**Developing Successful Transportation Management Plans**

**May 3, 2011**

**Presentations**

**Jennifer Symoun**

Good afternoon or good morning to those on the west. Welcome to the webinar on Developing Successful Transportation Management Plans. My name is screen Jennifer Symoun and I'll be moderating the webinar. Before I go any further, I want to let those calling into the teleconference know that you do need to mute your computer speakers or else you will be hearing the audio over the computer as well. Today's webinar will last 90 minutes and we will take about five minutes for questions following each presentation. We'll use remaining time at the end to answer questions. If during the presentation you think of a question, please type it into the chat area. Please make sure to send your questions to everyone. The questions typed into the chat box will be addressed following each presentation.

If we run out of time and there are unanswered questions, we will attempt to get written responses from the presenters and provide them to all attendees. The PowerPoint presentations are available for download from the file download box in the lower right corner of your screen. The presentations will also be available online in the next few weeks along with a recording and a transcript of the webinar. I will notify all attendees when these are available.

We're going to get started. We're going to start with a brief introduction given by Tracy Scriba of the Federal Highway Administration Work Zone Mobility and Safety Program. We will then have three presentations given by Angie Kremer of the Michigan Department of Transportation, Russell Holt of the Rhode Island Department of Transportation, and Tom Notbohm of the Wisconsin Department of Transportation. As a reminder if you have questions, please type them into the chat box and they will be addressed following each presentation. With that, I will turn it over to Tracy Scriba to get started.

**Tracy Scriba**

Hello, everyone. Thank you for joining us on the webinar today, Developing Successful Transportation Management Plans. As Jennifer said, I'm going to give a brief introduction and save most of the time for our presenters and the question and answer. To give us a little introduction as far as why do we have TMPs: The general reasons are that as many know we have an aging infrastructure; we did a lot of initial building of the roads early on and there is a lot of need for rehabilitation now, which creates a lot of work zones on roads that are carrying traffic and creates a lot of congestion. Some have likened that to trying to redecorate the interior of your house while you're having a party and everyone is over. It's a challenging exercise. There are a lot of things we can do to help manage that. Those challenges create some public dissatisfaction with work zones as many agencies have encountered at one time or another.

Because of these complexities, we do need more comprehensive planning for maintenance of traffic. Part of the way to do that is to consider the safety and mobility impact of work zones throughout the project life cycle, starting early in project development and continuing through adjustments made during construction. Instead of waiting until the end of design to develop a plan for managing traffic, trying to consider earlier what we can do as we go through design of the project and address some of those impacts along the way. Then, of course, there are going to be various impacts to traffic and other stakeholders that we cannot get rid of during the project development process, so we need to implement appropriate strategies. Those kinds of thoughts went into the transportation management plan, basically having a more comprehensive approach.

That is what a transportation management plan is, a set of coordinated strategies that we can use and how they will be used together to manage the impacts of a road project. A transportation management plan is required for all federal aid highway projects by the Work Zone and Safety Mobility Rule. That Rule was updated in 2004 with a compliance deadline of 2007 to require these more comprehensive plans instead of simply the traffic control plans that were required prior to that. The TMP has several different components. Which ones are required varies based on the project. The temporary traffic control plans, as I mentioned before, are still required. That component will always be part of the TMP. When we have something called a significant project, basically a project that's likely to cause a high level of impacts, the TMP must contain at least two other components: the traffic operations component (TO component) and public outreach component. So I wanted to start with that background so we have a common understanding going into the webinar of what a TMP is. We'll focus more on some of the ways that several DOTs have taken different approaches to make the TMP process effective and their TMPs effective. We have three great speakers today that will each be sharing unique aspects of their process and how they are implementing TMPs in their state. So I turn it back over to Jennifer to take us to the first presentation.

**J. Symoun**

Thank you. I will turn it over to Angie Kremer from the Michigan Department of Transportation.

**Angie Kremer**

Hope everyone's having a good day. Just to give you a little background, it may sound odd that a traffic incident management engineer is giving this presentation for work zones, but our unit covers both traffic incident management and work zones. So we are multifaceted here. To start the presentation, just to give you a little background about how we've implemented the Work Zone Safety and Mobility Policy in Michigan, our policy went into effect on September first of 2007. That was when our official guidance document went out for our offices to use and applies to all construction in our state. It's not just our major construction projects but our maintenance, permits and utilities and below listed was our implementation dates. So our construction projects went out first. Then we did different things for our maintenance projects and permits to streamline it because they don't usually have the staff to develop a TMP. This made it easier for that group to do. We developed some websites that were really easy.

To get our Work Zone Safety and Mobility Manual, you can get it online under the Michigan DOT web site under Doing Business then select Work Zone Safety and Mobility Resources or you can copy and paste from the presentation that website below. We don't use easy websites here in Michigan. We created a LISTSERV so that whenever we do any updates the LISTSERV gets notified and those people don't have to keep going back to that website.

So our part in our TMP is similar to what Tracy laid out for the requirements. The first part is the temporary traffic control plan which is mainly your contract documents: your special provisions, the typical, and the plans that are in there. Then we have the transportation operation plan, or TOP because we love acronyms here. This is looking at the non-motorized, our different stakeholders, and our mitigation process. Then we have our public information plan; our PIP. That's how we will get the information out to the public. For Michigan, what is a significant project? We have three criteria for it with the first which is usually our biggest; our customer impact. That is that the work zone delay isn't greater than 10 minutes. Now you can have background delay due to bottlenecks daily, and that doesn't count against the 10 minutes. For a flagging operation, this is the only criteria, the 10 minutes. For other projects, there's the volume to capacity ratio of nothing over 0.8. Some of our roadways are already over a 0.8 and so these roadways already qualify as a significant project for any work zones on them. And then our level of service, anything that drops below a level of service D or a roadway which has a level of service A that drops down to a C. That's because of the driver expectation that has changed in the work zone area. Now we have different criteria that we talk about. It could be a political or a very context sensitive type project and we term that as a high impact. It could be a significant project or not a significant project. It is kind of its own little classification. For non-significant projects, the only thing required is the temporary traffic control plan, the contract documents. They are required to do an analysis to see if it meets those thresholds. A TOP and the public information plan are recommended but not required.

