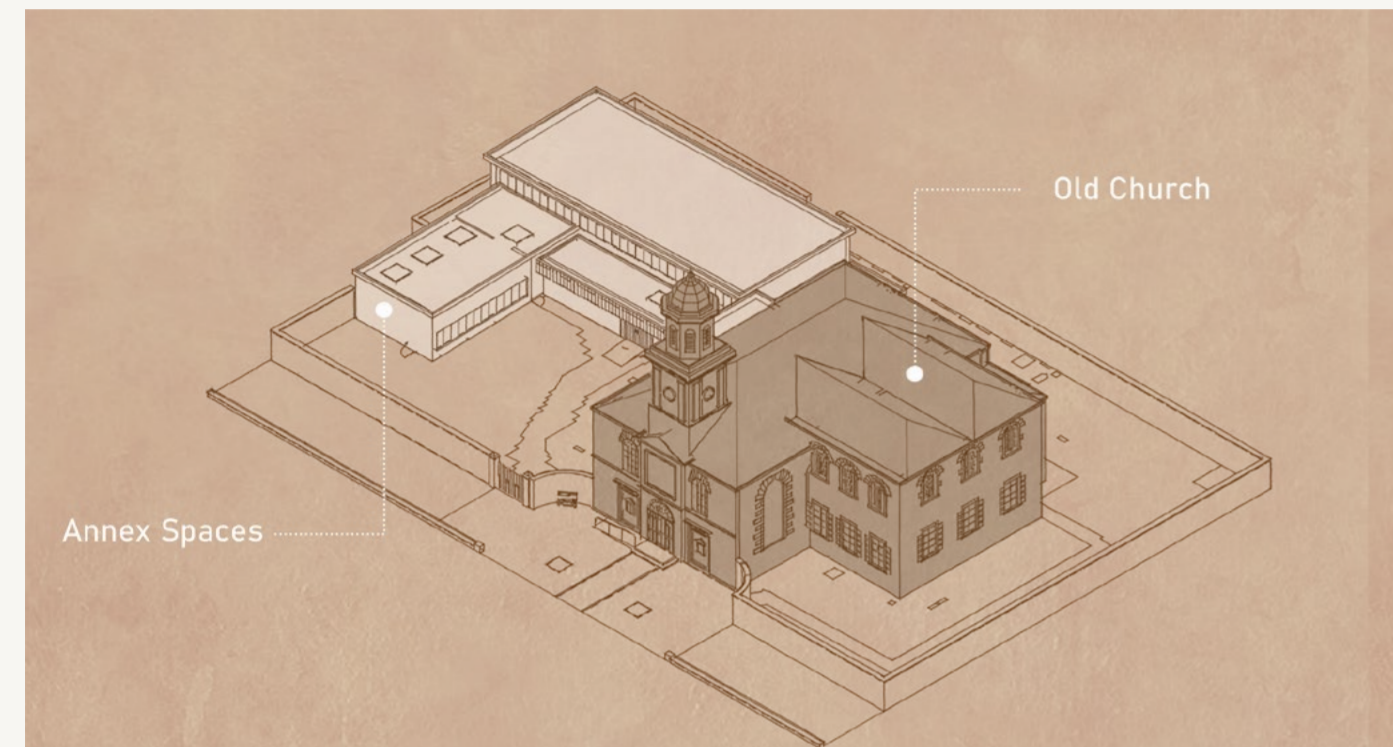


PROJECT DESCRIPTION

The Portobello Eco-Grief and Renewal Centre is a climate sanctuary shaped by the sea, where material innovation, environmental response, and community stewardship strategies converge. Guided by the Community Climate Infrastructure Framework, the project extends Bellfield Community Centre's legacy as a place of gathering and reflection towards collective ecological care and renewal.

Through adaptive reuse, biomaterial experimentation, and a heat recovery composting system, waste is transformed into resource and ecological processes become visible elements of everyday occupation. Together, these climate-responsive strategies demonstrate how material and environmental design can foster resilience, participation, and meaningful connections between people, place, and ecological renewal.



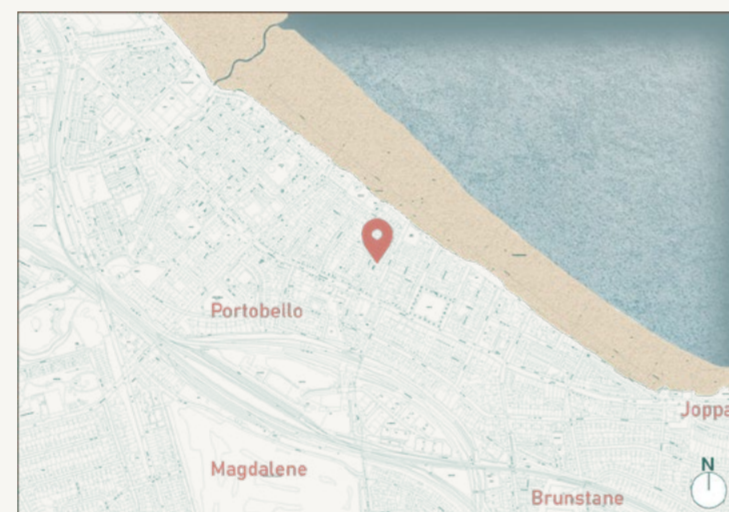
Located on Bellfield Street in Portobello, Edinburgh, Bellfield Community Centre is a former church that has been transformed into a vibrant hub for local residents. Hosting workshops, community events, social gatherings, and health classes, it welcomes people of all ages and backgrounds throughout the week. The centre blends historic architecture with contemporary interior design, reflecting both its heritage and ongoing community relevance. Situated between a residential neighbourhood and Portobello High Street, it links everyday local life with the wider civic environment. Selected for its visible climate-related challenges and strong history of community ownership, Bellfield embodies resilience, stewardship, and community-led ecological renewal.

