M.ARCH (PROF) GRADUATE PORTFOLIO

MIKI TILTMAN 美希

SELECTED WORKS — 2020-2025

Hello, I'm
MIKI TILTMAN 美希

TE HERENGA WAKA, VICTORIA UNIVERSITY OF WELLINGTON, NEW ZEALAND

Master of Architecture (Prof)
2023 - 2025
Major in Architecture

Bachelor of Architecture
2020 - 2022
Major in Architecture

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Web Portfolio



I completed my Master of Architecture (Professional) at Te Herenga Waka, Victoria University of Wellington, Aotearoa New Zealand, in 2025.

My Master's thesis took a small prefabricated house from concept through construction detailing, Passive House energy modelling, digital fabrication and assembly documentation, working with a community client and a timber-framing manufacturer. The result was a costed, PHPP-verified prototype, its wall panels CNC-cut and assembled by the community group I collaborated with directly. I'm looking to build on that experience in practice, across a broad range of project types and scales.

I grew up between Hong Kong, Abu Dhabi and New Zealand with an English father and a Japanese mother, and am comfortable working across cultures, languages and consultant teams.

This portfolio collates my architectural work, from my master's thesis. back to the start of my bachelor's degree.

Rhino 8 · Revit · CNC/DXF Workflows · Excel Cost Modelling · Adobe CC · PHPP











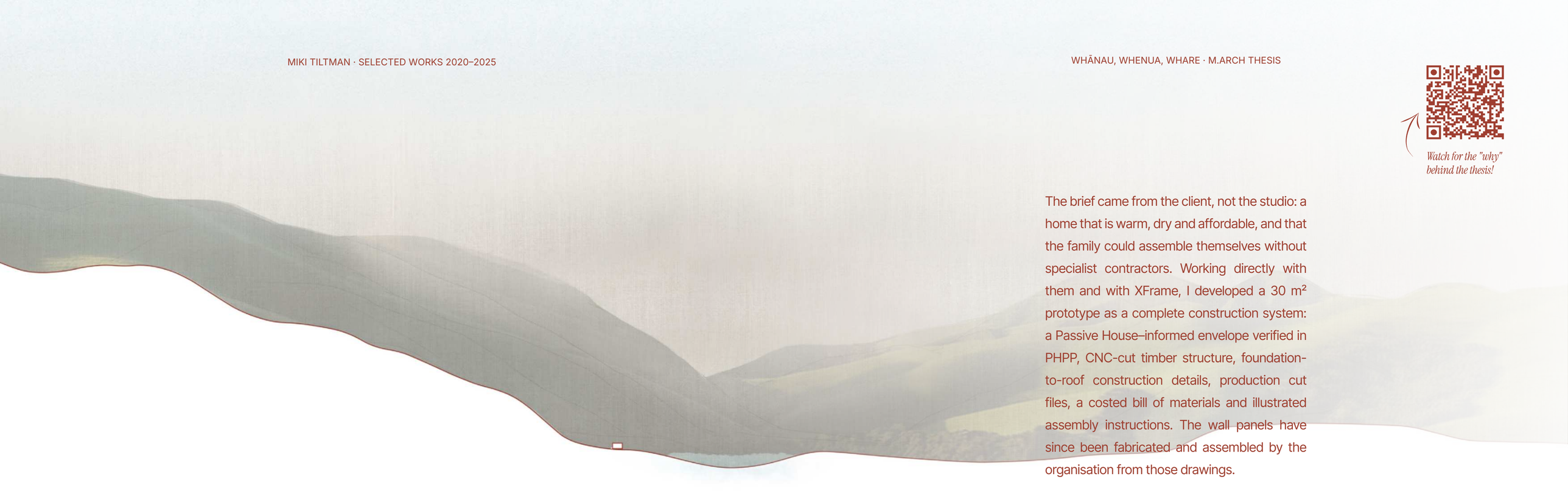
6 Whānau, Whenua, Whare

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70 Shelly Bay Library



(Family, Land, Home)

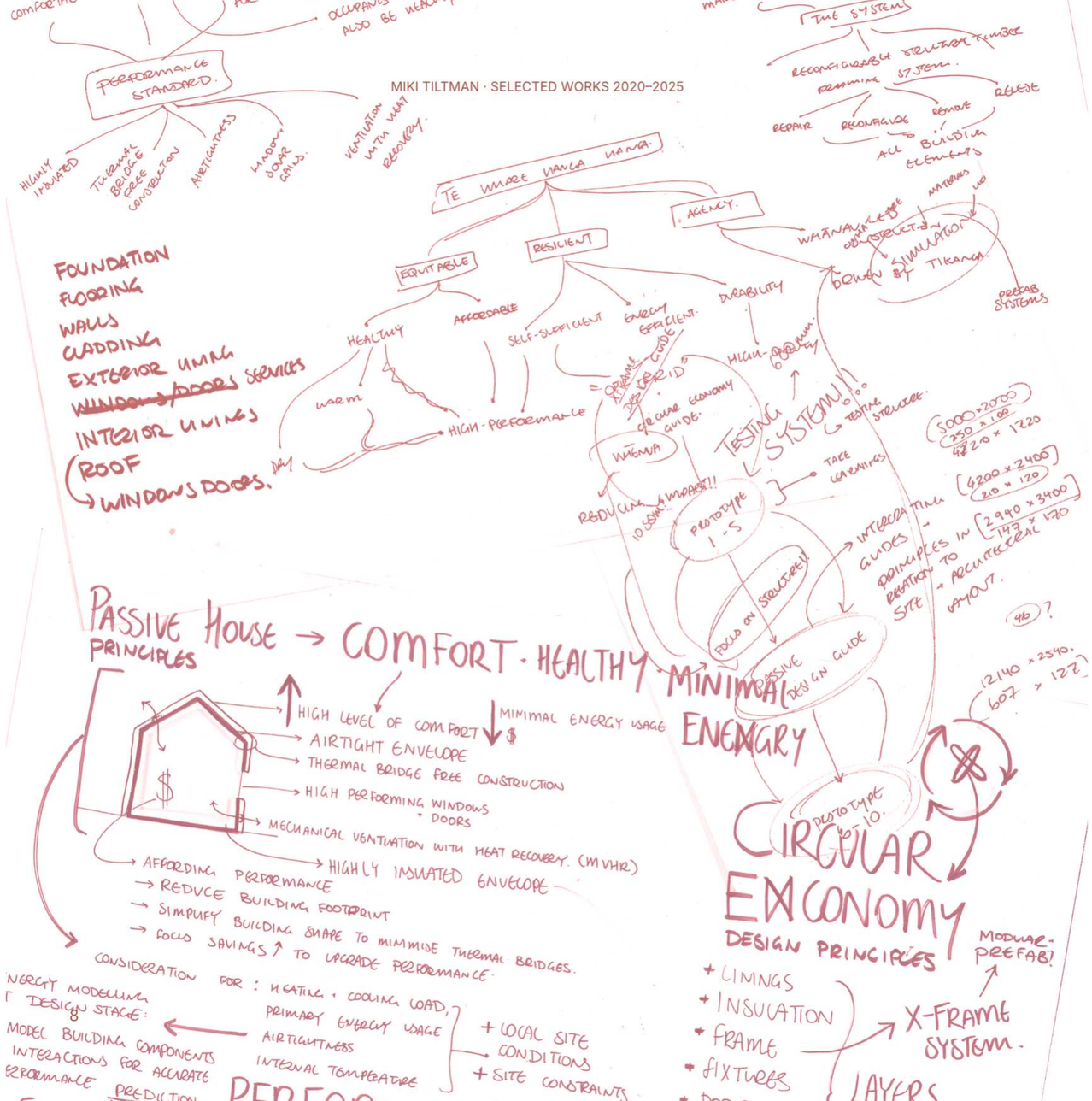
Whānau, Whenua, Whare

M.Arch Thesis
2024 - 2025

Watch for the "why" behind the thesis!

The brief came from the client, not the studio: a home that is warm, dry and affordable, and that the family could assemble themselves without specialist contractors. Working directly with them and with XFrame, I developed a 30 m² prototype as a complete construction system: a Passive House–informed envelope verified in PHPP, CNC-cut timber structure, foundation-to-roof construction details, production cut files, a costed bill of materials and illustrated assembly instructions. The wall panels have since been fabricated and assembled by the organisation from those drawings.

The project sits at the intersection of three things large practices are working on now: offsite manufacturing, low-energy housing, and community-led design.



Te Whare Hangahanga

Client:

A Māori family-led housing initiative building warm, affordable homes on ancestral land.

