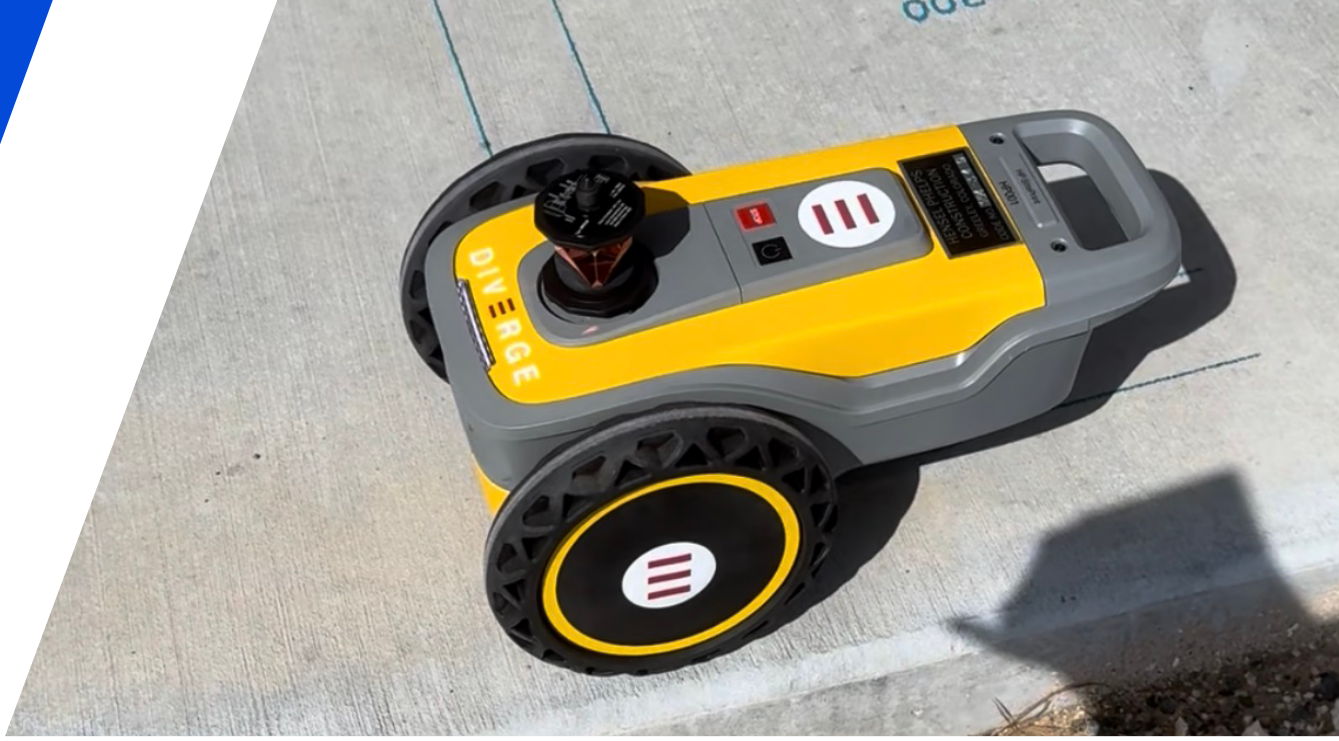

Hensel Phelps Uses HP SitePrint to Modernize Multi-Trade Data Center Layout

Highlights

Richer field information

Prints lines, points, text, symbols, equipment footprints, door swings, and other installation information directly on the slab.

Improved consistency

Reduces repeated field calculations and measurements by printing prepared digital information relative to common project control.

Multi-trade coordination

Allows coordinated information from multiple trades to be communicated through a common layout workflow and differentiated using color.

Reduced risk of errors and rework

Creates a more direct connection between coordinated digital information and physical installation.

Project Scope

Project type:

Hyperscale data center construction

Application:

Multi-trade interior layout

Layout scope:

Walls, containment systems, electrical infrastructure, HVAC and refrigeration systems, equipment pads, racks, and other coordinated building systems

Project scale:

More than 800,000 sf of layout on one hyperscale data center, with SitePrint deployed across multiple Hensel Phelps data center projects in the U.S.

Hensel Phelps delivers some of the country's most complex construction projects, including hyperscale data centers where dense building systems, prefabricated equipment, and aggressive schedules make coordination critical.

For these projects, layout is the connection between the coordinated digital model and the physical work installed in the field. Hensel Phelps has been using HP SitePrint as a digitally driven layout tool to make that connection more consistent and information-rich.

The Challenge

Traditional layout is a highly skilled process.

Field personnel may use drawings, total stations, tapes, lasers, string lines, chalk lines, and other tools to transfer design information onto the slab. The person performing layout must often interpret drawings, identify references, calculate offsets, pull measurements, verify dimensions, and physically mark each location.

These methods have successfully supported construction for decades, but on a large data center the process may be repeated thousands of times across multiple trades.

Every additional step between the coordinated model and the final physical mark creates another opportunity for information to be interpreted, calculated, measured, or marked incorrectly.

The challenge becomes even greater because data centers contain tightly coordinated electrical, mechanical, cooling, containment, architectural, low-voltage, and equipment systems. A small layout discrepancy can affect prefabricated components or surrounding trades and ultimately contribute to rework or schedule impacts.

