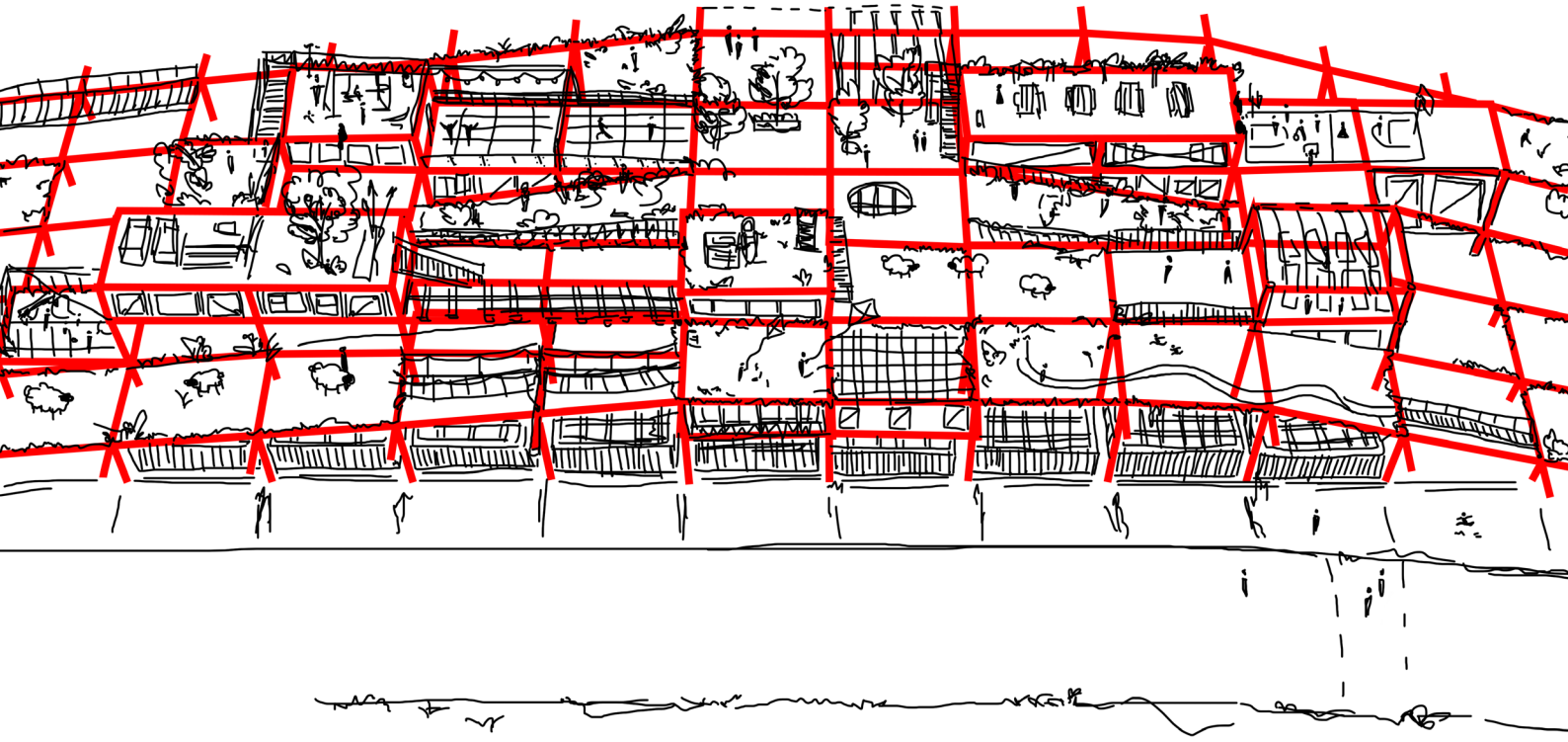
SELECTED WORKS

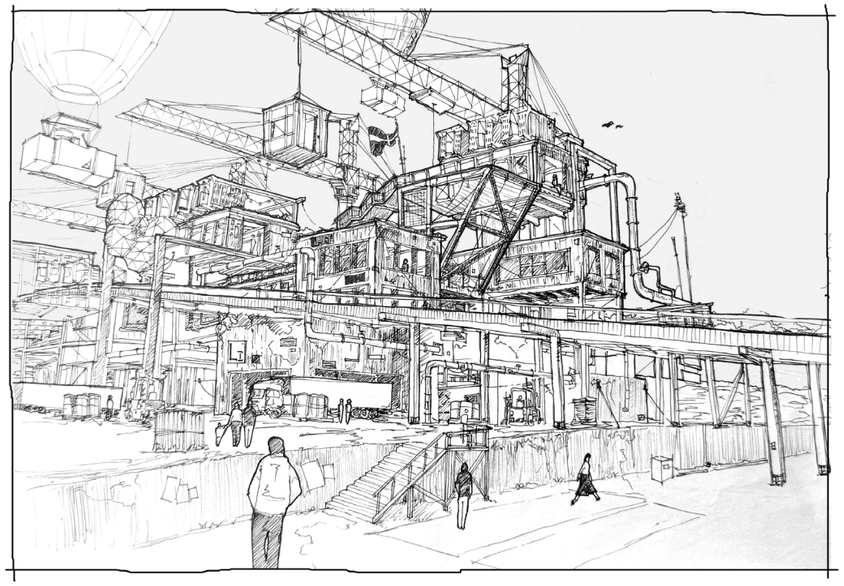


omer ibrahim

PART 1 PORTFOLIO

JULY 2025

'Uncertain futures' - sketch from Polytown - Studio 3



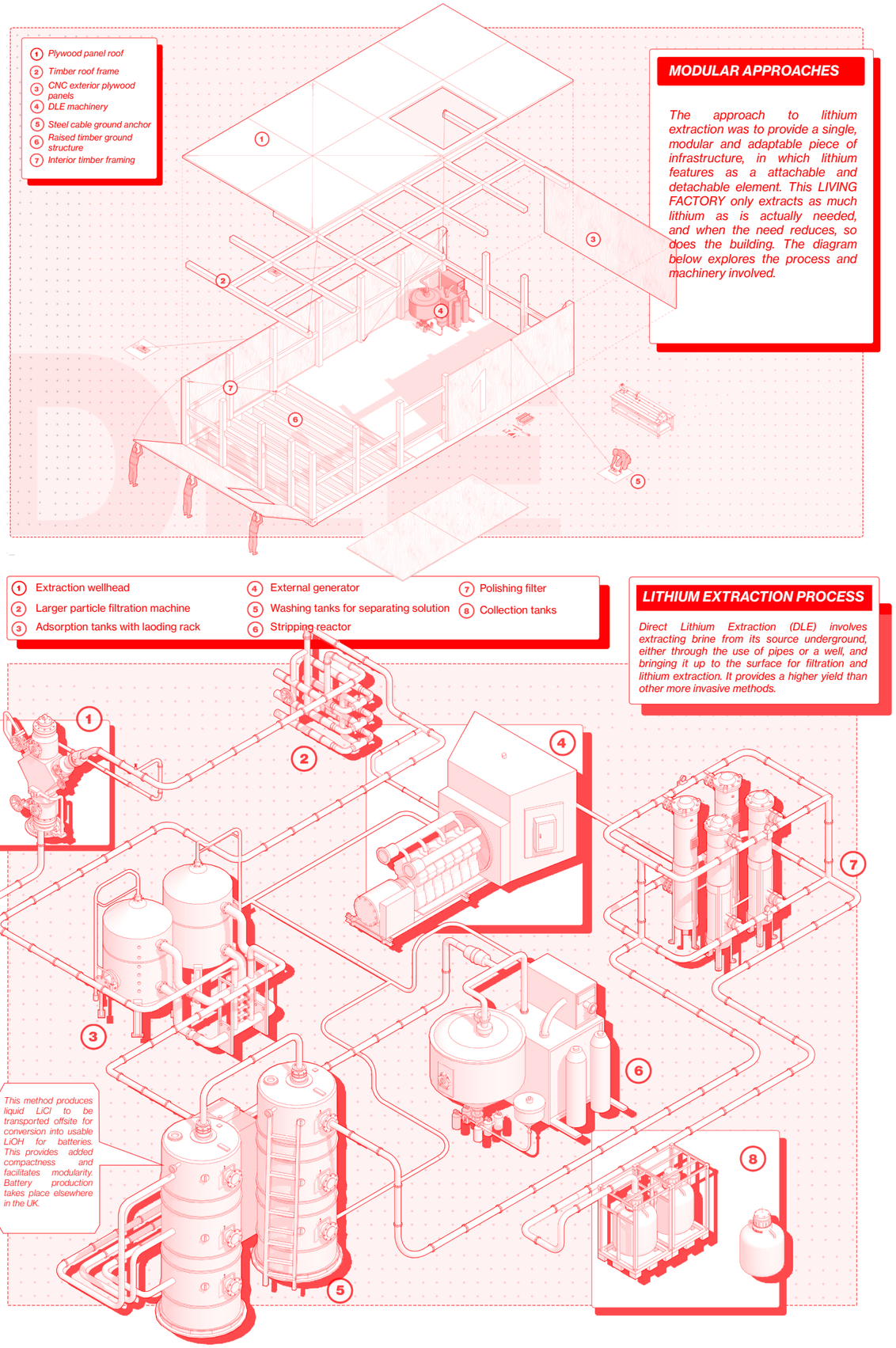
contents

1.

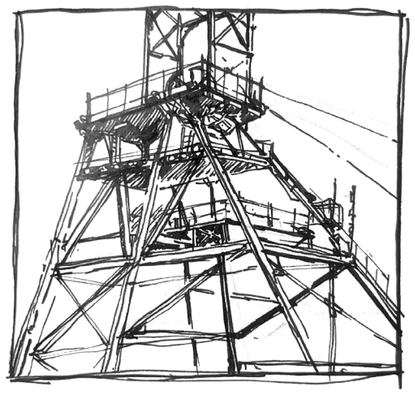
polytown:

THE LiVING FACTORY

As technological progress accelerates, we move from one finite resource to another. Whilst this use of our environment is in some ways inevitable, as architects, we look for less invasive strategies of powering a sustainable future. This particular project examined the extraction of lithium, and looked to celebrate the existing industrial heritage of a Cornish tin mine, whilst providing a community driven piece of infrastructure to last long into an uncertain future.



is a lithium future realistic in a finite world?



The first half of studio 3 involved the design of a lithium-based community in rural Cornwall, for which research into existing social and economic infrastructure was carried out.

As a group we developed a masterplan which used lithium mining as an initial push point for what would later become a self-sustaining and carbon-neutral community, with a number of sources of both income and energy. This was a key concept for the wider strategy, and the origin of the POLYTOWN.

