwealth; a political subdivision of the Commonwealth; or an institution of higher education whose main campus is located in Virginia. The revenue-sharing license plate authorization controls when the recipient receives funds and how those funds are to be used. Vehicle owners may be eligible to deduct a portion of the plate fee for revenue-sharing plates as a charitable contribution on their income taxes.

Personalized license plates, which may be standard or special plates, are controlled by *Va. Code* § 46.2-726. Personalization adds \$10 per year to the registration fees.

E. AAMVA on License Plate Design

AAMVA has long been a source for best practices in license plate design. In 2011, United States Customs and Border Protection asked AAMVA about the use of stacked characters on license plates, which prompted AAMVA to reevaluate the need for national standards for plate design in general. AAMVA formed the ALPR Working Group and focused its work on addressing the needs of users of ALPR systems to ensure readability by both the human eye and computer systems. The working group’s purpose was to evaluate the non-standardization of license plate design and manufacture, and recommend updated best practices for states⁷ and Canadian provinces⁸ to adopt as appropriate.

⁷ For purposes of this study, the 50 states and the District of Columbia will be collectively referred to as states. A review of U.S. territories was not included as part of this study.

⁸ For purposes of this study, the Canadian provinces and territories will be collectively referred to as provinces.

As part of this study, AAMVA endorsed the concept of a uniform motor vehicle registration license plate system, consisting of 16 recommended standards, which are listed in Appendix G. According to the AAMVA study, “[t]he scope of these recommendations is limited to the physical characteristics of license plates, the information displayed on plates, and the placement of license plates on motor vehicles and trailers.”⁹ In general, AAMVA encourages states to adopt standardized license plate design practices to create plates that are easily recognizable as being issued by those states.

Virginia conforms to most of the AAMVA recommended best practices. The Plate Design committee’s recommendations would move the Commonwealth into further conformance, but the committee recognized that Virginia will not be able to conform to all of AAMVA’s recommendations. The three key reasons are that 1) the necessary changes would have an undesired fiscal impact on the Commonwealth and on stakeholders, 2) the volume of plates affected would make the recommended changes impractical, and 3) the need served by Virginia’s current practice outweighs the potential benefit of the recommended changes. Instead of recalling and redesigning existing plates, the committee recommended adopting as many of the AAMVA standards as is feasible for new license plates as they are developed.

F. License Plate Design and Readability Issues in Virginia

The committee looked at the impact of license plate design on plate readability from two aspects: the human eye and ALPR systems, which are the primary tools used to read license plates by law enforcement and toll operators. Design choices have the potential to affect the ability of the human eye and ALPR to read the license plate mainly by interfering with the license plate number and hindering the identification of the issuing jurisdiction. Plate number choices can also affect how the plate is viewed. In addition, both the human eye and ALPR have limitations of their own that may reduce readability. Improving the process that DMV and VSP use to review license plate designs for readability should address many of these issues.

1. Interference with the Plate Number

At times, the plate design itself contributes to the illegibility of the plate, regardless of the tool used to read that plate. Logo shape and placement and background color and images play an important role in what the human eye or the ALPR sees. Through the years, DMV has relied on VSP to help evaluate plate legibility, but even when plates meet all of the design specifications, potential problems still exist. In preparation for the study, DMV identified several examples of license plates with designs that may interfere with the plate number. Each of these plates represents a different potential point of interference; however, all of these plates, unless otherwise noted, were approved for use by DMV and VSP and meet all current design specifications. The committee did not recommend recalling and redesigning these plates.

⁹ Best Practices Guide for Improving Automated License Plate Reader Effectiveness through Uniform License Plate Design and Manufacture, American Association of Motor Vehicle Administrators, July 2012.

Scenic Autumn



The Autumn plate¹⁰ is an example of how a particular color might interact with plate characters. The Autumn plate, first issued in 1997, is the only plate ever recalled and redesigned because of interference with the plate number. Often referred to as the “camouflage” plate, the original design featured red and gold leaves behind the plate number:



This first version seen above was not approved by VSP before release. Less than one month after the plates were first issued, DMV received enough complaints from law enforcement that it recalled and redesigned the plate. The current design was first offered in October 1997. Even on the current design, in which the leaves only contact plate characters on the edges, there is a potential for the red and yellow colors of those leaves to obscure the characters. This possibility grows more likely as the plate ages and the colors fade.

Shenandoah National Park Association



The Shenandoah National Park Association plate is an example of a full background plate with many darker colors. Under some lighting conditions, the dark blue plate number may appear to blend into the mountains.

Drive Smart Virginia



¹⁰ The plate shown above is the reissued design currently on the road.

The Drive Smart Virginia license plate represents a potential issue with logo size and placement. This plate is a full background plate with the organization’s logo as the background design. The logo’s size and placement in the center of the plate is roughly equivalent to the size and placement of a six-digit license plate number. The size and placement, coupled with its blue coloring, may cause the blue numbering on the plate to blend into it.

James River Park System



The James River Park System license plate represents a potential issue with background image choice. The potential problem area of this plate is the bush that appears on the left side of the picture. That dark green bush sits behind a single license plate number. Its contrast with the lighter bridge and white space may obscure that one number.

Each of the potential problem areas represented by these plates must be taken into account each time a new license plate is developed. The presence of recent designs in these examples indicates that there is room for improvement. In addition to the changes to the license plate review process, these problems would be addressed by limiting color choice and intensity, at least for license plates with full-background designs.

2. Identification of the Issuing Jurisdiction

Virginia’s standard license plate is unique and easily distinguished from other states’ standard plates, mainly through its color combination and font. As the number of special license plates has grown, Virginia’s license plates, as a group, have become less standardized and, therefore, less identifiable and distinguishable. Color and font choices that are similar to those used on license plates in other states can cause confusion for people who must rely on license plate identification for law or toll enforcement. For example, at least one other state issues Choose Life license plates with the same color and a similar design.



This particular issue can be difficult to manage because, in recent years, many of the plates the General Assembly authorized were sponsored by nationwide organizations that are trying to create the same license plates in as many states as possible. The Commonwealth does its best to keep these plates recognizable as Virginia plates, which is AAMVA’s primary goal.

To standardize plates within the state, logo size and placement would have to be uniform and the use of full-background plates would have to be eliminated in favor of logo-only special plates. Currently, logos are limited in size to 2.25 inches by 3 inches, but may be of any shape, and may appear on the left, right or center of the plate. AAMVA is not specific about standardizing logo placement, but, because of the needs and programming of ALPR systems, such standardization would mean limiting the use of a logo to the left side of the license plate. Most ALPR systems are programmed to ignore logos that appear on the left side of the plate and read only the plate number that follows. The committee understood the value of making a change to Virginia's plates, but determined that a change was impractical and unnecessary. The popularity of full-background plates also precludes their elimination.

If the Commonwealth were to require that all special license plates have a logo on a specific side, it would have to consider recalling and reissuing all nonconforming plates. DMV has identified more than one million vehicles on the road displaying license plates that do not meet this standard. The agency estimates that recalling and reissuing all of these plates would cost approximately \$8.3 million: \$5.2 million for the plates and \$3.1 million for the postage to mail the plates to customers.¹¹ If all of the recalled plates were returned for recycling, DMV could see a one-time revenue offset of only \$155,729.

Because the committee determined that replacing all non-conforming plates would not be justified, it considered standardizing only new and redesigned plates. Three factors convinced the committee not to replace these plates. One, center- and right-logo plates are requested less frequently than left-logo plates,¹² so changing them would not have a significant effect. Two, full-background plates are increasingly popular and the committee recognized that eliminating them in favor of left-logo plates could have public relations repercussions. Three, the committee recognized that only changing new plates would not standardize all plates and chose to focus on more practical changes that could be made moving forward.

An additional concern contributing to the growing difficulty of identifying jurisdictions is the inconsistent placement of jurisdiction names and, when applicable, decals. In accordance with AAMVA's recommendation, the committee agreed that DMV should consider limiting the placement of both "VIRGINIA" and the expiration decals to the top of new license plates. In addition, DMV should standardize the look of the word "VIRGINIA" and consider limiting the use of the abbreviated "VA."

Most license plates have "VIRGINIA" in blue block letters across the top of the plate, but "VIRGINIA" can appear in other colors (typically red or black), across the bottom, in script, abbreviated, or in any combination of these variations. Small license plates for motorcycles and trailers and license plates for some trucks have "VA" rather than "VIRGINIA" to allow for other design elements. To better identify the issuing jurisdiction, a key to identifying the vehicle, the committee recommended standardizing the placement, appearance, and color of "VIRGINIA" to the greatest extent possible. This recommendation would apply to all new plate designs and any existing plate designs that must be redesigned for another reason. The committee also recommended that DMV consider modifying the designs when additional license plate sheeting is needed to produce more plates.

¹¹ In addition to the costs, the numbers on production plates have meaning for some drivers (e.g., the random combination has significance, the driver remembers the number, the driver has the license plate registered with parking, security, or E-ZPass) and a recall would force those drivers to incur the cost of personalizing the plate to maintain the number.

¹² There are currently more than 150 left-logo license plates and fewer than 40 center- and right-logo plates.

For decals, restricting the placement to the top of the plate should not be an issue. Very few plates require the decals to be placed at the bottom and DMV discontinued the practice several years ago for new plates, even when “VIRGINIA” is placed at the bottom.

3. Plate Number Choices

The responsibility for plate number choices rests with both DMV and individual vehicle owners. DMV has used a variety of numbering conventions through the years. Since the early 1990s, standard license plates have used a seven-character plate number of three letters and four numerals separated by a dash. Special plates, which may have six or seven characters, depending on the design of the plate, follow a similar pattern. In general, this numbering convention does not cause confusion and is easily identifiable as belonging to Virginia license plates. In certain cases, though, DMV relies on alternative numbering practices, which may inhibit plate readability. These alternative numbering practices cause the most trouble for law enforcement and ALPRs, but cannot be addressed by changing the plate design review process.

The most visible of these alternative practices is the use of stacked characters. Many non-personalized truck plates use two half-sized letters stacked one on top of the other to the left or right of full-size plate number characters. These stacked letters are part of the plate number. In another version of stacked characters, on Disabled Veteran license plates, the letters “DV” are printed as part of the license plate design and appear as if they are a logo. Actually, these letters are part of a DMV-assigned plate number.¹³ The potential harm of stacked letters is that the two may be confused for one, especially by ALPR systems; however, because stacked characters are in widespread use nationwide, most law enforcement and ALPRs have adapted to reading them. The committee recommended that DMV evaluate its use of stacked characters and determine whether non-conforming characters are used based on size or position with respect to one another. Non-conforming characters should be replaced by conforming stacked characters or non-stacked characters, as appropriate.



The most common alternative practice to plate numbering involves using prefixes or suffixes with low plate numbers. Only the number is embossed on the plate. In DMV’s computer system and on the vehicle’s registration card, a prefix or suffix is shown as part of the plate number to identify the plate type and, therefore, the vehicle. This numbering practice allows DMV to issue multiple plates with the same low numbers in limited circumstances. In most cases, this practice is limited to plates for elected officials.

Unfortunately, the use of plates that appear to have the same number causes problems for vehicle identification. Without identifying the plate type on which these numbers appear, neither law enforcement nor ALPRs are likely to identify the plate properly. Because these plate numbers are tied to seniority and are assigned to such a variety of plates, the recommended approach to address this

¹³ “DV” appears on all Disabled Veteran license plates, but is not included in the plate number on personalized plates.

problem is through education, rather than replacing the plates. DMV provided law enforcement with the suffixes and prefixes used to identify these plates, so that officers would not have to view the registration card for the vehicle to identify it.

DMV also has two license plates with logos that contain small letters, which are both mandated by statute and part of a DMV-assigned plate number.¹⁴ These plates, which are for members of volunteer rescue squads (“RS”) and volunteer firefighters (“FD”), have been issued for decades, but committee members learned that neither law enforcement nor toll operators were aware that they should be including the small letters when reading the plates. For these plates, the committee recommended looking at ways to make the plate numbers clearer. It recommended educating law enforcement and toll operators on the existence of these plates and either moving the small letters out of the logos or creating new plate series for these plates that would not include these letters. DMV will determine which approach is more feasible and work with VCE as necessary.



Regarding customer choice, there are two potential issues related to license plate personalization. First, because Virginia has so many personalized license plates, many popular or common words are already taken, which leads to letter and number substitution to make a plate that appears to say a word. Examples of substitution include “5” for “S”, “1” for “L” or “I” and “0” for “Q.” On Virginia plates, “0” and “O” are the same character, so they cannot be substituted. Unlike in some other states, Virginia’s license plate font makes letters and numbers unique so, while substitution is allowed, it is also readily apparent. The committee did not recommend eliminating this option.



Second, special plate logos are sometimes used to replace letters so that, when the plate is read, the message is different from the official plate number. This is particularly common with logos that are shaped like letters, such as the University of Virginia’s athletics program’s block “V,” and round logos that are placed in plate centers, like the Great Seal, which look like the letter “O.” In most cases, this practice causes more problems for DMV because of inappropriate plate messages than it does for law enforcement or ALPRs. To avoid potential problems for ALPRs, the committee recommended placing letter-shaped logos only on the left side of the plate, where they can be ignored by the reader. Currently, only the Great Seal plate has a logo that looks like a letter and is not on the left side of the plate. Because of its popularity, the committee did not recommend restricting the use of the Great Seal logo to the left side of the plate.

¹⁴ These letters also appear on personalized plates, but are not included in the plate number for personalized plates.

4. Readability Issues for the Human Eye

DMV and vehicle owners play a role in what a license plate looks like, but the viewer of a license plate must be able to recognize it. So, while AAMVA's best practices are designed to improve ALPR success, they are still grounded in a basic need to be legible to a person. Neither the Plate Design Committee nor AAMVA can adjust plate design to accommodate visual impairments, but the committee believed that adopting AAMVA's recommendations for the design review process would improve legibility for the human eye.

License plates and highway signs are related more closely than many people may realize. Both are intended to identify something, be legible at high speeds, and be reflective to allow for clear reading at night using vehicle headlights. In fact, the earliest reflective license plates were created from the same materials as the states' highway signs. That shared history has resulted in a shared standard of legibility for both signs and plates, the Legibility Index.

The Legibility Index is a measurement of how far away an average person using the naked eye can accurately read a 1 inch capital letter at night. It is useful here as a basic measurement of what the human eye can do. The early rule of thumb (circa 1940s) was 50 feet of legibility for every inch of letter height, so a letter 2 inches tall should be able to be seen 100 feet away. Over time the distance was reduced to 40 feet and now the rule of thumb is 30 feet of legibility for every inch of letter height.

The committee's recommendations for changing the plate design review process are based on applying the Legibility Index. Virginia's characters are 2½ inches tall. Using the current standard of 30 feet per inch, the Legibility Index would dictate a standard legibility test distance of 75 feet. If a plate is not legible at this distance, then there is a problem with the contrast of colors, the background graphic, or some other feature. AAMVA recommends viewing the plates at a distance of at least 75 feet during the day and at night, using low-beam headlights, to maximize readability and limit the problems in design.

5. Readability Issues for Automated License Plate Readers (ALPR)

ALPRs serve an important role in the Commonwealth. ALPRs assist law enforcement, toll operators, Commissioners of the Revenue and even parking enforcement in a vast array of areas. With ALPRs, officers are better equipped to identify vehicles used to commit crimes or associated in some way with missing persons. Toll operators use ALPRs for automated toll collection and enforcement, in particular on barrier-less open-road toll lanes, which are intended to encourage the flow of traffic and reduce bottlenecks. Commissioners of the Revenue use ALPRs to identify vehicles for tax collection and local registration purposes. Even parking enforcement uses ALPRs to control access to lots and assess parking fees.

