PRESENTER: So then we learn how to check for violations of airspace restrictions. So some of you may think, oh, you're working at People Mover, that's not really an airport job. Well, it is, for two reasons. It interfaces a lot with terminal buildings and also has to constantly check if anything that we add in the area of an airport, would violate airspace protected zones. And we'll take a look at quickly how we do that.

Integrating civil components with airport building components, I've giving you the core of that ready. And then learn how to develop engaging public presentation, that's also-- when you're working any airport the stakes are really high. Everybody wants to know what you're doing. And you are under scrutiny continuously.

One of the examples that I'll show you today is for LAX. So you think you can imagine, you can't. So the constant communication between your client, and the public, and interested parties, and then the mayor wants to know exactly what's going on at any point, and then he wants to have a visualization in his office playing, and things like that.

So this is not just my work. So there's three major contributors to the models and data that I'll be showing-- parts of them. WSP Parsons Brinkerhoff is the company that I work for, and then STV, and Lea and Elliot-- STV was mostly responsible for architecture. We were responsible for civil and other engineering systems. And also I was leading the BIM and CAD management effort for that planning project.

So it's not design. It was just planning. And then STV was doing the architecture. And then Lee and Elliot were doing the track design, and basically, anything related to the APM systems, automated people mover, right? OK.

So the first step is to collect the base data. And then many times, before we had these tools-- first of all, we put this together and this example will be, for pursuit. So you don't have time. You don't have budget, but you expect it to really shine and impress everybody. And how do you do that under those conditions?

So lucky that we have tools. We use InfraWorks, and especially the Model Builder. How many of you have used InfraWorks and Model Builder? If you haven't, you absolutely must try that out. Pick any area, especially if you're in the United States, anywhere. Say I want data from here. And that's exactly what I've done for this example.

You get this user interface that's somewhat like Google Earth. And then you choose your location. And then you just say, here's the model. I don't even know if I have the name there, I hope not. OK. So and then you just sit and wait for that email to say your data is ready, go ahead and open it.

And so when you open your data it looks something like this. Now this might look trivial, oh, nice aerial image, but you don't see that there's buildings there, and they're all 3D. There's roadways, and they're all 3D. And the terrain model is, so you're working in 3D already. And you have the aerial image. And it's an integrated data set you just start adding some concepts, such as a new airfield.

So for this example, we added a new airfield. And this was done in a day. With little bit of detail, not too much. But then I'm going to show you we had alternative layouts. And that's the magic of it. So for conceptual and planning, I'm going to go into that demo right now, just to show you what we did there. But that's basically-- you go from nothing to something that you can show to your client within a day. And this was done by one person, all this.

So let's take a quick look, shall we. So I've seen a few hands went up when I asked how many of you used InfraWorks. So I'm assuming that that's how many of us. But InfraWorks allows you to create multiple alternative-- what they call in their proposals.

And you start from something that is automatically, let's see if we can see here, called the master. And the master is your original data that you just imported from Model Builder. This is what you get without any effort. And then you can start creating alternatives. So for alternative one, I think you've seen that in the previous slide, we had something like that. For alternative two, pay attention to those taxiways. Taxilanes, I should say.

So here it is, just taking its time. So the funny thing about this is I haven't used much of any customized content for this. It's pretty much your roadways with some changed parameters so that they are as wide, and with a sloping, and shoulders, as your runway would have or taxiways. Also in InfraWorks, you can design the profiles for them. And I'm not going to go to that one now, but if I turned it around-- everything you do is simply 3D.

Then we put some coverages in and giving them some grading rules. So then they also wanted to know, how will be the balance between areas in-fill and areas in cut be distributed across the site? They knew that they're going to have a lot of fill in this area. And that's due to

that detail of the airport design. I want to get into that.

And they also knew they're going to have some cut over there, but they wanted to know, given the runway elevations, what will those be? And there was also, obviously, for a long time a designated area there for a second airfield. And then as well, the taxilanes that were connected to-- obviously, that's the terminal building.