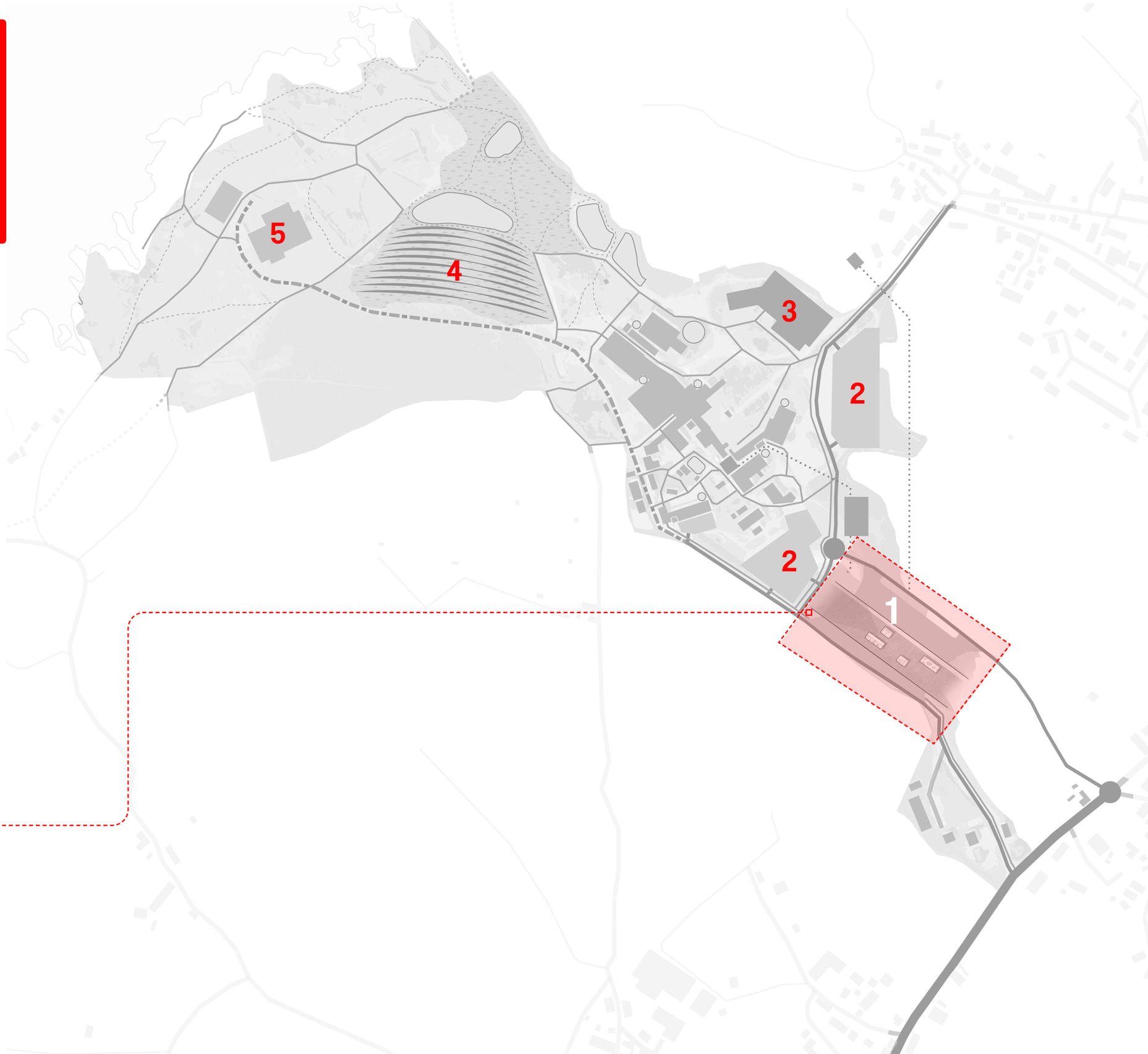
1. LITHIUM EXTRACTION SITE

2. Car Park

3. Reseacrh/education Centre

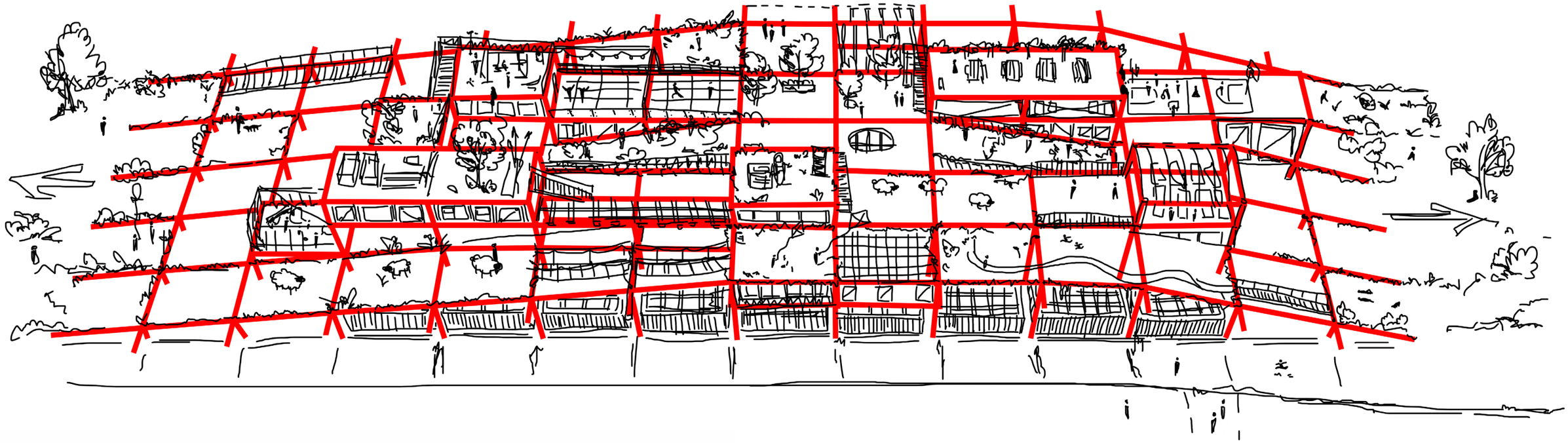
4. Rewilded Watershed Area

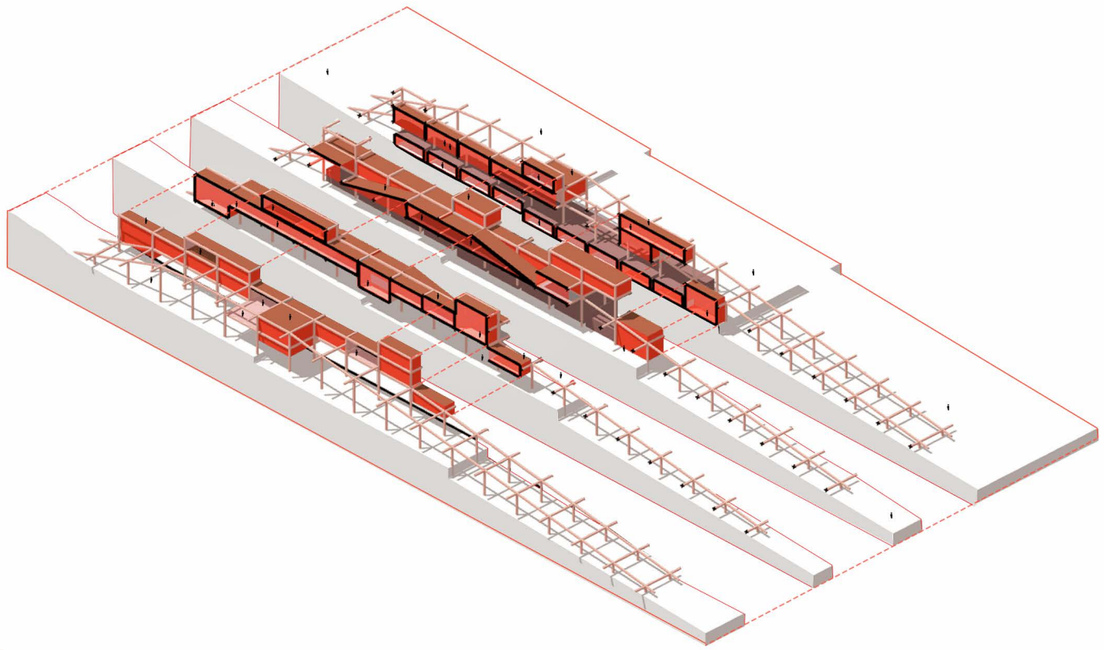
5. Leisure and Coasteering



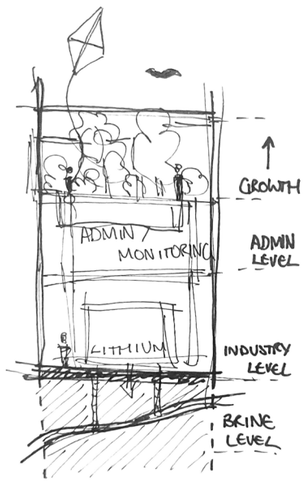
order and disruption:

CAN THE BUILDING FABRIC EXPAND TO GIVE AGENCY TO LOCAL COMMUNITIES?



