

**FINAL REPORT**

**USE OF POLICE IN WORK ZONES ON HIGHWAYS IN VIRGINIA**

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## ABSTRACT

It is generally accepted that one of the most effective ways of controlling speed in a work zone is to have a staffed police car positioned at the beginning of the work zone with its lights flashing and radar on. Drivers detect the presence of police either visually or via radar detectors and reduce their speed to comply with the posted work zone speed limit. The reduced speeds and reduced variation in speeds result in fewer accidents and minimize dangerous interactions between vehicles and work zone workers and equipment. A number of studies support these observations.

The use of police enforcement in work zones is a common practice among state departments of transportation, and the Virginia Department of Transportation (VDOT) is no exception. VDOT has an agreement with the Virginia State Police (VSP) for paying for and implementing the strategy in VDOT work zones and a mutually developed set of guidelines for using police enforcement. The purpose of the research was to document the current practices regarding the use of police in work zones in Virginia and to determine if any enhancements could be made. The research effort consisted of literature reviews to establish the background for police enforcement in work zones, discussion with and input from VDOT and VSP personnel, and the administration of a questionnaire survey.

A questionnaire survey was sent to personnel in VDOT, VSP, and VMS, Inc., asking the respondent's opinion about the effectiveness of using police in work zones and a number of questions about the work zone enforcement practices being used.

The use of police in work zones was almost unanimously felt to be effective in reducing speeds and improving safety in work zones, and few adverse effects were noted. Recommendations were made regarding the development and implementation of training in basic work zone operations, the development of a standard agreement for possible use with local police agencies, the use of more than one police officer, the promotion of the maximum \$500 fine for speeding in work zones, the requirement that police officers wear safety vests when outside their vehicle in a work zone, and the development of a standard pay practice for cancellations.

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#### INTRODUCTION

A 1998 report by the Federal Highway Administration noted that the two leading causes of work zone crashes are excessive speed and driver inattention. Further, it was observed that “there is universal agreement that the most effective way of controlling speed in the work zone is to have a staffed police car with flashing lights at the beginning of the work zone.”<sup>1</sup> Drivers detect the presence of police either visually or via radar detectors and reduce their speed to comply with the posted work zone speed limit. The reduced speeds and reduced variation in speeds result in fewer accidents (or, it is hoped, less severe accidents) and minimize dangerous interactions between vehicles and work zone workers and equipment.

A number of studies support this observation.

- A study at six work zones on rural and urban highways in Texas found that a stationary patrol car reduced average speeds by 4 to 12 mph (6 to 22 percent speed reduction) and a circulating patrol car reduced speeds by 2 to 3 mph (3 to 5 percent speed reduction).<sup>2</sup>
- A study at a single-lane closure on an urban multilane street in Sioux Falls, South Dakota, found that a stationary police car with an officer inside, its lights flashing, and its radar active reduced the average speed of free flowing vehicles from 30 to 25 mph.<sup>3</sup>
- A study in Illinois examined the impact of the presence, then the absence, of marked police cars on vehicle speeds at rural interstate work zones in Illinois. The average speeds of cars and trucks were reduced by about 4 and 5 mph, respectively, while the police car was circulating through the work zone. The numbers of cars and trucks exceeding the speed limit through the work zone were reduced by 14 and 32 percent, respectively.<sup>4</sup>
- A study by the Minnesota Department of Transportation (DOT) measured the effectiveness of positioning a patrol car with its lights and flasher activated approximately 500 to 600 feet upstream of work zones on a rural interstate, an urban freeway, and a metro location. The 85<sup>th</sup> percentile speeds at the rural interstate location (posted speed reduced from 70 to 40 mph) were reduced from 51 to 43 mph. The 85<sup>th</sup> percentile speed was reduced from 66 to 58 mph on the urban freeway where the posted speed limit remained the same at 55 mph. At the metro location, where

posted speeds were reduced from 50 to 40 mph, the 85<sup>th</sup> percentile speed was reduced from 58 to 47 mph.<sup>5</sup>

The use of police enforcement in work zones is a common practice among state DOTs. A study concerning the use of uniformed police officers on federal-aid highway construction projects prepared pursuant to Section 1213(c) of the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) concluded that “the majority of states use uniformed police officers in at least some work zones where there are particular traffic safety concerns.”<sup>6</sup>

The Virginia Department of Transportation (VDOT) fully supports this general strategy and has an agreement with the Virginia State Police (VSP) for funding and implementing it in VDOT work zones (see Appendix A). There is also a mutually developed set of guidelines for the use of police enforcement in work zones (see Appendix B).

## **PURPOSE AND SCOPE**

The purpose of this research was to document the current practices when police are employed in work zones in Virginia and to determine if any enhancements could be made.

The research effort consisted of literature reviews to establish the background for police enforcement in work zones, discussions with and input from VDOT and VSP personnel, and the administration of a questionnaire survey. A task group that provided ongoing oversight and guidance assisted in the effort. The membership of the task group is provided in Appendix C.

## **METHODS**

The primary method used to determine the state of the practice of using police in work zones was the development and administration of a questionnaire survey requesting a wide range of information on current practices and the use of police in work zones in Virginia. The survey was developed with the assistance of the task group and sent to selected personnel in VDOT, VSP, and VMS, Inc. (VMS). The survey is included in Appendix D.

### **Distribution of Survey**

Within VDOT, the questionnaire survey was emailed to 43 resident engineers, 29 work zone coordinators, and 62 project engineers. In addition, the project engineers were requested to forward the survey to their inspectors.

The VSP has seven field divisions with a total of 48 areas falling under them. The survey was emailed to the field lieutenant in charge of each division with a request to forward the survey to the sergeants in charge of the areas.

VMS has three offices in Virginia: in Petersburg, Chilhowie, and Wytheville. The survey was emailed to 25 employees: one regional manager, two project managers, two maintenance superintendents, three emergency response coordinators, three field engineers, five project engineers, and nine inspectors.

Finally, the survey was emailed to members of the task group who had not already received the survey by being on one of the previously cited lists.

## RESULTS

### Responses to Survey

Although 177 completed surveys were received, 30 respondents indicated that they had “never been involved with a work zone that used state police enforcement.” Accordingly, information from 147 respondents (see Table 1), 43 percent from VDOT, 43 percent from VSP, and 14 percent from VMS, was analyzed.

**Table 1. Number of Respondents and Distribution**

Respondent	No.
VDOT Resident Engineer	8
VDOT Project Engineer	19
VDOT Inspector	14
VDOT Work Zone Coordinator	14
VDOT Other	8
State Police Officer	63
VMS Personnel	21
<b>Total</b>	<b>147</b>

This section presents the responses received for each question in the survey. The results are ordered by the questions in the survey. Unless otherwise noted, the percentages reported were calculated on the basis of the 147 total responses or the total responses per respondent category shown in Table 1.

#### **1. Involvement With Work Zone That Used State Police Enforcement**

A large majority, 83 percent, had been involved with a work zone that used state police officers over the past 24 months. Fifty-nine percent had been involved between 1 and 25 times, and 24 percent more than 25 times.

#### **2. Criteria Considered in Determining Whether to Use Police in Work Zone**

Of the three choices, traffic volume was the most commonly used criterion (see Table 2). Thirty-nine percent chose this criterion, and average daily traffic (ADT) was the only measure

**Table 2. Criteria For Deploying Police In Work Zones**

<b>Respondent</b>	<b>Volume</b>	<b>Classification</b>	<b>Congestion</b>	<b>Don't Know</b>	<b>Other</b>
VDOT Resident Engineer	4	4	3	1	5
VDOT Project Engineer	10	3	4	1	15
VDOT Inspector	7	5	4	3	6
VDOT Work Zone Coordinator	9	9	5	0	11
VDOT Other	6	5	3	1	6
State Police Officer	8	7	6	38	10
VMS Personnel	13	7	9	4	10
<b>Total</b>	<b>57</b>	<b>40</b>	<b>34</b>	<b>48</b>	<b>63</b>

cited. Thresholds that justified police presence ranged from 6,000 to 100,000 vehicles per day. In addition to the extremes mentioned, other values cited were 10,000 (3), 12,000 (2), 15,000, 20,000(2), 25,000, 30,000, 40,000, 50,000, and 60,000.

Classification of road was selected by 27 percent. Categories of roadways named included interstates, arterials, and primaries.

