

2024 AGC/NCDOT Workshop - Asheville Attendance Log Day 2 – All Sessions



Please scan the QR code and sign in so your attendance is documented

AGC/NCDOT Workshop

February 2024



DIGITAL TRANSFORMATION

David Clodgo, PE, PMP
Roadway Design Unit

Jason Moore, PE
Roadway Design Unit

Bryan Edwards, PE
Construction Unit

DIGITAL TRANSFORMATION

DIGITAL DELIVERY

DESIGN

3D Model
Quantities
Cost Estimates

CONSTRUCTION

3D Model
Digital As-builts

ASSET MNGT.

Geospatial –
Attribute based
Asset Library



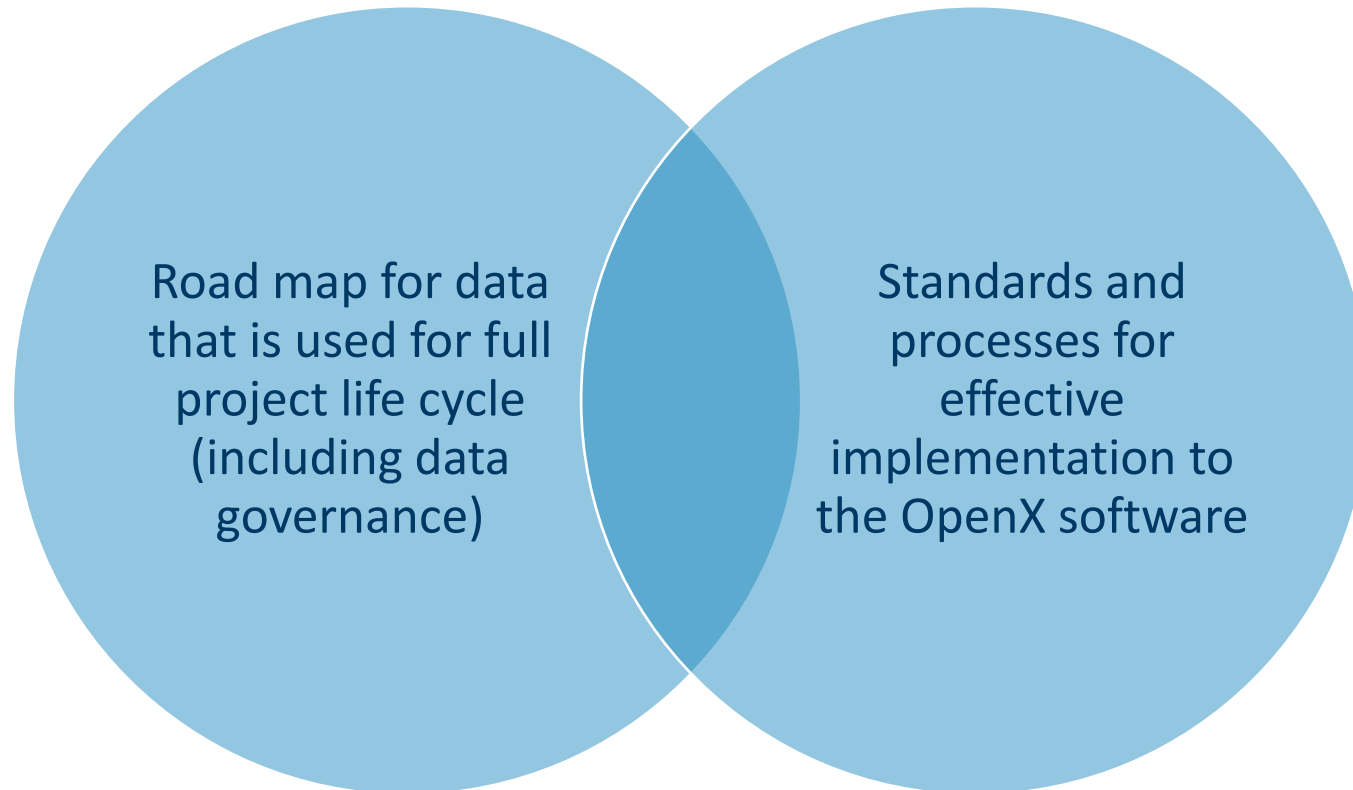
**DIGITAL
TRANSFORMATION**

DIGITAL TRANSFORMATION

NCDOT has undertaken two (2) different initiatives led by Steering Committees:

Digital Transformation

OpenX Implementation



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OpenX Integration

❖ Integrate multiple disciplines into one Model

- Plan Consistency
- Clash Detection

❖ OpenX discipline by software (Bentley - MicroStation CONNECT Edition)

- ORD – (Roadway, Hydraulics, Roadside Environmental, Utilities, WZTC, Signing and Delineation, & Signals)
- Open Ground – Geotechnical Design
- OBD & OBM – Structure Design
- Open Rail – Rail Design



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OpenX Integration

❖ A single model representing the life of a project

- **Data rich model**
 - Preconstruction
 - Construction
 - Asset Management
- **One source of truth**
 - Visual representation of the design intent
 - Surfaces
 - Construction limits
 - Quantities
- **Asset Library**
 - Geospatial
 - Attribute Based



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Digital Delivery - Data Workflow

Design Software OpenX Platform



.DGN
Design files

Common Data Environment ProjectWise



NCDOT CADD Standards
Asset Library

Construction Software Synchro



Field Software



AMG



ArcGIS

Asset Management Software AssetWise



→ Design Data
→ As-Built Data

NOTE: Bentley Software versions shown are for informational purposes. Alternate software that is deemed to be compatible will be accepted.



