



SIPA True Cost Bidding Tool (STCBT) Pilot Report

Prepared by Sam Rashkin for Structural Insulated Panel Association

November 2, 2023

Table of Contents:

Page 2: STCBT Background

Page 5: STCBT Pilot

Page 5: Pilot Test 1: Non-SIPs-Optimized Custom Home

Page 8: Pilot Test 2: SIPs-Optimized Single-Family Production Home

Page 11: Pilot Test 3: SIPs-Optimized Multi-Family Building

Page 13: Conclusion

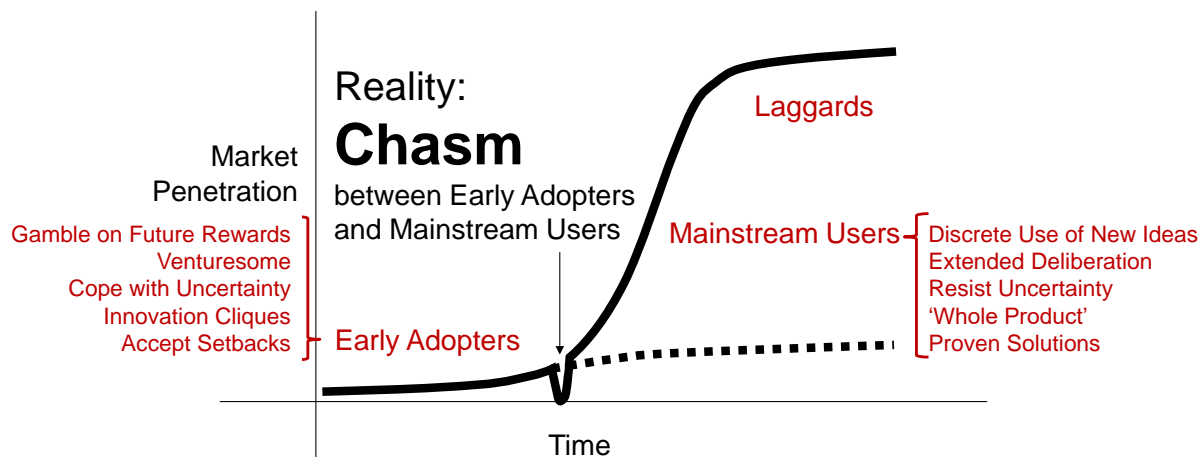
Page 14: Appendix A: Addison Homes STCBT Spreadsheet Analysis

Page 17: Appendix B: Howard Building Science STCBT Spreadsheet Analysis

Page 19: Appendix C: Greensmith Builders STCBT Spreadsheet Analysis

STCBT Background

The structural insulated panel (SIPs) industry has been providing a superior systems built enclosure for residential and commercial construction over many decades, but has experienced very limited growth in market penetration. Like any new innovation attempting to displace an entrenched market solution (e.g., conventional wood framing), it is critical to cross-over from early adopters to mainstream users. This is because there is a huge chasm between these two user segments that have vastly different behavioral profiles (see Figure 1). Specifically, mainstream users are much more discrete adapting new ideas, deliberative, resistant to uncertainty, dependent on whole product solutions, and in need of proven solutions. This tendencies work against new innovations that require market strategies to address them. In absence of effective chasm-crossing strategies, the market penetration for new innovations flattens out at a few percent limited to early adopters (dotted line shown in Figure 1)



Source: Inside the Tornado by Geoffrey Moore

Figure 1: Innovation diffusion curve

In response to these challenges reaching mainstream builders and architects, SIPA embarked on development of a bidding tool that would much more effectively translate the value of SIPs advanced enclosure technology that was hidden in the traditional bidding process where a framing package was simply compared to a SIPs package. The goal of this tool is to make it easier and faster to consider a new innovation and minimize uncertainties with a clear contrast of the true cost between 150-year-old framing technology and advanced SIPs.

The process began by setting up a working group of SIPs experts from both industry and construction and meeting to identify the most significant cost savings and added value of SIPs external to the traditional enclosure bid package. The results shown in Table 1 suggest significant opportunities for cost savings and added homeowner value are missing when comparing the cost of a SIPs enclosure to a traditional framing package.

SIPs Cost Savings Compared to Framing		SIPs Added Value Compared to Framing	
Time	<ul style="list-style-type: none"> • Framing • Drywall • Trim 	Enhanced Quality	<ul style="list-style-type: none"> • Strength/Dimensional Accuracy • Resilience (fire, wind, impact, pests) • Higher Appraisals
Air Flow	<ul style="list-style-type: none"> • Air Sealing • Air Barriers • Attic Venting 	Enhanced Space	<ul style="list-style-type: none"> • Added Space with Thinner Walls • Conditioned Attic Added Space • Conditioned Attic Added Storage • Sloped Ceilings Added Volume
Quality	<ul style="list-style-type: none"> • Rework (framing, finishes) • Risk (reserves for callbacks) • Inspections (inherent QA) • Training (framing, insulation, air sealing) 	Enhanced Incentives	<ul style="list-style-type: none"> • 45L Tax Credit • Utility High-Performance Home Rebate • Home Insurance Discount
Waste	<ul style="list-style-type: none"> • Framing • Drywall • Trim 		

Table 1: SIPs working group results assessing cost savings and added value associated with SIPs

The next step was to develop a spreadsheet tool that accounted for applicable costs savings and added value associated with SIPs into a true cost comparison. This tool was called the SIPA True Cost Bid Tool (STCBT). It was envisioned that the output of STCBT analyses could be used as a cover sheet for attaching to a typical SIPs bid package. Its purpose is to ensure potential customers (e.g., builders, homeowners) would have a much more informed basis for making enclosure decisions.

After a draft STCBT spreadsheet tool was developed, it was vetted with the SIPs expert working group and updated with their feedback. Then a focus group of thirteen non-SIPs builders was held to test how builders would respond to the true cost comparison results. The results shown in Figure 2 validated that the STCBT would be very valuable for its intended purpose to empower more informed enclosure decisions. Specifically, on a scale of one to five, with five being the highest related to key STCBT criteria, the focus group average scores were 3.8 for understandability, 4.4 for credibility, and 4.8 for actionable. And for the lowest score related to understandability, participants reported they would probably score this higher after they have more time to explore the tool.

STCBT Focus Group Key Criteria Average Scores		
Understandable	Credible	Actionable
3.8	4.4	4.8

Figure 2: Results from STCBT non-SIPs builder focus group

With the very strong response from the STCBT focus group, SIPA moved forward converting the STCBT spreadsheet into a web-based tool for broad use by SIPs providers bidding residential construction projects (see Figure 3). As the tool is used across the industry, big data will be collected into a data base where analytics can be applied to profoundly enhance the industry's insights related to how SIPs contrasts with conventional framing relative to cost, added value, and cycle time. However the last step before full dissemination of the STCBT, was to undergo a pilot test to better understand the impact the tool would have clarifying SIPs market competitiveness.

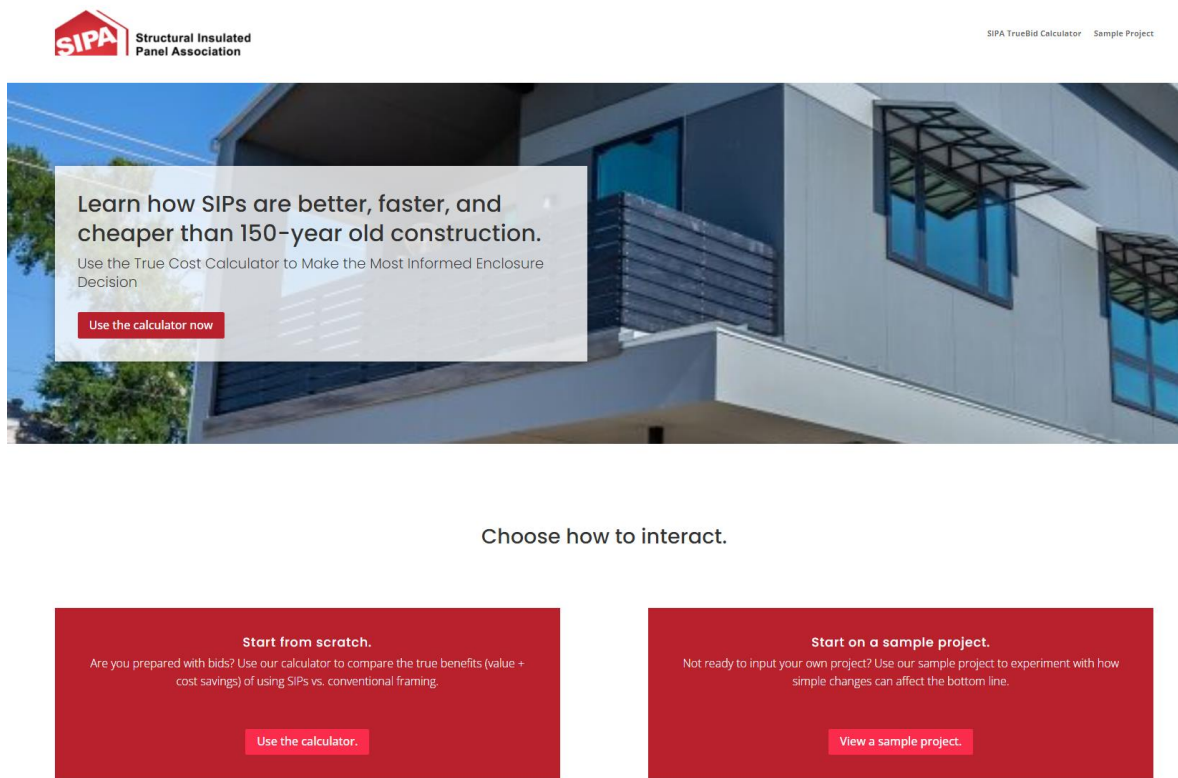


Figure 3: Splash page for web-based STCBT

STCBT Pilot

The goal of the STCBT pilot was to apply the tool to a diverse array of real projects to identify its impact on SIPs competitiveness when using actual bids and expert-based cost estimates. It was hoped that these results would help the industry better understand market growth opportunities. The targeted projects included:

- Non-SIPs-optimized custom home
- SIPs optimized production single-family home
- SIPs optimized multi-family building
- Vertically integrated builder and SIPs manufacturer with SIPs optimized single-family homes

The first three pilot test projects are completed and included in this report. The last project involving a vertically integrated builder and SIPs manufacturer with SIPs-optimized single family homes is still underway. Results will be included when available.

