TOP SCHOLAR EXEMPLAR

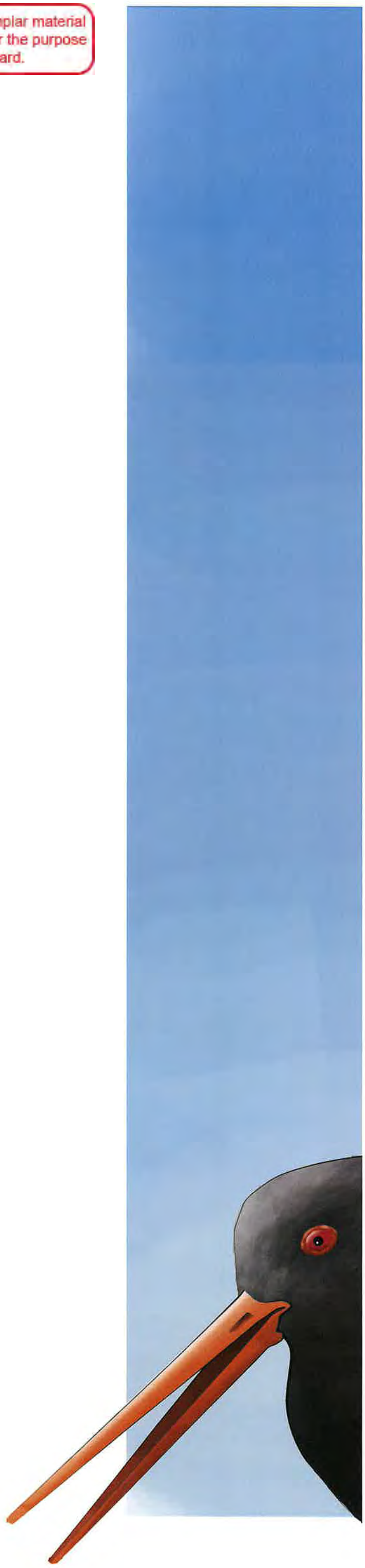
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Scholarship 2022

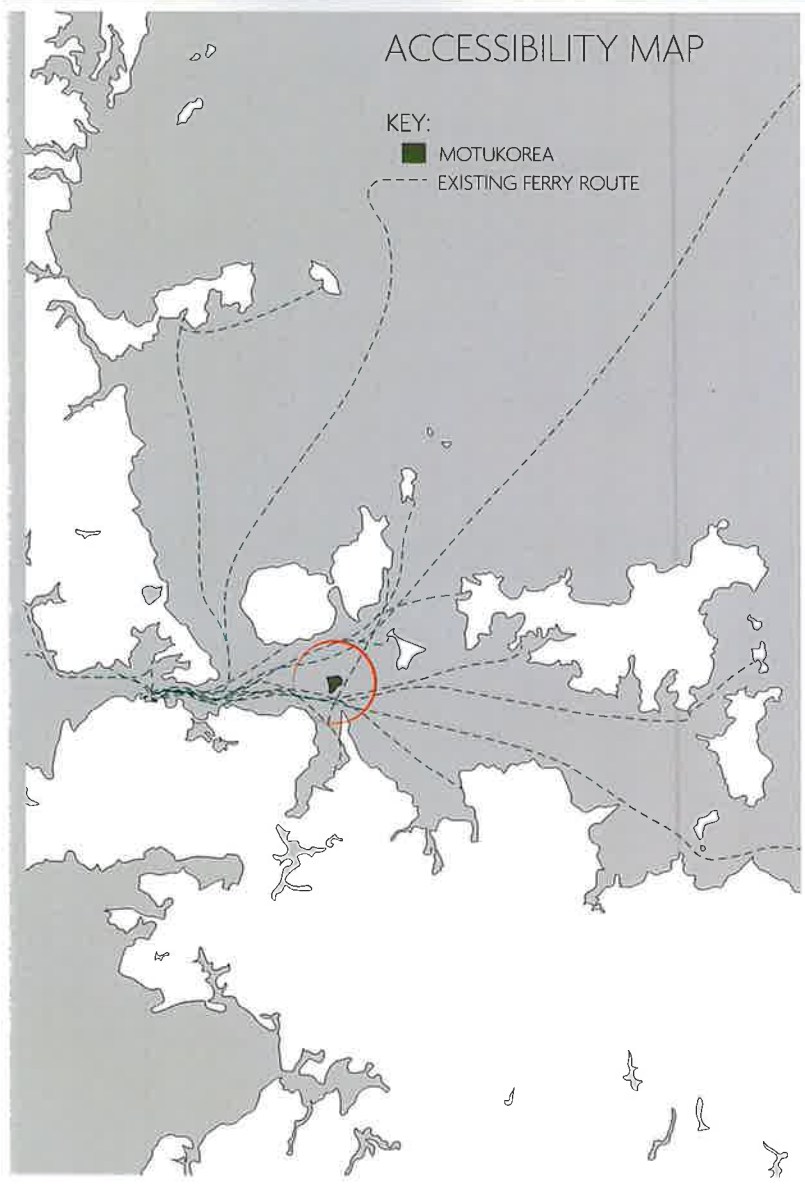
Design and Visual Communication

SPATIAL PROJECT – 2022

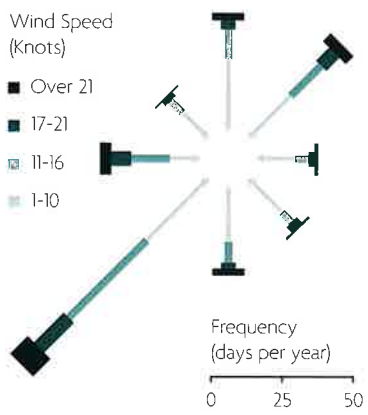


MOTUKOREA

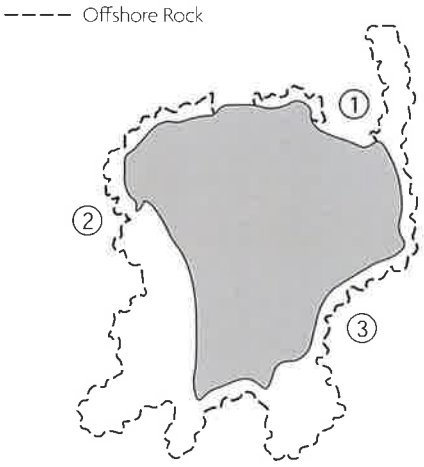
HAURAKI GULF / NEW ZEALAND / -36.830698 S, 174.894668 E / ENGLISH MONIKER - BROWNS ISLAND



AUCKLAND WIND ROSE



SUBMERGED OFFSHORE ROCK



BRIEF

Motukorea has mostly perished. It's predominated by kikuyu grass (an invasive weed) and cannot facilitate thriving native flora and fauna, even though it is the only predator- free island within the Hauraki Gulf. Furthermore although Motukorea is in close proximity to Auckland City, there are no existing ferry links, indicating a low public interest within the island. .

There is a simple solution, reforestation, but there are currently no structures able to accommodate such rehabilitation. This is the main problem I will solve.

Typically where boats anchor when accessing the island

Extremely steep relief around the bay, making it impractical to build

① CRATER BAY

Historically where wharves were established

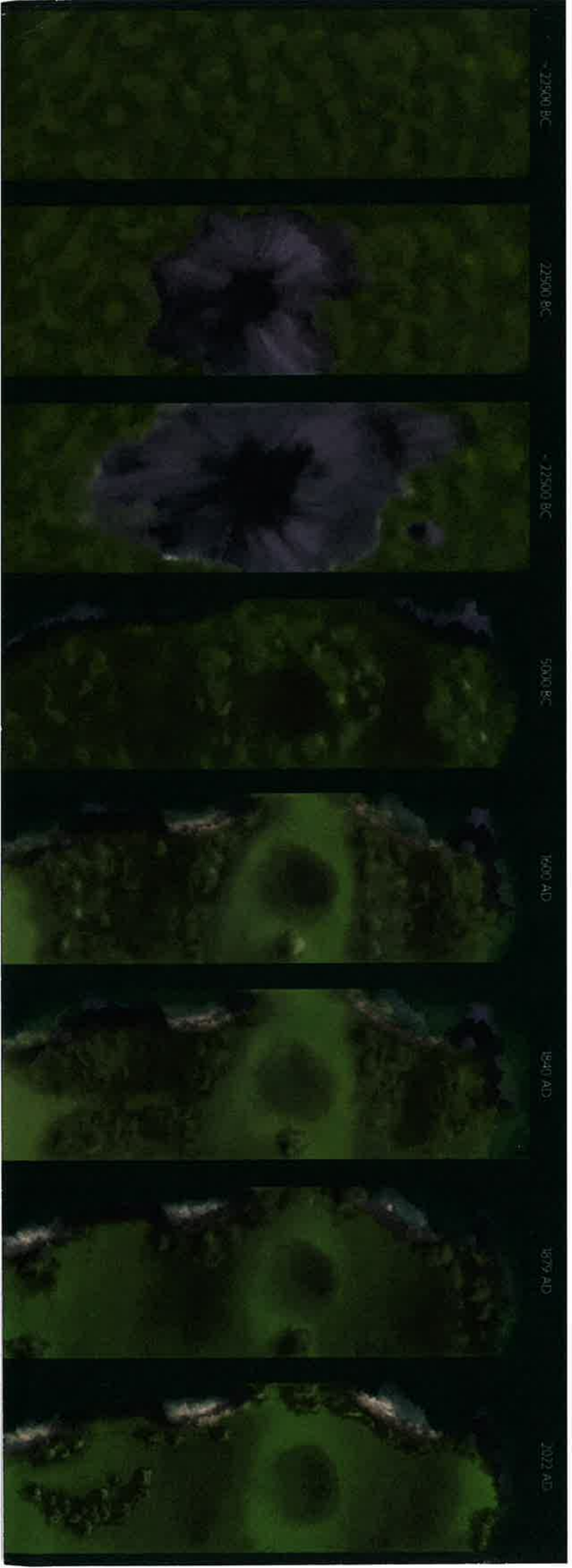
Underwater rock does inhibit access to the shore, requiring a large wharf

② WESTERN PLAIN

Lots of flat land, but all covered in dense grass

Exposed more to the elements, more likely to get sea spray

③ SOUTHERN PLAIN

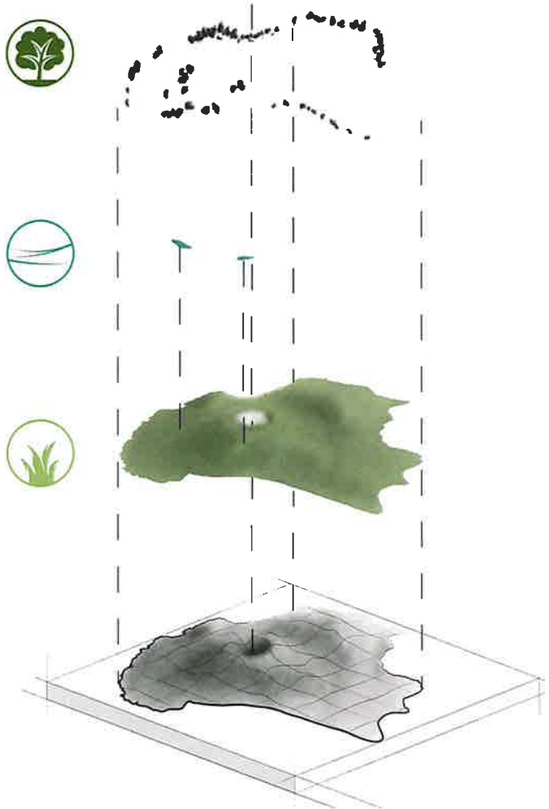


HISTORY

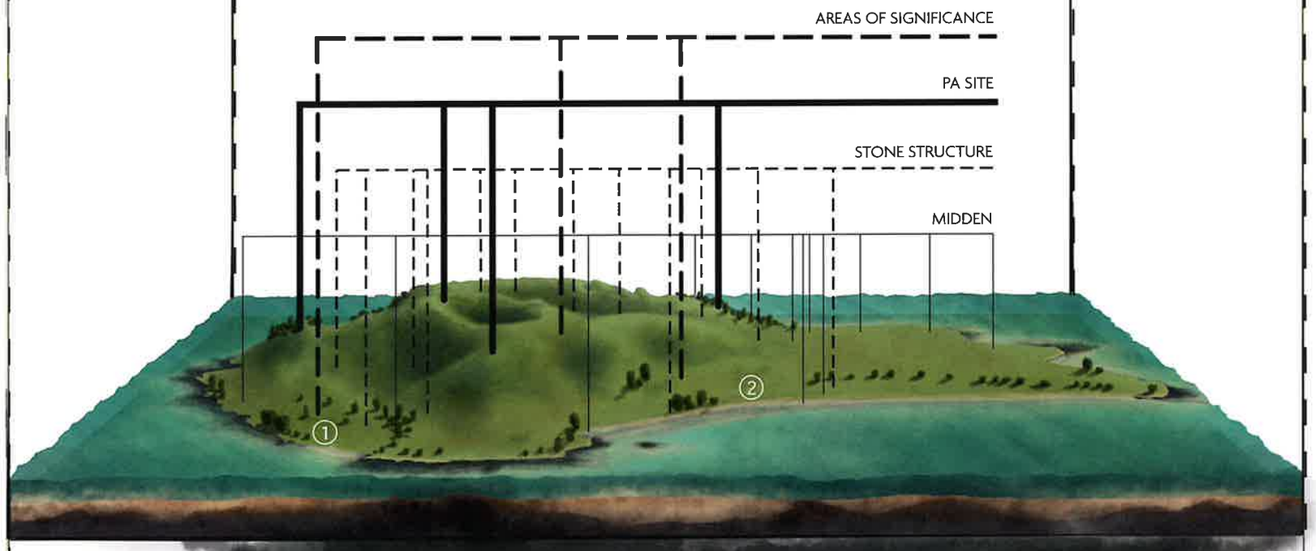
Wet explosive and dry fountaining eruptions built up the main cone, as well as tuff cliffs and mounts.
Fluvial and aeolian erosive processes continuously carve into the mountain/island, creating what we see today.

Motukorea was initially occupied by Ngāti Tamaterā, who likely gardened the fertile volcanic soils, and established a permanent settlement.
Through the 19'th and 20'th century a variety of families operated the island. This led to the construction of a variety of structures on the island that are now of archaeological/historical significance.
In 1955 Motukorea was gifted to Auckland, and is now under management by DOC.

Interestingly in 1906, 4 coal powered ferries were abandoned on the western shore of the island.



SITES OF ARCHAEOLOGICAL SIGNIFICANCE

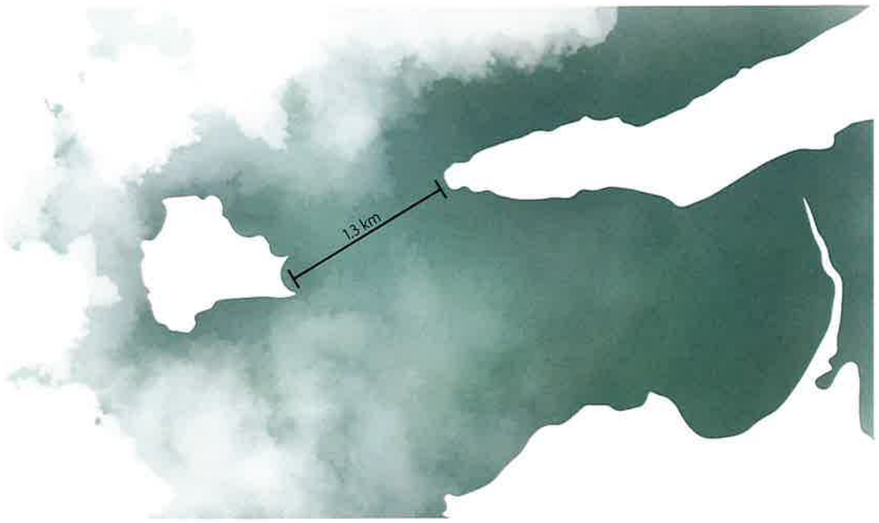


2018
13 Ha were burnt after a stranded person started a fire

A BALANCING ACT; HISTORY & NATURE

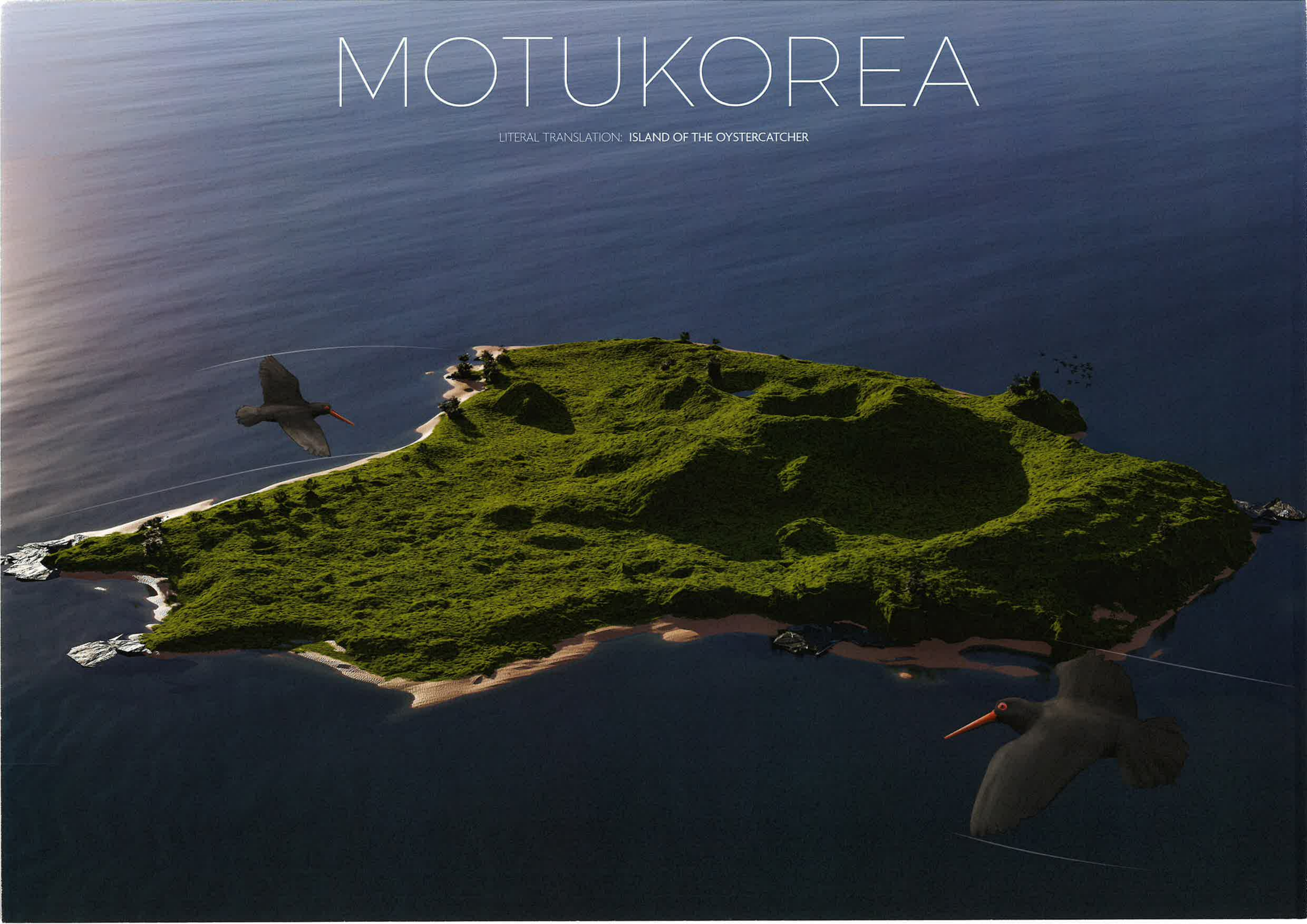
Motukorea presents a unique opportunity for the future. Motukorea is completely pest free, not even mice find their home on this island. This allows for a variety of endangered (basically verging on the edge of extinction) species, such as Torea Pango (5,000), and Dotterel (2,500) to freely nest on the island without risk of predation.

The island's proximity is key. A short distance from the mainland, shorebirds can freely move to the island to roost after feeding within the estuary. Furthermore Motukorea's location allows it to act as a stepping stone for birds between the Mainland and the gulf islands such as Rangitoto. If Motukorea were to be revitalized it could play a significant role in building back Auckland's decrepit natural environment.



