The Nature of Enticement

Biophilic Design in the Urban Setting

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By

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Thank you;

To my exceptional parents for your unyielding love and support;
you will never know the lengths that your love has propelled me to.

To my big brother, always setting the bar high and encouraging me to strive for greatness.

Mum, Dad, Thomas and Anne, you are my four pillars, without whom I could not stand.
I hope I have made you all as proud as I am to have you in my life.

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throughout this journey.

“... the enjoyment of scenery employs the mind without fatigue and yet exercises it, tranquilizes it and yet enlivens it; and thus, through the influence of the mind over the body, gives the effect of refreshing rest and reinvigoration to the whole system.”

(Olmsted, 1865)

Preface

My two preoccupations in life, well-being and architecture, have taught me to care and to create. As the learning in my degree and the way in which I live my life become more inherently linked, the manifestation of how I articulate treatment of the mind, body and soul comes from the designed built environment. My motivation then is derived from function and harmony; both of which can be thought of as simple definitions of successful personal well-being and architecture.

Our habitual connection to nature and natural concepts ensure an unsevered link between our wellness and the built environment. With the process of densification and urbanisation in the past, society has successfully protected itself from harsh natural elements and has conveniently positioned cities to aid urban dwelling, but what they have also succeeded at doing is constructing a barrier between people and the neurologically nourishing natural environment they evolved in.

Due to this separation from and exclusion of simple necessities such as sunlight and direct contact with other living organisms, illnesses and diseases of the body have increasingly become commonplace, such as experiencing headaches whilst working in the office and leaving work at 5pm feeling fatigued and nauseous.

The proposal is to investigate how biophilic design can contribute to a healthy lifestyle through the strategic design of common workspaces that a majority of the population will come in contact with. Utilising design as a mechanism for preventative medical assistance should be implicated in our everyday environment, not just in our health facilities where the negative effects of disconnected living has already taken its toll.

Abstract

As the world's population rapidly becomes significantly more urban than rural, the structures that enable urban adapted living can also become a barrier between humans and the living ecosystems they are a part of and have evolved within. It is becoming increasingly apparent that urbanisation in its current form, which tends to entail a disconnection with nature is having negative impacts on the minds and bodies of residents (such as excessive stress, headaches and fatigue).

This thesis explores the theories of biophilia and how architects can respond to the adverse effects of urbanisation on humans by applying biophilic concepts to the built environment; this being biophilic design. The research investigates how to invite people into designed spaces that connect them with the immediate ecosystem, the outcomes that are felt on the mind and body. Specifically, biophilic principles and the articulation of the nature of a space is explored regarding their importance for reducing stress, encouraging relaxation and restoring cognitive functions, to potentially ignite a ripple effect that can change the way in which we live our daily lives in urban settings.

Wellington, New Zealand has been identified as a global 'biophilic city' and is the chosen site for this design-led thesis, which tests how an area largely devoid of nature can be redesigned and used in a positive way to entice and draw people through space. The intention is to further enhance the connections made between the existing biophilic interventions and ultimately improve the holistic health of those who experience the urban setting.

A set of biophilic criteria are developed and used in the design, with the outcome of this design exploration being a collaborative Ecologies Design Lab where professionals and students from different disciplines can come together for the collective goal of forwarding urban biophilic practice research. In addition to this, the intervention is designed to encourage the public to interact with the building, widening the scope of the building and targeted demographic. The investigation of aspects in biophilic design and how this can draw people through and beyond the immediate site to existing biophilically alive spots in other parts of the city is examined in correlation with other complementary theories such as narrative design, interior architecture principles, landscape architecture and founding architectural principles. The research aims to propose a journey throughout the city intent on initiating the healing process that occurs as people experience a connection with nature, either literally or metaphorically.

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1.0

Introduction

1.1 - Human psychological well-being and the living world (biophilia)

As much as urbanisation illustrates how varying societies adapt to change and are benefited by a more condensed urban lifestyle (for example being able to live 20 minutes from work via walking, driving or catching a train), its synthetic make-up and densification has had an adverse effect on residents' holistic health. The number of people living in urban settings has increased from 756 million in 1950 to nearly 4 billion in 2014. The percentage of the world's population living in cities is expected to approach 70% by 2050 (United Nations, 2015). This then poses great reliance on and opportunity for urban planners, designers and architects to create urban settings to not only create a convenient way of living, but also a nourishing one.

At present the prevailing approach to constructing the modern urban built environment has encouraged the intense transformation and degradation of natural ecosystems and increasing separation between people and the natural world they evolved in. A growing body of evidence supports the notion that alienation from natural biological systems is having adverse effects on humans' holistic health. The grounds of this evidence is based on the fact that humanity's dependence on nature reflects their evolution in a natural world, their bodies and minds being created and conditioned in a sensory rich world where the connection with critical environmental features such as light, sound, odour, wind, weather, water, vegetation, colour, animals and landscapes is a biological norm (Heerwagen, Kellert, Mador, 2008). Unfortunately, many of these features are overlooked in the majority of urban structures (Pedersen Zari, 2009).

Humans need nature. This has been made clear through the teachings of such authors like Park (et al. 2014) that prove physiological responses can be triggered by connections with nature that relax muscles, lower blood pressure and reduce stress hormones in the blood stream. This is called biophilia. Defined by O.E. Wilson, it is "... the innately emotional affiliation of human beings to other living organisms, innate means hereditary and hence part of our ultimate human nature" (as quoted in Browning et al. 2014)

It addresses the conscious and subconscious attraction humans feel towards nature, ultimately addressing work place stress, student performance and creativity, patient recovery, community cohesiveness, cognitive functions and other challenges that arise from the separation of humans to nature.

Biophilic design is when natural concepts are applied to the built environment in order to create more nurturing spaces for people to dwell in. Relating to cognitive, psychological and physiological performance, biophilia is not a single instinct, but "... a complex set of learning rules that can be teased apart and analysed individually. The feelings moulded by the learning rules fall along several emotional spectra; from attraction to aversion, from awe to indifference, from peacefulness to fear-driven anxiety" (Kaplan, 1995). This then opens up many opportunities for architects to replicate designed situations that instil the same responses in the built environment that work towards healing people, preventing such a high occurrence of diseases of the mind and body. Although technical and engineering accomplishments have fostered a belief that humans can transcend their natural and genetic heritage, connections to natural stimuli they are essential to a human's functional development and maturation (Sternberg 2009).

