



# **Area 2**

## **Gap and Needs Analysis Report**

**Submitted to:**  
**FHWA Office of Safety**

**Submitted By:**  
**The ATSSA Work Zone Safety Grant Team**

**March 19, 2007**

## Introduction

The American Traffic Safety Services Association (ATSSA) Team was a recipient of one of the four recently awarded FHWA Work Zone Safety Grants. This grant has three main components to be administered by this team – Area 1: Highway Work Zone Worker Safety Training, Area 2: Highway Work Zone Safety Guidelines Development, and Area 3: Highway Work Zone Safety Guidelines Training. The purpose of this document is to identify gaps and needs for Area 2 that establish the need for guidelines to enhance the work zone safety culture.

To identify gaps and needs, the ATSSA team used the following information sources:

- Our Team's industry knowledge
- Guidance on gap areas from FHWA
- Results from the 2006 FHWA Work Zone Self Assessments
- Results from the 2002-2004 Making Work Zones Work Better Workshop Series
- Results from the 2007 ATSSA Practitioner Workshop.

The ATSSA Team held a number of brainstorming sessions with key industry experts to discuss important topic areas. These brainstorming sessions, at both the proposal stage and then during early stages of the grant, were very effective at identifying hot topic areas and discussing their relative merits. The initial results of these brainstorming sessions were presented to the AOTR during a November 16, 2006 meeting at ATSSA Headquarters.

The ATSSA Team also utilized FHWA's guidance on gap areas. The team received this guidance through the RFA package, through grant negotiations, through follow-up discussions with the AOTR, and through a meeting with the FHWA team on 2/28/07.

Using the 2006 Work Zone Self Assessment data, the ATSSA team analyzed the results to obtain relevant information. The 2006 Work Zone Self Assessment surveyed state agencies across the nation on six primary assessment areas: leadership and policy, project planning and programming, project design, project construction and operation, communications and education, and program evaluation. Agencies rated themselves on a scale of 0 to 15 on 46 questions. The ratings are broken down into 5 phases: agencies that score between 0 to 3 are in the initiation phase, agencies that score between 4 to 6 are in the development phase, agencies that score between 7 and 9 are in the execution phase, agencies that score between 10 and 12 are in the assessment phase, and agencies that score between 13 and 15 are in the integration phase. For the purposes of this exercise, our team reviewed all 46 questions and found 9 questions that related directly to our task. Of these nine questions, the team reviewed the scores for each question. The team then determined that there was a gap for a particular question if a low percentage (less than 30% of agencies responding) of agencies scored below a score of 7 for that question. When this occurred, the team determined that this topic was of particular interest as it identified an area related to this task that had not reached widespread implementation.

The team also reviewed the after action reports from each of FHWA’s “Making Work Zones Work Better Workshops” to identify gaps and needs. Starting in the summer of 2002, through the spring of 2004, FHWA conducted 20 of these workshops, covering 19 states throughout the United States. Each workshop consisted of a group of presentations from various experts that covered numerous subject areas on work zones. After the presentations were given, the workshop participants were then led in guided discussions on the various topics and issues within their agency. These discussions were then captured and reported back to FHWA. For this task, these report back discussions were analyzed to determine any particular issues that occurred in multiple agencies.

The following section presents the results of the Gap and Needs Analysis. Gaps and Needs were also a major topic of conversation at the 1-Day Practitioner Workshop in San Antonio (January 31, 2007). At the workshop, practitioners each ranked their top 10 priority topics and the Team used the results to work with FHWA to help choose the final five topic areas for guideline development. The final section of this document discusses how we used the Workshop results to prioritize Gaps and Needs for Area 2 and also describes the results from a meeting with FHWA on February 28, 2007 where we established the final five topic areas.

## Results of the Gap and Needs Analysis

The results of the Gap and Needs Analysis are presented in the table below. The table presents the potential gap/need area, and includes information on interpretations of the importance of that area. This table was updated following the 1-Day Practitioner Workshop to reflect the total scores as ranked by the practitioners and additional information useful to choosing the final five topic areas.

**Table 1: Results of the Gap and Needs Analysis for Area 2**

<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
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<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
<p>1. Positive Protection (PP)</p>	<ul style="list-style-type: none"> <li>• This subject is very important based on the current emphasis by most work zone groups and inclusion in SAFETEA-LU and Notice of Proposed Rule Making (NPRM).</li> <li>• The primary need is probably to develop consensus guidelines for when to use positive protection.</li> <li>• Jim Bryden’s synthesis listed other potential needs, including guidelines for shadow vehicle placement (the NPRM also includes shadow vehicles) and a toolbox of other intrusion countermeasures (non PP).</li> <li>• This general area can be subdivided into 4 or 5 major items.</li> <li>• While several research sources are available on this topic, specific guidelines are less common.</li> </ul>	<p>128 (2<sup>nd</sup> overall) – 17 of 19 practitioners assigned a rating to this topic</p> <p>4 practitioners assigned a rating of 10 to this topic area</p>	<ul style="list-style-type: none"> <li>• This topic area was pre-selected by FHWA and was ranked 2<sup>nd</sup> by the practitioners</li> <li>• This area should match the NPRM and complement current activities including a workshop on mobile devices and additional research by TRB.</li> <li>• NCHRP 3-69 includes information on positive protection.</li> <li>• Utah has developed a matrix based on the drop off and the hazard location. The matrix helps pick the type of protection and would be useful information for guidelines.</li> <li>• Practitioners discussed how ongoing Rulemaking efforts might affect guidelines</li> </ul>

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<p>2. Selecting/Decommissioning High Visibility Garments</p>	<ul style="list-style-type: none"> <li>• The overall topic possibly should be simply Hi-Visibility apparel – the recent Rulemaking effort requires the use of apparel when working on or in close proximity to federal aid highways.</li> <li>• Selecting/Decommissioning would be two sub-topics.</li> <li>• An overview of the ANSI standard would be extremely helpful.</li> <li>• Other regulations should also be covered: MUTCD, SAFETEA-LU provisions that will probably lead to FHWA rulemaking, OSHA requirements, etc.</li> <li>• The Final Rule on Worker Visibility should be a good source of information.</li> <li>• Most information available in the form of policies, regulations, and guidelines are for selecting garments. Less information is available on specific processes for decommissioning them.</li> </ul>	<p>46 (7<sup>th</sup> overall) – 9 of 19 practitioners assigned a rating to this topic</p>	<ul style="list-style-type: none"> <li>• This topic area was pre-selected by FHWA and was ranked 7<sup>th</sup> by the practitioners</li> <li>• Much information exists on high visibility garments, but information on decommissioning is less common</li> <li>• Contractors are a key target audience for this area</li> <li>• Guidance is needed on identifying the different classes of vests, and determining the appropriate garments for different situations (including law enforcement use)</li> <li>• Class II versus Class III may be confusing for practitioners</li> <li>• When to recycle garments is a major gap</li> </ul>

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<p>3. Proper Inspection of NCHRP Report 350 Crashworthy Features and Devices</p>	<ul style="list-style-type: none"> <li>• This is a good topic, but possibly too narrow since installation, maintenance, testing, etc. are all important components.</li> <li>• The topic could possibly change to general treatment of crashworthy device requirements.</li> <li>• Inspection is one subtopic.</li> <li>• Overall treatment of this topic ought to enable contractors, small agencies, and others to make correct decisions concerning purchase and maintenance of Work Zone Traffic Control Devices.</li> <li>• We may consider proposing a rewrite of NCHRP Report 350 also.</li> <li>• While many research sources are available on crashworthy devices, guidelines on in-service inspection are less common.</li> </ul>	<p>23 (17th overall) – 7 of 19 practitioners assigned a rating to this topic</p>	<ul style="list-style-type: none"> <li>• This topic area was pre-selected by FHWA and was ranked 17<sup>th</sup> by the practitioners</li> <li>• The update to the NCHRP 350 report will be valuable for this topic area</li> <li>• NCHRP 553 is a study on crashworthy work zone traffic control devices and should be examined for this topic</li> <li>• Manufacturer specifications could be examined to determine how to write guidelines across multiple devices</li> <li>• Field inspectors will be a target group for guidelines</li> </ul>

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4. Motorcycles and Work Zones	<ul style="list-style-type: none"> <li>• This is a good topic since motorcycles are often impacted more than vehicular traffic by issues such as uneven pavement and other potentially unsafe conditions.</li> <li>• Important, relevant safety issues can be addressed in a straightforward manner.</li> <li>• Key safety concerns for motorcycles could be identified, alongside a list of potential countermeasures.</li> <li>• Not much information is available on this topic area as discovered through the literature search aside from outreach materials for motorcyclists and some limited design guidance.</li> </ul>	13 (22 <sup>nd</sup> overall) – 4 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• This topic area was pre-selected by FHWA and was ranked 22<sup>nd</sup> by the practitioners</li> <li>• The work ongoing by the Motorcyclist Advisory Council will complement the grant work in this area, and vice versa</li> <li>• We may be able to have several sub-topics within the overall topic of motorcycle safety for work zones</li> </ul>