Traditional layout also tends to communicate only the information necessary for installation because every additional line, label, or annotation requires additional field effort.

Hensel Phelps' construction innovation team, Diverge, saw an opportunity to rethink how coordinated design information was being transferred into the field.

The Solution

Diverge has since deployed HP SitePrint on multiple Hensel Phelps projects as another tool for layout workflows.

Instead of repeatedly interpreting and calculating locations in the field, desired layout information is prepared digitally and tied to established project control. SitePrint then performs the positioning calculations and physically prints the prepared information onto the slab.

This does not eliminate the need for skilled people. The workflow shifts part of the effort upstream.

Trade files must be coordinated, cleaned, filtered, and prepared so the robot receives the correct printable information. Project control must be established and verified, and an operator monitors SitePrint as it performs the layout.

Once those inputs are established, however, the system can apply the same positioning process repeatedly across large areas of the project.

The digital workflow also changes what teams can economically communicate in the field.

Instead of only printing basic lines or points, project teams can include information such as:

- Wall types and room identifiers
- Door openings and door swings
- Equipment footprints and IDs
- Rack and containment layouts
- Mechanical Electrical and Plumbing (MEP) locations
- Symbols and installation references
- Trade-specific information using different colors

The result is not simply more markings. It is more usable information at the location where the work is being installed.



At Diverge, a Hensel Phelps company, we focus on practical innovation that solves real challenges in the field. Our experience with HP SitePrint has shown that the value of digital layout goes beyond simply performing layout faster. It can reduce opportunities for error, provide richer information to craft teams at the point of installation, and improve coordination across trades. Ultimately, our goal is not to deploy technology for technology's sake but to equip our project teams with tools that help them build more accurately, consistently, and predictably.

Mihir Somalwar
Robotics and Innovation Lead,
Diverge, a Hensel Phelps company



The Results with HP SitePrint

Hensel Phelps has now used HP SitePrint across multiple data center projects in the United States, including more than 800,000 sf of multi-trade layout on one hyperscale project.

The experience has highlighted benefits that extend beyond the speed of physically marking the floor.

Improved Consistency

Traditional layout relies heavily on the experience of the individual performing repeated calculations, measurements, and markings.

With digitally driven layout, those repeated positioning calculations are performed relative to common project control after the digital information has been prepared and verified.

This creates a more standardized process across large and repetitive layout scopes

Richer Information in the Field

The ability to print text, symbols, colors, door swings, equipment footprints, and other details gives project teams an opportunity to place more useful information directly in front of craft professionals.

Instead of asking only, **"Where does this go?"**, the layout can also help communicate **"What is this, how is it oriented, and how does it relate to the surrounding work?"**

Better Multi-Trade Communication

Different building systems can be incorporated into a coordinated printing workflow and visually differentiated using SitePrint's multi-color capability.

For complex data center construction, this allows the slab itself to become another communication layer between Virtual Design and Construction (VDC), field leadership, subcontractors, and craft teams.

Reduced Opportunities for Field Error

A traditional workflow may require repeated drawing interpretation, calculations, tape pulls, offsets, and physical markings.

Digitally driven layout moves more of those decisions into a prepared and reviewable digital workflow. While incorrect files, control, or calibration can still create errors, verified digital inputs can reduce the number of repeated manual calculations and measurements required in the field.

Potential to Reduce Downstream Rework

The ultimate value of accurate layout is not the mark itself—it is helping crews install the work correctly the first time.

For Hensel Phelps, that means evaluating layout technology not only by printing speed, but also by its impact on coordination, installation quality, field usability, and the risk of downstream rework.

I genuinely enjoyed using the Site Print Robot and was impressed by the value it brought to our workflow. It made the layout process faster and more efficient, allowing our team to spend less time on setup and more time focusing on the work itself. From my experience, it has been a practical tool that helps improve productivity and streamline field operations."



Michael Burge
VDC Engineer, Hensel Phelps



Long-Term Impact

The Hensel Phelps experience with HP SitePrint demonstrates that the value of digitally driven layout is broader than simply automating the act of drawing lines.

On large, repetitive, highly coordinated projects such as data centers, the technology creates a more direct connection between coordinated digital design information and physical construction.

That does not mean digitally driven layout is the right tool for every application. For a small amount of simple layout, conventional tools may remain the most efficient solution.

The value proposition changes as projects become larger, more repetitive, and more information-dense.
For Hensel Phelps, the question is therefore not whether a robotic layout system is cheaper than a tape, string, or chalk line.

The question is:
Which tool provides the most effective way to transfer coordinated design information into correctly installed work?

Conventional vs. Digitally Driven Layout

Conventional Layout Tools	Digitally Driven Layout
Field personnel repeatedly interpret drawings and dimensions	Desired information is prepared and reviewed digitally
Measurements and offsets may be calculated in the field	Positioning calculations are performed digitally relative to project control
Crews measure and physically mark locations	The system prints prepared information directly onto the floor
Typically communicates essential lines and points	Can communicate lines, points, text, symbols, colors, IDs, door swings, and footprints
Additional markings require additional field effort	Richer information can be incorporated during digital preparation
Quality relies heavily on individual layout execution	Provides a more standardized and repeatable execution process
Error opportunities exist during interpretation, calculation, measurement, and marking	Risk shifts toward digital file preparation, control, calibration, and verification

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