KENNETH L. DRISCOL:

Everybody good?

So this isn't the Dynamo and Revit class, right? This is the Green Stormwater Infrastructure.

So one of the things I kind of want to get across before we get started is this idea of-- this is like an open forum. So this isn't a click and pick class. This is an open forum. Because the things that this side of the class does, this side of the class doesn't do. So one of the things I tried to get across in any of my presentations is things that you will kind of be doing on a day-to-day basis or a project base, those are the kind of things that you want to ask in reference to your questions, right?

So if you're doing corridors and someone is doing grading, they don't want to hear about corridors. So you want to ask questions that address your issues at work.

And one of the things that I try to do, because I do a class down at Georgia Tech for the senior engineers who are trying to graduate-- they're in transportation and they're actually civil engineers, when they take the test and things like that. But the idea of what you really want to be thinking about is you want to be thinking like owners. You Because ultimately, it's about a return on investment. Because owners buy the software. Owners send their employees to training. So those are the things that you really want to think about in the back of your minds because the hundred other people that may be vying for your job, the things that are important is the return on investment.

So my name is Ken Driscol. I'm a Civil Application Specialist for a company called Applied Software. And of course, this class is in reference to Green Stormwater Infrastructure. And the kind of living on rooftops works out in terms of using InfraWorks in terms of how you're laying out things.

So has everyone here used Infraworks? Is that 1 hand? 2 hand, 3 hand, 4 hand. So anything that I do is going to be OK? That's perfect. Because I stayed up all night at this party and 8 o'clock came fast.

So what I'm going to do is I'm going to go through a little PowerPoint presentation in terms of what Green Stormwater Infrastructure is. And then, we're going to get into a demonstration.

And it's not going to be where I just go bang, bang, bang, bang and you go, wait. He should have slowed down on the last bang. I'm going to stop so we can see their interface. So you can kind of get acclimated to its intuitive measurements and tools that you want to be able to use. So we'll go through those things.

And then, if no one has used InfraWorks 360, which only like 2% raised their hands, there's some really interesting things that InfraWorks brings to the table.

And the first thing that we want to consider is InfraWorks is about communicating the infrastructure project that you're working with. So someone came over to me the other day and was like, well, where can I print and print out all these reports? Well, you can't do that. It's about presentation and what it brings to the table.

So this large bucket of reports that you may get for stormwater and things like that, it's not going to give you that. So you want to keep in mind to put it in its proper perspective in terms of what we're going to be looking at.

Hello.

AUDIENCE:	Hi.
KENNETH L. DRISCOL:	How are you?
AUDIENCE:	Good.
KENNETH L. DRISCOL:	We said we were waiting for one more person. So the first thing that we want to look at is we want to put InfraWorks in its proper perspective.

So Project Green Stormwater, which came from labs kind of graduated from that preview technology. So if we look at what it wants us to be doing, rapid design and analysis of sustainable stormwater projects in a interactive 3D environment. So it's geared towards planners, engineers, scientists, those who do civil infrastructure projects.

So I was talking to a gentleman earlier today. He's for roadway. He's for transportation. There's some really unique things that Green Stormwater doesn't have for transportation, but InfraWorks does. So in the midst of showing Green Stormwater, I'm going to show a road, just so he can examine what that brings to the table.

I mean, there are those who are doing stormwater drainage, pavement drainage. InfraWorks has all that stuff. So anything that I talk about-- and I'm going to start talking faster as we kind of go through this, because I've downloaded all the data sets and everything that I have here in terms of the user guide. How you can go through everything that I'm going through step by step at home or wherever you may use your machine.

So the other thing that you want to consider is right now, Autodesk has released 2017 R2 of InfraWorks 360. You want to download that as soon as possible.

So what is green infrastructure? So yada, yada, yada. Vegetation, soils, natural processes. So everything that we talk about in terms of hydrology and things like that, in terms of soils, vegetation, things like that, it's within InfraWorks. We just have to go in there and find it.

And I'm not going to read through everything, but this is critical where it comes from. So EPA. At the neighborhood site scale, green infrastructure includes bioretention, rain gardens, permeable.

So if we look about some of the programs that are out there, extra programs, there is some EPA programs out there that do specifically these things. And you can go on and you can open up the application, and then it's going to say bioretention or it's going to say rain garden in terms of what you-- some of these things that we look at here in terms of-- everyone here should have Civil 3D. Anybody here don't have Civil 3D? Anybody So everyone has Civil 3D.