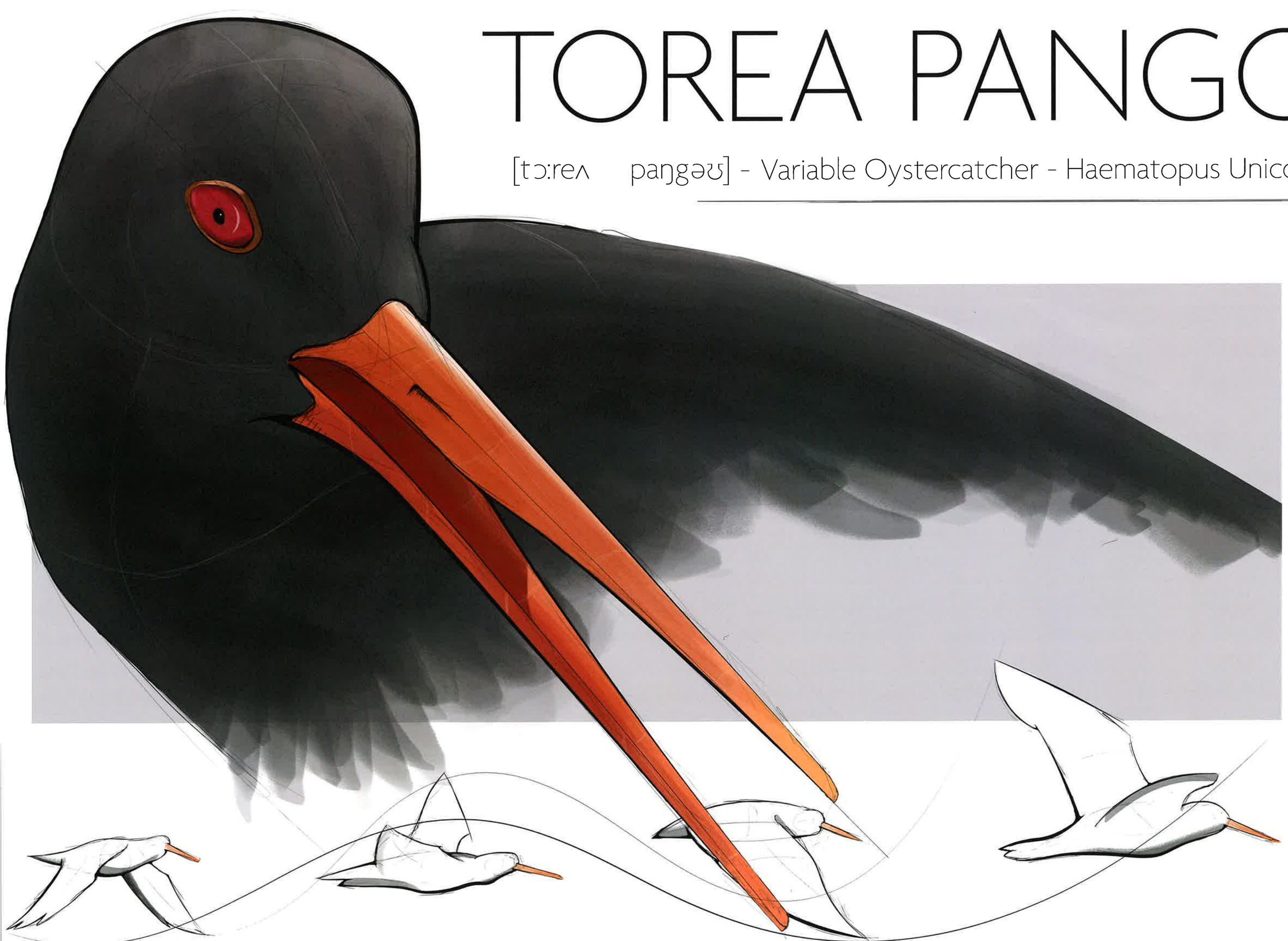
MOTUKOREA

LITERAL TRANSLATION: **ISLAND OF THE OYSTERCATCHER**



TOREA PANGO

[tɔ:reʌ paŋgəʊ] - Variable Oystercatcher - Haematopus Unicolor



FORM EXPLORATION – 1

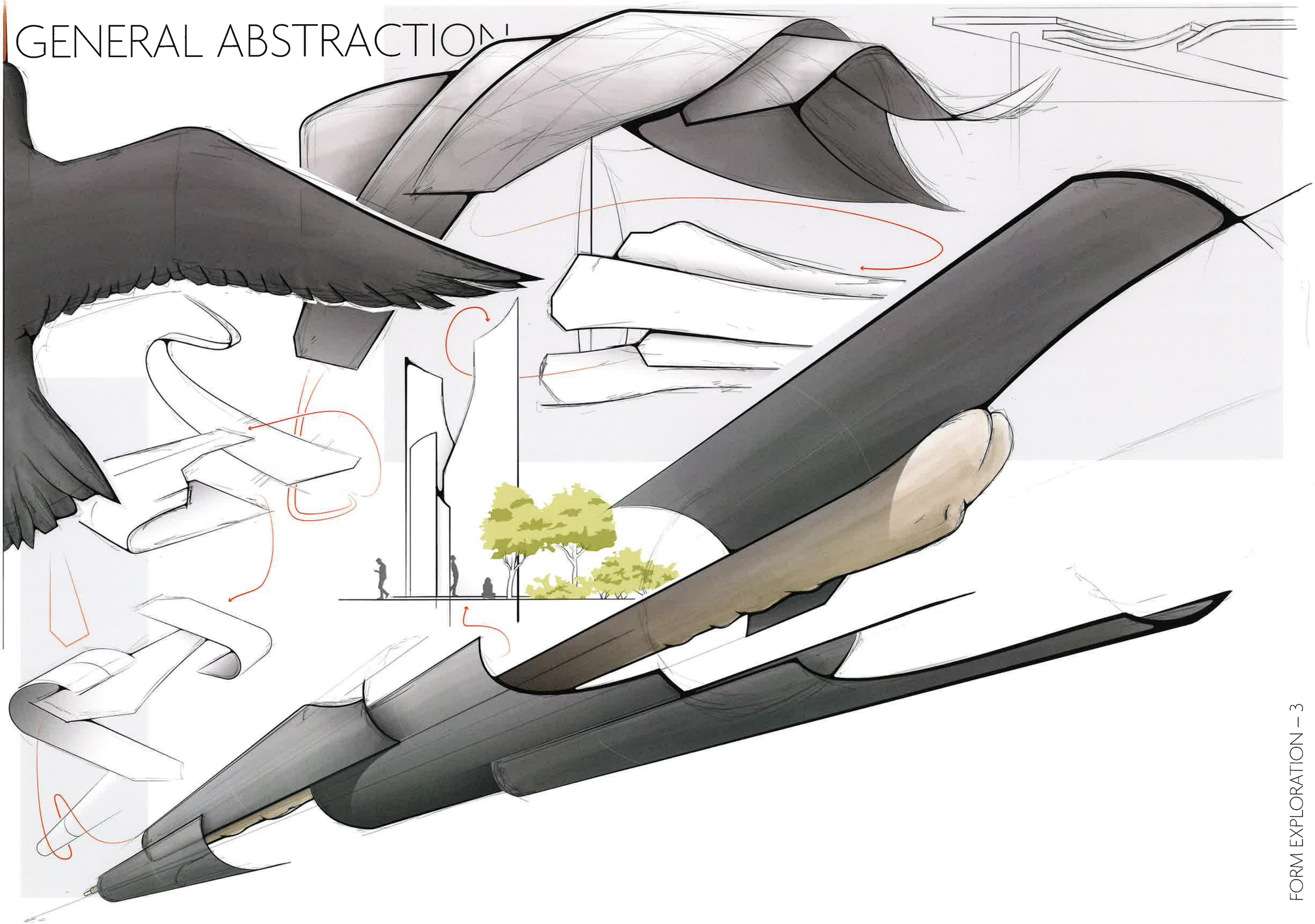
IDENTIFYING FORMS

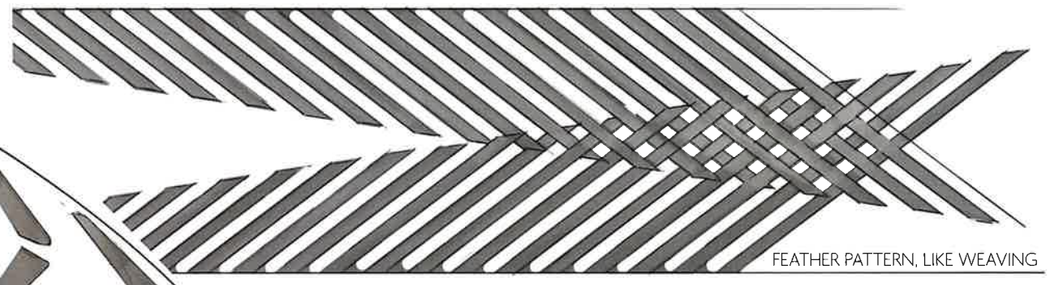
Zoom in

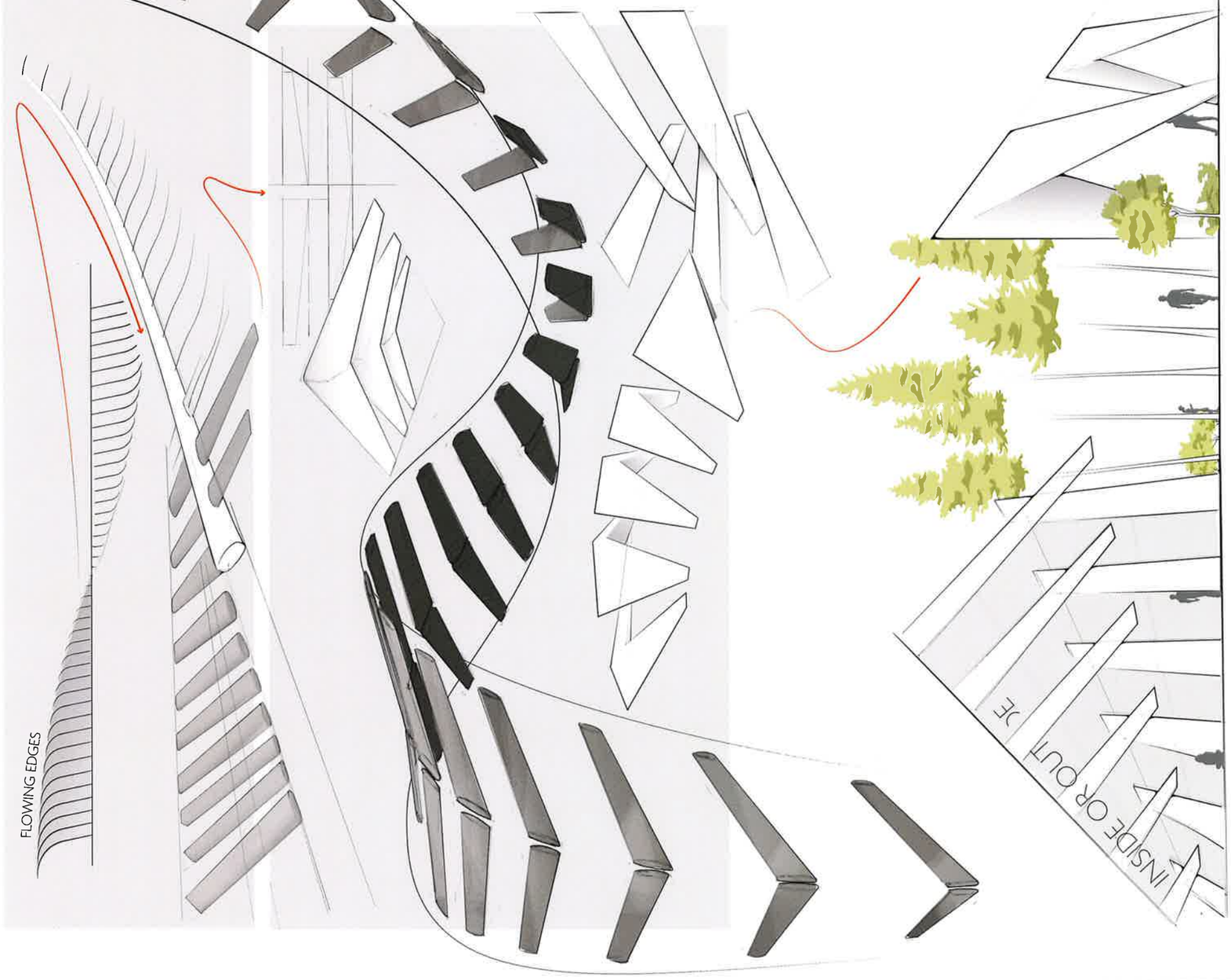
- FEATHER STRUCTURE

Structure allows for oil distribution, making the feathers hydrophobic

GENERAL ABSTRACTION





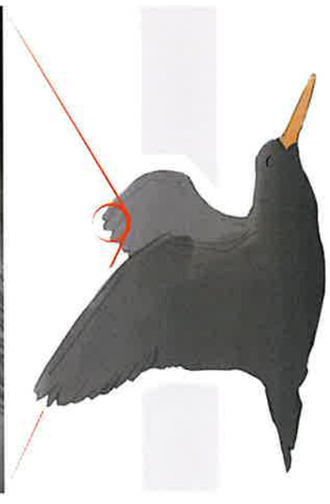






MACROPHOTOGRAPHY - TAKING A CLOSER LOOK



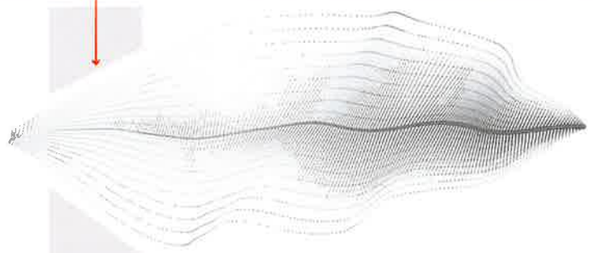


UNDERGROUND?

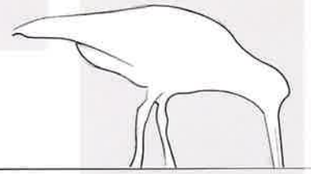
CONVERTING TO A PATTERN

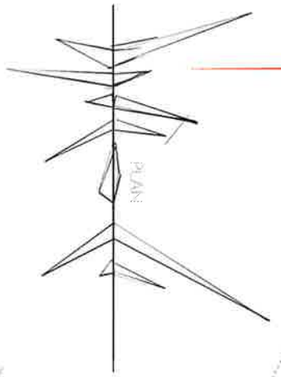
BASIC FEATHER STRUCTURE

I Used CAD to define this rough pattern mathematically. I then applied this pattern to paths to generate forms.



SINE WAVE



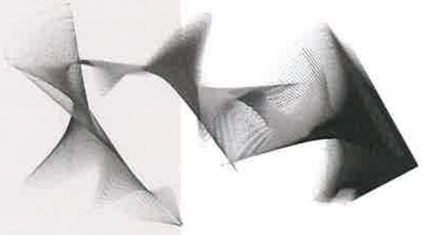


PLAN

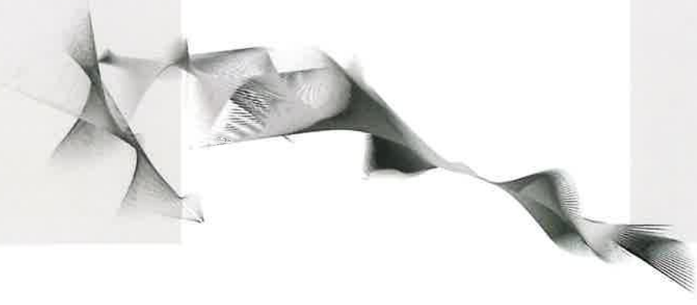
EXTENDING PATH LENGTH

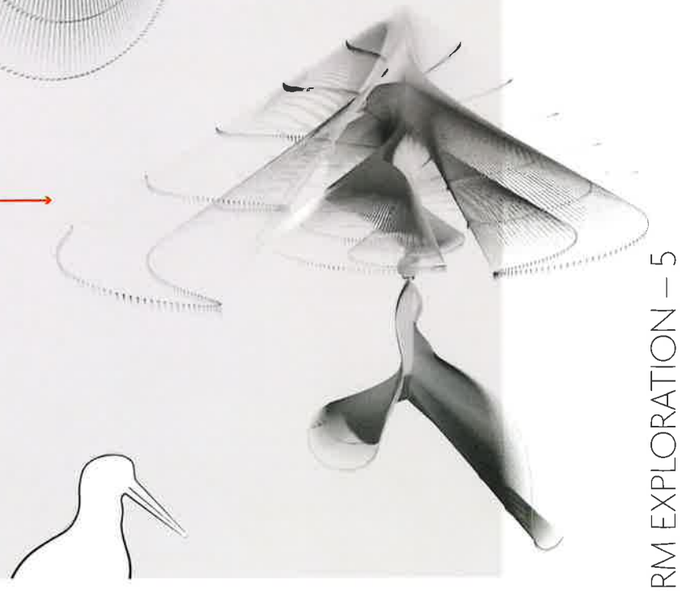
I

II



III





FORM EXPLORATION – 5

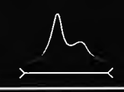
Application of a stripped down version of the pattern to a sphere.

SCALE

At what point does the size become imposing?

DISTRESS CALL

Short wavelength, with
2 distinct peaks

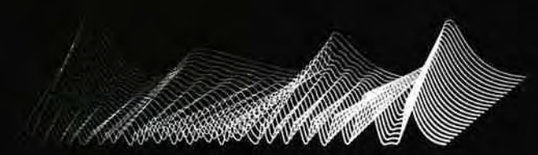


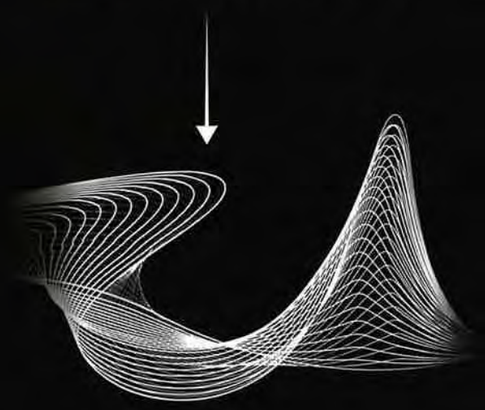
CONTACT CALL

Long wavelength,
1 distinct peak

TERRITORIAL CALL

Series of short
wavelength, that
increase in amplitude,
builds to a rapid
contact call





SCALE

As amplitude increases, width of wave segments also increases

REPETITION

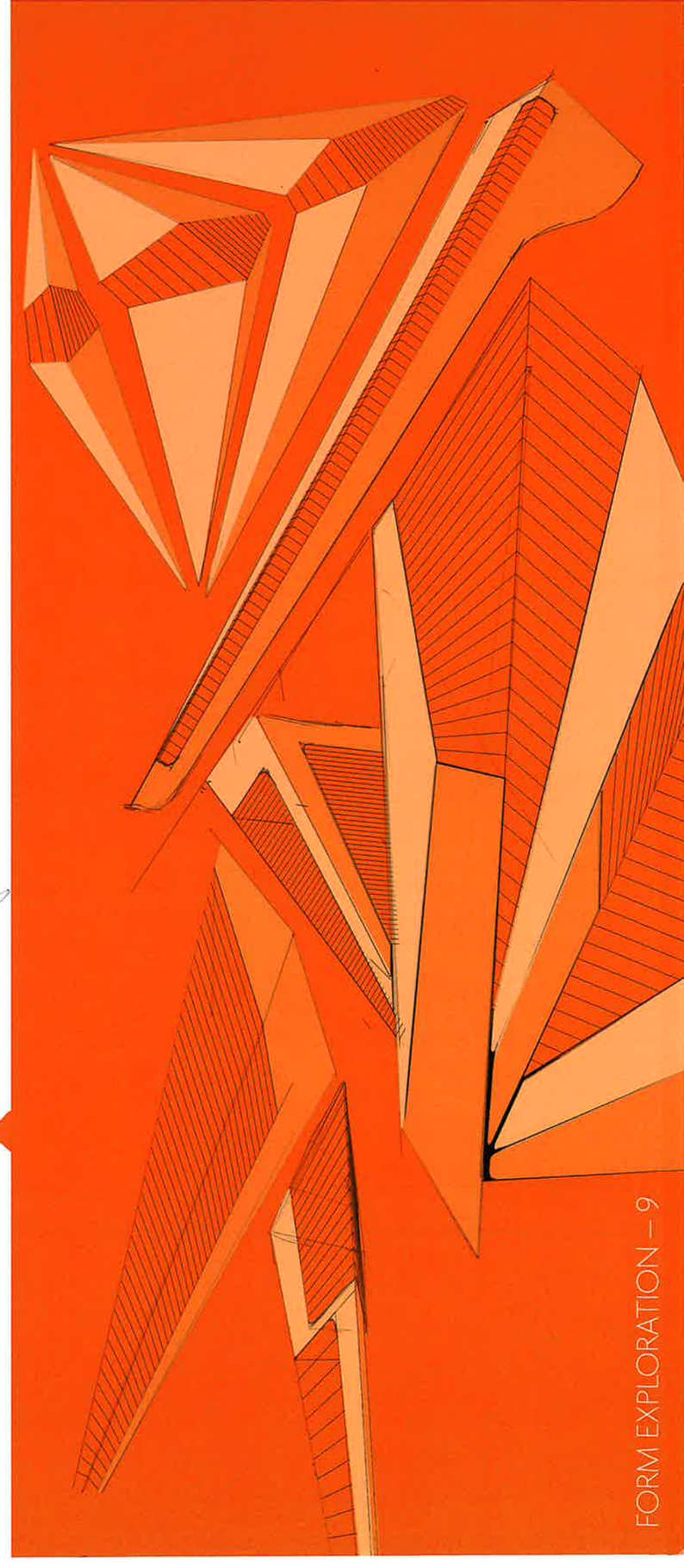
INDIVIDUAL CURVES

MORE TOPOGRAPHIC FORMS?

EMERGING UPWARDS FROM THE GROUND

BREAK IT DOWN INTO A MESH

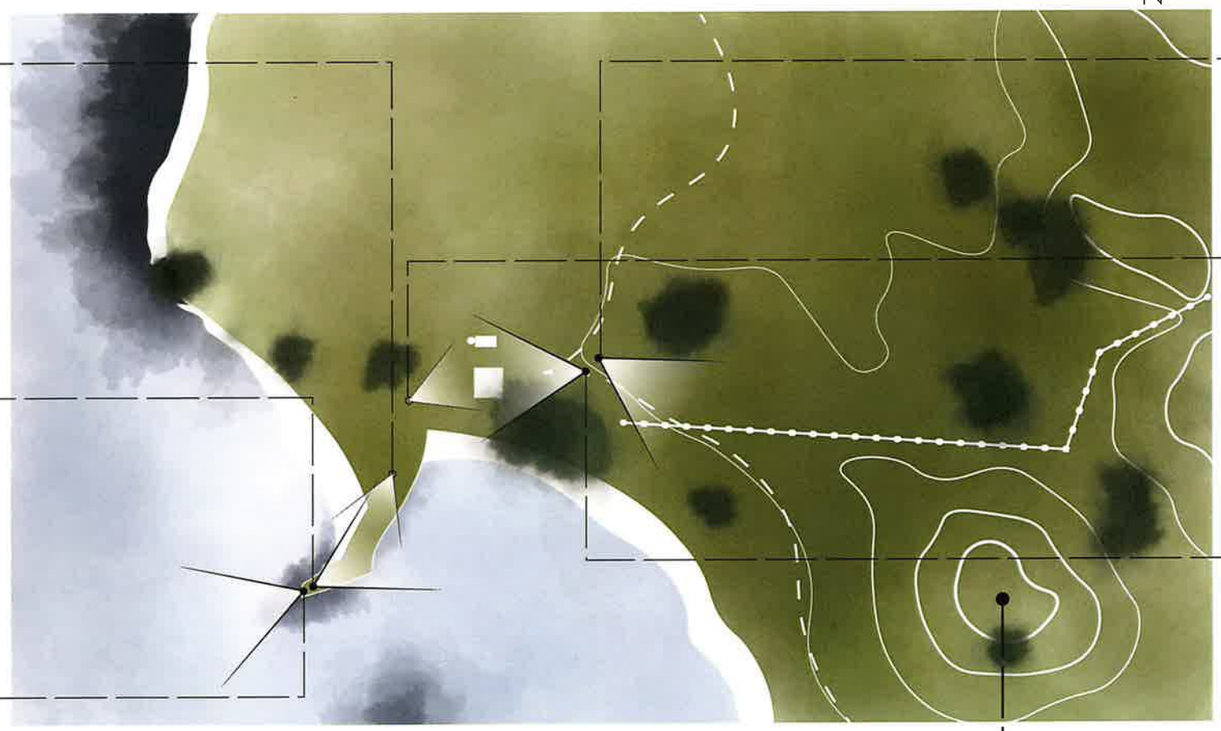
LOW POLY



HOW MUCH SPACE IS REQUIRED

FORMS COULD ACT AS AN ANCHOR

EXISTING SITE / SURROUNDING REGION



Old Wharf

Pied Shag

Other birds enjoy roosting here, if I do build here I could make the building bird friendly.

Trees Growing in Gutters

Existing Structure

360° VIEW

Motukorea is a deceptively complex location. My design needs to consider all aspects of this island to be successful.

The idea is to fully rehabilitate Motukorea's natural environment. The existing structure does not allow for this due to lack of facilities, size and other factors. But what would a new structure need to incorporate?

Multiple iwi have expressed tangata whenua interests in the island.

The unvegetated landscape allows for geological and archaeological features to be clearly visible and accessible. The shallow roots of grass that covers the island allows for archaeological/historical sites to be undisturbed. Due to this, in the past some aucklanders have protested earlier re-vegetation proposals. A new structure would need to ensure that these perspectives are respected, by minimizing impact with the island.

Re-vegetation of the island, with its complex terrain, and hefty volume of grass/weeds would require a fair amount of equipment and people. But what types of spaces would actually be required, and practical, for the structure to include?

Furthermore, should the island cater to tourists? A re-vegetated landscape would likely bring in nature tourism, similar to that of other islands in the gulf such as Rangitoto. A new structure would therefore be likely to receive a fair bit of public attention, and may need to cater to tourists.

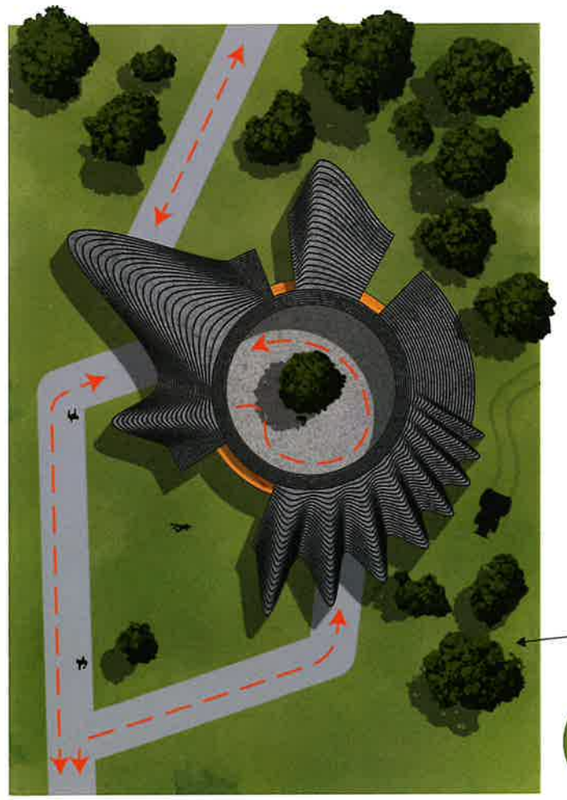
KEY QUESTIONS?

1: HOW CAN VISUAL AND PHYSICAL IMPACT BE BALANCED?

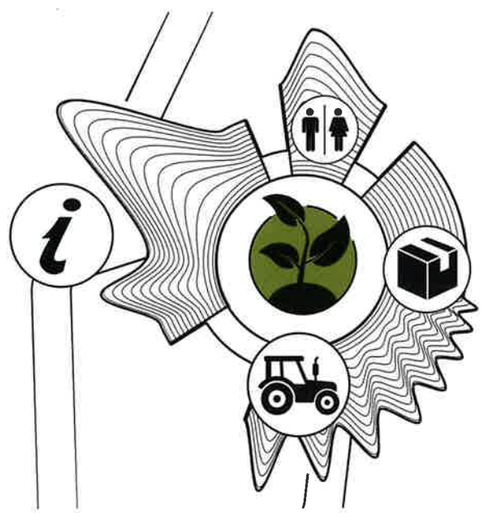
2: HOW CAN FORM AND FUNCTION BE INCORPORATED?

3: HOW CAN THE SITES CULTURAL HISTORY BE RESPECTED?

4: HOW CAN TOURISM AND REHABILITATION BE BALANCED?

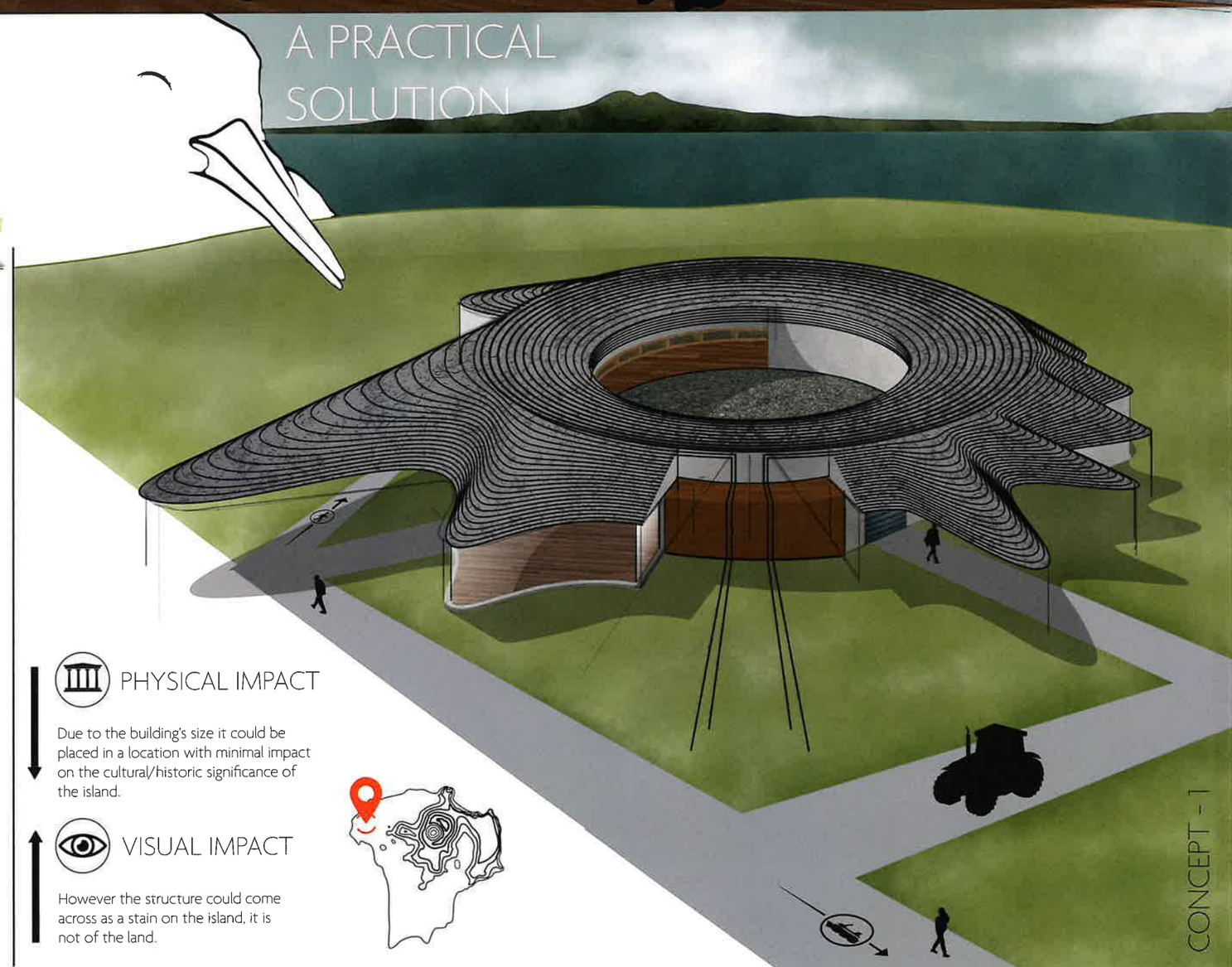


BUILDING USAGE



CENTRAL NURSERY

Native plants could be grown/stored inside the shelter of the building to be planted on the island.



PHYSICAL IMPACT

Due to the building's size it could be placed in a location with minimal impact on the cultural/historic significance of the island.

VISUAL IMPACT

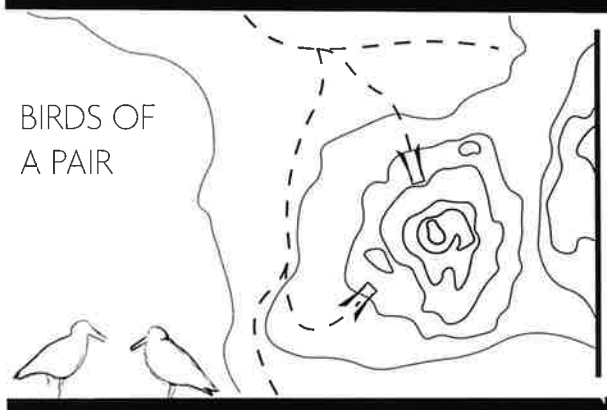
However the structure could come across as a stain on the island, it is not of the land.

PERSPECTIVE

TOURISM

REHABILITATION

BIRDS OF A PAIR

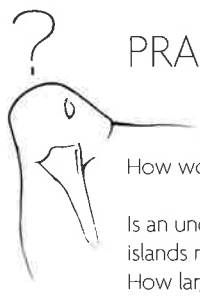


LIGHT POLLUTION

Although Auckland's region is heavily light polluted, having exterior lights might pollute Motukorea's land further.

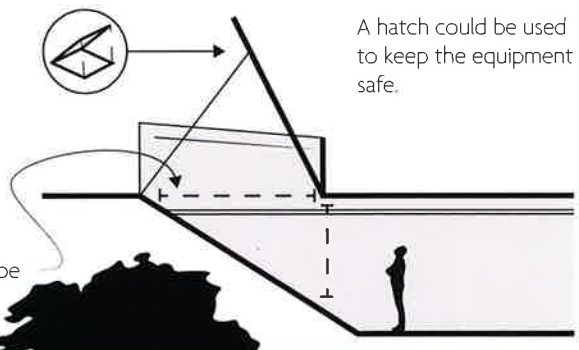
Exterior light does have the benefit of drawing people in.

PRACTICALLITY



How would the lights be powered?

Is an underground site practical for the islands rehabilitation?
How large would the entrance need to be for machinery?



A RAMBLER'S SHELTER

Weather conditions can change without notice on Motukorea. Tourists would need a place to wait out the weather. But what happens when it rains?

POSSIBLE DRAINAGE SYSTEM

If camping were to occur, a shelter that's accessible at night would be a nice amenity to have in close proximity.

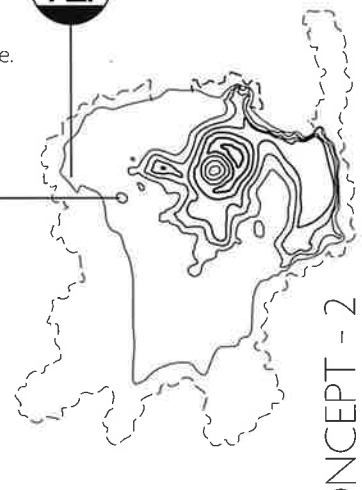
EXPLODED VIEW

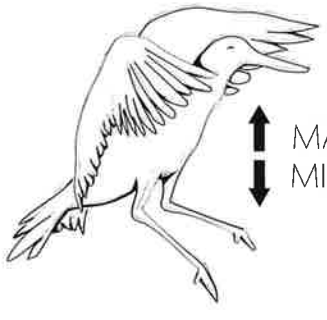
ARCHAEOLOGY

The hill that this structure is embedded in has no archaeological significance.

Meaning that the history of the island would be largely undisturbed by this concept.