And so all this was done-- I'm going to tip over this, definitely. All this was done in a day. And then there's more to it. This is not all. From getting the data to putting two alternative layouts with-- let's zoom in a little bit. Each one of these is an intersection, which it is, but not for your traffic in your cars.

And InfraWorks performed, actually, beautifully with all this. The only thing that was giving us a bit of extra work was the line marking on the runway. That's a CAD file. In the more recent versions of InfraWorks, they allow you to bring in a CAD as an overlay. You can drape it over a terrain. So that's exactly what we did. We put that on top of that runway. You can see it. It's a CAD file with its extents showing over there.

So these are maybe looking deceiving, but this is huge. So you have to be six to one. So these are with your proper gradings and whatnot. And that's a quick and easy hit on a proposed airfield to do for the airport.

Now I want to go into more detail. What happens when you really have to plan something that is in a congested area? And for that I'm going to first present to you the difference between InfraWorks and Civil 3D, the kind of workflows that we can have.

So we basically start by base data in InfraWorks. This is what I was just showing you there. Then we create a few concept models or proposals, or proposals in InfraWorks. Those can then be exported to Civil 3D, which is what we did.

Why would I do that? Well, the model with InfraWorks is very quick and smart. And you can put many alternative options together very quickly. But when you want to show any detail to your customer, you do want to create say, for example, a proper corridor and create some solids from that corridor. And then you can import those solids back to-- so there's a corridor model in Civil 3D.

Now what happens with each one of those taxilanes or taxiways? You get an alignment with a profile in your Civil 3D. So you're ready to go if you have a decent subassembly or assembly.

You can put a corridor model very quickly, and fine tune it, and do some other more detailed design in Civil 3D that you can do very easily.

Then we create corridor 3D solids. And then we can import those back into InfraWorks, this time with much higher level of detail to work with. And then in InfraWorks, we'll look at that later on, for presentation, you can create proposals or scenarios, as they call them. And then go to your client showing just those to tell your story.

Literally, how many people have used storyboards in InfraWorks? OK. So it's a great name. That's exactly what you are working on if anybody ever looked at what storyboards are. The way to tell your story is to create a storyboard and structure the presentation. And then those storyboards are filled with little animations, slides, some overlay text. You're making your own movie, basically.

OK. So with that, I want to start a little story that will be in Civil 3D, that will be in Navisworks, and use Revit. Here's the example of our LAX project. And this is just one of the many, many, many alternative layouts and options there that we abandoned in 2014, I think.

So to be able to show you this, I had to get permission. And this is what I can show. There's something else as well, but this is basically-- so what do we see here, is my point. First of all, the base model came, again, from Model Builder.

Before we did the aerial survey, before we did any terrain modeling, we had this in InfraWorks. And we started using dead data. And we started designing alignments and profiles, and putting some custom subassemblies to create these guideways for the people mover. And you can see that there's double tracks, there's single tracks, and they go over each other.

Then we have some roadways, which you can see here. These are proposed roadways. And this is a view taken from Navisworks. So these roadways are designed, laid out in Navisworks. This was not done by Civil 3D.

See, for example, that's an elevated ramp. These are bridges for roadways, and there's a bunch of them. There's a tunnel here. This street here is called Lincoln Boulevard. So there's a tunnel that you take off and you get into tunnel. And you get out of tunnel there. And then this is going west and then going east, have a different traffic flow.

So to design all that in Civil 3D that will take a long time. And get them all coordinated and-- it's

an entire street network, basically-- high capacity street network. So we did that in InfraWorks and we left it there. Whereas, for the guideway, Lea and Elliott, the company that did this, they wanted to do everything pretty strict. They're a very serious group of engineers. And they're very responsible because it's railways. They're very sensitive about doing things right and signing off on any transaction they make with us.