But if you look at Civil 3D and its hydrology programs and storm isn't-- sanitary analysis, it doesn't do some of these things. There's not a button. But just like InfraWorks 360, you can trick the program into it recognizing these things. So this is just one of the things that I try to bring to the table because you guys have Civil 3D. I just advise you of what the software can do and what it won't do. So I'm not here to blow smoke in your space. I'm not trying to sell anything. You guys already have it.

So by the end of this session, which goes really quick, you should be able to rapidly analyze green infrastructure for land development projects, meet stormwater performance requirements. And then, learn how to make the business case. And again, it's always about the business case. Because things cost no matter what you do. When you walk into a building and work, it costs for you to be there.

So as we move on here, let's think for a moment. Why are cities turning to green

infrastructure? So traditionally, stormwater development, draining, permeable, network, inlets, pipes, discharge, runoff. And we're going to take a look at all those things. And then however, gray infrastructure approach has proven to virtually affect hydraulic balance for our sites and watersheds.

Anybody do watershed analysis? OK. I'm in Florida all the time. And every time I talk to someone, they go, we don't do hydrology. But every time we work on a project, whether it's flat or not, you're doing hydrology. There's hydrology throughout InfraWorks 360. They even have a module specifically for hydrology.

So based on the 3D modeling environment, Green Stormwater Infrastructure, civil engineers, landscape architects, planners. Local performance requirements requires sustainability. So we're going to look at that.

So the first thing we want to look at is, where can we use this green water infrastructure for InfraWorks 360? So we're going to talk about that.

Choose and customize a variety of techniques-- green roots, bioretention, swales, pavement, trees, infiltration. We're able to input all that data.

So as we move on here, running an analysis. This is a simple workflow. And the reason I'm putting it here is because when I do it on the screen, it's just a couple of picks and clicks. But everything that I do is based upon this premise in terms of a workflow. It's five steps. So it goes really quick. With some thought, of course.

So build and prepare the model of a project. So with InfraWorks 360, you can go anywhere in the world, grab topo data, aerial photography, and also, roads. And you can create a model from that. Again, anywhere in the world.

And I've tested it. So over in the Cayman Islands, over in Dubai, over in the Bahamas. You know, I went over there just to do some roundabouts.

We also have the ability to set up our analysis. So in reference to setting up analysis, the first thing we're going to have to do is kind of add in a script to get the actual Green Stormwater Infrastructure to work. So we'll take a look at where we do that.

And then, we're going to define a site. There's a couple of people that have been using InfraWorks in here. Defining a site is pretty straightforward. You define the area that you want

to work within.

So land areas, buildings, trees, existing conditions. And again, InfraWorks is about conceptual.

And then, the critical part is reducing impervious area. Increase natural areas where possible. And then, plan for the required green infrastructure. And then we add-in best management practices. Draw and define for runoff volumes. So we're going to take a look at that.

So the first part of the define, run analysis stormwater requirements. We need to tell it the storm event. So within this green infrastructure program, you have Los Angeles, San Francisco, and Philadelphia. So you do have the ability to put in your own user data. But right now, these are the three cities that it really focuses on.

So when we're looking at our hydrology methodology, we're going to be looking at these three cities. And then, we're going to build a model with Model Builder. I've got the model already created, so that's just taking five minutes of our time that I've kind of pushed together.

And then from that model, we're going to lay out from our area that we're working with for our project. Clearly, there are some buildings right here. So someone came to me in reference to Green Stormwater Infrastructure and they said, well, I have this Revit model. I want to use this Revit model.

Well, it doesn't use the Revit model in reference to that because you want to define an area, and then select that area from a building or a coverage to kind of define it. And we'll take a look at those things. And then we're going to choose our method, TR-55 and the different design storms. So again, we can put in our user-defined data if we wanted to.

We're not going to get really detailed about these things. But then, defining a site feature. So if it's blacktop, the cover, the soil, and then the sub-area. And then based upon that area that you define, it's going to grab the square footage, which is typically the same thing we're going to do when we lay it out in CAD, if everybody's using CAD here. And then we'll reduce the impervious area.

So this little area right here, that could be my rain garden. It's pretty straightforward. I mean, because if this is my rain garden, then that takes away that area in terms of pavement. And the whole idea behind this is to reduce that area. So we're going to do those things.