For a significant project that exceeds one of those three items out there, all of the components of the TMP are required. So this is the temporary traffic control plan, transportation operation plan, and the public information plan. Because it is a significant project, what is unique is our Statewide Peer Review Team, and this is required. That's the approval process of the TMP if you look at it that way. So what is the Statewide Peer Review Team? All significant projects go through this process. It is a rating for that project. There is a standard review form that we have in an Excel spreadsheet. We'll go over what we're looking for during that peer review team and it engages our upper management level into this process. We keep it really simple here in Michigan. We give it a red, yellow, green rating to keep it understandable. So when is a TMP submitted? Our TMPs are to be submitted between plan review, which is about 80% completion, and before our emissions and errors conference (EOC meeting), which is 100% complete. That doesn't mean it can't be submitted to our office for us to take a look at, but the formal process is between that time. The closer we get to the letting, the more difficult it is to change the plans. We felt that this is a good mix to where there is enough developed in the plan to review, but it's not complete yet.

So who sits on our peer review team? Just to give you an understanding of how our state is broken up. If you look at those blue lines, they're labeled with different names: Superior, North, Grand, and Bay. Those are our regions. We have seven regions in the State of Michigan. Within those regions we have transportation service centers, which we call TSCs, and there are 26 of those. There's anywhere from four to three TSCs per region. Those TSCs are our front line for our customer service so is pretty much everything done at our transportation service centers and our central office is more of a support or if it's a specialty type of design. The team includes a statewide work zone administrator, a chairperson that has been myself, and Brian Zimmerman in the past. This is the consistent person who leads the peer review team. The remaining members that make up the peer review team are actually rotating members so they change every meeting. It's our TSC manager, so they usually have anywhere from three to five counties in those TSCs, the development engineer, a delivery engineer, a traffic and safety person, either one of our engineers or technicians, and a region engineer. Those people are picked for instance, if we had a project in Grand Region, we wouldn't pick anyone from Grand Region to be part of the peer review. We try to get a cross-section of people from different regions and different TSCs to sit in on the peer review so it has a really good cross-section of our department. The members who make up that review are kept anonymous so nobody can call up somebody and say “hey, why did you rate my project red.” It's done anonymously so people are free to comment and be constructive out there.

Some of the benefits we found from the statewide peer review team. It's a good check and balance for mobility issues. We also have an upper limit on costs for maintaining traffic. So if it exceeds 25%, if it's a little too lavish compared to the work that's being done out there, that can be looked at or if there isn't enough consideration for mobility, the team can look at that, also. We've gotten feedback from other areas. We included some of the process comments into our peer review system. Before we used to get the project submitted to us, we would review it and then contact that project office. Now we actually get a contact number so that if we do have minor questions during the actual review meeting, we can call up that project office and ask them. We have found it made a difference from being a yellow to a green project. So that's been incorporated into our process now. It allows for best practices and sharing. A lot of team members say they like this language that’s in the MOT for a certain issue like egress or emergency access. They are now taking different bits and pieces and incorporating it in their own projects. The statewide administrator provides that consistency so we aren't getting too nitpicky on certain things because this is a high level review. We're not getting into the sign should be switched for that one. We're just looking at it from a high safety and mobility level.

So some of the things that we review when we're doing that peer review team is we break it up into the different components that are in the TMP. In the TTCP area, we look at if it is reasonable and logical for the project duration and volumes out there. Is the staging and constructability reasonable and thought out? Is it easy to understand? Sometimes we'll look at the MOTs and it gets confusing to what's being done during the different phases. We look at the progress clauses. We look a lot at similar projects and drawing that knowledge of what has happened before out on similar roadways so that we learn from what we have done from the past so we don't keep repeating our mistakes. We look at cost benefit comparisons to ensure we are spending the tax payers’ money correctly. One of the big things we do is that we look at what crash analysis has been done. We look at three years worth of crash data prior so we understand what background crashes are out there before the work zone gets out there. If we start seeing a lot of crashes, we have something to compare it to which allows us to identify issues. For example, if we start getting a lot of fixed object crashes or a lot of rear ends which were not there before, we know it's contributed to by the work zone and we can do something to change that. We like to know there's a plan to monitor the safety and mobility out there just so that we are actually gathering some of that data so we can incorporate it into the future. Then egress and ingress are a big item for us because of the contractor getting in and out of the work zone can cause a lot of havoc.

In the Transportation Operations Plan, we look at if the delay mitigation techniques were applied correctly, did they explore different avenues, did they think outside the box. We look a lot at our lower end users - our pedestrians, local transit, non-motorized traffic - which sometimes get forgotten. We want to make sure they're addressed ahead of time so we don't have issues with getting people hrough the work zone or keeping their access and mobility, too. Emergency responders, we are working a lot more with them so that they at least have a notification if there's a detour so emergency responders can pick a correct route. They may reroute themselves and not go through our work zone or that we have access like emergency barrier gates or towing type items. We look at commercial vehicles. Our big one right now is looking at corridor impacts. I-94 is an example in our state which carries a tremendous amount of economics for us. So we're looking at that corridor as a whole in particular just to make sure in you go from one end to the other in our state that you're not having an excessive amount of delays. So we're starting to spread that to other corridors within our state.

This slide is for the public information plan. Are we getting information out to the public so they can make an informed decision if they want to stay on the route or reroute themselves. Some of the items we use is MiDrive. That's our website for the public where we put our work zone events. We put it out in the future so people can preplan if they're going to the lake or a cottage on the weekend, they can see that there's going to be construction on Friday on the route. We have been utilizing the LISTSERVs where the public can subscribe. Public kickoff meetings; we're getting heavily involved in social media and we've been working more on travel signs so that if there is an alternate route they can pick which one they who like to take if it's less or more, especially if we have a good alternate route in that area. We're making sure that the list of stakeholders is comprehensive and we're addressing all of our public out there.