So we took a different approach. We built corridor models from everything that they did because it was already detailed that way. I mean, they had a proper alignment and a profile. And they'd given us all these details for the guideway. And the structural guys were working out the height of the structure. And I'll show you all that detail there. So we said, OK. We'll build Civil 3D solid models and bring those into InfraWorks.

Then the fun began. We had architectural details, which is each one of these stations, that needed to sit exactly at the given station value of the people mover alignment, and nowhere else. If we were going to show this to the client, they had to be sitting in the right place at the right elevation.

Everything you see in color here, except the roadways, the dark color, is proposed. And then this is one of the alternatives that we had. Six different branches from here, optional, that were linking into one of the largest, in the country, consolidated rental car facilities, also known as, Conrac. So that's right there. And I'm not showing that, I wouldn't dare. So that one has six and half million square feet of parking, and office, and workshop space.

So these are proposed changed and upgraded parking structures that were considered at the time. That was a wonderful idea, hugely expensive. Nobody is going to do that, but it's here. So those are buildings, there, there. And there's also like a little shopping mall wrapped around the station there. You see, that was a wonderful architectural exploration of vocabulary and whatnot.

And these yellow lines are pedestrian walkways. Now each one of them is an extruded building with moving walkways, windows, floors, roofs, on stilettos-- on columns. So all of that needed to be put together. This is snapshots from Navisworks, as you can tell right there. All of that was put together, not to mention the existing buildings, which is an entirely different story.

We didn't use those that came from Model Builder. We purchased the data separately. It's a GIS file. It's a shape file, if anybody used ArcView ever. But each polygon has height and elevation. So when you process the data in InfraWorks and take those into account, you end

up with a very detailed building footprint with accurate heights.

So for any visualization it doesn't look all flat, and monotonous, and unrealistic. It looks more like your sky-- OK. I'm drawing a blank there. You know what I mean. Like a sky space, right? So skyline of the area.

So how do you even begin with all this? So first I mentioned that we did some work in Civil 3D. So I want to show you what we did there. When I find it. OK. Right there. So we began with, actually, this thing here. So this is a little development tool that comes with Civil 3D.

How many people know what this is? OK. It's a subassembly composer. You're essentially playing with a LEGO that you, actually, can add some intelligence in. You can add data types. You can add how each one of these little points and links and how are they calculated. And then they're grouped in blocks of data.

So this block diagram is actually a flowchart, which is what it implies. And when you say, Save and send this to Civil 3D, the system creates a little program in the background. It's actually a windows application. But this is how you program it, how you develop it. So you need maybe 5% or 10% of knowledge of any given programmer, to write this program for Civil 3D, so you can do things exactly the way you wanted to do.

So what's going on here? Right there, where I'm just pointing now is the attachment point. And this is where you baseline. So obviously, this is the track alignment, whatever the track is. We don't know yet. It may be rail, it may be not. And then you have what we call the left track offset. The left track is another alignment and profile that's used as a target.

So why? Whoever's using Civil 3D, they will know what the target is. So I'm targeting this point by attaching a horizontal and vertical alignment to it. So this could go not much vertical, but horizontal, definitely. So this controls the elevations and the horizontal flow.

And this alignment here controls how far the tracks are because they do come apart, and come together, and things like that. And then also the width because of the systems and equipment that needs to be considered. Each one of these edges changes along the elevated guideway.

So these were the challenges for a developer of this custom subassembly to meet and answer to, so that we can use this very automated way and account for all the changes of, shall we

have stationed here or not? Wait a minute, we don't have a station here, so we can bring those tracks narrower, because it's much cheaper. Whereas here, we have to come apart and go through the station. And then there are some stations that are too close to each other.

OK. Other details of the system that require us to keep the tracks separated. And sometimes over longer distances, so we need to cut holes in the guideway. So this subassembly has enough intelligence built into it, has enough smarts, to be able to make decisions based on what local conditions we put it in.

And it needs a little branching, so if whatever that's testing there is true, then do this. If not, then do something else. And then if you go that way, then you go to another flowchart. This flowchart can have 50 or 100 different items in it. So you can draw something entirely different based on that decision. And you arrive at the end.

