

24<sup>TH</sup> ANNUAL



24<sup>TH</sup> LCI CONGRESS  
OCTOBER 18-21

# Climbing the Prefab Curve

Leveraging Lessons Learned Quickly and Effectively

Mike Marchman, Brasfield & Gorrie

Katie Wells, Brasfield & Gorrie

Michelle Whiteside, Brasfield & Gorrie

LEAN GUMBO: THE RIGHT INGREDIENTS FOR PROJECT SUCCESS

October 19, 2022



# The Brasfield & Gorrie Team



**Katie Wells**

*VP of Project Delivery*  
Birmingham Office



**Mike Marchman**

*Regional Lean Director*  
Nashville Office



**Michelle Whiteside**

*Regional Lean Director*  
Orlando Office

# About Us

## Fast Facts



EST.

1964

58 YEARS IN BUSINESS



53 YEARS

HEALTHCARE EXPERIENCE



220

ACTIVE JOBSITES



100+

ACTIVE HEALTHCARE JOBSITES



3,200

EMPLOYEES



#3

MODERN HEALTHCARE

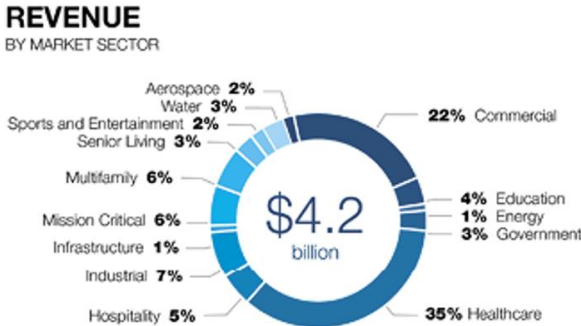
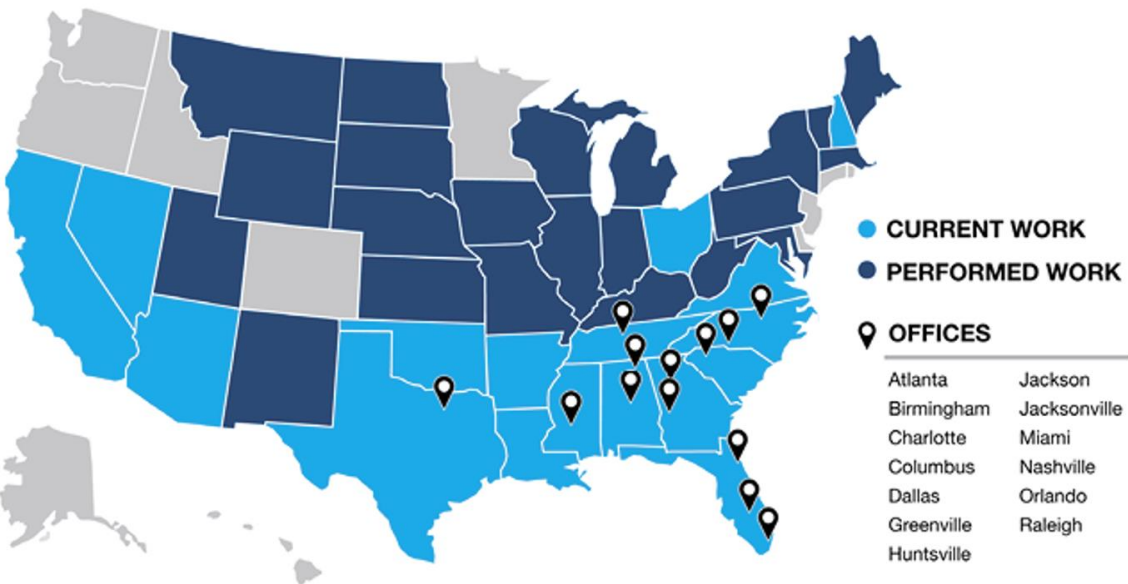
HEALTHCARE GENERAL CONTRACTOR



#24

ENGINEERING NEWS-RECORD

TOP 400 CONTRACTORS



## Self-Perform Contractor



5+ million

CUBIC YARDS OF CONCRETE  
POURED SINCE 2003



294

SUPERINTENDENTS



52

FIELD ENGINEERS



233

FOREMEN



1,800+

FIELD EMPLOYEES



4,000+

EQUIPMENT FLEET



# Our Approach



## BACKGROUND

*How We Got Here*



## CURRENT STATE

*What We've Built*



## FUTURE STATE

*Vision & Long-Term Goals*







# BACKGROUND

*How We Got Here*



# Background

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- **Pre-2019**
- **2019 and Beyond**
  - Created a Prefabrication Department
    - Established Clear Goals to:
      - Centralize & Quantify
      - Build relationships
      - Grow knowledge base
      - Create tools
      - Educate
      - Innovate



# Background

## Centralize & Quantify

**Historical Job Survey**

Project: HCA- StoneSprings Hospital and Medical Office Building

Date of Meeting / Phone Call: 1/8/2019

Location of Project: Sterling, Virginia

Type of Prefab (circle): Bathroom Pod    Ext. Wall Panels    Full Room Pod

Headwalls    Interior Wall Partitions    Structural Components

Other: Patient Room Head Walls and Bathroom Frames

Who visited (from B&G):

Opening: "We are working through collecting historical data on prefab components so that we can make a working list of past data and be able to better and more accurately show the benefits and drawbacks of prefabrication on future jobs. We have pulled past jobs from our database that used prefab in the past. Did your job use prefab? If yes, can you answer a few questions about the prefab components on your job?"

Questions:

Highlight each of the building styles that apply to this project:

trade built (on site)

self-performed (B&G people)

manufactured (offsite and brought to job)

If trade built, ask these questions:

- What all was built? Frames for bathroom and patient room
- Who were the trades?

