

A 360 Approach to Modular Housing

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Managing Director Hill Bespoke Ltd

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About the speaker

Managing Director Hill Bespoke Ltd

Mike is passionate about improving construction productivity, namely doing more with less. BIM and its associated technologies is an important factor in achieving that goal. With over 30 years experience in the construction industry, his team are charged with discovering better ways of producing buildings, particularly in challenging circumstances.

Aims



Aims of this presentation

It is the aim of this presentation is to explain how Hill Bespoke set about directing manufacturing and production work flows for a modular project. We will discuss:

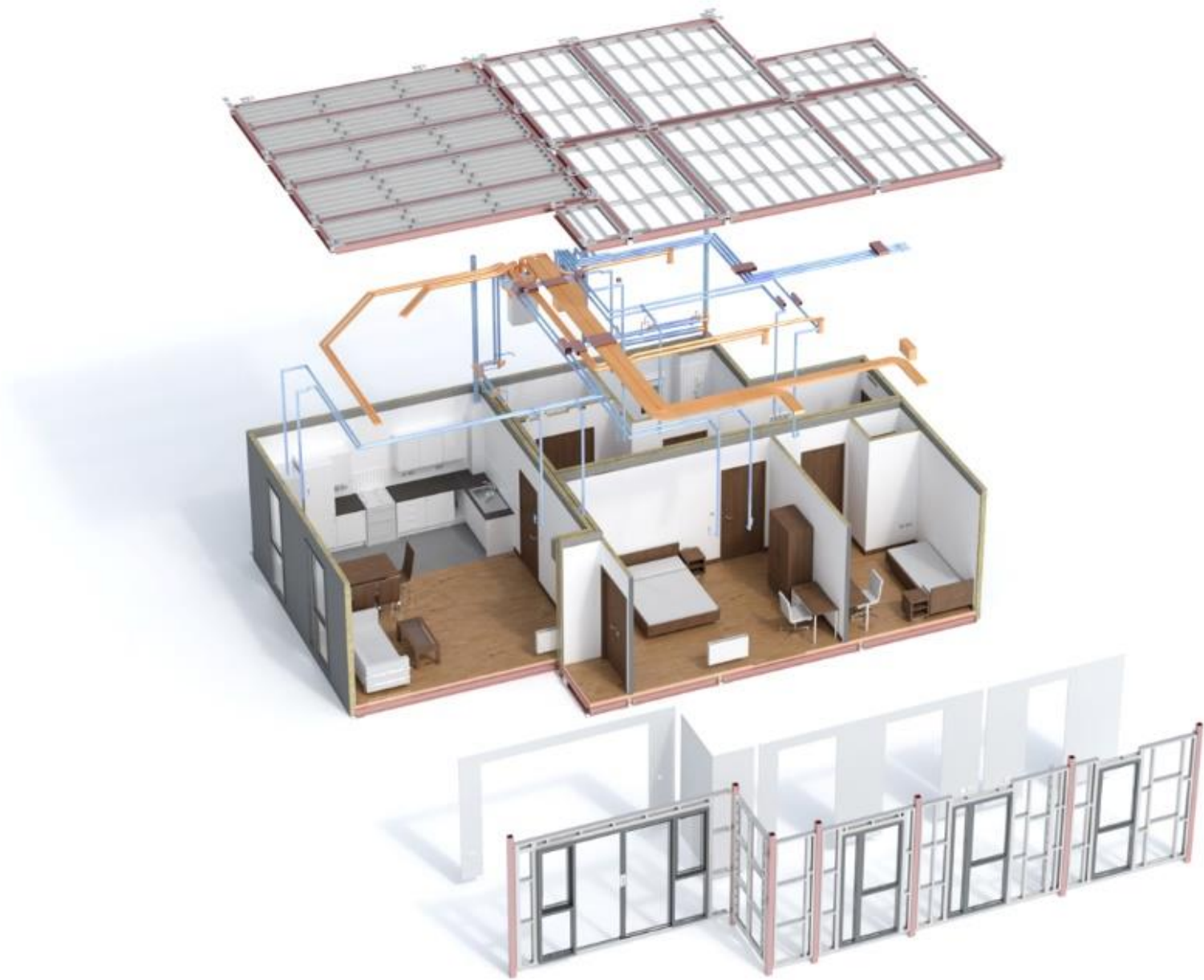
- How we set up a collaborative quality control regime
- How we monitored quality in the factory environment
- What reports we extracted from the BIM360 Field database
- How we linked quality to payment milestones