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5. Pedestrians and Work Zones	<ul style="list-style-type: none"> <li>• Most information covered will be implemented by the contractor at the field level.</li> <li>• Providing simple field guides on several key sub-issues would be very valuable.</li> <li>• Items could include what pedestrian accommodations are needed where, walking surface guidelines (paving, smoothness, width, etc), channelizing devices for pedestrians, special pedestrian devices (crossing assistance etc.), and detours.</li> </ul>	<p>136 (1<sup>st</sup> overall) – 17 of 19 practitioners assigned a rating to this topic</p> <p>6 practitioners assigned a rating of 10 to this topic area</p>	<ul style="list-style-type: none"> <li>• The ATSSA team is developing a pedestrian and bicycle considerations course in area 3 – information and guidelines will be readily available</li> <li>• At the 2/28/07 meeting, the FHWA team discussed whether the training course for this area would satisfy the need for guidelines</li> <li>• Information to supplement the MUTCD is needed – the MUTCD provides some guidance on signing</li> <li>• Particular attention should focus on ADA requirements and studies</li> <li>• We will need to examine whether or not agencies have materials to draw from in this area</li> <li>• The FHWA discussion noted that the focus for this may be urban areas</li> </ul>

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6. Night/Off-Peak Construction	<ul style="list-style-type: none"> <li>• This is a very important topic due to the increased use as a strategy to combat daytime traffic congestion during construction.</li> <li>• This topic should be broken down into specific subtopics.</li> <li>• A good amount of guidance is already available in NCHRP reports, FHWA Night Mobile Work Handbook, etc.</li> <li>• ATSSA has a Nighttime Traffic Control training course.</li> <li>• There is potential value in producing simple brochures in field format to get the information down to field staff in a concise, easy to follow format.</li> <li>• Information should also be available from the current SAIC/TTI effort being performed for the Office of Safety.</li> </ul>	<p>96 (3<sup>rd</sup> overall) – 14 of 19 practitioners assigned a rating to this topic</p> <p>2 practitioners assigned a rating of 10 to this topic area</p>	<ul style="list-style-type: none"> <li>• NCHRP 17-30 is currently underway and provides information on nighttime construction impacts to safety in work zones</li> <li>• A Traffic Handbook for Mobile Operations is also available</li> <li>• We may want to consider this “off peak” construction since the focus is typically avoiding restrictions during higher traffic hours</li> <li>• Information on lighting and guidance on noise control from previous studies is readily available, including sources such as FHWA, TRB, and ASCE</li> <li>• The FHWA discussion noted that this topic area has much material already that could make for simple products</li> </ul>

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<p>7. Setup and Takedown of Traffic Control Patterns</p>	<ul style="list-style-type: none"> <li>• Simple field guides for procedures could be very helpful to all field staff. It is worth considering how this would be different from the typical applications that are already in the MUTCD Part 6.</li> <li>• This information is available, but is scattered around and not readily available to those that need it.</li> <li>• This is something every contractor and utility needs to deal with on a regular basis, and, therefore, guidelines would be extremely valuable.</li> <li>• ATSSA’s TTC Guide features this topic</li> <li>• This could be another quick and easy accomplishment due to the availability of information.</li> </ul>	<p>67 (4<sup>th</sup> overall) – 13 of 19 practitioners assigned a rating to this topic</p> <p>2 practitioners assigned a rating of 10 to this topic area</p>	<ul style="list-style-type: none"> <li>• The ATSSA team is developing a traffic control specialist course for Area 3 and we could leverage the course development work for guideline development</li> <li>• Some of the technologies such as those developed at UC Davis could be highlighted to automate some of the setup and takedown procedures</li> <li>• Discussion occurred on how this topic differs from MUTCD Part VI – it may be more about the actual procedures</li> <li>• A good practices guidebook could be developed from state and local procedures manuals</li> <li>• Worker safety is an important issue for this specific topic area</li> </ul>

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8. ITS and Work Zones	<ul style="list-style-type: none"> <li>• FHWA/SAIC are already working on an Implementation Guide.</li> <li>• Several case studies and a cross-cutting study have already been published.</li> <li>• SAIC's quantified benefits study could prove useful in developing guidelines on when ITS is appropriate and what it is most useful</li> </ul>	<p>55 (5<sup>th</sup> overall) – 11 of 19 practitioners assigned a rating to this topic</p> <p>1 practitioner assigned a rating of 10 to this topic area</p>	<ul style="list-style-type: none"> <li>• Guidelines on procurement, education, human factors aspects, and funding sources would be useful</li> <li>• The IG would provide some guidelines for use here</li> <li>• Tailored products would be good – decision makers need one level of detail and front line engineers need another</li> <li>• FHWA also recently completed a leaflet on ITS for work zones</li> </ul>

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9. Maintenance Work Zone Safety	<ul style="list-style-type: none"> <li>• A number of highway agencies already have valuable materials available.</li> <li>• Areas that fall under this category would need to be defined.</li> <li>• The objective here could be to identify the already existing resources available and make them more accessible in a handy field format.</li> </ul>	49 (6 <sup>th</sup> overall) – 10 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• Minimal guidance exists for maintenance activities</li> <li>• Also, defining what constitutes a maintenance activity could be useful (repaving vs. pothole repair vs. mowing and other activities that aren't within the traveled lanes, etc.)</li> <li>• Specific guidance would be useful for field personnel</li> </ul>

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10. Law Enforcement and Work Zones	<ul style="list-style-type: none"> <li>• This is a good topic that generates lots of interest and support.</li> <li>• This area is called out in SAFETEA-LU and current NPRM.</li> <li>• Current NCHRP 3-80 will provide lots of answers to current questions. This one may need to be put on hold for the time being.</li> <li>• Sub-topics include when to use, how to pay for, how to use (active vs. passive enforcement) and administrative arrangements.</li> <li>• Responses from the Work Zone Self Assessment show that only 24% of state transportation agencies sponsor training programs specifically for law enforcement</li> <li>• The SAIC/ATSSA course may provide good material for guidelines.</li> </ul>	45 (8 <sup>th</sup> overall) – 9 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• There is a need for additional guidelines on passive versus active enforcement</li> <li>• Louisiana policy could be used as an example for guideline development – it states that officers should face traffic with headlights on and move upstream as the queue builds</li> <li>• One of the main benefits from use of active law enforcement is to slow traffic approaching an area with increased variability in speed</li> <li>• The document on traffic enforcement strategies should be reviewed for this topic area</li> </ul>

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11. Posting Proper Speed Limits	<ul style="list-style-type: none"> <li>N/A – new topic area added by practitioners</li> </ul>	45 (9 <sup>th</sup> overall) – 12 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>New topic area added by practitioners during workshop</li> <li>Guidance is needed on proper speed limits, including setting a maximum and allowing drivers to choose their speed (no more than XX mph) or staying within 10 mph of the original posted speed as stated by the MUTCD</li> <li>This alone may be a very small topic and might be a better sub-element of planning</li> </ul>

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12. Emergency Responders in Work Zones	<ul style="list-style-type: none"> <li>N/A – new topic area added by practitioners</li> </ul>	44 (10 <sup>th</sup> overall) – 8 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>New topic area added by practitioners during workshop</li> <li>Could focus on emergency vehicle parking within the work zone</li> <li>Some guidance exists on how to angle fire trucks and where and how to park police cars and ambulances safely</li> <li>The research on this topic should include any available FHWA guidance on incident management procedures for work zones</li> </ul>

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13. Utility Work	<ul style="list-style-type: none"> <li>• Clear and simple field guides for utility operations could be very valuable to work zone safety.</li> <li>• This topic could be broken down into various sub-topics.</li> <li>• ATSSA has a utility course that could provide information.</li> </ul>	41 (11 <sup>th</sup> overall) – 10 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• Mechanisms to alleviate potential safety issues are in place and include permitting, granting access, etc. by a transportation agency</li> <li>• However, often utility work is performed in an uncoordinated fashion – it is difficult to get consensus from all involved</li> <li>• Guidelines could also focus on examples of where enhanced coordination activities have minimized impacts from utility work</li> </ul>

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<p>14. Work Zone Planning, Impact Assessment, and Mitigation</p>	<ul style="list-style-type: none"> <li>• See 17 and 18</li> </ul>	<p>40 (12<sup>th</sup> overall) – 7 of 19 practitioners assigned a rating to this topic</p>	<ul style="list-style-type: none"> <li>• This topic was combined by 7 practitioners at the workshop</li> <li>• If combined categories are used, others will shift appropriately and individual categories will be removed. However, with one topic area left to choose, this may not be critical to the end result since no combined category moved into first place. In order to avoid losing any detail, individual categories have been preserved in their original format and notes have been made on the effects of combining them.</li> <li>• Impact assessment can be for mitigation strategies or also a true evaluation after the fact</li> </ul>