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ORD – OpenRoads Designer

Jason Moore, PE

Support Services Supervisor

Roadway Design Unit – NCDOT

32 years in the Roadway Design Unit

24 years in Production

8 years in CADD Support



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Modeling – "A Contractor's Point of View"

Martha Hahn – 2019 NCLUG Conference

ISSUES:

- Model not dense enough
- Level of Detail lacking
- Model not matching plans
- Superelevation Issues
- Rollover Issues
- Need to Simplify Common Shapes



CONFESSION: Modeling "The Old Way"

- **MICROSTATION / GEOPAK (SS2)**
 - Microstation = *Technician/Draftsman*
 - Geopak = *Engineer*
- We are designers (2D) ... not modelers (3D).
- The product we sealed ... was the plans.
- The "model" was a superfluous product.
 - Density – Result of 50' Cross Sections requirement
 - LOD – Turning Radius, "Grade to Drain" Note
- Design revisions: Plans updated ... Model was not.
- Super-elevation, Roll-Over, & Shoulder Break Issues ...
Revision omissions or mis-behaving templates



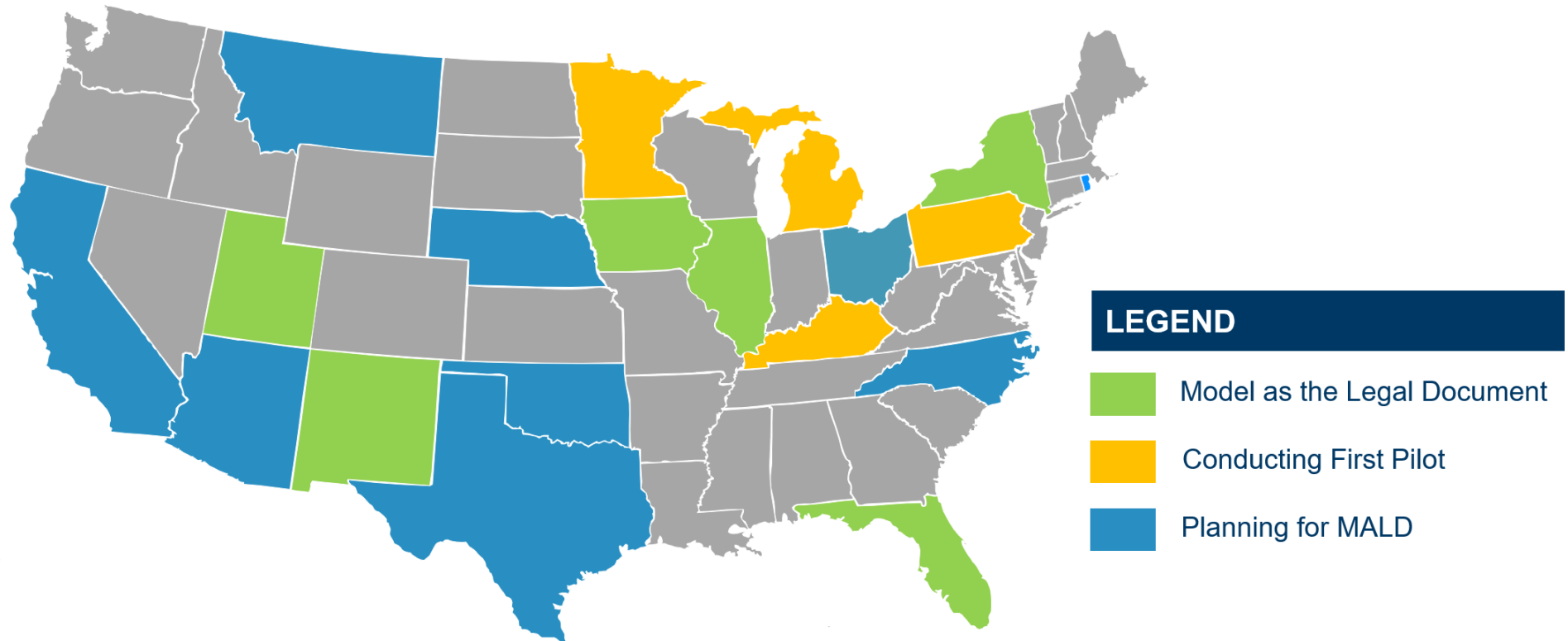
ORD: The New Day ... "The New Way!"

ORD – 3D Model-Centric Design Environment

- **No GPK file!** - Civil Intelligence is stored WITH the element.
- **RULES** – "Relationships" Exist Between Elements.
- **Dynamic Updates** – PLANS are incidental to the MODEL.
- **Cross Sections** are now LIVE slices of the model.
- **Denser Model** (5' Template Drops)
- **Earthwork** calculations more precise (Prismoidal vs Avg End)
- **Clash Detection** – Underground conflicts
- **Sight Distance** - Test sign lines against vertical model elem.
- **Convey Cross-Disciplinary Design Intent** – Disciplines will talk to one another through their models.