ALPRs use a series of computer algorithms to identify a motor vehicle through its license plate. License plate recognition involves capturing video or photographs of license plates and processing them to convert them into the alpha-numeric combination of the captured license plate. Generally, the system requires six algorithms for identifying a license plate. The algorithms must detect the vehicle and license plate, locate the license plate in the image, extract the license plate characters from the background, identify the license plate number, determine the jurisdiction, and send the results to a back-end system for use by the entity operating the ALPR.

A license plate recognition system has to first determine what aspect of the vehicle's image is the license plate (license plate localization). The algorithm has to search the shapes on and of the vehicle and differentiate which piece is the license plate from the rest of the vehicle. The system then has to compensate for the skew of the license plate image. Next, the system has to adjust the brightness and contrast of the image. Once the system identifies the plate, it has to find the individual characters on the plate. To do that, the system separates each letter or number and processes it by optical character recognition (OCR). Once the combination is translated into an alpha-numeric text entry, the system checks the characters and positions against jurisdiction-specific rules.

The complexity of each of these parts of the system affects the accuracy of the system. Vehicles are large objects with a variety of shapes, designs and colors and different jurisdictions have different standards, colors and character sets for license plates. On some vehicles, like motorcycles and trailers, the dimensions are different as well. This inconsistency requires algorithms to accommodate all possibilities. In addition, poor image resolution, blurry images, poor lighting, low contrast, and different fonts complicate the operation. Sometimes, the plate is obscured. Because of a lack of coordination between jurisdictions, two cars from different states can have the same number on a plate, but a different design. The committee's recommendations should limit the Commonwealth's contribution to these inconsistencies.

a) The North Carolina Study

To assess the impact that license plate design has on these readers, the committee reviewed a study conducted by the Institute for Transportation Research and Education (ITRE) at North Carolina State University. ITRE conducted a field test to determine the readability of North Carolina's license plates with an ALPR system. The institute focused on six plates of varying attributes (color of characters, background color, design, and logo). To measure the effectiveness of the ALPRs, they focused on the ability to locate and identify a license plate (the capture rate) and the accuracy of reading and processing characters (the read rate). The capture rate is determined by dividing the number of plates recognized as plates by the total number of plates studied. The read rate is determined by dividing the number of plates accurately read by the number of plates recognized as plates. The tests were conducted with two ALPRs operated by PIPS R&D, an ALPR system provider, and the Raleigh, North Carolina Police Department.

The North Carolina license plates tested were similar in many respects to Virginia plates. ITRE used standard North Carolina "First in Flight" license plates, which are primarily blue and white, license plates with stacked characters, special "First in Flight" license plates with logos, and a full-background special plate that is similar in design to Virginia's Blue Ridge Parkway license plate. The study also looked at a previous version of the North Carolina standard plate that has red lettering for the plate number and is still in use on many vehicles and a new style of full-background special plate with a white box behind the plate number. The new-style special plate has a design that is very close to Virginia's Shenandoah National Park Association plate.

The study concluded that the most readable plates were the standard-issue plate with blue ink. Personalization dropped the read rate by more than half. Red ink performed significantly worse than blue ink. Specialty plates without stacked characters were more easily captured and read than those with stacked characters. Specialty license plates with full background graphics were generally captured, but difficult to accurately read. Many incorrect matching combinations involved matches between letters and numbers (e.g., between the number "8" and the letter "B"). The study found significant

difficulty with accurately reading a variety of specialty and personalized license plates. The results of this study were reported by ITRE¹⁵ in the chart below:

Exhibit 9. License Plate Capture and Read Rate – Raleigh PD & PIPS R&D

Plate Type	Syntax Type	Number of Plates	Raleigh PD		PIPS R&D	
			Capture Rate % (Number)	Read Rate % (Number)	Capture Rate % (Number)	Read Rate % (Number)
Standard Issue - Blue Ink	Std	154	96% (148)	96% (142)	95% (147)	95% (140)
	Person	86	84% (72)	40% (29)	83% (71)	48% (34)
Standard Issue - Red Ink	Std	249	66% (164)	45% (74)	75% (186)	60% (111)
	Person	25	56% (14)	7% (1)	72% (18)	11% (2)
Specialty FIF - No Stacked Character	Std	43	86% (37)	57% (21)	88% (38)	68% (26)
	Person	4	50% (2)	50% (1)	50% (2)	50% (1)
Specialty FIF - Stacked Character	Std	83	80% (66)	20% (13)	87% (72)	28% (20)
	Person	12	33% (4)	0% (0)	50% (6)	0% (0)
Specialty Non-FIF - New Style	Std	213	80% (171)	7% (12)	89% (189)	17% (33)
	Person	27	52% (14)	0% (0)	67% (18)	0% (0)
Specialty Non-FIF - Old Style	Std	5	20% (1)	0% (0)	40% (2)	0% (0)
	Person	1	100% (1)	0% (0)	100% (1)	0% (0)
Total		902	77% (694)	42% (293)	83% (750)	49% (367)

Note: Std = Standard, Person = Personalized

ITRE’s researchers determined that readability should be one of the criteria for consideration when decisions are made regarding new license plate designs. Ink color, syntax type, and contrast have a significant impact on the capture and readability of license plates using ALPRs. Stacked characters, background colors, and consistent location of symbols are important on specialty plates. Ultimately, the lack of a national standard regarding the formatting of license plates significantly impairs the effectiveness of ALPR technology.

b) The AAMVA Working Group’s Findings

The ITRE study supports the observations of ALPR operators, which AAMVA was seeking to address with its ALPR Working Group. In moving towards recommendations for a national standard for plate design, AAMVA’s Working Group found that ALPRs benefit law enforcement, whose officers are 2.5 times more effective with ALPRs than without; public mobility, through the use of open-road toll lanes and bridges to reduce traffic; and homeland security, by facilitating the identification of vehicles used in acts of terrorism. However, those benefits are lost if the ALPR cannot identify the plate or its characteristics.

Like the ITRE study in North Carolina, the AAMVA working group found that a major challenge to using ALPRs is the increasing diversity of license plate designs across the United States. To help improve the design process, AAMVA recommended using ALPRs to evaluate new license plate designs in addition to using the naked eye. The Plate Design Committee recommended that VSP use a vehicle-mounted ALPR to photograph the plate and that at least one toll operator do the same with a stationary ALPR.

¹⁵ Institute for Transportation Research and Education (ITRE), “Effects of License Plate Attributes on Automatic License Plate Recognition,” 2012. ITRE has not yet published the final report, but it did make the results public. The chart embedded here was provided from the report by 3M.

G. New Technologies for License Plate Readability

In addition to evaluating the features of license plates, the committee also evaluated new technologies being developed to improve the readability of license plates and the accuracy and effectiveness of ALPRs.

1. Bar Codes

Manufacturers are developing bar code technology that can be integrated into license plates to improve their readability. Embedding a bar code with limited vehicle information that is visible to the camera in an ALPR system can increase the ability of that system to provide accurate information with a high level of confidence in the results. The goal is to reduce inaccuracies associated with current license plate readers to facilitate more efficient motor vehicle law and toll enforcement. In addition, this technology could reduce the need for staff to manually review license plate photos, thereby increasing the speed of enforcement and decreasing the costs.

These bar codes are not the small-form bar codes used on products that require a hand-held scanner to read. Instead, the new bar code for license plates would be part of a multi-layer overlay and would be roughly the same size as, or slightly larger than, the plate number. The bar code itself would be functionally invisible to the naked eye or to visible light cameras, but be visible, instead of the plate number, to infrared (IR) cameras, like those commonly used for ALPR. 3M shared prototypes and photos of plates with bar codes with the committee. On both, at close range or certain angles, the outline of the barcode is slightly visible in the blank areas of the plates, but does not interfere with the legibility of the plate number.

3M has experimented with smaller bar codes, but they are not practical because they require high-definition cameras to be read under the conditions that license plates are used. Most current ALPRs do not use high definition cameras because of the expense, but newer systems are being developed to do so. Because of the size limitation, bar codes are not ready for motorcycle plates, as the license plates are too small to accommodate a bar code large enough to be read without high definition cameras.

The bar code is based on an open standard format, known as PDF-417, which could be used by any license plate supplier or manufacturer. One type of bar code would be pre-printed by the plate supplier and contain a serial number that would be linked to a vehicle record when the plate is issued. A second type would be printed on-demand by the plate manufacturer and contain the plate information. The serial number bar code is likely to be the first available and would be the most cost-effective to produce, but would involve an additional step of linking the serial number to the vehicle record. The print-on-demand bar code, which is not as far in development, would require additional equipment for production and be more expensive, but it would be more efficient because the bar code would contain all of the information necessary to identify the plate.

With either option, the information contained in the bar code would be limited. The serial number would be readable with a scanner, but could not be used without a connection to DMV's computer system. The print-on-demand bar code would contain only information that is visible on the plate (i.e., plate number, plate type, and issuing jurisdiction). No personal information about the vehicle owner would be part of the bar code. After reading the bar code, authorized individuals would use the data provided to query the issuing jurisdiction's vehicle record for information, just like they do now.

The bar code would enhance vehicle identification by eliminating confusion over what is printed on a plate, but the technology is not without limitations. Like plate numbers printed or embossed on a plate, bar codes may be defaced, damaged, or otherwise visually obstructed. 3M is still evaluating the extent to which the bar code can be damaged, but remain readable. At this time, the company is only able to report that the nature and location of the error is just as important as the amount of damage. For example, debris on a black cell does not impact the plate like debris on a white cell.

An advantage of bar code technology is that existing ALPR systems support it; however, law enforcement's use of ALPR is limited. VSP reports that it has only 40 ALPR systems on its vehicles statewide. The technology is less prevalent in rural areas. Most toll facilities use ALPR and the systems are the backbones of red light camera programs in many localities, so an infrastructure of ALPRs is developing.

To take advantage of the bar code, Virginia would have to replace the embossed plates it currently uses with flat plates, which are digitally printed. The bar code, as 3M is developing it, cannot be stretched over embossed plate numbers and retain its readability. The committee asked for input from law enforcement on the use of flat plates. Only the VACP expressed concerns, which were limited to the security features of the plates and readability by ALPRs. 3M reported that the security features on flat plates are at least equivalent to those on the embossed plates, but could not address reports of difficulty reading flat plates with ALPRs experienced in some states. As a result, VACP recommended that the Commonwealth carefully examine the readability of flat plates by ALPRs before deciding to adopt them. In general, however, law enforcement was not opposed to the change even though, historically, law enforcement agencies have stated a preference for embossed plates.

VCE stated that both bar codes and flat plates would require new sheeting on the plates, and new technology that would be expensive for them to implement. Adopting a flat plate would require VCE to completely change the way it currently manufactures plates, as the traditional embossing presses and curing oven would be replaced by digital printers. Though VCE cannot completely project the cost of equipment and supplies, VCE expects it would have to retool its current processing system and estimates that cost at between \$75,000 and \$150,000. In addition, to being able to process the amount of plates currently needed at the current speed, VCE may have to add additional equipment at an estimated cost of between \$300,000 and \$400,000. Because the new lines would need fewer operators, this type of manufacturing would effectively reduce the number of workers from the current 55 or more to approximately ten. VCE was not in favor of reducing staff in its prisoner program.

While the effect of switching to flat plates on the total cost of plate production is not known, digitally printing license plates can be more environmentally friendly than embossing plates. The process used to produce embossed plates involves solvent-based inks which are harmful to the environment and require hazardous waste disposal techniques. Digital printing uses solvent-free technology to print images. The process eliminates the oven-curing step needed for drying the inked embossed numbers on traditional plates and saves energy.

2. Radio Frequency Identification (RFID)

Unlike the bar code technology, RFID technology is available now. RFID tags and transponders can be embedded in plates and used to send information about a vehicle wirelessly to a nearby reader. While RFID-embedded plates are currently available around the world, they are not in wide use, and no U.S. state uses the technology.

RFIDs can be active or passive. Active RFIDs use a powered transmitter to send out the information on the chip. They have a wide range (up to at least 300 feet) and are very secure, but are expensive and have a limited lifespan (between three and eight years). Passive RFIDs reflect radio waves transmitted by a reader back to the reader, along with the information from the chip. They have a limited read range (up to 40 feet) and are not as secure, but are affordable and have a long lifespan (at least 10 years).

The ideal read range for tolling and law enforcement purposes would be approximately 30 feet or less. DMV asked about transitioning to this technology and whether this would require executing a second contract for the RFID, in addition to the existing license plate contract. 3M's representative indicated that the company has a patent for RFID and it could be available to Virginia without a separate contract.

Like bar codes, RFID has limitations. While it cannot be defaced, RFID can be damaged or shielded and is subject to radio interference. To protect against the shielding and interference, RFID is often embedded in flat nylon plates; however, metal can be used for higher-power active RFID transponders. RFID also has an advantage over bar codes for Virginia because it can be used with embossed plates through the use of a plastic backing. RFID requires a similar reader and IT infrastructure to bar codes. Currently, no law enforcement agencies in Virginia have the necessary readers. In addition, toll operators use RFID readers for the E-ZPass system, but separate readers would be required to read the license plates, which may result in interference between the two RFID applications.

3. Implementation Costs

Using bar codes or RFID on license plates would enhance the identification of plates for both law enforcement and toll operators because these technologies would offset design issues that impact readability. These technologies would likely require considerable implementation costs. In particular, these technologies will lead to increased vehicle record inquiries, which will require a robust information technology infrastructure to handle both real-time and batch data transfers. Estimating the cost of this infrastructure is difficult because of the way DMV is charged for inquiries to its database and because the annual number of inquiries cannot be estimated reliably because of changing trends in highway tolling.

For either technology to be successful, its adoption and infrastructure must be nationwide. The concerns apply to most jurisdictions, so estimating the costs for each would be difficult. Because different states may use different license plate vendors, there is no guarantee that the technology will be consistent across state lines, which could further increase costs to ensure compatibility.

4. Implementation Concerns

In addition to the costs of implementation, both bar codes and RFID raise concerns about privacy and security. Both technologies would be used in a way that anyone with the proper reader could retrieve the information, which would make limiting that information very important. That possibility is, in part, why 3M recommended using only a serial number on the bar code. For RFID, this possibility would have a strong influence over the choice of technology used. Active RFID transmits its information to a waiting reader, while passive RFID must be queried.

Another concern for these technologies is an association for many with an Orwellian “Big Brother” government. RFID, in particular, is often cited as a key offender of privacy and, in fact, Virginia has a statute, *Va. Code* § 46.2-323.01, that prohibits the use of RFID tags in driver’s licenses for that reason. DMV reports that similar concerns have been raised for bar codes. Those same concerns apply to using bar codes or RFID tags on license plates.

By limiting the information contained in a bar code or RFID tag to the license plate type and number, Virginia would alleviate the concerns raised. Because the IT infrastructure necessary to support the technology is so extensive and the implementation costs cannot be reliably estimated, the committee could not recommend immediate adoption.

H. Conclusion

Accepting the committee’s recommendations should address most of the identified problem areas for Virginia license plates. In particular, improving the design review process should limit issuing plates with readability problems. Because of the costs associated with recalling and reissuing license plates, applying these recommendations to all existing and new license plates is not feasible; however, applying them to new plates and selectively to older plates, over time, will help to improve the readability of Virginia’s plates overall.

IV. NUMBER OF PLATES

A. Objective

The question of whether motor vehicles registered in Virginia should bear two license plates or one has been raised a number of times in recent sessions of the General Assembly and has generated a number of suggestions from the public. In the 2012 session, the legislature considered, but did not pass, three bills that would have required only a single (rear) plate. While the month and year registration decals affixed to license plates have not generated the same level of interest, both the number of plates and the number of decals raise similar policy considerations: monetary savings and impact on the ability of law enforcement, toll operators, and other stakeholders to identify a vehicle and determine compliance.

To help resolve these questions, the Number of License Plates Committee reviewed current practices for license plates and decals and identified the options and implications for the number of license plates on a vehicle and the number and type of decals used to indicate registration.