*"The best doctors anywhere,
and no one can deny it,
are sunshine, water, rest, and air
exercise and diet.
These six will gladly you attend
if only you are willing.
Your mind they'll ease.
Your will they'll mend.
And charge you not a shilling."*

What the River Knows, Wayne Fields 1990

1.2 - Research Question

How can architectural and urban design foster and celebrate connections between people and their surrounding ecosystems through biophilic design?

Fig 1.01. Abstraction of relationship between humans and nature

1.3 - Scope

This thesis works as a design-led research project within the scope of the theory of biophilia and biophilic design (as it is an architectural thesis), is based in Wellington, New Zealand (as it is a recognised biophilic city), includes linkages with Victoria University Te Aro Faulty of Architecture and Design (due to its location within the city and facilities), includes the notion of enticement as a vehicle for movement, and is expressed in the design of one Ecologies Design Lab.

Designing a biophilic Ecologies Design Lab is the goal of this design-led research that will ultimately address and improve the holistic health of people who reside in Wellington.

Fig 1.02. Diagram of scope within this thesis.
Representing: 1. Biophilia. 2. Biophilic Design. 3. Enticement. 4. Ecologies Design Lab.

1.4 - Aims and Objectives

- Explore the biophilic nature of Wellington and critically analyse its condition.
- Create a set of enticement principles that consider architectural, interior and landscape theories and are used as a framework to critically assess design iterations.
- Improve the connections through Te Aro Faculty of Architecture and Design in Wellington, New Zealand and the urban setting surrounding it.
- Design a research lab that furthers the investigation into biophilia, housing planners, designers, architects, geographers, psychologists, scientists and students whilst also encouraging the public to experience and interact with the intervention.
- Design a center where biophilic notions can ripple out of and influence the experience and performance of wider Wellington city for the benefit of the resident's holistic health.
- Nurture a sense of place and well-being in Wellington whilst emphasising and utilising present ecological conditions and design inspirations.

Fig 1.03. Collage of qualities that living organisms hold with progression to the built form

1.5 - Methodology

This thesis uses design-led research and is utilised as the primary research methodology. Iterative processes allow for trialling and testing that are critically analysed and either developed or left as influential milestones on the thesis journey. Differing mediums, tools and theories are compared, utilised and evaluated in order to present, at the conclusion of this thesis, a design outcome that is the accumulative result of many trials and experiments. Specifically the following research methods were used;

- 1 / A three week 'quick start methodology' was utilised to explore and present initial 'hunches', or assumptions about the design situation. Research, precedents and design responses to site were then critiqued by fellow students and supervisors of the Ecologies Design Lab at Victoria University of Wellington Faculty of Architecture and Design. Differing insights were exchanged, feedback and feasibility were discussed.
- 2 / Further investigation was carried out into the quick start design, critical assessment regarding whether intervention is more beneficial as a concentrated or dispersed spatial project.
- 3 / A 'Transect Walk' was conducted with locals through Wellington in order to call to attention to the importance of everyday user experience in real time and space, and determine suitable areas for intervention.
- 4 / Extensive field observation and investigation of present biophilic sites around Wellington.
- 5 / Utilising the concept of urban acupuncture (*refer to chapter 4.2*) to choose points in which to formalise designs.
- 6 / Presentation (May) of analysed findings and concept designs on chosen sites around Wellington to external reviewers, followed by critical feedback and the planning of the next strategic phases.

7 / Revisiting of concept designs and develop through iterative process. Investigation of new precedents relevant to the evolving project. Primarily designing as the vehicle of investigation into the overreaching research question.

8 / Presentation (August) of developed design to external reviewers followed by critical feedback and the planning of the next strategic phases.

9 / Feedback applied to final developed designs.

10 / Designs utilised to formulate conclusions and answers to thesis questions articulated in examination presentation (November) to a panel of internal and external examiners and reviewers.

Fig 1.04. It is important to note that because of the nature of design-led research, the distillation of ideas and theories happened concurrently to the actual design and through the design process. For ease of understanding this document, a linear time sequence is presented despite the fact that the actual process was a more circular one made up of numerous feedback mechanisms. Underlying principles and theorists have been talked about in chapter 3. Precedent examples are illustrated and discussed throughout the thesis as they evolved alongside the project.

2.0

Biophilia in time;
from marco to micro

2.1 - International Network

Biophilic Cities is an organisation, providing a common ground that brings like-minded cities from around the world together, working towards the goal of reconnecting their inhabitants with nature, natural concepts and nature activities. Founded by Professor Timothy Beatley of Virginia University, the idea is to further enhance biophilic research and implement interventions and principles into urban environments. Places such as Oslo in Norway, Singapore, Pittsburgh, San Francisco and Austin in the USA and Wellington in New Zealand are all biophilic cities. Each urban setting is unique and demonstrate how they practice maintaining a healthy biophilic approach to city planning and living. Singapore has been referred to as the “city in a garden” and Wellington as a “city in the forest” due to their biophilic efforts (Beatley, 2017).

2.2 - Wellington Network

Fig 2.02. Wellington, New Zealand, satellite, 5m contour (opposite page), urban development and connecting route

Wellington, New Zealand is made up of windswept beaches, arcane valleys, contrasted with rugged mountain features and luscious town belts that enclose the city in a remarkable shade of green. Overall, extensive green belts, blue belts, a harbour and ocean setting provide a sensory rich scenery for residents and visitors to dwell within. Wellingtons' natural environment is protected by environmental plans, policies and initiatives. For architects and urban designers, is there more to be done within Wellington to exploit the natural delight we have been gifted? Further architectural assessment and comparison to other biophilic cities is useful to consider improvements in the spatial conditions and connections between the existing network of trails following ridgelines and intertwining parks in Wellington.

