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Good afternoon. My name is Joey and I will be a conference operator today. At this time I would like to welcome everyone to the integrating project coordination technology application Iowa DOT conference call. All linesmen placed on mute to prevent any background noise. After the speaker's remarks there will be a question and answer session. If you would like to ask a question during this time Sibley press star then the number one on your telephone keypad. If you would like to withdraw your question press the pound key. Nicole you may begin your conference.

Good afternoon or good morning depending on where you are. Nothing to the eighth webinar on the smarter work zones webinar integrating project application to Iowa DOT many thanks and I will moderate today's webinar. Before I go any further I would like to let those of you know who are calling into the teleconference for the audio that you will need to meet your computer speakers or else you will be hearing audio over the computer as well. Today we have four presenters. Martha Kapitanov FHWA's Office of Operations. Todd Peterson also of FHWA Office of Operations. Mike Jackson of Iowa Department of Transportation. And Tara Kramer of HDR. Martha is currently transportation specialist on FHWA headquarters work zone management team. And a member of the FHWA every day counts smarter work zone implementation team. As a transportation specialist she provides leadership and guidance to the development and implementation of effective work zones in practices and innovations on a national level. She holds a bachelor's degree in civil engineering from the University of Puerto Rico. Todd Peterson, FHWA office operations as a member of the smarter work zones implementation team for FHWA's Every Day Counts initiative. Todd Peterson promotes adoption of work zone intelligent transportation system solutions and actions to better coordinate highway construction projects to accelerate project delivery, reduce costs and reduce public exposure to work zone congestion. Todd is a licensed PE and a certified PTOE and received his Master's degree in civil engineering from Virginia Tech. Mike Jackson is a state office operations engineer for the Iowa Department of transportation. Yes ma'am with Iowa DOT for 35 years working in construction maintenance. Has been involved in the deployment of Iowa's ITS network since conception. Mike's past position as the district maintenance engineer he was instrumental in identifying the need for reconstruction of the Council Bluffs interstate system. Tara Kramer of HDR is a traffic manager of the Council Bluffs interstate system improvement management project. Tara has 15 years of experience in traffic operations and traffic design and planning. She is leading the traffic operation of management coordination for the

program on this complex urban interstate construction. Today's seminar will last 90 minutes with 60 minutes allocated for the speakers and 30 minutes for audience questions. If during the presentation you think of a question you can type it into the chat area. Please make sure you send your question to everyone and indicate which presenter. Presenters will be unable to answer questions during the presentation that will pause halfway through a presentation to answer questions typed into the chat box and to participate in polling activities. Will answer questions again at the end of the presentation. In addition, if time allows we will open up the phone lines for questions and comments. PowerPoint presentation used during the webinar is available for download. The presentation will also be available online along with its recording and transcript. FHWA does not certify participation in online training courses for continuing education credits that may still -- though it may still be claimed for credit towards professional development hours. Please contact your professional certification force for requirements. Your registration requirement is only proof of attendance. We are now going to turn it over to Martha Kapitanov to get us started.

Thank you Nicole. Good afternoon everyone or good morning depending on where you are. This is our eighth webinar in the everyday counts round three smarter work zones webinar series. The previous seven webinars have been recorded and posted on the national work zone and safety clearinghouse webinar -- site. This is the last webinar for this year. We will continue to provide smarter work zones webinars next year. Our first for next year will be on January 21. For more information about previous and future webinars please visit the clearinghouse website. Today's topic includes a brief review of the project coordination and initiative and the discussion on how these two initiatives have helped minimize complex, optimize project schedules and improve safety and mobility in Iowa. Smarter work zones is one of the three everyday counts round three initiatives focused on safety and mobility. It was developed to promote safe and operationally safe work sounds through technology application strategies. The smarter work zones initiative provides innovative strategies, practices and tools to enhance the state of the practice for works in safety and mobility.

We have two initiatives under the smarter work zones effort. Today's webinar is unique in a way because we will be focusing on both strategies. Project coordination and technology application. We define project coordination as a coordination within a single project and/or among multiple projects within a quarter network. -- Or region. Possibly across agency jurisdiction two-minute -- minimize work sent traffic impact. Earlier identification of project impacts will provide a greater ability to reduce and manage traffic disruptions from roadwork. Like a project coordination can mean many road projects close together, Street cuts on recently paved roads resulting in unreduced quality and increased agency user cost and significant impacts to road user.

The main goal of the Smarter Work Zones Initiative is to raise the bar in regards to how agencies handle works then operations. In order to measure that option of the Smarter Work Zones Initiative we have set two goals for the project coordination initiative. The first goal as you can see is to have 25 state DOTs using work zone coordination strategies by December 2016. Examples of how your agency can meet this goal include using software-based systems to coordinate right-of-way construction activities using construction traffic management, and including project coordination strategies in your design agency manuals

The second goal under project coordination is to have five state DOT's who have volunteered to pilot the work zone implementation strategies estimator software tool Todd will give you an overview of the technology initiative.

Think you Martha. -- Thank you Martha. Martha gave an overview of what project coordination -- of smarter work zones is and the technology application is the other half of the Smarter Work Zones Initiative. When we talk about technology applications what I want everybody to think about is, in a nutshell we're talking about ITS. But it's really more than just the application of ITS hardware in the field. It's more of a holistic view of using technology in general including the use of ITS hardware took -- way of converting information from the field into and agencies transportation operations and utilizing that data to enhance and agencies capabilities through managing transportation operations. In the context of this webinar, we're talking about integrating project coordination and technology applications together via the ITS or the technology application side of things can be that conduit for linking the information about active projects to actual operations and planning activities surrounding this project. So the agency has a better handle on what's happening, where it's happening, what's going on when it's happening and what benefits and agency might take to better coordinate these activities.