B. Recommendations

Based on the research and discussion of the number of plates necessary for effective law enforcement and toll enforcement versus the cost difference, stakeholders recommended that Virginia remain a two-plate state.

In addition, based on research and discussion of decal options, costs and placement, stakeholders recommended that Virginia retain four decals: two on the front plate and two on the rear.

C. The Current State of License Plates and Decals¹⁶

Va. Code § 46.2-711 requires DMV to issue one license plate for every registered motorcycle, tractor truck, semitrailer, or trailer, and two license plates for every other registered motor vehicle. *Va. Code* § 46.2-712 requires license plates to display the plate number, name of the Commonwealth, and month and year of the registration's expiration, which can appear on decals. *Va. Code* § 46.2-715 requires passenger vehicles to carry one license plate on the front and one on the rear; motorcycles and trailers carry one plate on the rear; and tractor trucks carry one plate on the front (the rear is usually blocked by a trailer that carries its own plate). The Commonwealth's license plates for passenger vehicles contain four decals, consisting of month and year decals on both the front and rear license plates. The vehicles that require one plate contain two decals consisting of month and year. Other vehicles, like trailers, can carry permanent plates without decals.

While Virginia's two-plate, four-decal configuration is not unique, the study team's research into other states' practices revealed considerable diversity in the rules both for license plates and for registration decals. Thirty-two states issue two plates for most motor vehicles, while 19 issue only one. Twenty-two

¹⁶ For a complete breakdown of the use and display of license plates and decals in the U.S. states and Canadian provinces, see Appendix F.

states issue one decal, 22 issue two decals, five issue four decals and two do not issue any decals. Of the states that issue one decal, 19 place the decal on the rear plate and three place a sticker on the windshield. Of the states that issue two decals, 14 place the month of expiration on one decal and the year on the other and require both decals to be displayed on the rear plate, while eight states use combined month/year decals and place one on the front plate and one on the rear. Five states, including Virginia, issue separate month and year decals placing one of each on each plate for a total of four decals.

Within the last 30 years, two states have made the switch from one plate back to two plates: Massachusetts and Connecticut. Both did it for law enforcement reasons. Massachusetts switched in 1987 for all new registrations; a vehicle carrying the old green plate can still drive with one plate. Connecticut restored the front plate in 1983, just three years after it eliminated it (and it took until 1992 to complete the transition back to two plates).¹⁷ States have introduced legislation to change the number of plates from two to one, but none have been successful.

D. Switching to One License Plate Reduces Costs, but Not by Half.

Much of the debate over eliminating the front license plate focuses on the cost savings. In FY2012, the Commonwealth spent \$6,508,324 for license plates and approximately \$627,050 for decals, for a total of \$7,135,724. While, many people assumed that issuing one license plate and two decals instead of two plates and four decals would reduce costs by half, the study revealed that this was not the case. The actual savings is estimated to be \$1,833,726, or 25.7 percent. This savings translates to approximately \$0.30 per customer.

It should be noted that VCE contributes a significant portion of its retained earnings from license plates to the operating budget of the Department of Corrections and occasionally, the General Fund. A large part of VCE's mission is to "provide jobs and work skills for sentenced offenders to help them successfully re-enter society," which coincides with the Commonwealth Re-entry Initiative. Any reduction in VCE's retained earnings¹⁸ would create a revenue deficit for the Department of Corrections and would need to be filled from other sources. For these reasons, the savings from transitioning to a single plate would be less than may otherwise be expected.

The expenses that are incorporated in the production of license plates include materials, labor, shipping and delivery. Based on the number of license plates DMV issued in 2012 the savings align as follows:

Materials. If the Commonwealth were to change from two license plates to one, it would issue about 1.4 million fewer plates per year. Generating half of the license plates would save the Commonwealth about \$1,391,985 in materials to include aluminum and sheeting.

Savings on materials = \$1,391,985

¹⁷ "Panel Backs Restoring Front License Plates by 1992", Michelle Jacklin, The Hartford Courant, April 2, 1983.

¹⁸ Based on the Auditor of Public Account's report, "Virginia Correctional Enterprises / Department of Corrections – Report on Audit for the Years Ended June 30, 2006 and June 30, 2007", VCE reported an average 47.5 percent gross profit of sales for license plates.

Labor. The reduction in number of plates creates no savings in the cost of labor. VCE indicates it takes the same amount of labor to produce and ship a single plate as it does a pair of plates.

No savings on labor

Shipping and delivery charges. In addition to the costs of the plate materials, the Commonwealth must pay for shipping, sorting and stocking costs associated with delivering the license plates. VCE delivers these plates on behalf of DMV by contracting with a motor freight carrier. The contract includes not only delivering the boxed license plates to the CSCs, but also sorting and segregating the types of plates and stocking them on the individual CSC’s shelves for eventual distribution. The total cost for sorting, segregating and stocking the boxes of license plates on CSC shelving is \$4.39 per box. According to VCE, switching to a single license plate would reduce the overall shipping costs by about \$28,773 per year.

Estimated savings on deliveries to CSCs = \$28,773

The VCE Tag Warehouse also mails all the personalized license plates ordered by DMV customers directly to those customers. The package includes the plates, the registration, and the registration decals, both month and year. The VCE Tag Warehouse mails approximately 116,992 pairs of personalized license plates each year using UPS/Mail Innovations, at a cost of \$2.28 per package, or \$266,741.76 per year. Reducing the package by one plate reduces the cost of mailing by approximately \$0.85 per package, yielding a savings of \$99,443 per year.

Estimated savings on deliveries to customers = \$99,443

Cost of decals. Transitioning to a single license plate also reduces decal costs. The cost of decal production is \$0.04 per decal, or \$0.08 per set (including sheeting, clear coat, ink, personnel, and machines and maintenance). The estimated annual cost for decals is \$627,050 for about 16,218,415 decals. A reduction to two decals would save \$313,525. This reduction may not be entirely realized, because many of DMV’s registration transactions involve customers receiving year decals only. Savings would occur with the reduction from an original registration where the customer receives four decals.

Estimated Decal Savings if all Decals Reduced by Half = \$313,525

Estimated Cost Savings
\$1,391,985 (materials)
\$128,216 (shipping & delivery)
+ \$313,525 (decals)
1,833,726 (total savings)

E. Overwhelming Support for Two License Plates

To fully evaluate the practice of a motor vehicle displaying one license plate versus two license plates the group looked at not only the monetary cost, but also the impacts on law enforcement, toll collectors and other stakeholders.

The law enforcement stakeholders supported the continuation of requiring two license plates and did not support a change to one plate.¹⁹ Having two license plates is essential for identification of vehicles on the roadways, has proven to be a successful identifier during investigations, and has been crucial in apprehending criminals. The license plate number is tied to a number of databases such as Amber Alert, Elder Alert, the National Crime Information Center (NCIC), the Virginia Criminal Information Network (VCIN), and the Terrorist Screening Center Watch List. Having one plate eliminates the ability for law enforcement officials to read the plate on a vehicle in oncoming traffic and limits their ability to read the plate on stationary vehicles. Having two license plates is seen as a low cost/low tech tool for law enforcement to identify and catch criminals.

The toll industry supported two plates. RMA and Transurban stated that without both front and rear plates, more plates would have to be manually read, thereby increasing costs. As the Commonwealth moves to open road toll facilities, two plates enhance and meet the needs of electronic tolling. The toll industry believes that having two license plates doubles their chances for collecting revenue from a toll violator. If one plate is unreadable, there is a second chance in identifying the vehicle by viewing the other images captured by the readers, which are set up to capture both the front and rear plates.²⁰

AAMVA has endorsed the use of two license plates on vehicles as their top recommendation in their recommendations for uniform license plates.²¹ National law enforcement agencies have also strongly endorsed the use of two license plates.²²

Commissioners of the Revenue supported having two plates. In localities that use ALPRs, having two license plates on a vehicle makes it faster and more efficient for them to identify the vehicle and determine whether personal property taxes were assessed and paid. Similarly, parking enforcement officials use both plates for faster and more efficient management of, access to, and charges for using parking facilities. Removing the front license plate decreases the effectiveness of their operations leading to lost revenue.

Switching to one plate raises others concerns as well. Removing the front license plate leaves room for a souvenir plate (or something else) on the front of the vehicle. Being able to purchase and use a souvenir plate could reduce the customers' demand for personalized and special plates, resulting in less revenue

¹⁹ See Appendix H for the positions of stakeholders.

²⁰ For more information on the impact the lack of a front plate has on toll enforcement, see Walden, et al (August 2012), "Front License Plate Market Research: Comparison of Single Versus Dual License Plates," Texas A&M Transportation Institute; Virginia Tolling Legislation Working Group. (2010). Data from the Report of the Tolling Legislation Working Group (chapter 839 of the 2010 Acts of Assembly) – Report delivered on December 15, 2010; and Smith, B.L. & Yook, D. (2009), Investigation of enforcement techniques and technologies to support high-occupancy vehicle and high-occupancy toll operations. Virginia Transportation Research Council, Virginia Department of Transportation, Richmond Virginia.

²¹ See Appendix B of "Best Practices Guide for Improving Automated License Plate Reader Effectiveness through Uniform License Plate Design and Manufacture", AAMVA, August 2012. Available online at: <<http://www.aamva.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=2911&libID=2897>>.

²² See the National Sheriffs' Association 2009 Resolution "National Sheriffs' Association Supports Front And Rear Reflectorized License Plates" online at <www.sheriffs.org/sites/default/files/tb/resolutions/2009-9_final.pdf> and the International Association of Chiefs of Police 2012 Resolution "Validating the Public Safety and Homeland Security Needs for Retro-Reflective Front and Rear License Plates" online at <http://www.theiacp.org/resolution/index.cfm?fa=dis_public_view&resolution_id=442&CFID=7348201&CFTOKEN=26397737>.

for the Commonwealth and organizations that revenue share. Decreased demand for personalized and special plates could also lead to a decrease in license plate replacement and an increase in incidents of license plate illegibility. If the customer used an official-looking plate on the front or used an expired plate from another jurisdiction, it could confuse law enforcement in Virginia and other states increasing the likelihood of a Virginia driver being stopped.

Another concern is that removing the front license plate leaves vehicle owners with an “extra” plate that they may decide to illegally mount on an unregistered vehicle. To prevent misuse, DMV could mandate the surrender of the current set of license plates in exchange for a newly redesigned single plate. A redesign would require the Commonwealth to purchase new sheeting and incur associated template and mailing costs. This re-issue cost would exceed the savings of removing the front plate.

F. Number of Decals, Placement, and Windshield Sticker

In addition to its assessment of whether the Commonwealth should reduce the number of license plates from two to one, the committee assessed a number of options for the use of decals. The group focused on the options using two license plates on a vehicle. The following are the possible options, associated costs, pros and cons, and outcome of each option discussed.²³

1. DMV current practice: Two plates and four decals (month and year, front and back)

Using two plates and four decals is Virginia’s current configuration. This option costs \$6,151,575. The benefits are that everyone, especially law enforcement, can clearly see the year and month of expiration on each plate. Law enforcement is already familiar with the current plate and decal number, placement and color coding. As explained in the discussion on the number of license plates, the current decal configuration enhances law enforcement’s ability to assist with highway safety and criminal investigations.

The committee noted that having the year and month separate creates an increased opportunity for decal theft or misapplication, but this did not appear to be enough of a problem that warranted abandoning this practice.

Given all of the reasons for keeping the two plates, many of which apply to decals as well, the committee voted in favor of keeping the current number of license plates (two) and decals (four). While the committee evaluated other options, it rejected those options because the negative aspects outweighed any potential cost savings as explained below.

²³ All calculations are based on the average number of pairs of plates sold in FY2010 and FY2011 or 1,262,041 pairs of production plates and 150,554 pairs of personalized plates.

2. Two plates and two decals (month and year decals back plate only)

A second option is to issue month and year decals for the rear plate only. This option costs \$6,051,393, a savings of \$110,182 over the current practice. This option preserves the configuration that law enforcement is used to seeing, the month and year on separate decals.

However, with an oncoming vehicle or a vehicle that is backed in to park, law enforcement officials will not be able to see if the vehicle is in compliance. Also, putting the decals only on the back plate makes it less likely for the driver to notice if a decal were stolen.

Furthermore, the current license plates are designed for two decals, not one. Therefore, license plate sheeting would change for the front plate to remove the indicator for placement of decals (month and year). If a front plate is not reissued with a new plate design to address the decal change, the vehicle could potentially have invalid (old) decals on the front and valid decals on the back thereby confusing customers and law enforcement. This confusion could lead to Virginia drivers being over for expired tags, especially in other jurisdictions. Issuing a blank decal to address these issues on already issued plates and those in inventory, until they are depleted, adds approximately \$243,000 to the overall cost of this option.

3. Two plates and two decals (combination decal with month and year on both plates)

A third option is to issue combined month and year decals for both plates. This option costs \$6,052,473, a savings of \$109,102 over the current practice. By retaining decals on each plate, it is most similar to the current configuration, with which law enforcement and customers are already familiar. Unlike Option Two, Option Three retains both front and back decals so law enforcement officials can see vehicles travelling in both directions. Furthermore, using a combined decal on both plates may reduce the likelihood of theft of the decal combination while maintaining the driver's chances of noticing if a decal were stolen.

Like Option Two, Option Three requires modifying the license plate sheeting to reflect the new placement of the decals. Without a redesign to include appropriate indicators, customers would not know where the combined decal should be placed. Issuing a blank decal to address this issue on already issued plates and those in inventory, until they are depleted, adds approximately \$243,000 to the overall cost of this option.

With this option, waste would increase, because combined decals would have to be destroyed every month, instead of every year. Waste is minimal today because only the year decal has to be destroyed upon expiration. Finally, the potential cost to convert to a combined month/year decal includes creating 12 templates (one for each month) every year at a recurring cost of \$1,080 or \$90 per template.

Law enforcement was concerned that a combined month and year decal may be small and not easily read, so the committee discussed an alternative option. The decal could contain just the month and have changing background colors to indicate the year with the colors being recycled every six years. Any decal not used for a particular year would be shelved until it cycles through another six-year period. Not only would this alternative address the readability issue, but it also would help to limit the waste.

The committee was receptive to the new idea, but was concerned about the shelf life of the adhesive and reflective sheeting. In addition, this option would require CSCs and dealers to house and secure three times the current inventory. The “leftover” decals would need to be kept in an environment where the climate is controlled for humidity levels and temperature to maximize the shelf life and to ensure that the adhesive backing and reflectivity are not compromised. Storing the additional inventory was considered to be a major concern.

4. Two plates, one decal on rear (combination decal with month and year on one decal)

A fourth option is to issue a combined month and year decal for the rear plate only. This option costs \$5,997,382, a savings of \$164,194 over the current practice. In addition to saving money, it may reduce decal theft.

However, like Option Three, Option Four increases the annual costs for DMV to purchase the necessary templates for the new combination decals. This option has the same concerns for law enforcement and customers as Option Two: they won't be able to see if an oncoming vehicle or a vehicle that is backed in to park is in compliance and putting the decals only on the back plate makes it less likely for the driver to notice if a decal were stolen. Like Option Two, the license plate sheeting would have to change to avoid having invalid, obsolete decals on the front plate causing confusion for customers and law enforcement. To avoid the confusion, the Commonwealth could issue a blank decal, which adds approximately \$243,000 to the overall cost of this option.

5. Windshield Sticker

In addition to evaluating configurations using license plate decals, the committee evaluated using a windshield sticker in place of one or more of the existing decals.

a) Other States' Experience with Windshield Stickers

The committee looked at other states' experiences using the windshield sticker. Three states currently use windshield stickers for registration stickers – DC, New York and Texas. DMV staff surveyed these states for their experiences.