EXISTING STRUCTURE

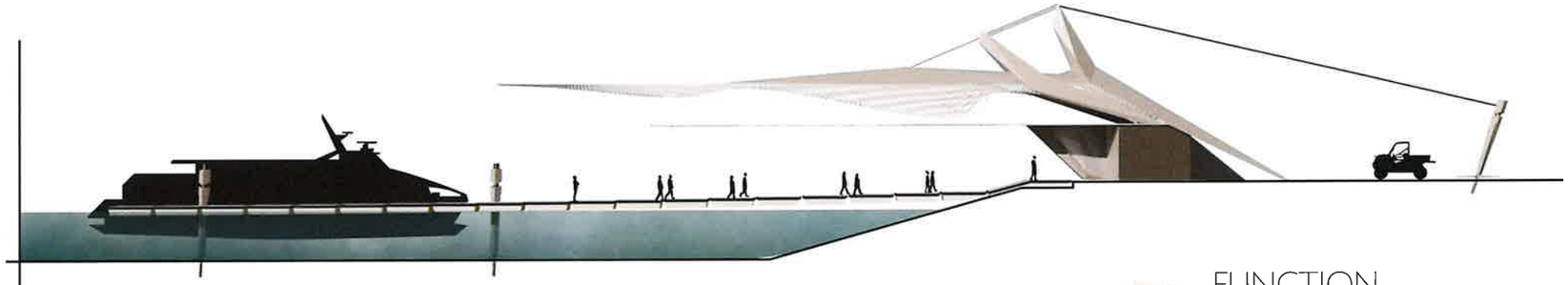




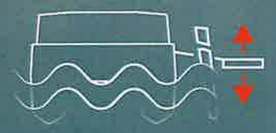
MAXIMUM PHYSICAL IMPACT
MINIMUM VISUAL IMPACT

CONCEPT - 2

FRONT VIEW

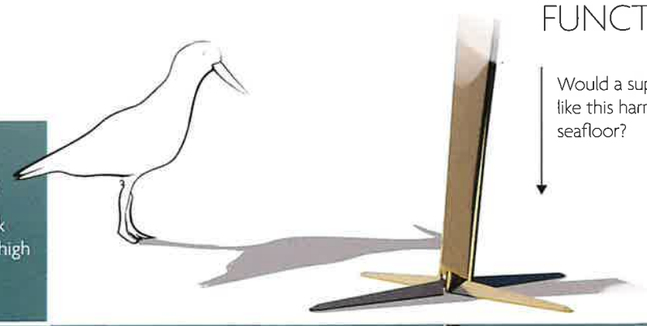


SIDE VIEW



DOCKING

How would the dock respond to low and high tides, especially regarding ferries?

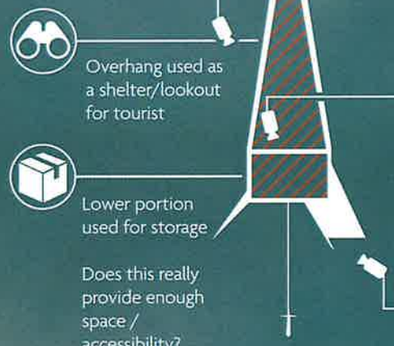


FUNCTION

Would a support like this harm the seafloor?

And would it even stay in the ground as the tides changed or during a storm?

BUILDING USAGE

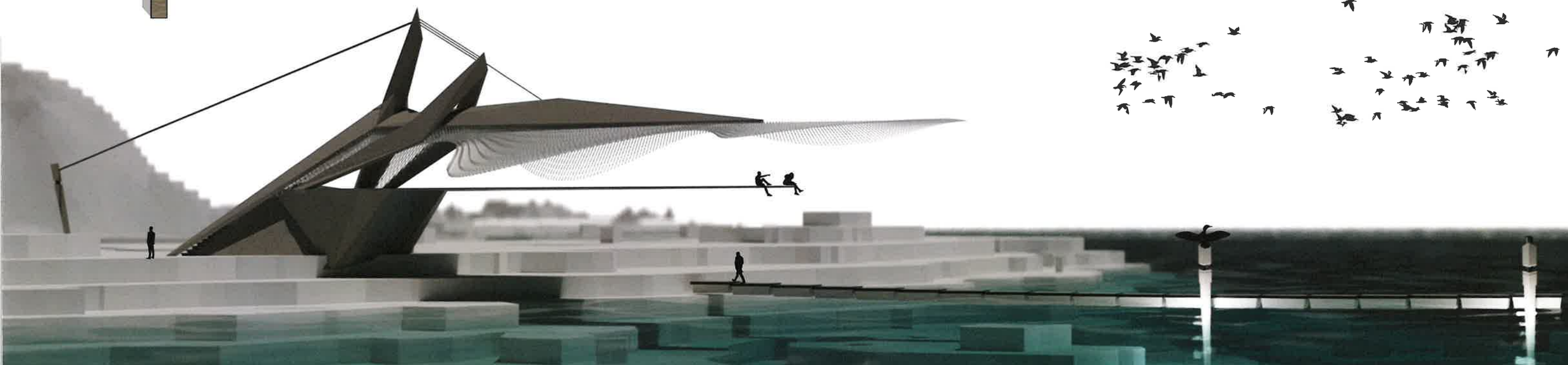


Overhang used as a shelter/lookout for tourist

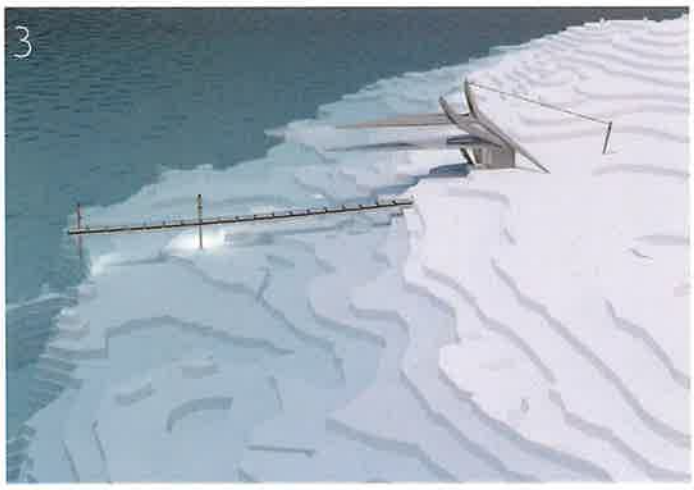
Lower portion used for storage

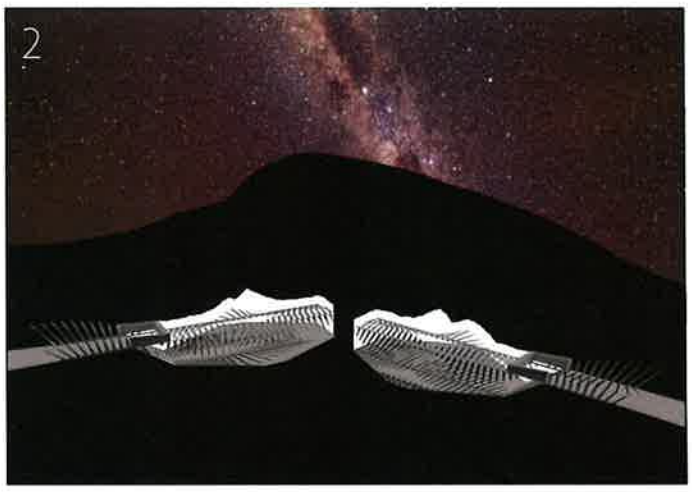
Does this really provide enough space / accessibility?

MINIMAL PHYSICAL IMPACT
MINIMAL VISUAL IMPACT



CONCEPT - 3

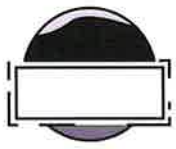




CONCEPT 3 KEY IDEA:

ACCESSIBILITY

Incorporating a wharf into my design seems like a natural extension.
Accessibility would be needed to the island for construction/tourism, so it makes sense to incorporate a wharf to make the design more cohesive and reduce the impact on the overall island by condensing the footprint.



CONCEPT 2 KEY IDEA:

PERCEPTION

Being underground brings a wealth of benefits to the design. It allows the island to be visually prioritized over the design.

I also feel the forms used in this design provide a cool, near skeletal appearance. I want to incorporate the repetitious feather forms more as I move forwards.

CONCEPT 1 KEY IDEA:

PRACTICALITY

There isn't much about this design form that I enjoy.

However the idea of using a portion of the design as a nursery is definitely a good idea that I want to try and incorporate moving forwards. As well as just the general idea of bringing the flora into the design more.

ANSWERS TO QUESTIONS

1

PHYSICAL/VISUAL IMPACT

The best balance between these 2 factors can be found within concept 3, however I feel that this concept could reduce the impact further, possibly by going underground, or even further out to sea.

2

FORM/FUNCTION

Each concept has it's own form, however I feel that concept 2/3 incorporated them the best. I want to further incorporate the more repetitious and natural forms.

3

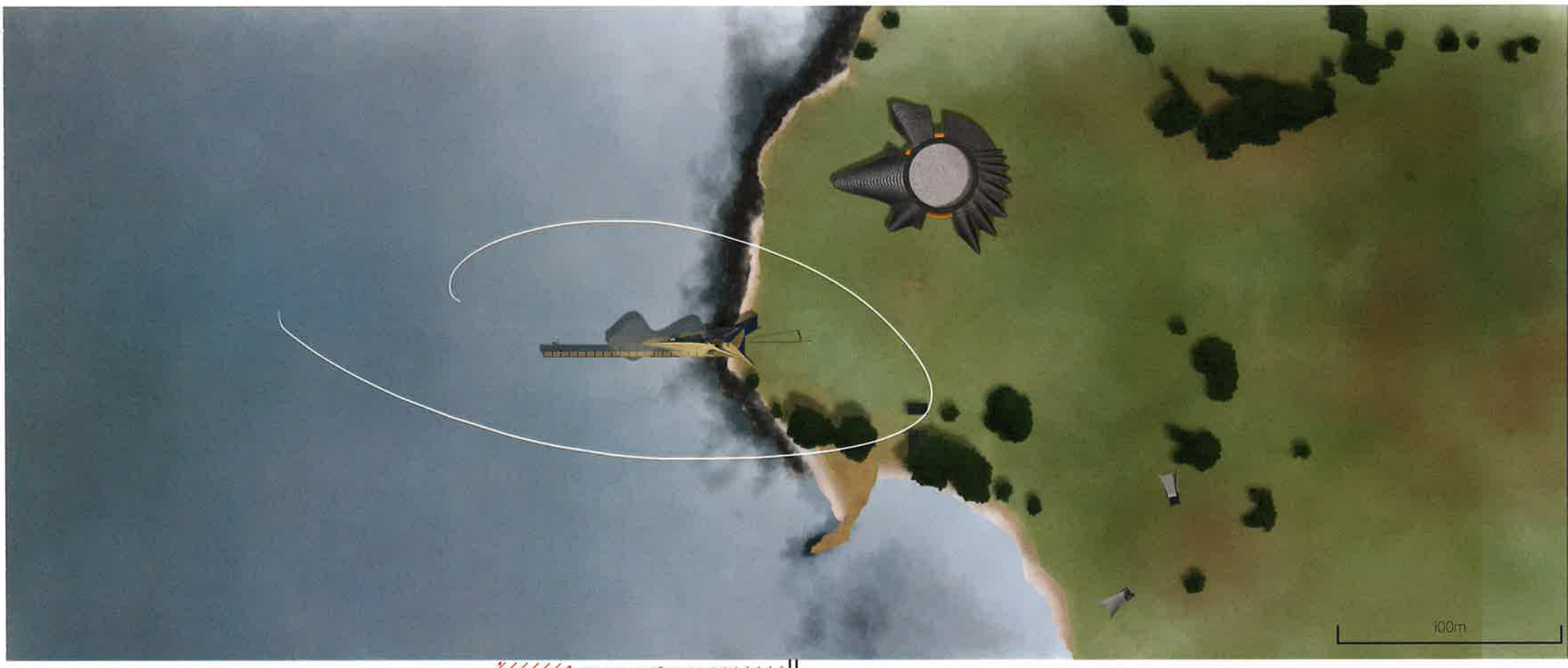
HISTORY

The best way I have found to respect this history is to simply avoid it, and build around it. However I could try using that history more, and possibly incorporating it into my design. However this may cloud the form of the design.

4

TOURISM/REHABILITATION

Torea Pango breed in monogamous pairs, and I feel my design could emulate this. By having 2 buildings that form a cohesive pair, and operate as 1 to fulfill their purpose. However this may prove impractical in relation to the site history.

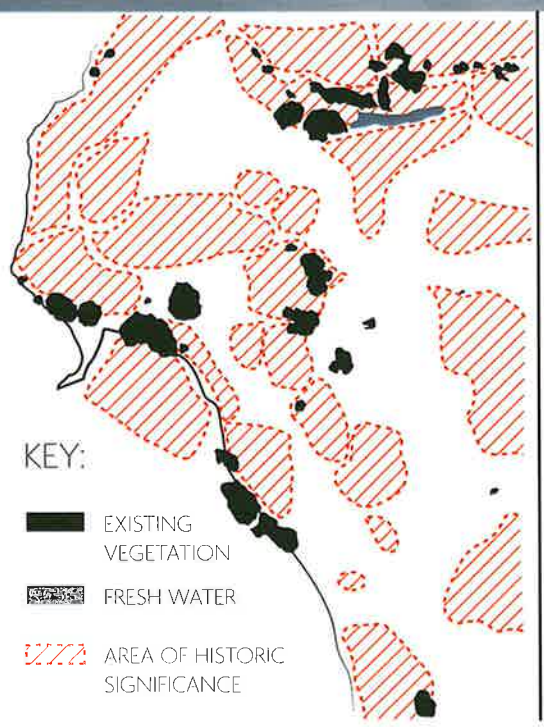


EXISTING VEGETATION

It seems counter productive to harm any existing flora, this would also help preserve the history.
Designing the final structure's footprint with these spaces in mind will be important.

HISTORY

To best respect the history, the building needs to avoid harming it. Therefore the design footprint should avoid impacting any existing site.

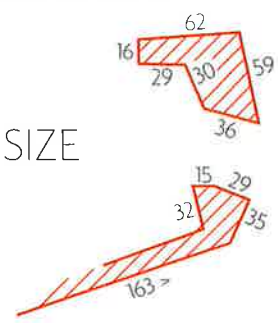


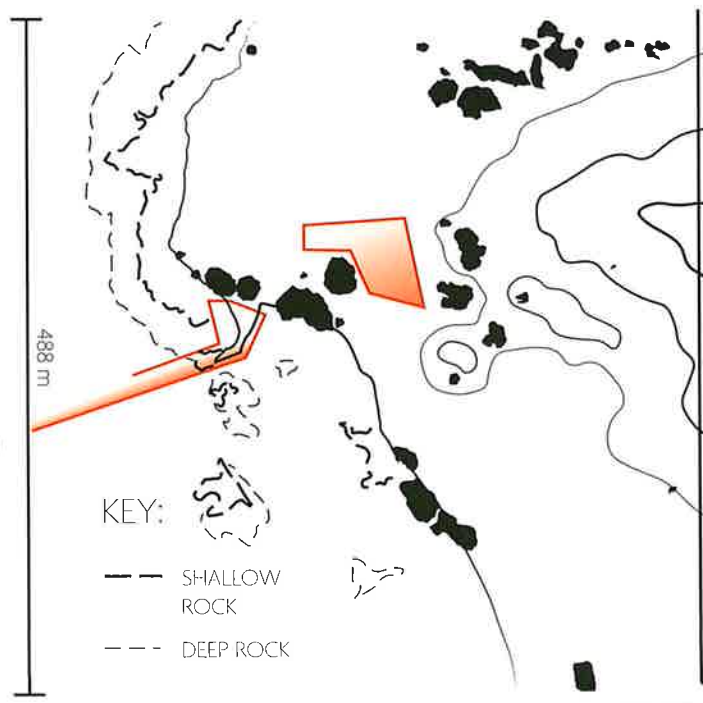
SITE SCALE

With these considerations in mind, this is the largest and least impactful footprint that my building could occupy.
Although this is the largest space, the structure will likely be far smaller to comfortably fit.

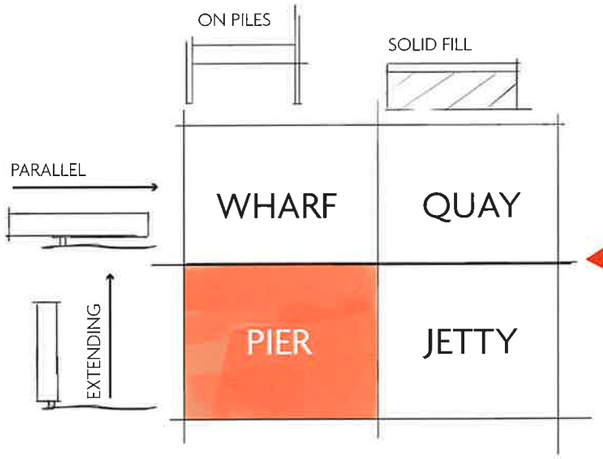
SITE SIZE

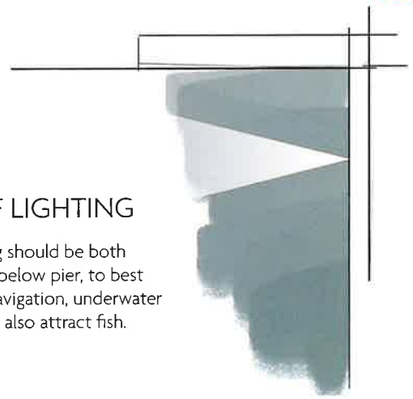
(Meters)





BASIC WHARF FUNCTION RESEARCH

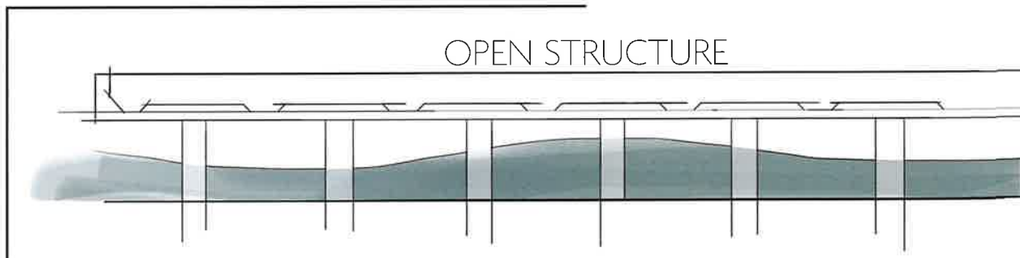


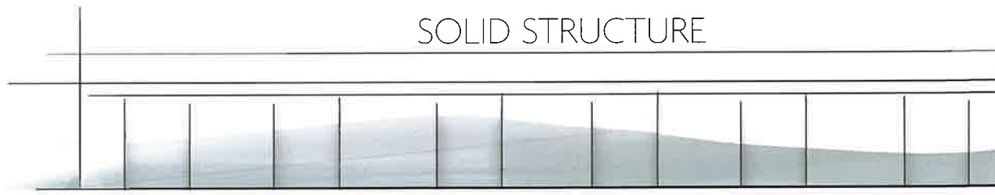


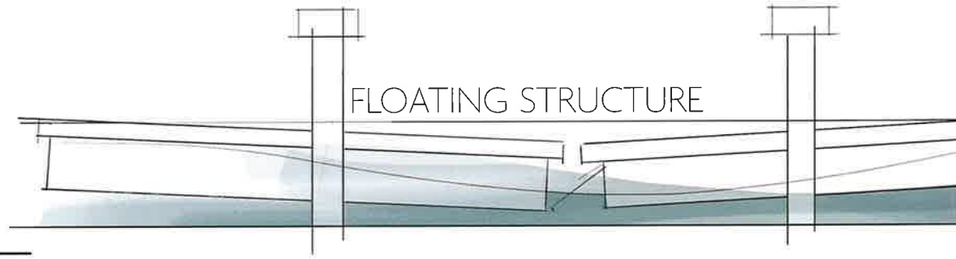
WHARF LIGHTING

The lighting should be both above and below pier, to best allow for navigation, underwater lighting can also attract fish.

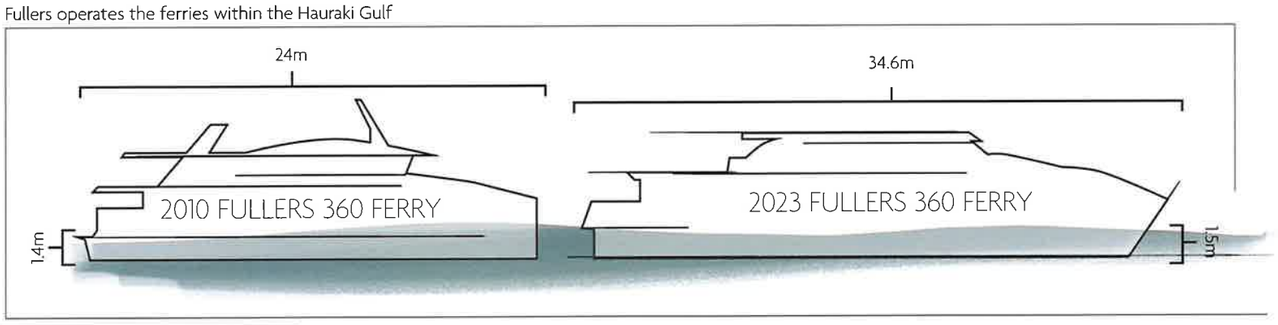
3 MAIN TYPES OF WHARVES

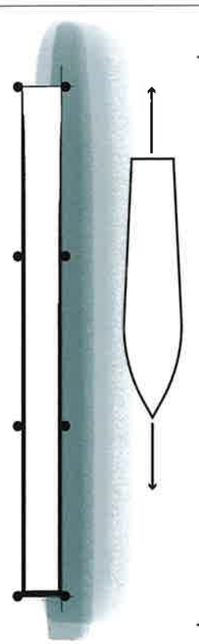






Fullers operates the ferries within the Hauraki Gulf





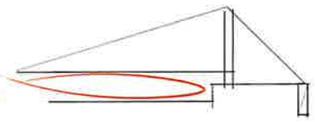
SIZING

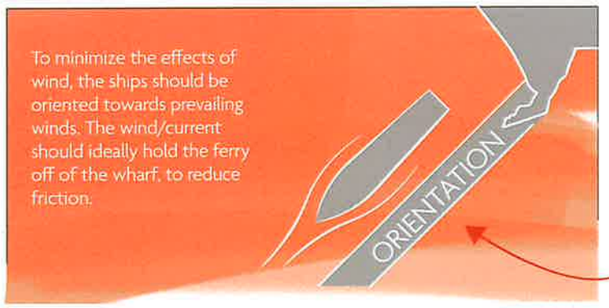
To berth a single ship the wharf needs to allow for the length of the ship, and at least 15m each side.

RANGITOTO WHARF

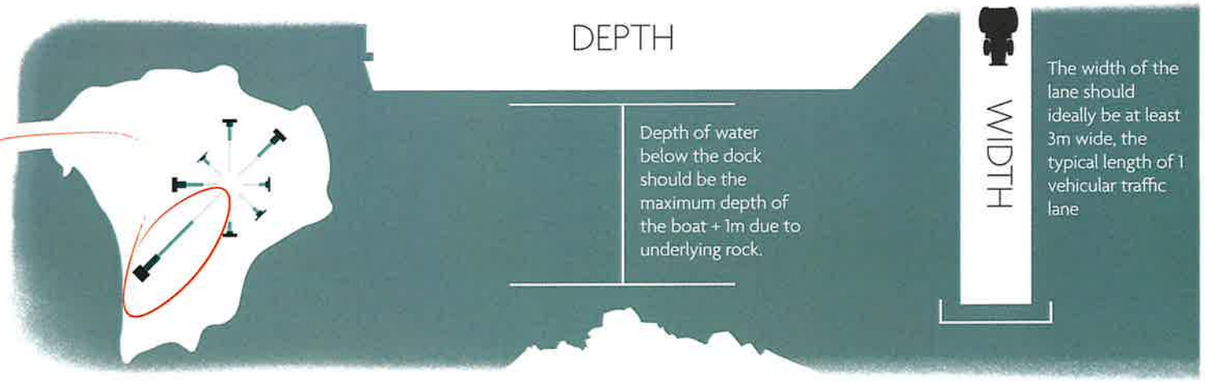
The Rangitoto wharf was re-built in 2012, and was a complete mess. The underlying geology made it difficult to install any piles. This resulted in unnecessary damage to the seafloor.

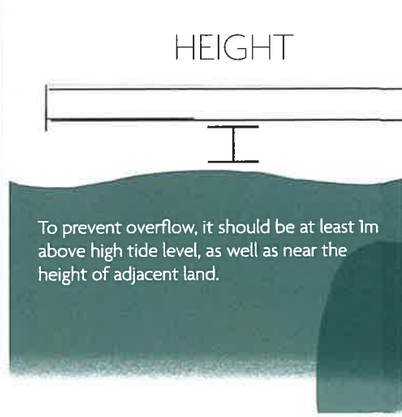
This geology of browns island it very similar, so any way to reduce the impact on the fragile seabed would be beneficial, especially considering the population of mangroves and shags that live in the region.





To minimize the effects of wind, the ships should be oriented towards prevailing winds. The wind/current should ideally hold the ferry off of the wharf, to reduce friction.





SITE PROPORTION

②

Wharf could also
act as a lookout
for visitors

①

SILHOUETTE

①

1

2

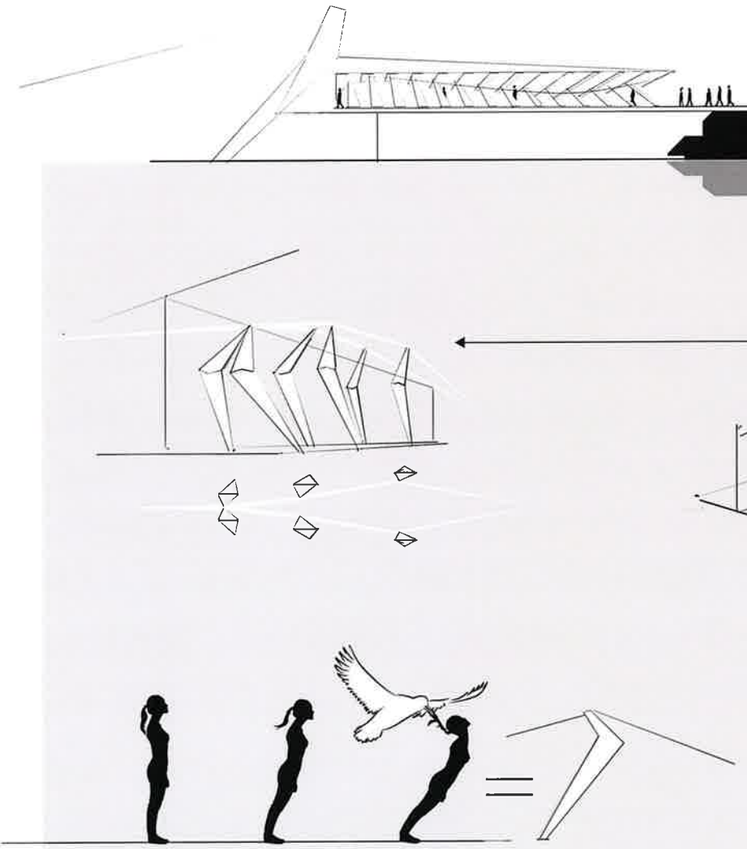
FLOW

②

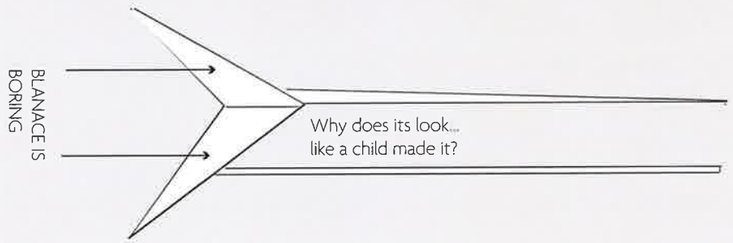
TOO FLAT?

