



e-Construction

E. Alan Saunders, P.E., CCM
Assistant State Construction Engineer

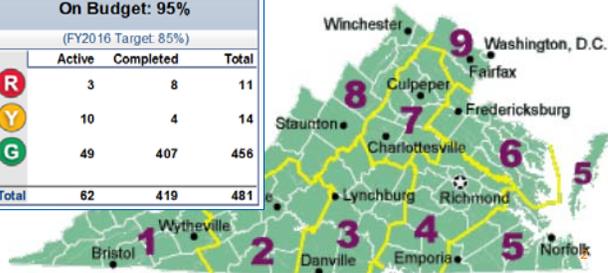


VIRGINIA DOT

- 3RD largest state-maintained highway system.
- 58,000-miles
- About 7,500 people full time (CEI = 400).
- 9 Districts + Central Office in Richmond.
- FY16: 481 Projects.
- Dashboard

	FY16	FY17	FY18	FY19	FY20	FY21	TOTAL
	\$2.2B	\$1.9B	\$1.4B	\$1.4B	\$1.4B	\$1.6B	\$9.9B

On Time: 85%				On Budget: 95%			
(FY2016 Target: 77%)				(FY2016 Target: 85%)			
	Active	Completed	Total		Active	Completed	Total
R	26	43	69	R	3	8	11
Y	3	0	3	Y	10	4	14
G	33	376	409	G	49	407	456
Total	62	419	481	Total	62	419	481



VDOT e-Construction @ VDOT

U.S. Department of Transportation
Federal Highway Administration

About Programs Resources Briefing Room Contact Search FHWA

Accelerating Innovation

Search Accelerating Innovation

FHWA Home / Accelerating Innovation / Every Day Counts / e-Construction

Find an Innovation Apply for a Grant Get Engaged

e-Construction

e-Construction is a paperless construction administration delivery process

- Paperless processes
- Electronic submission of documents
- Electronic approvals (e-signature)
- Workflow
- Internet accessible
- Mobile devices

VDOT

- Paperless Workflow
- Digital Signatures
- Project WebCams
- 3D/4D/5D
- SharePoint Document Management System (CADAC-SaS)
- VDOT Project Document Management System (PDMS)

VDOT e-Construction @ VDOT

Procurement Phase

- AASHTOWare TRNS*PORT Preconstruction
- Bid Express
- CABB
- Falcon
- SharePoint
- eVA

Bid Express

Bidding Services Order Policies Case

Your online source for:

- Secure Internet Bidding
- Bid and Plan Data

Trns-port

Trns-port Preconstruction® 2.02

USER Manual

Virginia Department of Transportation

Select a Canadian Agency

View Map

Virginia.gov Agencies | Governor

eVA Virginia's eProcurement Portal

BUY FOR VIRGINIA | SELL TO VIRGINIA | CUSTOMER CARE | BILL

BUYER LOGIN | VENDOR LOGIN | Login Help | Register

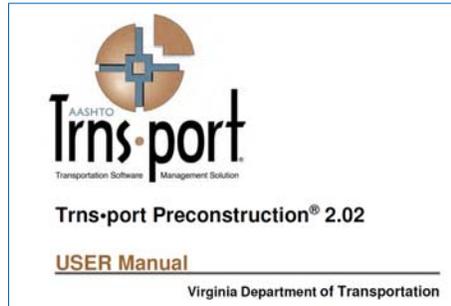
Welcome to eVA

http://cabb.virginiadot.org/

File Edit View Favorites Tools Help

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- AASHTOWare Preconstruction, VDOT migrated in 2015
- Web-based
- Supports preparation of the engineer's estimate, advertisement of proposals and bid letting
- Tracks plan and proposal holders
- Integrated with Project Document Management System



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- Contractor's Advertisement Bulletin Board (CABB)
- Advertisement and Bid Letting information.
- View and download electronic proposals and plans.
- Ask questions about an Advertised project.
- Web-based, custom solution.
- Dated

