Vermeer
EQUIPPED TO DO MORE.

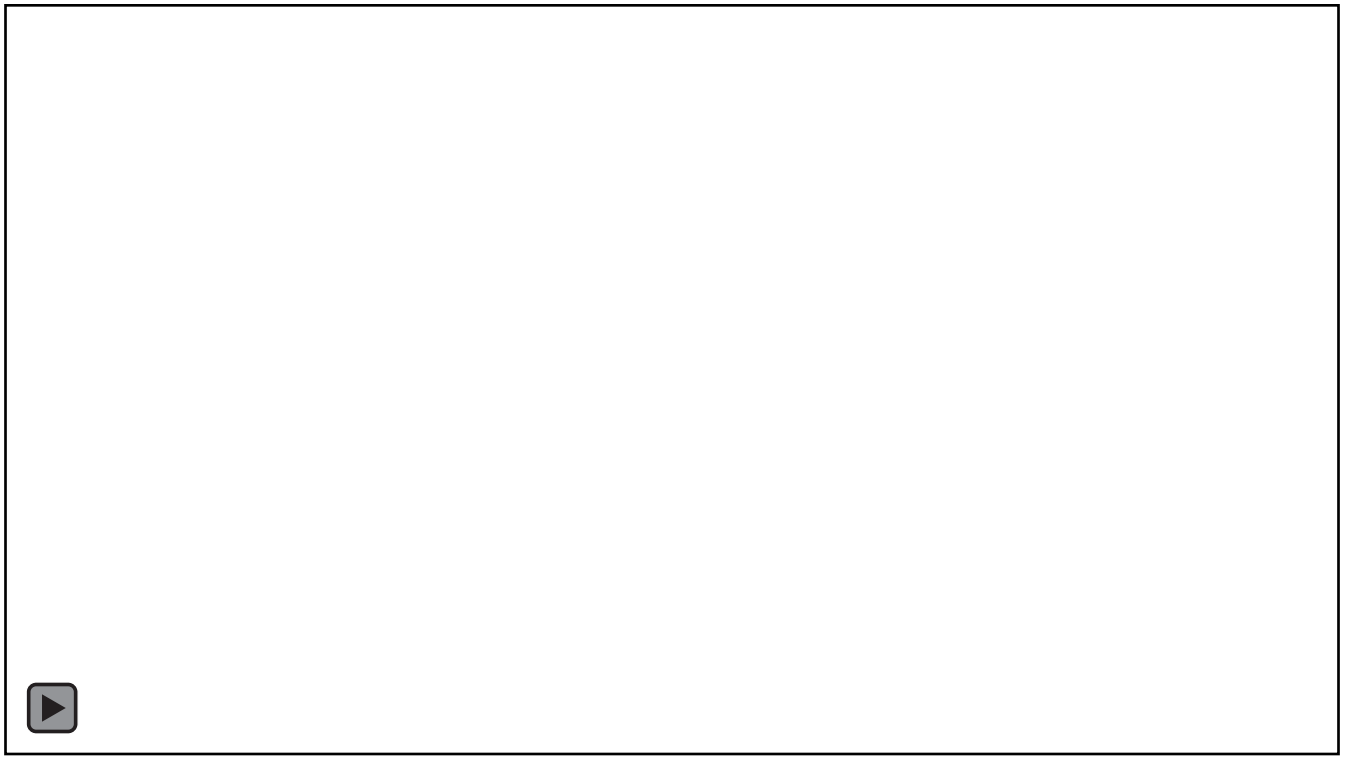
Maximize Productivity with your Utility Installation

Cory Mass

Content

- What is HDD?
- Productivity inhibitors
- Market situation
- Productivity tools in HDD
- Contractor story
- Demo

HDD: horizontal directional drilling



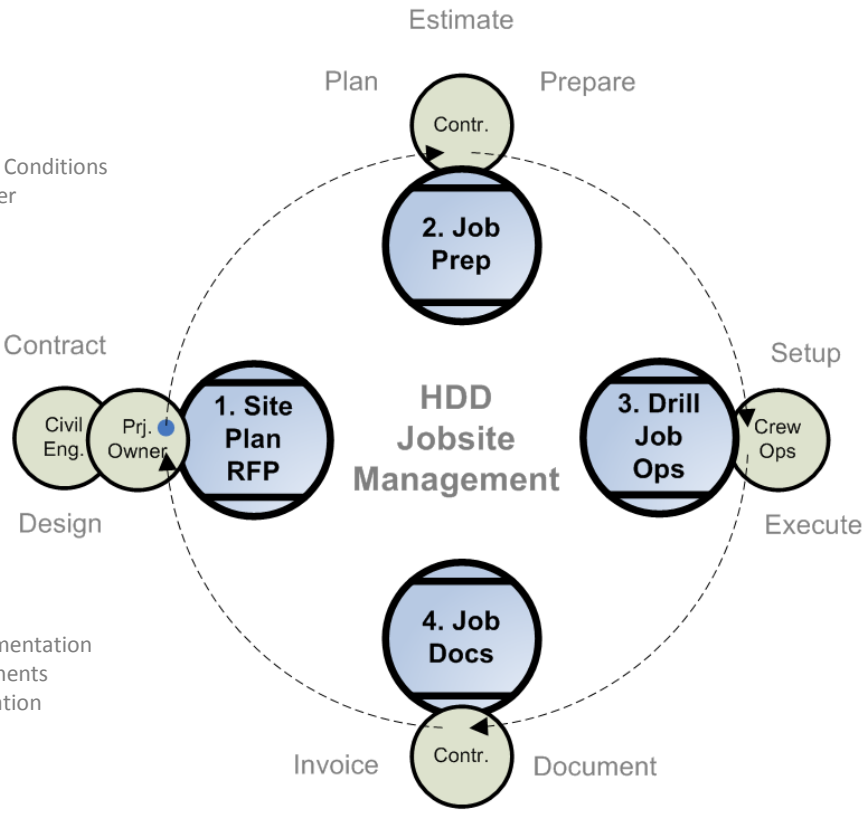
Typical HDD productivity inhibitors

Communication

- Varying, Difficult Ground Conditions
- Engineering Plan vs. Driller Experience
- Varying Documentation Requirements

Job Readiness

- What People
- What Equipment
- What Ground Conditions
- Where To Go



Consolidation

- Design vs. As-Built Documentation
- Time to Complete Documents
- Required Project Information

Production

- Product Installed Correctly
- Installation Risks, “Cross Bores”, “Inadvertent Return”

Utility hit stats

- Study conducted by PHMSA* looking into issue of one-call exemptions revealed that between 1993 and 2012
  - 1630 pipeline incidents caused by third party excavation damage, resulted in
  - 141 deaths and 440 injuries, costing
  - $336,736,529 in property damage
- October 2016 in Constructionequipment.com:
  - “APWA estimates an underground utility line is hit every 60 seconds”
  - “Estimated potential to unlock $21 in value for every $1 invested in underground asset management by reducing accidents, damages, and delays”

*US DOT’s Pipeline and Hazardous Materials Safety Administration, regulatory authority for gas and hazardous liquid pipeline safety materials; “Study on the Impact of Excavation Damage on Pipeline Safety” commissioned by Sec of Transportation

