Construction Robotics HP SitePrint Demo

BuildingPoint Partners: Midwest & Gulf Coast

Justin Davis– Construction Robotics Account Executive

BuildingPoint

Trimble

Who Am I?

Justin Davis

Construction Robotics

Account Executive

- Construction Industry for 12 years
- Located Near Fort Wayne, Indiana

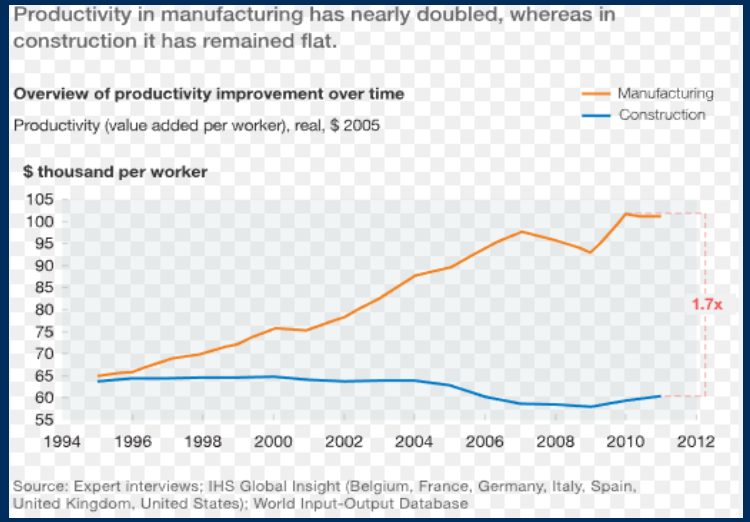
BuildingPoint

Digital Twin - Model to Field

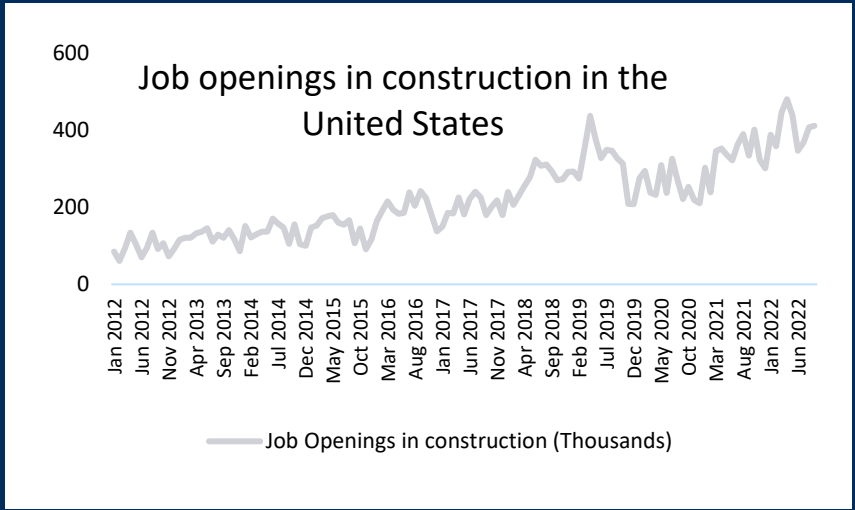
BuildingPoint

Construction Challenges

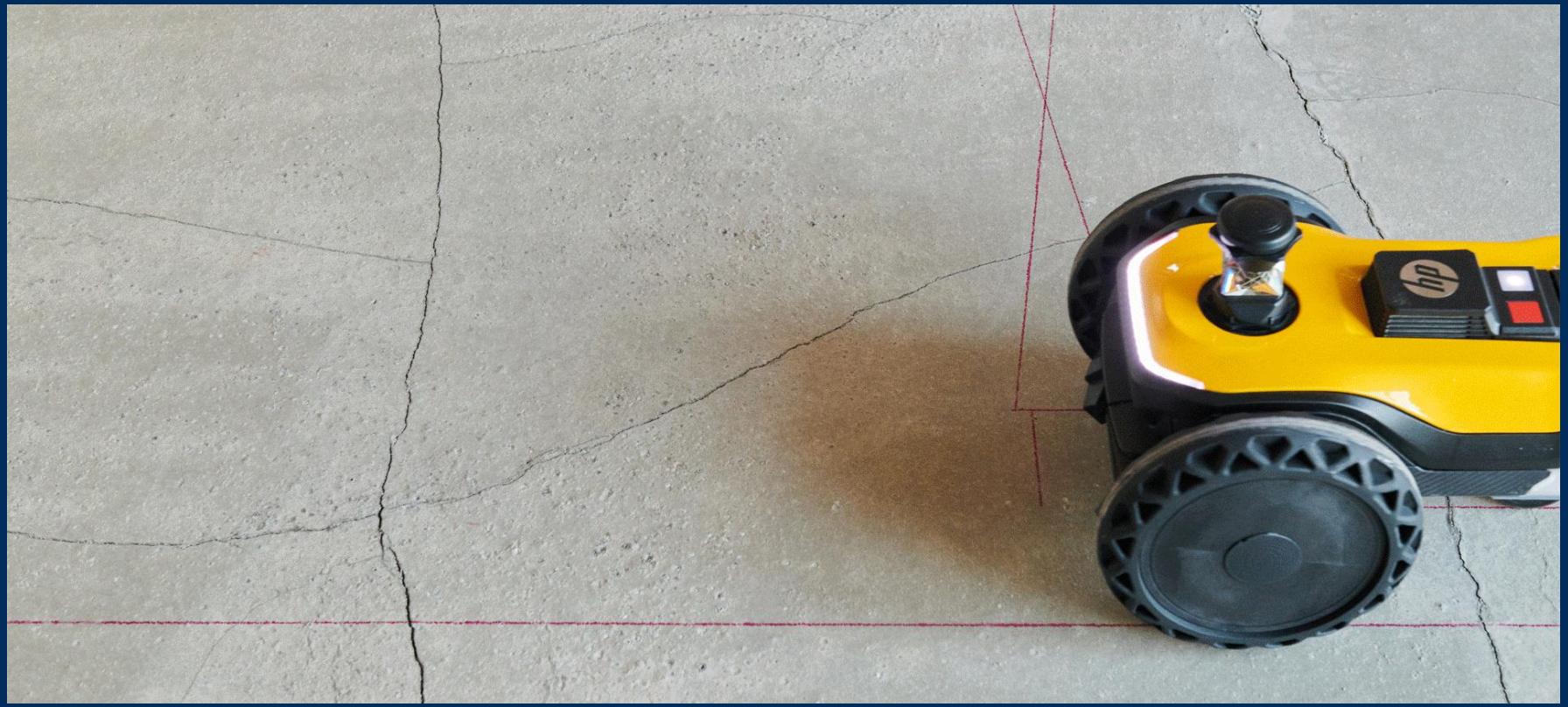
Productivity



Labor Shortages



Say hello to SitePrint



Prepare a 2D CAD file (.dxf) for the layout

A good CAD preparation is essential to increase execution productivity

Start by exporting a 2D CAD from your design

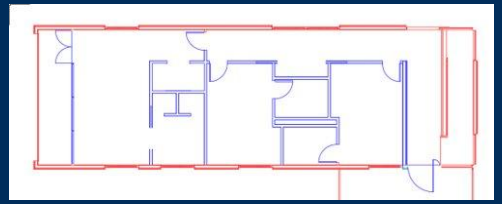
HP developed plug-in to help clean and get "robot-ready" files

Include solid lines, dashed-lines, points, circles, arcs and text up to 2in in height.

Upload your prepared CAD file in the cloud. Versions of the same CAD must be uploaded as such to keep version control.

3D Model

Standard 2D



Robot-ready 2D

BuildingPoint

Jobsite Prep

- Coordinated Control Points Onsite
- Chalk Ready
- Open Space

Solution setup in less than 5 minutes

1

Turn on the robot and connect your control panel to the Wi-Fi Network generated.