So this is, ultimately, a geometric object, a parametric object in Civil 3D whose behavior and sizing you control parametrically. And those parameters are defined by you, exactly the way you want them to be, right here. This is the development tool. And then we did this for roadways as well. We did this for other components, but this is the concept. This is the basic technology we used.

So when that arrives in Civil 3D it looks like this. So when I click on it, it's going to tell me, hey, I'm a subassembly. Do you want to change my properties, check something? This has got nothing because everything is a target. Everything is controlled by another object in Civil 3D.

And here's how that looks like in a corridor model. So little alignments for these are called crossovers. And so whenever you have a crossover, your guideway structure needs to widen to allow for more equipment. And look, the tracks come apart and come close all the time, throughout the entire length of the roadway.

And of course, there is a maintenance facility, so you need some lead tracks to get to there. And so there's a lot of detail here. And then when I click on that entire object, I get through 3D solids. Those 3D solids can then be exported to InfraWorks. And that's exactly how we arrived at this model.

Revit is somewhat easier, but also challenging, nevertheless. So if I close this and I go to this different model-- so the key to bringing it all together in terms of data, not yet in terms of visualization, is to establish the shared coordinates system. How many of you have used

shared coordinate system? And of those, how many are Revit users? Everyone. Excellent.

So when working on an infrastructure project where you need to put a building on a bridge, right, that's the major challenge, to first establish the shared coordinates, then stick to them, but also keep everything synchronized between the two models, the civil structure and the building structure. So this is the key to your success.

Now we all know how to do this in Revit. I hope we don't need to hire a special service for that, to establish the shared coordinates and then maintain them. However, Autodesk have given us an easy way through this.

And especially Revit users, they want to know about it. Of course, they know how to set-up a shared-- I mean, some Revit users know how to set-up Shared Coordinate System. But even if they're not clear on that, or haven't used it, everybody frowns on an automated way. I love it because all you do is you just go to the toolbox, different roles for different parts of the software.

And I go over to Shift Reference Point. I right click on that. I execute that and then it's asking me a few questions to select the origin point. You must select the one whose coordinates you know exactly. And then we also establish what will be the rotation between the true north and the project north in Revit. And it simply writes a file. It's an xml file.

So we publish shared coordinates from Civil 3D. And then we decide that it's in feet. We look carefully at what we got. And then in Revit, we simply run the same type of little macro that will import the shared coordinates from xml file. And the file name you use to save this to, becomes your shared coordinate name. And you've done.

You keep your work sharing, and you keep your Revit data, using this Shared Coordinate System all the time. If you are within two miles of that shared coordinate, you're perfectly fine. If you need to go with something further, you might establish another one. So you might have two if your project is, I don't know, 15 miles long or 30 miles long, things like that. OK.

So I'm not exactly sure if you all need to hear this, or this might be yesterday's news to some of you, but I've seen a lot of trouble rising from this not being set up, or maintained, or both. So I wanted just to make sure that we get that point across.

So I'm going to go back to our software. And then I don't think I need to show you exactly that in Revit because it's extremely simple. Here it is in Revit, I have that reference file. I can take

that and put it over there. And then set the coordinates for that point. And then set the rotation to that exact value, whatever it says there.

Or I can go here, add-ins, and then import the shared coordinates. And say that's the point. That's the rotation. And where's your file? And I go find that file where I left it, from the Civil 3D, and here it is. And I click Open. OK. Now we're done.

So when I got to Manage, I go to Coordinates and Report. Did I last save this project? I get coordinates that are expressed, this is state plane coordinate system in California, whatever. But it's a 6 and 1/2 million by 1.8 million. And it's got to be for the survey point because your Revit will not work with your project point having such large coordinates. All right.

So once you have that then you can move on. I want to talk about our other objective here, and that's how do we bring all these things together. And then what do we use? What can we use it for? I want to open this airport all. And now we're going to jump onto that other project.