# Background

## Centralize & Quantify

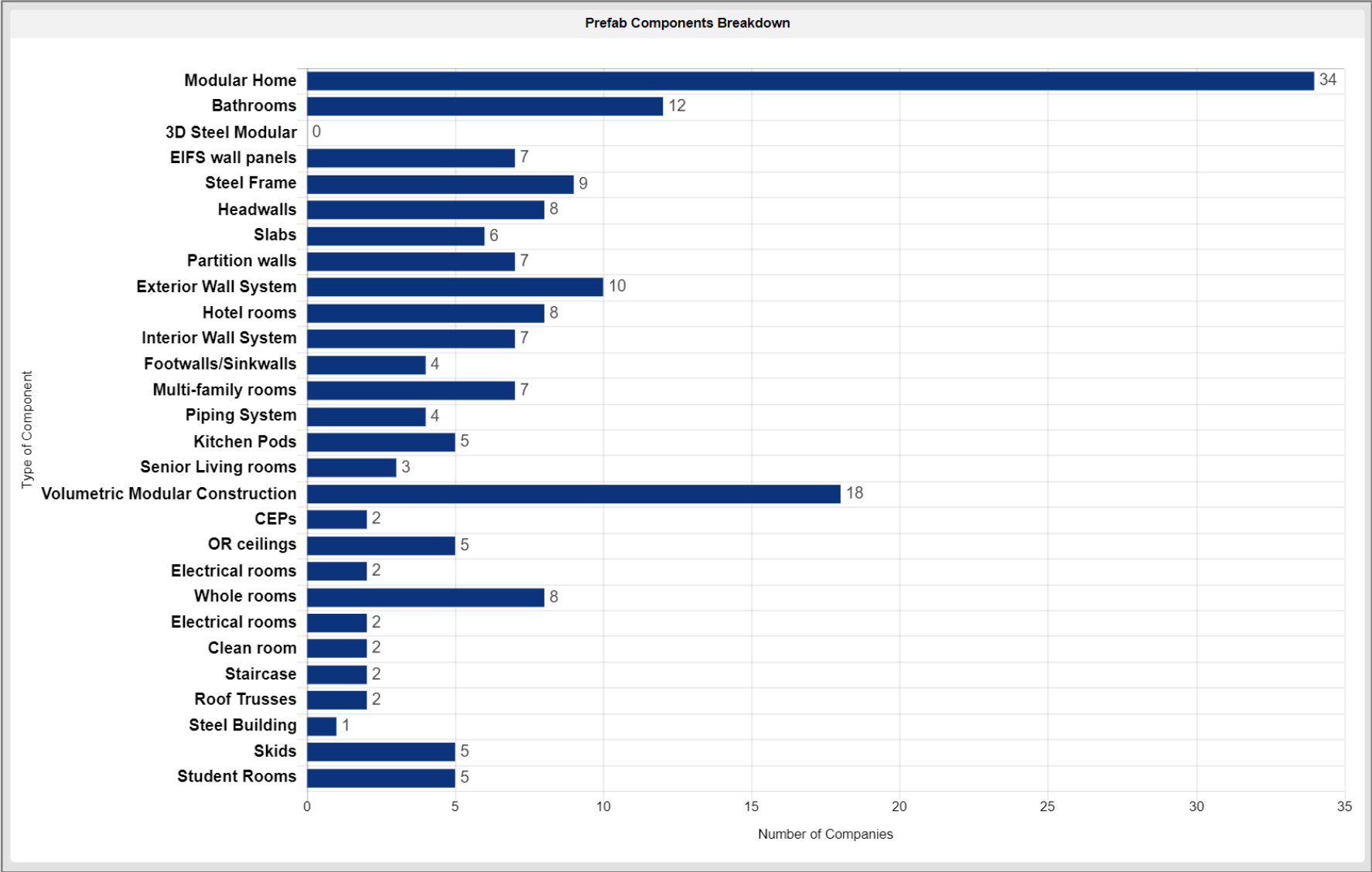
The screenshot displays a software interface for managing project data. The title bar reads "90 - Past Projects Calling List". The interface includes a menu bar with "File", "Automation", and "Forms". Below the menu bar is a toolbar with icons for "Grid View", "Filter", "Anal", and "10". The main data area is a table with the following columns: "In Salesforce?", "Data Collection", "Reference", "Assigned To", "Status", "Due Date", "Project Name", "Region", and "Comments". The table contains 25 rows of data, with some rows highlighted in green and others in grey. The "Assigned To" column lists names like "Dudley Simms" and "Leah McGriff". The "Status" column shows "Complete" for all entries. The "Due Date" column shows "01/10/20" for all entries. The "Project Name" column lists various projects, including "HCA Alliance", "HCA Davie", "HCA Summit Medical Center Med-Surg Expansion", "TriStar Centennial Medical Center Vertical Expansion", "HCA Medical City Dallas Hospital Electrical Substation (EPSS)", "Omni Louisville Hotel & Residences", "GE Aviation Engine Assembly and Manufacturing Facility", "Omni Hotel - Dallas (PGA)", "Celebration Church - Arena Expansion", "Charles Schwab 4th & 5th Floor Interior Alterations", "HCA Las Palmas Women's Vertical Expansion", "Select Specialty - North Knoxville", "Packaging Corporation of America Expansion", "DeKalb Medical Center at Hillandale - Modular Offices Site Prep", "HCA - StoneSprings Hospital and Medical Office Building", "Cone Health Women's and Children's Center at Moses Cone Hospital", "Moses H. Cone Memorial Hospital - North Tower", "Lexington Medical Center Clinical Expansion", "San Antonio Courthouse", "[FMCSA - Salesforce Name] Federal Motor Carrier Safety Administration (F)", "Confidential Client - North Airport Campus Expansion Tucson", "M.T. Mustian Center at Tallahassee Memorial Hospital", "Mission Hospital for Advanced Medicine", "Medical City Dallas Women's and Children's Hospital Expansion", and "HCA Medical City Dallas Hospital Master Plan Expansion and Tower Renovi". The "Region" column is mostly empty, with some entries like "or Drew Roy", "Luke Stoker", "or Christian Pitts, or Bill Vaughn", and "Mike has the lessons learned". The "Comments" column contains various notes, including "Left VM & emailed template to fill out", "Locate on Monday. Stadium Team", "Call 1/27. Re-emailed 2/5.", "Can't find info on Project or Super.", "Said to check out the Fitts Company", and "Can't find project in SF. \*Maybe good to talk to more. Had a k".

In Salesforce?	Data Collection	Reference	Assigned To	Status	Due Date	Project Name	Region	Comments
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Dudley Simms	Complete	01/10/20	HCA Alliance		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Dudley Simms	Complete	01/10/20	HCA Davie		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Dudley Simms	Complete	01/10/20	HCA Summit Medical Center Med-Surg Expansion		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Dudley Simms	Complete	01/10/20	TriStar Centennial Medical Center Vertical Expansion		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	KW	Dudley Simms	Complete	01/10/20	HCA Medical City Dallas Hospital Electrical Substation (EPSS)		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	KW	Dudley Simms	Complete	01/10/20	Omni Louisville Hotel & Residences		or Drew Roy
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	HB	Dudley Simms	Complete	01/10/20	GE Aviation Engine Assembly and Manufacturing Facility		Left VM & emailed template to fill out
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MW	Dudley Simms	Complete	01/10/20	Omni Hotel - Dallas (PGA)		Locate on Monday. Stadium Team
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MW	Dudley Simms	Complete	01/10/20	Celebration Church - Arena Expansion		Call 1/27. Re-emailed 2/5.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Dudley Simms	Complete	01/10/20	Charles Schwab 4th & 5th Floor Interior Alterations		Left VM & emailed template to fill out.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Dudley Simms	Complete	01/10/20	HCA Las Palmas Women's Vertical Expansion		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	KW	Dudley Simms	Complete	01/10/20	Select Specialty - North Knoxville		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Leah McGriff	Complete	01/10/20	Packaging Corporation of America Expansion		Luke Stoker
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	K - MT	Leah McGriff	Complete	01/10/20	DeKalb Medical Center at Hillandale - Modular Offices Site Prep		Left VM & emailed template to fill out.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	K - MVT	Leah McGriff	Complete	01/10/20	HCA - StoneSprings Hospital and Medical Office Building		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	HB	Leah McGriff	Complete	01/10/20	Cone Health Women's and Children's Center at Moses Cone Hospital		Can't find info on Project or Super.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	KW	Leah McGriff	Complete	01/10/20	Moses H. Cone Memorial Hospital - North Tower		or Christian Pitts, or Bill Vaughn
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	KW	Leah McGriff	Complete	01/10/20	Lexington Medical Center Clinical Expansion		*Mike has the lessons learned
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	HB	Leah McGriff	Complete	01/10/20	San Antonio Courthouse		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MW	Leah McGriff	Complete	01/10/20	[FMCSA - Salesforce Name] Federal Motor Carrier Safety Administration (F)		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Leah McGriff	Complete	01/10/20	Confidential Client - North Airport Campus Expansion Tucson		Said to check out the Fitts Company
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Leah McGriff	Complete	01/10/20	M.T. Mustian Center at Tallahassee Memorial Hospital		Can't find project in SF.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Leah McGriff	Complete	01/10/20	Mission Hospital for Advanced Medicine		*Maybe good to talk to more. Had a k
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Leah McGriff	Complete	01/10/20	Medical City Dallas Women's and Children's Hospital Expansion		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MM	Leah McGriff	Complete	01/10/20	HCA Medical City Dallas Hospital Master Plan Expansion and Tower Renovi		



# Background

## The Results...



# Background





# Background


## Grow Knowledge Base & Provide Tools

Prefab Companies ☆								
	Company Name	Location to Visit	Exterior Components	Interior Components	MEP Components	Modules	Structure Components	Industry
1	Amico	Ontario, CA		Headwalls				
2	Deluxe Modular	Berwick, PA						Office Residential Hotels
3	Digital Building Components	Phoenix, AZ				Modular Construction		
4	FA Wilhelm	Indianapolis, IN				Bathrooms		Hotels
5	FL Crane	Fulton and Gulfport, MS	EIFS wall panels	Partition walls				
6	FullStack Modular	Brooklyn, NY				Modular Construction		Residential
7	Pivotek	Milford, OH				Bathrooms Kitchen Pods		Medical Residential Hotels
8	Prescient	Mebane, NC					Slabs Steel Frame	Military Hotels Student Housing Multi-family
9	Raymond Group	Orange, CA	EIFS wall panels	Partition walls				
10	Skender	Chicago, IL				Modular Construction		Medical Education Office Residential
11	Stack Modular	Canada and China				Modular Construction		Office Hotels
12	Metric Modular	Agassiz, BC				Modular Home Modular Construction		Education Office Residential
13	Roeslein	St. Louis, MO			Piping System		Steel Frame	Manufacturing Plants Data Centers
14	Synergy Med - CLEAN CUB	Denver, CO				OR Rooms		
15	TD Industries	Dallas, TX						
16	American Panel Tech	South Plainfield, NJ	EIFS wall panels	Partition walls				
17	SM Lawrence	Nashville, TN			Piping System Skids			
18	Surepod (DPR)	Orlando, FL		Footwalls/Sinkwalls		Bathrooms		Assisted Living Hotels Multi-family
19	Baker Triangle	Dallas, TX	EIFS wall panels					
20	Big State Electric	San Antonio, TX						
21	BLOX	Bessemer, AL		Headwalls Footwalls		Bathrooms Whole rooms Whole rooms with skin (uber modules)		
22	Enterprise Electric	Nashville, TN			Underground Single			
23	Factory Blue	Fortworth, TX		Headwalls		Bathrooms Elevator		Medical Hotels Airports
24	Factory OS					Whole rooms		Residential Multi-family
25	Modular Services	Oklahoma City, OK		Headwalls Footwalls				
26	NeoPod	New Braunfels, TX		Headwalls Footwalls		Bathrooms		Medical Military Residential Hotels Student Housing
27	Southern Wall Systems	Sewanee, GA	EIFS wall panels Pu	Partition walls				Medical Hotels




