Starting the Ecology Conversation

Art and Design Proposals for the Styx Catchment

Sophie Harrison

2017 - 2018 Summer

Special thanks to Styx Living Laboratory Trust and the Christchurch City Council.

the styx-pūrākaunui
Living Laboratory Trust

Contents

Context of Project and proposals

In the implementation of the Styx Vision 2000 – 2040 (Styx Vision), the Christchurch City Council and project partners have been carrying out significant waterway, wetland and terrestrial restoration projects across the Styx/Puharakekenui catchment area. The Styx Living Laboratory Trust (SLLT) has in parallel undertaken to support a number of summer scholar research projects and also long term monitoring programmes. To date this information has been held on the SLLT website in formats that are not readily accessible nor palatable to a wide section of the community. The following work aims to communicate the work of past SLLT summer scholars and interns to the general public through art and design installations within the Styx River Reserve Network.

The Styx needs more ecology interpretation.

On the 25th of January 2018 Antony Shadbolt and I met with Clive Appleton the Christchurch City Council Natural Environment Team Leader, who reaffirmed our thoughts around the need to initiate stronger public engagement, understanding, and action when it comes to the waterways and ecology of both the Styx catchment and the catchments around Christchurch city. Clive stressed the need for education of the public, and in extension cultural change and action around waterway pollution. These proposed initiatives for within the Styx catchment will undoubtedly educate the public and through increased understanding change will occur.

How the project relates to the Styx Living Laboratory trust values.

1) Viable Spring Fed River Ecosystem: Active engagement with the public on a range of environmental issues will seek to improve their understanding of these issues and result in better care and guardianship of the environment.

2) A Source to Sea Experience: Unique interpretive features along the Styx River Reserve Network will add to the visitor experience through the features themselves, and the learning experience gained from interacting with them.

3) A Living Laboratory: This project offers opportunity for the summer intern to carry out research and learning in the Styx catchment that can be disseminated through a range of out outputs.

4) The Styx as a Place to Be: Having a diverse range of interpretive features in the Styx celebrates the special qualities of this environment and encourages active participation and engagement.

5) Partnerships: Offers the SLLT and the summer intern opportunity to develop partnerships with a range of people and organisations actively involved in managing natural and cultural values in the catchment.

The ecology in the Styx catchment that the art and design initiatives series will focus on educating about include;

1. The Southern Grass skink (Oligosoma nigriplantare polychroma) and McCann's Skink (Oligosoma maccanni), their preferred habitat (this being reasonably long grassland areas), dangers facing their habitat (the grass being seen as a fire risk so it gets mowed down in effect destroying it as a habitat), the physical differences between the two skink species, and other characteristics of the skinks (McClure, 2010). This initiative will highlight the work of Christine McClure from 2010.
2. What makes a healthy waterway habitat, in terms of why logs, tree roots, overhangs, and a variety of substrate sizes are important for providing shelter within waterways so that freshwater invertebrates and aquatic fauna have places to shelter, and spawn. Also educating about why native riparian planting is important along waterways as it provides shade to the waterways cooling the water making it a viable temperature for invertebrates, blocking out sunlight so algae and weeds can't grow, filtering out sediments and pollutants such as rubbish and nitrates before they can get into the waterways, and providing nesting and perching sites for water fowl. This initiative will highlight the work of Guinevere Coleman in the summer of 2006/2007, Katie Collins in the summer of 2007/ 2008, and Amiee Robinson and Katie Collins in the summer of 2008/2009.
3. Educating about every-bodies wider connection to rivers in this case the Styx through its catchment and through the storm water drains that run from people's houses into the Styx catchment. As well as common pollutants people are putting into waterways without thinking. This education is recommended by Dr Belinda Margetts (Freshwater Ecologist at The Christchurch City Council).
4. Interpretation for Ashleigh Mathews work on habitat enhancement in the summer of 2016/2017, in conjunction with interpretation around the selective poisoning methods being used on the willows in the Styx, so that their structure can be used to shelter and nurse native restoration plantings, while not competing for resources and spreading willow further through the catchment because they are an invasive species.

Other possible things that could be educated about through art and design in the Styx catchment.

1. Mahinga kai, education around the resource that the Styx once was for Māori for food and materials. Interpretation about what resources where found in the catchment including; Tuna (Eels), Inanga (Whitebait), birds e.g. Pukeko, weaving materials e.g. Harakeke.
2. Cultural Histories of the Kaputone Creek, Freezing works, and rubbish dumping in the waterway.

Southern Grass skink (Oligosoma nigriplantare polychroma)
http://01271bfede0954168758-da1041207dde8e2d0a75af6fbedebedf.r83.cf1.rackcdn.com/20100506044342.jpg

McCann's Skink (Oligosoma maccanni)
https://farm5.static.flickr.com/4725/38769143214_411f1b2461_b.jpg

Skink sculptures, interpretation and population panels.

This installation consists of a series of large scale 3D skink shaped gabion stone baskets which are up to 6 meters long four of the gabion skinks will be made. One will be 2.5 meters long, one 4 meters long, and two 6 meters long. One of the 6 meter long skinks will be placed in the mown grass area, on the edge of the habitat and will be more robust than the three other gabion skinks as these will be situated within the longer grass (habitat area), and so will be inaccessible to the public. The more robust skink will be able to be climbed on and will have a series of interpretation boards around it.

Ecology - The main habitat of the Southern Grass skink (Oligosoma nigriplantare polychroma) and McCann's Skink (Oligosoma maccanni) in the Styx mill reserve is near contemplation point (see context map). In 2010 160 skinks were recorded in the area near contemplation, through research done by Christine McClure. The Skinks preferred habitat is, open areas, including native and introduced grasslands, as well as rocky and coastal areas, however they rarely enter forests (McClure, 2010). At the current site there are a number of dangers facing the viable skink habitat. These include; the grass being seen as a fire risk so it gets mowed down in effect destroying the habitat, as the short grass provides no shelter and protection for the skinks (McClure, 2010).

This series of installations aim to raise the awareness of the public for the site as a skink habitat. As well as answer the common question and complaints about why the site has such long grass and looks a bit scruffy, which the answer to is because the skinks need the grass to be long. The installations are also intended to educate the public about skinks, the differences between the two skink species on the site, and their cultural value and significance as taōnga to Maori.

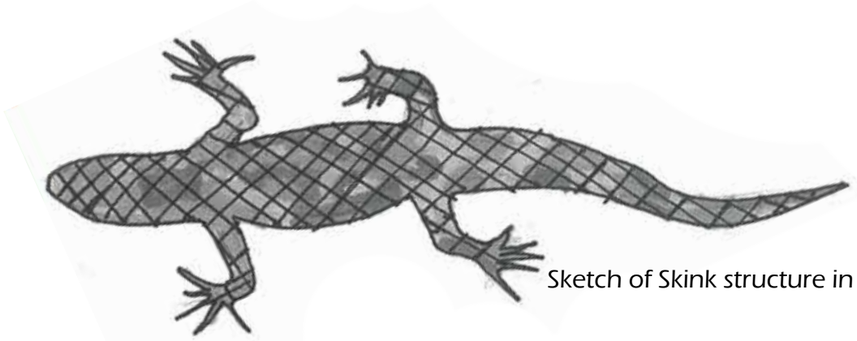
Literature review – The gabion skinks will create strong memories as they engage people through their senses and therefore invoke emotion. The sculptures have visual, kinesthetic, and emotional elements so they cater for three of the 4 main learning preferences of people therefore providing opportunity for the majority of people to become engaged with the installation and be educated (Harrison, 2018).

Benefits of design

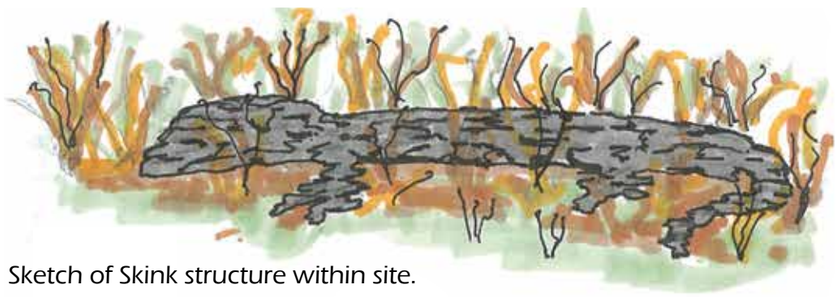
- The use of visual, kinesthetic, and emotional engagement within the design. Meaning that the information that the installations are trying to communicate is accessible to most people (Harrison, 2018).

Ecological function - The gabion skinks provide shelter for actual skinks, as well as protection from predators. Through the small holes and spaces the rocks within the gabions create.

Education - Around habitat awareness, Skinks in general, what they look like, and their cultural value.

