

Please stand by for real-time captions. >> At the centerleft and welcome to the Smarter Work Zones project coordination guide and examples conference call. After the meeting will have a question-and-answer period before concluding the conference.

Good afternoon or good morning depending on where you are and welcome to the seventh webinar in the Smarter Work Zones series. My name is Nicole Coene and I will moderate today's webinar. Before I go any further I do want to let those of you who are joining the teleconference you will need to mute your computer speakers or you will be hearing the audio over the computer as well. Today we have four presenters Martha Kapitanov, Gerald (Jerry) Ullman, Murdo M. Nicolson, Jr., and Chip Eiztel. Martha is currently a transportation specialist on the FHWA headquarters work zone management team and is a member of the FHWA everyday counts smarter work zones implementation team. As a transportation specialist Martha provides leadership and guidance to the development and implementation of effective work zones and practices and innovation on a national level. She holds a bachelor's degree in civil engineering from the University of Puerto Rico. Gerald is a senior research engineer at the Texas A&M Transportation Institute. Since joining TTI in 1984 he has been the principal investigator for numerous studies pertaining to smarter work zones safety and mobility, traffic control device effectiveness, freeway operations and traveler information systems. He was the primary author of the FHWA publication Work Zone ITS Implementation Guide and is a member of the FHWA everyday counts smarter work zones implementation team. From the city of Palo Alto of California Murdo M. Nicolson, Jr. He is an associate engineer from the City of Palo Alto's public works engineering division and has been highly involved in the city's pavement maintenance and management for 15 years. He comes from a background in the general construction industry. With his hands on experience and resource planning degree from Humboldt State University and a specialization in geographical information systems or GIS, he utilizes Encompass GIS software as powerful tool for the City of Palo Alto. Chip of Geodesy is a geographic information systems excuse me -- Chip is a partner at Geodesy, a Geographical Information System (GIS) consultancy in San Francisco. Chip's career started with studies in architecture at UC Berkley and has evolved through the inception of geographical information systems for McDonnell Douglas and EDS into the implementation and automation of GIS for local, state, and federal governments. At Geodesy he has focused on the creation of the database-centric geographic asset management system called Encompass. The project coordinator, a task specific implementation of Encompass is used by the city of Palo Alto as a point of reference for all parties interested in infrastructure located in the city's right-of-way with an emphasis on minimizing impact on pavement. Today's seminar will last 90 minutes with 60 minutes allocated for speakers and 30 minutes for audience question and discussion. 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 your questions for. The presenters will be unable to answer your questions during the presentation but we will pause halfway through the presentation to answer questions typed into the chat box. Will answer questions and participate in some polling activities at the end of the presentation. In addition, if time allows, we will open up the phone lines for questions and comments. The PowerPoint presentation used during

the webinar is available for download in the files download box the lower right corner of your screen. The presentation will also be available online within the next few weeks along with the recording and the transcript. I will notify all attendees once these materials are posted online. FHWA does not certify participation in online training courses for continuing education credits but may still be credit for professionally development hours. Please contact your professional certification board for requirements. Your registration confirmation is the only proof of attendance we will be able to provide. I will now turn this over to Martha of FHWA to get started. Martha?

Thank you Nicole. Good afternoon or good morning everyone. This is our seventh webinar in the everyday counts three smarter work zones webinar series. The previous six webinars have been recorded and posted on the national work zone safety information clearinghouse website. Also known as the clearinghouse website. We have one more webinar in December which will provide an overview of Iowa's DOT statewide intelligence work zone efforts and the Council Bluffs interstate system improvement project and how technology application strategies have helped the project coordination of these projects. For more information about previous and future webinars please visit the clearinghouse website. The purpose of today's webinar is to provide a comprehensive overview of the proposed project coordination guide and discuss real word examples of successful smarter work zone project coordination strategies that can help your agency minimize travel delays, enhance safety for all road users and workers, while improving customer satisfaction. Smarter work zones is one of the three initiatives focused on safety and mobility. It was developed to promote safe and operationally efficient work since the project coordination and technology application strategies. The smarter work zones initiatives provides the innovative strategies, practices and tools to enhance the state of the practice for work zone safety and mobility. Again, we have two initiatives under the smarter work zones effort in today's webinar is all about project coordination strategy. If you want to know more about the technology application strategy please check the clearinghouse website. We define project coordination as the coordination within a single project and run multiple projects within a quarter network a region and possibly across agency jurisdictions to minimize work zone traffic impacts. Early identification of project complex and impact will provide a greater availability to reduce and manage traffic disruptors from what our work. Project coordination should include roadwork and by state and local DOT offices such as the maintenance construction. Also work performed by utilities, developers and any other work that will impact road users. The lack of project coordination can mean many road projects to together, street cuts on recently paved roads resulting in reduced quality, increased agency and the user costs, significant impacts to road users resulting in many unsatisfied customers. The main goal of the smarter work zones initiative is to raise the bar in regards to help agencies handle work zone in operations. In order to measure that option of the smarter work zones initiatives we have set to goals for the project coordination initiative. The first as you can see, is to have 25 state duties using works on project coordination strategies by December 2016. The ways to meet this goal include using software based systems to coordinate right-of-way construction activities using corridor level traffic management