# Background

Grow Knowledge  
Base & Provide  
Tools

 Prefab Components

All ▾



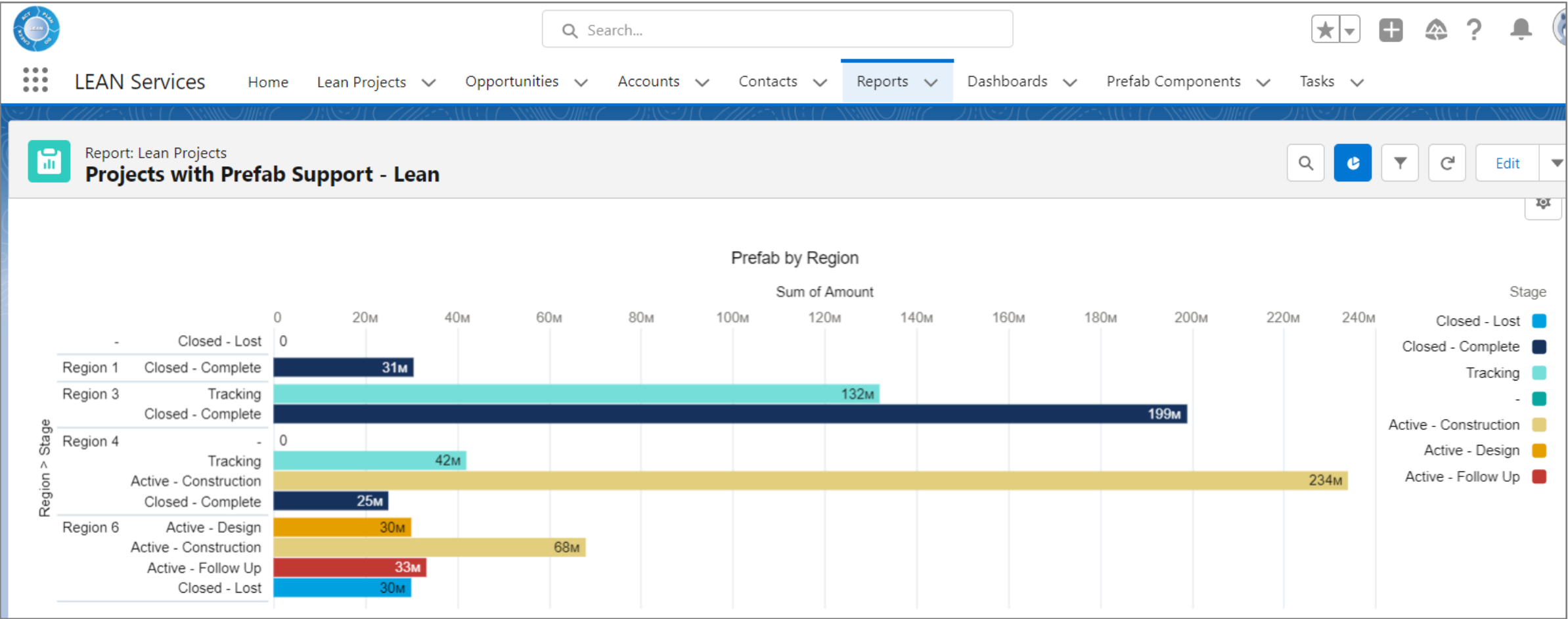
22 items • Sorted by Prefab Components Name • Filtered by All prefab components • Updated a few seconds ago

<input type="checkbox"/>	Prefab Components Name ↑ ▾	Type ▾	Job Count ▾	
1	<input type="checkbox"/> Bathrooms	Modules	31	▾
2	<input type="checkbox"/> CEP Components	MEP	7	▾
3	<input type="checkbox"/> Decorative Steel Structures	Exterior	1	▾
4	<input type="checkbox"/> Electrical Room Components	MEP	10	▾
5	<input type="checkbox"/> Electrical Room Modules	Modules	2	▾
6	<input type="checkbox"/> Exterior Wall Panels	Exterior	25	▾
7	<input type="checkbox"/> Formwork	Structure	0	▾
8	<input type="checkbox"/> Headwalls	Interior	35	▾
9	<input type="checkbox"/> Hotel Rooms	Modules	0	▾
10	<input type="checkbox"/> Kitchen Components	Interior	1	▾
11	<input type="checkbox"/> Modular CEP's	Modules	7	▾
12	<input type="checkbox"/> Modular Elevators	Modules	1	▾
13	<input type="checkbox"/> Multi-Family/Apartments/Senior Living	Modules	0	▾
14	<input type="checkbox"/> Multi-Trade MEP Racks	MEP	9	▾
15	<input type="checkbox"/> OR Ceilings & Walls	Interior	11	▾
16	<input type="checkbox"/> Other Whole Room Modules	Modules	4	▾
17	<input type="checkbox"/> Partition Walls	Interior	11	▾
18	<input type="checkbox"/> Patient Rooms	Modules	5	▾
19	<input type="checkbox"/> Single Trade Racks	MEP	24	▾
20	<input type="checkbox"/> Underground	MEP	20	▾
21	<input type="checkbox"/> Unitized curtainwall	Exterior	5	▾
22	<input type="checkbox"/> Wet Walls	MEP	7	▾




# Background

## Grow Knowledge Base & Provide Tools



# Background

## Grow Knowledge Base & Provide Tools



### PREFABRICATION Exterior Wall Panels

BRASFIELD & GORRIE GENERAL CONTRACTORS

Prefabricated exterior wall panels are being considered on many of our projects across various market sectors. With a variety of finishes to choose from, designers are considering the panels in lieu of traditionally built wall systems. The speed of installation and quality control panels provide will minimize risk, increase schedule certainty, and in general, provide for a safer installation that our project teams can benefit from.

#### ★ KEY CONSIDERATIONS

**Do exterior wall panels make sense for your project? Consider these questions:**

**Q:** What types of finishes can I get the panels in?  
**A:** Finishes can include EIFS, metal panels & brick. EIFS can be made to look similar to precast, stone, metal, and wood grain.

**Q:** What type of project is ideal for exterior wall panels?  
**A:** Any project that the client and design team are open to an EIFS, metal panel or brick finish can be considered for exterior wall panels. Panels will yield maximum benefit to the project if the trade contractors can be engaged early (schematic design) to coordinate with the design team and can influence the profiles and panel sizes. Multi-story buildings tend to return lower cost per SF over single story buildings. Projects where restricted crane access is a concern are good candidates as well because these panels are significantly lighter than traditional precast panels.

**Q:** Are wall panels a premium cost to traditionally built wall systems?  
**A:** In general, the minimum starting cost/SF we've seen for panels is \$40-45/SF. This price point would provide a basic EIFS finish and includes exterior finish, waterproofing membrane, insulation and exterior framing. The cost/SF begins to increase based on the finish system and complexity of the profiles. The greater the quantity of exterior skin, the more efficient the panel pricing becomes. The window system can also influence cost. Punched openings tend to be the most cost efficient. Introducing ribbon windows and/or curtainwall add complexity to panel layouts and can thus increase panel cost.

**Q:** How much time will this save on my overall project schedule?  
**A:** Generally, panels will save time off of the total project schedule, but it is critical to analyze the savings on a project specific basis. Though panels will significantly reduce the exterior skin duration vs. traditional built systems, the critical path then shifts to roofing and interiors.

**Q:** What is the process & timeline for fabricating the wall panels?  
**A:** Generally speaking, the process will follow this order (dependent upon the fabricator)

1. Panel Layouts approved
2. Fabricator generates shop drawings & delegated design (3-5 weeks)
3. Designer approval of shops (2-3 weeks)
4. Procure materials (3-4 weeks)
5. Fabricate Panels (6-8 weeks)

See the QR code (right) for install guides, helpful templates, etc... Please contact the Lean Department for any other questions.

#### 🔍 PROS

- Reduction in exterior skin durations, especially if glazing is included in prefab panels from factory.
- At a minimum, panels will increase schedule reliability, as traditional field install is heavily dependent on weather and temperature.
- Potentially eliminates / minimizes the use of scaffolding and boom lifts which increases safety and quality.
- Removal of traditional install of EIFS or brick methods removes debris and waste.
- Building in a controlled environment increases level of finish quality.
- Decreases onsite manpower, which decreases risk of labor shortages and increases safety and quality.