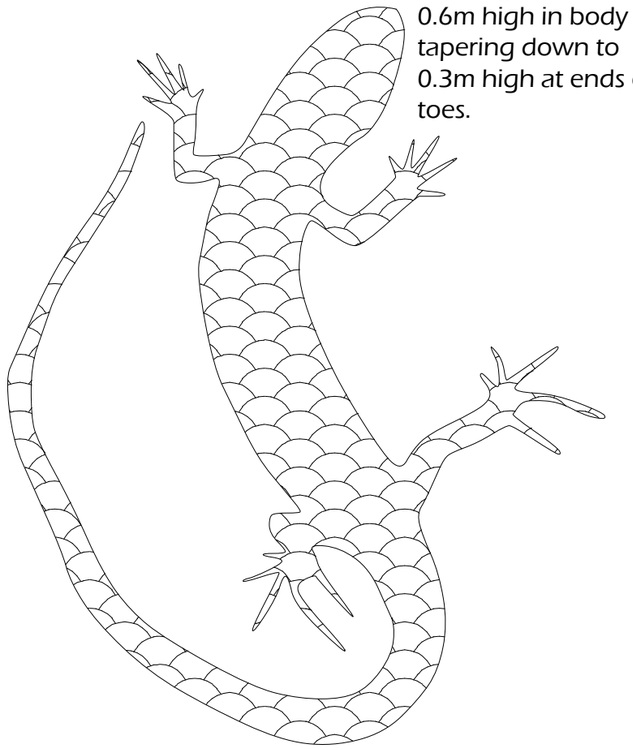


Sketch of Skink structure in plan view.

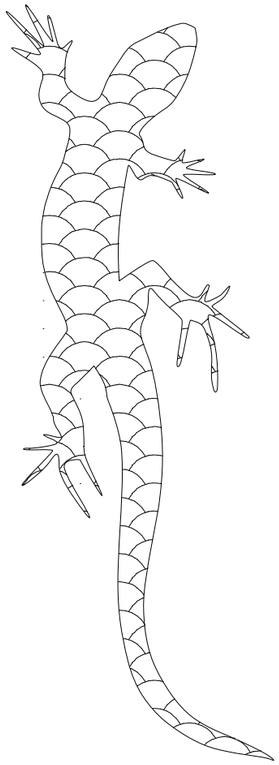


Sketch of Skink structure within site.

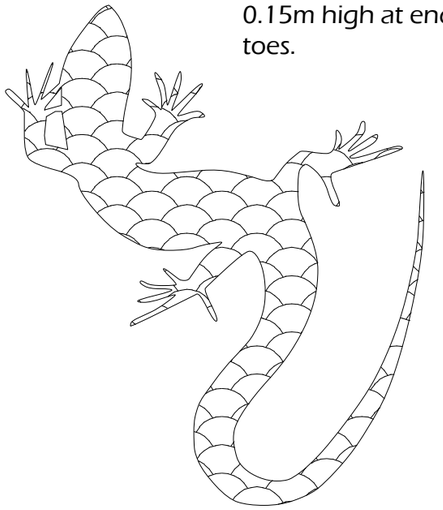
All skink silhouettes are
1:50 @ A3



6m long
0.6m high in body
tapering down to
0.3m high at ends of
toes.



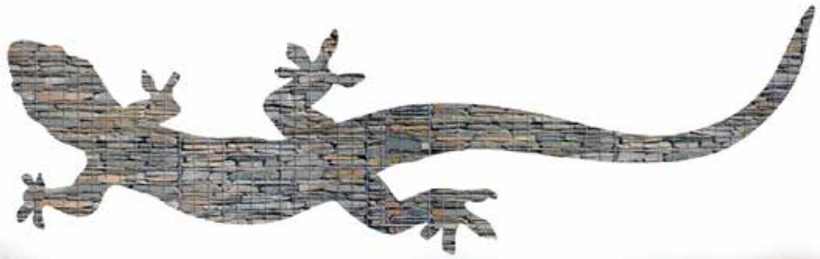
6m long
0.6m high in body
tapering down to
0.3m high at ends of
toes.



4m long
0.4m high in body
tapering down to
0.15m high at ends of
toes.

2.5m long
0.25m high in body
tapering down to
0.05m high at ends of
toes.

Elevation N.T.S

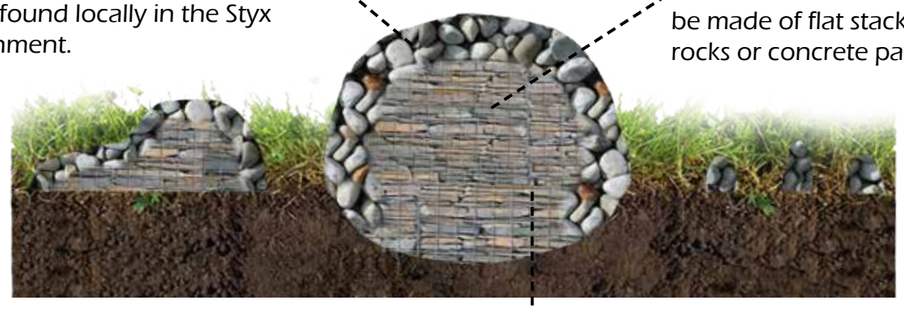


Plan view N.T.S

Illustration of
Gabion Skink on
site N.T.S

The outer Gabion Skink will be made of greywake stones, the rock found locally in the Styx catchment.

The core of the skink will be made of flat stacked rocks or concrete pavers.



Section across Gabion Skink N.T.S

The main body of the Gabion Skink will be dug into the ground to provided a cool, damp, sheltered place for the Skinks and other invertebrates to take shelter during hot and dry periods.

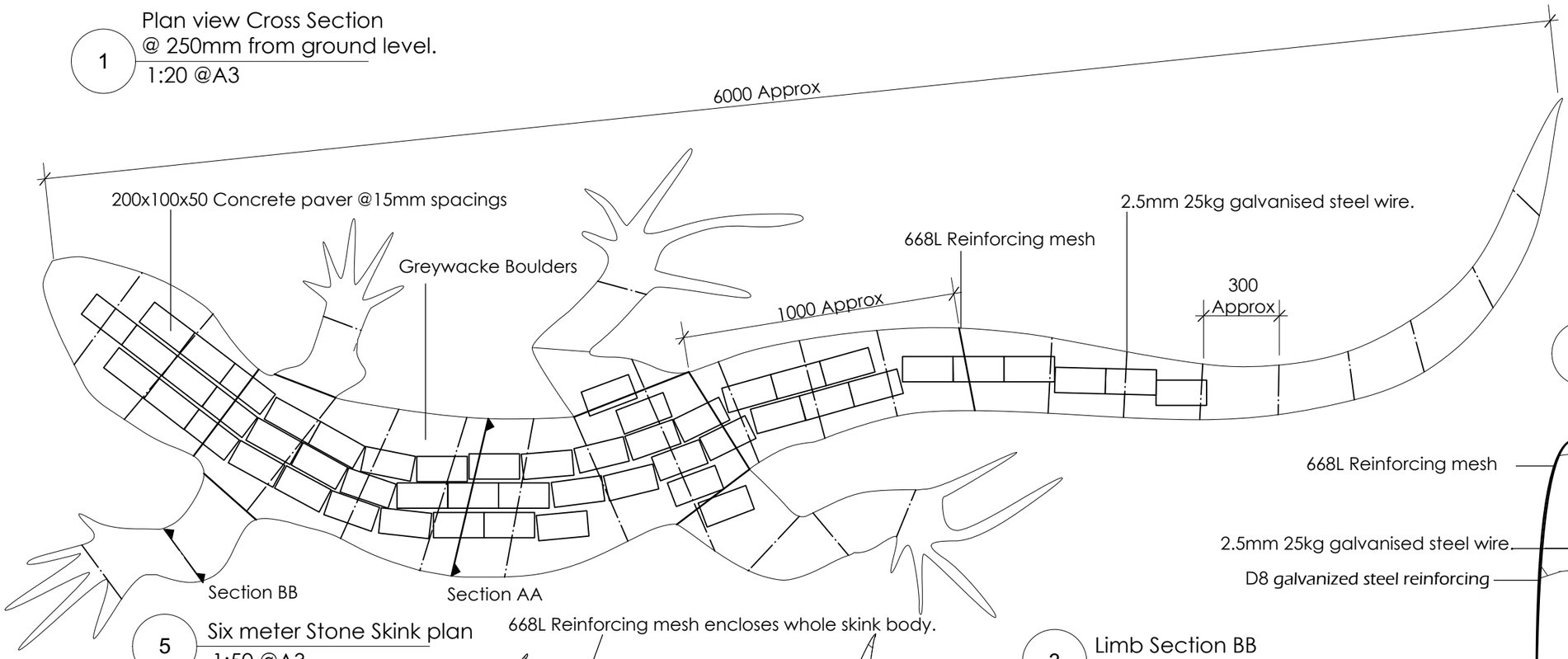
Planting around Gabion Skinks.

I would recommend that within the known skink habitat and around the gabion skinks native vegetation that skinks are known to enjoy for shelter and food is planted. Some species could include: Sophora prostrata (Dwarf Kowhai), Muehlenbeckia complexa (Scrambling Pohuehue), Coprosma propinqua and crassifolia (Mingimingi and NZ Coprosma), Melicytus alpinus (Porcupine Shrub), and Discaria toumatou (Matagouri). All these plants can be seen growing around the stone skinks.