2

Mount the RTS on the tripod, turn on and level it

3

Connect the SitePrint and the RTS through the Connectivity tab in the User Interface

4

Set up the RTS through the SitePrint User Interface using orientate to line or resection

5

Aim the RTS to the tracking prism mounted on top of SitePrint

6

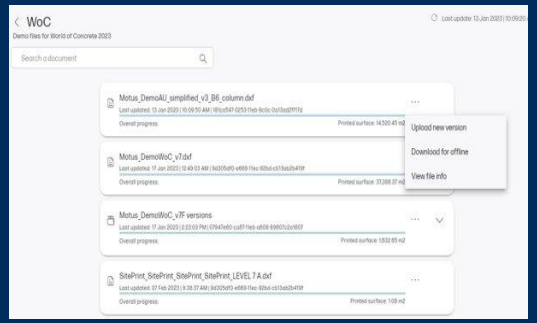
You are ready to go!

BuildingPoint

Command job execution through the Control Panel

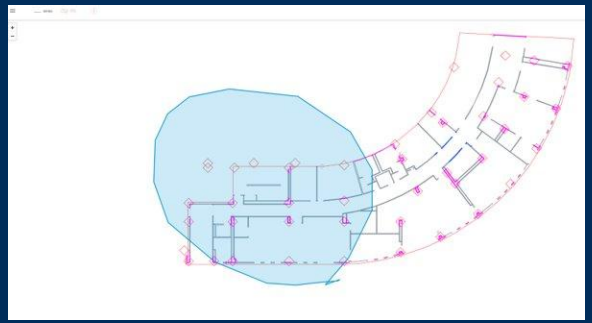
Open CAD file

Open the CAD from the "MyProjects" tab (CAD must be uploaded in the cloud). If working with no connectivity, download the file prior to getting to the jobsite.



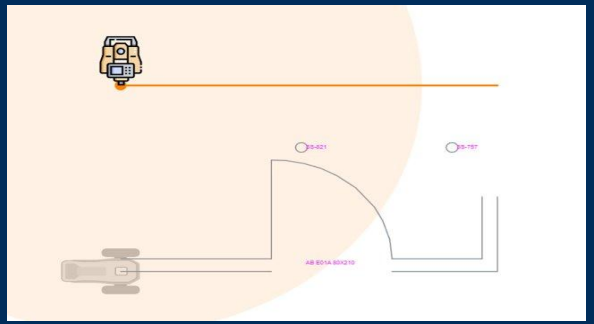
Select Printing Area

Submit the area to be printed. Select all at once, or by different areas. Click Print and robot will start the execution.



Track Progress

See real time movement. Printed elements displayed in green, and elements that require re-printing displayed in yellow.



BuildingPoint

Obstacle avoidance technology for 360 vision and space awareness

CAD Obstacle layer

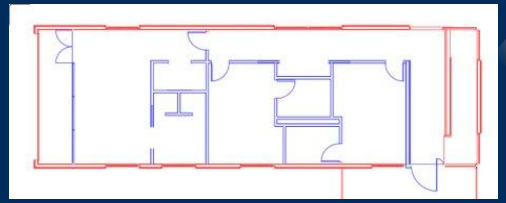
SitePrint will avoid all obstacles defined in the obstacle layer of CAD. Obstacles can also be defined on the spot through the SitePrint User Interface.

x4 Safety sensors

Detect declines from 8in. Away and stop immediately to prevent accidental falls and to comply with security regulations.

x3 LiDAR sensors

Accurate measuring of distance to detect obstacles. Lateral sensors detect from 17.7in. Away and front sensor from 11.8in away.



Boost productivity in layout

Save time and money

Faster layout and with just one operator, increasing layout productivity up to 10x.

Autonomous operation

Free up manpower for value-added tasks.