And speaking generally about technology application, the idea that in addition to coordinating the project is to give the agency the tools of improving driver awareness and providing both dynamic and actual guidance to drivers. What we mean by dynamic and actionable -- which are key phrases there. And dynamic we are talking about real-time data, the direction of the drivers is based on -- and also to agencies is based on a real-time awareness of what's happening out in the field -- robust data collection and component to this is the real-time process so that any information that can be to either the drivers for travel information person -- purposes or to the agency for performance measurement or to the agency for management purposes is what we are calling action that you can actually do something based on the information. Instead of saying -- given an example of actionable, what that means is if you have a DMS or portable change -- message sign you put it on the field this is roadwork ahead. That doesn't tell anybody anything. But if you say it's 40 minutes until the end

of the work zone. Stop traffic ahead. Or something like that that tells the driver they can change their behavior in response to that message that is what that means.

There are two goals associated with technology applications. First goal is for by the end of EDC three -- 35 state DOT is to have implemented business processes. To implement work zone technologies as identified in the work zone ITS implementation guide. The guide is a publication we have available on our website. It was published in January technologies as identified in the works and implementation guide. The guide is a publication we have available on our website. It was published in January 2014. It's a foundational document for how agencies can adapt ITF -- ITS specifically to their agency processes. The first goal is really surrounding -- setting up agencies capabilities around the guidance established in the document itself.

The second goal is also by the end of EDC three 435 state DOT staff utilized some sort of work so ITS technology application in practice. The first goal is -- isn't just setting up the business Professor -- processes to make it work. In the second goal is making it happen. I think that concludes our discussion of what the technology applications is. I think we will see that I was -- they are doing a lot of that stuff in regards to integrating I -- ITS integration. With that I will handed over.

Thank you Todd. Hello everyone this is Mike Jackson. I'm the traffic operations engineer for the Iowa Department of Transportation. This first presentation will focus on the intelligent work zones component of the Iowa DOT's traffic critical project program.

To give credit where credit is due this presentation was per -- put together by Neil Hawkins the director at Iowa State University Center for transportation and research and education and myself. They are involved with DOT in a number of traffic operations and our traffic critical project program.

The traffic critical project program was -- is in its second year at Iowa Department of Transportation. It's a new program. It's intended to meet and -- embrace the requirements of the works then safety and mobility federal rule that all states are obliged to meet and participate in. What we wanted to do was expand as components to cover not only the significant projects but really as EC on the slide, any projects that may result in having repeated or significant travel delays. Really any project on multi-lane highways, interstate, freeways or expressways with over 17,000 vehicles a day. In Iowa, we are bordered on either side of the state by significant rivers. The Mississippi River on the east border and the Missouri River on the West. There is only so many crossings of those and any projects on those crossings are considered to be part of this program as well. From the standpoint that while it may not have necessarily a lot of traffic, the impact that there is a closure on those is fairly

significant and out of distance travel and delay. Also, any other projects that are in surrounding districts -- provide input on need to be included in that. They don't meet this criteria that they think there is extenuating circumstances or other circumstances that warrant consideration. We take that input as well.

The objective of our traffic critical project program, we're focused on improving traffic safety and work zones, maintaining traffic mobility, and providing high-quality travel information. The features of this as we kicked off this program a year ago -- a year and a half ago now, is we wanted to incorporate various traffic mitigation elements into project design. At the early stages, if we could mitigate the impact of traffic by doing -- by confining the hours that the work is conducted in or doing it overnight or by other measures, certainly those are some of the features that we want to do. Intelligent work zones having ITS on projects and providing good services so that we know what is occurring in real time on the projects and where able to get that information to the folks who are approaching that work zone. Also to the public who may be looking at it on 511 as they get ready to take off on their travels. And making informed decisions about how to conduct their travels. Also by making sure that, that projects that we think will have significant impacts and certainly crashes an instance that are occurring. Having traffic management plans developed for those projects involving all the stakeholders. The responders and various folks that would be involved in addressing any of the incidences that occur in or around the project.

The resources that we have available, Iowa has a 24/7/365 statewide traffic operation center. It -- we want to make sure all this information is available so that they will be the ones to manage this and provide the guidance to the traveling public. And coordinate much of the response activities. We have existing ITS systems in all the major metropolitan areas in Iowa. Certainly we can leverage that capability with that in response to these projects when the projects are in those areas. Those are cameras, sensors, dynamic message signs and the communications network that we have. We had a statewide software that integrates and integrate -- controlled integrates all of these processes and provides services like your detection and travel time and those capabilities that may have value in response to that. One of the other components for areas that where we have projects that don't occur where we have an existing ITS network or even in those metropolitan areas where we do but we need to supplement that capability. We actually borrowed the concept from Minnesota DOT of having standalone contracts to rent portable devices -- cameras, sensors and D -- DMS. Originally we tried to make this part of the road and bridge projects. We were very dissatisfied with the results of it because quite candidly it was never a priority of that road or bridge contractor. In fairness to them, it's not what they do best. They can have a sub there to do that but their many, their whole focus is in building that bridge or rehabilitating that road. So after couple of years of trying to not have the results

that we desired and talking to the neighbors to our north, they actually had utilize this approach in the Twin Cities area. We thought it may -- it was really the application -- putting round pegs in round holes and doing what folks to best. We let separate standalone projects. Three of them statewide in Iowa where we would rent portable devices and deploy those and integrate them with our state were -- statewide ITS and use the a ATMS software to provide the services that we wanted on those projects.