plans to address traffic related impact of construction projects, using construction traffic management, using the project coordination strategies to the point that are included in design, agency manuals. And also the driver time and will capacity will be saved. The second project coordination goal is to have five state DOTs who have volunteered to pilot the work zone implementation strategies estimator software application also known as the WISE tool. This is a product of the SHRP 2 program. Jerry will give you an overview of our proposed federal highway project coordination guide which should become available in early spring. Jerry?

Thanks Martha. Hello everyone from Texas. I appreciate the opportunity to provide a briefing today this morning and this afternoon. This is on the proposed guide. We believe it's going to be valuable and helpful as a roadmap to assist agencies in figuring out how to reach their goals with respect to project coordination. We certainly understand, I think some of those remarks, that project coordination is important and has a very significant potential benefit to traveling public as well as agencies, contractors. But figuring out how to do it can be daunting. Just some of the challenges we've heard are listed here. The ability to gather and update the data needed in terms of what is going on, what is going to be going on and those kind of things can be very challenging and labor intensive. To lessen the mechanism for doing that can be developed. Coordination efforts and effects and the impact that has on individual project schedules is a challenge and some cases a constraint. We bid on projects many times with a set date, duration and then we try to step in and try to influence those schedules even though the intent is to achieve a better global regional safety and mobility impacts. You are talking about effecting individual, and bottom lines. The ability to quantify what you get out of coordination is a challenge. We don't often know what would have happened if we did not coordinate. Some cases we can estimate that and that is the most logical way to compare what benefits are being achieved. But without that extra effort you would really have a hard time saying yes we did this. Was it worthwhile for all of the effort? That kind of thing can be a challenge. One of the most significant -- things that gets in the way of trying to coordinate projects is the fact that the projects themselves were driven by financial constraints and the order the resources available. Basically the money becomes available, you need to get the project going even though it might be better if we don't do this one. We do another one. Now this is when we have money for. We don't have money for that one. Many has to be spent. These are very challenging impediments to coordination in many ways. Certainly I would imply the guide fixes all of those but provides a framework that agencies can follow and start to address where you can and mitigate some of these problems and come up with a process that they can live with and which achieves benefits intended with respect to coordinating. From the guides perspective we break it down. What is project coordination? It's fairly simple. Who is involved? What's being coordinated? And when or how can it be done. Sort of a who, when, and what. You can envision this and more of a matrix standpoint. When you're talking about the when or I mean the whole it can be within a single entity or agency. In most cases that is where a lot of agency start. They can be better coordinated amongst their own sets of projects and activities. You can then expand that to, particularly in larger areas, printing out across multiple agencies and

even some private sector developers. Those kinds of things. With respect to the when, use the activities that can be initiated and performed that occurred early in the project development process in the planning and design area. Looking down the road. As well as activities that are sort of within the realm of the actual work activities themselves. Let's call it the operational phase. Again if you can tell that can be within a single agency you can be doing those kinds of things even across multiple agencies in a region or corridor. As far as the what, here are listed a few things we've seen that have been successful in its implementation by certain agencies across the country. Something as simple as having a database with the agency's plant products -- projects were within the planned 3-5 project years. The beta side of things. Mapping that out so you can get a spatial temporal view of what's going to be going on. It makes it easier to see where the potential conflicts are and those kind of things. Then stepping forward and say we know we have and what we plan to do. Having the sequence things? That's another step. That is the right tool. -- The why tool. You can run multiple models look at different alternatives during the interim process. That is a similar way to do that thing. All of these things. A single agency trying to deal with or improve project coordination and planning design in the design phase. A single state or within a single agency well you moved to the operations during construction or during project activity phases. We have things such as developing and implementing regional transportation management plans as opposed to having multiple individual transportation management plans taking a corridor -- you can't justify doing major transit improvements on a single project but when you look across the multiple projects going on, you might be able to Institute the work with the transit agency and the work that would be beneficial for all projects. Holding coordination meetings within the agency to coordinate simultaneous projects going on and looking for opportunities. Combining lane closures for example for two projects so you don't have two lane closures on different days. You have one that does both of the same day. Those kind of things are being done by some agencies. Some agencies are looking at ways to establish formal steps and procedures with the maintenance efforts. People are checking with construction projects in the same region to see if there are opportunities to coordinate and piggyback on top of the each other so again, there's not multiple enclosures on different days or nights when it can be done the same night. Some agencies have laying closure permitting processes for external folks and other entities. The link that with the construction and maintenance coordination efforts. Those are examples of ways to coordinate during project activities in a way that would achieve safety and mobility. You can easily see how you can expand these kinds of activities to a multiple agency or multiple entity environment. This includes project activities, and mapping efforts. Not just one agency but all of the agencies within a region. It can include private sector developers and those kind of things. Make that database and mapping tool available to everyone in the region. All the entities involved so they can see what everyone else has going on in plant. This can happen during the planning and design area. Again establishing from operations standpoint matters that are not just one agency focused but can accomplish all the things going on in the region. Some city, some state, maybe even some utility work. All of those can be incorporated in an incorporated. And then hosting regional coordination meetings to make