About the project







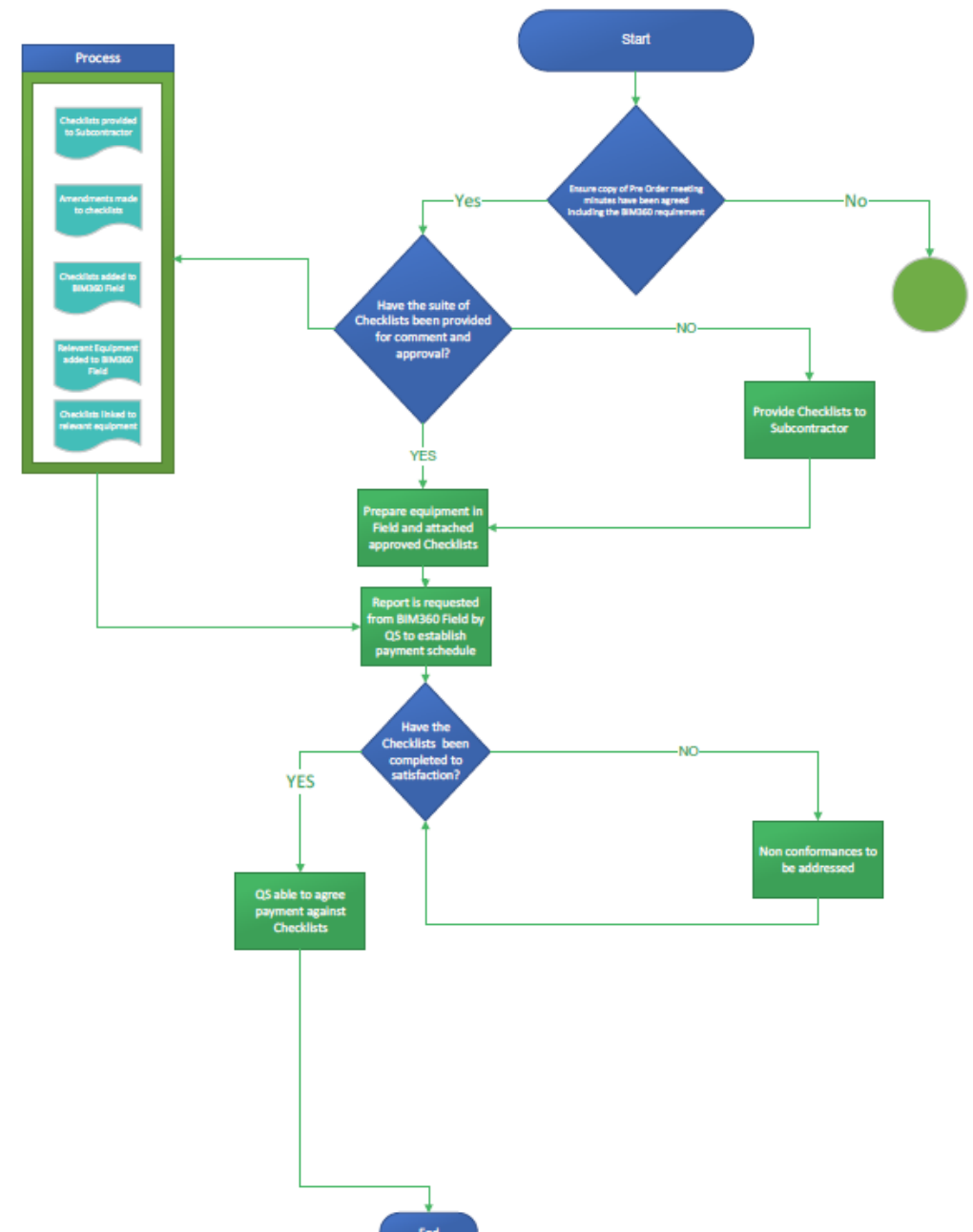


How to set up a collaborative quality control regime



Setting up a collaborative QC regime

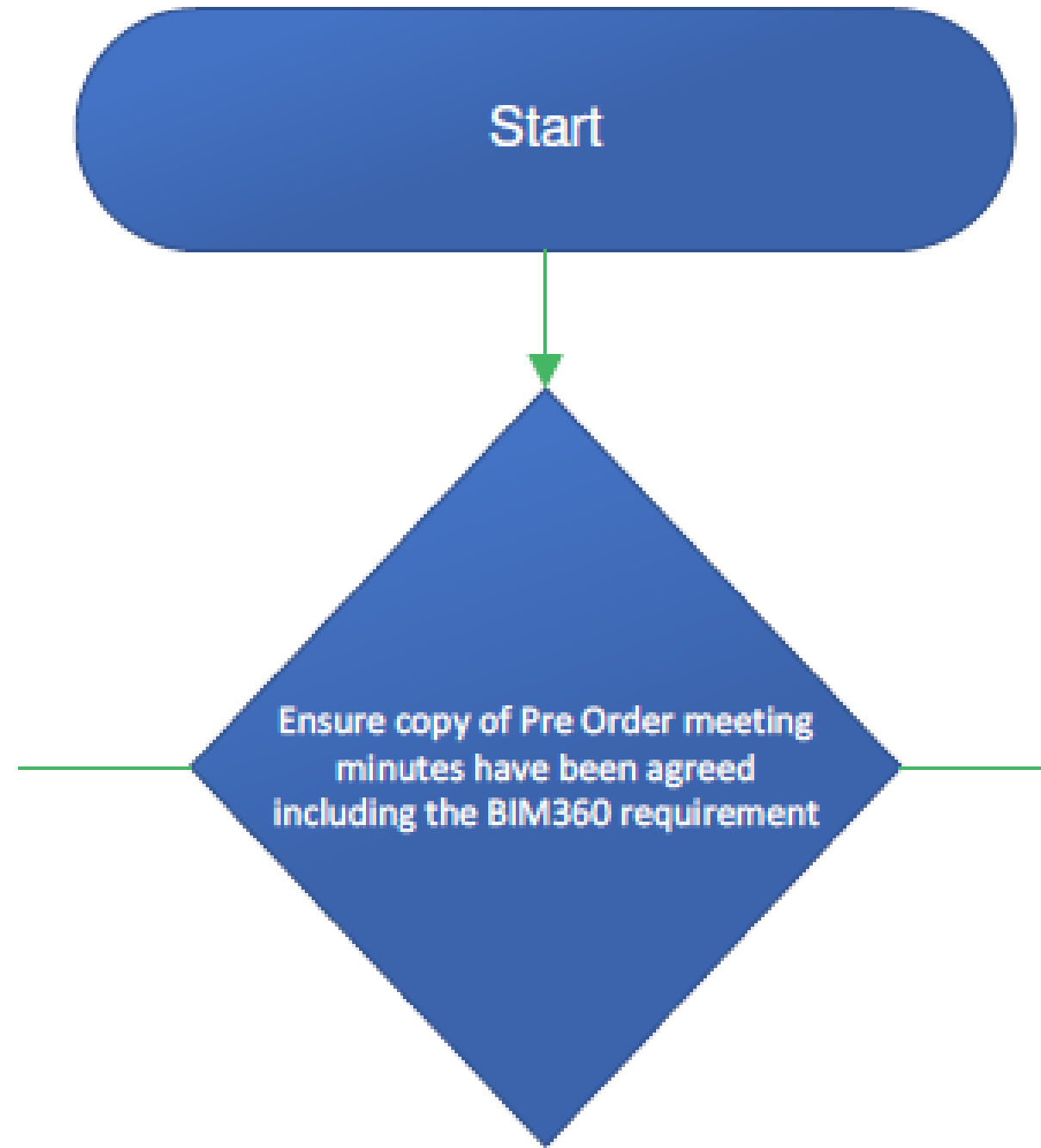
We have set up a workflow to ensure that we repeat the steps