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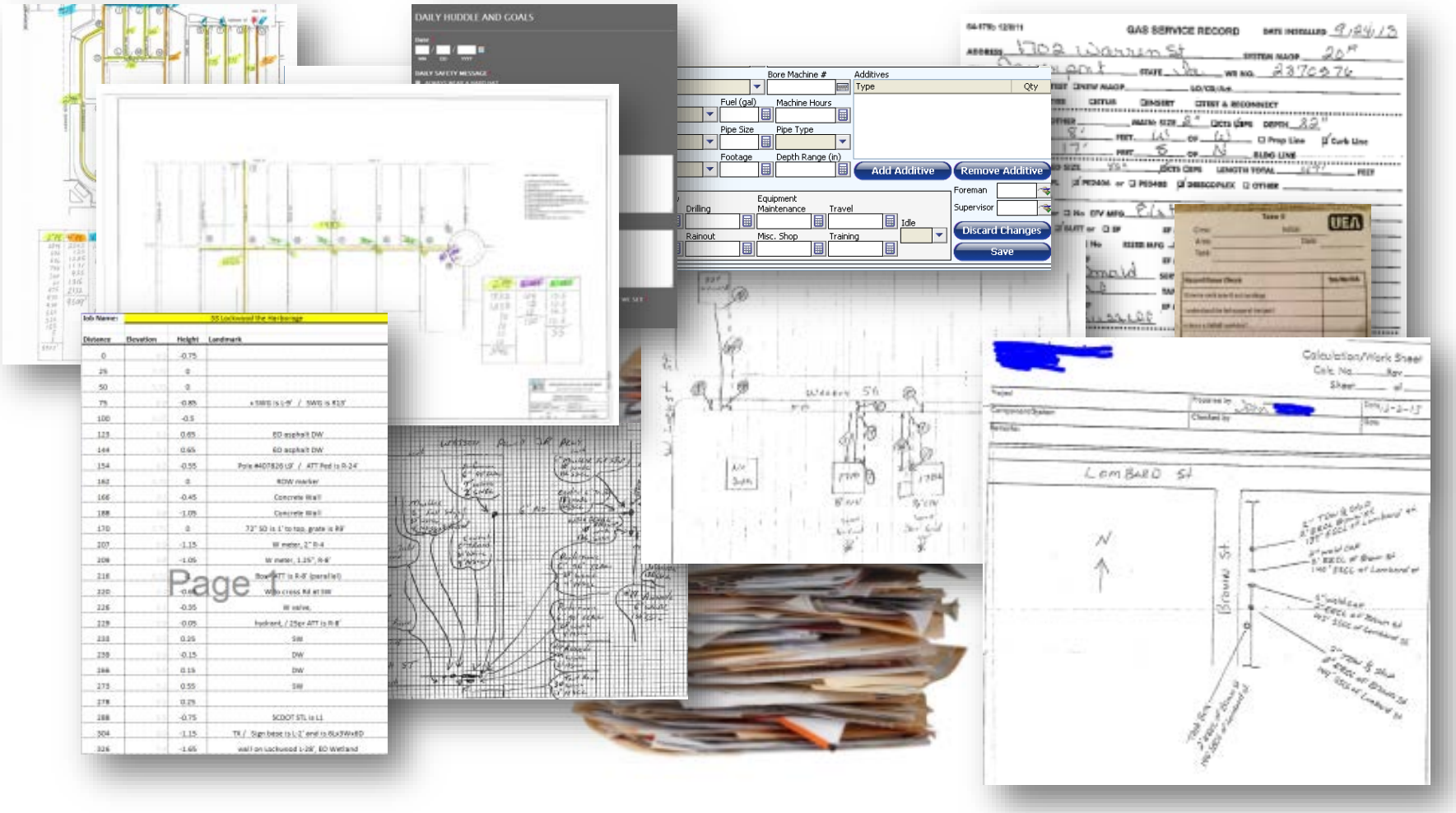
*US DOT's **P**ipeline and **H**azardous **M**aterials **S**afety **A**dministration, regulatory authority for gas and hazardous liquid pipeline safety materials; "Study on the Impact of Excavation Damage on Pipeline Safety" commissioned by Sec of Transportation
The total number of pipeline incidents caused by third-party **excavation damage in any given year is just a small fraction of the number of excavation damage incidents to all underground facilities

Jobsite management



ROI example

- Increasing revenue vs. productivity*

Case Study: Utility Contractor X: more revenue

	Base Case		Option 1 (10% more revenue)	
Revenue	$ 50,000		$ 55,000	
Cost of goods sold:				
Labor	20,500	41.0%	22,550	41.0%
Material	10,250	20.5%	11,275	20.5%
Equipment	8,200	16.4%	9,020	16.4%
Subcontractors	2,050	4.1%	2,255	4.1%
Total	41,000	82.0%	45,100	82.0%
Gross profit	9,000	18.0%	9,900	18.0%
Operating expenses	6,000	12.0%	6,600	12.0%
Operating income	3,000	6.0%	3,300	6.0%
Interest expense	750	1.5%	750	1.4%
Pre-tax income	$ 2,250	4.5%	$ 2,550	4.6%

10%

10% increase in revenue !

$300K to bottom line

$300K

Case Study: Utility Contractor X: greater productivity

	Base Case		Option 2 (5% more productive)	
Revenue	$ 50,000		$ 50,000	
Cost of goods sold:				
Labor	20,500	41.0%	19,475	39.0%
Material	10,250	20.5%	10,250	20.5%
Equipment	8,200	16.4%	7,790	15.6%
Subcontractors	2,050	4.1%	2,050	4.1%
Total	41,000	82.0%	39,565	79.1%
Gross profit	9,000	18.0%	10,435	20.9%
Operating expenses	6,000	12.0%	6,000	12.0%
Operating income	3,000	6.0%	4,435	8.9%
Interest expense	750	1.5%	750	1.5%
Pre-tax income	$ 2,250	4.5%	$ 3,685	7.4%

5%

5% labor & equipment productivity gain....

$1,435K to bottom line!

$1,435K

Why new technologies in HDD?

- **Risk Mitigation**
  - Field studies on utility line hits, jobsite incidents
- **Efficiency Improvement**
  - Efficiencies below general construction industry
- **Governmental and Institutional Initiatives**
  - The PIPES Act of 2016
  - ASCE-xxx: Standard Guideline for Data Collection and Exchange of Exposed Utility Infrastructure

Remote monitoring systems

- A telematics technology using cellular, Wi-Fi or satellite communications to transmit data remotely
  - Equipment and jobsite monitoring
  - Fleet management, standard solutions
  - Advanced Fleet solutions to include CAN bus data
  - Wide range of system providers: i.e., Trimble *VisionLink Unified Fleet* or other OEM-specific systems

Standard productivity data

- **GPS location** for tracking equipment and planning work routes
- **Engine rpm** to monitor things like work vs. idle times
- **Fuel utilization** to better optimize operation costs
- **Engine hours** to drive machine lifecycle decisions
- **Geofencing** to monitor machine positioning outside of the expected limits