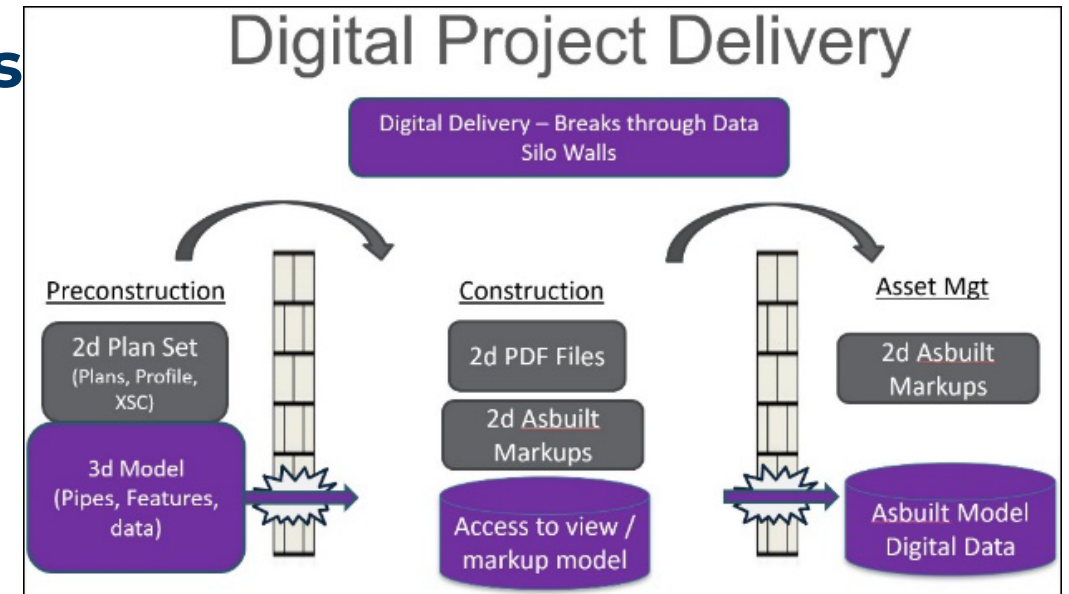
What is Digital Transformation?

**Adopting and embracing fully digital workflows and deliverables.
(Also known as Digital Delivery)**



Why Digital Transformation?

- ❖ Keep pace with and harness innovation/technology
- ❖ More accurate design leads to better information to contractor leads to reduced risk leads to reduced bids
- ❖ Digital data breaks down data silos



Communication and Collaboration

Communication and Engagement Plan

- ❖ Digital Transformation Website
- ❖ 3d Model / Contractor-NCDOT workgroup
- ❖ AGC/NCDOT
 - ❖ Workshops
 - ❖ Subcommittee Meetings



Defining the 3d Model

What we mean when we say “the model” ... in this new world of ORD

- ❖ File Format: 3D DGN file
- ❖ For now .. Just a grading and pavement model (and subsurface)
- ❖ No GPK !

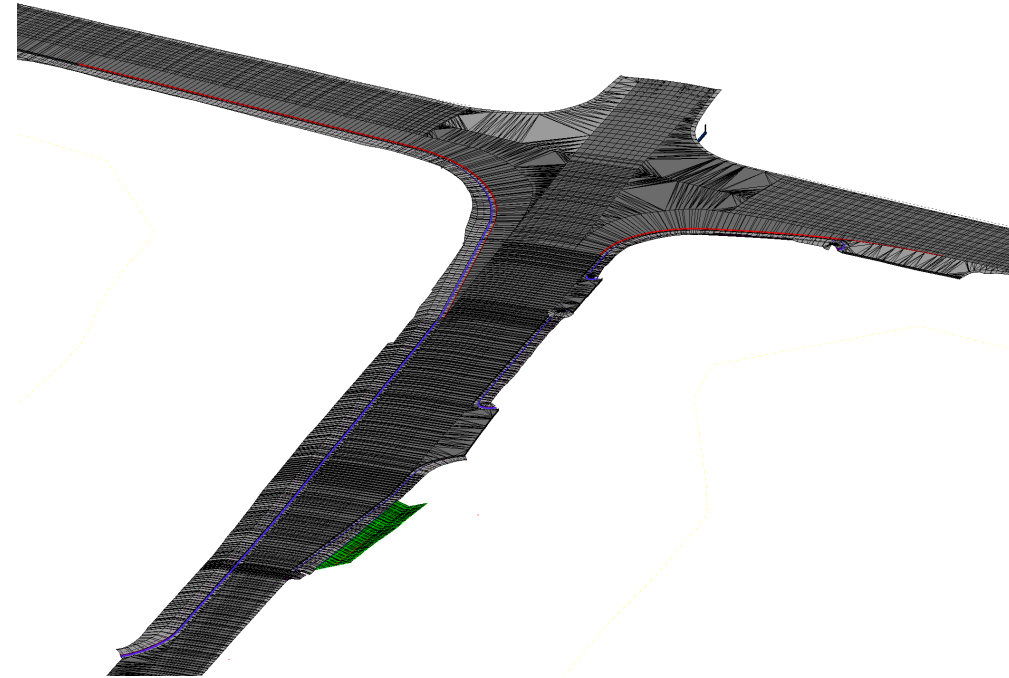
It is not currently in our deliverables roadmap to provide any format other than DGN ... Until IFC

What is IFC? International Foundation Class?