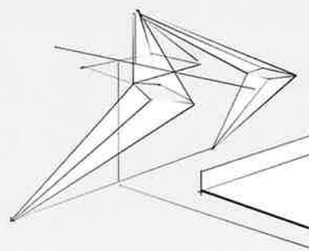
DEVELOPMENT - 1

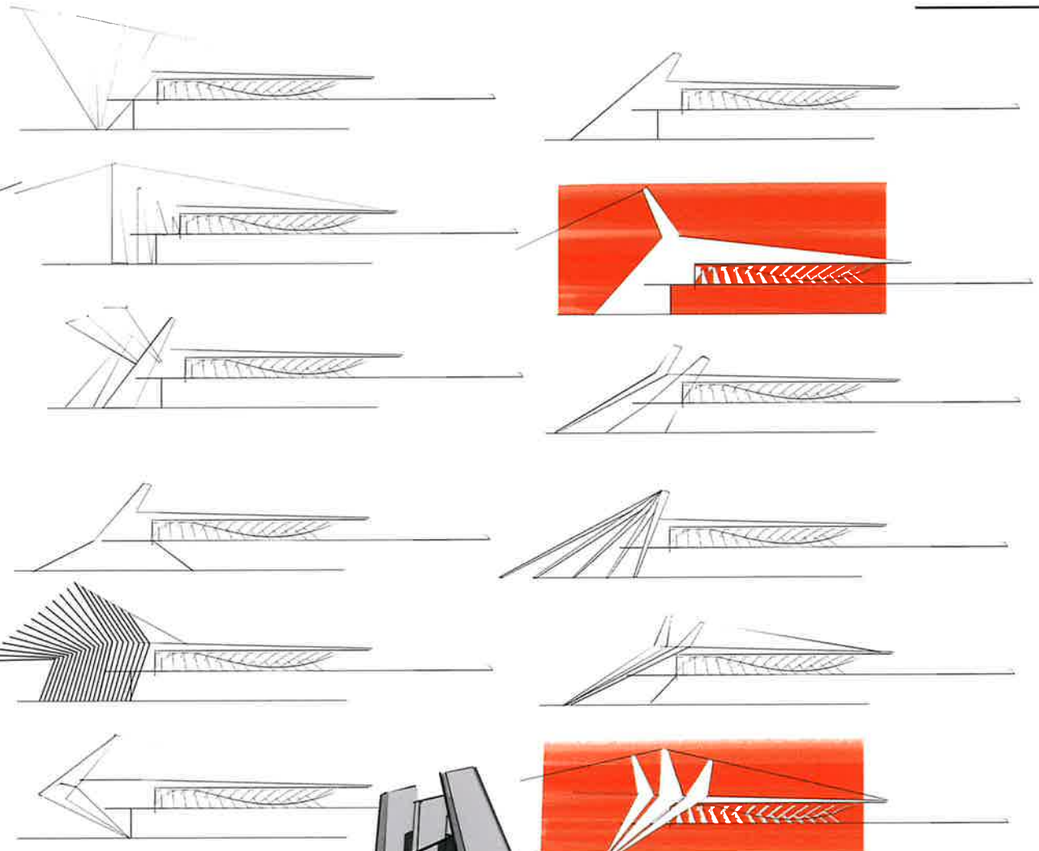
DEVELOPMENT - 2

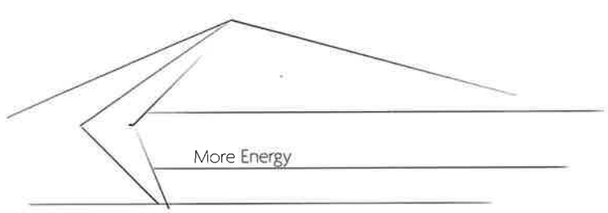


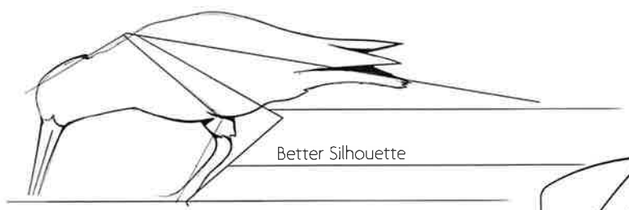
* *I know its a wierd way to think about the form, but its how I conveyed the idea to others*

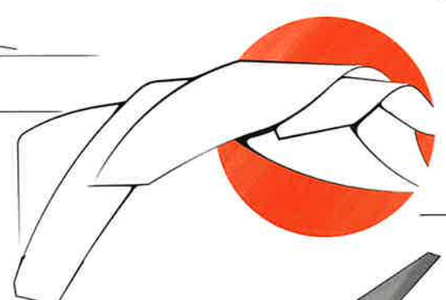


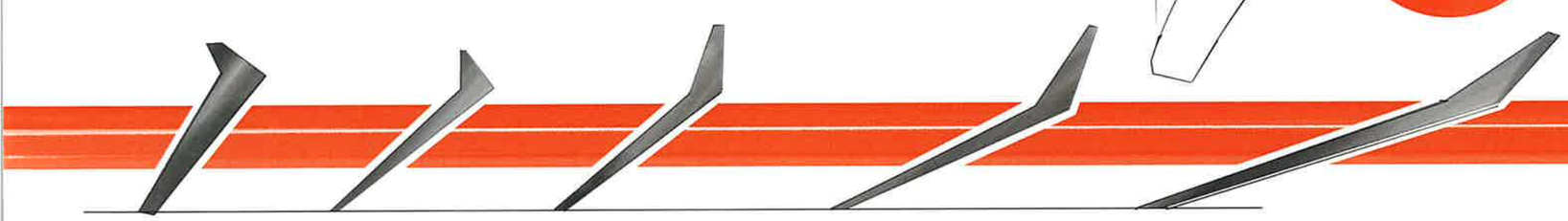












DEVELOPMENT - 4

ALTERNATE OPENINGS

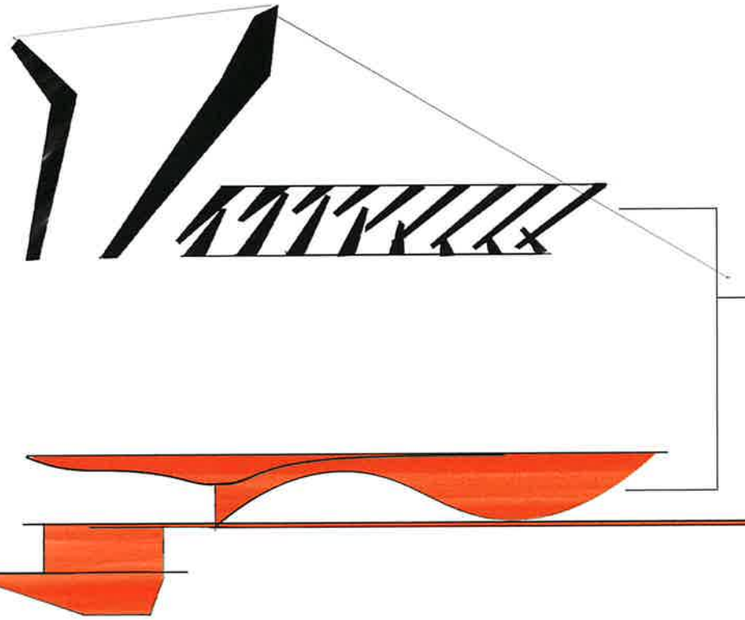
Form Blocks
Out Light

UNDERGROUND

STRIGHT THROUGH THE CENTRE

I LIKE IT, BUT I DON'T LOVE IT

PROBLEMS



i feel like the design is too disjointed. It has 2 main elements but they don't really interact.

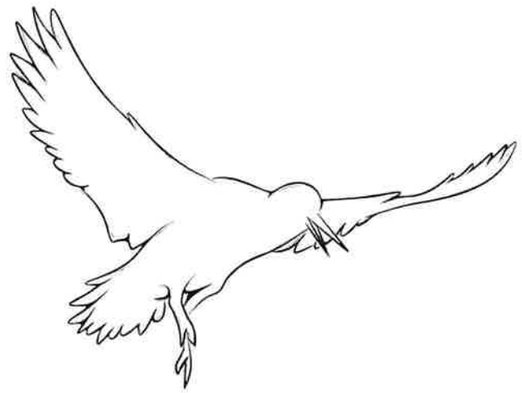
Furthermore the form has largely lost it's movement.
It also doesn't look as organic as a building designed after a bird should look.

DESIRES

I want it to feel more organic, like when you're inside the building, you should feel like you've entered into something living.
I need to bring back movement into the design, exaggerate the flow more.

I also want the more organic, round forms to feel as though they are being constrained by the more angular forms. This would give a cool sense of the building having a skeleton.

I've built up a good base with my forms /concepts. But to reach the goal I want to, I feel I need to design more freely, with less constraints. However, this design needs to have guidance.



ORGANIC DESIGN

"No house should ever be on a hill or on anything, it should be of the hill."

OF MOTUKOREA

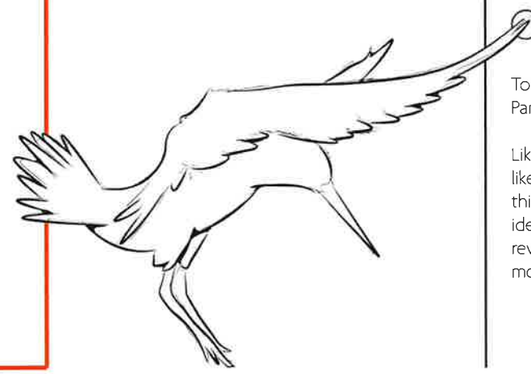
Frank Lloyd Wright's idea of organic design differs from what I've used so far during this project. Instead of imitating the natural world, he believed that we should fit in with the natural world; the site, and our structure should benefit from their interaction.

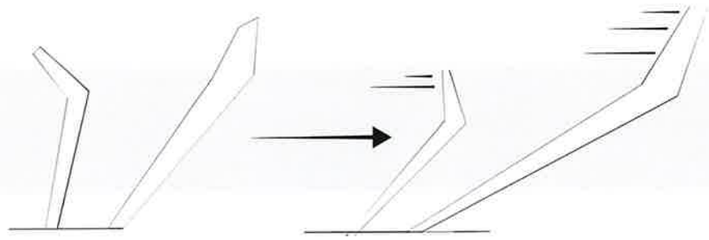
I've already designed the structure to be respectful of the site, and its purpose is to benefit nature. However, I feel that this structure needs to visually fit in more with the land; that it should feel like Motukorea is its home and that it wouldn't belong anywhere else.

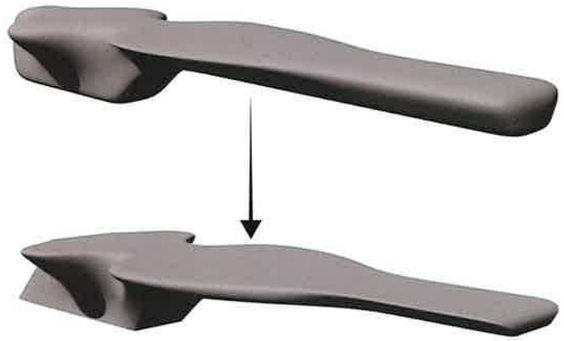
OF TOREA PANGO

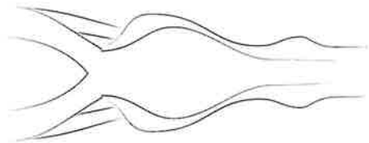
To extend this philosophy, the structure should also be of the Torea Pango. I really want this building to feel alive.

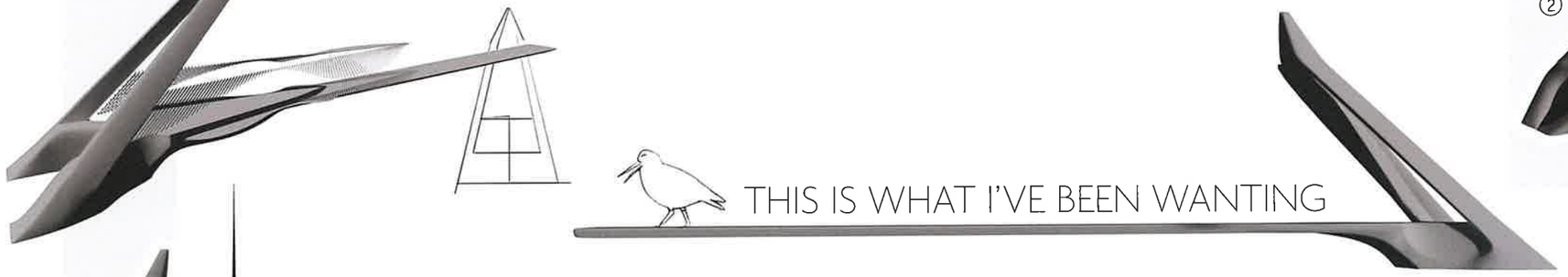
Like when a visitor enters the island through the structure, they feel like they're walking through something alive and thriving, that this thing has swallowed them whole. I'm personally enchanted with this idea, that the structure is a dormant titan, who rests here only to revitalize the island. I just think that would be a really awesome mood to bring to this project.



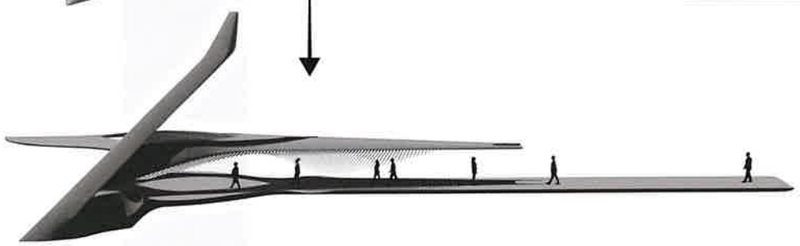


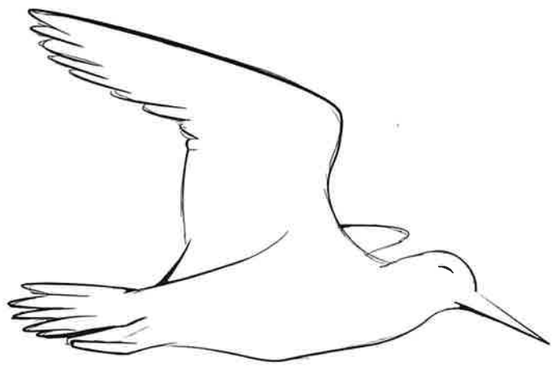


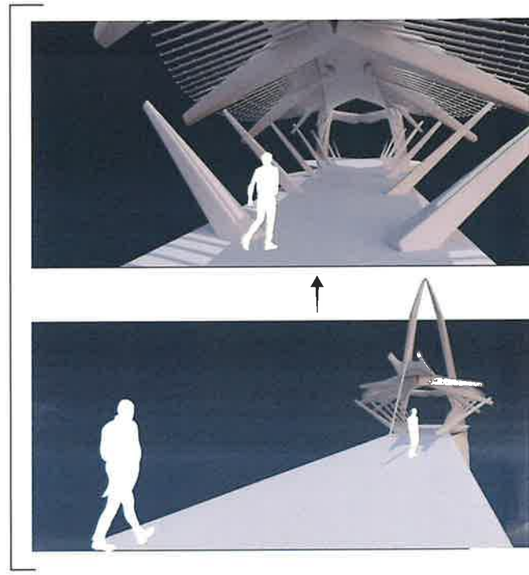


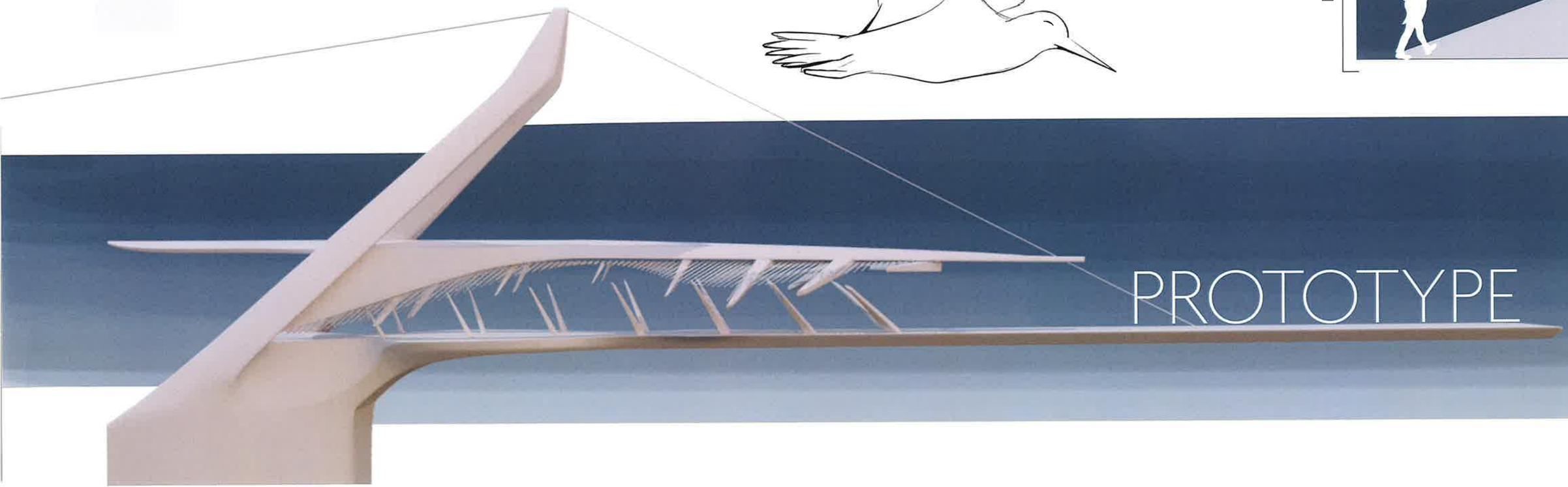


THIS IS WHAT I'VE BEEN WANTING









PROTOTYPE

How do they get down?

①

50

37

30

IDEAL RANGE

30

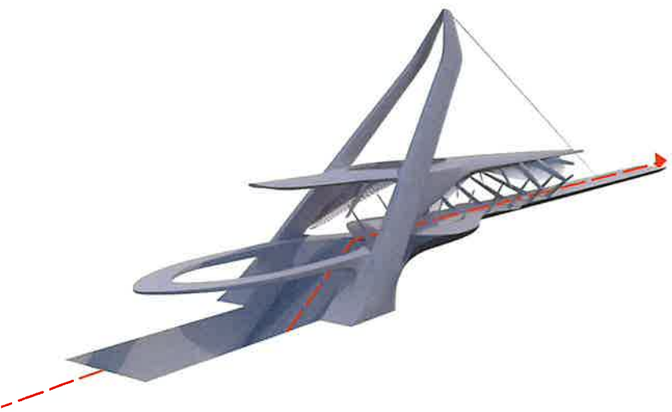
22

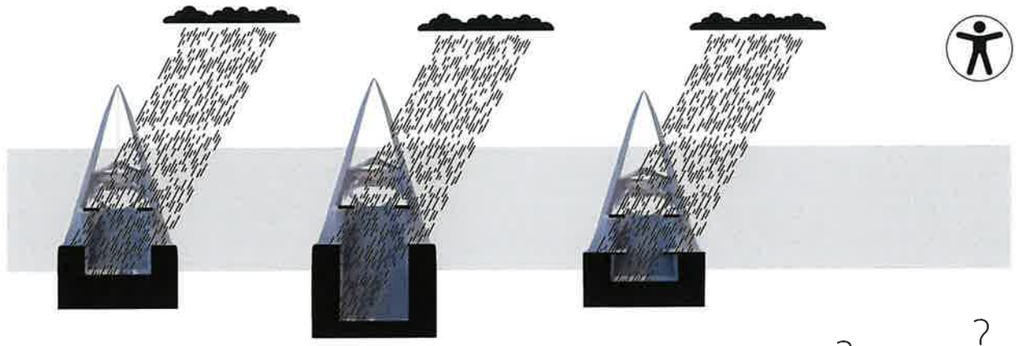
SHELTER?

What if you're hiding from the weather and need to run to the ferry? Well, you have to get exposed.

Should feel cozy

STRAIGHT THROUGH
Less Exposure



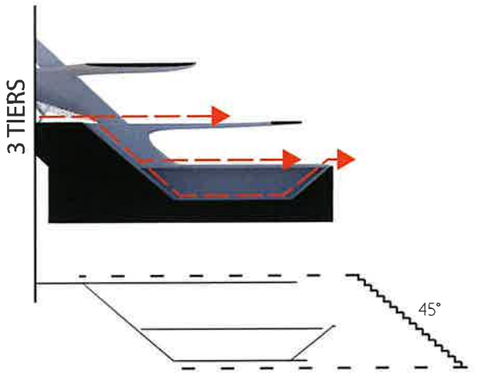


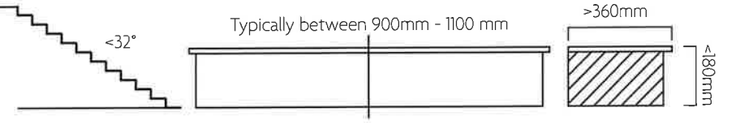
RAMP

Wheelchair/disability access isn't the reason for implementing a ramp, due to the nature of the site. However activities such as vehicle import, transportation of goods (saplings) will be important to accommodate. Such activities can be dangerous on stairs.

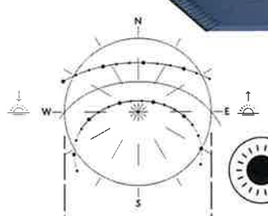
Stairs that facilitate access for people with physical disabilities, are typically required in places that the general public use.

Although Motukorea is not widely accessible by the general public, anyone who can pay for a ferry ticket is able to go there. Therefore the same features should be required





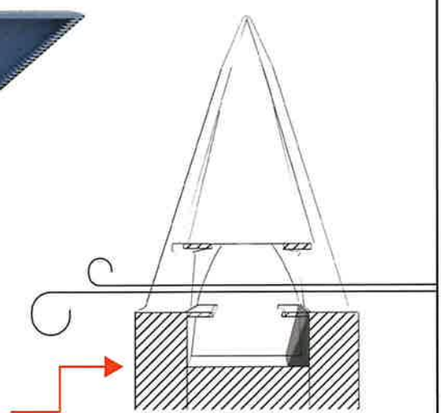
SUBTERRANEAN NURSERY



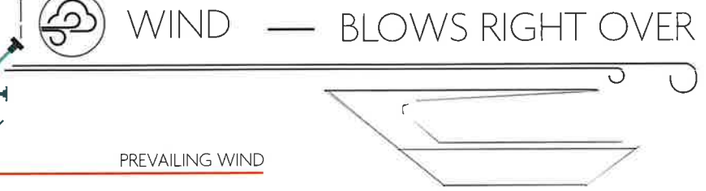
LIGHT

Due to the sun path over Motukorea, the nursery should receive an ample amount of sunlight during the day.

However, to get more light in, why not make the 'roof' glass?

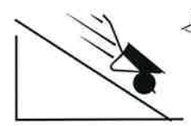


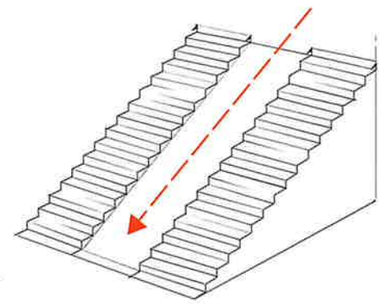
WIND — BLOWS RIGHT OVER



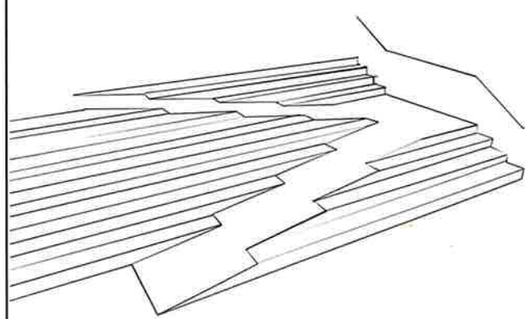
An external ramp within an urban context should have a maximum gradient of 1:14, with 1:20 being preferred.

A ramp such as this would be ridiculously steep, like 1:1

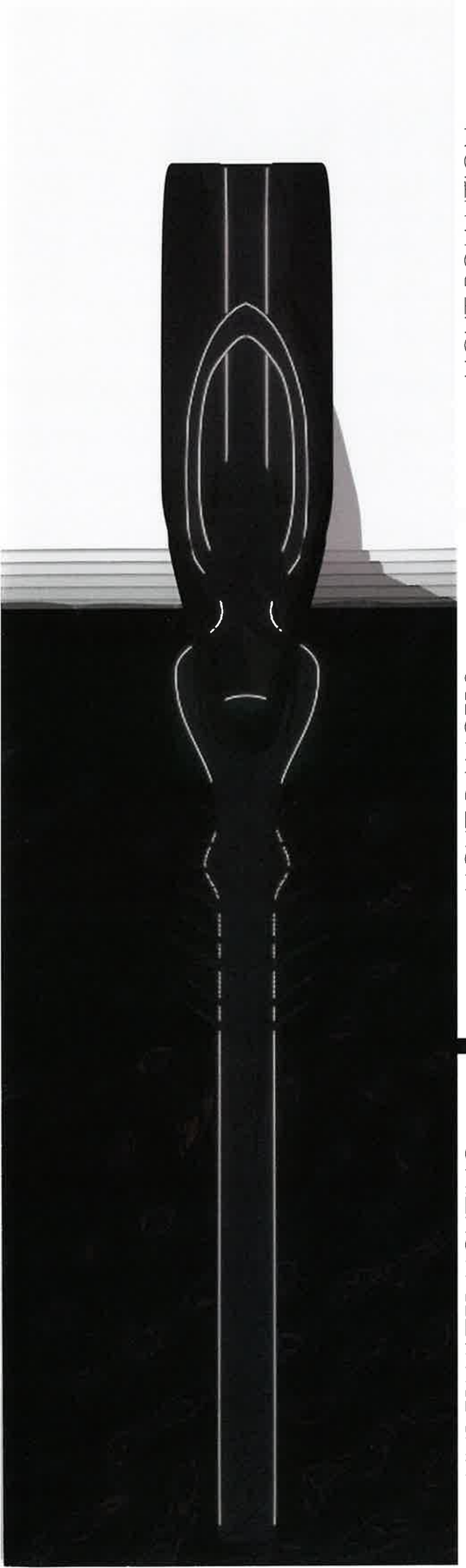




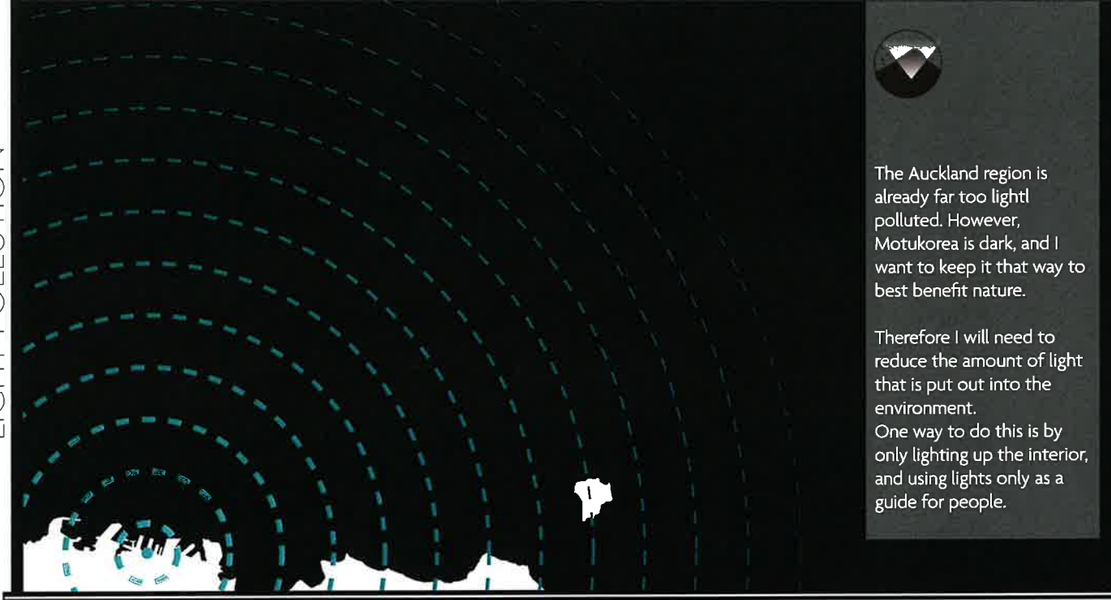
- Provides a shallower gradient of roughly 1:8.



This design challenges peopie with disabilities in a myriad of ways. However due to the nature of the ramp being for goods transport rather than access, I feel this is still appropriate as it will be used by capable individuals.