Summary | Positions | Engine | Unit Data | Alerts | Maintenance Plans | Faults

Engine Summary

	Engine	Work	Idle	Fuel Used
Current	236 hr	196 hr	40 hr	920 gal
Today	2 hr	0 hr	2 hr	8 gal
Yesterday	4 hr	3 hr	0 hr	14 gal
This Week	6 hr	3 hr	2 hr	22 gal
This Month	12 hr	7 hr	4 hr	45 gal
This Year	236 hr	196 hr	40 hr	920 gal

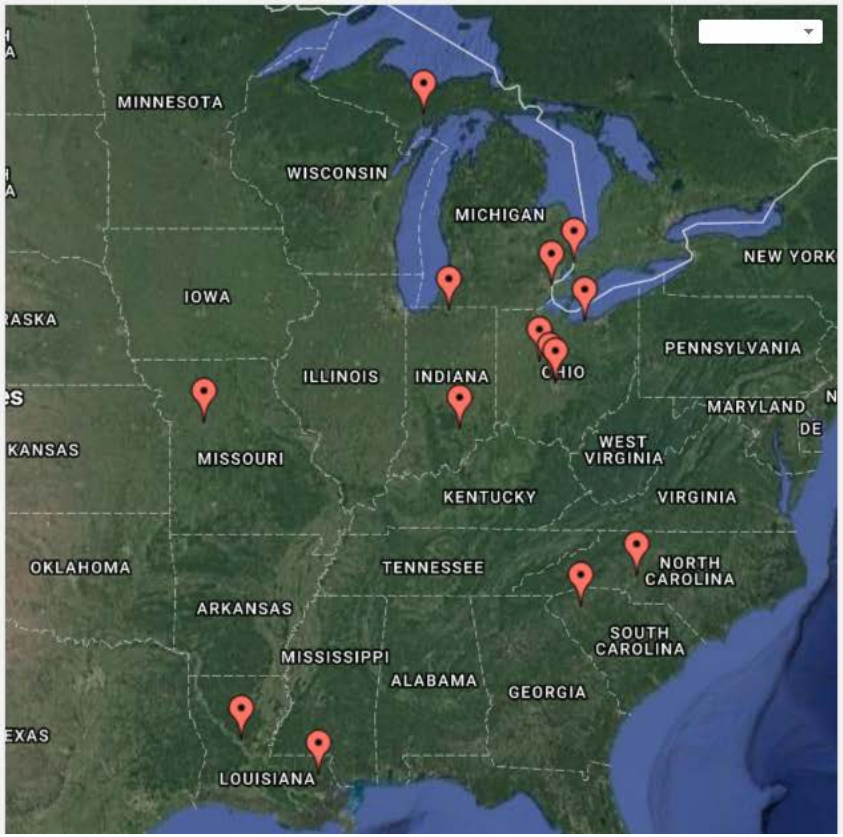
Last report received 5 hrs and 51 mins ago

Equipment monitoring

Model: *D24x40 S3* **Status:** *Owned, Sold*

Name	Engine Hrs (hr)	Idle Hrs (hr)	% Idle (%)	Fuel (gal)
200407	912.40	472.04	51.74	2,260.65
200408	314.05	181.25	57.71	629.39
200412	168.90	96.41	57.08	392.96
200413	459.25	230.44	50.18	1,033.71
200414	372.90	190.29	51.03	1,016.27
200415	602.90	331.45	54.98	1,465.10
200417	285.55	131.58	46.08	733.08
200419	470.55	310.61	66.01	949.43
200420	415.90	294.66	70.85	746.81
200421	404.30	233.85	57.84	1,007.16
200423	193.15	111.55	57.75	429.54
200424	117.00	65.16	55.69	308.16
200426	50.85	27.05	53.19	119.67
200427	22.75	10.89	47.85	51.78

Showing items 1 to 14 of 14



Maintenance planning

- Planned vs. unplanned maintenance
- Jobsite interruptions
- Maintenance records