In 2014, the first year of this effort, we did the expanded monitoring using portable cameras and sensors. We provided information to drivers approaching the project with the portable DMS and the specific services we focused on more so than anything was really cute detection and providing those warnings. Both on the DMS for traffic approaching and also on our 511 system.

These are photographs showing the various portable devices. This is a solar powered camera installation that hasn't axis to -- camera on it. The same type of cameras that we have used in most of our ITS components. It integrated easily to our -- most of the projects you will see on the subsequent slide is that your bell within one of those areas where we had existing networks, we were able to integrate that in with the high-speed communications that we had in those areas. And have full-motion video available to monitor and to provide to the public on 511. Where we weren't in an area that had an existing ITS medication network, we used cell modems for the cameras and didn't have as good a video or maybe had to resort to still images. We were still able to monitor the projects pretty closely.

This is a slide of the portable traffic sensor trailers they use Wavetronics side fire radar which questioningly also is the predominant sensor we use in most of our installations statewide. We can figure those to do traffic counts and record the speeds every 20 seconds. Which is the same interval that we pulled -- polled all of our traffic sensors around the state printed -- information. It integrated very easily.

Like many of the states around the country have portable DMS, solar powered, we have integrated these into our statewide DMS and controlled portables and rental DMS since 2013 and so this was a fairly easy thing to set up and have integrated. We use the GPS coordinates transmitted by the cell modems to make sure that we tie down the locations of those.

This is a shot of our old traffic operation center which was located in Ames, Iowa. They monitor the entire system statewide and then provide the appropriate responses in management of events as they occur in the system. We recently, just a few months ago opened a new traffic operation center in Ankeny which is part of the Des Moines metropolitan area. We have expanded our footprint to approximately 4 times the size of what you see in the photo on the bottom right. We are able to have this space for

much more staff to be able to help monitor the work zones we have a on a statewide basis and provide the appropriate responses.

Not as a political statement, but I said quite frequently, it takes a village. One of the things that we have found is there were a lot of moving parts to this program. It took a team of folks to help pull this off and make sure that it works. At the top of the list we secured the services of SRF consulting to help us write the original contracts or the contracts as far as the rental of the ITF -- ITS devices. And also to help Iowa DOT to manage the projects both in setting up and determining what the program would be and making sure what the deployments of the IT -- ITS devices were conducted in an orderly manner and a timely manner. And also to help us do the QA and QC to make sure we were staying on top of it and everything was working. Streetsmart rentals is the firm that was awarded all three of the statewide portable device projects. They are out of Minnesota and have done this before. Did the same thing before with Minnesota DOT and has done an excellent job at making sure that they provide very good quality devices and working with Iowa DOT with the integration of those devices. They also maintain them and relocate them as project phases change and stay on top of all of that TransCore is a vendor that does the -- they also provide our software and were part of the team to help integrate all of the devices to make sure the algorithms were appropriately -- set up in the software. And got the messages to the software and also that that other systems. Schneider's hell-bent is -- they provide the staffing for that and so they provided and made sure that we had the -- and the systems that we were setting up were intended to do and what the attended responses would be and also we train them on the traffic incident management plans which were developed as part of the projects so they can help manage and coordinate those plans when they were implemented. Finally, a center in the Institute for transportation at Iowa State University, we brought those folks on board to help pulling all the data that we collected from these projects to help do the evaluation analysis to do performance measures. That was the team of folks along with Iowa DOT that helped implement this program and continues to help us manage and improve the program as we move through the years.

This map shows a typical layout on a project we had in the first year of the program. This is on Interstate 35 N. in the central part of the state. This was a segment of freeway we had the ADT was marginal enough that we almost did not consider it in including this in the program. In the end, we did and the red pins represent where we established the portable DMS. The green pins represent where the portable sensors are. You can see the notation of the work them down in the lower part of the slide. One of the assumptions we made this year, and it is part of our lessons learned from our first year, this was an injured -- interstate pavement replacement in the southbound lane, we had traffic traveling single lane head-to-head in the northbound

lanes. The assumption was, once traffic got into the work so in that head-to-head environment or the 5 to 6 mile project they would travel fairly uniformly and there would not be a lot of problems most of the concerns was approaching the 2 or 3 miles approaching the work some as traffic had to consolidate down into a single lane and merge together and travel through the work them. That is where we placed our technology. What we found in reality and that works them is throughout the course of the construction project, it was fairly commonplace for speeds to reach really a standstill at some locations go up to where you were traveling at 55 or 60 miles an hour and come back down to a near standstill again. As I said, one of the lessons learned in -- learned is you make no assumptions that anything will go nice. You are prepared for any possible occurrence because Murphy's Law is always in full effect.