New York began using windshield stickers in 1973, Texas in 1993 and DC in 2003. New York's program is so old that officials could not state why they use these stickers as opposed to license plate decals. Texas and DC use them to combat a problem with validation decals being stolen from license plates. Only Texas still reported using license plate decals, but that use was limited to vehicles without a windshield.

All three states encode similar information on their stickers. All of the stickers contain the license plate number, an expiration date, and either some portion of or all of the vehicle identification number. New York's and DC's stickers contain the year and either the make or model of the vehicle to which they apply. New York uses two bar codes that contain the information on the sticker and information on the registrant. Texas's bar code contains the sticker information as well, but it also contains information on the document number, county number, workstation ID, sticker print date, and plate and sticker types. Texas also includes a county name on their stickers. DC reported no bar codes, but they do include a

zone number on their stickers for parking enforcement. In all cases, if a new plate is issued, a new sticker is issued as well.

Other than the typical issues associated with using stickers (e.g., problems getting them to stick in a specific location and customers putting stickers in different locations) and an initial learning curve, none of the three states reported significant issues with windshield stickers.

To accommodate the change from license plate decal to windshield sticker, DC did not change its plate in any way,²⁴ while Texas reported a slight redesign. Like Virginia's current plates, Texas' plates had two placement indicators at top left and right corners for month and year stickers, but they removed the left side placement indicator. New York reported a redesign at the same time it switched to windshield stickers but could not say if the two events were related.

The experiences with production and cost are different for each state. While DC outsources its production, both New York and Texas print the decals on demand. Additionally, while New York reports a relatively low cost for the stickers, Texas reported greater overall costs because of the more expensive paper used in creating windshield stickers. They offset the cost through process redesign and elimination of excess inventory. DC reported that the stickers were more expensive, but could not say how much.

b) Two plates and a windshield sticker

The committee used the other states' experiences to evaluate the impact of using a windshield sticker in Virginia.

This fifth option costs \$6,191,051, an increase of \$29,476 over the current practice. The windshield sticker would include vehicle-related information on it (e.g., expiration month and year, license plate number, part of the VIN) and have to be printed on demand. In addition to the plate and sticker costs, DMV could incur an estimated \$7.8 million or more in start-up costs (based on Texas' current configuration and upfront investment charges, which the committee assumed would be similar to Virginia's needs if it adopted this option). Without any vehicle-related information on the sticker, only including the month and year of expiration, the cost is reduced by \$124,120,²⁵ and does not have the same start-up costs.

Law enforcement officials would have difficulty reading a windshield sticker without stopping the vehicle and inspecting the sticker more closely. This option also may require additional changes such as redesigning the front license plate to indicate the placement of the decals or issuing a blank decal to cover the decals or spaces made obsolete by the new configuration.

The committee had several concerns with this option, including readability on a moving vehicle, lack of equipment to read the bar codes and the cost to purchase this equipment, and possibly obstruction of the driver's view with the addition of another windshield sticker. The public has already shown disdain for windshield stickers prior to many Virginia localities ending their annual use for local registration.

²⁴ DC did issue stickers for customers to apply to the plate stating "see window decal."

²⁵ Using only the month and year on the windshield decal would reduce the annual cost to \$6,066,931 for a total savings of \$94,644 over the current option.

DMV reported that the decal production equipment used today cannot support production of this type of sticker and another printing option would be needed. Such a change would include utilizing an outside vendor to print the sticker (with the expiration date on it only), or utilizing print on demand (with expiration date and vehicle-related information).

c) One plate and a windshield sticker

If the purpose of the windshield sticker is to replace the front license plate and all decals, the Commonwealth would have to include a bar code that incorporates the identifying information for the vehicle to address the concerns over eliminating the front license plate. Law enforcement would require specialized equipment to read the bar code at various speeds and distances. Furthermore, the sticker would have to be large enough to read and ultimately could obscure the windshield.

One last concern is worth noting. Using a windshield sticker instead of a front license plate means that the windshield will be photographed to obtain vehicle information for enforcement purposes. These pictures may raise concerns about constituents' privacy, since the image of the driver could be taken.

6. Two plates and No Decals

The last option discussed was eliminating the use of decals. Quebec eliminated registration decals on passenger cars in 1992, New Jersey in 2004, and Connecticut²⁶ in 2010. According to an AAMVA survey²⁷, these jurisdictions reported discontinuing use of license plate decals because of decal theft. Issuing no decals in Virginia means a savings of \$220,365 over the current practice.

However, having no decals means having no indication for law enforcement officials to determine if a vehicle is properly registered and no probable cause for pulling them over if the registration were expired. This option has the potential for a reduction in registration renewals and in the number of summonses issued for expired registration, which means lost revenue. Additionally, because the current plates are designed for two decals, the license plate sheeting would need to be modified to remove the decal placement indicators or blank decals would need to be issued to cover the existing spaces.

VSP informed the committee that the revenue generated from summonses issued for expired registrations over the past three years brought in on average \$1.5 million in fines and \$3.8 million in fees. This revenue goes back to the localities. A reduction in the number of citations, therefore, means a significant financial loss to localities.

G. Conclusion

Maintaining the current configuration of two plates and four decals is optimal for identifying the vehicle. Any change to this configuration, while it could generate some savings does not generate enough savings to offset the decrease in public safety and motor vehicle enforcement.

²⁶ Connecticut originally went to window stickers in 2006 because of plate decal theft, and then totally eliminated registration decals in 2010 after a pilot study.

²⁷ April 28, 2008 AAMVA survey, "Plate Registration Stickers," conducted for Virginia at the request of the IACP; April 2010 PennDOT Report, "Evaluation of the Use of Registration Stickers".

V. PLATE ENFORCEMENT

A. Objective

The ability to read a license plate is the key factor in using the license plate to identify a vehicle. If the plates cannot be read either because they are obscured or illegible, law enforcement, toll enforcement, parking enforcement and others will be less effective.

The Plate Enforcement Committee was charged with reviewing license plate enforcement and replacement processes as they address obscured and illegible plates whether intentional, due to age, or other factors and outlining recommendations for identifying illegible, obstructed, damaged or improperly mounted plates and replacing those plates, if necessary.

To accomplish its task, this committee reviewed current laws and practices for license plate legibility and replacement in Virginia and other states and weighed the impact that obscured and illegible plates have on public safety and toll collections. The committee also reviewed the current policies on reissuing personalized plates that are reported stolen.

B. Recommendations

The Plate Enforcement committee evaluated the issues presented and made recommendations based on a review of current and past practices, the number of illegible plates as a percentage of all plates on the road, and the impact to law enforcement, toll enforcement, funding and public safety. The committee recommends the following:

1. Using the safety inspection program to identify illegible plates.

NOTE: VSP does not support this recommendation because inspecting license plates for appearance is subjective, and falls outside the scope of the inspection program, which is to ensure mechanical operation and equipment safety. VSP believes that this determination should be left to sworn law enforcement personnel.

2. Reintroducing the Illegible License Plate Notice (Form VSA-28) and the process to law enforcement.
3. Retaining Virginia's customer-oriented plate replacement process, but restoring the prompt in the DMV's plate registration renewal system to provide replacement options to owners of vehicles displaying license plates that are 10 or more years old.
4. Keeping the fine for illegible and improperly mounted plates at the current amount, given the low rate of illegible and improperly mounted plates.
5. Changing the policy on stolen plates so that they are only re-issued to the original owner with a warning letter and not issued to others for five years, the length of time they are in the NCIC database. There may be some exceptions, especially with low number series plates.

C. The Current State of License Plate Enforcement

Va. Code § 46.2-716 establishes the standards for how license plates are to be fastened to a vehicle. It requires every license plate to be securely fastened to the motor vehicle, trailer, or semitrailer to which it is assigned (1) to prevent the plate from swinging, (2) in a position to be clearly visible, and (3) in a condition to be clearly legible. The Code does not define legibility, nor does it state the exact position to fasten the plate.

Va. Code § 46.2-716(B) prohibits altering the appearance of license plates. Specifically, it prohibits placing, mounting or installing any type of covering if any part of the covering alters or obscures (i) the alpha-numeric information, (ii) the color of the license plate, (iii) the name or abbreviated name of the state wherein the vehicle is registered, or (iv) any character or characters, decal, stamp, or other device indicating the month or year in which the vehicle's registration expires. It further prohibits mounting any insignia, emblems, or trailer hitches or couplings in a way that hides or obscures any portion of the plate or makes any portion of the plate illegible. The only additional requirement is that the license plate be illuminated.²⁸

Violations of *Va. Code* § 46.2-716 are punishable as traffic infractions, not as misdemeanors or felonies, with a fine of not more than \$250. The current penalty for failing to display a license plate, improperly displaying a license plate, or improperly fastening or obscuring a license plate is a \$25 fine.²⁹ Convictions for a violation of this section are few. Since 2007, there were 11,520 for Improper Display; 30,375 for Failure to Display Both Plates; and 9,578 for Improper Mounting.

The Commonwealth has an Illegible License Plate Notice (Form VSA-28)³⁰ that law enforcement can use as an alternative to a citation. Since its introduction in 1999, its use has declined considerably.

D. License Plate Replacement in Virginia

1. Aging, Illegible and Obstructed License Plates and the Replacement Process

Sixteen U.S. states have programs to replace aging plates. No Canadian province has a replacement program. Of the states that have a replacement program, six replace them on a rolling basis (when a motorist's plate reaches a certain age) and ten replace them all at once at a set time. Citing the economy and cost concerns, Pennsylvania abandoned its replacement program in 2008, one year before it was to go into effect.

Prior to 1972, the Commonwealth required annual replacement of vehicle license plates. By 1978, the longevity and legibility inherent with the use of new reflective sheeting material and the durability of the aluminum plate material allowed DMV to extend the mandatory plate replacement cycle to five years. In 1985, DMV extended the replacement cycle to eight years. Finally, in 1987, DMV dropped the mandatory plate replacement and changed to replacement on demand. To assist customers, DMV once

²⁸ See Code § 46.2-1013.

²⁹ Supreme Court Rule § vs-cr-3B:2 sets the total cost at \$76 - a \$25 fine and a \$51 processing fee.

³⁰ See Appendix I for a copy of the Illegible License Plate Notice (Form VSA-28).

had a prompt in its system asking them if they wanted new plates when the plates became 10 years old, but the prompt has since been removed.

DMV implemented one voluntary replacement program in 1996 for the license plates issued to commemorate the U.S. Bicentennial. Many plate holders “called or wrote to complain about the effort, considering it an unwarranted intrusion of government.”³¹ DMV has not undertaken any wide-scale replacement efforts since then.

License plates are replaced on a voluntary basis. According to DMV statistics, approximately 37,000 plates are replaced annually due to mutilation. Approximately 974,000 more are replaced annually at the request of the customer. These plates could have been requested for a variety of reasons, including readability or the customer wanting to switch to a new plate type or a personalized plate.³²

Virginia currently has 7.7 million active motor vehicle registrations. Of those, 57.1 percent, or 4.4 million, are less than five years old. Another 27.3 percent, or 2.1 million, are between five and ten years old. The remaining 15.6 percent, or 1.2 million, are more than ten years old. Of the 1.2 million that are more than ten years old, 558,120 are more than 15 years old.³³ Of those, 181,041 are former production plates that owners converted to personalized plates so that they could continue to use the three letters and three numbers that they were originally assigned. Recalling the remaining 377,039 plates from customers is estimated to cost \$2,756,125, including postage, but excluding a potential \$55,209 offset from recycling the plates.

The oldest plates currently on the road are more than 30 years old. The Bicentennial license plates were issued between 1976 and 1981. In 1996, DMV offered voluntary replacement at no cost; at that time 13,000 were active and more than half were replaced. Today, 712 active Bicentennial license plates are still in use. As long as the registration fees are paid, the Code of Virginia states that these plates may continue in use for a period determined by the Commissioner.³⁴ Being a customer-oriented agency, no Commissioner has issued a mandatory recall of the Bicentennial plates.



Over time, license plates lose reflectivity and fade or become mutilated making them illegible. Aging plates also tend to lose decals as more of them are piled on. According to 3M, the supplier of the reflective sheeting, the reflectivity of the license plate carries a five year warranty. After five years, there

³¹ “Study of the Costs and Benefits of a Regular License Plate Replacement Program,” Department of Motor Vehicles, 1998.

³² Based on a review of the available data for 2010, 2011 and 2012, customers are more likely to switch from standard to special plates, than from special to standard plates. Customers are more likely to switch from a production plate to a personalized plate within the first two years. As the plates age, there is a higher likelihood that customers will not change them at all. No significant changes occur even when the plates reach ten years old and customers are notified by mail and during online registration that their plates are old. For definitions of the plate types, please see the Glossary at Appendix D.

³³ This figure is based on DMV records as of August 24, 2012.

³⁴ See *Va. Code* § 46.2-727 (Bicentennial license plates and decals; fees).

is a decrease in reflectivity, but how much is not known. By some estimates, license plates lose more than 50 percent of their initial reflectivity within 10 years. It is not just age that impacts reflectivity, but how the vehicle is driven, where it is garaged, environmental conditions (sun, snow, etc) and many other factors.

The committee researched whether decals become illegible with age. Because the year decals are changed every one to three years and the reflectivity lasts for at least five years, this was not a concern. The month decals are changed only when the plate changes, but the impact of age on month decals was not considered to be an issue either. VSP looks at the color of the decal for enforcement based on DMV's rotation. The key for legibility is in the color.

Law enforcement officials did not indicate that the number of illegible plates was a problem. None of the law enforcement officials represented in the study saw the age of the plate and reflectivity as significant problems, or the stack of decals resulting from multiple renewals, so long as they are able to read each character on the plates.

Law enforcement officials did say that they were primarily concerned about license plate frames/covers, luggage racks, trailers and other things covering the plate. Various illegal mechanisms have been used on plates to obscure the plate number enough to make it unreadable to cameras and sometimes to the human eye. Examples include a specially-designed hood that sits out around the plate to block the camera, mechanisms to drop the plate down as it is going through the toll booth (plate flippers), sprays to obscure the plate number (so-called ghost plates), and tinted covers. In addition, license plate frames and covers can obscure the name of the state, plate type, or registration stickers making enforcement difficult.³⁵



2. License Plate Replacement and the VSA-28

When plates are unreadable or non-reflective, this presents a problem for law enforcement and the public in general. Besides identifying a vehicle, license plates act as reflectors, enabling the vehicle to be seen better at night. Readability and reflectivity contribute greatly to overall public safety. Loss of these fundamental characteristics is a concern to DMV and law enforcement agencies statewide.

Va. Code § 46.2-607 requires vehicle owners to apply for and immediately obtain replacement license plates when any license plate becomes illegible. Illegible license plates are those plates with one or more registration letters or numbers that are damaged, mutilated or faded beyond recognition.

³⁵ Knowing the plate type is required for determining which suffix or prefix to use to identify many low-number license plates. For more information, see the discussion under section III.F.3 above.

As a result of commitments made by DMV during the 1999 General Assembly session and DMV's work with the VSP, the VACP and the VSA, the "Illegible License Plate Notice" (VSA-28) was developed and distributed to law enforcement agencies throughout the Commonwealth. Service of the VSA-28 constitutes a law enforcement determination that one or both license plates displayed on the vehicle are illegible. To replace illegible license plates, owners are instructed to call or visit a local DMV CSC.

During the study, the committee learned that the form is used very little. According to DMV statistics, since 2008, an average of approximately 40 of these forms was issued each year. Some of the law enforcement representatives indicated that they were not aware of the form. VSP representatives indicated they thought there had been a big push for the form when it was first introduced but over time its use had declined. The committee decided that better education was needed on the VSA-28 form and on the process for issuing them. The form should be reintroduced with any needed revisions.