LIGHT POLLUTION



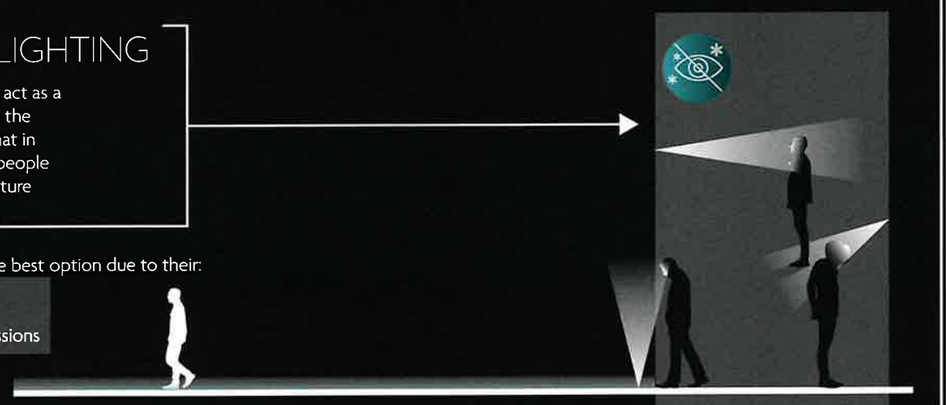
The Auckland region is already far too lightl polluted. However, Motukorea is dark, and I want to keep it that way to best benefit nature.

Therefore I will need to reduce the amount of light that is put out into the environment.
One way to do this is by only lighting up the interior, and using lights only as a guide for people.

LIGHT DANGERS

GROUND LIGHTING

I want the lighting to act as a guide for those using the structure, ensuring that in low light conditions people can still use the structure safely.

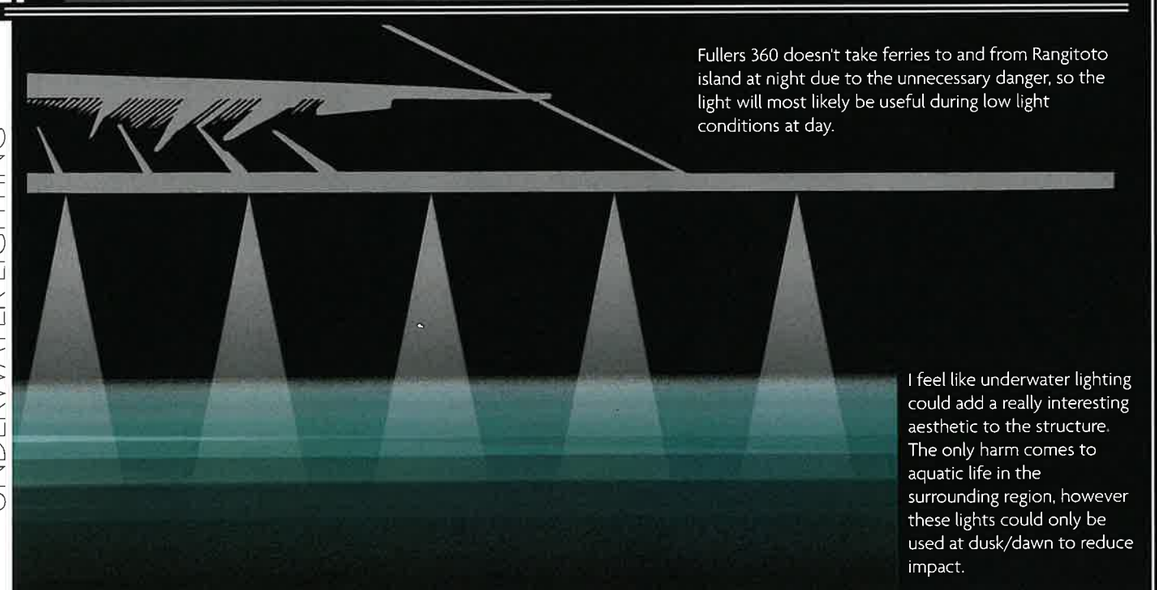


LED lights will be the best option due to their:

- Energy Efficiency
- Long Lifespan
- No Heat or UV emissions

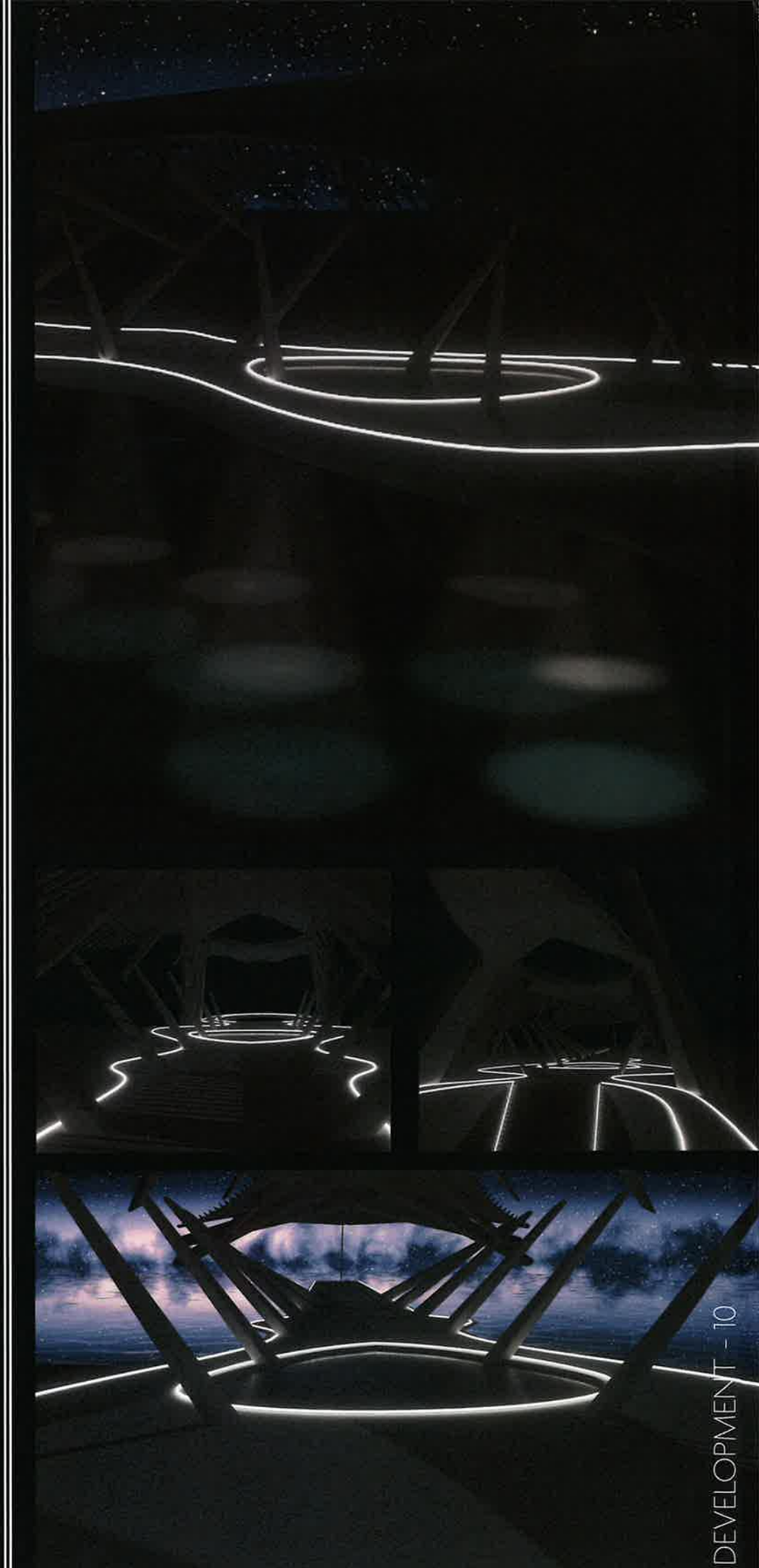
The main danger of lights is affecting ferry pilots, however ground lighting could be used to outline the structure to assist with docking.

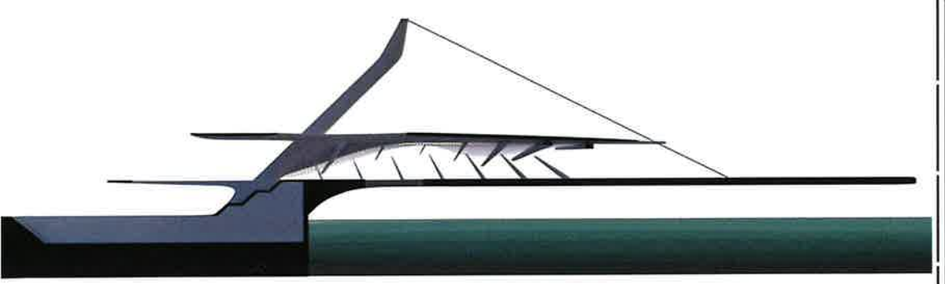
UNDERWATER LIGHTING

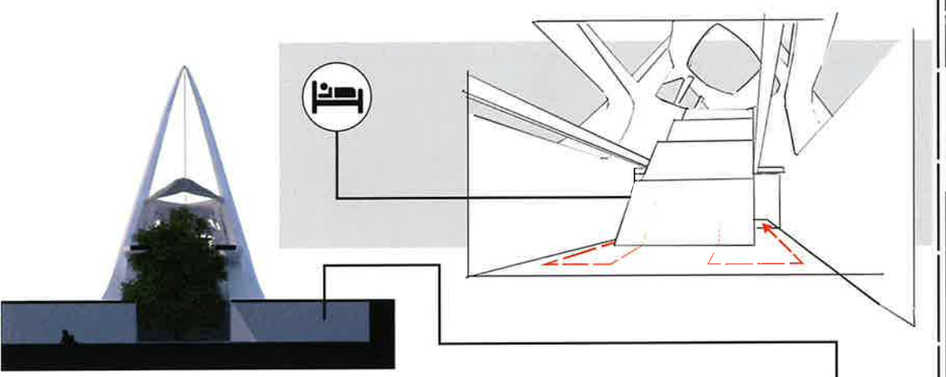


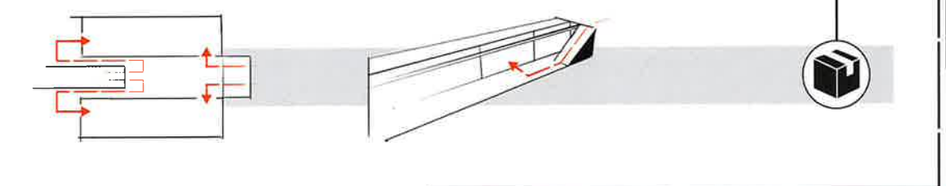
Fullers 360 doesn't take ferries to and from Rangitoto island at night due to the unnecessary danger, so the light will most likely be useful during low light conditions at day.

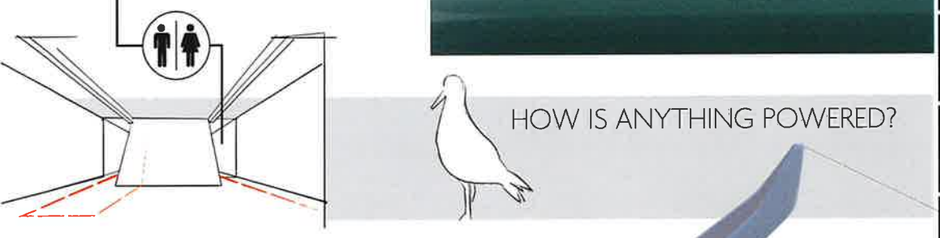
I feel like underwater lighting could add a really interesting aesthetic to the structure. The only harm comes to aquatic life in the surrounding region, however these lights could only be used at dusk/dawn to reduce impact.



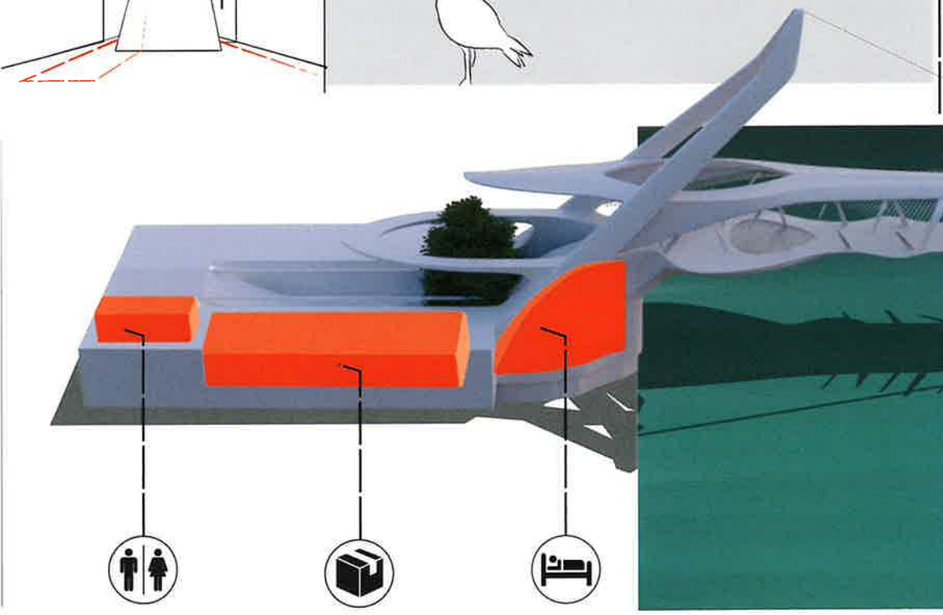


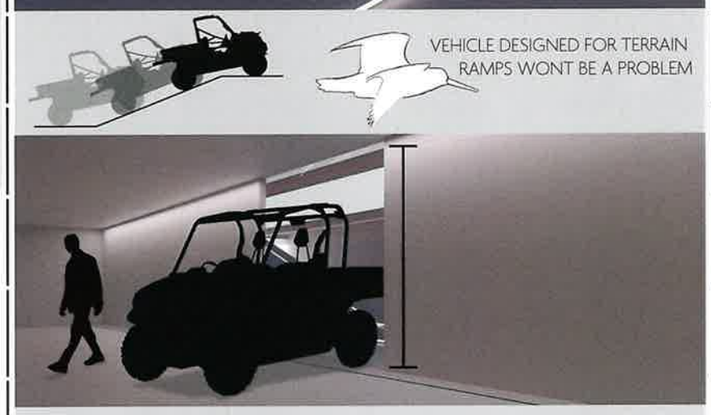


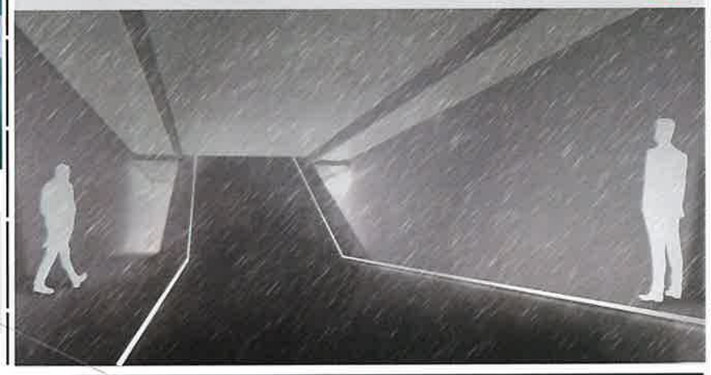


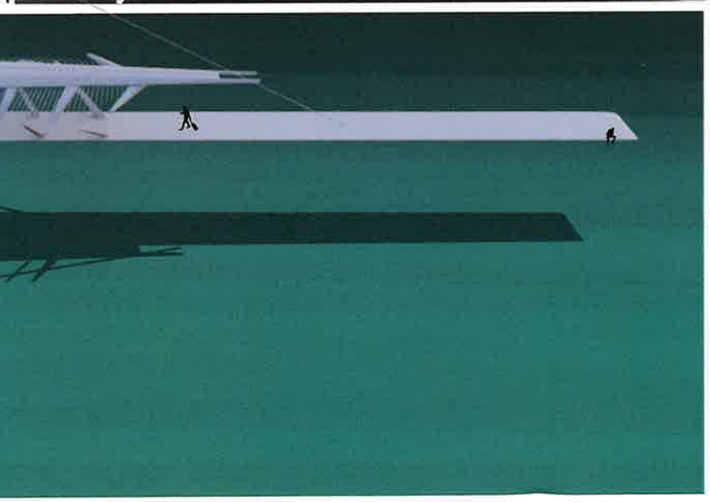


HOW IS ANYTHING POWERED?

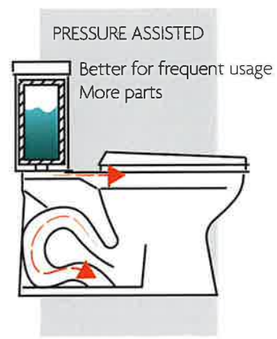








VEHICLE DESIGNED FOR TERRAIN
RAMPS WONT BE A PROBLEM



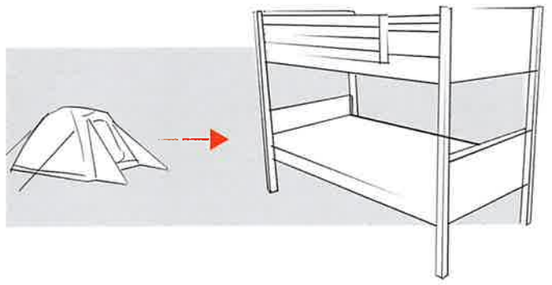
ACCESSIBILITY

Due to the nature of the site the toilets don't need to be disability accessible. However both the wharf and the Fullers 360 vessels are accessible so the

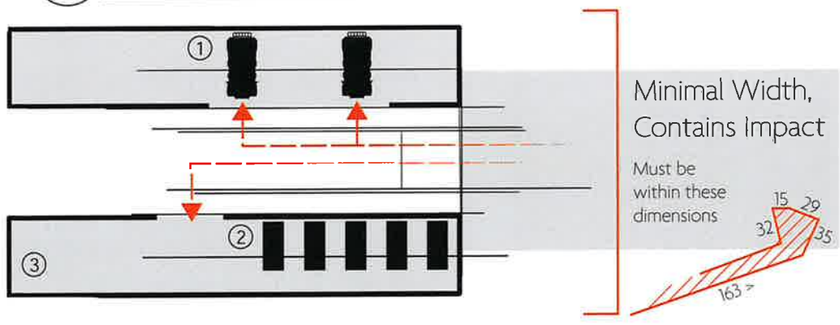
Toilets may as well be accommodating, especially considering there is no harm in making them more accessible.

ACCOMMODATION

The purpose of the accommodation is not to be a hotel. It's simply a space that is better than camping which provides more warmth and shelter. This would allow more people to work on the island for longer periods of time.



STORAGE



① Tawharanui park is larger than Motukorea, and houses 2+ utility terrain vehicles. Motukorea will likely need to house less.

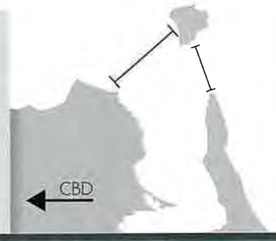
② Shelving could be used to hold tools and various resources.

③ Space is key because no one really knows how motukorea will be reanimated.

METHOD OF POWER

AC MAIN

AC main lines are used to power the majority of utilities and buildings in Auckland. All locations using AC need to be connected to the lines to be powered. However AC power is efficient in transporting electricity over long distances.

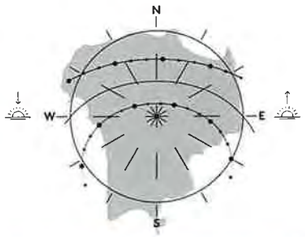


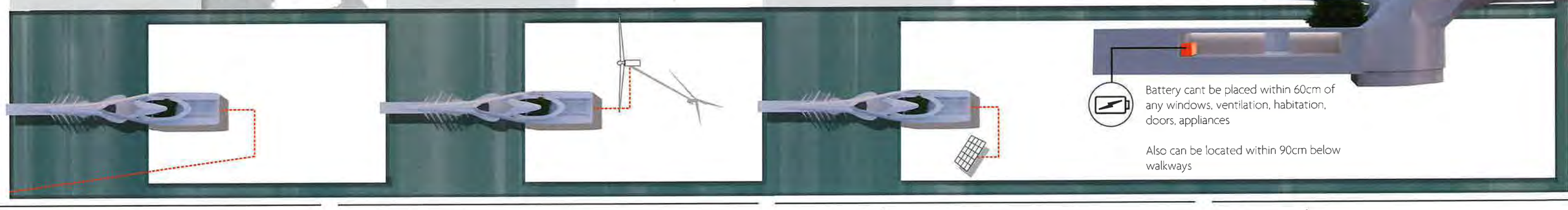
WIND

Motukorea does have open space and windy conditions to allow for wind farming, however such farms can pose a significant danger to bird life.

SOLAR

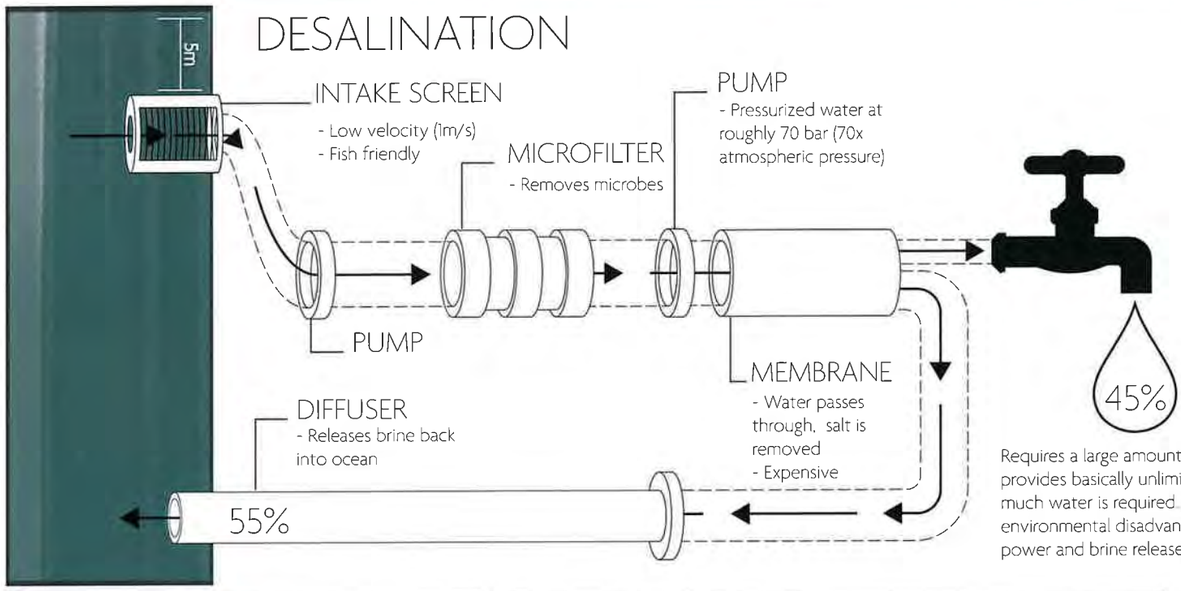
Heavily limits power to only when it's sunny, unless a battery is installed. Can also be expensive. However, they do provide a large amount of power with very little environmental impact, also are easy to add more as demand grows.





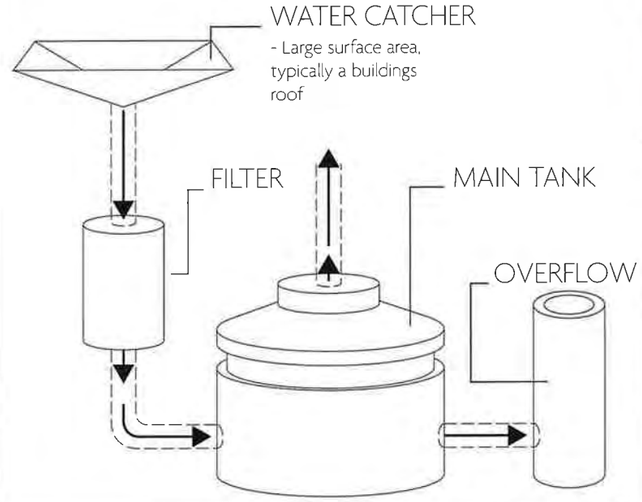
METHOD OF HYDRATION

DESALINATION



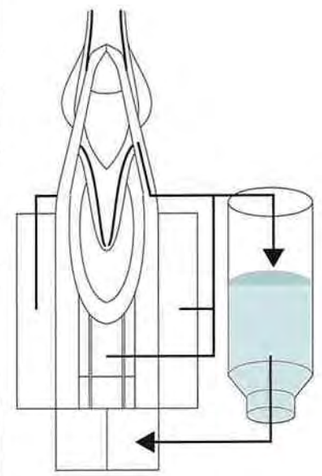
Requires a large amount of power, and provides basically unlimited water. But, not much water is required. Also has environmental disadvantages due to power and brine release.