EXISTING INTERIOR SPACES



Portobello Eco-Grief & Renewal Centre

Transforming eco-grief into collective action



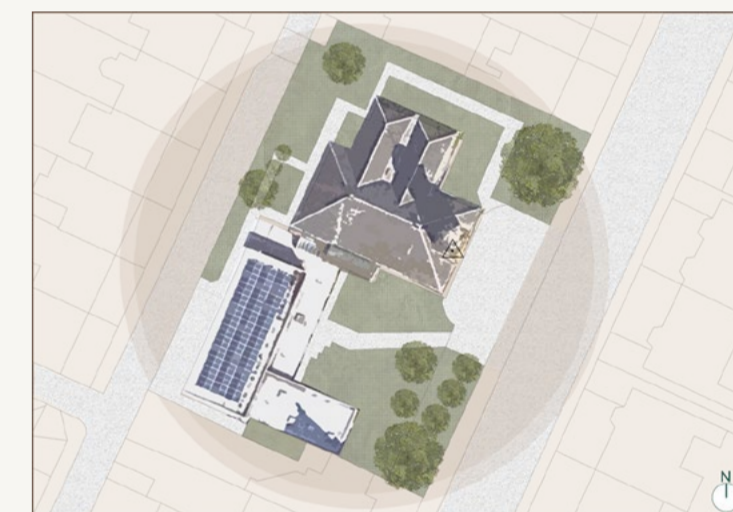
City Context



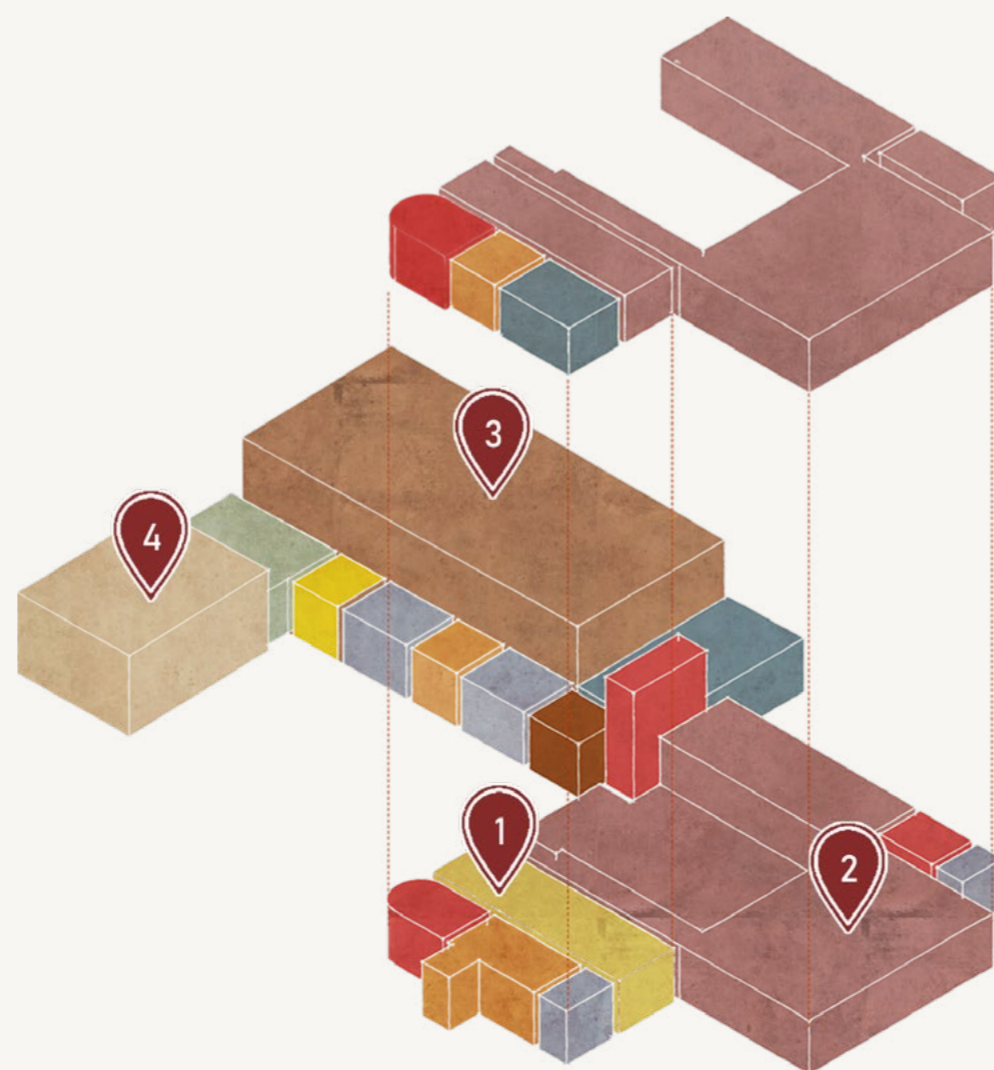
Neighbourhood Context



Location Plan



Site Plan



Zoning of Existing Spaces

- Small Hall
- Large Hall
- Storage
- Celebration Foyer
- Kitchen
- Entrance/Lobby
- Staircase
- Celebration Hall
- Toilet
- Office/Management
- Building services



Coastal flooding and erosion



Contention over local development



Pollution and sewage overflow



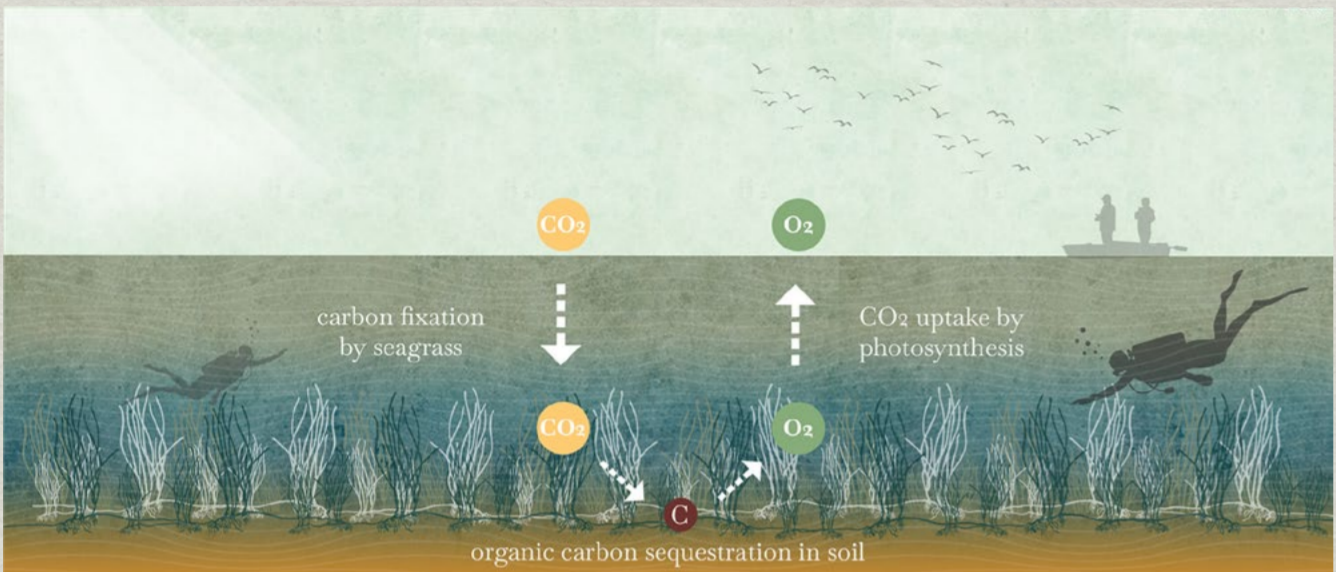
Flooding and intense storms

Portobello Climate Related Issues

Eco-Grief

The phrase "eco grief" can also be referred to as "solastalgia", which describes the emotional and physical toll that environmental destruction and climate change can have on individuals. In Scotland, this issue is becoming increasingly relevant as more people especially youths express their fears, anxieties and sadness when witnessing significant changes to landscapes that have been an integral part of Scottish culture. It has been reported by Climate X Change Scotland that 70% of people living in Scotland are worried about climate change with 25% of the population already being affected by this mentally. This problem seems to be more prevalent in youths and those living in areas directly affected by climate change. Coastal erosions, loss of ecosystems and degradation of peatlands are among some of the issues Scotland is facing currently. For this project, one of the places that are being highlighted is Portobello, Edinburgh.

SEAGRASS MEADOWS & COASTAL RESILIENCE

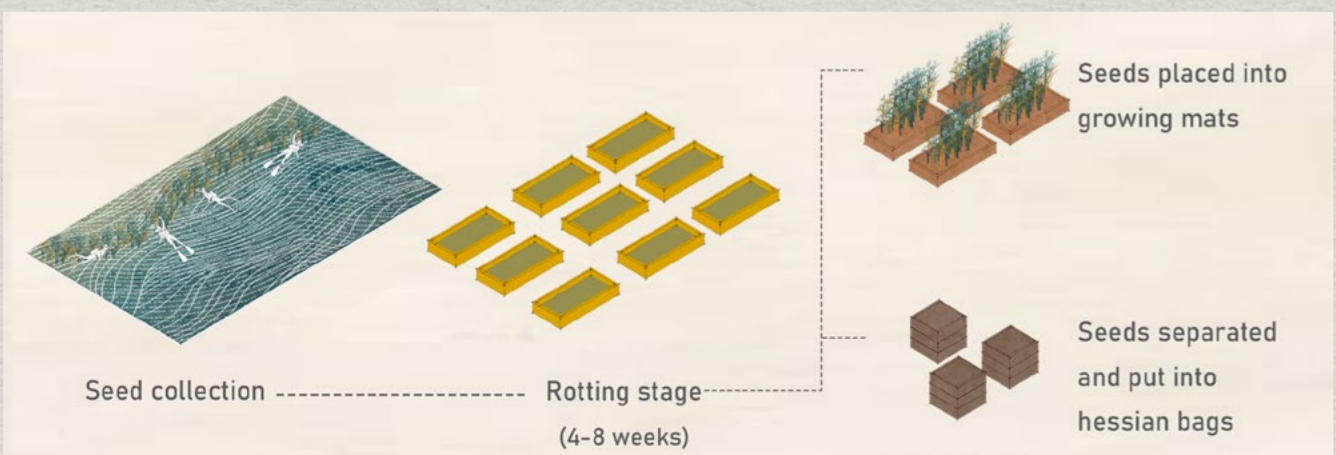


Seagrass ecosystems rank amongst the most efficient natural blue carbon sinks on Earth

