

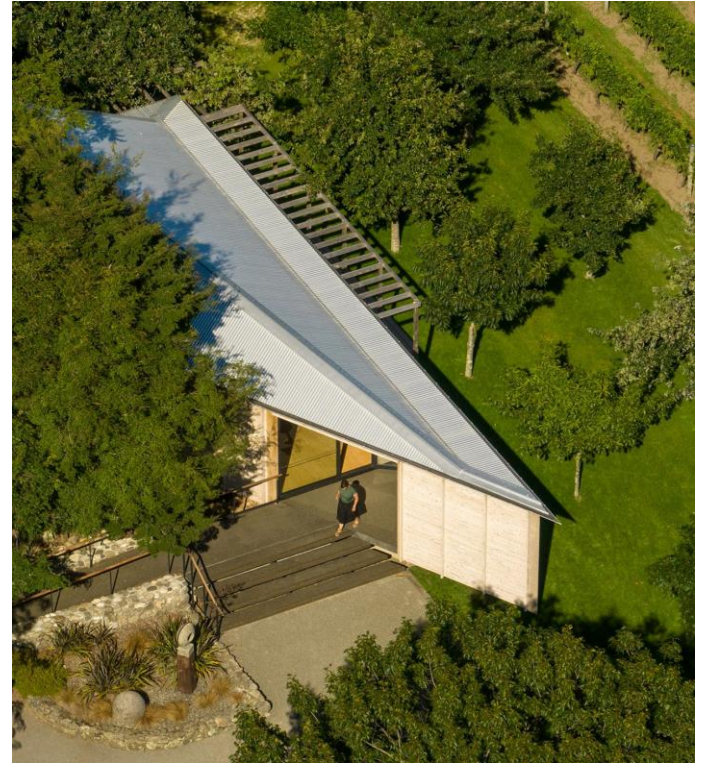
**MAKERS**

# makers of architecture

Architecture | Landscape | Collaboration

# makers fabrication

Prefabrication | Construction | Management



Photography - Simon Devitt

# makers of architecture

Architecture | Landscape | Collaboration

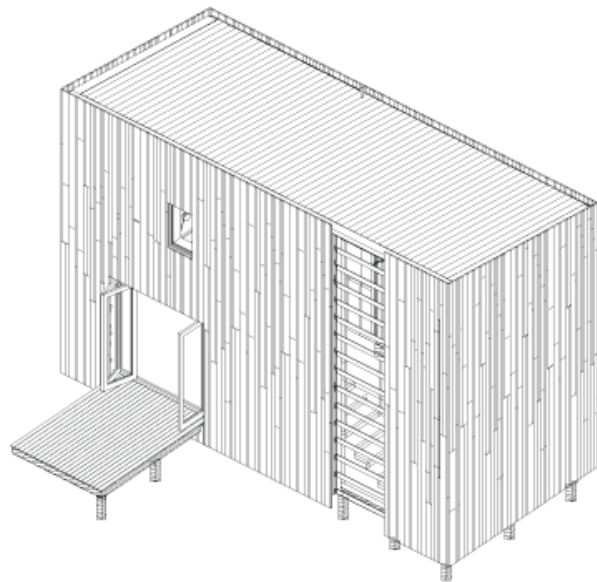
# makers fabrication

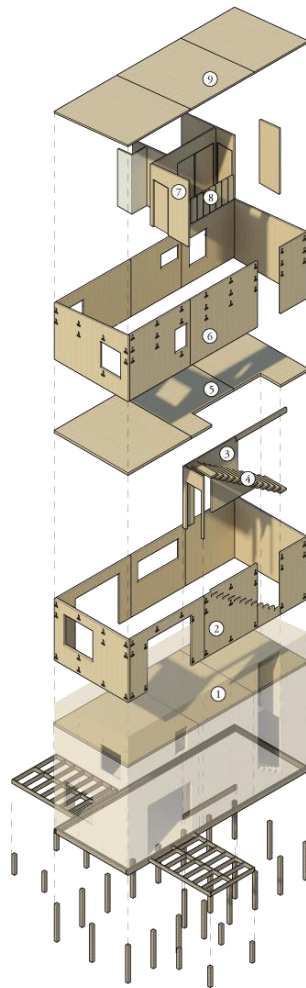
Prefabrication | Construction | Management











- ① CL,3125MM CLT FLOOR - 3 PANELS
- ② CL,375MM EXTERIOR CLT WALLS - 9 PANELS
- ③ CL,375MM INTERIOR CLT WALLS - 2 PANELS
- ④ CL,375MM CLT STAIR TREADS
- ⑤ CL,3125MM CLT FLOOR - 3 PANELS
- ⑥ CL,375MM EXTERIOR CLT WALLS - 8 PANELS
- ⑦ CL,375MM INTERIOR CLT WALLS - 5 PANELS
- ⑧ CL,375MM CLT BALUSTRADE
- ⑨ CL,375MM CLT ROOF - 3 PANELS



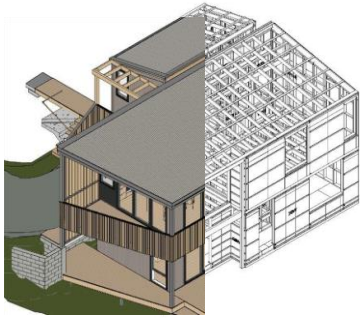




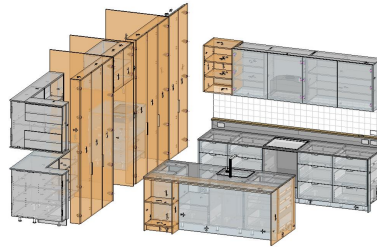
# **we are makers**

**Our goal is to produce custom  
beautiful architecture with a DfMA  
focus, supported by shared processes**

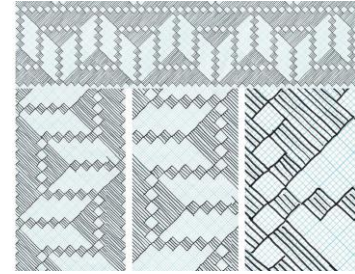
## Construction



## Joinery & Fitout



## Artwork & Installations



## Design

## Make

## Beauty



# engagement

virtual reality supports the communication between the architectural and construction environments.



