WEBINAR SERIES – MODEL DELIVERABLES AND QC PROCESS QUESTIONS

Project: **TxDOT Digital Delivery Program**
Date: Monday, February 24, 2025 | 9:30 AM – 11:00 AM CST
Location: Microsoft Teams

	QUESTIONS/RESPONSES
1.	Some Districts are now requiring constructability reviews prior to construction. Can you elaborate how and when the QC review will incorporate these constructability reviews? (Greg Cleveland) Regarding district roll out and training, we visited all 25 districts last year and are providing continued training and implementation this year on the new QC review guidance. We are working with the eight (8) districts currently participating in our work groups, most of which have pilot projects. Constructability review should be currently being performed on applicable projects. This QC process and checklist is specific to PS&E milestone submittals. We are addressing the actual design components and verifying accuracy. A constructability review should be on top of that, which we are not addressing in this document or in this phase right now. But two different sets of eyes should be looking at it. You have the designer who can use this QC checklist as a guide to help them design and then you have someone checking that design. Having someone with the constructability and construction experience being able to look at it and identify areas that they can then communicate with designers. If constructability reviews are not being completed as part of your QC process, teams should be meeting with their area engineer, area offices, and their construction division. The Digital Delivery QC review process can be incorporated into constructability review with the use of 3D review tools and the detailed QC checks can provide guidance on interdisciplinary review. An opportunity for the DD pilots would be , the model manager supporting the constructability review with the review tool and walking the team and area office through the project to help with visualization.
2.	To make sure I understand the process, in step “3.1.2 - Initiate project in design review platform,” does this require maintaining a Bentley ORD model and a separate "federated" model? (Jim Langston) Yes, a federated model will need to be maintained throughout the milestone submittals. See TxDOT’s DD website for guidance on ‘Using Bentley Infrastructure Cloud Platform (ICP) for Design Review’ for detailed on created a ‘Master iModel’, or federated model. The expectation is that throughout the design process, a model manager will maintain a federated model. We have guidance on Wednesday coming out about that federation process. As for the 3D review platform being Bentley or not, that is a component not yet finalized but we wanted to share what we're doing right now on the pilot projects.
3.	Can you clarify the difference in the requirement for the Model as the FIO and Model Deliverables? Phase 2 starts this summer, and the Model Deliverables will be required in November and I'd like to understand the difference in these requirements. (Katie Kirk) Model deliverables is a key initiative within the Digital Delivery Program (DDP) in which digital design files (aka CAD models) will be utilized beyond plan sheet development for the letting, construction, and asset management. The DDP is implementing this initiative with a phased approach: - phase 1, internal quality review of design models to access future training and software development needs; - phase 2, earthwork model deliverables provided to the contractor as “For Information Only” (FIO); - phase 3, enterprise 3D review solution for all districts including technology and training deployment; and