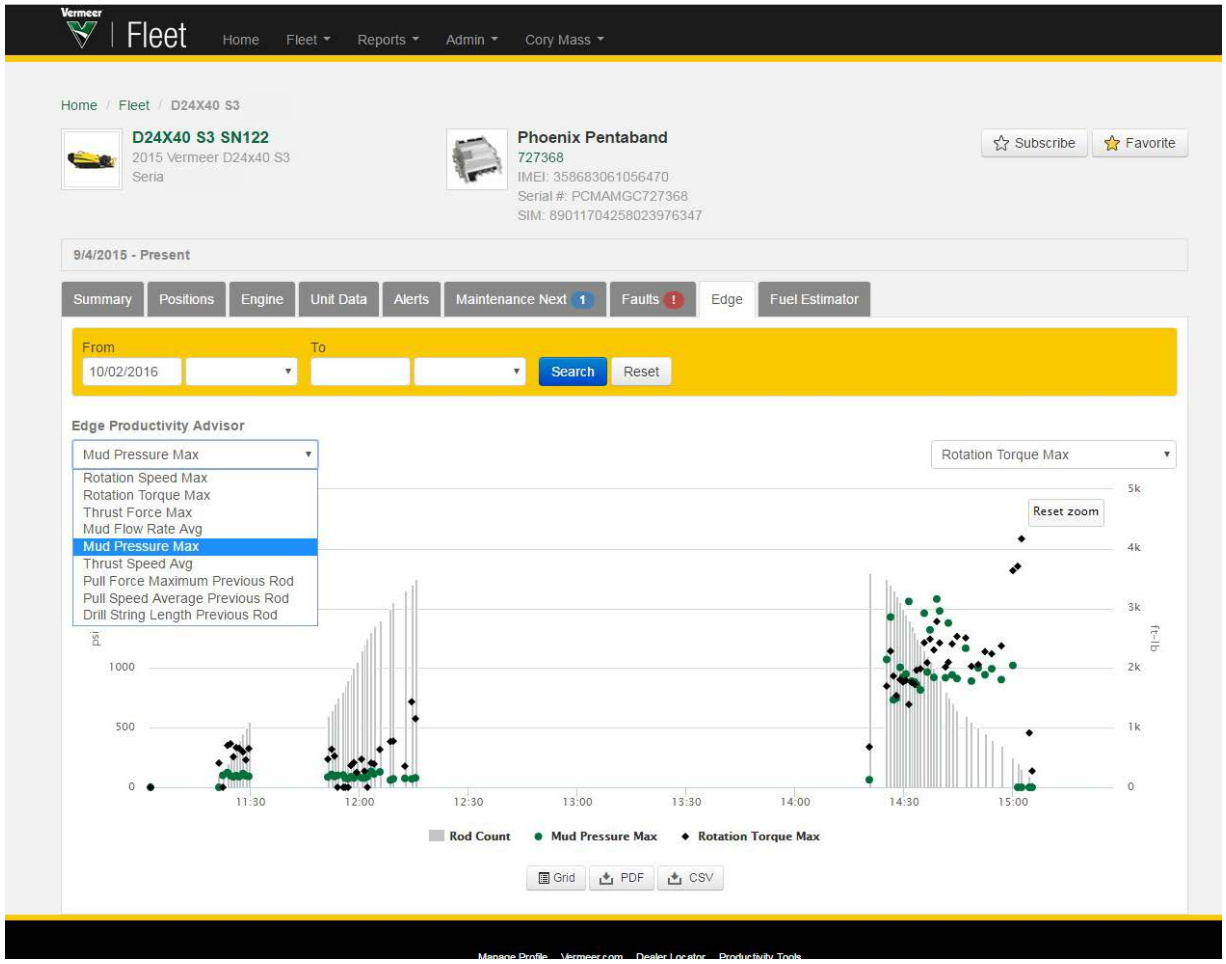
Log Unscheduled Maintenance

Current | History | Defined

Type	Name	Data Point	Due	Reminder	
Milestone	100 Service Hours	Engine Hours	at 100 Hours (hr)	at 50 Hours (hr)	Details
Milestone	1000 Service Hours	Engine Hours	at 1,000 Hours (hr)	at 950 Hours (hr)	Details
Milestone	1500 Service Hours	Engine Hours	at 1,500 Hours (hr)	at 1,450 Hours (hr)	Details
Milestone	2000 Service Hours	Engine Hours	at 2,000 Hours (hr)	at 1,950 Hours (hr)	Details
Milestone	250 Service Hours	Engine Hours	at 250 Hours (hr)	at 200 Hours (hr)	Details
Milestone	4500 Service Hours	Engine Hours	at 4,500 Hours (hr)	at 4,450 Hours (hr)	Details
Milestone	50 Service Hours or Weekly	Engine Hours	at 50 Hours (hr)	at 20 Hours (hr)	Details
Milestone	500 Service Hours	Engine Hours	at 500 Hours (hr)	at 450 Hours (hr)	Details

Showing items 1 to 8 of 8

Enhanced productivity data

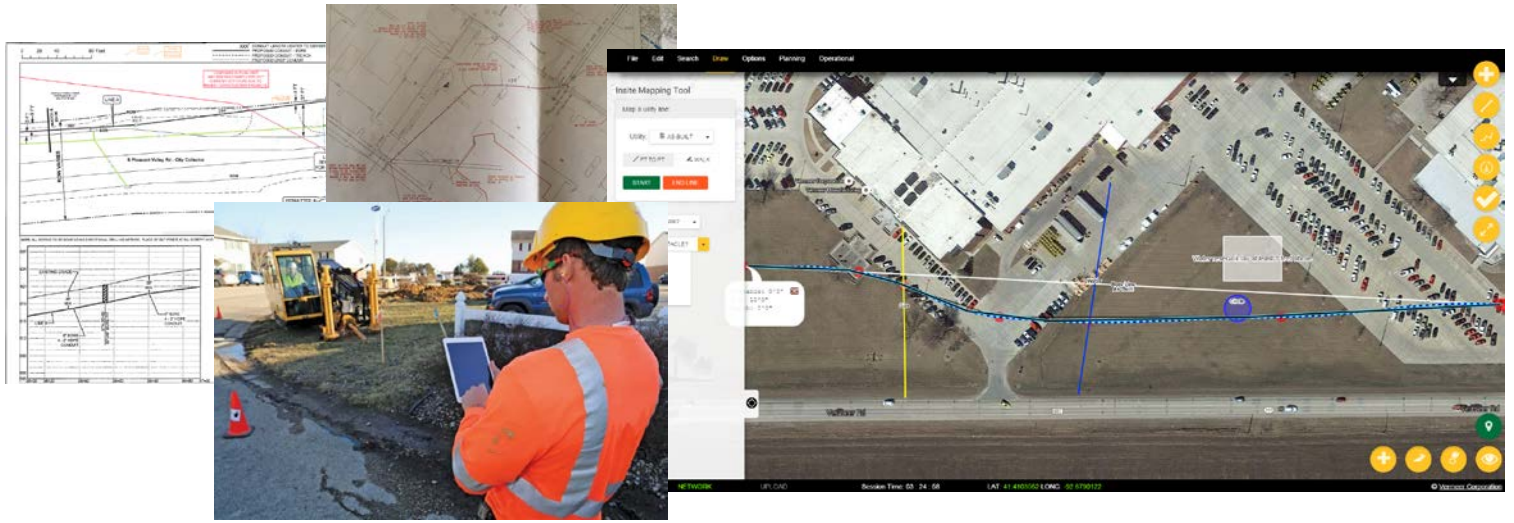


Preplan with easy-to-use tools

Plan a job in the office, add or change a bore plan, share “digital job jacket” with remote field team instantly

- **Customer value:** Swift jobsite preparation in the office using intuitive planning tools may reduce travel time

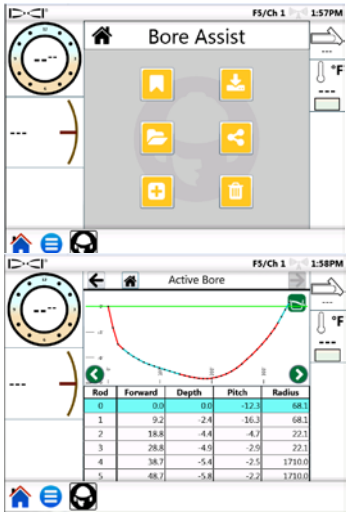
Simple jobsite mapping



Map Utilities, as-built, potholes, etc., for fiber job accurately into electronic "job jacket"

- **Customer value:** Help save time and costs with simple GPS mapping, providing data in line with job specifications, including latitude/longitude

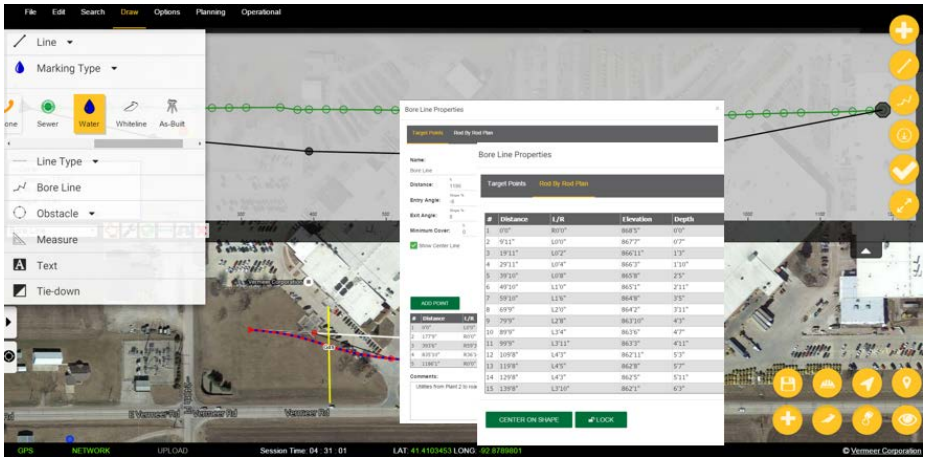
Bore plan on rig



Load plan information to machine or plan/change it on the machine

- **Customer value:** Save time, avoid rework, Increase the chance for “first time right” drilling with simple tools, protect the assets

Complete job documents digitally



File job documentation online: invoicing materials readily available soon after installation

- **Customer value:** Help shorten billing cycle time, decrease time to generate professional reports