# integrated modelling

designing out the unknown and leaving less  
to chance





# manufacturing

our local makers fabrication workshop  
creates custom components



# assembly

assessing site constraints



# assembly

logistics and planning



# installation

end-to-end project delivery

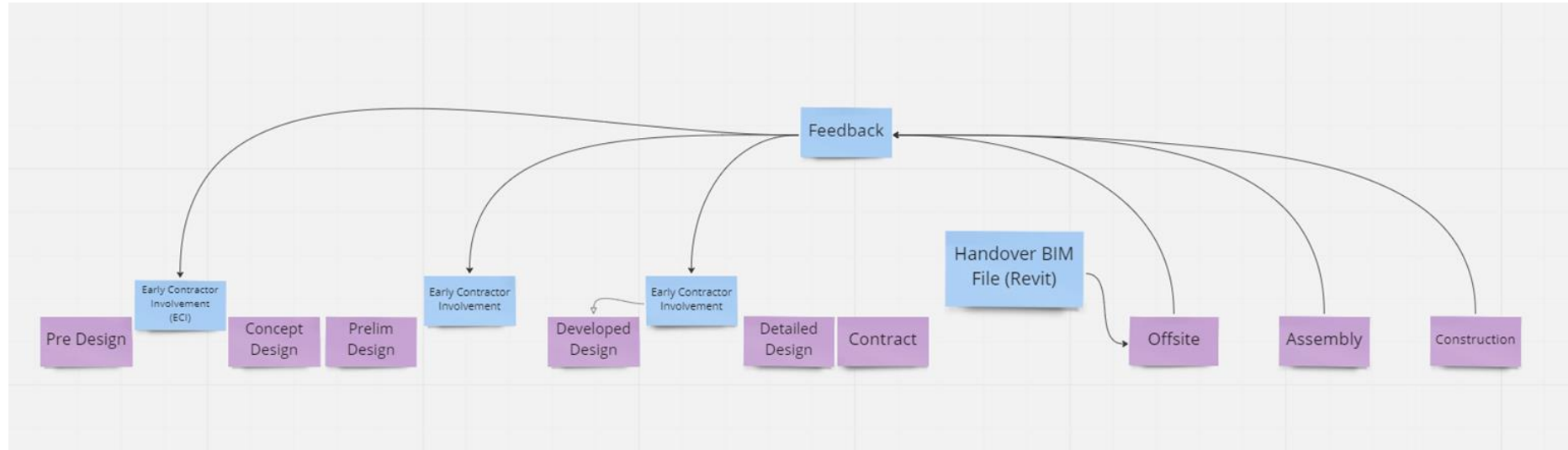


Photography - Simon Devitt



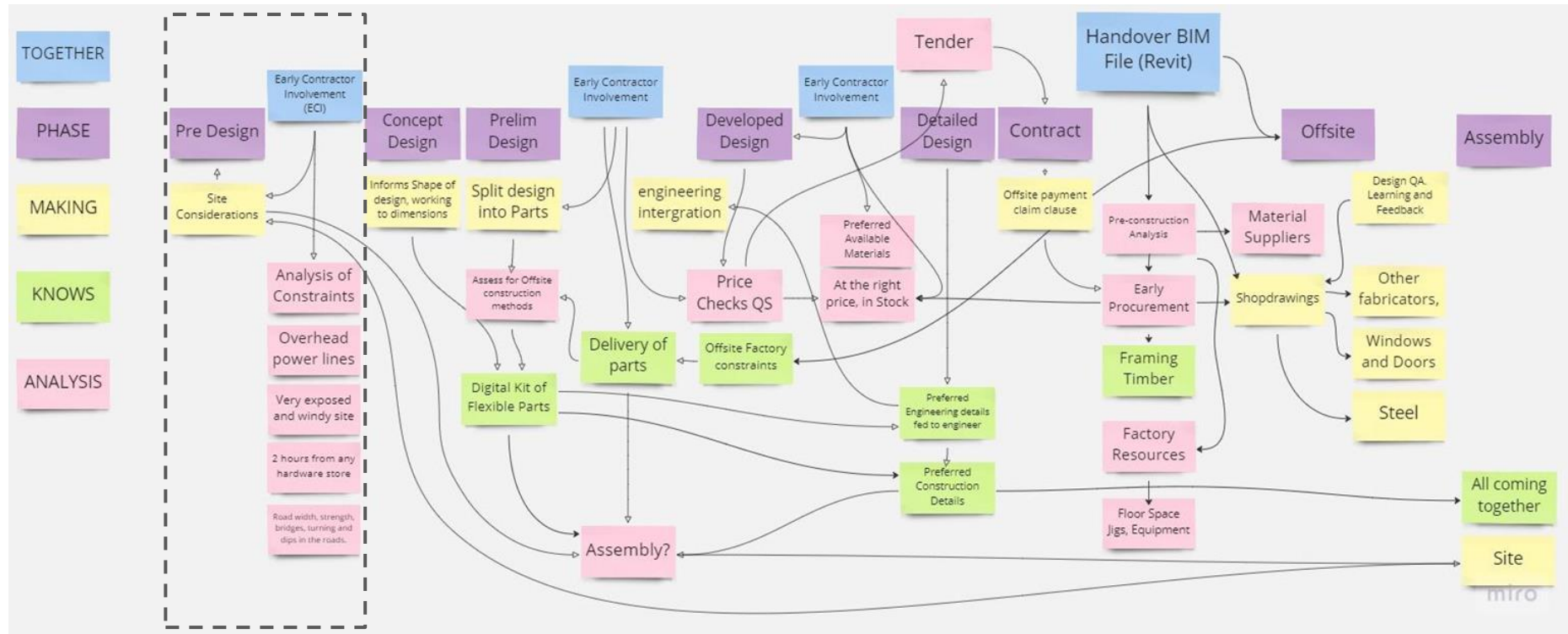
# Scale 1 - Construction

# Simple Workflow



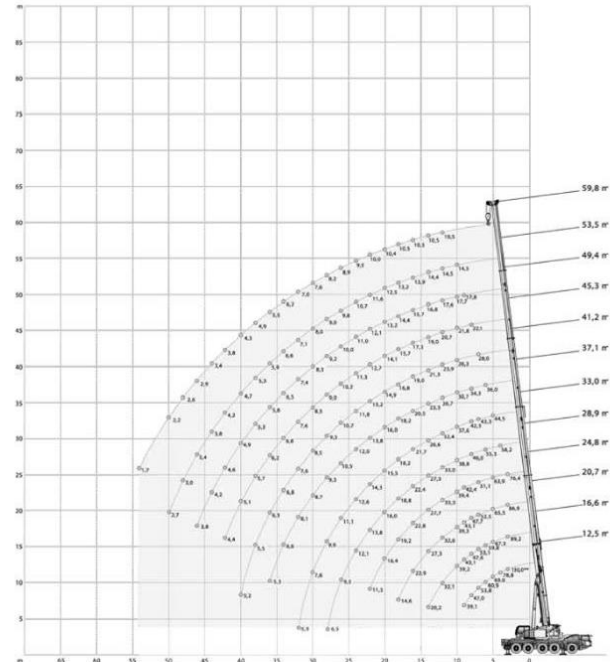
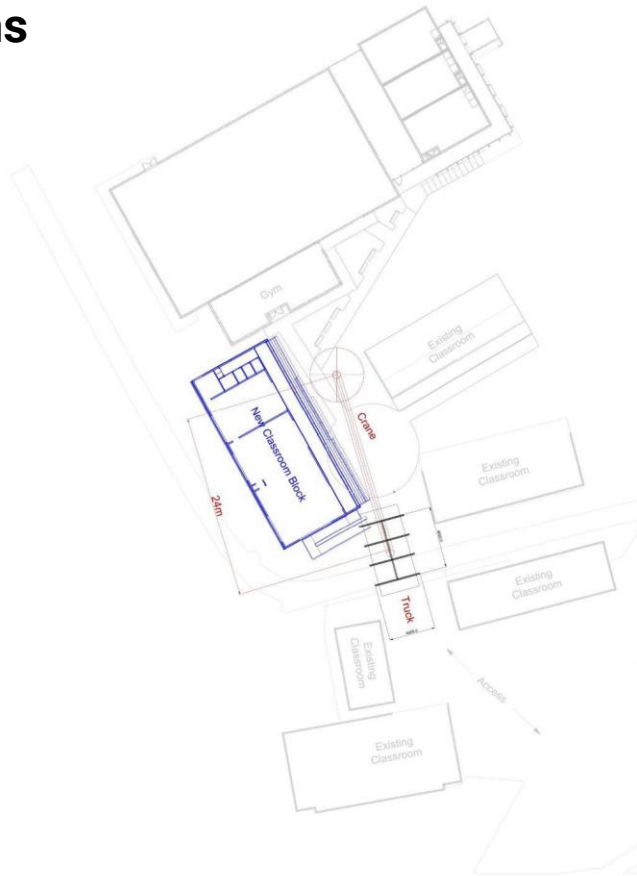
**Early Contractor Involvement = ECI**

# Workflow extended



miro

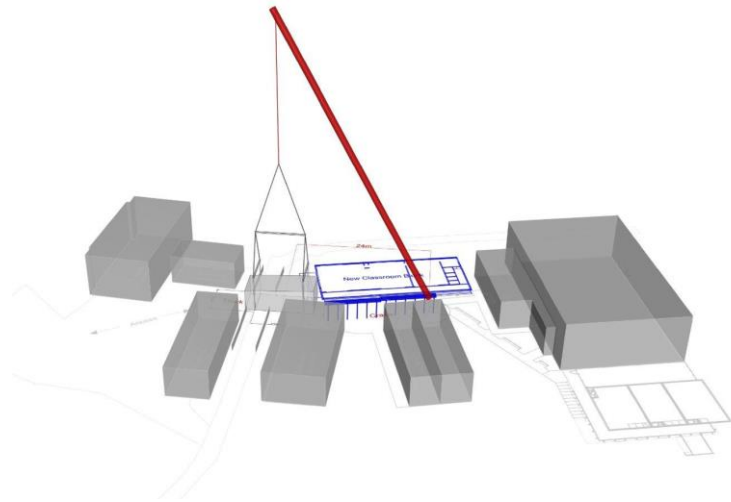
# Site Considerations



\*\* Capacity class - Tragfähigkeitsklasse - Classe de capacité - Classe di portata - Clase de capacidad - Classe de capacidade - Класс грузоподъемности



# Understand Aim



Site Coordination Model



Assembly On-site

# Constraints





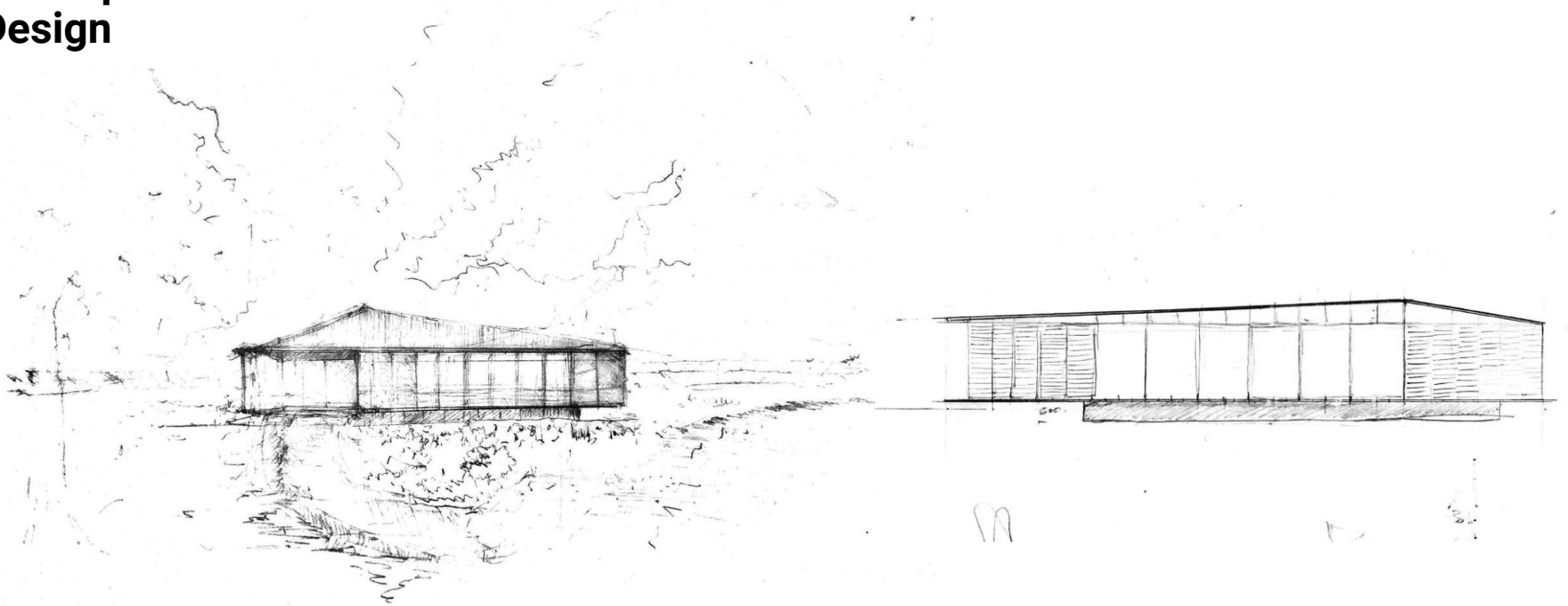
# Context



# Remote Locations



**Concept  
Design**

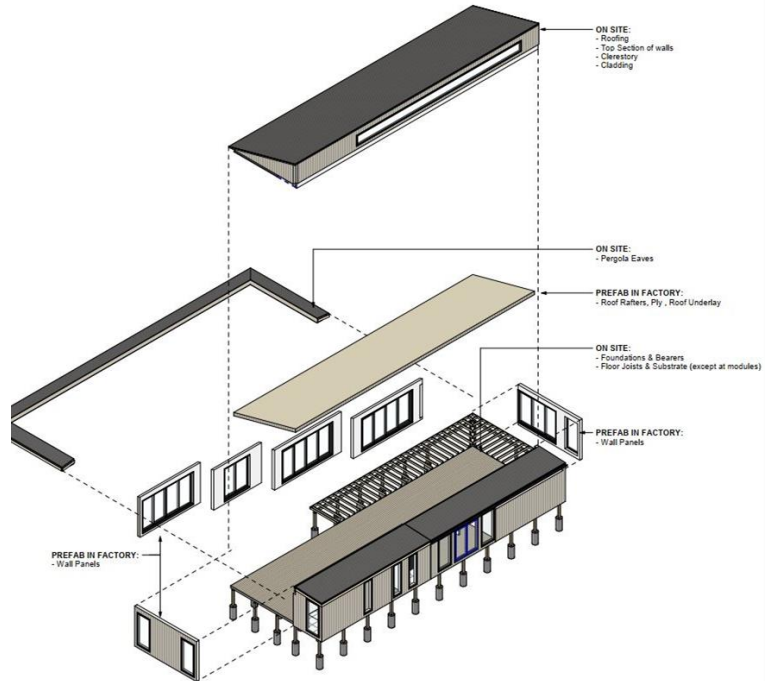




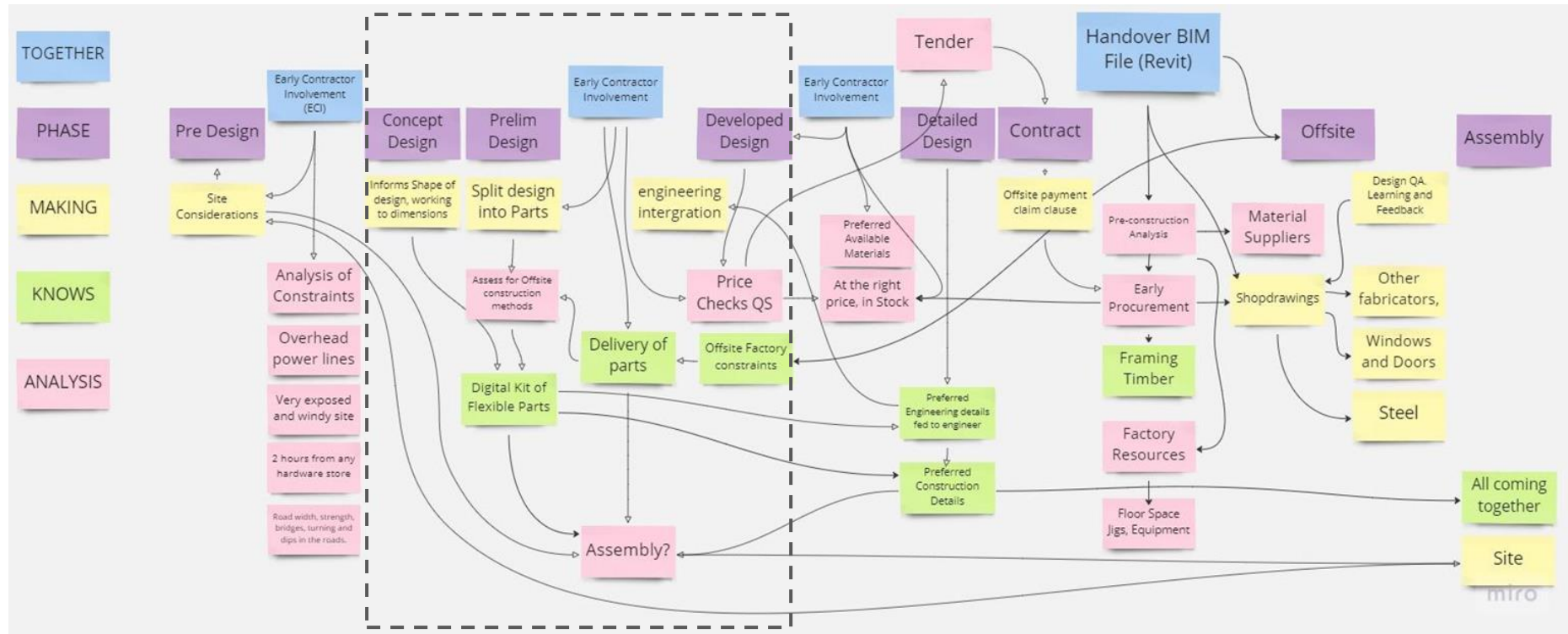




# Prelim Design



# Workflow extended



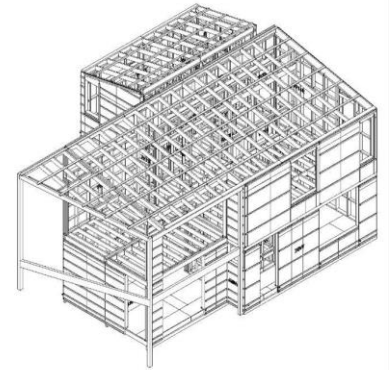
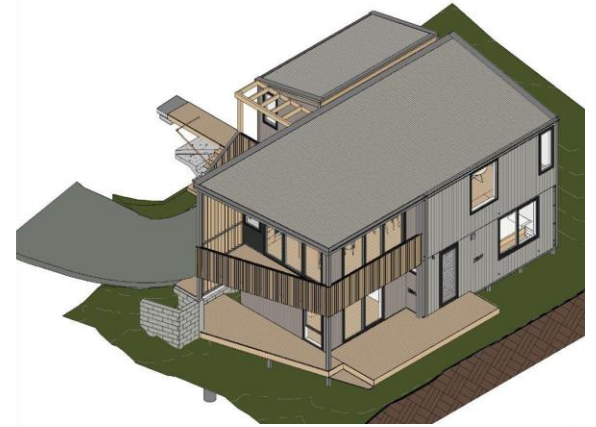
miro