	- phase 4, earth work model deliverables provided to the contractor as "Model as the Legal Document" (MALD). Note phase 4 is still in the planning phase and is subject to change. Therefore, when we say models are For Information Only (FIO), that's really the same thing as the phase 2 of the model deliverable initiative. Eventually, when we get to Model as a Legal Document (MALD), we will have additional guidance and training. The model deliverable plan in DD QC Checklist for PSE lists the files that need to be submitted as part of phase 2 for model as FIO. As the DDP matures, we'll modifications to this list. Using the model deliverable plan will give you an idea of what is needed for model as FIO this summer. When we say FIO, think of it as not being signed/sealed by an engineer. Whereas when we say MALD, that is a model that's effectively signed/sealed by an engineer. Both summer and the month of November were mentioned. Is the start date flexible or is there a certain date in mind for phase two to kick off? We are evaluating when the exact start date will be for requesting the Model Deliverables as FIO. We want to make sure there is a process and that everyone has the tools they need to deliver, and this checklist is a good tool. We are working towards the summer to begin Phase 2 with the exact date is still to be determined. There will be communication sent out to everyone, both internally and externally. This is, in part, the reason for these webinars, to provide advanced notice of upcoming expectations and to ensure everyone has the proper training and documentation that they need to compile with the phase 2. The reason November was included was to account for the letting schedule which would result in model deliverables being posted on the district FTP sites no earlier than the November letting assuming FIO model deliverables are required as of the summer. The final PS&E plans and FIO models would be due to districts in August or September. When you submit your model as an FIO, you are submitting all of your deliverables for letting, whether that's in-house or consultant design. The date that Jacob and Design Division determine to be the best is when final plan deliverable submittals will be due.
4.	For Taylor, will there be a format for display of the model like wireframe vs. smooth? The breaklines will work out, but rail or retaining walls, for example, may need to be solids. Is this correct? (Jim Langston) Remember who your audience is for the model. How the reviewers want to see the model might be different than how the area office, the inspectors, or the contractors want to see the model. Guidance will be provided on this and may part of the model development standards that we are discussing. Currently, we are not prescribing which display view the design team needs to use.
5.	I noticed for a 60% deliverable, there is the item, 3D model breaklines. Can you elaborate on this? Is a TCP model to be expected for all PS&E projects in the future? (Anthony Lozano) 3D model breaklines are not required until the Final Stage (90/95%). We don't want to do the breaklines too soon because if there are changes, breaklines would also need to be updated causing unnecessary rework. We will double check that our posting online has this deliverable at 90% or 95%. If some people are not familiar with the term 3D model break line, it can be viewed as a skeleton of your model, the backbones, as 3D line strings that are generated from a corridor. The 3D model breaklines should represent grade breaks, lane delineation, and others. The DDP is currently working on the Model Development Standards Guidance to define which model elements should have 3D model breaklines. 3D model breaklines can be viewed at any point once a corridor is generated, but the QC Checklist is referring to curated breaklines that follow the guidance provided on TxDOT DD website under "3D Model Breakline Curation Process." The goal of this curation process is to resolve gaps, overlaps, and duplicate linework and ensure clear naming convention for ease of understanding by the contractor. This guidance was developed based on national best practices and contractor feedback from AGC. Regarding TCP question, we are exploring TCP models for the future. We have worked with our contracting partners and realized the advantages of having a phase model. We realize this may require a larger level

	of effort potentially, especially starting out, but we know the benefits. As we continue exploring, expect phase models in the future as a deliverable.
6.	What are you considering for pavement marking and signing models? (Jim Langston) When you look within the checklist, you'll see our traffic QC tab that talks about what we expect to see in a roll plot on a DD pilot project. There is minimal detail in the model QC checklist for traffic specifically because we are still in the workspace development phase for additional cells for traffic and for signing. We are looking at using the roll plot and 2D elements but please reach out if anyone sees an opportunity for enhancements.
7.	If Infrastructure Cloud is selected as the Design Review platform: (John Padilla) • How will data hand-off be handled? Will there be a single Cloud project connected to a TxDOT ProjectWise Work Area? We are exploring how the ICP set up with external users and have been working closely with our ITD staff to identify requirements and access control, as we take security very seriously. One of TxDOT's goals is to get consultants and contractors within their ProjectWise environment for more collaborative and efficient work. This will streamline a lot and help with the handoffs and compatibilities. This is one of TxDOT's near term goals but cannot provide a timeline due to the intricacies involved. ITD staff are heavily involved with this process and working to build a path. • I'm assuming the Model Manager will be responsible for managing iModel synchronizations? Yes, and if not the Model Manager, then assigning responsibility to someone else and verifying completeness. • How will data hand-off be handled for consultant design projects? Will consultants be working in TxDOT's Work Area? If not, how is data integrity being addressed? Especially critical as it sounds like reviews may become more frequent based more on component and less on milestone. See previous response for external access. Current pilot projects are being designed in-house by Design Division and now San Angelo District is leading design too. We are testing out different scenarios and looking at how the contractors interact as well. Also, the reviews will still be focused on milestone submittals with an emphasis on detailed QC occurring prior to the submittal to the district. • For consultant design projects, if we're not working in TxDOT's Work Area, will TxDOT developed ICP Forms (native, not PDF) be made available for use? First, the DDP needs to determine if Bentley ICP will be an enterprise solution for model review. If so, then the next steps will evaluate external access and the distribution of configuration settings such as project set up and forms.
8.	Regarding model detailing, what level of detail needs be in the model? For example, showing pavement marking and striping, utilities, and cross street grading details. TxDOT ORD work set doesn't have all of the feature definitions (like TCP related features, striping symbols, pavement materials), so it might affect some of the deliverable criteria like automatic annotation, etc. (Ghazal Sokhansefat) Thursday's webinar is on TxDOT's Model Development Standards (MDS) Guidelines and level of development (LOD) spreadsheet that will provide instructions for modeling criteria and considerations. The LOD spreadsheet breaks down model elements and classifies model elements by numbers 100 through 400.For instance, level of development 200 helps you understand that the expectation from TxDOT is delivering a 2D model element with additional notes and guidance. We see complexities in model elements that are LOD 200 but have 3D dimensional properties in the model. For these cases, the LOD 200 communicates to the contract that the model element should only be relied upon for the 2-dimensional properties. For in depth guidance on this topic, refer to the Thursday webinar on MDS and LOD.

