

22ND ANNUAL



22ND LCI CONGRESS
OCTOBER 19-23

AdvocateAurora Outpatient Collaborative Evolution of Modular: Where did we Start and how did we get here?

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Andrew Shaw, PE - IMEG Corp.

Aaron Frederick – Martin Petersen Company

THE ABC'S OF LEAN: TRANSFORMATION THROUGH ACTIONS, BEST PRACTICES AND COACHING

October 22, 2020

Introduction

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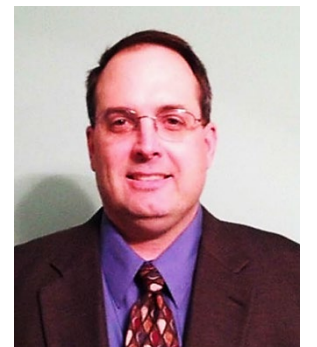
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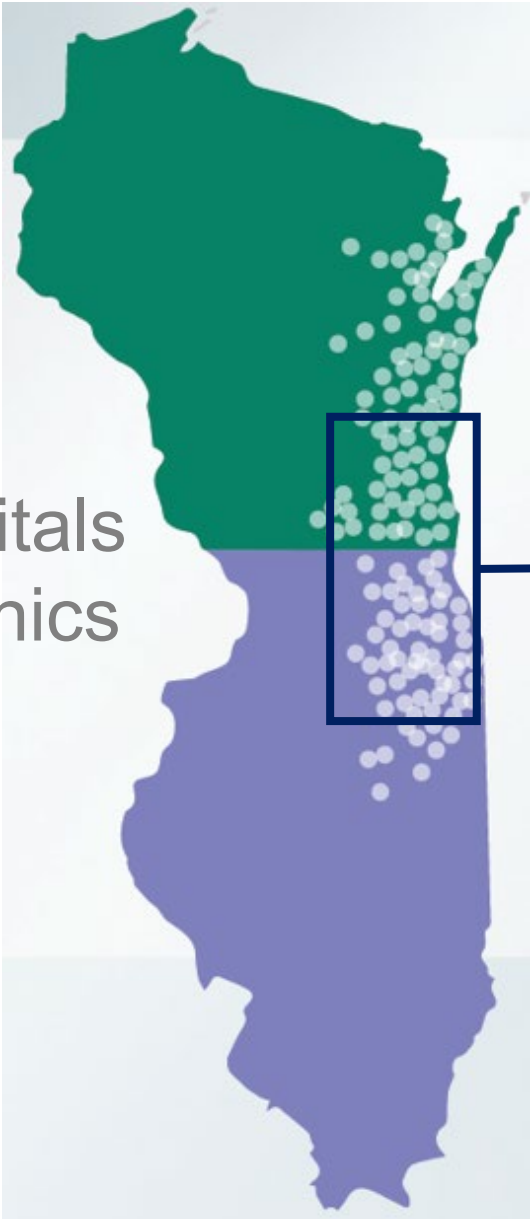
Learning Objectives

- Define prefab/modular and its role in the AdvocateAurora Outpatient Collaborative (AAOC) 
- Review how prefab/modular evolves throughout the project(s) 
- Understand how use of prefab/modular is a team effort rooted in trust 
- Review the next generation of modular for the AAOC program 