# Splitting in to parts

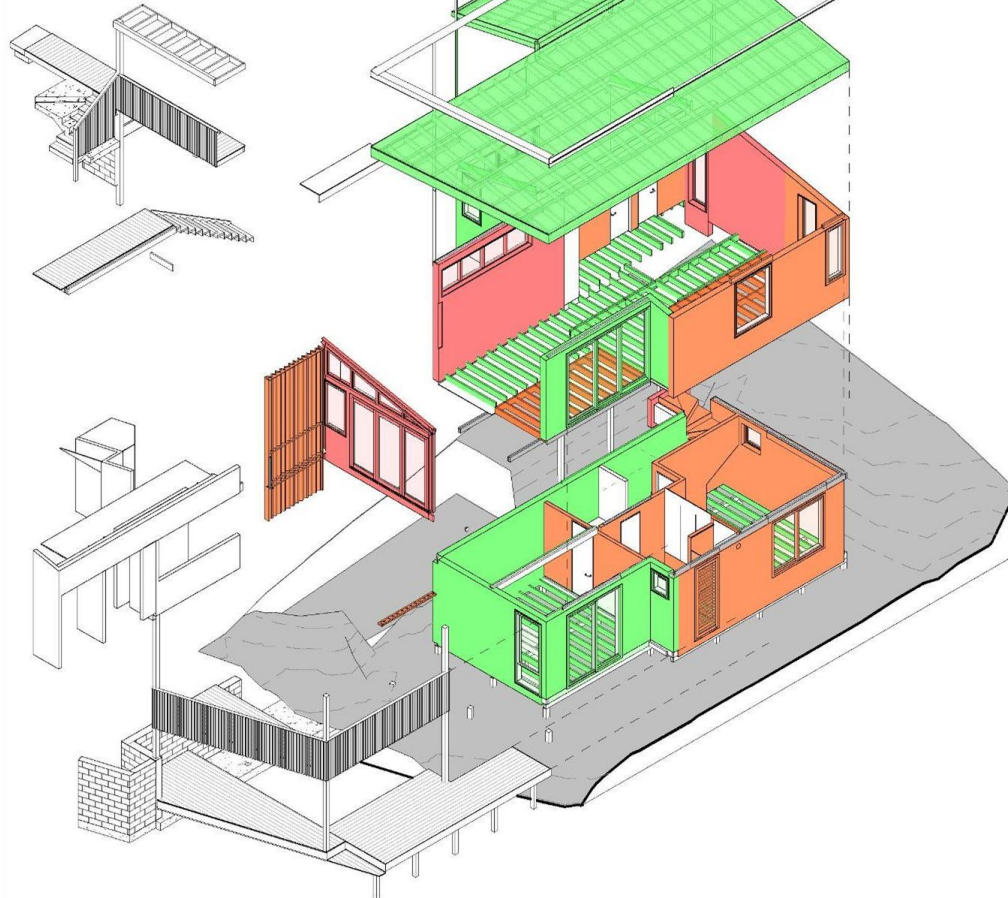
## Offsite %

Design team communicating offsite intentions

- 40% Complete panels
- 25% Limited panels
- 8% Special panels
- 27% Onsite



# Part Layout Assessment



From our set of "knowns" - Offsite constructed panels exterior cladding on and windows installed in panels



Can still be constructed Offsite but requires some onsite work. E.g. Continuous two floors of Metal cladding



Beyond some limits of our typical 'Knowns' and requires specific engineering or detailing.



Built on site, no benefit to constructing offsite.

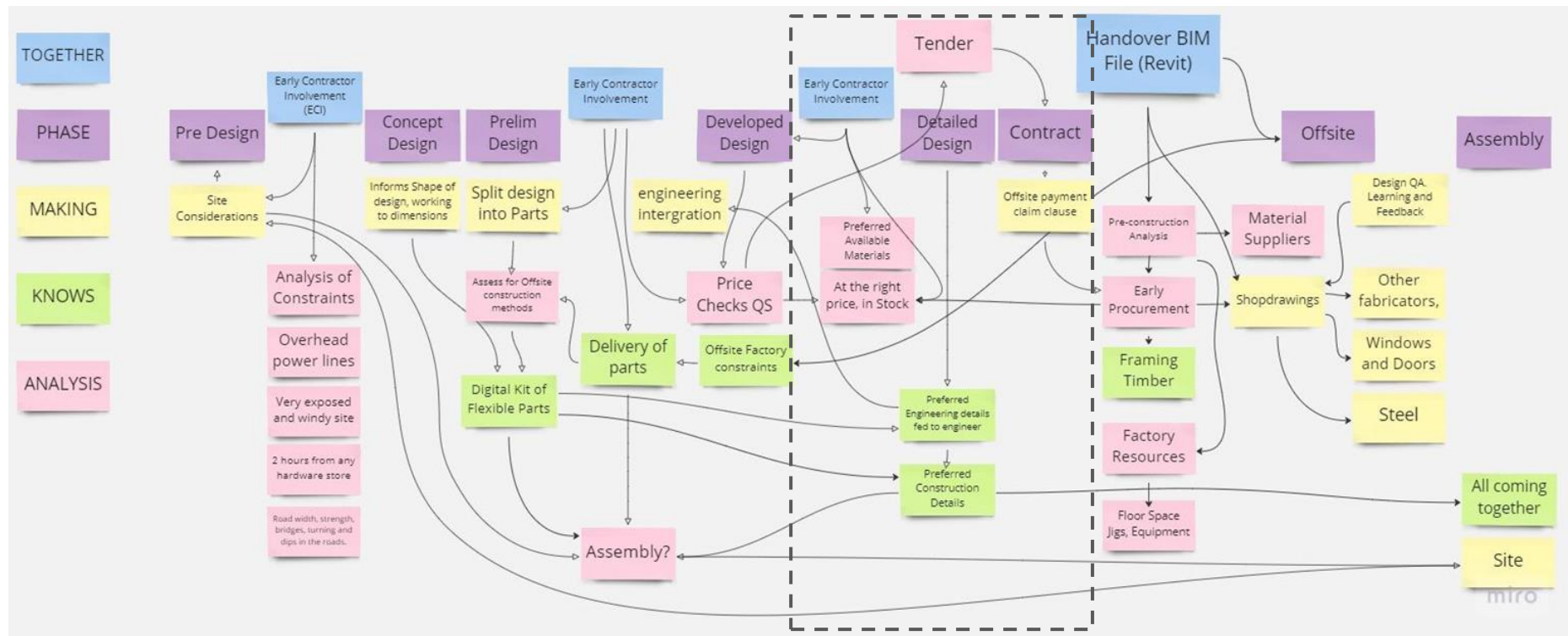


# Early Cost checks

## costing analysis compare design changes

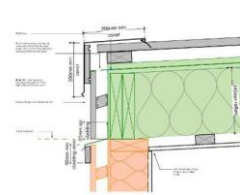
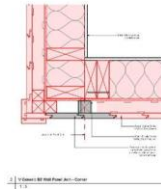
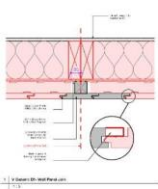
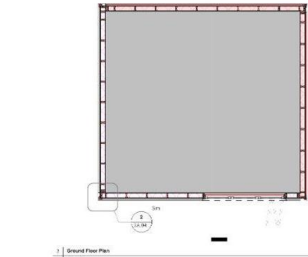
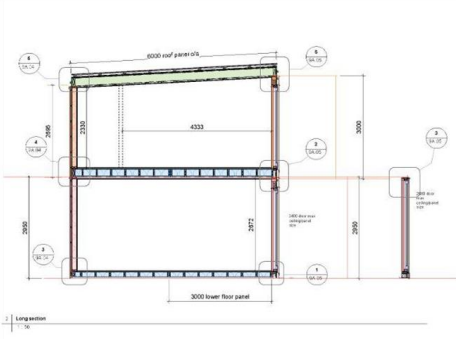
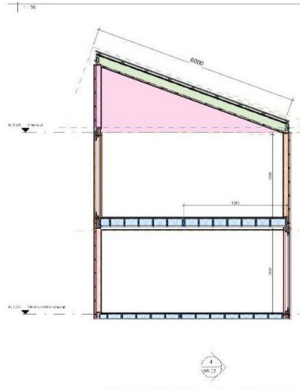
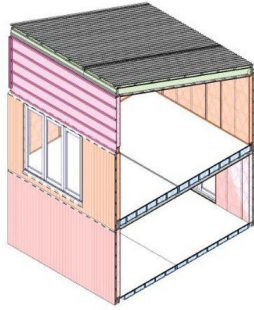
Code	Description	Quantity	UOM	Rate	SubTotal	Total	%	Notes	Former Price	Difference	% Diff
1000	Preliminaries & General	177	m2	478.64	84,720	84,720	7.09%	Project Management, Rates, Scaffolding, Insurance	56,721.00	27,999	49.36%
2220	Site preparation	3	no	966.67	2,900	2,900	0.24%		3,000.00	-100	-3.33%
2240	Excavation, Piling & Foundations	201	m2	465.76	93,617	93,617	7.84%		112,971.00	-19,354	-17.13%
3400	Steel Structure	28	m	865.62	24,237	24,237	2.03%	Steel prices & rates, Steel Stairs	7,978.00	16,259	203.80%
3800	Timber Structure	615	m2	293.66	180,601	180,601	15.12%	Labour rates, Material rates, further detail, allocations	86,085.00	94,516	109.79%
4100	Pre-Cladding	314	m2	115.11	36,143	36,143	3.03%	Material Costs Increases, Labour rates	22,629.00	13,514	59.72%
4200	Wall cladding	258	m2	297.01	76,628	76,628	6.42%	Material Costs Increases, Labour rates	65,858	10,770	16.35%
4300	Roofing	77	m2	149.10	11,481	11,481	0.96%	Material Costs Increases, Labour rates	8,511.00	2,970	34.90%
4500	Windows and doors	70	m2	1,054.29	73,800	73,800	6.18%	Material Costs Increases, Labour rates	74,400.00	-600	-0.81%
4700	Insulation	615	m2	29.49	18,139	18,139	1.52%	Rates for subcontractor installation	7,191.00	10,948	152.24%
5100	Wall and ceiling linings	566	m2	92.50	52,356	52,356	4.38%	Rates for subcontractor installation & material costs	46,998.00	5,358	11.40%
5200	Partitions and doors	8	no	945.75	7,566	7,566	0.63%		8,570.00	-1,004	-11.72%
5500	Joinery fixtures and hardware	1	LS	73,242.00	73,242	73,242	6.13%	Stairs put into timber structure	78,493	-5,251	-6.69%
6200	Tiling	12	m2	1,465.22	17,583	17,583	1.47%	Assumption of material amendment	10,000	7,583	75.83%
6300	Overlay flooring	138	m2	121.77	16,805	16,805	1.41%	Subcontractor general rates for flooring	24,475.00	-7,670	-31.34%
6500	Carpeting	43	m2	135.00	5,805	5,805	0.49%	Area change	2,334	3,471	148.71%
6700	Painting, decoration and coating	835	m2	40.49	33,812	33,812	2.83%	Rates for painter	33,750.00	62	0.18%
7100	Plumbing	177	m2	155.37	27,500	27,500	2.30%	Estimate & Assumptions. Excl. Draininglaying	29,670.00	-2,170	-7.31%
7150	Client Fixture Selections	1	LS	11,666.24	11,666	11,666	0.98%	Material Costs Increases	10,000	1,666	16.66%
7400	Gutters & Downpipes	30	m	140.92	4,228	4,228	0.35%	Subcontractor Cost Increases	2,025.00	2,203	108.77%
7500	Heating and Cooling	177	m2	36.36	6,435	6,435	0.54%	Lower HWC Spec Change	11,690.00	-5,255	-44.95%
7700	Electrical	177	m2	146.89	26,000	26,000	2.18%		25,974.00	26	0.10%
8100	Retaining Walls	116	m2	406.42	47,144	47,144	3.95%	Area calculations, apportioning of materials	53,417	-6,273	-11.74%
8400	Landscape Structures & Decking	102	m2	780.63	79,624	79,624	6.67%	Decking prices, Labour Rates, Detailed Information	46,770.00	32,854	70.25%
	Offsite Overheads 8%	117	m2	691.99	80,962	80,962	6.78%				
	Margin 10%	177	m2	571.77	101,203	101,203	8.47%				
	GFA	177	m2	6,746.87	1,194,196	1,194,196		ex GST			
	Additional from ROC Rev 0										
7700	Solar/Mains	177	m2	51.10	9,045	9,045					
7500	LUNOS & Heating	177	m2	149.83	26,520	26,520					
8400	Carpad	30	m2	960.66	28,820	28,820					
	Overheads 8%	117	m2	44.02	5,151	5,151					
	Margin 10%	177	m2	36.38	6,438	6,438					
	GFA	177	m2	429.23	75,974	75,974		ex GST			
	<b>TOTAL FOR BUILDING</b>					\$ 1,270,170.1					
						\$ 1,460,695.1					

