Architecture as Nature

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A Research Project submitted in partial fulfillment of the requirements for the degree of Master of Architecture (Professional). Unitec Institute of Technology, 2013
Fig1: Kaimai Mamaku Forest Park, Bay of Plenty, New Zealand.
Fig 1: Kaimai Mamaku Forest Park, Bay of Plenty, New Zealand.
Acknowledgements

I would like to thank my supervisors David Turner, John Pusateri and David Chaplin for their knowledge and criticism. Their continuous support and advice is integral to the development of this project. I would like to thank my family and friends for their support and forbearance.

I would like to thank Philippa Fox for proof reading this lengthy document.
Abstract

“A building is something that protects us and differentiates itself from the natural environment. I like the idea of energy; in a sense, the energies are about thermodynamics and about the real forces that we are creating. The history of nature is about evolution and specialization of form following some reaction to place. Architecture from that point of view should be trying to understand more about this interaction.—Vicente Guallart”

Architecture can own the same flexibility, wideness, diversity with nature. This project discusses the relationship between architecture and natural environment.

“Clouds appear in all sorts of places, and come in all shapes and sizes. They also disperse in different ways: rain clouds may disappear after making it rain, for instance, while morning mist dissolves in a moment. How much justification can there be for permanence in architecture within the natural environment?—Junya Ishigami”
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1.0 Introduction

1.1 Research Questions

How can architecture become, in itself, a natural environment?

1.2 Aims and Objectives

What defines the relationship between architecture and the environment provided in nature? In the beginning, architecture is a humble shelter from dangerous animals and turbulent weather conditions. In the most primitive architecture, caves belonged to nature and existed regardless of convenience or otherwise to its inhabitants.¹ A maze of internal space with convexo-concave surface, caves refuse any artificial arrangement. In the caves, humans could always adjust to create a suitable way of life to accommodate themselves, but not to change the cave’s form. “Instead of oppressing functions, a cave is a provocative and unrestricted milieu.”² Compared with caves, modern architectural forms in the 20th century seems like isolated entities which estrange people from the natural environment further. With the development of urban areas and new technology, humans get used to living in a forest of skyscrapers. People adjust to the diverse symbolic meanings and visual enjoyments which make large scale architecture irreversible and which consume large amounts of resources. In spite of this, once disaster strikes, these ‘strong architectures’ become extremely fragile. The theory of ‘strong architecture’ comes

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¹ Soo Fujimoto, “Nest or Cave”, in Primitive Future (INAX Publishing 2008), 22.
from the perception of ‘architecture first, environment sec-
ond’. Worked as a machine, architecture gradually loses its
balance with the natural environment, and on the contrary,
the beauty of nature is hard to realize in architecture as well.

What would happen if architecture went back to the past and
refused to cater for the outward appearance, just like caves
blurring into the natural environment with a very peaceful
and low-key attitude? Actually, architecture cannot sepa-
rate itself from the natural environment, and is not superior
to it. Architecture should be gracious, warm, welcoming
and pure, and bring a sense of safety to human existence.

If people still draw a line between the natural environment
and man’s artificial environment in their conception of ar-
chitecture, then, architecture will always be defined as a
sheltering space built within that vast environment, which
is no longer suited to the current world. Therefore, archi-
tecture is not merely a shelter, it is the environment itself.

Architecture is not antithetic to nature; on the contrary, the
relationship between them should be symbiotic and contin-
uous. The purpose of this project not only attempts to bring
architecture closer to the landscape, it also seeks a path to
weaken the distinctions between the natural and the artifi-
cial. Architecture no longer separately exists as an object.
Instead, it can be invisible and disappear into the surround-
ings. Vague concepts, vague functions, vague direction or
vague space, architecture could then melt into the landscape
and create a new environment, which inspires the human
sense of the whole of the vast landscape with all its intensity.

Again, Architecture exists, not as shelter but as environ-
ment, itself.

Fig 3: Russell Cave National Monument
1.3 Outline of the project

This project explores the idea of ‘architecture as natural environment’. Firstly, the meaning of ‘natural environment’ should be defined. In order to get more ideas and inspirations, the research of characteristics of “the natural environment” is in a wide range such as sky, river, forest, mountain and many others, and not limited to a particular species like lotus, dandelion or pine tree. On the other hand, the natural environment also means the landscape of the site. Look across the land, everything on the site such as trees, flowers or lakes can be classified as natural environment.

In addition, this project attempts to discover some interesting or unique ideas of architecture. The preconceived definition of architecture is stability, stillness or independence. In fact, architecture can change the boundaries like the clouds, or float in the air like the dandelion seeds. In this project, the possibilities of vagueness, disorderliness or limitlessness to architectural design will be discussed.

This project firstly investigates relative natural knowledge and architectural theories about ‘architecture as natural environment’. Nature is huge and complex, therefore the thesis will focus on the surrounding natural elements which are easier to analyse. For architectural theories, because almost every famous architect has a theory relating to architecture and nature, this thesis will focus on some recent architects such as Kengo Kuma, Sou Fujimoto or Junya Ishigami who are still active in the 21st century.

Secondly, this project explores methods of ‘architecture as natural environment’. There are two main ways. Architecture can replicate the natural environment. Architects can call on nature as an image, a metaphor or a process so as to arrive at a new form of contemporary architecture. No matter the flying height of birds or the relationship between trees and forest, inherently nature is a peaceful and a dynamic world. Architecture is not merely a world consisting of construction, space, technology or narrative. It can mirror nature. In addition, architecture can eliminate the artificial marks and blur with the natural environment, using natural materials such as wood, bamboo or stone, to increase the transparency of internal space or enrich the diversity of shade, there are many ways to weaken the artificial marks.
1.4 Focus and Challenges

The main focus of this project is the relationship between humans, architecture and the natural environment.

**Relationships between architecture and natural environments.**

This project avoids imitating nature in a literal way, for example, by designing a building to look like a real mountain, a shell, a lotus outwardly. The aim of this project is to make architecture more lifelike, that is to say, more fluid like clouds, more flexible like a forest, more infinite like the sky and earth. It is better to endow architecture with natural scale or character rather than shape biological forms. In addition, there is not only one way to make architecture invisible by using glass. This project also focuses on other methods to make buildings blur into natural environments.

**Relationship between human use and architecture**

Because the building typology tends to be concerned with public buildings, this project will focus on the communal space and circulation design. Architecture should satisfy the basic functional requirements according to different types of buildings. In addition, architecture should consider the convenience, safety and influence of human emotions especially for disabled people.

**Relationship between human occupation and natural environments**

In this project, it is better for people to feel and touch the natural environment rather than look at it from a distance. Architecture should help people access to nature from both indoor and outdoor space, horizontally and vertically.