"One of the selling points of Wellington is that if you come here you can get to the sea, you can climb the hills in bush, you can mountain bike and you can enjoy the forest. It has become a sense of who we are."
Sir Paul Callaghan 2014

1. Wellington botanic Gardens, Thorndon.

2. Protoplasm (a.k.a the Pebble sculpture). Artist; Phil Price.

3. Midland Park, Lambton Quay.

4. Kumutoto Stream Sound Installation. Artist Kedron Parker brings to life the stream through a pedestrian tunnel.

5. Walk the Line Sculpture, by artist Joe Sheehan. The Cenotaph Memorial precinct designed to mark the original bed of the Wai Piro stream

6. Kina sculptures, artist Michel Tuffery, completed in 2012.

7. Albatross water fountain. Artist; Tanya Ashken

8. Glover Park, Ghuznee Street.

9. Cuba Street Bucket Fountain.

10. Eva Street and Leeds Street, green walls, interactive laneways.

Nature in the city

Nature activities

2.4 - Local Transect

Taranaki Street, running south-southwest through north-northeast as a main arterial route through the Wellington central business district connecting wider amenities and suburbs such as the Wellington Hospital and Newtown area. It has been identified as a road that is devoid of natural elements hence creating negative psychological effects on many of its users. The stretch of road maintains no human scale or natural features that encourages connection when walking its transect as a pedestrian, with all emphasis and priority given to the motor vehicle and industrial processes. A large stretch of the road consists of four lanes with the wide footpaths utilised as car parks and loading bays for the production warehouses along the route. Amongst the industrial warehouses sit two of Wellington's main education facilities (Massey University and Wellington High School) where little urban consideration is given to the students as they move through the city before, during and after classes.

To propose positive biophilic development along this transect of Wellington's vernacular would be to connect people to nature, improve the fluidity of movement for pedestrians, making it a more enjoyable stretch of journey, further connecting the southern based population to the central business district and the wider nature reserves in a more sustainable fashion. Introduction of water, pattern, greenery, weather protection and dynamic lighting has the potential to instil excitement hence a preference of walking and interacting with these spaces.

Fig 2.06. Taranaki Street transect identifying the ailing spots along the transect journey

2.5 - Site Situation

Opportunity arises when assessing the area surrounding the Taranaki Street transect, especially the sites neighbouring Wellington's Victoria University, Faculty of Architecture and Design. Many empty lots and earthquake prone buildings are positioned within close proximity to both Taranaki Street and the Faculty of Architecture and Design, allowing for the combined extension of facilities for the University whilst also improving the connectivity through space and the city. Further analysis will be undertaken to test initial assumptions about whether this site is appropriate for development in regards to effects on the surrounding urban environment and answering the research question "How can architectural and urban design foster and celebrate connections between people and their surrounding ecosystems through biophilic design?"

Fig 2.07. Positioning of proposed site in relation to Victoria University Faculty of Architecture and Design, and Taranaki Street with potential new pedestrian routes.

Remove due to Earthquake

Existing School on Knigges Ave

Existing School and Knigges Ave North facing

Remove to open up space

Laneway from Taranaki Street

Traffic

Site context photography journey.

Beginning with the northern most part of the site and walking clockwise around the site.

Existing throughfare from Wigan Street

2.6- Taranaki Street Transect

The next pragmatic step was to conduct a 'transect walk' along one identified underperforming streets in Wellington in terms of biophilia; Taranaki Street. Although personal experience reinforced thoughts on its performance, it was crucial to consider how a wider range of locals experienced this particular transect in order to back up theory and provide a reliable foundation of details to base architectural interventions on.

Five people, local to the Wellington area were asked to take a short 1 km walk with the author from the northern end of Taranaki Street to the southern end (refer to figure 2.09). Along the way they were asked to write answers to specific questions as well as to take photos to visually back up their findings. They were asked the following questions:

- What do you see?
- What do you hear?
- What do you smell?
- Do the things you notice add to or detract from your personal sense of 'well-being'? Why?
- Is what you are experiencing during your walk 'enjoyable' or 'relaxing'?
- What are your favourite places along this route? Why?
- Does your mind tend to wander whilst walking this pathway or focus on your surroundings?

Fig 2.08. Taranaki Street situation

- Do you ever feel like sitting down/ stopping/ lingering while walking this route? If so where?
- Would you rather take another route to get from the beginning to the end of this pathway (path though the city)? Why? Why not? What path would you rather take?
- Can you name one thing that makes this walking route an enjoyable one?
- Can you remember the last time you just meandered around the Wellington streetscape? If so, what path/s did you take? What do you most remember about your journey?

The key findings from the Transect walk were; that people feel and notice how grey, cold, loud, fast paced and exposed Taranaki Street is. Less expected outcomes were; that they noticed and appreciated the small amount of shelter provided (especially the new shelter alongside Briscoes fitted with mechanisms that encourage plant growth up the vertical elements of the structure figure 2.08). They were also aware of the proportional difference between Taranaki Street and a 'pedestrian oriented' street, like Cuba Street for example. And finally what was interesting to note is that the last time locals noted that they simply meandered around Wellington with no intentional route or pathway, was when they were looking for somewhere to eat. The rest of the group noted they couldn't remember or had never simply taken the time to walk around the urban scene in a drive fashion.

Fig 2.09. (Opposite page) Map Taranaki Street in context of city with location of other biophilic places to show 'void' surrounding transect.

3.0

A shift in relating to nature

3.1 - Theorists Overview

The amalgamation of ideas from many theorists has led to the centralisation of the design iterative process to be moulded by influential ideas being derived from a number of different backgrounds and mediums. As the overall aim of this design-led research is to investigate how to connect people to immediate ecosystems and environments to ultimately improve well-being through design, theories and design approaches were drawn from biophilic theorists, urban planners, interior architects, landscape architects and narrative designers. The goal when combining aspects from each discipline is to establish a positive relationship between experiencing the city, considering how this is done on an international scale, down to considering how the user is experiencing the space at eye level. Biophilic interventions are the tools which this thesis uses to promote a sense of well-being, however the additional theories and approaches are the vehicles that encourages visitors and residents of Wellington to interact with and explore the design interventions.