This is more of a background on our TMP ratings; we use the red yellow green rating scale. Everyone loves to get a green TMP from us. It means you're good to go. We may have a few suggestions and we ask you to look at that and we don't necessarily need feedback. Yellow projects is a proceed, but we would like you to look at the comments and provide information back on whether you incorporated the suggestions, if you did not, what was the reason. So we want that feedback. A red project, nobody wants to get these. It's a do not proceed. Pretty much, there are show stoppers in the project and we see them as a big issue. The region engineer and chief engineer are brought into the project at that point. We've had very few red projects and what has happened in the past is they've just, in essence, withdrawn it and reworked it themselves. Just to give you a breakdown since late 2007, that's when we first started this process, we've had 169 TMPs that went through this review process. About half were yellow, half were green and two that were red.

We have run into a couple challenges for TMP reviews which we are still working out. One is how and when do we do the reviews when we deal with design-build projects. Do we do them in the beginning when there isn't a concept and they're still working with the contractor and designer for those plans? That's one area we're trying to get a little more handle on. A second is our quick turnarounds for the value engineering proposals. Usually when a request comes in for a TMP review, I schedule an appointment. We have two weeks to review the projects and then we get together. With the value engineering we need to respond quickly to the contractor, so the last time we did an email peer review. I sent it out and collected it via email. That seemed to work okay. It is not as good as a face-to-face meeting. With that, I have finished. If there are any questions, there is my contact information.

**J .Symoun**

Okay. Thank you. We'll take about five minutes for questions. The first question we have is: how do you calculate or consider benefit cost for your alternatives analysis?

**A. Kremer**

We usually look at the cost. What the cost is for the constructability and then we look at the user delay cost. We use one of our heavily used tools, it's called CO3. It is a free Excel spreadsheet that anybody can get. It calculates user delay cost. It's not a true benefit cost but we can see if we spend $200,000 and reduce the user delay cost by X versus Z that kind of helps us make an informed decision.

**J. Symoun**

Okay. The next question is do you calculate queue lengths and if so, have you established a queue length threshold where mitigation is required?

**A. Kremer**

We haven't used queue length as a threshold for our delay analysis, but that CO3 spreadsheet does give your average queue and your max queue. So it's a powerful spreadsheet with very limited information you have to put in there.

**J. Symoun**

Okay. We have two questions that were typed and sent directly to the presenters. Again, if I could ask please send the question to everybody so everyone can see them. The question is: please explain how the peer review team is formed, when they meet, and how often they meet. This sounds like it's a good idea but it may be hard to implement.

**A. Kremer**

It's written directly into our policy. They only meet when they're needed. When a project office will have a TMP ready to submit, they will submit it to me or our operations engineer. I have a spreadsheet that I use to keep track of all the different types of people needed for the team, and I go through and see availability and how soon we can all get together. It takes a little bit to schedule that meeting but it's not too bad once you get a hang of it.

**J. Symoun**

How do you allocate resources to the team and select team members?

**A. Kremer**

We have that spreadsheet. We make sure everybody has participated once so we don't keep asking the same person multiple times and everyone gets a chance. They can charge to the project job number and we have some people who do that. It's kind of that give and take. You're going to need a project reviewed eventually. It's kind of like you scratch my back I'll scratch your back type of thing.

**J. Symoun**

How do you manage all levels of review in the process and how do you resolve all the comments?

**A. Kremer**

What do you mean by all levels?

**J. Symoun**

I guess the main question is basically how do you consolidate and manage all the different comments that might be coming in?

**A. Kremer**

Usually the team has a pretty good consensus together. So we put all those comments out there and discuss them. We do not usually see an extraordinary number of comments, the group is generally pretty collective and a consensus is met.

**J. Symoun**

Two more questions. Do you do any traffic modeling?

**A. Kremer**

We do traffic modeling. We don't dictate what type of modeling needs to be done because we feel there are a lot of different tools and situations for different projects. We use Synchro a lot. That CO3 is just a simple modeling tool. Some of our more elaborate high impatc projects may get into different things such as VISSIM, but for the most part it's CO3 and the Highway Capacity Manual.

**J. Symoun**

Following up on that, where do you get the CO3 spreadsheet?

**A. Kremer**

I can send a link. We might have it on our Work Zone Safety and Mobility web page that was shown in the front part. I think it was the University of Michigan that created that spreadsheet. I could send you the link and you could send out to the group.

**J. Symoun**

Sure. That would be great or if you happen to find it you can type it into the chat box. Or if you want to send it to me I can send it out to everybody. We have one more question. We'll quickly get to that. What happens if the TMP developers do not agree with the review?

**A. Kremer**

They don't have to incorporate any suggestions from the team. It's not like you shall do. We ask that you look at suggestions and either incorporate them or tell us why you can't incorporate them. Earlier today we suggested a different alternate for constructability. They looked into it, but have a bridge in the way and can’t get a taper in there. So it's that documentation in there.

**J. Symoun**

Thank you, Angie. We will move on to our next presentation, Russell Holt, a senior civil engineer from Rhode Island Department of Transportation.

**Russell Holt**

I want to start with some Rhode Island facts because especially if you're not from this area you might wonder why Rhode Island is giving a presentation. We have 1,000 people per square mile, very populated. I think we only rank behind New Jersey in terms of population density. You can see the urban areas in gray on the map. We have three interstate routes. 95 is the biggest approaching 200,000 ADT. So we do have traffic demands. Also, my agency RIDOT, we maintain only 1100 highway miles. That's minuscule compared to other states but we do maintain 640 bridges. Many of those are structurally deficient and almost 800 traffic signals in one shape or another. We have a lot to maintain. It's an urban state. We have impact to consider and we want to try to minimize impacts to motorists with our work zones. Most importantly we have about 80 roadway fatalities a year. Everyone will agree that's not acceptable, but that's a fact. So that's a safety aspect that we need to improve upon.