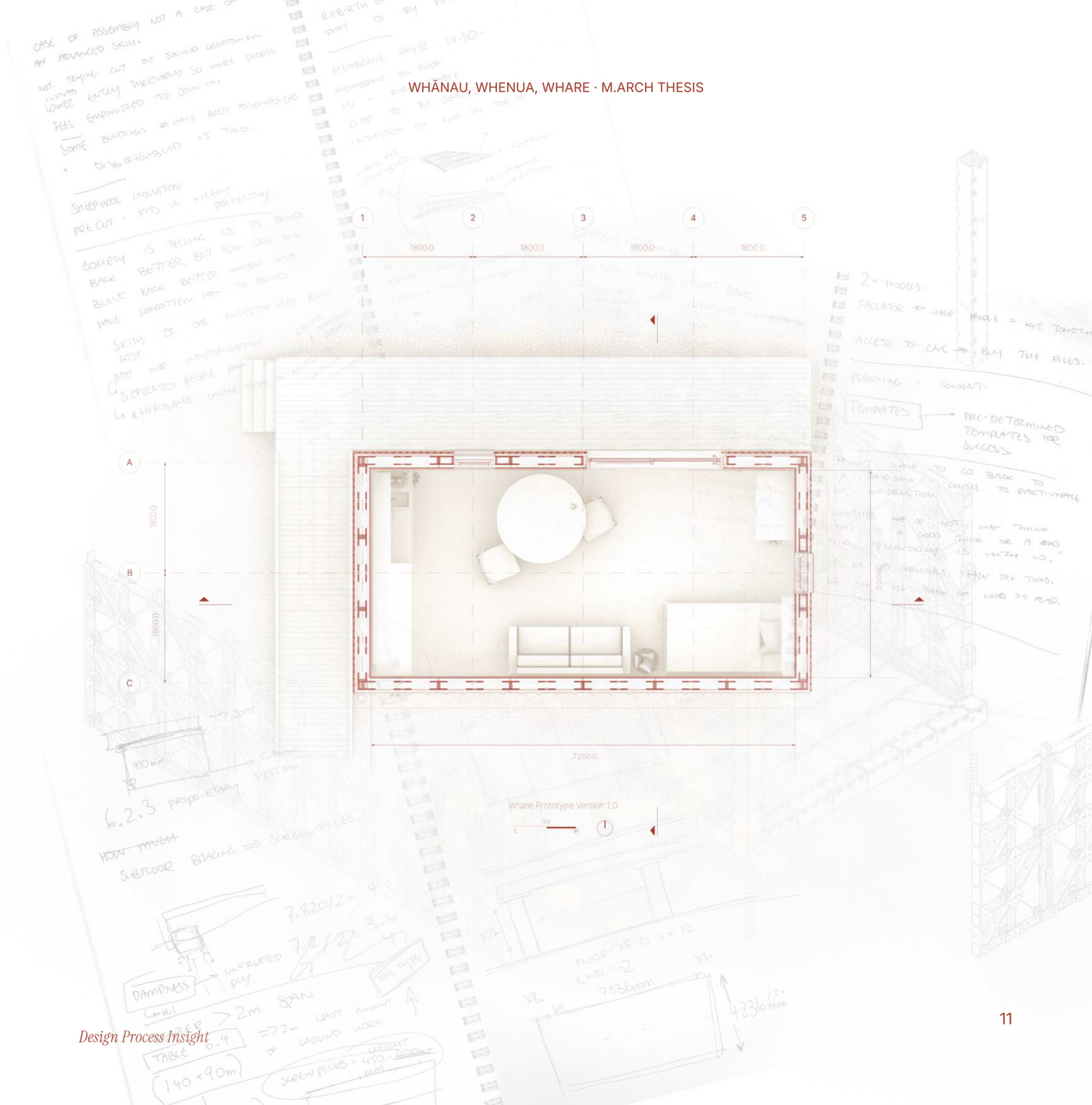
XFRAME

Industry Partner:

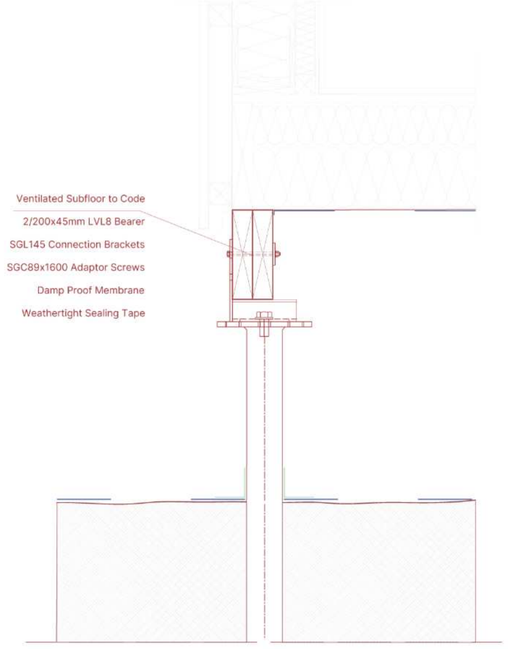
A New Zealand manufacturer of reconfigurable, demountable timber framing.



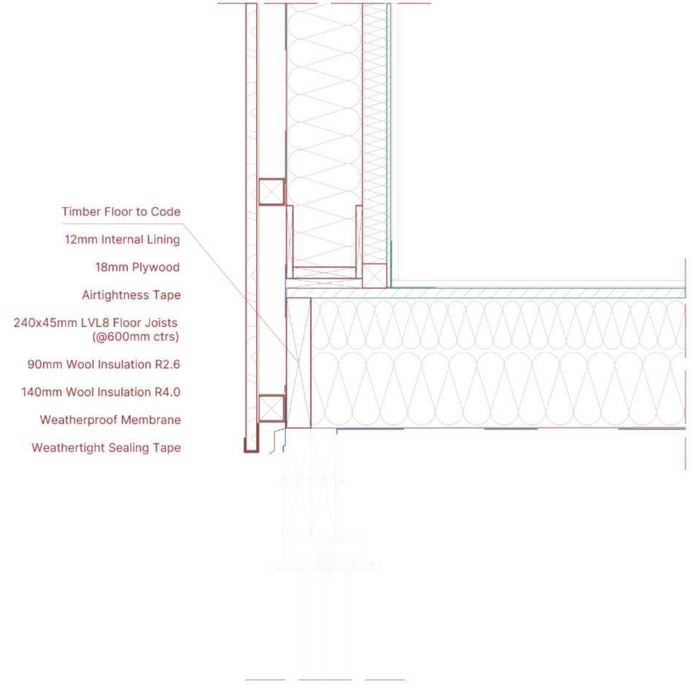
Whare Prototype in Site Context



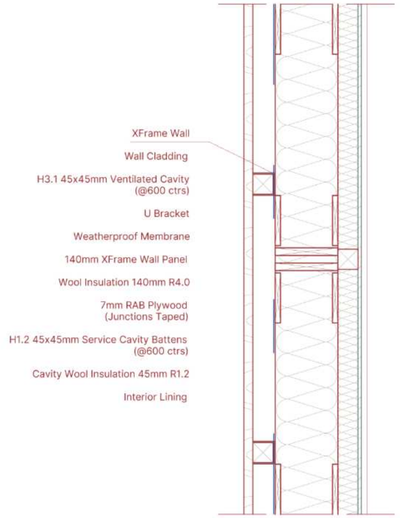
Design Process Insight



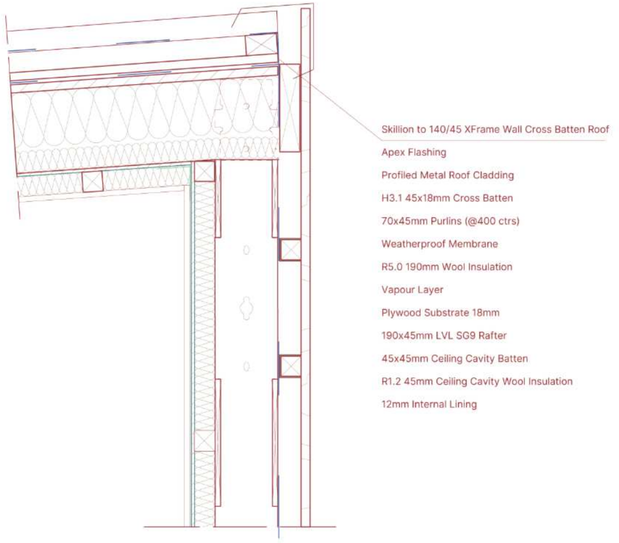
Foundation Detail



Floor Detail



Wall Construction Detail



Roof Apex Detail



Whare Protoype Detailed Section

Prototype: Physical Modelling

A 1:2 model tested the compatibility of two prefabricated system, XFrame walls and WikiHouse floor cassettes. The floor-to-wall junction was cut from my own files in 6 mm birch plywood, with technical guidance from XFrame's founder, Ged Finch. Building from my own files surfaced tolerance and offset errors early, before anything was issued to the client.