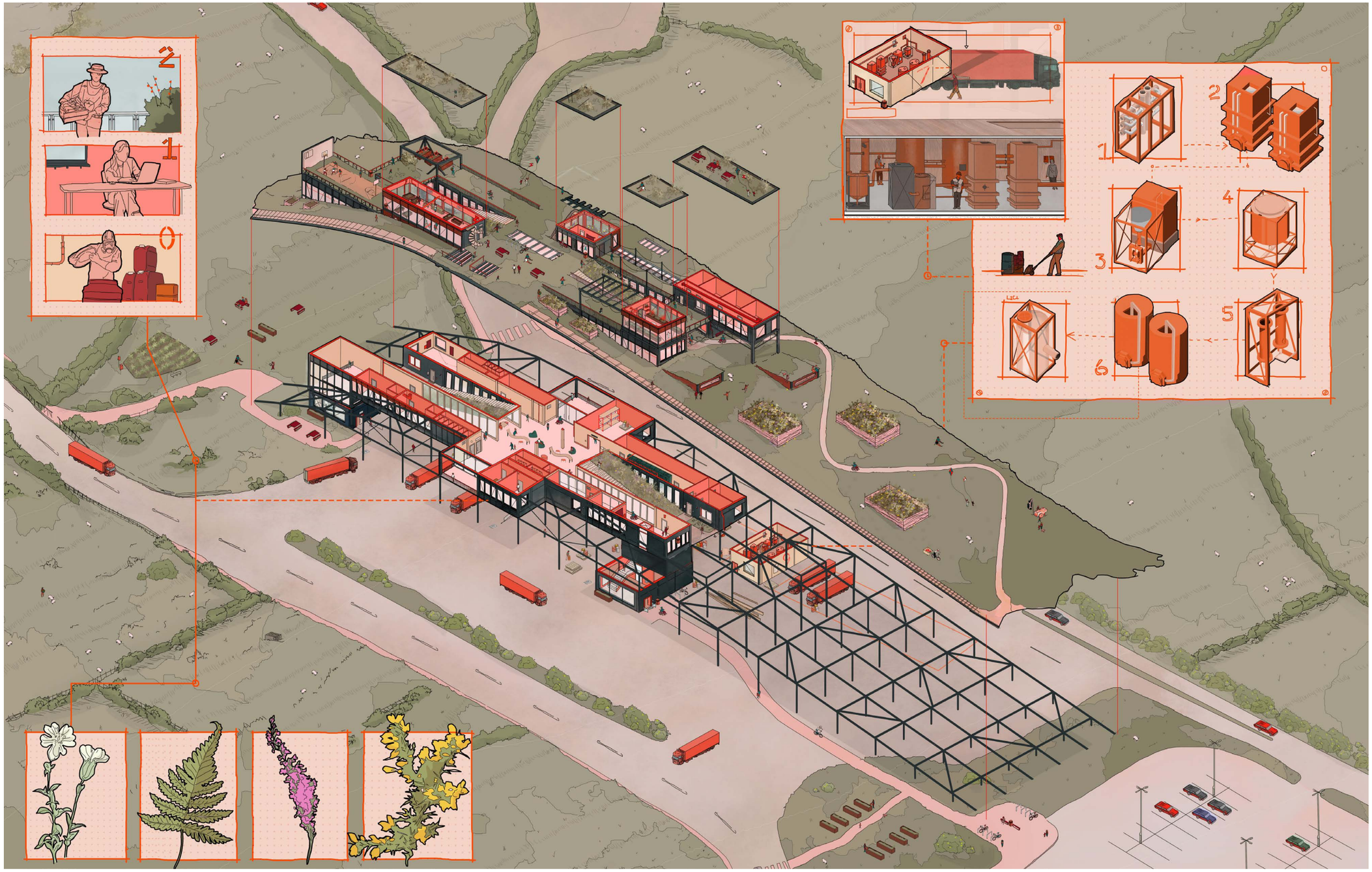


UNLOCKING THE POTENTIAL OF THE STRUCTURAL GRID



key elements of verticality

The structural grid was defined by the dimensions of one lithium unit, providing a shell for the depot hub below. Through a relatively sketchy attempt at a perspective roof plan, I experimented with the potential of the roof space, using growth as a theme throughout to establish what kind of activities might take place on the roof space. Here, the roof begins to become the heart of the scheme, creating a clear heirarchy of what is lithium space, admin space and public or social space. This roof space was to be used for the restoration of wildlife, and social space.

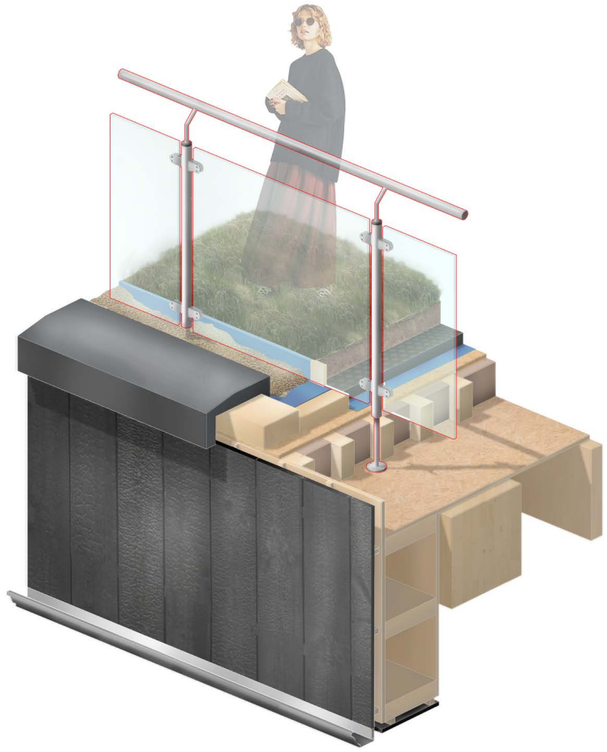


verticality:

MODULAR APPROACHES TO LITHIUM AND GROWTH

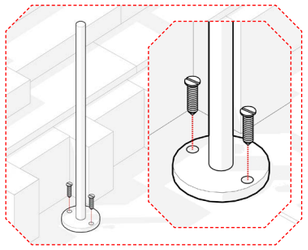
The arrangement of internal spaces is efficient and focuses primarily on circulation and public/ private space relationships, with lithium extraction being a modular feature on the lower industry level.. Putting the social space at the heart of the building encourages collaboration and discussion, whilst the two parallel corridors meet in the middle where natural cross ventilation can occur. The building itself acts as a medium between landscape and industry and between settlement and factory, with efficient and smooth typological transitions being at the heart of the programme.

The material palette of the interior spaces aimed to celebrate local Cornish landscapes, whilst making slight nods to the highly industrial facility below.

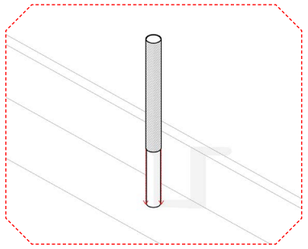


HANDRAIL DETAIL STUDY

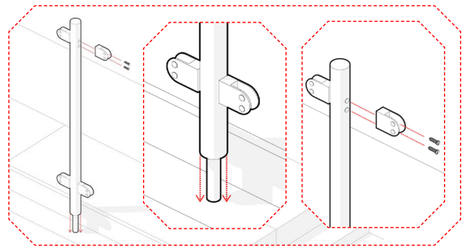
At a 1:5 level of detail, I was able to explore the hilltop level handrail and green roof edge strategy in greater depth. A crucial aspect of this design element was water tightness, to protect the timber structure underneath the cladding, and so a two-part sleeve-design was implemented. Here, the main railing would wrap around a structural base, which would in itsefl be coated with a tight DPM. This way, the membrane into the structure is not breached. The use of aluminium and glass provides a balance between a modern and industrial appearance which reflects the rest of the scheme, with maximum transparency so as to not obstruct views over the Cornish landscape.



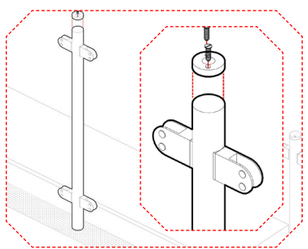
1. The footing is attached to the timber structure using steel screws to fix firmly into place.



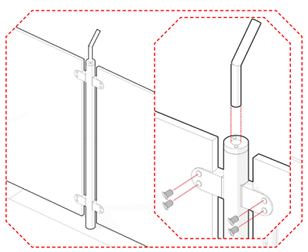
2. Roof envelope layers continue around this footing, which is encased in a tight damp proof membrane.



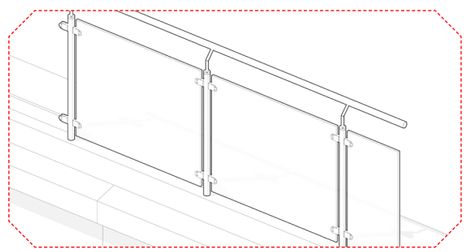
3. The main sleeve of the handrail is fitted directly over the base, and held in place with screws. The aluminium clamps with rubber inserts for the glass are attached precisely, for security.



4. Metal screws are used to attach base of angled handrail element, which is ergonomic and accessible



5. The angled element is added, adding an ergonomic handhold for users going uphill. The glass is also fixed into place.



6. Handrail itself is fixed in place using steel screws. and process is repeated for length of hill for safety and security.