So do we have everything here? OK. So we're going to go and take a closer look at components of this project, and how successful we were doing these things. So this is a more advanced idea and concept. I think we have to wait for a little while now.

But here we have more than a simple building and the Civil. I'm going to show you how we have some of the roadways that you can see right there, where the tunnel came out from Lincoln Boulevard. We're, obviously, going to look at some Revit models. But there's also a lot of content underground.

And that's what I've been telling you was in the description of the class. You have to really work with all zones around the airport. An airport is not up in the air or your air field right here. Airport is also these terminal buildings and the connections with them. Airport is also your public transport access and public access to it.

But also, airport is how those two interact, and how all of them interact. Your Civil with your buildings, your buildings and Civil with underground utilities. So when I show you what's going on under this area, really, you'll then see that that's a major part of the entire task.

So which way are we going to squeeze this people mover and the elevated guideway through this congested built up area, depends in a great on not what's going on there, and avoid all those, but also what's going on underground.

How do we come up with a solution that does not make the airport relocate 50% of its telecommunications, hot and chilled water, fuel lines, power lines, and water supply, sanitary sewer, storm sewer, and a bunch of other things that you can never lay your foot on, let alone a support for an elevated guideway. So if this is now back in control, maybe I can show you some.

By looking at those columns or their foundations, you can see where we go. And now you're looking at terminal buildings from under. And this is, call it underbelly of the airport terminal area. But all these red are power, blue, obviously, water, green storm sewer, brown are sanitary sewer, purple or magenta are either fiber optic or otherwise telecom cables.

A lot of stuff has emerged here, so everything is fiber optic, it's not. Every blue is some water, whether fire, hot and chilled water, or just potable water supply. There's also recycled water, and so on and so on.

So how did we get this? We started with GIS data. We found a lot of public information from, in this case, Los Angeles Department of Water and Power, that had in shape files. And some of them had even elevation, for say, water, this is the first pass. So don't think of this as the design. It's not.

We hired a completely separate service to go along the narrow path of the guideway, and actually collect the actual existing utilities to comply with standards and build us a 3D model. It would be most interesting to see how it compares with this, but it suggests that data. And what's the difference?

Well, if you look at between two nodes, like here and there between two manholes, we have a straight line. That's hardly ever the case in real life, especially when it comes to water supply. They go under, and over, and bend around the existing manholes and whatnot. So this is the first pass. Something to give us a good idea of what we should expect. And where are the expensive areas to build and less expensive areas to build. So you take that with that understanding.

However, already in this model, I can go and run a clash detection and give you the full list of exactly which column, that you see here, that we are proposing, interacts with what type of service. And I didn't quite touch on that.

But if I call up that one and I'll click on that line, it's going to tell me, that's a sanitary sewer. I

should leave that on. That's our electricity. And this guy here is-- that's water supply. So I know what I'm hitting, and where I'm hitting it, and how much of it we have if we should go that way, as opposed to go some other way.

So with that, I'm going to do something else. I'm going to go, Save viewports, and I go to what I call part 77. And part 77 is something from the FFA standards. These are the airport surfaces, which are mostly departure and approach surfaces by different types of aircrafts. And then they consolidate all that data and come up with a unified, what they call part 77, by the standard.

And so we model those as well. Obviously, with Civil 3D surface models. And so here I didn't even show that. So I'm going to unhide that. And so when I zoom in to the airport area, I think you will begin to see at least something.

OK. So the dark blue is the actual protective surface. And then you have these little things, like that's the new control tower. OK. And typically between the two airfields, right there in the middle, it's not critical. And hopefully, no plane will try to fly that way, but that's the old tower.

But look at that, there's a number of buildings. These are all existing. We didn't do this. This was there before we came. --are actually violating that space. And for each one of those, each time anything compromises the airport surface, the entire airport has to modify their operations book. Every airline, every aircraft that flies from there, has to be informed.