# Workflow extended

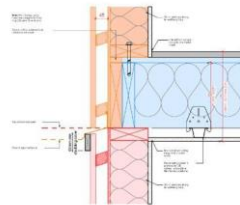




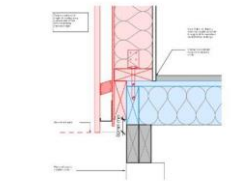
# Detailed Design



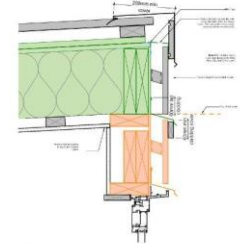
1 | Elevation 01 - Roof/Floor Junction



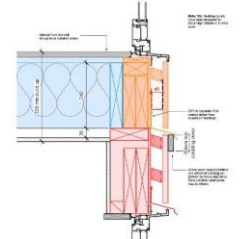
2 | Elevation 02 - Wall/Floor Junction



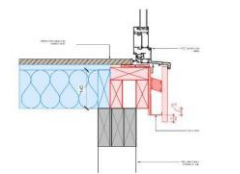
3 | Elevation 03 - Wall/Floor Junction



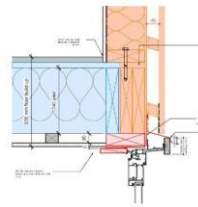
4 | Elevation 04 - Roof/Floor Junction - Roof



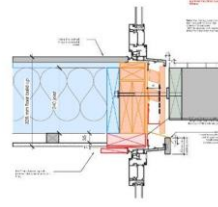
5 | Elevation 05 - Wall/Floor Junction - Roof



6 | Elevation 06 - Wall/Floor Junction



7 | Elevation 07 - Wall/Floor Junction - Roof



8 | Elevation 08 - Wall/Floor Junction - Roof

# Construction alert lists

“Supporting each other”

**PROJECT ALERTS**

**SHOP DRAWING REVIEW:**

- The Architectural Specification outlines requirements for review of shop drawings (Section 120):
- Review of shop drawings should be allowed for in the programme. Once shop drawings have been prepared and/or coordinated by the contractor, they should be resubmitted to the architect. The time to be allowed for review of shop drawings is 10 working days. The format for review is specific to different contractors.
- WooliesClear priority: Once the Contractor has received and coordinated the manufacturer's drawings (except pdf), these are to be resub to M&A to review.

**CONSTRUCTION ALERTS**

Mark	Location	Alert	Comments
CLADDING	SK18	CUT DOWN STANDARD BOARD TO CREATE RECESS/SUITY JOINT. NO CUSTOM MOULD	
CONSTRUCTION	SK17	EXTRA 20 WALL FOR SHOWER NICHE	
CONSTRUCTION	SK17	PARTIAL SERIAL 1 FOR SHOWER SHELF	
CONSTRUCTION	76.00	CENTRE OF BASK, TAP AND MIRROR TO ALIGN WITH CENTRE OF SKYLIGHT ABOVE	
CONSTRUCTION	SK17	FRAME OUT WALL, 90°	
CONSTRUCTION	SK17	PROPOSED ROCK CLIMBING WALL ADD EXTRA BLOCKING/TE PLY LINING AND GIBPOINT FINISH	
CONSTRUCTION	SK18	REFER TO ENG. PFC ENDPLATE EXTENDS 300 FACE OF STUD	
CONSTRUCTION	SK18	ALL CORNERS/EDGES OF BASK TAPED WITH FIB TAP	
CONSTRUCTION	SK18	ENSURE ALIGNMENT BETWEEN BATTENS AND FRESH FACE OF CLADDING	
CONSTRUCTION	SK18	CUT BOARDS TO FIT	
CONSTRUCTION	SK18	DISCUS ON SITE. PROPRIETARY BASE, CAST IN PLACE COVER	
CONSTRUCTION	SK18	SEALY BRACKET CAST INTO SLAB	
CONSTRUCTION	SK18	CUSTOM ALUMINIUM EXTRUSION NEEDED TO CAP REVEAL ADAPTOR OF COURTYARD SLIDER. FORMER COURTESY KARRARA	
CONSTRUCTION	SK17	PROPOSED ROCK CLIMBING WALL ADD EXTRA BLOCKING/TE PLY LINING AND GIBPOINT FINISH	
CONSTRUCTION	SK17	PROPOSED ROCK CLIMBING WALL ADD EXTRA BLOCKING/TE PLY LINING AND GIBPOINT FINISH	
CONSTRUCTION	SK18	CHAMFER BATTEN TO CREATE DRAINAGE PATH	
ELECTRICAL	SK18	ALLOW FOR DOWNLIGHT DOWNLET TERMINATING OUT WALL	
ELECTRICAL	SK18	COORDINATE ON SITE - POSSIBLY HAVE DATA AND POWER IN STAIRCASE FOR BEARERS LOOK UP WALL	

**SAMPLES:**

- ONSITE SAMPLE OF CONCRETE SLAB FINISH (UNDER STAIR OR BALCONY) TO BE APPROVED BEFORE CONTINUE

**1 | DETAIL - GUTTER AGAINST BUILDING**

**1 : 5**

## Tender Summary

1000	Preliminaries & General	\$81,178.00
2220	Site preparation	\$5,720.00
2240	Excavation & Foundations	\$0.00
3400	Steel Structure	\$27,709.42
3800	Timber Structure	\$158,937.97
4100	Pre-Cladding	\$26,939.38
4200	Wall cladding	\$69,759.36
4300	Roofing	\$29,515.30
4500	Windows and doors	\$71,423.00
4700	Insulation	\$11,556.23
5100	Wall and ceiling linings	\$38,381.27
5200	Partitions and doors	\$6,545.00
5500	Joinery fixtures and hardware	\$58,663.00
6300	Overlay flooring	\$36,724.19
6700	Painting, decoration and coating	\$18,749.50
7100	Plumbing	\$53,880.57
7400	Gutters & Downpipes	\$7,021.49
7500	Heating and cooling	\$31,479.57
7700	Electrical	\$28,600.00
	Margin 10%	\$76,278.33
	GFA	\$839,061.58
8400	External Works & Decking, incl. Stairs	\$120,072.62
	Margin 10%	\$12,007.26
	GFA	\$132,079.88
	<b>TOTAL FOR BUILDING</b>	<b>\$971,141.46</b>

### Itemised Areas

All itemised areas include margins and overheads. GST is excluded.

#### House

Accoya Cladding 115 Cover | **\$52,364.93**

Lunawood Cladding 135 Cover | **\$29,920.88\***

Verdus Thermally Modified Spruce Cladding 113 Cover | **\$31,772.18\***

Sarking Ceiling /m2 Cost (incl. Material & labour install/no painting) | **\$193.60/m2**

Gib Ceiling /m2 Cost (incl. material/labour/stopping/no painting) | **\$54.45/m2**

Primary interior joinery (Kitchen/ Bathroom/ Laundry) | **\$53,845.00**

Secondary interior joinery (Lounge Shelving and Entertainment/ Wardrobes)\* | **\$12,100.00**

#### External

Car Pad | **\$27,331.90**

Engineered stairs and balustrade | **\$18,220.07**

Simple low level straight flight stairs as above | **\$9,483.69**

Decking area | **\$25,698.48**

Paving area | **\$4,138.20**

On site built canopy including entry screen | **\$14,053.55**

\*Excluded from pricing/not in summary total

# BIM Transition to Build Team



	SELECTION	COMMENTS	SUPPLIED BY	STATUS
81	S5500-BT BENCH TOP Caeserstone - Primordia Size:20mm Thickness Location: Kitchen, Island and Pantry Bench, Laundry Bench		Contractor	Confirmed
82	H5574-HR HANDRAIL Victorian Ash Handrail	dimension (35dia) Coatings & Brackets to be specified	Contractor	TBC
83	S5432-C CORKOLEUM Ecofloors Corkoleum Natural Cork Colour: Grit Thickness: 3mm Location: Staircase Coating: Bona Primar x2 Coats and Bona WB Traffic x1 Coat		Contractor	Confirmed
84	S5432-CF CORK TILE Corkit Cork Tile Colour: Desert Sands Thickness: 6mm Location: All First Floor, Except Bathrooms and Staircase Finish: 1 Coat of Matt Bona Traffic HD		Contractor	Confirmed
85	S6200-TL TILES Size:7mm Wall, 10mm Floor. Location: Bathroom Wall Tiles Bathroom Floor Tiles Outdoor Cooking Wall and Kitchen and Pantry Splash Back Heat and Impact Resistant	REFINE	Client	TBC
86	S5500-WS WARDROBE AND STORAGE Futura HPL Colour: TBC Carcase: 16mm MDF HPL with edgetap (Preference Grey) Hardware: TBC	Where is this? Same as WARDROBE JOINERY? Secondary Pricing - PS sum.	TBC	TBC
87	S5500-LJ LAUNDRY JOINERY Product: Plantation Bamboo - Vertical Coffee Bamboo Panel Thickness: 18mm Size:Refer Laundry Drawings Location: Laundry Finish: 2 Coats of Diamond Oil Active (TBC)	Bamboo?	Contractor	TBC

X SURFACES				
ID	Title	Description	Supplied	Status
S5432-C	CORKOLEUM	Ecofloors Corkoleum Natural Cork Colour: Grit Thickness: 3mm Location: Staircase Coating: Bona Primar x2 Coats and Bona WB Traffic x1 Coat	Contractor	Confirmed
S5432-CF	CORK TILE	Corkit Cork Tile Colour: Desert Sands Thickness: 6mm Location: All First Floor Except Bathrooms and Staircase Finish: 1 Coat of Matt Bona Traffic HD	Contractor	Confirmed
S5500-BT	BENCH TOP	Caeserstone - Primordia Size:20mm Thickness Location: Kitchen, Island and Pantry Bench, Laundry Bench	Contractor	Confirmed
S5500-LJ	LAUNDRY JOINERY	Product: Plantation Bamboo - Vertical Coffee Bamboo Panel Thickness: 18mm Size:Refer Laundry Drawings Location: Laundry Finish: 2 Coats of Diamond Oil Active (TBC) Colour: Natural Hardware: TBC	Contractor	TBC
S5500-V	VANITY JOINERY	Product: Plantation Bamboo - Vertical Coffee Bamboo Panel Thickness: 18mm Finish: 2 Coats of Diamond Oil Active (TBC) Colour: Natural Hardware: TBC	TBC	TBC
S5500-WS	WARDROBE AND STORAGE	Futura HPL Colour: TBC Carcase: 16mm MDF HPL with edgetap (Preference Grey) Hardware: TBC	TBC	TBC
S5510-W	KITCHEN JOINERY	Product: Plantation Bamboo - Vertical Coffee Bamboo Panel Thickness: 18mm Size:Refer Kitchen Drawings Location: Kitchen Finish: 2 Coats of Diamond Oil Active (TBC) Colour: Natural Hardware: TBC	TBC	TBC
S5510-W	WARDROBE JOINERY	Futura HPL Colour: TBC Carcase: 16mm MDF HPL with edgetap (Preference Grey) Hardware: TBC	TBC	TBC
S6200-TL	TILES	Size:7mm Wall 10mm Floor. Location: Bathroom Wall Tiles Bathroom Floor Tiles Outdoor Cooking Wall and Kitchen and Pantry Splash Back Heat and Impact Resistant	Client	TBC


# BIM Transition to Build Team




EXTERIOR SIDING		REFERENCE LINKS	
Supplier:	UNION		
Application:	All sides and ends of house		
Location:	Front Entry Deck		
Preparation:			
Topcoat System:			
Colour:			

WINDO/WINE REVEALS (PAINTED)		REFERENCE LINKS	
Supplier:	Resene Paints & Oils - East Auckland		
Application:	Dark to White - 1 coat - Full Door / Window / Track		
Location:	All Windows		
Preparation:	Scrub to 100% No. 2 / 1 Hour and Spec Sheet 2:1/1		
Primer / Sealer:	1 coat of Resene Quick Dry - Primer Undercoat		
Topcoat System:	2 coats of Resene Lumbersider - low sheen		
Colour:	White		