And then in terms of planning, surface cover. Whether existing, permeable, green roof, or

bioretention. And then we move on to our green infrastructure. So we're going to define these areas. And we're going to move on from there. So there's various stormwater performance requirements, direct determination, a description. And then TR-55 rational, District of Columbia, Philadelphia, and then Los Angeles. So again, these are the three cities. Again, most of us are so familiar with the idea of TR-55. So we'll take a look at that.

And then, what it brings to the table in terms of GSI. OK. So that was quick.

Any questions so far? So just a little verbiage in reference to what we're going to be looking at. Yes, sir.

AUDIENCE: How does this compare to [INAUDIBLE]?

KENNETH L. DRISCOL: How does it compare to what? I'm sorry.

AUDIENCE: There's a similar water quality estimation tool [INAUDIBLE].

KENNETH L. DRISCOL: [INAUDIBLE]? So how does this compare to [INAUDIBLE]? The only reason I'm repeating this is because those who are watching this from video, from afar, or at some point I want them to be able to hear the question.

So similarities? The only difference is it's got different requirements in terms of that area. And this has specific requirements for Philadelphia, DC, and Los Angeles.

AUDIENCE: Is this one [INAUDIBLE] track pollutants moving through the system, or it only does [INAUDIBLE]?

KENNETH L. DRISCOL: It does volumes. But in terms of-- there is a menu when we get down, I'll show you, for infiltration, for pollutants and things like that.

AUDIENCE: Second question. Is there a reason why SWMM [INAUDIBLE]?

KENNETH L. DRISCOL: At this point right now, they haven't included that because of the XP SWMM engine and because the storm and sanitary analysis and things that you can use with they XP SWMM engine in reference to what you get with Civil 3D and Infrastructure Design Suite.

AUDIENCE: Cool.

KENNETH L. Any other questions?

DRISCOL:

So one of the things I want you to be able to do, again, is because I'm not going home with you. And I'm not going to be on Google. So this is a good opportunity to ask these kinds of questions.

Where are we at? I mean, we can't do a site from that, right?

So the idea of InfraWorks 360 is you have the ability to kind of set in bookmarks of where your project is.

So here's my project. And one of the things you can do with InfraWorks 360 is I went out and used the Model Builder to kind of define the site.

Who hasn't seen Model Builder? Everyone's seen Model Builder? OK. So I'm just going to jump right back to my beginning interface here. So one pick and we're out of this model.

So when you first open up InfraWorks 360, you get this. So right now, this is kind of showing me the different-- showing you all the different models that I've kind of worked on.

So if I kind of scroll down, you can see there's a plethora of different places and models that have been created. One of the things that you will look at if you're using the old version of InfraWorks 360 is you see these orange eyes. Those are because I haven't updated those models. So Model Builder.

What it does is it comes up with this screen right here. And it comes up with the United States. There's some South Americas in there also. But it's just like Google Maps.

So if I wanted to, I can just kind of move this around. So what area are you living in?

AUDIENCE: New Orleans.

KENNETH L. DRISCOL: New Orleans? So one of the things with Model Builder is you can kind of tell it, specify where you want to be. So New Orleans.

So when I pick on it, it zooms right to that area. So Model Builder allows me to go in and define an area of 200 square kilometers. So if you gave me like an intersection, I could do that. Or I can just zoom in and define the area.

So as an example, I'm just going to define this area. And it shows me how much area that I'm

looking at. So right now, it says that's 151 square kilometers. So I'm going to make this smaller, so we can kind of get a feel of what this is going to look like.

So I'll just put that and I'll just call it New Orleans. There's me creating a model. So anyway in the world. And we'll take a look at what it brings to the table.

And it says it takes about 15 minutes or so. So it sends me an email when that is complete, and then I'll open up the model. So we'll close that.

So what you would get in the preview technology on the right-hand side of the screen is some [? corridor ?] optimization suitability maps, some grading previews that-- they're already in the product. They just haven't pushed them in there. So they're preview technology. So we're going to jump back to our model. Pretty straightforward.

So if you look at this interface up at the top, you have a big blue icon there. This is my hydrology model. So if I pick on it-- people don't know within this hydrology model, we have flood simulation, rainfall confit, content. We can put in IDF curve data. We can also impact performance. We can draw two structures with a pipe in between and give it data. We can tell it, well, does its size correctly? We can do all those things within InfraWorks. Drainage, quantities, create watershed, terrain themes.

The reason why I'm going to look at this terrain themes is because the terrain themes gives me an idea of how my sight may be draining. So something really quick.