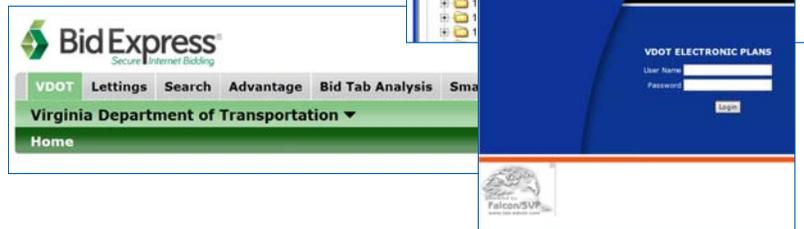
The screenshot shows a web browser window with the URL <http://cabb.virginiadot.org/>. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The application interface has a navigation menu with links for Advertisements, Division Home, Bid Results, Bid Tabs, Order Forms, VDOT Forms, and Falcon. Below the navigation menu is a search section titled "Search Advertisements" with input fields for Order Number (a dropdown menu), Federal Project Number, UPC, State Project Number, and County/City. At the bottom, there is a table with two rows of data:

11/20/2014	To view electronic plans / proposals you must have a Log in to the Falcon Web Site. http://vdotforms.vdot.virginia.gov/SearchResults.aspx?strFormNumber=L_D_443
8/7/2014	THE PRICE SHEETS IN CABB AND THE ELECTRONIC PROPOSALS AND PLANS IN FALCON ARE NOT WORKING ON THIS SYSTEM

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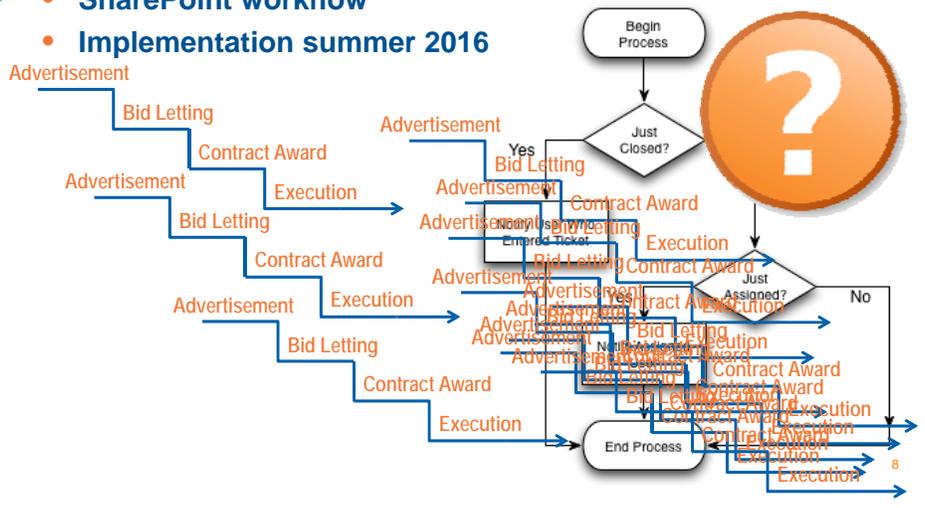
PROCUREMENT PHASE

- Falcon: bidders obtain plans, proposals and revisions before and after projects have been let.
- Migrating from Falcon → Bentley ProjectWise in 2016
- Bid Express Secure Internet Bidding



PROCUREMENT MANAGEMENT

- Automate Project Advertisement and Award Process
- SharePoint workflow
- Implementation summer 2016



Construction Phase

- VDOT Project Document Management System
- 3D/4D/5D
- CADAC, Bentley ProjectWise Connect
- OxBlue

VDOT Online Forms

Perform a new search

Click the name of any document listed

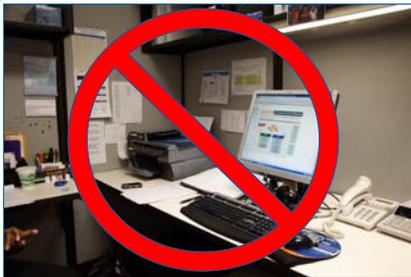
1.) **Advanced Form**
This agreement is accepted when they check the box.

From: Gregory A. Whitley, COMMISSIONER
Date: August 7, 2012
Subject: Disposal Area Approval No. 1

Dear Mr. Stanall:

The department has reviewed your submission for Disposal Area No. 1 and this site is approved for use and your plan has been found to be acceptable. Please to utilize the site, adhere to the approved plan.

Project Document Management System



WE WORK HERE!