#### 🔍 CONS

- The costs for panels significantly vary based on the finish selection, so an early and thorough analysis is required to determine if they are viable for the project budget.
- Panels can be a premium cost to the job depending on the local labor market (this is not always the case and of course is dependent on the finish)
- Requires full use of onsite crane or requires a separate crane for hoisting in place
- Client and Design team need to be okay or approve added caulk joints on project

#### 📋 LESSONS LEARNED

##### Design and Preconstruction






- Engage exterior wall panel vendors early in design (preferably at or before schematic design) to ensure exterior envelope is designed for the vendor specific wall panel system.
- Build mock-up at least 6 months before onsite install to ensure all details are finalized, including waterproofing details and color selections. Allow 4-5 months for fabrication and delivery.
- When analyzing multiple exterior wall panel vendors, note that panel quantity and design can/will vary which will affect installation durations and final joint details.
- Always analyze traditional vs. prefabrication to ensure best value decision is made (i.e. single-story construction may not be best fit for prefabricated wall panels).
- To provide the maximum cost efficiency, incorporate prefab panels during the SD phase so remaining trades will price the project with prefab in mind.
- Pay special attention to through wall penetrations, canopy connections, return conditions, etc... Treat panel coordination just as you would treat unitized curtainwall or precast panels.
- You must secure your spot on the vendor's production line, so late decision making and/or changes can cause procurement and schedule delays.

##### Construction


- Utilize visual tools for sequencing, planning deliveries, and installs
- Plan for dedicating hoisting for scheduled install times, and when selecting cranes at the beginning of the job, make sure you have enough capacity for the prefab panels.
- Schedule early coordination meetings with AHJ, roofer, glass, fire-safing, and waterproofing trade contractors.

#### VENDORS

The industry leaders for manufacturing and installing exterior wall panels in the Southeast are currently, Southern Wall Systems, Baker Prefab, FL Crane & Wal Mark Contracting. Each of these trade contractors typically install Sto products, the primary manufacturer of the panel materials.




#### TESTIMONIES



"On a recent project, we awarded the Prefab Exterior Wall Package at the Schematic Design stage which allowed us to begin engineering of the exterior wall panels in the early design stages while ensuring the project budget and the design intent were maintained. The panels were installed in less than 50% of the time compared to conventional construction, resulting in a 6-week overall schedule reduction. There are many benefits to utilizing prefabricated exterior wall panels: single source responsibility, water tightness, quality, manpower, elimination of scaffolding, no foam debris flying over the jobsite, and schedule reduction. Seeing is believing, consider using these panels on your next project, you and your client will be glad you did."

- Christian Pitts (ROM, Reg. 6)




"In today's world, nothing is certain. Whether it's a pandemic, weather, labor shortages or material procurement, we face daily constraints on our jobsites. Offsite construction allows us to benefit from those constraints by using a single contractor to control what once required multiple onsite trades. All we have to do is ensure is that the site is ready when we want panels, and it will fly!"

- JT Sanders (Gen. Superintendent, Reg. 3)

#### ADDITIONAL INFORMATION

For additional information such as drawings, submittals, videos, photos, vendor quotes, and scope leveling, please scan the provided QR code



### PREFABRICATION Bathroom Pods

BRASFIELD & GORRIE GENERAL CONTRACTORS

Bathroom pods have become a standard part of the conversation early in design in the healthcare, multifamily, and hotel market sectors. As the industry learns more about the efficiencies pods can provide and incorporates best practices for design, manufacturing, and installation, we will continue to see the costs trend closer toward those of conventional construction.

#### ★ KEY CONSIDERATIONS

Do bathroom pods make sense for your project? Consider these questions:


**Q:** How many pods do I need on my project to gain a cost benefit?  
**A:** If you're working with a client using pods for the first time, the answer is...

#### 🔍 PROS

- Reduces number of MEP and finish trades in building during construction
- Reduces risk of labor force shortage resulting in higher trade costs
- Pods built off site result in better work environments, leading to higher quality and safety
- Reduces punch list work
- Off-site inspections, which reduces risk on the field because of higher quality

#### VENDORS

The current industry leaders for manufacturing and installing bathroom pods in the Southeast are BLOX, Neopod, Photek, and SurePods. Brasfield & Gorrie has worked with each of these vendors.



### PREFABRICATION Exterior Wall Panels

BRASFIELD & GORRIE GENERAL CONTRACTORS

Expansion and Renovation 22314

Completed April 2020  
Location

Number of Panels 250  
Finish No Finish (Traditional brick was installed in the field)  
Total Panel Cost \$1,194,824  
Cost/SF \$47.82  
Estimated Installation Duration 40 Days (Phased project)  
Project SF 66,780 SF  
SF of Skin Installed 42,800 SF  
Prefabricated By  
Preconstruction Manager Ben Shives  
Project Manager Drew Roy

Hotel and CEP 21261

Completed October 2019  
Location

Number of Panels 250  
Finish EIFS  
Total Panel Cost \$3,477,200  
Cost/SF \$13.52  
Installation Duration 18 days per building (2 towers)  
Project SF 318,917 SF  
SF of Wall Panel Installed 32,650 SF  
Prefabricated By  
Preconstruction Manager Ben Shives  
Project Manager Drew Roy

Surgery and Bed Addition 20965


In Design  
Location

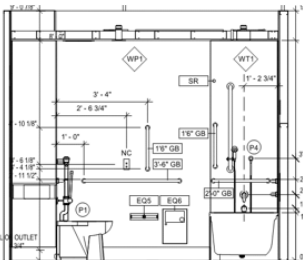



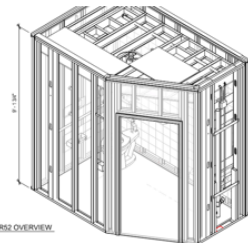
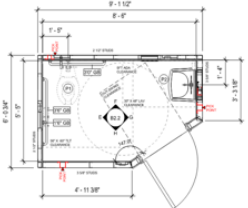
Number of Panels 90  
Finish EIFS  
Total Panel Cost \$1,087,118  
Cost/SF \$12.08  
Estimated Installation Duration 10 Days  
Project SF 18,425 SF  
SF of Skin Installed 18,425 SF  
Prefabricated By  
Preconstruction Manager Steven Bishop  
Project Manager Walker Cox





# Background

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	AA	AB	AC	AD	AE	AF
1																									
2		Company:																							
3		Vendor selected						Vendor selected						Vendor selected						In Precon					
4		Project X						Project X						Project X						Project X					
5		Quantity	Material Only	Shipping	Install	Total/Pod	Traditional Cost	Quantity	Material Only	Shipping	Install	Total/Pod	Traditional Cost	Quantity	Material Only	Shipping	Install	Total/Pod	Traditional Cost	Quantity	Material Only	Shipping	Install	Total/Pod	Traditional Cost
6	COMPONENT																								
7																									
8	Prefabricated Bathroom Pod	28												373											
9	Standard Patient Bathroom	9												78											
10	Standard General Purpose Bathroom	4																							
11	Standard ADA Patient Bathroom																								
12	Bathroom Patient ADA/VIP																								
13	Bathroom Patient Room VIP																								
14	General purpose - Public																								
15	General purpose - Staff																								
16	General purpose - Triage																								
17	General purpose - Rehab																								
18	Standard Patient Room Med Surge																			180					\$27,135
19	Standard Patient Room SICU																								
20	Standard Patient Room PICU																								
21	Pre-Op Bathroom																								
22	Surgey Bathroom																								
23	ICU Bathroom							8													36				\$22,524
24	ICU ADA Bathroom							10																	
25	Womens Bathroom																								
26	NICU Bathroom							18																	
27	ED New Bathroom							*should be 178 total, 14 are missing																	
28	Diagnostics Heavy																								
29	Diagnostics Light																								
30	Lab																								
31	Hotel Bathroom																								
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[Simple Comparison](#) [Comparison Sheet](#) [BLOX](#) [NeoPod](#) [SurePods](#) [Amico](#) [Pivotek](#) [Pictures](#) [+](#)

# Background

## WHAT MAKES A PROJECT SUCCESSFUL?

### PRECON

- Early Design Involvement
  - Engage key stakeholders / trades early in design
  - Brainstorm, analyze, and incorporate decisions as early as SDs
- Leverage existing lessons learned
- Utilize standard prefab scope templates and RFPs
- Consistent involvement from B&G personnel with prefab experience

### CONSTRUCTION

- Collaborate with other project teams to share lessons learned and expectations
- Periodically meet with prefab vendor or sub for updates and quality checks
- Utilize key plans for clear install directions

**Proven History of Prefab**

Brasfield & Gorrie believes that prefabrication is a critical element in delivering successful projects. Prefabrication consistently yields higher cost certainty, schedule reliability, and quality, as well as decreased onsite manpower and decreased incidents. Ultimately, prefabrication brings speed to market.