If I pick on terrain themes, I can create a theme. Everyone has Civil 3D. Everyone can do this in Map 3D and Civil 3D right now. So if I create a theme.

And you can see it's based upon elevations. And I can define it in terms of how I want it to look in different ways. So, as an elevations. Then, it shows me that theme for the whole site.

So why is this all red? This is all one elevation. It's pretty flat.

So if I zoom in, it's all one elevation. But look what happens when we get to the mountains. Different elevations. OK.

So I'll just come right back. So some really quick stuff. I'll delete that and I'm right back to where I started. OK.

So I'll just go back in, go to my bookmark. I'm never away from my site, really.

So the first thing that we want to look at is in order to get Green Stormwater Infrastructure running, we have to run a script. So this is my hydrology module. This is my bridge module. This is my road design module. Everything that I'm showing you, you get with InfraWorks 360.

So if I pick on this [? eye, ?] one of the critical things that you all want to be aware of is, if I pick on this [? queue, ?] I have this Data Sources. And you have the same thing in Civil 3D. So if I pick on Data Sources, you have the same functionality in Civil 3D where we have SDF. We have saved files. We have SketchUp. We have SQLite. We have [INAUDIBLE] XML.

Those who are doing point cloud data, laser scans, we can bring in point clouds. We can also bring in Revit models. Even if I wanted to overlay just a DWG drawing. Because a DWG drawing is 2D and most of us are familiar with 2D. We just can pull it in on our site.

So a lot of functionality in reference to bringing in different file formats. So InfraWorks is kind of built on the Navisworks engine in terms of bringing in different file formats. And those who may be familiar with Navisworks bringing in different file formats into one model. OK. A lot of things that you can do, but we won't get into that. That's Navisworks.

So one of the critical things for Green Stormwater Infrastructure is it's a script that's written. So within the script, I can load the script. I have a document that walks you through everything in terms of where you go to get the script. So it's a script that's written. OK. So I just loaded the script.

I mean, some of you are looking like, what the heck is a script? It's just written code, a program. OK. So InfraWorks allows me to run this script.

So when I select Start Script, it brings up my Green Stormwater Infrastructure. So that's the simple process. Script file, run the script, and we're halfway there.

So any questions so far? OK. No questions so far?

AUDIENCE: What language are the scripts [INAUDIBLE]?

KENNETH L. DRISCOL: Some of the scripts are written in just a text. Yeah. That you can write it in.

And this is the person from Australia asking all the questions and everybody in here is like--

that's perfect. OK. Yes.

AUDIENCE: Where did you get the script?

KENNETH L. DRISCOL: So you can--

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Yeah, the document allows you to download the script. And what's your name, by the way, sir?

AUDIENCE: Me?

KENNETH L. DRISCOL: Yes.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Upper Northwest?

AUDIENCE: Yes.

KENNETH L. DRISCOL: See? I remember things. Yes, the script shows you exactly where you can get-- and I have the actual site. And again, anyone who wants the script will have access to it. And the whole user guide in terms of a walk through step by step.

So once we get the Green Stormwater Infrastructure running, the first thing we want to take a look at is our different methods. So if I look at pushing this button under my methods, clearly we can select our design storm where we can put in for our design storm. And then we have the different hydrology methods that I showed on that sheet there. So direct determination gives me a definition. And hopefully, that's bigger on my screen.

And then, it gives me a definition. And then, reference of where the technical [? guy ?] for that is. As we move on here, then we just jump to TR-55.

If I jump to TR-55, then it changes all my inputs and assumptions based upon TR-55. And clearly, it shows the reference from the Urban Hydrology Manual, which 25 years ago everyone had to go in there and find information. Now, you can go in there and just pick and

click. And that's also with storm and sanitary analysis, your [? hydraflow ?] extensions. Because you guys all have Civil 3D, right?

So based upon that, if we look at our input and assumptions, now we're talking open space, woods. Really, what that area may be in terms of our site.

And then we'll go to, again, the three cities that green infrastructure focuses on. District of Columbia, Los Angeles, and then Philadelphia.

And then if you look at it, it already has water quality and soil types and things like that based upon those specific areas. Again, Green Infrastructure Stormwater is going to be focusing on more areas in the United States. But again, these three cities are the ones that it kind of started out with.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Yes. And that's what I was saying, some direct input. You can put in your own calculations. But right now, these have an interface with those specific cities that grabs data automatically from those areas.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Yes and it's an open interface that you can customize. It's a little bit more work. But yes, you can do it.