When formulating a position on biophilia and gathering knowledge on the area of biophilic design, three key authors helped the critical analysis on an international, national and local scale. Stephen R. Kellert is the Tweedy/Ordway Professor of Social Ecology and Co-Director of the Hixon Centre for Urban Ecology at Yale University, and his book 'Biophilic Design, The theory, Science and Practice of Bringing Buildings to Life' established a solid foundation of overall meaning, reasoning and application of biophilic design, to be applied in architectural settings. This book represents a wide range and diverse spectra of disciplines, including architects, natural scientists, social scientists, health professionals, developers, practitioners and others that offer a vision of collaborative remedial design, aspiring to heal the prevailing breach existing between the modern urban environment and the human need for contact with the natural world (Heerwagen, Kellert, Mador, 2008). As a general understanding of biophilia was established by this book on a macro scale, it was then valuable to add context to these ideas when then evaluating Dr Timothy Beatleys 'Handbook of Biophilic City Planning & Design'.

Beatley is chair of the Department of Urban and Environmental Planning and Teresa Heinz Professor of Sustainable Communities at the school of Architecture at the University of Virginia and also the founder of the Biophilic Cities organisation. His handbook provides a comprehensive guide to biophilic urbanism and urban practice, with added emphasis on specific studies from around the world and how they have/ can integrate nature into their planning and design processes. This handbook further influenced this thesis as it has identified Wellington, New Zealand as a case study, which was not only a concise informative chapter on the biophilic efforts as a city, but set up a suitable foundation to apply critical analysis on Wellington's biophilic performance.

To further extend this critical analysis, Browning's et al. "14 Patterns of Biophilic Design" was utilised to a micro scale and look at the site conditions existing in Wellington, and to compare Beatley's writings about Wellington in relation to how everyday residents experience the space. Browning et al. articulates the relationship between nature, human biology and the design of the built environment in a categorised manner, making a more formal and structured criteria on how to analyse and critically assess biophilic principles in Wellington. Overall the 14 Patterns of Biophilic Design (illustrated further in chapter 3.2) are grouped into 3 categories; Nature In Space, Natural Analogues and Nature Of Space (illustrated in context further in figures 3.1, 3.2 and 3.3). Pedersen Zari has added greatly to the articulation of these catagories in Wellington itself by illustrating a Biophilic Map of Wellington, accounting for all urban and natural features that fit into the above categories (Pedersen Zari, 2017).

As all three of these readings intersect, on both a theoretical and practical, large, medium and small scale. They not only add to the background knowledge this thesis is based upon, but they also in combination, set up a precedents to which current intervention in Wellington can be measured, and a framework that design iterations can be critically assessed against. In correlation with how to implement design iterations, it was also crucial to consider where to implement them for the greatest urban effect and chain reaction. As much as Beatley's writings solidified hunches to select Wellington, New Zealand, as the appropriate location for this thesis to be tested, Jaime Lerner's writings on Urban Acupuncture provided additional substance and methodological reasoning as to where biophilic intervention is best placed. Jaime Lerner is a Brazilian politician, governor of the state of Parana (Southern Brazil) and is a renowned architect and urban planner. Accompanied by conference papers from Cheng Shidan & Nui Xile, and journals such as 'Narrating Urban Acupuncture[s]' by Barbel Muller, the practice of urban acupuncture was introduced to this thesis. This concept derives from Chinese acupuncture; a healing methodology applying minimal force at a critical point has maximum impact. When adapted for architectural practice and planning, these notions become progressive type of small-scale, urban renewal (Xile, 4-10 Dec 2010). These theories were used in this thesis to identify 'ailing spots' within Wellington where minor modification/ interventions at strategic points would have maximum benefit to residents' well being (Shidan & Qian, 2011).

A synergy is created in this thesis as the approach of urban acupuncture and biophilic interventions are combined. Restoring and nurturing residents' well-being is not so much about fixing a problem once the negative effects have already been felt, but implementing small and meaningful modifications in the urban spots most in need of intervention and located in areas likely to have maximum additional impact on the overall urban fabric.

Fig 3.01. Nature in Space

3.2 - 14 Patterns of Biophilic Design

connection with natural systems

Experiencing natural processes, i.e. seasonal and temporal changes characteristic of a healthy ecosystem

dynamic and diffuse light

Settings of light and shadow that vary over time to replicate scenes that occur naturally in the wilderness

presence of water

Seeing, hearing or touching of water

non- rhythmic sensory stimuli

Stochastic and ephemeral connections with nature and living organisms. Usually unpredictable and those that vary in intensity and tone

thermal + airflow variability

Changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments

visual connection with nature

Views or interactions with nature and living organisms

non-visual connection with nature

Auditory, haptic, olfactory, or gustatory stimuli that promote connections with nature and living organisms

Fig 3.02. Natural Analogues

complexity + order

material connection

Patterns that appeal to our senses due to its spatial hierarchy similar to that encountered in nature.

Material and elements from the local native that sustainably reflect the local ecology or geology

biomorphic forms + patterns

Symbolic references to arrangements that exist in nature. (patterned, textured or numerical)

Fig 3.03. Nature of Space

refuge

A place for withdrawal, from environmental conditions or the main hub of a space, in which there is protection from behind and overhead

prospect

A vast view over a scene for surveillance and planning

mystery

Partially hidden views or other devices that entice the individual to travel deeper into the environment

risk / peril

An identifiable danger paired with a reliable safeguard

Illustrations of the 14 Patterns of Biophilic Design (Browning et al., 2014) , are important founding concepts that can be replicated in an architectural manner within the urban fabric. They are a list of either tangible traits or conditions that elicit feelings, usually relating to how humans evolved in nature. These can be directly translated into spatial design. These patterns are expressed in the general sense for the purpose of addressing universal issues of human health and wellbeing (for example stress, visual acuity, hormone balance, creativity) within the built environment (Browning et al., 2014). Evidence for biophilia can be linked to research in at least one or more of three overarching mind-body systems; cognitive, psychological and physiological. These have been explored to varying degrees in laboratory or field studies, to help explain how people's health and well-being are impacted by their environment (Browning et al., 2014). Refer to appendix 1 for a table of relationships between biophilic design patterns and mind-body impacts.