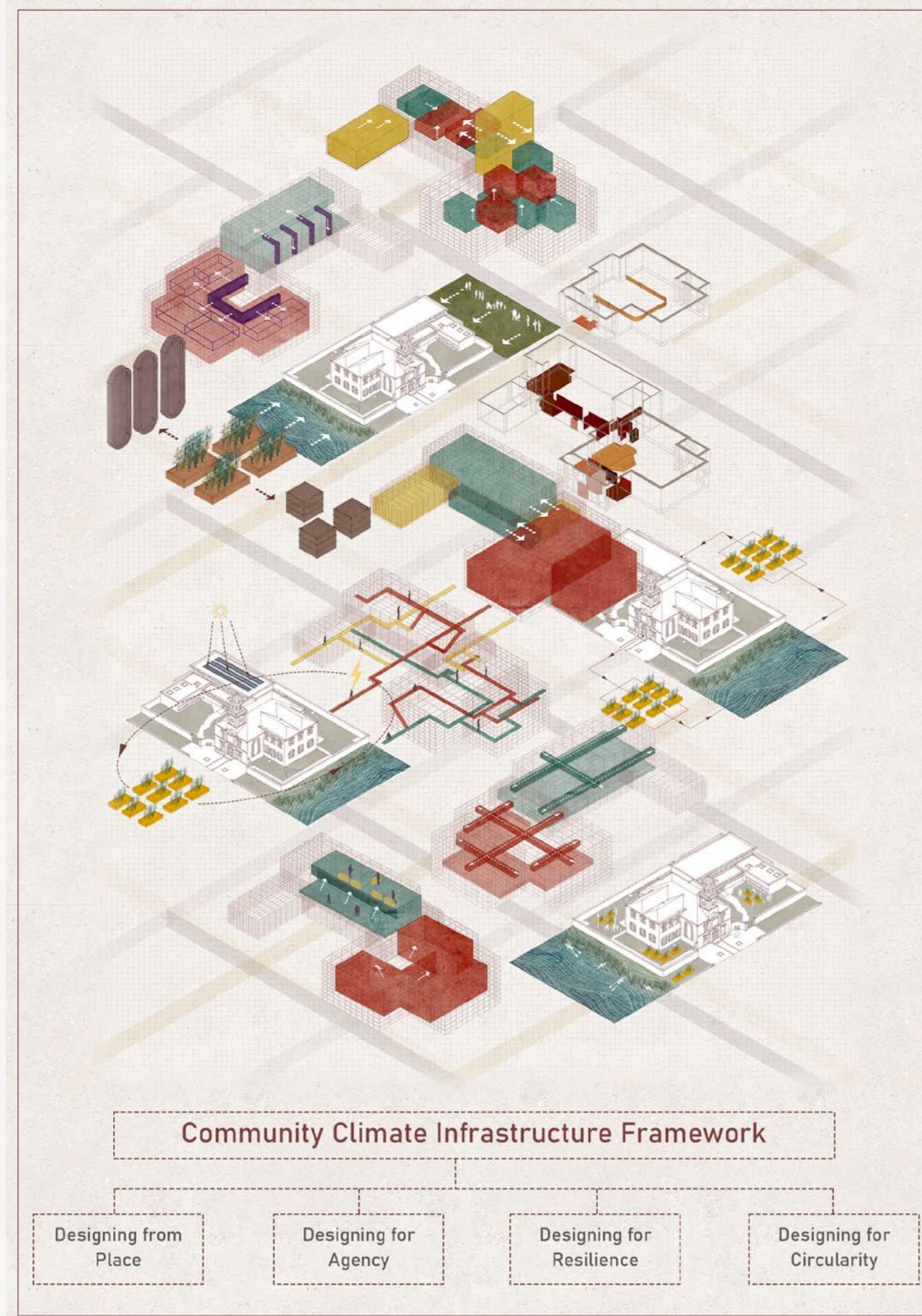
Seagrass was selected as a nature-based solution for the Eco-Grief and Renewal Centre due to its ecological importance, local relevance, and ability to create reciprocal benefits for both people and the environment. As a habitat that supports biodiversity, sequesters carbon, and reduces coastal erosion through sediment stabilisation, seagrass plays a vital role in climate resilience and ecosystem health. Through education, stewardship, and community engagement, the project supports the restoration of vulnerable seagrass meadows while fostering environmental awareness. This mutually beneficial relationship highlights both ecological loss and recovery, providing a tangible framework for exploring eco-grief, stewardship, and ecological renewal.



SEAGRASS PROCESSING



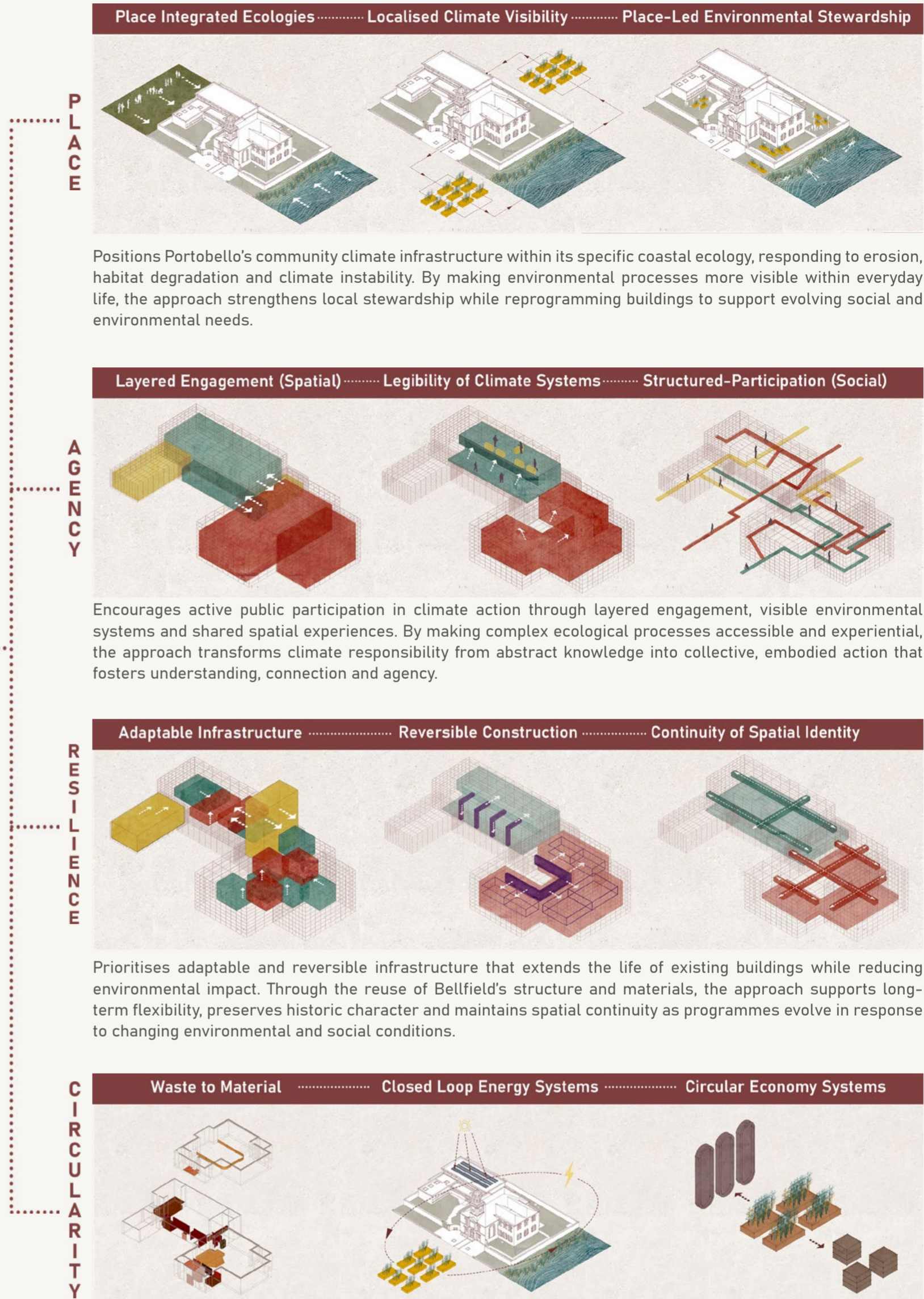
Seagrass seed cultivation techniques (before planted into restoration sites)