SECTIONAL DETAIL

Roof

- 950mm steel railing
- 150mm soil substrate
- 50mm drainage layer
- 18mm OSB
- Damp proof membrane
- 150mm mineral wool insulation
- 18mm plywood
- 400mm timber primary structure
-200x400mm steel brackets w/ steel fixings
- Aluminium roof parapet
- Aluminium gutter

Wall

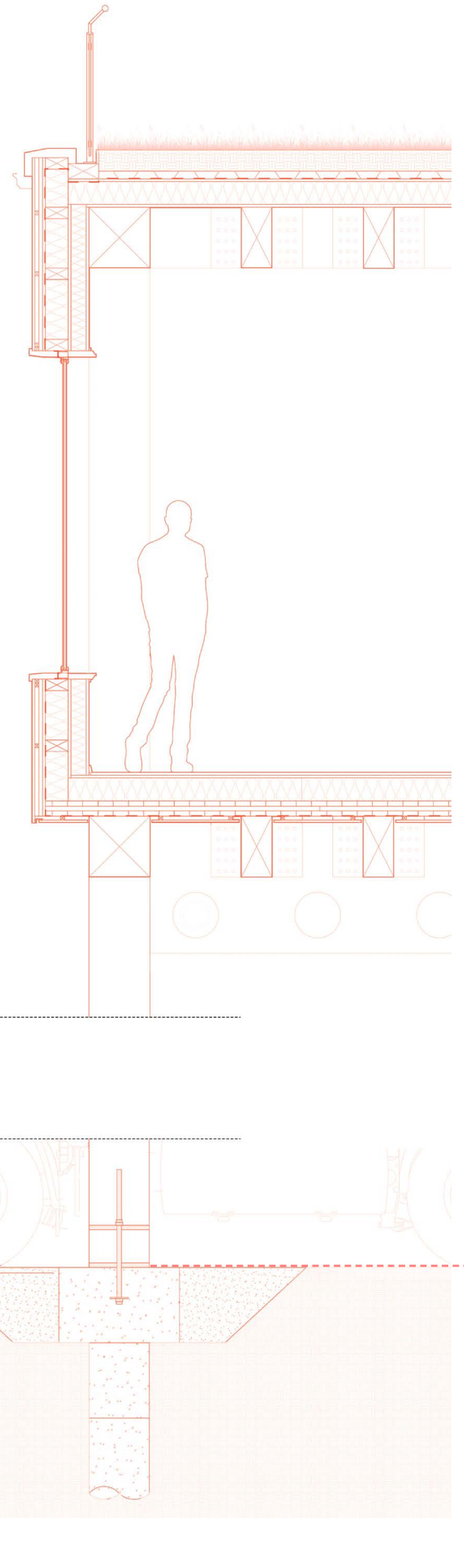
- 18mm plywood
-100mm continuous insulation
- 18mm OSB
- 150mm CLT structure w/ insulaton infill
- 25x25mm Vertical battens
- 25x25mm Horizontal battens
- 18mm shou sugi ban cladding
- Aluminium window framing
- 24mm Double glazing

Interior floor

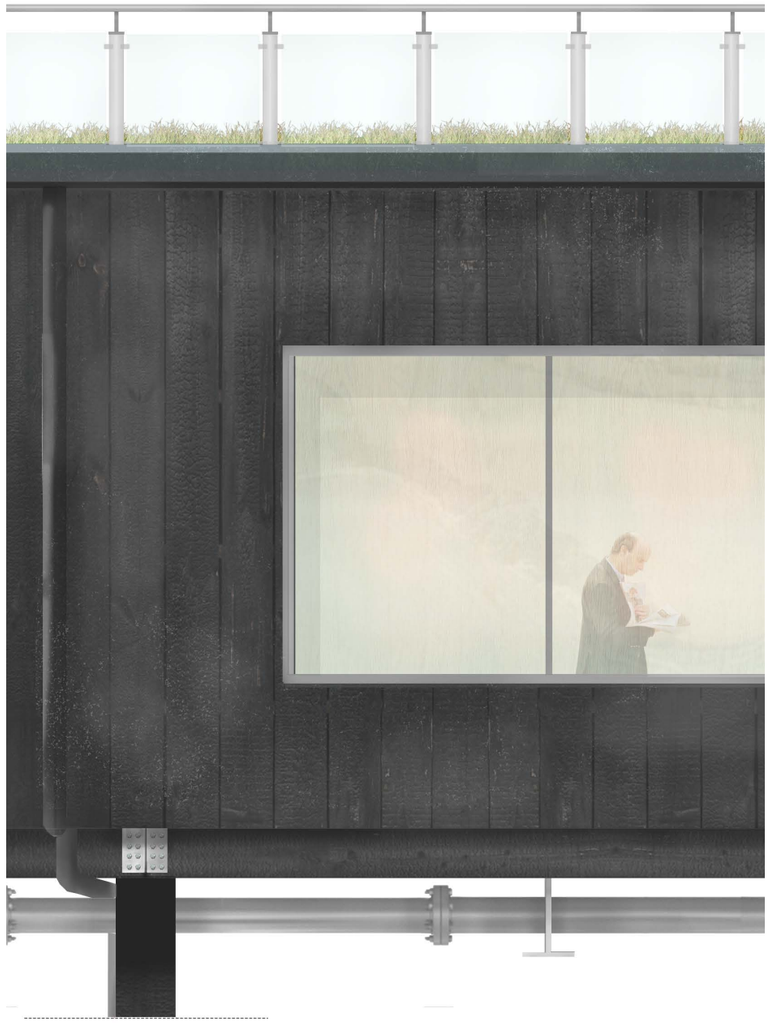
- 18mm laminate floor finish
- 18mm cork underlayment
- 1150mm mineral wool insulation
- 100mm CLT slab
- Damp proof membrane
- 25x25mm battens
- 18mm shou sugi ban cladding
400mm timber primary structure
- 200x400mm steel brackets w/ steel fixings
- 900mm steel beam, fitted with services

Ground

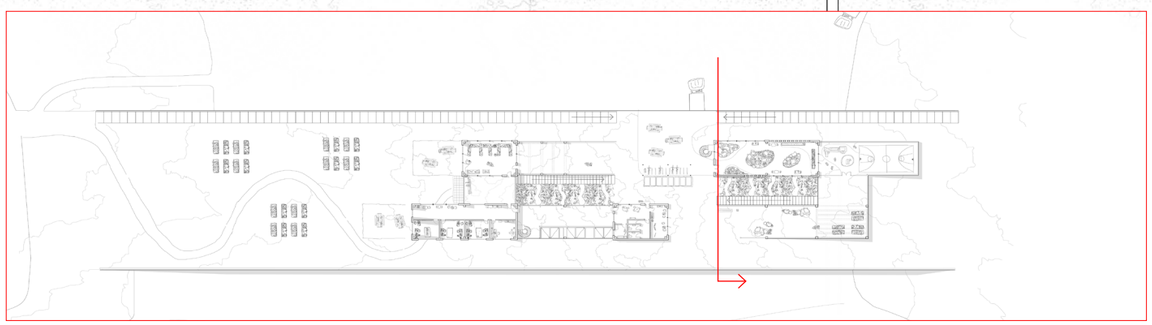
- 400mm wide timber column
- 400x400x280mm stainless steel post base
- 500x800x800mm concrete footing
- 1000mm deep concrete foundation



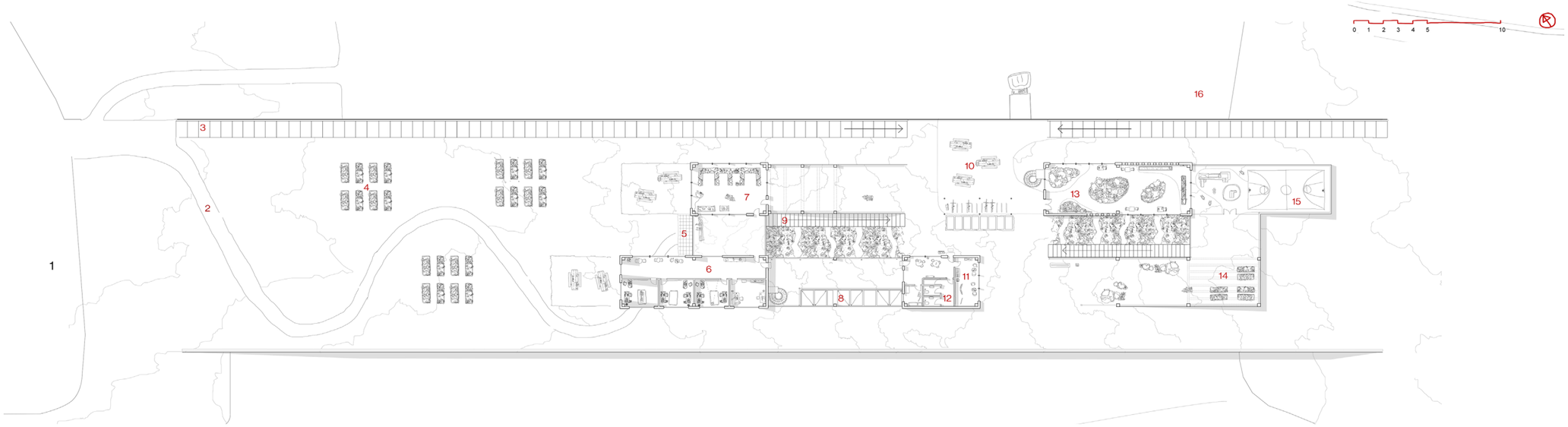
CORRESPONDING ELEVATION



The lithium units themselves are a simple timber framework , covered with plywood sheets and are uninsulated and temporary, with machinery added with relative ease.. There is a clear heirarchy between industry, admin and social spaces.