The committee discussed whether the Commonwealth should include license plate readability as part of the Virginia Safety Inspection Program, which VSP oversees. Illegible plates would not cause the vehicle's inspection to be rejected, but owners would be advised to replace the plates by registration renewal. VSP representatives indicated that inspection stations should not have the form or be responsible for legibility standards, because they are subjective, and the inspectors do not have enforcement rights. VSP stated that the role of the state inspection is to inspect for those things "detrimental to the safe operation of the vehicle" and focus on mechanical control. They did recommend better education to law enforcement on the VSA-28 form, especially to make them aware it exists. This form would save the owner court fines and costs as the law enforcement officer would not be writing a citation.

E. Impact of Illegible/Obscured License Plates on Toll Collections

Illegible plates can be an issue not only for law enforcement, but also toll enforcement. VDOT manually reviews license plate images from toll violators on the Powhite Parkway Extension, Coleman Bridge, Dulles Toll Road, and the RMA ORT (Open Road Tolling) lanes. From June 2011 to May 2012, VDOT reviewed 1,510,427 license plate images of which 32,872, or 2.2 percent, were rejected because the license plate was unreadable or obstructed.

VDOT estimates total annual toll violation collections in the amount of \$1,507,306.11. Using the 2.2 percent estimate for the total amount of loss due to unreadable or obstructed plates, this translates to an annual loss of \$33,160.73.

Other tolls are run by entities that do not use VDOT for enforcement. Those tolls include the Chesapeake Expressway and the Pocahontas Parkway. Based on the information from these tolls,³⁶ total current revenue losses from unreadable plates were estimated to be between \$65,446.73 and \$70,474.73 per year. What the committee learned is that it is impossible to determine exactly how much money tolls lose from illegible plates. What can be determined is that the annual loss is not a significant burden on the toll operators based on today's operations. While technological innovations can improve the ability to get a picture of the license plates associated with a vehicle to identify the registrant, technology cannot resolve a major issue for toll operators - making toll violators pay.

³⁶ DMV staff was only able to obtain information from the Powhite Parkway Extension, Coleman Bridge, Dulles Toll Road, RMA ORT, Chesapeake Expressway and Pocahontas Tolls.

F. Stolen License Plates and Reissuance

The committee evaluated the Commonwealth's stolen license plate policy. In a February 2011 report, AAMVA stated that 14 out of 31 states that responded to their questionnaire will not reissue license plates if the plate has been reported in the NCIC database. A survey of nearby jurisdictions revealed that Maryland and North Carolina will reissue stolen plates; DC, Tennessee and West Virginia will not.

In Virginia, when a license plate has been reported as stolen to the police, the person replace standard plates with a new number; the old number is not reissued. However, if the plates are personalized, the person can replace the plate with one that has the same personalization. If the individual who reported the plates stolen does not reorder the personalization, any person can order it. This person may be stopped for having a stolen plate because a search of VCIN will show a stop for that plate.

The committee recommended that DMV send a letter to plate owners when they are reissued plates that are reported stolen. The plate number should not be reissued to anyone other than the original owner of the plates. The customer should be handed a letter warning about the possible ramifications of having a license plate that was reported to the police as stolen.

DMV systems would need to be programmed to apply an "expiration date" to any license plate that had been reported stolen. The "expiration date" would be five years, the length of time the stolen plate appears in the NCIC database. After that time, anyone who wants that license plate can request it if the original owner no longer has it.

G. Conclusion

Based on the experiences of law enforcement and toll enforcement, the number of Illegible License Plate Notices issued, and the number of convictions over the last five years, the committee did not find that illegible or obscured license plates was a pervasive problem in the Commonwealth. The number of special plates available and the low cost for special and personalized plates encourage a turnover that keeps the number of old plates on the road to a minimum. In addition to low number of illegible plates, the costs associated with recalling and reissuing license plates, led the committee to believe that a mandatory replacement program was unnecessary. The cases that are a problem can be addressed on a case-by-case basis. Implementing the committee's recommendations will assist the Commonwealth in that process.

V. EUROPEAN PLATES

A. Objective

The European Plates Committee was charged with determining the feasibility of and rationale for the production and issuance of European-style license plates for passenger vehicles and light duty trucks in Virginia.

To evaluate the cost and impact of issuing European-style license plates, the committee assessed the size of the market for these plates in Virginia and the impact these plates would have on electronic tolling systems and law enforcement. The committee discussed options for plate sheeting, construction requirements, plate security features, and readability specifications required to meet Virginia standards for security and visibility. The committee reviewed production options and studied solutions, feasibility and costs of various options.

B. Recommendations

With such a limited market and high costs, the committee agreed that Virginia should not change its standards to allow for European-style license plates. The Commonwealth would have to redesign the production process or contract with someone who can invest in the technology to read the plates for law enforcement and tolling purposes, and ensure that its security standards are followed to address counterfeiting issues.

More importantly, Virginia would be violating the 1956 agreement among all 50 states and the District of Columbia, the Canadian provinces and territories and the automobile manufacturers, as well as AAMVA's standards. It is highly likely that other states would follow suit, resulting in a hodge-podge of plate standards around the country. Differing plate standards could reduce the effectiveness of ALPRs, toll collection efforts, and law enforcement

Given the concerns, and the limited upside, the committee recommended that Virginia neither manufacture nor accept European-style license plate at this time.

C. The Current Standards for License Plate Size

Va. Code § 46.2-712 states that "Subject to the need for legibility, the size of the plate... shall be in the discretion of the Commissioner." However, a 1956 agreement between auto manufacturers, U.S. States, and Canadian Provinces set the standard dimensions at 6 inches by 12 inches, a standard that Virginia has used since 1950. This standard has since been adopted by AAMVA, and was included in AAMVA's "Best Practices" study. Today, only the Canadian province of The Northwest Territories has a license plate of a different shape – that of a Polar Bear – but the overall dimensions and location of the bolt holes match the agreed-upon standard.



Most European plates are much longer and narrower. Standardized European Union registration plates are 520 mm (20.5 inches) by 112 mm (4.72 inches),³⁷ or 1.3 inches shorter and 8.5 inches longer than standard plates issued in the United States. European Union countries require the same sized registration plate on both the front and back of the vehicle. European countries who are not members of the European Union have a variety of different sized plates and some allow a smaller plate on the back of the vehicle and the longer, European-style plate be displayed on the front. The committee decided that the European Union standard-approved plate should be used as a model for any potential Virginia plate.

European Union Standard Plate
A European Union standard plate is 20.5-inches by 4.72-inches



Virginia Scenic Plate
A standard, regular, full size license plate is 6-inches by 12-inches.



According to an AAMVA study conducted in early 2011, no U.S. state currently issues European style license plates. European-style license plates are not issued or officially accepted as valid in any location in continental North America. They are used in French-controlled St. Pierre and Miquelon off of Canada's Atlantic coast and in Puerto Rico.³⁸ They are tolerated in some areas outside of the United States (particularly in Mexico). However, states that issue only a single license plate allow vehicles to display a European-sized novelty plate on the front bumper.

³⁷ For the purposes of this study, the dimensions of plates issued in European Union countries were used in comparing the current plates to "European" plates.

³⁸ Puerto Rico issues the American standard license for most vehicles; however, it does issue the European standard license plate for European vehicles.

D. Potential Market for European-Style License Plates

There are currently 7.7 million registered vehicles registered in Virginia. Of these, approximately 16,000 (or less than 0.21 percent) are vehicles manufactured for the European market and the European-sized license plate. The remaining vehicles are manufactured for the U.S. market and are constructed to accommodate the standard 6 inch by 12 inch license plate. A large number of these vehicles have cut-outs on the rear bumper for this plate which would not allow them to carry the longer European version.

E. Production Options

Virginia license plates are manufactured by VCE and they are not equipped to produce European-style plates. VCE would have to acquire the necessary equipment and, because there is such a small market, recover all of its costs in the first run of plates.

Alternatively, a private production company could be used. Currently, no U.S.-based manufacturer meets Virginia's required security standards, which include hologram decals, security marks, and reprinting of the license plate number, among others. The Commonwealth would have to contract with a European-based manufacturer and have the plates shipped. 3M, which produces plates for European Union countries, estimates that this option would price the plates at roughly \$300 or more per pair. This price does not include additional charges that DMV would need to pass along to the customer for processing and other administrative costs.

Two possible options for European plates were presented: silk screening the plate sets individually to create flat plates or contracting with a European company to have the plates produced and shipped to Virginia. Silk screening is the most economical. The \$300 per pair price from 3M is based on the rationale that we would have to issue two sizes of plates per pair – one long for the front and one "standard" for the rear. The cost estimate includes the cost to produce the sheeting, ship it to Europe and ship the plates back to Virginia in limited production numbers.

Europlates is a manufacturer of European-style license plates. They charge \$29.95, plus shipping, for a single plate. The reflective sheeting used does not have any of the required safety features of Virginia's license plates.

The current design of European Union plates does not accommodate Virginia's standards. Images and graphics could be distorted to accommodate the new size. Also, there is no room for decals to indicate that the plates are from Virginia. Either the registration decals or the plate design would need to be changed accordingly.

F. Impact on Law Enforcement and Tolling Systems

VSP has expressed a number of concerns regarding European-style license plates. ALPRs used by law enforcement are not programmed to read European-style license plates. According to the VSP, law enforcement officers are taught to look for unusual plates, which currently include European-style plates. Increasing the number of acceptable sizes of plates would make it difficult for officers to spot

irregularities in the new plates. Such a change would require a national campaign, since Virginia drivers passing into another state could be detained by law enforcement not aware of Virginia's new standard.

In addition, many vehicles manufactured for use in the U.S. have bumpers designed to fit the standard North American 6 inch by 12 inch license plate. Mounting and displaying European-style plates on these vehicles could lead to improper display of plates.

For electronic tolling facilities, the plate size requires different image capture parameters which could be an issue for video enforcement. These plates create a different "area of interest" depending on where plates are mounted and increase the number of plate types and designs that OCR needs to deal with. The toll collectors expressed concern that European-style plates would force a change in toll collection technology, as they are legally bound to collect tolls from all vehicles that use toll roads. Tolling system operators would incur a significant investment to purchase and install the technology required to capture and read multiple shapes and sizes of plates.

G. Conclusion

The desire for European-style license plates is aesthetic. Owners of European manufactured vehicles may consider Virginia plates to be incompatible with their vehicles. These concerns can be remedied by after-market fixes such as the "no-holes bracket." Due to compatibility issues, the market for European plates in Virginia would most likely be limited to those vehicles manufactured for the European market and shipped to the U.S. Neither the committee's discussions, nor the discussions of the committees in this study warrant expanding the number of acceptable sizes of license plates in Virginia. The risks far outweigh potential gains.

VI. CONCLUSION

License plates have come a long way since their first introduction over 100 years ago. What started out as a homemade porcelain plate used to register a vehicle has evolved into a device that supports public safety, transportation and funding initiatives. No longer is the license plate just a number on a vehicle. Today, it serves as a means to direct the flow of traffic, protect the public, pay for expansion and upkeep of the transportation infrastructure and even to express individuality or support for an organization.

Through this study, stakeholders assessed the readability and functionality of license plates and the use of new and improved technologies both in the manufacture and operation of license plates (flat plates, bar codes, RFID tags). The study committee evaluated and assessed a multitude of options for the effective number and position of license plates and decals that serve to both identify and ensure proper registration of motor vehicles that operate on Virginia's roads.

Stakeholders concluded that the Commonwealth should maintain the current size, shape and configuration of the license plates it issues. Any potential savings resulting from changing the current two license plate-four decal configuration does not outweigh the potential losses in efficiency for law enforcement, toll enforcement and others. By improving the readability of license placements and addressing unreadable plates on a case-by-case basis, DMV, its transportation partners and the General Assembly can ensure that the dual functions of safety and transportation continue to be met.

Finally, DMV thanks the stakeholders for their contributions and cooperation. Without them, this study could not have been possible.

VII. APPENDICES

A. Charge Letters

SENATE OF VIRGINIA



STEPHEN D. NEWMAN
23RD SENATORIAL DISTRICT
ALL OF BEDFORD COUNTY; ALL OF THE
CITIES OF BEDFORD AND LYNCHBURG;
AND PART OF AMHERST AND CAMPBELL COUNTIES
POST OFFICE BOX 490
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COMMITTEE ASSIGNMENTS:
COMMERCE AND LABOR
EDUCATION AND HEALTH
TRANSPORTATION
RULES

January 18, 2012

Mr. Richard D. Holcomb
Commissioner
Virginia Department of Motor Vehicles
P.O. Box 27412
2300 West Broad Street
Richmond, VA 23269

Dear Commissioner Holcomb,

As you know, three separate bills were introduced this year in the Senate to either eliminate the requirement for a front license plate entirely or to provide an allowance for a single plate on vehicles with no front mounting bracket. Based on the insight and background information you provided to me late last year on why Virginia requires two license plates, I believe that the introduction of these bills provides an excellent opportunity for the Department of Motor Vehicles to examine license plate issues, in general, more closely.

While most bills that are introduced in the General Assembly focus on the elimination of the front license plate as a cost-saving measure, other practical license plate concerns may have direct impacts on highway and public safety, as well as highway funding. In particular, as license plate reader and other optical recognition technology improves and moves toward widespread adoption, legible license plates will be the keys to vehicle identification by law enforcement and toll facility operators. Those keys will provide the Commonwealth with access to improved safety and highway revenue collection in the coming years.

The need for improvement in those areas is always important to the General Assembly and I believe now is an appropriate time to assess the current state of license plates and their potential contributions to these concerns. To that effect, I respectfully request that the Department of Motor Vehicles consult with the Virginia State Police and convene a working group of interested parties to conduct such a study.

In addition to any other options identified by the parties, I ask that the group consider the following:

- Options for improving the readability of license plates, including standards for design, display, and legibility and the potential for the use of new technology for license plate production;

Mr. Richard D. Holcomb, Commissioner
January 18, 2012
Page 2

- Methods for identifying, or helping to identify, illegible, obstructed, damaged, or improperly mounted license plates, including the possibility of a license plate check as part of the annual motor vehicle safety inspection process;
- The viability of a license plate replacement program;
- The implications of and options for the elimination of one or both decals on license plates; and
- The implications of and options for the elimination of the front license plate for passenger vehicles, including statewide elimination, replacement of the plate with a windshield decal, and the allowance for the display of a single plate for vehicles with no front mounting bracket.

I request that you report back to the Senate Committee on Transportation in December 2012 with the results of the study and the working group's recommendations. As part of the report, the working group should provide, at a minimum, for each option: an analysis of the option's feasibility, its cost to the Commonwealth, and its cost-effectiveness compared to alternatives, if any. Also include any proposed legislation that would be necessary in order to pursue the recommended options.

This study will be important as the General Assembly and the Governor work towards comprehensive government reform and solutions for funding and safety concerns. I look forward to seeing the results of your efforts.

Sincerely,



Stephen D. Newman

C: The Honorable Sean T. Connaughton, Secretary of Transportation
The Honorable Marla G. Decker, Secretary of Public Safety
Col. W. Steven Flaherty, Superintendent, Virginia State Police
Members of the Virginia Senate Transportation Committee



COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

JOE T. MAY
POST OFFICE BOX 2146
LEESBURG, VIRGINIA 20177-7536

THIRTY-THIRD DISTRICT

COMMITTEE ASSIGNMENTS:
TRANSPORTATION (CHAIRMAN)
APPROPRIATIONS
SCIENCE AND TECHNOLOGY

January 18, 2012

Mr. Richard D. Holcomb
Commissioner
Virginia Department of Motor Vehicles
P.O. Box 27412
2300 West Broad Street
Richmond, VA 23269

Dear Commissioner ^{*Rick*} Holcomb,

You are, no doubt, aware that license plate issues and legislation appear frequently during General Assembly sessions. This year is no different. While the focus is often on the elimination of the front license plate as a cost-saving measure, other practical license plate concerns may have direct impacts on highway and public safety, as well as highway funding. In particular, as license plate reader and other optical recognition technology improves and moves toward widespread adoption, legible license plates will be the keys to vehicle identification by law enforcement and toll facility operators. Those keys will provide the Commonwealth with access to improved safety and highway revenue collection in the coming years.