RAIN CATCHER



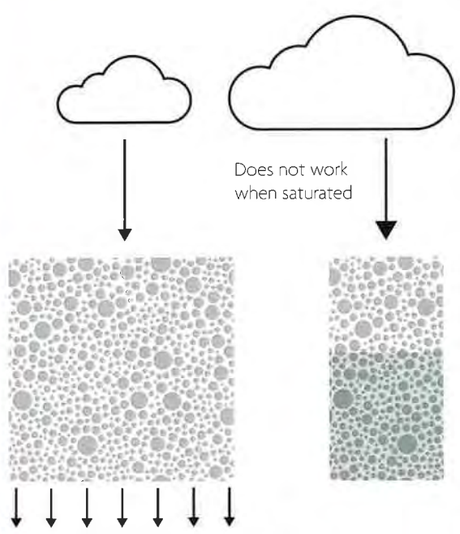
COMBINATION

Water could be gathered from both the roof in the form of a rain catcher as well as through the floor through drainage systems and stored in a tank for later use/filtration



METHOD OF DRAINAGE

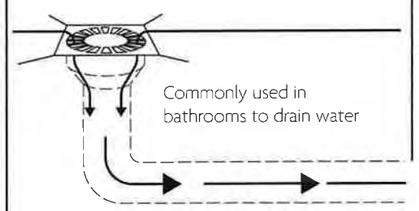
POROUS CONCRETE



DRAINAGE SYSTEMS

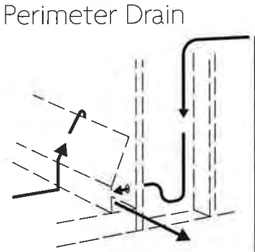
FLOOR DRAIN

Baseboard Drainage System

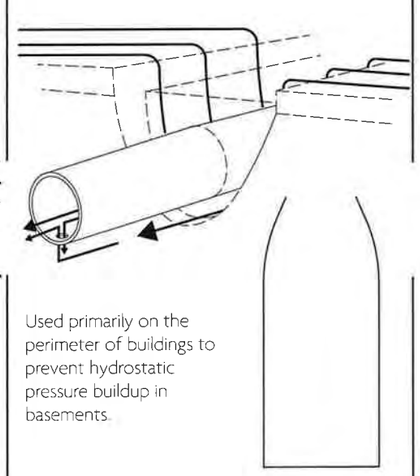


Interior Perimeter Drain

Used primarily in basements to prevent flooring and the buildup of hydrostatic pressure

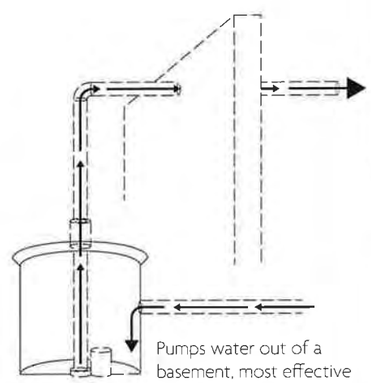


FRENCH DRAIN

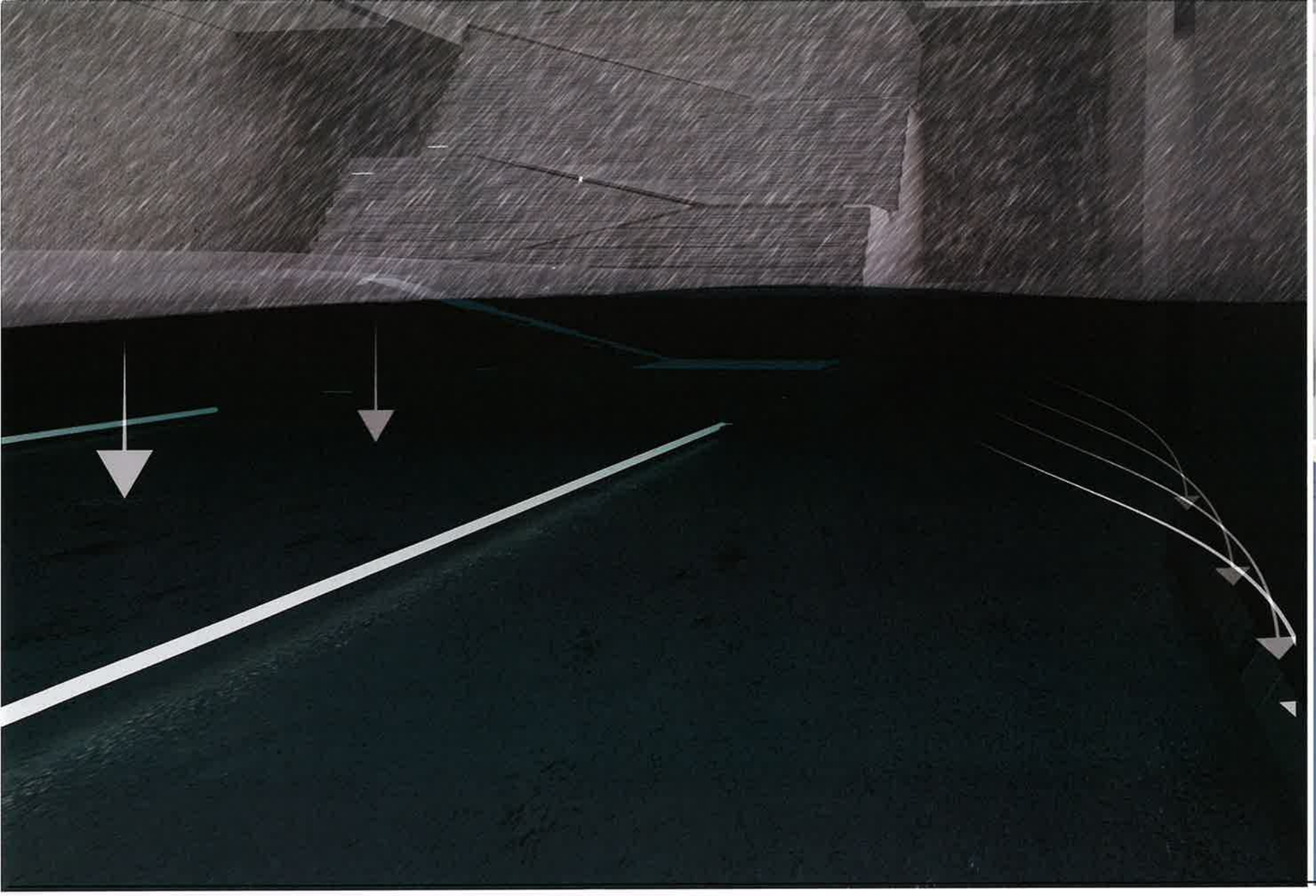


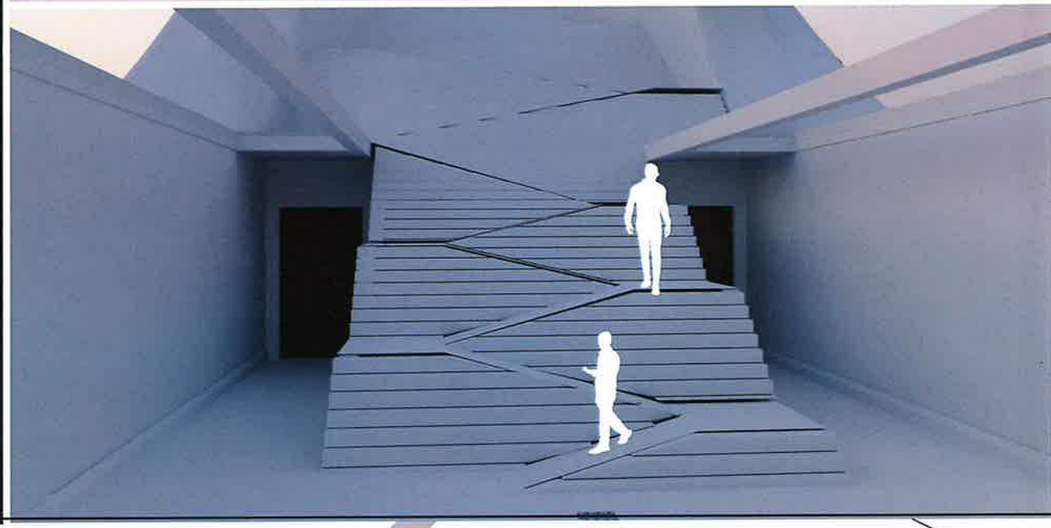
Used primarily on the perimeter of buildings to prevent hydrostatic pressure buildup in basements.

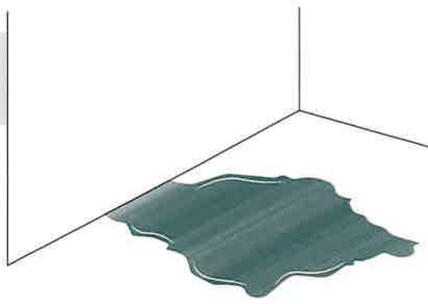
SUMP PUMP



Pumps water out of a basement, most effective during a flooding event. Does have the disadvantage of requiring power.

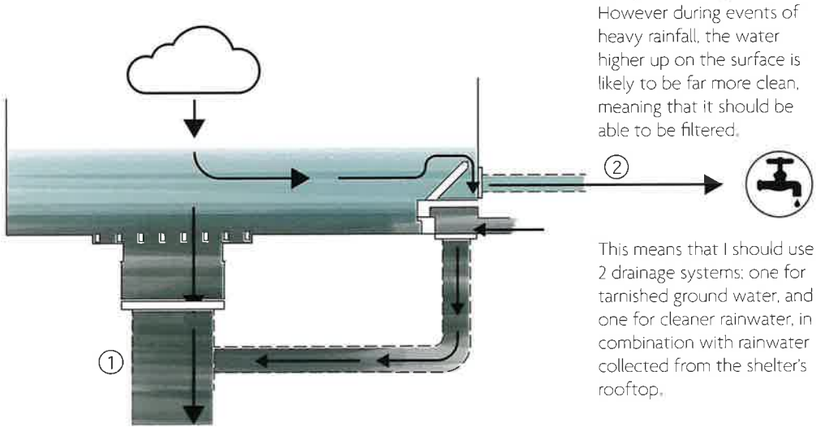






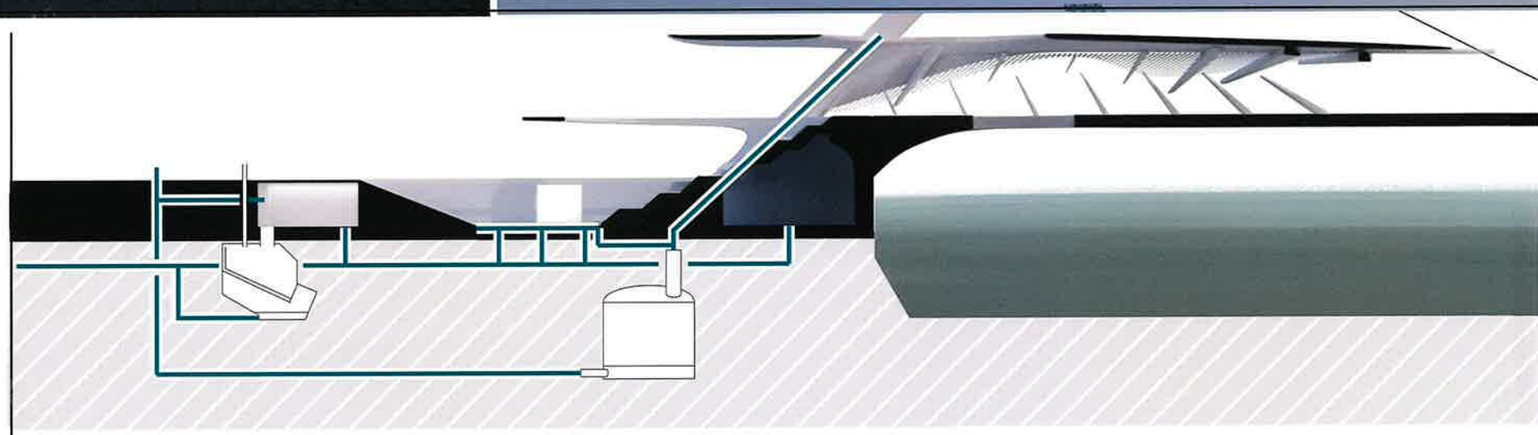
EFFECTIVENESS

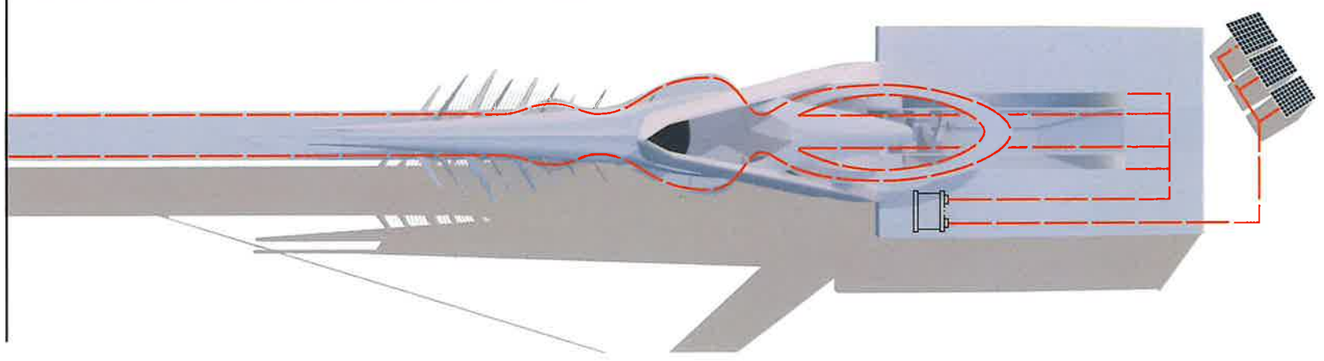
Water that is on the ground is likely to be tarnished, meaning that it is extremely likely to clog up any filters, meaning that it is unreasonable to attempt to purify the water.
However during events of heavy rainfall, the water higher up on the surface is likely to be far more clean, meaning that it should be able to be filtered.

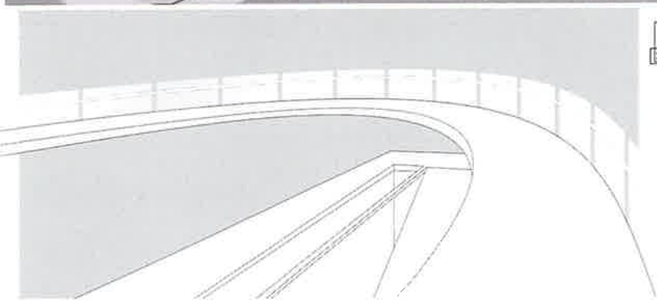


This means that I should use 2 drainage systems: one for tarnished ground water, and one for cleaner rainwater, in combination with rainwater collected from the shelter's rooftop.

SYSTEM DEVELOPMMENT



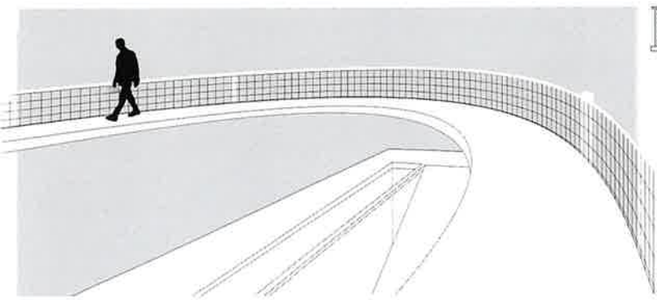




EXPENSIVE

FRAGILE

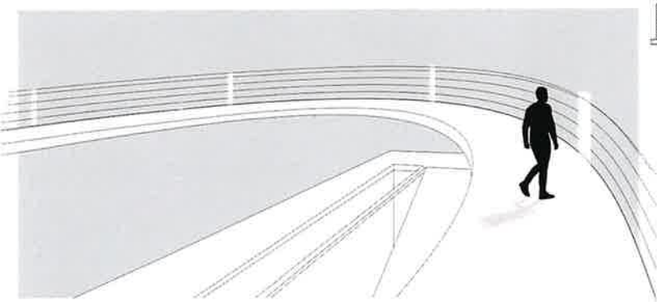
AESTHETIC



CHEAP

STRONG

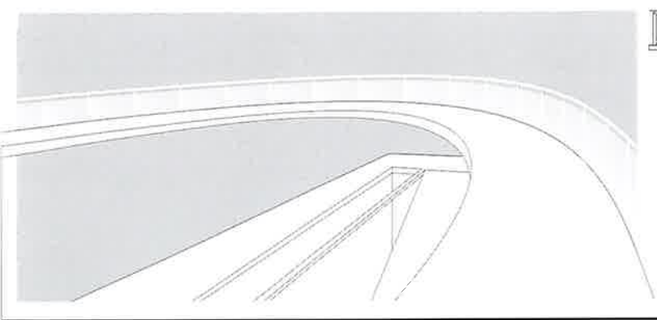
UGLY



CHEAP

STRONG

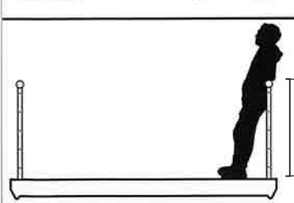
AESTHETIC



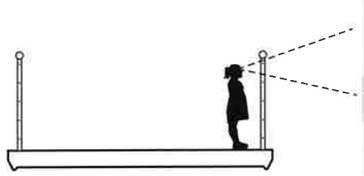
EXPENSIVE

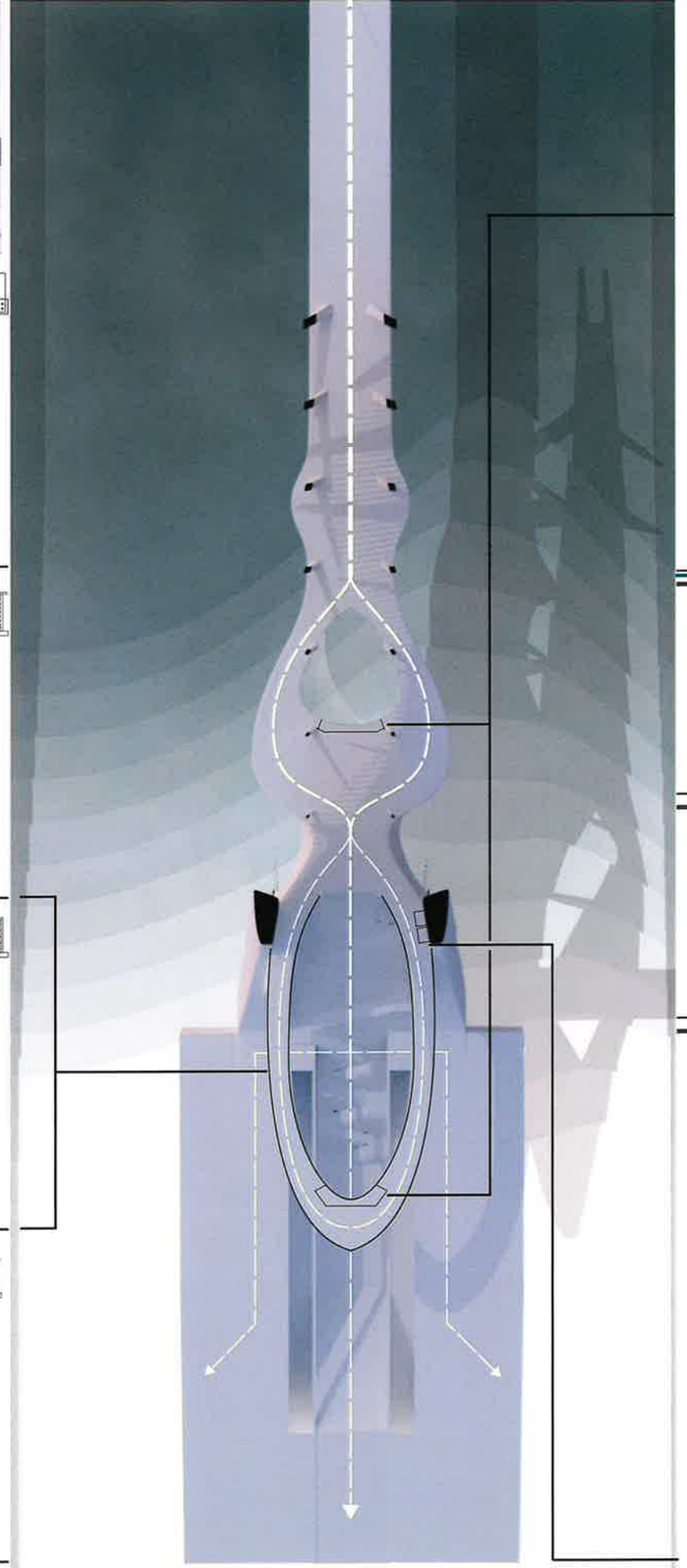
STRONG

AESTHETIC

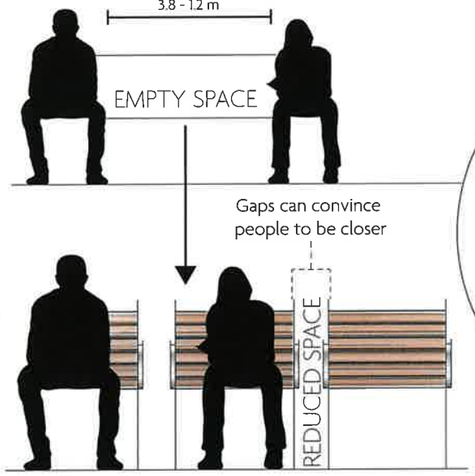


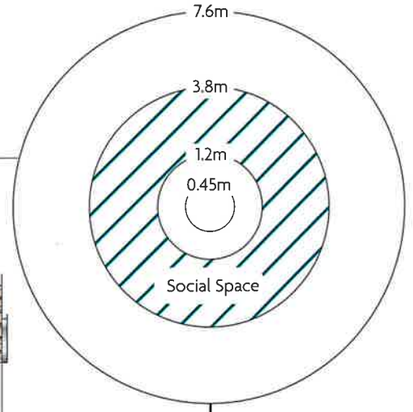
Needs to be roughly this high to be comfortable for users, this design also allows people at any height to view through the barrier.