In that first year we had a total of 14 projects statewide. You can see the distribution of them. Most of them are centered around metro areas. The project that I just showed you is located there and north-central Iowa. The rest of them are in Waterloo, Cedar Rapids, Devonport, Omaha area, Des Moines and Sioux City. We had initially 11 projects. We plan to include in the IWZ effort. Two of them because we mitigated them in other matters, we added five additional projects for a total of 14. All total we deport 60 sensors, 44 DMS and six cameras. Since these projects were mostly in metropolitan areas, we had a fairly good network of cameras that were available for most of them. The additional cameras were just a supplement what was already out there.

In 2015 we expanded to about 22 projects. The red pins represent projects we did both IWZ and traffic management. The orange pins represent the projects we just did in IWZ alone -- there were existing plans that were sufficient. The yellow pins were areas where we already had technology in place that was sufficient and we just did additional traffic incident management planning.

I mention the role of CTRE to help us do evaluations. How effective it was and what value have brought it helped us guide what we were doing as far as the services we wanted to provide. They looked at delay on the projects in both -- in a lot of different ways. The total delay -- our average delay that we were seeing, the maximum and then the percent of vehicles that were experiencing delay. Just as an example of some of the calculations. We focused on the cuing that was occurring. And the significance of that. You see this represented here for a few of the projects that we had around the state. Just providing that feedback so that we had that information and we could go back and evaluate how things were proceeding.

They also prepared some regular reports. Part of their overall support for the office of traffic operations addresses the performance of the DOT transportation network statewide. One component of that is focused specifically on work zones and

performance. And the final area in their support to the office of traffic operations is the quality assurance efforts that they do.

So for the works and efforts they focus on a number of locations in the report. The performance summary, the exposure performance. Also the efforts in cuing and delaying that we had. They provide heat map so that we can look at each work zone and how they were performing on a daily, weekly and longer basis. And also some of valuations of the data. How complete he was and how accurate it was. And give us guidance on where we needed to focus some of our maintenance efforts

Southern -- for the performance major -- may -- measure categories the exposure the traffic cuing and the delay. For the exposure, it was really focusing on the time frames that we had of the work zones. When the beginning and ending date, how long they were lasting. This is a map that shows the number of work so that we had in the first year. The blue dots represent all of the sensors that we had. The larger circles represent the dynamics message find -- signs. It shows the level of resources that we deployed specifically, more so than just stick pins that showed where the projects were.

This slide represents both the exposure and the number of vehicles that were passing through the projects. The number of events that we had. The traffic cuing that occurred and the delay. You see the summary -- the numbers that summarize that for each of the projects listed here on the left side of the table. At the table with a lot of numbers. So we wanted to give some way that you could look and really -- where your biggest impacts were. We also gave the color coding with the relative difference by the length of the bars in each of those areas so you can really see the ones that you had the greatest exposure, that maybe had the most number of events, that you have the greatest cuing and the relative amount of delays on each of the projects just as a matter of interest, the group 5 projects that we're showing right in this area here, in the next presentation, those are the projects that we will be focusing on. You can get a sense for what the exposure, the traffic that we had on those projects compared to some of the other ones. The number of events that we had occurred. The cuing and also the amount of delay that we were seem. This is only counsel bless area. It's not a huge city unto itself. It is part of a larger metropolitan Omaha metropolitan area. Which is the largest metro area in our bordering Iowa. The traffic issues that we see our much more indicative of what you would see for Iowa in a larger metropolitan area.

This is the layout of the heat maps that we were generating. We would -- each of the lines that we have here represents a given center location. These are listed sequentially. Where it's white is there was no data coming in. Green means that speeds were traveling at 45 or above. As traffic of slower it turned to yellow and then

to read. You can see from midnight traveling through the course of the day to midnight on the course of the day, whether it's daily or average for a week, of where you are having your issues. What you would see here for this particular sensor, where you see red at two in the morning, chances are in Iowa, one of the reasons we live here is there is not a lot of traffic and at two in the morning there is no traffic. To see slow speed listed at two in the morning if you and idea that your sensor needs to be recalibrated but over in this area where you are seen at the morning rush time you are seen some slowed speeds and traffic cuing that is occurring, that is typically what you would expect to see. Those are good measures for us to go back and see the impacts of the works them and also the effectiveness of error mitigation efforts.

We produced these same heat maps on a daily basis and then we also produce them averaging for a week and a 2 week period so you get a sense of how the overall work zone is performing. This slide also shows another tool that was developed by CTRE for the DOT for all of the work zones. This is a tool that's measuring in real time. You see the various work zones represented by the lines on the map. Up in the top left corner you see a speed of 50 miles per hour. That is the threshold that set presently when we took the screenshot. The projects or the lines EC and read our projects where the average speed is below that 50 mile an hour threshold. This is a slider bar that you can move back and forth. If you moved it up to 70 miles per hour probably every one of those dark lines would turn red. If you move it down to 45 or 35 only the ones where the speed -- average speed had gone below -- below that threshold would show up. This allows one to do in real time to see how the work zones are performing, where you're having problems -- and what you need to do. Also be click on one of the work zones down that you see listed here in the bottom left corner, are actually on the map. Then you will get a blowup of the work zone. This is one over in the Quad city area on the eastern side of the states. Where you will see the red arrows represent slow traffic that is crossing the Mississippi River into Iowa. It's a way to be able to really monitor the state as a whole and focus in on specific work so if you wanted to take a closer look.

This is just another tool that was developed to be able to follow -- this is one hour and 10 minutes worth of speeds for four different sent -- sensors. You can break it down to very small time frame. In a micro manner look at what's happening within that work zone and which sensors are being most effective.