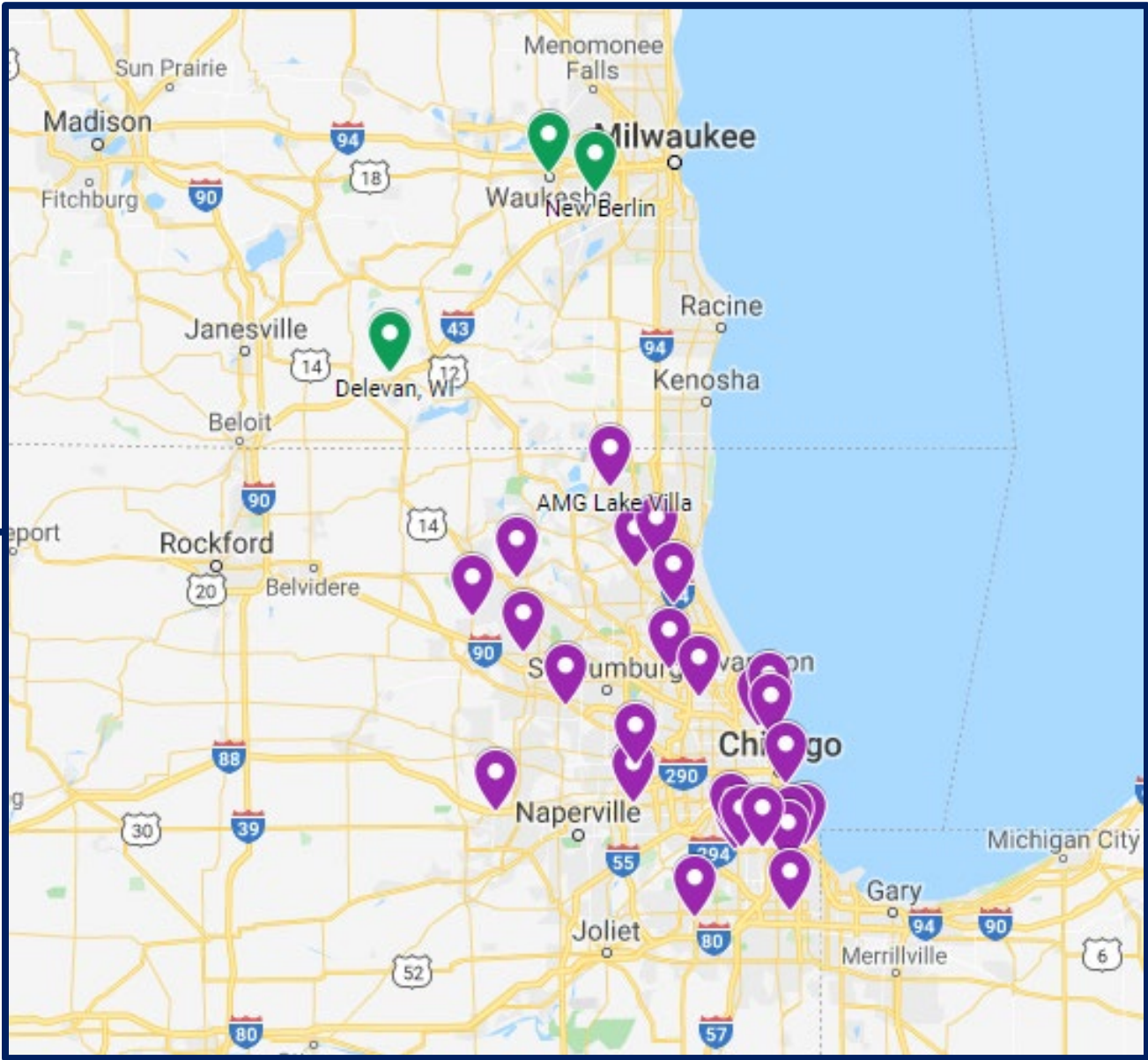
AdvocateAuroraHealth

Advocate Health Care Aurora Health Care®

24 hospitals
400+ clinics



ADVOCATE OUTPATIENT COLLABORATIVE

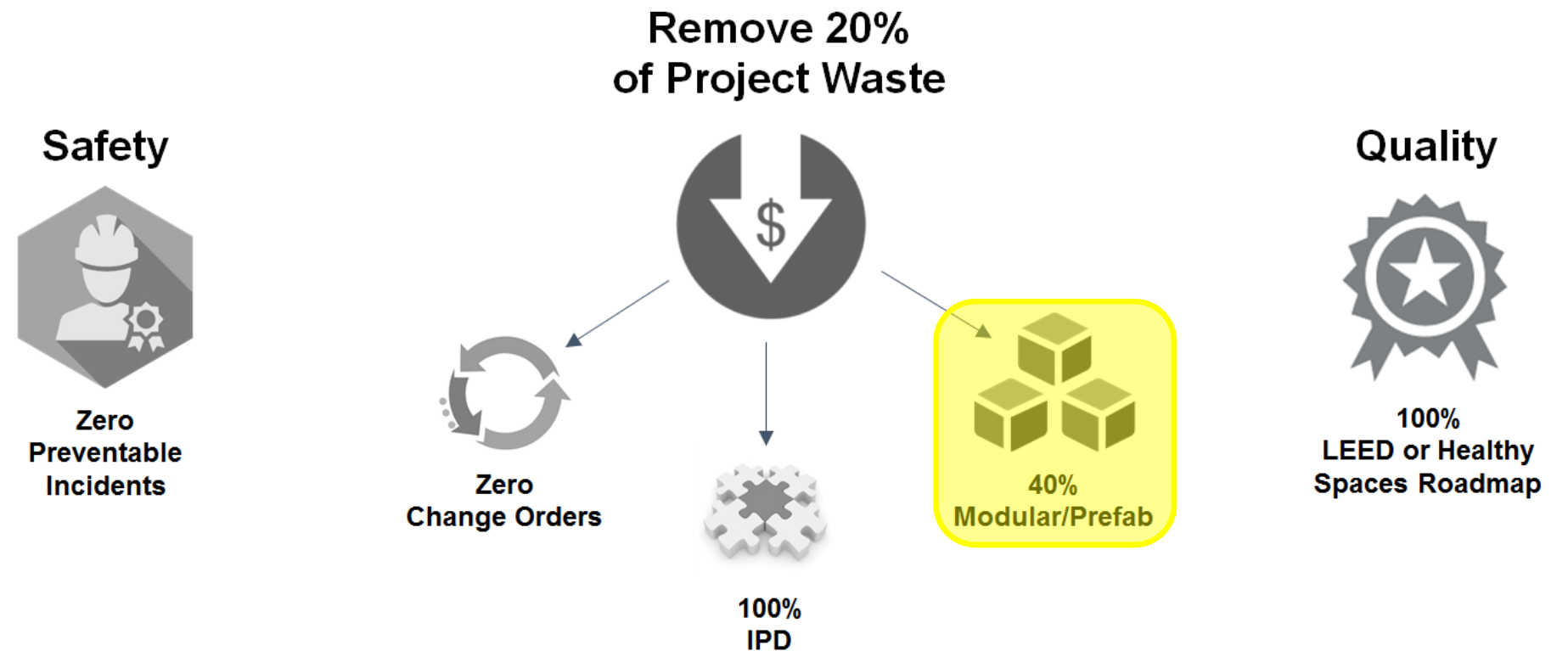


The AdvocateAurora Outpatient Collaborative



Problem Statement: How do we achieve higher safety, schedule, and financial performance through prefab/modular?