The project is anchored by the Community Climate Infrastructure framework, developed in response to the limitations of many community-led climate initiatives, which are often fragmented and lack long-term support. Drawing on Architecture and Design Scotland's Climate Action Towns Project, the framework acknowledges that climate action is shaped by both practical and emotional factors, including eco-grief and climate anxiety. It emphasises the importance of supportive structures, shared platforms, and accessible spaces in sustaining participation, positioning climate action as a social, spatial, and emotional system that fosters resilient, long-term community engagement.

HEAT RECOVERY COMPOST SYSTEM

The heat recovery composting system was informed by the University of New Hampshire model, which captures thermal energy generated through organic decomposition and reuses it as a renewable heat source. Adapted for seagrass cultivation, the system recovers heat from composting decayed seagrass collected after seed release, helping to stabilise tank temperatures and support seed germination during colder months. To address the unique characteristics of seagrass waste, carbon-rich materials and seasonal landscape waste are incorporated to improve composting efficiency and maintain consistent heat output, creating a circular and resource-efficient system.

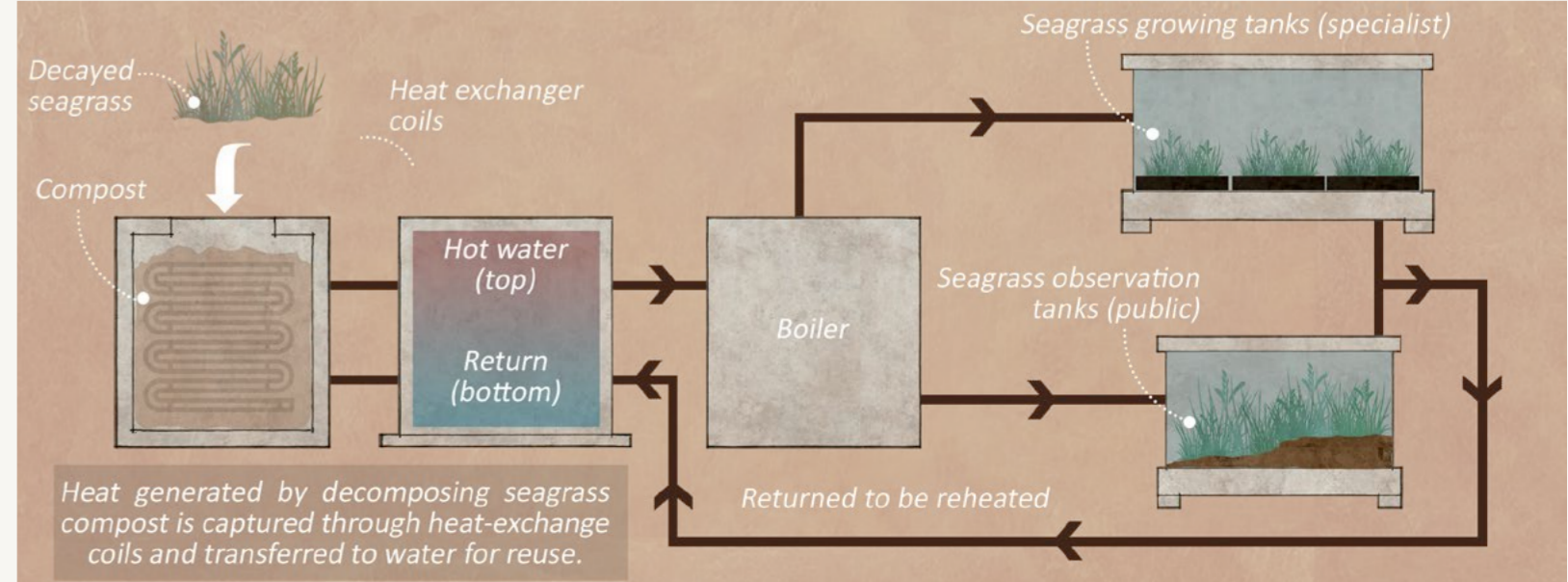


Positions Portobello's community climate infrastructure within its specific coastal ecology, responding to erosion, habitat degradation and climate instability. By making environmental processes more visible within everyday life, the approach strengthens local stewardship while reprogramming buildings to support evolving social and environmental needs.

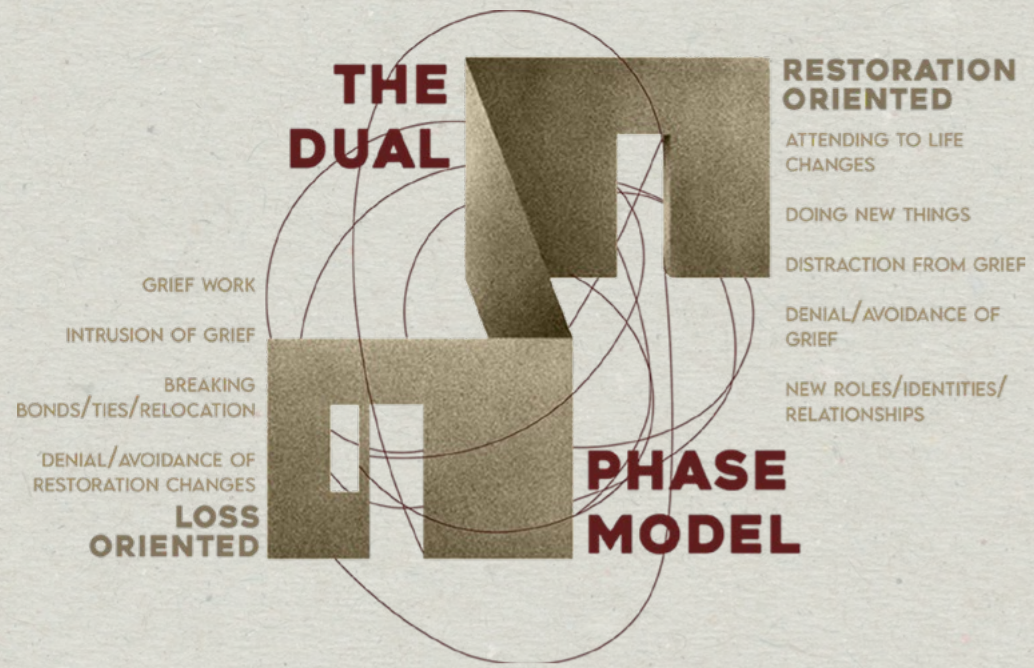
Encourages active public participation in climate action through layered engagement, visible environmental systems and shared spatial experiences. By making complex ecological processes accessible and experiential, the approach transforms climate responsibility from abstract knowledge into collective, embodied action that fosters understanding, connection and agency.

Prioritises adaptable and reversible infrastructure that extends the life of existing buildings while reducing environmental impact. Through the reuse of Bellfield's structure and materials, the approach supports long-term flexibility, preserves historic character and maintains spatial continuity as programmes evolve in response to changing environmental and social conditions.