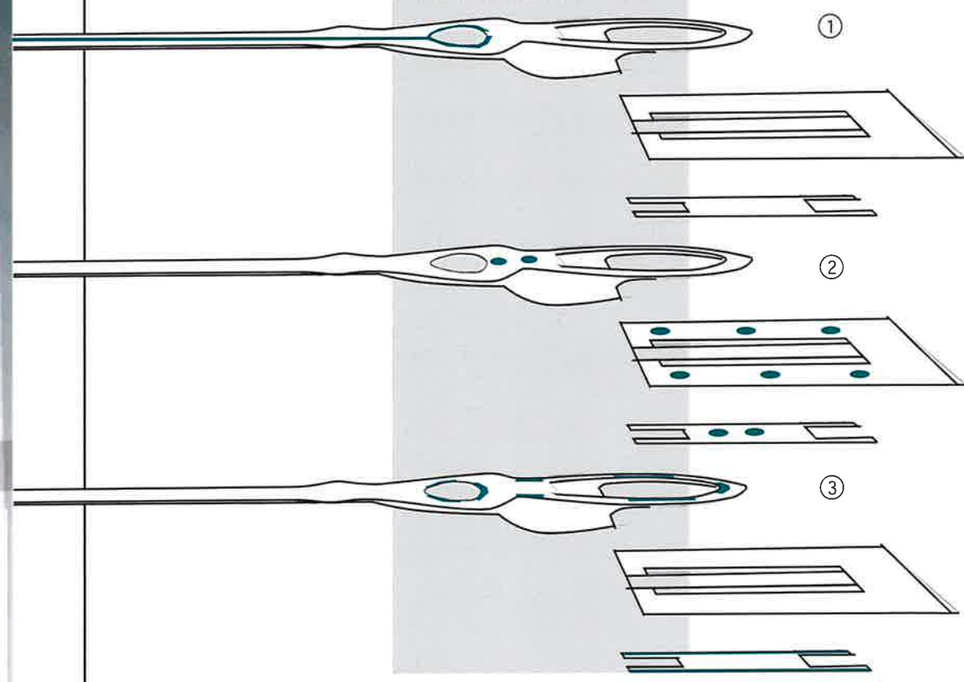


PROXEMICS

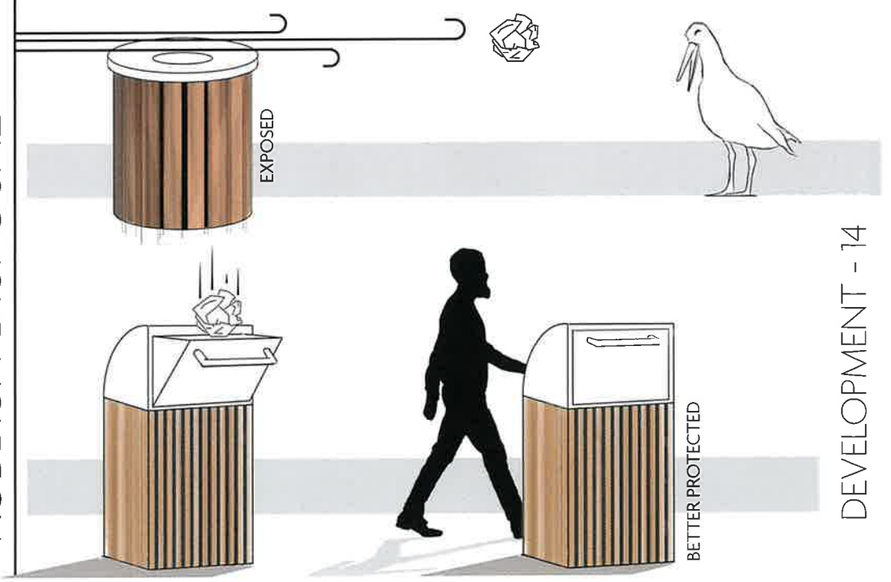




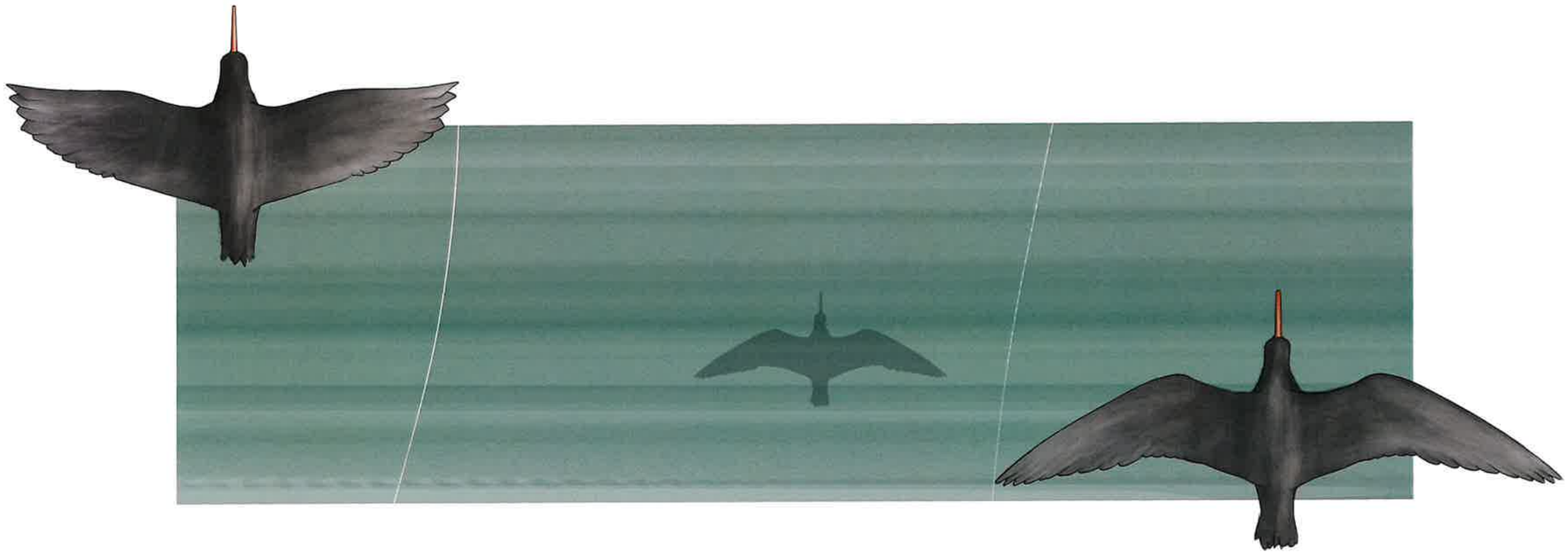
PLACEMENT

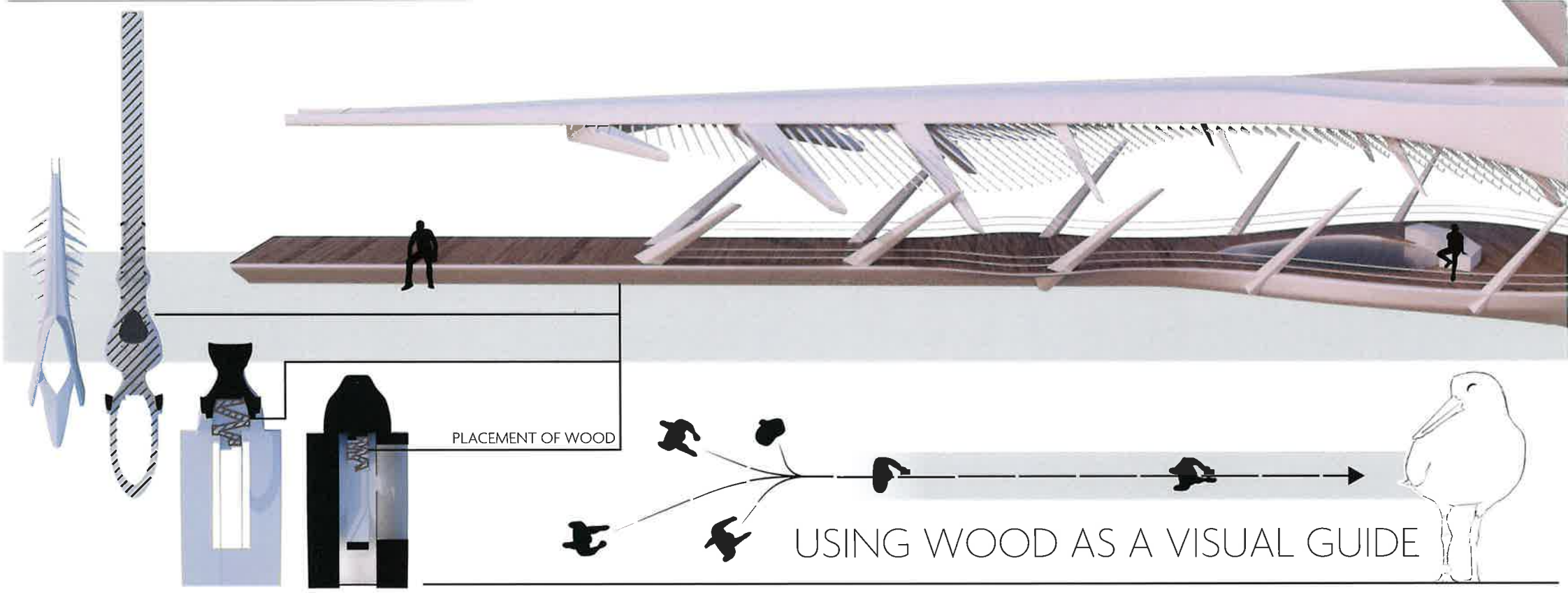


RUBBISH DISPOSAL

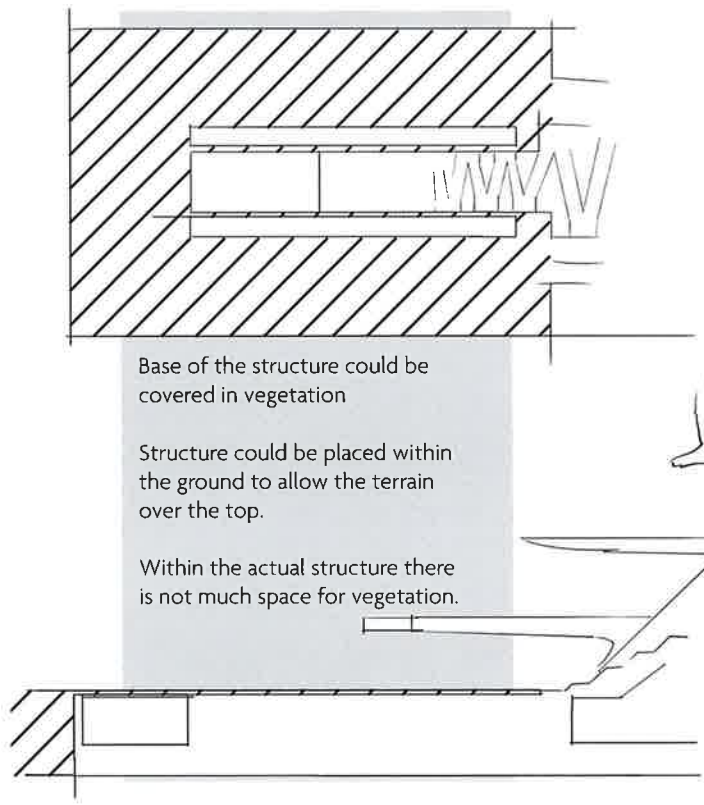


DEVELOPMENT - 14



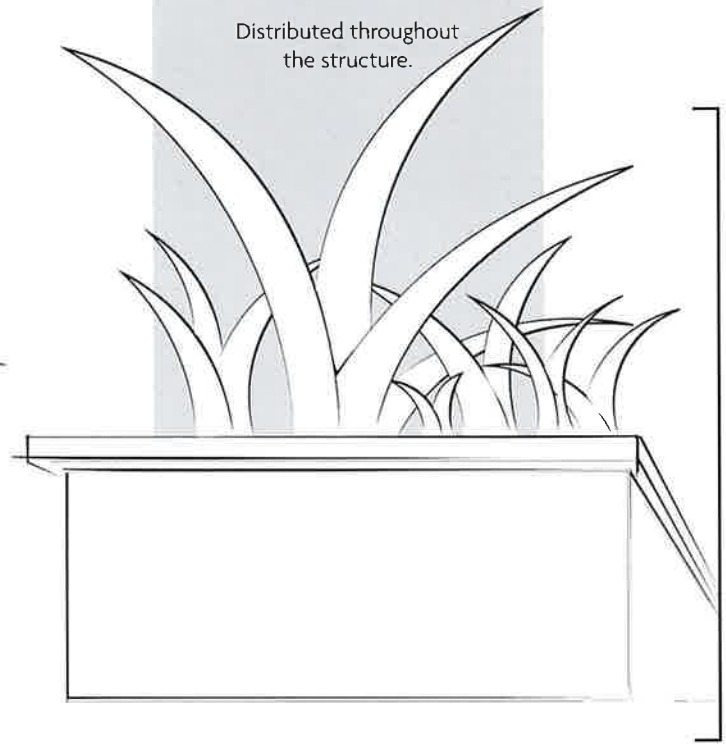


USING WOOD AS A VISUAL GUIDE



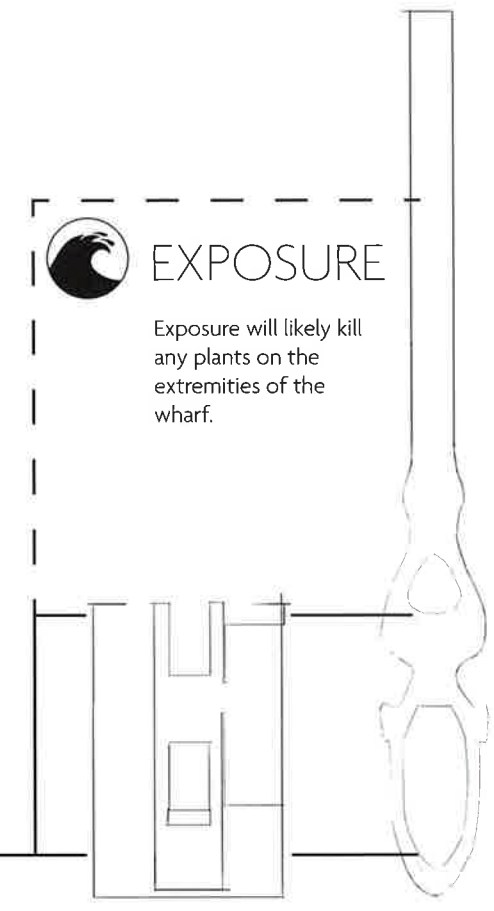
PLANTERS

Distributed throughout the structure.



EXPOSURE

Exposure will likely kill any plants on the extremities of the wharf.



Pressure Treated Timber

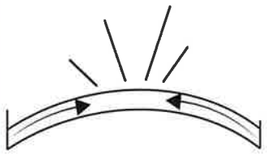
- Extended timber life
- Low maintenance
- Can be made resistant to salt water

Wood-Plastic Composite

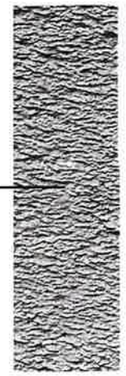
- Splinter free
- Low maintenance
- Resistant to saline environment
- Polyethylene (non toxic)

Flexible Concrete

- Lighter by 20 - 40%
- Reduces stress placed on wharf
- 'Self healing'

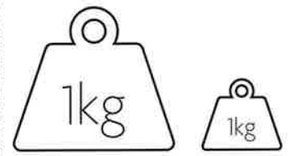


REINFORCED CONCRETE BASES



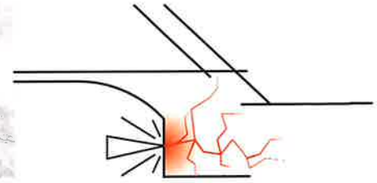
Lightweight Concrete

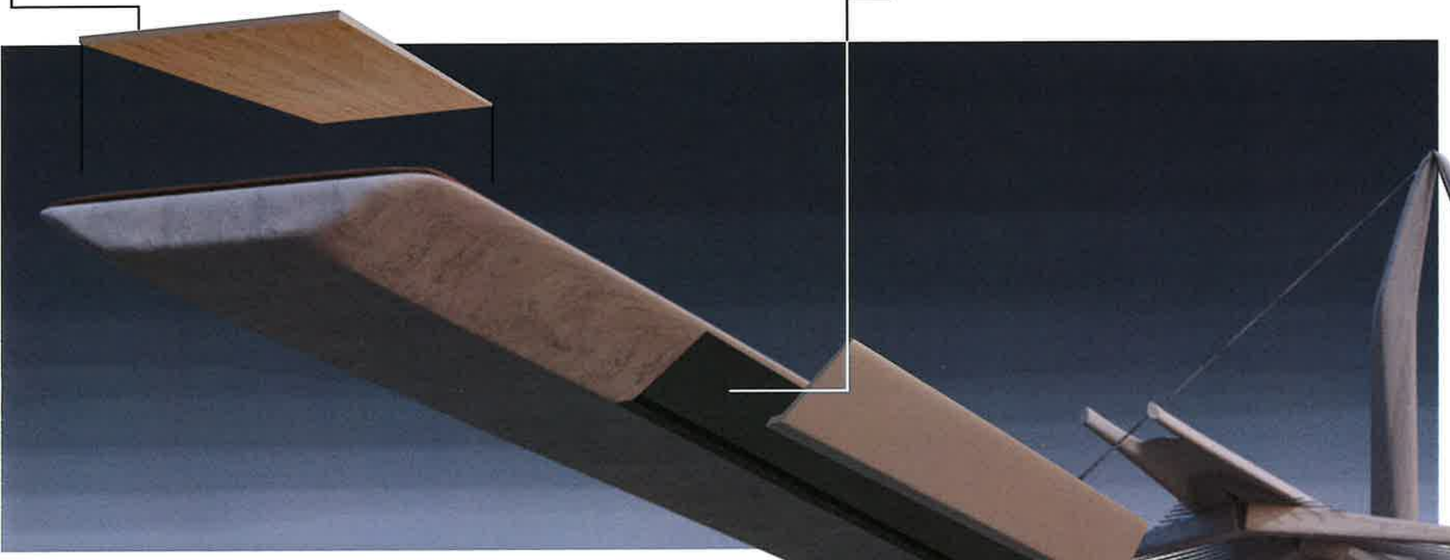
- Less than 1920kg/m3
- Due to weight, impacts site less
- Can be made from scoria or pumice



Self Sensing Concrete

- Carbon fibers within the concrete creates electrical energy allows detection of structural stress
- Useful in prototyping





Stainless Steel Cable

- Non-alloy carbon steel
- High tensile strength
- Used on Rangitoto Island Wharf for same purpose

304 Stainless Steel

- Corrosion resistant
- Holds up when in coastal environment, but not submerged

Lightweight Concrete

- Seats likely won't need to be strong, or support heavy loads
- Needs to be light to reduce stress placed on wharf

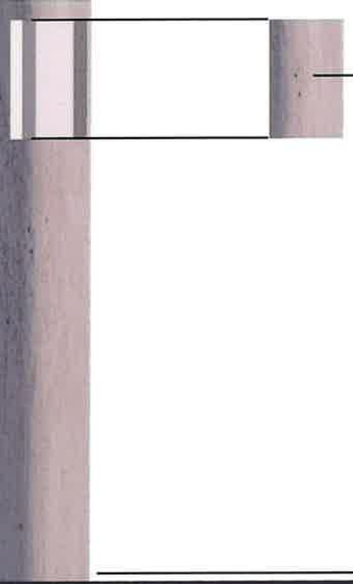
Stainless Steel

- Corrosion resistant nature suitable due to location on wharf,

Pressure Treated Timber

Toughened Laminated Glass

- Layers of tempered glass
- Plastic interlayer supports glass integrity
- Can easily be strong enough for pedestrian movement



Smoother finish will likely result in a longer lifespan of the material especially considering the open nature of the environment, as well as a nice finish.

Having extremely rough concrete could allow for local flora to grow on the structure.

Concrete blocks would be the easiest to construct with however they likely wouldn't fit with the organic forms.

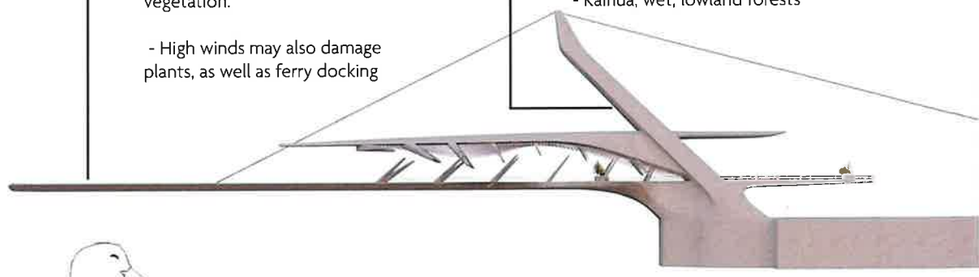
TOO EXPOSED FOR GROWTH

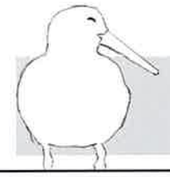
- Sea spray (saline environment) will likely kill off any coastal vegetation.

- High winds may also damage plants, as well as ferry docking

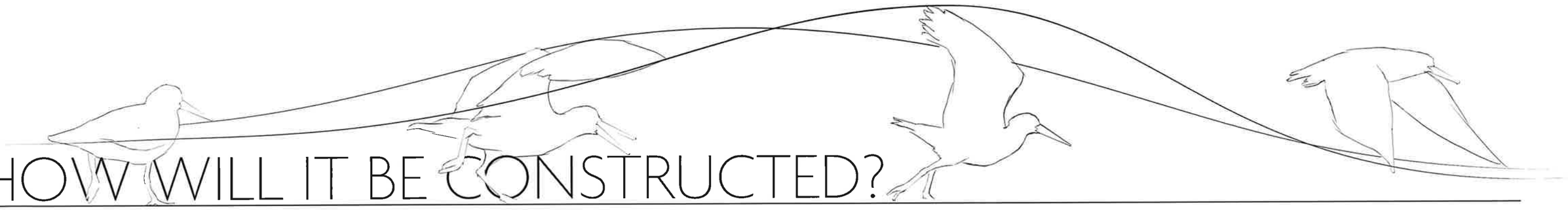
LESS EXPOSURE

POSSIBLE VEGETATION:
- Tātarāmoa; coastal environments
- Kaihua; wet, lowland forests

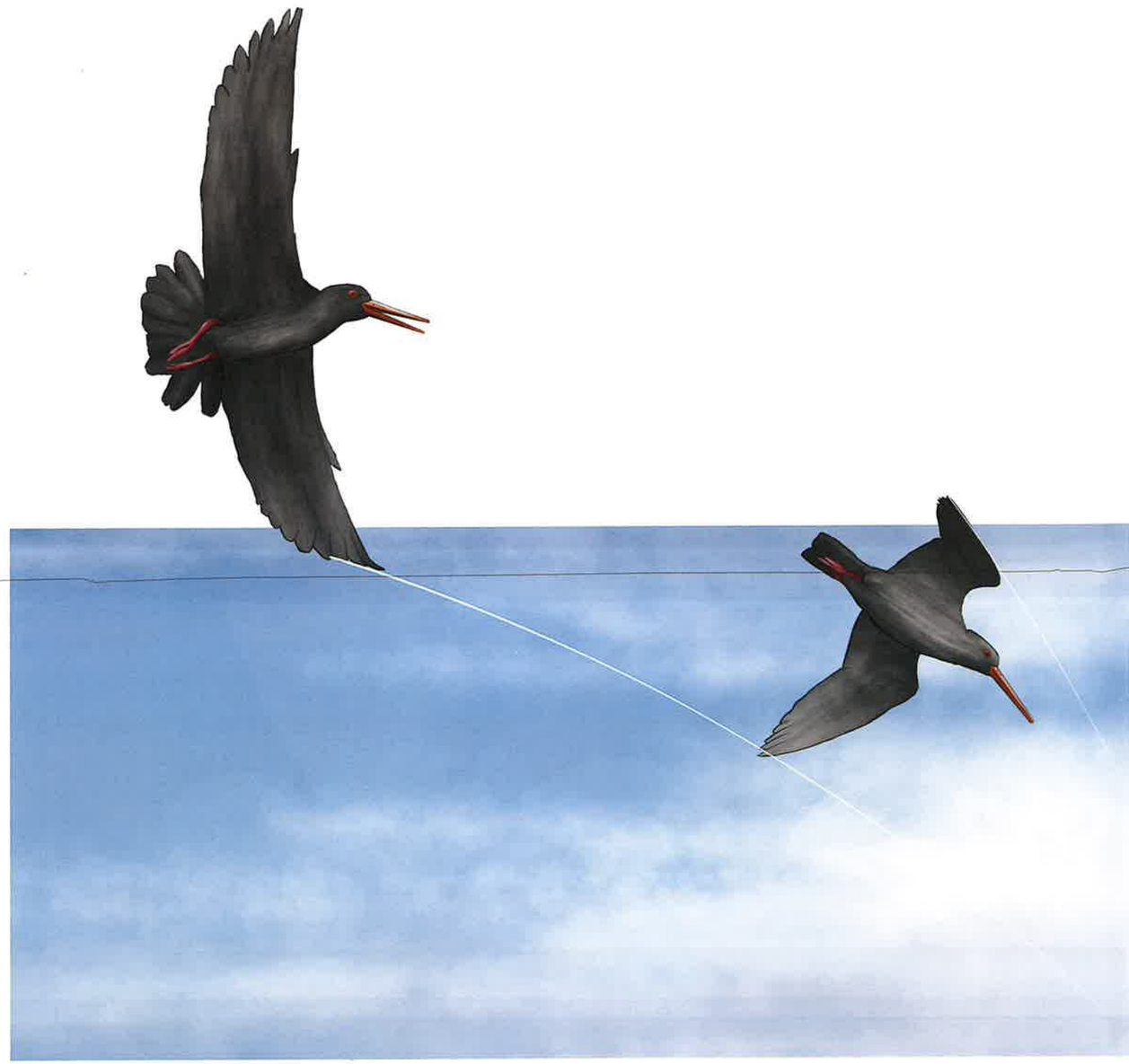




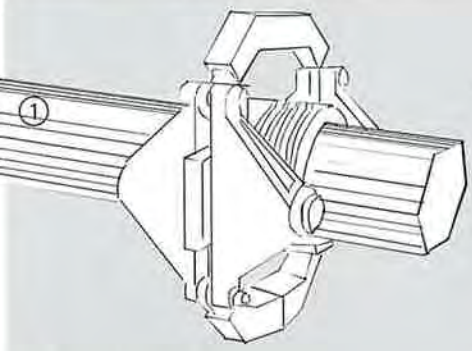
ONCE WE'RE DONE WITH IT RETURN IT BACK TO NATURE



HOW WILL IT BE CONSTRUCTED?



DAMPING SYSTEM

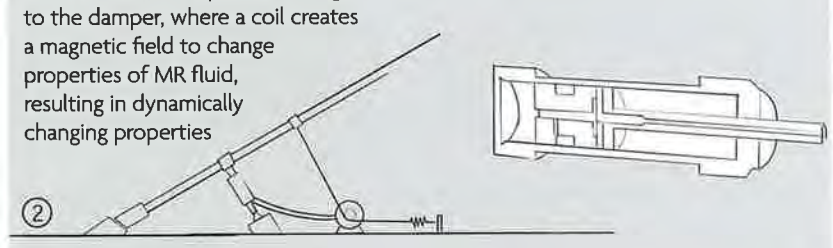


FRICTION DAMPER

- Functions similarly to disk brakes on a car
- Spring blades clamp onto the stay cable
- At a particular amplitude, force of vibrations overcomes friction between connecting paths between 2 assemblies, damper activates
- Provides damping across all amplitudes and axis
- Long span stay cables

MR DAMPNER

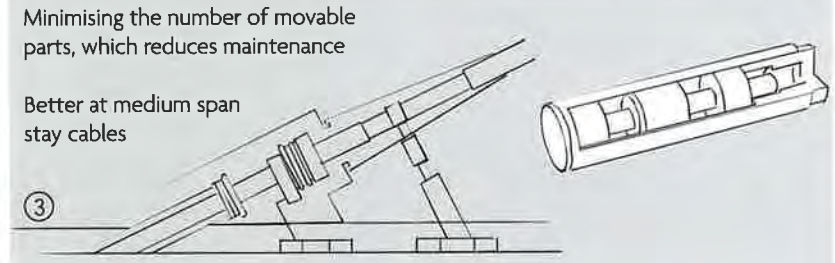
Electrical current is passed through to the damper, where a coil creates a magnetic field to change properties of MR fluid, resulting in dynamically changing properties



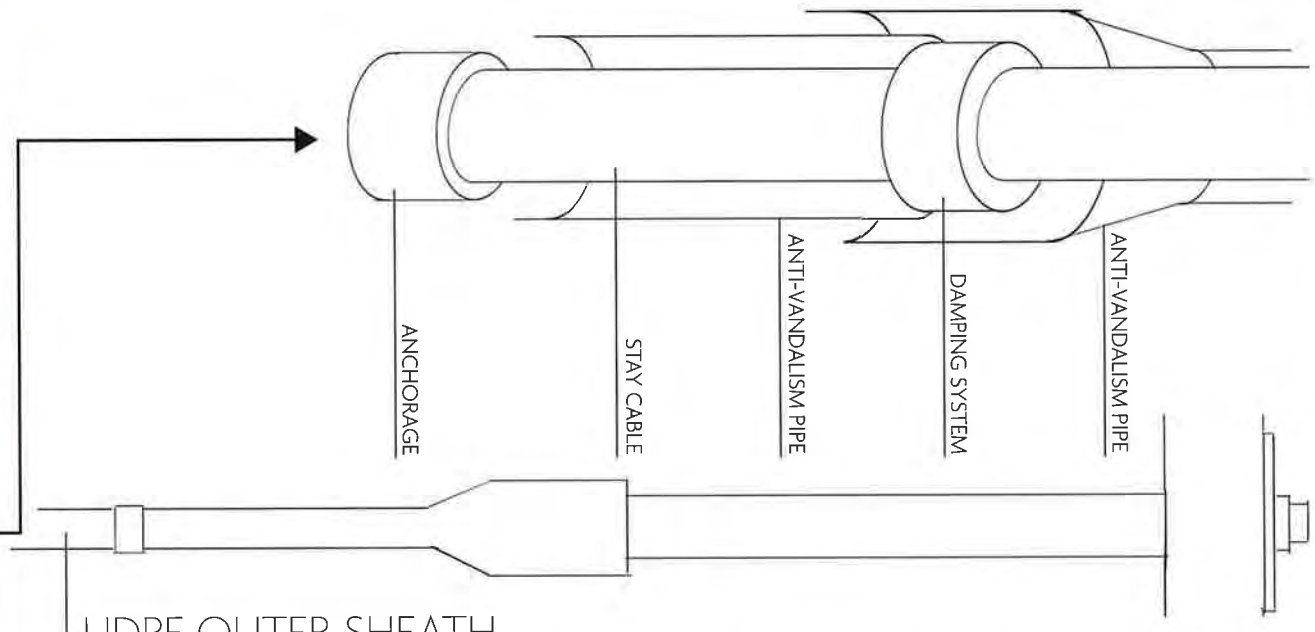
RUBBER DAMPNER

Minimising the number of movable parts, which reduces maintenance

Better at medium span stay cables



ANTI-VANDALISM PIPE



HDPE OUTER SHEATH

STRONG

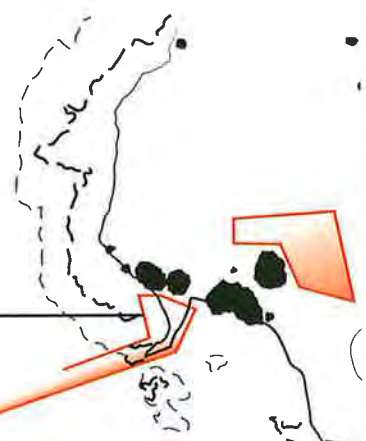
LIGHTWEIGHT

HDPE pipes are commonly used to protect stay cables against corrosion as well as reduced wind resistance. Due to the high strength to weight ratio, HDPE also adds very little extra weight to the stay cable, resulting in less stress.

HDPE is also very slick and slippery, meaning it will be hard to climb on.

STRUCTURAL FOUNDATION

Due to the coastal nature of the sculpture the foundation will likely be a deeply embedded pile or column foundation. The lack of historical significance in this location on Motukorea also allows for this type of penetration into the land.

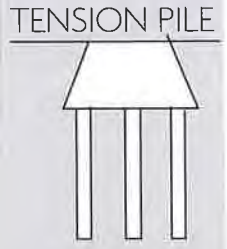


KEY:

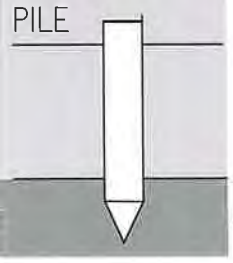
- SHALLOW ROCK
- DEEP ROCK

FRICTION PILE

TENSION PILE



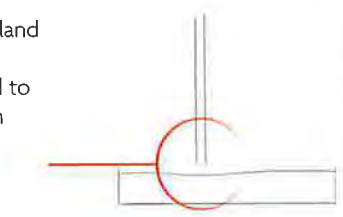
END BEARING PILE

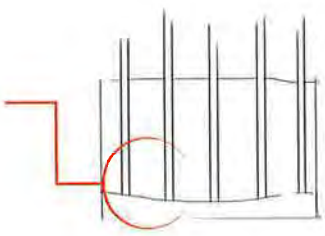


RANGITOTO WHARF

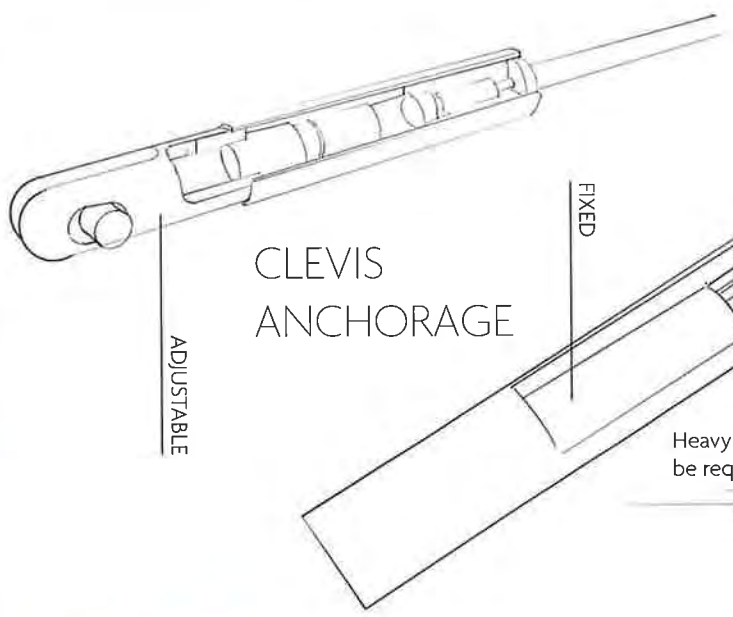
Piles closest to the land encountered hard basalt rock that had to be cored through in order to get the required pile embedment.

Likely there will be a similar layer below Motukorea, however such a layer could be relied on to support the load of the structure.





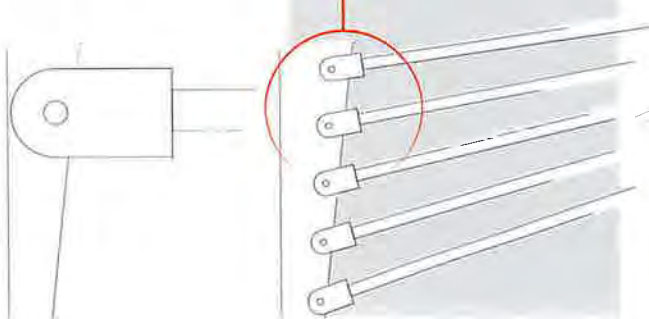
CLEVIS ANCHORAGE



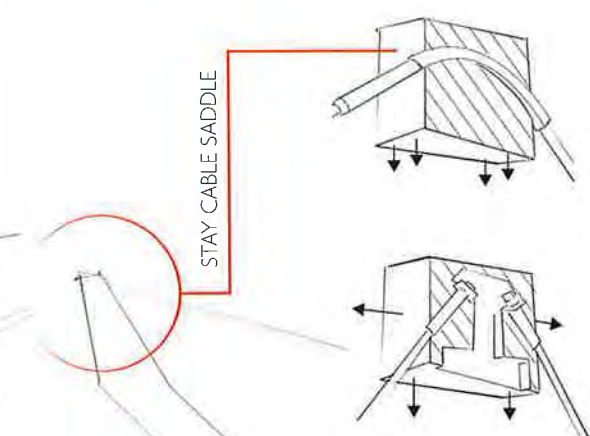
Heavy structural support will likely be required to support the pier.