Adopted Digital Workflow



Computer Aided Design
Rhino 8

Digital File
.dxf

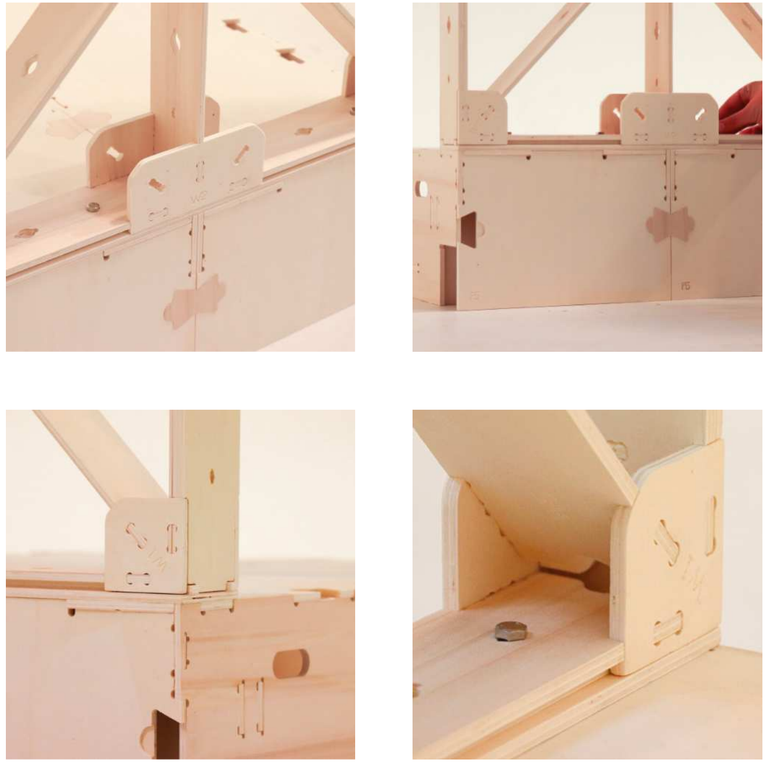
Manufacturing
CNC Router

Components
6mm Birch Plywood

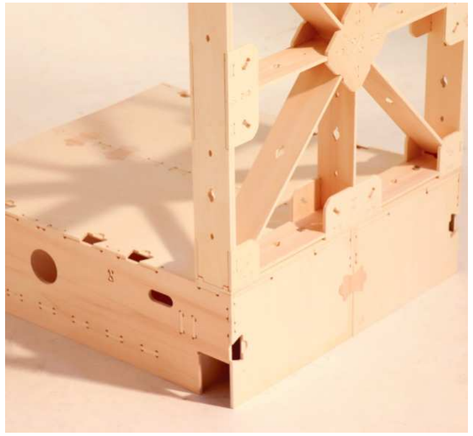
Assembled
1:2 Physical Model



1:2 Physical Model
WikiHouse Floor Block (SKYLARK250-XS)
+ XFrame (2700mm)
Prefabricated Plywood System Test

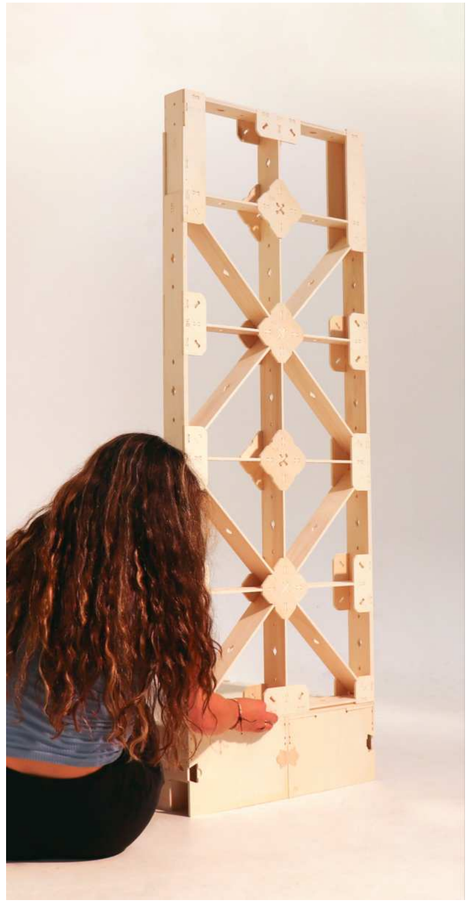


Model Close-Up Details





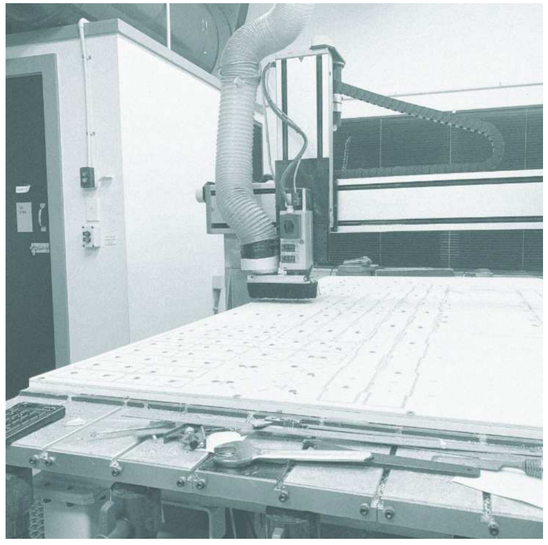
Model Details



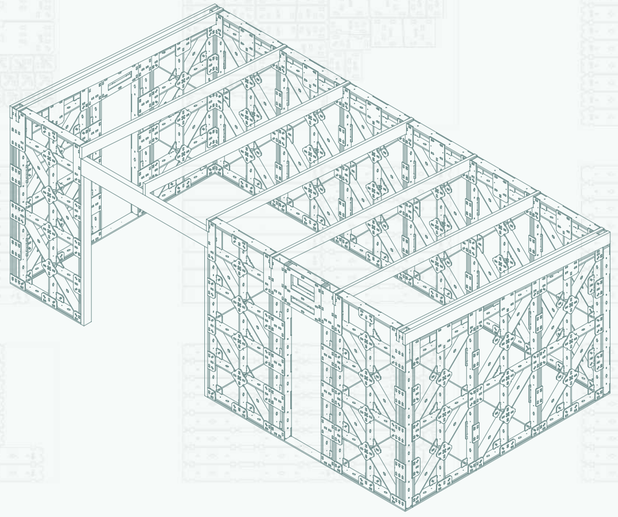
XFrame + WikiHouse 1:2 Partial Physical Model

Design for Manufacture + Assembly

In fortnightly sessions with XFrame I refined the digital model and nested every component onto standard sheets, optimising for material yield and CNC travel time. The cut files (seven standard panel types plus custom panels for openings and rafter pockets at 1 mm tolerance) were issued to the client with a component schedule and labelling convention so their own CNC router could cut them.