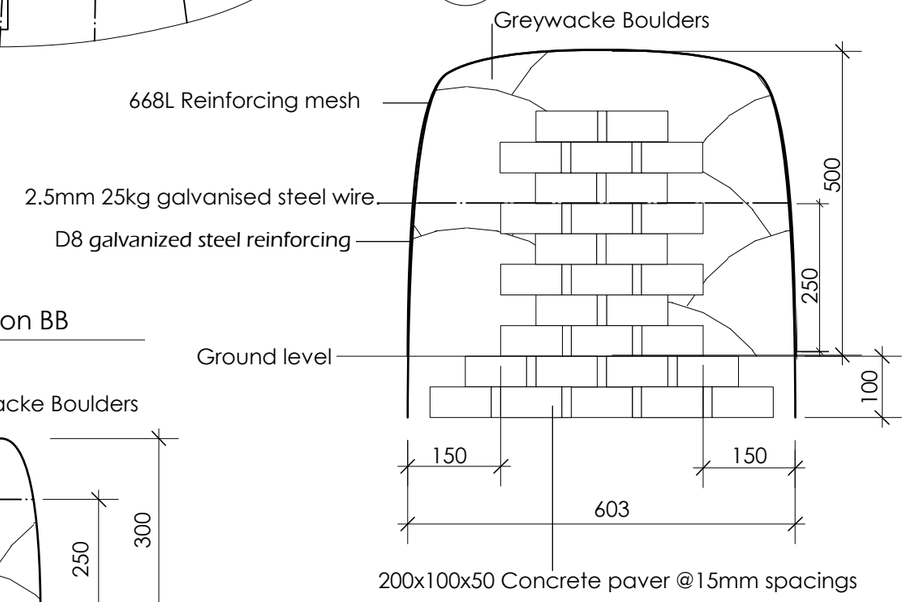
Gabion Skinks construction.

Note : That only one Skink has been detailed however the same construction methods apply to each skink all that changes is their size and body position.
*Please also note that construction method and materials can be changed with approval from Antony Shadbolt.

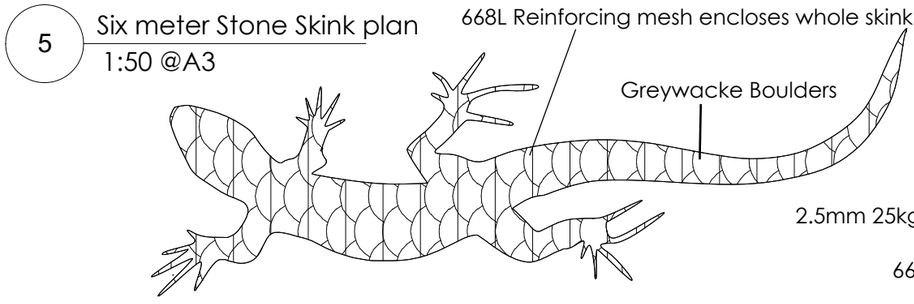
1 Plan view Cross Section @ 250mm from ground level.
1:20 @A3



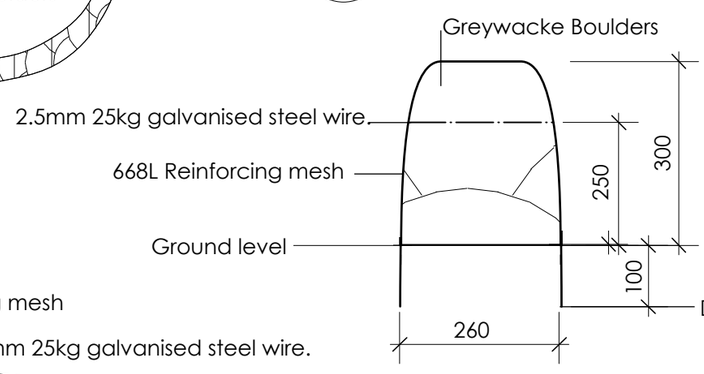
2 Body Section AA
1:10 @A3



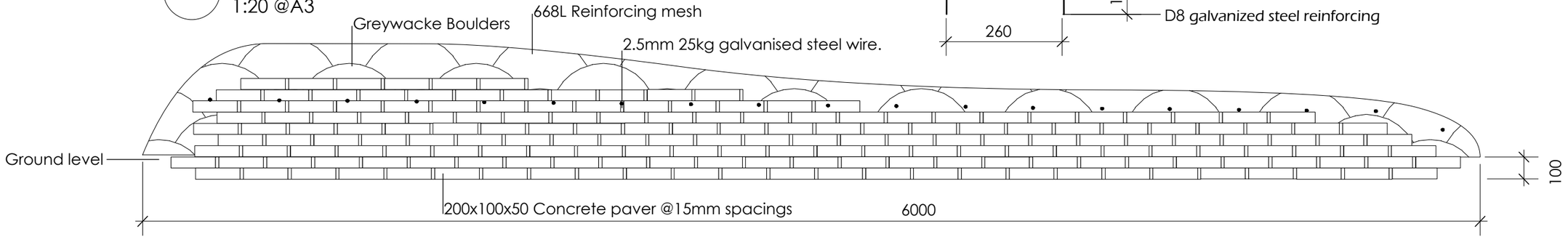
5 Six meter Stone Skink plan
1:50 @A3



3 Limb Section BB
1:10 @A3



4 Head to tail Cross Section CC
1:20 @A3



Note: all dimensions in millimeters.

Job Name : Skink Refuge and Sculpture	Designed For : Styx LLT	Drawings Number : 1, 2, 3,4
Construction Details	Designed and Drawn By:	Scale : 1:10, 20, and 50 @ A3
	Sophie Harrison	Date : 21/6/18
	Page 1 of 1	Do Not Scale

Harrison Landscapes LTD

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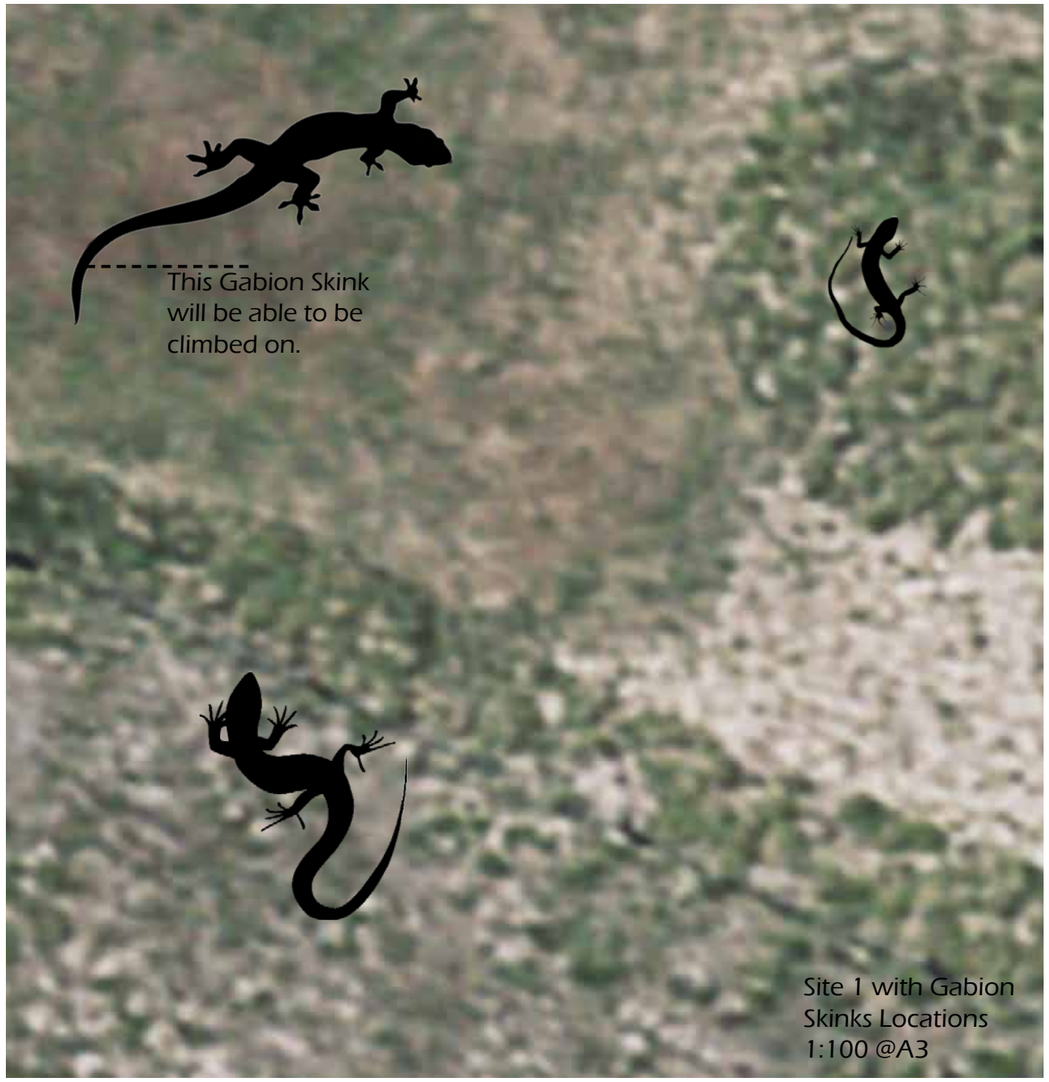


Site 1 with Gabion
Skinks Locations
1:100 @A3

Site 2 with Gabion
Skink Location
1:100 @A3

1:100 @ A3

0m 1m 2m 4m 8m 10m

The Gabion skink located at site two is within the skinks habitat. Its function is ecological while it will also spark the publics curiosity and draw them towards the interpretation boards near contemplation point, as they walk along the pathway.