- ❖ Open file format for Building Information Modeling (BIM) programs
- ❖ IFC files can be imported into various BIM programs
- ❖ When will IFC be here ? No one knows

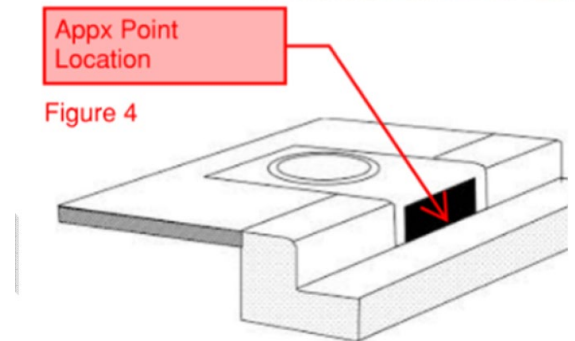
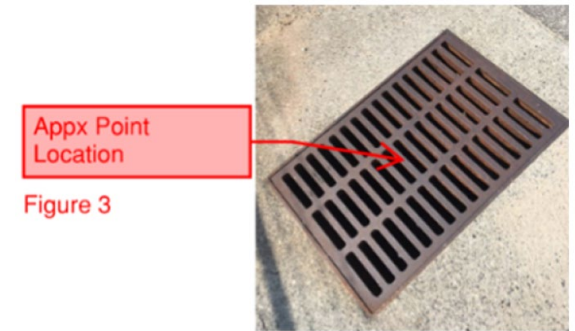
NCDOT Focus Areas

- **Focus Area 1: 3d Design Model**
 - ❖ **Designers actually design in 3d view (model) instead of 2d (plan view / profile view)**
 - ❖ **Deliver a data-rich 3d Model instead of “dumb” 2d PDF plans sheets**
 - ❖ **Challenge: Sealing 3d Model**



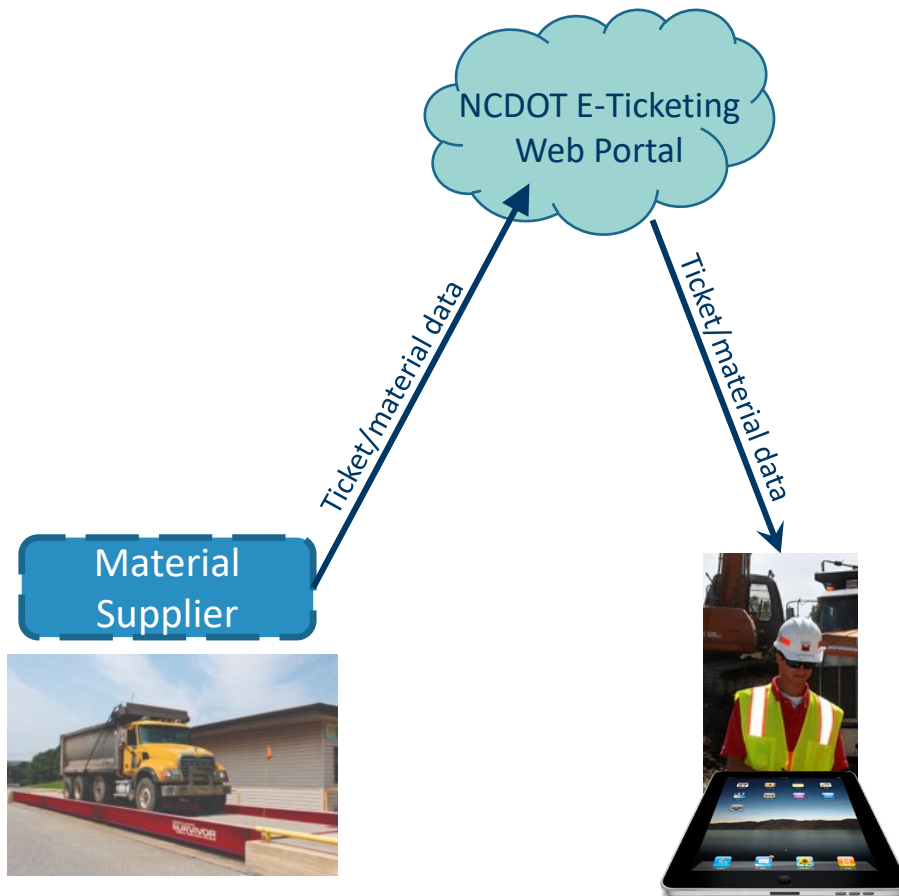
NCDOT Focus Areas

- **Focus Area 2: Digital Asbuilts**
 - ❖ **Capture Asbuilt records on priority assets digitally at time of construction .. not afterwards**
 - ❖ **Capture important attributes of priority assets such as**
 - ❖ Geospatial location
 - ❖ Asset elevations where appropriate
 - ❖ Other attributes needed for Asset Management and Operations efforts
(Ex. Pipe Material Type, Year Installed, Size, etc)
 - ❖ **Challenge: Who will perform work?**