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15. Safety Impacts Analysis	<ul style="list-style-type: none"> <li>Both major strategy decisions at the agency level as well as lower-level strategies at the contractor level could be addressed.</li> <li>Focus could also be on a combined operations/safety impacts analysis to enable agencies to compare the trade-offs between the two and come up with the optimum solution.</li> </ul>	<p>38 (13<sup>th</sup> overall) – 6 of 19 practitioners assigned a rating to this topic</p> <p>2 practitioners assigned a rating of 10 to this topic area</p>	<ul style="list-style-type: none"> <li>Training on “selling” a concept to management based on a model or analysis would be useful here</li> <li>FHWA has guidance available on impacts assessment in the form of a guidance document</li> </ul>

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16. Work Zone Safety Performance Measurement	<ul style="list-style-type: none"> <li>• Performance contracting and performance measurement are hot topics.</li> <li>• FHWA is working on developing performance measures for work zones.</li> <li>• SAIC recently developed performance measures for work zones for the Highways for LIFE program.</li> <li>• We may need to look at surrogate measures since safety impacts can be difficult to measure.</li> </ul>	34 (14 <sup>th</sup> overall) – 5 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• Guidelines could be developed on appropriate measures of effectiveness, including how to use crash data or other safety measures or conflict analysis</li> <li>• Agencies have cited difficulties in determining the actual performance so that a contract clause can be evaluated (incentive paid, disincentive applied, etc.)</li> <li>• The Highways For Life Program also covers this topic area and appropriate materials should be considered</li> </ul>

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17. Work Zone Planning and Programming	<ul style="list-style-type: none"> <li>• Proper planning can lessen impacts from projects at the corridor or system level.</li> <li>• Appropriate staging and timing of lane closures and construction activities along a corridor can reduce safety impacts for motorists and workers.</li> </ul>	27 (15 <sup>th</sup> overall) – 5 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• 7 practitioners rated a combined planning and impact assessment category; the total rating for the combined topic area is 89 (excluding one rating that would be double counted) making the combined category the 4<sup>th</sup> highest as ranked by practitioners excluding any shifts due to removal of individual topics</li> </ul>
18. Work Zone Impact Assessment and Mitigation	<ul style="list-style-type: none"> <li>• FHWA recently published “Work Zone Impacts Assessment: An Approach to Assess and Manage Work Zone Safety and Mobility Impacts of Road Projects”.</li> <li>• This area may be one to focus on considering the impacts related to the Supplemental Rule on Work Zone Safety and Mobility.</li> </ul>	24 (16 <sup>th</sup> overall) – 5 of 19 practitioners assigned a rating to this topic  1 practitioner assigned a rating of 10 to this topic area	<ul style="list-style-type: none"> <li>• The ATSSA team is developing a course for Area 3 on the use of analysis tools and models to assist in the development of mitigation strategies for work zones – guidelines and examples will be readily available</li> </ul>

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19. Accelerated Construction Techniques	<ul style="list-style-type: none"> <li>There is currently an abundance of information available on this topic from FHWA, NCHRP Report 500 Vol 17, etc.</li> </ul>	16 (18 <sup>th</sup> overall) – 3 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>The ATSSA team is developing a course for Area 3 that includes accelerated construction techniques – guidelines and examples are readily available from our past experience with state DOT strategies</li> <li>Accelerated construction, lane closure techniques, and full closure could all be combined for guideline development</li> </ul>

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20. Full Roadway Closure and Lane Closure Combined with Accelerated Construction Techniques	<ul style="list-style-type: none"> <li>• See 19 and 21</li> </ul>	16 (19 <sup>th</sup> overall) – 3 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• Three practitioners combined the two topics and, when added to the individual ratings (minus two individual ratings that would be otherwise double counted), the total combined rating is 38 (tied for 13<sup>th</sup> overall excluding any shifts due to removal of individual topics)</li> </ul>
21. Full Roadway Closure and Lane Closure	<ul style="list-style-type: none"> <li>• There is an abundance of information available on full roadway closure.</li> <li>• A simple summary of guidelines on when and how could be useful.</li> <li>• There is a need for an implementation guide. FHWA/SAIC had plans to produce one, but the effort has been re-programmed.</li> </ul>	14 (20 <sup>th</sup> overall) – 3 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• This topic would also be part of the Area 3 training</li> <li>• Many examples are available on successful practices in this area, including those from Ohio, Kentucky, and Oregon – the examples would allow for ease of guideline development</li> </ul>

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22. Temporary Pavement Markings	<ul style="list-style-type: none"> <li>• Technologies and products are available from industry to allow for safe implementation of temporary markings</li> </ul>	13 (21 <sup>st</sup> overall) – 3 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• New topic area added by practitioners at workshop</li> <li>• Many states have guidance available in design manuals on raised pavement markers, removable tape, reflectorized paint, etc. that would prove useful for guideline development</li> </ul>
23. Markings and Lights for Vehicles and Equipment	<ul style="list-style-type: none"> <li>• Most contractors, utilities, etc. have to make this decision for their equipment.</li> <li>• A readily available and simple source of information would be very valuable.</li> <li>• There is much information available, but most of it is hard to find. The research is difficult to sort through to make a decision.</li> <li>• One problem for this and other topics is that laws and regulations vary from state to state.</li> </ul>	12 (23 <sup>rd</sup> overall) – 4 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• General guidance would be difficult at other than a high level since laws and regulations varying from state to state</li> <li>• However, a synthesis of information could prove useful and be an easy-to-access resources for practitioners</li> <li>• Mounted warning lights are common for vehicles and equipment</li> </ul>

<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
24. Guidelines Based on the FHWA Work Zone Rule	<ul style="list-style-type: none"> <li>• FHWA already has a large scale effort underway and is getting much information and many tools out for agencies to use.</li> <li>• We don't think there is a lot we can or should do here.</li> <li>• Perhaps a simple brochure listing key requirements in simple terms, and providing key definitions could be helpful to contractors and local agencies. If so, it would be very easy to produce because there are many examples to work from.</li> <li>• We would need to coordinate with FHWA Operations.</li> </ul>	<p>12 (24<sup>th</sup> overall) – 2 of 19 practitioners assigned a rating to this topic</p> <p>1 practitioner assigned a rating of 10 to this topic area</p>	<ul style="list-style-type: none"> <li>• The supplemental materials to the FHWA Work Zone Rule should provide adequate guidance to practitioners in implementing the elements of the Rule</li> </ul>

<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
25. Permit Process for Work on Public Roadways	<ul style="list-style-type: none"> <li>• This topic affects many contractors and utilities.</li> <li>• A readily available source of information on this topic would be helpful.</li> <li>• This topic will be difficult to set up because it is highly variable from agency to agency, especially at the local level.</li> <li>• This one will need some innovative thinking to come up with something that is workable.</li> </ul>	11 (25 <sup>th</sup> overall) – 3 of 19 practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• Examples of permitting processes individual to states could be highlighted in guideline materials if there is particular interest in moving forward on this area</li> <li>• This area was ranking very low by practitioners</li> </ul>

<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
26. Standardized Payment Items for Work Zones	<ul style="list-style-type: none"> <li>• This topic is critically important – in SAFETEA-LU and NPRM.</li> <li>• Informational resources vary from state to state – some good, some not so good.</li> <li>• This topic may need to be broadened to address the entire issue of WZTC specs.</li> <li>• Payment is one of the important subtopics, but there are other issues that need coverage as well.</li> <li>• This item needs more discussion to define other key areas to be addressed.</li> </ul>	No practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• Pay items are covered in the Work Zone Rule</li> </ul>
27. Guidelines Based on the NPR on Temporary Traffic Control Devices	<ul style="list-style-type: none"> <li>• This area tracks closely with the general Positive Protection area.</li> <li>• The two areas may eventually be combined since the NPR covers positive protection.</li> <li>• The NPR also covers appropriate use of law enforcement personnel and funding sources for their use.</li> </ul>	No practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• This topic overlaps with law enforcement, positive protection, and setup and takedown of traffic control devices, and will likely be covered elsewhere in this grant</li> <li>• This is also an amendment to enhance the original Work Zone Rule</li> </ul>

<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
<p>28. Guidelines Based on the New Rule on Minimum Levels of Sign Retroreflectivity</p>	<ul style="list-style-type: none"> <li>FHWA proposes to amend the MUTCD to include a standard for minimum maintained levels of sign retroreflectivity and methods to maintain such retroreflectivity at or above these levels.</li> </ul>	<p>No practitioners assigned a rating to this topic</p>	<ul style="list-style-type: none"> <li>FHWA research led to the development of proposed minimum maintained levels of retroreflectivity</li> <li>Guidelines for maintaining traffic sign retroreflectivity could be developed based on the Rule</li> <li>The methods proposed would allow agencies options for evaluating and managing their signs</li> <li>The existing MUTCD requires that traffic signs be illuminated or retroreflective</li> </ul>