CNC Router



XFRAME

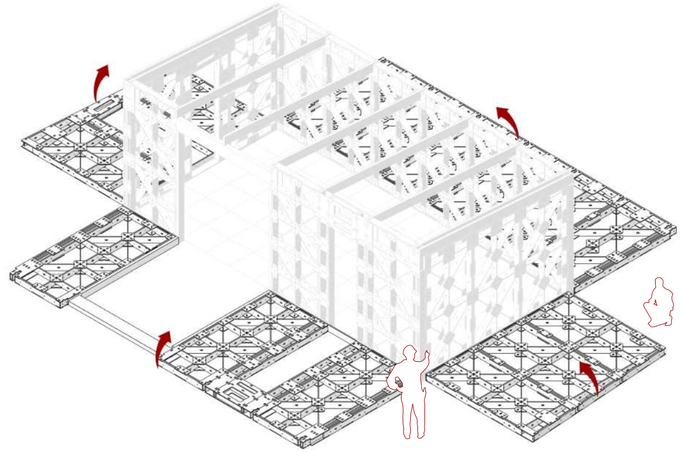
Cut Files + Whare Prototype Digital

XFRAME

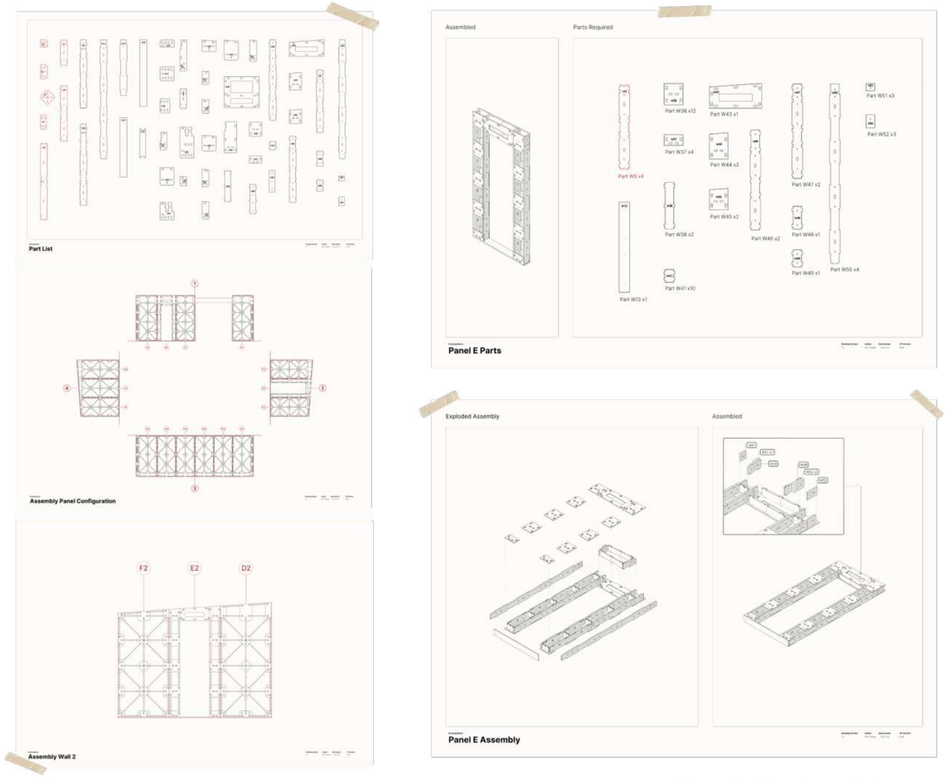
Design for Manufacture + Assembly.

The community group assembling the panels had limited construction experience, so I wrote and illustrated step-by-step assembly drawings: an image of the finished panel, a sequenced workflow from a consistent viewpoint, and enlarged details where errors were most likely. The wall panels, alongside technical assistance from XFrame, were built from these drawings.

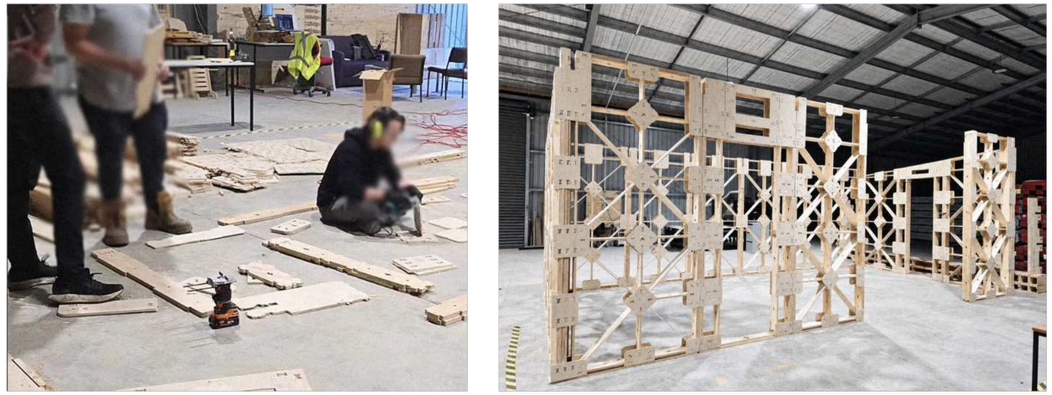
What this taught me: a fabrication file is only half the product; the documentation for the person assembling it is the other half. It's the same discipline as a well-structured technical drawing set or a clear specification.



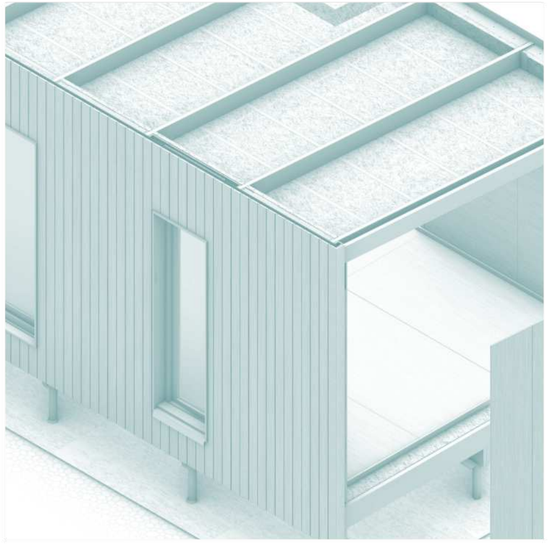
XFrame Wall Panel Proprietary Assembly Drawings



XFrame Wall Panel Assembly Drawings

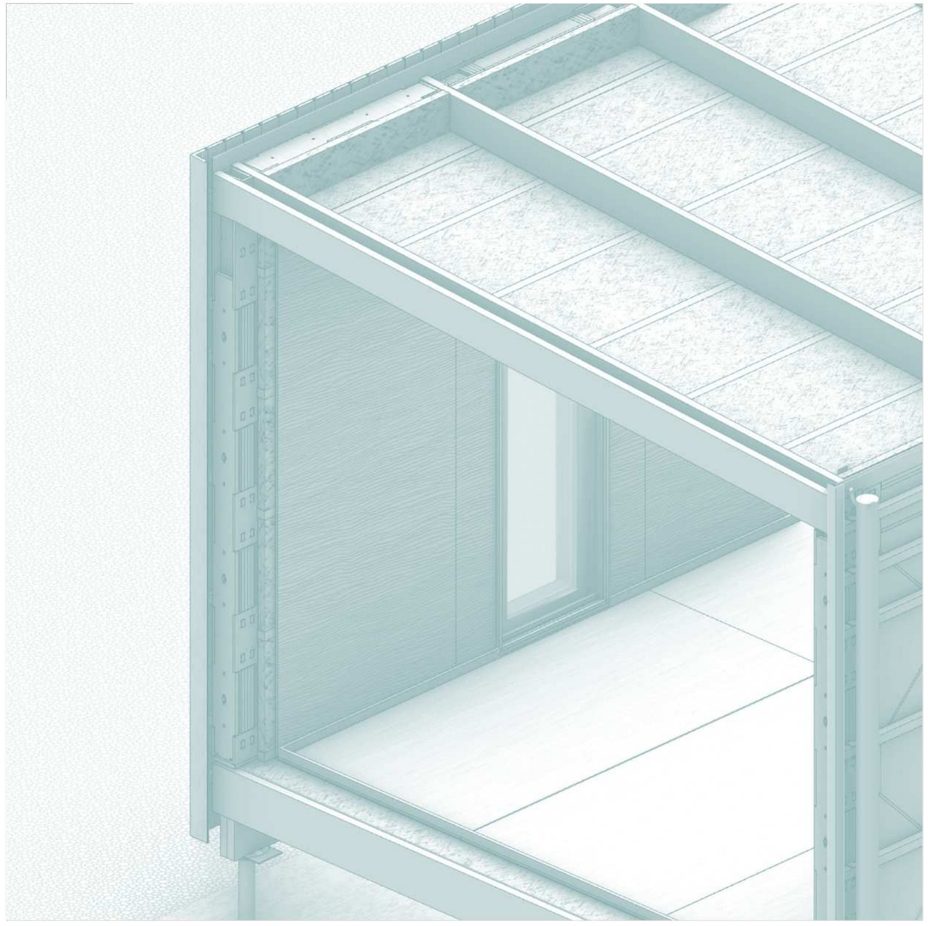


Constructed XFrame Wall Panels

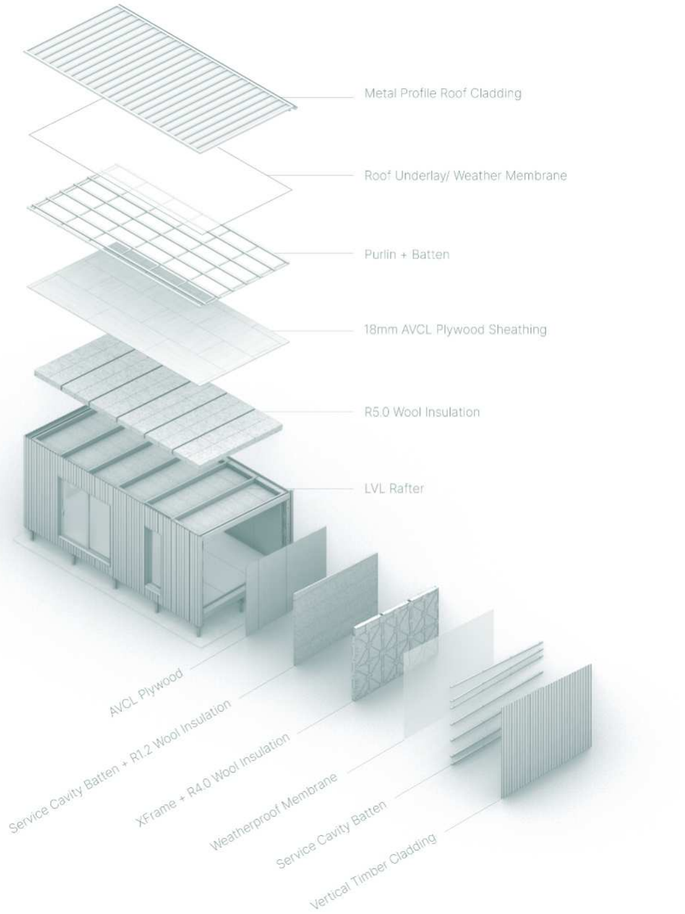


Envelope Performance vs. Buildability

I modelled the envelope in PHPP and tested alternative build-ups (insulation depth, airtightness layer position, service cavities) against Passive House targets, then weighed each against what the client could realistically assemble and afford. There was no perfect answer, so I made the trade-offs explicit.