SCHEDULE OF COLOURS/PAINTS/STAIN SPECIFICATION	
Supplier:	UNION
Application:	Exterior Timber Cladding, Fascia Board, Deck Balustrade, External Screen and Front Door T&G Panelling
Location:	above colour swatch
Preparation:	Scrub to 100% No. 2 / 1 Hour and Spec Sheet 2:1/1
Primer / Sealer:	1 coat of Resene Quick Dry - Primer Undercoat
Topcoat System:	2 coats of Resene Lumbersider - low sheen
Colour:	White

EXTERIOR - TIMBER WEATHERBOARDS + EXTERNAL BALUSTRADE + FASCIAS + FRONT DOOR - T&G PANELLING		
Supplier:	Unknown	 <p>Vulcan Natural</p>
Application:	Exterior Timber Cladding, Fascia Board, Deck Balustrade, External Screen and Front Door T&G Panelling	
Location:	Whole exterior envelope	
Preparation:		
Topcoat System:	Abodo Vulcan Oil: (Wood Protector Oil) 1st coat to all sides <b>factory applied</b> . 2nd coat applied on site. Ensure all cut ends are <b>double</b> coated. Allow 24-48 Hours to dry	
Colour:	Vulcan Natural	

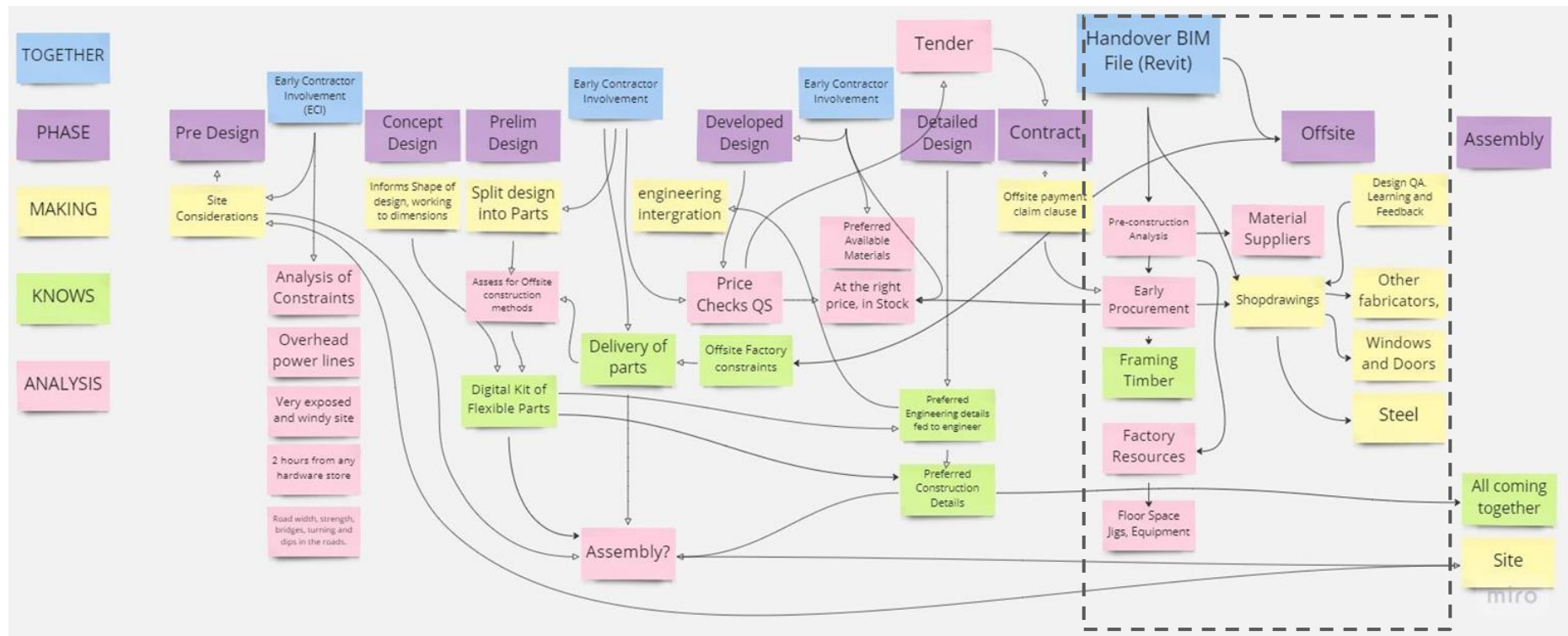
EXTERIOR PROLAM POST & EXTRA WIDE FASCIA - TRICOYA		
Supplier:	Resene Paints Ltd (NZ) - Sarah Cummins	
Application:	All sides and ends of post	
Location:	Entrance and FF Deck Fascia	
Preparation:	Refer to SIPDS No. 2 Timber and Spec Sheet 2:1/1	
Primer / Sealer:	1 coat of Resene Quick Dry - Primer Undercoat	
Topcoat System:	2 coats of Resene Lumbersider - low sheen	
Colour:	Resene Paddock (Same as Colorsteel Mist Green)	
Notes:	Ensure all cut ends are coated during installation.	

Supplier:	UNION		
Application:	Exterior Timber Cladding, Fascia Board, Deck Balustrade, External Screen and Front Door T&G Panelling		
Location:	above colour swatch		
Preparation:	Scrub to 100% No. 2 / 1 Hour and Spec Sheet 2:1/1		
Primer / Sealer:	1 coat of Resene Quick Dry - Primer Undercoat		
Topcoat System:	2 coats of Resene Lumbersider - low sheen		
Colour:	White		

PROJECT ADDRESS	CLIENT	DATE	DESCRIPTION	REVISED	SCALE	DATE
10111	10111	15/03/2023	Construction Drawings	1	1:100	15/03/2023
1012	1012	14/03/2023	Site Detail	1	1:100	15/03/2023
1013	1013	28/10/2022	Building Contract	1	1:100	15/03/2023

Schedules of Paint Systems Specification		DESCRIPTION		REVISED		DATE	
1	100	1	100	1	100	1	100