And every pilot has got to know, if one of their engines goes out and they have to go at the lower and slowest surface, what conditions are there and the decisions that they make, stop and go, is based on the modified airport operations book.

So if we want to be a good consultant and do a good job, we shall not add anything to what's already existing, like we had over there. So how do I ensure that that's happening and exactly where? I want to show you a little window. We're running out of time.

And so I'm going to add a test. And I'm going to pick buildings versus part 77. OK. And I'm going to run the test. And for each one of those where it happens, it's going to take me there. And you know what clash detection is. If you've ever ran a clash detection, that's what it does.

We did this for utilities and columns, but also this was kind of exotic. And we did this for the one engine inoperable surface, which is very flat and low. And we realized that our guideway, when we put the equipment on top of it, which is a train, and any one who would want to have

an overhead catenary line for power, would be violating over 1,000 feet.

So we had to change the profile. We had to realign the alignment. And then, I think, the verdict was there will be no power supply overhead. It's got to be built into the guideway as a system. So all of those decisions were based on the fact that we detected that it was violating one of these surfaces.

OK. So I don't have a lot of time left, but I want to show you a couple of things. Let's go and turn that off. And I'm going to go back to my overall-- OK. That's something different.

So now, roadways-- a couple of tunnels. So here's where the three tunnels-- these are roadway tunnels that we were relocating some streets converge together. And to prove that they're tunnels-- so this required a different custom subassembly, you can see it right there. It's got that box tunnel cut and cover type that shows exactly which way it goes.

But also, if you look it's going to tell us exactly, if we want to do the fancy project like this to put urban highway underground, then this is what we're hitting underneath. These are the utilities, these are the conflicts that we're going to encounter. So that's done for roadways.

So again civil 3D model in red here, combined with utilities. And utilities were also done in Civil 3D. We started, I said, from GIS data. And then simply applied-- created the pipe networks for each service separately. And for water, we just said, all right, it's three feet under. We just dropped it by three feet. And then we arrived at this. Of course, it's not accurate.

But no matter how much work we've done with the GIS data, we wouldn't get it design accurate. For that, somebody has got to go there and scan. Did you hear that they do it like a CAT scan now? Like at hospitals, they do that for existing utilities.

So except for the storm sewer, storm sewer had as-builts with invert elevations and manhole type, so we did that properly. We did that right. So you see the green here, that is what it is. But then again, we can never know what happens between two manholes. That's anybody's guess. We assume a straight pipe, but mostly not. OK. So that's what we did for utilities.

And then the last one-- I want to just go jump back to InfraWorks, because time's running out. So how do we present this? And I like to use this as an example. You start from your concept model, from your planning data, and you go into things like storyboard creator. And I have one that is pre-made here.

So the storyboard is a few different components there, that you can see. And if I go and just play the entire storyboard, this is now telling the story in a way that I told it, which is one of the infinite possibilities. And you can replay and rerecord this. This is alternative two. If I go there and change it back to alternative one, I'm going to rerun the same thing for a different alternative. The same animation, same presentation, different alternative.

So if I go, simply, click there, alternative one-- I don't know if you're going to notice that, but it doesn't matter. Playing the same animation, but this group of taxilanes is for the north, not right there. So it was very easy to create because right here I can record this. See there, I can do whatever the video file type, and AVI, and whatever I want to do. So I just recorded two animation files.

And I love the fact that how easy it is. Once you get a hold of different camera paths, different cranes, zoom-- I mean, here we were doing a few things. We were doing zoom in. I was doing crane from there. And I can play just that one. That's orbit, actually.

And then there's a key frame there. Here's the crane down. Here's the crane-- it starts with the crane now. So ask the crane type. And then I went to zoom. I zoomed in just to get closer. And then we went into orbit, which orbits just around. Now that's a simple case.

Now with this one, you're not going to impress anyone with your media content because it isn't really. I mean, you can add sound. You can overlay with signs. So you can put some text there, put some labels, that helps a lot. I didn't bother to do any of that for today.