sure everyone is on the same page. And if there is a way to resolve any conflicts that might be arising on a day-to-day basis can be resolved in those meetings. That is the types of things we can do or what can be done in coordination. It's fairly simple process always agencies can think about project coordination. How to move forward and reach a project coordination process as teacher of their own. There are five simple steps here. Here are a few examples for each of these. They go into detail. The first step is really establishing as far as an entity or agency wants to accomplish with respect to coordinating projects. Evidence strongly suggests getting the upper management support of the agency or agencies involved is critical. It takes support and the ability to have someone's back when trying to do something as complicated as coordinating to project. In some cases you can establish who works together between the multiple agencies involved. Then at this point the first thing is to get the people involved caught the coordinating committee together. Those are really your decision-makers. Those who can act on behalf of the group they are representing. And give them the charge of figuring out how to coordinate activities. The next step is what the coordinating committee works on and figures out specifically what they want to do and how they will accomplish it. What is the vision? This typically involves identifying data, identifying tools that are needed. They may involve more than one of these databases. Impact and analysis. Those kind of things. And the decision-making process about how this will be achieved. They wanted to be clear to everyone that this is what we're going to do. We will establish priorities, have some sort of voting or whatever it takes. It will be decided upon up front. This is what we're going to try to achieve and figure out how to try to resolve complex. Step three is taking the processes and everything that has been developed by the committee and making sure everyone at the agency is on board and understands what is going to be done. And more importantly why it's going to be done. Those folks in the field are being judged predominantly or historically by getting the project done fast, on time and under budget and to come back and say well we might ask you to make some changes to the schedule. If you do those kind of things during design it's important to make sure they are well aware of why and how this will occur. Education of your own staff and other stakeholders in the region is very important. By this the next step is straightforward. You have a plan a process in place. Everyone is on the same page. You implement what you have developed as far as the process. Regular coordination meetings occur pretty frequently earlier on. As things go on you don't meet as frequently but you still want to track what is going on. The progress of the projects. I'd just schedules. Updating databases. All of the other things that go along with that in terms of analysis and monitoring tools. Finally -- other the process may be thorough and thought out -- there are definitely going to be things that pop up that were not anticipated. So being able to be flexible and just -- address processes -- adjust processes and kittens is the last step. Pretty much that is the general framework for doing this. I have a couple of examples to illustrate what I'm talking about here. These are generic steps. The first one is from the I-35 corridor that Texas DOT has been working on for several years. A multiple project of a 96 mile length of interstate I-35. I think you've heard about this and it has been a project webinar that focused quite into detail on things that are being done as part of this particular project. I wanted to frame it relative to the steps that we have outlined