We are at a point now in Virginia, where the government, as a whole, must continually find a balance between funding needs, budget reductions, and commitments to citizen safety. As such, I believe now is an appropriate time to assess the current state of license plates and their potential contributions to these important concerns. To that effect, I respectfully request that the Department of Motor Vehicles consult with the Virginia State Police and convene a working group of interested parties to conduct such a study.

In addition to any other options identified by the parties, I ask that the group consider the following:

- Options for improving the readability of license plates, including standards for design, display, and legibility and the potential for the use of new technology for license plate production;

Mr. Richard D. Holcomb, Commissioner
January 18, 2012
Page 2

- Methods for identifying, or helping to identify, illegible, obstructed, damaged, or improperly mounted license plates, including the possibility of a license plate check as part of the annual motor vehicle safety inspection process;
- The viability of a license plate replacement program;
- The implications of and options for the elimination of one or both decals on license plates; and
- The implications of and options for the elimination of the front license plate for passenger vehicles, including statewide elimination, replacement of the plate with a windshield decal, and the allowance for the display of a single plate for vehicles with no front mounting bracket.

I request that you report back to the House Committee on Transportation in December 2012 with the results of the study and the working group's recommendations. As part of the report, the working group should provide, at a minimum, for each option: an analysis of the option's feasibility, its cost to the Commonwealth, and its cost-effectiveness compared to alternatives, if any. Also include any proposed legislation that would be necessary in order to pursue the recommended options.

This study will be important as the General Assembly and the Governor work towards comprehensive government reform and solutions for funding and safety concerns. I look forward to seeing the results of your efforts.

Sincerely,



Joe T. May

C: The Honorable Sean T. Connaughton, Secretary of Transportation
The Honorable Marla G. Decker, Secretary of Public Safety
Col. W. Steven Flaherty, Superintendent, Virginia State Police

B. License Plate Project Structure and Study Participants

License Plate Study Project Structure

Executive Oversight Team

Commissioner Rick Holcomb, DMV
Karen Grim, DMV
Ellen Marie Hess, DMV
Ryan Kelly, Office of the Secretary of Transportation
Donald Guillory, Virginia Correctional Enterprises

Barbara Klotz, DMV
Joe Hill, DMV
Lieutenant Colonel Robert Northern, Virginia State Police
Rick Walton, Virginia Department of Transportation

DMV Core Team

Janet Smoot (Project Coordinator)
William Childress (Technical Expert)
Don Boswell (Technical Resource)
Carolyn Easley (Technical Resource)
Matt Wells (Legislative Strategist)
Damian McInerney (Administrative Resource)
Alicia Hotinger (Financial Resource)

Robin Sheldon (Project Co-Coordinator)
Matt Martin (Legislative Strategist)
Tonya Blaine (Technical Resource)
Patrick Harrison (Legislative Resource)
Michael Baxter (Motor Carrier Services)
Rachel Kerns (Project Support)

Stakeholders

Dana Schrad, Association of Chiefs of Police
Janet Brooking, Drive Smart
David Caudill, Richmond Metropolitan Authority
Dale Bennett, Virginia Trucking Association
Major Tracy Russillo, Virginia State Police
John Lawson, Virginia Department of Transportation

Jim Agnew, Sheriffs' Association
Anne Gambardella, VADA
Michael Whelan, Transurban
Mitch Nuckles, Commissioners of Revenue
Lieutenant Danny Glick, Virginia State Police
JoAnne Maxwell, Virginia Department of Transportation

Chris DeColli, 3M
Pete Iaricci, VIADA
Ken Germain, Motorcycle Dealers Association
Fred Parker, Treasurers' Association
Barry Boothe, Virginia Correctional Enterprises

Contact as needed: Martha Meade, AAA/Bret Richardson, Recreational Vehicle Dealers

Number of License Plates

Chair: William Childress

- Two vs. One Plate
- Four, Two One or no Decals on license plate
- Window decal vs. Front License Plate

Plate Design

Chair: Matt Martin

Standard Design:
(background colors, lettering, logo locations)

Plate Material:
(embossed vs. flat plate technology, new technology to include barcodes and changes to material with an embedded code)

Plate Enforcement

Chair: Don Boswell

- Enforcement of Plate obscured by a plate holder
- Reflectivity and Readability issues
- Plate Replacement Program

European Plate Design

Chair: Matt Wells

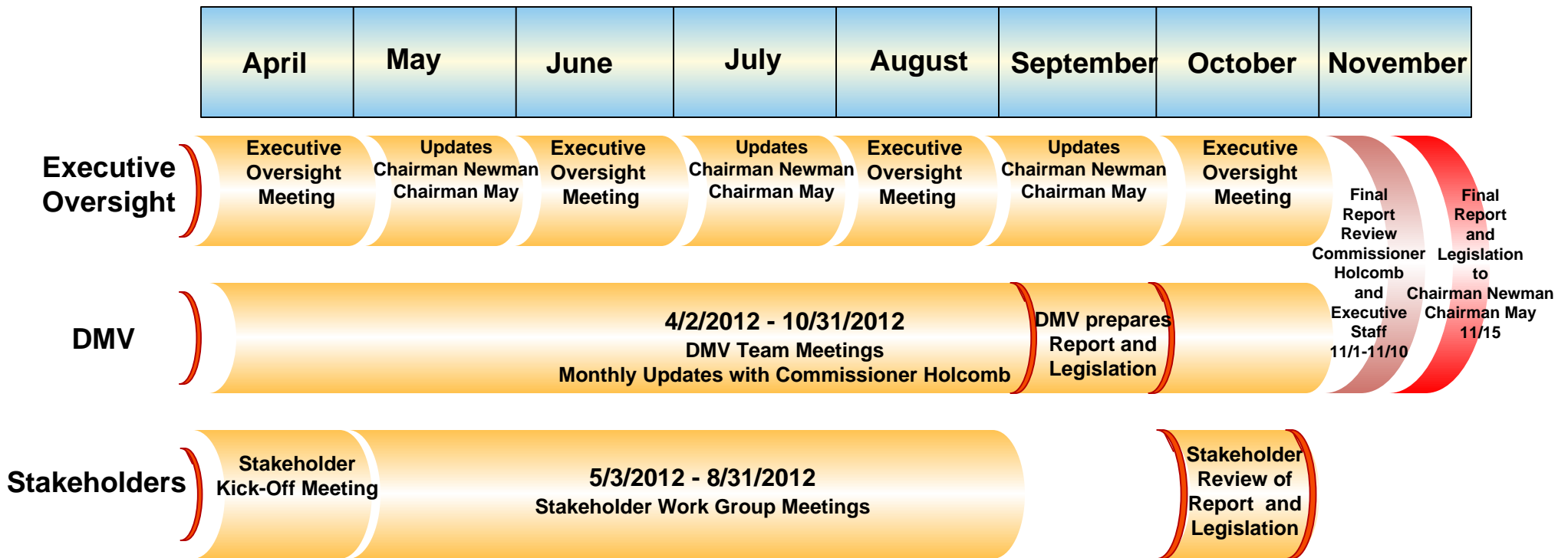
- Plate Design
- Equipment Needs

Participant List for License Plate Study Group

Name	Organization
Commissioner Rick Holcomb	DMV
Jim Agnew	Virginia Sheriff's Association
Michael Baxter	DMV
Dale Bennett	Virginia Trucking Association
Tonya Blaine	DMV
Burt Boehling	Virginia Department of Transportation
Robyn Bolton	Virginia Trucking Association
Barry Boothe	Virginia Correctional Enterprises
Don Boswell	DMV
Janet Brooking	Drive Smart VA
Barbara Carraway	Treasurers Association of Virginia
David Caudill	Richmond Metropolitan Authority
William Childress	DMV
Chris DeColli	3M
Carolyn Easley	DMV
Lt. Kenny Epling	Virginia Sheriff's Association/Hanover S.O
Sgt. Robert Evans	Virginia State Police
Charlie Finley	Virginia Motorcycle Dealers Association
Laura Farmer	Virginia Department of Transportation
Anne Gambardella	Virginia Automobile Dealers Association
Mitchell Goldstein	DMV
Donald Guillory	Virginia Correctional Enterprises
James Gillie	Commissioners for the Revenue Assoc. of Virginia
Karen Grim	DMV
Ken Germain	Virginia Motorcycle Dealers Association
Lieutenant Dan Glick	Virginia State Police
Alicia Hotinger	DMV
Daniel Harket	Transurban
Dave Hollis	Virginia Correctional Enterprises
Don Hall	Virginia Automobile Dealers Association
Ellen Marie Hess	DMV
Joe Hill	DMV
Patrick Harrison	DMV
Pete Iaricci	Virginia Independent Automobile Dealers Association
John Jones	Virginia Sheriff's Association
Barbara Klotz	DMV
Lois Keenan	Virginia Independent Automobile Dealers Association
Rachel Kerns	DMV
Ryan Kelly	Office of the Secretary of Transportation
John Lawson	Virginia Department of Transportation
J. C. Miers	Virginia State Police
Matt Martin	DMV
JoAnne Maxwell	Virginia Department of Transportation
Damian McInerney	DMV
Lieutenant Colonel Robert Northern	Virginia State Police
Mitch Nuckles	Commissioners for the Revenue Assoc. of Virginia
Bil Parrish	Virginia Independent Automobile Dealers Association
Fred Parker	Treasurers Association of Virginia
Major Tracy Russillo	Virginia State Police
Dana Schrad	Virginia Association of Chiefs of Police
Janet Smoot	DMV
Robin Sheldon	DMV
Michael Tilley	Virginia Sheriff's Association/Hanover S.O
Robert Todd	Richmond Metropolitan Authority
Matt Wells	DMV
Michael Whelan	Transurban
Rick Walton	Virginia Department of Transportation

C. License Plate Project Timeline

Timeline of the License Plate Study



D. Glossary

3M – The supplier of license plate sheeting for the Commonwealth.

Blank – A flat aluminum plate with attached sheeting that has not yet been embossed to create a license plate.

Capture Rate - Represents the number of license plates a reader detected and identified as a license plate compared to all the plates it came across (contrast Read Rate).

Character Combination – The alphanumeric combination displayed on a license plate, including any special characters (- and &) and spaces. Commonly used when referring to a personalized license plate.

Deboss - to indent a design into a surface.

Digital License Plate – License plate with a printed, not embossed, plate number. Commonly known as a “flat plate.”

Emboss – To raise a design on a blank with dies of similar pattern, one the negative of the other.

Embossed License Plate - A license plate that has been embossed with a plate number. For some plates, additional design elements may be embossed, as well.

Fixed Replacement – Replacing license plates at the same time at fixed intervals (contrast Rolling Replacement).

Full Background/Graphic Design – One or more colors or a design is used instead of the standard white background of a license plate.

Fully-/All-Embossed License Plate –All characters on a plate are embossed (license plate number, VA, For Hire, Private, Permanent, Taxi, etc.).

Graphic – A picture or logo used on a license plate.

License Plate Design – The look and layout of a license plate. Each plate design has its own unique plate type code.

License Plate Number – The official alphanumeric combination, as it appears on a registration card, that is assigned to a vehicle and embossed on a license plate. Special characters (- and &) and spaces are not part of the license plate number and are not used for an inquiry.

PDF417 - A stacked linear barcode symbol format used in a variety of applications, primarily transport, identification cards, and inventory management. PDF stands for Portable Data File. The 417 signifies that each pattern in the code consists of 4 bars and spaces, and that each pattern is 17 units long.

Personalized License Plates – A plate with a license plate number that is chosen by the customer.

Plate Type Code – The unique code (up to 5 alpha/numeric) that identifies the license plate name and use in DMV’s database.

Production Plate – A plate with a license plate number that is the next randomly generated number in a series.

Read Rate - Represents the accuracy of reading and processing the alphanumeric characters on the license plates compared to all the plates it recognized as license plates (contrast Capture Rate).

Roll-coating – The process of rolling special paint across the raised portion of the license plate to paint the plate number after embossing.

Rolling Replacement – Staggered replacement of license plates over a period of time (contrast Fixed Replacement).

Screen Printing/Silkscreen – A process used to create small batches of plates with special designs. Rather than using pre-printed sheeting, the background design of the plate is printed at the Tag Shop prior to embossing. This process is sometimes used to add additional design elements to existing sheeting until new sheeting with those elements can be ordered.

Sheeting – Pre-printed background material used for embossed license plates. License plate sheeting is fused to aluminum to create license plate blanks prior to embossing. The sheeting used in Virginia is reflective and contains visible security marks.

Special or Specialty License Plates – License plates with designs related to various organizations, institutions of higher education, military service, and interests.

Standard License Plates – Virginia’s blue and white plates.

Tag Shop – Virginia’s license plate production facility, run by Virginia Correction Enterprises at the Powhatan Correctional Facility.

Virginia Correctional Enterprises (VCE) – The division of the Department of Corrections responsible for the production of license plates.

E. A History of License Plates

1. License Plates in Virginia

On June 1, 1906, the state's first vehicle registration and license plate was issued for a fee of \$2.00. The license plates were black and white in color and made of porcelain and measured 5 inches by 11 inches. These first passenger license plates were issued as straight numbers 1 through 99. As registration increased, the A series was implemented, A 1 through A 999-999. In 1970, a B series was added. However, the letter B was often misread as an eight and it was discontinued.



Virginia's First License Plate (1906)

In 1910, Annual license plate renewal was required. Fees were based on engine horsepower engine.

Until 1914, the state's license plates were made by the Baltimore Enamel and Novelty Company. All plates manufactured by the company bear its oval seal on the reverse side. To exercise more control over license plate production, Virginia decided in 1914 to manufacture the plates at the Virginia State Penitentiary. License plates were attractive goods to produce because of the increase demand and stable market for them. In addition, making plates provided inmates with a source of income.

With the exception of the 1925 plates, all license plates manufactured at the penitentiary were made of steel until World War II, when metal and other raw materials became a scarce commodity. In 1925, plates were made of fiberplate, which was cheaper than steel, but not as durable. In fact, the plates were sometimes eaten by goats.

As a conservation measure due to the war shortage of steel, DMV decided that instead of making new plates for 1943, small steel tabs and windshield stickers would be issued to renew all 1942 license plates. Attached to the upper right corner of the license plate, the small tab was a prototype of our present-day decals, which the Commonwealth began using in 1973.

In 1944 due to the increase in war shortages, DMV experimented with fiberboard license plates. Although the fiberboard was said to with stand the wear and tear of travel, they were again no match for hungry goats.

In 1945, steel license plates with a baked enamel coating replaced the fiberboard plates. A set of these plates, however, weighed about one pound and was expensive to mail. After 1945, DMV switched to a lighter gauge steel, but it was not until 1973 that DMV used the light-weight aluminum currently found in Virginia's license plates.

In 1950, Virginia changed the size of its plates to the current size of 6 inches by 12 inches, a size that would become the standard in North America in 1956 through an agreement among automobile manufacturers, other governments and international standards organizations.

In 1954, antique license plates were authorized.

Before 1972, all plates were renewed during March and April, resulting in long customer lines outside of DMV. That meant an extremely heavy workload and a backlog that was not caught up for months. To

resolve this problem, DMV introduced staggered renewals in 1972. In this system, the customer chose which month they would like to renew their vehicles in the future. Staggered renewals spread the renewal process throughout the year and shortened lines at DMV.

In 1973, DMV offered the first of many plates Virginians could use to personalize their vehicles. Reserve plates, composed of three letters (AAA, AAB, AAC, and AAD were manufactured) followed by numbers 1 to 100, were offered in 1973 for an additional \$10 fee. In 1976, reflectorized Bicentennial plates were issued for an additional \$5 fee.