	If you have additional workspace enhancements requests, we encourage using the digital delivery email (digital-delivery@txdot.gov) to share things that you are seeing and using every day. We are working to prioritize those enhancements, and this email is a great way for the program to hear from you. Another point is that we view our ORD workspace as an evolving entity. We know that as time goes on, continuous enhancements will be made to it, and the MDS and LOD will be updated as needed.
9.	ICP seems like a good tool for reviewing the model, but with hybrid plans, where do you track the PDF comments? Tables and quantities... and those types of items? (Drew Wilson) For the DD pilots, we are asking the districts to use the PDF markup tool that is part of ICP. This way we are not only use Infrastructure Cloud to review the iModels but also to review the PDFs and use PDF markup tools. This allows us to give Bentley feedback on the tool's existing functionality and define preferred review workflows. Taking it a step further, we are asking reviewers to fill out a comment form, which you'll see more about in Wednesday's webinar. Essentially, instead of using a highlight or markup tool, you create a form and type in your comment. This allows the dashboard to track all of the comments. Bentley has also showed us some new technology that would allow the sheet view and model view to be side-by-side. Advancements are out there. GIS has also shown us a couple of different ways of using the plan sheets to attach details to model elements. We are still exploring and understand there's a hybrid need for review. For more information on using Bentley ICP for PDF review, see TxDOT's DD website under 'Using Bentley Infrastructure Cloud Platform (ICP) for Design Review."
10.	Will the Division reviews such as PBLR and HYD work similar with models as they do with pdf's? (Jim Langston) For the DD pilots, we are working with bridge division and H&H on the submittal and review process for models. It's important to note that when we start talking about models, it does not mean that everything is a 3D model. We need to continue making sure people understand there may be elements that are still on PDFs. Our goal is to make submittals and review the most efficient and thorough as possible. It's an exploratory process to determine what remains in a PDF format.
11.	Will training be open to consultants? (Philip Barnes) Every training held will be added to the TxDOT website. Each will have a breakdown by chapters. And we will continue to reach out to consultants if we have openings in our internal trainings to ensure classes are full and that the consultants are getting the necessary training.
12.	Will the Model Manager be a new consultant rate category? Is there an anticipated # of years experience requirement for these individuals? (Eugene Lee) This is yet to be determined. We are exploring what a model manager looks like but believe it is a necessity. It is too early for us to determine rates and potential years of experience. We are going to need more data points for us to confirm the model manager responsibilities and what the experience level needs to be. Once that happens, we will work with PEPS to determine if this needs to be a new consultant rate.
13.	How will sequence of construction and project phasing be communicated? (Noel Spaar) On FM 1977, we had a phased narrative and then we modeled our TCP phases. We anticipate it looking similar to this moving forward. We will have phased models that represent the earthwork and pavement phases. Districts have preferences on how those phases are broken up. We are exploring, but at a minimum, we want to make sure that the earthwork is constructible. In this pilot, we gave the contractors the earthwork quantities and phases and they appreciated that.
14.	Comment - Break lines can be reviewed at any time by reviewing the corridor files in a container view, without any extra work on the design side before the final submission. (Catherine Cassar) See responses from question #5.