And then, we'll look at Philadelphia. And then inputs an assumption. And as you can see, as I move from area to area, it's showing different numbers, different runoff coefficients, things like that. OK. So that would be the first part. So I'm just going to cancel that.

So as a simple step here, I'm just going to draw in a coverage area. Because really, I have this site and I have these buildings. And I want to draw in my pavement area. Because ultimately, this whole site references mostly pavement, and then roofs. And they're all composed in this single project.

Everybody good with that? OK.

So within InfraWorks, if I just pick on my little pencil there, we have coverages. So I'm going to draw in a coverage area.

So if I pick on it. And it's just a couple of picks and clicks. And if you look, you can put in your lengths of these areas. So for instance, CAD, you can select ortho to draw straight lines. Similarly, you can do these things in InfraWorks.

And I'm just going to, again, kind of rotate that around. And I'll just pick that. Then, I'll move that over a little bit. And then, I'll double pick. And then it generates that area in terms of square footage. OK. Pretty simple.

So one of the other questions that came up earlier was this idea of units within InfraWorks. So if I pick on my Model Properties, we can see specifically where this is located at, what geographic location it is in terms of latitude and longitude.

And then if I go-- well, that is moved around-- up to Application Options, now we can come in and look at our unit configuration. So those who have been using InfraWorks 360, again, the first thing you want to do is remove that and download the new version. Because now, you have default units where you can change width, diameter, volume, area, angle, and slope. And you couldn't do that in the previous versions. So I'm just kind of keeping things along a path here.

So we still have this area. So one of the first things we want to do is-- that didn't look square, but we have this area.

So right now, we're going to use TR-55. And it's showing me pavement, roofs, and my runoff coefficient. Excuse me. And then I'll go and select OK.

So the first thing I want to do is that's my pavement. So I'm just going to type in pavement up at the top, and then a sub area. And we can go through the definitions of the different-- clearly, there's going to be sub-areas and different soils that we look at in terms of our site. So that's what this is representing in terms of sub-area. So then we look at the parent. So the parent is going to be pavement. So I'll type in pavement. And then, my coverage is going to be pavement, right?

So if you look down this list of items, you can see where it has residential, woods, brush, different types of soil. And also, once you get to BMPs, you can see bioretention and things like that in reference to what you would be defining in terms of that area.

So if I select it, it's going to highlight. And it's going to show me specifically what this coverage area is over here. And then, the square footage of that area that I'm going to define. And then,

I'll just select define. And let me change that. So different soil. And let's see if that's going to come in. I'm sorry about that. Let me reset that. We'll go back to TR-55.

Jump into pavement. So once I do that, I'll select my hydrology method. And then it's under pavement and roads. And then it gives me my square footage. And then it gives me my curve number for that pavement. So pretty straightforward.

Anybody don't understand what I did yet? I just defined a little coverage area. And I just told it, it's going to be pavement.

If I was working in Civil 3D, I define an area. And I'd tell it what type of soil it's going to be. Whether it's the [? hydraflow ?] extensions or the storm and sanitary analysis. OK.

So it's giving me a runoff coefficient, suggested BPM area. And if I pick on it, now I can go in and tell it surface cover if I wanted to change. Because if I'm not in this specific area and I need to put in user-defined data, I can go in and change these values. OK. So I'll go ahead and select OK. So that's the first thing that we're going to look at.

So the whole idea of this runoff number is we needed to get it way down. So by adding this pavement, the next thing we would do is start adding roofs in terms of this area. Because it's all going to be based upon the same area.

So the next thing that I would do is, if I pick on this building, now it's showing me this building. Now I'm going to type in building. And then I'll go in and select this building is going to be a roof. So I can go in and do individual roofs.

So if I hold my Control key down, I'll pick all three, and then I'll define those. So green roof.

So once I define that, now I need to add these individual buildings to this site area because those are contributing to my drainage area. So I'm going to have building 1. And all I want to do is add it to that. So now that's added it to that.

And then based upon that, there is this BMP designer where I'll go in and select Designer Enable. So I can go in and change the depth and change the design parameters.

And then if I select Refresh, now it shows me effective depth, the dimensions of that building. So if you notice something, it was really quick. That number's lower now. So the whole idea behind the Green Infrastructure Stormwater is to reduce this runoff number.

Everybody here in terms of [INAUDIBLE]? You have to reduce this runoff number, right? So that's what we're doing here.