through here in the proposed guide. From the standpoint of the established division. It was early in this initiative that upper management realized this could cause some very significant impacts if we don't do anything or let this occur without some type of coordination. So there were directives given to the districts engineers, and others that said we need to look at this in a corridor and cumulative standpoint. We wanted to manage the impacts on travelers both local and foreign travelers. There are businesses that will be inconvenienced by what was going on. So management said we want to have this better coordinated. This included coordination with the multiple contractors. Early on a target was established that limited the main lane freeway delay to 30 minutes. That is what everyone agreed upon and worked towards achieving. That is step one. The coordination and how can about is step two. The integration of mobility coordination positions. Those would be the eyes and ears that focus on the mobility and safety impact on these projects would have. It would be the eyes and ears. There's also a significant amount of data collection they were responsible for as far as where they would be closures. And how long the closures by. And what were those closures have in terms of impacts to the public. There was quite a bit of effort in that area. Then the efforts of the coordination to encourage the collaboration and discussions between the individual contractors so opportunities for coordination became more apparent as well as recognition of the need to focus on a corridor level perspective of the impacts. Some of the tools. Lane closure and input processes were developed. Each and every lane closure on the freeway as long as for roads, ramps cross streets were all put into a giant database. Those on the freeway was analyzed with simple traffic analysis tools. They would show expected travel time delays. Mesh those between the corridors in order to generate an expected travel time delay given a day or night specifically. And then we see the threshold. In this case looking at the projects someone will be traveling to any particular time of night, if they had all of these they would exceed the threshold. So then the process was to figure out how to bring that down. In this case the project at mile marker 293 the contractor was able to shift and delay the start of the line closure by a couple of minutes which changed the goal quarter and F 30 minutes. That's how the Texas model process work. Mobility coordinators were instrumental toward the education of the personnel at Texas DOT and the contractors by keeping them in the loop by what was going on. As well as being the go to people for local communities and key stakeholders who had questions about how things were being coordinated and making sure that the frontage roads in front of businesses were not torn up at the same time so people could not get in and out of the business. Those things were all education for the public and that was recorded his job. Stepping forward. As for supplementation there were regular meetings with the constituents as well as one-on-one contact with businesses. This was to help them coordinate their needs with the contractors themselves and dates of closures. Then the Cooperative resolution of multiple enclosures and talk about earlier when officials were exceeded. Finally the refinement occurs and still occurs to this day. Initially there was some hesitancy as you might imagine. They were not going to address the lane closures. We need to get this work done and that kind of thing. By testing the process itself -- by trusting the process itself and the relationship involved with the coordinators and the contractors. When they realized they weren't going

to be ignored and they would get an opportunity to get their stuff done as a higher priority this process worked itself out well. The second project is also heard about is in Oregon. They went over and had a major bridge repair and placement. As you can see on this map 300 bridges over eight years. Then recognizing if they didn't coordinate all of those that could be tremendous effect on the community trying to move through and around the state. Just like Texas DOT, Oregon DOT folks in the upper management established a directive in a vision. They organized a group and the function each group had. Who had key decision-making authority. And the work to develop on an overall guide on how they would function. They had all the memorandum was in place and identified what they needed to do to monitor and manage this for coordination. Travel times were key. And to estimate travel time they needed data on lanes of capacity. Because these were bridge projects another one of the key things was concern over the space. Large equipment or tow trucks or freight be moved to the corridor is a concern. If you had multiple bridges like that we had to have a detour and get those done at the same time so you're not constantly prohibiting that truck on that particular route. You get them all done at the same time. They came up with several tools to plan, estimate, monitor impacts and developed guidance similar to Texas DOT. They had quarter statewide plans that worked with the bridges plan. They had various other tools to help them coordinate the work activity that had to occur. They made sure the staff knew what was expected, what stakeholders needed to expect and significant training about the guidelines and processes that were being implemented to maintain coordination throughout this multi-year effort. Step four was the implementation of all the tools. Ongoing coordination meetings. They established early on during the planning with the escalation process was. If conflicts cannot be worked out at a certain level gets involved? If that is a result then where does it go. They had that in place before they started the processes. They had that clear and understood. There certainly the monitoring of the projects and schedules. That went on during this process. Then the final step is the refinement. Another example of changes made on the fly to put the final touches on this effort. They had several things to tweak early on. Some of that came from the technical area that was established. Some came from training when they found out things they needed to define better. During implementation when challenging process would arise they had a plan in place to fix the process and get back out to everybody and move forward. I think I'm going to give it back to Nicole. Correct?

Yes. Thank you. At this time we don't have any questions in the chat box. I guess we'll go ahead onto Murdo's presentation

Thank you Nicole. It is a pleasure to be here today from Palo Alto. It's great to share a coordination experience with everyone and to provide our cities data model for success in project coordination utilizing our GIS. I also want to thank Jerry from Texas A&M for putting his documents together. It's a great outline for any agency to follow. Even though was done for larger regional scale we believe we will be able to take this and use it on our localized level in Palo Alto. I looking forward to getting these documentations implementing at higher level. As we go through the slides I will provide the information about how we coordinate and discuss our pavement management strategies while Chip will discussed

the software. The City of Palo Alto is located in the San Francisco area adjacent to Stanford University. Our pavement is currently ranked as some of the best pavement conditions in the region. This is thanks in part to goals and approaches I will be discussing. Our success begins with our geographic information system we have a massive database of files length of lines, polygons, etc. We started in 1987 the GIS was created. Back in 1986 they had a management-based system that provided all of the data that is currently in our database for our current management system that we use today. I have example maps made from the GIS. Despite the diversity of our GIS features and classifications and with information from its database. The first drawing you see on the left shows data from our original miler logbooks from 1920s, 1930s, and 1940s that were hand digitized into GIS and now exists with an incredible amount of data source for the existing infrastructure under the pavement. The map in the middle shows the pavement aging in five-year increments. We can say let's go look for streets in this age category to determine if this is something we need to work on. The third map on the right shows a picture using our database displayed on the pavement segments that needs of early work. We send this out to the inspectors who will verify if it truly needs that level of resurfacing.