**Prefabricated elements on previous and current HCA projects:**

**Medical City Dallas Projects**

- Prefab Headwalls

**HCA Lawwood**

- Prefab CEP Skids
- Prefab MEP Underground and Overhead
- Prefab Exterior Wall Panels

**HCA Lantana**

- Prefab Bathroom Pods
- Prefab Headwalls
- Prefab Electrical Rooms
- Prefab MEP Corridor Racks
- Prefab Exterior Wall Panels
- Prefab OR Ceilings
- Prefab CEP Skids
- Prefab Electrical Underground
- Prefab Plumbing Underground

**Brasfield & Gorrie General Contractors**



### PREFABRICATION Bathroom Pod and Headwall Planning/Install Checklist

Activity / Equipment / Material	Site	B&G Project Team	B&G Install Team	Drywall Trade	Plumbing Trade
<b>Preparation and Materials:</b>					
• All loading/unloading areas, lift, loading area/platform, pallet jacks					
• All blue-printed rigging, hoists, jacks, etc.					
• Site dimensions marked out within 1/8" (check R-100)					
• Hoist ordered and ready for install (Lancaster 25k Platform)					
• New shoring erected on site to hold up pods until					
• Insulation and long studs ready for install					
• Other install materials/tools (spray foam, buffer bars, hole gun, gloves, heat gun, mixing and, etc.) (20' x 20' x 20')					
• Underlaid plumbing connection materials					
<b>Site Preparation for Delivery:</b>					
• Pre-install meeting under complex 2 weeks before delivery					
• Floor marked with spray paint where pods and headwalls go. Staging location and permanent location					
• Trucking plan and delivery plan printed out and hung up onsite					
• Travel path, clear, clean, and checked for height/width clearance					
• All rigging and rigging onsite and ready					
• B&G delivery drivers have specific jobsite delivery map and responsibilities/phone number					

R6 Healthcare > Prefab Past and Future





# CURRENT STATE

*What We've Built*



# Current State

## Prototype Programs

- Tools for Success

- 1 Aligned Goals
- 2 Consistency
- 3 Early planning for success
- 4 Consistent and real time information sharing

# Current State

## Prototype Style Projects

- Tools for Success
- Aligned Goals

### TEAM CHARTER

2022 MID-YEAR UPDATE

#### Background

- Speed to market/ competitive advantage
- Predictable outcome with cost, schedule, quality

#### COMPLETED: 6 Projects

#### ONGOING: 5 Projects

#### UPCOMING: 6 Projects

#### Current State

##### Challenges in Current Market/ Industry

- Market saturation
- Skilled labor shortages
- Inconsistent delivery in design, quality
- Material procurement management
- Material escalation

#### Future State/ Goals

- Beat inflation by 15%
- Speed to Market (Pad ready to CO)
  - 7.5 months on Nuts & Bolts Model
  - 7 months on Uber Modules
- Move 35% manhours offsite
- Zero construction related activities remain at building turnover and zero quality comments at the end of project walk
- Increase MWBE participation to 15%
- Reduction in RFIs by 25% per job
- Transparency in project status and knowledge sharing
- Construction waste diversion target of 90%

#### Plan

##### Inflation

- Early purchases of equipment
- Issue subcontracts early and ensure quickly
- Strategic partnerships with trade
- Bulk purchasing through Vizient
- Leverage our multiple office locations GC peers in the market

##### Speed to Market

- Prefabrication
- Consistency in partnerships
- Sharing lessons learned among team

##### Move Manhours Offsite

- Tracking onsite / offsite manhours
- Explore additional opportunities for offsite

##### Quality

- Sharing Lessons Learned from previous projects
- Hardscape/landscape completed
- Finish mockups and approvals
- Design document review against Encompass standards

##### Diversity and Inclusion

- MWBE Solicitation Plan
  - Maximize solicitation of MWBE contractors in each project market

##### RFI Reduction

- Design and Construction Milestone Retrospective
- Consistent collaboration with design team

##### Transparency

- Team Collaboration Site

##### Waste

- Work with waste management partner to separate waste onsite and offsite to achieve diversion goal

## Program Goals

- Implement standardization across jobs and maintain an efficient **BUDGET**, resulting in reduced cost across the program.
- Improve **SCHEDULE** (from foundations to Certificate of Occupancy) without sacrificing safety, cost, or quality.
- Utilize **PREFABRICATED COMPONENTS** to increase offsite manhours while decreasing onsite manhours.
- Improved **QUALITY** with strategic reduction in RFIs and number and type of punch list items.
- Improve **DIVERSITY AND INCLUSION** impact with active solicitation of minority trades in the market.
- ELIMINATE WASTE** and increase tool time through consistent application of lean ground rules, and the utilization of materials management and site logistics plans.
- Rapidly **IMPROVE** from project to project.



# Current State

## Prototype Style Projects

- Tools for Success
  - Team Website
  - Early Planning

PREFAB ANALYSIS / IMPLEMENTATION								
	PROJECT 1 PROJECT 2 PROJECT 3 PROJECT 4 PROJECT 5 PROJECT 6 PROJECT 7 PROJECT 8							
Patient Room Modules	●	●	●	●	●	●	●	●
Patient Bathroom Pods	●	●	●	●	●	●	●	●
Patient Room Headwalls	●	●	●	●	●	●	●	●
Exterior Skin Panels	●	●	●	●	●	●	●	●
MEP Racks	●	●	●	●	●	●	●	●
Underground MEP Rough	●	●	●	●	●	●	●	●
Under Slab Rough	●	●	●	●	●	●	●	●
In-Wall Rough	●	●	●	●	●	●	●	●
Electrical Room Components	●	●	●	●	●	●	●	●

BRASFIELD & GORRIE

GENERAL CONTRACTORS

Florida Program

Florida Program

Florida Program Home

Program Update

Schedule

Prefabrication

Florida Program

Egnyte - External

Egnyte - Internal

Power BI

Smartsheet

Videos

See Prefab video

This site was created to be a one-stop-shop and an all-in-one team platform to provide continuous information sharing with all team members. We hope this site will be your first stop to accessing everything you need for your project.

Please let us know if we can add or change anything on this site to better serve you or make your life easier!

Program Goals

Implement standardization across jobs and maintain an efficient BUDGET, resulting in reduced cost across the program.

Improve SCHEDULE (from foundations to Certificate of Occupancy) without

Popular Resources

Efficiency Site Review

© LEAN CONSTRUCTION INSTITUTE

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# Current State





# Current State

## Healthcare Clients Pushing Envelope





# Current State

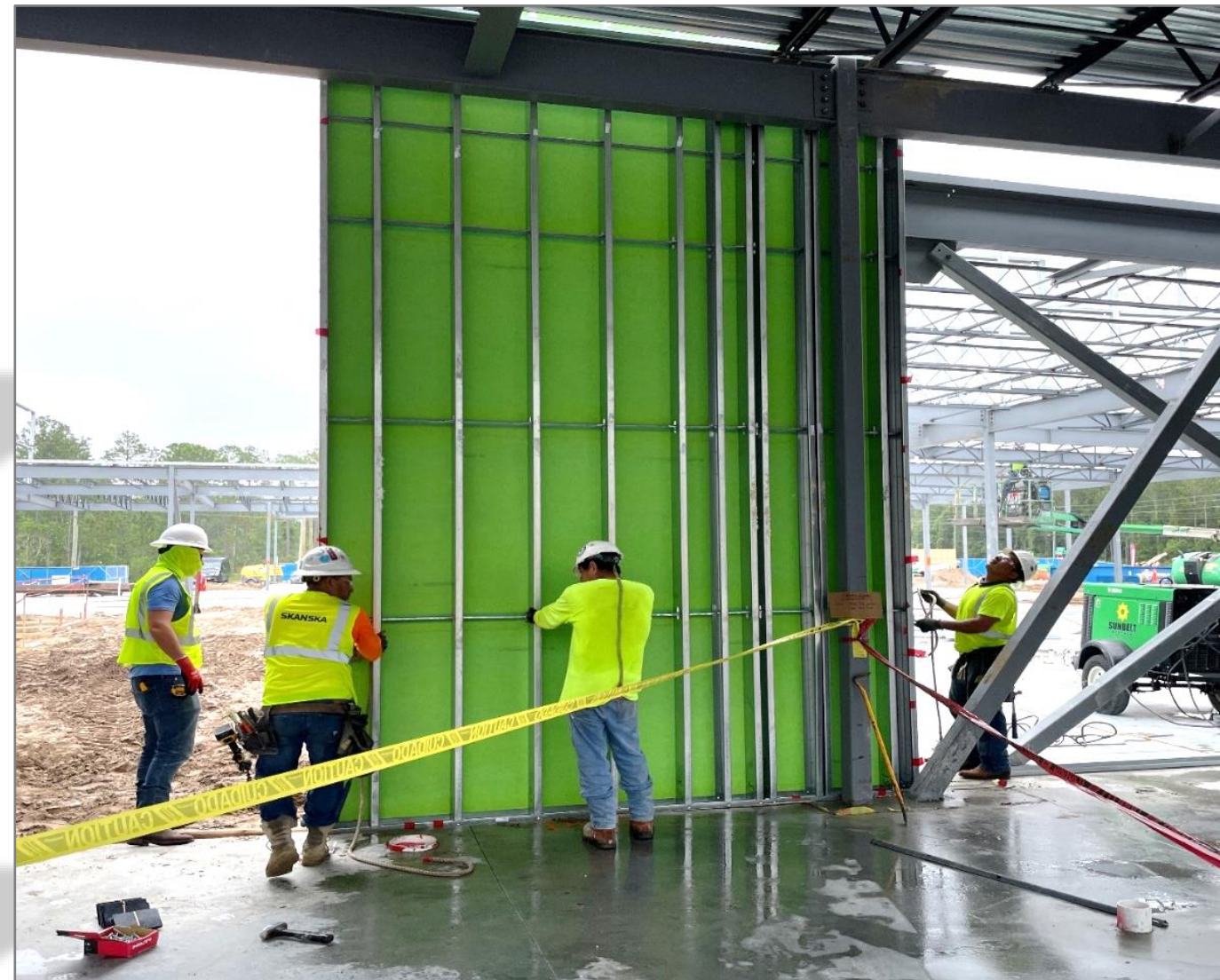
## Bathroom Pods & Headwalls





# Current State

## Exterior Skin





# Current State

## Exterior Skin





# Current State

## Prototype Style Projects

- Tools for Success
  - Consistent and Real-time information sharing
  - Weekly APM Calls
  - Post Install Sharing Meetings
  - Retrospectives & Lessons Learned
  - Installation Guides
  - Tracking & Metrics