- AdvocateAurora (AAH) prefab/modular goals for construction
 - What does this mean?
 - Why is this important?
 - Why are we doing this?



"Create safe and healing environments through thoughtful collaboration and innovation."

How do we Define Prefab/Modular?

- “Singular trade or multi-trade work that is assembled off site to allow on-site production to occur simultaneously”
 - Single and multi-trade examples
 - Off-site definition
- What cannot be included?
 - Earthwork, paving, CIP concrete
 - PM/GRs/fee/insurance
- Historical precedence
 - Finishes examples



How do we Measure Prefab/Modular Inclusion?

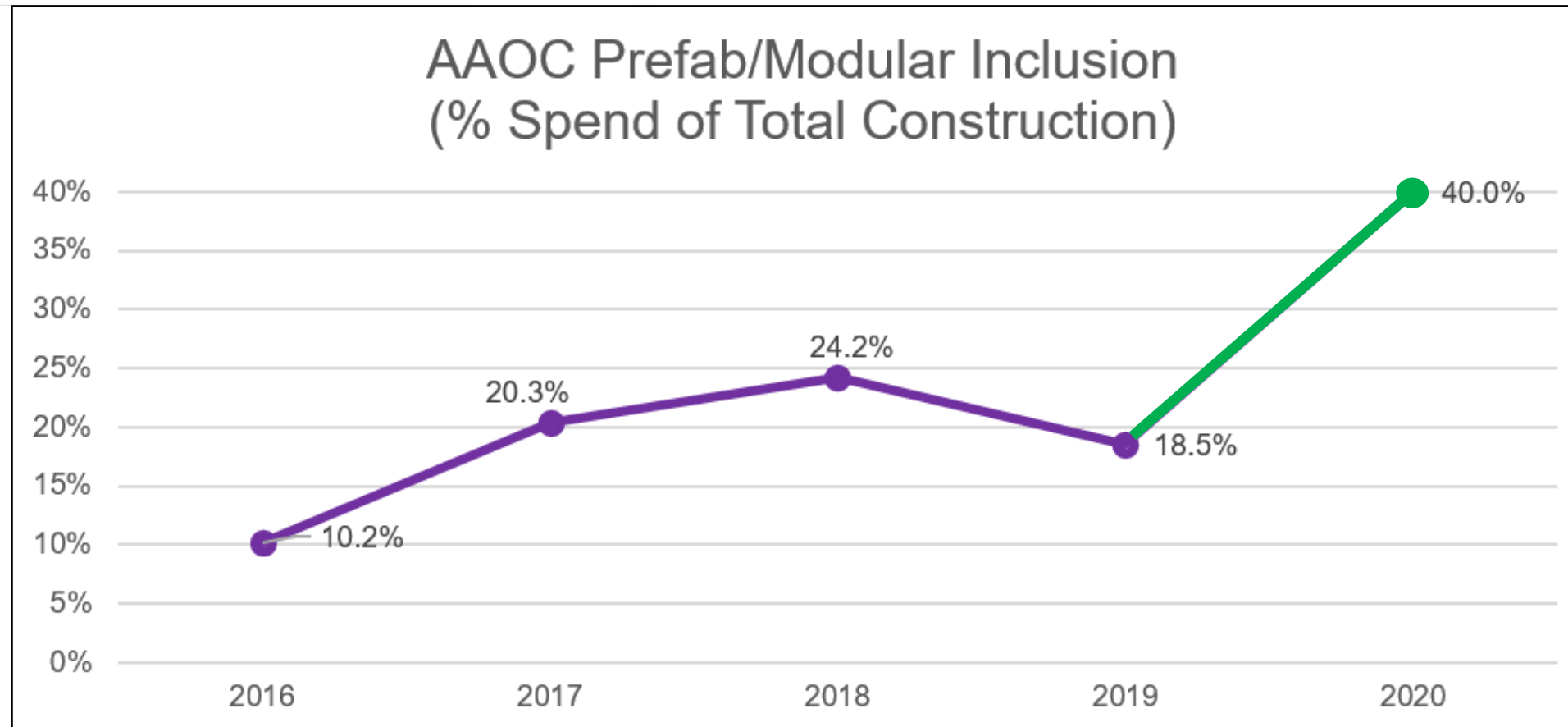
- AAOC program stats

Projects Complete		Projects in Construction	Projects in Planning
28	558,739 SF	3	6