# Workflow extended



miro



## Procurement & Administration



# BIM Transition to Build Team

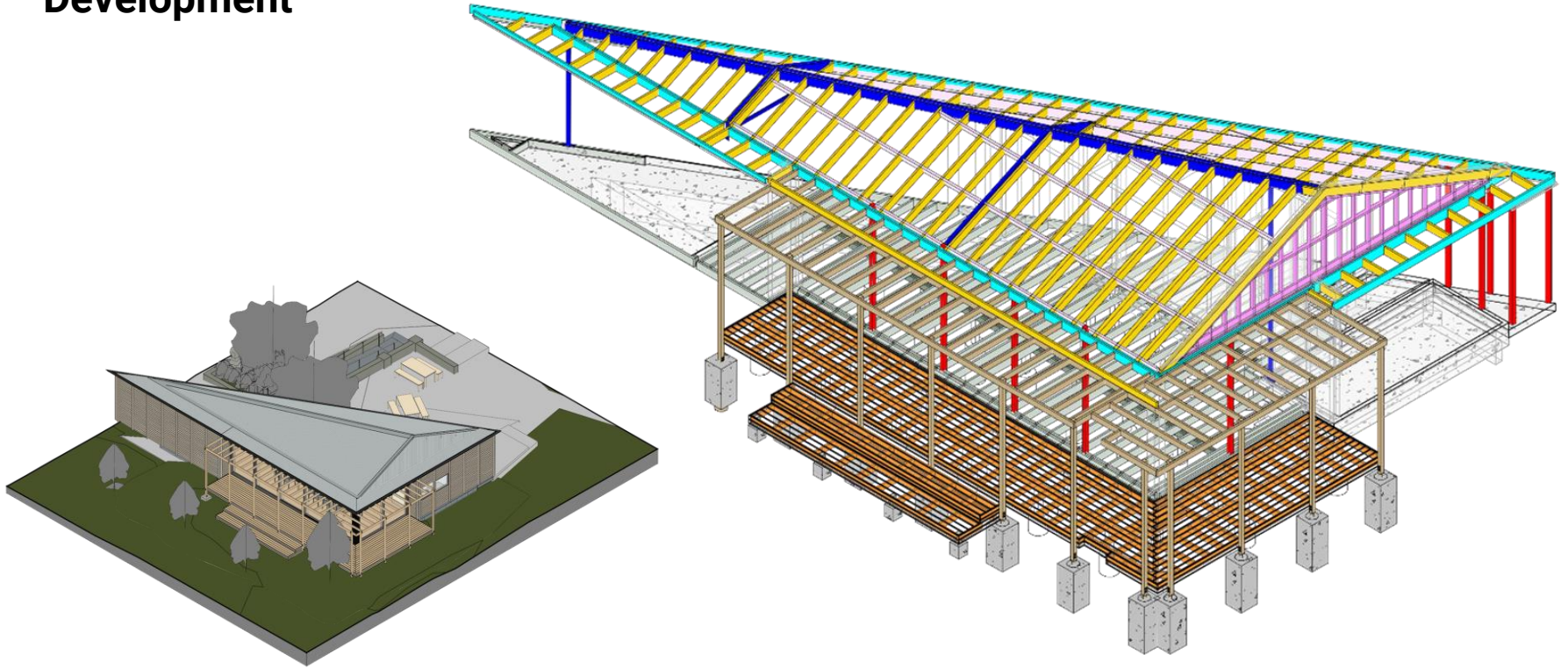


# Motivational Images

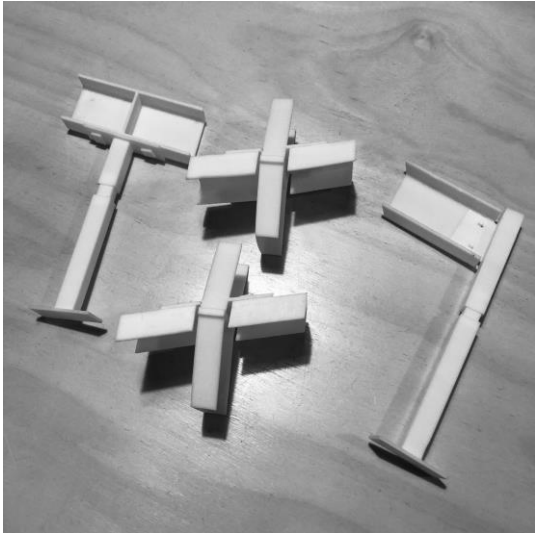


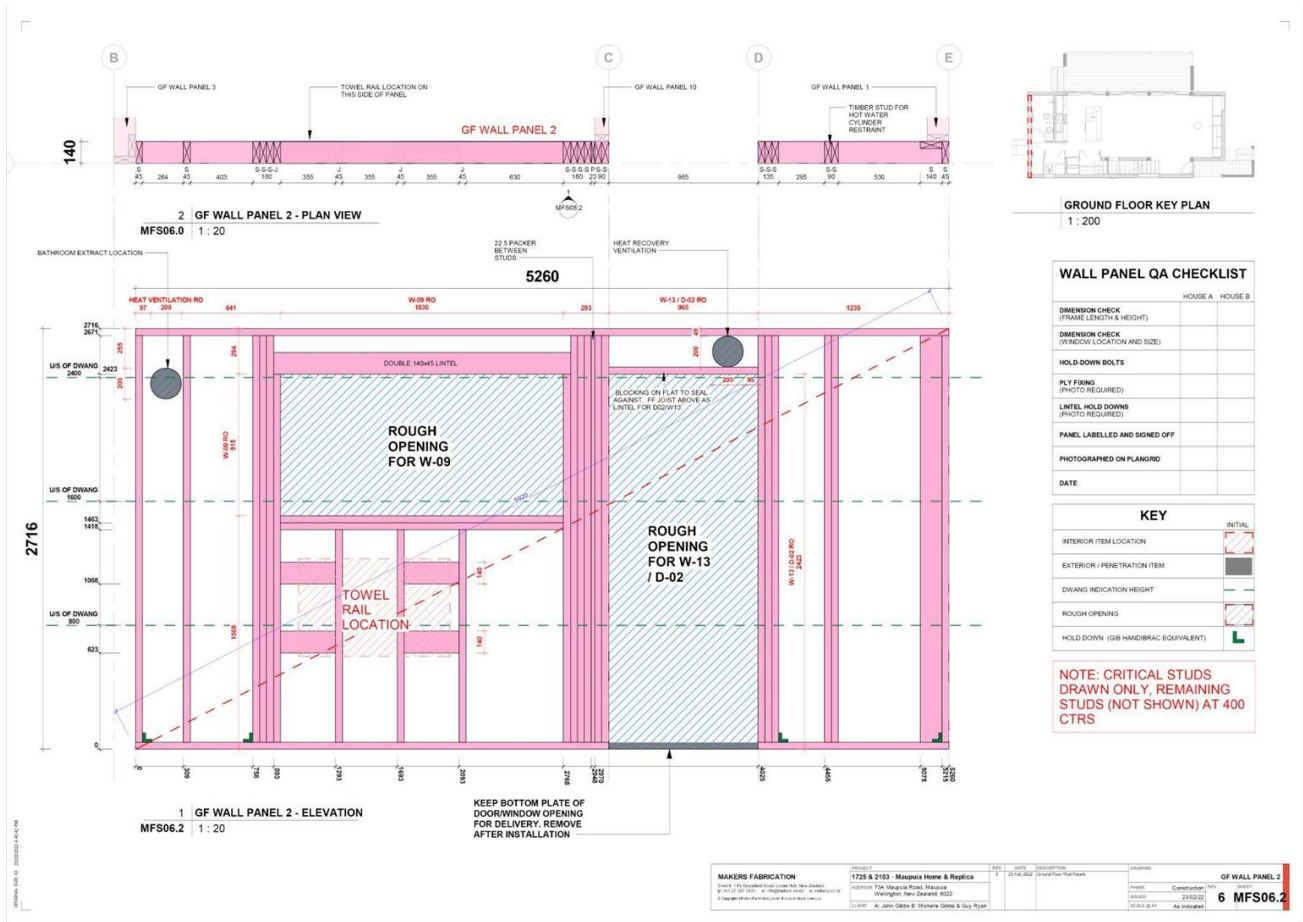


 **BIM**  
**Development**

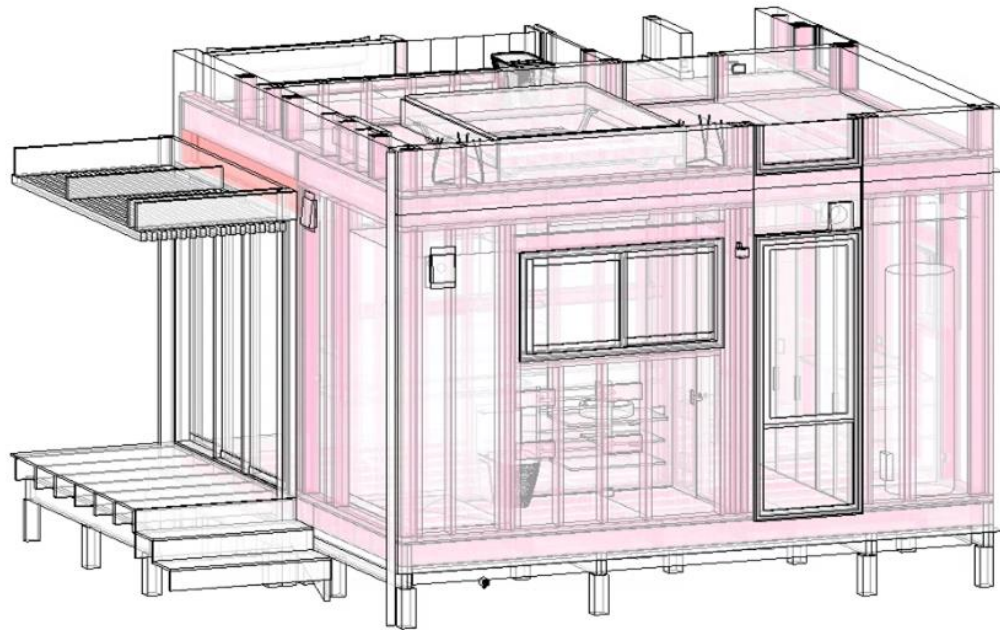


 **Digital  
Fabrication**





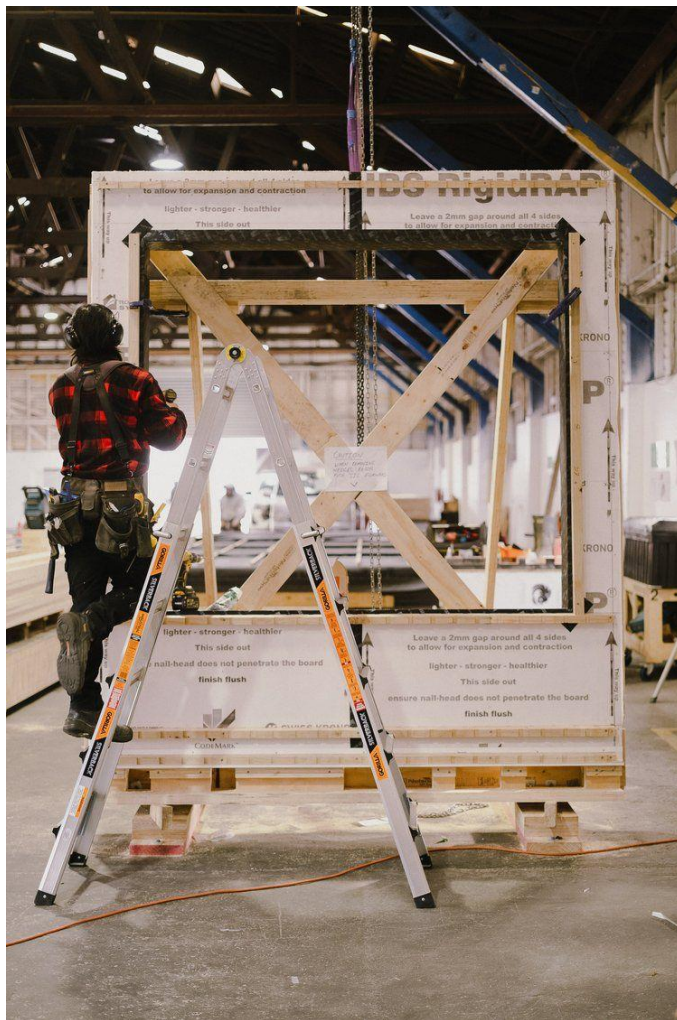




# Offsite Control

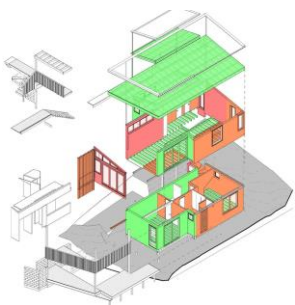
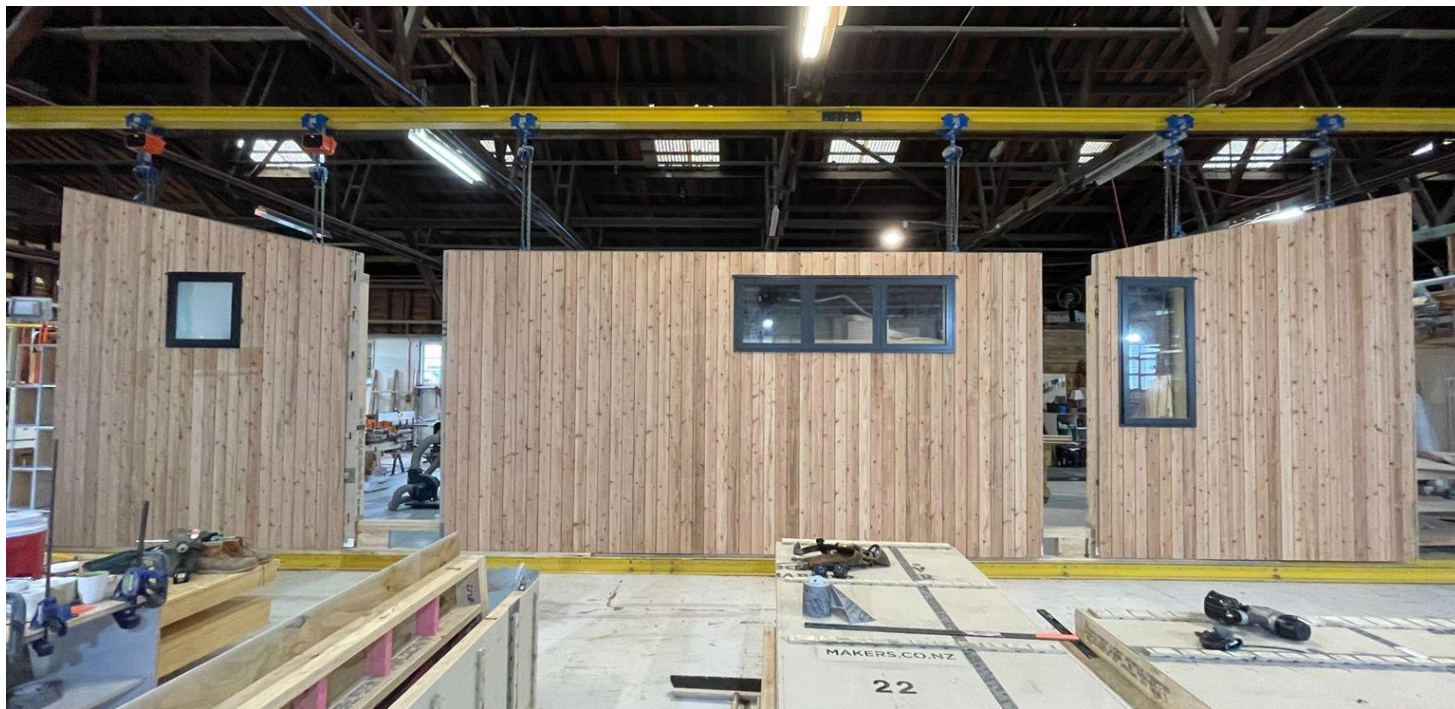