**Action \***

☐ Keep ☐ Start ☐ Stop ☐ Puzzle/Wish

**Lesson Learned Description \***

**Team/Role \***

☐ B&G Operations Team  
☐ B&G Support/Corporate  
☐ B&G Precon  
☐ B&G Safety  
☐ Design Team  
☐ Owner  
☐ Trades/Subcontractors  
☐ External Entity/Other

**Category**

Select ▼

**Affected Trade (If Applicable)**

Select ▼

**Name**

**Job Number \***

**Submit**

# Current State

## Prototype Style Projects



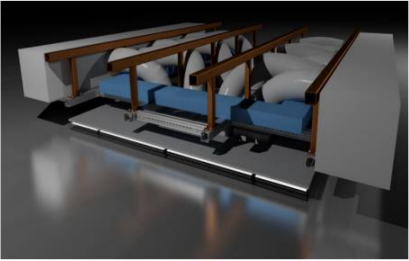


- What We've Learned
  - Staying **consistent** with information sharing is challenging
  - **Centralized source** to facilitate is key
  - The tools are effective, but the magic is in the **conversations**
  - The **sum of the parts**, not individual components, drives efficiency
  - When **not designed** for prefab, quality and cost suffer
  - No doubt – with current industry challenges, **prefab is the future** and becoming more accessible every day



# Current State

## Support & Information Sharing

- Preconstruction
  - Cost & Schedule Analysis
  - Scope Analysis
  - Constructability Reviews
  - Historical metrics
  - Industry Trends
  - Design Support

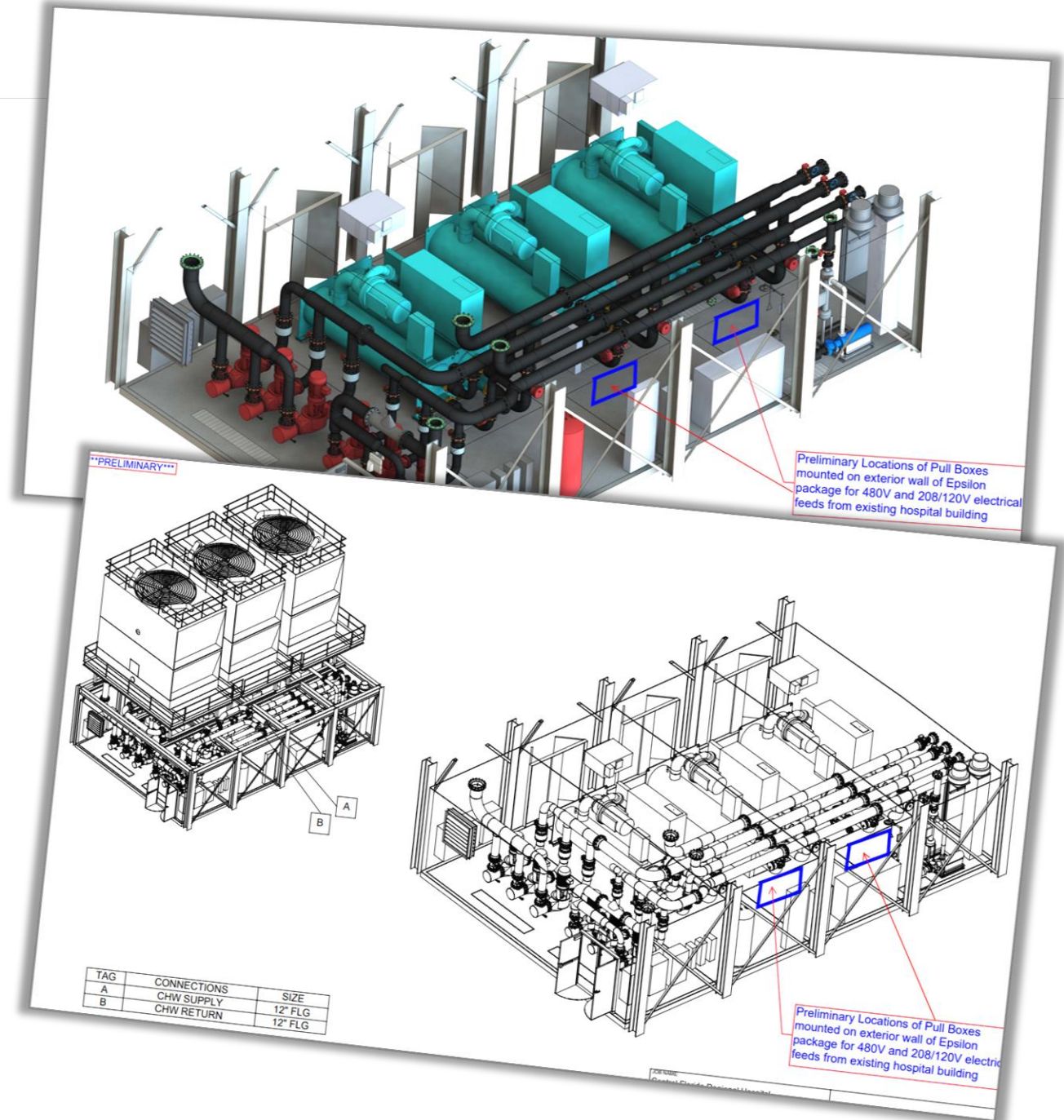
STERIS	IN DAPT	FLEXIBLE OR SOLUTIONS	BLOX
 <p><b>Is duct work included?</b> Yes</p> <p><b>Is med gas included?</b> Yes</p> <p><b>Is lighting provided?</b> Yes</p> <p><b>Is lighting installed?</b> Yes, LED strips are within each module. Inner and outer lights can be dimmed, and a lens can be ordered for green light as well for ambient light.</p> <p><b>Are equipment supports provided?</b> Yes</p> <p><b>What are they made of?</b> 5/8" all-thread in each of the four corners of each CleanSuite module. Additional angle bracing can be installed in the four corners if required by the structural engineer.</p>	 <p><b>Is duct work included?</b> No, the mechanical subcontractor supplies duct work.*</p> <p><b>Is med gas included?</b> Yes, med gas subcontractor connects to the pig tails on the in-dapt system.</p> <p><b>Is lighting provided?</b> Not typically but can be if requested.</p> <p><b>Is lighting installed?</b> No</p> <p><b>Are equipment supports provided?</b> Yes</p> <p><b>What are they made of?</b> Hilti Mi Structural Support</p> <p><small>* Please see QR code for more information.</small></p>	 <p><b>Is duct work included?</b> Yes</p> <p><b>Is med gas included?</b> Yes, the plumbing subcontractor connects to the ceiling.</p> <p><b>Is lighting provided?</b> Not typically but can be if requested.</p> <p><b>Is lighting installed?</b> No</p> <p><b>Are equipment supports provided?</b> Yes</p> <p><b>What are they made of?</b> Combination of tube steel and heavy-duty modular steel (Hilti Mi or Sikla Framo)</p>	 <p><b>Is duct work included?</b> Yes</p> <p><b>Is med gas included?</b> Yes, med gas hook up on modular unit, the plumbing subcontractor connects to the ceiling.</p> <p><b>Is lighting provided?</b> Yes</p> <p><b>Is lighting installed?</b> Yes</p> <p><b>Are equipment supports provided?</b> Yes</p> <p><b>What are they made of?</b> Tube, angle, and plate steel</p>
<p><b>ADDITIONAL INFORMATION</b></p> <div>  <p>For additional information on the QR ceiling vendors check the</p> </div>			