- Dollar spent basis

MPC-HVAC		AdvocateAurora Outpatient Collaborative												
HVAC		Schedule of Values												
32790-AMG Oak Lawn		Hide Unused Rows			Hide Columns for Print									
		Show All Rows			Show All Columns									
Enter Values in Yellow Fields														
		Current Schedule of Values (Must Match Contract Amount)										Actuals To Date		
												Production Thru (Enter Date) ->		11/1/2018
Description	Prefab / Modular	ARCMP	Acct #	Floor	Train / Description	Sector	TYPE	U/M	Hrs	\$/hr	Current Est Cost	Actual To Date Hrs Expended	Actual To Date % Comp in Place	Actual To Date Amt Expended
Labor														
D3045-Distribution Systems - Piped	Yes	D3000	15500		3045-F Phase 1 Pipefitters -- Field		L	MH	1,554	\$90.00	\$139,860	3,385		\$300,498
D3050-Terminal & Package Units	Yes	D3000	15500		3050-F Phase 1 Pipefitters -- Field		L	MH	108	\$90.00	\$9,720			
D3045-Distribution Systems - Piped	No	D3000	15500		3045-F Phase 2 Pipefitters -- Field		L	MH	350	\$90.00	\$31,500	376		\$34,206
D3050-Terminal & Package Units	No	D3000	15500		3050-F Phase 2 Pipefitters -- Field		L	MH		\$90.00	\$0			
D3040-Distribution Systems - Air	Yes	D3000	15500		3040-I Phase 1 Tinnners -- Install		L	MH	2,654	\$90.00	\$238,860	108		\$11,009
D3050-Terminal & Package Units	Yes	D3000	15500		3050-I Phase 1 Tinnners -- Install		L	MH	0	\$90.00	\$0			
D3040-Distribution Systems - Air	No	D3000	15500		3040-I Phase 2 Tinnners -- Install		L	MH	2,400	\$90.00	\$216,000	2,562		\$241,731
D3050-Terminal & Package Units	No	D3000	15500		3050-I Phase 2 Tinnners -- Install		L	MH	32	\$90.00	\$2,880	291		\$27,449
Materials														
D3045-Distribution Systems - Piped	Yes	D3000	15500		3045-F Phase 1 Field Pipe - Matl & Equip		M	%			\$100,000			\$83,679
D3050-Terminal & Package Units	Yes	D3000	15500		3050-F Phase 1 Field Pipe - Matl & Equip		M	%			\$0			
D3045-Distribution Systems - Piped	Yes	D3000	15500		3045-S Phase 2 Shop Pipe - Matl & Equip		M	%			\$29,000			\$29,965
D3050-Terminal & Package Units	Yes	D3000	15500		3050-S Phase 2 Shop Pipe - Matl & Equip		M	%						
D3040-Distribution Systems - Air	Yes	D3000	15500		3040-I Phase 1 Install SM Matl & Equip		M	%			\$153,323			\$36,036

How do we Measure Prefab/Modular Inclusion?



Year		Total Construction Spend (\$)		Total Prefab/Modular Spend (\$)		Prefab/Modular Spend of Total (%)
2016	Actual	\$	36,991,146	\$	3,763,339	10.2%
2017	Actual	\$	41,804,964	\$	8,501,634	20.3%
2018	Actual	\$	49,145,056	\$	11,890,197	24.2%
2019	Actual	\$	17,761,310	\$	3,292,226	18.5%
2020	Target		TBD		TBD	40.0%

Early Prefab/Modular, Team relationship, Support, & Trust



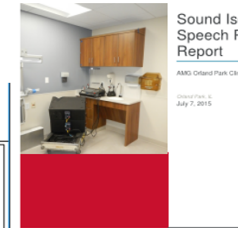


Early Modular Development

- Sound masking study – lead to partial height walls
- Started with multi section prefab ductwork
- Moved on to prefab wall panel development
- Tested a 3 & 4-sided framed exam room (with & without drywall)
- Designed an overhead multi-trade rack and corridor piping racks
- Performed a prefab study for costs and benefits



Prefabrication/Modular Evolution Sound Study - 2015

[illegible]



Early Challenges

- Old Mindset vs New Mindset: "Why can't we prefab it?"
- Transportation hurdles (road restrictions)
- Site logistics (off loading, staging, setting in place)
- How can we get things into the building? (leave out openings)
- Push each other to do it better than the last time



Team Relationship

- Built a long-term team
- Keeping the same team members from designers to installers
- Potential site visits with the entire team to analyze the building potential
- Building a trust bond between all members
 - Weekly workday onsite for an designers to answer questions
 - Workers interacting directly with owners, architects, engineers, and other foreman (open dialog)
 - Foremen working together on repetitive projects



Current State Prefab/Modular



Pre-fabricated Exterior Wall Panels

- Reduced installation schedule from 16 days down to 7 days
- Used Choosing by Advantage (CBA) to develop and select this strategy
- Panels covered both levels at once meaning only one lap around the building for the crane



Pre-fabricated Interior Wall Panels

- Challenges / Lessons Learned
 - Panel identification, orientation
 - Storage, panel stacking
 - Floor leveling
 - Access to the site
- Results, initially 15% over target, final cost 8% below target, 3 weeks of schedule savings



AMG W. Dundee - Illinois

Pre-fabricated Interior Wall Panels



- Allows for uninterrupted overhead MEP work
- Increases safety with less congestion

AMG W. Dundee

Pre-fabricated Overhead MEP Racks

- Challenges
 - Existing site conditions on renovation projects.
 - Low ceilings
 - Structure



Pre-fabricated Exam Rooms



AMG Sykes- Illinois

Laundry List of small items add up!

- Light fixture whips
- Terminal Air Boxes w/ controls pre-installed
- Plumbing fixtures double checked at the shop with part kits to minimize site install time
- Temp power kits are pre-assembled
- Upper cabinet sloped tops added at the factory



Owner's perspective on the Collaborative Evolution

Are we ready to go?