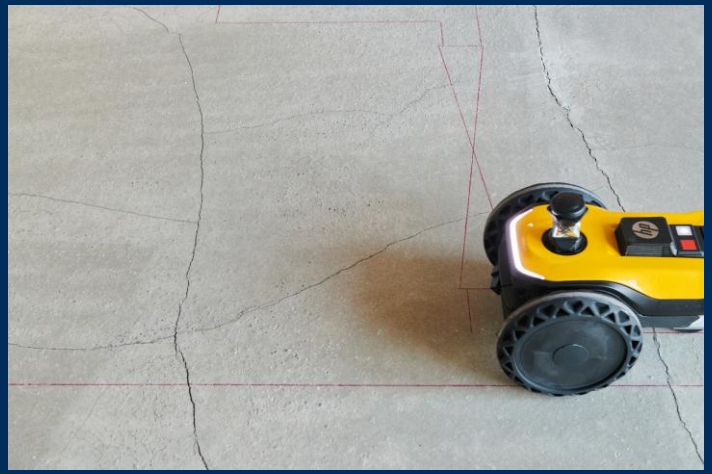
Avoid errors and rework

Bring information from the digital model to the jobsite.

Get reliable layouts on the slab

Accuracy tolerance of 1/8in.

Breakthrough accuracy on drop positioning achieved by pairing the printing device to a Robotic Total Station.

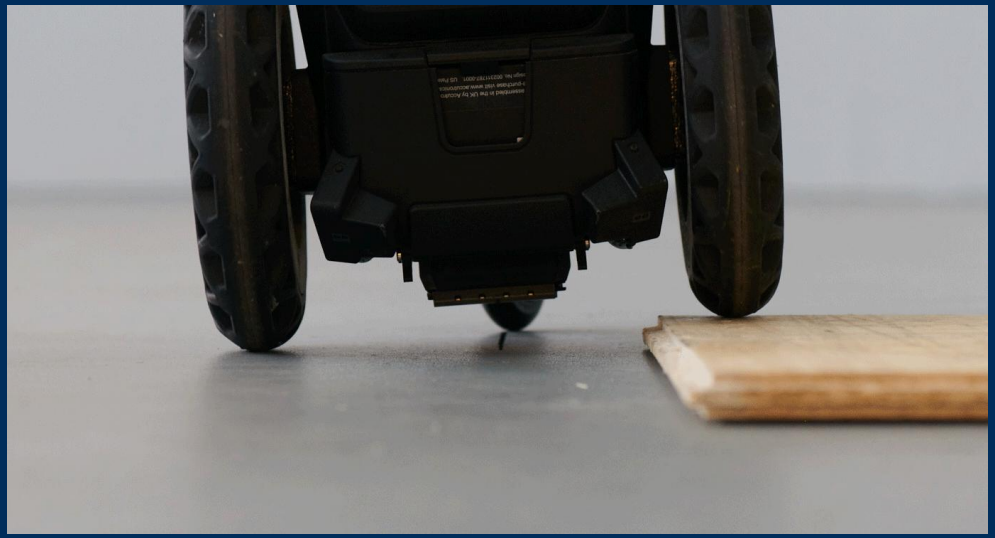


Avoid human error

Robotic technology brings consistency and repeatability while freeing up manpower to focus on other value-added tasks.

BuildingPoint

Versatile robot to adapt to construction environment



Printhead clearance and tilt compensation allow printing on rough surfaces and compensate ink firing when tilting.

Big wheels to climb obstacles.
No need for broom swept floor or even surfaces.

Easy to use interface for everyone at the jobsite.
No need for additional RTS software or deep surveying knowledge.

BuildingPoint

Key supported materials

Water-based inks are recommended for porous materials and solvent-based for water-proof (non-porous)

Porous materials

Water-proof (Non-porous)

Tarmac

Rough Concrete

Plywood

Polished Concrete

Formwork / Vinyl

Paint / Epoxy

BuildingPoint

Who Benefits?

General Contractors

Layout Service Provider

Interior Trades

MEP/HVAC Trades

Concrete Trades

BuildingPoint

General Contractors

Self-perform multi-trade layout merging all use cases or outsource layout activity to trade contractors.