necessary for successful delivery.



Setting up a collaborative QC regime

Enquiry and Pre Order meeting

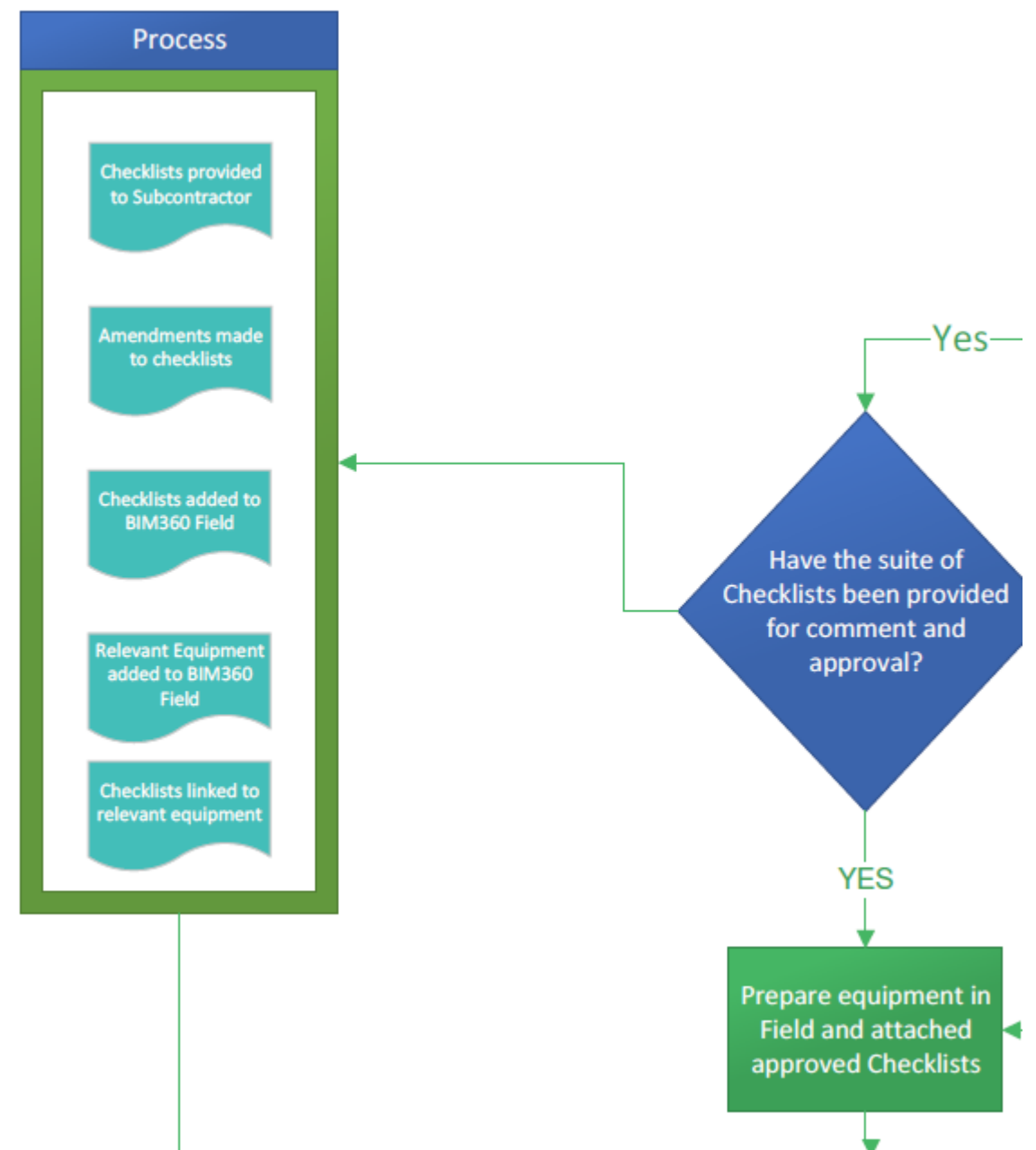
- Outlining what BIM360 Field is
- How we use BIM360 Field
- Expectations
- Subcontractor's input
- Training