Peak hour congestion was selected by 23 percent. The only measure and threshold entered was the *Highway Capacity Manual* Level of Service D.

Approximately one third (48) could not identify any criterion used for determining whether police should be used. A majority of these, 38, were state police officers.

Forty-three percent noted other criteria used. Seventeen respondents cited time of day (most often nighttime) as a criterion. Other factors cited by more than 4 respondents included type of operation (reduced speed, detour/road closed, complexity, greater than 10-minute traffic stoppage), geometric conditions (existing terrain, reduced travel width, drop offs on shoulder), location (proximity to areas having young drivers, entering/exiting traffic, areas known for high speeds and motorists ignoring warning signs and devices), and proximity of workers to roadway. Other factors included heavy truck traffic, safety, traffic engineering memoranda, and perceived risks.

### **3. Types of Work Zones in Which Police Are Used**

Three types of work zones were identified: long-term (more than 3 days), short-term (1 hour to 3 days), and moving (0 to 60 minutes). Long- and short-term work zones were selected almost equally, 48 percent and 50 percent, respectively (see Table 3). Only 31 percent had observed police in moving work zones. The annual percentages of police usage for each type of work zone varied greatly, obviously depending on the respondent's individual experience.

**Table 3. Type of Work Zone Using Police Enforcement**

<b>Respondent</b>	<b>Long-term</b>	<b>Short-term</b>	<b>Moving</b>	<b>Don't Know</b>
VDOT Resident Engineer	5	6	4	1
VDOT Project Engineer	10	12	3	0
VDOT Inspector	8	6	1	0
VDOT Work Zone Coordinator	11	9	5	1
VDOT Other	4	6	3	1
State Police Officer	24	19	13	27
VMS Personnel	7	16	17	1
<b>Total</b>	<b>69</b>	<b>74</b>	<b>46</b>	<b>31</b>

**4. Status of Officers Assigned in Work Zone Enforcement**

The current guideline is to use off-duty state police officers who volunteer for assignment in work zones. A majority of the respondents, 63 percent, agreed with the current situation; however, 30 percent felt it appropriate to use on-duty as well as off-duty officers (see Table 4). Only five respondents liked the idea of using only on-duty officers, and none of the five was a state police officer.

Responses to the request to explain their choice ranged from “it really doesn’t matter” to “it’s a state police decision.” For those having a stronger opinion, many who supported the off-duty (either only off-duty or in combination) noted the shortage of police officers and that assigning on-duty officers to work zones would be detrimental to the performance of their other duties. Off-duty officers are dedicated and committed to work zone enforcement and would not likely be called away to other assignments. Off-duty assignments also give officers a chance to make extra money.

Respondents who supported using on-duty officers (either only on-duty or in combination) were concerned about VDOT having to pay the extra money, especially if the need was for a very short time (several respondents noted that on-duty officers assisted for short time periods). Several respondents felt that volunteer off-duty officers would be difficult to schedule; however, a number of other respondents noted that the use of off-duty volunteers worked fine. Several respondents implied that on-duty officers were the only ones allowed to issue citations.

**Table 4. Status of Officers Assigned to Work Zone Enforcement**

<b>Respondent</b>	<b>Volunteer Off-duty</b>	<b>On-duty Only</b>	<b>Combination</b>
VDOT Resident Engineer	4	1	2
VDOT Project Engineer	9	0	10
VDOT Inspector	4	4	6
VDOT Work Zone Coordinator	4	0	8
VDOT Other	3	0	5
State Police Officer	55	0	4
VMS Personnel	13	0	9
<b>Total</b>	<b>92</b>	<b>5</b>	<b>44</b>



## 5. Source of Officers Assigned to Work Zone Enforcement

As noted, the current guideline is to use volunteer, off-duty VSP officers. There are no similar agreements with local police organizations. Sixty-one percent chose VSP as the source of officers (see Table 5), and 37 percent considered it appropriate to use both state and local police. Only two opted for only local law enforcement officers. Although an explanation was not requested, a couple of respondents noted that it would be helpful to use VSP for interstate routes and a combination for other routes.

**Table 5. Source of Officers Used**

<b>Respondent</b>	<b>VSP</b>	<b>Local Law</b>	<b>Both</b>
VDOT Resident Engineer	6	0	2
VDOT Project Engineer	9	1	10
VDOT Inspector	8	0	6
VDOT Work Zone Coordinator	4	0	9
VDOT Other	6	1	2
State Police Officer	46	0	14
VMS Personnel	11	0	11
<b>Total</b>	<b>90</b>	<b>2</b>	<b>54</b>

## 6. Special Training Provided to Officers Patrolling in Work Zones

Only 19 percent replied that special training was provided to officers assigned to work zones (see Table 6). If the 45 who replied “don’t know” about special training are combined with the 68 who replied “no,” 77 percent were not aware of special training opportunities. Only 25 percent of VSP officers responding were aware of special training opportunities.

In explaining their response, many respondents referred to on-job and on-site instructions given to the officers by VDOT or VMS personnel as the “training” provided. Many of the troopers who responded noted several internal documents, e.g., memoranda, policy, training manual, or other instructions, as the training provided. Several respondents felt that the officers have the knowledge, skills, and abilities to perform the job without additional training. On the other hand, 14 respondents in all three major categories of VDOT, VMS, and VSP felt there was a need for training.

When asked specifically if they would be willing to attend a short (2-hour maximum) basic work zone training course prior to being assigned to work zone enforcement, 44 of the 61 VSP respondents, or 72 percent, replied in the affirmative.

**Table 6. Special Training Provided**

<b>Respondent</b>	<b>Yes</b>	<b>No</b>	<b>Don’t Know</b>
VDOT Resident Engineer	0	2	6
VDOT Project Engineer	3	9	7
VDOT Inspector	2	6	6
VDOT Work Zone Coordinator	3	3	7
VDOT Other	1	4	3
State Police Officer	16	40	3
VMS Personnel	3	4	13
<b>Total</b>	<b>28</b>	<b>68</b>	<b>45</b>

## 7. Criteria Used to Select Officers for Work Zone Enforcement

The current guideline is to use volunteer police officers; therefore, it is not surprising that 63 percent selected that option (see Table 7). As expected, most of the VSP who responded, 87 percent, were aware that work zone assignments were on a volunteer basis. Interestingly, 11 officers felt experience and skill and aptitude also played a role. Twenty-two percent of the respondents did not know how officers were selected, though as expected 30 of the 33 were non-VSP. Several respondents noted “other” criteria; however, these were all a variation of the volunteer choice.

**Table 7. Officer Selection Criteria**

<b>Respondent</b>	<b>Experience</b>	<b>Skill and Aptitude</b>	<b>Anyone Volunteering</b>	<b>Don't Know</b>
VDOT Resident Engineer	0	1	1	4
VDOT Project Engineer	0	1	8	7
VDOT Inspector	2	1	7	4
VDOT Work Zone Coordinator	1	0	4	7
VDOT Other	1	1	3	3
State Police Officer	6	5	55	3
VMS Personnel	1	1	14	5
<b>Total</b>	<b>11</b>	<b>10</b>	<b>92</b>	<b>33</b>

## 8. Most Typical Location of Officers Within Work Zone

It is suggested in the current guideline that the officer be stationed in the lane closure 500 to 1,000 feet in advance of the first work crew. If traffic backs up, then the officer should be in advance of the backup. Respondents apparently interpreted the question to suggest that more than one answer was satisfactory; accordingly, there are more responses than respondents (see Table 8). Sixty percent reported that the officer was most typically located at the beginning or in advance of the lane closure, and 50 percent reported the location as inside the work area, either near the workers or away from the workers. Only 4 percent of the respondents noted the location as at the end of or following the work area. The “other” locations offered by 28 respondents were not specific locations per se. Rather, the comments were generally that VDOT or VMS personnel assign the location, that the officer location depends on the location of the work zone, and that officers are mobile and patrol the entire work zone and thus are not “located” at any one place. This latter comment seems contradictory to the guidelines, except when two troopers are assigned to a work zone and one parks while the other patrols.