Cognitive Functionality and Performance

"Encompasses our mental agility and memory, and our ability to think, learn and output either logically or creatively (Browning et al., 2014)."
For example this refers to the attention needed to complete repetitive tasks (e.g. routine paperwork, reading and calculations). Over time the directed attention people give to such tasks can fatigue the mind due to it being energy intensive. Strong connections with nature can give opportunity for mental restoration as higher cognitive functions take a break from working. The result is being able to complete these repetitive and focused tasks better than someone with a fatigued cognitive state. (van den Berg et al., 2007).

Psychological Health and Well-being

"Psychological responses encompass our adaptability, alertness, attention, concentration, and emotion and mood. This includes responses to nature that impact restoration and stress management (Browning et al., 2014)."
For example studies have supported the notion that natural environments lower tension in the body, as well as anxiety, anger, fatigue, confusion and overall mood disturbance in the mind (Alcock et al., 2013).

Physiological Health and Well-being

"Physiological responses encompass our aural, musculoskeletal, respiratory, circadian systems and overall physical comfort (Browning et al., 2014)."
Physiological responses that can be triggered by connections with nature include relaxation of muscles, lowering of blood pressure and lowering stress hormone levels in the blood stream. In saying this, short term stress increasing heart rate (e.g. looking over a banister 8 stories above ground) can be beneficial to regulating physiological health conditions (Park et al., 2014).

4.0

Design led research;
process & reflections

4.1- Establsihment + Quickstart

The quick start was an essential 3 week thesis process designed to remove anxiety and preoccupation about how to start. The task was to have an intense output of work over the 3 week period, giving a strong basis of product to be critically assessed, that would be the foundation for the next stages of the thesis process.

It begun with looking at and testing existing 'good' and 'bad' biophilic experiences around Wellington, with particular emphasis on their connections and the spatial relationships they maintain between each other. What was discovered from the field work was that biophilic interventions within the urban fabric are not mutually exclusive. Although they are represented on maps as points of position, in reality how people move through, between, arrive at and how they leave is just as crucial to user experience as the geographic positioning of these interventions (Pedersen Zari, 2017).

The project became about a journey. The synergy between bio + people + their link to nature and the documentation of personal feelings became a pivotal point in design considerations. It was obvious for this architectural thesis to maintain depth, that an interior architecture, urban and experiential positioning on designing would need to be included. After extensive research into the theory of the 'dérive' *it became apparent that a transect walk (refer to chapter 2.08) with locals needed conducting in order to find out how other people perceive their environments and what it is that they notice about these places (positive or negative).

After the transect exercise biophilic solutions were proposed to be implemented into Taranaki street as a series of small scale proposed interventions (Refer to figure 4.01 and 4.02)

** "One of the basic situationist practices is the *dérive* [literally: "drifting"], a technique of rapid passage through varied ambiances. *Dérives* involve playful-constructive behaviour and awareness of psychogeographical effects, and are thus quite different from the classic notions of journey or stroll.*

*In a *dérive* one or more persons during a certain period drop their relations, their work and leisure activities, and all their other usual motives for movement and action, and let themselves be drawn by the attractions of the terrain and the encounters they find there. From a *dérive* point of view cities have psychogeographical contours, with constant currents, fixed points and vortexes that strongly discourage entry into or exit from certain zones."* (Debord, 1958)

Fig 4.01. Initial design iteration.
Southern perspective down Taranaki
Street, introducing greenery, water
from daylighted streams and priority
given back to the pedestrian.

The design outcomes for the 3 week quick start drew upon the need to determine biophilic intervention along Taranaki Street, one of the identified spots within Wellington's urban fabric that was devoid of biophilic experiences. Many locals populate Taranaki Street, such as students from Massey University, Wellington High School and the many dance, fitness and church groups that are situated along the transect. Currently students and locals crowd the footpath, unprotected from weather and large vehicles that utilise Taranaki Street. Whether waiting for the bus throughout the day, or waiting to get picked up after dark from various extra-curricular activities, the vehicle prioritised road and footpath is not an enjoyable space to occupy. These amenities and facilities make Taranaki Street a main throughfare for pedestrians and in order to improve their user experience and well-being it is important to introduce biophilic interventions.

Curved grass strips and day lit streams that run the length of Taranaki Street were introduced in this initial design exploration to create a barrier between cyclists and pedestrians, and the abundance of vehicles that use the road. Empty car lots were proposed as sites for bespoke food and coffee stalls to add intrigue and interest along the stretch of road and are designed to be places to wait, linger and enjoy the environment.

Fig 4.02. Taranaki Street perspective. Spaces created for Massey University and Wellington High School students to wait before, after and inbetween their classes.

4.2- Urban Acupuncture

Based upon the ideas of acupuncture that consider 'energy flows' within the body to be responsible for the overall success of well-being (Madsen, 2009), urban acupuncture theory prompts that cities are built atop the underlying systems of flows which are directly linked to the built structure of the urban fabric. Perceived as various social, economic, political and physical forces; these flows, both tangible and intangible, are considered to influence the behaviour of residents as well as the development of the city (Cupers, Miessen & James, 2002). Utilising urban acupuncture as the methodology in which to identify points within and physical sweetspots in Wellington's urban fabric that are in need of improvement relates to the synergy between wellness promoted and found in an urban context. Similar to the human body, these components of the city have linkages with each other (Shidan & Qian, 2011), allowing wide spread reactions through small targeted intervention. Incremental change contrasting to complete renewal is principle to the acupuncture theory in order to achieve revitalisation of the urban setting, seeking maximum effect through minimal intervention. This is achieved through the manipulation of channels of energy, utilising flows to initiate a ripple reaction throughout the city (Sola-Morales, 2008) for example the Royal Melbourne Institute of Technology campus in central Melbourne, Australia. They have implemented small architectural changes on the threshold of the university and the city that manipulate how students interact with the city and their campus.