Pilot Test 1: Non-SIPs-Optimized Custom Home:

Addison Homes owned by Todd Usher is a highly regarded high-performance home builder based in Greenville, South Carolina. Todd's provided a new custom home he was planning to build for himself with conventional framing to be used for the pilot. It included approximately 2,740 square feet of conditioned space with three bedrooms, and two baths at an anticipated retail price of \$450,000.

This project plans and renderings shown in Figures 4 and 5 are not designed for SIPs. This includes a footprint not aligned with 2-foot dimensions and an open floor plan that doesn't accommodate posts to support a ridge beam for the SIPs panel. As a result, the non-SIPs-optimized plan still requires conventional roof truss framing to support the SIPs roof.

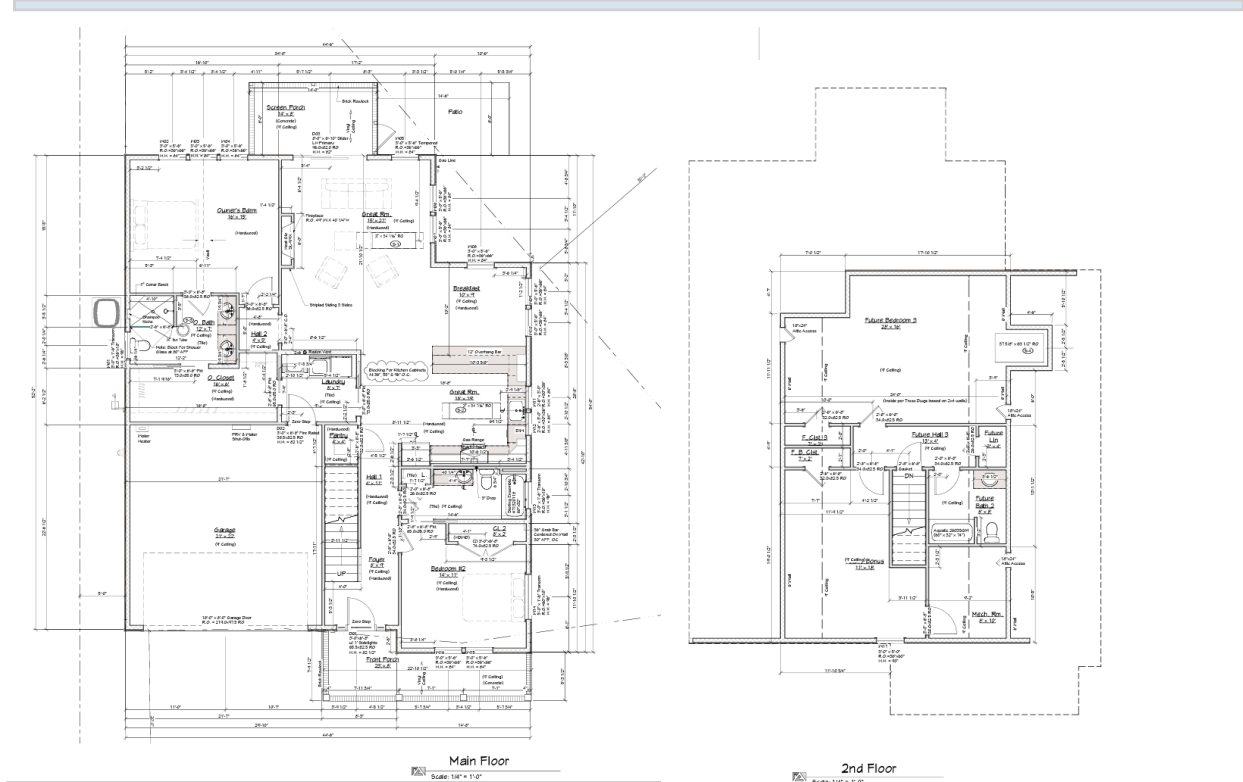


Figure 4: Usher Residence custom home STCBT pilot test – floor plans



Figure 5: Usher Residence custom home STCBT pilot test - rendering

Since this project was not intended for SIPs, bids were solicited from three different SIPs companies to provide SIPs panels for the walls and roof. Addison homes already had cost estimates for conventional framing. The first part of the pilot test was a baseline comparison typically used by builders of the SIPs package and conventional framing.

Then a true cost comparison was executed using costs assumptions based on estimates from the original STCBT working group to account for cost savings related to insulation, air sealing, finishes, quality, and cycle time. Added value assumptions related to enhance strength and resilience of the home were also integrated. All of these cost and value assumptions were reviewed with Todd Usher as would be expected any time the tool was used with a builder. If the builder client believes any of the cost savings or added value assumptions do not apply or should be modified, they can be edited right on the spot using the web-based tool on a tablet with immediate revised results. The objective is to ensure builder client buy-in to all assumptions to minimize objections to the analysis results

With this project, the non-SIPs optimized floor plan with the roof truss framing resulted in significant extra cost burden. This was because of the double-structure roofing system with both SIPs and framing. Todd Usher went back to the SIPs company and collaborated on adjustments that mitigated the need for the roof trusses without compromising the integrity of the design. This more SIPs-optimized design resulted in \$18,000 lower cost for the SIPs package.

The results of the Addison Home pilot test for the baseline, true cost comparison without SIPs optimization, and true cost comparison with SIPs optimization are shown in Table 2 based on the detailed spreadsheets in Appendia A. The baseline case just comparing SIPs with the conventional framing package, results in a substantial \$42,868 cost premium for SIPs that is 69% greater than conventional framing. The true cost where SIPs is not optimized results in a much lower but still significant \$13,013 net cost and added value premium that is 10% greater than conventional framing. However, the true cost where SIPs is optimized results a \$4,987 cost and added value advantage for SIPs that is 4% lower than conventional framing. In other words, a meaningful cost and value benefit for a superior quality enclosure when the design was optimized for SIPs.

Addison Homes Pilot Test: SIPs vs. Framing Bid Cost Comparison			
	SIPs vs. Framing Cost Savings	SIPs vs. Framing Added Value	Total SIPs vs. Framing Cost Savings + Value
Baseline	-\$42,868	\$0	-\$42,868
True Cost Not SIPS Optimized	-\$19,763	+\$6,750	-\$13,013
True Cost SIPs Optimized	-\$1,763	+\$6,750	+\$4,987

Table 2: Results of STBCT Pilot Test for Addison Homes

Pilot Test 2: SIPs-Optimized Single-Family Production Home:

Howard Building Science owned by Rob Howard, an accomplished building science expert. He started a new home building business targeting workforce housing in Granite Falls, North Carolina while also teaching building science at nearby Appalachian State University. Rob’s small residential development called Duke St. Cottages features U.S. DOE Zero Energy Ready Home certification for all homes. The project submitted for this pilot. It is a two- bedroom, two-bath home with 1,600 square feet of conditioned space. The retail price for this high-performance home is an impressively low \$199,900 in contrast to the current median home price \$363,000 in North Carolina.

Sample construction drawings and images for this project are shown in Figures 6 through 9. It was designed from the outset for SIPs wall and roof construction including a simple roof design, leveraging the conditioned space created with the SIPs roof for additional loft storage over half the home and a sloped ceiling for the other half of the home. The home also follows two-foot dimensions to minimize waste.

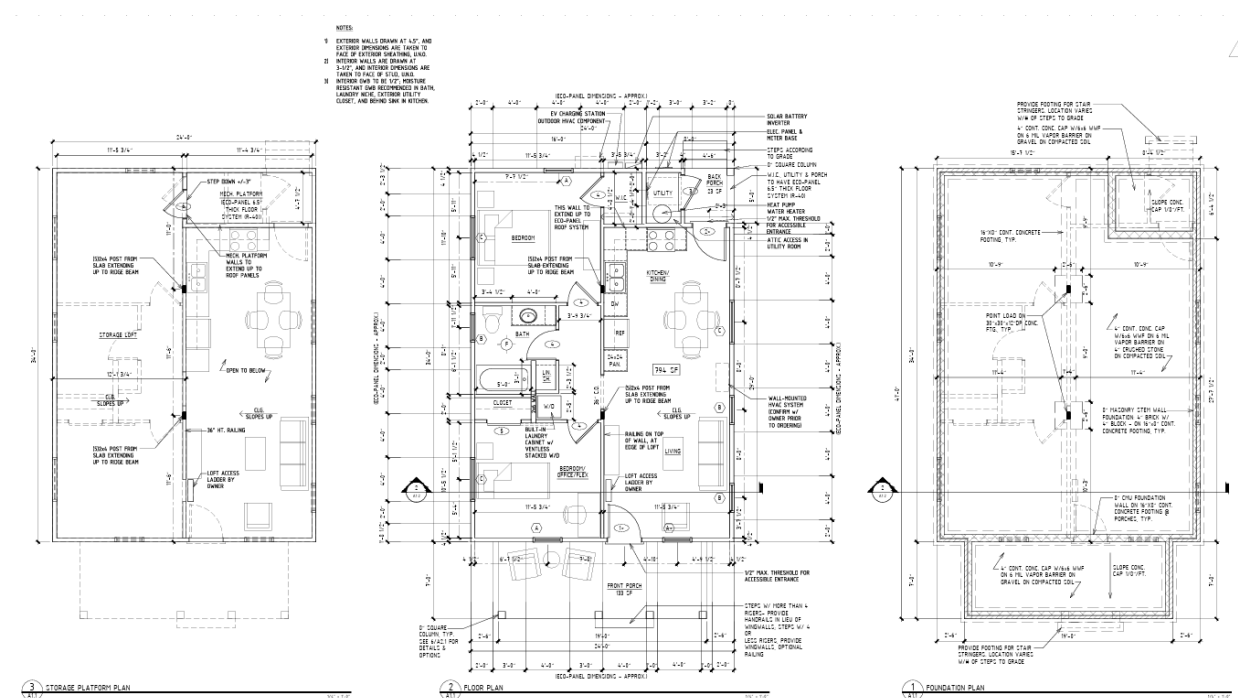


Figure 6: Howard Building Science single-family production home STCBT pilot test – floor plans