Setting up a collaborative QC regime

Agree suite of checklists

- Ideally subcontractor have their own checklists
- If not provide standard set
- Adapt
- Agree
- Implement



Setting up a collaborative QC regime

Upload to BIM360 Field

Import Checklists [Import] [Close]

From Account From File

<input type="checkbox"/>	Name	# items	Project	Status
<input type="checkbox"/>				
<input type="checkbox"/>	00 PPM70 FORMS	44	S012 - Nescot Phase 1 - FICC	Active
<input type="checkbox"/>	00 PPM70 FORMS	44	TEMPLATE - FICC	Archived
<input type="checkbox"/>	00 PPM70 FORMS	44	S017 - The Reach - FICC	Active
<input type="checkbox"/>	00 PPM70 FORMS	44	TEMPLATE - FICC	Active
<input type="checkbox"/>	00 PPM70 FORMS	42	HILL FICC TEST	Archived
<input type="checkbox"/>	00 PPM70 FORMS	44	E048 - Pampisford Road	Active
<input type="checkbox"/>	00 PPM70 FORMS	44	TEST - X007 Blackwall Reach - F	Active
<input type="checkbox"/>	00 PPM70 FORMS	42	Hill FICC L250	Archived
<input type="checkbox"/>	00 PPM70 FORMS	44	X007 - Blackwall Reach - FICC	Active
<input type="checkbox"/>	01 FICC - External	69	TEST - X007 Blackwall Reach - F	Active
<input type="checkbox"/>	01 FICC - External	69	TEMPLATE - FICC	Active
<input type="checkbox"/>	01 FICC - External	69	X007 - Blackwall Reach - FICC	Active
<input type="checkbox"/>	01 FICC - External	69	E048 - Pampisford Road	Active
<input type="checkbox"/>	01 FICC - External	69	TEMPLATE - FICC	Archived
<input type="checkbox"/>	01 FICC - External	69	S012 - Nescot Phase 1 - FICC	Active
<input type="checkbox"/>	01 FICC - External	69	S017 - The Reach - FICC	Active
<input type="checkbox"/>	02 FICC - Hall	16	TEMPLATE - FICC	Active