VDOT VirginiaDOT Project Document Management System






Microsoft® SharePoint® 2010

K2[blackpearl]®

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

SUBMITTING REQUEST

Date: _____ Revise: _____ City/Co: _____ Subject No: _____ (Do Not Use)

Project: _____

FHWA: _____ (Do Not Use)

Prime Contractor: _____ Vendor No: _____

Proposed Subcontractor: _____ Vendor No: _____

FORMS

Conditions and Amounts Proposed to be Sublet

Item No.	Item Description	Quantity	Unit Price	\$ Amount



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VDOT PDMS – WHO?

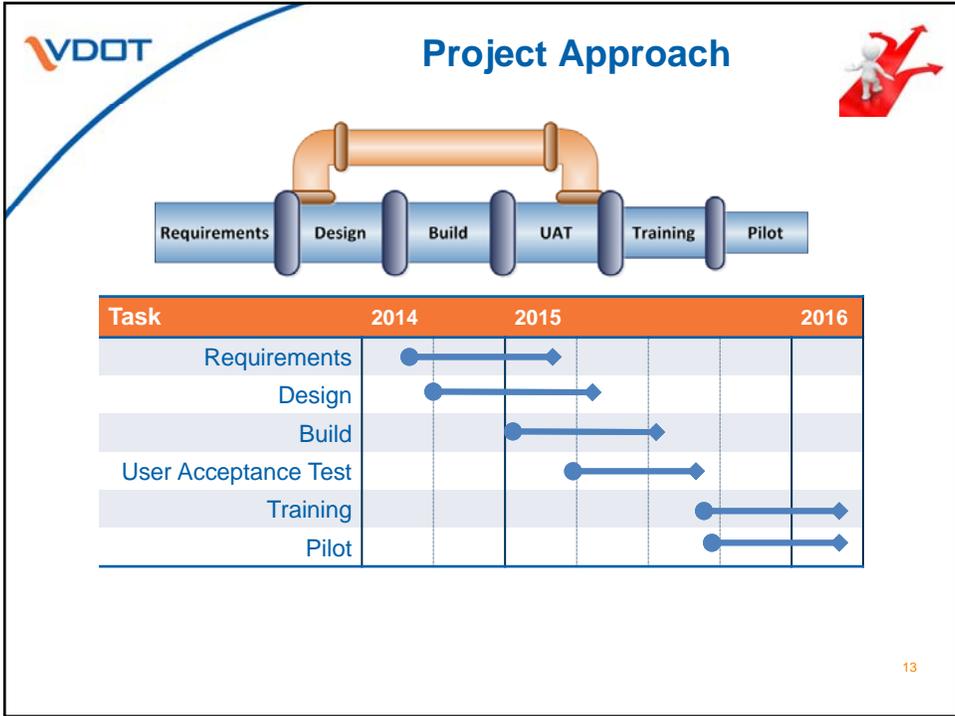




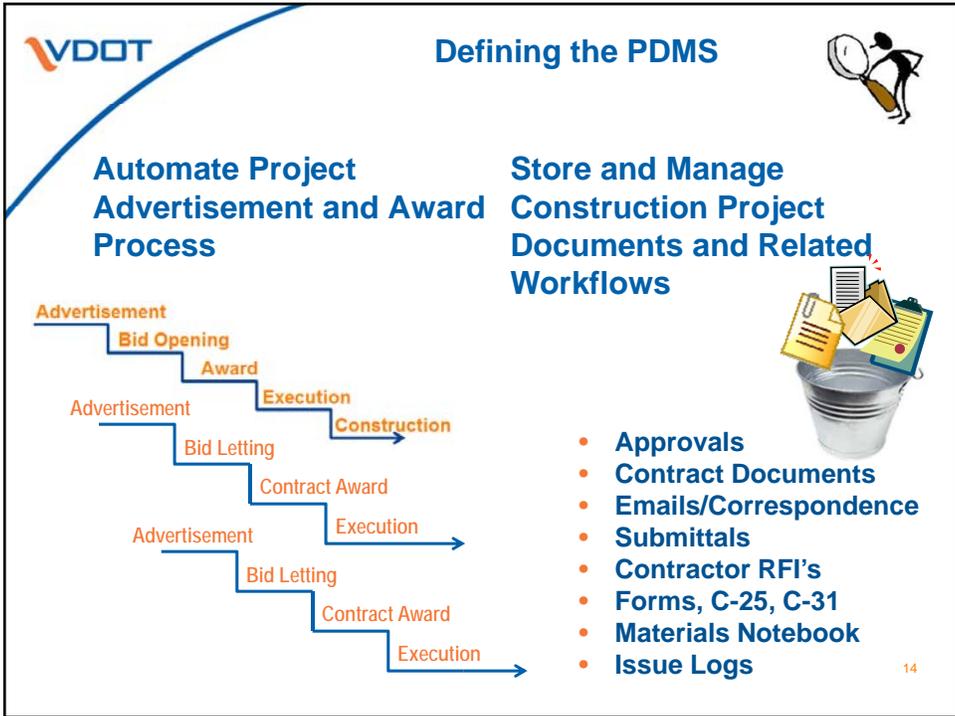



- VDOT Construction
- Contractors
- Consultant CEI
- FHWA
- Local Partners
- Whoever we need

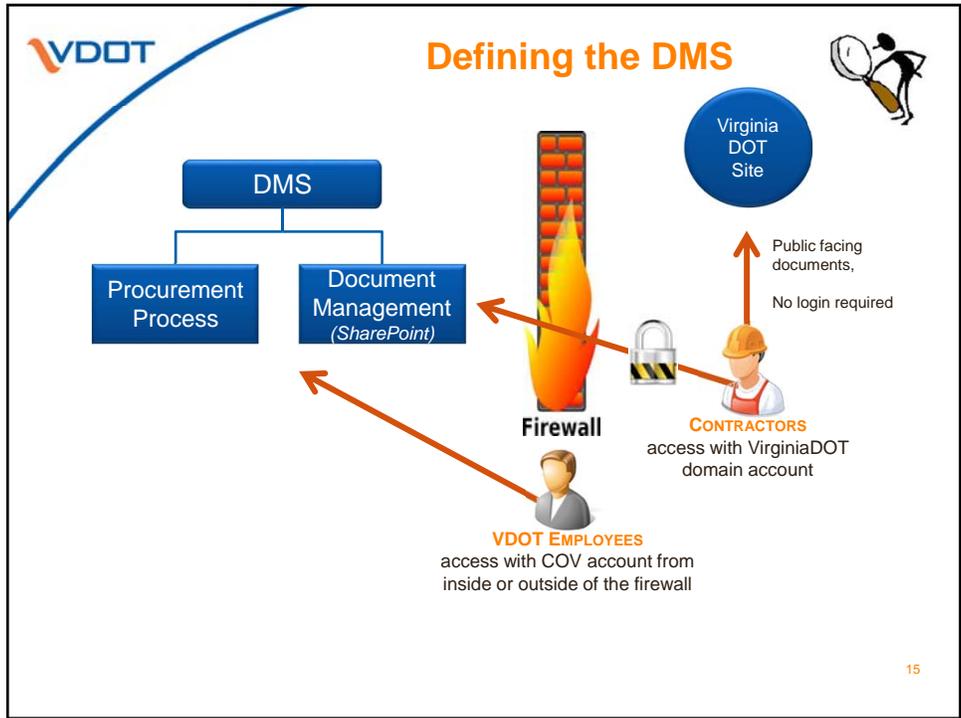
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PDMS

Virginia.gov Agencies | Governor Search Virginia.gov

Welcome to the Virginia Department of Transportation Project Document Management System (PDMS)

Login

- VDOT workers with COV Credentials
- VDOT business partners / contractors with EADS Credentials

Click Here → [Click here to login](#)

If you are using a VDOT workstation and have PDMS as a trusted site, you will be logged in automatically.

Otherwise, please login using your VDOT username and password (e.g. gov\YourUsername or YourName@vdot.virginia.gov)

Sign In

VDOT CONSTRUCTION

PDMS HOME CONSTRUCTION CONTRACTORS SERVICES SEARCH

Click Here →

Construction Home Page
Construction Root Site

Click Here →

Construction Sites

- Construction Management
- Construction Procurement
- Contractor Prequalifications
- Specifications Engineering

VDOT CONSTRUCTION PROCUREMENT

PDMS HOME CONSTRUCTION CONTRACTORS SERVICES SEARCH

Click Here →

Construction Procurement Home Page
Construction Procurement Site

Welcome to the Construction Procurement

My Tasks

You have no pending tasks.