In general for the future of TCP and the traffic critical project in Iowa, we have just completed our second year of the project. We made a number of changes in the first year. I gave you one example of based on some of the lessons learned. We are expanding the program to really look at every project that is going to occur on the freeway or interstate system in Iowa. We want to look at other tools within the toolbox and make sure we are providing as many services as we can and provide the

very best -- best information that we can. We look at this being a long-term effort. Quite honestly, one of the priorities -- prior to programs for the Iowa Department of Transportation relative to traffic operations. With that, that concludes this presentation. Questions?

Thank you Mike. We are going to go ahead now and open up our first set of polling questions. Our first question, does your agency integrate temporary and permanent ITF -- ITS information to have one advanced traveler information system advanced transportation management system solution? If yes please send an email to jawad.paracha@dot.gov. The second question does your agency track lane closures and permit requests in real-time to minimize complex? If yes please send an email jawad.paracha@dot.gov or add a comment in the chat box and will follow up.

Did you consider providing real-time advisory feed to help reduce the traffic -- to help reduce the stop and go traffic through the work sounds?

In the first year of this, the first couple of years we have not provided specific speeds. Whether it's advisory or regulatory. And Iowa we would focus on advisory. We are considering that going forward. In -- not relative to works them that in some of our metro areas where we see recurring congestion we have provided warnings of the slower speeds ahead. And certainly to let people know what they will encounter. This is something that we haven't done to date it is on the table for consideration as part of the service that we provide going forward.

Thank you Mike. We will pause for one minute to let people finish responding to the poll question. Then we will resume with our presentation.

It does not appear that we are getting any more responses I'm going to go ahead and both those and bring back up our presentation. And handed over to Tara and then Mike.

Thank you. As she said in the beginning, my name is Tara Kramer and I am the traffic manager for the Council Bluffs interstate system. This is a map of the city of -- Council Bluffs. We have two interstates running through the area. We have I-80 that runs east and west through the area. We also have I-29 that runs north and south are the area. The two interstates overlap. -- In this area. Between the wet -- the West systems interchange and the East systems interchange. In the area that we currently have under construction are in orange in this graphic. That consists of the two system interchanges as well as about five service interchanges. The Iowa DOT has as program managers for the project, we're problematically looking at the area and we have multiple projects going on. -- Of the different areas that are under construction. When of our goals in the construction is to continually add capacity as we go along.

We actually have the luxury of doing that by the ultimate design. It consists of a dual divided system. What you're seeing here is a graphic of that. You can see I-80. Express lanes that will not have access to the local interchanges of 24th Street and South Expressway. On the outside we refer to that as the I-29. -- Local lanes as well as the I-80 local lanes. We are providing access on both sides of the dual divided system. And the East system interchange and the West system interchange both for the inside and outside lanes. Here is a cross section. It's showing that we will have three lanes -- three express lanes in each direction as well as three lanes in each direction on the outside lanes that will provide the local access.

The current construction activity, we are constructing from the north to the south. We actually have I-29 northbound lanes partially constructed and we are containing that construction from the north to the south. We are lucky to be able to continually add capacity. This is a graphic showing our different construction packages going on. We start -- we started construction in 2013 and in 10 for construction to be wrapping up in 2022 at least in that orange colored area. We do have several projects going on. They are concurrent. Mike, was there anything you wanted to add?

No. I think the slide shows very well be complexity of doing this. Once again, this is not a huge area it's only a few miles long. We are doing all of this reconstruction under traffic so we are of liberating every square inch of not only the pavement but of right-of-away that we have and expanding the system in this area. And maintaining a minimum of two lanes of traffic at all time. The challenge of getting this built in a timely fashion of being able to do it under traffic and maintain traffic safety and mobility at high levels is -- it takes a lot of coordination and a lot of effort. Certainly a good number of -- it's a nine-year construction effort. Its overall value is in excess of \$1 billion it's not insignificant reeks -- reconstruction.

I made mention earlier to the 23 CFR Part 630 the work zone safety and mobility. The project falls under that and then some. We have an overall traffic management plan that we have developed for this project. To address all the work zones and components. From having a temporary traffic control plan, to have in a traffic operations plan that we implement to doing intelligent works in activities, to doing traffic incident management planning and a coordinated and comprehensive public information plan as well. It really takes all of those in a coordinated effort to make sure that we conduct this project and the reconstruction effort safely and efficiently as possible.

This slide focuses on the TMP which you see in the lower right corner. Or at least the front page of it. That contains the goals and objectives for the project. Also the traffic control plan, traffic operations, and public information. What our goal and objective is and what we are trying to achieve. The goals and objectives are quite simple. We want

to make sure that the safety of the traveling public and construction workers are provided for and enhanced in any way possible. We want to provide for the efficient traffic flow along the interstate system through the construction area and minimize impacts to local access within the project area.

On the traffic control plan, I mentioned earlier that we are trying to maintain at all times two lanes of traffic. The top couple of diagrams gives the cross-section layout of what those objectives are and where we are desirably maintaining 12 foot lane widths with -- whenever possible we want to maintain full shoulders. When we need to consolidate traffic down into a shoot configuration which we do frequently, there are standards as far as the lane widths as well as well as the amount of distance between the barrier rails. We have also gone to the extent of making sure that we can find what the taper rates that we try to maintain throughout the project. We are in a fairly small area here. Moving a lot of traffic through. It would be very easy for us to consider -- making this taper rates a bit steeper to try to fit things in. For safety purposes we want to make sure that we maintain certain minimum standards threat the project.