Layout all trades with just one solution: gridlines, interiors, mechanical, electrical, plumbing, fire-protection, etc

Extreme value proposition in high density layouts. High ROI increasing productivity up to 10x vs manual and free up manpower for value-added tasks

Increase communication from the design office to the jobsite by printing text on the slab.

For non-self performed: turn weeks of layout into days of layout by doing trade marking simultaneously instead of sequentially.

For non-self performed: avoid mismatches between trades and reduce time answering RFIs by using one coordinated multi-trade model.

Concrete Trades

Layout concrete formwork in cast-in-place projects, tilt-up panels or casting beds for pre-fab concrete.

Print concrete formwork, pillars, slab edge, embeds, post tension cables, tilt-up panels, slab openings, reveal strips, bracing and lifting points, pre-cast casting beds, etc.

ROI in time and cost. Consistency and accuracy. Competitive advantage vs. Competition.

Use washable inks to re-use formwork in multiple stories

Ink does not transfer to concrete after it's poured.

MEP and HVAC Trades

Mechanical, Electrical, Plumbing and HVAC Contractors

Print ductwork, hanger points and labels, piping, fire sprinklers, electrical and mechanical systems, wall penetrations, etc.

ROI in time and cost Consistency
and accuracy. Competitive advantage vs competition.

Import .csv files to .dxf with the HP AutoCAD plugin

Print accurate points and text labels (up to 2 in) to improve communications from the office to the jobsite and between different trades.

Use washable inks when laying out
points on finished floor for over-head systems.

Interior Trades

Framing, Drywall, Masonry trades that perform interior partition layouts.

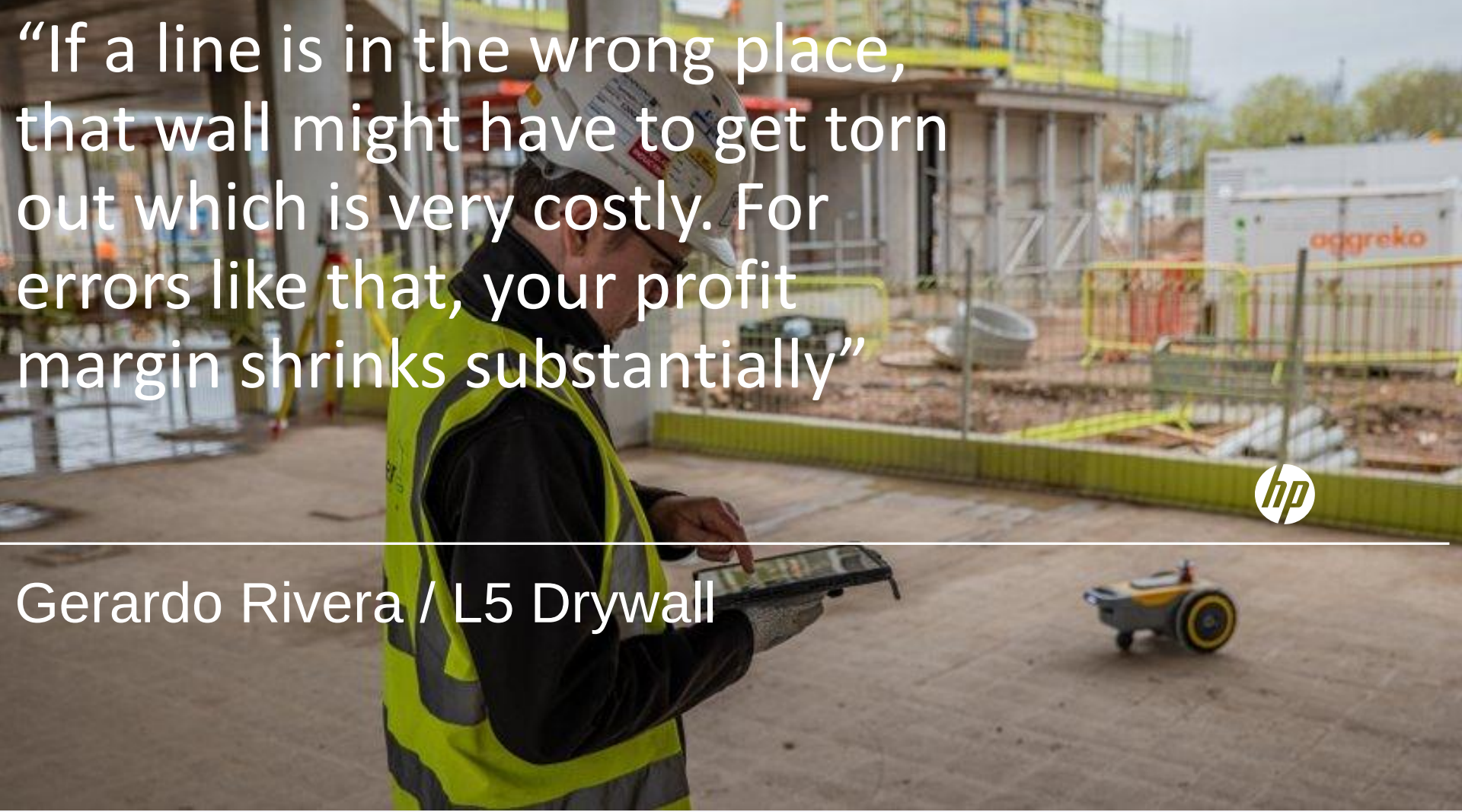
Print wall framing, finishes, wall type, door openings, and door labels.