So the second portion will be to add the second building. And the third building. And then, now we can put in another coverage area to define, like a rain garden. Yes, sir. I he the only one-- yes, sir.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: That is a very good question. These calculations don't take into consideration routing, which is why we have to add all these together and kind of--

Thus far, again, the same premise in terms of getting that number lower. So the next thing that I would do is add in a rain garden.

So what I want to do is define another coverage area. And if I came in. And just a couple picks. And if we zoom in. So now we have a different area here.

So if I pick on that, now this is not a building. This is going to be a rain garden. And then from that rain garden now, now we can say this is going to be bioretention. So different things we're just going to add and keep adding and keep adding until we get this number down to zero.

So from that area, we're going to Define Selected. And then from that, now we have a rain garden. And then we're going to add that to contributing to this drainage basin. So I'm going to select, and then I'm going to change this ponding to 12. So again, we can go in and change our design parameters as we're going through this. I didn't know my screen was that small. Sorry about that. OK.

And then I'll just hit Refresh. And then it's showing me my infiltration. And again, this is all schematic because it is conceptual. Then, I'll go ahead and select Add. And then it shows me my square footage. Then I'll select OK. And then that number gets lower again.

So one of the things we want to do is make this number lower and lower. So you have to think about what you're trying to accomplish. Maybe we need to make this rain garden even bigger. So now we can go in and change the size of this. So look at my runoff coefficient number now. Because it's still calculating based upon this information from my rain garden that I put in.

So again, there is a lot in terms of-- but this is just the premise of it. The first five steps. Yes,

sir.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Yes. Yes. So that would be another sub-area. And all I wanted to do to get across this idea because this is not one plus one, right? In terms of what we're trying to do. So there are some complex things in terms of hydrology and what we're trying to do. But this is the premise, define an area, run analysis, define roofs, payment, bioswales, rain garden, things like that, to reduce that number. That's the whole premise of that.

Because what you're going to do by hand-- you're going to do the same thing by hand with CAD, right? But conceptually, this gets you to that point a lot faster than a calculator will. Because everything is interactive. Because we're creating coverage areas and things like that. And all that's running within this program. So we're moving and updating this data.

Again, interactively we want to look at this what-if scenario. Because we're thinking it here, but I don't want to spend a lot of time with CAD creating this stuff, and then changing it over and over, when I can go in and create this site on different proposals multiple times to reflect my changes.

AUDIENCE: So you have two different rain garden layout [INAUDIBLE]. You say each one's a different [INAUDIBLE].

KENNETH L. DRISCOL: Different proposal. So let's say, for instance, you have one that's 25 by 30. OK. And then in the proposal too, you have one that's 15 by 10. You can go back and forth and it still can be part of the program.

And what's your question?

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: What was the question again?

AUDIENCE: That was it.

KENNETH L. DRISCOL: Yes so he's saying, in InfraWorks, the idea behind these proposals is if you started existing when there's nothing there, and then you get to proposal number 5. You have proposal number 3 where you have a bigger rain garden. Is it still going to recognize that number? So

the beauty of working with InfraWorks is it runs on a SQLite database. So that information is still running in the database, even though you don't see it.

And even if you delete proposal number 5, it doesn't take away from proposal number 3. OK.

So any questions? OK. So I just want to show a couple more things because everyone hasn't seen InfraWorks. But I just wanted to get across this premise. Again, I'm going to give you this data. You can walk through it step by step. So I don't want to take a lot of time in terms of-- you can do these things. I want to show you things that you probably haven't seen before.

So if I just jump out of this model. And you can see that was still running, right? Even though I'm out of this model, that's still running. It's a program that's running. So I'm just going to exit that. I'm not going to save it. So clearly, you can save multiple instances of that information. As I scroll up.

I didn't know I picked on a model, but we'll see what that is, and then we'll come right back out of that. Go figure. OK. So I'm just going to look at whatever we got here.

So this is a model. This is in Massachusetts. But the whole idea behind it, I can do the same thing in reference to running that Green Stormwater Infrastructure. So I'm just going to zoom in.

Because someone asked about transportation also. So I could do the same things here.

So the idea of SketchUp and creating this proposal, I got a bridge interchange. So I've done other classes here. In my lab, we did this bridge interchange. That's part of my lab. And again, you can get all of this. So even Philips arena in Atlanta, which this is in Massachusetts. But again, creating this idea of different proposals. So we have all of this.

But if I came back, because I'm still on the question of the different proposals. If I came back and said Preliminary. So now everything is from scratch from Model Builder. So no buildings. No interchange, anything like that.