With the traffic operations plan, one of the key pieces to that plan is an appendices item which is our traffic operational analysis summary what we have used is a Transmodeler. We started with the Transmodeler and we have the entire metropolitan area in the network. We review construction scheduling for various projects to give us a project by project basis and take the best information we have four concurrent projects. And identify any areas of concern. We model those scenarios for the metropolitan area using transmodeler. The benefit of transmodeler is it allows us to view dynamic traffic assignments. Which we have closed the ramp and we aren't able to see what the impact and its capacity changes are to the network not just the interstate network but the local arterial network. We are able to make decisions on whether or not certain construction activities can be done concurrently or even if we are willing to allow certain construction activities to happen at all. Such a certain types of closures. With that information, we do documents -- we do get user cost information. We have used that user cost information to integrate incentives to our contract documents. Then the contractor is said to a certain milestone. It's based on Transmodeler output -- output we also use this as -- as an inner design process. They identify areas where they need to do certain options. Four Lane or three lane, or a ramp at. We have been able to review those areas and identify which scenario we would suggest moving forward with. We also use this to identify intelligent -- the stuff that Mike was talking about before with their portable devices. If we do find areas of operational concern, we take that back to the team and to determine what type of intelligent works then widens that we might integrate into the system. Wheaties signal timing modification with rerouting information. As well as we have identified

the need for adaptive traffic control along one of the quarters that we use as a primary alternate route.

I mentioned earlier that we have ITS systems deployed in most of the metropolitan areas. -- The larger metropolitan areas in Iowa. Council Bluffs is ahead of any of the [Indiscernible] we had gone in and installed a fairly comprehensive ITS network of cameras and sensors. The icons here are small, but we in some -- installed it along the concurrent section of I-80 and I-29 as well as in approaching that area. As well as some of the principal arterial areas in the area that we expected would be impacted by additional traffic with the reconstruction efforts. When we put in the fiber optic network as the backbone for the communications, knowing that in this concurrent section we were going to obliterate every square inch of right away, we made appointments to not install fiber ahead of that. Instead we went along and -- US 275 which runs parallel to the interstate in that area to the south, and went up and crossed at a couple of areas. All of the devices that were on that concurrent section, we used wireless communication. It's a short distance and a good line of sight. A single hop for each of the devices to bring that information in. That allows us a great deal of flexibility as we go through the reconstruction effort of relocating devices and getting them back up and functioning very quickly.

This slide shows an example of -- for the first year or two years ago when we were reconstructing the Yi -- US 275 -- US 275 I-29 -- US 275, I-29 we were reconstructing the bridge over that. We were narrowing what is a four lane and plus divided highway down to two lanes head-to-head to carry that traffic over the interstate while we really built the overhead bridge. At the same time, at times we had to close down the ramps or restrict the traffic on the ramps. We placed a number of sensors and portable DMS in the area to -- to be able to ride warnings in the area. That they make encounter delays as the approach the area. Not only for those on the interstate but on the other -- all terriers that are leaving up to that so we can provide the information on traffic backing up and warnings and delays for that information. The other thing here in the bottom right area that is shown on this map, there is a couple of schools, -- that there is a lot of school traffic. All of those issues and sensitivity about issues of kids going to and from school came into play in a vivid way on this project. We wanted to make sure that we provided them the very best information that we could and also the warnings that we could as you approach this project. Knowing that we were going to be -- at times not able to handle the capacity at this interchange of I-29 and US 275, and this area shown in the green arrow is area of high commercial activity we also knew that this interchange of the letter I-80, 29 would be significantly impacted interchange. You cannot go -- if you cannot go to the interchange of your choice this is where he had to go. We anticipated see larger volumes using the interchange and causing cueing and things like that.

We hope to implement a truck entering the freeway system next year. The system would consist of a sensor on the truck entrance that would trigger the upstream DMS to notify the traveling public. We did identify an area for this earlier this year and then we ended up not using that call raps. We engage the contractor, the portable device, DOT constructions that -- staff into the site visit so we can identify what dishware equipment would go and not be in the way of construction and serve our public in letting them know in advance when a truck was entering the freeway.

Mike had mentioned that we have sensors in the area. Along the interstate. We use that information to identify Linklater closures. This spreadsheet shows a month -- month's worth of data. What you're seeing in red is when we exceed a volume threshold. That is showing the morning peak hour in this particular area, that yellow color is 85% of the threshold. We are basically not really showing the need to restrict lane closure times throughout our peak hour in this particular location. We have been allowing the contractor to work at varying locations at different times of the day. We recently integrated this graphic into our traffic control plan. It again shows the variability, where we allow construction to occur based on day of week and also time of day and month of the year. We have had some requests at one point in time and -- our summer months can be heavier and we could be less restrictive during the winter months. We did incorporate that to give our contractors more time for lane closures.

On the link closure front we utilize a Google calendar to track events that would affect traffic. We automatically get the information from 511 cent to hear and we integrate events like concerts. We are able to use that information to review historic data as well as to coordinate future lane closures for adjacent projects and adjacent check -- sections of the interstate to make sure we don't have complex. There have been request by contractors to close the left lane and downstream a -- another contractor has rightly closed. So we have been using this as a tool to keep track of that. We are color coding the events once we have done coordination with our traffic management center. To identify -- to coordinate with them on it -- in advance and during the message center as well as with the city to make sure that signal timing modification have been integrated if we need that for diversion.