In addition, this project also needs to consider ecological and sustainable issues. As the project is concerned with public buildings, it should mention the cultural and social connections.

The challenge is the application of knowledge of nature and its integration into architectural design to explore the possibilities of how close these two environments are. The outcome of this project should give a reasonable explanation of the original research problem.

1.5 Methodology

The approach was to design from a basis of existing knowledge and then to analyse the design outcome while addressing the research problem by the development of alternative solutions throughout the design process.

The following cyclical process was used: site selection, analyse physical context, resource existing knowledge, study knowledge of natural environment, initial landscape design, initial architecture design, analyse the relationship between architecture and landscape. This cycle is repeated until the design intention is achieved.
2.0
Existing Knowledge

2.1 Literature review

2.1.1 Treating a horizon as an outline of architecture

The horizon is the boundary between the earth and the sky and all visible directions are divided into two categories. Because the formless landscape is marked on the outer edge by a horizon, if architecture becomes a part of the landscape, a horizon also creates an outline of the architecture and the architectural space will be enclosed by a sky-like roof and ground-like floor.3

In Japanese architect Junya Ishigami’s book, Another scale of architecture, he applied the concept of horizon into a cafeteria design. He described a cafeteria which is a single storied one-room space and the ceiling is only an average 2.3m high. There is no column inside and all the elements of this building are extremely thin especially the light roof which is only 10 to 50mm thickness. Plants and flowers grow lushly on the roof. The floor is soil. Planted with vegetation of all varieties, it forms a continuity with the surrounding landscape. The sky-like ceiling and earth-like floor have “a subtle, almost unnoticeable curvature, just as the earth’s surface has a subtle curvature.”4 As a result, the ceiling and floor form a horizon far beyond and

3 Junya Ishigami, “Horizon”, in Another scale of architecture (Seigen-sha Art Publishing 2010), 94.
4 Ibid, 90.
give the partially glass-walled interior, skirting the perimeter wall, a landscape that seemingly extends forever. The interior space makes up only about 5% of the entire floor area and the other area is semi-exterior space. Junya Ishigami pointed out that the semi-outdoor spaces inhabit a realm between architecture and landscape, enrich the diversity of architectural space, and at the same time maintain the richness of the environment. By means of architecture, a vast landscape is produced, and there, a small house is erected.

Junya Ishigami believed this kind of space is full with uncertainties because architecture is totally influenced by its surroundings. In his book, he also mentioned that architecture can show the current weather conditions, clouds and land simultaneously with landscape. The clouds are regarded as a part of architecture, the ceiling possesses the lightness of the sky. The vegetation covering the roof shows seasonal transformation of colour, arrangement of leaves, and thickness. Day-to-day changes in the sky are also reflected exactly in the space under the roof, on both fine days and wet. These changes in scenery can be viewed at leisure from the cafeteria. The landscapes depicted between roof and floor alter the quality of the space in myriad ways. “Obviously, the landscape changes if one moves, and rolls on endlessly.”

2.1.2 To conceive a building as if planning a forest
A forest is a symbiotic place in which transparency and opacity live together. It is a place where “segmentation and totality coexist. It is a place that has an exterior envelope, and simultaneously lacks an exterior envelope.” Japanese architect Sou Fujimoto believed that architecture can replicate the forest. Considering the abstract qualities of natural environment and architecture, Junya Ishigami also suggested that design can be an assembly of beams according to the densely intertwining branches of trees in a forest, and pillars reminiscent of narrow tree trunks.

Junya Ishigami’s book, Another scale of architecture, analyses the positions of plants in a forest. He found the positions are most likely determined according to strict principles; however the creatures “living in a forest go about their daily business in a rational fashion without knowing exactly why the vegetation is located in this position. For architecture, this could hardly be more different.” To be more specific, in a building, it is immediately obvious that a certain wall is there to partition off two adjacent spaces, a stair is there to connect vertical space, but in a forest, people really have no idea why a particular tree is in a particular place. Rationality in a forest may be less about a simple one-to-one coincidence of function and form and more about the linking of new relationships and endless, fathomless complexity.

Sou Fujimoto also focused on the forest especially the vertical layers of it. In his book, Primitive Future, he suggested that a forest is a locus in which people interact with information. Information cannot be confined to normative ‘information’ but subsumes everything that ubiquitously surrounds us. In a forest, myriads of information at diverse resolutions interrelate and coexist. Something seems useless at the first sight, maybe important to other creatures. Architecture made by mankind typically tries to organize this hierarchy of information. However, if people make a place analogous to a forest, then they must endeavour towards a locus where in various information can inter-

5 Ibid, 115.
6 Ibid, 115.
7 Ibid, 127.
8 Ibid, 116.
9 Ibid, 127.
10 Ibid, 128.
12 Junya Ishigami, “Forest”, in Another scale of architecture (Seigensha Art Publishing 2010), 51.
13 Ibid, 57.
act, which will include what might appear at first to be trivial, inconsequential, and meaningless matters. The locus should impose an order that simultaneously “negotiates, stimulates, catalyses various interactions and amplifies multiplicity of information.” This information does not simply exist, but motivates people in such a way that their mastery will lead to discoveries of deeper truths. This will stimulate various ‘interactions of humanity and information’ which will open our eyes evermore to new relationships. Such a place must be a forest-like locus.

Sou Fujimoto applied his viewpoints to residential design. He pointed out that the way people live in a house is akin to living in a tree, which he called “tree-like place”. To be more specific, he believed that each room can be displayed like branches of a tree. They are separated, but are connected and are continually redefining each other. “Totality formed by interrelationship.” “Branches develop while reciprocally altering its own directionality; forests survive by networks and densities resulting from natural selection.” Sou Fujimoto thought there was a prospect of a future architecture which is impregnated by chaotic and uncertain elements.

### 2.1.3 Weak architecture

What is ‘weak architecture’? The concept was introduced by Japanese architect, Kengo Kuma. Firstly, weak architecture is the building with vague boundaries, that is, the architecture can be invisible. Kengo Kuma is not satisfied to use transparent material alone to achieve a feeling of vagueness and he believed when the architecture and surroundings have similar order, rhythms and background, architecture will be invisible. Secondly, “weak” architecture is the surface of building and is inanimate. Some buildings will become antiquated with the passing of time. It is better to tap the material potential rather than maintain the delicate surface. Architecture should adapt to natural changes and keep buildings in good appearance. Kengo Kuma prefers to use the natural material such as wood, bamboo, and stone in place of concrete.

He emphasized the use of natural materials produced from local surroundings, even if they are broken or flawed, but materials that are able to bind building and landscape closely. Thirdly, weak architecture combines building and landscape. Architecture is not dominant in the natural environment, on the contrary, architecture should service the natural environment. Architecture should present the surroundings rather than the building itself.

