Temptest Tech 3

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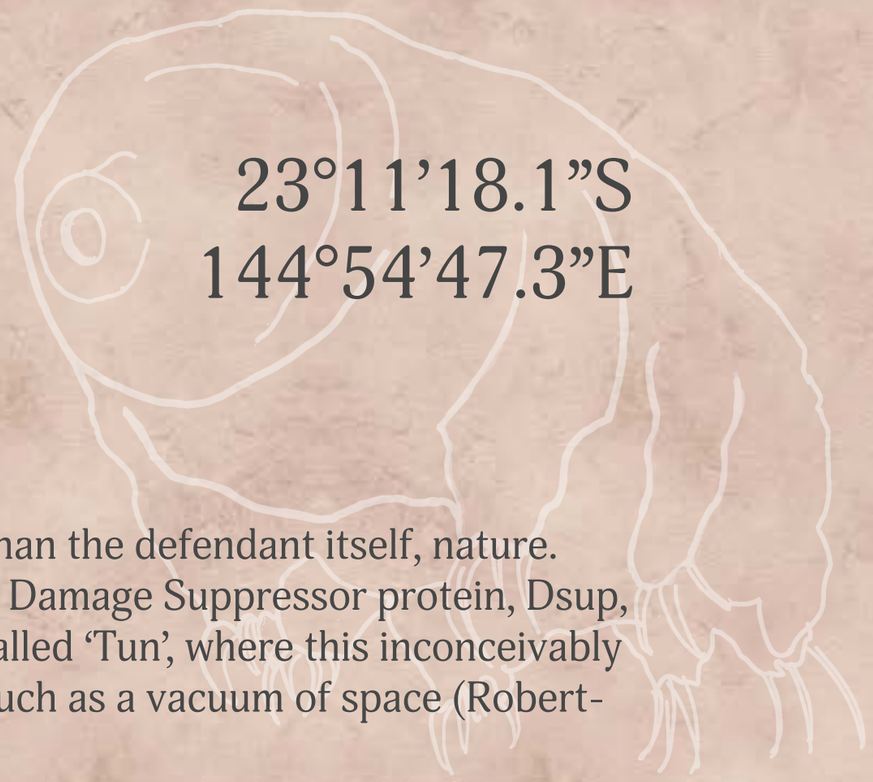
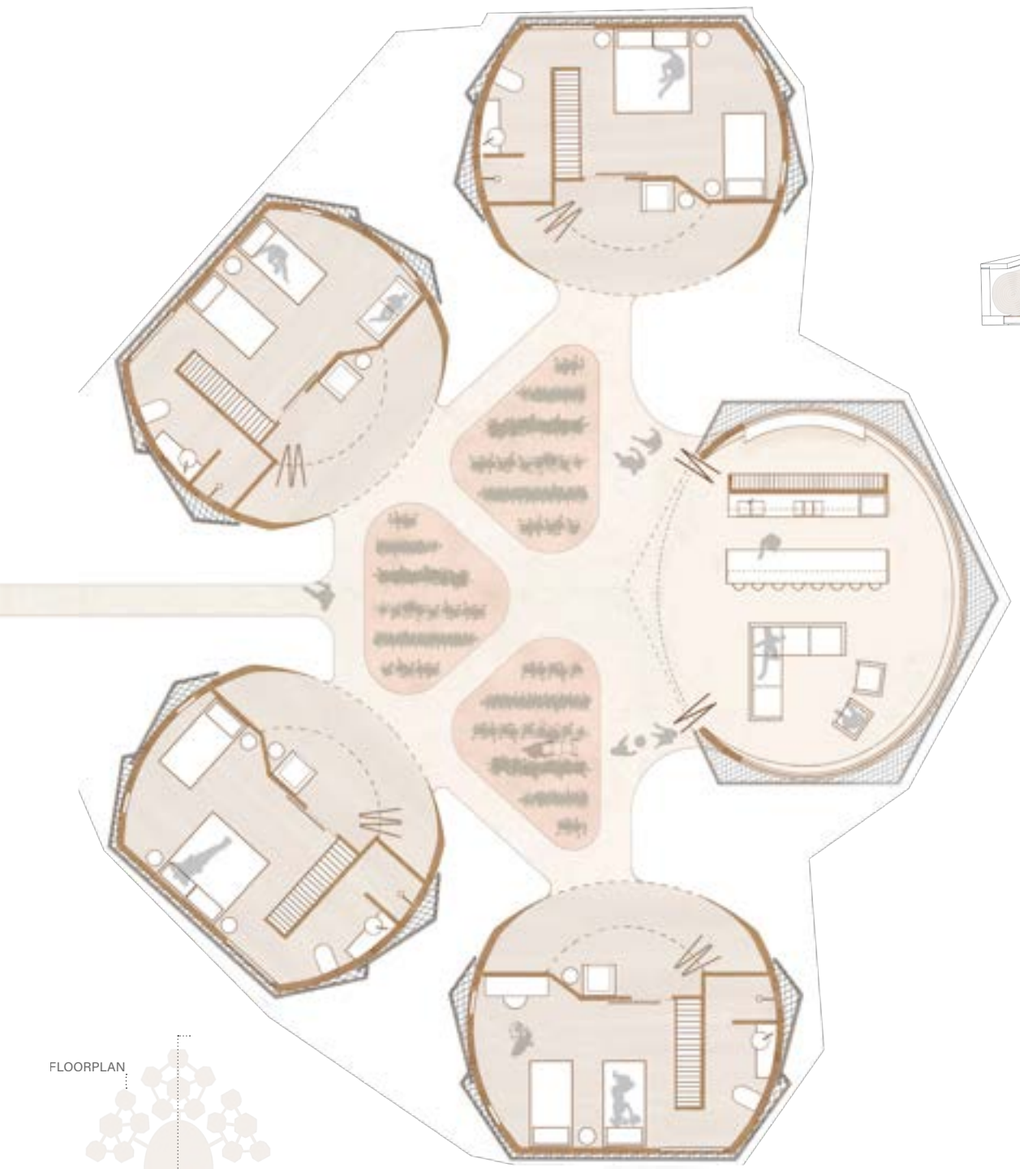
ARAMAC, QUEENSLAND
Mallintji people