We are using a tool called Salander based -- that we get alerts and without alert it pulls up -- we get that via email. And text alerts. You can pull it up and it shows where the event occurs and you are seeing the red and blue dots. There is a -- that identifies the cameras in the area. It will roll through the different DMS and the area and also the cameras in the area so you are able to see in real time what is going on and if you may need to make modifications against the DMS is to -- to notify of delay or congestion ahead. We get nightly reports as well. This is an example of a nightly report. There is a delay that occurred at this location and when you click on that delay there is a summary of information. Again, it pulls the adjacent sensors. It shows when

the event occurred. Which is the part in yellow. And then it shows the speeds that were occurring as well as the volumes that were occurring for each of the four sensors in the adjacent area. We use that information, to identify if there is any construction activity that we should not have been doing during certain times. We also get monthly reports. This monthly report is for letter I-80 westbound. The graph on the left is from September and the graph on the right is from November. The variance that you're seeing here is we did add a lane of capacity in October. You are seeing the minor issue created highly variable travel times when we did not have that additional lane. In November we are seeing very consistent travel times throughout the core door. That is a problematic level not just project level. We also review crash information on a weekly basis. We pull crash information from the police department as well as the patrol report. We identify any trends that we may be able to mitigate. We identify a few crashes in a particular location and modify pavement markings as a result of that information. We are able to mitigate those issues we do and put this information into Salander so we do have a repository for all of the data we are gathering so we can pull it up quickly if where looking at historic information and want to see if there were any crashes that occurred during a particular day.

Traffic incident management. We felt very early on that we needed to engage our stakeholders. Mike had mentioned that the US to 70 5/4, we had reduced capacity from four lanes to two lanes. That was one of our primary diversion plans. The state had created a traffic incident management plan in 2011 -- is that when it was?

Yes. Spirit so we revisited the plans of they created and making sure that with the construction activity that we had going on including ramp closures that those alternate routes are consistent with the construction activities that we have going on. We have both jurisdictions -- the city Council as well as the city of Omaha public works, police, fire of both, state patrols, our County folks and emergency management folks. We have all of those folks attend. One of the standing agenda items is construction, maintenance and an event coordination we make sure that we talk about those so that everybody knows what's coming up and can identify any particular issue. We did have a ramp closure and the fire folks were concerned about how to get to a particular segment of the interstate in the event of an emergency.

The next slide shows an example plan that we did modify slightly based on the fact that the US to 70 5/4 was down to two lanes. -- To 75 was down to two lanes.

As we went through the planning -- planning effort, reviewing the existing plans that were in place in the apex of the project, it was the second time through and there is always -- one of the things we talked about that you see on this map the green represents the diversion route and the yellow represents a secondary if there's a problem with the primary. Over in the inset area, the map in that area shows the global

diversion routes. If you do not need to go in that area at all, through traffic and take that and miss the conflicted area all together. One of the things that is typical of -- at least for all of the Metro areas we have in Iowa and in many places, the local diversion routes rarely have the capacity to actually handle the volume from the interstate system. One of the things that originally we would only activate the global diversion routes when we reached that capacity on using the locals. One of the changes we made as a result of the input from the stakeholders was immediately the global diversion route is always enacted. You set off the message boards and the various things to activate those plans right away. Then you use the local diversion to clear traffic out of the queue that is jammed up on the project. This plan represents that -- it's just a screenshot of the plan. The plan is very simple. Its maps and different documents that were PDF and put together. But there are embedded links. If you click on an -- on any of these boxes you can get the diversion information, response matrix for when you need to do certain activities, the response stakeholders, DMS message sense that we would deploy, and the barricades and or traffic control efforts to deploy this is intended to try to have everybody operating from the same script in a response activity. These areas on the plans are also links where if you are in the wrong section and it's not this section of the interstate that is affected, but it's the next one to the east you click on this arrow here. And you will move to the plan in that section in that direction. And allows you to really quickly move around whether it's the folks of the 911 center or traffic operations center or local police or fire or any of the folks involved in the response activities to get to the appropriate plans to make sure we are coordinated in our responses.

With that,

I believe we are handing it over to Todd.

Taught over to you. -- Todd over to you.

Todd, you may be on mute. Spirit yes. --

Thank you Mike and Tara. I wanted to take a moment to acknowledge their contribution for us at FHWA, we are pursuing the EDC initiative and preparing for this webinar in particular. We were challenged by the good example of an agency that is effectively integrating technology applications and project coordination side of this initiative. I think that is something that I was DOT is doing well and is exemplified in this webinar. Thank you to both of you for your contribution I think Iowa really serves as an example here for how to do that well. That is good. I want to wrap this up by the script -- discussing some of the resources that federal highways developed and can bring for other agencies that are looking to engage in any of the project coordination or technology application separately or looking for something -- a way to duplicate

what Iowa is doing here. First, we consolidated a lot of the materials that were developed under the -- under the smart work zone initiative -- a link is provided here. If you go to that link you will see it's divided into both project coordination and technology application side. There are copies of associated publications, fact sheets, case studies of other states that have done similar activities or implemented these solutions within their agencies. There is also copies of the webinars. Both the recorded sessions as well as the power points. All the material that's been developed today under smarter work zones is all available here. I would encourage anybody to go there a sort of a one-stop shop of what we are doing for EDC and when other -- whatever other information is available. There are number of publications that are not directly associated with EDC but also deal with the same issues and provide complementary guidance on project coordination and technology applications. For project coordination, there are number of publications here. I will not go through each of these. I'm hoping that everybody is able to download the PowerPoint and have access to the links.