But if I wanted to, I can go right back to that same final project where everything's concluded in the proposal. Only difference is it's in a different proposal.

One of the things that you also want to look at is in that new version of R2, you have this idea of component roles. If you're using InfraWorks 360, you want to use component roles.

I'm just going to draw in something real simple. Pick this point. And I'm going to double pick that point.

As civil engineers, you guys should be able to do something as simple as this. That profile of that existing ground. I mean, think about what it takes to do that in Civil 3D. OK.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: That's the beauty of it all. I can push this data into Civil 3D. So it's only going to be roads, alignments, surfaces, coverage areas, things like that, that you can push straight to Civil 3D. And bridges from Revit into Civil 3D also.

So if I pick on this road again, I can show design speeds, things like that. I can also show super-elevations. If I right click, I can also show cross-sections. So as a civil engineer, if you do something like this. And if I pick here and I can see my cut and feel, I mean, how long does it take you to do that in Civil 3D?

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: So again, I just want to be able to show you. And then if I pick on my cut and fill-- I mean, it takes a lot to get to this in Civil 3D. So again, it's about communicating ideas. But as civil engineers, I'm thinking, what's cut and fill already from my site? And this is what the new version of InfraWorks brings to the table.

Roadside grading, things like that. So something to consider. And There's a lot that it brings to the table. Maybe I don't want to see this conceptual view. Maybe I want to look at what this looks like in terms of contours and what an engineer would want to see.

Because in a conceptual view, as an engineer, I don't care if the clouds are moving and the sky is doing this. I'm not doing any solar analysis. I'm trying to do earth works and things like that. So I don't need some of that stuff. I don't need to see some of that stuff. I mean, I can even go to the point of looking at where my day lighting ties in. Where are my triangles at in my [INAUDIBLE]? I mean, you can't do that in the InfraWorks that you have now, which is why I'm saying take advantage of it and download the new version.

OK, something real quick. Any questions? OK. All right.

We haven't moved away from our green infrastructure. We haven't. In fact, anybody

remember how we get to that script? Nobody?

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: That's a nice thought. But on the orange eye up here, remember this cube? There's the scripts right there. So that script, I can load it. I can delete it.

If I start a script, I'm right back there. Even though we don't see these things, it's still running. So we just determined where our site is from Model Builder, anywhere in the world. And again, this is not detailed design.

Once you start thinking detailed design, where I start to get really detailed design, then I'm starting to think about Civil 3D.

Who's doing pavement drainage? Anybody doing pipes? Networks? And how are you doing that, with Civil 3D?

AUDIENCE: Yeah.

KENNETH L. DRISCOL: What are you using with Civil 3D?

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Wait a minute. Did you hear that? He said, whatever we-- we don't want to have to do that, right? So there is this idea of Project Chameleon. Anybody heard of it?

I got a card up here. I'm going to let you know everything you want to know about the infrastructure solution. So just real quick. I'm going to close that. I'm not going to save it.

If I pick on this role right here and I right click, I can replace assemblies. But it has this drainage on here. And I can size a drainage network.

So if I size a drainage network, add pavement drainage, we can do all those things-- add culverts. We can do all those things in reference to a road.

Now clearly, it's based upon gravity flow, right? So you do want to keep that in mind. So as a quick example-- and this is going to be, again, quick.

If I go to a Design Road, I'm just going to do something simple here. And then I'm going to

raise it up a little bit. Everyone knows how to right click and say Show in Profile View. If we take a look at this road here.

I mean, this takes a lot to do in Civil 3D. If I pick out here, it's kind of showing drainage there, right? So if I pick on that road, right click. I can go to Drainage and say Add Drainage Network. So we're just going to see, then it comes up with this palette in reference to what type of pipes, what type of manholes, what type of inlets.

The beauty of working with this version is it has intelligence to say, well, on the right side of the road, this inlet needs to be a little bit higher in terms of its location. And on the left side, it needs to be pushed down because of drainage. And you can't do that with the old version. So there is some intelligence in here thinking in terms of what we want the program to do. So let me just move this.

And it says Add Drainage Network by pressing Enter. I'm going to hit Enter, just to show you how quickly you can do this. Because if you're using Civil 3D. And if you're using this as a conceptual plan, and you can push this data from here to Civil 3D, why wouldn't you do it? Let me close that.

Oh. What is that? I mean, how long does it take you to do that in Civil 3D?