Say goodbye to chalk-lines! Combine point marking and snapping chalk-lines in one single step.

Reduce injuries and improve layout, ergonomics. No more getting on your knees.

Reduce material waste. Minimize layout errors by getting reliable layouts on the slab and avoid tearing up walls.

No need for RTS expertise. SitePrint is easy to use for everyone at the construction site.



“If a line is in the wrong place, that wall might have to get torn out which is very costly. For errors like that, your profit margin shrinks substantially”

Gerardo Rivera / L5 Drywall

Increased productivity for interior finishing trades

Value Pack 3.0 is 11 times faster than the traditional wall layout process and requires half the crew, which typically involves manually measuring wall corners with a tape measure from established on-site references and then marking the line between these points with a chalk line.

	Traditional Layout (Manual)[6]	HP SitePrint VP1.0[7]	HP SitePrint VP2.0[7]	HP SitePrint VP3.0[7]
Workers on Layout Crew	2 or 3	1	1	1
Printed ft² (m²)/hour	330 ft² (31 m²)	2,300 ft² (214 m²)	3,330 ft² (307 m²)	3,600 ft² (334 m²)
Printed ft (m) of track *Assuming average of 1.3 ft of wall every 10 ft² and two lines per wall	43 ft (13 m)	29 ft (91 m)	429 ft (131 m)	468 ft (143 m)
Speed increase vs Traditional Layout	NA	7x	10x	11x

With VP 3.0, interior designers benefit from a print output rate of 3,600 ft² per hour, approximately 10% faster than the previous software version.

HP SitePrint also reduces the interior wall layout crew from 2 or 3 operators to just 1, allowing other professionals to begin installing track while the layout is being completed. In a 6-story building with 10,000 ft² per floor, HP SitePrint VP3.0 can save more than 3 weeks on the project schedule compared to manual layout methods.

BuildingPoint

Save Money & Get Back Time!

	Traditional Layout	HP SitePrint
Project SqFt	52,800	52,800
Crew Size	2	1
Labor Rate	$70	$70
Usage Cost	-	$.20/sqft
Time	160 Hrs	14.67 Hrs
Labor Cost	$22,400	$1,027
Total Usage	-	$10,560
Total Cost	$22,400	$11,587
Total Saving		$10,813 / 145 Hrs

Increased productivity for MEP/PF trades

HP SitePrint users can now print 200 points per hour with Value Pack 3.0, representing a 33% increase in productivity compared to the previous software version.