**Table 8. Most Typical Location of Officers in Work Zone**

<b>Respondent</b>	<b>Beginning/in Advance of Lane Closure</b>	<b>Inside Work Area Near Workers</b>	<b>Inside Work Area Away from Workers</b>	<b>End of/Following Work Area</b>	<b>Other</b>
VDOT Resident Engineer	6	1	3	1	0
VDOT Project Engineer	12	2	3	1	5
VDOT Inspector	7	4	5	0	2
VDOT Work Zone Coordinator	7	6	3	1	3
VDOT Other	6	3	1	0	2
State Police Officer	39	18	12	3	15
VMS Personnel	11	4	8	0	1
<b>Total</b>	<b>88</b>	<b>38</b>	<b>35</b>	<b>6</b>	<b>28</b>

Survey respondents submitted a number of advantages and disadvantages concerning where the officer is located, and these are summarized as follows:

*At Beginning of or in Advance of Lane Closure*

Advantages:

- Motorists are alerted to upcoming work zone.
- Traffic is slowed down in advance of work zone and the workers.
- Traffic speeds stay slow (hopefully).
- Motorists can change lanes/merge more easily at slower speeds.
- Officer is located near the reduce speed sign.
- Most accidents occur in transition area and slower speeds can help reduce them.

Disadvantages:

- Motorists may be involved in rear-end accidents.
- Police officers are not as well protected as in other locations.
- Location is not conducive to enforcement and issuing citations.
- Traffic tends to speed up after passing officer.

*Inside Work Area, Near or Away From Workers*

Advantages:

- Police presence is associated with and better for worker safety.
- Backups at the beginning usually slow traffic so location is better for maintaining the slow speeds for worker safety.
- Location is safer for police officer.
- Workers feel safer.

Disadvantages:

- Rubbernecking can cause a problem; i.e., motorists are distracted from watching for workers.
- Police officers are not as visible.
- Location is not as effective, as most accidents occur in transition area.

*At End of or Following Work Area*

Advantages:

- Location allows for better observation and thus enforcement (assuming a short work zone).
- Police officers can better respond to accidents/incidents and stay out of the work zone (especially when two are deployed).

Several respondents suggested that the location is site specific to the work zone being patrolled. The goal is to protect the workers, the motorists, and the police officers. Other respondents noted that the location should vary so that motorists do not get used to an officer being in a particular location; that is, “keep them guessing.”

The last part of this question requested ideas for better locations. Respondents noted the following:

- Position police officers such that any crash cushions or truck-mounted attenuators being utilized protect them.
- Position police officers at both ends of the work zone, one for slowing approaching traffic and one for issuing citations.
- Rather than being “stationed,” officers should be constantly patrolling the work zone.

## 9. Effectiveness of “Circulating” Police Officer (vs. Stationary Patrol Car)

The current guideline is to station a patrol car with its lights and radar on and only “periodically stopping vehicles exceeding the safe speed.” Sixty-five percent of respondents felt that a circulating officer who issues citations would *not* be more effective. About the same percentage of state police officers felt the same (see Table 9). VDOT personnel were less sure, with 59 percent noting it was not more effective; VMS personnel were surer at 81 percent.

**Table 9. Effectiveness of Circulating Patrol**

<b>Respondent</b>	<b>Yes</b>	<b>No</b>
VDOT Resident Engineer	2	5
VDOT Project Engineer	4	14
VDOT Inspector	3	10
VDOT Work Zone Coordinator	7	6
VDOT Other	4	2
State Police Officer	19	42
VMS Personnel	6	17
<b>Total</b>	<b>45</b>	<b>96</b>

The survey question asked respondents to explain their choice. These results are provided in the following summary of advantages and disadvantages:

### *Stationary Vehicle*

#### Advantages:

- Officer stays in work zone and does not lose the impact of his or her presence by having to move outside of work zone for issuing citations.
- Motorists tend to slow down when they see blue lights; therefore, a stationary vehicle is sufficient.
- Officer needs to maintain his or her position near workers for their protection.
- Visibility and motorists' attention/awareness are the key objectives of police being in work zones.

#### Disadvantages:

- Motorists become accustomed to seeing parked patrol cars and will begin to ignore them.
- Stationary officer may not be able to see complete work zone.

### *Circulating Vehicle*

#### Advantages:

- One hundred percent enforcement is essential.
- Ticketing is important for lasting impression on motorists.
- Motorists are not aware of location of officer and tend to stay in compliance with speed limit.
- Motorists are quick to realize that officer is not "just for show."
- Reduces the perception that the officer is sitting and doing nothing.
- Motorists are never sure of where officer is located. This helps to maintain slower speeds throughout the work zone.

#### Disadvantage:

- Traffic congestion makes it difficult for officer to stop speeders and issue a citation.

Several respondents said that the ideal scenario is to have two officers: one parked and one circulating. In further support of this idea, a number of respondents noted that a second stationary officer is necessary for the circulating scenario to be viable. Finally, a couple of respondents indicated that the decision to use circulating vs. stationary should be evaluated on a site-specific basis.

## **10. Need for Minimum of Two Officers**

In many cases only one officer is deployed in a work zone. As noted previously, there are advantages to having at least two officers, one stationed pursuant to the guidelines and one available for pursuit. Fifty-six percent of the respondents agreed that there should be two (see Table 10). Specifically, 68 percent of VSP, 51 percent of VDOT, and 33 percent of VMS personnel felt the need for two officers.

**Table 10. Need for Minimum of Two Officers in Work Zones**

<b>Respondent</b>	<b>Yes</b>	<b>No</b>
VDOT Resident Engineer	2	5
VDOT Project Engineer	7	9
VDOT Inspector	9	5
VDOT Work Zone Coordinator	10	2
VDOT Other	4	3
State Police Officer	43	17
VMS Personnel	7	14
<b>Total</b>	<b>82</b>	<b>55</b>

When asked to explain their choices, respondents cited the following advantages and disadvantages:

*Advantages*

- A police officer is always available to slow down motorists by his or her presence.
- A police officer is always available to issue citations or work accidents/incidents.
- Presence is more effective and speeds are more likely to be reduced if citations are issued.
- Speed reduction is maintained throughout the work zone, not just near the parked police officer.
- A police officer is always in the work zone to protect the workers rather than outside of the work zone issuing citations.
- Provides some relief and a break in routine for officers, especially if they periodically switch positions (roles).

*Disadvantages*

- There are additional costs associated with additional police officers.
- There may be a limited availability of volunteer police officers.

As with previous responses, a number of respondents felt that the need for two officers was site specific, depending on such factors as volume of traffic, length of work zone, classification of facility, type of roadwork being done, and location of workers.

**11. When Police Enforcement Occurs in Work Zones**

The largest number of respondents reported that the use of police enforcement in work zones occurred frequently during the week (see Table 11). Slightly more respondents reported their frequent use during night operations rather than day operations (63 vs. 53). About half that many respondents (30) reported the frequent use of police during rush hours. Very few respondents (18) reported frequent use on weekends.

**Table 11. When Police Enforcement Occurs in Work Zones**

<b>Respondent</b>	<b>Weekday- Day Frequently</b>	<b>Weekday- Day Occasionally</b>	<b>Weekday- Night Frequently</b>	<b>Weekday- Night Occasionally</b>	<b>Weekday- Rush Hours Frequently</b>	<b>Weekday- Rush Hours Occasionally</b>	<b>Weekend Frequently</b>	<b>Weekend Occasionally</b>
VDOT Resident Engineer	0	2	2	1	1	1	0	2
VDOT Project Engineer	7	6	11	4	3	2	2	3
VDOT Inspector	5	4	8	2	2	4	2	3
VDOT Work Zone Coordinator	3	8	4	5	2	3	2	6
VDOT Other	2	3	3	2	0	2	1	2
State Police Officer	28	17	25	13	18	12	10	14
VMS Personnel	8	8	10	4	4	3	1	5
<b>Total</b>	<b>53</b>	<b>48</b>	<b>63</b>	<b>31</b>	<b>30</b>	<b>27</b>	<b>18</b>	<b>35</b>

**12. Use of Unmarked vs. Marked Police Cars with Lights Flashing**

The current guideline is for the officer to park at the designated location in a marked police vehicle with its lights flashing. The survey question asked whether an unmarked police vehicle should be used. The majority of the respondents, 67 percent, answered “no” (see Table 12). Slightly fewer VSP, 62 percent, and slightly more VDOT and VMS personnel, 71 percent, were against the use of unmarked vehicles.