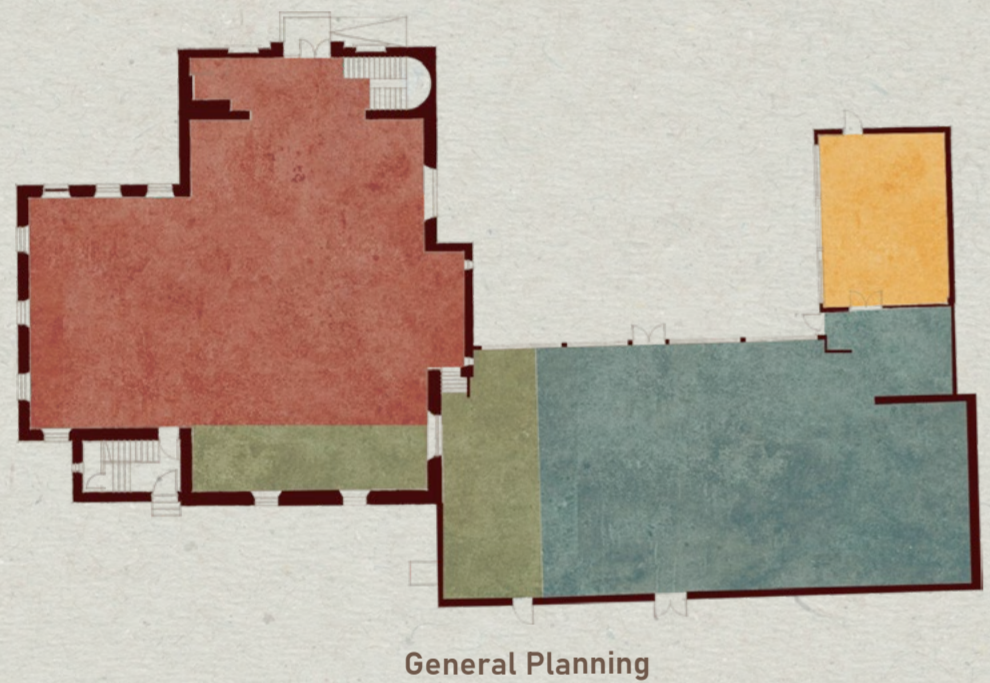
Redefines waste as a resource, embedding closed-loop material, energy and economic systems within climate infrastructure. Through reuse, energy recovery and regenerative production cycles, the approach reduces dependency on external resources while enabling the building to actively contribute to local environmental and economic resilience.



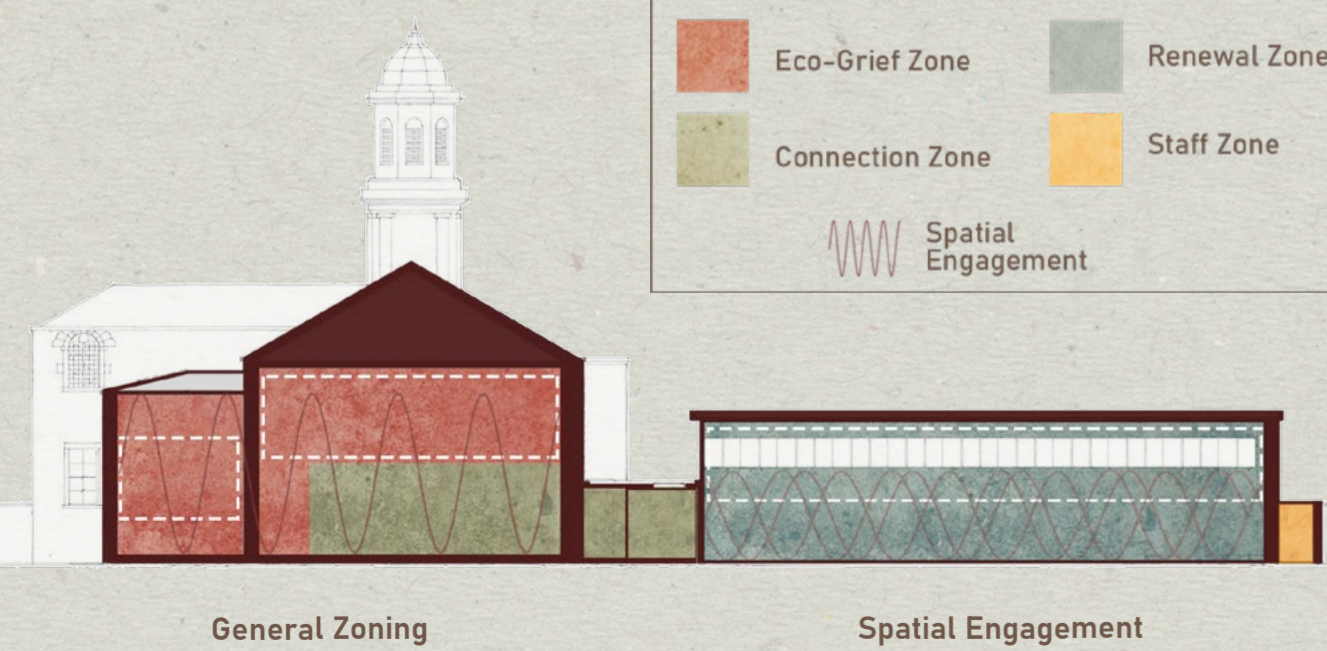
EMOTIONAL JOURNEY



Inspired by Stroebe and Schut's Dual Phase Model of Grief, the project presents a social, emotional, and spatial response to eco-grief through two interconnected zones: the Eco-Grief Zone and the Renewal Zone. Together, they reflect the ongoing movement between loss and restoration, framing renewal as a continuous process rather than a fixed outcome. The design encourages users to move between spaces of reflection and action, transforming eco-grief into a shared and constructive experience. Through active participation and stewardship, the project supports ecological awareness, environmental repair, community engagement, and long-term social regeneration.



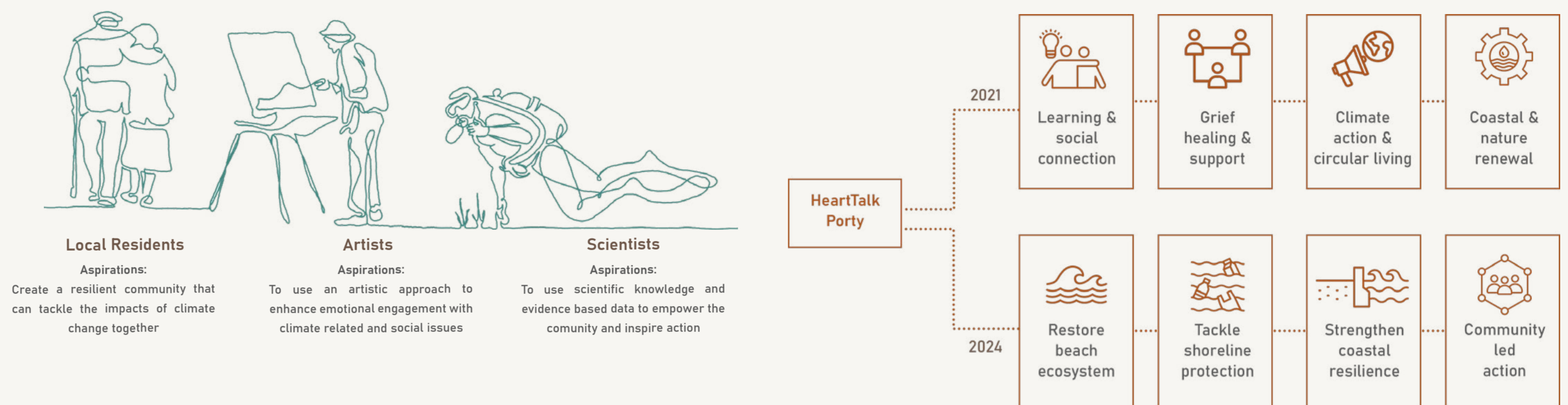
Themes and spatial programmes are distributed across the two buildings, with the Eco-Grief Zone reflecting the original church's spatial hierarchy and the Renewal Zone extending the role of the annex as a response to evolving community needs. A new Connection Zone is introduced to link these spaces, improving circulation and accommodating shared facilities that support both zones.