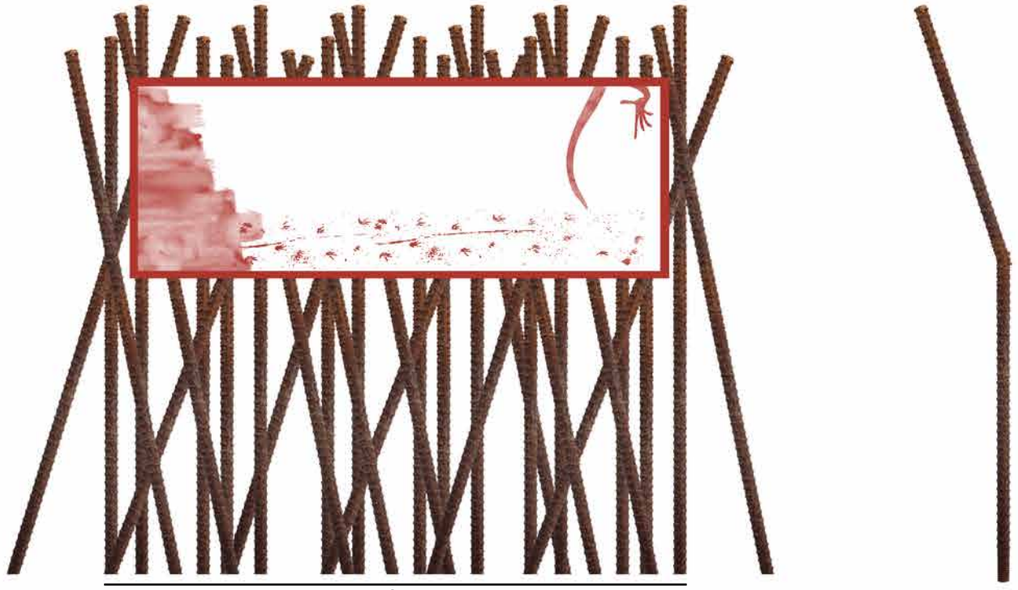
Location map of sites
on Styx Mill Reserve
N.T.S

There are three gabion skinks located at site one, two of the skinks will be located within the longer grass and habitat area, and will perform ecological and visual functions. While the other 6 meter long skink will be located in the mown grassed area with interpretation around it. This skink will be able to be climbed on and interacted with to raise awareness for the skinks and their habitat.

Gabion Skinks Proposed locations.

Gabion Skinks Interpretation

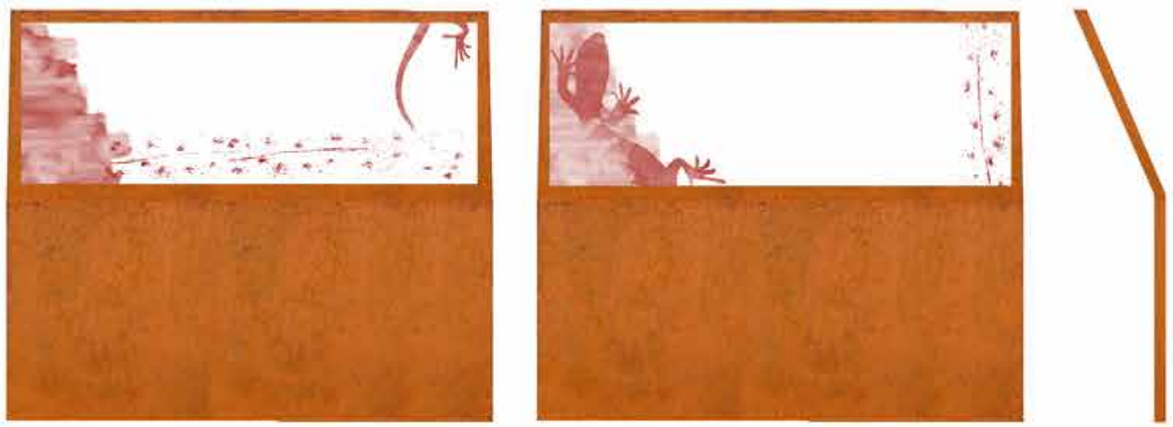
Option 1



Front elevations and side elevations of possible interpretation signs about skinks N.T.S.
These boards will communicate the information about skinks including; physical differences between the two species of skinks found in the Styx Mill reserve. Their preferred habitat as well as information around what they like to eat, their basking habits, and the impact on predators on skinks. Thirdly the boards will communicate the cultural significance of skinks to Maori as a taonga species.

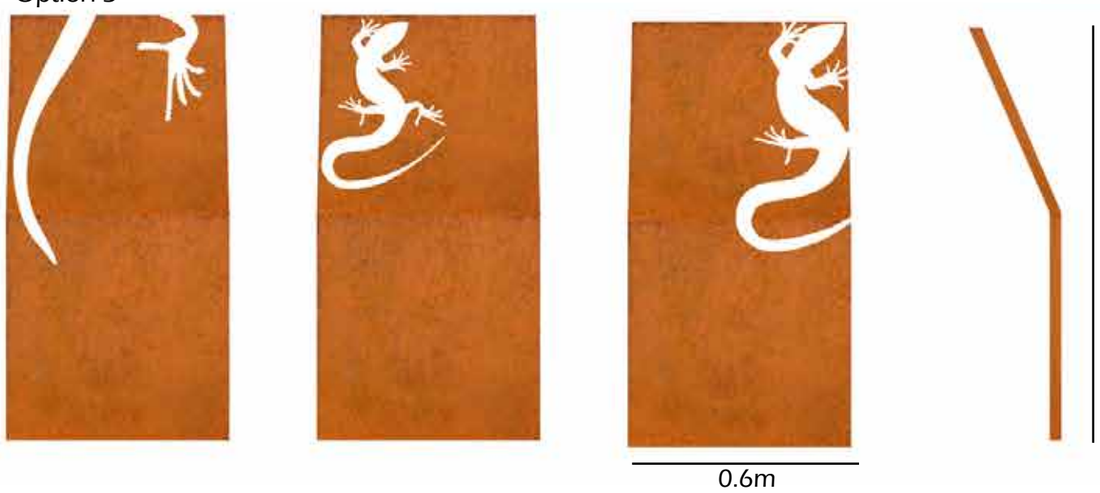
Side elevation of interpretation board.
There will be two boards of this design, both boards will be the same size.

Option 2

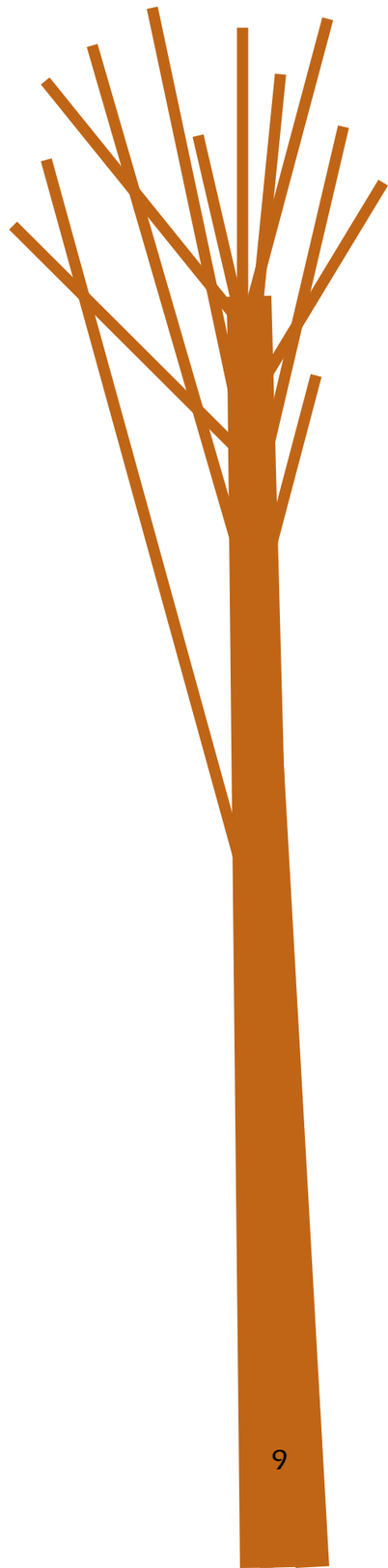


Interpretation boards made of corten steel with sign insert. There will be two boards of this design, both boards will be the same size.

Option 3



All three boards will be the same size. Made out of corten steel and laser printed



Gabion Skinks Interpretation

Proposed information boards 820x297 in size.

Can you see the big stone skinks in the grass?

They love basking in the sun – Just like the living skinks who call this place.

In 2010 and 2012 Christine McClure from Lincoln University recorded over 180 skinks in this area around Contemplation Point.
There are two species of skinks living in this area, the Southern grass skink (Oligosoma nigriplantare polychroma) and McCann's skink (Oligosoma maccanni).

Southern grass skink (Oligosoma nigriplantare polychroma)

Skink Spotting

There are two species of skinks living in this area, the Southern grass skink (Oligosoma nigriplantare polychroma) and the McCann's skink (Oligosoma maccanni).

The McCann's skink (Oligosoma maccanni)

The Southern grass skink (Oligosoma nigriplantare polychroma) is a small-bodied, brown orsandy coloured skink that has either a striped or speckled back.

The McCann's skink (Oligosoma maccanni) is a small to medium sized skink that can grow up to 73mm. It has a grey or light brown back that can be either patterned or striped. If patterned, they may be herringbone or chequered and if striped, they may be smooth or notched. The McCann's skink also has a yellowish belly and a finely spotted throat.