The cities GIS currently has 673 different feature classifications supporting utilities and public works, engineering and operations, planning, etc. The map on the lower left side displays our past and present paving work which shows locations as documented and submitted by residents of Palo Alto for funding requests to replace curbs and gutters. This is a powerful tool and GIS also incorporates the data received by the public. This mirrors the California road system map which is part of the GIS map for functional classification to find those roads suitable for grant funds. What I mean by that is some roads are classified as arterial or collector. We can overlay these lines with our projected plans and paving condition index scores to find the roads we need to resurface. The answer -- our goals in Palo Alto is to have the best pavement condition index in the Bay Area. Our local goal is to have an average of 85 with no section under a 60 with no section under a 60 by 2019. This is a monumental task to achieve. By doing this we will minimize the waste and reduces an inconvenience. We need to avoid trenches and the pavement at all costs. On the right you can see our chart -- we get this chart from the Metropolitan transportation commission -- it breaks out the pavement condition index score. Ending new road -- and a new road is a 100. If you look at the 50 to 59 in the orangeish yellow and red. By 2019 we will have taken care of all of the streets this area which is massive. Currently we are right at a 79 between good and very good and excellent. Our PCI is calculated after every pavement work is performed and is verified every year again when re-inspect our routes which we are currently doing right now. Our approach. We need to survey and inspect city infrastructure. We use GIS to analyze and prioritize maintenance via our pavement management software, our cities GIS and pavement management software. We use project coordinators to find potential conflicts and hold monthly meetings to resolve them. We have increased -- toughened our regulations and street standards. We charge higher fees if they do not coordinate the prioritization. Because we are adopting these policies city Council has tripled our funding into 2021 to reach this goal. The trench fees are based on existing PCI scores. And streets are inspected and as the PCI

scores increased the trench fees are visible to the utilities department via GIS users over there to see what the actual new scores are. We coordinate during construction. In 2016 the city will be imposing stricter restoration standards for trenching in the streets with a PCI of 80 or higher, in addition to our current fee of \$17 per square foot which goes to offset costs in the city's general fund. We require all large private developer projects, nonresidential, to resurface the phone with of the property that they are working on once it is completed. Jerry talked about outreach. I can't say it enough. Outreach. Outreach. Outreach. We send our project updates. We give out tons of information about our paving projects. We send out flyers and utility building statements -- billing statements. We notify the residence about everything and keep them in the loop. This is a map of our unplanned work such as Maine lakes, collapses, that of repair, customer initiated projects, etc. These are all part of what is in the cities GIS. These are actually trench plate locations in the city of Palo Alto. The engineer operators and so these plates at these locations. They get tags for this legend and are entered in and is visible to me in real time. I can coordinate with operations department to fast-track these repairs prior to our overlay for presented surfacing -- resurfacing projects. We don't want to stop private development from occurring that we can mitigate with ordination and trench fees. This is our list of internal and external stakeholders. Would you will meet monthly. The entire internal contest to meet at a mandatory monthly meeting. In 2000 we only met quarterly and it was less efficient. Since then we have been meeting every month. This provides updates and verifies construction schedules and propose projects and make sure the ones that are proposed are still on target. The city of Palo Alto owns all of its own utilities directly. With that being said, all stakeholders have a vested interest in coordinating work at the highest level possible. As we encounter conflicts with the external agencies listed there we bring them in the mix of our monthly meetings. --

Chip is going to take over here.