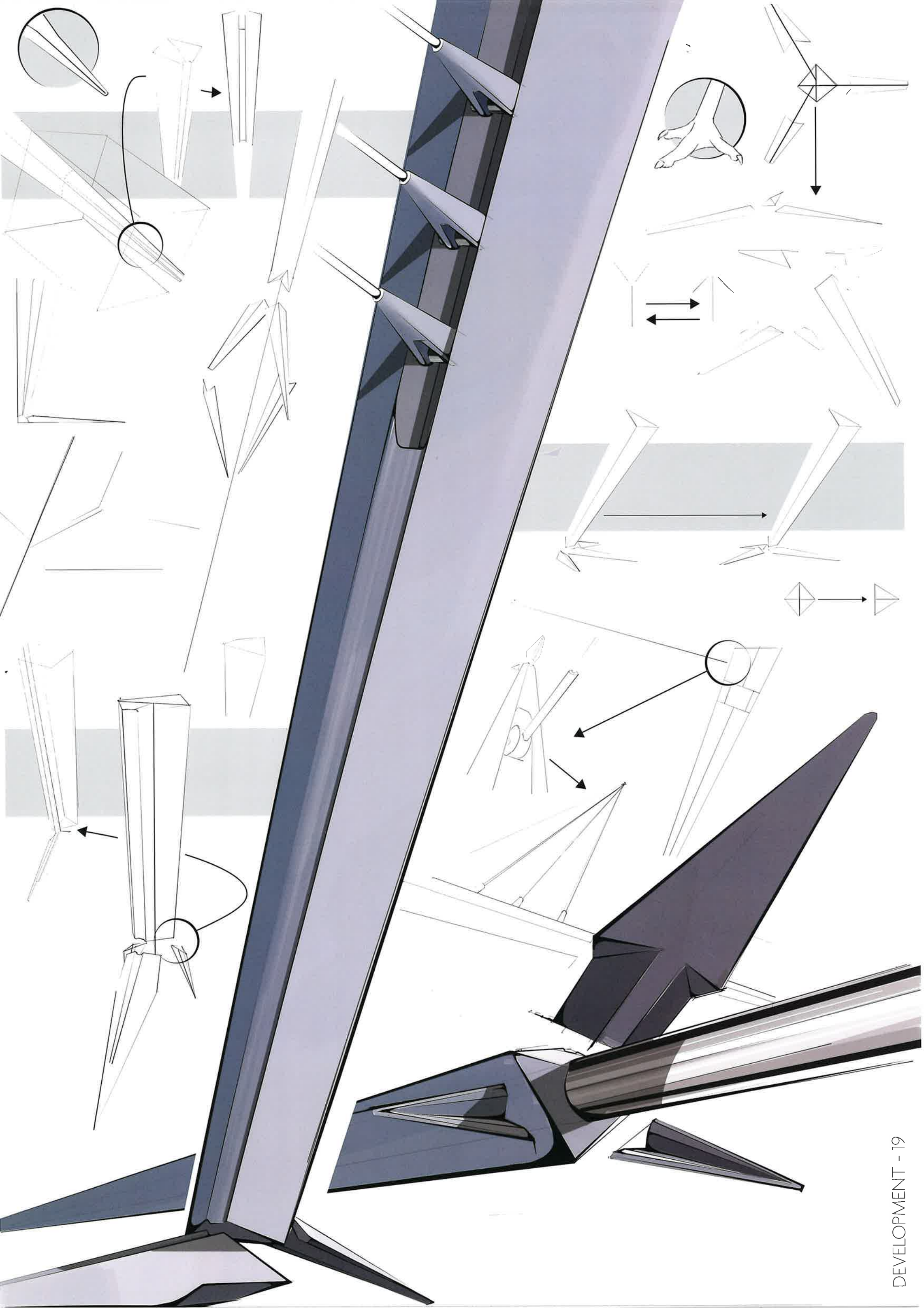
PROPORTION

Clevis anchors are far more susceptible to structural stress than a normal anchor. I could either make the anchor larger/stronger, or I could spread the load over a variety of anchors.



One connection point should be sufficient to support the pier.





DEEP FOUNDATION?

HIGH STRESS

LOW STRESS

EXPANSION ANCHOR

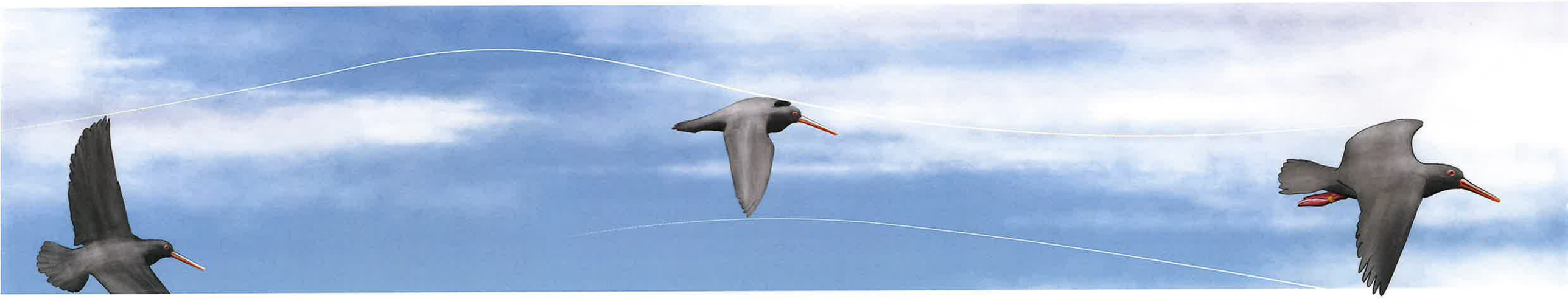
The structural support could open up like an expansion anchor into the ground.

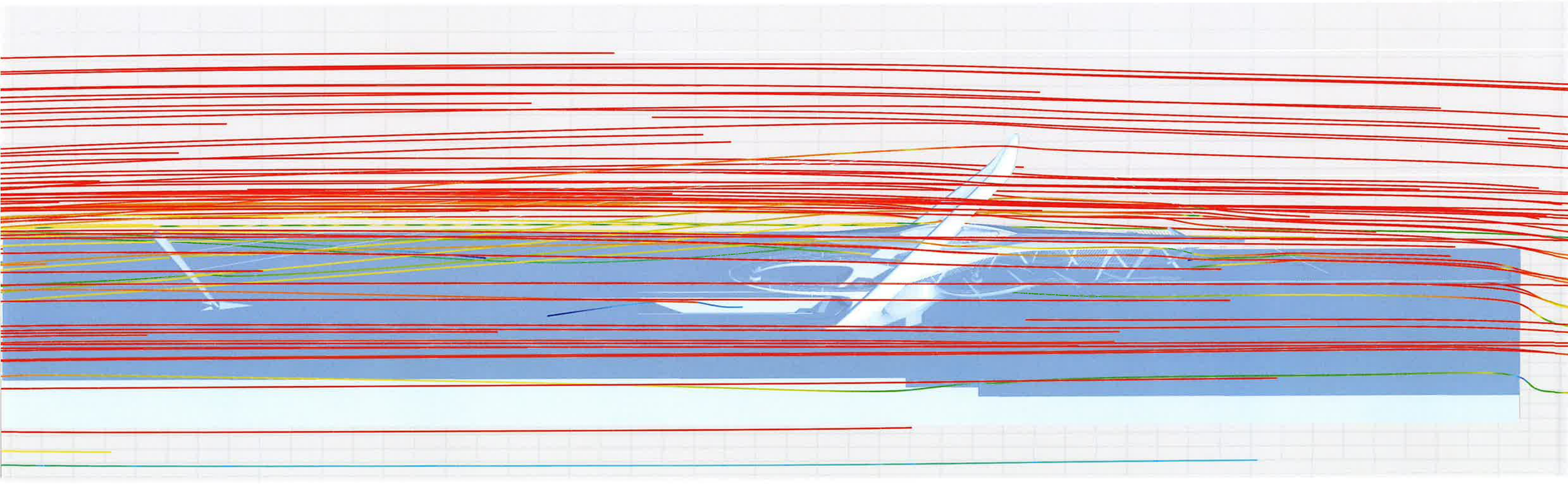
HIGH STRESS

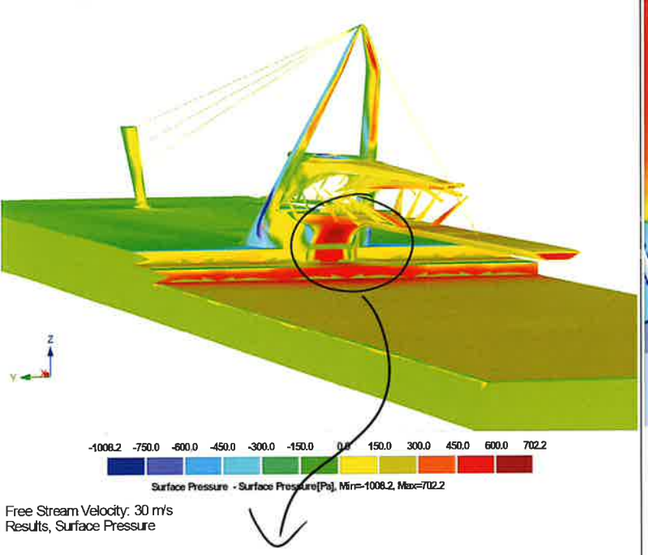
LOW STRESS

WIND SIMULATION

RWIND Simulation | Wind Simulation (Wind Tunnel)

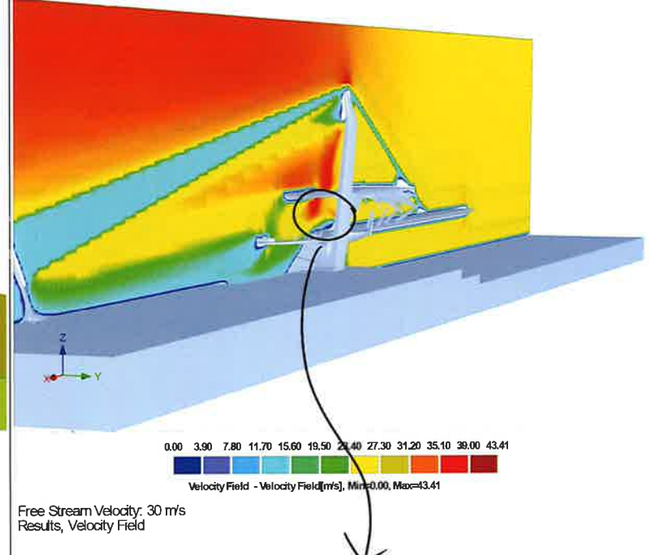






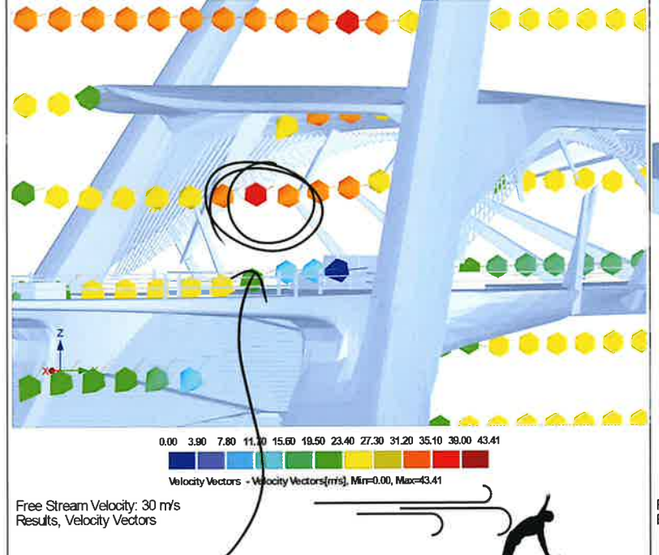
Free Stream Velocity: 30 m/s
Results, Surface Pressure

Pressure is only problematic at the base, but that shouldn't effect the structure in any way.



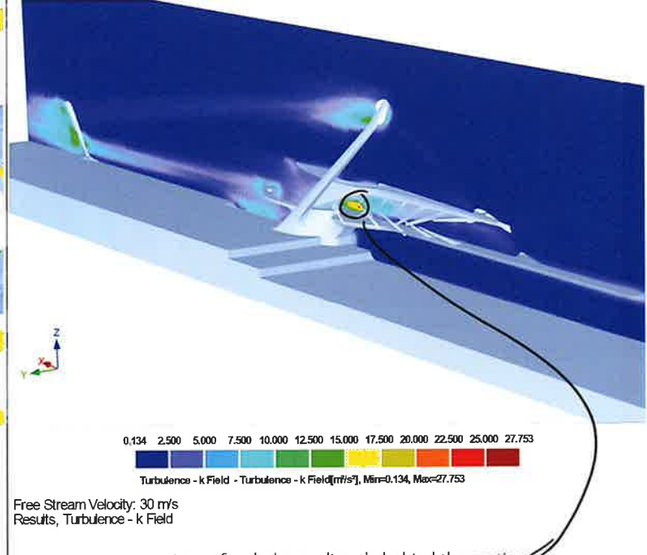
Free Stream Velocity: 30 m/s
Results, Velocity Field

Area of high wind velocity may become problimatic.



Free Stream Velocity: 30 m/s
Results, Velocity Vectors

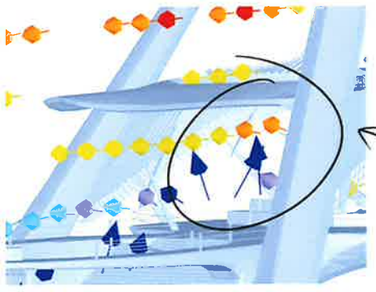
Air Velocity is highest at head height directly before the stairs.



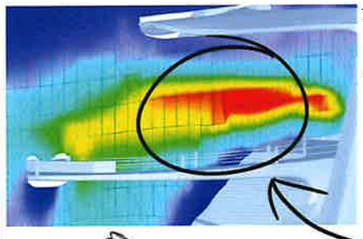
Free Stream Velocity: 30 m/s
Results, Turbulence - k Field

Area of turbulence directly behind the seating

PROBLEMS:



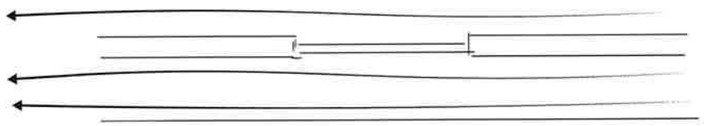
REDUCED WIND VELOCTY



Adding in a 'roof' did reduce the velocity of the wind above the stairs, however;

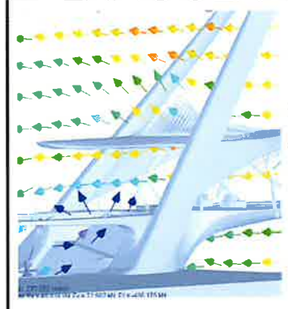
MORE TURBULENCE

SOLUTION:



Prevent any wind from entering other flows, and prevent any turbulence by furthur removing the seating.

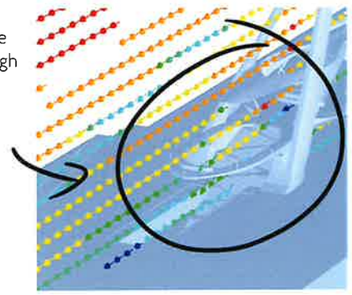
EXAGGERATION

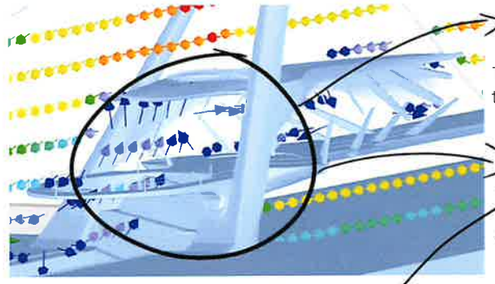


ONLY MADE THE PROBLEM WORSE

PRESSURE

The wind feeding into the excess velocty gave rnough pressure to prevent the turbulence.

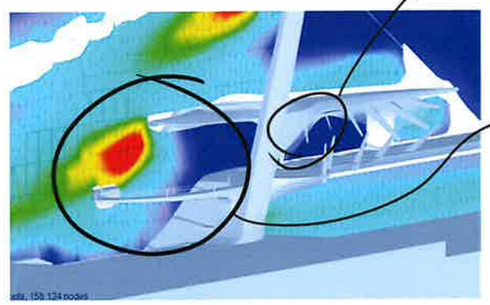




LOW VELOCITY

The shape of the 'roof' did definatly reduce the wind velocity by a lot.

Although wind does still 'cycle' the wind velocity is so low that turbulence in the wind is negligible.



TURBULENCE

There is high turbulence in this location, however noone will be impacted by it.

One problem with this solution is that ive had to remove the existing seating.

SEATING

Wood cladding for people to sit on.

Concrete stairs where ramp is flat to encourage people to walk.

WHY NOT SIT ON THE STAIRS?

RANGITOTO WHARF

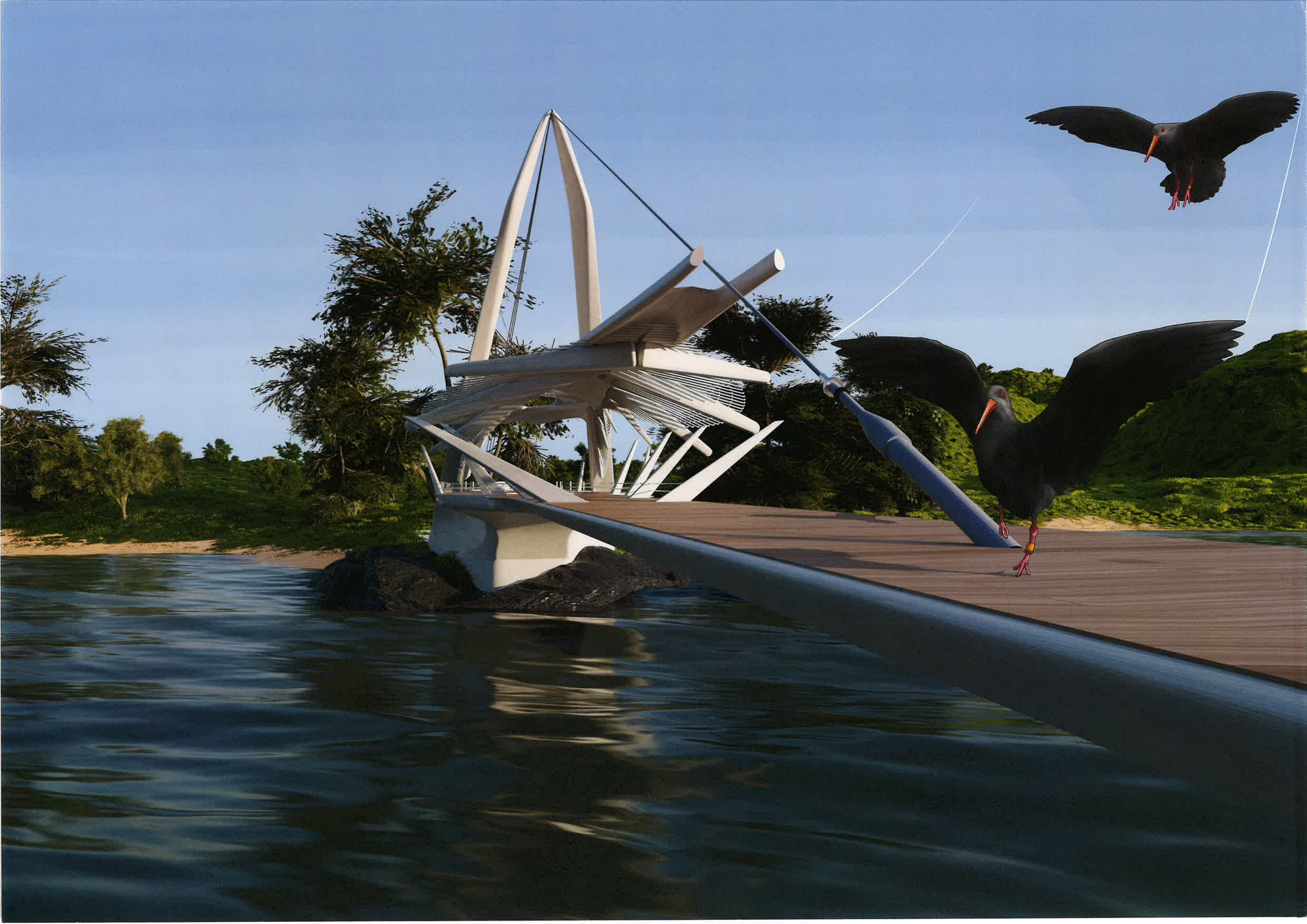
Rangitoto has little in the way of designated seating.

People tend to just sit on theese stairs.

APPROXIMATE SCALE

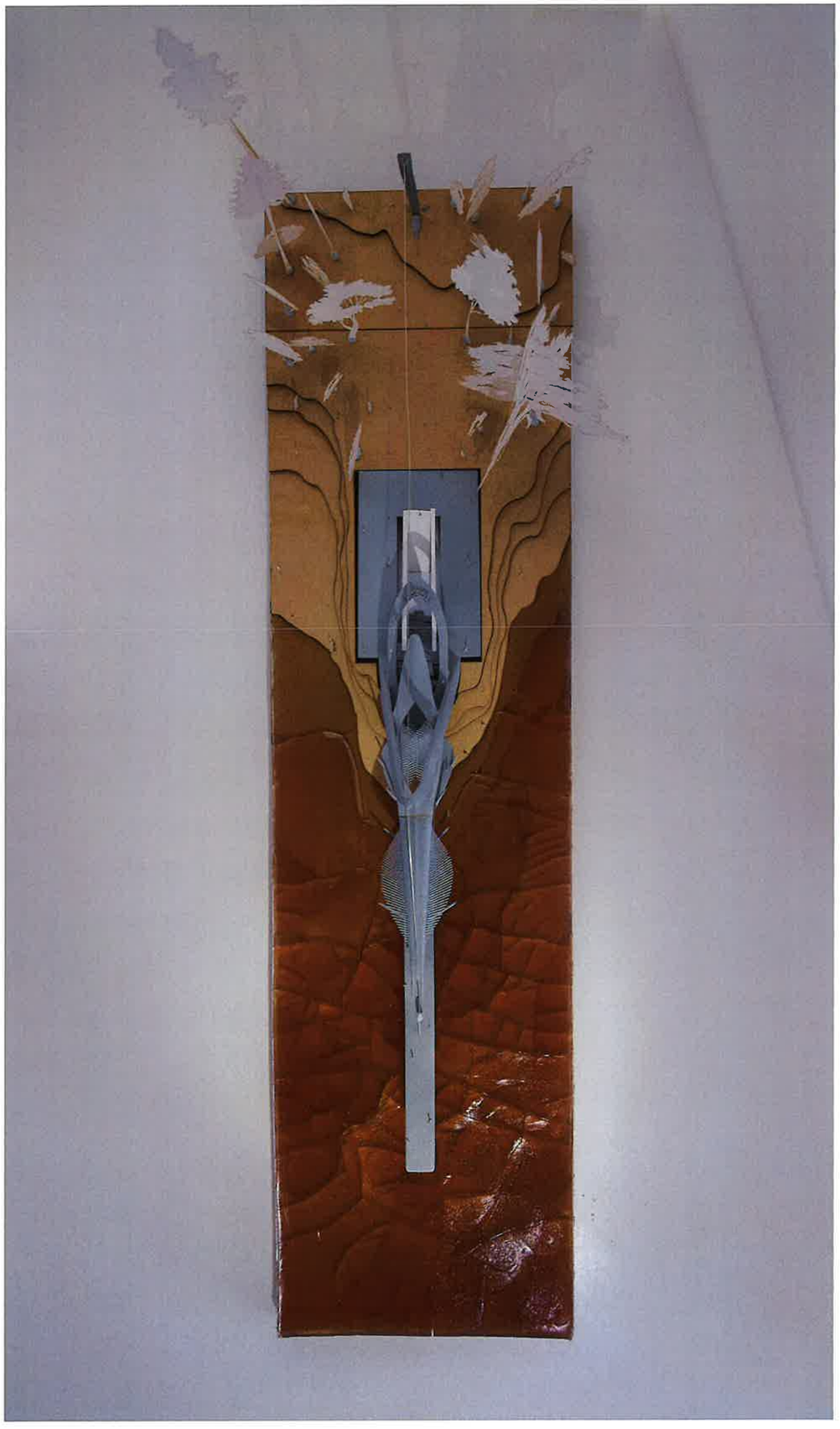
SITE SIZE
(meters)

The Structure fits within the defined perimeter. This is important as it means after the development process my structure still adheres to respecting the cultural and historic significance of the site.



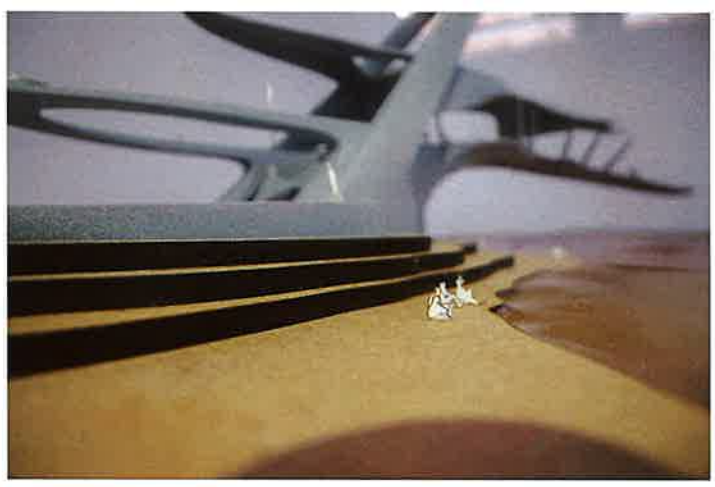




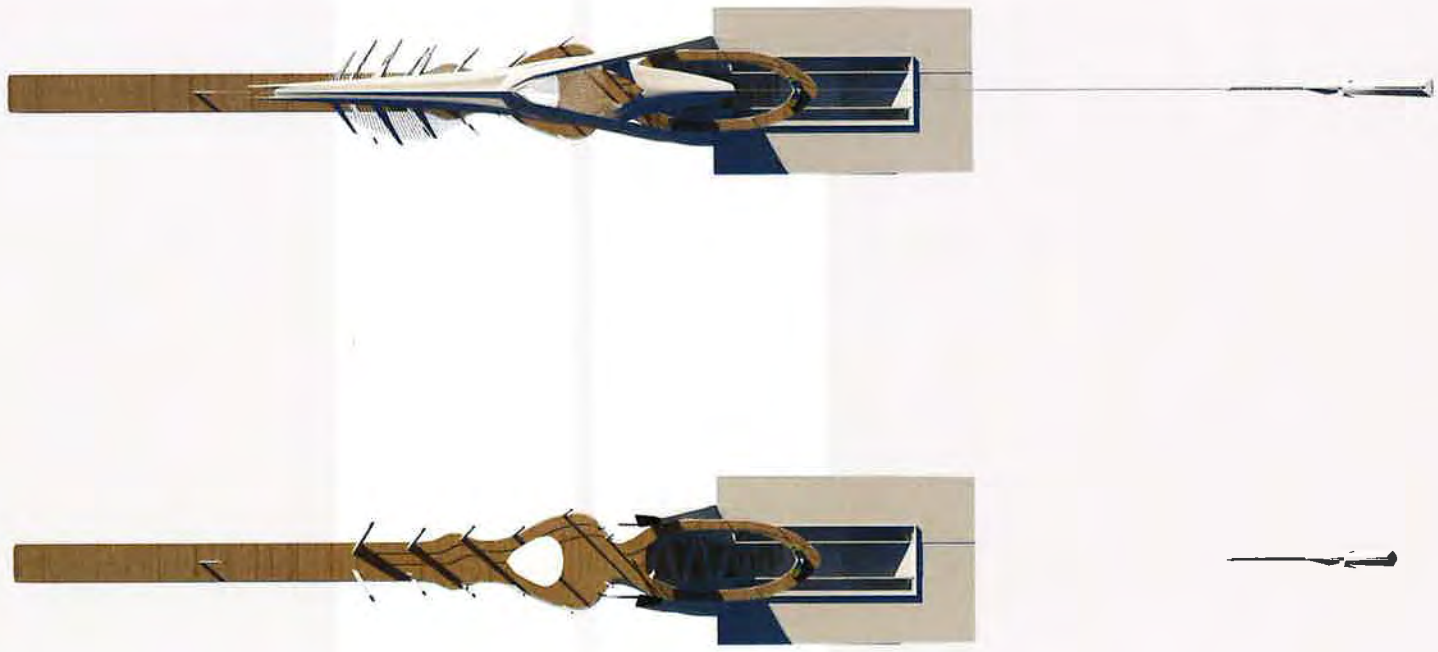


Architectural Model of
Structure and
Surrounding Region
1:245

Main Contours comprised of laser cut 3mm MDF Board. Ocean formed from Polyester Resin. Main Structures formed through the use of a Sonic Mega 8K resin printer using Aqua Grey 4K Resin with a layering height of 0.03mm to 0.05mm. Structure Joined through the use of PVA Glue, Super Glue, and Blu-Tack. Photographs taken through Canon EOS R5 using a Canon Zoom Lens EF 24 - 105mm as well as a Laowa 24mm Probe Lens.



SECTION VIEWS



MOTUKOREA

DURING REHABILITATION PHASE – 2050 AD

HAURAKI GULF

NEW AUCKLAND ⟶ MOTUKOREA FERRY CONNECTION – 2030 AD

≈ 2200 AD – AFTER HUMANITY HAS LEFT ITS MARK