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16 Ibid, 67.
2.2 Precedent Architecture

2.2.1 White forest building

Kait Kanagawa Institute of Technology, Japan, 2008

As a part of a university campus redevelopment project, the KAIT workshop was built in 2008. The building is an open facility that students can access 24 hours a day to work on their own creative works. The studio is one single-storey room, approximately 2000 m² encased entirely in 10mm thickness glass. The architect, Junya Ishigami, designed 305 slender steel columns in the interior space. 42 of them are compression columns for vertical loads and others are post-tensioned columns to carry horizontal loads like mini sheer walls. None of them is identical in proportion and orientation. The space seems to have no defined form, but was carefully planned. The floor is a 47m by 46m concrete slab. Due to the complexity of the columns, it was important to keep the structural system as simple as possible.

Ishigami believed that architecture can be planned like a forest. Just as the structure of a forest environment is formed by how the trees are grouped, prototypes for various environments are formed according to how the pillars

and beams are positioned and grouped, shaping the spatial structure of the building. He dismissed the traditional column grid and only relied on familiar structures such as concrete framework and steel columns to support the whole building. The uncertainty of the columns’ layout makes the circulation and space more flexible, the users can discover different views when they choose different paths. The circulation will be influenced by pillars, by the movement of people, by furniture or flora. The connections between things giving rise to a space are complex, and not easily grasped. Ishigami searched for a way to deliberately incorporate this uncertainty in the design of a building. Moreover, in order to blur the boundary between indoors and out, he eliminated all openings on the glass walls except for doors and a few small floor vents that draw fresh air supplied by roof vents. The surrounding landscape serves as the backdrop for the interior.

20 Junya Ishigami, “Forest”, in Another scale of architecture (Seigensha Art Publishing 2010), 51.
2.2.2 Architecture without boundaries

Japanese architect, Sou Fujimoto was invited to design the Serpentine Gallery in 2013. Sou Fujimoto described his project as architectural landscape which is totally open to the public and covers 350 square meters of lawn.\(^{21}\) The pavilion provides space for cafe tables and people can seat in front of it meanwhile, the terraced steps provide extra seating for activities at both entrances. The whole structure was made of 800 steel bars and 400mm rectangles supporting interior space and a canopy which encourages people to interact with and explore it in diverse ways.\(^{22}\) The structure is completely transparent. The whole atmosphere made by grids is more blurring and ambiguous, like trees or a forest or clouds, which makes the pavilion integrate into natural environment. Although the pavilion is artificial and sharp, it creates a mixture of nature and architecture, and at the same time it helps people to enjoy the vivid scenery. As a result, a new form of mixed environment was created, where the natural and the man-made merge; not solely architectural or solely natural, but a unique meeting of the two.\(^{23}\)


2.2.3 House before house

Known by the name of “House before House”, the project is located in a residential area of Utsunomiya in Japan and was planned for 2–4 people. The designer, Sou Fujimoto attempted to break the understanding of house as a limited enclosed space. He encouraged people to live not just in indoors, but in the outdoor realm as well. Ten white boxes were stacked together to form a group of rooms around a small courtyard. Some of them are detached and can be accessed through the gardens. The uppers boxes are accessed by exterior staircases. Large trees grow on the tops of these small boxes/rooms at random in order to seek a harmony between natural and man-made environment. Individual rooms are parts of the living space for residents; however, there is various interior area other than these rooms, such as cave-like outdoor spaces that extend outward from a room or the bases of the floating trees.

Sou Fujimote believed a house does not necessarily need to be a house. Houses and forests must have been distinguishable. If it is possible, a house that is simultaneously a garden, a city and a forest can be designed. People can be liberated in such an open natural garden.

24 Fernando Marquez Cecilia, “House before House”, in EL Croquis 151, (EL Croquis 2010),94
25 Ibid, 96
2.2.4 Landform architecture
Orhidelia Wellness Centre, Slovenia, 2009

Located in Terme Olimia spa resort in Slovenia, the new Wellness Centre was designed by local architecture company Enota in 2009. With the development of thermal complex, the building is the third project Enota designed in this area. From the brief, one of the basic design requirements is that all buildings should interfere as little as possible with the existing scenery and try to connect with the natural environment that surrounds them.

Since the service requirements of a wellness centre are diverse, the building demanded certain areas overcome great spans and heights of the interior space. However, constructing a typically conceived building above the ground would have occupied the remaining open area and largely degraded the spatial quality. Therefore, the main concept of this project was to diminish as much as possible its presence in the surroundings.

“The new wellness centre is more like a landscape arrangement than a building.” 26 Formed like a semi-underground cave, the building seems to break the peaceful natural environment; however it has already built another harmonious relationship with its surroundings. Folded facades appear

like “supporting walls dividing different levels of landscape surfaces which create a strong modern architectural feeling inside.”\textsuperscript{27} A central walking path stretches over the roof and visitors can enjoy a completely different sense of the site. “On both ends, where the strolling path connects with passing inner roads, it forms two smaller public squares to control the speed of vehicles and ultimately gives priority to pedestrians over the vehicle traffic.”\textsuperscript{28} In terms of structure and material, the steel frames support the concrete roof in internal space. All the folded elevations are made by dark grey glass curtain walls which presents the beauty of an internal structural frames for visitors.

\textsuperscript{27} Ibid.
\textsuperscript{28} Ibid.
2.2.5 Botanic Gardens Visitor Centre
Cairns Botanic Gardens, Australia, 2011

Located in Cairns Botanic Gardens, Australia, the new visitor centre was designed by Charles Wright Architects (CWA). Due to the client’s brief to create a sustainable architecture, CWA focuses on an environmentally sustainable design. This project includes a number of green features such as thermal energy, stormwater harvesting tanks, mixed mode air-conditioning system, low energy light fittings throughout, low water usage fittings, long ventilated circulation corridors and a shaded exposed thermal mass internally.29

In addition, the clients also hoped the visitor centre would blend into the surrounding environment.30 The designers decided to use a mirrored facade reflecting the natural environment to diminish the presence of facilities amongst the surrounding trees. The mirrored glass not only increases transparency but also brings an aesthetic beauty both indoors and outdoors. The new visitor centre includes a café terrace, gift store, information and exhibition space, and offices for the council staff.31 Divided into two ‘wings’ and a pedestrian promenade, the visitor centre was designed as a gateway to the gardens, linking the gardens and other service facilities. Both buildings have non-linear forms, generated by the routes of predefined pathways and locations of mature trees. “They also have to nestle against the landscape at one end where the ground starts to climb upwards around them.”32

31 Ibid.
Fig. 22 Courtyard, Cairns Botanic Gardens Visitor Centre, Australia-CWA

Fig. 23 Exterior, Cairns Botanic Gardens Visitor Centre, Australia-CWA

Fig. 24 Exterior space, Cairns Botanic Gardens Visitor Centre, Australia-CWA


2.3 Ecological biomimicry context

When people analyse the natural world, there are some basic principles that can be found: super-efficient structure, high strength biodegradable composites, zero waste system, self cleaning systems and many others. Nature runs on sunlight for energy, banks on diversity, rewards cooperation and recycles everything. Compared with typical human system, nature is relatively complex and efficient. There are many human attempts to replicate natural knowledge by using ecological and biomimicry methods. Biomimicry can be divided into three strands, deriving inspiration from natural forms, natural systems and natural process. To be more specific, nature fits form to function. In nature, the ‘forms’ of a biological entity consist of size, structure, material, colour, etc. Inspired by plant surfaces which remain dirt-free, human ingenuity has produced a coating for exterior walls that cleans automatically.