3 Are the roof coverings clean and free from mortar?

Setting up a collaborative QC regime

Link relevant equipment

Orchard Village Phase 4

Equipment

G-G03 - C

Back to Equipment

*

= required

•

= COBie-standard property

Profile

Name

G-G03 - C

Type

Modules

Description

Mass: G-G03 - C: G-G03 - C

Location

Status

Specified

Identifiers

Barcode

00033

Serial number

Checklists

Issues

Tasks

Attachments

Comments

History

2.2.2.1.13.01 - Modular - Chipboard Flooring

Checklist

Edit

Link Che

Created	Modified	Name	Author	# Issues	#
Oct 26, 2017 11:43	Dec 13, 2017 5:40	F 5.4.2.20 - Modular - 2nd Fix Plumbing	robertosborn@hill.co.uk	0	0
Nov 10, 2017 1:46	F Nov 20, 2017 12:14	5.4.2.20 - Modular - 2nd Fix Plumbing	rob@elements-europe.com	0	0
Nov 8, 2017 2:30	PI Nov 16, 2017 10:58	5.4.2.05-D8-V3- Modular - Plumbing 1st fi	scottl@mies-bs.co.uk	0	0
Nov 10, 2017 1:44	F Nov 15, 2017 4:41	F 3.1.20.01-D8- Modular - Walls-Ceramic an	rob@elements-europe.com	0	0
Nov 13, 2017 7:25	F Nov 13, 2017 7:31	F 3.1.1.05-D8-V2- Modular - metal stud parti	robertosborn@hill.co.uk	0	0
Nov 13, 2017 7:27	F Nov 13, 2017 7:31	F 3.1.1.15-D8-V1- Modular - Board Fixing to	robertosborn@hill.co.uk	0	0
Nov 13, 2017 7:16	F Nov 13, 2017 7:21	F 2.2.2.1.13.01 - Modular - Chipboard Floori	robertosborn@hill.co.uk	0	0
Nov 13, 2017 7:18	F Nov 13, 2017 7:21	F 2.7.1.1.10 - Modular - Metal Stud Fixing	robertosborn@hill.co.uk	0	0
Nov 13, 2017 7:17	F Nov 13, 2017 7:21	F 2.5.1.12.01 - Modular -Steel Framing Syst	robertosborn@hill.co.uk	0	0
Nov 13, 2017 4:48	F Nov 13, 2017 7:21	F 2.6.1.10-D8-V2- Modular -Window installa	stephen@elements-europe.com	0	0
Nov 13, 2017 4:50	F Nov 13, 2017 4:52	F 2.8.1.05 - Modular -Carpenter - 2nd Fix Fl	stephen@elements-europe.com	0	0
Nov 13, 2017 4:49	F Nov 13, 2017 4:52	F 2.5.1.5.02 - Modular - Carpenter - 1st Fix f	stephen@elements-europe.com	0	0
Nov 13, 2017 4:39	F Nov 13, 2017 4:52	F 2.8.8.05 - Modular - Painter - Mist Coat	stephen@elements-europe.com	0	0
Nov 13, 2017 4:41	F Nov 13, 2017 4:52	F 2.8.8.01 - Modular - Pre-Paint Inspection	stephen@elements-europe.com	0	0
Nov 13, 2017 4:41	F Nov 13, 2017 4:52	F 2.8.8.10.01-D8-V2 - Modular - painting an	stephen@elements-europe.com	0	0
Nov 10, 2017 4:21	F Nov 10, 2017 4:26	F 3.2.1.1.30 - Modular - Vinyl Floor Covering	stephen@elements-europe.com	0	0
Nov 10, 2017 4:23	F Nov 10, 2017 4:26	F 3.3.3.1.06-D8-V2- Modular - MF- Ceilings	stephen@elements-europe.com	0	0
Nov 10, 2017 4:20	F Nov 10, 2017 4:26	F 3.1.1.20-D8-V1- Modular - tape and jointin	stephen@elements-europe.com	0	0
Nov 8, 2017 8:14	AI Nov 8, 2017 4:48	PI 2.8.8.10.02-D8-V2 - Modular - painting an	robertosborn@hill.co.uk	0	0

How to monitor quality



Monitoring quality

- Training
- Benchmarking
- Supervision
- Checklists
- iPads
- Daily briefings



Monitoring quality

- Access to drawings on BIM360 Field
- Access to project specification's on BIM360 Docs












Running the necessary reports



Reports

- Select reports for equipment

	Recent
	Scheduled
	Saved
	Issues
	Tasks
	Checklists
	Daily Updates
	Equipment
	Account