In 1977, painted aluminum plates were designed for use over a five-year period. Replacement plates were made at the owner's option. Though Virginia introduced reflectorized plates in 1971, complete reflectorization did not occur until 1979 when reflectorized aluminum plates were issued with white and blue letters and numbers. "Virginia" was screened in the background.

In 1981, Communiplates (now called "Personalized" or "Vanity" plates) were introduced, allowing Virginians to reserve combinations of two to six letters and /or numbers, to express themselves. The cost was \$10. In 1985, The Great Seal of Virginia was printed in blue and gold in the center of the plate with three numbers to the left and three numbers to the right in blue. In 1988, the number of characters allowed on a plate increased from six to seven. Also in 1988, DMV began issuing College Plates that bear the seal or logo of many college and universities.

Today, DMV currently issues more than 250 special plates with another 300 plus on the road. Personalized plates cost only \$10 per year. Special plates range in cost, but most are \$25 per year with the money being shared with the designated organization. Drivers can show school pride or support for an organization while expressing their individuality.

Drivers also have the option of personalized or vanity plates, which are license plates with a custom set of numbers and/or letters. According to a 2007 study by AAMVA,³⁹ there are 9.3 million motor vehicles with vanity plates in the United States. One tenth of all U.S. personalized plates are in Virginia, giving it the highest concentration of such plates issued by a state at 16.19 percent, or 1,065,217 out of 6,578,773. Only California with five times the number of registered vehicles (32,592,000), and Illinois with 50 percent more (9,645,590), have more personalized plates (and not by much: only 1,136,772 or 3.49 percent and 1,293,157 or 13.41 percent, respectively). Ohio is next for raw numbers (514,996 out of 10,755,809, or 4.79 percent) and New Hampshire is next for percentage (13.99 percent, or 171,438 out of 1,225,075).

2. License Plate History in North America

License plates have been around since 1884 when they were first issued for horse-drawn carriage taxis in Victoria, Canada. France was the first country to introduce a national license plate with the passage of the Paris Police Ordinance on August 14, 1893, followed by Germany in 1896 and the Netherlands in 1898.

³⁹ The 2007 American Association of Motor Vehicle Administrators - LCNS2ROM Vanity License Plates Survey is available online at <http://www.lcns2rom.com/vanityplatesurvey.htm>.

License plates became a permanent fixture when it became apparent that motor vehicles were going to replace horse-drawn carriages and that a system of registering and taxing them and their drivers was needed. The first license plates in North America appeared in 1901 in New York State. At that time, motorists had to make their own plates. Massachusetts and West Virginia were the first states to issue plates, in 1903. By 1918, almost every state had adopted a form of license plates.

These early plates were made out of porcelain baked onto iron or ceramic with no backing, which made them fragile and impractical. Throughout the years, license plates were made out of various materials, including cardboard, leather, rubber, iron, plastic and, during wartime shortages, copper and pressed soybeans. For identification, the plates consisted of two colors, one for the background and one for the numbering. Letters came along later when the need for more combinations arose.

The plate would usually contain the registration number in large digits, and in smaller lettering on one side of the plate, the two- or four-digit year number, and an abbreviated state name. Each year, citizens were required to obtain a new license plate from the state government, which would have a different color scheme than the previous year, making it easier for police to identify if citizens were current with their vehicle registration.

Prior to 1920, some states had adopted the technique of embossing the metal plates with raised lettering and numbering, without porcelain, and applying paint all over the plate, directly onto the metal. Today some states use digitally produced flat license plates either for all plates or exclusively for short-run plates, such as personalized and special license plates. License plates originally were merely flat plates in various forms, typically rectangular, but by the 1930s, officials found that they could be easily forged. They switched to embossing the plates because the equipment to do this was not easily available to criminals wishing to create their own plates.

Also in about 1920, the states began using inmates in their correctional institutions to manufacture plates to provide useful work for the prisoners and also to keep plate production costs down. The states began to require that automobile builders provide lights for illuminating license plates in about 1923. The first reflectorized plates were issued in 1936 in Mexico and the first fully retro-reflective plates were issued in 1947 in Connecticut.

The numbering system of license plates also varied among the jurisdictions. Some states issued a driver a combination that stayed with that person as long as he lived in that state, while other states periodically issued new combinations and completely rotated out any old ones. Several states do not regularly use certain letters (most commonly I, O, and Q) in their plates, except on vanity plates, to avoid confusion.

Moving from one state or province to another usually requires obtaining new license plates issued by the new place of residence. Some U.S. states even will require obtaining new plates for people who accept employment in that state, except through a showing that the person intends to return to another state to live on a regular basis. The most prominent exceptions to this policy are active duty military service members, who legally do not change residence when they move to a new posting. Federal law specifically allows them to choose to either retain the state vehicle registration of their original residence or change registration to their state of assignment.

As a cost-saving measure, starting around the 1970s, states began using a small decal on the plate or on the windshield to indicate the expiration date of the registration. Even with the decals, many states

previously required that all license plates be replaced every few years. That practice is being abandoned by many states because of the expense of continually producing large numbers of plates.

Some jurisdictions follow a "plate-to-owner" policy, meaning that when a vehicle is sold, the seller removes the current plate(s) from the vehicle. Buyers must either obtain new plates or attach plates that they already hold, as well as register their vehicles under their own names and plate number. If the seller buys a new car, he can apply to have the old plates put onto this car. Otherwise, depending on the jurisdiction, he has to turn the old plates in or destroy them, or may be permitted to keep them. Other states keep the plate with the vehicle when ownership passes.

Plates varied in size and shape from one jurisdiction to the next. When an owner moved to another jurisdiction, new holes had to be drilled into the bumper to support the new plate.

3. The Standardization of License Plates.

“One of the most important considerations in connection with proper administration of automobile regulations is that of insuring clear and unmistakable identification of every vehicle on the road.”

These words appeared in the New York Times article “STANDARD LICENSE PLATE FOR ALL STATES NEEDED: Society of Automobile Engineers Has Adopted a Design Which Will Be Offered for Universal Use.” on January 2, 1916. By that time, automobiles were here to stay and state governments required some form of identification to be attached to the vehicle. However, the features of that identification varied widely.

The standards were not widely adopted so the Society proposed standards for license plate bracket slots that would accommodate almost every plate in the United States. In a March 1925 article, “License-Plate Standard Proposed”, which appeared in SAE International, the journal of the Society of Automobile Engineers, the Society argued that standardizing all features except color, the name of the issuing state, and year issued would serve the purposes of registration and identification. These standards would include plate punching, size of plate symbols, gage of metal, size of the plate, method of numbering, location of the plate, illumination, and coordination of color selection to avoid conflicting with neighboring states.

In the 1950s, the Society recommended that all license plates comply with a standard size of six by twelve inches in order to make the manufacture of car bumpers easier. The states complied by 1956, through an agreement among automobile manufacturers, governments and international standards organizations. While peculiar local variants still exist, there are three basic standards worldwide. The majority of the Americas adopted a standard of 12 inches by 6 inches (300 mm by 150 mm). Through different agreements, the bulk of European countries and many of their former overseas territories adopted a standard of 520 mm by 110 mm or 120 mm (20.5 inches by 4.5 inches). The other standard adopted in Australia and some other Pacific Rim countries is 372 mm by 135 mm (14.5 inches by 5.3 inches), about halfway between the dimensions of the other two standards, longer than Western Hemisphere plates but taller than European ones.

Only the French-controlled Saint Pierre and Miquelon (off Newfoundland’s southern coast) has not adopted these standards. The plates of Canada’s Northwest Territories are shaped like a polar bear, but their overall size and mounting holes are compatible with those of the rest of Canada and the U.S.

Canada's Nunavut originally adopted the polar bear shape when it separated from the Northwest Territories in 1999, but as of July 2012, it adopted the standard license plate size and shape. Puerto Rico also offers an optional European-sized plate for European cars. Smaller-sized plates are used for motorcycles and, in some jurisdictions, mopeds and certain types of trailers and construction equipment.

Most governments require a registration plate to be attached to both the front and rear of a vehicle, although certain jurisdictions or vehicle types, such as motorcycles, require only one plate, which is usually attached to the rear of the vehicle.

With standards in place, many of the issues of early plates were remedied and new technological systems were developed to identify vehicles, enhance public safety and increase the convenience to the motoring public.

F. A Comparison of U.S. and Canadian License Plate and Decal Practice

LICENSE PLATES and DECALS

	<u>NUMBER</u>		<u>Re-issue</u>		<u>TYPE</u>		<u>PRODUCTION</u>		<u>SHEETING</u>		Printer Manufacturer	Registration Decals	<u>Production</u>	
	Number of Vehicles*	plates per vehicle	Rolling / Set Pd	Time Pd/ Last	Embossed	Digital	Produced by whom?	Private Comp	Std Pssngr	Special plates			Method	Implementation
Alabama	4,610,845	1	Set Period	2009 (5 yrs)		X	Corrections		3M	3M	3M	2 rear		Thermal
Alaska	695,282	2		1982	X		Private	Waldale	3M	3M		2 rear		Thermal
Arizona	4,357,634	1		1980's		X	Corrections		3M	3M	3M	1 rear		Laser
Arkansas	2,037,401	1		N/A	X		Private	Waldale	3M	3M		2 rear	On Demand	Thermal
California	34,433,206	2		1969	X		Corrections		3M	3M		2 rear	Conventional	
Colorado	1,429,474	2		2004	X	X	Corrections		3M	3M	Matan	2 rear		Thermal
Connecticut	3,071,575	2		2001	X		Corrections		3M	3M		none	N/A	
Delaware	843,357	1		1997		X	Private	Waldale	3M	3M	3M	1 rear	On Demand	Laser
Dist. of Col.	217,648	2		1999		X	Corrections		3M	3M	3M	window	On Demand	Laser
Florida	15,314,757	1	Rolling	10 Years	X		Private	Pride	3M	3M		1 rear	On Demand	Laser
Georgia	8,507,293	1		1997	X		Private	3M	3M	3M		1 rear		Laser
Hawaii	895,336	2		1991	X		Private	Waldale	3M	3M		1 rear		Thermal
Idaho	1,374,967	2	Rolling	7 Years		X	Corrections		3M	3M	3M	1 front 1 rear		Laser
Illinois	9,890,872	2		1999	X		Private	Macon Res	3M	3M		1 rear	On Demand	Laser
Indiana	5,847,588	1	Set Period	2008 (5 yrs)		X	Private	3M	3M	3M	3M	1 rear	On Demand	Thermal
Iowa	3,363,108	2		1996		X	Corrections		3M	3M	3M	1 rear	On Demand	Laser
Kansas	2,425,263	1	Set Period	2011 (5 yrs)		X	Private	Center Ind	3M	3M		1 rear	On Demand	Laser
Kentucky	3,584,501	1	Set Period	2007 (5 yrs)	X		Corrections		Avery	Avery		1 rear		Laser
Louisiana	4,033,411	1		N/A	X		Corrections		3M	3M		1 rear	On Demand	Thermal
Maine	1,055,920	2		2000	X		Corrections		3M	3M		2 front 2 rear	Conventional	
Maryland	4,483,598	2		1985	X		Corrections		Avery	Avery		2 rear	On Demand	Thermal
Massachusetts	5,261,803	2		1986	X		Corrections		3M	3M		1 rear	Conventional	
Michigan	7,913,124	1		2007	X		Corrections		3M	3M		1 rear	On Demand	Laser
Minnesota	4,796,095	2	Rolling	7 Years		X	Corrections		3M	3M	3M	2 front 2 rear		Laser / Thermal
Mississippi	2,025,690	1	Set Period	2008 (5 yrs)	X		Private	Waldale	3M	3M		2 rear	On Demand	Thermal
Missouri	4,904,201	2		2008	X	X	Corrections		3M	3M	3M	1 front 1 rear	On Demand	Thermal
Montana	924,950	2	Rolling	5 Years		X	Corrections		3M	3M	3M	1 rear		Thermal
Nebraska	1,793,023	2	Set Period	2005 (6 yrs)		X	Corrections		3M	3M	3M	1 front 1 rear	Conventional	
Nevada	1,397,341	2		2001		X	Corrections		3M	3M	3M	1 rear	On Demand	Thermal
New Hampshire	1,212,493	2		1999	X		Corrections		3M	3M		2 front 2 rear	Conventional	
New Jersey	6,113,807	2		1959	X		Corrections		3M	3M		none	N/A	Inspection Sticker
New Mexico	1,620,704	1		N/A	X		Private	Waldale	3M	3M		1 rear		Laser
New York	11,245,208	2		2001	X	X	Corrections		3M	3M	Matan	window	On Demand	Laser
North Carolina	6,047,239	1		N/A	X		Corrections		3M	3M	Matan	2 rear	On Demand	Laser
North Dakota	722,071	2		1992	X		Corrections		3M	3M		1 front 1 rear	On Demand	Thermal
Ohio	11,022,129	2		2000	X	X	Corrections		3M	3M	3M	1 rear	On Demand	Thermal
Oklahoma	3,396,395	1		2009		X	Corrections		3M	3M	3M	2 rear	Conventional	
Oregon	3,046,373	2		1950	X		Private	Waldale	3M	3M		2 front 2 rear	Conventional	
Pennsylvania	9,857,311	1		2000	X		Corrections		3M	3M	Matan	1 rear	Conventional	
Rhode Island	788,623	2		1996	X		Corrections		3M	3M		1 front 1 rear		Thermal
South Carolina	3,614,400	1	Set Period	2008 (6 yrs)		X	Private	3M	3M	3M	3M	2 rear	On Demand	Laser
South Dakota	926,168	2	Set Period	2006 (5 yrs)		X	Corrections		3M	3M	3M	1 front 1 rear	On Demand	Thermal
Tennessee	5,139,662	1	Set Period	2006 (6 yrs)		X	Corrections		3M	3M	3M	2 rear	Conventional	
Texas	18,208,170	2	Rolling	20% (7 yrs)		X	Corrections		3M	3M	3M	window	On Demand	Laser
Utah	2,453,879	2		N/A	X		Corrections		3M	3M		2 rear	Conventional	
Vermont	557,370	2		N/A	X		Corrections		3M	3M		1 front 1 rear	Conventional	
Virginia	6,301,835	2		N/A	X		Corrections		3M	3M		2 front 2 rear	Conventional	
Washington	5,580,668	2	Rolling	7 years	X	X	Corrections		3M	Avery	Matan	2 rear	Conventional	
West Virginia	1,412,478	1		1996	X		Corrections		3M	3M		1 rear		Thermal
Wisconsin	4,874,316	2		2008	X		Corrections		3M	3M		2 rear	Conventional	
Wyoming	652,324	2	Set Period	2009 (8 yrs)		X	DMV		3M	3M	3M	1 front 1 rear	On Demand	Thermal

Summary	1 Plate - 19 2 Plates - 32	Rolling - 6 Set Period - 10 N/A - 7	33	23	Corrections - 37 Private - 13 DMV - 1							Placement of Decals	Number of Decals
												Front Only - 0	4 Decals - 5
												Front & Rear 1 - 8	2 Decals - 22
												Front & Rear 2 - 5	1 Decal - 22
												Rear Only - 33	0 Decals - 2
												Window - 3	
												None - 2	

* 2009 FHWA Highway Statistics source for # registered vehicles

LICENSE PLATES

	<u>NUMBER</u>		<u>Re-issue</u>		<u>TYPE</u>		<u>PRODUCTION</u>			<u>SHEETING</u>		<u>SECURITY FEATURES</u>		<u>Printer Manufacturer</u>	<u>Registration Stickers</u>
	<u>Number of Vehicles*</u>	<u>plates per vehicle</u>	<u>Rolling / Set Pd</u>	<u>Time Pd/ Last</u>	<u>Embss'd</u>	<u>Digital</u>	<u>Produced by whom?</u>	<u>Private Comp</u>	<u>Business Model</u>	<u>Std Pssngr</u>	<u>Spclty plates</u>	<u>Ensure</u>	<u>VST</u>		
Alberta	4,186,834	1		N/A	X		Private	Waldale		Painted				3M	2/3 rear
British Columbia	3,178,660	2		N/A	X		Private	Waldale		3M	3M	X		3M	2 rear
Manitoba	979,172	2		N/A	X		Private	Waldale		3M	3M	X		3M	2 rear
New Brunswick	665,934	2		N/A	X		Private	Waldale		3M	3M	X		3M	1 front 1 rear
Newfoundland / Labrador	526,894	1		N/A	X		Private	Waldale		3M	3M			3M	1 rear
Nanavut	5,922	1		N/A		X	Private	Waldale		3M	3M			3M	2 rear
Nova Scotia	686,713	1		N/A	X		Private	Waldale		3M	3M			3M	1 rear
Ontario	10,443,981	2		N/A	X		Corrections			3M	3M	X		3M	1 rear
Prince Edward Island	102,693	1		N/A	X	X	Private	Waldale		3M	3M				1 rear
Quebec	7,218,242	1		N/A	X		Private	Waldale		3M	3M			3M	no decal
Saskatchewan	984,454	1		N/A	X		Private	Waldale		3M	3M	X	X	3M	1 rear
Northwest Territories	30,788	1		N/A		X	Private	Waldale		3M	3M				2 rear
Yukon	45,011	1		N/A	X		Private	Astrographic		3M	3M				2 rear
Summary		1 Plate - 9 2 Plates - 4	Rolling Set Period N/A	0 0 13	This is passenger only		Corrections - 1 Private - 12					5	1		

* 2009 Statistics Canada source for # of registered vehicles
<http://www40.statcan.gc.ca/l01/cst01/trade14d-eng.htm>

G. AAMVA STANDARDS

Standard 1. Two registration license plates should be issued for all passenger type vehicles and single unit trucks. One plate can be issued for tractors, motorcycles, and all types of trailers.