**Table 12. Use of Unmarked Police Vehicles in Work Zones**

<b>Respondent</b>	<b>Yes</b>	<b>No</b>
VDOT Resident Engineer	2	5
VDOT Project Engineer	7	12
VDOT Inspector	4	10
VDOT Work Zone Coordinator	3	11
VDOT Other	2	7
State Police Officer	22	39
VMS Personnel	6	15
<b>Total</b>	<b>46</b>	<b>99</b>

*Reasons for Using Marked Vehicle*

The primary functions of work zone enforcement are ensuring safety for motorists and workers, preventing accidents, alerting motorists to the upcoming work zone and dangerous conditions (visibility), improving traffic flow. A marked vehicle is better suited for these functions. That is, marked vehicles with flashing lights have greater visibility and impact than unmarked vehicles, thus resulting in a greater chance that motorists will slow down. Slower

speeds have positive impacts on all the aforementioned functions. One respondent noted that “a marked car does more for safety than all the signs we erect.”

*Reasons for Using Unmarked Vehicle*

Unmarked vehicles should be used for circulating patrol officers who are pursuing violators and issuing tickets. Several respondents suggested that they should be used only in conjunction with a stationary marked vehicle with its lights flashing. The use of unmarked cars sends a message that speeding in work zones is a serious offense and that the police presence is not just for show. The use of unmarked vehicles gives an element of uncertainty and may result in slower speeds throughout the work zone, not just around the flashing lights. One respondent noted that the use of unmarked vehicles “keeps the public on its toes.”

Another reason cited by a few respondents for using unmarked vehicles is the relative shortage of marked vehicles, which are sometimes hard to borrow. It was suggested that it may be easier to get volunteers as those officers assigned unmarked vehicles do not have to search for and then spend the extra time (could be several hours) traveling to the site of the marked vehicle, switching out equipment, and then returning the vehicle in time for the next officer to use. A couple of respondents noted that unmarked cars are now equipped with several lights and felt that they provide adequate visibility and are just as visible from front and rear.

**13. Provision of Specially Designed and Located Safety Pull-Off Areas**

A significant majority of respondents, 88 percent, reported pull-off areas were not provided (see Table 13). The few who responded “yes” were generally referring to roadway shoulders. Several respondents commented that a pull-off area for ticketing is a good idea.

**Table 13. Provision of Specially Designed and Located Safety Pull-Off Areas**

<b>Respondent</b>	<b>Yes</b>	<b>No</b>
VDOT Resident Engineer	0	6
VDOT Project Engineer	1	17
VDOT Inspector	1	12
VDOT Work Zone Coordinator	0	13
VDOT Other	2	5
State Police Officer	2	57
VMS Personnel	0	20
<b>Total</b>	<b>6</b>	<b>130</b>

**14. Adverse Effects of Police Enforcement in Work Zones**

A significant majority of respondents, 82 percent, had not observed any adverse effects of using police in work zones (see Table 14). The percentage of VSP and VMS personnel who had not seen adverse effects was around 90 percent; the percentage for VDOT personnel was 71 percent.



**Table 14. Adverse Effects of Police Enforcement in Work Zones**

<b>Respondent</b>	<b>Yes</b>	<b>No</b>
VDOT Resident Engineer	2	5
VDOT Project Engineer	3	15
VDOT Inspector	2	12
VDOT Work Zone Coordinator	7	6
VDOT Other	1	7
State Police Officer	4	56
VMS Personnel	2	19
<b>Total</b>	<b>21</b>	<b>120</b>

Adverse effects noted were as follows:

- Motorists slowing to a speed below the posted speed can lead to accidents.
- Motorists slowing too quickly can lead to more congestion, especially during rush hours.
- Officers writing tickets within the work zone can lead to significant back-ups and the potential of rear end collisions.
- Motorists who “rubber neck” create a hazard.
- Traffic may bottle neck on off ramps near work zones (presumably due to motorists exiting the interstate to avoid work zone congestion).
- Local jurisdictional officers have been known to pursue violators through the work zone at high speeds and/or stopped vehicles in the travel lane to issue tickets.
- Motorists have been known to stop in the middle of the road and ask the officer for directions, obviously creating an unsafe situation.
- A pulled over motorist may stop in the work zone and, by the time the trooper moves him/her to a safe area, the traffic has already backed up.

**15. Percentage of Time Stationary with Lights Flashing (vs. Enforcement)**

The current guideline is for the officer to park with his or her lights flashing and “periodically stopping vehicles exceeding the safe speed established for that work zone.” When asked for an estimated percentage of time that the officer is stationary and percentage of time the officer is in pursuit or writing a ticket (enforcement), most respondents estimated that the officer was stationary at least 90 percent of the time (see Table 15). Of the 109 respondents who ventured an estimate, 66 percent estimated 90 percent or more and 82 percent estimated 80 percent or more.

**Table 15. Percentage of Time Officer Stationary with Lights Flashing**

<b>Respondent</b>	<b>&lt;50</b>	<b>50-79</b>	<b>80-84</b>	<b>85-89</b>	<b>90-94</b>	<b>95-100</b>
VDOT Resident Engineer		1	1		1	
VDOT Project Engineer			1		4	9
VDOT Inspector		1	2	2	2	4
VDOT Work Zone Coordinator		1			5	1
VDOT Other					5	
State Police Officer	3	14	7	1	12	12
VMS Personnel			2	1	5	12
<b>Total</b>	<b>3</b>	<b>17</b>	<b>13</b>	<b>4</b>	<b>34</b>	<b>38</b>

## 16. Use of Speed Trailers in Work Zones

Speed trailers are often used as a tool to reduce speeds. When asked if speed trailers had been used in work zones, only a small number, 18 percent, answered “yes” (see Table 16). Only 5 percent of VMS personnel and 10 percent of VSP reported the use of speed trailers. Thirty percent of VDOT personnel had observed the use of speed trailers in work zones.

**Table 16. Use of Speed Trailers in Work Zones**

<b>Respondent</b>	<b>Yes</b>	<b>No</b>
VDOT Resident Engineer	5	1
VDOT Project Engineer	5	12
VDOT Inspector	1	9
VDOT Work Zone Coordinator	6	6
VDOT Other	2	4
State Police Officer	6	49
VMS Personnel	1	19
<b>Total</b>	<b>26</b>	<b>100</b>

Several respondents reported that speed trailers were placed right before the work area. Opinions on effectiveness ranged from not effective (e.g., “public ignores them”) to somewhat effective to very effective. A couple of respondents noted that effectiveness diminished over time, and one respondent felt that they were not effective without accompanying police support. One police officer felt that they were a distraction to some vehicle operators. A respondent from VMS suggested that the speed trailer could be used as the “stationary” officer while the real officer used his or her time for enforcement. One respondent reported the apparent effectiveness of using drone radar prior to the work zone in addition to the police officer.

## 17. Effectiveness of \$500 Fine for Speeding in Work Zones

Only 10 percent of the respondents felt that the \$500 fine for speeding was effective in reducing speeds (see Table 17). Another 20 percent felt that the fine was somewhat effective. These percentages held fairly consistent across all categories of respondents. On the other hand, 34 percent indicated that the fine was not effective. The percentages varied somewhat among respondent categories: about 42 percent for VSP and VMS personnel and 24 percent for VDOT personnel.

**Table 17. Effectiveness of \$500 Fine**

<b>Respondent</b>	<b>Effective</b>	<b>Somewhat</b>	<b>Not Effective</b>	<b>Don't Know</b>
VDOT Resident Engineer	0	1	1	5
VDOT Project Engineer	3	4	5	6
VDOT Inspector	1	2	4	7
VDOT Work Zone Coordinator	0	2	2	8
VDOT Other	1	0	3	3
State Police Officer	6	15	26	15
VMS Personnel	2	6	9	3
<b>Total</b>	<b>15</b>	<b>30</b>	<b>50</b>	<b>47</b>

When asked to explain their opinion and describe suggestions for improving the effectiveness of this maximum fine in work zones, 30 of the 80 respondents who provided comments noted that the fine was not enforced in the courts. VSP have first hand experience with this issue, and 19 of the 30 state police who commented made this comment. Few respondents ventured a guess as to the percentage of citations issued for speeding in a work zone that resulted in the \$500 fine; however, 10 of the 13 state police who responded indicated that no citations resulted in that fine. Other reasons cited for non-compliance included:

- There are motorists who really do not care and will speed regardless of the penalties.
- Motorists are not aware of the additional fine.
- Motorists do not pay attention to the signs.
- Volumes are so heavy that officers cannot catch everyone, and motorists know this and are willing to take the chance.
- Motorists drive at the speed at which they are comfortable, regardless of the signs and penalties.