# Current State

## Modular CEP

- Production / Ready To Ship: 32-34 Weeks after Release To Production
- Estimated Site Installation Duration: 4-5 Weeks
- Panel Boards: 40-60 Week Lead time
- Start Up Coordination & Assistance Only
- Participation in Commissioning Process Only  
– T&B / Commissioning Agent By Others



# Current State

## Support & Information Sharing

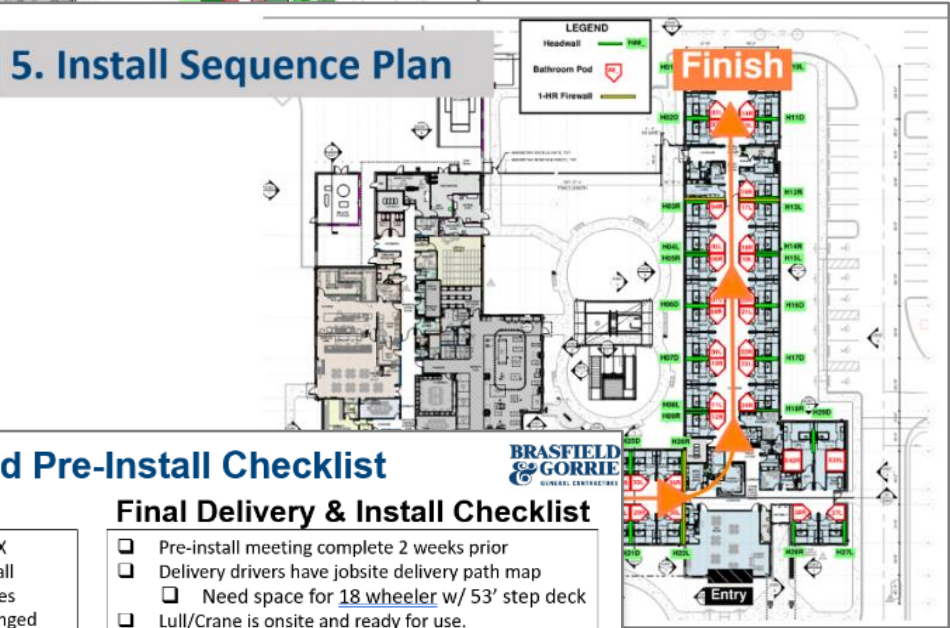
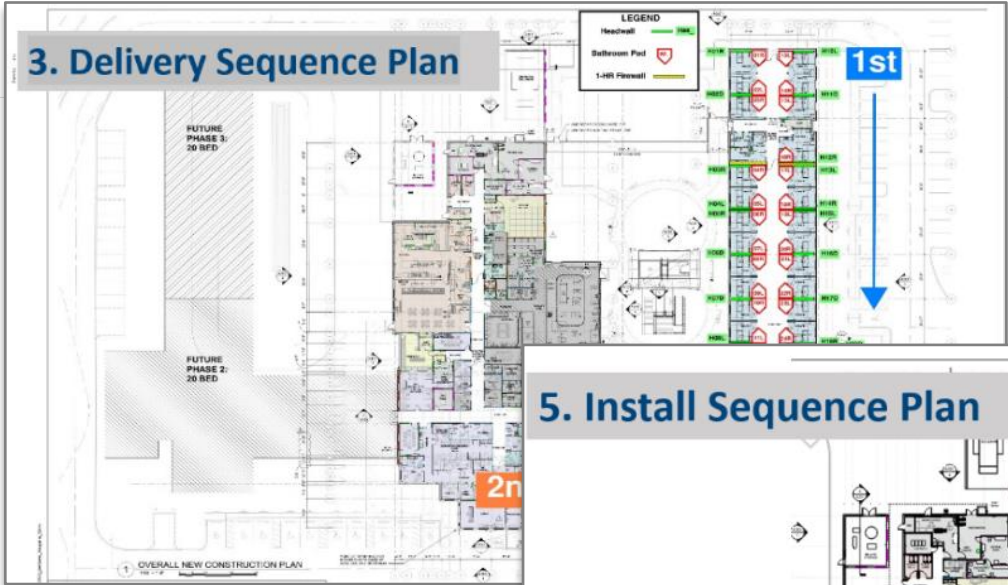
- Construction Support
  - Best practices
  - Install guides
  - Pre-planning and coordination
  - Onsite installation support
  - Post Install lessons learned and data tracking





# Current State

## Install Guides



### 6. Lessons Learned and Pre-Install Checklist

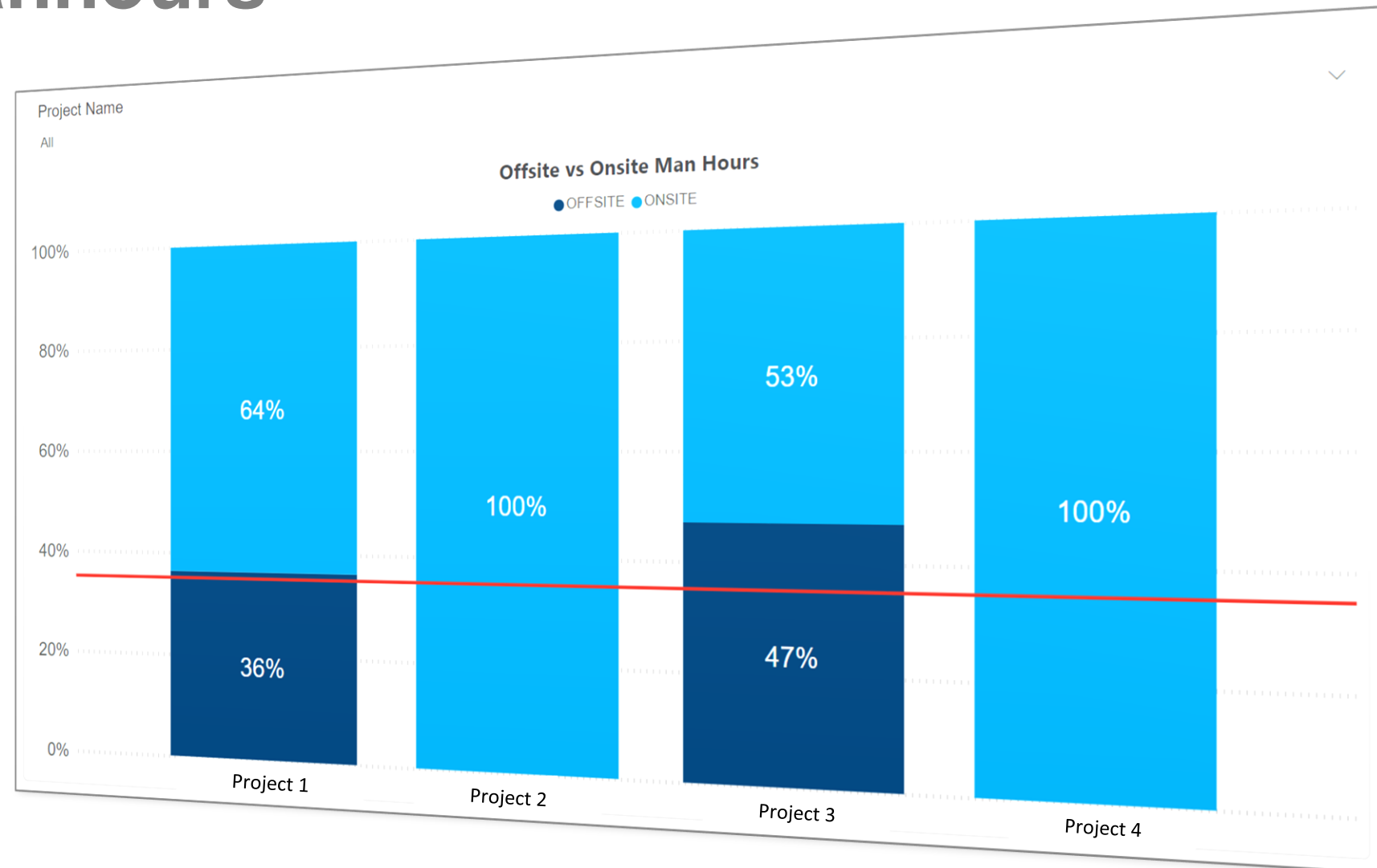
- | Install Best Practices   | Final Delivery & Install Checklist  |
|--|---|
| <ul style="list-style-type: none"><li>❑ Triple check all plumbing locations with BLOX provided templates before delivery and install<ul style="list-style-type: none"><li>❑ Check with BLOX to make sure templates delivered are correct and have not changed</li></ul></li><li>❑ Pour self leveling compound (Ardex) to insure slab depression is within 1/8" tolerance / flatness</li><li>❑ Clear travel path and remove all items from rooms where Bathroom pods and headwalls will be staged</li><li>❑ Label floor with spray paint where each prefab pod and headwall should be placed, and travel path.</li><li>❑ Hang up trucking plan and install sequence plan near delivery area</li><li>❑ Utilize weekly call to check for any schedule/fabrication delays and drawing changes</li><li>❑ Double check floor layout is correct. Especially 8' wide corridor opening.</li><li>❑ Maintain clear path inside building of 12'W and 11' high for delivery and staging</li></ul> | <ul style="list-style-type: none"><li>❑ Pre-install meeting complete 2 weeks prior</li><li>❑ Delivery drivers have jobsite delivery path map<ul style="list-style-type: none"><li>❑ Need space for 18 wheeler w/ 53' step deck</li></ul></li><li>❑ Lull/Crane is onsite and ready for use.<ul style="list-style-type: none"><li>❑ Lull has extended forks</li></ul></li><li>❑ Outrigger/loading platform is ready (if 2-story)</li><li>❑ Wall layout on floor (especially if 8' clear corridor)</li><li>❑ Travel path and floor is clean and nothing in the way. 10'6" minimum clearance is checked.</li><li>❑ All jacks, <del>thinset</del>, insulation, movers, and rigging is onsite and ready</li><li>❑ Install crew is trained and through orientation</li><li>❑ 1 plumbing foreman able to attend install</li><li>❑ Any plumbing or firewalls needed to be installed and inspected are complete</li><li>❑ Emergency and safety/lift plan completed</li><li>❑ Waterproofing plan prepared for re-wrapping/protecting units after staging</li><li>❑ Punchlist plan made with BLOX</li></ul> |