# Fabrication QA Check





Ready to  
roll



# Procurement & Offsite Payments

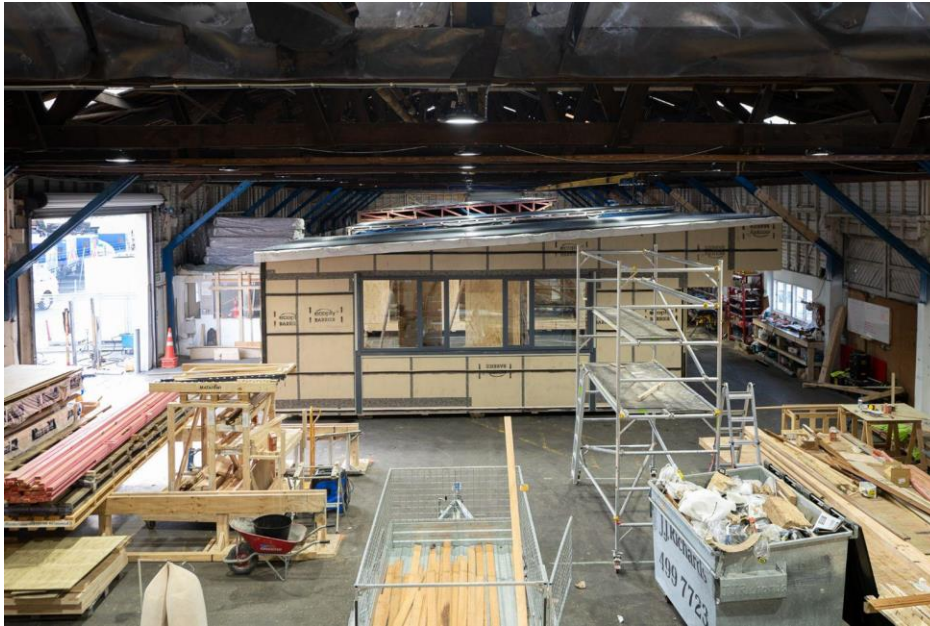
## Schedule B1 Specific conditions

### Clause 14.1.2

### Off Site Payments

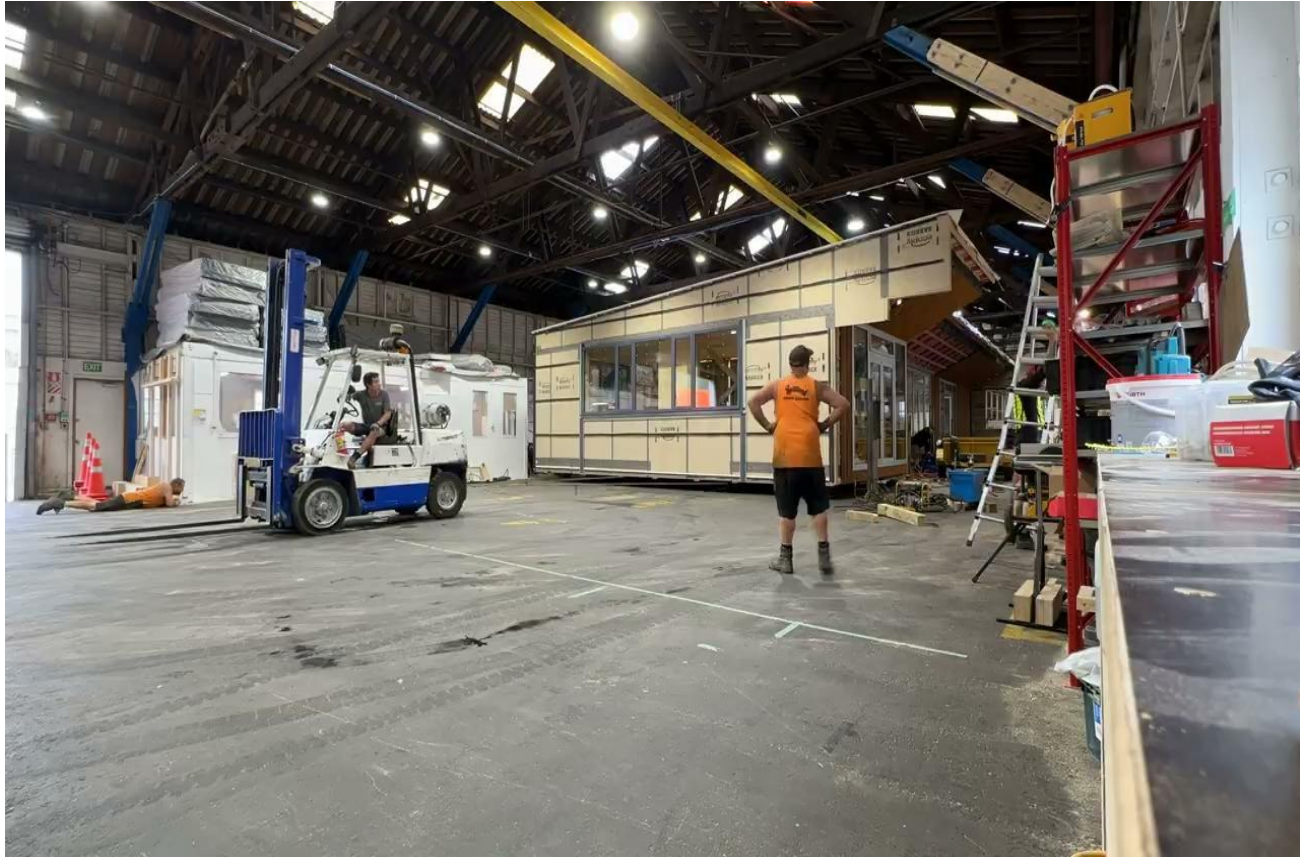
Offsite payments are allowed but only for the following:

- Contractors to identify specific elements prior to payment claims. These items are to be identified and tracked in the register by the main contractor outlining ownership of goods by principal until secured on site. e.g. Photos of goods with principal identification, each pack of materials should have packing slip in.