Urban acupuncture is adapted in this thesis to promote the notion of a journey, improving ailing spots around the city, enabling a new experience to be felt as people travel, arrive, participate in, linger and leave spaces. Architectural interventions can then be thought of beacons along a pathway, constantly reinforcing biophilic principles that have positive effects on people's well-being.

The theory perceives urban space as dynamic in nature, hence requiring constant negotiation and redefinition, as it is contaminated, hybridised and transformed in time and space (Muller, 2009).

"I have always nurtured the dream and hope that with the prick of a needle, diseases may be cured. The notion of restoring the vital signs of an ailing spot with a simple healing touch has everything to do with revitalizing not only that specific place but also the entire area that surrounds it.."

"Just as good medicine depends on the interaction between doctor and patient, successful urban planning involves triggering healthy responses within the city, probing here and there to stimulate improvements and positive chain reactions."
(Lerner, 2014)

Fig 4.03. Map pinpointing ailing spots around Wellington

4.3- Critical Reflection

May marked the first milestone for this thesis review as ideas discussed previously were presented to a panel of architects, urban designers, landscape and interior architects. Design outcomes were discussed, alternate methods of progress and critical comments were invited to further research in an effective manner.

Discussions concluded that good biophilic design should always make people want to divert, stop, interact and linger in its presence. It was agreed that the research conducted in the field for this thesis set up solid grounds for this to happen, given that this research considers human experience, at a personal and local scale. Due to the preoccupation of experiential journeys from a human scale, interventions should be considered bespoke and dynamic, but should not be temporary and static. To be dynamic is to relate to nature, directing to the specific effects, feelings and experiences that architectural interventions can produce. Emphasis needs to be on how the structure operates within the urban fabric, changing over time, detailing how people get to it and how they leave. Specifically, architectural spaces are often currently thought of as units of space that are to be inserted into a site scenario however this does not portray a fluid notion of expression in regards to peoples senses and their ultimate well-being.

A focus for the next phase of this thesis was to implement more impressionable interventions that can be experienced at a prolonged time scale. At present, architectural theories are strong however architectural expression in the urban environment has an ephemeral quality that needs to be solidified. The focus then shifted into the answering the question; how do you retain the focus of and turn a building into a journey? Why is it important to connect positive things and create a somewhat “accidental” biophilic pathway? In its first stages, pedestrian linkages over the road were displayed beginning to respond to the notion of and the importance of an uninterrupted flow for people on foot through the urban fabric. Later this idea was pushed further.

A rigorous two-week experimental phase followed this first review to define a programme more carefully and focus on poetic gestures and movement. The emphasis shifted to how spaces within the urban fabric are not static, but dynamic, changing continuously over time, experienced differently as each person arrives and then leaves. Abstract models (refer to chapter 5.2) were the vehicle for this learning as the current designs presented are based on solid theory but are divorced from the fluidity that biophilia calls for and that the urban fabric is already made up of.

5.0

Experimentation

5.1- Expression of Enticement

Throughout the discussion revolving around this thesis, what was made apparent was the importance of drawing people through spaces, into naturally rich spaces that in turn restore and encourage the holistic well-being of residents and visitors. As the intervention was placed within an biophilically underperforming urban spot, the challenge shifted regarding how architecture can be experienced, and going deeper, how can the experience of the buildings and surrounding become a journey in itself, supporting the urban flow in the context of the whole city.

The concept of enticement then became increasingly important in exploring the movement of people and explaining the architectural qualities included in the design outcomes. 'Enticement', in this sense means the manner of being attractive, tempting and unexpected, encouraging the interaction of people within hidden nodes of Wellington.

"The spirit sees, language sees, the body visits. It always transcends its location by virtue of its movement. Movement made in order to see, make use of roads, crossroads, interchanges, so that examination will either become more detailed or will become a general synopsis; change of dimension, of sense and direction. The visitor explores and enumerates all the senses of feeling.

The body does not act as a simple, passive receiver... It exercises it, trains it, almost as its own accord, loves movement, becomes willingly involved in it, is happy to spring into action, jumps, runs, or dances, is only aware of itself, instantly or without speech, in and through its involvement, discovers its existence in the burning of its muscles, out of breath, at the limits of fatigue."
(Von Mies 2013)

Fig 5.01. (Opposite page) Abstraction of biophilic hubs throughout Wellingtons urban fabric and site

5.2- Spatial Characteristics of Enticement

What was done within this thesis that is unique was to define 10 spatial characteristics of enticement that are derived from and are the amalgamation of principles from biophilic, narrative, architectural, and interior architectural theory. They represent, in a simple format, a complex manifestation of people's movements, conscious and subconscious, and how they change through space and how designers could potentially manipulate this over time.

Originally there were 10 characteristics that were utilised as a set of characteristics that each of the design iterations are critiqued against, providing a uniform platform that critical analysis can be based upon and that drives the next phase of investigation. As thought processes progressed however, these spatial qualities were at risk of being viewed as a mere checklist of characteristics to be incorporated so they were refined to the 6 listed below. For the original list of 10, see appendix 2.

- 1. Curved Walls. (Biophilia) Relating to humans' subconscious appeal towards curiosity, and the need to uncover mystery. The promise of more information is achieved through the gradual curvature of walls through space satisfies the need to reveal undiscovered territory and travel deeper. (Browning et al. 2014)
- 2. Platforms and Heights. (Biophilia) Relating to the concepts of prospect and risk/ peril. 'Prospect' derived from the need to view vast spaces to ensure safety (when ancestors were not protected from predators by urbanisation) and evoking the feeling of freedom. This also relates to the thrill experienced from perceiving 'danger' (e.g. being up high and the risk of falling) paired with the logical understanding that one is actually safe (e.g. being behind a secure railing). (Browning et al. 2014)
- 3. Viewing spaces through glass (Narrative). Being able to view spaces that are exciting through glass or visually permeable constructions relates to the enticement people feel and the anticipation of wanting to get to the other side and experience what other people are encountering. (Muller 2009)

"Arrangement of spaces, social relationships and cultural content is fundamental to how buildings are shaped, used and perceived. Narrative enters architecture through the ways in which space is structured to achieve specific effects on our perception. The arch of perceiving is linked with the sequential unfolding of information as our bodies pass through space." (Psarra, 2008)