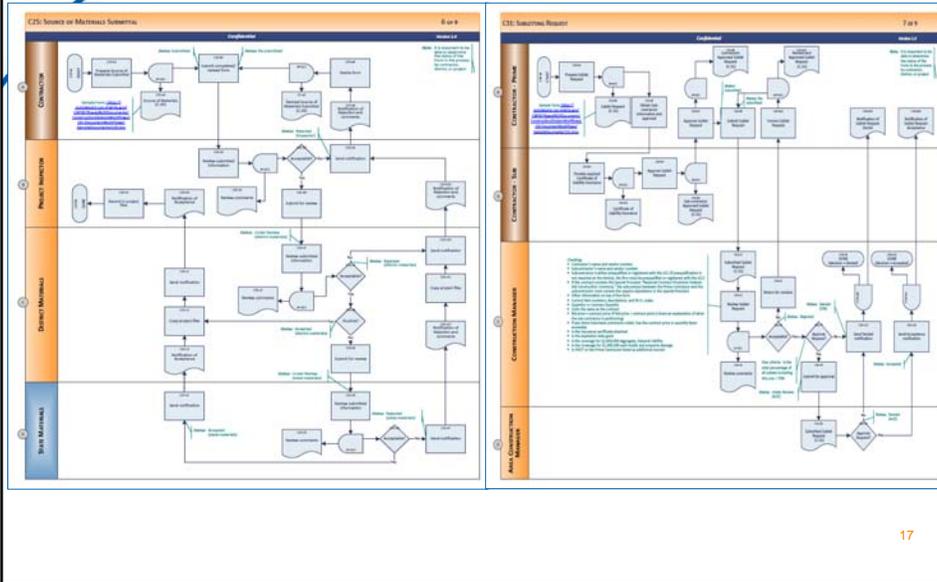
Folio	Activity	Assigned On	Due	View
This task list will automatically refresh every 60 seconds. Task list refreshes at 01/27/2016 11:24:26 AM				

Events for January 2016

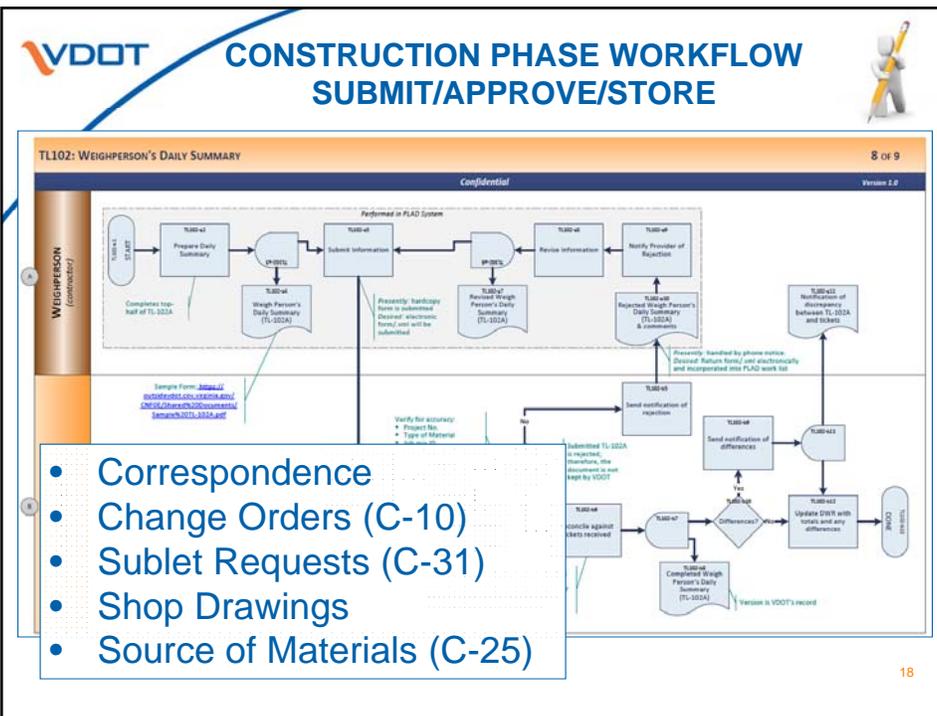
Start/End	Event
1/21/2016	Advertisement
1/28/2016	Bid Letting