23°11’18.1”S
144°54’47.3”E



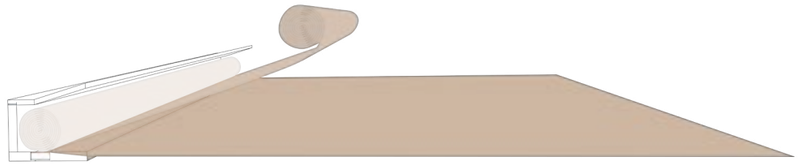
When faced with the unforgiving forces of weather, who better to turn to than the defendant itself, nature. The exceptional and strange morphology of a Tardigrade is comprised of a Damage Suppressor protein, Dsup, which clouds their DNA. This allows them to fall into a cryptobiotic state called ‘Tun’, where this inconceivably indestructible creature can survive supposedly unliveable environments, such as a vacuum of space (Robertson 1993).
Inspired by this morphology, our structure uses an innovative material to latch an easily deployable 3D printed environment in a ‘Tun,’ state to combat any weather threats. Prefabricated, Shape Memory Alloy (SMA) Mesh pieces replicate the Dsup protein as a seal of protection, whilst functioning sustainably as rainwater collection and thermal insulation (Ramirez 2013). SMA Mesh fractals are transported to site, as well as 3D printers which will source their matter locally, by recycling the destroyed debris from the extreme weather event mixed with local ground sediments such as sandstone, clay, calcium and a bio-degradable bonding agent, lignin (Posch 2024).
The metal exoskeleton seals the organic structure in a buoyant state during flood, floating on the surface whilst tethered to the ground by chain reels. During cyclone, the reels keep the structure taught to the ground as the mesh defends it from heavy rains and flying debris. During bushfire, a mote of SMA mesh will unfold into its thermally treated state when it senses the ground temperature rising, unravelling like a fire blanket, suffocating the fire, displacing the danger from the inhabitants.
At the end of the housing lifespan the fractals of mesh can be dismantled and utilized again. Imbedded in the organic 3D printed matter are seedlings of native trees, so at the end of the structure’s lifecycle the Architecture will give back to the land that it was originally sourced from as per Indigenous customs.

This story-board illustrates the abstracted biomimicry of the Tardigrade morphology in response to extreme weather events as well as the efficient construction timeline.