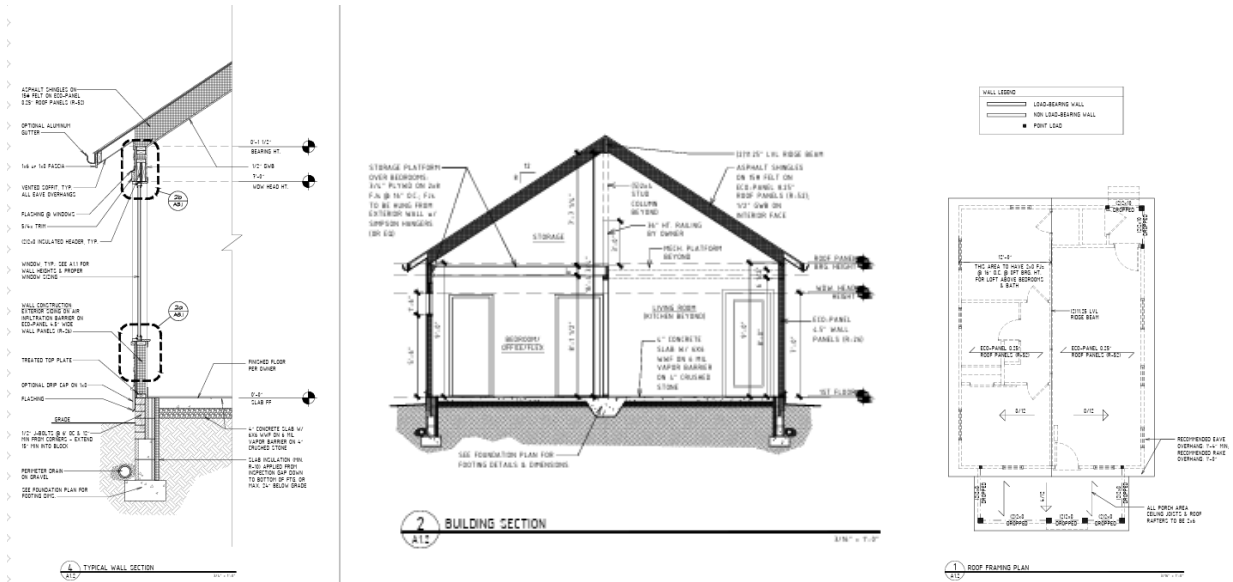


Figure 7: Howard Building Science single-family production home STCBT pilot test: sections & roof plan



Figure 8: Howard Building Science single-family production home STCBT pilot test: Exterior



Figure 9: Howard Building Science single-family production home STCBT pilot test: Interior

Since this project was constructed with SIPs, actual costs for SIPs were provided from the builder along with estimates for conventional framing based on industry cost data. As with the first pilot project, the baseline simply compared the SIPs and framing bid packages. Then a true cost comparison was analyzed as with the prior pilot using costs assumptions based on estimates from the original STCBT working group to account for cost savings related to insulation, air sealing, finishes, quality, and cycle time. Added value assumptions were applied related to enhance strength and resilience and enhanced spaces for storage and high ceilings. All of these cost and value assumptions were reviewed with Rob Howard as with the prior pilot test.

The results of the Howard Building Science pilot test for the baseline and true cost comparison are shown in Table 3 based on the detailed spreadsheets in Appendix B. The baseline comparing the SIPs and conventional framing package results in a significant \$14,000 cost premium for SIPs that is 56% higher than conventional framing. However, the true cost analysis results for this SIPs optimized project results in a \$35,291 net cost and added value advantage for SIPs that is 65% lower than conventional framing. This demonstrates the huge importance of integrating SIPs in the project design.

Howard Building Science Pilot Test: SIPs vs. Framing Bid Cost Comparison			
	SIPs vs. Framing Cost Savings	SIPs vs. Framing Added Value	Total SIPs vs. Framing Cost Savings + Value
Baseline	-\$14,000	\$0	-\$14,000
True Cost SIPs Optimized	-\$1,950	+37,241	+\$35,291

Table 3: Results of STBCT Pilot Test for Howard Building Science

Pilot Test 3: SIPs-Optimized Multi-Family Building:

Greensmith Builders is committed to high-performance homes. That is no surprise given Aaron Smith, executive director of the Energy and Environmental Building Alliance (EEBA), is a part owner. Prairie Lofts is a two-building multi-family project each with 27 units. It is located in Leverage, Minnesota not far from Sioux City, Iowa. This project is certified to U.S. DOE Zero Energy Ready Home which is especially challenging for multi-family housing. This includes a Home Energy Rating System (HERS) score of 45 without solar and air tightness tested to 1.35 ACH50. The project features one and two-bedroom all-electric units including ductless mini-split space conditioning.

This project as shown in Figures 10 through 12 was designed from the outset with SIPs for the exterior, hall, and demising walls. This includes a simple building design along with one-hour easy shipping distance from the SIPs plant. Roof construction uses conventional framing.



Figure 10: Greensmith Builders multi-family building STCBT pilot test – exterior

2 Bedroom
1 Bathroom
790 - 824 SF



1 Bedroom
1 Bathroom
556 SF



Figure 11: Greensmith Builders multi-family building STCBT pilot test – floor plans



Figure 12: Greensmith Builders multi-family building STCBT pilot test – interior

Since this project was SIPs-optimized, actual costs for SIPs were provided from the builder along with estimates for conventional framing based on industry references. In this pilot, once again the baseline simply compared costs for SIPs and framing packages. Then a true cost comparison was analyzed as with the prior pilots using costs and added value assumptions. These cost and value assumptions were reviewed with Aaron Smith.

The results of the Greensmith Builders pilot test for the baseline and true cost comparison for the SIPs-optimized multi-family building are shown in Table 4 based on detailed spreadsheets in Appendix C. The baseline case just comparing the SIPs and conventional framing package, results in a significant \$51,485

cost premium that is 11% higher than conventional framing. However, the true cost for the SIPs optimized building results in a \$233,224 net cost and added value advantage for SIPs that is 31% lower than conventional framing.

Greensmith Builders Pilot Test: SIPs vs. Framing Bid Cost Comparison			
	SIPs vs. Framing Cost Savings	SIPs vs. Framing Added Value	Total SIPs vs. Framing Cost Savings + Value
Baseline	-\$51,485	\$0	-\$51,485
True Cost SIPs Optimized	+\$108,424	+124,800	+\$233,224

Table 4: Results of STBCT Pilot Test for Greensmith Builders

Conclusion

Two significant conclusions can be drawn from the STCBT Pilot Test has provided. First, the STCBT consistently delivers substantially lower true cost comparisons with conventional wood framing by accounting for all costs and value associated with different enclosure options. The case studies used in this pilot results in 15% to over 100% of net cost savings and added value that would be missed just comparing SIPs and conventional framing packages. Second, where both single-family and multi-family projects are SIPs-optimized, SIPs provides substantially greater net cost savings and added value compared to conventional wood framing.

These findings suggest important opportunities for the SIPs industry to leverage significant market growth. These include:

- Use the STCBT regularly to ensure a much more competitive bid to home builders and homeowners.
- Seek SIPs-optimized projects to offer superior cost savings and added value compared to conventional framing.
- Consider developing world-class expert designs that are fully optimized for SIPs and market them to builders and homeowners with the STCBT results to showcase the superior value.
- Encourage use of the SIPA web-based STCBT to ensure that ‘big data’ is collected into that can be used with analytics to create strategic industry insights about costs, cycle time, and added value metrics for both SIPs and competing enclosure technologies.