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Hideaway Habitats

Skinks rarely enter forests and prefer open areas with native shrubs and rank grass. They are also found in rocky and coastal areas.

Grass must be kept reasonably long to provide shelter for skinks to hide in.
If the grass is too short, predators such as birds will be able to easily see the skinks.

Skinks are cold blooded and use the sun to warm their bodies. The easiest way for them to do this is to lie (bask) in open areas among long grass or on rocks.

The stone skinks have been designed to provide opportunities for basking in the sun and hiding away in cracks so they are protected from predators such as cats, hedgehogs, and rats.

Mokomoko

Historically Mokomoko (skinks) have an association with Whiro, the atua (god) of the underworld - a realm of evil, darkness and death. Lizards were often feared by Maori who saw them as a bad omen.

Carrying for skinks

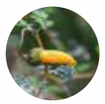
Skinks are a taonga, they are not pets and they don't like being stroked, cuddled or picked up. Please respect the skinks, watch them quietly from a distance and leave them be.

The favorite plants of a skink.

Coprosma crassifolia
NZ Coprosma

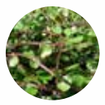
Coprosma propinqua
Mingimingi

Melicytus alpinus
Porcupine Shrub



Sophora prostrata
Dwarf Kowhai

Discaria toumatou
Matagouri



Muehlenbeckia complexa
Scrambling Pohuehue

Food

Skinks feed primarily on insects but some also eat the fruit and nectar found in native plants. Native vegetation that skinks are known to enjoy for shelter and food include: Sophora prostrata (Dwarf Kowhai), Muehlenbeckia complexa (Scrambling Pohuehue), Coprosma propinqua and crassifolia (Mingimingi and NZ Coprosma), Melicytus alpinus (Porcupine Shrub), and Discaria toumatou (Matagouri). All these plants can be seen growing around the stone skinks.

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The River walkway

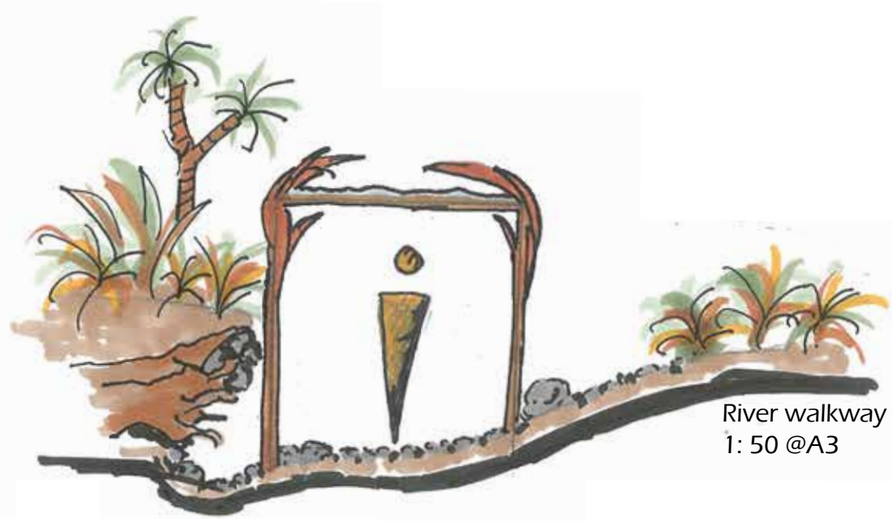
The river wander is a covered walkway that makes you feel as though you are underwater, walking in a dry river bed. Experiencing what it is like from within a waterway, from the perspective of its fauna.

Under a section of the glass/perspex it will be hot like it is for invertebrates, and freshwater fauna without shade/ shelter within the waterways. As the walkway progresses the glass/ perspex will be electronically printed with sections of shading in an effort to imitate the varying shade density depending on the forest density and its period of establishment. This could also be achieved through either, locating the structure next to existing vegetation, using reclaimed totara found on site to provided shade, or creating some form of sculptural vegetation out of corten steel.

To add audio engagement to the structure contact microphones will be attached to rocks within the neighboring stream/waterway and the sounds from the microphones will be played through speakers along the walkway.

Why
Ecology - The walkway installation aims to provide an understanding around the elements which make up a healthy waterway ecosystem. These include; why logs, tree roots, overhangs, and a variety of substrate sizes are important for providing shelter within waterways so that freshwater invertebrates and aquatic fauna have places to shelter, and spawn. Also educating around why native riparian planting is important along waterways as it provides shade to the waterways cooling the water making it a viable temperature for invertebrates, blocking out sunlight so algae and weeds can't grow, filtering out sediments and pollutants such as rubbish and nitrates before they can get into the waterways, and providing nesting and perching sites for water fowl. This initiative highlights the work of Guinevere Coleman in the summer of 2006/2007, Katie Collins in the summer of 2007/ 2008, and Amiee Robinson and Katie Collins in the summer of 2008/2009.

Literature review - The design engages with the public visually through sculpture that is the walkway. By audio through the sounds and music produced by the river. Kinesthetically by the movement of walking along the walkway, and through touching the structure and the dry waterway. The design engages emotionally through the overall sensory experience of the walkway (Harrison, 2018).



River walkway section
1: 50 @A3

Possible walkway structures and configurations
Scale 1:50 @A3

The perspex or glass of roof is on atilt so that water and debris can runoff. This roof will be supported by a series of columns, which could have a variety of forms as seen here. These forms could include sculptural pieces which portray different flora and fauna found in the waterways.

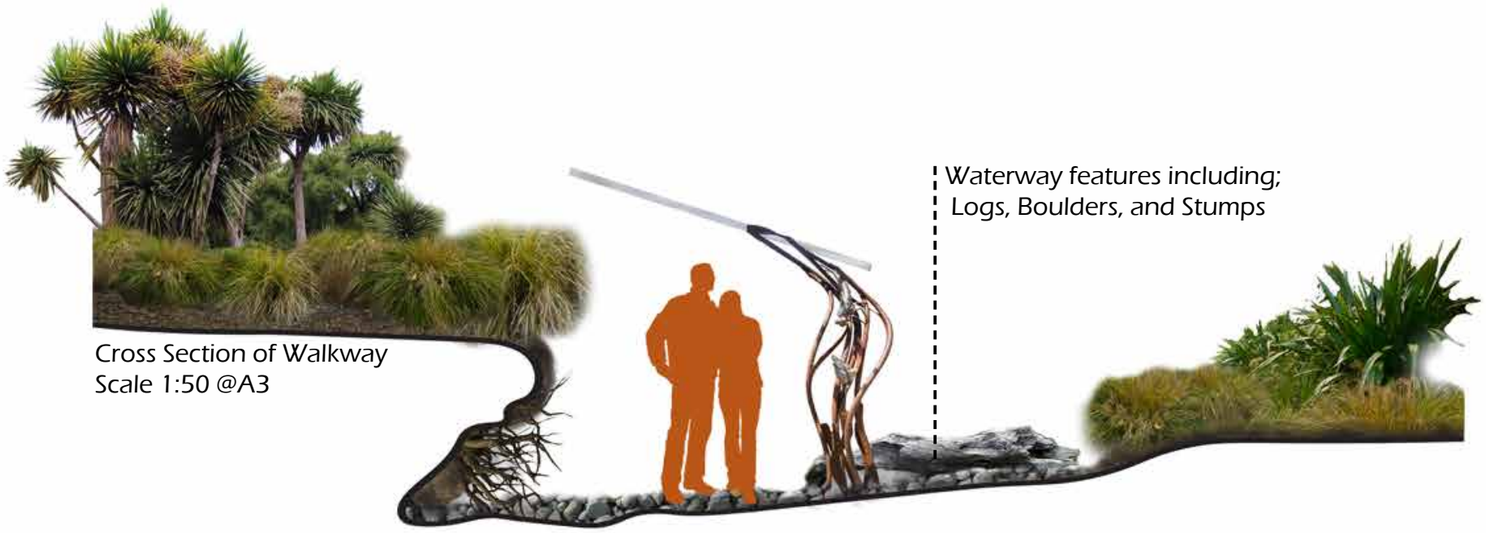
Possible material for walkway roof, PSP Infused Acrylic.