Construction Layers Detailed Close-Up



Roof + Wall Construction Performance Layers

Envelope Performance vs. Buildability

Rigid air barrier over membrane: 7 mm taped plywood is harder to puncture on site than a membrane, so airtightness survives an inexperienced crew.

Sheep's-wool insulation over PIR: at the client's request, for a natural material that still met the targets.

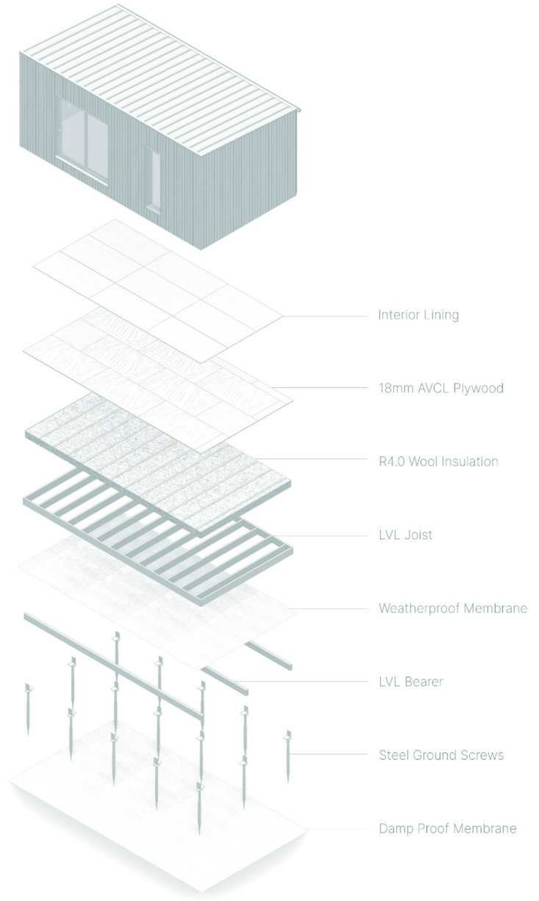
Cold roof over warm roof: fixing through insulation to rafters was impractical for self-builders; 190 mm wool between LVL rafters with an insulated ceiling cavity achieved the target without it.

Envelope Performance vs. Buildability

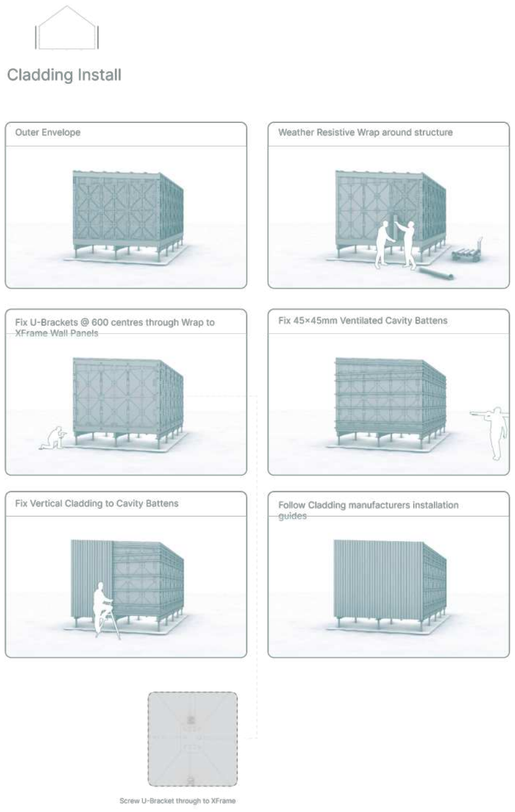
Mono-pitch over gable: no internal ridge beam, simpler framing, same prefab logic.

Conventional LVL floor over a prefabricated cassette: the cassette performed better thermally but needed structural sign-off outside the project timeline, so I reverted to a proven joist floor sized from manufacturer span tables.

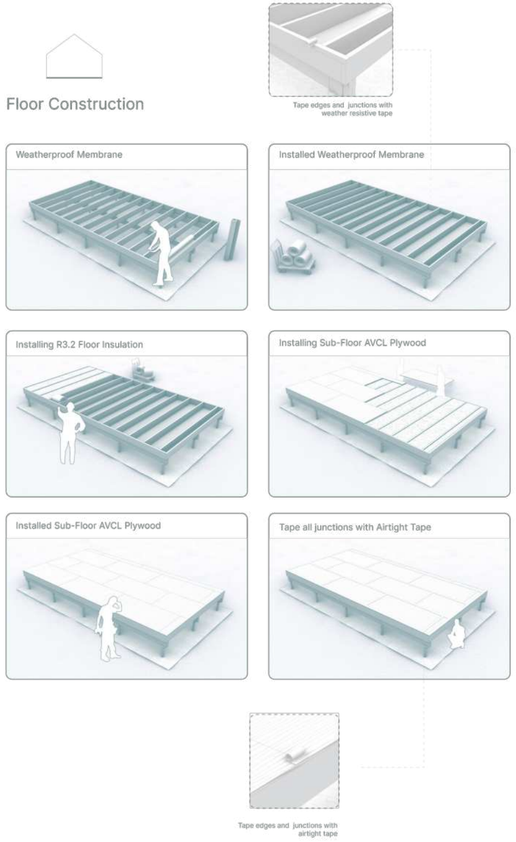
Screw piles over concrete: fast, reversible, minimal ground disturbance.



Foundation + Floor Construction Performance Layers



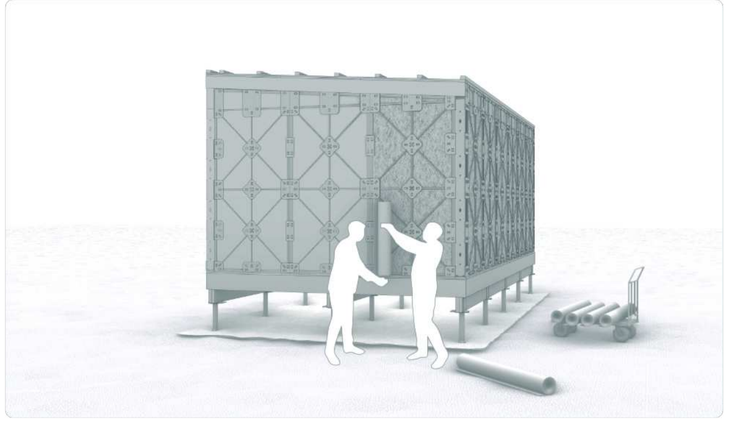
Cladding Self-Build Instruction Install Example



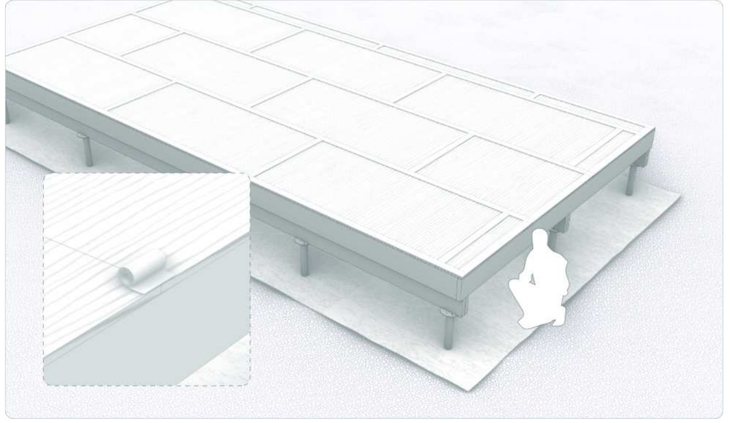
Installing External Weatherproofing Layer

Envelope Performance vs. Buildability

The envelope exceeds the local code and meets the PHI Low Energy Building standard. The broader lesson I took from it is that circular-economy demountability and Passive House airtightness pull against each other, and the design task is to resolve that tension deliberately, detail by detail.