SIPA True Cost Bidding Tool (STCBT) Pilot Report

Prepared by Sam Rashkin for Structural Insulated Panel Association

November 2, 2023

Appendix A: Addison Homes STCBT Spreadsheet Analysis Custom Home - Baseline SIPs vs. Conventional Framing

Cost Assumptions:	Metrics:	Source
Cycle Time:		
Carrying Cost per day of construction	\$ 400	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day
Finishes:		
Percent Cost Savings Installing Drywall w/SIPs	0%	Estimate
Percent Cost Savings Installing Cabinets w/SIPs	0%	Estimate
Percent Cost Savings Installing Trim w/SIPs	0%	Estimate
MEP:		
Cost of Schematics for Optimizing MEP with SIPs	\$ -	
JAC Cost Difference for SIPs vs. Conventional Framing	\$ 0	Assume "\$0" but Enter a Cost from Builder
Electric Cost Difference for SIPs vs. Conventional Framing	\$2,000	Assume "\$0" but Enter a Cost from Builder
Plumbing Cost Difference for SIPs vs. Conventional Framing	\$ 0	Assume "\$-1,000" with Optimized Schematics, but Enter Builder Cost
Quality Control and Lean Construction:		
Training Cost with Framing [% of Home Base Price]	0.00%	Placeholder Assumption
SIPs % Training Cost Savings	0%	Placeholder Assumption
Inspection Cost with Framing [% of Home Base Price]	0.00%	Placeholder Assumption
SIPs % Inspection Cost Savings	0%	Placeholder Assumption
Framing Rework Cost [% of Home Base Price]	0.00%	Placeholder Assumption
SIPs % Rework Cost Savings	0%	Placeholder Assumption
Engineering Risk Management Reserves [% of Home Base Price]	0.0%	Placeholder Assumption
SIPs % Risk Management Reserve Savings	0%	Placeholder Assumption
Framing Waste in # Dumpsters Per 1,000 Sq. Ft.	0.0	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day
SIPs Waste in # Dumpsters Per 1,000 Sq. Ft.	0.0	SIPA Meeting
Cost Per Dumpster	\$ 500	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day

SIPs Added Value Assumptions:	Metrics:	Source
General Inputs:		
Base Price of Home	\$ 450,000	Builder
Conditioned Square Feet of Home	2740	Take-Off
Conditioned Square Feet Above Grade	2740	Take-Off
Conditioned Square Feet Basement Below Grade	0	Take-Off
Additional Conditioned Square Feet with Thinner Walls	0	Take-Off
Retail Cost per Sq. Ft. Above-Grade Conditioned Space	\$ 164	Default Calc Assumes A
Retail Cost per Sq. Ft. Below-Grade Conditioned Space	\$ 82	Default Calc Assumes B
Enhanced Quality:		
Value of Greater Strength/Dimensional Accuracy (%)	0.0%	Estimate
Value of Greater Resilience (e.g., Impact, Wind, Earthquake) (%)	0.0%	Estimate
Higher Appraisal Value (%)	0.0%	AI Cobb Study
Enhanced Space:		
Sq. Ft. of SIP Attic Traded Off for Basement	0	Take-Off
Additional Conditioned Square Feet with SIP Attic	0	Take-Off
Incentives/Savings:		
45 L Tax Credit	\$ -	IRS Language
Utility Rebate	\$ -	Local Utility where avail
30-year Energy Savings (from HERS report x 0.7)	\$ -	HERS Report x 0.7 correct
Annual Home Insurance Cost	\$ 1,200	Insurance Company
Discounted Home Insurance with SIPs (%)	0%	Insurance Company

Application: SIP Walls Only, Basement		Costs		# Days	
Scope of Work		Framing	SIPs	Framing	SIPs
TOTAL		\$61,950	\$104,818	0.0	0.0
Structure		\$61,950	\$102,818	0.0	0.0
SIP Panels - Material and Labor			\$62,818		
Wall Framing - Material and Labor		\$30,975	\$20,000		
Floor Framing - Material and Labor		\$0	\$0		
Roof Framing - Material and Labor		\$30,975	\$20,000		
Structural Beams Material and Labor					
Stair Framing					
Concrete Foundation - Material and Labor					
Insulation		\$0	\$0	0.0	0.0
Wall - Cavity		\$0	\$0		
Wall - Rigid					
Attic Ceiling		\$0	\$0		
Band Joists		\$0	\$0		
Floor		\$0	\$0		
Basement					
Air Flow Control		\$0	\$0	0.0	0.0
Air Barriers		\$0	\$0		
Air Sealing		\$0	\$0		
Wind Baffles		\$0	\$0		
Attic Venting		\$0	\$0		
Finishes		\$0	\$0	0.0	0.0
Interior	Drywall	\$0	\$0	0.0	0.0
Interior	Cabinets	\$0	\$0	0.0	0.0
Interior	Trim	\$0	\$0	0.0	0.0
Exterior	Trim				
MEP		\$ -	\$2,000	0.0	0.0
Schematics for Optimizing MEP			\$0		
HVAC Cost Differential			\$0		
Electric Cost Differential with Conventional Framing			\$2,000		
Plumbing Cost Differential with Conventional Framing			\$0		
Quality Control and Lean Construction		\$0	\$0	0.0	0.0
Training		\$0	\$0		
Inspections		\$0	\$0		
Rework		\$0	\$0		
Risk (Reserves for Call-Backs)		\$0	\$0		
Waste Removal (Dumpsters)		\$0	\$0		
Value of Construction Time Saved vs. Framing		\$0	\$0	0.0	0.0

Summary: SIPs Savings/Value vs. Conventional Framing		
Cost Savings	Added Value	Total
\$ (42,868)	\$ -	\$ (42,868)

This cost comparison is based on an actual bid for SIPs and estimated costs for conventional framing based on standard cost data available. Work with your SIPs sales rep to integrate actual bids for conventional framing to get a more precise comparison for your project.

SIPs Improved User Experience	Metric	Value
Total Added Value		\$ -
Enhanced Quality:		
Stronger/More Dimensionally Accurate Enclosure	\$ 450,000	\$0
Greater Resilience to Fire, Wind, Impact, Pests	\$ 450,000	\$0
Higher Appraisals to Base Price	\$ 450,000	\$0
Enhanced Space:		
Additional Square Footage with Thinner Walls	0	\$0
Sq. Ft. of SIP Attic Traded Off for Basement	0	\$0
Additional Conditioned Space with SIP Attic	0	\$0
Incentives/Savings:		
45 L Tax Credit		\$0
Utility Rebate		\$0
30-year Energy Savings		\$0
Reduced Home Insurance Annual Insurance Cost	\$ 1,200	\$0

Input Key:
Enter Input
No Input - Automatically Calculated
No Input - Automatically Calculated or Enter Input
Not Applicable

Notes:
 True-Cost Bidding is a foundation for system-based thinking
 Tool assumes comparison of SIPs to high-performance homes
 Add tax credits, rebates, and energy savings added value where applies
 Learning curve typically results in significant added cost savings when applying new innovations
 Value of additional square feet will correlate to the impact on design/function
 Thinner walls can help achieve code requirements (more space for stairs)
 SIPs do not require double sill for trim like conventional framing
 SIP window openings require much less rough opening clearance
 There are also potential HVAC cost savings for compactness and multi-zone



SIPA True Cost Bidding Tool (STCBT) Pilot Report

Prepared by Sam Rashkin for Structural Insulated Panel Association

November 2, 2023

Appendix A: Addison Homes STCBT Spreadsheet Analysis (continued)

Custom Home – STCBT Results Non-SIPs-Optimized vs. Conventional Framing

Cost Assumptions:	Metrics:	Source
Cycle Time:		
Carrying Cost per day of construction	\$ 400	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day
Finishes:		
Percent Cost Savings Installing Drywall w/SIPs	7%	Estimate
Percent Cost Savings Installing Cabinets w/SIPs	0%	Estimate
Percent Cost Savings Installing Trim w/SIPs	0%	Estimate
MEP:		
Cost of Schematics for Optimizing MEP with SIPs	\$ -	Assume "\$0" but Enter a Cost from Builder
IC Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$0" but Enter a Cost from Builder
IC Cost Difference for SIPs vs. Conventional Framing	\$2,000	Assume "\$0" but Enter a Cost from Builder
IC Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$1,000" with Optimized Schematics, but Enter Builder Cost
Quality Control and Lean Construction:		
Training Cost with Framing [% of Home Base Price]	0.13%	Placeholder Assumption
SIPs % Training Cost Savings	20%	Placeholder Assumption
Inspection Cost with Framing [% of Home Base Price]	0.21%	Placeholder Assumption
SIPs % Inspection Cost Savings	50%	Placeholder Assumption
Framing Rework Cost [% of Home Base Price]	0.35%	Placeholder Assumption
SIPs % Rework Cost Savings	50%	Placeholder Assumption
Risk Management Reserves [% of Home Base Price]	0.0%	Placeholder Assumption
SIPs % Risk Management Reserve Savings	50%	Placeholder Assumption
Framing Waste in # Dumpsters Per 1,000 Sq. Ft.	2.0	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day
SIPs Waste in # Dumpsters Per 1,000 Sq. Ft.	1.0	SIPA Meeting
Cost Per Dumpster	\$ 500	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day

SIPs Added Value Assumptions:	Metrics:	Source
General Inputs:		
Base Price of Home	\$ 450,000	Builder
Conditioned Square Feet of Home	2740	Take-Off
Conditioned Square Feet Above Grade	2740	Take-Off
Conditioned Square Feet Basement Below Grade	0	Take-Off
Additional Conditioned Square Feet with Thinner Walls	0	Take-Off
Retail Cost per Sq. Ft. Above-Grade Conditioned space	\$ 164	Default Calc Assumes
Retail Cost per Sq. Ft. Below-Grade Conditioned space	\$ 82	Default Calc Assumes
Enhanced Quality:		
Value of Greater Strength/Dimensional Accuracy (%)	0.5%	Estimate
Value of Greater Resilience (e.g., Impact, Wind, Earthquake) (%)	1.0%	Estimate
Higher Appraisal Value (%)	0.0%	Al Cobb Study
Enhanced Space:		
Sq. Ft. of SIP Attic Traded Off for Basement	0	Take-Off
Additional Conditioned Square Feet with SIP Attic	0	Take-Off
Incentives/Savings:		
45 L Tax Credit	\$ -	IRS Language
Utility Rebate	\$ -	Local Utility where avc
30-year Energy Savings (from HERS report x 0.7)	\$ -	HERS Report x 0.7 corr
Annual Home Insurance Cost	\$ 1,200	Insurance Company
Discounted Home Insurance with SIPs (%)	0%	Insurance Company