(PSP Limited, 2018)

1:50 @ A3

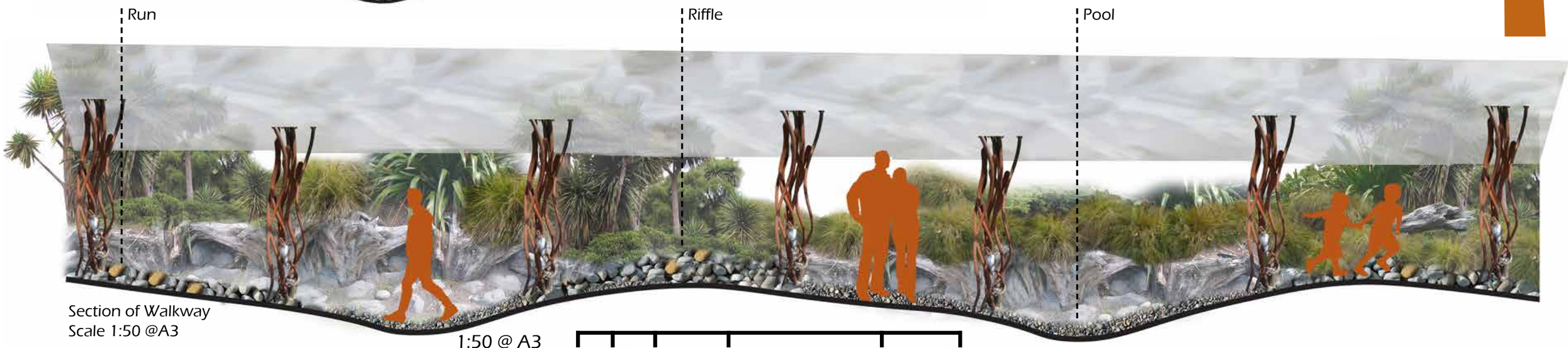
0m 0.5m 1m 2m 4m 5m

The River Walkway Sections



Cross Section of Walkway
Scale 1:50 @A3

Cross Section of Walkway
Scale 1:50 @A3



Section of Walkway
Scale 1:50 @A3

1:50 @ A3

0m 0.5m 1m 2m 4m 5m

Benefits of design

The use of elements which enlist all the senses (vision, kinesthetic, audio and emotion) heighten public engagement with the design, meaning that the information that the installation is trying to communicate is accessible to almost everyone (Harrison, 2018). The combined engagement of the senses through the installation creates a long last educational experience.

Ecological function – The structure is predominantly educational however the ecological concepts learn't about through the installation will likely mean that ecological benefits to waterways will occur further afield through public action due to the education.

Education - Understanding around the elements which make up a healthy waterway ecosystem.

Interpretation

I would recommend that the walkway has a series of interpretation boards within it. Each one highlighting a different aspect that adds to the waterway, for example a sign discussing the importance of logs in the waterways as they provide shelter, and spawning sites for the aquatic fauna that are part of the waterway ecosystem. Five key points should be presented along the walkway. As this is the optimum number of pieces of information a person can take in at one time. I would recommend that each point is based around one of these five groups of things; Shade, native riparian planting, runs riffles and pools, overhangs and beaches, and wood debris/ logs and large rocks.

Possible River walkway location Scale 1:400 @A3

Site suitability

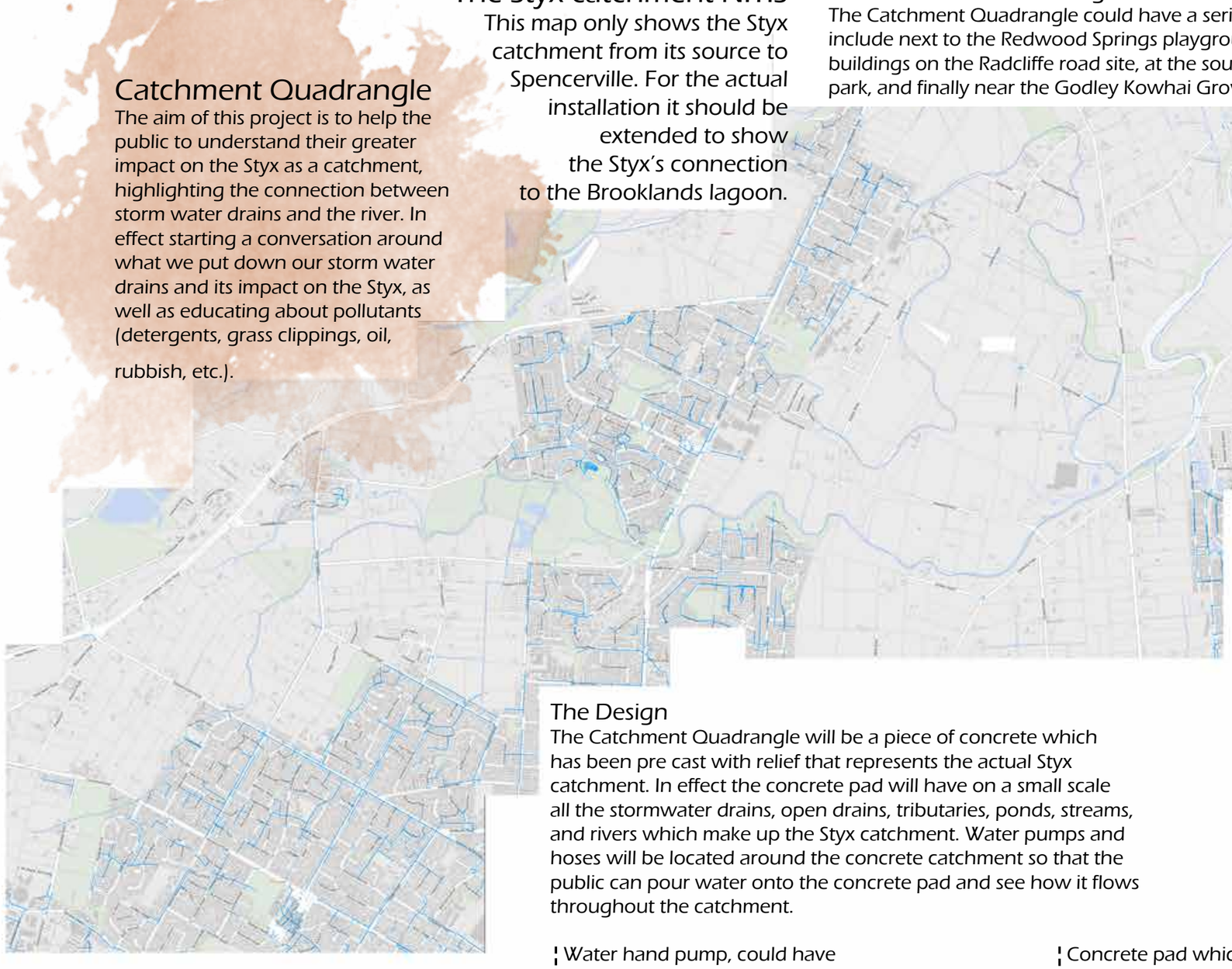
This would be an ideal site for the River walkway, as it has a great view of the Styx river, and on its northern side there are already establishing native restoration plantings. The existing track that the walkway would be built into has undulations meaning that to create the River walkway would be reasonably achievable.

Catchment Quadrangle

The aim of this project is to help the public to understand their greater impact on the Styx as a catchment, highlighting the connection between storm water drains and the river. In effect starting a conversation around what we put down our storm water drains and its impact on the Styx, as well as educating about pollutants (detergents, grass clippings, oil, rubbish, etc.).

The Styx catchment N.T.S

This map only shows the Styx catchment from its source to Spencerville. For the actual installation it should be extended to show the Styx's connection to the Brooklands lagoon.



Possible locations for design

The Catchment Quadrangle could have a series of possible locations these include next to the Redwood Springs playground, near the restored farm buildings on the Radcliffe road site, at the source of the Styx in Nunweek park, and finally near the Godley Kowhai Grove at Styx mill reserve.

Benefits of design

The design engages the public through a variety of senses (vision, kinesthetic, audio and emotion) heighten public engagement, meaning that the information that the installation is trying to communicate is accessible to people with a variety of learning preferences. The combined engagement of senses through the installation also creates a long lasting educational experience.

Ecological function – The structure is educational, and play based, with no specific on site ecological benefits. However the ecological concepts learn't about through the installation will likely mean that ecological benefits to waterways will occur further afield through public action due to the education from the installation.

Education - The design provides understanding around personal impact on waterways and how individuals can mitigate the pollution of waterways in their daily lives.

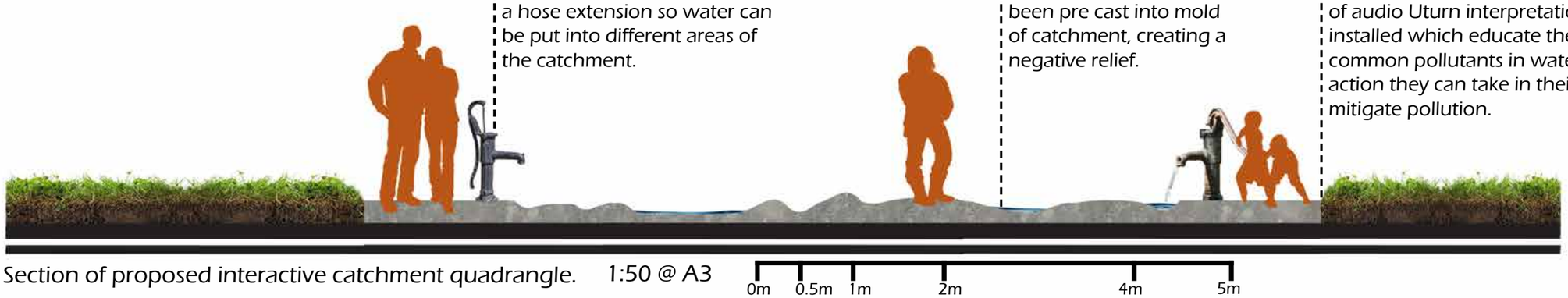
The Design

The Catchment Quadrangle will be a piece of concrete which has been pre cast with relief that represents the actual Styx catchment. In effect the concrete pad will have on a small scale all the stormwater drains, open drains, tributaries, ponds, streams, and rivers which make up the Styx catchment. Water pumps and hoses will be located around the concrete catchment so that the public can pour water onto the concrete pad and see how it flows throughout the catchment.

Water hand pump, could have a hose extension so water can be put into different areas of the catchment.