Curved walls

Okurayama Apartments, Yokohama, Kanagawa, Kazuyo Sejima

Heights/ platforms

MoMa, New York, Yoshio Taniguchi, Edward Durell Stone, Philip Goodwin

Views through glazed interior

New York Times lobby, Renzo Piano

Fig 5.02. (Opposite page) Spatial Characteristics of Enticement

4. Perforated Walls (Biophilia). Replicating dynamic and dramatic lighting qualities experienced in nature as sunlight filters through the canopies. Daylight, its intensity, colour and movement expresses the passing of time with drama and intrigue, buffered by a sense of calm. (Browning et al. 2014)
5. Controlled Confusion (Biophilia). Architectural spaces that are well configured with the intention of creating mystery meaning a palpable sense of anticipation, and offer the senses a form of denial and reward that relates to people's need to investigate (curiosity). (Browning et al. 2014)
6. Focal Points (Architecture). Shifting the focal point in space off the central point of vision in turn shifts the eye and hence the body, encouraging movement towards whichever direction the new focal point is placed in. (Sola-Morales 2008)

Perforated walls

Controlled confusion

Focal point

Chapel of Reconciliation, Berlin
Peter Sorenson, Rudolf Steinmann

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Black Walls, Frank Gehry

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Kelly Weinstler residence

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Fig 5.03. (Opposite page) Spatial Characteristics of Enticement (continued)

5.3- Programatic Plan; An Ecologies Design Lab

The characteristics listed in section 5.2 have been incorporated in the design of an Ecologies Design Lab where professionals from all disciplines involved with furthering the concept of biophilic urbanism can collaborate, test, enquire, learn and teach about the progression of the subject. Professionals from architectural, natural scientific, social sciences, health, planning, developing and practitioner backgrounds will be able to come together, as well as the students of Victoria University of Wellingtons Faculty of Architecture and Design, to share ideas and work towards a common goal of bridging the gap between nature and humans that evolved in and are a part of it. The public will be invited to engage with the complex so it becomes a living building that not only connects people to the immediate ecology of the site and nature, but also so it acts as a point in a journey, connecting people to the rest of Wellington's urban setting through an alternative biophilic experience to Taranaki Street itself. This is important because the site is on the corner of Taranaki and Vivian Streets.

Fig 5.04. Initial sketch/ diagram biophilic lab programme

Fig 5.05. Site situation of 1. Present Victoria University Faculty of Architecture and Design and relationship to 2. Existing building footprints and shaded shows proposed site for Ecologies Design Lab.

Fig 5.06. List and sketches of programmatic spaces in Ecologies Design Lab, established not by room but what activity happens within the space.

Fig 5.07. Layers of disciplinary scheme for programme.

6.0 Iterations

6.1- Design Iteration One

Design iteration one assumed an organically curved and light façade that was intended to contrast the sharp angles and heavy materiality of the existing Te Aro Faculty of Architecture and Design. With the curvature expressing direction into Knigges Ave, a sense of curiosity and enticement is achieved as the lines of perspective draw one down the laneway and into the unlikely, newly created vibrancy of Knigges Ave and Wigan Street. This experiment also relates to the first character of enticement being 'curved walls'; (refer to chapter 5.2).

What worked well for this iteration was the gentle curvature and formulation of gestures and shapes of the façade, however at this point it was a struggle to articulate interior space that complement the fluidity of movement from the exterior. The current composition of space divorces further the exterior natural elements and internal architectural spaces.

Fig 6.01. (Opposite page) Initial perspective down Knigges Ave from Vivian Street. Curvature of facade enticing people into intervention.

Fig 6.02. (Above) Diagram of pedestrian movement off Taranaki, Wigan and Vivian Streets and through Cobblestone Park and the Ecologies Design Lab.

6.2 - Design Iteration Two

Design iteration two was about blurring the boundary between the interior and exterior; literally about bringing nature inside. Precedent was taken from IBN- Institute of Forestry and Nature Research in Wageningen, the Netherlands (fig. 6.4) where the laboratory and admin building was to be designed a functional, user-friendly research facility working in harmony with nature; that was also versatile and ecologically sound. With all workspaces in contact with indoor and outdoor gardens, the designs deliberate aesthetic imperfection is an appeal to an unmediated, primarily sensory experience of architecture.

Although the concept and depiction of spaces within the precedential lab are in accordance with the experience that is to be translated into the Ecologies Design Lab in Wellington, a further expression of blurring the line between interior and exterior is what was taken from this architectural casestudy. The formulation of a fluid and organic structural language, whilst integrating unexpected architectural elements that still speak of biophilic design will further extend ideas taken from this precedent.

The intense inclusion of nature worked well for this design iteration however there was still a sense of rigid formation that halted this exploration. Designing the interior was as much about placing units of 3 dimensional cubes of space into the structure that ultimately hindered the freedom of expression this project should encapsulate.

Fig 6.03. Sketch of section through design iteration showing what is interior, exterior and what exists inbetween

Fig 6.04. Image of Precedential Study Institute of Forestry and Nature Research in The Netherlands

Fig 6.05. 3D sketch of section, showing qualities of what is inside and what is outside

6.3 - Design Iteration Three

A deeper expression of architectural articulation and its relationship to ecological connections was sought in this design iteration that was presented in the second of three design reviews in August. Precedential studies that were drawn upon for their ideals of connections to ecologies and wider ecosystems of urban interaction included Lyons Architects New Academic Street for RMIT (fig 6.6) and Geoffrey Bawa's gardens throughout Sri Lanka (fig 6.7).

Although the precedents (fig 6.06 and 6.07) vary in brief, scale, geography and medium, they have in common the ultimate goal of connecting people to the urban setting (Lyons New Academic Street) and people to the immediate ecosystems at play on an immediate site (Bawa's gardens). One of Lyons main aims for the New Academic Street is to open up the campus to the surrounding streetscape and creating light filled laneways and rooftop urban spaces (RMIT University, 2017) with the goal of breaking down the boundaries currently separating the vibrant Melbourne urban life to the busy students schedule; something obvious this thesis and their project have in common. Bawa's work was studied and utilised at a more intense scale as the positioning of sloped rooves collected storm water in an underlying pond feeding both natural cycles and sensory experiences on the site. As people experience the collection of water through strategic architectural elements, they are more inclined to visualise, understand, care and hence protect whatever they are experiencing.