With that we have a quick video and Jennifer will bring that up. Again, trying to prove the point Rhode Island does have work zones and we are concerned impacts to motorists. We have delays. We have complaints called into my office when we do things don't seem to make sense. We have significant delays because we're in an urban state. That's what this video is intended to show. Okay. So what I'd like to talk about is most of my presentation I'm going to talk about what we do with TMPs. I want to focus on our work zone safety and mobility policy to start. We didn't adopt this until late in the game, December 2008. We adopted our overall RIDOT policy. We also had an associated design policy memorandum, or DPM. It gives guidelines and requirements for designers. Long story short, these documents include a lot of different provisions including identifying significant projects, assessing our impact in work zones, selecting appropriate strategies, and developing a TMP. Every other state has these exact same things in one shape or form or another in their policies, but I have a couple slides that show you some specifics about how we identify significant projects and also our strategies. So let me show you that.

This table is in our design policy memorandum. It shows different criteria that are used to assigning which projects are significant. The level one and two are termed significant projects and we use the rankings one, two, three and four. You can see the criteria across the table in blue. Some are subjective. Looking at what Michigan had, we're not quite as technical as what they have. We're a little more subjective. We did it that way knowing there is subjectivity to this and that impacts can be qualitative and quantitative. You can see them there, what we use: the duration of work, level of public interest, et cetera. One other thing, about significant project level 2, is the example here of a major bridge project. We have quite a few of those. Many roads have over 15,000 ADT. I'm willing to bet that we have more significant projects that many other states. I don't know if that's a good or a bad thing. I do want to quickly show the transportation management strategies recognized by RIDOT in our policy. These aren't anything new. I'm pretty sure your individual state policies are almost the same thing. We itemize these based on guidance from Federal Highway. I think I got these from Ohio. Thanks to our friends in Ohio for coming up with the national list, but we did make changes, specifically to performance monitoring. This is a topic of much interest right now, and I think I've seen a question about how do you do this. What's the best way to monitor what's going on? This outlet probably isn't the focus of what we're talking about. I want to show you these strategies are listed explicitly in our policy and on our TMP dropdowns. These strategies can be used to evaluate how things are going. We're learning we don't have much formal studies of this yet, but we hope to some day.

The next table, this is also in our design policy. Please don't try to read all the small language. The table goes from planning to preconstruction. I'm presenting this to show you that preliminary design for significant projects levels, level one and two, designers are responsible for initiating an appropriate level TMP. We define that as a 10% submission, a conceptual type study report. It's pretty early on so that's what we consider our preliminary design. If it's not significant then you can see that it’s not until the final design you have to start developing and completing your TMP. The next couple of slides, I want to talk briefly about how RIDOT develops these. The first bullet says that the designer obtains a TMP template from RIDOT. Clearly, we decided to use templates, one each for each of our work zone impact levels. We did these in Microsoft Excel. We did that for a couple of different reasons. I'm going to show you this in a little while. We chose to use templates for a couple reasons. We wanted to make sure that we were giving appropriate guidance to our designers. Sometimes we do things in-house and sometimes we use consultants to help design our projects. Probably more of the latter is more likely what happens. So we wanted to make sure we had a document that clearly shows the components. We also did it for consistency. This way each of our TMPs will be consistent. Finally, an important note about the templates before I show them to you. These TMPs are made part of our contract documents. I imagine a lot of people are opening their mouths saying that's a little crazy. To make this a contract document, that means we have to make sure our language is clear and consist and all that. We did this again following the guidance from the Federal Highway guidebooks that were published saying you need to identify who's the person responsible from the contractor and RIDOT and what's your plan in how to implement the TMP. So we said we can put all that together in the contract document, and as of today that's what we do. So keep that in mind as I go through the next few slides.

The next bullet says we update these templates throughout design, as strategies are selected and project changes occur. Project changes always occur. Sometimes major. Sometimes minor, but this is a challenge to make sure we update our TMP. At the bottom, our public information, transportation operations, and performance measurement strategies are required to be explicitly identified in that TMP. However, the other strategies such as traffic control coordinating and contracting, those are usually shown. Flaggers, cones, drums, scheduling, coordination with utilities are usually part of RIDOT's documents. We don't make them explicit in the TMPs. It will be easier when I show you the template. Next is a slide about final design documentation. Our TMPs are submitted at basically 30 to 90 percent PSE - plans, specifications, and estimates. We don't have the luxury of having a designated section to focus on work zone impacts or traffic control inspections all day. Other states beat us in this category because they are much larger. We don't have that luxury. We have general construction inspectors who are inspecting bridge piers one moment and are checking traffic control set-ups the next. That’s on the construction side. On the design side, it might be me or my colleagues in traffic engineering who review traffic control plans So that's why these TMPs are sent to the bulleted offices you see, including our Federal Highway Office if there is oversight on the project.

Finally Work Zone Safety Mobility related analysis and reports. These can be provided as an attachment to the TMP unless they're already included in other final design reports. I mentioned that because RIDOT has been doing things for a long time caring about work zone impacts. It's not because the final rule came out and now we spring into action. We now have the policy to prove what we are doing is compliant with the requirements. For years we've been doing things in preliminary design saying okay let's check capacity, let's check how this is going to impact traffic. Those processes still exist, but now they're underneath the overall TMP. Finally for TMP development, we arrange for and show on each TMP what we call TMP implementation managers – one for RIDOT and one for the contractor. If it's a significant project we go a step further and list TMP development managers. There's one for RIDOT, and one for the designer if it’s not an in-house design. I'll show you that on a template.