# Transport



# Assembly



 HoloLens  
Aid





 HoloLens  
Aid



# Site Days



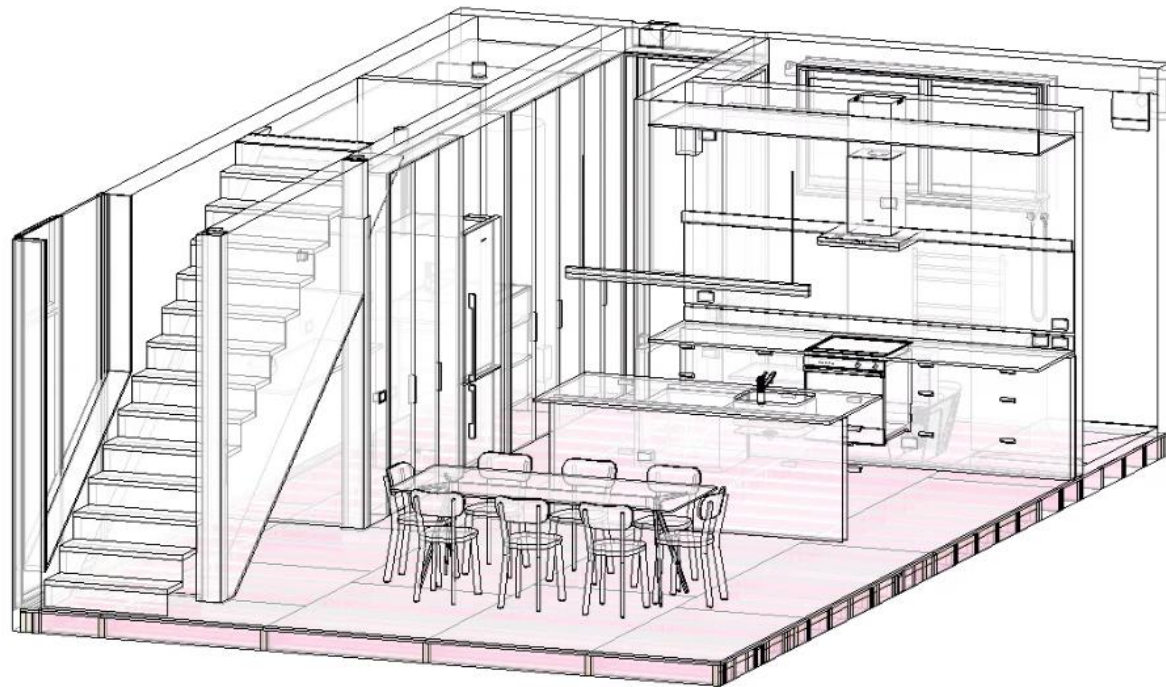


 Happy Home



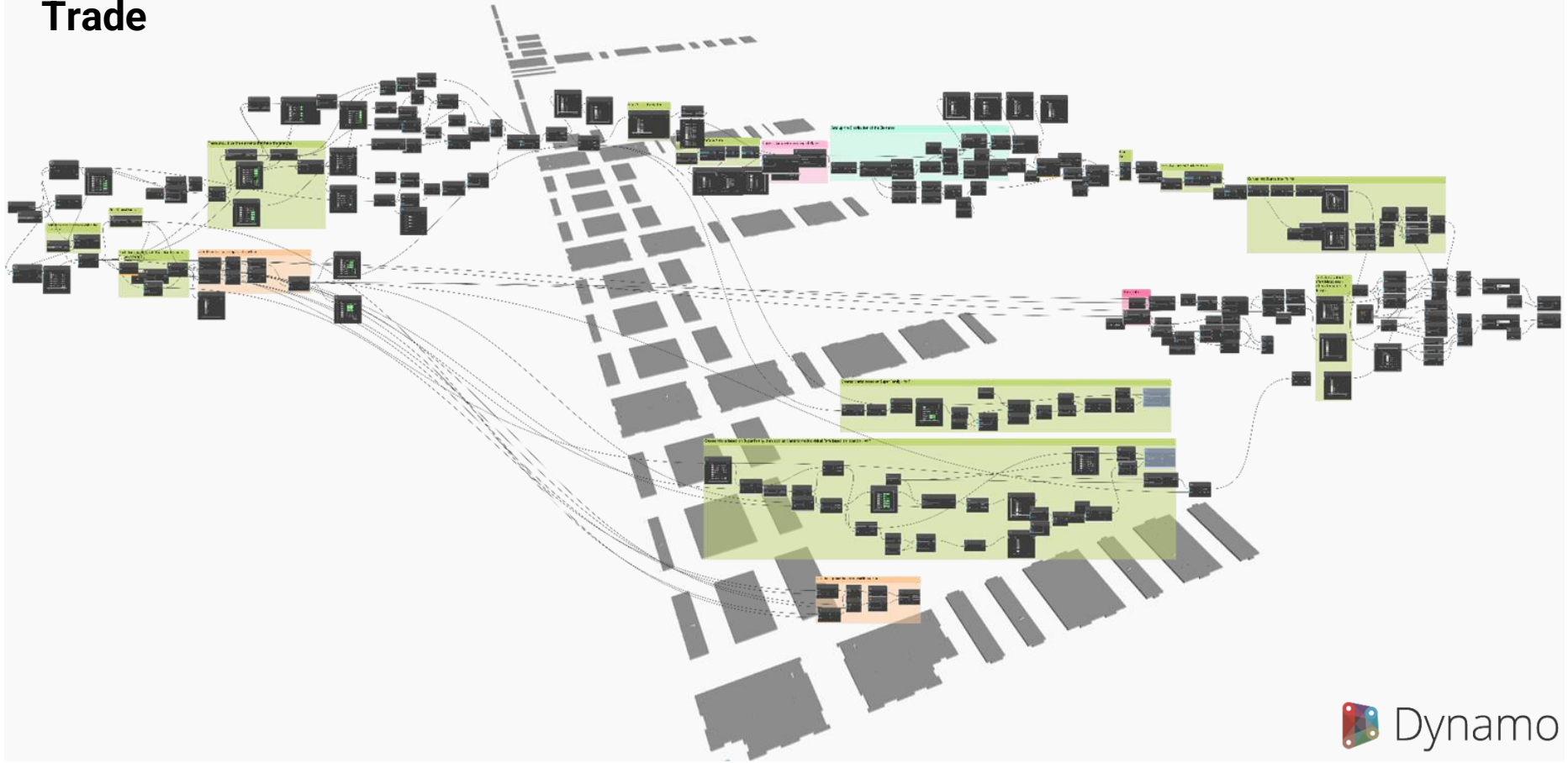
# Scale 2 - Joinery & Fitout

Same  
process and  
part of the  
solution



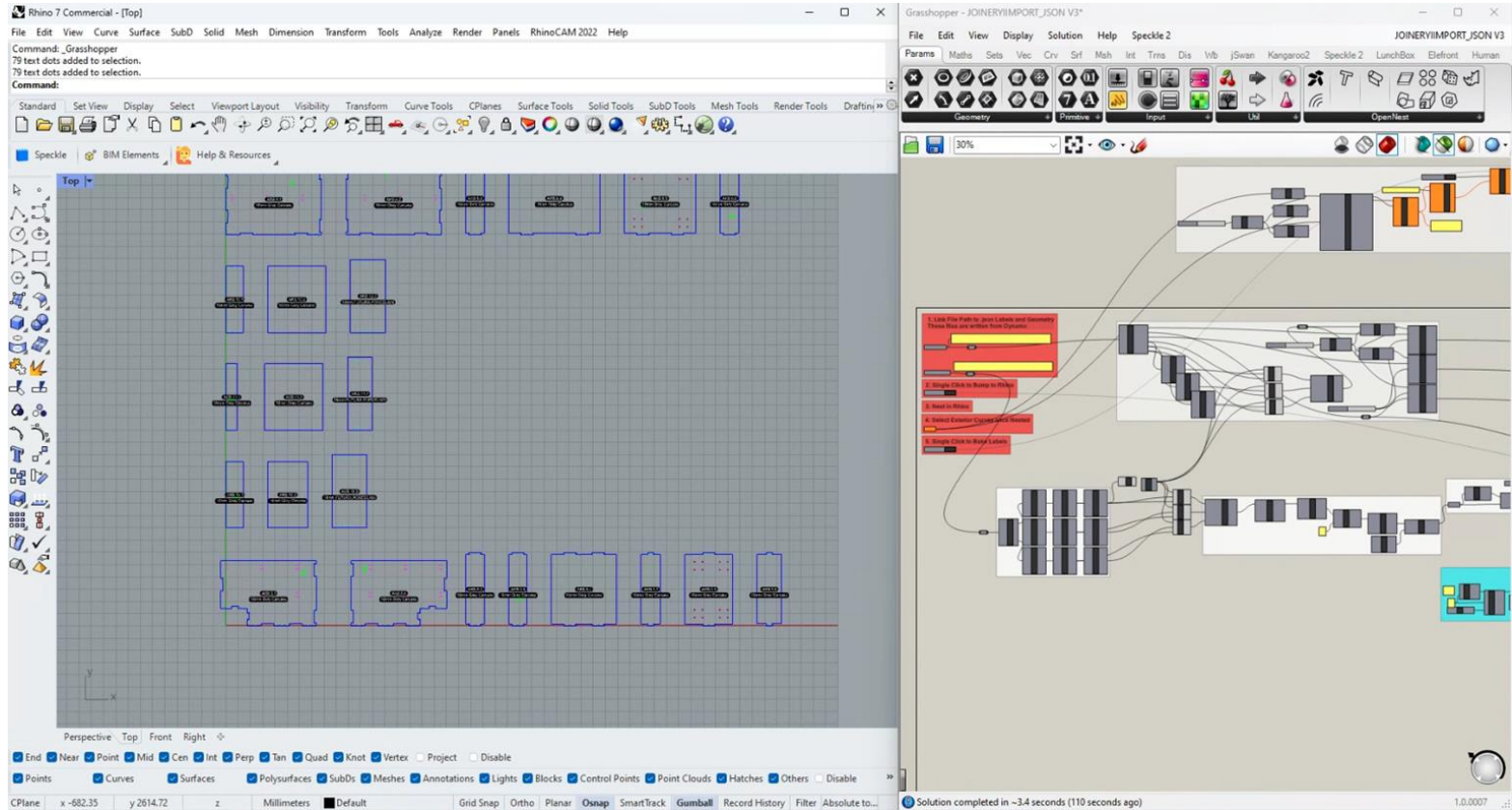


# Tools of the Trade

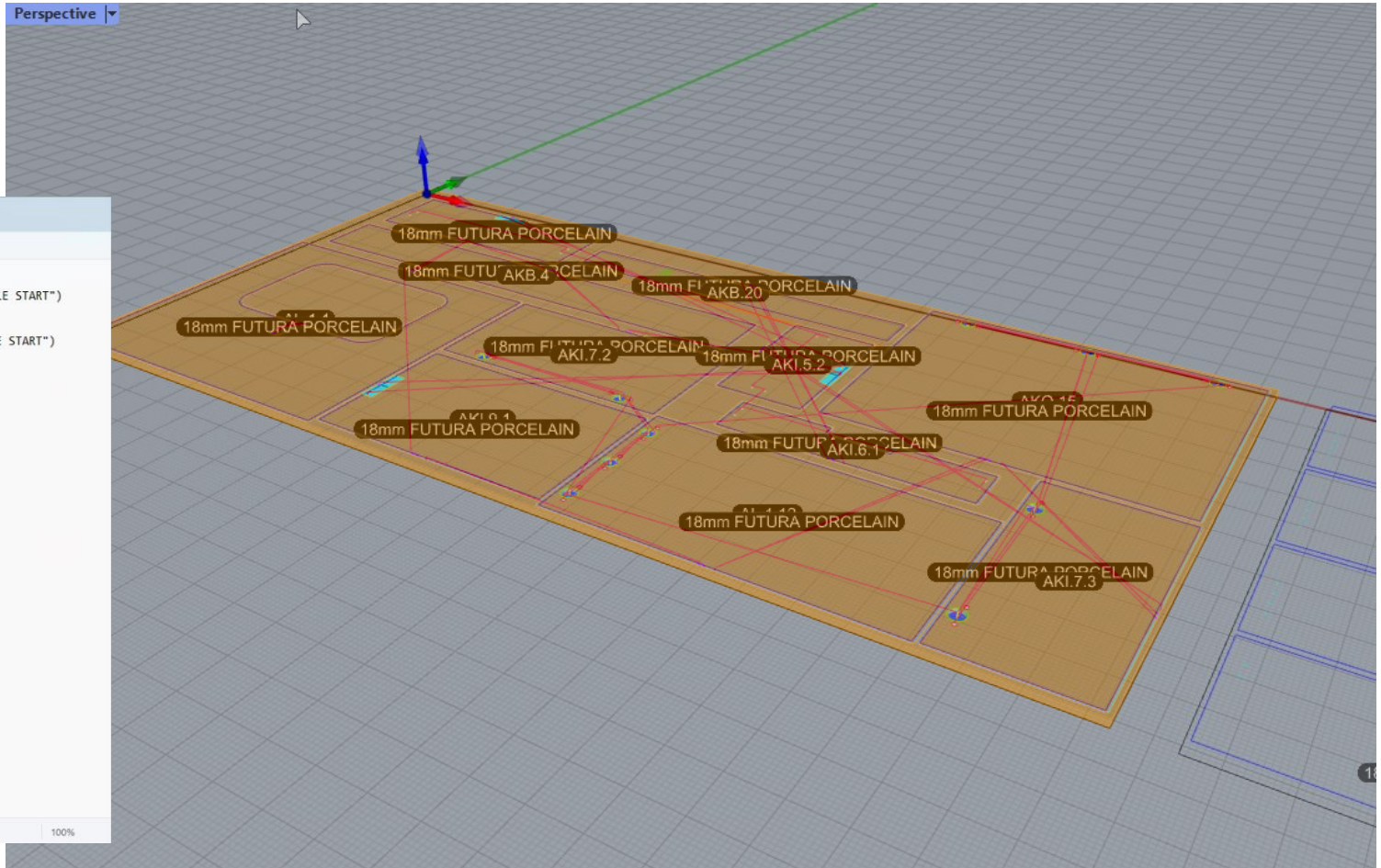




# Tools of the Trade



# CAM Path Ready to Cut



```
Setup 1_2 1_2 Axis Profiling
File Edit View
M142
(DIS, "LOAD PANEL, ACTIVATE VACUUM, PRESS CYCLE START")
M00
M143
(DIS, "CHECK THAT PINS ARE DOWN, PRESS CYCLE START")
M00
(DIS, "")
G90
G17
G40
G80
G79 Z0
T0
M52
(UA0,1)
G27
;2 1/2 Axis Profiling
G79 Z0
M06 T2
M03 S18000
M54
M49
G27
G0Z24.
X972.124Y-577.
G1X990.Y-577.Z9.F7000
G1X1965.Y-577.Z9.
G17
G3X1968.Y-574.Z9.R3.
G1X1968.Y-15.Z9.
G3X1965.Y-12.Z9.R3.
G1X15.Y-12.Z9.
G3X12.Y-15.Z9.R3.
G1X12.Y-574.Z9.
G3X15.Y-577.Z9.R3.
G1X990.Y-577.Z9.
Ln 1, Col 1 100%
```

## Cutting & Assembly





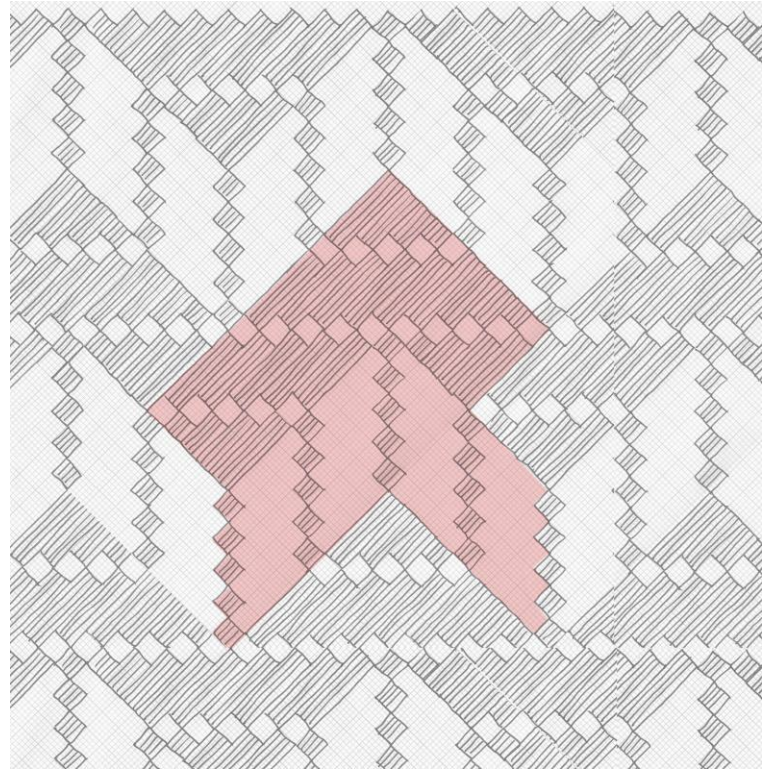
Site  
Install



# Scale 3 - Artworks & Installations

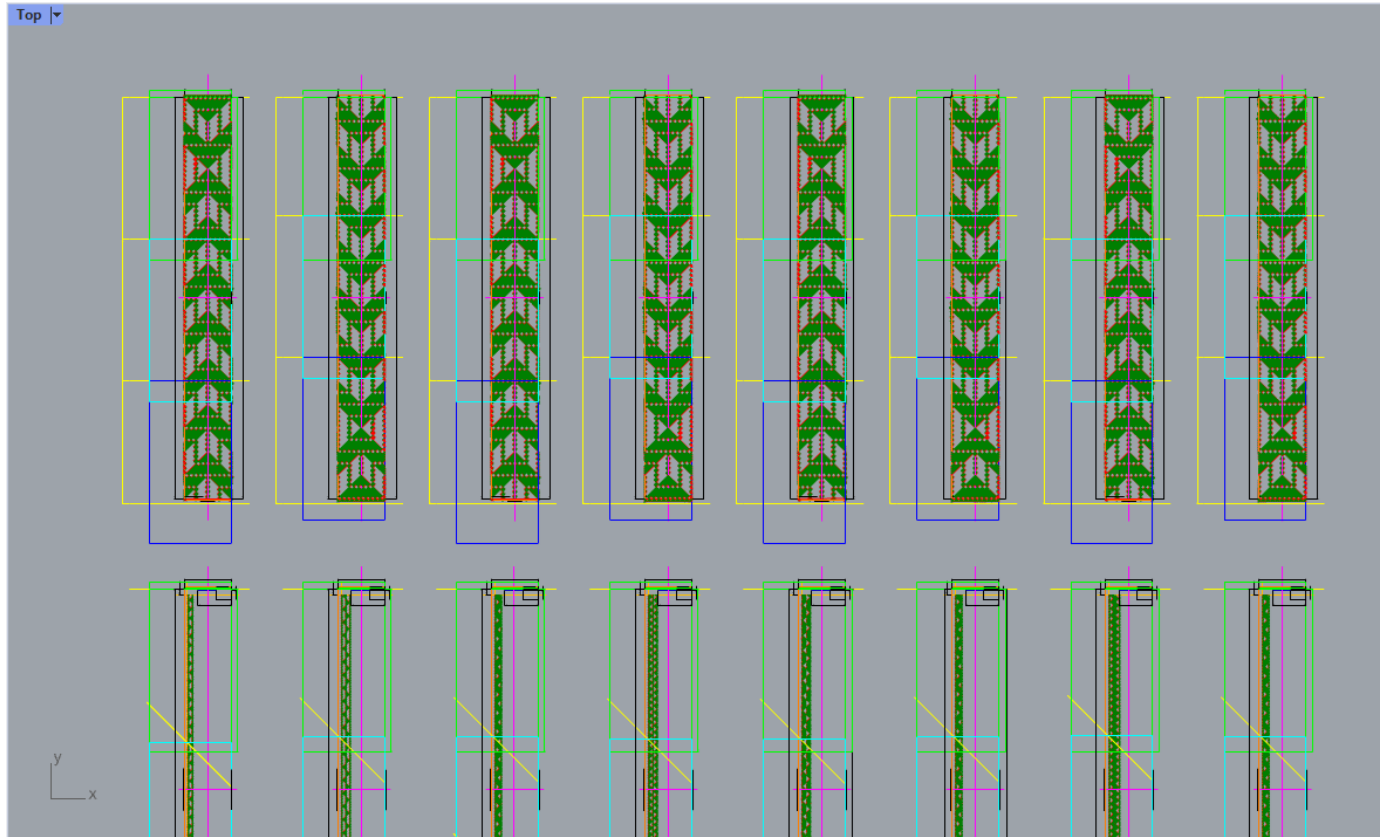


**Concept  
Design**

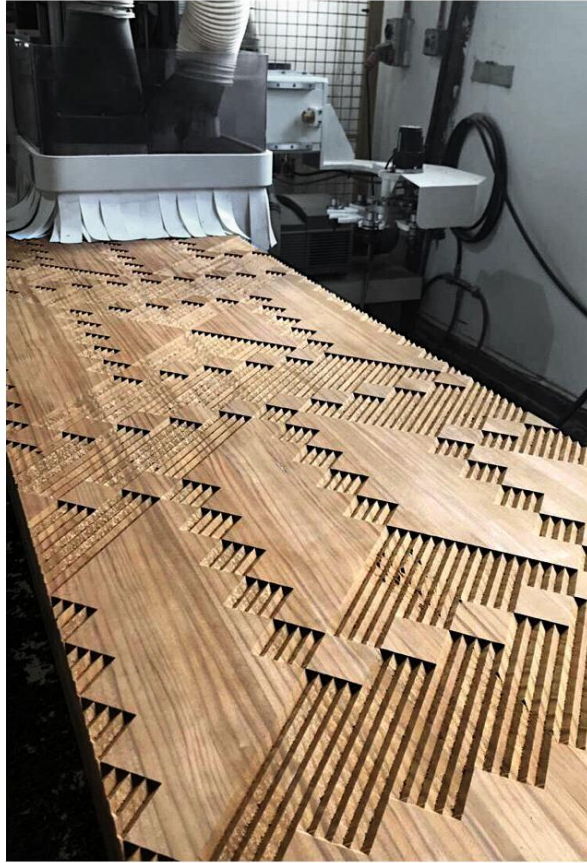


Artwork - Matthew McIntyre Wilson

# Digital Design + CAM



# Cutting



Artwork - Matthew McIntyre Wilson



Site  
Result



Artwork - Matthew McIntyre Wilson  
Photography - Jason Mann Photography  
Architect - Athfield Architects Limited



## Key Takeaways:

- Seek out repetitive tasks in your workflow and automate them out
- Have early and continuous contractor engagement to create a feedback loop and develop a 'system of knows'
- Create one source of truth (BIM Model) and leverage technology to develop it further



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