Job story – Erik Carlson

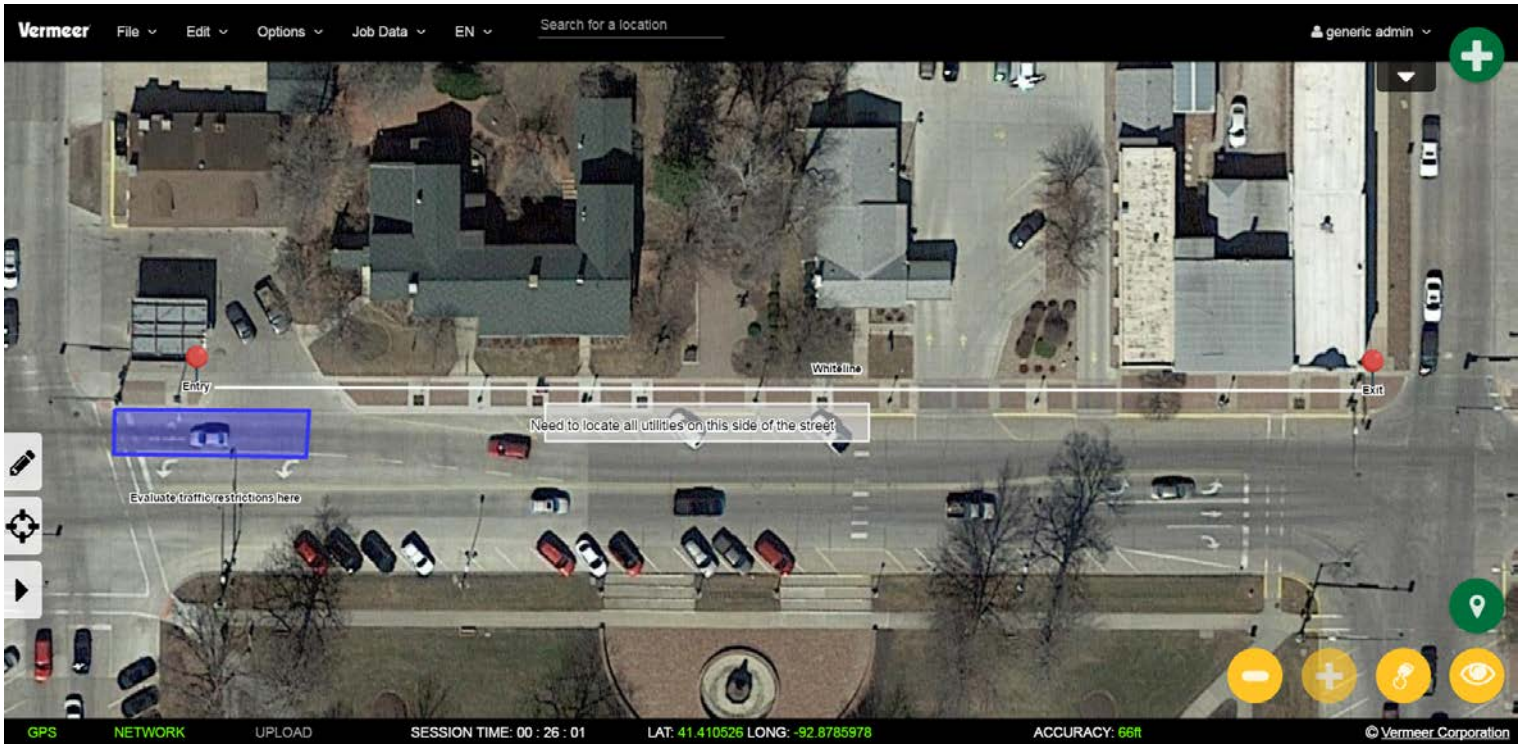
President/Owner, Pinnacle Construction

- Operating since 2001 in Charleston, South Carolina with a military and customer service background
- Specialized in underground utility construction, operating a fleet of Vermeer and competitive horizontal directional drills, from 9,000 to 40,000 lb (4082.3 to 18,143.7 kg) capacity, and employs more than 40 people
- Each crew is fully outfitted with electronic utility locating equipment, hydraulic reel trailers, mud spoils vacuum units and various sized mini-excavators or backhoes
- Pinnacle is a full-service underground utility construction contractor specializing in horizontal directional boring and public utility – electric work

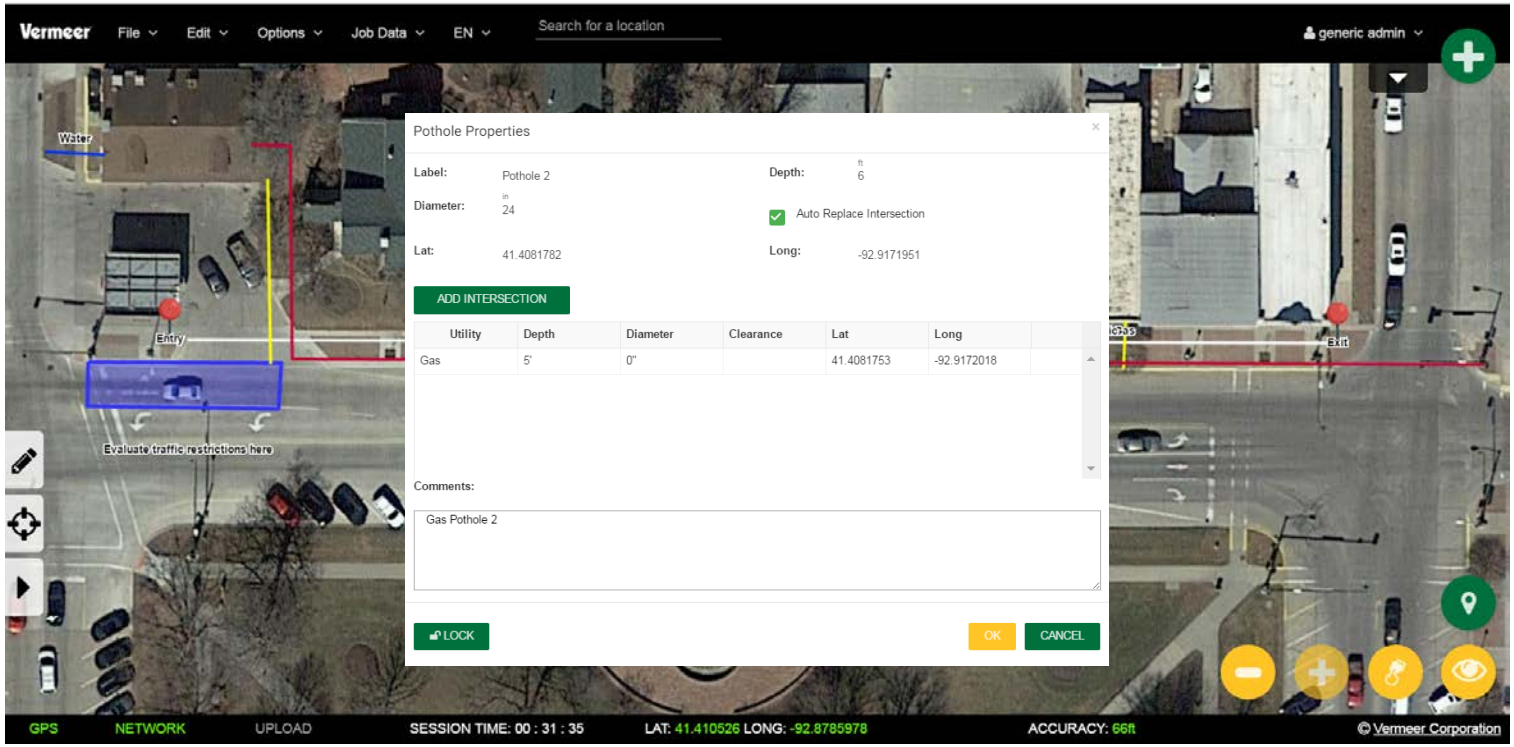
"We take responsibility for our actions. Foremen are being held responsible for the decision-making that occurs in the field. If there is not a safe "window" to operate within, then we either hand dig the area to locate the obstruction or we adjust to create a larger margin of separation. The customer's needs will always be a priority – so long as it is safe to do so."