Okay. These are the templates on the high end level. Levels one and two are significant, so they're much more lengthy documents. Level three is three pages blank. Level four is two pages blank. If I have a few minutes, I will show you at least a level one blank template so you can see what that looks like. You can also download these, I'm told, on the right-hand side. Again, they're in Excel format. What I'm not going to be able to show you is we have annotations inside the yellow boxes that give guidance to whoever's filling these TMPs out. These notes help describe what we are looking for in different areas. So those notes we hope are helpful to our designers. Let me say this here. Because RIDOT got into this late in the game, this document was helpful. This is a 2005 Federal Highway document on developing and implementing TMPs. I'm sure many states have seen this. Many states helped develop this. This document was helpful. In addition to our local Federal Highway Office, they were with us every step of the way and in establishing or TMP process.

Next I'm going to go through a TMP template starting with level one. What you're looking at is actually a PDF. Hopefully anyone can download it on the right-hand side. Basically, this is not anything ground breaking. Yellow boxes are what we expect the designers to fill out. The table of contents shows that it's lengthy. Keep in mind this a level one TMP, so that’s a significant project. So we have roles and responsibilities, the all important transportation management strategies. These are all the things we're doing to mitigate adverse impacts. Finally, there is a section on changes, contingencies, etc. Let me scroll down. Next, this is where an individual person will be identified as the primary contact for implementing this TMP. Task leaders, we have a whole section on that. Certain fields are in white. These are ones where RIDOT does the activities on every project, so we would never expect a designer to have to change it. If and when we do change it, then that's on the RIDOT to change them. I apologize. I have it go quick through this. I know we don't have too much time. You list any stakeholders to be consulted or coordinated with during the work. This does not include people who do utilities who do advance work or RIDOT people. This section is external people, people from the public, common groups. Finally, we list emergency service contacts. We anticipate this being a one stop page where all my contacts are for fire department, police, hospital, etc. The next few sections are project information. There's a section on general project schedule. If you're familiar with the Federal Highway documents, you can see clearly we used that to develop these. There's a lot of space. Traffic conditions, prior to the start of work, ideally a summary. Say you only had one roadway then please list the ADT or hourly volume, expected traffic conditions during the work, things like that.

Finally the orange sections are the transportation management strategies that the design team has selected to use. And the traffic related work restrictions is for when I can close a lane and when can I not. This section is very important. The TMP also itemizes the traffic control plans that are used on the project. The next few pages show the public information plan. You can't see it on your screen but in Excel the selected strategies column, the left hand column, those are the dropdowns. These are all the strategies I mentioned briefly at the top of my presentation. We have a whole set. You can select those inside Excel or add your own. Then there’s the transportation operations plan. At the bottom, here's the performance monitoring which some people are curious about. The general language at the top is default. We call it blue book stuff; we do it on all of our projects. They're all responsible for that. If you have specifics, that's what this section in yellow is for. Finally I'll scroll down. TMP approvals, this will be shocking to most of you. We have a signature line for the chief engineer. I can't imagine that will work anywhere else but Rhode Island. We're very small, may be a small district for some of you guys. We decided during the preparation of our policies how we wanted to do this. This is what was agreed upon. The chief engineer appreciates that this is part of his task but that's the approval we have. That's part of the work flows.

Maybe next I should go right into the example TMP, which is a level one. I won't show you a level three and four. They are only about two or three pages. A lot of that stuff is removed from there because you don't talk about existing information. You just get right into what are my work limits, my strategies, and my approvals. This is an example. This is a Route 146 improvement project near downtown Providence. It's a busy corridor. This was assigned a level one impact back in design and so I’ll scroll through this very quickly and try to show you. In this case this isn't the final final TMP as it doesn't show the RIDOT and contract personnel for implementation, but on the design side people who were assigned to this specific project. Some stakeholders are filled in here, some local people were impacted. There are provisions for them to be contacted at certain times. Then emergency service, there's a lot of different contacts there for police, fire, etc. You can see the sections are filled out. I won't spend too much time. This section, this is where we tell them how many lanes can you close at a given time or can you close any at all. This is a 2009 project. So this isn't the prettiest thing. Every day we get better at this. We have tables that are clearer, much easier to understand but I use this as an example. This is the location where the stipulations are included. It's all about documentation. When we first were aware of the work zone rule, this was what was sensible to use to start documenting what we do on projects and these TMP plans allow us to do that.

I want to focus on one strategy on the transportation operations under work zone safety. We have movable traffic barrier. We used that on the project after considering different options and we felt we wanted to have positive worker protection in order to keep the number of lanes open. You see under traffic incident management and incident for emergency response plan. The police were involved with routine meetings to develop a plan. I'm told by our construction team that it works very well. Okay. Jennifer, if you could close that. I had to go through that quickly. Please, if you have questions, please type them in.

The next thing I want to show is two final slides. First, we have done some training efforts in Rhode Island. We had an introductory session at a local ITE meeting just prior to the introduction of these polices. We felt that was helpful as many of our practitioners are active in our local ITE chapter. Then we had formal training sessions for both internal staff and external staff in early 2009. We established an email account. It has not been use frequently lately, but it was used a lot in the beginning by consultants. They would ask how you want this TMP filled out and so on. The next slide is challenges and next steps. I find that designers don't always consider the full many realm of potential strategies. Our hope with these TMP templates is that showing a dropdown list of all the strategies, maybe we'll start thinking outside the box. Both internally, in-house, and external where we have consultants a lot of times I think these TMPs are viewed as being an administrative task. So they feel that they have use their time to fill these out and their time is precious so just use the minimal time and send it to RIDOT. If everyone at RIDOT is doing their jobs, then we’ll always make sure our TMPs are adequate. Next, inefficiencies in revising these TMPs in the field once their in construction. Many can guess that they have a tough job with this. Because of that, we're using Excel, a standalone hard copy document that’s included in the contract documents but when you want to change it, someone will have to go in and make the changes and get the approvals and print it out again. That's true. It has been inefficient and RIDOT does the best job it can but there are plans in the future to hopefully get this incorporated into our web-based tool. We have a project management portal. This is all online. As of today, we've invested a lot of money in getting this developed. It's a web-based tool where we keep track of project documents during planning, design and construction. On the construction side, we keep track of shop drawings, RFI's et cetera through this tool. As of today our TMPs are not in here. If a lot of us had our way in the design side, we'd love to have TMPs incorporated here. This way, somebody wants change and this goes through the chain of command then he proper approval can be made in real time. We’re not there yet and the major reason is cost; updating is very costly. So we haven't had a chance to do that. That's my presentation. I have my personal work email there and the generic work zone e-mail as well. If you don't get a question answered today, please feel free to send one off.