Application: SIP Walls Only, Basement		Costs		# Days	
Scope of Work		Framing	SIPs	Framing	SIPs
TOTAL		\$133,528	\$153,291	37.0	22.7
Structure		\$61,950	\$102,818	14.0	7.0
SIP Panels - Material and Labor			\$62,818		
Wall Framing - Material and Labor		\$30,975	\$20,000		
Floor Framing - Material and Labor		\$0	\$0		
Roof Framing - Material and Labor		\$30,975	\$20,000		
Structural Beams Material and Labor					
Stair Framing					
Concrete Foundation - Material and Labor					
Insulation		\$14,000	\$800	3.0	0.5
Wall - Cavity		\$10,000	\$0		
Wall - Rigid					
Attic Ceiling		\$3,200	\$0		
Band Joists		\$0	\$0		
Floor		\$800	\$800		
Basement					
Air Flow Control		\$1,050	\$350	2.0	0.5
Air Barriers		\$500	\$200		
Air Sealing		\$550	\$150		
Wind Baffles		\$0	\$0		
Attic Venting		\$0	\$0		
Finishes		\$50,683	\$49,945	14.0	13.7
Interior Drywall		\$10,543	\$9,805	10.0	9.7
Interior Cabinets		\$26,700	\$26,700	2.0	2.0
Interior Trim		\$13,440	\$13,440	2.0	2.0
Exterior Trim					
MEP		\$ -	\$2,000	0.0	0.0
Schematics for Optimizing MEP			\$0		
HVAC Cost Differential			\$0		
Electric Cost Differential with Conventional Framing			\$2,000		
Plumbing Cost Differential with Conventional Framing			\$0		
Quality Control and Lean Construction		\$5,845	\$3,098	4.0	1.0
Training		\$585	\$468		
Inspections		\$945	\$473		
Rework		\$1,575	\$788		
Risk (Reserves for Call-Backs)		\$0	\$0		
Waste Removal (Dumpsters)		\$2,740	\$1,370		
Value of Construction Time Saved vs. Framing		\$0	-\$5,720	0.0	-14.3

Summary: SIPs Savings/Value vs. Conventional Framing		
Cost Savings	Added Value	Total
\$ (19,763)	\$ 6,750	\$ (13,013)

This cost comparison is based on an actual bid for SIPs and estimated costs for conventional framing based on standard cost data available. Work with your SIPs sales rep to integrate actual bids for conventional framing to get a more precise comparison for your project.

SIPs Improved User Experience	Metric	Value
Total Added Value		\$ 6,750
Enhanced Quality:		
Stronger/More Dimensionally Accurate Enclosure	\$ 450,000	\$2,250
Greater Resilience to Fire, Wind, Impact, Pests	\$ 450,000	\$4,500
Higher Appraisals to Base Price	\$ 450,000	\$0
Enhanced Space:		
Additional Square Footage with Thinner Walls	0	\$0
Sq. Ft. of SIP Attic Traded Off for Basement	0	\$0
Additional Conditioned Space with SIP Attic	0	\$0
Incentives/Savings:		
45 L Tax Credit		\$0
Utility Rebate		\$0
30-year Energy Savings		\$0
Reduced Home Insurance Annual Insurance Cost	\$ 1,200	\$0

Input Key:
Enter Input
No Input - Automatically Calculated
No Input - Automatically Calculated or Enter Input
Not Applicable

Notes:
 True-Cost Bidding is a foundation for system-based thinking
 Tool assumes comparison of SIPs to high-performance homes
 Add tax credits, rebates, and energy savings added value where applicable
 Learning curve typically results in significant added cost savings when applying new innovations
 Value of additional square feet will correlate to the impact on design/function
 Thinner walls can help achieve code requirements (more space for stairs)
 SIPs do not require double sill for trim like conventional framing
 SIP window openings require much less rough opening clearance
 There are also potential HVAC cost savings for compactness and multi-zone



SIPA True Cost Bidding Tool (STCBT) Pilot Report

Prepared by Sam Rashkin for Structural Insulated Panel Association

November 2, 2023

Appendix A: Addison Homes STCBT Spreadsheet Analysis (continued)

Custom Home – STCBT Results SIPs-Optimized vs. Conventional Framing

Cost Assumptions:	Metrics:	Source
Cycle Time:		
Carrying Cost per day of construction	\$ 400	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day
Finishes:		
Percent Cost Savings Installing Drywall w/SIPs	7%	Estimate
Percent Cost Savings Installing Cabinets w/SIPs	0%	Estimate
Percent Cost Savings Installing Trim w/SIPs	0%	Estimate
MEP:		
Cost of Schematics for Optimizing MEP with SIPs	\$ -	
IC Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$0" but Enter a Cost from Builder
IC Cost Difference for SIPs vs. Conventional Framing	\$2,000	Assume "\$0" but Enter a Cost from Builder
IC Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$-1,000" with Optimized Schematics, but Enter Builder Cost
Quality Control and Lean Construction:		
Training Cost with Framing [% of Home Base Price]	0.13%	Placeholder Assumption
SIPs % Training Cost Savings	20%	Placeholder Assumption
Inspection Cost with Framing [% of Home Base Price]	0.21%	Placeholder Assumption
SIPs % Inspection Cost Savings	50%	Placeholder Assumption
Framing Rework Cost [% of Home Base Price]	0.35%	Placeholder Assumption
SIPs % Rework Cost Savings	50%	Placeholder Assumption
Risk Management Reserves [% of Home Base Price]	0.0%	Placeholder Assumption
SIPs % Risk Management Reserve Savings	50%	Placeholder Assumption
Framing Waste in # Dumpsters Per 1,000 Sq. Ft.	2.0	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day
SIPs Waste in # Dumpsters Per 1,000 Sq. Ft.	1.0	SIPA Meeting
Cost Per Dumpster	\$ 500	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day

SIPs Added Value Assumptions:	Metrics:	Source
General Inputs:		
Base Price of Home	\$ 450,000	Builder
Conditioned Square Feet of Home	2740	Take-Off
Conditioned Square Feet Above Grade	2740	Take-Off
Conditioned Square Feet Basement Below Grade	0	Take-Off
Additional Conditioned Square Feet with Thinner Walls	0	Take-Off
Retail Cost per Sq. Ft. Above-Grade Conditioned space	\$ 164	Default Calc Assumes /
Retail Cost per Sq. Ft. Below-Grade Conditioned space	\$ 82	Default Calc Assumes /
Enhanced Quality:		
Value of Greater Strength/Dimensional Accuracy (%)	0.5%	Estimate
Value of Greater Resilience (e.g., Impact, Wind, Earthquake) (%)	1.0%	Estimate
Higher Appraisal Value (%)	0.0%	AI Cobb Study
Enhanced Space:		
Sq. Ft. of SIP Attic Traded Off for Basement	0	Take-Off
Additional Conditioned Square Feet with SIP Attic	0	Take-Off
Incentives/Savings:		
45 L Tax Credit	\$ -	IRS Language
Utility Rebate	\$ -	Local Utility where ava
30-year Energy Savings (from HERS report x 0.7)	\$ -	HERS Report x 0.7 corre
Annual Home Insurance Cost	\$ 1,200	Insurance Company
Discounted Home Insurance with SIPs (%)	0%	Insurance Company

Application: SIP Walls Only, Basement		Costs		# Days	
Scope of Work		Framing	SIPs	Framing	SIPs
TOTAL		\$133,528	\$135,291	37.0	22.7
Structure		\$61,950	\$84,818	14.0	7.0
SIP Panels - Material and Labor			\$62,818		
Wall Framing - Material and Labor		\$30,975	\$20,000		
Floor Framing - Material and Labor		\$0	\$0		
Roof Framing - Material and Labor		\$30,975	\$2,000		
Structural Beams Material and Labor					
Stair Framing					
Concrete Foundation - Material and Labor					
Insulation		\$14,000	\$800	3.0	0.5
Wall - Cavity		\$10,000	\$0		
Wall - Rigid					
Attic Ceiling		\$3,200	\$0		
Band Joists		\$0	\$0		
Floor		\$800	\$800		
Basement					
Air Flow Control		\$1,050	\$350	2.0	0.5
Air Barriers		\$500	\$200		
Air Sealing		\$550	\$150		
Wind Baffles		\$0	\$0		
Attic Venting		\$0	\$0		
Finishes		\$50,683	\$49,945	14.0	13.7
Interior Drywall		\$10,543	\$9,805	10.0	9.7
Interior Cabinets		\$26,700	\$26,700	2.0	2.0
Interior Trim		\$13,440	\$13,440	2.0	2.0
Exterior					
MEP		\$ -	\$2,000	0.0	0.0
Schematics for Optimizing MEP			\$0		
HVAC Cost Differential			\$0		
Electric Cost Differential with Conventional Framing			\$2,000		
Plumbing Cost Differential with Conventional Framing			\$0		
Quality Control and Lean Construction		\$5,845	\$3,098	4.0	1.0
Training		\$585	\$468		
Inspections		\$945	\$473		
Rework		\$1,575	\$788		
Risk (Reserves for Call-Backs)		\$0	\$0		
Waste Removal (Dumpsters)		\$2,740	\$1,370		
Value of Construction Time Saved vs. Framing		\$0	-\$5,720	0.0	-14.3

Summary: SIPs Savings/Value vs. Conventional Framing		
Cost Savings	Added Value	Total
\$ (1,763)	\$ 6,750	\$ 4,987

This cost comparison is based on an actual bid for SIPs and estimated costs for conventional framing based on standard cost data available. Work with your SIPs sales rep to integrate actual bids for conventional framing to get a more precise comparison for your project.