Respondents had the following suggestions for improving the effectiveness of the fine:

- Officers should cite more motorists.
- Amount of the fine/penalty is insufficient. Suggestions included having \$5,000, \$2,500, \$1,500, and \$1,000 fines; upholding convictions in court; and suspending the driver’s license.
- The penalty should be publicized more, including a public awareness/public education campaign.
- More signs are needed, possibly including a lighted “work zone active” sign that can be turned on or off depending on the status of the work zone.

### **18. Need for Formal Guidelines for Paying Officers When Work Zone Is Cancelled at Last Minute**

The current agreement between VDOT and VSP states that “VDOT will reimburse the State Police for the number of hours of patrol actually provided at the trooper’s overtime rates, plus . . . vouchers.” As determined from discussions with the task group, there is some confusion over pay practices that should be followed when a work zone in which officers are scheduled to work is cancelled at the last minute. Seventy-six percent of the respondents felt formal guidelines are needed (see Table 18). State police respondents were slightly more concerned with this issue as 82 percent felt that formal guidelines are needed.

**Table 18. Need for Guidelines for Paying Officers When Work Zone Cancelled**

<b>Respondent</b>	<b>Yes</b>	<b>No</b>
VDOT Resident Engineer	2	4
VDOT Project Engineer	13	5
VDOT Inspector	11	2
VDOT Work Zone Coordinator	9	4
VDOT Other	7	1
State Police Officer	52	8
VMS Personnel	17	3
<b>Total</b>	<b>111</b>	<b>27</b>

A total of 102 respondents offered suggestions for possible pay practices. Most indicated that there should be “show-up” pay, or a minimum number of hours of pay. The minimum number of hours suggested by respondents was equally split between 2 and 4 hours, with non-VSP generally favoring the former and VSP generally favoring the latter. Several respondents felt that the “show-up” pay should be for the agreed upon time, and others felt that the trooper should still patrol in the area even without the work zone being set up for the agreed-upon time. Several respondents reported that a “cancellation” policy was already in place and troopers were compensated in some manner.

## 19. Effectiveness of Using Police in Work Zones for Reducing Speeds and Improving Safety.

Questionnaire recipients were asked for their opinion as to the effectiveness of police presence in reducing speeds and improving safety in work zones. The responses were overwhelmingly positive as 96 percent responded “yes” to both questions (see Table 19). A number of respondents, 26 percent, reported that these benefits had been documented; however, essentially all “documentation” described consisted of qualitative or subjective information.

**Table 19. Effectiveness for Reducing Speeds and Improving Safety**

Respondent	Reducing Speeds		Improving Safety		Benefits Documented?	
VDOT Resident Engineer	7	0	7	0	0	7
VDOT Project Engineer	19	0	19	0	2	12
VDOT Inspector	14	0	14	0	3	7
VDOT Work Zone Coordinator	13	0	13	1	1	8
VDOT Other	8	0	8	0	1	3
State Police Officer	61	1	61	1	29	23
VMS Personnel	20	1	20	1	2	13
Total	142	2	142	3	38	73

Only 46 respondents offered comments when asked to describe conditions where police enforcement has not been effective. Almost half of these 46 indicated that they were not aware of any conditions and that there was always a positive effect. However, several conditions causing police use to be ineffective were identified as follows:

- Officer leaves the work zone for enforcement and is not visible.
- Traffic is very heavy.
- Officer is parked within the work zone and not back with the end of the queue.
- Officer does not issue any citations.
- There are not enough officers; at least two are needed for most work zones.
- Officer is not positioned in the correct location.

## 20. Coordination and Cooperation Between VSP and VDOT

Ninety-one percent of respondents reported that the coordination and cooperation between VDOT and VSP was either excellent or good, with 59 percent of those noting it as excellent (see Table 20). This breakdown held fairly uniformly across all the respondent categories. No one rated the coordination and cooperation as “poor.”

**Table 20. Coordination and Cooperation between VDOT and VSP**

<b>Respondent</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
VDOT Resident Engineer	4	3	0	0
VDOT Project Engineer	16	3	0	0
VDOT Inspector	7	7	0	0
VDOT Work Zone Coordinator	5	7	1	0
VDOT Other	4	3	1	0
State Police Officer	31	26	5	0
VMS Personnel	12	6	2	0
Total	79	55	9	0

Thirty-six respondents noted problems and/or suggestions for improvement, and these are as follows:

- Officer is pulled out of work zone for other duties (rare).
- Billing is sometimes mixed up and sent to wrong place.
- Sometimes there are no officers available when needed.
- Sometimes work crews will advise to be ready at 7 am and then the work does not start until 11 am.
- Sometimes lane closures and work zones are implemented without input from State Police, and VDOT needs to follow up on any feedback that troopers provide.
- Training is needed for officers who are assigned to work zones, including proper work zone layouts. There is a big difference between rural and interstate training. This training could be done at the VSP training academy (if not already done).
- Give as much notice of needing officers as possible to the VSP.
- Avoid last-minute cancellations if at all possible.
- It would be helpful to have a communication device so that all could talk when necessary. This could be a CB, two-way radio, or cellular phone.

## **21. Coordination and Cooperation Between VSP/VDOT and Contractors**

Eighty-seven percent of the respondents reported that the coordination and cooperation between VDOT/VSP and contractors was either excellent or good, with 34 percent of those noting it as excellent (see Table 21). This breakdown held fairly uniformly across all the respondent categories. No one rated the coordination and cooperation as “poor.”

**Table 21. Coordination and Cooperation between VDOT/VSP and Contractors**

<b>Respondent</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
VDOT Resident Engineer	0	7	0	0
VDOT Project Engineer	11	8	0	0
VDOT Inspector	3	11	0	0
VDOT Work Zone Coordinator	2	7	3	0
VDOT Other	1	6	1	0
State Police Officer	20	33	9	0
VMS Personnel	6	13	2	0
Total	43	85	15	0

Twenty-seven respondents noted problems and/or suggestions for improvement, and these are as follows:

- Officers should always take directions from VDOT and not from the contractor.
- Extensive planning of work, including having back-up equipment available, reduces exposure.
- Sometimes the contractors cancel operations without proper notification.
- Last-minute cancellations are sometimes left on officer's answering machine at work. Officers should routinely check their messages from home before leaving for the work site.
- Problems are usually caused by poor planning on the contractor's part or changes to the plans that cannot be prevented.
- Communications can always be improved. Sometimes there are miscommunications about work zone locations and times the officers should report.
- Often lane closures and work zones are implemented without input from State Police.
- It would be beneficial to have a radio channel for all parties involved in the work zone.

## **22. Problems Encountered/Observed in Work Zone Enforcement, Including Any Suggestions for Resolving Problem**

A total of 44 respondents provided comments to this inquiry. Following is a summary of the key problem mentioned:

- *Communication issues.* Several respondents mentioned this as an area in need of improvement. Officers were often unclear as to what time to report or found no one present when they did report. There was sometimes confusion as to where to locate their vehicle. It was suggested that one person should be in charge at the work site to instruct the officer.
- *Number of officers.* Several respondents mentioned problems related to having only one officer present. If enforcement is desired, then it becomes problematic to have a single officer leave his or her location to apprehend a violator. During the time the officer is pursuing the violator and issuing a citation, the goal of having visible police presence to alert motorists to the work zone and slow them down is compromised. The time away may be increased if the officer becomes involved with a situation more serious than just speeding, e.g., processing an impaired driver. Respondents felt that at least two officers are needed.
- *Location to pull over violators.* Several respondents noted the need to have a safe location for issuing citations. If a motorist is pulled over in the work zone, traffic may back up and potentially cause rear-end accidents. On the other hand, if the motorist is pulled over in a safer location beyond the work zone, the officer is away from the area for a longer time.