**J. Symoun**

Thank you. We have a lot of interest in the templates. Those are available along with the example for download in the lower right corner. Question, what tools do you use for modeling in Rhode Island?

**R. Holt**

That's a good question. In our design policy memo, we have a table that simply lists kind of generically the preferences for tools for modeling. We start with a simple deterministic method based off of NHI course 13355. I think many states use that. It's based on work zone capacities that somebody determined from a study. You can do it in an Excel spreadsheet. It's a simplistic tool. If that doesn't work, then the next thing in line is we do HCM based. Many times people will use Synchro, but as long as its HCM based we can use it. We allow micro or macroscopic simulation. We had used them recently on projects where bridges are being removed and freeways are being realigned; we used VISSIM there. I'm sorry to give you a vague answer but we try not to be too restrictive because we realize they are all tools and can be helpful.

**J. Symoun**

Thank you. Have your performance monitoring efforts worked during construction?

**R. Holt**

Great question. I think I mentioned at the top that I'm not aware of formal evaluation studies showing us that we really improved things doing say travel time runs during a project. We have not done that formally, but we've definitely done it in practice. We do it quite frequently. We get staff from the design office to do travel time runs or we'll have our designers check capacity based on existing conditions and things. We'll do delay studies. So we have done them, but we have to get our act together documenting them. That will be helpful as we can learn from what we are doing. That's why I mentioned the performance monitoring strategies. I am kind of tentative on that. It's a very timely topic. I think we're on the right track and hopefully soon we'll have a better procedure in place. As of today I can't give you a specific study. Sorry.

**J. Symoun**

Okay. One final question: which division prepares or reviews the documents?

**R. Holt**

If the document is a TMP, the TMP is reviewed, per the DPM, by the project manager for the project. That could be somebody in bridge design, road design or traffic design or even the intermodal office. It's got to be that project manager to review it, then the traffic engineer, someone like myself. Then the construction management section will take a look at it and comment if they have questions. Let me back up my slides. The bullet items in the middle. The transportation management centers usually do not comment on it as they're more involved with day-to-day operations, but we do send it to them. Like I mentioned, also our Federal Highway local office if there's project oversight. Those groups right there. Those are the people that if everybody's following all the policies to a T; those are the groups that will review each TMP during the design process.

**J. Symoun**

Okay. Thank you. Well, we're going to move on to our final presentation given by Tom Notbohm from the Wisconsin Department of Transportation. Tom, you can go when you're ready.

**Tom Notbohm**

Thank you Jennifer, thank you everyone and good afternoon. What I'll be talking about this afternoon are some highlights of our safety strategies and especially our incident management strategies for our work zones in Wisconsin. I'm going to start out though, first of all with a bit of brief information about our Wisconsin DOT TMP process. Then I'll discuss some guidance we've recently developed for work zone incident management plans followed by some specific project examples that will illustrate various safety-related strategies that we've used in work zones in Wisconsin.

As some of the other speakers have mentioned, we have a well-developed TMP process here in Wisconsin in response to the Federal Work Zone Safety and Mobility Rule. As others have indicated, our TMPs describe coordinated strategies. The traffic control plan certainly remains a very important component of the TMP, but for those projects that have more significant impacts, there are significant public information and transportation components that are part of the TMP as well. In Wisconsin, we also recognize the importance of incident management, especially for our highest impact projects where we have an incident management plan that is developed as well. We consider our TMP process to be a living process which should begin during the planning of the project. We do make adjustments to the plan at particular points as more information is known. During construction if there are changes in the field to, for example, the staging of the project or perhaps lane closure schedules, if those are going to have significant increased impacts on mobility and safety of the project, then those should be documented as revisions to the TMP. A key activity certainly in developing a TMP is to conduct a good assessment of the work zone impacts. Once we understand those impacts we can determine the TMP type. We have four TMP types, one through four, in Wisconsin similar to what you just saw for Rhode Island. We have guidance in our design manual for the different types of TMPs that give some ideas of potential strategies that could be employed on a particular project. Once that type is determined, we'll identify potential strategies, evaluate those strategies, and develop a TMP report. Typically that TMP report is completed at the time our design study report gets submitted. This is at about 60% of project design. Then we have an approval process for that.

This slide shows an excerpt of a work sheet that we use to document our TMP and the approvals. The work sheet can serve as the TMP format except for the projects that have the most significant impacts. For those really, really high impact projects, the work sheet could function as an executive summary and a more detailed TMP report would be prepared. The work sheet is a minimum of two pages but can get lengthier, depending on the answers that are provided to the various questions on the work sheet form. I mentioned earlier the incident management plans. We are more commonly developing incident management plans for the higher impact projects and we have recently developed guidance that will be published in our design manual that includes checklists for various stakeholders such as our statewide traffic operations center, law enforcement officials, the project leader or project engineer, and then other personnel in the region that have responsibilities for managing incidents. So for example, our law enforcement check list would include items such as contacting the dispatch to report the incident or back-ups, but then also things like trying to estimate the likely duration of the incident to help determine what traffic control would be needed to be set up to manage the incident. There may be contacts needed with the media by the law enforcement agency. Also, there need to contact our statewide operations center regarding the incident, some identification of need for specialized equipment that might be needed to clear the incident such as towing equipment. Finally, this would include making notifications at the conclusion of the incident. For project engineers or project leaders, this is an example of a checklist. They would function as a liaison for the contractors on the project with information from the response personnel and also have responsibility to notify the project supervisor or manager if traffic backups or queues are getting severe.