Virginia conforms to this standard.

Standard 2. The name of the issuing jurisdiction should be prominently displayed on the top center of the plate. Alpha-numeric characters commonly referred to as the registration number or plate number should be displayed in the center of the plate.

Virginia does not fully conform to this standard.

Standard 3. The registration expiration should be displayed on the vehicle by means of a retro-reflective validating sticker on the rear license plate, except on vehicles that are required or permitted to have only one license plate, or those plates manufactured with an expiration date and for which a sticker is not required. Secondary decals should be placed on the windshield for jurisdictions that have multiple uses for the stickers. New validating stickers may be issued upon renewal of registration in lieu of issuing new plates for the vehicle.

Virginia conforms to this standard.

Standard 4. License plates should be manufactured in two sizes, depending on their use. Passenger type vehicles, tractors, trucks, trailers, etc., should be issued standard 6" x 12" plates. Smaller plates measuring 4" x 7" may be used on motorcycles or other small vehicles.

Virginia conforms to this standard.

Standard 5. License plates can be issued for multi-year periods and should be reissued or replaced on a regular basis to ensure that they remain retro-reflective and the information they display remains legible.

Virginia has no mandatory replacement program due to cost.

Standard 6. Fully retro-reflective license plates should be adopted and used.

Virginia conforms to this standard.

Standard 7. Motor vehicle agencies should consult with jurisdictional law enforcement, and if applicable local law enforcement representatives, prior to adopting new license plate standards or designs. Other stakeholders should be consulted as appropriate.

Virginia conforms to this standard.

Standard 8. Jurisdictions should standardize license plates, including specialty plates, e.g., placement of graphics, font and font size, alpha-numerics, plate numbers, use of stacked characters, etc.

Virginia mostly conforms to this standard.

Standard 9. License plates must be readable in daylight and night using low beam headlights, under optimal conditions at a distance of no less than 75 feet.

Following the study committee recommendations would conform Virginia to this standard.

Standard 10. Duplication of license plate numbers, including look-alikes, e.g., ABC OOO vs. ABC 000, is discouraged to allow accurate retrieval of vehicle registration information.

Virginia does not conform to this standard.

Standard 11. Retro-reflective decals should be color-coded with durable printing. Motor vehicle agencies should consult with jurisdictional law enforcement, and if applicable local law enforcement representatives, prior to adopting new color schemes for registration stickers.

Virginia conforms to this standard.

Standard 12. A license plate is considered to be fully retro-reflective if the base retro-reflective sheeting used for its' manufacture meets the following initial retro-reflective specifications (see table below):

Color	Entrance Angle	
	4°	40°
White	50	16
Yellow	25	10
Orange	25	10
Lemon-Yellow	25	10
Gold	25	10
Green	18	7
Blue	18	7
Red	9	3

3M's representative has confirmed that Virginia conforms to this standard. DMV's contract with 3M ensures that Virginia conforms.

Standard 13. "Decorative plate" means a license plate or other similar device that is not issued for registration purposes by a jurisdiction or agency responsible for the registration of the vehicle. A decorative plate may contain alpha or numeric characters but the alpha or numeric characters are not recorded in the jurisdictional records and are not a part of the registration records maintained by the jurisdiction. The use of decorative plates that resemble official license plates issued by a jurisdiction should be prohibited.

Virginia has souvenir plates that are not issued for registration purposes.

Souvenir plates DO resemble official license plates. DMV does not plan to change this practice.

Standard 14. “Specialty plate” means an official license plate issued for recognition or fund raising.

DMV agrees with this definition.

Standard 15. Graphics on license plates should not distort or interfere with the readability of the alphanumeric characters or with any other identifying information on the plate by either human eye or machine readable technology such as Automated License Plate Readers (ALPR).

Following the study committee recommendations that VSP and toll facilities use an ALPR when inspecting the new plate design on a vehicle in daylight and at night would conform Virginia to this standard.

Standard 16. Plate type identifiers displayed on license plates should be standardized and placed in a uniform location on the license plate within a jurisdiction, e.g., commercial, dealer, etc.

DMV attempts to conform to this standard, but is unable to do so at every time. Plate type identifiers are placed in a standard location for that type of vehicle, but not from one type to another. DMV plans to keep these plates as they are.

H. Stakeholder Position Letters

1. Virginia State Police



Colonel W. S. (Steve) Flaherty
Superintendent

(804) 674-2000

COMMONWEALTH of VIRGINIA

DEPARTMENT OF STATE POLICE

Lt. Col. Robert B. Northern
Deputy Superintendent

P. O. BOX 27472, RICHMOND, VA 23261-7472

September 7, 2012

Richard D. Holcomb, Commissioner
Virginia Department of Motor Vehicles
2300 West Broad Street
Richmond, Virginia 23269


Dear Commissioner Holcomb:

I have been briefed by Lieutenant Colonel Northern concerning the results of the recent License Plate Committees which were commissioned by House Transportation Chairman Joe T. May and Senate Transportation Chairman Stephen D. Newman. I appreciate the great challenge you have been given as well as the effort this committee has put forward. I would like to offer my recommendations concerning four topics which were under review by the committees.

Elimination of the front license plate

As you are aware, the importance of being able to readily identify the registration of a motor vehicle from the front or the rear is critical to the mission of the Virginia State Police and law enforcement agencies across the Commonwealth.

Virginia state troopers routinely conduct enforcement activities such as checking details and speed enforcement where they may initially only observe the front license plate of the vehicle. If the vehicle flees the location this may be the only opportunity they have to identify the vehicle, and in situations like this the front license plate provides valuable investigative information. Our troopers routinely receive information to be on the lookout for specific vehicles for many reasons and being able to see the tag information from the front is an invaluable asset, particularly on the Interstate and other four lane highways. In addition, the presence of a front license plate is very valuable during surveillance activity in criminal investigations when the vehicle may only be seen from the front. Citizens also benefit by having a front license plate because this allows them to

Richard D. Holcomb, Commissioner
Page 2
September 7, 2012

more rapidly identify other motor vehicles during amber/senior alerts, following traffic crashes or incidents of road rage.

Elimination or relocation of license plate decals

The elimination or alternate placements of license plate decals will make it impossible for law enforcement personnel to quickly and easily determine if vehicle registrations are current. This limitation on enforcement will encourage many motorists to drive with expired registrations and significantly reduce revenue generated from the registration renewal or subsequent fines. While I appreciate that these measures may provide some cost savings to the Commonwealth, I believe both would make the difficult and dangerous job of law enforcement even more challenging.

"Flat" versus "embossed" license plates

Historically, law enforcement agencies in Virginia have preferred the use of the "embossed" or "raised numeric" license plates because they inhibited fraudulent reproductions and could be identified even when burned in a vehicle fire. Due to new technologies these issues are no longer concerns to our law enforcement personnel. Consequently, I would support the use of "flat" license plates.

The use of the Safety Inspection Program for license plate legibility inspection

The Virginia Safety Inspection Program is and has historically been a program which inspects vehicles for mechanical safety. The inspection of license plates for appearance is speculative and falls well outside the scope of the Inspection Program. Because there is no obvious or clear standard for plate legibility, it is my belief this determination should be left to sworn law enforcement personnel through enforcement of §46.2-716 of the Code of Virginia or the sworn use of DMV form VSA 14 when appropriate.

I hope you find this information helpful and I wish you and your organization all the best in future.

Sincerely,



Superintendent

WSF/FDG/crj

2. Virginia Association of Chiefs of Police



VIRGINIA ASSOCIATION *of* CHIEFS *of* POLICE

EIN #54-600803

PRESIDENT

Chief James E. Williams
Staunton

IMMEDIATE PAST

PRESIDENT

Chief Richard C. Clark, Jr.
Galax

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COMMUNICATIONS
MANAGER

Erin G. Schrad

FINANCE MANAGER

C. Suzanne Robinson

Positions of the Virginia Association of Chiefs of Police on Vehicle License Plates August, 2012

TWO LICENSE PLATES: The VACP supports Virginia's current law requiring two license plates on motor vehicles to promote visibility for effective traffic law enforcement. The requirement for two plates makes license plate theft more difficult, and enables law enforcement to quickly identify and run license plate checks on moving vehicles. Officer safety is enhanced by the presence of two plates, especially on an occupied stopped vehicle, when the officer can identify the plate number from either end of the vehicle. Laser speed enforcement and photo red enforcement, which are important tools in highway safety efforts, rely on the presence of a front license plate. Virginia law enforcement overwhelmingly supports the continued requirement of two license plates on motor vehicles.

EMBOSSSED VS FLAT PLATES: The VACP has opposed the transition away from embossed plates to flat plates for many years, based on concerns about fraudulent reproduction of flat plates and the durability of embossed plates when a vehicle is severely damaged in a crash. The VACP is willing to support the transition to flat plates if the Commonwealth can ensure the use of new technology to create code-embedded flat plates to reduce the threat of fraudulent reproduction. The VACP cautions that the transition to code-embedded flat plates also would require code-reading equipment for all Virginia law enforcement agencies to ensure the authenticity of flat plates.

LICENSE PLATE DECALS: The VACP supports the number, position and location of the decals on license plates remain unchanged, and the separate month and year decals continue to be required on both front and back plates.

Dana Schrad
Executive Director

3. Virginia Sheriffs' Association



Virginia Sheriffs' Association

701 EAST FRANKLIN STREET, SUITE 706, RICHMOND, VIRGINIA 23219
PHONE (804) 225-7152 • FAX (804) 225-7162 • WWW.VASHERIFF.ORG

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Region V
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Region VI
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Region VII
Jeff S. Walton

Region VIII
C. T. Woody, Jr.

Region IX
Brian K. Roberts

Region X
Kenneth W. Stolle

Executive Director
John W. Jones

August 21, 2012

Mr. Richard D. Holcomb, Commissioner
Department of Motor Vehicles
2300 West Broad Street
Richmond, Virginia 23269

Commissioner Holcomb:

The Virginia Sheriffs' Association maintains the follow positions on issues that are currently under review by the DMV.

Two plates on vehicles: The Virginia Sheriffs' Association is opposed to removing the front plate from registered motor vehicles. The front plate serves a number of law enforcement purposes, including officer and public safety. Officers and members of the public are better able to identify vehicles and license plate readers, cameras, and toll collection cameras remain as effective tools for law enforcement.

The number, position and location of the decals: The Virginia Sheriffs' Association supports the position of the study team and maintains that the number, position and location of the decals remain as they are now.

Flat plates: The Virginia Sheriffs' Association has no objection going to flat plates.

Thank you for involving law enforcement and the Virginia Sheriffs' Association in the decision making process.

Sincerely,

John W. Jones,
Executive Director

JWJ/llm

4. Commissioners of the Revenue Association of Virginia



THE CITY OF LYNCHBURG, VIRGINIA

P.O. BOX 858, LYNCHBURG, VIRGINIA 24505-0858 • (434) 455-3870
FAX • (434) 847-1842

MITCHELL W. NUCKLES
COMMISSIONER OF THE REVENUE

July 10, 2012

To Whom It May Concern:

I write on behalf of the Commonwealth of Virginia Commissioner of the Revenue Association.

The Commissioner of the Revenue Association supports the continuation of front and rear license plates on vehicles registered in the Commonwealth of Virginia.

Localities in Virginia are utilizing automated license plate readers to ensure vehicles are properly assessed personal property tax. Front and rear license plates are essential to ensure compliance with the personal property tax laws of the Commonwealth.

Thank you for allowing the Commissioners of the Revenue Association to participate in this study.

Sincerely,

Mitchell W. Nuckles
Commissioner of the Revenue

5. Virginia Department of Transportation



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219-2000

October 31, 2012

Richard D. Holcomb
Commissioner, Department of Motor Vehicles
2300 West Broad Street
Richmond, Virginia 23269

Dear Commissioner Holcomb:

The Virginia Department of Transportation (VDOT) participated in the License Plate Study executed by the Department of Motor Vehicles at the request of House Transportation Chairman Joe T. May and Senate Transportation Chairman Stephen D. Newman. The study assessed the current state of Virginia license plates and their contribution toward, and impact on, highway and public safety, as well as highway funding.

VDOT has reviewed the draft License Plate Study and supports the majority of the recommendations offered therein. These recommendations would enhance law enforcement operations and functions that are dependent upon identification of vehicles based on readability of license plates. Furthermore, the recommendations would enhance the effectiveness and efficiency of modern-day automated toll collection methods and enforcement, both of which rely upon license plates as the means of identifying vehicles.

While VDOT is supportive of the vast majority of the study recommendations, we will decline comment and defer to Virginia State Police with regard to the recommendation calling for examination of license plates during vehicle safety inspections.

Thank you for providing the Virginia Department of Transportation (VDOT) the opportunity to participate in this important study.

Sincerely,

A handwritten signature in blue ink, appearing to read "R. Walton, Jr.", with a long, sweeping underline.

Richard L. Walton, Jr.
Chief of Policy and Environment

I. “Illegible License Plate Notice” (Form VSA-28)



Illegible License Plate Notice

VSA 28 08-98

Virginia Code § 46.2-607 requires vehicle owners to apply for and immediately obtain replacement license plates when any license plate becomes illegible. Illegible license plates are those plates with one or more registration letters/numbers that are damaged, mutilated or faded beyond recognition. Service of this notice constitutes a law enforcement determination that one or both license plates displayed on the vehicle described below are illegible. To replace your illegible license plates or for more information, call or visit your local DMV customer service center. Failure to replace illegible license plates will prevent you from renewing this vehicle’s registration and can result in license plate revocation in accordance with law.

Issue Date	Time <input type="checkbox"/> AM <input type="checkbox"/> PM	Location	
Owner's Name			
Street Address			
City/County		State	Zip Code
Vehicle Make		Model Year	Plate Number
Vehicle Identification Number (VIN)			
Operator's Name (Please Print)			
DL Number		Operator's Signature (Acknowledgment of Receipt of Notice)	
Law Enforcement Agency			
Officer			Badge/Code Number

SAMPLE

WHITE - Customer Copy

CANARY - DMV Copy

PINK - Law Enforcement Copy