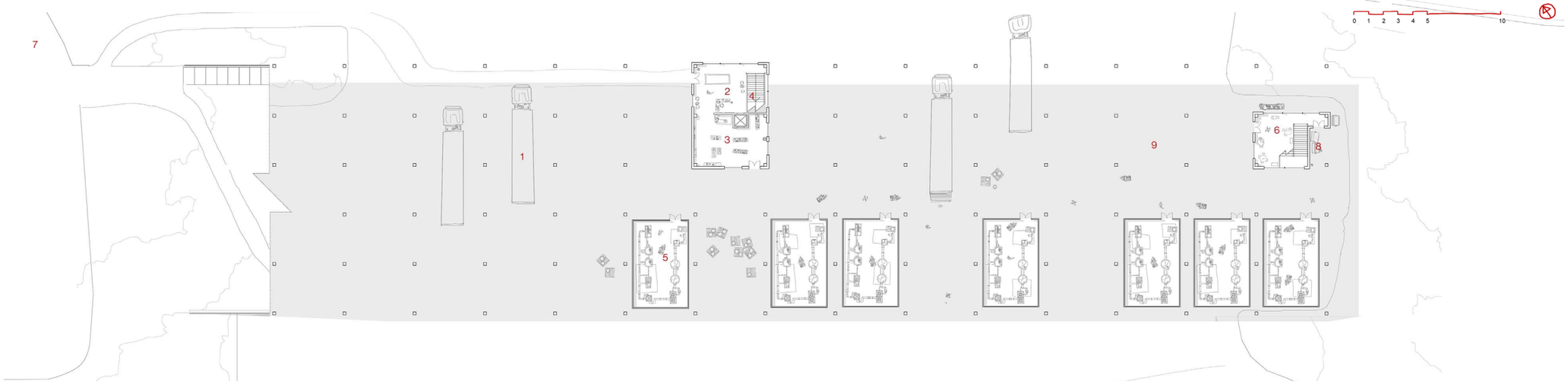


1. Car Park
2. Wheelchair friendly meandering ramp
3. Stepped walkway
4. Hillside allotments
5, Main hillside entry point
6. Roof level offices
7. Tomato farm
8. Skylight, overlooks mid level non-chemical storage
9. Stairs from hillside entry point
10. Outdoor seating area
11. Small exhibition space
12. Toilets
13. Coastal flora showcase
14. Outdoor crop farm
15. Playground
16. Vehicle and worker entry point
17. Public access road



1. Public entry point
2. DLE Process education space
3. Admin office
4. Meeting room
5, Toilets
6. DLE admin offices
7. Non-chemical storage
8. Chemical storage
9. Changing rooms
10. Lithium monitoring office
11. Metal and wood workshops
12. Mixed use social space
13. General offices
14. Balcony with views
15. Private worker breakout space
16. Worker ground level entry point
17. Worker ramp level entry point

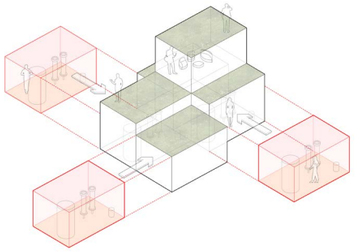
1. Truck bay area
2. Visitor and general public reception
3. Shop
4. Admin floor access
5, Lithium modules
6. Worker reception and seating
7. Public parking
8. Waste Collection
9. Loading and unloading space



With lithium mining, it is crucial to keep an eye on the future, as whilst it may be essential now, it is ultimately a finite resource, and new technology continues to accelerate. As a result the modular approach is key to the success of this programme.

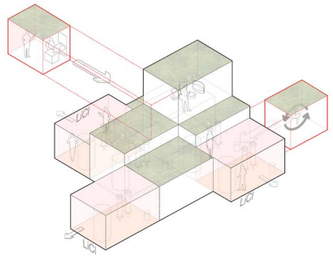
Modularity provides flexibility. This means production can be easily scaled up or down based on lithium demand and global markets. More importantly, it means new technology can be more easily integrated and at a rapid rate, so that when new methods or materials come into use, they can be implemented with little carbon expenditure in theturnover. The graph shown suggests an initial spike in lithium usage, followed by a gradual decline, which implies a non-modular design would result in a stranded asset which is likely to be demolished. The modular unit by unit approach prevents this.

2.



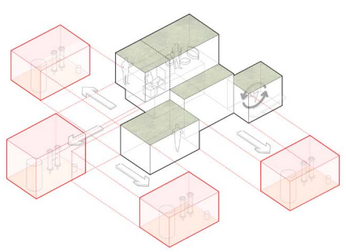
0-15 YEARS

LiCl PRODUCTION ACCELERATED FOR MAXIMUM OUTPUT



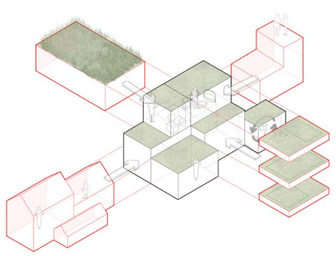
15-30 YEARS

HYBRIDISED OUTPUTS, EMPHASIS ON NEW METHODS AND RESEARCH INTO RENEWABLES



30-60 YEARS

DE-INDUSTRIALISATION, NEW ENERGY SOURCES IN PLACE



60+ YEARS

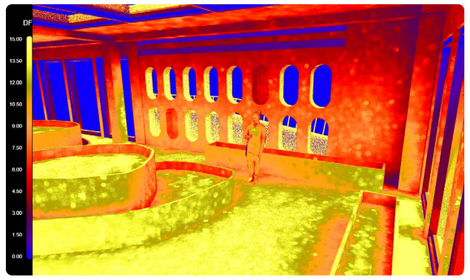
REALMS OF POSSIBILITY, MAJOR CHANGES IN OVERALL PURPOSE

polytown:

ITERATIVE DESIGN

PROJECT

The current iteration of the proposal contains a perforated wall in the flora showcase, which allows daylight and natural ventilation to pass into the space. These interlinked factors benefit human comfort, due to improved air quality and psychological benefits, but are also crucial for plant life in the space, facilitating photosynthesis and exchange of gases. Due to the production carbon dioxide and oxygen by plants and humans respectively, the relationship between them is symbiotic, meaning an optimisation of the perforated facade would benefit both life forms massively. The prototyping phase aims to optimise this for maximum results.



iterative design project

FINAL ITERATION

The final iteration for the design proposal utilised 16 capsule shaped perforations, each of surface area 0.53m2 to optimise daylight and ventilation. I would consider this iteration to be a success in its ability to respond to these conditions whilst retaining a good level of sustainability, due to its prefabricated construction and use of materials with a low embodied carbon. The diagram shown explains the key envelope features and their junctures, aiming to explain how the building fabric responds to local climates whilst being structurally and economically viable.