Thank you. We are secondly -- we are going to describe the second step of our implementation. The first one is a simple bit of data entry so all the stakeholder groups can enter project information. They have to go into the GIS, to a polygon around the area of interest and a few attributes and then we were going to use GIS capabilities to find overlaps which would then give us a sense of whether might be potential conflicts. What we found was that was too much for users to engage with. So after about six months no one entered into the thing into the data system. We revisited the requirements and try to simplify as much as possible. What we're looking at here is a list of the concepts that we were able to come up with to keep things as simple as possible. We defined the pavement sections as single block roads centerlines. That means our smallest unit we focused on from a potential conflict was so one block on a city street. The project represents all of the centerlines that are acted on a single year. That means that the pavement projects for one year are in one of the project. Then we each segment has its own record in each project. We wanted to focus on simple as possible entry for the users. Try to encourage them to add the data. Another simplification we came up with was how to define what a conflict is. At

first the polygon overlap was too specific. We generalize that so anything on the same road segment within a specific number of years is going to be considered a candidate for a potential conflict. Behind the scenes for storing data in the database system that can be accessed by any number of applications is easy to understand and easy to use. The last bit is behind the scenes everything is meta-driven which means that an administrator can define things like what users are in what user groups, who has authority, and what capabilities are available to that particular user when they start the application. I'm going to step through some sequences. This shows what the data entry looks like and the other shows some of the lightweight analysis and what it looks like. In order to enter data first the user opens the application and because of the metadata behind the scenes when the application is started we know he is in the pavement group. So if he gets a set of pavement discipline we take the current year and a default setting based on the metadata for what kind of project this is. In this case there is a start and end date that can be entered. He enters those things because we want to be able to broadcast to the public the payment dates. That is important. Most of the utility engineers don't enter this. Just getting the year is important enough and satisfies the requirement for coordination. So they tend not to enter start date and end dates. Period to identify segment as a candidate for coordination, they simply click on it. The current year gets appended with the segment that has been clicked on. All the user has to do to identify areas of interest is to click on the road segment and they get feedback, shows the coloring for that year. If the segment is already in the project year they click on it again it will remove the project here. That's the entire data entry for this application. To do some lightweight analysis they can go in and check conflicts and set the number of years over which they want to check with the conflict is. The screen displays any conflicts that show up. They can identify on that particular segment to get a little more information about what they are conflicting with so they can talk to the other stakeholders. If they want more information they can click under the help menu which describes, based on the parameters of the users have entered, what a comfort definition is. Other kinds of output from the system which will be covered later in more detail. They can quickly look at the five-year plan they have such as budget capital improvement projects. They can look at it with all of the other projects turned on. So this is a five-year plan that shows both the paving and utility projects. Let me to sign -- describe behind the scenes. The key part of this implementation was finding a data model that was easy to understand and expendable. When the user clicks on a segment in the project here. If it's the first one it creates a project record and then an activity label. So we're looking at the table in front here, it has one wrote in it for every project for every discipline. Then when they click on another segment or click on a segment to remove it and it adds or removes records from the second table. This is a list of segments or road centerline blocks that are part of that project for that project year. That's the entire data model. It is very simple and means all of our analysis can be used. We can use equals and database query language to draw the analysis without fancy programming. Also along the lines of what gets tracked and the edit made goes into the history tables which is not shown here. That is part of the GIS in general. We can go back at any point in time and see when things

are added and taken out of projects and re-create the project. I will now turn it back over to Murdo to talk about what comes out of the system.

Thank you Chip. I have some extra notes that I wanted to say about the data and project coordinator. All stakeholders maintain and update their own five-year strategic plans. That is what chip is showing here. This is their activity table. The data is accurate by verifying that the mandatory level correlation units. The important thing here -- a success story -- since 2000 and has been almost 25,000 edits into the stable. Only 2150 pavement sections that means everyone has been clicking and modifying the five-year strategic plans. We see that as a sign of success that it is being used by everyone. The GIS allows for output of maps. You can use a single line centerline. You can create a double line Road page. You can actually use the road features, curbs and gutters. All the different layer featured classifications are able to be used in the mapping. For my job, the cities GIS is the most important tool I use on a daily basis. The customized maps that I am able to create through data query enables any user in the city to have visuals to coincide with reports. Visuals are great for city Council and presenting to the general public. I like data reports. We also have a customized pavement management software we call PMMS which is part of the same GIS data set. We also use the street saver pavement management software as required by the Metropolitan transportation committee. We were actually using to pavement management software's. We can transfer data back and forth and share that data equally between both software's. We provided some examples of other uses of project data in the next three slides. These are examples of printed out maps. Here is a map showing pavement data. In the background I have mice -- five-year strategic plan. I want to know more information about why the streets I'm selected for that year. I use the identified button in GIS and it brings up this identify feature. I can see all the database information related to that pavement section. I have the section data right there. I can determine if it is a federal classification. Its pavement condition scores right there. And even street that trenchant views are listed. It's pretty powerful to seal of that. All that information in that feature table can also be Corydon. Can also be queried on. We can look at what might have severe alligator cracking the next five years. I can send out forward to the project core data to see if that can be removed. In this map we have a utilities information map versus are 2015 overlay. The part of the map highlighted in blue is actually under construction right now today. I needed to verify the water valve still operable. So I brought in all of these city utility mains and valves into the steel and clicked on the valve in question. It brought up whether or not it had been married manually actuated and was operable. I am going to be installing a brand-new traffic. I coordinate with utilities to make sure I am restoring the street data successfully when we pave the road. Here is the same intersection. This came up about a month ago. We are still working on this road. We are getting ready to take out a traffic loop. Right here we have the actual real-time location of the traffic signal loops in the roadway. When we come in, instead of removing these loops and starting chaos on this arterial roadway, I contacted by electrical engineering group. A simple phone call. They came in and installed the new traffic symbol -- signal camera activated signals. Now we can change the loop without any chaos resulting from removing the loops. How we provide