E-Ticketing Update

Option 1: E-tickets sent to NCDOT system in real time via API



Option 2: QR Code on Physical Ticket

		Murphy Asphalt Plant		WARNING: SEE BACK OF TICKET FOR SPECIFIC PRODUCT WARNINGS.	
Murphy, NC		TICKET # 38275			
Date:	6/16/21	Time:	10:30 am	Plant:	AS221
Customer:	201818 WNC Paving Inc PO Box 896 Waynesville, NC 28786-0896	Job:	1902 NCDOT DN00667	Phase:	1
Carrier:	999 None- Pickups	PO #:	NCDOT DN00667	Zone:	0
Truck ID:	55	Product:	49886 NC S9.5C With Rap	Temp:	
License:		JMF:	18-0797-151		
*** Simulated Delivery ***		Max Legal Gross	Gross	Tare	Net
1 /LDS Today		56,500 Lb	40000*lb	20900 lb	19100 lb
9.55 Tn			20.00*Tn	10.45 Tn	9.55 Tn
8.66 Mg		*= Manual Weight	18.14*Mg	9.48 Mg	8.66 Mg
				CA1	06/30/2021
		Weighmaster: Derrick Stiles 45013		CTF8	06/30/2021
		Lab: 06/30/2021			
		Weighmaster:			
		Received By:			

E-Ticketing Update – New in 2024

❖ E-Ticketing Spec for Asphalt (Draft)

- Optional E-Ticketing

❖ Focus on Aggregate

DRAFT NCDOT Electronic Ticketing System Provision	
DESCRIPTION <p>At the contractor's option, the use of an electronic ticketing system for reporting individual and cumulative asphalt material deliveries may be utilized on this project. At the preconstruction conference, the contractor should notify the Engineer that they intend to utilize an electronic ticketing system for reporting individual and cumulative asphalt material deliveries to the project.</p>	Tare Weight Net Weight Load Number Cumulative Weight Truck Number Weighmaster Certification Weighmaster Expiration Weighmaster Name Facility Name Plant Type Plant Number Ticket Number Voided Ticket Number (if necessary) Original Ticket Number (if necessary) Supplier Revision (if necessary)
ELECTRONIC TICKETING REQUIREMENTS <p>a. The electronic ticketing system must be fully integrated with the load read-out system at the plant. The system shall be designed so data inputs from scales cannot be altered by either the Contractor or the Department.</p> <p>b. Material supplier must test to confirm that ticketing data can be shared from the originating system no less than 30 days prior to project start.</p> <p>c. After each truck is loaded, ticket data must be electronically captured, and ticket information uploaded via Application Programming Interface (API) to the Department.</p> <p>d. Obtain security token from NCDOT for access to E-Ticketing portal (to send tickets). To request a Security Key, fill out the below E-Ticketing Security Request Form: https://forms.office.com/g/Xn17QeRtqt</p> <p>e. Obtain API from NCDOT containing the required e-ticketing data fields and format. Download the API from the NCDOT E-Ticketing Webpage: https://connect.ncdot.gov/projects/construction/E-Ticketing/Pages/default.aspx</p> <p>f. Provide all ticket information in real time and daily summaries to the Department's designated web portal. If the project contains locations with limited cellular service, an alternative course of action must be agreed upon.</p> <p>g. Electronic ticketing submissions must be sent between the Material Supplier and the Department.</p> <p>h. The electronic ticket shall contain the following information:</p> <p>Date Time Contract Number Supplier Name Contractor Name Material JMF Gross Weight</p>	<p>The Contractor/supplier can use the electronic ticketing system of their choice to meet the requirements of this provision.</p> <p>Paper tickets may still be required for auditing purposes.</p> <p>MEASUREMENT AND PAYMENT</p> <p>Payment for the electronic ticketing system will be incidental to the material being provided.</p>




AGC Survey – Digital Readiness

Link to Survey Results:



Contractor responses: 17

Responses summarized as a percent of total responses



Digital Transformation Contractor Survey

NCDOT is taking efforts to become a more digital and data centric organization that enhances lifecycle delivery and transportation asset management activities. Impacts to the construction industry could include building from an NCDOT-provided 3D Design model, providing Digital As-Builts, and more.

This survey hopes to capture the digital readiness and/or capabilities of our contracting industry and to continue collaborative engagement as we move to a more digital future.

Name of Submitter (optional)

What size do you consider your company (select one option)

☐ Small (less than 50 employees) ☐ Medium (50-100 employees)

☐ Large (over 100 employees)

For what activities do you use automated machine guidance (AMG) technology?
(select all that apply)