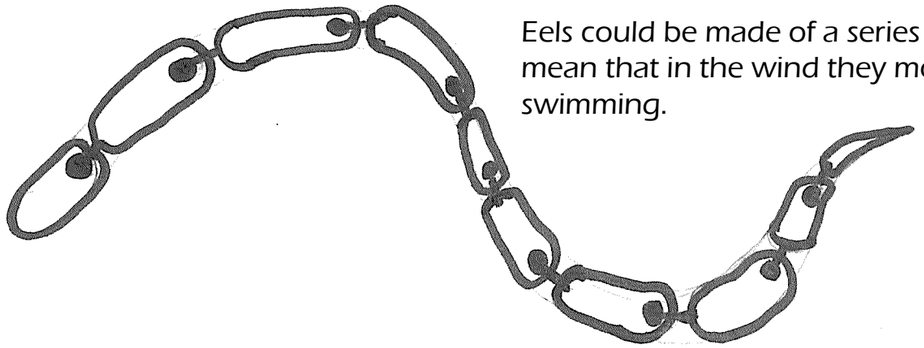
Concrete pad which has been pre cast into mold of catchment, creating a negative relief.

Around the Catchment Quadrangle a series of audio Uturn interpretation signs will be installed which educate the public about common pollutants in waterways and what action they can take in their daily lives to mitigate pollution.

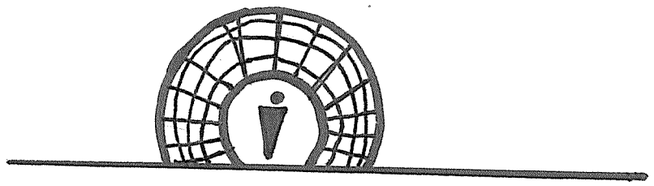


Section of proposed interactive catchment quadrangle. 1:50 @ A3

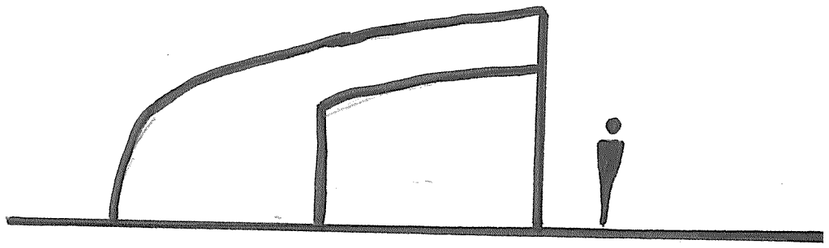
The Hīnaki and the Tuna



Eels could be made of a series of interlocking pieces that mean that in the wind they move and look as though they are swimming.



Elevation of Hīnaki experience entrance.
1:100@A3



Cross section of Hīnaki experience entrance.
1:100@A3

The Design

The Hīnaki experience is a sculptural instillation that aims to start a conversation with the public around the historic cultural value that the Styx catchment has for Māori. Due to its use for mahinga kai.

A Hīnaki (Eel catcher) structure could be woven out of corrugated iron strips with interpretation printed on some of the horizontal strips.

The Hīnaki and eel sculptures would be most effective in the communication of the mahinga kai values if the installation was located at either the Styx mill reserve site or the Radcliffe road site.

Illustration of possible Hīnaki experience

1:50 @ A3

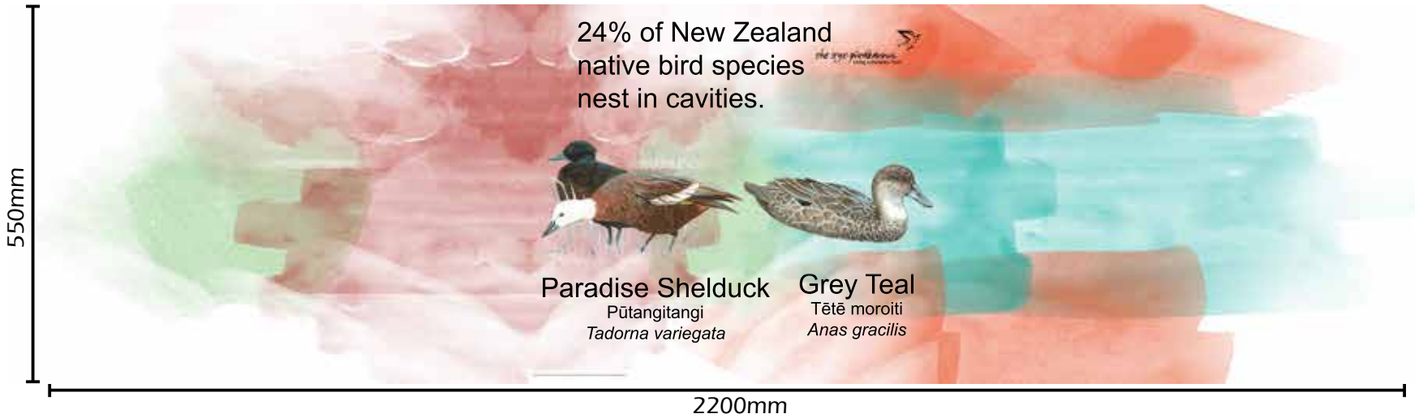
0m 0.5m 1m 2m 4m 5m

Ashleigh Mathews Habitat Enhancement 2016 -2017 Summer Extension.

The existing work that Ashleigh Mathews has achieved is a series of standing deadwood trees that have been sculpted to simulate storm damage. Within the deadwood five cavities have also been created through chiseling and cutting. This has been done to provided nesting sites cavity nesting avifauna. Four of the constructed cavities have a depth of 100mm to encourage bushbird nesting, and one of the constructed cavities is lower on the deadwood with a depth of 300mm to encourage waterfowl nesting. The standing deadwood trunks have been fitted with tree collars/ bands to prevent predators accessing the cavity nests (Mathews, 2017).

Proposed Interpretation.

This interpretation will be printed on adhesive stickers and stuck to the tree collars/ guards that are around the deadwood trees with constructed decay cavities in them.



Both if these signs also extend all the way round the tree band.

Another option could be to have the information on a white background.

Sound Sculptures

To comment on the cultural history of Kaputone creek and the freezing works factories which were based there, a series of sound sculptures could be built along the walkway. See the Youtube links below for sound sculpture inspiration.

Harry Bertoia's Sounding Sculpture in Bally Pennsylvania USA.
https://www.youtube.com/watch?v=TtZ3qmGBWEM
The unique, quirky 'Musical Fence' - Ingenious Oz Project
https://www.youtube.com/watch?v=ep4NFATbOvM
Harry Bertoia Sonambient Sculpture Barn Motion Study
https://www.youtube.com/watch?v=zS-YQ0-Rmmk
Some other amazing sound sculptures.
https://www.youtube.com/watch?v=hP36xoPXDnM
https://www.youtube.com/watch?v=WWgJejAiGFg
https://www.youtube.com/watch?v=IvUU8joBb1Q

A series of sculptures which are similar to the ones in the videos above could be built at Kaputone creek with car parts. Referencing the Messers Oppenheimer's works "cat gut" factory, which made the strings for instruments. As well as the dumping of rubbish which used to happen along the creek.

Another possible idea for a sound sculpture series could be to use them to educate the public around different sources of mahinga kai, and weaving materials. For example a sculpture could be made which resembles the Raupō plant and the leaves clash together making sound.

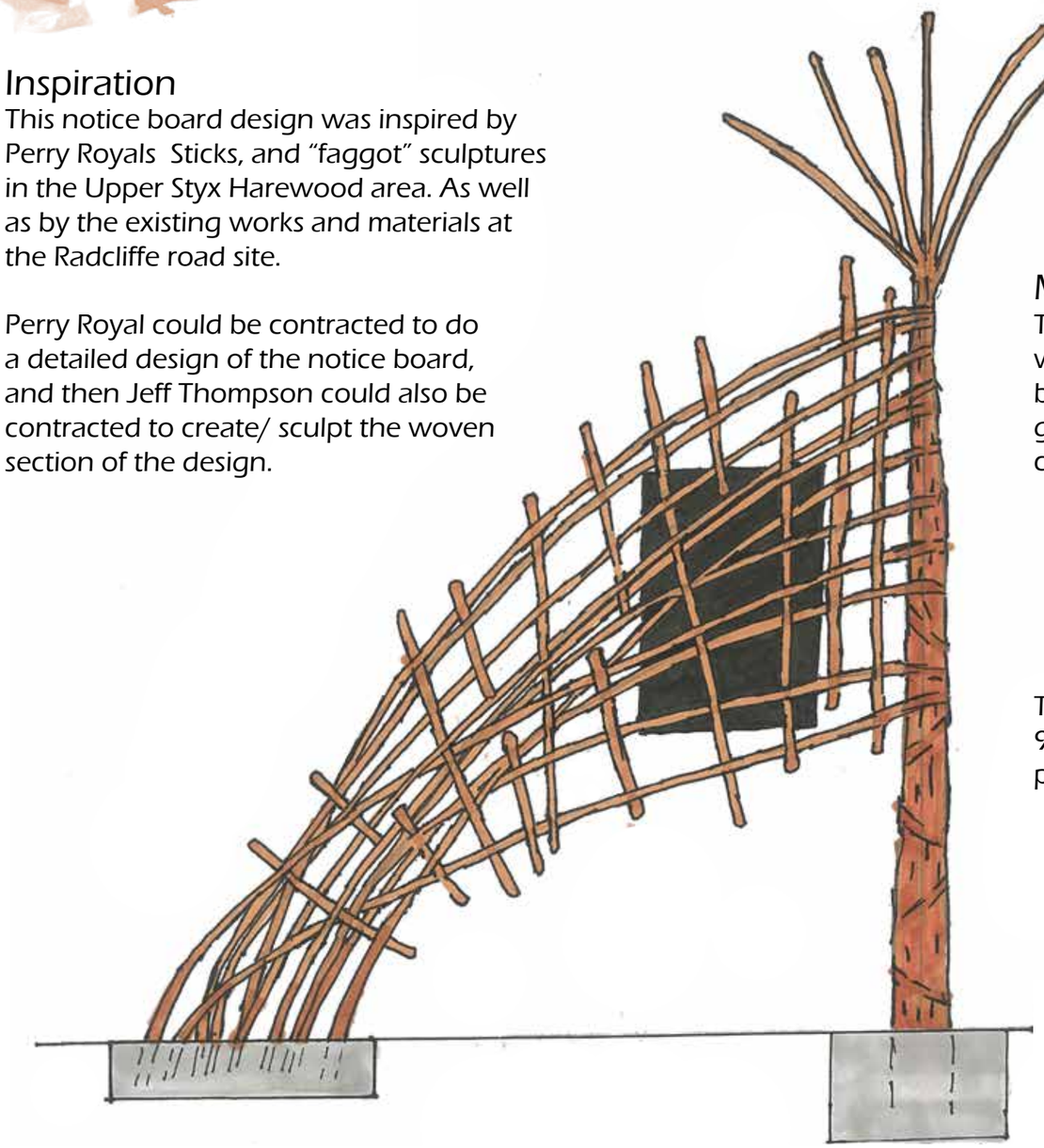
The car bodies seen in the pictures below are located on the Styx near Marshlands road. They could be used to create sound sculptures.