<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
29. Flagger Procedures	<ul style="list-style-type: none"> <li>• Plenty of information is already available, but this doesn't necessarily address all of the critical issues in a manner that makes it easy to understand and implement.</li> <li>• Subtopics that could be addressed separately include: escape routes for flaggers, best flagger positioning for various situations, location of flagger stations, extra warning devices for flagger stations, alternatives to flagging (temp. signals, AFADs).</li> <li>• ATSSA has an extensive flagger training/certification program that could provide relevant information.</li> </ul>	No practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• Guidelines for this area could be based on ATSSA's previous work in identifying key issues and developing training on such issues</li> </ul>

<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
30. Channelizing Devices	<ul style="list-style-type: none"> <li>• There is not much guidance in MUTCD; most is very general information.</li> <li>• This could address such issues as preferred type of device for various situations, preferred device spacing and position, maintenance/condition of devices.</li> <li>• ATSSA TCT/TCS courses cover this information and could provide input for guidelines.</li> <li>• ATSSA's Quality Guidelines booklet contains information regarding maintenance/condition of devices.</li> </ul>	No practitioners assigned a rating to this topic	<ul style="list-style-type: none"> <li>• This area had low practitioner interest, possibly due to current information and standards</li> <li>• Washington DOT has a matrix for selecting the appropriate channelizing devices based on speed</li> </ul>

<b>Potential Gap/Need Area</b>	<b>Preliminary Discussion Points on Relative Importance</b>	<b>Practitioner Rating (Sum of 1 to 10 ratings)</b>	<b>Post-Workshop Discussion</b>
<p>31. Policy, Regulation, and Guideline (PRG) Sources</p>	<ul style="list-style-type: none"> <li>• A comprehensive list of key PRG including information on how to obtain them, and a brief explanation of what they include and how they apply, would be extremely valuable to contractors, utilities, and local agencies. A listing of websites would help in accessing the information.</li> <li>• PRG for work zones is an extremely complex topic, and it is very difficult for small agencies, contractors, etc. to access all that they need to know.</li> <li>• A “comprehensive list” may be difficult to develop in an efficient manner.</li> <li>• The relationship to the Work Zone Clearinghouse would need to be considered.</li> </ul>	<p>No practitioners assigned a rating to this topic</p>	<ul style="list-style-type: none"> <li>• This topic was not rated by any practitioners, possibly due to the broad nature of the topic</li> <li>• Many of the sources applicable to this area will be covered in other areas that were rated higher</li> </ul>

## Recent Steps Taken

The ATSSA Team updated the Gap and Needs Analysis as follows:

- Prioritized/pared down the list to a manageable number for the Practitioner Workshop on January 31, 2007
- Developed conversation-sparking questions for the workshop participants that both identified additional gap/need areas and encouraged discussion on the relative importance of these gap/need areas
- Established a scorecard for use at the Workshop – this allowed prioritization of topic areas
- Held the Practitioner Workshop in San Antonio on January 31, 2007
- Met with FHWA to discuss the prioritized gap/need areas, came to consensus on the five final topic areas, and discussed the priority of the pre-selected four topic areas
- Updated the Gap and Needs Analysis Report to reflect the activities since the last draft.

### *Prioritized/Pared Down the List*

In order to maximize the productivity of the discussion with practitioners, the ATSSA Team eliminated identified gap areas that we felt were of low importance, or that are covered adequately elsewhere. This exercise resulted in a more manageable discussion with the practitioners.

### *Developed Conversation-Sparking Questions*

The ATSSA Team developed questions to help get discussion going with the practitioners in the “Practitioner Brainstorming on Additional Topic Areas” portion of the Practitioner Workshop. Questions such as, “Where do you wish you had more guidance when it comes to work zone safety?” were used to spark conversation, and helped us to identify current and potential gap/need topic areas.

### *Established a Scorecard*

In order to end up with a quantifiable, comparable, prioritization exercise, the ATSSA Team developed a scorecard for use by the practitioners at the Workshop. This scorecard covered such issues as:

- Level of practitioner interest
- Whether the topic addresses a critical work zone safety issue that is widely recognized as an issue
- Whether the topic is addressed in a comprehensive manner elsewhere.

Additional items for prioritizing the gap/need areas, but that were addressed outside of the Practitioner Workshop include:

- Level of FHWA Interest (discussed at the February 28, 2007 meeting)
- Potential to develop straightforward products with a reasonable effort and in a timely manner.

### ***Held the Practitioner Workshop***

The ATSSA team held the Practitioner Workshop in San Antonio as part of the 2007 Traffic Expo. The agenda for the Workshop is included as Appendix A. The Workshop included discussion on the FHWA pre-selected areas, as well the gap/need areas presented above and new areas identified by the practitioners. Following the Practitioner Workshop and the meeting with FHWA, the ATSSA Team revised the report to capture the results of the discussions. The following tables highlight those in attendance at the workshop and also their topic area rankings.

**Table 2. ATSSA Work Zone Safety Grant - Practitioner Workshop List of Attendees**

<b>Name</b>	<b>Company</b>	<b>Contact Information</b>
Brad Henry	Kansas Department of Transportation	(T) 785.817.1374 (F) 785.296.3619 (E) <a href="mailto:bradhe@ksdot.org">bradhe@ksdot.org</a>
Ernie Huckaby	MUTCD Consultant Services	(T) 301.292.4157 (E) <a href="mailto:ehuckabymutcd@yahoo.com">ehuckabymutcd@yahoo.com</a>
Morris Oliver	FHWA	(T) 202.366.2251 (F) 202.366.2249 (E) <a href="mailto:morris.oliver@dot.gov">morris.oliver@dot.gov</a>
Gene Putman	City of Thornton	(T) 303.538.7333 (F) 303.538.7373 (E) <a href="mailto:gene.putman@cityofthornton.net">gene.putman@cityofthornton.net</a>
Steve Kite	NCDOT, WZTCU	(T) 919.250.4159 (F) 919.250.5948 <a href="mailto:skite@dot.state.nc.us">skite@dot.state.nc.us</a>
Larry Christianson	Deja Program Development	(T) 971.241.0771 (E) <a href="mailto:dejaceo@msn.com">dejaceo@msn.com</a>
Mike Gostovich	Wyoming Department of Transportation	(T) 307.777.4492 (F) 307.777.3993 (E) <a href="mailto:mike.gostovich@dot.state.wy.us">mike.gostovich@dot.state.wy.us</a>
John Logan	JL & Associates	(T) 206.440.0400 (F) 206.440.0401 (E) <a href="mailto:johnjlogan@msn.com">johnjlogan@msn.com</a>
Gerald Ullman	Texas Transportation Institute	(T) 979.845.9908 (F) 979.845.6006 (E) <a href="mailto:g-ullman@tamu.edu">g-ullman@tamu.edu</a>

Name	Company	Contact Information
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Juan M. Morales	JMMA	(T) 703.471.7031 (E) <a href="mailto:jmassoc@aol.com">jmassoc@aol.com</a>
Jeff Grossklaus	Michigan Department of Transportation	(T) 517.322.5769 (F) 517.322.5664 (E) <a href="mailto:grossklauss@michigan.gov">grossklauss@michigan.gov</a>
Sott Stotlemeyer	Missouri Department of Transportation	(T) 573.526.1759 (F) 573.526.4868 (E) <a href="mailto:scott.stotlemeyer@modot.mo.gov">scott.stotlemeyer@modot.mo.gov</a>
Mark Robinson	SAIC	(T) 703.676.2384 (F) 703.676.2432 (E) <a href="mailto:mark.d.robinson@saic.com">mark.d.robinson@saic.com</a>
Donna Clark	ATSSA	(T) 540.368.1701 (F) 540.368.1722 (E) <a href="mailto:donnac@atssa.com">donnac@atssa.com</a>
Jerry Pavliska	Texas Department of Transportation	(T) 830.303.0130 (F) 830.372-5168 (E) <a href="mailto:jpavlis@dot.state.tx.us">jpavlis@dot.state.tx.us</a>
Eric Perry	SAIC	(T) 865.481.8528 (F) 865.481.2970 (E) <a href="mailto:eric.j.perry@saic.com">eric.j.perry@saic.com</a>
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Frank Newboles	Washington State Department of Transportation	(T) 360.705.7392 (F) 360.707.6826 (E) <a href="mailto:newbolesf@wsdot.wa.gov">newbolesf@wsdot.wa.gov</a>
Tracy Scriba	FHWA	(T) 202.366.0855 (F) 202.366.3225 (E) <a href="mailto:tracy.scriba@dot.gov">tracy.scriba@dot.gov</a>