SIPs Improved User Experience	Metric	Value
Total Added Value		\$ 6,750
Enhanced Quality:		
Stronger/More Dimensionally Accurate Enclosure	\$ 450,000	\$2,250
Greater Resilience to Fire, Wind, Impact, Pests	\$ 450,000	\$4,500
Higher Appraisals to Base Price	\$ 450,000	\$0
Enhanced Space:		
Additional Square Footage with Thinner Walls	0	\$0
Sq. Ft. of SIP Attic Traded Off for Basement	0	\$0
Additional Conditioned Space with SIP Attic	0	\$0
Incentives Savings:		
45 L Tax Credit		\$0
Utility Rebate		\$0
30-year Energy Savings		\$0
Reduced Home Insurance Annual Insurance Cost	\$ 1,200	\$0

Input Key:
Enter Input
No Input - Automatically Calculated
No Input - Automatically Calculated or Enter Input
Not Applicable

Notes:
 True-Cost Bidding is a foundation for system-based thinking
 Tool assumes comparison of SIPs to high-performance homes
 Add tax credits, rebates, and energy savings added value where applies
 Learning curve typically results in significant added cost savings when applying new innovations
 Value of additional square feet will correlate to the impact on design/function
 Thinner walls can help achieve code requirements (more space for stairs)
 SIPs do not require double sill for trim like conventional framing
 SIP window openings require much less rough opening clearance
 There are also potential HVAC cost savings for compactness and multi-zone



SIPA True Cost Bidding Tool (STCBT) Pilot Report

Prepared by Sam Rashkin for Structural Insulated Panel Association

November 2, 2023

Appendix B: Howard Building Science STCBT Spreadsheet Analysis Single-Family Home – Baseline SIPs-Optimized vs. Conventional Framing

Cost Assumptions:	Metrics:	Source	SIPs Added Value Assumptions:	Metrics:	Source
Cycle Time: Carrying Cost per day of construction	\$ 500	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day	General Inputs: Base Price of Home	\$ 199,900	Builder
Finishes: Percent Cost Savings Installing Drywall w/SIPs	0%	Estimate	Conditioned Square Feet of Home	800	Take-Off
Percent Cost Savings Installing Cabinets w/SIPs	0%	Estimate	Conditioned Square Feet Above Grade	800	Take-Off
Percent Cost Savings Installing Trim w/SIPs	0%	Estimate	Conditioned Square Feet Basement Below Grade	0	Take-Off
MEP: Cost of Schematics for Optimizing MEP with SIPs	\$ -	Assume "S0" but Enter a Cost from Builder	Additional Conditioned Square Feet with Thinner Walls	0	Take-Off
Electric Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "S0" but Enter a Cost from Builder	Retail Cost per Sq. Ft. Above-Grade Conditioned space	\$ 250	Default Calc Assumes A
Plumbing Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "S0" but Enter a Cost from Builder	Retail Cost per Sq. Ft. Below-Grade Conditioned space	\$ 125	Default Calc Assumes B
Quality Control and Lean Construction: Training Cost with Framing [% of Home Base Price]	0.00%	Placeholder Assumption	Retail Cost per Sq. Ft. for Additional Storage Space in Attic	\$ 50	Estimate
SIPs % Training Cost Savings	0%	Placeholder Assumption	Enhanced Quality: Value of Greater Strength/Dimensional Accuracy (%)	0.0%	Estimate
Inspection Cost with Framing [% of Home Base Price]	0.00%	Placeholder Assumption	Value of Greater Resilience (e.g., Impact, Wind, Earthquake) (%)	0.0%	Estimate
SIPs % Inspection Cost Savings	0%	Placeholder Assumption	Higher Appraisal Value (%)	0.0%	AI Cobb Study
Framing Rework Cost [% of Home Base Price]	0.00%	Placeholder Assumption	Enhanced Space: Sq. Ft. of Conditional Attic Space Added with SIPs	0	Take-Off
SIPs % Rework Cost Savings	0%	Placeholder Assumption	Square Feet with Raised Ceiling	0	Take-Off
Risk Management Reserves [% of Home Base Price]	0.0%	Placeholder Assumption	Increased Value of Space with Raised Ceiling (%)	0%	Estimate
SIPs % Risk Management Reserve Savings	0%	Placeholder Assumption	Additional Conditioned Square Feet with SIP Attic	0	Take-Off
Framing Waste in # Dumpsters Per 1,000 Sq. ft.	0.0	Estimated twice SIPs	Incentives/Savings: 45 L Tax Credit	\$ -	IRS Language
Number Framing Waste Dumpsters	0.0	Automatically Calculated	Utility Rebate	\$ -	Local Utility where available
SIPs Waste in # Dumpsters Per 1,000 Sq. ft.	0.0	SIPA Meeting	Annual Home Insurance Cost	\$ 1,200	Insurance Company
Number of SIPs Dumpsters	0.0	Automatically Calculated	Discounted Home Insurance with SIPs (%)	0%	Insurance Company
Cost Per Dumpster	\$ -	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day			

Application: SIP Walls Only, Basement	Costs		# Days	
	Framing	SIPs	Framing	SIPs
Scope of Work				
TOTAL	\$25,000	\$39,000	0.0	0.0
Structure	\$25,000	\$39,000	0.0	0.0
SIP Panels - Material and Labor		\$35,000		
Wall Framing - Material and Labor	\$25,000	\$4,000		
Floor Framing - Material and Labor	\$0	\$0		
Roof Framing - Material and Labor	\$0	\$0		
Structural Beams Material and Labor				
Stair Framing				
Concrete Foundation - Material and Labor				
Insulation	\$0	\$0	0.0	0.0
Wall - Cavity	\$0	\$0		
Wall - Rigid	\$0	\$0		
Attic Ceiling	\$0	\$0		
Band Joists	\$0	\$0		
Floor	\$0	\$0		
Basement				
Slab				
Air Flow Control	\$0	\$0	0.0	0.0
Air Barriers	\$0	\$0		
Air Sealing	\$0	\$0		
Wind Baffles	\$0	\$0		
Attic Venting	\$0	\$0		
Housewrap	\$0	\$0		
Finishes	\$0	\$0	0.0	0.0
Interior Drywall	\$0	\$0	0.0	0.0
Interior Cabinets	\$0	\$0		
Interior Trim	\$0	\$0		
Exterior Trim				
MEP	\$ -	\$0	0.0	0.0
Schematics for Optimizing MEP	\$0	\$0		
HVAC Cost Differential	\$0	\$0		
Electric Cost Differential with Conventional Framing	\$0	\$0		
Plumbing Cost Differential with Conventional Framing	\$0	\$0		
Quality Control and Lean Construction	\$0	\$0	0.0	0.0
Training	\$0	\$0		
Inspections	\$0	\$0	0.0	
Rework	\$0	\$0		
Risk (Reserves for Call-Backs)	\$0	\$0		
Waste Removal (Dumpsters)	\$0	\$0		
Value of Construction Time Saved vs. Framing	\$0	\$0	0.0	0.0

Summary: SIPs Savings/Value vs. Conventional Framing		
Cost Savings	Added Value	Total
\$ (14,000)	\$ -	\$ (14,000)

This cost comparison is based on an actual bid for SIPs and estimated costs for conventional framing based on standard cost data available. Work with your SIPs sales rep to integrate actual bids for conventional framing to get a more precise comparison for your project.

SIPs Improved User Experience	Metric	Value
Total Added Value		\$ -
Enhanced Quality: Stronger/More Dimensionally Accurate Enclosure	\$ 199,900	\$0
Greater Resilience to Fire, Wind, Impact, Pests	\$ 199,900	\$0
Higher Appraisals to Base Price	\$ 199,900	\$0
Enhanced Space: Additional Square Footage with Thinner Walls	0	\$0
Sq. Ft. of Conditioned Attic Space Added with SIPs	0	\$0
Additional Storage Space with SIP Attic	0 \$	-
Value of Conditioned Space with Raised Ceiling	0 \$	-
Incentives/Savings: 45 L Tax Credit		\$0
Utility Rebate		\$0
Reduced Home Insurance Annual Insurance Cost	\$ 1,200	\$0

Input Key:
Enter Input
No Input - Automatically Calculated
Not Applicable



SIPA True Cost Bidding Tool (STCBT) Pilot Report

Prepared by Sam Rashkin for Structural Insulated Panel Association

November 2, 2023

Appendix B: Howard Building Science STCBT Spreadsheet Analysis (continued) Single-Family Home – STCBT Results SIPs-Optimized vs. Conventional Framing