Zoning is organised vertically to establish a clear spatial hierarchy, with public spaces on lower levels and quieter, semi-private functions positioned above to support focused activities and controlled access. The Eco-Grief Zone supports reflection and contemplation through passive engagement, while the Renewal Zone promotes active participation, creating a more dynamic and interactive spatial experience.

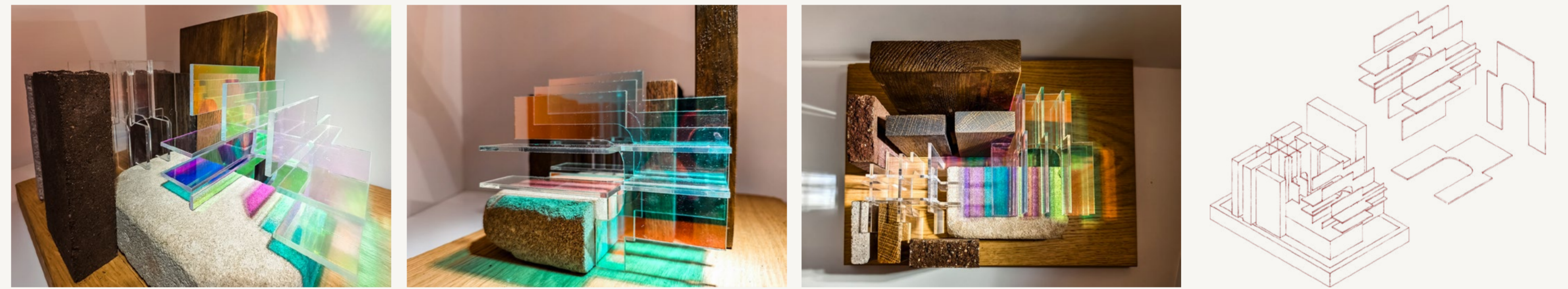
USER PROFILE

This centre aims to bring together a diverse but interconnected user group. Local residents, mainly older people, bring personal stories, lived experience, and a strong interest in reuse and climate action embedded within Portobello's identity. Artists contribute creative and emotional perspectives on eco-grief and renewal, while scientists provide evidence-based knowledge to help educate the public. Together, this mixed user group can create a centre that benefits both the community and environment. The project was informed by community priorities identified through HeartTalk Party, an initiative led by Action Party (the organisation that manages Bellfield) to support local collaboration and decision-making. Proposed activities and spatial programmes respond directly to community needs and aspirations.



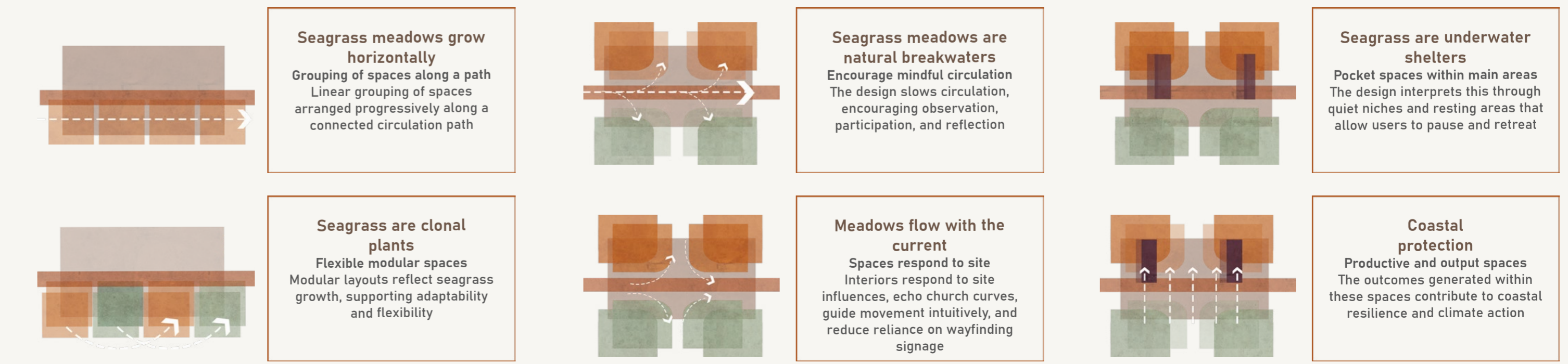
MATERIALISING SITE CHARACTER

The maquette is an interpretation of Bellfield's layered spatial volumes, prominent internal voids, and evolving material character. Acrylic represents light-filled spaces, while timber, brick, and sandstone reflect the relationship between historic and contemporary fabric. Its off-centred composition mirrors the site layout, reinforcing spatial hierarchy. The iridescent and clear acrylic represent the site's stained and standard glazing, expressing their influence on light, spatial character, and architectural identity.



KEY SPACE

The Seagrass Cultivation Area within the Renewal Zone was identified as the project's key space due to its representation of active restoration, hope, and future change, rather than solely focusing on loss. While the Eco-Grief Zone remains an important space for reflection and emotional support, the Seagrass Cultivation Area provides a tangible and participatory response through which users can contribute to environmental renewal. This approach aligns with the project's aim of transforming grief into collective action, creating a positive focal point that connects wellbeing with ecological recovery. To inform the design process, selected characteristics of seagrass were explored as a reference for spatial development. This investigation established a balance between practical building strategies and the project's thematic intentions.





Seagrass Connection Lobby
Acts as a transitional space between the Eco-Grief Zone and the Renewal Zone, improving circulation, provide opportunities to observe seagrass cultivation, processing, and research systems.



Ground Floor Plan
Not-to-scale



Multipurpose Workshop Space
Designed for diverse seagrass-related activities, the space supports seed processing, workshops, and flexible community use through adaptable work surfaces and integrated storage.



Seed Release Tank Room
A public space for seagrass seed collection, volunteer participation, guided engagement, and preparation before transfer for processing.



Mezzanine Floor Plan
Not-to-scale



Specialist Research Lab
A hybrid laboratory supporting seagrass restoration, marine research, and future coastal studies through adaptable specialist facilities and equipment.



Heat Recovery Compost Room
Provides public visibility while enabling trained volunteers to support circular waste management and renewable energy generation.



First Floor Plan
Not-to-scale



Collaboration Space
Designed for informal meetings, discussion, and collaboration, the space encourages knowledge exchange between researchers, visitors, and community members.

DEVELOPED MATERIALS & DESIGN APPLICATION

Material selection within the Community Climate Infrastructure framework explored how marine-derived waste could be transformed into valuable architectural resources. Crushed mussel and seashells were investigated for bespoke finishes that reflected Portobello's coastal identity while reducing landfill waste. Alongside low-impact commercial materials with recycled content, the project developed experimental shell-based composites and biomaterials through continuous testing and refinement.