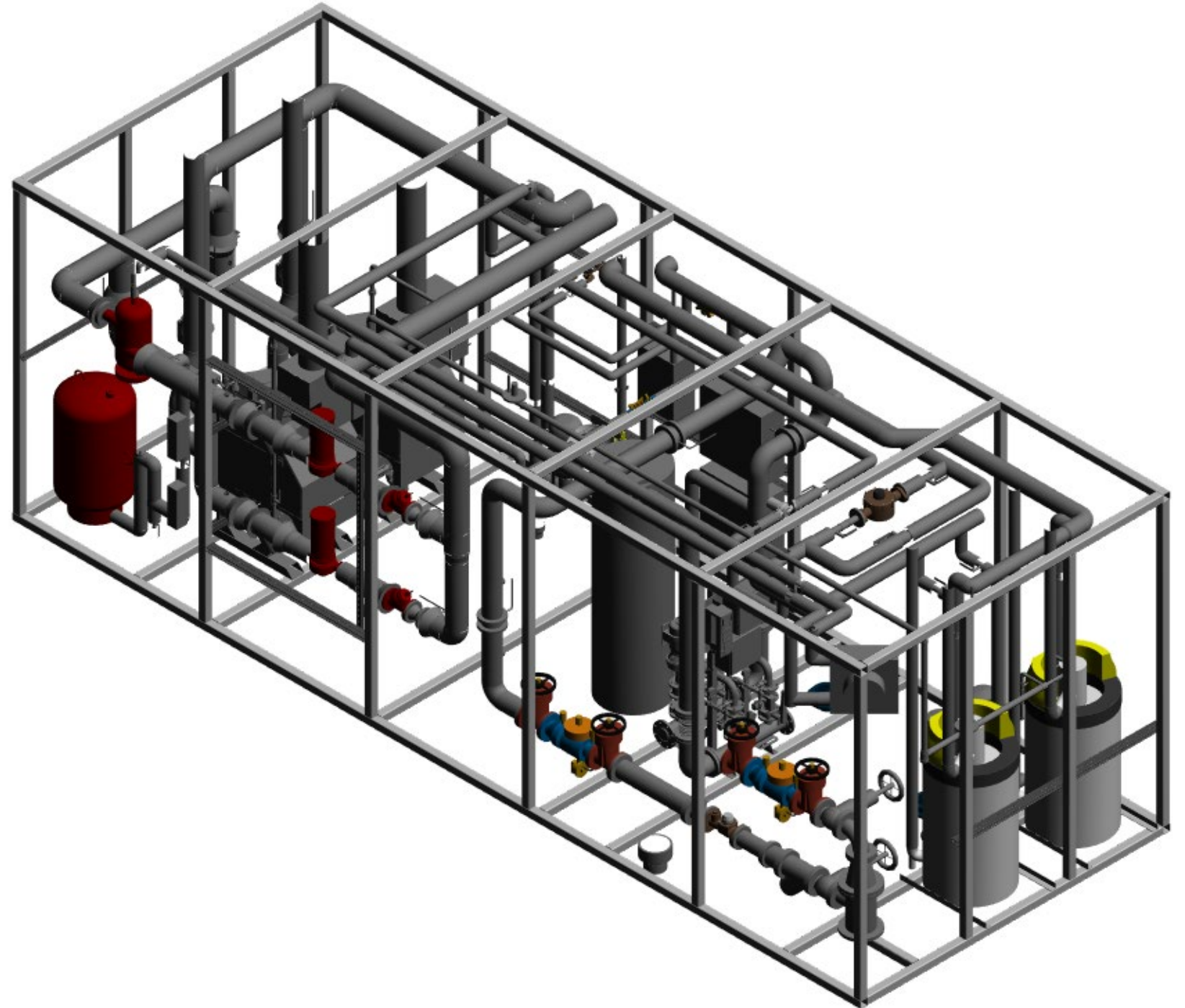
Are we there yet? Are we there yet?

How much longer?



Start with a goal

- Modular Boiler/Elec Rooms
 - Maximize the use of mechanical space (eliminate waste)
 - Create ease and convenient service access
 - Future replacement access
 - Maximize quality craft work



Next Level AAOC Performance - Collaborate



- Encouraging our team to “push the envelope”



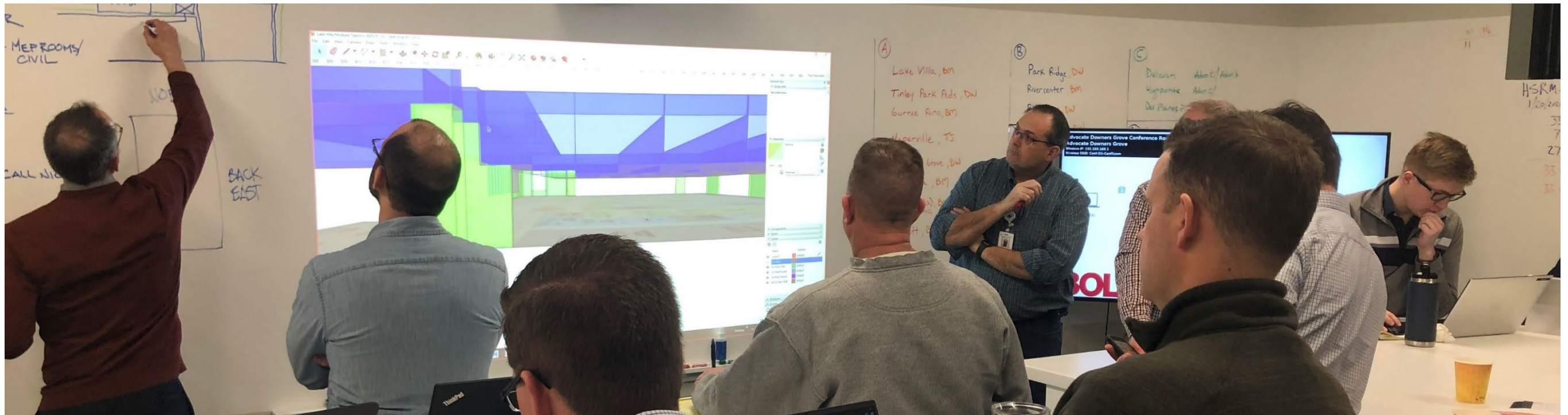
- Using our metrics to drive decision making