In talking about natural systems, ecosystems should be mentioned. An ecosystem is a complete community of living organisms and the non-living materials of their surroundings which include plants, animals and micro-organisms. Energy, water, nitrogen and soil minerals are other essential abiotic components. Compared with human-made systems, some advantages can be concluded: complex, closed-loop flows of resources, densely interconnected and symbiotic, zero waste, use local resources and many others. As for natural processes, a symbiotic relationship can be found in the eco-systems in which organisms can hook up for mutual benefits. Nature is changing continuously with the passing of time. When disasters happen, nature possesses a certain degree of adaptability, which is superior to the man-made world.

With the development of science and technology, it does not follow that the man-made world, and especially architecture, are completely inferior to the natural world. In fact, some modern architecture has already addressed problems of waste, simplification, obsolescence or monolithic structure. This project aims to enrich the methods of architectural design especially in ecological and biomimicry aspects.

2.4 Cultural context

The notion of close connection to the land is deeply embedded in the local culture, a foundational element of both Maori and pioneer understanding of life. Traditional Maori attitudes to the land, the sky, rivers, lakes and seas, and the creatures that live in the forest are to protect them from unwanted destruction. They have strong spiritual bonds with the land, respect it and cherish it.


3.0 The Site

3.1 Site Selection

In order to pursue the architectural development of the project, an existing real site was required. The key intention of this study is to deal with the relationship between architecture and natural environment. Therefore, the crucial criteria for site location are urban natural space.

Over half the world’s people live in urban areas which are still expanding into the natural environment. Urban green spaces provide an increasingly important opportunity for people to connect with the natural world. In land use planning, urban natural space is “open space areas for “parks”, “reserves”, and other open areas which are commonly open to public access.” As well as helping people get close to nature, urban green spaces also provide a habitat for a variety of birds, fish, animals, insects and other organisms, while preventing soil erosion and absorbing pollutants. Plants can reduce the urban heat island effect and noise pollution. Generally speaking, green space is an important measure in judging the ecological sustainability of the community.

In addition, green space is an ideal place to read, meditate, play, gather and for other social activities. Encouraging people to communicate and exchange information, the green spaces allow people to gain social recognition and promote spiritual growth. Compared with modern buildings, the urban natural space provides a refreshing contrast to the harsh shape, colour, and texture of buildings, which reduces stress and increases sense of wellness and belonging.

In 2012 more than 72.4% of New Zealand population live in the main urban areas. In Auckland, the proportion was up to 92.8%. This causes concerns not only for the quality of life for humans, but for biological issues and the natural environment. As one of the world’s most liveable cities, Auckland’s parks and urban green spaces make a major contribution to Auckland’s quality of life. The varied landscape makes Auckland visually attractive and the parks and civic spaces help to create distinct, vibrant town centres and suburbs. In the next 10 years, Auckland Council is dedicated to protecting and conserving Auckland’s environment, heritage and landscape, meanwhile ensuring the urban natural space network expands and develops to accommodate more

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38 Ibid.
use and the diverse demands of the growing population.39

Through a critical analysis of some potential sites in Auckland such as One Tree Hill, Kilmarnock Park, Takapuna Rose Gardens and Auckland Botanic Gardens, Auckland Botanic Gardens:

• Botanic gardens offer opportunities for people to enjoy and learn about a wide range of plant diversity. Auckland Botanic Garden is established as one of the most popular tourist resources in New Zealand and holds the largest number of trees and shrub species in Auckland. In the gardens, all the plants are interspersed among more than nine gardens according to their original distribution. Attracting more than one million person-times in 2012, Auckland Botanic Garden is an ideal park for visitors who appreciate Auckland’s urban natural environment and meanwhile acquire knowledge of botany.

• Botanic gardens attract a wide range of people enjoying a lunch break and socializing with friends and educating children in an open air classroom. Auckland Botanic Gardens have some service facilities including car park, visitor centre, library, wedding/conference buildings, classrooms and others which encourage people to come together on a common purpose and foster social contract. As community gardens, it is an ideal park to organize community activities providing mutuality and common interests among community members. Botanic gardens are rarely isolated entities but connect ecologically, culturally and socially with the surrounding locality and people.

• Auckland Botanic Gardens is a place which presents Auckland’s values, history and stories. It is also an ideal place for the cultural exchange.

• Auckland Botanic Gardens has an advantageous location and convenient transportation. Situated right next to the Southern Motorway, it is only 20 minutes’ drive from the city centre or airport. It is convenient for people to visit at any time and stay away from stressful life temporarily.

• Auckland Botanic Gardens cover an area of 65 hectares, larger than the alternatives. There are many potential natural sites for this project can be chosen.

After determining the site, the project intends to design a new building in the Auckland Botanic Gardens. However, the existing service facilities have already met the basic requirements of functions. Meanwhile, after a site visit, it is obvious that some existing buildings such as library, friends’ building and visitor centre are located in the same area independently which is far away from the natural environment. Some buildings are constructed in a single storied one-room space with sloped roof. In fact, these service facilities should provide a natural feeling for visitors as well, not just meet the requirements of use. Therefore, this project proposes to offer another solution to the existing buildings in the Auckland Botanic Gardens.

Fig. 26 Wilder context location map

Fig. 2 Location map

Fig. 28 Aerial view of the Auckland Botanic Gardens
3.2 Circulation

The main entrance of the Gardens is located in the Hill Road next to the car park, visitor centre, library and other service facilities. Private cars are parked near the entrance, while, vans and sightseeing buses can drive through the Gardens. Visitors could use the map to take a self-guided tour. The walking guide recommends several short routes to explore the Gardens and the Native Forest. Visitors can discover different feature trees, artworks, plant collections around the Gardens.
The Garden Map

The main walking route is a circle which starts from the visitor centre. After parking, people can walk into the visitor centre and exit from the rear. There is a path connecting the visitor centre and the first Garden, Edible Garden. Following the road, people will cross each Garden in turn. Nestled in garden collections, along walkways and at the visitor centre, visitors will encounter the Auckland Botanic Gardens permanent collection of artworks and sculpture. Finally, visitors will return back to the visitor centre. If people attempt to get closer to nature, there are many paths connecting with the main road they can choose.