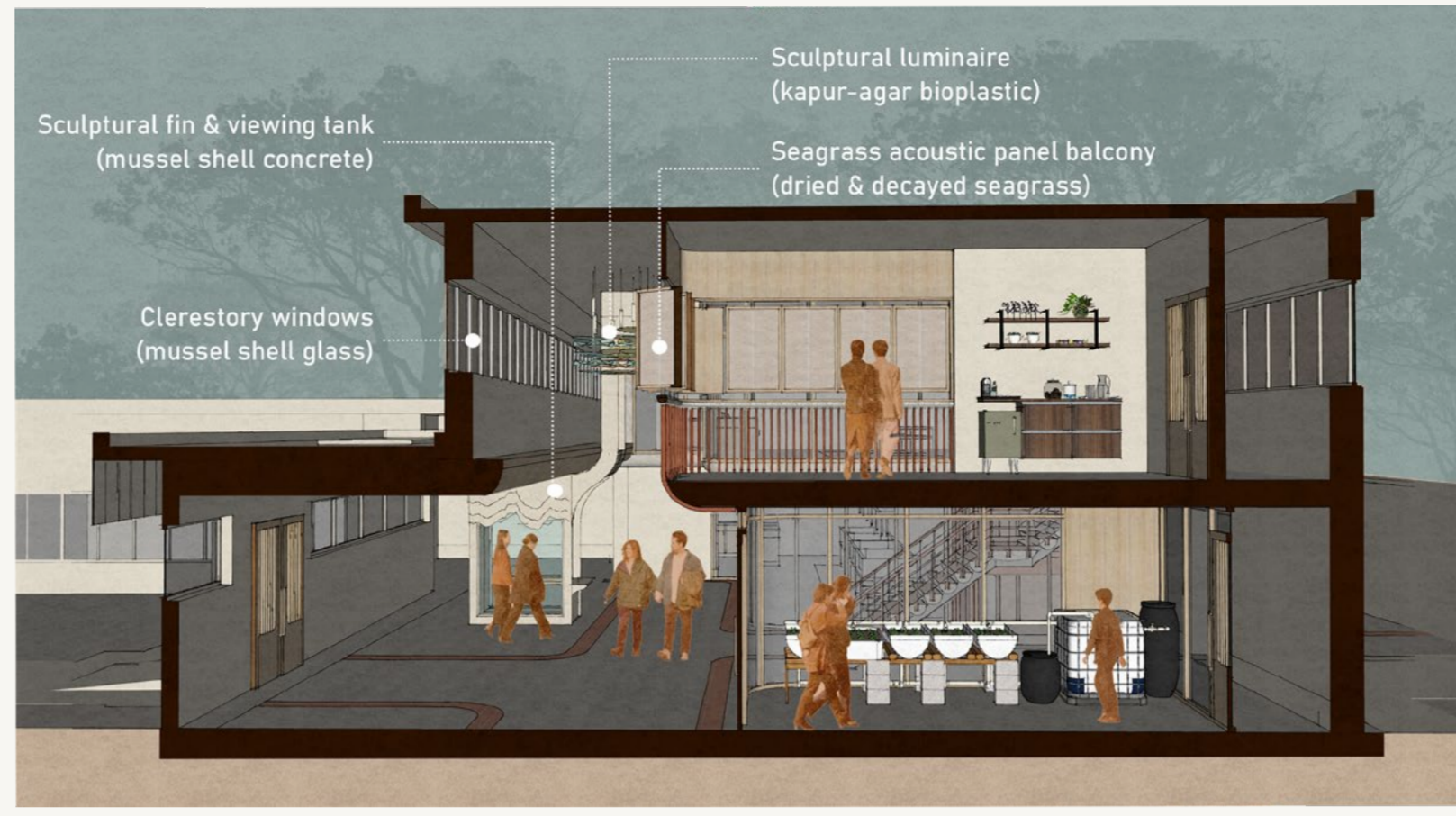
Material palette of the EGRC made up of commercial and self-developed materials

Early prototypes revealed limitations in durability and environmental performance, prompting a more embedded and iterative approach to material development. Through further experimentation, the revised materials demonstrated improved stability and longevity, aligning environmental intentions with practical application. This process emphasised the importance of adaptability, critical evaluation and long-term performance within sustainable material design, showing that innovative materials must balance ecological responsibility with realistic functionality for use within interior environments.

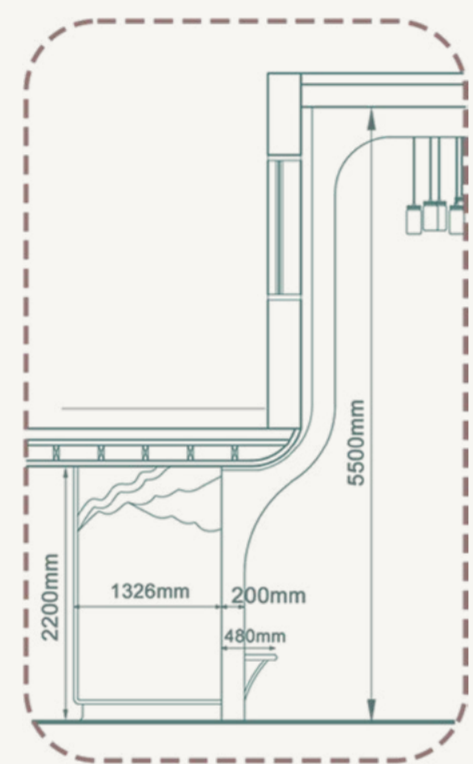
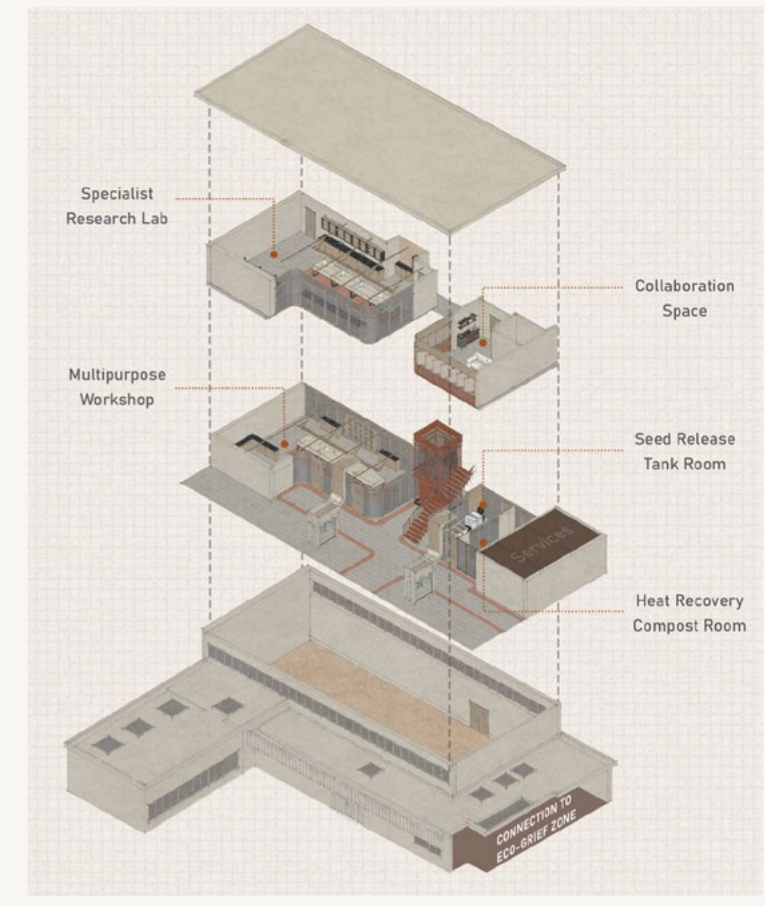


Improved material iterations

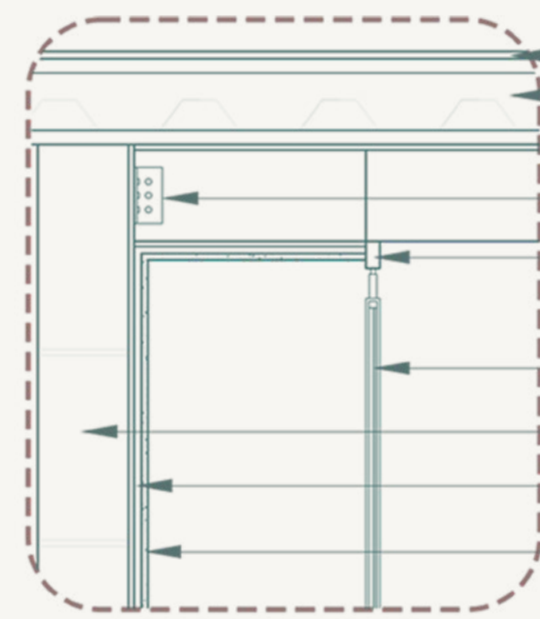
1. Agar-mussel shell biomaterial (flower dye)
2. Agar-prawn shell biomaterial (onion dye)
3. Mussel shell concrete (without byssus, no dye)
4. Mussel shell concrete (with byssus, no dye)
5. Mussel shell concrete (with byssus, with dye)
6. Mussel shell embedded glass brick
7. Cement-Free Mussel Shell Composite (biodegradable)
8. Kapur (lime paste)-enhanced agar bioplastic developed for improved material performance