- Erik Carlson
Pinnacle Construction

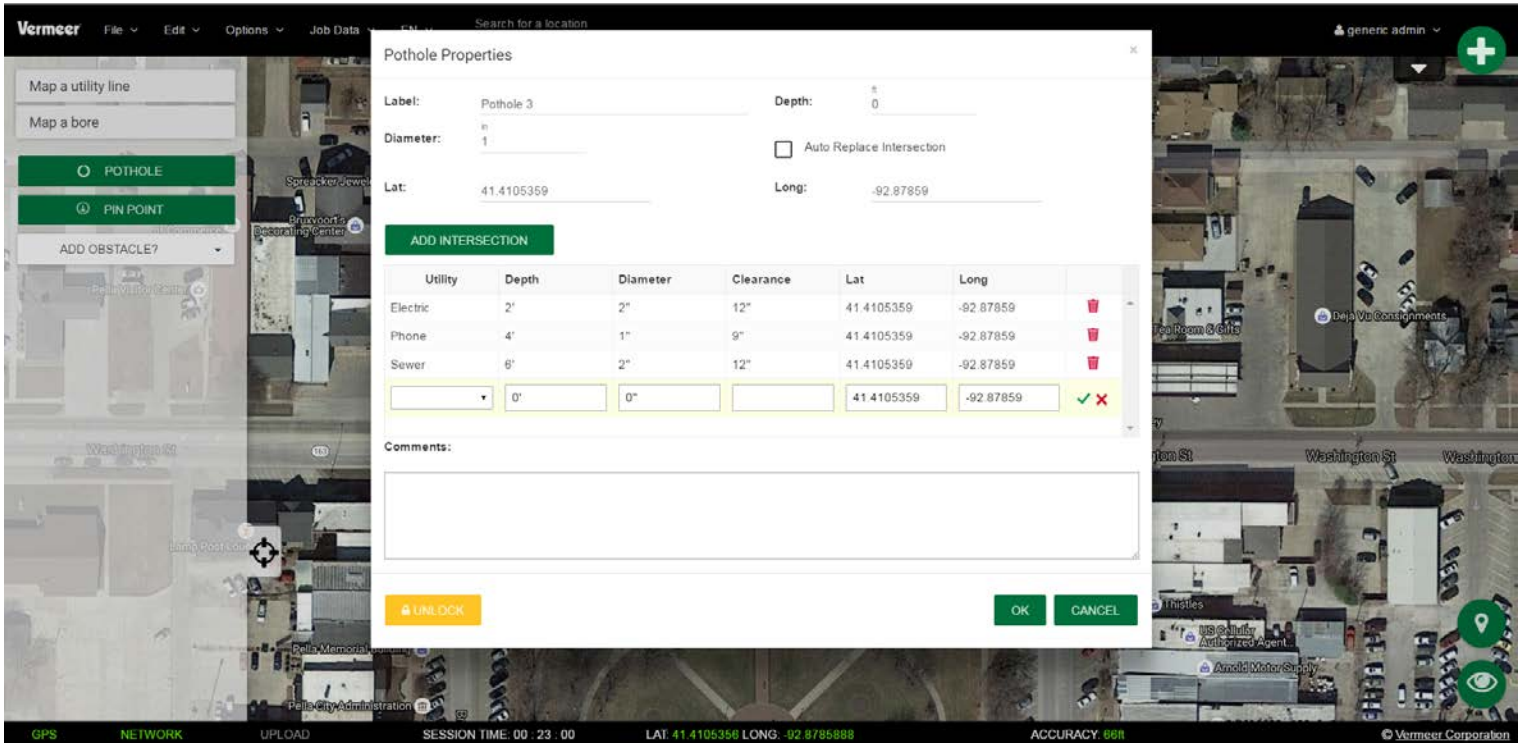
Starting a basic plan



Planning potholing - daylighting

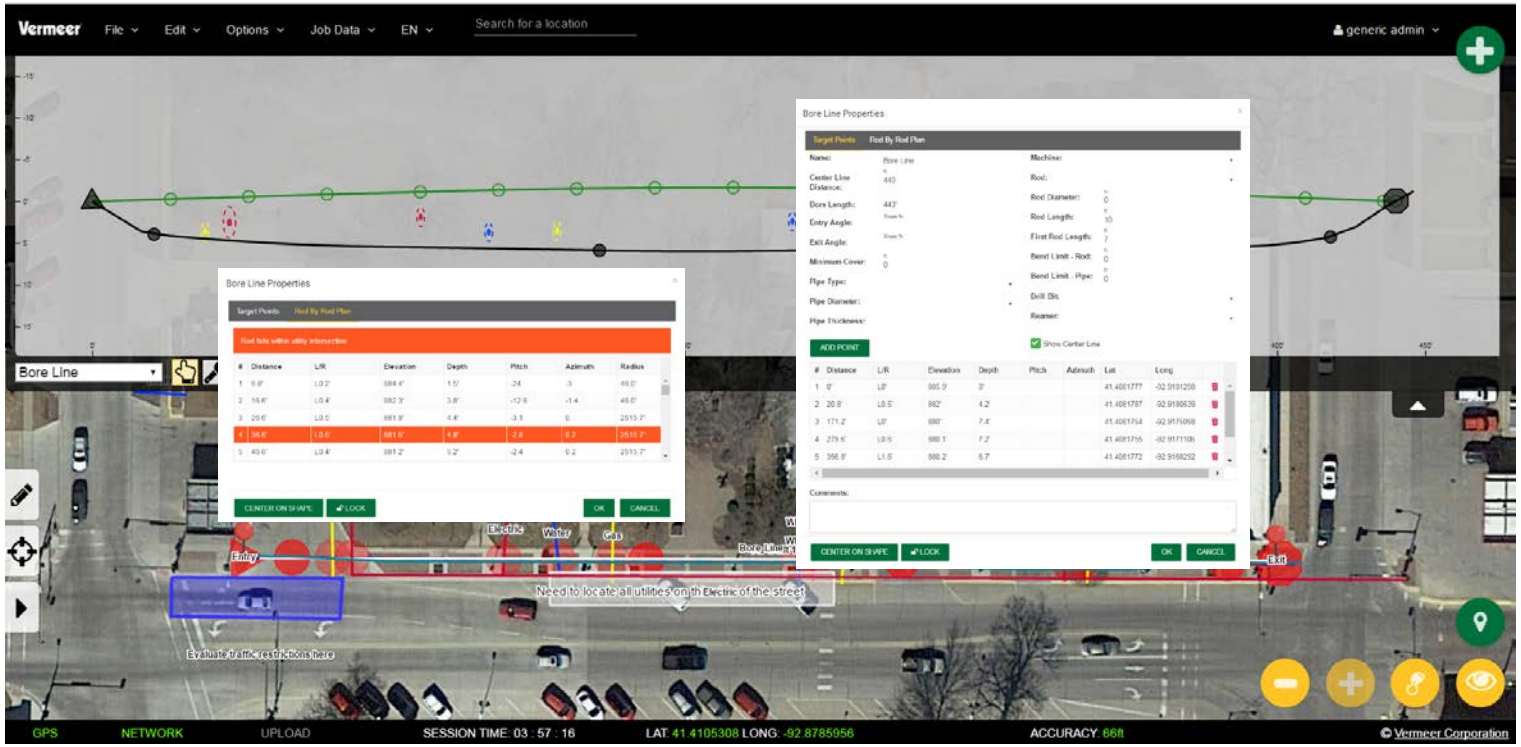