For service circulation, there is a private road for staff access to the service facilities such as storage, kitchen, library and others.

For disabled people, they can ask at the information desk for access to drive around the loop road of the gardens so that they can stop their cars at any time and be able to enjoy much of the gardens at leisure.
**Interactive map**

In the interactive map, it is obvious that the areas of plant collection are interspersed among the Gardens. The main service facilities are grouped mainly in the south of the gardens. In addition, there are two wedding sites in the middle of the Garden and near the lakes.
3.3 Existing buildings

**Huakaiwaka Visitor centre**

Opened to the public in April 2005, the visitor centre provides opportunities for visitors to learn, explore and enjoy the Gardens. It is an essential starting point when visiting the Gardens. The visitor centre includes information displays area, themed plant displays area, cafe, toilet facilities and office space.\(^{40}\)

**Library**

The Horticultural Reference Library was opened to public in 1992 and was funded by the Friends of the Auckland Botanic Gardens. It is located to the left of the visitor centre. With over 2500 books and a number of horticultural journals and magazines, the library has the largest selection of horticultural books in New Zealand.\(^{41}\)

**Covered Courtyards**

Two covered courtyards are available for hire at Auckland Botanic Gardens for day time and evening events.\(^{42}\)

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42 ‘Covered Courtyards’, (accessed 10.10.2013), http://www.aucklandbotanicgardens.co.nz/BotanicGardens/index.cfm?67407FC0-BCD4-1A24-9B30-0CB8C6531B7F
Friends Buildings

The friends’ Building is a small house available for hire. Featuring an outside deck, and close to the car park, it’s open plan layout makes it ideally suitable for group meetings.43

Potter Children’s Garden

For children, the Potter Children’s Garden includes many interactive features, encouraging self-discovery and learning through play. The exciting walled garden is full of interactive activities.44

Logan Campbell Building

The Logan Campbell Building can be booked for groups of up to 45 people for daytime meetings and gathering.45


4.0 Project Development

4.1 Brief

4.1.1 Building typology
Consider the workload in the whole school year, it is hard to redesign all the existing buildings in the Gardens. According to the site analysis and the usage of these buildings, this project will redesign the visitor centre and library. Typical of public architecture, the visitor centre and library are ideal experimental subjects to discuss the relationship between architecture and the natural environment. A new design would explore different possibilities of architectural form in the same site. The functions of visitor centre and library will be increased and walking routes of the Gardens may be little changed.

4.1.2 Aesthetic Requirements
The aesthetic requirement of each building element needs to respond to the specific natural environment it is engaged with. The outward appearance of each building should keep harmony with the surroundings.

4.1.3 Functional requirements
There are several functional improvements and attentions that should be mentioned during the design process:
• With open doors to both the main entrance of visitor centre and the return walking route back, the gift shop becomes a transit point connecting the garden walking route: the area of gift shop will be expanded.

• To increase the prominence and accessibility of popular science, a new exhibition hall will be designed in the visitor centre. The exhibition hall includes the area of display documentary, introduction of plants, introduction of horticulture knowledge and others.

• Expand the area of the cafe especially its outdoor seating space, to provide if possible, the cafe as a place for weddings and parties.

• A new courtyard will replace the indoor atrium to be shaped to suit other functions such as meetings, parties and other social activities.

• Expand the area and flexibility of reading rooms in the library in order to enrich the private and communal space at a different size and scale. The functions of the library are not limited to reading or searching information; it is also a place for relaxing, chatting, lectures or speech.

• Protect the trees and other existing buildings on site. Functions and circulation design should consider elderly people especially disabled people.

To be specific, the functional requirements can be summarized:

**Visitor centre**
- Courtyard for circulation and outdoor activities
- Information Desk
- Restroom
- Cafe includes indoor and outdoor eating area
- Gift Shop
- Screening rooms for playing documentaries and holding lectures.
- Exhibition Hall to introduce popular science
- Lounge for staff
- Office for staff
- Storage space

**Library**
- Information desk
- Book Stack Room
- Office for staff
- Reading rooms
4.2 Site Analysis

In order to connect with the main entrance, car park and other service facilities, the ideal site for further development of the visitor centre and library intends to the south part of the Gardens.

The analysis of physical content will be split into 3 aspects:

**Typology**

The topography slopes up from north to south, the highest point at Auckland Botanic Gardens is in the existing visitor centre which is roughly 13 meter above the Lower Lake. The area of existing visitor centre is relatively flat and half a meter lower than the road around it. Therefore, the main entrance of the site should consider the storm water drainage measures to prevent the rainwater back up into the site. The land between the visitor centre and the lower lake is a large area of lawn. The slope steeper is about 5% at average. When the height difference between the inside and outside level is more than 1.5 meters, the retaining walls should be considered to protect the boundaries of the site.
Fig. 38 Long section sketch of the site
**Surrounding environment**

All the service buildings on site are linked by the circulation network which is convenient for people walking around. In this design, the connections between the visitor centre and surrounding environment especially other service facilities will be enhanced. In addition, the surrounding trees or grass will be reserved, moved or cut according to the design.

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*Fig. 39 Photograph showing the entrance of the courtyards and the library*

*Fig. 40 Photograph showing the driving road around the car park*
Fig. 41 Photograph showing the walking road.

Fig. 42 Photograph showing the path to the courtyard

Fig. 43 Photograph showing the returning path to the visitor centre

Fig. 44 Photograph showing the path to the library
Landscape view

A key feature of this site is the beautiful landscape scenery which creates a very strong visual axis. The main scenery is the lawn and the trees in the front of the visitor centre. It provides both wide vision and a good first impression of the Gardens for visitors. The lawn is an ideal space for public activities.

Fig. 45 Photographs showing the new site for the library
Fig. 46 Photographs showing the grassland of the site
4.3 Landscape Plan

The ideal site for the visitor centre is the original site. The main reason is the perfect location and relatively even ground which can provide large spaces to arrange outdoor activities. In order to connect with the natural environment, the visitor centre will expand to the north and attempt to activate the large area of lawn. Therefore, the path connecting the walking route and the visitor centre will be replanned.