15.	A couple questions: (Nicola Ianeselli) • Do you see MALD to become mandatory for TxDOT? How long will it take? Yes, it will become mandatory. As mentioned, when we roll out MALD, it will be in a phased approach. Through the pilot projects and working groups, we are evaluating MALD for a particular project type in consideration with the size and complexity. How long the full MALD model deliverable initiative takes to implement yet to be determined, but we are going to get there as fast as we can i a way that ensures we have training and resources available to secure a successful rollout. • Do you believe the natural evolution is Digital Twin? Yes, that is what we are working towards. Having a twin of our system will be advantageous to the department as a whole so that we understand, not only our assets, but everything else in between and how it all ties together. • Do you see iModel to be interfaced with multiple stakeholders at the same time? Like BIM in buildings? Whatever we work towards will be interoperable. We will want to make sure that multiple stakeholders can utilize the data that is being captured by the department. Yes, similar to BIM in buildings. It is going to be a matter of what platform we decide to use and how that interoperability works. • How do you see the integration of AI with the design process? We are just now exploring AI within TxDOT and will be working alongside STR division for
16.	When you download the Digital Delivery PS&E QC Checklist spreadsheet from the website the Form control for the checkboxes is showing TRUE/FALSE instead of a checkbox. It would appear these are being created with different versions than some of us have. Can someone verify this? (Darren Conway) Yes, the same thing happened with our schematic QC checklist. We are working to resolve that, but until then, we can upload a PDF version.
17.	I missed the first webinar in this series and understand it is to be posted on your Digital Delivery site. I am not able to find it there. Can you provide a direct link or when you expect to post it? (Gary Soward) The recording of the webinar on February 11th, along with the Q&A, will be posted this week. You will find it on the Digital Delivery Website-Program Updates-Webinars. Webinars
18.	You mentioned earlier perhaps augmenting the DSR to include some kind of “BIM Execution Plan” (BEP). Is there consideration to enhancing this beyond a PDF form? A system that is more interactive than a PDF would be invaluable in helping design teams to better interrogate that document for various requirements, etc. (John Padilla) Yes, we want to make the design, letting, construction, and all the processes involved within the project life cycle, more efficient. If there are opportunities for efficiency, we want to explore those.
19.	Jacob/Taylor – Do we anticipate temporary TCP drainage to also be a part of these TCP models (culverts, inlets, etc.)? (Carlos Pizarro) There is value in that as we understand what is occurring during our phases to make sure we are not flooding a roadway or flooding someone out due to construction. As we continue this process of phasing our TCP models, we can better determine if it will become a requirement. For our first pilot, despite being a small job of .3 miles, we found that completing the phased TCP model was helpful with temporary drainage. During the phased modeling, we discovered that the initial order of phasing would potentially cause some ponding issues. The ponding was identified during the constructability modeling review, through some surfaces and contours within the phased design. The team was able to easily spot that in the model through the contours and the surfaces and adjust the TCP to avoid extensive temporary drainage measures.

20.	Have you explored Bentley Infrastructure Cloud for digital iTwin of the project? Can you please share your experience or any future plans to use it? (Vishal Salunkhe) We are in the planning stages for a digital twin for Texas. While there has been an initial investigation into Bentley's solutions digital twin, further investigation into software solutions is necessary. With any solution, we are placing it through a thorough vetting process. We are doing our due diligence when it comes to exploring any sort of solution for any part of the program.
21.	Will there be prerequisite for the DD training? (Leonard Macias) We are working on having a training path to ensure users understand which course needs to be taken before another and which courses are prerequisites. Some will require that the user knows how to model in ORD before doing anything else. We plan to notate prerequisites on each training course.
22.	(Nicola Ianeselli) • Do you guys have any interface with other DOTs? • Bentley has a platform that embeds AI We have frequent peer exchanges and participate in conferences and organizations that are advancing similar initiatives. TxDOT is also a member of the BIM for Bridge and BIM for Infrastructure pooled funds among others.