Review and update as-you-go

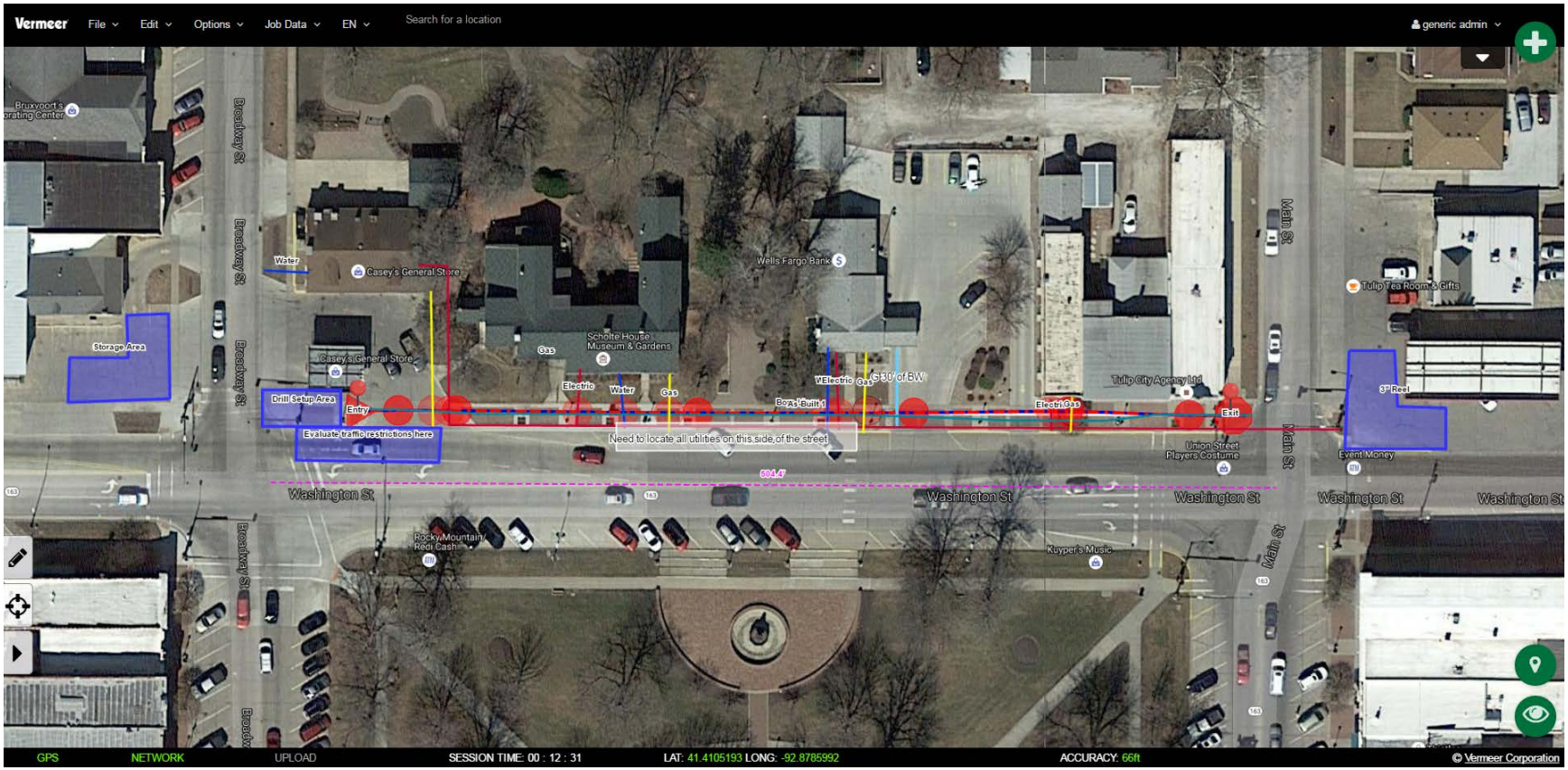


Create proposed bore path

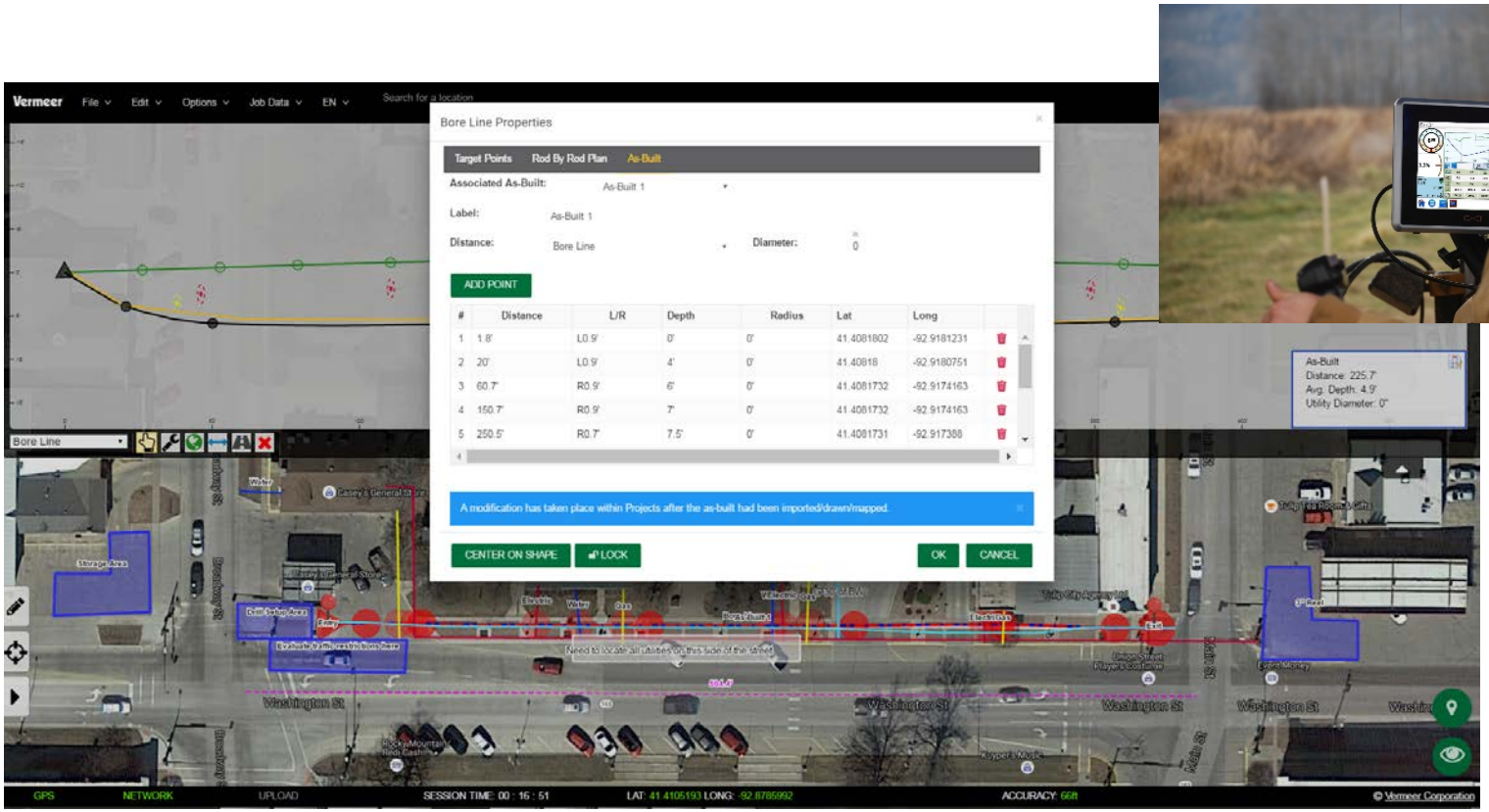
Bore path view and per-rod conflict warning