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COMPLEX PROCUREMENT WORKFLOWS



CONSTRUCTION PHASE WORKFLOW SUBMIT/APPROVE/STORE



VDOT

Signing a Document

with your Pen

with your Device

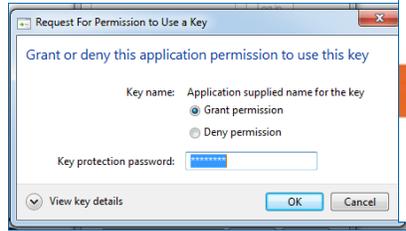
Signed	 wet ink signature	 scanned signature	 digital signature
Identity verified <i>note: electronic signature also verifies the content is unchanged</i>	 notarized	 electronic signature	
Identity verified Action documented	 multiple signatures	 workflow	 audit log

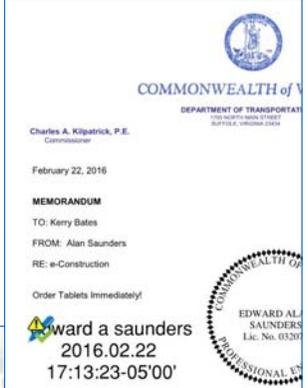
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VDOT

IDENTRUST Digital Signatures

- Adobe/Bluebeam Review
- Department of Professional and Occupational Regulation (DPOR) requirements for P.E.'s to sign and seal their work.
- IdenTrust Trust Network, 128-bit SSL certificates.
- Digital Signatures based on a public key infrastructure (PKI).





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RETURN ON INVESTMENT

- **Current PDMS budget = \$2.5M**
- **Savings:**
 - 1-hour per week (Two 15-minute trips to the field office)
 - 1,600 Construction Engineering and Inspection Personnel
 - Over 83,000-hours annually (conservative)
- **Annual Labor Savings = \$3.5M**
- **Additional Savings:**
 - Direct Costs (vehicles, printers, paper).
 - Response to FOIA requests.
 - Storage (both paper and e-files)
 - Reduce duplication errors, claims, re-work
 - Data integrity (yes that's expensive)
 - Standardization improves efficiencies



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PDMS REQUIREMENTS

Software requirements specification

- **Functional and non-functional requirements**
- **100% Web-based (no thin-client)**
- **Mobile-device-ready (all devices)**
- **Transparent workflow and task lists**
- **e-Approvals (does the CFR require a wet signature?)**
- **Auto file-compression**
- **Records retention (per Code and CFR)**
- **FOIA**
- **Hard/paper files**
- **TRNS*PORT**
- **Shop-Drawings**
- **Mouseovers**

Administrative Services Procurement Section Title: Construction Document Management and Workflow System RFP # 130968-FW		VDOT Virginia Department of Transportation
F-131	The ability to status the receipt and certification of printed contracts	a step in the workflow will distribute notifications to the appropriate users to confirm that contracts have been printed.
F-132	The ability to distribute or trigger electronic notifications that final Construction Contract files have been published or introduced to the solution.	

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PROJECT DOCUMENT MANAGEMENT SYSTEM LESSONS LEARNED

- Start with standardized, established processes
- Project stakeholder training before you start
- RFP system requirements – use an IT business analyst
- Include processes, sample forms in RFP
- Post-award scope validation period
- Develop system on your system
- Plan for post-implementation user support
- No-build option, some things humans can do better
- Post implementation transition period