In the library design for this project, large areas are not necessary. The important element of this design is the comfortable and quiet reading space. The library in the Gardens is not only for access to knowledge, but also access to nature. Reading is not limited to the interior space. Therefore, the ideal site for the library will move to the eastern side of the lawn which is surrounded by the trees. The library can be invisible in this kind of natural environment. Compared with the original site, the new site is steeper, but the surrounding is natural and peaceful. As the function of library is not merely reading, it is also a place for relaxing, chatting or attending a lecture. Therefore, beautiful surroundings are essential. In addition, the new site is more prominent than the original one, even if it keeps a certain distance from the visitor centre. The paths will be designed to connect the library, visitor centre and the walk routes.

Fig. 47 Diagram of the new site of the library
Fig. 48 Initial site planning sketch. The connection between visitor centre, exhibition and library.

Fig. 49 Second site planning sketch. The connection between visitor center, library and the walk routes.

Fig. 48 Sketch showing the path connecting visitor centre and library.
4.4 Exploring the relationships between architecture and nature

4.4.1 Inspiration for the trees
As the main natural elements on site, trees or forest are important sources for design. They are complex structures elaborated from simple rules, growing coherently and continuously in time and space. Firstly, the intertwining branches of a tree are a perfect pattern for architectural structure and surface. For a tree, branches are the woody structural member connected to the central trunk. In a forest, tree canopy projection indicates the variety of trees that make up a forest, with extending branches and spreading-out leaves. The branches protect the species on the bottom of the forest meanwhile, the sunlight and rainwater filter through the gaps. In architecture design, if the roof and wall can replicate this pattern, the shadow they form will make the building alive and the natural wind penetrating through will make building breathe like a living organism.

Secondly, there are four layers of vegetation in the tropical rainforest: Emergent layer, Canopy layer, Understory layer and Forest floor. Every layer has its own plants and animals. However in a forest, all the layers protect and interact each other in a symbolic way. This kind of hierarchy system can be replicated into architectural design. The building can be divided into several levels vertically with the height difference between them maybe less than one meter. So people on each level can get their own private space, but they can communicate with each other conveniently.

46 Junya Ishigami, “Horizon”, in Another scale of architecture (Seigensha Art Publishing 2010), 59.
Diagrammatic Models

Fig. 52 Photographs of Model No.1 Tree-like architectural surface and circulation in large scale.
Fig. 53 Photographs of Model No.2 Relationship between buildings and green space.
4.4.2 Inspiration for the landscape

Landscape is soft, neutral, and continuous. Architecture, on the other hand, is hard, opinionated, and typically fragmented. Today, landscape succeeds where architecture fails. Compared with high-level buildings, people feel more comfortable when the architecture lies on the ground fluidly even buried underground. Step by step, if people climb to the top of the roof, architecture is no longer an object which is invincible. The ground can become the roof, the floor or the wall of a building. If that happens, architecture is no longer understood as a figure, but as a complete environment.

In this project, it is more suitable to design a new visitor centre as a landscape, more than a work of architecture. Landform building means constructing the site itself rather than occupying a given landscape. It is the place where architecture, landscape and users integrate effortlessly. Through sectional or topographic elaboration, a more complex relationship between interior and exterior can be developed.

Fig. 54 Diagram about the landform architecture

Fig. 55 Diagram showing the relationship between human behaviours and the landform
Fig. 56 Cross sections show the connection between roof and the ground.

Fig. 57 Long sections show the connection between roof and the ground.
4.4.3 How are ecosystem thinking and architecture connected?

Everything in the natural world is connected. An ecosystem is a community of living and non-living things that interact with each other. In nature, the renewable resources are critical parts of an ecosystem. To be specific, the sun provides the heat to keep plants and animals warm. Without sunlight there would be no photosynthesis and plants would not have the energy they need to make food. They also rely on the rainwater and air to survive.

For architecture, ecosystem refers to the sustainable method which utilizes the abundant resources in nature. Instead of man-made energy such as electricity, artificial ventilation and others, architecture should reduce pollutions as much as possible. In addition, architecture should focus on the local resources which will decrease the waste and pollution during transportation.

In Auckland Botanic Gardens, the lakes were once affected by contaminated stormwater; the staff set up the catchment to deal with it. A catchment is an area from which rainfall flows into a water way. There is a 16 hectare catchment surrounding the Gardens lakes, made up of suburbs, roads, carpark and planted areas.

As the main service building in the Gardens, the visitor centre can use water that is collected from the roof and stored in an underground tank. In addition, the natural lighting and ventilation are guaranteed through all the interior space. Meanwhile, the exterior shading can minimize the thermal gain.

Fig. 58 Map showing the stormwater solution in the Auckland Botanic Gardens
5.0
Architectural Development of Visitor Centre
5.1 Integrating architecture and landscape

Open the space and feel real natural scenery
As the first stop in the journey of the Gardens, visitors are able to appreciate the natural environment for the first time and at this point, the architecture is no longer a completely enclosed space. The natural environment should invade the architecture, so that architectural space is expanded, outside the limit of the building boundary. The outdoor and semi-outdoor space will cover a much larger area than indoor space. All of space engages alternately the outdoor circulation and the building will be broken up into several parts which are accessed and located separately. So when people pass through the building, they can feel the same atmosphere with surroundings which are natural, changeable and genuine. Meanwhile, the building can get enough sunlight and natural wind which is sustainable and ecological.

Fig. 59 Drawing showing the plan of existing visitor centre
Fig. 60 Drawing showing the relationship between building, courtyard.
Fig. 61 Photoshop showing the view when standing in the atrium of the visitor centre and look south over the site.
Semi-underground
In order to mix architecture into the landscape, the design process of the visitor centre starts with the site typology. Because the site is steep, it is better to utilize this height difference rather than flatten it. Meanwhile, in order to enhance the connection of architecture and landscape, architecture should interact with the ground, not just stand above it. Considering these issues, the building will be embedded into both the geology and landscape of the site. In order to enrich the aboveground connection, some parts of this building will be semi-underground. In that case, the nature of the site is uncovered. The architecture acts as a tool for recognizing and revealing the site’s presence.

Utilize the roof
Because the building is embedded into the landscape, the roof will connect with the ground and become a part of it. Visitors and staff can enter through the building or bypass the interior by walking over the top and gaining a different view of the surrounding and landscape. In addition, the roof will be punctured by skylights, which guarantee the right illumination of the internal space.

Fig. 62 Drawing showing the vertical relationship between building and the landscape.
Outline as contours

In order to pursue the organic form and natural boundary, the outline of the visitor centre is shaped to follow the contour of the land. In the plan, the boundary is almost parallel with the contour and most angles are obtuse angle which guarantees the utilization of internal space. In this section, the building should accommodate the slope of the site, which is in some places a gradual slope and in some it is steep. During the design process, forms are developed to produce a profile which will be a subtle change corresponding to the internal space.
Fig. 65 Third sketch about the outline of the buildings.
5.2 Creating line generated circulation

Function Distribution
At this stage, it seems appropriate to address functionality. There are some factors should be considered in the initial design:

- The cafe also provides service for other buildings.
- The storage room should be accessed through the existing service road.
- People can come into the gift shop through the returning road.