You can take this animation video and send it to Adobe After Effects, and then knock yourself out there. But your graphics, and the level of fidelity of media file, that's what it is. OK. If you want to do something fancy, then you will take your models from this model here. Let's go back to the-- OK. From here and-- for every existing, this is what we did.

First of all, you need 3D Studio Max. That's a media creation software. Then you need a different texture map for each facade that you see, both for existing and proposed. What do you want it to be? Now these are easy. They are going to come from your architect. And you got to have fun adopting the type of facade and finish that they want to have there. That's going to work beautifully. For this we just use concrete.

You can put a train. I think I do have train. There's a train right there. It's hard to see. You'll see it in a moment. There's another building there. So each one of those-- and then also, the

aerial image is used for the rest for the terrain. And then they can animate objects. The train can be moving. Your camera can be moving in a much larger variety of ways than what we had in InfraWorks. But also, the fidelity of media content is much higher.

So when we had the finale of our planning process, there was an industry forum. It was a public event. And the mayor was, while I was, there as well. He was very impressed with a more formal version of the-- the thing that just crashed, that's great. OK. So right on time too. So I'm going to play this to you. Oh, one other thing. This is one of my ultimate favorite. I think we're going to run over time a bit.

So looking from that fancy theme building that we call-- it used to be an Encounter's Restaurant. We produced a bunch of before and after images. So you can see that's how it is today looking east. And that's how it will be once we put the people mover there. There's the Encounter's Restaurant. That's in that building. So you're looking at terminal two. That's how it's going to be after.

Again, a slightly different angle from there, before and after, before and after. These are my absolute favorites because this really gives you a sense of-- this is from an old tower. Somebody let him up there. I'm so jealous of that photographer. But this is what nobody will ever see from the old tower, but this is how it will look like.

And then this is from the parking structure that's right next to terminal one, looking west. So that's how it is today, that's how it's going to be once it's built. And actually, don't take any of this for granted because they're going to change it another 500 times before it's actually built.

So from this angle, this is from parking structure six, next to terminal six-- seven. And that's just from a driving car somewhere. We took that when you're under the guideway. And then this one is further up from the Century Boulevard for the east. So you don't see much there. OK.

So that's one way of high grade media content. This was also done in 3D Studio Max. But simple photographer with a [INAUDIBLE] camera-- and everything from that model that we browsed in Navisworks. That's the building components to produce these.

And then we had the animation. This is not the one we played at Industry Forum, but I think it's appropriate. So let's hear it. OK. I'm not going to go with that sound. And they promised me sound. And I think he just turned it off. Well, I'll do it here. I don't know how many you can hear

that, but maybe I can--

[TRAIN WHISTLE]

There it is, right there. So I'm going to silence that and let you ask any questions. No questions? Yes?

AUDIENCE: [INAUDIBLE] question with the other [INAUDIBLE] group. So when you guys designed [INAUDIBLE] group within Civil 3D, do you usually just go with, on the 3D, [INAUDIBLE] or do you have a 2D [INAUDIBLE]?

PRESENTER: Yes and no. For the people mover for the guideway, no, we didn't. For the street network, the engineers did a layout and worked with traffic engineers to make sense in which way the traffic will flow, for months before we started working on any profiles for it, or a 3D model.

AUDIENCE: The only reason why I ask that is because [INAUDIBLE] 2D, 3D [INAUDIBLE] and then, when you're dealing with the contractor they want to see all these [INAUDIBLE].

PRESENTER: So absolutely. And that's going to happen for design. Right now this was planning. So everything was contemplation, right? Everything was we were trying to get a sense of what the contractor designers will experience.

Now the services out in the field right now are collecting the actual underground utilities data. Then that can be used by a designer for clash detection and construction grade analysis.

OK. Anyone else? All right. Well, thank you very much for attending this. And I hope you have a wonderful rest of the day. Thank you.