Use dropdown

Select or enter value

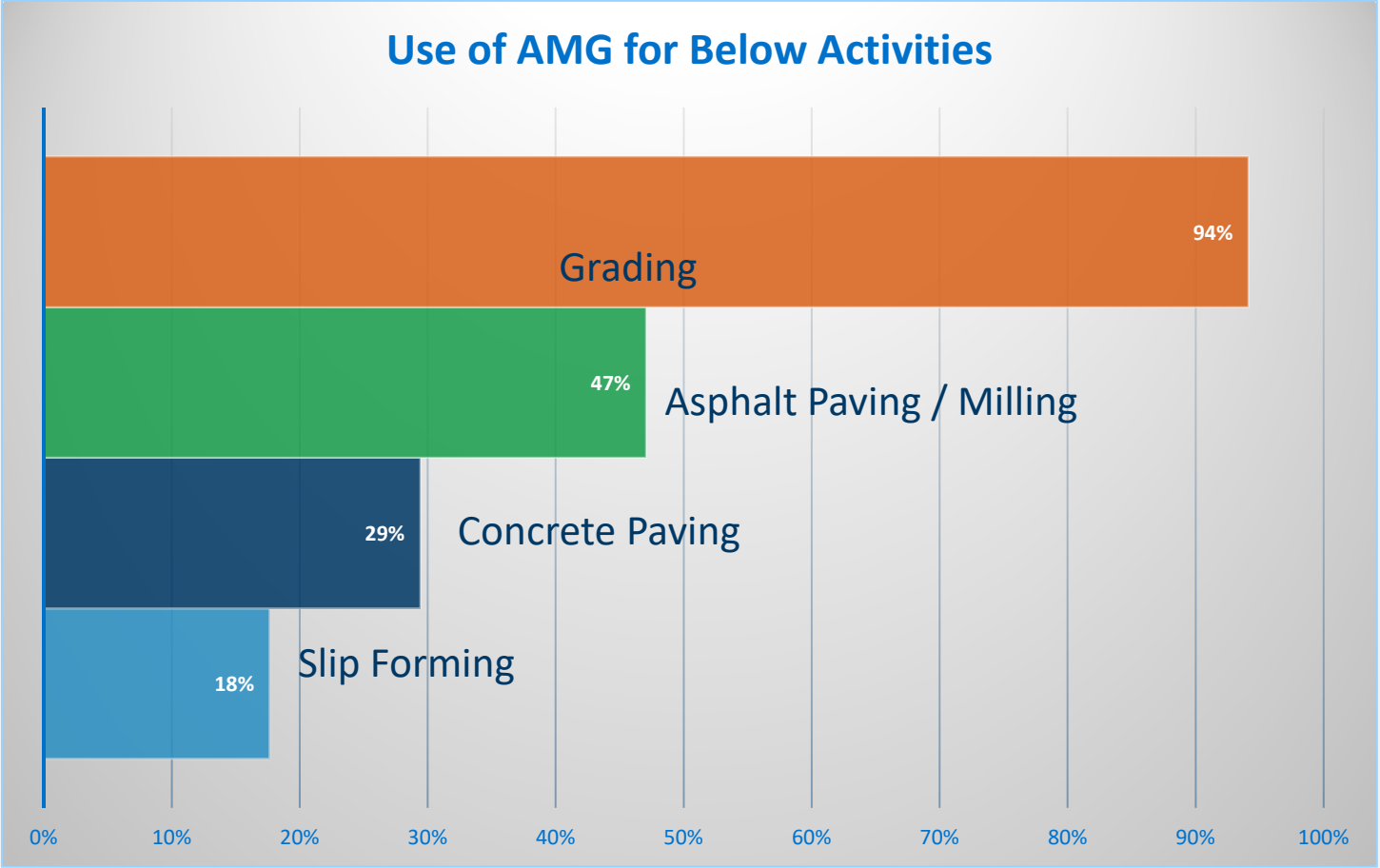
Grading

Asphalt Paving / Milling

Concrete Paving

Slip Forming

Other

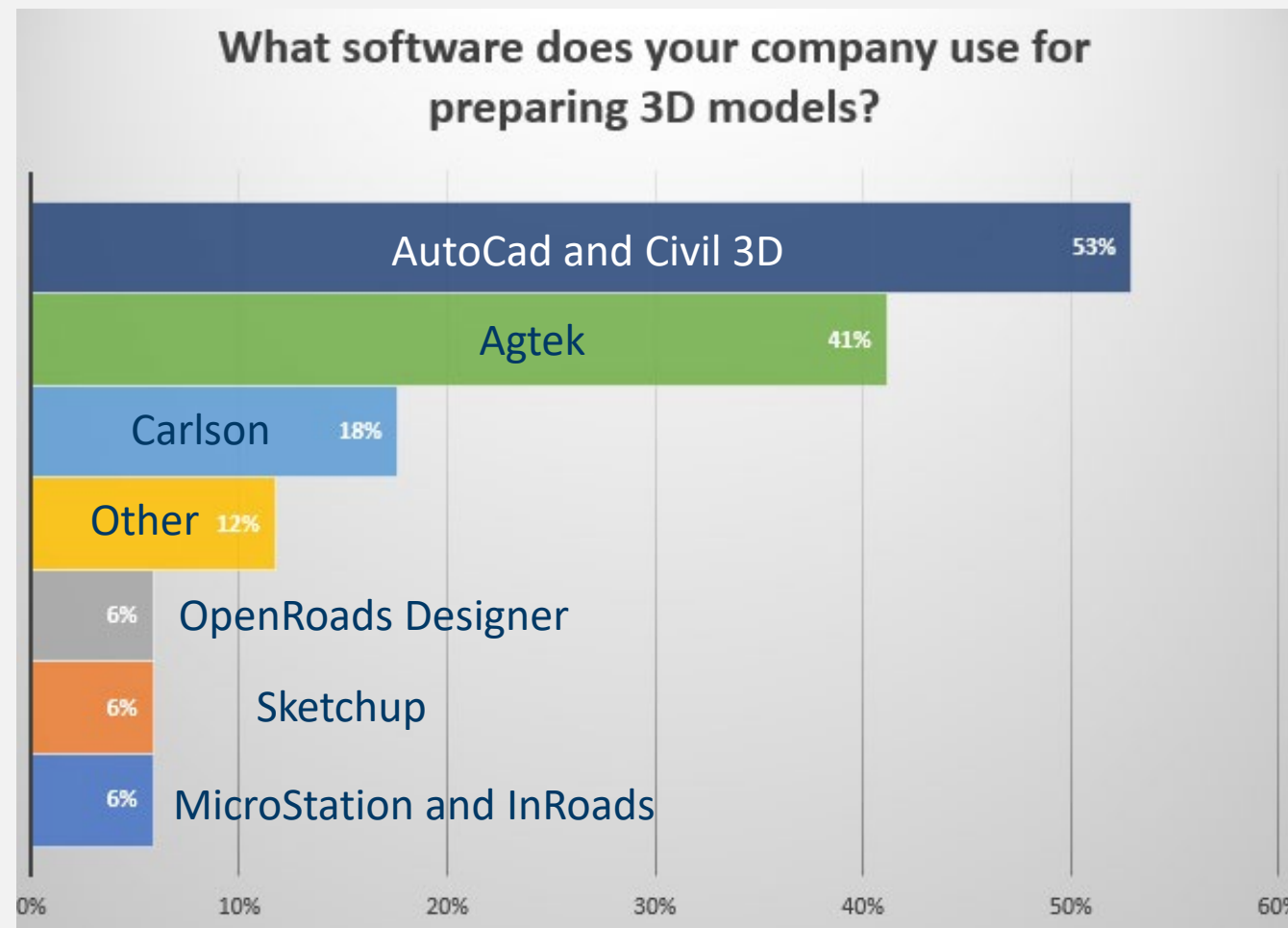


What software does your company use for preparing 3D models? (select all that apply)

Use dropdown

Select or enter value

- AutoCAD only
- AutoCAD and Civil 3D
- Agtek
- Carlson
- Microstation and InRoads
- OpenRoads Designer
- OpenBridge Modeler / Designer
- Sketchup
- Other



If NCDOT contractually required the use of digital design data for construction activities, what concerns or questions do you have (select all that apply).