The incident management plan would include an emergency contact list and we have a template that we've developed for that. That will be provided in the guidance that's going to be published. Also recommended would be a list of alternate routes if we need to divert traffic from the route. An estimate of queue levels under lane closure conditions is recommended to be documented as well as locations of barricades that could be available if needed to close ramps or other parts of the road way. There should be some discussion of scenarios for activating portable changeable message signs or any other travel information systems.

Now to help anticipate the queue backup levels, we do have a new tool that we're calling our lane closure analysis tool. It is available online and contains a set of charts for segments of our freeway system statewide that include hourly traffic volume data and queuing and delay that could be expected if a lane is closed at a particular time of the day or week. Regarding activating things like a portable changeable message sign or other travel information, the incident plan guidance lists some examples of messages that could be displayed under various scenarios like normal flowing traffic conditions or conditions where we've got some kind of a backup due to work zone congestion as a result of a lane closure, backups due to an incident that's occurred or a scenario where the highway is completely blocked.

Related to our incident management efforts is our use of contracts for extra law enforcement or freeway service teams. We commonly use these services on our higher volume, higher speed roadway projects, at least one or both of these services, especially where we expect the project may have recurring delay so the TMP may become more complex. Other factors in determining whether or not to employ these types of services would be if there are challenging geometrics associated with the project, if there's unusual terrain, crossovers, abrupt shifts, features like that and certainly if there are lane closures, reduced widths or other restrictions on lane capacity and a few other factors like the need to escort oversized loads or need to manage speeds is particularly critical on a project. Then that would be a call for the law enforcement services.

Now I'll touch on a few specific projects in Wisconsin and some of the strategies we employed. The Marquette Interchange in downtown Milwaukee as well as the I-94 North-South freeway between Milwaukee and the Illinois State line and the US 41 freeway interchange with highway 29 in Green Bay. At the Marquette Interchange in downtown Milwaukee, which is located at the junction of Interstates 94, 43 and 794 there was a significant project that was completed a couple years ago. It did have some long duration lane restrictions and ramp closures. In addition to the traffic control plan, we employed some traffic operations elements like intersection improvements, including some new traffic signals, and upgraded signals on alternate routes. We also posted some temporary parking restricted zones near intersections to allow additional lanes for travel on the alternate routes. To enhance the freeway operations and safety our statewide operations center expanded their hours of operations and used their system of detectors and cameras to provide information to the public on current conditions on dynamic message signs and through other means. There was very intense coordination with the emergency responders. One of the measures designed into the project was to offset the median barrier at several locations to provide a turnaround at periodic points within the work zone for emergency vehicles. Also an incident crisis communication plan was developed for the project.

On the I-94 North-South freeway between the Illinois state line and Milwaukee, there are a number of sections in that freeway that are being expanded and reconstructed over a multiyear period. For some of the measures we employed there on some of the segments, it was important to be aware of the need to emphasize ingress and egress. There were some typical drawings developed for the project that showed the use of shoulder areas to provide ingress and egress along with warning signing of that ingress and egress activity. Also improvements were provided for alternate routes. Traffic responsive signal improvements were included to be able to react to different volumes on some of the alternate routes for traffic that would be diverted from the freeway. At some locations where an arterial street bridge was closed there were additional bus routes that were provided for pedestrians to give them a shorter and safer route from one side of the freeway to the other. Those freeway service teams were also used to assist in handling incidents as well as completion of a crisis communication plan and an emergency response plan developed for some tunnels. That plan was useful for both during construction as well as being used beyond the construction period.

On the Highway 41 freeway and Highway 29 interchange project, this is part of a larger expansion project. This included a number of the measures such as signal improvements, some temporary signals, some other signals that are being upgraded and retimed. This project is just in progress now and a number of the activities that are planned will include the use of radar speed display boards to help manage traffic speeds and some geometric improvements at intersections including modifications to access points to allow for safer operations during the construction.

We are finding public information very critical on this project as well as other major projects. There were a number of outreach and task force meetings to share information on the traffic staging and to help in identifying and discussing some of the mitigation concepts on this project. One of the concepts being discussed, and this hasn't been implemented yet but one of the measures is the idea of providing what we are calling a rapid intervention vehicle for responding to emergencies with similar equipment that would be available on a traditional fire truck or fire response vehicle but somewhat smaller, easier to respond more quickly, easier to access the work zone. So, with that, I wanted to highlight some of the strategies we have found to be valuable in Wisconsin in our TMP process. Many of these have been used on a number of our major projects throughout the state, although each project certainly has its own needs. So I just wanted to share those highlights and I can take a few questions. Here's my contact information as well as that for our State Work Zone Traffic Safety Engineer.

**J. Symoun**

Thank you, Tom. We'll go through the questions now. The first question: how do you determine diversion rates and impacts to alternate routes?

**T. Notbohm**

Well, we've used a variety of software packages available, some HCM based spreadsheet types of tools like Russ mentioned and like Angie mentioned for Michigan. We have also recently made quite a bit of use of a package called QUADRO. It is similar to HCM. If the volume entering the work zone exceeds the capacity, it will start showing a queue of traffic. One thing QUADRO does is that it can be set up in a couple of different ways and it can allow and account for diversion to an alternate route. You tell it some characteristics, things like travel distance, travel speed, and traffic volumes on the alternate routes. Then when the main line starts getting congested, the software will start diverting traffic to that alternate route when it concludes that the travel time on the alternate would be better than staying on the main line. It tries to keep the travel time in balance between the alternate route and the main line. We have to be a little careful when applying this tool. Sometimes it can give you diversion rates that are maybe unrealistically high, especially in the more rural areas where you may have drivers who are less likely and willing to take an alternate route if they're not familiar. That's a tool that we found has been helpful.

**J. Symoun**

The next question: what is the freeway service team? Is it required from the contractor or is it a state service?

**T. Notbohm**

The freeway service team is a motor assistance patrol service that we would call for at particular times -for some projects it’s just the peak times where it's provided. I don't believe we've been requiring it from the contract. I don't think we've implemented it in this way where it's the contractor required to provide it. Usually it's a process that we contract for separately up through the state.