Installing Airtightness Tape to Plywood Layer



Floor Self-Build Instruction Install Example

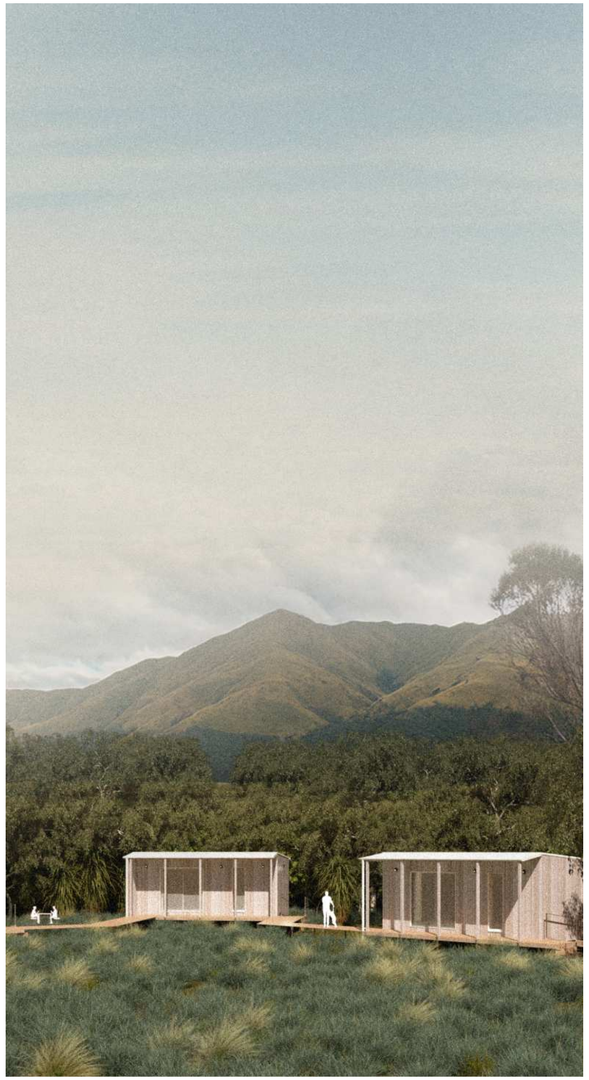
Te Whare Hangahanga

Stakeholder Engagement

Design reviews with the client, a Māori family-led housing organisation, ran through their own cultural protocols rather than studio crits, and the design changed in response: natural wool insulation, high performing construction makeups whislt adhering to the self-buildability requirement , a stronger indoor–outdoor connection. The transferable skill: running a design process on the client's terms, not the architect's, and delivering a technical outcome within it.



Papakāinga Potential Visual



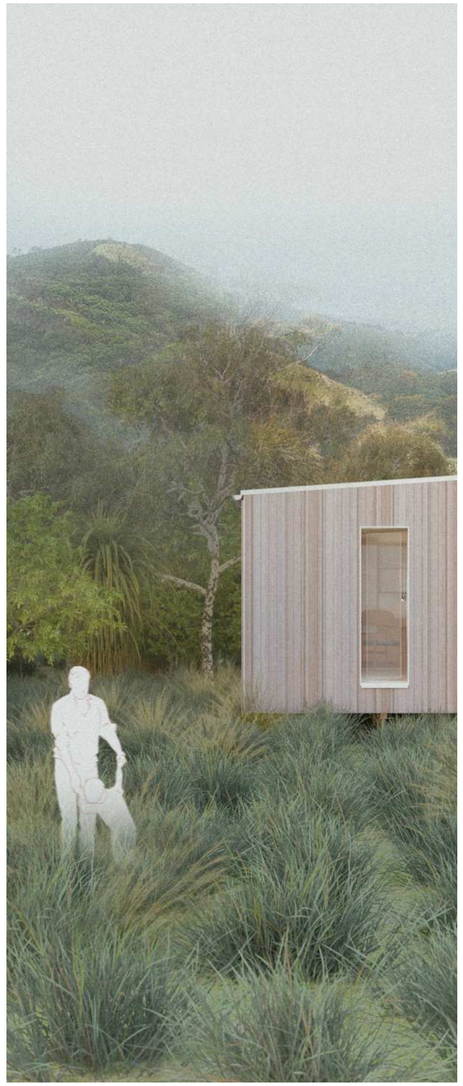
House Prototype Urban Scale Potential

House Prototype Interior Potential





Whare Prototype Exterior in Site Context



Whare Prototype Exterior in Site Context



Whare Prototype Design

Full Thesis Here



Scalable Prototype Potential for Papakāinga Vision

Kaiwharawhara Ferry Terminal

Fourth Year 2023

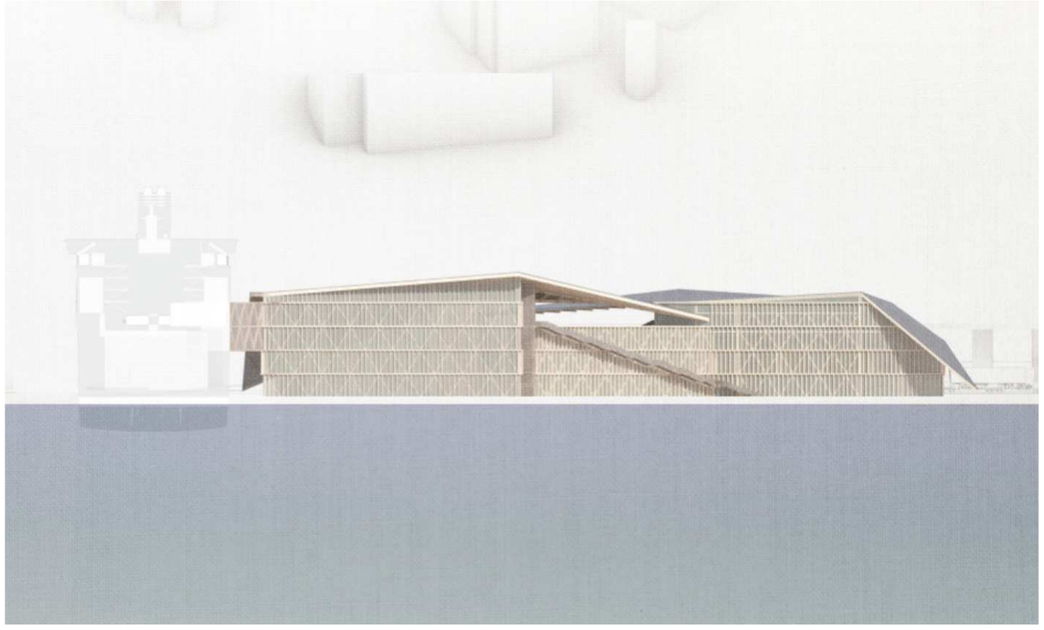
Ai Ps

A redesign of Wellington's Interislander ferry terminal, guided by ki uta ki tai ("from the mountains to the sea"), a Māori whole-of-landscape philosophy that treats site, water and building as one environment. The design re-establishes the layered, contested landscape of Kaiwharawhara as it was before industrialisation, reconnecting the terminal to its harbour edge through a publicly accessible roof garden and a ground floor opening onto views of Te Whanganui-a-Tara (Wellington Harbour). Developed from site analysis and concept through plans, sections and construction details, elevations, interior views of the passenger areas, and a laser-cut structural physical model.

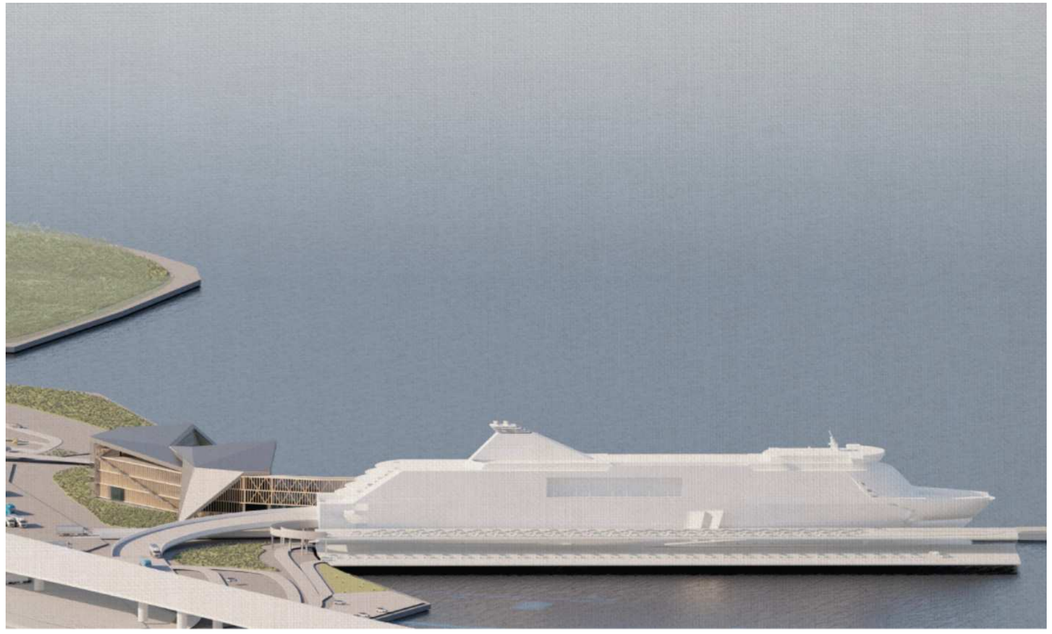
Kaiwharawhara Ferry Terminal in Site Context