	Traditional Layout (Manual)[4]	Manual Total Station	Robotic Total Station	HP SitePrint VP1.0	HP SitePrint VP2.0	HP SitePrint VP3.0[5]
Workers on Layout Crew	2	2	1	1	1	1
Layout Points per hour	9	19	38	110	150	200
Speed Increase vs Traditional Layout	NA	2x	4x	12x	16x	21x
Speed increase vs Robotic Total Station layout	NA			3x	4x	5x

This table highlights the productivity comparison between conventional layout methods and HP SitePrint across its software releases. Key findings include that HP SitePrint is now 21 times faster at marking points compared to manual layout methods and 5 times faster than a Robotic Total Station. Additionally, HP SitePrint's productivity in marking points has seen a 33% improvement over VP2.0.

Since its launch in summer 2023, HP has achieved an impressive 80% productivity enhancement for MEP/FP professionals with HP SitePrint.

"I could mark more than 40 points per hour for short periods, but sustaining productivity above this rate throughout an entire workday is unfeasible, particularly due to the physical strain of repeatedly kneeling to mark each point." -Anonymous Surveyor

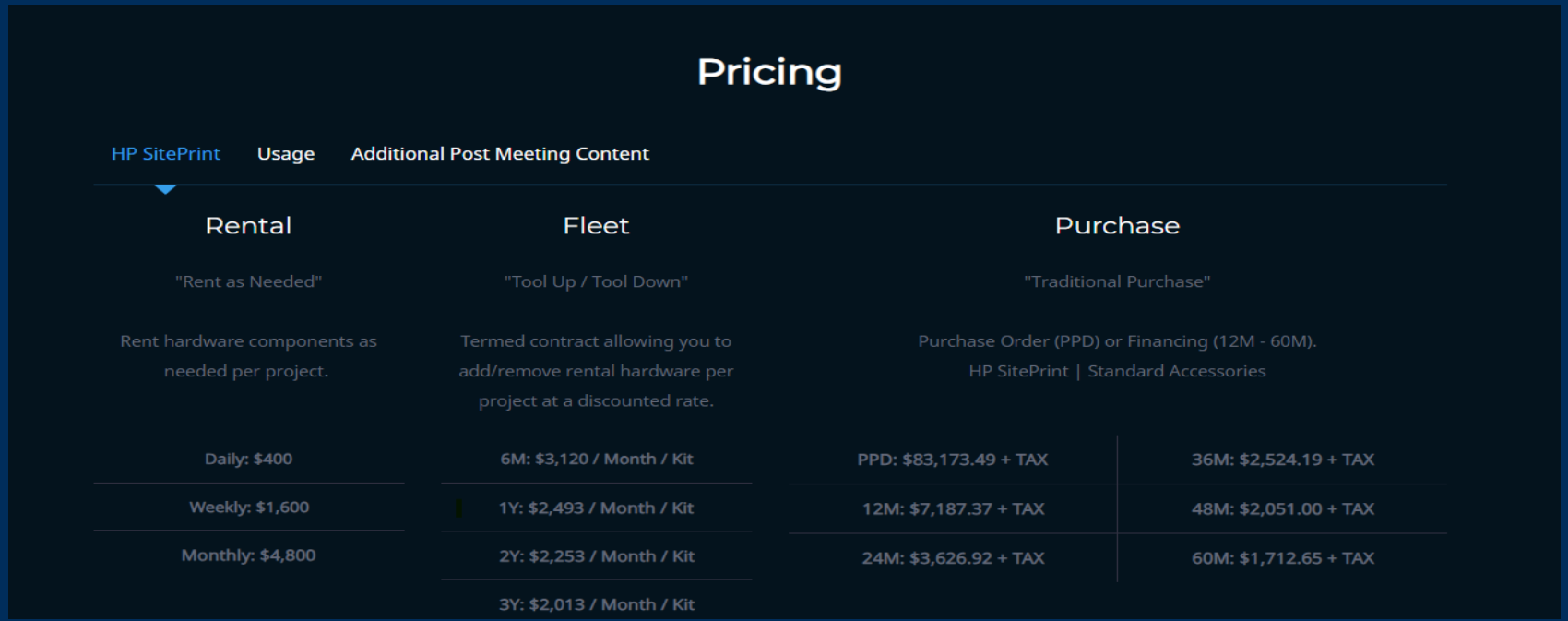
BuildingPoint

Save Money & Get Back Time!