In this project, the visitor centre is divided into three buildings. The first building is located in the southeast which includes the information desk, office and the gift shop. The second building is located in the southwest which includes the restroom, lounge for staff, storage, kitchen, cafe and screening room. The third building is the exhibition hall which is located in the north side.

Fig. 66 Initial design of the plan
The outside circulation

The main entrance is still in the south side of the site which is near the car park. Visitors will follow the paths to enter the courtyard and different rooms. Then they will go downstairs to the screening room and exhibition area.
Fig. 68   The entrance of the visitor centre.

Fig. 69   The stairs to the cafe
Fig. 70   The stairs to the exhibition hall

Fig. 71   The ramp to the exhibition hall.
5.3 Courtyard design

In this project, the courtyard is multi-functional. The courtyard covers more than 1200 m² which is divided into four levels vertically. Regardless of horizontal and vertical level differences, the courtyard works as a connection of each building. Moreover, the courtyard is transit space between internal and external space. Because it is the main area for circulation, almost all of this area is made of stone. Consideration for disabled people is also included with circulation connected by both stairs and ramps. Following the path, visitors can appreciate the natural environment when they pass through the courtyard. In addition, there is an area of 110 m² of lawn located in the centre, which provides opportunities for outdoor activities especially in the evening.

The courtyard will be covered by a roof. The roof should guarantee transparency so that sunlight can come into the courtyard.
Fig. 73 Development of the courtyard.

Fig. 74 The stairs in the courtyard.

Fig. 75 The view axis.
5.4 Roof design

Timber Gridshell

In order to protect the courtyard, a large span of canopy should be considered. Inspired by the branches of trees, architecture can also have a natural kind of structural pattern. Therefore, a large span timber gridshell will be constructed to cover the semi-open space.

The geometry of the roof bends to the west and east which makes the whole visitor centre look like a mountain from a distance. The lattice weave of this gridshell structure will be supported by the columns and walls. Meanwhile the boundary of the structure will be fixed on the roof of the buildings. In addition, the inflated ETFE (Ethylene Tetrafluoroethylene) air pillows are tethered into the gridshell structure, which bring sunlight into the courtyard. Sheltered below an innovative timber canopy, the courtyard becomes an intriguing blur of interior and exterior, the character of the space shifting depending on one’s position and direction of view.

The most obvious effect that the timber gridshell produces is the shadow. In essence, nature is changing continuously even if it looks static outwardly. In order to integrate architecture with nature, the shadow is essential. In the visitor centre, the roof casts a branch-shaped shadow on any place in the building such as the ground, the wall, the columns or the roof. When people pass through the visitor centre, they will be attracted by the shadow thereby look up the roof and the sky unconsciously. In addition, the tree which is planted in the centre of the courtyard also casts the leaves-shaped shadow on the ground. Combining these two shadows, the visitor centre seems like a forest.
Fig. 76 The bird’s eye view from the southwest.
Fig. 77 The perspectives showing the timber gridshell roof.
Fig. 78 The bird's eye view from the northwest
Fig. 79 The shadows in the courtyard
ETFE

Compared with glass, ETFE cushions used as roof membranes have the advantage of being light in weight, strong in tension and durable, and have the ability to be cut to different shapes and joined together economically.\(^{47}\) In this project, ETFE cushions allow the roof to be visually transformed, while altering its light transmission. Moreover, the LED lights will be installed on the roof. When the courtyard holds a party at night, every “pillow” will shine in different colours which will make the whole building more beautiful.

\(^{47}\) Watts, Andrew, “Fabric Roofs 01”, in Modern Construction Envelopes, (Springer 2011), 486

Fig. 80 The joint detail of the timber gridshell
5.5 Columns design

As a part of supporting elements of the timber gridshell, the forms of the columns are intended to be tree-like structures. Except for the structural requirements, the columns also influence the circulation and the definition of the space. For example, there are more than ten columns standing in the main entrance of the visitor centre. Every column is very thin and there are subtle differences in the proportions of the pillars embodying the diversity of environment created by the structure. People can follow the different paths according to their interests. Actually, this space which is formed by the pillars creates the relationship between architecture and people who perceive this. The certainty and uncertainty of the space coexist at the same time. After people pass through this “forest of pillars”, the internal scene of the building and natural view of the Gardens will come into view together.

Fig. 81 The different pathway in the entrance of the visitor centre.
Fig. 82 The columns in the courtyard

Fig. 83 The columns in the gift shop
5.6 Structural Detail Designs

**Green roof**

In this project, all the roofs of the buildings are planted roofs except the screening room. The essential requirements for the planted roofs are the provision of nutrients in the growing medium, water retention, soil aeration and drainage.\(^\text{48}\) Because the rainwater on the timber gridshell will run into the green roof, a rainwater outlet should be installed on every roof.

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\(^{48}\) Watts, Andrew, “Concrete Roofs 03”, in Modern Construction Envelopes, (Springer 2011),412
Curtain wall

In order to ensure the continuity of sight lines, the exterior walls of café and gift shop are made of curtain walls. In the interior space, the tree-like columns support the concrete roof and floor. The elevations are shaped in non-rectilinear geometries, which seem like the cracks of the ground.
5.7 Sustainable design

**Rainwater collection**
Rainwater is collected and stored in an underground tank for use in the visitors and staff toilets and the park.

**Photovoltaic system**
The photovoltaic panels will be installed on the roof of the exhibition hall which provide electricity for illuminating the internal space.

**Photovoltaic lovers**
Moveable photovoltaic louvers on the north side of the exhibition hall will block direct light by absorbing it and generating energy.

**Window film on curtain wall**
Because the facades of the café and gift shop are curtain walls which cause the problems of direct sunlight, glare and overheating, heat control window film should be stuck on the glass. The window film not only provides heat control, it also reduces glare from the sun’s rays without blocking people’s view.

Fig. 86 The solar panels.
5.8 Internal space design and spatial experience

**Gift shop**

In order to satisfy access to the gift shop from different directions, there are three entrances to this space. Divided into three levels vertically, the maximum height of the internal space is up to 7.8 meters. The gift shop mainly trades in plant-related products such as souvenirs, potted plants, books and handicraft. There is a storage room on the bottom floor.
**Cafe**

The cafe consists of a kitchen, the two-story internal eating space and the outdoor sitting area for use in nice weather. The café can serve more than 90 people at the same time. In addition, it is available to hold a party or ceremony at night. The structure is similar to the gift shop. In order to bring the lush view inside, a green internal wall near the stairs is decorated by the natural lawns. There are some plants hanging down from the second floor.