**Table 3. Tabulated Scorecard Results by Topic Area**

Practitioner Ranking	Potential Gap/Need Area	Potential Gap/Need Area																			Sum
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1	5. Pedestrians and Work Zones	10	10	10	10	10	10	9	9	9	8	8	8	6	5	5	3				136
2	<b>1. Positive Protection (PP)</b>	10	10	10	10	9	9	9	8	8	8	8	7	6	6	4	4	2			128
3	6. Night/Off-Peak Construction	10	10	9	9	9	8	7	7	7	7	5	4	3	1						96
4	7. Setup and Takedown of Traffic Control Patterns	10	10	8	7	6	6	6	4	4	2	2	1	1							67
5	8. ITS and Work Zones	10	8	7	7	6	6	5	3	1	1	1									55
6	9. Maintenance Work Zone Safety	9	7	7	5	5	5	4	3	3	1										49
7	<b>2. Selecting/Decommissioning High Visibility Garments</b>	9	9	8	5	4	4	3	2	2											46
8	10. Law Enforcement and Work Zones	8	7	6	6	4	4	4	3	3											45
9	11. Posting Proper Speed Limit	6	6	5	5	4	4	3	3	3	3	2	1								45
10	12. Emergency Responders in Work Zones	8	7	6	6	5	5	4	3												44
11	13. Utility Work	8	7	5	5	4	4	3	2	2	1										41
12	14. Work Zone Planning, Impact Assessment, and Mitigation	9	9	8	5	4	3	2													40
13	15. Safety Impacts Analysis	10	10	9	6	2	1														38
14	16. Work Zone Safety Performance Measurement	9	8	8	7	2															34
15	17. Work Zone Planning and Programming	8	7	6	5	1															27
16	18. Work Zone Impact Assessment and Mitigation	10	8	3	2	1															24
17	<b>3. Proper Inspection of NCHRP Report 350 Crashworthy Features and Devices</b>	7	6	3	3	2	1	1													23
18	19. Accelerated Construction Techniques	7	7	2																	16
19	20. Full Roadway Closure and Lane Closure combined with Accelerated Construction Techniques	9	5	2																	16
20	21. Full Roadway Closure and Lane Closure	9	4	1																	14
21	22. Temporary Pavement Markings	9	3	1																	13
22	<b>4. Motorcycles and Work Zones</b>	5	5	2	1																13
23	23. Markings and Lights for Vehicles and Equipment	7	2	2	1																12
24	24. FHWA Work Zone Rule	10	2																		12
25	25. Permit Process for Work on Public Roadways	6	4	1																	11
26	26. Standardized Payment Items for Work Zones																				0
27	27. NPR on Temporary Traffic Control Devices																				0
28	28. New Rule on Minimum Levels of Sign Retroreflectivity																				0
29	29. Flagger Procedures																				0
30	30. Channelizing Devices																				0
31	31. Policy, Regulation, and Guideline (PRG) Sources																				0
																					1045

Notes: Highlighted areas were pre-selected by FHWA  
 The first column represents the practitioner rating

***Met with FHWA to Discuss the Prioritized Gap/Need Areas***

Following the Practitioner Workshop, the ATSSA Team met with the AOTR and other FHWA representatives on February 28, 2007 to review the feedback received at the Workshop and the scorecard results. The primary goal of this meeting was to arrive at consensus on the five Area 2 Topic Areas.

Appendix B highlights the results of the February 28, 2007 meeting and lists the five final topic areas chosen. Based on the discussions, two of the four pre-selected topic areas are not being considered currently for guideline development.



## Appendix A

### **ATSSA Work Zone Safety Grant – Practitioner Workshop Agenda**

**Henry B. Gonzalez Convention Center - Room 211**

**Wednesday, January 31, 2007**

**Dress: Business Casual**

1. Breakfast - Provided (8:30 – 9:00 AM)
2. Introductions (9:00 – 9:15 AM)
3. Overview of the ATSSA Work Zone Safety Grant (9:15 to 9:30 AM)
  - a. Goals
  - b. Areas
  - c. Anticipated Products
  - d. Partners
4. Area 2 and the Goal of Today’s Workshop (9:30 to 10:00 AM)
5. Break (10:00 to 10:15 AM)
6. Introduction of the Topic Areas Pre-Selected by FHWA (10:15 AM to 12:15 PM - 30 min per Topic Area)
  - a. Presentation of Identified Existing Policies, Regulations, and Guidelines
  - b. Practitioner Interaction on Additional Sources of Policies, Regulations, and Guidelines
  - c. Practitioner Feedback on the Selected Topics
  - d. Target Audience for each Topic Area
7. Lunch – Provided (12:15 to 1:00 PM)
8. Practitioner Brainstorming on Additional Topic Areas (1:00 to 2:30 PM)
  - a. Discussion on Results of the Gap Analysis
  - b. Discussion on Challenges Encountered Regularly
  - c. Prioritization of Candidate Topic Areas
9. Break (2:30 to 2:45 PM)
10. Practitioner Interaction on How to Make the Guidelines Effective for the Identified Target Audiences (2:45 to 3:45 PM)
  - a. Revisit Target Audience
  - b. Content
  - c. Format and Style
  - d. Media
  - e. Outreach and Distribution

11. Discussion of Next Steps (3:45 to 4:30 PM)
  - a. Desired Input Over the Course of the Contract
  - b. Q & A
  
12. Thanks and Adjourn (4:30 PM)

## Appendix B

### Notes From The 2/28/07 Meeting To Finalize The Five Topic Areas For ATSSA Area 2

#### *Participants:*

Morris Oliver, Chung Eng, Shirley Thompson, Wei Zhang, Tracy Scriba, Donna Clark, Mark Robinson, Allie Schreck, Tim Luttrell, and Eric Perry.

#### *Introduction*

Donna gave the lead-in presentation and referred to Tim's discussion handout/table. Tim explained the layout and thought process behind the handout. He reviewed how the individual topic areas were decided upon at the workshop and how practitioners were asked to rank them. The table identified each topic area and the corresponding level of interest that people had. Topics were ranked from 1-10. From some topics, practitioners assigned a lower rank citing that they didn't think the topic was critical but might provide useful results. Tim suggested the group discuss the different areas and look at the breakdown. He called the group's attention to cases when many people ranked a topic, but didn't think it was critical; he also called attention to cases where few people ranked a topic but still thought that topic was highly critical. Tim concluded that if the group wanted to continue with the current four areas, there was one additional area that could become the fifth as it was rated highest by practitioners. But, if the group wanted to discuss the topics areas, they could choose topics together and then decide how to move forward. Morris agreed that some discussion would be worthwhile. He mentioned the example of the safety issue of motorcycles as important because of crashes in work zones. However, based on practitioner feedback, he suggested that the group may not want motorcycles in the top five. Chung proposed that the group look at the topics with fresh eyes and decide which topics would work based on workshop results as well as the group's own opinions. Everyone agreed with Chung's approach.

Chung asked about the roster at the workshop. He observed that there were 20-25 people there, but that the table showed only nineteen voters. He asked whether ATSSA or SAIC voted. Donna explained that only the practitioners voted. Mark and Shirley entered the room, and were quickly briefed by Morris. Tim suggested that Mark discuss the table. Morris asked if there was an electronic copy for the participants that were not able to make the meeting. Tim confirmed that he had an electronic copy and offered to email the table to all attendees.

Mark began explaining that the objective of the workshop was to find out what the practitioners were interested in and where they wanted guidance. He reviewed the process of the workshop: the four pre-selected topics were presented, practitioners gave their feedback, and information was gathered about topic areas of interest. The team's objectives were based on the original gap and needs analysis. The five top topic areas needed to include a balance of FHWA interest, practitioner interest, guidelines from

elsewhere, and also allow for a high probability that something quick, successful, and high impact can be produced. Mark identified the current objective for the meeting: to come away with the five topic areas. At that point, the decision had already been made about how to proceed. Mark suggested the group discuss the topics one-by-one to see where FHWA interests lie.

The group looked at the first page of the handout. Mark explained the results from the practitioner workshop and how no one from the ATSSA Team voted. He observed that the workshop was good for participation and discussion. Practitioners did not hold back. Mark described the numbering system on the table, and how the first page showed the practitioner ranking in order. Some practitioners rated combined topics. Mark then explained the columns/table and how the unique identifier number is meant to help readers find information elsewhere in the table. The table was designed to be conducive to however the group decided to proceed: whether the group decided that the four original topics were set in stone and the group had to pick the fifth, or whether the group wanted to pick all the topics. Pages weren't numbered on purpose to eliminate confusion with the table.

### ***Positive Protection***

Mark explained that Positive Protection was the first topic listed. This topic was both of high interest to FHWA and highly rated by practitioners. The bulk of discussion on this topic was very positive in terms of practitioners thinking of it as a good topic area. Mark stated that he thought this topic would be a good candidate for the final five. Most of the group agreed. Tracy had some hesitation. She pointed out that the topic met the criteria for a selection, but that at the workshop, practitioners mentioned that ongoing rulemaking might affect the guideline for this topic. Mark noted her point. Chung asked if the five topics were going to be developed concurrently. Mark described the process as fairly open at the moment. In terms of schedule, draft materials need to be done by October. Any opportunities to do topics concurrently would be ideal. If some topics needed to wait a little longer, the problem would then become whether they would be ready by October.