- *Work zone training for officers.* Several respondents noted problems that might be mitigated by having officers undertake basic work zone training. For example, sometimes officers want additional signs put out when the work zone has already been set up in accordance with the *Virginia Work Area Protection Manual*. Occasionally, officers will do things that are not in compliance with the manual. It was also suggested that officers' personal visibility gear needs improvement. Officers should fall under the same visibility requirements and be provided with the same vests as other construction workers.
- *Location of officer.* Several respondents noted that there is some confusion as to where the officer should park when assigned to a work zone. One respondent suggested that the officer be placed prior to the work zone as traffic flows better through the work zone than if the officer is placed within the work zone area.
- *Reduced speed limits.* Several respondents noted that the use of reduced speed limits should be used more often in work zones to encourage motorists to travel at the maximum safe speed. These signs should be "highlighted" in some way to catch the attention of motorists.
- *Miscellaneous problems noted:*
  - Elderly motorists tend to drive more slowly than other drivers through work zones.
  - Contractors sometimes remove signs without notification.
  - Devise a way to keep traffic up to speed limit when a lane is closed. Perhaps a message board with "Maintain Speed Limit" could be employed.

### **23. Other (Not Within Current Guidelines) Initiatives or Strategies Used by VDOT and VSP That Maximizes Effectiveness of Work Zone Enforcement**

A total of 29 respondents provided comments to this question. Following is a summary of the suggestions mentioned:

- Use reduced speed limits.
- Use at least two officers in the work zone. Clarifications included the placement of officers at the beginning of the lane closure and also at beginning of the work zone and the use of a stationary officer and a roving officer in every work zone.
- Use message boards in advance of work zones to provide information for travelers, both static and real-time.
- Call in on-duty officers to help if conditions require.
- Use unmanned marked cars along with marked cars (like Florida), with both running radar.
- Use a speed trailer (respondent did not explain whether this is with or without an officer being present, or what an officer's role might be if present).
- Use undercover police activities like the Florida DOT does. (Officers are disguised as construction workers.)

- Be proactive with enforcement rather than just being stationary.
- Require officers to attend work zone safety classes that are offered through VDOT.

#### **24. Additional Initiatives of Strategies That Could Be Tried or Implemented to Further Improve Effectiveness of Work Zone Enforcement**

A total of 26 respondents provided comments to this question. Following is a summary of the suggestions mentioned:

- Use on-duty officers for work zone enforcement rather than volunteer off-duty officers in order to save money for VDOT. (Respondent added that he was aware that VSP are understaffed at this time.)
- Require work zone training for officers assigned to work zones.
- Use at least two officers in the work zone. It was noted that most of the work zones on interstates are 2 to 5 miles long and cannot be effectively patrolled by one officer given the amount of traffic involved.
- Officers assigned to work zones should not be called for other problems.
- Officers should have cellular phones so that VDOT personnel can contact them when there is a problem. It was noted that some officers use their personal phones.
- Use radar trailers if speeding is a problem (respondent did not explain whether this is with or without an officer being present, or what an officer's role might be if present).
- Use a changing billboard on project showing a larger than life state trooper.
- Use the overhead message boards on I-95, which are blank most of the time, to remind motorists of the increased fines in work zones.
- Maintain a list of officers to call who would be available on short notice.
- Pay officer travel time one way or both ways.
- Use an unmarked police vehicle to pace vehicles.
- Use enforcement in work zones more often as the program is underutilized and is currently used for major, long-term projects.
- Use reduced speed limits with the penalty enhanced in all work zones.

#### **CONCLUSIONS**

- The use of police in work zones is almost unanimously felt to be effective in reducing speeds and improving safety in work zones and there are few adverse effects. However, there is a need to be continually alert to innovative practices used elsewhere that may enhance effectiveness in Virginia.
- The current agreement and guidelines governing the use of police in work zones are working well and need only minor revisions to make them even better.
- VDOT and VSP personnel have an excellent working relationship regarding police use in work zones and, in general, cooperate and coordinate very well in meeting the goal of reducing speeds and improving safety in work zones. Although the relationship is still



generally good, VDOT and VSP personnel do not have the same excellent working relationship with contractor personnel.

- Traffic volume, specifically ADT, is the criterion most commonly used in evaluating the need to deploy a police officer in a work zone.
- The current practice of using off-duty VSP officers who volunteer for assignment in work zones works well and is preferred. Local police are occasionally used, and there is support for this practice if VSP officers are unavailable.
- VDOT does not currently provide special training on the fundamentals of and practices to be followed in work zones to police officers who volunteer for assignments. However, there is considerable interest on the part of VSP officers in attending a short training course in work zone basics.
- The current guideline regarding the positioning of officers in the work zone is for the most part being followed in practice as officers are most typically stationed at the beginning or in advance of the lane closure. This placement offers the advantage that motorists are alerted by police presence and visibility to an upcoming work zone and slow down. However, there are many occurrences of officers being positioned inside the work area, which has the advantage that worker safety is enhanced because of slower speeds in the vicinity of the work itself.
- Police in work zones employ two main practices to reduce speeds: they park on the side of the road with their vehicle lights flashing and their radar on in order to slow motorists through their presence and visibility, and they pursue, apprehend, and cite motorists who are speeding. If only one officer is assigned to a work zone, the officer obviously cannot both park and pursue at the same time. The current guideline is for the officer to stay parked most of the time, “periodically stopping vehicles exceeding the safe speed.” This is the current practice in the field and the one that is preferred over the practice of using a “circulating” officer who is pursuing, apprehending, and citing motorists.
- There is a strong feeling, however, that a minimum of two officers should be used in work zones: one stationary and continuously on site to slow motorist by presence and visibility and to protect the workers, and one for enforcement. This arrangement is particularly advantageous if an officer must leave the area to process a major offense such as driving under the influence of alcohol. Further, motorists are more likely to maintain a reduced speed through the work zone if the real possibility of enforcement is present. The major disadvantage to the arrangement is the increased costs to VDOT.
- The use of an unmarked vehicle is a common tactic on the part of state police to apprehend violators; however, since police presence and visibility have priority over enforcement in work zones, unmarked vehicles are not used in practice. If multiple officers are assigned to a work zone, the use of an unmarked vehicle can enhance the enforcement component of using police.

- Specially designed and located safety pull-off areas are typically not provided for enforcement in work zones; shoulders are most often used for issuing citations.
- Speed trailers are not typically used in work zones; however, some feel their use has some advantages.
- It is commonly felt that the potential for a maximum fine of \$500 for speeding in work zones is not effective in reducing speeds. The most common reason cited for its ineffectiveness is the lack of support for the fine within the judicial system.
- The current agreement between VDOT and VSP does not specifically address the pay practice that should be followed when a work zone in which officers are scheduled to work is cancelled at the last minute. Although this is not a major issue, there is a commonly held view that formal guidelines are needed.

## RECOMMENDATIONS

1. *VDOT, in cooperation with VSP, should develop a short training course (approximately 2 hours duration) on the basics of work zone operation and layout for state police officers who volunteer to patrol work zones. Officers should complete this training before being selected for work zone duty. As appropriate, key parts of the Guidelines for Use of Virginia State Police in Construction/Maintenance Work Zones should be discussed. Further, the agreement between VDOT and VSP should be revised to reflect this requirement.*

To the extent possible, the course should be presented at the biannual “in-service” training for 2004 required of all state police officers that is held at the Virginia State Police Academy in Richmond. This would allow some of the *current officers* to fulfill the training requirement, the number dependent on the timing of the development of the course and the “in-service” training. VDOT and VSP should work together to present the course to the remaining officers as conveniently and quickly as possible. The course should be offered as a part of the training required for *new recruits* at the Virginia State Police Academy, thus allowing *future officers* to automatically fulfill the training requirement.

Until such time as all officers receive the suggested training, only those having at least six months experience patrolling in work zones or having completed the work zone course should be selected for work zone duty.

These, and other details that arise concerning implementation of this recommendation, should be agreed upon by VDOT and VSP. It is suggested that VDOT’s Mobility Management Division take the lead in this effort.

2. *VDOT should develop a standard agreement, patterned after its current agreement with VSP, to execute when state police are unavailable and local police are being considered for use in*

*work zones*. It is suggested that VDOT's Mobility Management Division take the lead in this effort.