# Current State

## Tracking Offsite Manhours

- Utilized Trade Input



# Current State

## Time Study – Typical Bathroom Pods

Truck	Unit Type	Delivery Date	Delivery Time	Load Building	Set on Jacks	Move to Location	Total Install	Notes
7	TYP BP	8/4/2021	8:30AM	5	5	7	17	1 jack came off.
7	TYP BP	8/4/2021	8:30AM	4	5	19	24	Had to move door frames out of the way
7	TYP BP	8/4/2021	8:30AM	3	5	13	18	2 jacks came off. Stud ripped.
8	TYP BP	8/4/2021	9:00AM	2	4	9	13	1 jack came off.
8	TYP BP	8/4/2021	9:00AM	3	5	26	31	Out of sequence
8	TYP BP	8/4/2021	9:00AM	3	5	6	11	
9	TYP BP	8/4/2021	9:30AM	2	4	7	11	1 jack came off.
9	TYP BP	8/4/2021	9:30AM	2	4	4	8	
9	TYP BP	8/4/2021	9:30AM	2	5	9	14	2 jacks came off.
10	TYP BP	8/4/2021	10:00AM	2	3	9	12	1 jack came off.
10	TYP BP	8/4/2021	10:00AM	2	5	10	15	1 jack came off.
10	TYP BP	8/4/2021	10:00AM	2	5	9	14	
11	TYP BP	8/4/2021	10:30AM	3	5	12	17	1 jack came off.
11	TYP BP	8/4/2021	10:30AM	2	5	10	15	2 jacks came off.
11	TYP BP	8/4/2021	10:30AM	2	4	7	11	
12	TYP BP	8/4/2021	11:00AM	2	3	6	9	
12	TYP BP	8/4/2021	11:00AM	3	4	7	11	1 jack came off.
12	TYP BP	8/4/2021	11:00AM	3	5	5	10	
13	TYP BP	8/4/2021	12:30PM	2	5	6	11	1 jack came off.
13	TYP BP	8/4/2021	12:30PM	3	4	5	9	
13	TYP BP	8/4/2021	12:30PM	2	4	5	9	

**Average times for each step:**

2.5 Min

4.5 Min

9 Min

**\*14 Min**

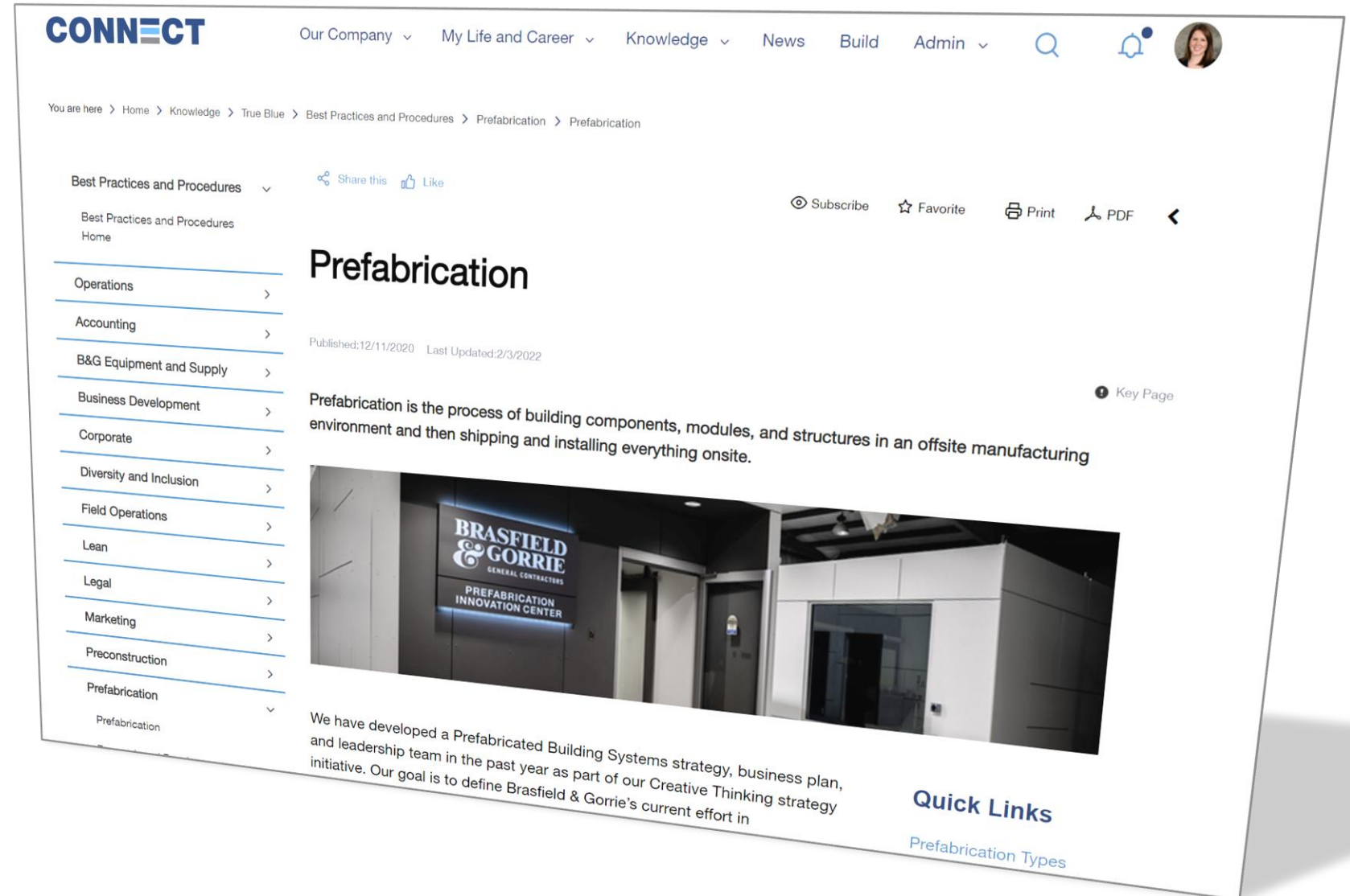
The next unit was already loaded in the building by the time the crew has staged the current unit. **If we had 2 more men to leave behind to pre-install the movers on the next pod, the 4.5 min “set on jacks” step would be eliminated. This would not give the men moving the pods a break in between pushing though.**



# Current State

## Support & Information Sharing

- Information Sharing
  - Staying in front of as many groups as possible
  - Intentional capturing of lessons learned
  - Company Intranet to house the information
  - Videos – Marketing and Informational





# FUTURE STATE

*Vision & Long-Term Goals*



# Future State



## Prefab Steering Team

*One company approach*



## Support Prefab as an Industry

*Let's get better together*



## Leveraging the Design Side

*Support projects by making decisions early in the process*



## Knowledge Management

*Leveraging Lessons Learned as efficiently as possible*



## Expanding Market Sectors

*Not just for Healthcare*



# Future State

## Exploring Opportunities



# Future State

## Becoming the Future

- Researching and investigating in-house opportunities





# How can you apply this tomorrow?

## How can you climb the prefabrication learning curve within your organization?

- Identify where your organization is currently
- Make big plans – where do you want to go?
- Take small incremental steps to support your goals
- Look for low hanging fruit
- Ask for help
- Keep it simple – Tools like Excel, Smartsheet and Power Point are powerful and accessible

# Our Approach



24<sup>TH</sup> LCI CONGRESS  
OCTOBER 18-21



## Thank you! Questions?





# Contact Us

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