Reports

- Select checklist summary

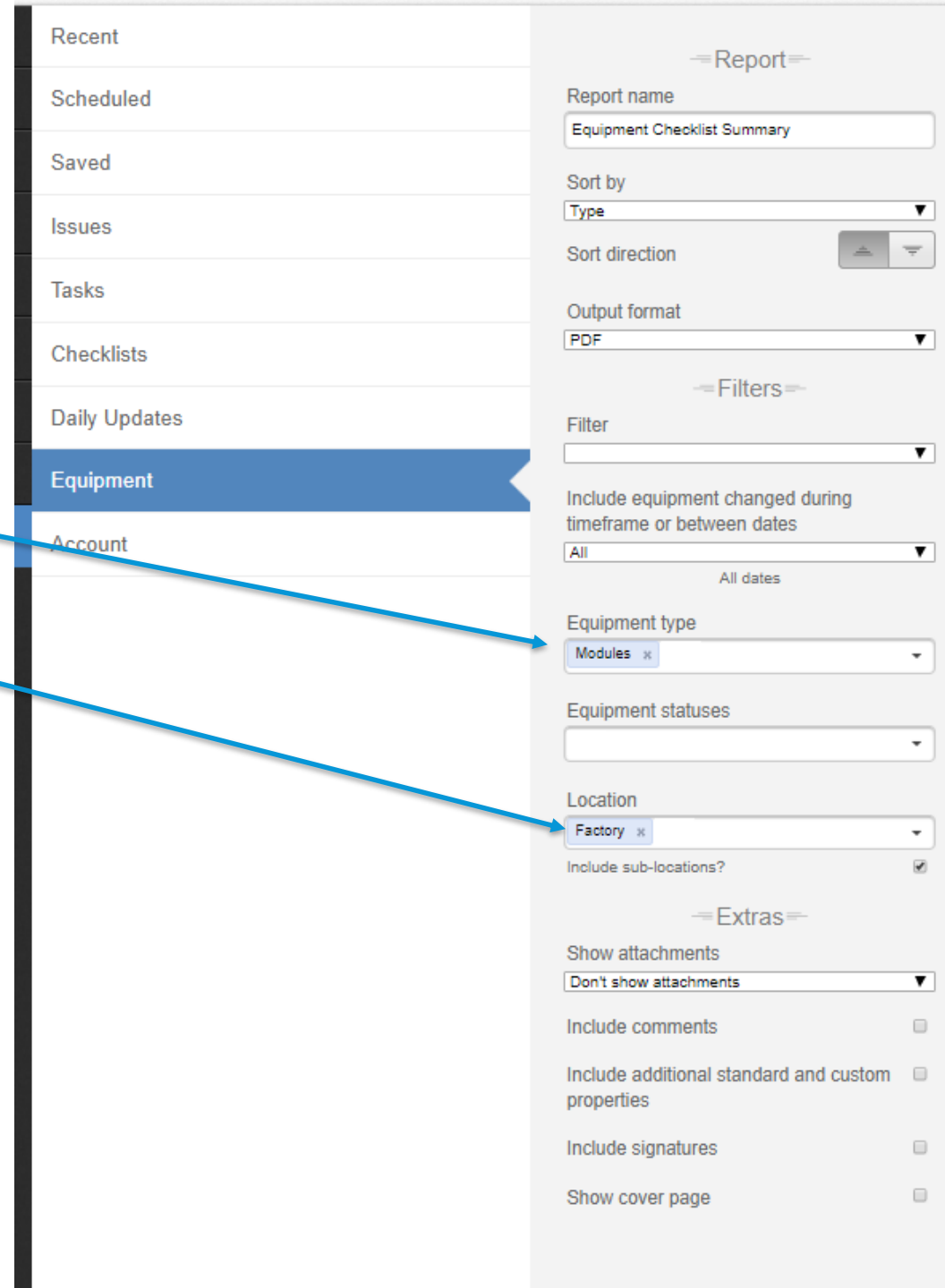
BATCH: AC2 Office		Equipment Checklist Summary						
Checklist Type	Checklist	Status	% Complete	# Issues	# Open Issues	Last Updated		
ECOB10 - 14 X 42 Column		Status: White-Conforming	Type: Form 01	Checklist Template: 3		Barcode: 80407-14ECOB10-040-2	Asset ID: 993 L04-1-01	
24/0C	Column Postloop - AC2	Closed	---	0	0	0	09-Aug-2013	
24/0C	Column Postloop - AC2	Open	0%	0	0	0	18-Apr-2014	
24/0C	Column Postloop - AC2	Closed	---	0	0	0	09-Aug-2013	
24/0C	Column Postloop - AC2	Open	0%	1	1	1	18-Apr-2014	
24/0C	Column Postloop - AC2	Open	50%	2	2	2	18-Apr-2014	
24/0C	Column Postloop - AC2	Open	100%	12	12	12	18-Apr-2014	
24/0C	IT Preloop - AC2	Open	0%	0	0	0	18-Apr-2014	
24/0C	IT Preloop - AC2	Open	45%	0	0	0	18-Apr-2014	
ECOB10 - 14 X 42 Column		Status: White-Conforming	Type: Form 01	Checklist Template: 3		Barcode: 80407-14ECOB10-041-2	Asset ID: 993 L04-1-02	
24/0C	Column Postloop - AC2	Closed	---	1	0	0	07-Aug-2013	
24/0C	Column Postloop - AC2	Open	50%	1	1	1	18-Apr-2014	
24/0C	Column Postloop - AC2	Open	11%	0	0	0	18-Apr-2014	
24/0C	Column Postloop - AC2	Closed	---	0	0	0	09-Aug-2013	
24/0C	Column Postloop - AC2	Open	0%	0	0	0	18-Apr-2014	
24/0C	IT Preloop - AC2	Closed	---	0	0	0	18-Apr-2014	
24/0C	IT Preloop - AC2	Open	0%	0	0	0	18-Apr-2014	
24/0C	IT Preloop - AC2	Open	17%	0	0	0	18-Apr-2014	
FMSD10 - 20X40 - 08		Status: Not Made	Type: Form 07	Checklist Template: 3		Barcode: 80407-20X40-02-07-1	Asset ID: 993 L04-1-01	
24/0C	IT Preloop - AC2	Open	0%	0	0	0	18-Apr-2014	
24/0C	IT Preloop - AC2	Open	17%	0	0	0	18-Apr-2014	
24/0C	Preloop - Redund Testing Prefabrication	Closed	---	0	0	0	24-Jan-2014	
24/0C	Preloop - Redund Testing Prefabrication	Open	100%	0	0	0	18-Apr-2014	
24/0C	Preloop - Redund Testing Prefabrication	Open	100%	2	2	2	18-Apr-2014	
24/0C	Preloop - Redund Testing Prefabrication	Closed	---	0	0	0	24-Jan-2014	
24/0C	Preloop - Redund Testing Prefabrication	Open	100%	1	1	1	18-Apr-2014	

Checklist Summary

over Equine Management Organization		Equipment List by Type						
Battery Room Fan Coil Units - 1 Item								
Item	Description	Location	Status	Barcode	Asset ID	Total Issues	Total Open	Last Updated

Reports

- Complete report filter
- Select module as equipment type
- Select location as factory



The screenshot shows a web application interface for generating reports. On the left is a sidebar with a list of report categories: Recent, Scheduled, Saved, Issues, Tasks, Checklists, Daily Updates, Equipment, and Account. The 'Equipment' category is currently selected and highlighted in blue. On the right is a configuration panel for the report. It is divided into sections: 'Report' (containing Report name, Sort by, Sort direction, and Output format), 'Filters' (containing Filter, a date range selector, Equipment type, Equipment statuses, Location, and an 'Include sub-locations?' checkbox), and 'Extras' (containing Show attachments, Include comments, Include additional standard and custom properties, Include signatures, and Show cover page). Two blue arrows originate from the list items on the left: one points from 'Select module as equipment type' to the 'Equipment' category in the sidebar, and the other points from 'Select location as factory' to the 'Factory' option in the Location dropdown of the Filters section.