Minimal aluminium roof parapet neatly conceals envelope and roof juncture and provides waterproof barrier.

Aluminium gutter links directly to drainage layer and collects excess water from green roof and transfers it to the ground below.

Shou sugi ban charred timber cladding provides strengthened barrier angainst corrosive coastal air and is strong and durable, with a striking physical appearance.

Timber shutter mechanism, based on design of window shutter of an aircraft, aimed to provide adjustable internal environment.

CLT slab rises at edges to accomodate soil layer, whilst providing space between timber cladding and grass/soil.

Timber joists act as secondary structure, supporting the CLT slab above, and fixed between steel beams.

CLT slab, for strength and and large span, supporting grass and soil above.

Timber battens fix cladding into place.

18mm OSB, upon which battens are fixed for support and waterproofing.

Timber wall structure provides strength and durability to envelope system.

Interior plywood sheet forms wall raw and honest to material wall finish.

Biodegradable eco-friendly linoleum floor finish.

GLAZING STRATEGY

Fibreglass window framing is strong and durable, and is more energy efficient than aluminium used in initial iteration.

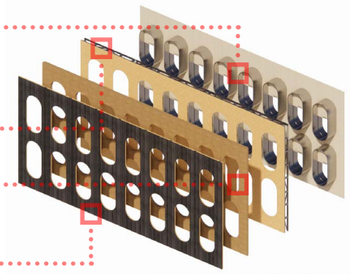
Double glazed skylight provides additional sunlight over central areas, where maximum sunlight for plant growth is positioned. It also can be opened to provide a stack effect, which adds to the natural ventilation system.

PERFORATED FACADE STRATEGY

Timber shutters with aluminium framing allow for greater level of adjustability in perforations, meaning sunlight can be reduced in bright summers, or cold can be kept out in windier winter conditions.

Steel structural layer mounted to 18mm OSB is lightweight and easy to assemble offsite, which is both practical and cost effective.

Insulation layer maintains some degree of thermal comfort and fits togther with rest of continuous insulation.
Exterior layer is comprised of 30mm charred timber siding, which is chemically sealed into place for water and air-tightness. This exterior layer is the main barrier against harsh weather and damage, as well as a range of temperature conditions.



GREEN ROOF STRATEGY

Drainage layer collects excess water from the soil above and moves it along roof towards gutter system, preventing root rot and waterlogging

DPM prevents moisture from reaching timber structure and causing rot and water damage.
Wood fibre continuous insulation is high performance and provides interior space with thermal comfort.
Timber ceiling structure, comprised of simple grid of joists.

CLT structural frame provides strength, and fire resistance whilst also sequestering carbon. This is only charred in exterior uses, where it is exposed to the elements.

Indoor plants formed a key subject for the facade study, as they are considered users of the space to the same extent as the humans that oversee their growth.

FLOOR STRATEGY

Steel beams are used sparingly in conjunction with timber frame, as extra support is required on some longer spans.

Steel brackets form strong connective joints between timber and steel, for added strength.

Services such as water pipes and mechanical vents fixed through steel I-beams.

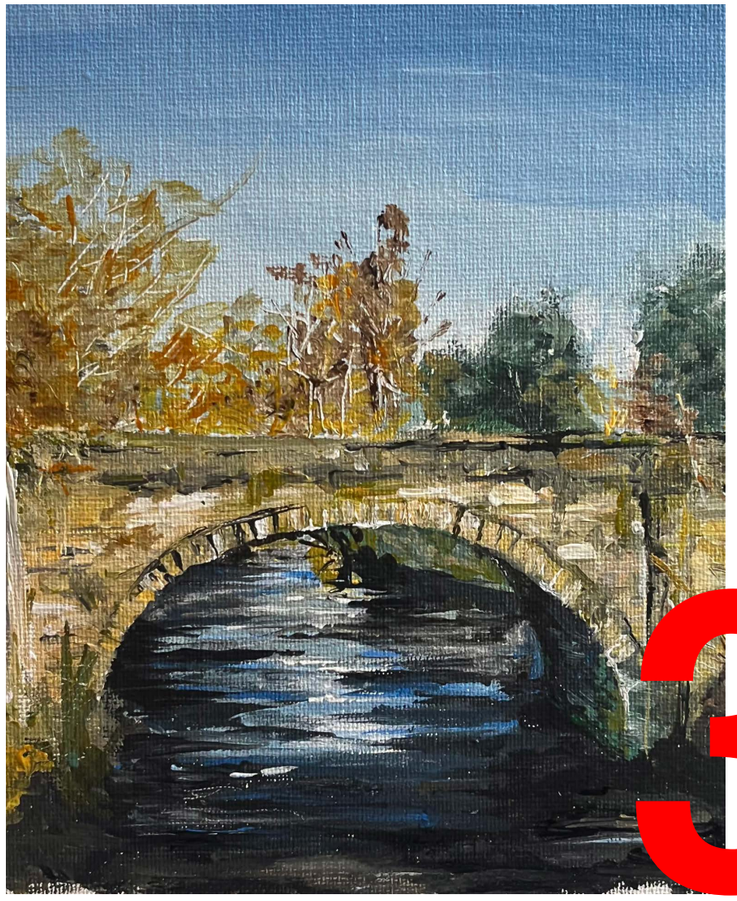
Timber slab forms strong and durable basis of floor structure. This is charred on the outside for corrosion-proofing

DPM protects interior and insulation against moisture damage.

Mineral wool insulation provides high thermal performance.

Floor screed provides basis for floor finish

Initial site painting, carried out as part of a texture and materiality exploration.



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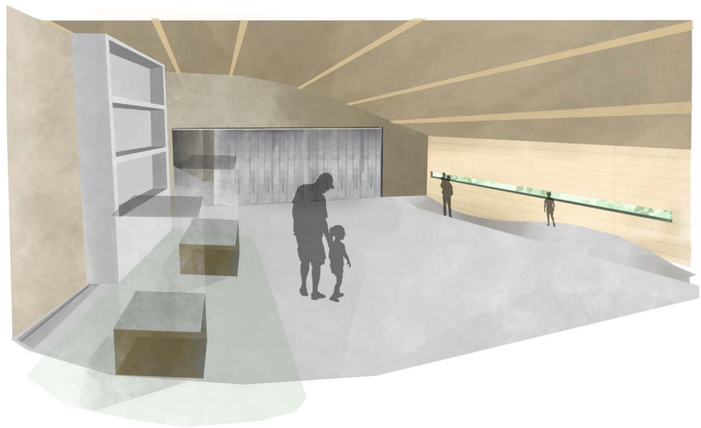
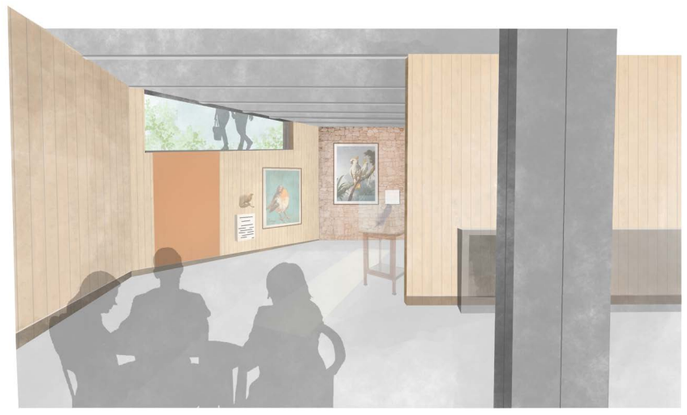