AUDIENCE: [INAUDIBLE]

KENNETH L.   So I'm just letting you guys you know again. You guys have this. You just have to use it. And
DRISCOL: there's a lot in here. So I'm just showing some really quick things, and then analyzing a pipe network. I mean, you have the ability to do all that.

If I pick on a pipe. You have the ability to do all those things.

If I pick on an inlet. I mean, what's one of the biggest things we want to look at in terms of an inlet? What's that right there? That's gutter spread.

I mean, are you going to do that with [? hydraflow? ?] You have to lay it out, and draw it, and do all those things. Again, if I pick on that and move it to here, it's showing me my gutter spread and slope. OK. So you guys have access to these things. You want to be able to use them.

One of the things that I did-- and I did like 12 years of residential subdivision and

transportation. If I had this then-- I mean, one of the things we want to do is we want to do less work, be more efficient, more productive. And you can do that. But you're not going to do it with a calculator.

Software is ever-evolving. And if you use it, so will you. Yes, ma'am.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Yes. Definitely.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Yes. So you also have on here, on the hydrology portion, impact performance for your pipes, rainfall data. And then, creating a watershed. And then also, if I go and select-- it'll just select my low point. It will determine my watershed area based upon that existing ground, which is what you do. I mean, I'm old school. In fact, I got my little preliminary right-- no.

No, but seriously. You've got to draw that area with high contours and the high points. We still do that. Yes, sir.

AUDIENCE: She and I, we do a lot in New Orleans. And there's the new stormwater [INAUDIBLE]. And that was 1.25 inches of [INAUDIBLE]. But we don't really design roads or bridges or anything. We design the building with Civil as well for a particular site. So when we bring in the Model Builder, we do pre-development analysis, which is [INAUDIBLE].

KENNETH L. DRISCOL: Yes.

AUDIENCE: And when we [INAUDIBLE], how do we input the [? inverse ?] of what we got to connect to? Is that something we manually put in [INAUDIBLE]?

KENNETH L. DRISCOL: Yes. So let me slow down a little bit. His question is they do the pre-development and the post-development. So with the development, that's easy because whatever there is there. So that's going to generate pretty easily. But the post-development, now you're putting in your own pipes and inlets and that drainage area.

When you pick on a pipe or a drainage area, you can just go right and edit and put in those inverts and things like that.

When you push it to Civil 3D, now you can get really more detailed design in terms of doing that. This is conceptual. So the thing you have to consider is, where are you going to create your proposed surface? You got to do that in Civil 3D.

You can bring it back to InfraWorks and run the same analysis. Because if you're looking at different scenarios, I would do it that way. That would be the workflow. Because the data that you generate from the Model Builder is 10 foot, 10 meter, 5 meter. So it may be off because it's conceptual.

But if you create your existing ground from a survey and you guys win the project, you got the existing ground and then you got your propo-- You can still bring that into InfraWorks. OK.

Just one more thing. Flood simulation.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: Should have used that a couple of years ago. Yeah.

So I still have two minutes, so I just want to show this really quick. And if anyone has questions, I'm listening. OK.

AUDIENCE: [INAUDIBLE].

KENNETH L. DRISCOL: I already picked the-- huh. Wherever that model is. But you do have flood simulation also that you want to utilize, and then you can push this data to Civil 3D.

What I wanted to show you is they do have a program called Project Kameleon. That's expired? OK.

So just to kind of show you really quick. Those who are using transportation structures and things like that for DOT, Caltrans, Florida DOT, New Mexico, [? WISDOT. ?] I would go on the website. Their website is public. And grab that catalog for the structures. Because that catalog for the structures are all the ones that you want to use.

I mean, you can build your own. But why do that if they're already created somewhere else? You know, for Civil 3D. So again, I was trying to not go too fast, but it's a lot of information I was trying to get to you guys because there's a lot of stuff in InfraWorks 360.

So one of the things that I did last year was I told students in this 98-person class that I had was, if you guys are trying to use infrastructure, InfraWorks 360, and you need help building a model, email me. I'll be wherever I'm at. And I'll help you define your area and get started. And I do that because we're all together. OK.

So it's no big deal. I want you guys to be successful using the software. But you can't get that way without using it. OK.

Learning is about repetition, repetition, repetition. Because if you click this button 10 times, I guarantee you tomorrow someone say, where do you start this at? And you'll go, pfft. That's how it works, repetition.

I just want to help you guys get there. So thanks for your time.

[APPLAUSE]