coordination during construction. It's quite simple. We provide language in our contract special provisions. We clearly state all contractors shall coordinate his activities with the water, gas, waste load engineer prior to beginning their project. We make the contractors committee with each other. Contractor shall provide a weekly and three-week look ahead schedule with ties into the baseline schedule. The state are entered into the project core data for the web-based map for the resident to view. For contractors to coordinate the construction activities via the engineers involved such as the pavement restoration which appears to be seamless, even though whether one project is underway. That means our coordination is so close now that we are picking immediately after trenching is complete of utility projects. The public perception is that there was only one project there. We take this to a higher level in what we called target work sounds which are neighborhoods throughout the city where we determine all the infrastructure, all water, gas, waste water, infrastructure that needs to be replaced in conjunction with the paving. We coordinated those entire neighborhoods to have the water gas wastewater group replace all of their infrastructure just prior to us resurfacing the roads. In this case no tragedies were issued because of the massive coordination. Citizen involvement in Palo Alto is an important part of our process. This web map of active street project enables residents to click on the map to see if their street is going to be under construction within the next 14 days or if it's currently under construction. On this map you can see the section of this road, a 200 block of this road, is actually under construction right now today. This is where we're showing real-time updated information. These are the dates inputted or updated and project coordinator. Every week during weekly meetings of general contractors we have two and three-week look ahead schedules. This is where I get the dates to update this map on a weekly basis. With five patent projects a year -- five pave the projects a year and currently updating the status of the residence. Some of the cities GIS is available as open data. It's available to the general public. You can see trench plate data. You can see public project data. You can see the road centerline data. All of the data behind each of those featured classifications. My final level of citizen involvement we developed. We have this little app called Palo Alto 311. Residents can report issues, get notifications, ask questions and get city information. The location feature enables these issues to be mapped in the GIS as well. Project coordination of Palo Alto is a success story. It has improved the citizen's quality-of-life. The streets are better. The pavement condition scores are at an all-time high. We have less streets trenched into that are brand-new. All infrastructure is targeted, not just pavement. That is what is unique about this coordination. Not just pavement. We support target work sounds which I just talked about. Provides a routine communication combined between all stakeholders. Provides a working example to neighboring cities. Neighboring cities can adopt our approach. Project coordination is easy to get started. It's a simple approach. Only [NULL] centerlines in a GIS -- only need centerlines of the GIS project. On the right side this week taken from the streetsaver software shows our actual paving condition score at a 79. It's just about to get to 80. Just to move into the upper bracket of the PCI table earlier showed. Another item I like to see from screensaver is what they call the remaining surface life. If we did now resurfacing in Palo Alto a roadway network at 29 years left. That is to reach a 25 PCI

remaining service life. Most people don't look at pavement condition in terms of that. We've had a couple of accolades in Palo Alto the last couple of years. In 2014 the California local streets and roads street assessment update recognized us at the state level for increasing our PCI from a 72 to a 78 in five years. We only one of three cities used as a success story in the states report. To me the most important accolade is this one. This is the feedback from the city's residents. The city of Palo Alto in 2014 performance report, based off of national citizen survey, shows the street resurfacing group had the most improved waiting for infrastructure management in the city department. The graph over here. It breaks out the Public Works operations success story. The amount of potholes they have repaired within 15 days of notification. It's kind of amazing. Our street lane miles are surfaced on this graph. It shows we have been averaging about 36 or 40 lane miles and then resurfaced in the last three years. However in fiscal year 15 and hopefully in FY16 we will be surpassing 50 lane miles per year. This is due to our increased of funding. The premises to Palo Alto. We rank number one among all comparable cities. We rank second in Santa Clara County. Here's a brief slide about the software. Click on these links. I encourage you to check them out. That concludes my presentation. I will hand it back to the goal.