Chung noted Mark's explanation. Mark continued by pointing out that according to the agreement text, guidelines should be developed for pre-existing policies and regulations. If there aren't any existing policies and regulations, the process begins from "scratch." This would take more time. Tracy recalled the meeting summary referencing a lot of discussion about the topic and a desire from the practitioners to move forward. Chung mentioned that some of the topics are more complicated than others (including Positive Protection.) He explained that a complex topic may evolve into subtopics and could become a completely different "animal" than a less complex topic. He asked if some of the more complex topics could become two separate topics. Mark pointed out that the reverse could also happen. He offered an example by saying that if the group chose an easy topic, that topic could become a training module instead of training course. As a result, more room for another topic may open up. Mark then suggested the group revisit the table. He mentioned that when the team first went to the practitioner workshop, one of the early deliverables was the gap and needs analysis. This was made up of a two column table. Since the gap and needs analysis, the table has been shifted, two columns

were added, information from practitioner ratings was added, and some of the post workshop discussion was added. The level of FHWA interest was still missing. Mark noted two things regarding the practitioner rating: the overall rating, and how many people rated it as a ten. He asked if the group wanted to walk through pre-selected areas or jump to number five, Pedestrians in Work zones (the top-rated area by practitioners.)

Morris suggested the group work through what was rated highest by practitioners. Mark agreed and pointed out item five on the table. This was the topic ranked highest by the practitioners. Seventeen of nineteen assigned a rank to this topic (#5 on table). Mark explained to folks who weren't at the practitioner workshop that the practitioners were asked to rank their top ten in order from lowest to highest. Almost all practitioners that assigned Pedestrians in Work Zones a rank placed it in their top ten. Six folks gave it a ten. Mark noted that this topic is also of interest to FHWA. A training course on pedestrians in work zones is being developed for Area 3. As a result, the issue would then become: does that training course satisfy the need for guidelines for pedestrians in work zones, or are more traditional guidelines in document format to supplement that course?

Tracy asked a question about whether the table mentioned if information and guidelines would already be available for Area 3. Mark answered her by saying that the wording is wrong. If the course is developed, the issue mentioned earlier may appear. Mark reminded the group that guidelines should be made for existing policies and regulations. Tracy wondered if this would hinder the course for Area 3. Mark proposed that it may make the course easier if the work is done under Area 2. The work has to be done, whether it is done for Area 2 or Area 3. Tim explained that it would be advantageous if state or local guidance fed into training as materials are developed for Area 2. Tracy didn't recall information regarding the current topic in the gap and needs analysis. She explained that people are looking for a lot in the area of pedestrians. She asked if many states have materials to draw from. Mark revealed that there is a little bit of material. He offered an example of D.C. having some materials that need to be supplemented. Mark pointed out a note at the bottom of the right-hand column in the table about ADA requirements and studies related to the current topic. Policies and regulations exist that practitioners might not know how to put their hands on or implement. Mark suggested that if guidance documents are made, it would make it easier and help practitioners know how to make that work within a work zone. He stated another possibility with regard to Area 2. The statement of work is to do guidelines, outreach and training. Mark explained that with this particular topic, if the training ends up being developed in Area 2, funds might open up in Area 3.

Wei wondered if the focus was on urban areas for pedestrians. Mark stated that he was surprised this topic was rated as high as it was given that exact fact. Many people think work zones are primarily on interstates. But, there aren't pedestrians on interstates. Not many construction workers need ADA access. Tracy observed that local concerns were not being brought up. Mark explained that many of those folks are on the national committee, where Pedestrians in Work Zones may be a hot topic. Morris agreed that the topic has broad appeal. Tracy suggested that the group move along. She assessed that everyone agreed the topic would be a good candidate, but reminded the group that more

discussion of the other topics would need to take place before folks are ready to decide whether it's one of the top five. Mark agreed and suggested the group discuss which topics would or wouldn't make good candidates and take some off the list. Even if the top ten or fifteen are the only ones discussed, they would still provide good discussion basis. Chung observed that some topics may jump out as definite possibilities. Maybe enough would jump out that some of the "maybes" would fall by the wayside. He pointed out that evaluating the complexity of the topics may not be possible presently and may need to be done down the road. Mark proposed that if the group could walk away with five topic areas, they should know quickly if one of them is too complex to do. In the meantime, they'll have already discussed a bunch of other good candidates. Donna stated that in Area 3, they are doing an urban work zone course. Some of that information could be shared, and guidelines could be developed for Area 2. Mark explained that the whole urban issue seems to be more and more of an item when considering ACTT workshops in downtown urban corridors. The team has been looking at where to put all the traffic. Morris suggested that the group go through the list, as Tracy said, and note which topics would be considered "keepers" or not. The group agreed.

### ***Night/Off-peak Construction***

Mark introduced the next topic, Night/Off-peak Construction, as a "hot topic." Morris called it a "keeper." Chung mentioned that there was already a bit of material. Mark verified and revealed that more is being made. A report to congress is being done right now. Mark described that over and over, NCHRP is doing that. Practitioners are saying: "We don't read those reports. We want to know what those say quickly." Morris asked Chung if Mark's comments address the issue he raised. He then asked if Chung thought there were a lot of guidelines out there. Chung explained that before the meeting, he went on the DOT website, printed off stuff, and read night-work zone information. He realized that a bunch of work had already been done, and wondered if materials could be boiled down to something briefer. Morris asked if there might be a simpler topic because there is so much out there on Night/Off-peak construction and not a lot of work to be done. Tracy stated that she didn't know how readily in agreement the various materials are. She explained that this topic would involve covering many areas with a number of facets. Mark mentioned that Tracy's comment related to an internal discussion. Tracy had touched on one of points raised, as noted on the fifth bullet down near the preliminary discussion points in the table. Mark explained that the table note referred to the potential value of boiling this topic down to a brochure format in an easy-to-use manner. Tracy brought up the traffic handbook for mobile operations as a resource that covers some of this material. She asked if it could be used, though she couldn't remember how well that document was received. She then asked Morris if he knew how much that document was in demand. Morris was unsure, other than that he knew someone requested it. Morris stated that he thought this topic was a keeper for consideration.

### ***Setup and Takedown of Traffic Control Patterns***

Mark moved along to the next topic, Setup and Takedown of Traffic Control Patterns. Mark explained that this was also a surprising topic to receive a high ranking. Thirteen of nine assigned a rating. Two people assigned it a ten. The initial concern was how this topic differed from MUTCD part 6. Tracy asked how much MUTCD part 6 goes into

setup and takedown, and if it is pretty explicit on how to do that. She explained that she thought this topic was getting at the actual procedures. Donna mentioned that she thought it touched on that, but not explicitly. She found that many states take that information and develop their own handbooks. There, they have explicit instructions for set up and take down. There is a lot of information out there on that. Mark drew attention to a note on the table about UC Davis technologies. UC Davis has good practices, such as automated cone machines. Mark was not sure if that is a guideline everybody ought to follow. He suggested developing a “good practices” guidebook that takes experiences from different folks across the country and ways that they setup and takedown traffic control patterns in a safe manner. Mark observed that he has seen some creative and dangerous approaches.

Chung asked, based on existing material on this topic and material being developed through other means (like an ATSSA course), whether this topic could be expanded on. Tracy stated that it is covered in the ATSSA course and a handbook details the topic. Chung observed that if there is any additional information, it would be an enhancement of what is already there, unless there is some facet of this topic that isn't currently addressed. Tracy asked the group if anyone could recall whether there is additional information. She observed that the summary does not say a whole lot. She wondered if there was a lot of discussion. Chung remembered there was some debate as to whether the topic would be needed or not. Tracy remembered having some discussion, but also remembered this topic wasn't a “hot item.” Mark explained his own surprise at how high this topic was ranked. Apparently, practitioners had heard about it enough that it was in their mind and made it to their top 10. Chung mentioned that worker safety side is an issue. Setup and takedown is important there. Tracy elaborated on her voting procedure. She explained that she tried to take in what she heard at the meeting only. If she had to guess what the group would vote based on what she heard, this particular topic was not counted in her top ten because she didn't think the group was going to rank it. Tracy stated that there wasn't a lot of discussion on this topic, but maybe it was high on the practitioners' minds. Wei offered the possibility of having a mandatory training topic for construction workers and traffic control. Morris asked the group whether they thought this topic could be considered elsewhere, but maybe not as a guideline. Chung agreed. Morris stated that the topic would be covered in the other course, but is not a keeper.

### ***ITS and Work Zones***

Mark moved the meeting forward to ITS and Work Zones, a subject near and dear to him. A lot of interest stills exists as to how to do ITS and Work Zones, and where to do it. According to Mark, many folks use it by political appointee mandate instead of identifying a need or carefully designing a system to meet that need. He stated that the information needs are like a bell curve on its side. People at the top and on the street need a little bit of information that is easy to digest. People in the middle need it beefier. An implementation guide (being working on with Tracy) will be a good part of the medium portion. There are also some brochures for the high end. Tracy remarked that she was surprised this topic was ranked as high as it was. Mark agreed, and explained that the implementation guide has a lot of the information in it. He didn't know if guidelines will be made outside of that. At the lower level, Mark wanted to know what the group wanted to tell people about ITS, other than not to drive their truck into it. Morris mentioned that

the topic didn't sound very high on the list. Tracy brought up a question related to another topic. She asked what the group was envisioning guidelines will look like. She wanted to know what kind of level the group was talking about.