Technology application, same thing. I really want to primarily point people towards the ITF implementation guide -- ITS implementation guide. Its key dock -- document of how we want states to approach -- IT -- ITS specifically. It walks agencies through the steps from considering the need for ITS . Whether or not it's actually going to be a benefit project through design, evaluation -- it's a super approach to application and gives a really good perspective on how you can do ITS well.

With that. Thank you for joining us today. As Martha said, we are wrapping up our webinars for 2015. We will be picking this back up again in the New Year with two new webinars. Number nine on technology application strategies. This is focusing, again like I mentioned before, technology application is not just about traveler information and putting messages up on PMS. It's also about enhancing capabilities of agencies and managing their own activities. That's what this one is going to focus on. Using ITS and technology application for performance measures and monitoring system health. On January 21. Will follow that up with webinar number 10 designing ITS systems based on identified needs. This focuses on the first step of that six step process from the implementation guide we will be sending updates on this but if you want to keep track of this yourself, the information on upcoming webinars can be found at the national works and safety information clearinghouse. If there are any questions that come up outside of this webinar deal free to contact Jawad Paracha his contact information is here. If you let him know, he will direct your inquiries to whoever -- which one of us can help you the most. With that, I think Nicole I will turn it back over to you.

Thank you Todd. We are now going to conduct another polling session. And answer any questions that are in the chat pod. The first two questions are short answers.

Please note that you are limited to 250 characters and may only answer each question once if you answer a second time it will override your first response. Please provide any examples of how your agency has effectively coordinated multiple projects within your own program. Question number four, please provide any examples of how your agency has effectively coordinated your own activities with external stakeholders, i.e., municipal DOT's, utilities with overlapping assets. The final pulling question of the day, does your agency actively coordinate with internal, external stakeholders to minimize works in complex? Please select all that apply. While you are answering these questions, we appreciate any details you can provide in question three and four. We do have a question in the chat pod but before I read that question, if anyone would like to ask a question or provide a comment on the phone please press*one on your telephone keypad to be placed on -- in line. The question in the chat pod under EDC three Iowa plans to institute project coordination and technology applications it seems that Iowa DOT already has separate -- several elements are in place to successfully achieve this goal by December 2016. When do you expect all business processes to be completed in these two areas?

By December 2016. We are actively involved in rewriting the DOT's policy for work zone safety and mobility. In fact we are expanding it into two policies. One that represents the overall problematic approach to it and secondly getting more specifically into the details of the traffic critical project program and the various components of that. That is -- we expect to have draft policies prepared for review by sometime either in late January or early February of sometime either in late January or early February 2016. That has been underway for a little while now. We expect that to tie up. The other thing that -- more challenging to do and certainly we have all of the support within our agency that we need. Is to integrate this into the various systems and processes that occur for project development within Iowa Department of Transportation. From the very initial concept of the project through the review and design phases. Then to the -- through the deployment and actual construction phases. Making sure that those various components are instituted and formalized within those processes. There is a lot of internal constructional memorandum and guidelines that have to be modified to reflect that. That is what I said by 2016 -- over the course of the next year we will work to get all of that accomplished.

Thank you, Mike. Again if you would like to ask a question on the phone please press*one on your phone keypad. Ronnie would like to know if it's possible to get a copy of TMP?

Absolutely.

Sorry Mike. We have a Pro – programmatic TMP and we have -- as each project comes on we develop a project TMP as well. I can send the programmatic one and an example project level one.

Tara, the best way for people to get that would be to email you?

I don't know. Is there --

We can post it on the clearinghouse for everyone

If you can send it to Paige or me and we will make it work.

I do see one person typing into the chat pod. We will pause to give them an opportunity to type their question. I encourage people, if you have any information on question three and four please type it in or feel free to put it in the chat pod or email.

Our other question is in, other fire/medic and school districts -- I'm not sure if this is a question as much as a comment. Postmaster and business community

My guess is maybe did we incorporate maybe outside of the areas. We actually have a really strong PI group -- and mentioning the business communities and other school districts we have at least a yearly public information meeting that is in person as well as we have an online meeting in the website. Then we do work with the business owners. They have business information packets that they put together that people can put on their next to the cash register so that their patrons can take that home and see what is going on with construction. Postmaster, I'm not sure that we have worked with them directly. The other folks I would say that we have.

I wonder since the polling question number five says other in the response in chat box, if that other that Larry entered maybe a response to question number five.

I think you are right, Martha.

At this time we don't have any questions. -- In the chat pod or over the phone. There is one person typing but while they type I will wrap up comments. The recording will be available in the next 2 to 3 weeks. I will send that out to everyone who is registered the next smarter work zones webinar will be held on Thursday, January 21 at 1:00 Eastern time. The topic is Smarter Work Zones Technology Application strategies performance measurement and system health monitoring. Registration is not yet available we will send out the registration link in the next couple of days. It will be posted on the clearinghouse website. I want to thank both our presenters and everyone

for attending it does look like we are through all of our questions. Please everyone enjoyed the rest of your day.

Thank you everyone.

Thank you everyone.

This concludes today's conference call. You may now disconnect.

[Event concluded]