Recent

Scheduled

Saved

Issues

Tasks

Checklists

Daily Updates

Equipment

Account

Report

Report name

Equipment Checklist Summary

Sort by

Type

Sort direction

Output format

PDF

Filters

Filter

Include equipment changed during timeframe or between dates

All

All dates

Equipment type

Modules x

Equipment statuses

Location

Factory x

Include sub-locations?

Extras

Show attachments

Don't show attachments

Include comments

Include additional standard and custom properties

Include signatures

Show cover page

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	S						
1	Orchard Village Phase 4				Equipment Checklist Summary																		
2	Name		Description			Status		Type		Checklist Templates			Barcode			Asset ID							
3	G-G01 - A		Mass: G-G01 - A: G-G01 - A			Specified		Modules		10			00026			11.80 kg							
4	Checklist Type		Checklist					Status		% Complete		# Issues		# Open Issues		Last Updated							
5	QA/QC		2.2.2.1.13.01 - Chipboard Flooring					Closed		--		0		0		17 Oct 2017							
6	QA/QC		2.5.1.12.01 - Steel Framing System (Metsec)					Open		94 %		0		0		16 Oct 2017							
7	QA/QC		2.7.1.1.10 - Metal Stud Fixing					Open		100 %		1		0		17 Oct 2017							
8	QA/QC		3.1.1.05-D8-V2-metal stud partitioning					Open		97 %		0		0		16 Oct 2017							
9	QA/QC		3.1.1.15-D8-V1-Board Fixing to Metal Studs					Open		96 %		0		0		16 Oct 2017							
10	QA/QC		5.3.1.2.05-D8-V2-Soil and Vent Pipe Installation					Open		0 %		0		0		17 Oct 2017							
11	QA/QC		5.4.2.01-D8-V1-Speedfit pipework fitting					Closed		--		0		0		17 Oct 2017							
12	QA/QC		5.7.1.2.02-D8-V2 MVHR Installation					Closed		--		0		0		17 Oct 2017							
13	QA/QC		5.8.2.10 - Electrical Pre Plaster					Closed		--		0		0		17 Oct 2017							
14	G-G01 - B		Mass: G-G01 - C1: G-G01 - B			Specified		Modules		10			00027			12.38 kg							
15	Checklist Type		Checklist					Status		% Complete		# Issues		# Open Issues		Last Updated							
16	QA/QC		2.2.2.1.13.01 - Chipboard Flooring					Open		100 %		0		0		16 Oct 2017							
17	QA/QC		2.5.1.12.01 - Steel Framing System (Metsec)					Open		94 %		0		0		16 Oct 2017							
18	QA/QC		2.7.1.1.10 - Metal Stud Fixing					Open		100 %		0		0		16 Oct 2017							
19	QA/QC		3.1.1.05-D8-V2-metal stud partitioning					Open		97 %		0		0		16 Oct 2017							
20	QA/QC		3.1.1.15-D8-V1-Board Fixing to Metal Studs					Open		96 %		0		0		16 Oct 2017							
21	QA/QC		5.3.1.2.05-D8-V2-Soil and Vent Pipe Installation					Open		0 %		0		0		17 Oct 2017							