Cost Assumptions:	Metrics:	Source	SIPs Added Value Assumptions:	Metrics:	Source
Cycle Time:			General Inputs:		
Carrying Cost per day of construction	\$ 500	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day	Base Price of Home	\$ 199,900	Builder
Finishes:			Conditioned Square Feet of Home	800	Take-Off
Percent Cost Savings Installing Drywall w/SIPs	0%	Estimate	Conditioned Square Feet Above Grade	800	Take-Off
Percent Cost Savings Installing Cabinets w/SIPs	0%	Estimate	Conditioned Square Feet Basement Below Grade	0	Take-Off
Percent Cost Savings Installing Trim w/SIPs	0%	Estimate	Additional Conditioned Square Feet with Thinner Walls	19	Take-Off
MEP:			Retail Cost per Sq. Ft. Above-Grade Conditioned space	\$ 250	Default Calc Assumes
Cost of Schematics for Optimizing MEP with SIPs	\$ -	Assume "\$0" but Enter a Cost from Builder	Retail Cost per Sq. Ft. Below-Grade Conditioned space	\$ 125	Default Calc Assumes
IC Cost Difference for SIPs vs. Conventional Framing	\$ 0	Assume "\$0" but Enter a Cost from Builder	Retail Cost per Sq. Ft. for Additional Storage Space in Attic	\$ 50	Estimate
IC Cost Difference for SIPs vs. Conventional Framing	\$ 0	Assume "\$0" but Enter a Cost from Builder	Enhanced Quality:		
IC Cost Difference for SIPs vs. Conventional Framing	\$ 0	Assume "\$-1,000" with Optimized Schematics, but Enter Builder Cost	Value of Greater Strength/Dimensional Accuracy (%)	1.0%	Estimate
Quality Control and Lean Construction:			Value of Greater Resilience (e.g., Impact, Wind, Earthquake) (%)	0.5%	Estimate
Training Cost with Framing [% of Home Base Price]	0.00%	Placeholder Assumption	Higher Appraisal Value (%)	0.0%	AI Cobb Study
SIPs % Training Cost Savings	0%	Placeholder Assumption	Enhanced Space:		
Inspection Cost with Framing [% of Home Base Price]	0.15%	Placeholder Assumption	Sq. Ft. of Conditional Attic Space Added with SIPs	0	Take-Off
SIPs % Inspection Cost Savings	50%	Placeholder Assumption	Square Feet with Raised Ceiling	380	Take-Off
Framing Rework Cost [% of Home Base Price]	0.05%	Placeholder Assumption	Increased Value of Space with Raised Ceiling (%)	10%	Estimate
SIPs % Rework Cost Savings	100%	Placeholder Assumption	Additional Conditioned Square Feet with SIP Attic	400	Take-Off
Risk Management Reserves [% of Home Base Price]	0.0%	Placeholder Assumption	Incentives/Savings:		
SIPs % Risk Management Reserve Savings	0%	Placeholder Assumption	45 L Tax Credit	\$ -	IRS Language
Framing Waste in # Dumpsters Per 1,000 Sq. ft.	2.0	Estimated twice SIPs	Utility Rebate	\$ -	Local Utility where ava
Number Framing Waste Dumpsters	2.0	Automatically Calculated	Annual Home Insurance Cost	\$ 1,200	Insurance Company
SIPs Waste in # Dumpsters Per 1,000 Sq. ft.	1.0	SIPA Meeting	Discounted Home Insurance with SIPs (%)	0%	Insurance Company
Number of SIPs Dumpsters	1.0	Automatically Calculated			
Cost Per Dumpster	\$ 300	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day			

Application: SIP Walls Only, Basement			Costs		# Days	
Scope of Work			Framing	SIPs	Framing	SIPs
TOTAL			\$54,500	\$56,450	15.0	6.0
Structure			\$25,000	\$39,000	6.0	3.0
SIP Panels - Material and Labor				\$35,000		
Wall Framing - Material and Labor			\$25,000	\$4,000		
Floor Framing - Material and Labor			\$0	\$0		
Roof Framing - Material and Labor			\$0	\$0		
Structural Beams Material and Labor						
Stair Framing						
Concrete Foundation - Material and Labor						
Insulation			\$5,000	\$0	2.0	1.0
Wall - Cavity			\$1,500	\$0		
Wall - Rigid			\$2,000	\$0		
Attic Ceiling			\$1,500	\$0		
Band Joists			\$0	\$0		
Floor			\$0	\$0		
Basement Slab						
Air Flow Control			\$3,500	\$1,500	3.0	1.0
Air Barriers			\$0	\$0		
Air Sealing			\$500	\$0		
Wind Baffles			\$500	\$0		
Attic Venting			\$1,000	\$0		
Housewrap			\$1,500	\$1,500		
Finishes			\$20,000	\$20,000	2.0	1.0
Interior Drywall			\$5,000	\$5,000	2.0	1.0
Interior Cabinets			\$10,000	\$10,000		
Interior Trim			\$5,000	\$5,000		
Exterior Trim						
MEP			\$ -	\$0	2.0	0.0
Schematics for Optimizing MEP				\$0		
HVAC Cost Differential				\$0		
Electric Cost Differential with Conventional Framing				\$0		
Plumbing Cost Differential with Conventional Framing				\$0		
Quality Control and Lean Construction			\$1,000	\$450		
Training			\$0	\$0		
Inspections			\$300	\$150	2.0	
Rework			\$100	\$0		
Risk (Reserves for Call-Backs)			\$0	\$0		
Waste Removal (Dumpsters)			\$600	\$300		
Value of Construction Time Saved vs. Framing			\$0	-\$4,500	0.0	-9.0

Summary: SIPs Savings/Value vs. Conventional Framing		
Cost Savings	Added Value	Total
\$ (1,950)	\$ 37,241	\$ 35,291

This cost comparison is based on an actual bid for SIPs and estimated costs for conventional framing based on standard cost data available. Work with your SIPs sales rep to integrate actual bids for conventional framing to get a more precise comparison for your project.

SIPs Improved User Experience	Metric	Value
Total Added Value		
Enhanced Quality:		\$ 37,241
Stronger/More Dimensionally Accurate Enclosure	\$ 199,900	\$1,999
Greater Resilience to Fire, Wind, Impact, Pests	\$ 199,900	\$1,000
Higher Appraisals to Base Price	\$ 199,900	\$0
Enhanced Space:		
Additional Square Footage with Thinner Walls	19	\$4,748
Sq. Ft. of Conditioned Attic Space Added with SIPs	0	\$0
Additional Storage Space with SIP Attic	400	\$ 20,000
Value of Conditioned Space with Raised Ceiling	380	\$ 9,495
Incentives/Savings:		
45 L Tax Credit		\$0
Utility Rebate		\$0
Reduced Home Insurance Annual Insurance Cost	\$ 1,200	\$0

Input Key:
Enter Input
No Input - Automatically Calculated
Not Applicable



SIPA True Cost Bidding Tool (STCBT) Pilot Report

Prepared by Sam Rashkin for Structural Insulated Panel Association

November 2, 2023

Appendix C: Greensmith Builders STCBT Spreadsheet Analysis Multi-Family Building – Baseline SIPs-Optimized vs. Conventional Framing

Cost Assumptions:	Metrics:	Source
Cycle Time:		
Carrying Cost per day of construction	\$ 400	Cost of Quality, Glenn Cottrell w/IACOS - \$500 - \$800/day
Finishes:		
Percent Cost Savings Installing Drywall w/SIPs	0%	Estimate
Percent Cost Savings Installing Cabinets w/SIPs	0%	Estimate
Percent Cost Savings Installing Trim w/SIPs	0%	Estimate
MEP:		
Cost of Schematics for Optimizing MEP with SIPs	\$ -	
AC Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$0" but Enter a Cost from Builder
Electric Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$0" but Enter a Cost from Builder
Plumbing Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$-1,000" with Optimized Schematics, but Enter Builder Cost
Quality Control and Lean Construction:		
Training Cost with Framing [% of Home Base Price]		Placeholder Assumption
SIPs % Training Cost Savings		Placeholder Assumption
Inspection Cost with Framing [% of Home Base Price]		Placeholder Assumption
SIPs % Inspection Cost Savings		Placeholder Assumption
Framing Rework Cost [% of Home Base Price]		Placeholder Assumption
SIPs % Rework Cost Savings		Placeholder Assumption
Risk Management Reserves [% of Home Base Price]		Placeholder Assumption
SIPs % Risk Management Reserve Savings		Placeholder Assumption
Framing Waste in # Dumpsters Per 1,000 Sq. Ft.		Cost of Quality, Glenn Cottrell w/IACOS - \$500 - \$800/day
SIPs Waste in # Dumpsters Per 1,000 Sq. Ft.		SIPA Meeting
Cost Per Dumpster	\$ 650	Cost of Quality, Glenn Cottrell w/IACOS - \$500 - \$800/day

SIPs Added Value Assumptions:	Metrics:	Source
General Inputs:		
Base Price of Home	\$ 3,840,000	Builder
Conditioned Square Feet of Home	24836	Take-Off
Conditioned Square Feet Above Grade	24836	Take-Off
Conditioned Square Feet Basement Below Grade	0	Take-Off
Additional Conditioned Square Feet with Thinner Walls	0	Take-Off
Retail Cost per Sq. Ft. Above-Grade Conditioned space	\$ 155	Default Calc Assumes All
Retail Cost per Sq. Ft. Below-Grade Conditioned space	\$ 77	Default Calc Assumes B
Enhanced Quality:		
Value of Greater Strength/Dimensional Accuracy (%)	0.0%	Estimate
Value of Greater Resilience (e.g., Impact, Wind, Earthquake) (%)	0.0%	Estimate
Higher Appraisal Value (%)	0.0%	AI Cobb Study
Enhanced Space:		
Sq. Ft. of SIP Attic Traded Off for Basement	0	Take-Off
Additional Conditioned Square Feet with SIP Attic	0	Take-Off
Incentives/Savings:		
45 L Tax Credit	\$ -	IRS Language
Utility Rebate	\$ -	Local Utility where avail
30-year Energy Savings (from HERS report x 0.7)	\$ -	HERS Report x 0.7 correct
Annual Home Insurance Cost	\$ -	Insurance Company
Discounted Home Insurance with SIPs (%)	0%	Insurance Company

Application: SIP Walls Only, Basement		Costs		# Days	
Scope of Work		Framing	SIPs	Framing	SIPs
TOTAL		\$454,712	\$506,197	0.0	0.0
Structure		\$454,712	\$498,712		
SIPs - Material and Labor for exterior, hallway, demising walls			\$498,712		
Framing - Material and Labor for exterior, hallway, demising walls		\$454,712			
Floor Framing - Material and Labor					
Roof Framing - Material and Labor					
Structural Beams Material and Labor					
Stair Framing					
Concrete Foundation - Material and Labor					
Insulation		\$0	\$0		
Wall - Cavity					
Wall - Rigid					
Attic Ceiling					
Band Joists					
Floor					
Basement					
Air Flow Control		\$0	\$0		
Air Barriers					
Air Sealing					
Wind Baffles					
Attic Venting					
Finishes		\$0	\$0	0.0	0.0
Interior Drywall					
Interior Cabinets					
Interior Trim					
Exterior Trim					
MEP		\$ -	\$0	0.0	0.0
Schematics for Optimizing MEP			\$0		
HVAC Cost Differential			\$0		
Electric Cost Differential with Conventional Framing			\$0		
Plumbing Cost Differential with Conventional Framing			\$0		
Quality Control and Lean Construction		\$0	\$7,485		
Training		\$0	\$7,485		
Inspections					
Rework					
Risk (Reserves for Call-Backs)					
Waste Removal (8 Dumpsters for framing vs. 4 for SIPs)					
Value of Construction Time Saved vs. Framing		\$0	\$0	0.0	0.0

Summary: SIPs Savings/Value vs. Conventional Framing		
Cost Savings	Added Value	Total
\$ (51,485)	\$ -	\$ (51,485)

This cost comparison is based on an actual bid for SIPs and estimated costs for conventional framing based on standard cost data available. Work with your SIPs sales rep to integrate actual bids for conventional framing to get a more precise comparison for your project.