- Driving safety and quality back into the design process




- Find efficiencies – in design, assembly, and in construction




Next Level Performance

 • Continue to raise goals

 • Measure, measure, measure

 • Maximize the Team

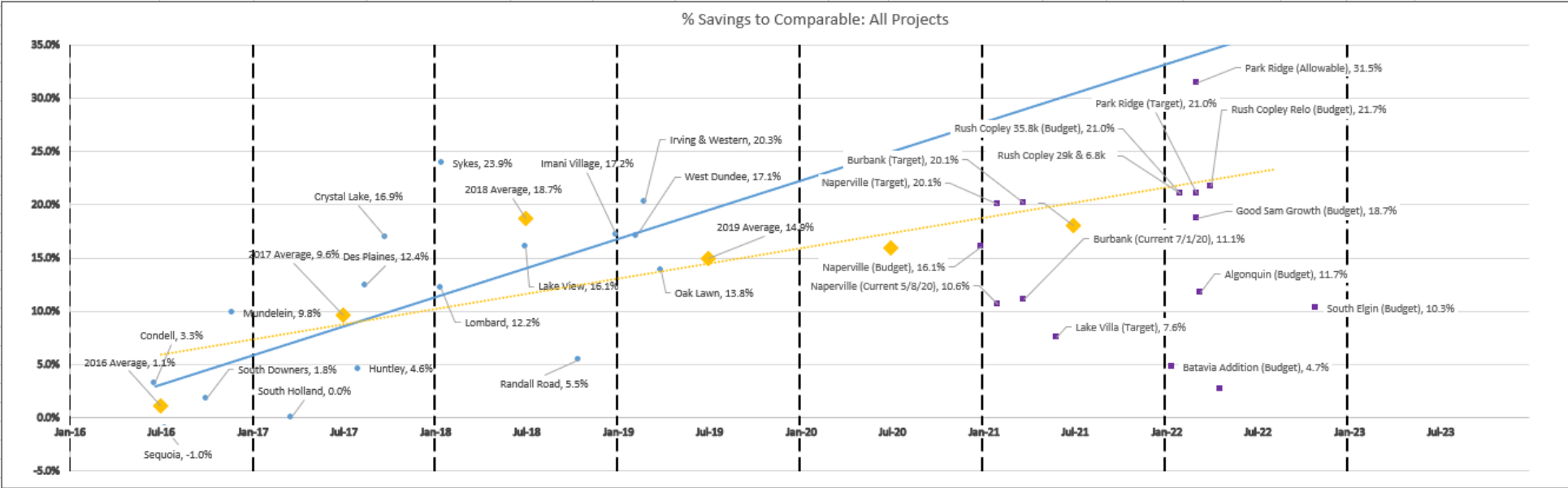
AAOC Program Statistics Normalization Summary				Baseline Project Comparables		
				Project Type	Project Date	Project Name
				A-Ground Up	6/20/2016	\$335 Condell (cost)
				A-Ground Up	6/20/2016	\$346 Condell (model)
				B-White Box TI	4/18/2017	\$316 North Broadway (cost)
				B-White Box TI		TBD North Broadway (model)
				C-MOB TI	4/18/2017	\$316 North Broadway (cost)
				D-Renovations		TBD TBD
				E-Other		TBD TBD
				F-Small/One-Off		TBD TBD

Year RESULTS	Year	% Savings
2016 Average	2016	1.1%
2017 Average	2017	9.6%
2018 Average	2018	18.7%
2019 Average	2019	14.9%
2020 Average	2020	
2021 Average	2021	

All Projects

Summary of RESULTS: All Projects					
Project Name	Project Year/Date	% Savings to Comparable	Project Type	Normalized \$/SF	Comparable Project
Condell	Jun-16	3.3%	A-Ground Up	\$335	Condell (Model)
Sequoia	Jul-16	-1.0%	A-Ground Up	\$335	Condell (Model)
Huntley	Jul-17	4.6%	A-Ground Up	\$338	Condell (Model)
Des Plaines	Aug-17	12.4%	A-Ground Up	\$310	Condell (Model)
Oak Lawn	Mar-19	13.8%	A-Ground Up	\$333	Condell (Model)
Mundelein	Nov-16	9.8%	B-White Box TI	\$280	North Broadway (cost)
South Holland	Mar-17	0.0%	B-White Box TI	\$312	North Broadway (cost)
Lombard	Jan-18	12.2%	B-White Box TI	\$283	North Broadway (cost)
Sykes	Jan-18	23.9%	B-White Box TI	\$247	North Broadway (cost)
Imani Village	Dec-18	17.2%	B-White Box TI	\$283	North Broadway (cost)
West Dundee	Feb-19	17.1%	B-White Box TI	\$278	North Broadway (cost)
Lake View	Jul-18	16.1%	B-White Box TI	\$279	North Broadway (cost)
South Downers	Sep-16	1.8%	C-MOB TI	\$305	North Broadway (cost)
Crystal Lake	Sep-17	16.9%	C-MOB TI	\$265	North Broadway (cost)
Randall Road	Oct-18	5.5%	C-MOB TI	\$314	North Broadway (cost)
Irving & Western	Feb-19	20.3%	C-MOB TI	\$268	North Broadway (cost)
Delavan Addition	Mar-20		A-Ground Up	\$432	Condell (Model)
Des Plaines Addition	Apr-20		A-Ground Up	\$615	Condell (Model)
Highpointe	Jul-20		B-White Box TI	\$258	North Broadway (cost)