	Total Station	HP SitePrint
Points	32,000	32,000
Crew Size	1	1
Labor Rate	$70	$70
Usage Cost	-	$2/point
Time	640 Hrs	160 Hrs
Labor Cost	$44,800	$11,200
Total Usage	-	$12,000
Total Cost	$44,800	$23,200
Total Saving		$21,600 / 480 Hrs

Pricing Options

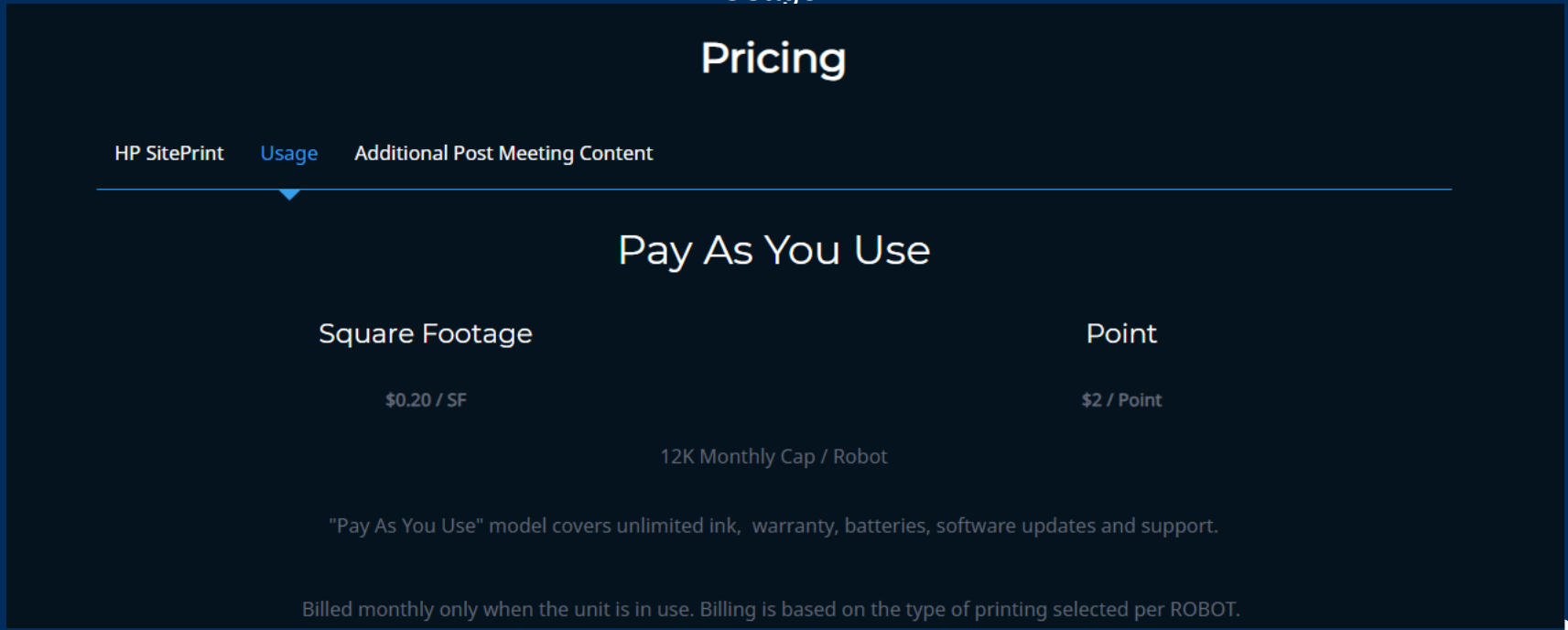
Equipment



BuildingPoint

Pricing Options

Usage



Questions?

Justin Davis
317-749-0600
justin.davis@buildingpointpartners.com

- Thank you