Mark mentioned having discussed what qualifies a guideline. Guidelines can vary quite a lot in terms of target audience. If the target is the CEO of State DOT, short guidelines are needed. In the meatier portion, implementation guidelines are needed. Mark mentioned Tracy's work on the national work zone rule as an example. He then explained that best practices guides may be needed in the meatier portion; however, best practice guides are not guidelines, but synthesis documents. The challenge about guidelines is getting something useful at the national level, when every state is unique and every project is unique. Mark explained that best practices are useful for providing examples of how other states/agencies have implemented the practice. It would be hard to have detail and consensus at the national level. Mark suggested that folks out in the field need something durable, picture oriented, laminated, that shows what is acceptable and what isn't; something they can hold up to their item. For each topic area and target audience, what qualifies as a guideline needs to be determined.

Tracy asked if the implementation guide will offer 80 or 90% of what people are looking for and if it will include other things (not running over equipment, etc.) Mark explained that the meaty portion is covered by implementation guide. There's a recommended process to follow during implementation. The team currently has the brochure on ITS and work zones with good points about what to consider. Tracy mentioned that a leaflet with JPO and ATSSA was recently completed. The ITS council is looking at putting out something else, possibly an extensive version of a leaflet, like a booklet. It won't be like an implementation guide, but will be beefier than a leaflet. Morris asked if the implementation guide will cover most of guidelines, and if there is there a need to go beyond an implementation guide. Mark noted that the only need identified in this conversation is the need for something for workers. He mentioned how the ITS portion in some of the materials has been discussed, as far as adding in content about what the heck these things are and why it is important that they stay where they are. They need to stay where they are designed to be placed. Mark explained that the implementation guide discusses thinking about placement. Tracy mentioned Mark's previous statement that some of the folks that need to be reached aren't going to be reading that guide. Mark responded that from a design standpoint, it's covered. This issue is looking after the material while it's out there. Chung observed that the topic is going to stay general from a standpoint of all the different devices that can be put out there. Folks need to be aware of these types of things. For each one, there can be additional information. It may not be here, but folks need to be aware of it. Wei asked if when the group referred to work zones, if they were talking about the whole package. He mentioned the issue of integration.

Mark responded by mentioning that there are a couple of integration issues. One is the fact that the ITS contractor is often different from the construction contractor, but they are in the same work zone. The construction person wants to move stuff, shut it off, etc. Chung mentioned potential leveraging. If there are systems are out there collecting

information, what are the opportunities to use that data for other applications? For good work zone performance type data? Is there an opportunity? Do ITS systems in general have implications for work zone activities themselves? From that perspective, isn't that a different aspect of it? Is that something that might benefit from additional information or do we have that covered? In response to Chung's questions, Mark noted that one interesting thing is that the completed materials are oriented toward the owner agency. He didn't know if contractors know why ITS is important or how it's helping them. Most of it serves to improve safety on operations for the public. It's also helping the contractors to do their work.

Tim observed that leading up to the decision to deploy is where a gap may be. Sometimes things get lost in the middle. Tracy agreed that it's a tough area. Some work zones are trying to come up with a model about where/when to deploy. She mentioned that there is not a lot to hang a hat on yet, or much consensus. Tim brought up that with the higher demand areas, these things are more warranted, high traffic areas. Tracy brought up the another aspect being that people voted very high. Were they voting on the full picture of ITS and work zones? Or, were they voting based on the fact that they use VMS a lot? Tim remembered that some of the past participants have had some experience with this, and with portable systems in general. Mark named Jeff, Steve, etc. as examples. Tracy couldn't remember if they were the ones that voted on this. They have been the drivers. Wei asked who the target audience is. He mentioned that this topic may not be for the field workers. Morris observed that the topic is very broad. There are a variety of different tools that can fit. Tracy stated that this topic sounds like a "maybe." Morris suggested leaving it as a "maybe", or moving it to the TCT course.

### ***Maintenance Work Zone Safety***

Mark began the next topic, Maintenance Work Zone. He explained how this one ranked sixth overall and is an important topic area. He noted that it's becoming more and more of a topic area. A lot of injuries and fatalities are happening. There is specific guidance needed. For example: there are folks working in front of a shadow vehicle. Mark proposed the question: how far in front of the shadow vehicle should people be working? Mark explained that maintenance folks he's worked with tend to not think safety is their top priority. Their priority is to get in and get out and get it done without impacting traffic. They put themselves at personal risk rather than delaying traffic. For this one, the score is coming down quite a bit. Ten of nineteen gave this one a rank. There are not a lot of guidelines out there. The MUTCD is wishy washy. Morris asked if this is still a keeper if there is not a lot out there. Chung proposed that this one doesn't drop off, and maybe the group should compare it to other maybes and return to it. Morris asked if this topic was maybe a "maybe."

### ***Work Zone Impact Assessment and Mitigation***

Mark asked Tim about the item that Tracy brought up with combined scoring. Tim explained that if you look at twelve, fifteen, and sixteen for example, we tried to arrange these at the lowest level so that we would not lose any detail. However, the combined

topics should be combined with their individual topic areas for a total combined score. If you look at the combined totals for the individual and combined categories, we only have to subtract the lower of the two scores that were assigned when practitioners ranked both of them individually to avoid double-counting.

Tracy asked about which two. Chung suggested twelve, fifteen and sixteen. Mark wanted to clarify if those were the practitioner ranking numbers. Tim explained that it ends up moving up quite a bit. They were left there so that readers could see everything that is available to look at. Tracy asked about the other topics, if that changes much. She specifically asked about eighteen, nineteen, and twenty. Tim brought the group's attention to a note in the table near number seventeen. A comment was listed under post-workshop discussion. He explained how the topics were combined: number twenty combined ends up with thirty eight as a total. A couple topics there were both ranked as individuals; the highest of the two was taken. Mark brought people up to speed by explaining that there's a bunch of discussion about which topics could be combined. Some people voted on combined topics as a write in; some people voted on individual topics. The question becomes whether ranks should be packaged together, or whether one should consider that some people may think a topic is important combined and some people think the individual topics are important but as independent items, don't make the top ten. Morris mentioned that minor topics could need more or less work. If those are combined, does that merit a significant guideline? Would consistent guidelines come out of a topic that blends all of those together?

Tim suggested this as a good lead up to the decision to deploy. He observed that the group was discussing trying to get the proper planning and data. These are mitigation strategies. Mark then offered his personal opinion: for planning and impact assessment, impact assessment is different from planning. Planning is figuring out what to do. Impact assessments can be done to figure out which alternatives give the best solution, but impacts analysis can also be done throughout the deployment process. When the team was out in Idaho, there were a lot of questions about the new version of QuickZone. Mark described this as a good topic area. Chung asked what the topic area would be called if the group combined that into one topic area. Number fourteen is the universal identifier. Morris noted that the combined topic had a ranking of twelve, fifteen and sixteen combined. Tracy asked how the team would see what would come out of this as compared to the impact assessment guide. Mark proposed that maybe the impact assessment guide satisfies the need for guidance on this area. The group could agree that these are hot topics, but that there are other things being done that provide enough information under the target audiences that nothing else needs to be done on this topic under this grant. Tracy asked the specific interest related to topic. Mark wondered if Eric remembered a previous conversation about the topic. Eric couldn't remember, but did note that Brad from Kansas brought this topic together. It was opened up to the floor, and practitioners were asked what they thought were the hot topics. Brad is the one who said he liked this topic, not the programming aspect. This leaves the group open to combining topics. Tracy noted that according to the comments from the meeting, it looks like there are guidelines coming. She asked if FHWA was putting them out. Mark responded by mentioning that the group needed to consider (note on item 18 in big table) that two of

the Area 3 courses will have material aimed at this. The work zone strategies course has stuff. The course on analytical work zone planning does. Tim suggested thinking about definitions, too. Someone from the workshop had a comment about dropping programming. Tim explained that when the group thinks about programming, they think about travel demand, or about long range. The question is how to plan, stage and set them up so that impacts from them are minimized. Mark commented that Tim was describing the design stage. Tim agreed that he was not describing planning in the truest sense. Tracy agreed as well. Tim explained that the discussion was referring to the latter of what he described. Mark observed that it's a very hot topic. Existing tools address it, and featured courses will address it. The question is whether more materials need to be done under Area 2 under this grant. Chung asked if this topic should be added because the topic is hot; but, if it turns out that after a harder look nothing is needed, then it could drop off as compared to some of the others. Chung revealed that he thought this topic was a keeper for additional consideration. Tracy agreed, and explained that she was unsure as to what is available – if there's still a gap or not.

Mark suggested the group look across the different target audiences. He asked if the present materials speak to appointed officials about why it's important to do impacts analysis. He explained that with planning, you get away from folks on the ground other than performance-based contracting. The contractor will need to know about work zone planning and what tools are available to structure work zones to meet goals. There would be more of a need for designer-types. Morris noted that the meeting was running out of time. He suggested that for the next fifteen minutes, the discussion continue and then focus on narrowing down. The group agreed.