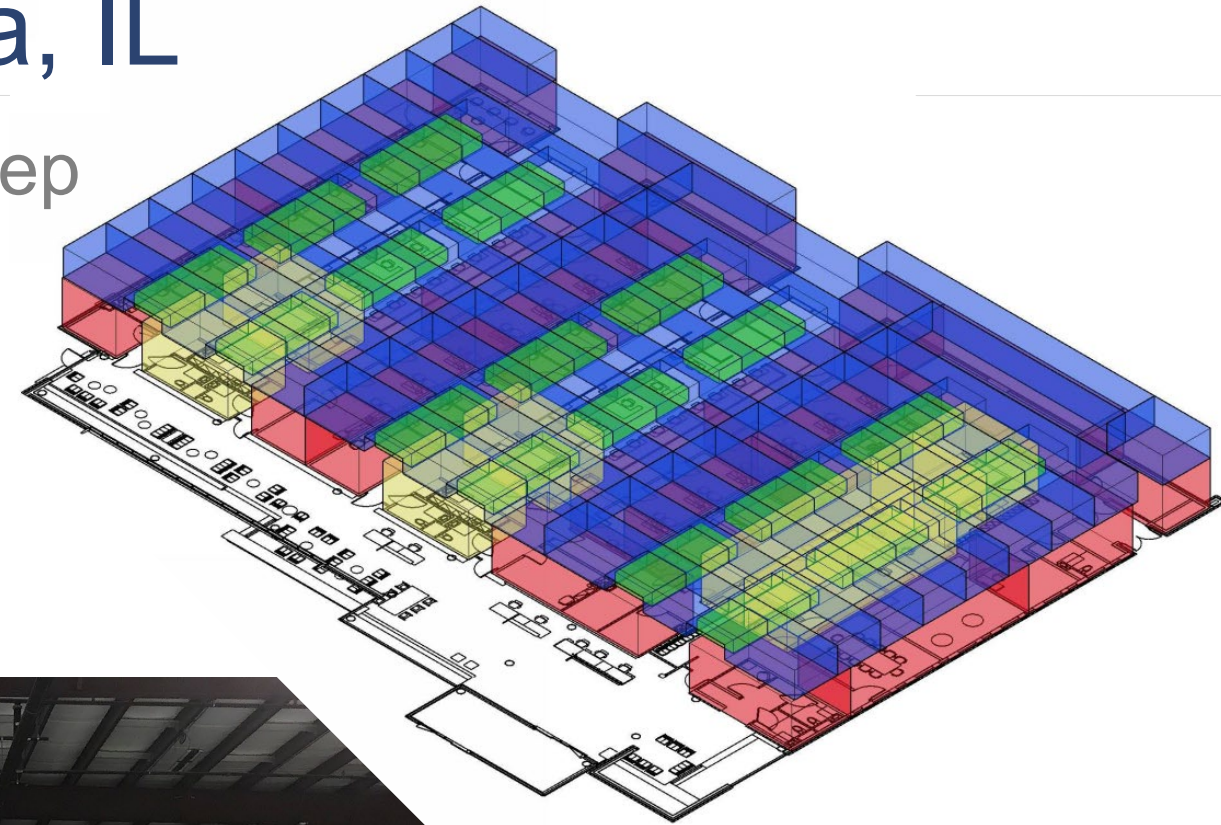
Summary of IN PROGRESS: All Projects					
Project Name	Project Year/Date	% Savings to Comparable	Project Type	Normalized \$/SF	Comparable Project
Burbank (Budget)	Feb-20	-12.1%	B-White Box	\$385	North Broadway (cost)
Burbank (Current)	Mar-21	11.1%	B-White Box	\$319	North Broadway (cost)
Burbank (Target)	Mar-21	20.1%	B-White Box	\$286	North Broadway (cost)
Good Sam Growth (Budget)	Mar-22	18.7%	B-White Box TI	\$299	North Broadway (cost)
Lake Villa (20200317)	May-21	7.6%	A-Ground Up	\$411	Condell (Model)
Lake Villa (Target)	May-21		A-Ground Up	\$376	Condell (Model)
Naperville (Budget)	Dec-20	16.1%	B-White Box	\$301	North Broadway (cost)
Naperville (Current 5/8/20)	Feb-21	10.6%	B-White Box TI	\$319	North Broadway (cost)
Naperville (Target)	Feb-21	20.1%	B-White Box	\$285	North Broadway (cost)
Park Ridge (Budget)	Apr-22	2.6%	B-White Box	\$359	North Broadway (cost)
Park Ridge (Allowable)	Mar-22	31.5%	B-White Box	\$255	North Broadway (cost)
Park Ridge (Target)	Mar-22	21.0%	B-White Box	\$291	North Broadway (cost)
Rush Copley Relo (Budget)	Apr-22	21.7%	B-White Box TI	\$291	North Broadway (cost)
Rush Copley 35.8k (Budget)	Feb-22	21.0%	B-White Box TI	\$293	North Broadway (cost)
Rush Copley 29k & 6.8k (Budget)	Feb-22	21.0%	B-White Box TI	\$293	North Broadway (cost)
Six Corners (Budget)					
Six Corners (Target)					
South Elgin (Budget)	Nov-22	10.3%	C-MOB TI	\$334	North Broadway (cost)
Algonquin (Budget)	Mar-22	11.7%	C-MOB TI	\$326	North Broadway (cost)
SSUB OB-GYN (Budget)	May-22	-9.3%	C-MOB TI	\$403	North Broadway (cost)
Batavia Addition (Budget)	Jan-22	4.7%	B-White Box TI	\$351	North Broadway (cost)