Digital design information includes, but is not limited to, CAD files/models, open source experots such as LandXML, and/or tabular data in a spreadsheet. (Use dropdown)

Select or enter value

What are the new deliverables?

How do I access the right files? How do I know I have the right files?

Will I be able to use the files with my current systems and equipment?

Will I need to procure of learn new software?

What is the quality of the 3D design models?

What is included and not included in the 3D design models?

How will summary of quantities be provided?

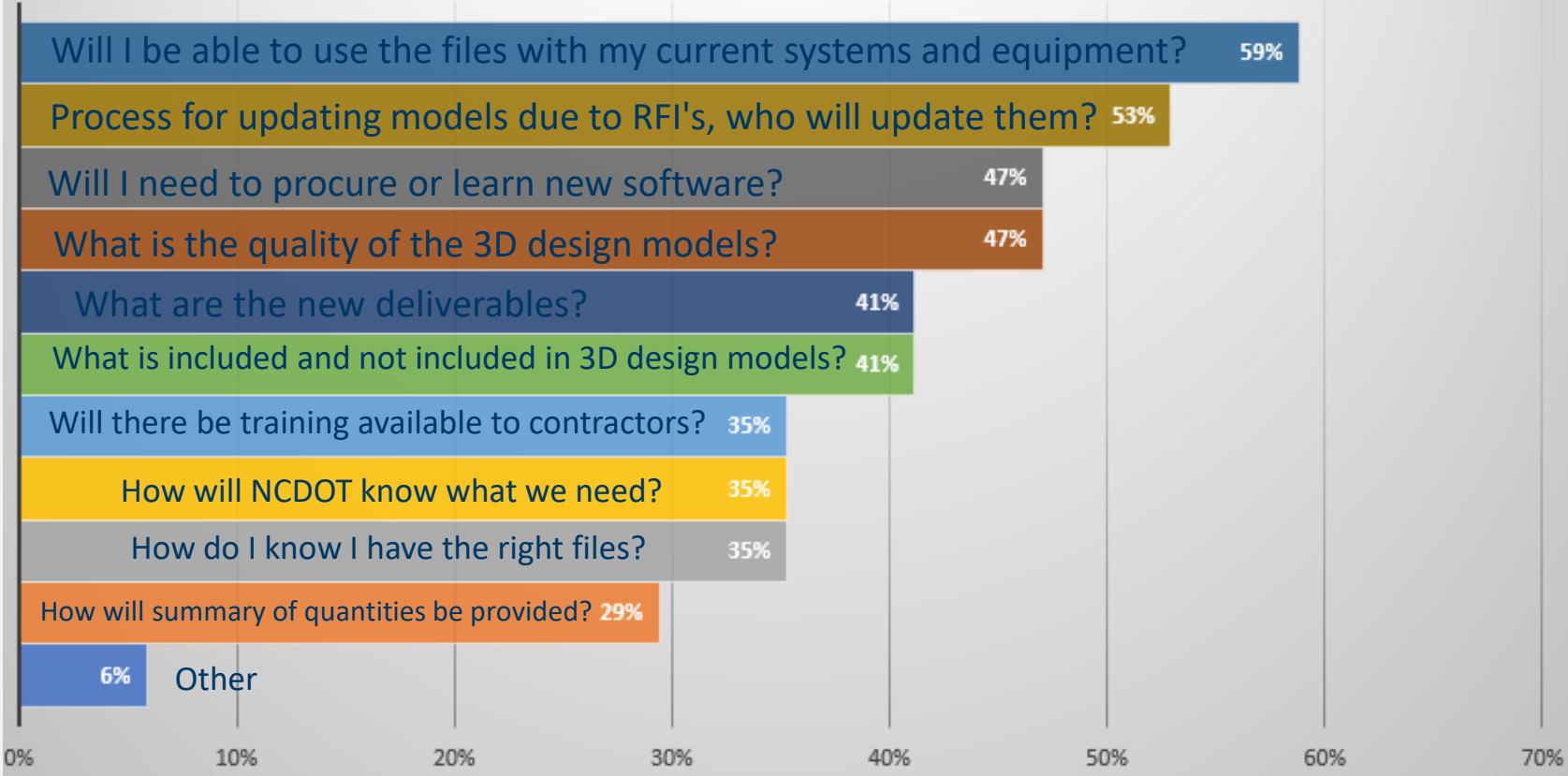
How will NCDOT know what we need?