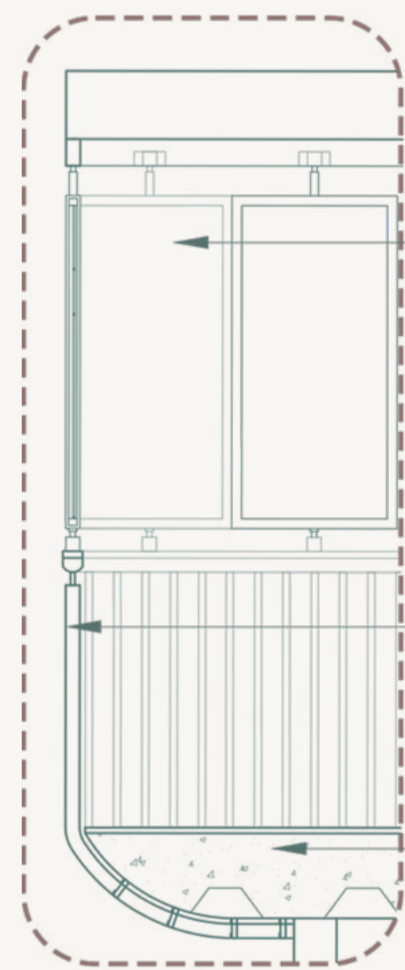
Rendered section and exploded axonometric illustrating the overall material application and location of the detailed material interventions



Detail 1 (fin and viewing tank)
Side elevation drawing
Not-to-scale

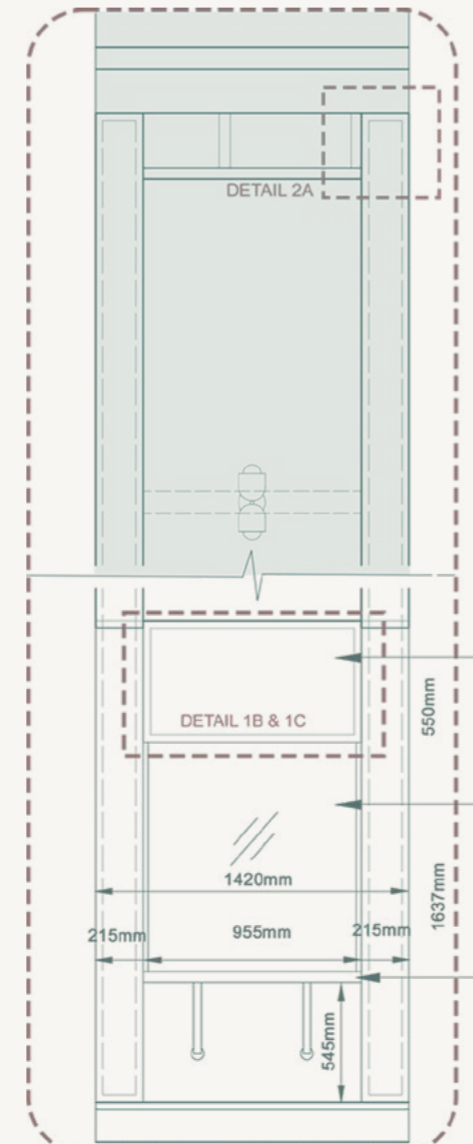


Detail 2A (sculptural vertical fin and balcony connection)
Section drawing
Not-to-scale

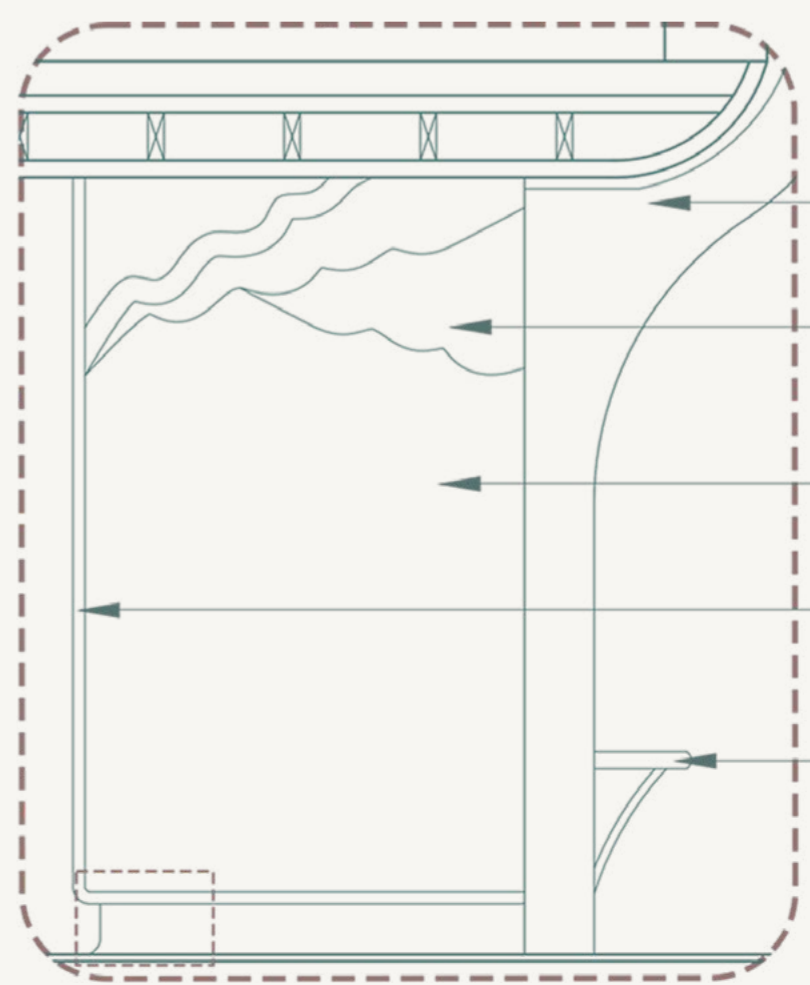


- 18mm thick SOULD seagrass acoustic panel attached to 584mm thick x 1365m x 50mm thick timber frame structure on pivot pole
- 25mm thick curved (roll banded) mild steel vertical fin balustrade @ 100mm centre to centre. Mechanically fixed to reinforced concrete floor slab with anchor bolts @ 176mm centre to centre, steel to be powder coated matte finish (terracotta colour)
- 300mm thick concrete slab

Detail 3A (balustrade)
Section drawing, panels closed
Not-to-scale



Detail 1 (fin, viewing tank and seating)
Front elevation drawing
Not-to-scale



Viewing tank detail
Elevation drawing
Not-to-scale

- Side fascia panels to operate as concealed, top hinge lift up cabinet for tank maintenance
- Seagrass viewing tank
- Recessed perch seating

- Sculptural vertical fin attached to 152 x 152mm universal steel column, formed in lightweight secondary framing with expanded metal lath substrate and finished in spreadable mussel shell concrete render
- Continuous feature façade incorporating CNC-finished coastal relief profile, with varied depths 15-40mm to create texture, shadow, and a sculptural landform expression, made from developed mussel shell concrete. Panels fixed to concealed aluminium support rail with stainless steel bracket
- 580 gallon rectangular tank overall size 1300mm x 1176mm x 1500mm high formed in 25-30mm low-iron laminated glass with structural silicone sealed joints.
- Tank supported within a powder-coated galvanised steel perimeter frame with RHS vertical posts. Internal tiered substrate bed 100-150mm deep comprising lower drainage gravel layer and upper marine sand/silt layer for seagrass root establishment
- Integrated timber perch seat recessed to side of aquarium, seat overall width 955mm, set at 545mm above finished floor level. Formed in 40mm repurposed timber from site with rounded edge.