Te Whanganui-a-Tara, Aotearoa
Wellington, New Zealand
Commercial Scale



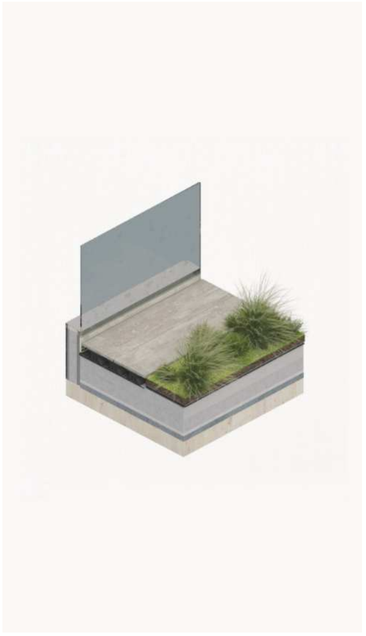
Kaiwharawhara Ferry Terminal Elevation



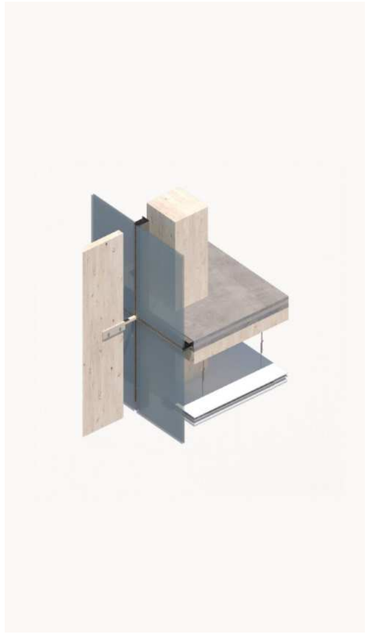
Kaiwharawhare Ferry Terminal in Te Whanganui a Tara



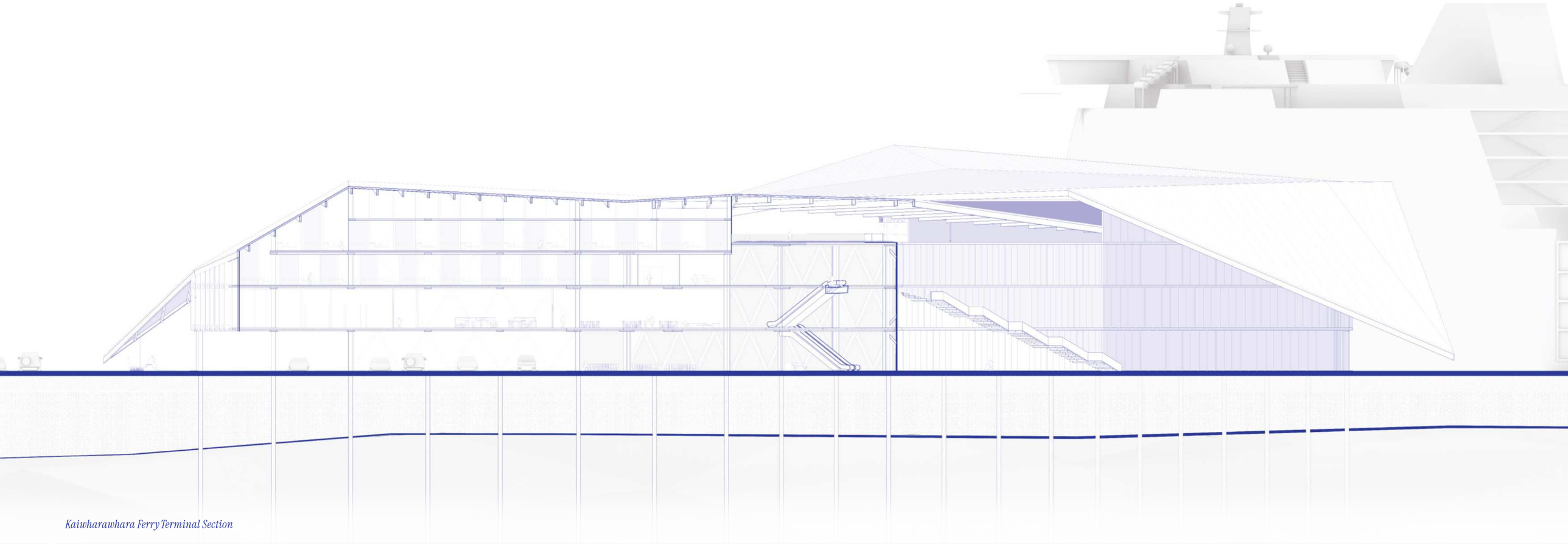
Interior View Facing Te Whanganui a Tara



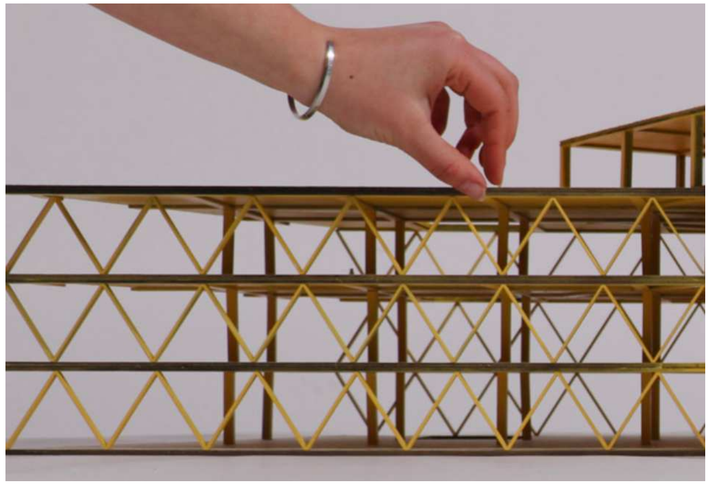
Roofscape 3D Detail



Facade 3D Detail



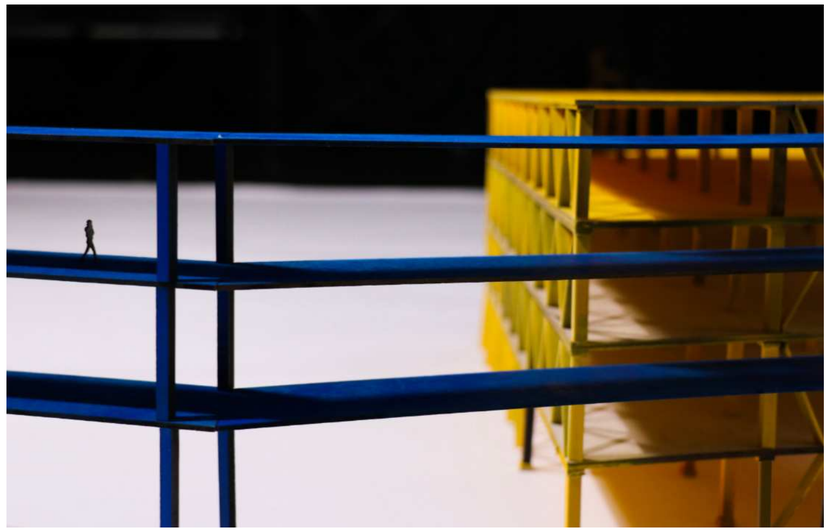
Kaiwharawhara Ferry Terminal Section



Kaiwharawhara Ferry Terminal
Structural Model

Fourth Year 2023

1:100
MDF + 3mm Cardboard
Lasercut



Passanger Walkway to Ferry Terminal

Chikara Matsushima Community Centre
力 松島 公民館

Fourth Year

2023

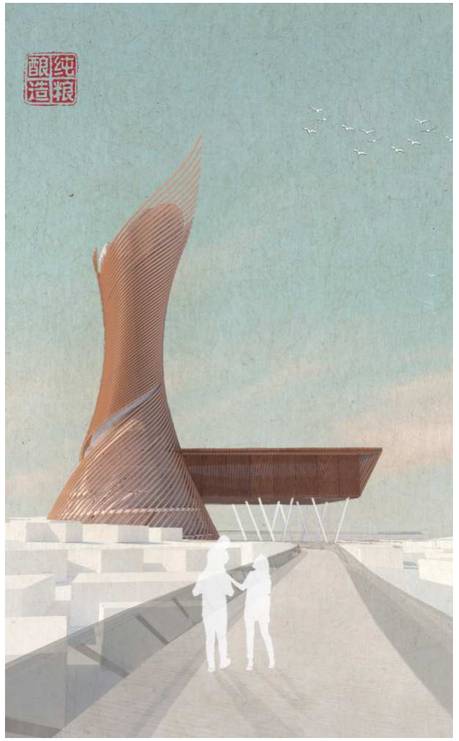
Speculative Tsunami Emergency Shelter + Disaster Relief

Ai Ps

Matsushima, Japan

Public Infrastructure

A community centre for Matsushima designed in response to the 2011 Tōhoku tsunami, working in dualism: everyday cultural and recreational space for the town, with particular attention to its elderly population, and accessible refuge the moment disaster strikes. The design language draws on traditional Japanese architecture and woodblock-print technique (after Hokusai's Great Wave) to convey the human experience of the spaces, grounding emergency infrastructure in the community's own visual culture so the building sustains social networks and resilience in ordinary time, not just in crisis.