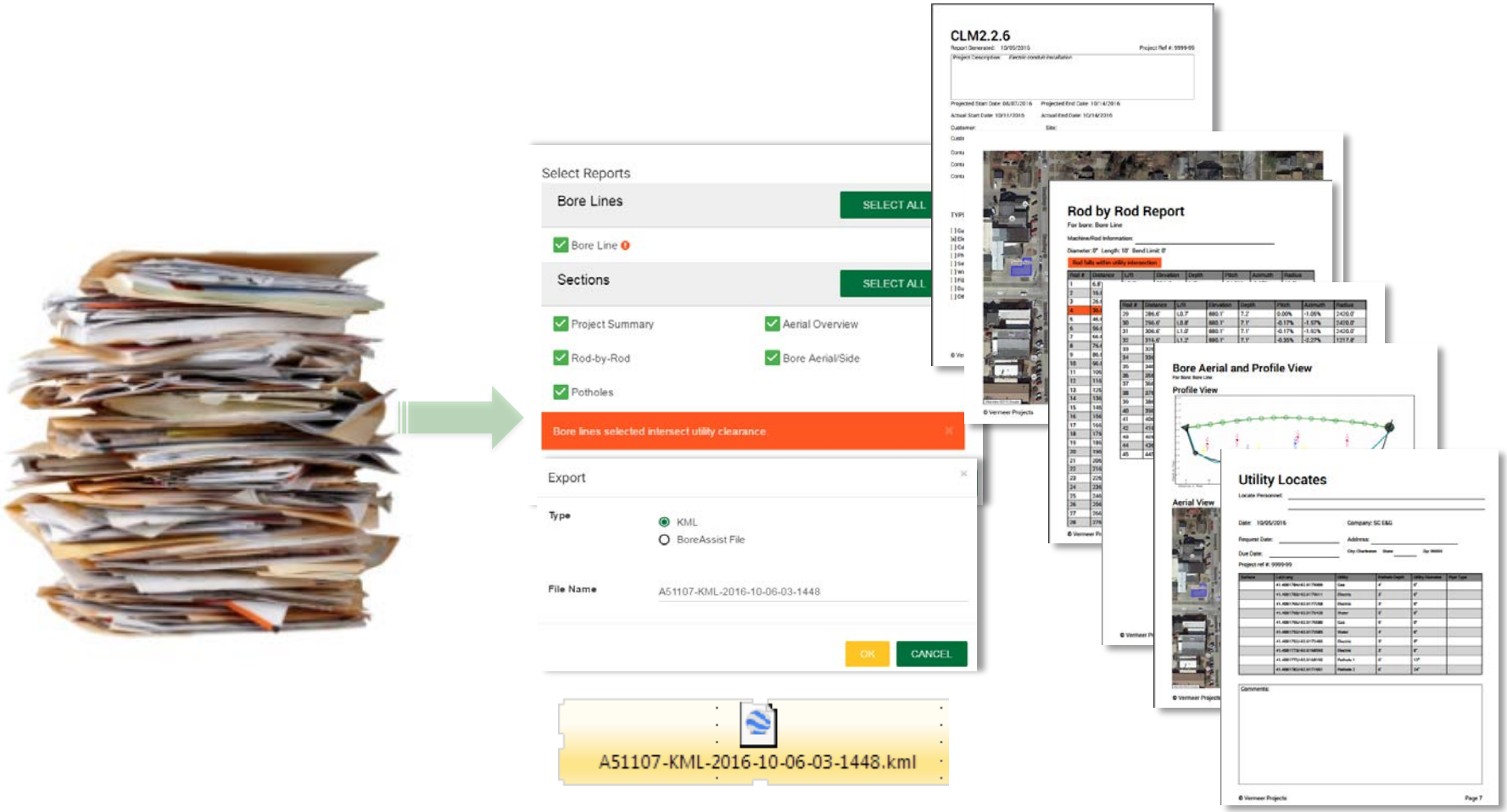
Add jobsite information



Actual vs. plan



Finalize job record



Key benefits observed, Pinnacle Study*

Main Steps	Legacy Methods	New Methods	Benefits & *Time Saving per Job
Preplan for bid/permit	**Multiple trips** to site, random pictures at site, unmanaged data collection, if any	Virtual visit, "Job e-file," add pictures and information to e-file	Faster, more accurate RFP response: **DAYS to HOURS**
Preplan for production	**Separate files:** checklists, permits, safety, plan, etc. Paper folder, in-person pick up	E-file update, add files in cloud; share complete e-file with crews	Optimize time of jobsite managers: **HOURS**
Production, jobsite documentation	**Penmanship**, losing docs, as-built in notebook, job spec change, multiple trips to office	Cloud access to e-file, shared files for updates, changes and approvals	Real- time file share with stakeholders: **DAYS to HOURS**
Post doc for invoice and record keeping	**Consolidate** 30-80 pieces of paper, copies, duplicates, filing etc.	Consolidated cloud-based and searchable e-file	"Where, when, what, who" at your fingertips **DAYS to HOURS to MINUTES**

* Time study ongoing, time savings depends on the scope of a construction job

Product demo

- Bore path, utilities and add pictures
- Plan, map and collaborate in near real-time
- https://projects.vermeer.com

Summary

Productivity tools (software, hardware) on and off machines are increasingly necessary for achieving jobsite **productivity** gains and help **managing potential risks** of drilling operations

- Help achieve consistency in jobsite development
- Claims mitigations
- Future work coordination, know what to expect
- Reduce non-value-added time on jobsite

Questions?