### ***Selecting/Decommissioning High Visibility Garments***

Mark drew attention to number two: Selecting/Decommissioning High Visibility Garments. The topic is number seven on the chart. This one provided good discussion and feedback. The big point is that there's a whole lot about selecting garments. It is still confusing as to what qualifies a class two or class three. A huge hole exists as to when to recycle the garments or throw them out. Mark explained that the key question is when folks need to get a new vest. Several different scenarios were discussed, either time-based or another form of testing. Mark suggested that swatches are developed to hold up against the vest to see if it's time to go. Chung joked about the idea of expiration dates. Morris mentioned that it wasn't a bad idea. Tracy pointed out that if someone doesn't wear a vest often, it wouldn't be "expired." Morris observed that the topic is ranked highly on the preliminary list. Tracy mentioned that she thought this was a good one.

### ***Law Enforcement and Work Zones***

Mark moved on to law enforcement and work zones, number ten on the chart. There is a lot of interest. A course was done a year or two ago. It's about to hit the street. Morris mentioned that comments were received from former state police and sheriffs. Chung noted that there is a document from Jerry Ullman dealing with traffic enforcement strategies and work zones. There are a lot of details related to positioning and, ultimately, a need for additional research in certain areas. That document is a good resource to draw from. Morris noted that law enforcement person needs to know where they should be.

Tim agreed and added that the contractors need to know what their responsibilities are, etc. Tracy asked about the audience for this topic. Chung explained that there are multiple audiences. Tim agreed, and listed law enforcement, contractor, state, and local owner agency as potential audiences. Tracy was unsure a citation in the table that is a bit misleading. She pointed out that the table shows 24% of states don't sponsor training problems. This just means states don't sponsor training; it doesn't mean those officers are not trained. It just means that the state DOT is not providing it. There is a need for training. But as for the state DOT, it is unclear how much of the audience they are. Sometimes, it's all for the contractor. Tim explained that they have some responsibility there. It's just a matter of how it's set up particular to that project. They do lean on the contractor. It's ultimately their project. Morris mentioned that this topic is probably still a consideration. Wei agreed.

### ***Posting Proper Speed Limits***

Morris asked if the group wanted to combine law enforcement with proper posting of speed limit. Wei noted that there are some distinctions. Law enforcement has a lot do with maintaining speed. With law enforcement, there can be a trooper there. And, there are people who know where the radar cameras are. Morris asked if this topic could act as a sub-element within the two combined. Wei reminded the group that speed limit alone is a very small topic. Mark suggested it would be a better sub-element of planning and impact assessment. Police officers enforce, it but don't post it. Morris asked if everyone agreed to move that down to twelve, fifteen and sixteen that the group combined. Chung admitted that he didn't know what else is out there already for determining appropriate speed for work zones. He thought there was a lot being done to determine appropriate speed. He thought this topic related to whether the speed limit should be reduced, and what the ramifications would be. Chung thought a lot had been done already. Wei explained that there's a lot of research for determining which speeds go where. Morris wondered if maybe this topic shouldn't be considered, and should be taken off the table. Wei observed that this was more of the designer's job. Chung mentioned that designing a project is one of the elements. As a separate element, it could be taken out. Tracy observed that if the topic is addressed, it has to be in the context the group has been talking about. Mark mentioned that it would be very hard to come up with national guidelines. So many states have individual legislation that dictates speed in work zones. Morris suggested the group move on to emergency responders in work zones.

### ***Emergency Responders in Work Zones***

Mark observed that this topic was ranked relatively high. There are overlap elements with law enforcement elements in work zones, in terms of where to stop and not stop. Morris referred to the incident management program, and mentioned that he would not be surprised if Dave Helman has something for when an incident occurs (like guidelines at an incident site.) There are a lot of parallels to emergency responders in work zones. Morris didn't know whether or not this merits separate guidelines or not. Tracy offered that if the group is going to keep it separate and pick five, she'd agree. If it could be combined, the problem is if the audiences are two different ones. She wouldn't keep it as a separate item. Mark asked about the score of the other combined, full closure stuff?

Tim gave the score of 38. Mark asked if the group wanted to look at what they had so far or if they wanted to do a few more. Morris suggested the group could do a couple more. He mentioned that twelve, fifteen and sixteen are combined with work zone planning impact assessment and mitigation, and asked if it should be twelve, thirteen, fifteen and sixteen. Tracy mentioned that people may want something more in-depth than so many topics are combined. Folks may want more detail. Chung asked how the work zone safety audits relate. Morris explained that this is being done by another team. Mark proposed that it is a good result to boost the fact that it is an important topic area. The same goes with utilities. Tracy suggested mentioning something about the trade-off in the notes. Something more detailed could come out of the work zone safety audit. Mark noted her point. Morris moved the group along to the last two topics.

### ***Work Zone Safety Performance Measurement***

Mark stated that this topic has been touched on slightly under Highways for Life. The team has worked with folks in the safety office, looking at performance measures for work zones and construction contracts, coming up with draft performance measures, how to develop performance measures. Mark was unsure if the topic was broad enough.

### ***Proper Inspection of NCHRP Report 350 Crashworthy Features and Devices***

Morris agreed and suggested the group move on to the seventeenth overall: the Proper Inspection of NCHRP Report 350 Crashworthy Features and Devices. This was one of the original ones. It didn't seem like it was that high. Mark commented that from practitioners, this topic was more lukewarm than motorcycles. He didn't know why they were so adamant against motorcycles as a topic. These topics provided good conversations, but not as hot as others. Chung observed that this one is a little bit below others for level of interest. This is not for the combined one. Chung asked if the full closure topic is a combination of nineteen and twenty, or eighteen, nineteen and twenty.

### ***Full Closures***

Tim explained that full closures is a combination of eighteen, nineteen and twenty. There are two that people ranked individually, and the lower of the two can be taken away. That's where the total of thirty eight comes from. Morris noted that it seemed like that is where the group hit the limit. Tracy mentioned that few people ranked those individual items at all. Those who ranked may have ranked them highly, but they weren't ranked a lot. She asked how many people all together ranked the items separately. Tim answered that there are seven. Morris suggested the group tabulate topics individually. Tracy asked for a review of the keeper list. Morris read the practitioner rankings: 1, 2, 3, 5, 6, 7, 8, and 12, 15, 16 combined. He mentioned that he thought the group didn't want eighteen, nineteen and twenty. Chung noted that there were eight to work with. Tracy asked if seven was a definite keeper. Morris predicted it would fall in the top five, but noted that a decision hadn't been made yet. Chung thought positive protection was the only one that got unanimous agreement. Morris asks the group to take a moment and rank them, 5 being the highest.

### ***Voting***

Morris’s highest was Positive Protection, then Decommissioning Garments, then Pedestrians and Work Zones, then Law Enforcement, and last was Work Zone Planning. Wei’s highest was Positive Protection, then Work Zone Planning, Law Enforcement, Night off-peak, and Maintenance Work Zone Safety. Chung’s highest was Positive Protection, then Work Zone Planning Impact Assessment, then Maintenance Work Zone Safety and High Visibility Garment (tied), then Night Off-peak and/or Law Enforcement. Tim asked Chung, just for ease of coming up with average, if any of his topics ranked as one. Mark joked that Chung should put a 0.333! Chung didn’t want Pedestrians in Work Zones. Shirley’s highest was Positive Protection, Pedestrians, Decommissioning, the combined work zones ones, and then Night off-peak. Tracy’s highest was Positive Protection, then High visibility garments, then Maintenance, then Planning impact, and then Pedestrians. Tim noted that Positive Protection was all across unanimous. Mark noted that this feedback would provide a data point for program planning.

Tim: Positive Protection, seven and twelve are tied (2.6), Pedestrians had 1.6, and then number eight, Law Enforcement, got a 1 overall, and then. Here’s the sum: twenty five for Positive Protection, 7 and 12 are tied at 13, Pedestrians is an 8, Maintenance is a 7, Law Enforcement would be a 5, Night off-peak is a 3, and ITS didn’t get any.

Mark: I would have voted for it!

Tim: 1,2,6,7,12 = **Pedestrians, Positive Protection, Maintenance Work Zone Safety, Selecting/Decommissioning High Visibility Garments, and Work Zone Planning / Impact Assessment / Mitigation.** Those are the final ones!

Mark: We’ll proceed down the path of those five, and then we can talk back and forth.

Morris: We had couple more that followed.

Mark: If we need to get more, we’ve got a set of eight to pick from.

The following table highlights the FHWA rankings from the 2/28/07 meeting. The FHWA representatives ranked five topic areas in the order they felt were most critical, with five being the highest ranking. The numbers in the table reference a topic based on the assigned final practitioner rankings for each topic area as shown in the first column of Table 3.

**Table 4. FHWA Rankings and Final Topic Area Selection Results**

Participant	Ranking				
	5	4	3	2	1
Morris	2	7	1	8	12
Wei	2	12	8	3	6
Tracy	2	7	6	12	1
Chung	2	12	6	7	
Shirley	2	1	7	12	3