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VDOT 3D/4D

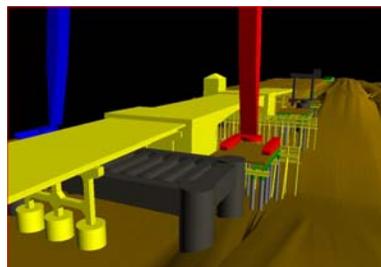
3D Engineered Models

- Planning
- Design
- Construction



4D/5D Engineered Models for project Schedule and Cost

- Constructability, Risk Management, Collaboration
- Claims Analysis



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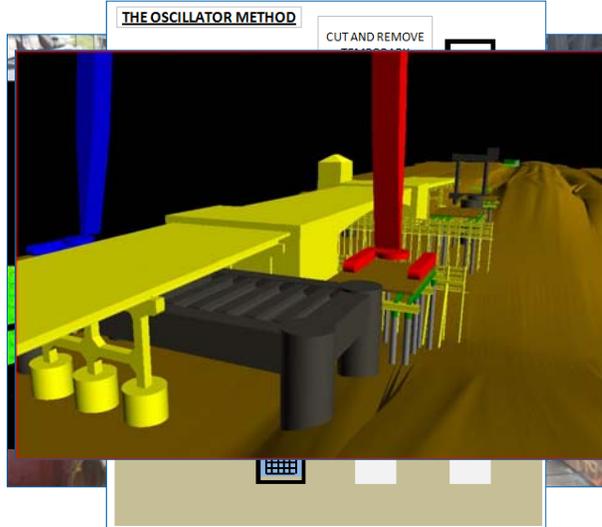
CONSTRUCTABILITY

Pre-Operational Meetings

Critical Coordination

- Planning
- Logistics
- Hold Points
- Progress
- Testing

Lessons Learned Meetings



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3D/4D FABRICATION/ERECTION

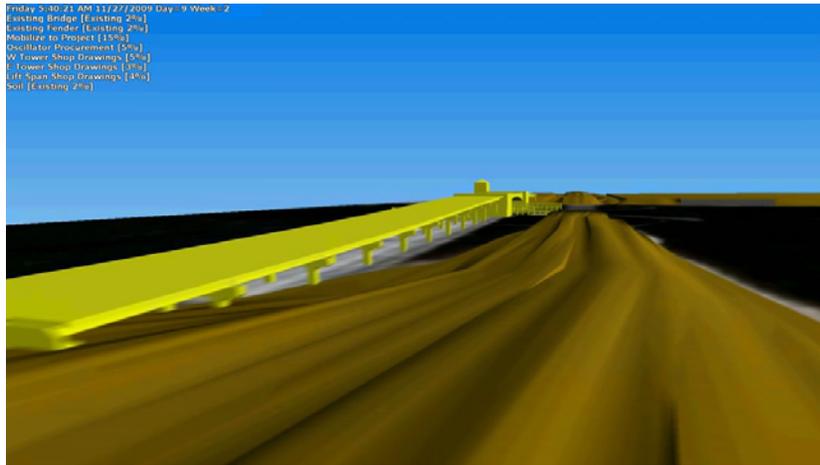
- Between towers and span 150,000 bolts
- Precise dimensional control



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4D - COLLABORATION



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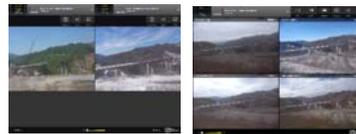


Construction Cameras On VDOT Projects

I-95 & US-460



- Cellular connection
- Unlimited storage on cloud
- Instant time-lapses
- 600% Zoom



Compare two different days
side by side

View past days, weeks &
months on one screen

Camera resolutions up to 24MP

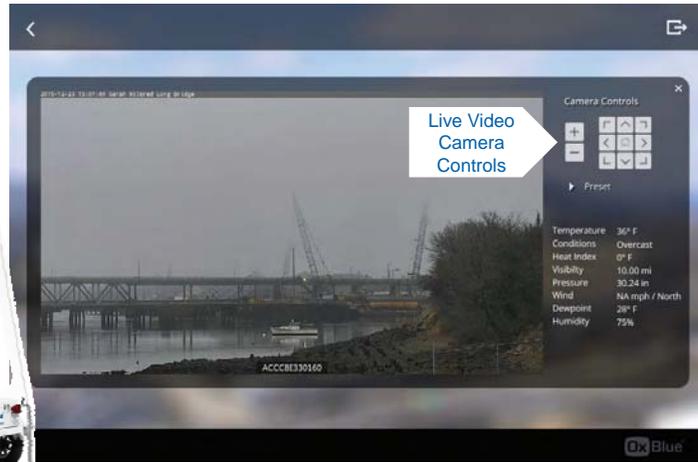
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Solar Video Cameras



Self Sufficient
Solar & Cellular
Trailer-mounted
(Licensed
& Registered)



Live Video
Camera
Controls



E-Construction with Microsoft SharePoint

- Engineering Workflow Engine
- Easy navigation
- Flexible reporting
- Automated Transmittals






Bentley ProjectWise