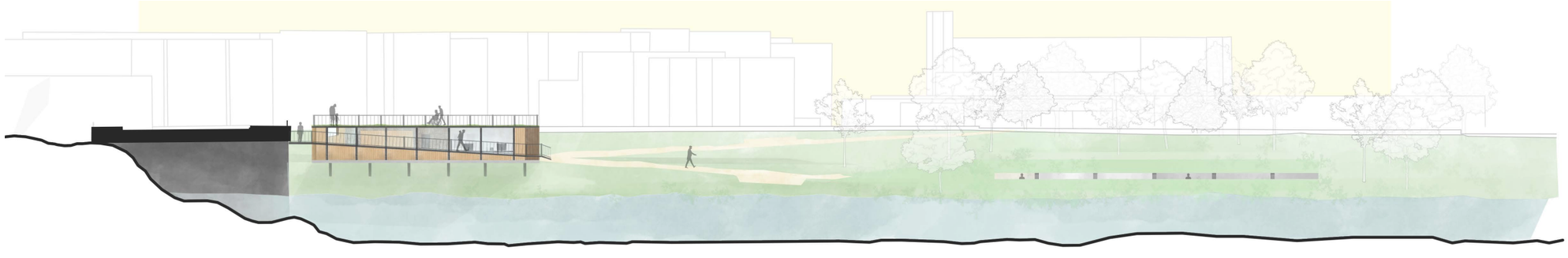


Interior mock-ups of the bird hide and nest spaces

studio 2:

WATCHING AND WAITING

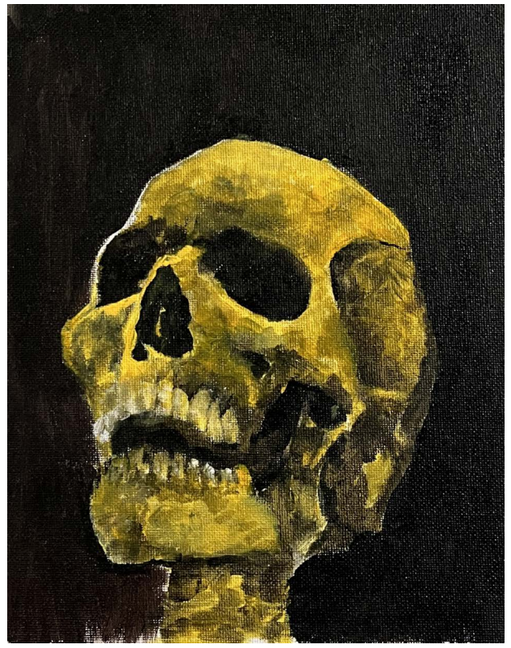
My final studio project of second year centred around the design for a flexiible public facility by the river Goyt in Stockport. It was a multi-faceted project which required me to think about including a range of facilities, including an outdoor promenade, an office space, and an exhibition room for up to 50 people. This culminated in a two-unit proposal, which I centred around the pasttime of birdwatching, with stealth, subtlelty and community being key design drivers. The bird hide was to be a floodable sunken space, using gabion retaining walls and offering secret views over the river.

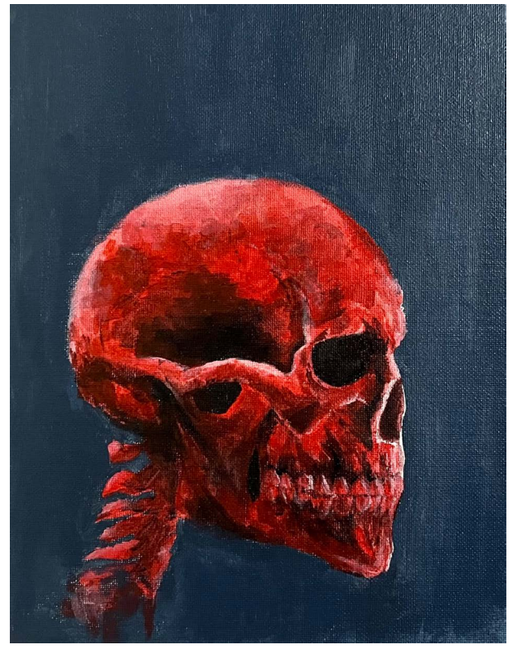


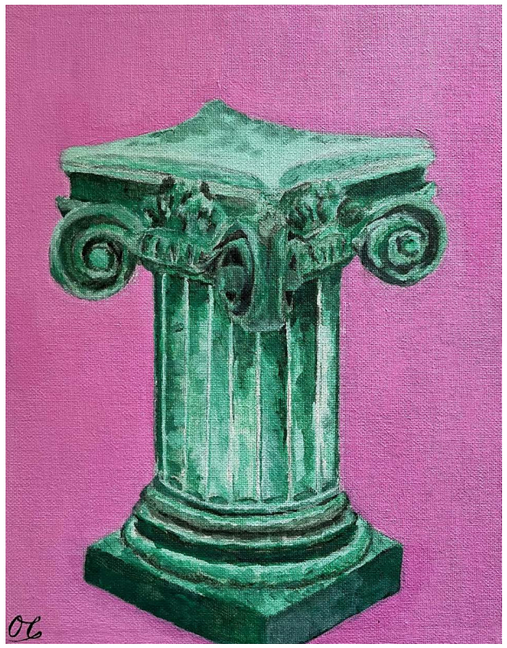
4.

outside of architecture...

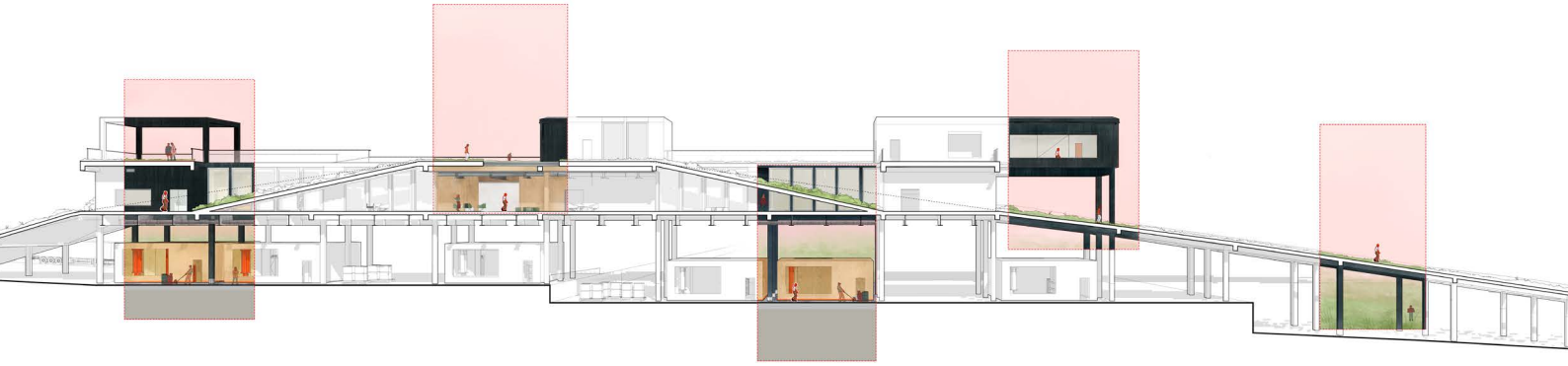
ACRYLIC PAINTING WORK and COMMISSIONED
INK SKETCHES







Acrylic painting series from
early 2024.



Thank you for taking the time to read my portfolio.

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