Thank you. I think we're going to go ahead and have my figures some wrap-up comments. What method you want to do the polling first.

Let's go ahead and do the poll questions. >> Everyone you now see three polling questions on your screen. If you can take a moment to go ahead and answer them. I will read them off. Question one. Select the documents activities your agency uses for project coordination. Please choose all that apply. Question on by -- if your agency uses any the documents are participate in any the activities listed above please provide a link to the documents or contact information when we are able to obtain a copy of these documents. And the final question. What other tools do you need to implement a map based project management system in your agency? Please be as specific as possible. In addition I want to remind everyone if you have a question please feel free to type it into the chat box still available on the right side of your screen. In addition, if you'd like to ask a question over the phone, you're welcome to press star on a telephone keypad. That will put you in a queue to have your phone line on muted.

-- unmuted. We do have a question. In each of these example areas, what is the biggest challenge you face to getting this were? I made of getting this to work? That is for one of you too. >> The biggest challenge is getting all the stakeholders involved initially. There was some resistance at first, that change comes about through pushing way through it and creating goals and objectives. Once we got city Council and upper management involved everyone has bought into the system. Like I said we own our own utilities and that makes it a little easier to have all of these agencies internally within their own city. As Jerry pointed out and I have seen other jurisdictions -- San Francisco has its own coordination efforts that brings in lots of outside agencies with good results as well. Does that answer your question?

Jerry would also like some input from you.

I think I will speak to the I-35 most directly. The biggest challenge has been the initial resistance to the status quo. Everybody's business projects are built around getting projects done. This is initially viewed typically of the private sector side and maintenance crews as a branch of the process. It takes time to convince them and involving them in a way of finding out how we can better coordinate so it doesn't adversely affect the bottom line, their schedule, and those kind of things. I think it I-35 was an example where everyone realize there are ways to adjust and give a little bit that they might gain something down the road. That is sort of foreign to the whole arena and I think has been the biggest challenge. As the risk has been lowered and they see a more limited risk things will go better. That is initially always been the challenge I have seen. >> One more question for you Jerry. >> Did you see quantitative benefits and other places or other assessment of results?

Quantitative ones are the challenge. In the guide Texas DOT for example shows a measurable benefit. We did some analysis of the adjusting of one projects timeline. I forget if it was a six minute or seven minute benefit to coordinate the way we did. I've seen the Michigan people talk about how they have adjusted and brought down the road user cost. They base their data on dollars as opposed to management. I was not really able to associate a specific activities or is it just a matter of such work in the following week or whatever type of thing. That still is the biggest challenge.

Finding examples where you can quantify how coordination led to a benefit especially safety and mobility.

Think you Jerry. We will switch back to the presentation for Martha to do some remarks. Then if we have any more questions will open up the question and answer session again. We will have the poll backup if anyone is looking for pieces of information to the second part of our first question. You have an opportunity to enter it again. Martha?

Thank you Nicole. I strongly encourage agencies answer question number one. I think there about 27 or 30 agencies that responded that they have either a memorandum of understanding of guidance for project coordination. Please share this with us. Through this effort we are trying to share best practices with other DOT agencies and other local agencies that are not at the same level as you are. Please take the opportunity to get in touch with one of us and share that information. >> Who have developed a smarter work zone resource toolkit available on the national clearinghouse website. It has fact sheets about Smarter Work Zones projects, case studies, previous presentations, webinars as well, information about deployment strategy, guideline, specifications. That's where we are asking different agencies to share with us their best practices. Because we want to have one place where everyone can learn from each other and continue to implement and adopt the Smarter Work Zones for project coordination or technology application. We also have other resources available that can definitely help your agency as far as project coordination strategy. One of the most important things I would like for you to think about is the peer to peer program. This is an excellent tool for your agency to learn more about other states smart

work some strategies. Again whether this is project coordination and/or technology application and help you implement the strategies in your state or local jurisdiction. Please save the date and register for our next webinar on December 15. Don't forget to check the clearinghouse website for available Smarter Work Zones materials. Thank you for joining us today. We hope to see you at the next trend of work webinar. I will do the spectacle. -- I will give the spectacle. Nicole.

Bring backup withholding questions if you would like to enter your information. 1B If you like to answer question. If you have any questions please type them into the chat box *1 or press on your touchtone phone to be put into the kid ask a question on the phone. I'm going to give it a minute or two for people to respond. If we do not have a more questions will wrap up. >> I'm going to write my email address in the chatterbox in case someone finds their guidance and want to share with us later. Can't wait to wrap it up and like to say thank you to everyone for attending and I hope to see the next webinar.

[Event concluded]