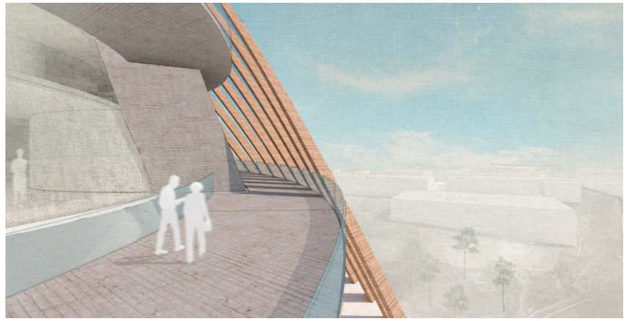
Elevated Bridge Walkway to Chikara Community Centre



Tea House Evacuation Mid Point



Tea House Ramp Access to Emergency Evacuation Route



Ramp Around Structure



Library Floor Normative + Emergency Use



Site Plan

Te Papa Museum Redesign

Third Year 2023

Te Whanganui-a-Tara, Aotearoa

Wellington, New Zealand

National Museum

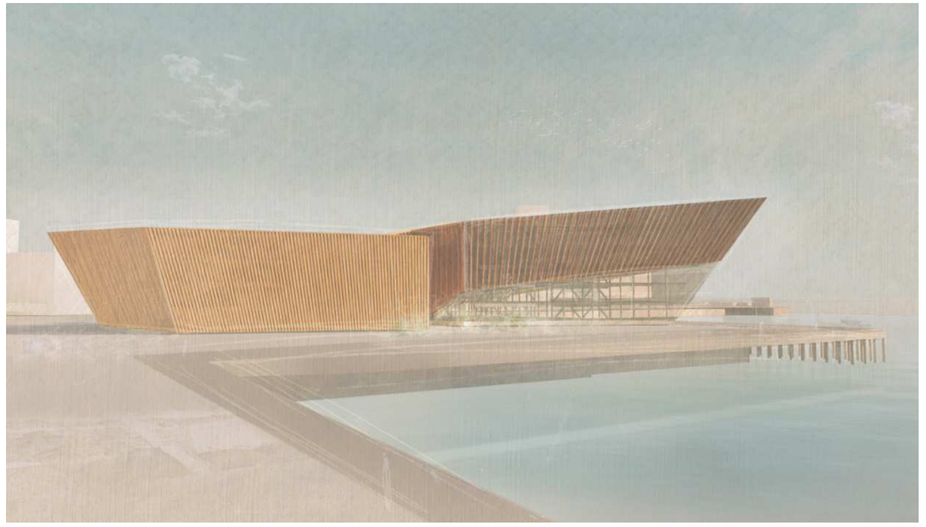
A speculative redesign of Te Papa, New Zealand's national museum, giving spatial form to the country's contested history, and to the gaps and silences in how it is told. History discloses itself in fragments; the design weaves them back together as three separate volumes, deliberately fragmented, intertwined through a central body, making space for many identities within the national narrative. Covered site planning, entrance sequence and exhibition design.



Te Papa Entrance



Exhibition Display



Exterior Perspective From The Waterfront

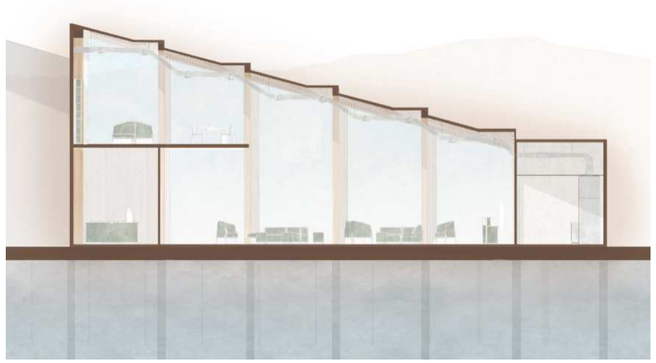
Shelly Bay Library

Second Year 2021

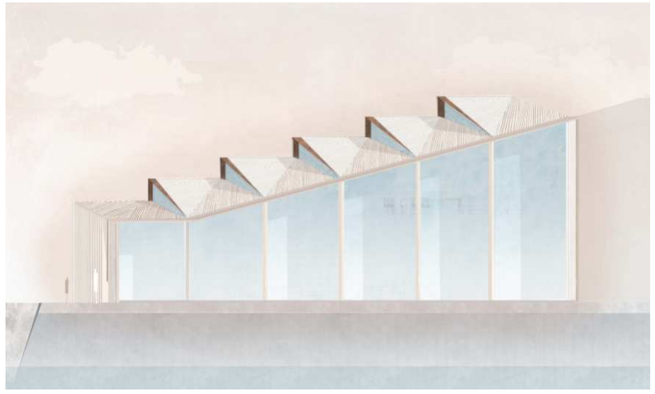
Design Capstone Project

Te Whanganui-a-Tara, Aotearoa
Wellington, New Zealand
Public Infrastructure

"An extension of the existing structural and cultural context, the Shelly Bay library speaks to a revitalisation whilst sparking a conversation between old and new."









美希

What I Bring

Rhino 8 | Revit | CNC/DXF Workflows | Excel Cost Modelling | Adobe CC | PHPP

Stakeholder Engagement

A design process run within a community client's own cultural protocols, with the design changing in response.

Documentation

Assembly instructions and guidebook written for non-specialists, the same clarity I aim for in drawing sets and specifications

Offsite and DfMA

A construction system developed with a manufacturer from digital model to production cut files that were fabricated.

Cost Awareness

A line-item bill of materials priced from suppliers for each construction layer for a prototype.

Low-Energy Design

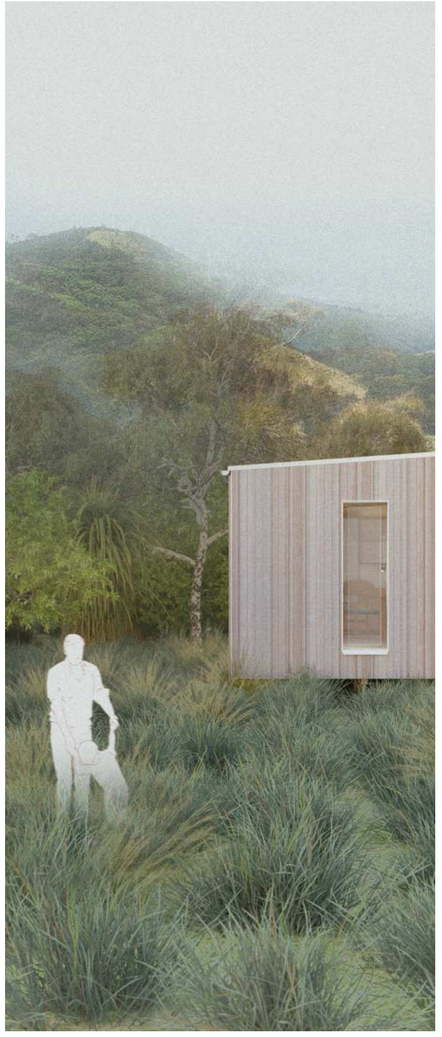
PHPP modelling, U-value and thermal-bridge calculation, Passive House principles applied in all details of a verified prototype.

Construction Detailing

Foundation-to-roof details to a national timber-framing standard, with buildability as a design criterion.

Working across cultures.

Raised in Hong Kong, Abu Dhabi and New Zealand; English and Japanese heritage



Thank you ありがとう Tēna koe

MIKI TILTMAN 美希

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SELECTED WORKS — 2020-2025