3. *When planning for work zone enforcement, VDOT field personnel should consider using more than one officer.* The use of multiple officers generally ensures that one is always on site providing police presence and visibility and protection for the workers and one is typically providing enforcement through pursuit, apprehension, and citations. The patrolling officer could use a marked or unmarked police vehicle. If only one officer is available/used, the officer should be positioned and operate as described in the current guidelines.
4. *VDOT should develop a presentation on the rationale for and statistics behind the maximum fine of \$500 for speeding in work zones as a tool to promote the penalty and make it more effective as a deterrent to speeding in work zones.* This presentation should be given at the 2004 Judicial Transportation Safety Conference. It is suggested that VDOT's Mobility Management Division take the lead in this effort.
5. *For their own safety while outside the vehicle, police officers should always wear appropriate safety vests for visibility within the work zone.* The standard vests currently issued are satisfactory for the time being and the agreement between VDOT and VSP should be revised to reflect this practice. However, further investigation into alternative work zone safety vests for police is suggested. It is further suggested that VDOT's Mobility Management Division take the lead in this effort.
6. *VDOT and VSP should mutually develop a standard pay practice that should be followed when a work zone in which officers are scheduled to work is cancelled.* It is suggested that if a cancellation notice is provided 24 hours or more prior to the start of the assignment, then no compensation should be provided. If the cancellation is less than 24 hours, then the state police officer should report to the site and patrol the area for a minimum of 4 hours and thus be paid for that service according to the pay allowed. Further, the agreement between VDOT and VSP should be revised to reflect the agreed upon practice. It is suggested that VDOT's Mobility Management Division take the lead in this effort.
7. *VDOT should conduct further investigations of innovative uses of police and other strategies to reduce speed/improve safety in work zones.* At a minimum, the following should be investigated.
  - Florida's "Operation Hard Hat" in which officers dressed as construction workers "run radar" for officers stationed downstream of the work zone awaiting the violators
  - specially designed and located safety pull-off area for issuing citations
  - use of changeable message signs for reducing speeds (see Garber and Srinivasan<sup>7</sup>)
  - ways to improve/guarantee constant communication capability between VDOT and VSP personnel assigned to a work zone.

The Virginia Transportation Research Council, in conjunction with VDOT's Mobility Management Division, should take the lead in this effort.

## ACKNOWLEDGMENTS

The author thanks Chairman David Rush and the members of the Police Presence/Enforcement in Work Zones Task Group, whose names are included in Appendix C, for their contribution to the project. They attended two meetings and reviewed and provided comments on the survey and drafts of the final report. Appreciation is also expressed to Jan Kennedy for her diligent and timely compilation of the survey responses. The many questions and many respondents required considerable effort on her part. Finally, thanks are given to Mike Fontaine and Ben Cottrell for their review of and comments concerning the first draft.

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**APPENDIX A**

**Interagency Work Zone Safety Patrol Enforcement Agreement**



**(NOTE: This is a re-typing of the original.)**

**Interagency Work Zone Safety Patrol Enforcement Agreement**

This Agreement is entered into between the Virginia Department of Transportation and Virginia Department of State Police on this first day of January, 1988.

WHEREAS the Commonwealth of Virginia has undertaken a program of historic dimensions to enhance the transportation facilities of the Commonwealth; and

WHEREAS the Virginia Department of Transportation (VDOT) and the Virginia Department of State Police (State Police) desire to preserve and enhance the safety of both the traveling public generally and members of the construction forces generally in their joint use of roadway facilities undergoing construction projects; and

WHEREAS safety may be enhanced through the employment of extraordinary traffic surveillance/enforcement in highway construction zones, therefore, VDOT and the State Police enter into the following agreement to establish a highway construction project patrol.

1. The State Police will use its best efforts to seek volunteer state troopers to work paid overtime to staff the highway construction project patrol.
2. State troopers assigned to construction project patrols will be under the sole control and supervision of the State Police at all times while engaged in patrolling construction projects.
3. During the design phase of a project, the VDOT district engineer will contact the State Police area sergeant and the two of them will review the proposed plans to determine if it is both desirable and feasible to use a construction project patrol to enhance safety in a construction area of the project in question. Where project patrol is deemed feasible, the district engineer and area sergeant will agree on the desirable number of hours of patrol required from time to time during the duration of a construction project.



4. The State Police will be solely responsible for ultimately determining the timing, method and duration of patrol.

5. Troopers patrolling construction projects will be available for temporary reassignment to other areas in the event that emergencies arise during their patrol and the troopers and/or troopers' supervisors shall have the same discretion to make this determination as would exist in similar situations absent this agreement.

6. VDOT will reimburse the State Police for the number of hours of patrol actually provided at the troopers' overtime rates, plus fringe benefit additives and actual cost for use of patrol cars upon presentment of agreed upon vouchers. The obligation of VDOT to compensate for hours of overtime worked pursuant to this agreement shall not be contingent upon receipt of matching or reimbursing funds by VDOT from any other governmental source but shall, subject to all applicable law and regulation, be absolute.

7. VDOT, through its district engineers, will be the primary contact for the State Police in the implementation of this agreement.

8. VDOT will not enter into similar agreements with political subdivisions embracing work zones on pre-existing interstate routes, without first offering the patrol to the State Police.

9. The terms of this interagency agreement do not confer any rights or benefits upon any persons not a party to this agreement. It is expressly agreed and understood there are no third party beneficiaries to this agreement and that this agreement poses no legal duties on the signatories, their agents and employees, to any specific persons or bodies corporate or politic.

COL. R. L. SUTHARD  
DEPARTMENT OF STATE POLICE

RAY D. PETHTEL  
DEPARTMENT OF TRANSPORTATION

## **APPENDIX B**

### **Guidelines for Use of Virginia State Police in Construction/Maintenance Work Zones**



## **APPENDIX C**

### **GUIDELINES FOR USE OF VIRGINIA STATE POLICE IN CONSTRUCTION / MAINTENANCE WORK ZONES**

The following Guidelines for use of Virginia State Police in construction and maintenance work zones have been developed by the Virginia State Police and VDOT to ensure the maximum effectiveness of law enforcement in work zone operations. These guidelines are not intended to be all-inclusive, as each work zone presents its own unique situations and ever-changing conditions. Situations will occur which dictate deviations from these guidelines as stated and/or are not covered by the guidelines. In those situations, the project inspector and the trooper should confer on the best way to address the traffic safety problems presented.

<p style="text-align: center;"><b>Guidelines for Use of Virginia State Police In Construction/Maintenance Work Zones</b></p>
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To ensure the maximum effectiveness of the use of the Virginia State Police in work zones, the following guidelines have been developed for standard lane closure operations:

1. Prior to placing a request for state police on a particular project or work zone operation, the project inspector (or VDOT maintenance personnel) and contractor's superintendent should meet and discuss when and where the trooper will give the best benefit in reducing excessive speeds through the work zone. The following suggestions are offered:
  - A. If traffic is expected to be free flowing through the work zone with little to no back-ups, the trooper should be located in the lane closure 500 - 1000 feet in advance of the first work crew. If a Truck Mounted Attenuator (TMA) is used within the lane closure, the trooper's vehicle should not block the TMA cushion.
  - B. If traffic is backing-up within the transition area or within the advance warning area, the trooper should position his vehicle on the shoulder in advance of the back-up to slowed/stopped traffic, which should increase driver attention and prevent potential crashes. This may require repositioning of the vehicle from time to time to stay in advance of the back up.
  - C. Mobile lane closure operations on multilane roadways are one of the most dangerous operations performed. If possible, the use of a trooper, placed on the shoulder 500 to 800 feet in advance of the vehicles performing the lane closure operations, is recommended to increase motorists' awareness and slow approaching traffic. The trooper's vehicle should not block an open lane unless protected by a TMA.
2. After determining when and where the state police are to be used, the project inspector (or VDOT maintenance personnel) should contact the state police and arrange for a meeting on the project to discuss that day's operations and placement of the trooper. VDOT contact information, including name and cell phone or pager number, shall be given to the trooper so that communication may be maintained throughout the shift for that operation. During the course of the day/night, the project inspector, VDOT maintenance supervisor, or his designate shall relay any changes to the placement of the trooper.
3. VDOT personnel should request that the trooper's vehicle be a marked vehicle and equipped with a radar unit.
4. Once on the project at the designated location, the state police vehicle should operate with its lights flashing. If equipped with radar, the trooper should operate the radar unit, periodically stopping vehicles exceeding the safe speed established for that work zone. To retain credibility with motorists, the trooper may travel out of the work zone to stop speeding motorists. Otherwise, motorists will believe that the trooper is there for "show" only and not for "enforcement". Due to the activities occurring in the work zone at any given time, the trooper should stop motorists outside of the closed lane or work zone area, then return when possible.