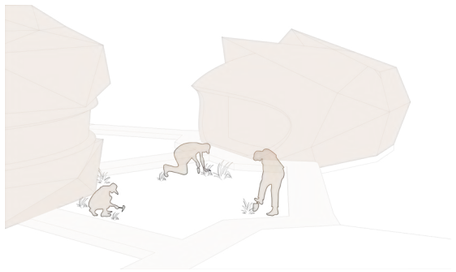


FLOORPLAN

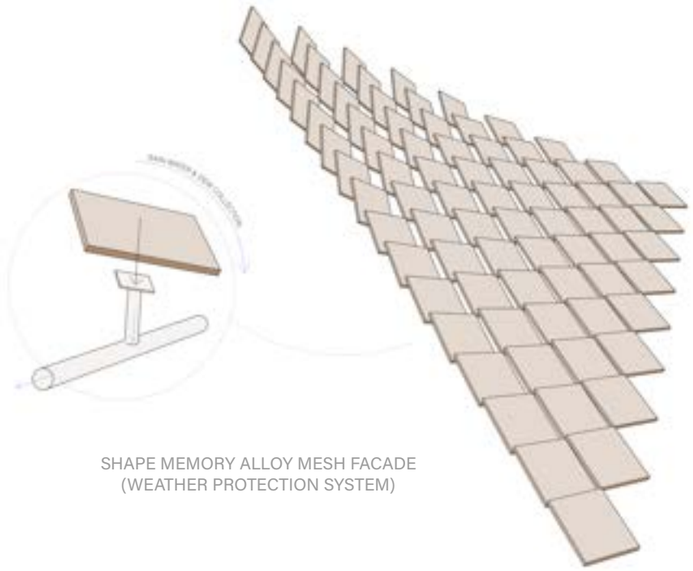
SECTION



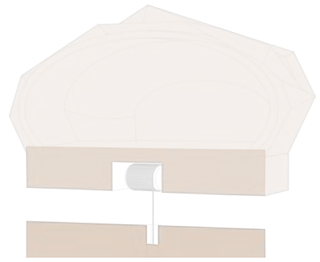
SHAPE MEMORY ALLOY - FIRE DAMPENER SYSTEM
Upon detection of heat, the metal expands and projects out-wards, to smother the fire.



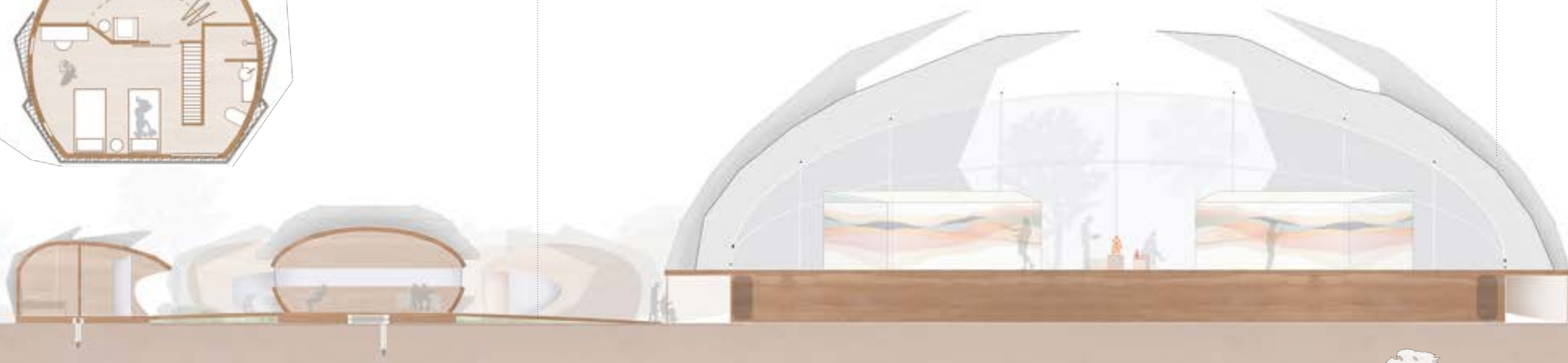
COMMUNITY GARDENS

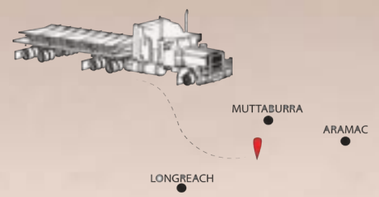


SHAPE MEMORY ALLOY MESH FACADE
(WEATHER PROTECTION SYSTEM)



CHAIN REEL GROUND ANCHOR SYSTEM





STAGE 1
The innovative prefabricated metal mesh is transported to the site location via truck.

STAGE 2
The Mirco-homes are 3D printed using locally sourced natural materials (e.g. Sand) with Lignin as the binder.

STAGE 3
The shape memory alloy mesh pieces, are fitted to the exterior of the Micro-Homes, issuing protection.

STAGE 4
Evacuees reside in the homes pods, connected with community, health resources, and the natural environment.

STAGE 5
The metal mesh is removed from the Micro-Homes, leaving the biodegradable 3D-printed home shells, to decompose.

STAGE 6
As the shells decompose, the pre-set seeds within the material, sprout to regenerate biodiversity within the site.

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