Possible notice Board design for the Radcliffe Road Site.

Inspiration

This notice board design was inspired by Perry Royals Sticks, and "faggot" sculptures in the Upper Styx Harewood area. As well as by the existing works and materials at the Radcliffe road site.

Perry Royal could be contracted to do a detailed design of the notice board, and then Jeff Thompson could also be contracted to create/ sculpt the woven section of the design.



Materials

The design endeavors to keep in consistency with the existing materials on the site, these being; corten steel, red corrugated iron, and galvanised steel. It will do this by using D12 corten steel rods to create the structure.

The Notice Board (black rectangle) will be 900x600mm Approx, therefore it can display an A1 poster with abit of space to spare.

Scale - 1:20 @A3

Grid of Possible funding opportunities

Name, type, website	Brief	Amount of funding available	Application assessment Criteria	
Innovation and Sustainability fund The purpose of this fund is to encourage innovative community, school or business projects that support the Council's vision and strategic priorities. https://www.ccc.govt.nz/culture-and-community/community-funding/innovatefund =	The Council's vision is for Christchurch to be a city of opportunity, open to new ideas, new people and new ways of doing things, a city where anything is possible. The Council's strategic priorities focus on: • active citizenship • healthy waterways • creating a vibrant, prosperous and sustainable twenty-first century city.	A total of $500,000 has been allocated by the Council in 2017–18. To enable swift decision making, applications seeking up to and including $10,000 will be approved by the Head of Urban Regeneration, Urban Design and Heritage. Applications seeking between $10,001 and $100,000 will be decided by the Innovation and Sustainable Development Committee, and applications seeking over $100,001 will be approved by Council. Generally the fund will provide no more than 60 per cent of the project costs with the remainder to come from other sources.	**Innovation** - The project is a new idea or locally applies good ideas and approaches from elsewhere or supports innovation in Christchurch. **Sustainability** - The project addresses a sustainability issue or opportunity of particular importance to Christchurch. Consideration will be given to the nature or scale of benefits provided and the significance of the issue or opportunity being addressed by the project. **Legacy -** The project will be able to deliver benefits beyond the funding period, it can have enduring benefits or can be self-sustaining. **Deliverable** - The applicant is able to successfully deliver the project and achieve the stated outcomes (e.g. the applicant has the required skills, experience, resources or support to complete the project).	(Christchurch City Council, 2018)
Biodiversity funding https://www.ecan.govt.nz/your-region/your-environment/our-natural-environment/biodiversity-funding/faqs/	Projects will be assessed against the six goals set out in the Canterbury Biodiversity Strategy: Protect and maintain the health of all significant habitats and ecosystems. Restore the natural character of degraded indigenous habitats and ecosystems. Increase the integration and sustainable use of indigenous species in modified environments (e.g. farm, urban, lifestyle blocks). Enhance public awareness, understanding and support of biodiversity. Encourage, celebrate and support action by landowners and communities to protect, maintain and restore biodiversity. Improve the range and quality of knowledge and information about Canterbury's biodiversity for its sustainable management.	Over $1million available annually. https://www.ecan.govt.nz/your-region/your-environment/our-natural-environment/biodiversity-funding/faqs/	Projects are also assessed against the following criteria to consider the ecological value of the project. **Ecological context:** Projects must provide a benefit to indigenous biodiversity and play an important role in the long-term health of the wider eco-system. **Representativeness:** The extent to which an area represents a habitat type or ecosystem that is typical of the area concerned. **Diversity and pattern:** Ecosystems including vegetation communities, habitats for native animals, and wetlands that contain a high degree of natural diversity (e.g. a range of plant types). **Naturalness:** Native vegetation or habitat of indigenous fauna is in a natural state or healthy condition, or is in an original condition. **Rarity or distinctiveness:** Plants or habitats (including wetlands) that are rare or threatened or support rare or threatened species; plants or habitats that are distinctive (e.g. a plant species at the limits of its natural range or is uniquely adapted due to special areas such as caves; species at the limits of their natural range). **Project leadership:** Proposed projects that will be undertaken by groups need identified leadership. **Geographic spread:** Where possible a fair distribution of funding will be allocated across the region **Community education:** The extent to which the project will provide environmental benefits to the wider community, for example, enhancing the communities understanding of indigenous biodiversity.	(Environment Canterbury, 2018)
Community Environment fund http://www.mfe.govt.nz/more/funding/community-environment-fund/funding-and-application-process	The Community Environment Fund (CEF) empowers New Zealanders to take environmental action by funding projects that: Strengthen environmental partnerships. Raise environmental awareness. Encourage participation in environmental initiatives in the community	$10,000 and $300,000 Note that round 9 of funding closed in August 2017 – Not sure if there is a round 10 or when it starts.	http://www.mfe.govt.nz/more/funding/community-environment-fund/eligibility-criteria http://www.mfe.govt.nz/more/funding/community-environment-fund/funding-and-application-process	(Ministry for the Environment, 2018)
Rata Foundation - Participate http://www.ratafoundation.org.nz/funding/what-we-fund/participate/additional-criteria-for-environment-projects		$20,000 or less come under their small grants applications. There is also large grants $20,000 or more	• Environmental Education and sustainability programmes should demonstrate how they follow best practice or are evidence based, and have been evaluated in the last twelve months or demonstrate a plan for evaluation. • Organisations seeking funding for biodiversity projects should be focused on ecosystems in threatened environments, or that are severely depleted or under-protected, or key habitats for threatened or regionally endemic species, or areas of high ecological value that are subject to significant threats. • In line with biodiversity best practice, projects will be reviewed for priority actions (in this order: legal protection e.g. through covenant; physical protection e.g. pest/livestock control; habitat restoration or enhancement; habitat re-creation/reconstruction). • Where planting is a component of the project, the organisation needs to demonstrate they will use locally eco-sourced indigenous plants (if applicable).	(Rātā Foundation, 2018)
Ngāi Tahu Fund	http://ngaitahu.iwi.nz/wp-content/uploads/2013/07/Ng%C4%81i-Tahu-Fund-Interactive-Application-Form-2017.pdf	$5,000 - $30,000 Available at anytime.		(Te Rūnanga o Ngāi Tahu, 2018)

What I have gotten out of the Internship?

I have really enjoyed meeting with experts, and have gained a greater appreciation for the value of collaboration, especially in projects where I am not very knowledgeable. I will definitely try to collaborate with experts in my future projects so that my projects can make positive impacts on the environment, its ecology, and tell the stories of different cultures.

This was my first experience of working in an office environment so it was really good to see what its like working in an office with all the noise, and people coming and going.

It was really interesting to learn about the whole process of trying to get a project under way, in terms of all the meetings you have to go to, and the process of getting costings, then engaging contractors.

I really enjoyed practicing the process of design in terms of (site visits, meetings, presentation drawings, and presentations) especially since the designs could possibly be built in the future.

Recommendations

To fully achieve successful communication of the ecological value and issues facing the Styx catchment there are a number of things which must be done.

The most fundamental thing being to actually implement some installations in the in the reserves within the Styx catchment so that users are made aware of the ecological value and issues in and facing the catchment.

Secondly I would recommend that the Gabion skink design and the tree collar signage are the first proposed designs to be implemented as they are the most developed designs, and they will be reasonably inexpensive to build and maintain.

Thirdly to realise these designs there are a number of things which must be checked and done including; construction drawings, funding, building, maintenance plan and implementation, and interpretation/ signage.

Thank you to the Styx Living Laboratory trust for this opportunity.

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