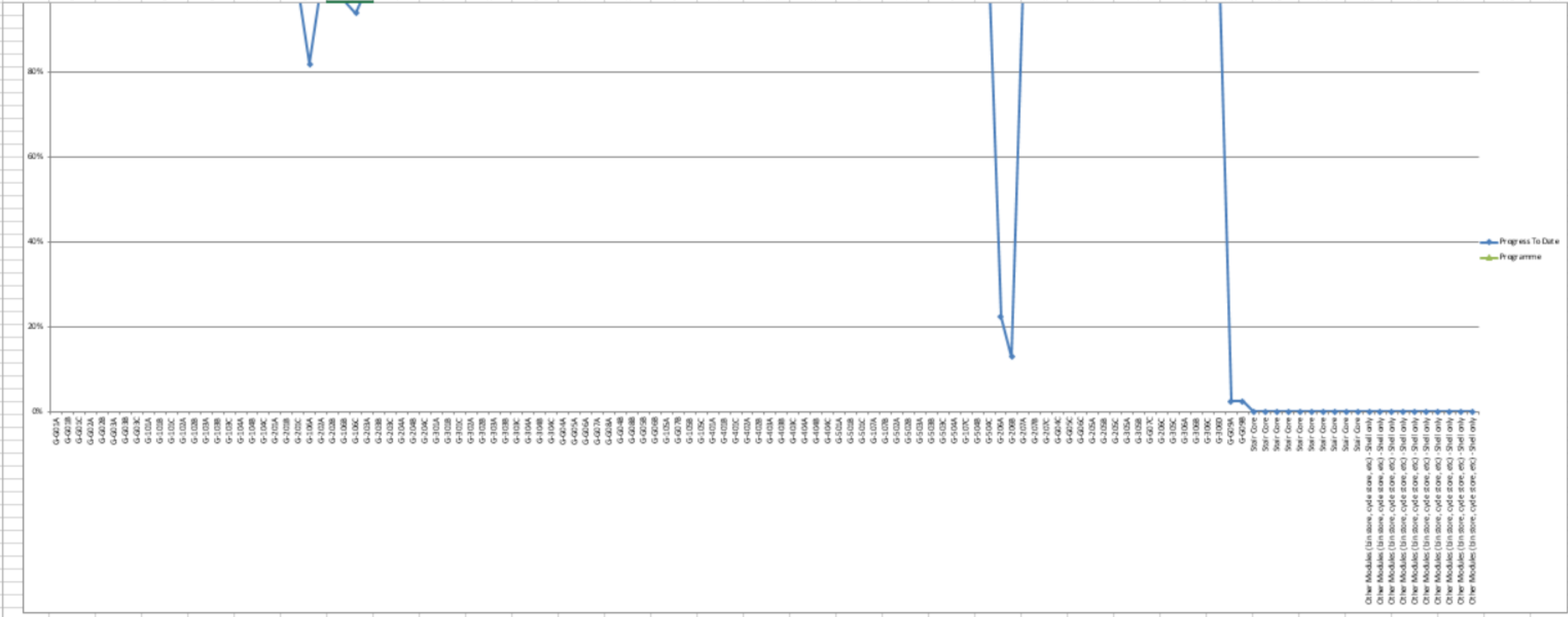
Linking quality to payment milestones



Linking quality to payment

- Allocate QC checklists to agreed daily activity
- Monitor completion of checklists per day
- Payment only for fully completed checklists
- Payment only for completed suite of daily activity checklists

A		D	E	F	G	H	I	J
1	Updated:	Day 1						
2	Plot Type	Day 1	2.7.1.1.10	3.1.1.15-D8-V1	2.2.2.1.13.01	3.1.1.05-D8-V2		2.6.1.10-D8-V2
3		Modular - Steel Framing System (Metal Stud)	Modular - Metal Stud Fixing	Modular - Board Fixing to Metal Stud	Modular - Chipboard Flooring	Modular - metal stud partitioning		Modular - Window installation
4		1	2	3	4	5		6
5	Block A							
141	2B 4P - Type 04 - Double Module	100%	100%	100%	100%	100%	100%	100%
142	2B 4P - Type 04 - Double Module	100%	100%	100%	100%	100%	100%	100%
143	2B 3P - Type 03 - Double Module	100%	100%	100%	100%	100%	100%	100%
144	2B 3P - Type 03 - Double Module	100%	100%	100%	100%	100%	100%	100%
145	2B 3P - Type 02 - Double Module	100%	100%	100%	100%	100%	100%	100%
146	2B 3P - Type 02 - Double Module	100%	100%	100%	100%	100%	100%	100%
147	1B 2P - Type 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
148	1B 2P - Type 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
149	1B 2P - Type 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
150	1B 2P - Type 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
151	2B 3P - Type 02 - Double Module	100%	100%	100%	100%	100%	100%	100%
152	2B 3P - Type 02 - Double Module	100%	100%	100%	100%	100%	100%	100%
153	2B 3P - Type 02 - Double Module	100%	100%	100%	100%	100%	100%	100%
154	2B 3P - Type 02 - Double Module	100%	100%	100%	100%	100%	100%	100%
155	2B 4P - Type 05 - Double Module	100%	100%	100%	100%	100%	100%	100%
156	2B 4P - Type 05 - Double Module	100%	100%	100%	100%	100%	100%	100%
157	2B 4P - Type 01 Level 00 - Double Module	100%	100%	100%	100%	100%	100%	100%
158	2B 4P - Type 01 Level 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
159	2B 4P - Type 01 Level 00 - Double Module	100%	100%	100%	100%	100%	100%	100%
160	2B 4P - Type 01 Level 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
161	2B 4P - Type 01 Level 00 - Double Module	100%	100%	100%	100%	100%	100%	100%
162	2B 4P - Type 01 Level 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
163	2B 4P - Type 01 Level 00 - Double Module	100%	100%	100%	100%	100%	100%	100%
164	2B 4P - Type 01 Level 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
165	2B 3P - Type 06 - Double Module	100%	100%	100%	100%	100%	100%	100%
166	2B 3P - Type 06 - Double Module	100%	100%	100%	100%	100%	100%	100%
167	2B 4P - Type 01 Level 00 - Double Module	100%	100%	100%	100%	100%	100%	100%
168	2B 4P - Type 01 Level 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
169	2B 4P - Type 01 Level 00 - Double Module	100%	100%	100%	100%	100%	100%	100%
170	2B 4P - Type 01 Level 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
171	2B 4P - Type 01 Level 00 - Double Module	100%	100%	100%	100%	100%	100%	100%
172	2B 4P - Type 01 Level 01 - Double Module	100%	100%	100%	100%	100%	100%	100%
173	2B 4P - Type 01 Level 00 - Double Module	100%	100%	100%	100%	100%	100%	100%
Update		Progress	Charts	Valuation	Checklists			



Conclusion



Summary

- Early engagement
- Predetermined workflows
- Supervision
- Checklists
- iPads
- Equipment
- Factory
- Correct filters on reports



Questions





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