5. Upon completion of the state trooper's shift, the trooper and the project inspector, maintenance supervisor or his designate should meet to review that shifts operation and to agree upon the time worked and obtain a project charge. If the trooper must leave the site due to an emergency or other related situation, the VDOT contact person shall be notified.
6. These guidelines are not intended to be all-inclusive. Situations will occur which dictate deviations from the guidelines as stated and/or are not covered by the guidelines. In those situations, the project inspector and the trooper should confer on the best way to address the traffic safety problems presented.



## **APPENDIX C**

### **Police Presence/Enforcement in Work Zones Task Group**





<b>Police Presence/Enforcement in Work Zones Task Group</b>	
<b>Name</b>	<b>Organization</b>
David Rush, Chairman	Virginia Department of Transportation
Danny Cruff	Virginia Department of Transportation
Gene Arnold	Virginia Transportation Research Council
John Grier	Virginia Department of Transportation
Mike Hall	Virginia Department of Transportation
Lance Dougald	Virginia Transportation Research Council
Lt. Andy Engemann	Virginia State Police
Lt. Jim Clare	Virginia State Police
Lt. Jimmy Snow	Virginia State Police
Lt. Tom Martin	Virginia State Police
Martha Kapitanov	Federal Highway Administration
Robert Prezioso	Virginia Department of Transportation
Donald Robertson	Virginia Department of Transportation
David Rush	Virginia Department of Transportation
John Sabato	Virginia Department of Transportation
Donnie Smith	Virginia Department of Transportation
David Thoma	Virginia Department of Transportation
Tom Kinsling	Virginia Maintenance Services



## **APPENDIX D**

### **Survey: Use of Police in Work Zones**



## USE OF POLICE IN WORK ZONES

The Virginia Transportation Research Council (VTRC), the research arm of the Virginia Department of Transportation (VDOT), is conducting a study to evaluate the effectiveness of using state police enforcement in work zones in Virginia. As a part of that effort, we are surveying VDOT construction and maintenance personnel, State Police officers, and personnel of Virginia Maintenance Services to solicit their opinions on a number of issues related to police enforcement in work zones. It would be appreciated if you would complete the following survey and return it to Gene Arnold, Virginia Transportation Research Council, 530 Edgemont Road, Charlottesville, VA 22903. It can also be faxed to 434-293-1990. If there are questions, or if you wish to discuss any of your answers, please call Mr. Arnold at 434-293-1931.

### Who are you?

- VDOT Resident Engineer
- VDOT Project Engineer
- VDOT Inspector
- VDOT Work Zone Safety Coordinator
- VDOT other, please list: \_\_\_\_\_)
- State police officer (Rank? \_\_\_\_\_)
- VMS (Title? \_\_\_\_\_)

### Please tell us how to contact you if we have any follow-up questions (optional).

Name: \_\_\_\_\_

Telephone Number: \_\_\_\_\_ Email: \_\_\_\_\_

**If you have never been involved with a work zone that used state police enforcement, please check here and return the survey. If you have been involved, please continue.**

1. Over the past 24 months, approximately how many times have you been involved with a work zone that used state police enforcement? \_\_\_\_\_

2. What criteria are considered in determining whether to use police in a work zone? Check all that apply, and provide measure and threshold numbers you might use. (As an example, the measure for traffic volume may be ADT and the threshold may be 20,000.)

- Traffic volumes (measure = \_\_\_\_\_; threshold = \_\_\_\_\_)
  - Classification of road (measure = \_\_\_\_\_; threshold = \_\_\_\_\_)
  - Peak hour congestion (measure = \_\_\_\_\_; threshold = \_\_\_\_\_)
  - Don't know
  - Other (please describe) \_\_\_\_\_
-

3. In what type of work zones are police used? Check all that apply, and provide an estimate of total police use in each type as an annual percent.

- Long term; i.e., more than 3 days (annual % = \_\_\_\_\_)
- Short term; i.e., 1 hour to 3 days (annual % = \_\_\_\_\_)
- Moving operations; i.e., from 0 to 60 minutes (annual % = \_\_\_\_\_)
- Don't know

4. What should be the status of officers assigned in work zone enforcement?

- Volunteer off-duty only (current practice)
- On-duty only
- Combination of on-duty and volunteer off-duty

Please explain your answer. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. From where should officers assigned in work zone enforcement be obtained?

- Virginia State Police
- Local law enforcement agencies
- Both Virginia State Police and local law enforcement agencies

6. Is any special training provided to officers patrolling in work zones?

- Yes (please describe)
- No
- Don't know

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**\*\* Police officers only\*\***

Would you be willing to attend a short (2-hour maximum) basic work zone training course prior to being assigned to work zone enforcement?

- Yes       No

**\*\* Police officers only\*\***

7. What criteria are used to select officers for work zone enforcement?

- Experience
  - Skill and aptitude
  - Anyone who volunteers
  - Don't know
  - Other (please describe) \_\_\_\_\_
- 
- 

8. Where are officers *most typically* located within the work zone? Please provide your thoughts as to why they are located there and why another location might be better.

- At the beginning of or in advance of the lane closure
- Inside the work area where the construction workers are
- Inside the work area but away from the construction workers
- At the end of or following the work area
- Other (please describe) \_\_\_\_\_

Please describe advantages/disadvantages of this location. \_\_\_\_\_

\_\_\_\_\_

Is there a better location? (Please explain) \_\_\_\_\_

\_\_\_\_\_

9. Do you feel that a continuously circulating officer who issues citations as needed would be more effective than the current practice of stationing a vehicle and only “periodically stopping vehicles exceeding the safe speed”?

- Yes (please explain)
  - No
- 
- 
- 

10. As an alternative, do you feel that there should be a minimum of two officers assigned to a work zone, one stationed pursuant to the guidelines and one available for pursuit?

- Yes (please explain)
  - No
- 
- 
-



11. When does enforcement in work zones occur? Please check all that apply and indicate frequency.

Frequently      Occasionally

- |   |                          |                          |
|---|--------------------------|--------------------------|
| <input type="checkbox"/> Weekday, during daylight   | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Weekday, during nighttime  | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Weekday, during rush hours | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Weekends                   | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Don't know                 |                          |                          |

12. Should unmarked police vehicles be used when assigned in work zone enforcement, and why? (Current practice is to use only marked cars with lights flashing.)

- Yes
- No

Please explain your opinion: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

13. Are specially designed and located safety pull-off areas ever provided for ticketing operations?

- Yes (please describe)
- No

\_\_\_\_\_  
\_\_\_\_\_

14. Have any adverse effects of police enforcement in work zones, such as additional congestion, been observed during police officer presence and activities?

- Yes (please describe)
- No

\_\_\_\_\_  
\_\_\_\_\_

15. What approximate percentage of the time do the officers spend doing the following when involved with work zone enforcement?

Percent

\_\_\_\_\_ Enforcement (pursuit and issuing citations/warnings)

\_\_\_\_\_ Stationary (parked with lights and radar on)

Don't know

16. Have speed trailers been used in work zones?

Yes (please describe how they are used **and** your feeling as to effectiveness)

No

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17. Based on your experiences, what is the effectiveness of the \$500.00 fine for speeding in work zones?

Effective

Somewhat effective

Not effective

Don't know

Please explain your opinion and describe suggestions for improving the effectiveness of this additional penalty: \_\_\_\_\_

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Based on your experience, approximately what percent of the citations issued for the \$500 fine are upheld in court? \_\_\_\_\_%  Don't know

18. Should there be formal guidelines established for paying officers when a work zone is cancelled at the "last minute"?

Yes (please describe suggested guidelines or procedures)

No

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19. In your opinion, has the use of police enforcement in work zones been effective in:

a. Reducing speeds in work zones?

- Yes
- No

b. Improving safety in work zones?

- Yes
- No

c. Have any benefits (speed reduction, reduced crashes, or number of citations issued) been documented?

- Yes (please describe)
- No

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d. Describe conditions where police enforcement has not been effective:

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20. Do you feel that the coordination and cooperation between the Virginia State Police and VDOT is:

- Excellent
- Good
- Fair
- Poor

Please describe problems and/or suggestions for improvement: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

21. Do you feel that the coordination and cooperation between the Virginia State Police/VDOT and contractors is:

- Excellent
- Good
- Fair
- Poor

Please describe problems and/or suggestions for improvement: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