Fig. 89  The detail plan of the cafe

Fig. 90  The interior space of the cafe

Fig. 91  The detail of the internal green wall
Exhibition hall

The exhibition hall is the last stop in the visitor centre. The internal space is divided into four display areas. Because it is constructed underground, the illumination relies on artificial lighting and daylight comes in through the roof windows. There are no openings in the western and eastern walls.

Fig. 92 The detail plan of the exhibition hall

Fig. 93 Drawing showing the internal space of the exhibition hall
In order to create an elegant natural feeling, the internal walls and ceiling are decorated by twigs which are provided by the Gardens. Because the twigs come from nature and the main function of this area is to introduce the popular science of nature, the exhibition hall itself becomes an item on display. In addition, instead of the cold flat concrete surface, the twigs make it more uneven and the colour becomes warmer.

After the exhibition tour, visitors can walk into a small courtyard behind. People can have a short time rest here or continue visiting the rest of the Botanic Gardens.

Fig. 94 The detail of the internal wall
6.0
Architectural Development of Library
6.1 Improvement the atmosphere of reading

Compared with other libraries in Auckland, the most significant advantage of this project is the natural environment. Besides borrowing and consulting the books, the library in the Gardens is an ideal place for reading, discussing, relaxing and meditation, and people can take a good break away from the urban noise and stress temporarily. Instead of a shared enclosed space, the reading areas of this project are intended to be peaceful, open, and private.

Fig. 96 The concept model of the library
6.2 Forest-like library

The new site of the library is surrounded by the trees. In order to blur the distinction between architecture and the natural environment, this project intends to create a place that is simultaneously a library and a forest.

The reading space is divided into several reading rooms/boxes, which are supported by the columns on each corner. Every box and its columns can be analogous to a tree in the forest. Horizontally, the location of each room is planned at random. Some of them are scattered loosely, some are grouped in a dense scale, just like the trees in the forest. Vertically, the boxes are located in different levels. Most of them are detached and connected by the stair-turned-bridge.

The reason for this design is to create private and public, indoor and outdoor reading space simultaneously. The function of each reading room is equal, but the space it creates is totally different.
6.3 Garden-like library

Besides the reading rooms, book stack room and staff room, other spaces such as stairs, decks and paths are open to the natural environment. Actually, there are no existing barriers or fences to outline the boundary of the site. Considering the security issue, the library should be hedged in by a fence. In that case, a garden-like library is formed.

In fact, a garden is an original form of architecture. It is a part of nature which is manipulated by humans. It is also a constantly changeable place where plants or grass grow up every day. People can walk, stand or sit freely in the garden. They can observe it in the entirety or just stare at a single tree. In this library, although the fences define the boundary, the natural environment exists both inside and outside.

In this project, individual rooms are part of the reading space. However there are various areas for reading in this garden rather than these boxes, such as the courtyard, the stairs and the deck. People can discover a suitable way to relax and the diverse functions of these architectural elements.

Fig. 99 Drawing showing the concept of ‘garden’
6.4 Modular design

The size of each box is 2.5 meters by 2 meters by 2.7 meters which can serve 1-2 people. There is a table, a chair and a small bookshelf in each reading room. The box is prefabricated and made by wood. In order to be earthquake proof, the column on each corner is welded with both the steel frame of the box and the deck. In order to get enough sunlight and natural ventilation, the sliding door and windows are installed in each reading room. Large trees are planted on the top of some boxes which are on the higher level.

Fig. 100 Drawing showing the detail of reading room
6.5 Circulation design

The main entrance of the fence is open to the south and there is a path connecting the library and the visitor centre. The book stock room and staff office are located on the ground where people can get the books and the key of the reading room. There are 16 reading rooms on different levels and they can be accessed through the stairs and the ramp. Moreover, there is a small courtyard in the central of the garden. It is a place for chatting, group meetings or lectures.

Fig. 101 Drawing showing the ground floor of the library

Fig. 102 Drawing showing the first floor of the library
6.6 Development in the future

Because the library is planned in a loose scale, if the library requires more reading rooms in the future, the garden can be expanded and more wood boxes can be added.
6.7 Spatial experience

Fig. 104 Drawings showing the spatial experience in the library
Fig. 105 The bird view from the southwest
7.0
Appraisal of the final Design
7.1 Summary and critical appraisal of the research

This thesis explored the various methods about the relationship between architecture and the natural environment. Firstly, architectural design prefers to inhabit the site rather than the site being shaped to suit the architecture. Architecture can help people to experience the original geological phenomenon of the site. In addition, architecture can hide the artificial elements as much as possible and open the internal space to the natural surroundings so that people can enjoy the real natural environment. These are the key contents of this project.

In today’s society, the process of constructing modern buildings should not be an enclosure movement which estranges people from the natural surroundings. However, people look forward to the freedom and architecture should not restrict human behaviours in the limited area. People can discover their own ways to utilize the building rather than follow a predetermined roles.

The core questions posed by this thesis were:
- How can architecture become, in itself, a natural environment?
- How can architecture replicate natural environment?

Starting with the analysis of the natural world such as the forest and the horizon, it is easier to find that the various natural elements can be replicated into architectural design. For example, it is possible that architectural columns can be planned like the trees in the forest. People can walk around in a building as if mountain climbing. Architecture is able to reflect the subtle changes of the sky and the ground. All of these possibilities aim to integrate architecture with the natural environment and provide a large open space for people perceive the whole natural landscape.

The project is an attempt to translate the theories into the design of the visitor centre and the library in the Auckland Botanic Gardens. The idea of this project is to develop the positive potentials of the natural environment in the Gardens and apply them into architectural design. It is a project to create an open, functional and flexible public space to enable the visitors enjoys the scenery in the Auckland Botanic Gardens. This thesis is only part of a larger study on the topic. It is one possibility to test the theory, there are many other building typologies and sites can be explored in the future. There is potential for further study in this area.
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Appendix

Visitor Centre Design

ARCHITECTURE AS NATURE

How can architecture become, in itself, a natural environment?

Abstract

“A building is something that protects us and differentiates itself from the natural environment. I like the idea of energy; in a sense, the energies are about thermodynamics and about the real forces that we are creating. The history of nature is about evolution and specialization of form following some reaction to place. Architecture from that point of view should be trying to understand more about this interaction.—Vicente Guallart”

Architecture can own the same flexibility, wideness, diversity with nature. This project discusses the relationship between architecture and natural environment.

“Clouds appear in all sorts of places, and come in all shapes and sizes. They also disperse in different ways: rain clouds may disappear after making it rain, for instance, while morning mist dissolves in a moment. How much justification can there be for permanence in architecture within the natural environment?—Junya Ishigami”
Library Design