SIPs Improved User Experience	Metric	Value
Total Added Value		\$ -
Enhanced Quality:		
Stronger/More Dimensionally Accurate Enclosure	\$ 3,840,000	\$0
Greater Resilience to Fire, Wind, Impact, Pests	\$ 3,840,000	\$0
Higher Appraisals to Base Price	\$ 3,840,000	\$0
Enhanced Space:		
Additional Square Footage with Thinner Walls	0	\$0
Sq. Ft. of SIP Attic Traded Off for Basement	0	\$0
Additional Conditioned Space with SIP Attic	0	\$0
Incentives/Savings:		
45 L Tax Credit		\$0
Utility Rebate		\$0
30-year Energy Savings		\$0
Reduced Home Insurance Annual Insurance Cost	\$ -	\$0

Input Key:
Enter Input
No Input - Automatically Calculated
No Input - Automatically Calculated or Enter Input
Not Applicable

Notes:
 True-Cost Bidding is a foundation for system-based thinking
 Tool assumes comparison of SIPs to high-performance homes
 Add tax credits, rebates, and energy savings added value where applies
 Learning curve typically results in significant added cost savings when applying new innovations
 Value of additional square feet will correlate to the impact on design/function
 Thinner walls can help achieve code requirements (more space for stairs)
 SIPs do not require double sill for trim like conventional framing
 SIP window openings require much less rough opening clearance
 There are also potential HVAC cost savings for compactness and multi-zone



SIPA True Cost Bidding Tool (STCBT) Pilot Report

Prepared by Sam Rashkin for Structural Insulated Panel Association

November 2, 2023

Appendix C: Greensmith Builders STCBT Spreadsheet Analysis (continued) Multi-Family Building – STCBT Results SIPs-Optimized vs. Conventional Framing

Cost Assumptions:	Metrics:	Source
Cycle Time:		
Carrying Cost per day of construction	\$ 400	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day
Finishes:		
Percent Cost Savings Installing Drywall w/SIPs	7%	Estimate
Percent Cost Savings Installing Cabinets w/SIPs	0%	Estimate
Percent Cost Savings Installing Trim w/SIPs	0%	Estimate
MEP:		
Cost of Schematics for Optimizing MEP with SIPs	\$ -	
IC Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$0" but Enter a Cost from Builder
Electric Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$0" but Enter a Cost from Builder
Plumbing Cost Difference for SIPs vs. Conventional Framing	\$0	Assume "\$-1,000" with Optimized Schematics, but Enter Builder Cost
Quality Control and Lean Construction:		
Training Cost with Framing [% of Home Base Price]		Placeholder Assumption
SIPs % Training Cost Savings		Placeholder Assumption
Inspection Cost with Framing [% of Home Base Price]		Placeholder Assumption
SIPs % Inspection Cost Savings		Placeholder Assumption
Framing Rework Cost [% of Home Base Price]		Placeholder Assumption
SIPs % Rework Cost Savings		Placeholder Assumption
Risk Management Reserves [% of Home Base Price]		Placeholder Assumption
SIPs % Risk Management Reserve Savings		Placeholder Assumption
Framing Waste in # Dumpsters Per 1,000 Sq. Ft.		Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day
SIPs Waste in # Dumpsters Per 1,000 Sq. Ft.		SIPA Meeting
Cost Per Dumpster	\$ 650	Cost of Quality, Glenn Cottrell w/IBACOS - \$500 - \$800/day

SIPs Added Value Assumptions:	Metrics:	Source
General Inputs:		
Base Price of Home	\$ 3,840,000	Builder
Conditioned Square Feet of Home	24836	Take-Off
Conditioned Square Feet Above Grade	24836	Take-Off
Conditioned Square Feet Basement Below Grade	0	Take-Off
Additional Conditioned Square Feet with Thinner Walls	0	Take-Off
Retail Cost per Sq. Ft. Above-Grade Conditioned space	\$ 155	Default Calc Assumes 1
Retail Cost per Sq. Ft. Below-Grade Conditioned space	\$ 77	Default Calc Assumes 1
Enhanced Quality:		
Value of Greater Strength/Dimensional Accuracy (%)	0.8%	Estimate
Value of Greater Resilience (e.g., Impact, Wind, Earthquake) (%)	1.5%	Estimate
Higher Appraisal Value (%)	1.0%	AI Cobb Study
Enhanced Space:		
Sq. Ft. of SIP Attic Traded Off for Basement	0	Take-Off
Additional Conditioned Square Feet with SIP Attic	0	Take-Off
Incentives/Savings:		
45 L Tax Credit	\$ -	IRS Language
Utility Rebate	\$ -	Local Utility where ava
30-year Energy Savings (from HERS report x 0.7)	\$ -	HERS Report x 0.7 corr
Annual Home Insurance Cost	\$ -	Insurance Company
Discounted Home Insurance with SIPs (%)	0%	Insurance Company

Application: SIP Walls Only, Basement		Costs		# Days	
Scope of Work		Framing	SIPs	Framing	SIPs
TOTAL		\$763,062	\$654,638	156.0	71.0
Structure		\$454,712	\$498,712	80.0	37.0
SIPs - Material and Labor for exterior, hallway, demising walls			\$498,712		
Framing - Material and Labor for exterior, hallway, demising walls		\$454,712			
Floor Framing - Material and Labor					
Roof Framing - Material and Labor					
Structural Beams Material and Labor					
Stair Framing					
Concrete Foundation - Material and Labor					
Insulation		\$72,880	\$0	20.0	0.0
Wall - Cavity		\$72,880	\$0		
Wall - Rigid					
Attic Ceiling					
Band Joists					
Floor					
Basement					
Air Flow Control		\$44,696	\$18,900	9.0	2.0
Air Barriers					
Air Sealing		\$44,696	\$18,900		
Wind Baffles					
Attic Venting					
Finishes		\$185,574	\$160,941	36.0	29.0
Interior Drywall		\$144,974	\$129,441	18.0	15.0
Interior Cabinets		\$27,100	\$20,250	12.0	9.0
Interior Trim		\$13,500	\$11,250	6.0	5.0
Exterior Trim					
MEP		\$ -	\$0	0.0	0.0
Schematics for Optimizing MEP			\$0		
HVAC Cost Differential			\$0		
Electric Cost Differential with Conventional Framing			\$0		
Plumbing Cost Differential with Conventional Framing			\$0		
Quality Control and Lean Construction		\$5,200	\$10,085	11.0	3.0
Training		\$0	\$7,485		
Inspections					
Rework					
Risk (Reserves for Call-Backs)					
Waste Removal (8 Dumpsters for framing vs. 4 for SIPs)		\$5,200	\$2,600		
Value of Construction Time Saved vs. Framing		\$0	-\$34,000	0.0	-85.0

Summary: SIPs Savings/Value vs. Conventional Framing		
Cost Savings	Added Value	Total
\$ 108,424	\$ 124,800	\$ 233,224

This cost comparison is based on an actual bid for SIPs and estimated costs for conventional framing based on standard cost data available. Work with your SIPs sales rep to integrate actual bids for conventional framing to get a more precise comparison for your project.

SIPs Improved User Experience	Metric	Value
Total Added Value		\$ 124,800
Enhanced Quality:		
Stronger/More Dimensionally Accurate Enclosure	\$ 3,840,000	\$28,800
Greater Resilience to Fire, Wind, Impact, Pests	\$ 3,840,000	\$57,600
Higher Appraisals to Base Price	\$ 3,840,000	\$38,400
Enhanced Space:		
Additional Square Footage with Thinner Walls	0	\$0
Sq. Ft. of SIP Attic Traded Off for Basement	0	\$0
Additional Conditioned Space with SIP Attic	0	\$0
Incentives/Savings:		
45 L Tax Credit		\$0
Utility Rebate		\$0
30-year Energy Savings		\$0
Reduced Home Insurance Annual Insurance Cost	\$ -	\$0

Input Key:
Enter Input
No Input - Automatically Calculated
No Input - Automatically Calculated or Enter Input
Not Applicable

Notes:
 True-Cost Bidding is a foundation for system-based thinking
 Tool assumes comparison of SIPs to high-performance homes
 Add tax credits, rebates, and energy savings added value where applicable
 Learning curve typically results in significant added cost savings when applying new innovations
 Value of additional square feet will correlate to the impact on design/function
 Thinner walls can help achieve code requirements (more space for stairs)
 SIPs do not require double sill for trim like conventional framing
 SIP window openings require much less rough opening clearance
 There are also potential HVAC cost savings for compactness and multi-zone