Will there be training available to contractors?

What will be the process for updating models due to RFI's, and who will update them?

Other?

If NCDOT contractually required the use of digital design data for construction activities, what concerns or questions do you have?



Which of the below best describes your company's perspective on the national trend of a more digitally based (and less plans based) approach to construction activities? (select one)

Use dropdown

Select or enter value

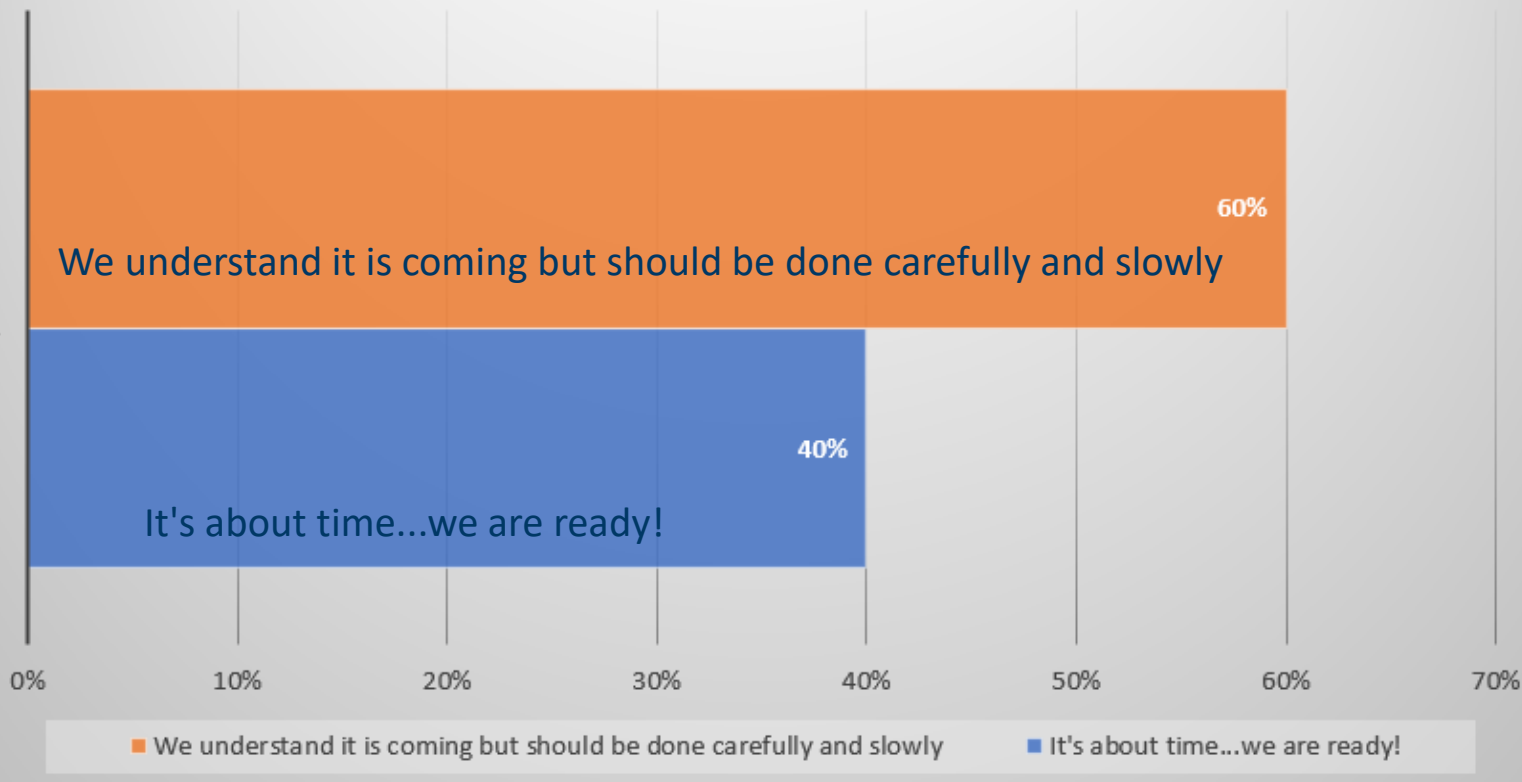
It's about time...we are ready!

We understand it is coming but should be done carefully and slowly

We are not sure our equipment and personnel are ready

Can't we just keep doing things the way we have always done them

Which of the below best describes your company's perspective on the national trend of a more digitally based (and less plans based) approach to construction activities?



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AGC / NCDOT Partnership

We need your help as we move NCDOT forward Digitally !



QUESTIONS?



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