**J. Symoun**

Okay. What was the funding source for the free bus routes?

**T. Notbohm**

For the bus routes on the I-94 project, I believe there was a mix. There were a couple of different services provided. In one situation there was a pedestrian route to a school that was affected. In that situation the school district ended up providing the service. For the more general public, the service was funded out of traffic mitigation funding we had for the state project.

**J. Symoun**

Were EMS personnel receptive to the rapid intervention vehicle?

**T. Notbohm**

To this point, yes I think they have been very receptive. That's an idea being considered for a project that's getting underway now, so we haven't had experience with it in the field yet at this point, but for that concept the emergency providers are very receptive.

**J. Symoun**

Was there an impact to the freeway due to the reconfigured intersection?

**T. Notbohm**

Well, the reconfigured intersections were done primarily on alternate routes to allow for diversions from the freeway. So no, I would not say that there was impact necessarily to the freeway from the reconfigured intersections.

**J. Symoun**

What has been the most difficult aspect of developing TMPs for Wisconsin DOT and how are you working to overcome it?

**T. Notbohm**

Well, I would say one difficulty for us has been efforts to try to coordinate among multiple projects that might be occurring in the same corridor, same vicinity. So we've been trying to become a lot more proactive in that way in looking ahead a little better on a more coordinated, comprehensive basis at projects that are coming up throughout the State especially those with the highest impacts expected so that we can hopefully spot if there are conflicts, for example, construction on an alternate route that would be needed to divert traffic from a mainline.

Also, ability to move freight and oversized vehicles. We've had to place a lot more emphasis on that to make sure we have a route that is reasonable and available for moving some of those oversize, overweight loads. Coordination among projects and handling some of that freight has been a big challenge. Although, some of our designers have indicated that on some of the larger corridor projects where there are multiple contracts and multiple projects, the TMP process and the fact there we’re documenting things better, such as where detour routes will occur, has helped in coordinating projects.

**J. Symoun**

Okay, thank you. We will go to some of the questions that were sent directly to the presenters. Do you have any specifications of the freeway service team, such as the size of the truck?

**T. Notbohm**

For the size of the rapid intervention vehicle in particular, I'd have to do some checking with the project staff and see if we can provide that through Jennifer to the group.

**J. Symoun**

That would be fine. How much money do you estimate for each TMP during the PID phase? Such as is it two percent of the project cost, or five percent?

**T. Notbohm**

It varies by project. I wouldn't say we have a fixed percentage that we would always use. Although I think somewhere in the neighborhood of about five percent plus or minus is common for our traffic mitigation efforts.

**J. Symoun**

We have one more question. How does a rapid intervention vehicle work? Is there a paramedic or firefighter stationed with the vehicle at all times?

**T. Notbohm**

The vehicle would only be deployed to the project with those paramedics or firefighters at the time of the incident. As far as the actual operational details of personnel and how they're handling the particular location and the particular scene, we don't have a lot of experience with that yet. It's really still a concept that we're considering for this upcoming work.

**J. Symoun**

Okay. Thank you. Well, thank you Tom and thank you to Russ and Angie as well. I'm now going to turn it over to Tracy Scriba for a few concluding remarks for today.

**T. Scriba**

Again, I echo Jennifer's thanks to our presenters today and their interesting presentations on various aspects on TMPs. I also want to thank everyone for their questions. I think your questions are very important to bringing up points that might be of interest and I appreciate everyone's participation. I just want to mention a few resources that are available on our website. Some of them were mentioned today. The *Developing and Implementing TMPs for Work Zones*, the guide shown on the screen, is on our website as well as various TMP examples including a few from the States that presented today. So if there is something that you didn't get a chance to download today, they will be available via our website shortly. As far as training, TMPs are one of the topics in the *Advanced Work Zone Management and Design* course, an NHI course which was put together corresponding with TMPs as well as some other aspects of the Work Zone Safety Rule.

One other resource on our web site that I'd encourage you to check out is an article on *Public Roads* magazine back in the fall talking about TMPs. For this article we talked to about six states and got some of their practices. If you haven't read that article, I would encourage you to go ahead and take a look at it. Then to provide a preview of a few upcoming things. We created a couple sample TMPs. They're based on the projects that were done by Michigan and the District of Columbia. These are not the actual TMPs which were developed but they contain a lot of the actual information and data from the TMPs, as well as a couple templates. We saw the interest in Rhode Island's templates so we developed some additional templates to provide further ways to look at TMPs. They are not required, just ways to consider developing TMPs and formatting them. I want to thank the three states on the line today as well as there were several other states that helped with the technical working group that developed those sample TMPs and templates. Angie and her colleague as well as Tom and Russ were some of the others that helped with the TMPs and templates. Those should be on our website in the next few weeks. We'll make notice of those so you know those are available as another set of ways to look at developing TMPs.

The final item on there is actually a web-based training course that's about three quarters of the way completed. It has six modules which covers TMP basics and looking at impacts and TMP development. We should have that up by later this year. It's the kind of thing you take online. You can take the whole thing at once or one module at a time. In total, it's probably between three or four hours of material. So just to let you know, those are some things that will be coming up. One other thing coming is up is our plan to do a webinar similar to this, quarterly. I'm showing you a few of the topic ideas. You got ideas from our Division Offices in Federal Highway Administration. If one of these ideas catches your attention, feel free to mention that. You can put that in the chat pod or email us afterwards. Or if there's another topic that you don't see mentioned, we would be open to considering that. We thought quarterly would not be overwhelming but often enough that we can cover a good number of topics in the course of this series here. Again, I thank you very much for your participation today. Hopefully we'll see you on some of our future webinars as we develop those and get the word out to those who were signed up for today's webinar. Thank you

**J. Symoun**

That concludes our webinar for today. If you have topic ideas or questions, you can continue to type them into the chat box or email them to either one of us. I will be sending out an email in the next few weeks to let everybody know when the recording and transcript are available online. Thank you.