Next Generation Modular – Lake Villa, IL

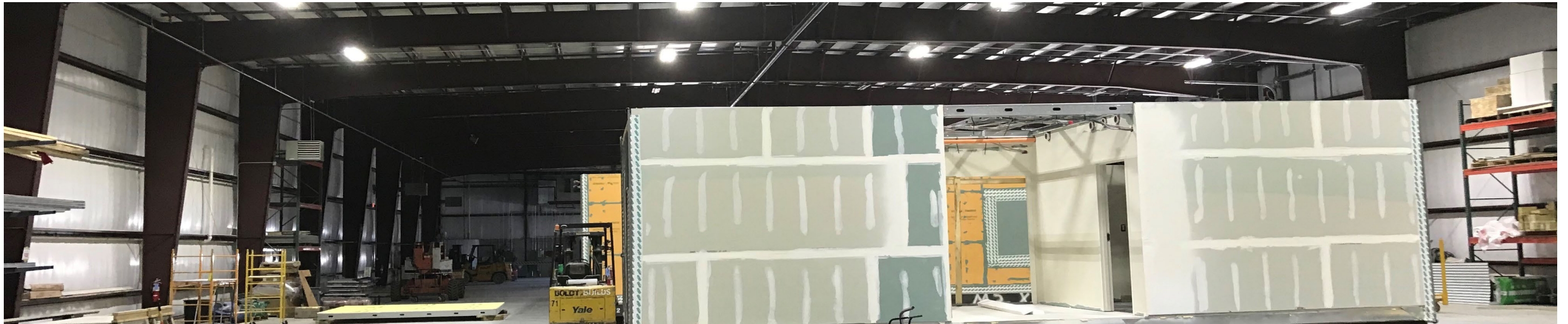
- Just like Amazon – order, receive at your door step
unwrap, and put to use.

- Take it to the next level



COVID-19 and Modular

- Be SafeR aspect, controls social distancing during construction in the factory
- Minimal trade interaction
- Changing AdvocateAurora's needs and adapting to society's shift to tele-med
- Increased tele-med is allowing AdvocateAurora to reduce footprint
- Acceptance by AHJ, Building Departments other healthcare and institutional owners



How can you apply on your project?

- Make-up of the team early on in a project or program... how the team is set up and *team trust is a prerequisite*
- Advocate Aurora' Healthcare's guide on *"where to start."*
 - *"Start small"* – pick a products or assemblies that can be done on any project
 - *"Track the process"* – what metrics are important
 - *"Collaborate"* with all stakeholders and support the goals of all
 - *"Challenging questions"* – what **can't** be "modularized" or "pre-fab"
 - *"Plan, Do, Check, Repeat"*
 - *"Failures don't mean stop,"* let them be a guide. What works, what doesn't?



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Thank you for attending this presentation. Enjoy the rest of the 22nd Annual LCI Congress!

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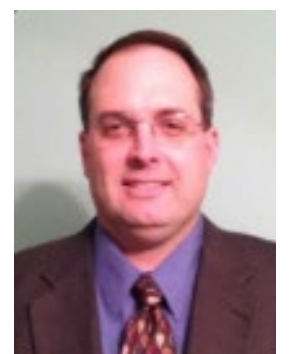
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Glossary of Terms

- AAH – AdvocateAurora Healthcare
- AMG – Advocate Medical Group
- AAOC – AdvocateAurora Outpatient Collaborative

Icon Library

- These icons can be used throughout your presentation



Plan | Value
Generation



Do



Check



Act | Safety



Continuous
Improvement



Respect for
people | Team



Removal of
Waste



Process
and Flow



Optimize the
Whole



Built
Environment



Tools



Resources



Training



Research



Collaboration



Slide Guidelines (from LCI)

- Make sure guides are turned on. Click “View” on top ribbon then select guides
- Use the Provided Template Layouts and Arial font
- The Font color for text is Grey. Minimum font size = 28.
- Plan to spell out acronyms the first time they are used in your presentation
- Insert an image to each slide
- Keep each bullet at no more than 15 words
- Provide a glossary of acronyms from your presentation in the back
- Make sure to delete any unused slide layouts

Slide Guidelines (from LCI)

- Keep it **short**
- Keep it **focused**
- Keep it **concise**
- Keep it **powerful**

Use this text format for callouts, quotes, stats, or to draw attention to important text.

Slide with Photo (see bottom) (from LCI)



Section Divider