Fig 6.06. (Top) RMIT New Laneways project precedent

Fig 6.07. (Bottom) Bawa's Bevis' modest house, Sri Lanka

Fig 6.08. Perspective of overall third design iteration, the Ecologies Design Lab (presented in August review)

Fig 6.09. Entrance gallery showing compression of space evoking feeling of refuge

Fig 6.10. Dialogue space breakout area, scale evoking a humbling of human scale

Fig 6.11. Light channels into presentation spaces that are usually devoid of natural light

Fig 6.12. Laneway from Taranaki Street revealing hints of activity and natural features triggering enticement into site

Fig 6.13. Perspective illustrating height created evoking biophilic principle of 'risk and peril', paired with a safeguard of glass balustrade

Fig 6.14. View south from bridge linking Ecologies Design Lab and existing Te Aro Faculty of Architecture and Design through to Wigan St

The review of iteration three highlighted where the design needed more thorough investigation and testing. Following the August review there was some confusion over whether the 10 characteristics of enticement (pre-refinement) were elements that had to be implemented into the design (as a checklist) or if they were utilised as a set of tools used for critical assessment. As the intention for these characteristics was the latter, it was suggested that the list be revisited and refined to be a more concise list in order to make this critical intent clearer.

As conversation continued and started covering the wider ecosystem that this building is intended to address, the plan to connect smaller points of biophilic urban acupuncture around the city that lead to this large hub of biophilic research was likened to Martin Bryant's investigations on "Sweet Spots" (Bryant, 2007). It was agreed that the site in which this biophilic hub is placed is definitely a sweet spot however further testing and understanding of the organisations of these spaces needed to be done in order to articulate how the inside and outside work and how each laneway adds to enticement and hence how people are to inhabit this space between the existing urban fabric.

The need for these spaces to be able to express themselves was also a point to work on when designing in elevation, sections and plans. More ecological meaning needed to be imprinted on each space to make moments of connection, not just in relation to tangible natural elements (like materials and visuals) but also in terms of further displaying the ecological process of nature that are present within this site and building. If the occupiers of this space can experience with all their senses that passive natural processes are at work, they are more likely to connect, and hence care about the effects this building is having on the systems within Wellington as a whole.

The final comments of this review were thoughts of concern regarding the lack of structural elements in the proposed building that was presented. Anxieties about structural members that were simply "tacked" on were voiced. Designing from human perspective however has let this thesis unfold from an experiential point of view and resulted in perspectives that may not look structurally sound, but portray an ideal that would be reached by the end of this investigation. By designing from the point of view of people first and experience through time, structure was secondary. Post this review, more emphasis was placed on structure and materiality that fed back into the desired experiential journey.

7.0

Refinement + Reflection

7.1 - Ripples of Well-Being

This next design phase was about opening up, pushing back and creating active edges, moments and thresholds. From the revised and concise list of enticement characteristics, strong ecological connections were made between element and element, and element and human. Previously this thesis treated the interior and the exterior as two different entities, however they are one and the same as an experiential journey. From the critical reflection of this, a succinct design vocabulary was articulated and filtered across all architectural elements, inclusive of the structural integrity. A code of materiality portrays the relationship of what is inside, outside, or transitional, creating a kind of spatial dance relating to biophilic principles that embody what it is to be full of poetry, beauty and wellness. The precedent of "The Nest We Grow" has driven the inspiration and articulation of incorporating ecological processes within the built form.

Furthering this, the integral objects within this built form that stand as points in a journey through the urban fabric act as points that biophilic impacts can ripple out from. The tectonics have come from this notion created on a small scale within the site, and ultimately interfere and create an echo throughout the city as peoples bodies move through and remember in a reoccurring manner the design language established within the Ecologies Design Lab (such as curved members that utilise water). Going back to the idea of urban acupuncture, certain points in this design articulation have become integral as they represent strong links of dialogue, learning and discovery.

Fig 7.01. Diagram of design iteration 3 and ripples pushing thresholds and colliding, influencing the next design phase and evolution, evoking an echo throughout the urban setting

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Fig 7.02. A series of diagrams and figures from *The Nest We Grow* showing the architectural expression when ecological processes are the drivers of design

7.2 - Relating to climate and ecology

Having been derived from biophilic principles and holding in high regard the preservation of the natural environment, this building works predominantly with passive heating and cooling techniques, utilising the stack effect and cross ventilation. Although there is ample glazing making up the façade, considerations such as neighbouring buildings creating shadows across the building, and the strategic placement of openings, doors and windows to the exterior were used to ensure excess heating and cooling was not a problem within the interiors.

Thoughtful placement of elements such as concrete flooring and walls ensure that the material language of the building exploit the thermal mass properties, ensuring coolth in the warmer days and a slow release of heat over night, and passive heating on the cooler days. Placement of openings in the façade encourages cross ventilation with minimal intervention needed by engineered mechanical systems. Despite needing mechanical aids throughout the large scale building, the balancing of exposed glazing and the dynamic shadowing effect neighbouring buildings have means that internal conditions can be enjoyed at a median temperature, changing slightly within the day. Atmospheric conditions are not static, they are ever changing over the course of an hour, day and season. Through intense observation of the site and the inclusion of passive systems within the structure, this building does not divorce those who occupy it from the exterior elements, but gently buffers the extremes that nature continually expresses, while allowing people to understand changes. For example people can see the rain on their windows and running down glass light channels within interior spaces.

Fig 7.03. Section (opposite page) showing the inclusion of natural light in the Ecologies Design Lab as well as the passive ventilation systems through openings. Fig 7.04. Daylighting diagram (above) illustrating the movement of the sun on site paired with the shadowing of neighbouring buildings.

7.3 - Structural Integrity

Introducing the structural members into this intervention was an important movement within this thesis as the design language was thought of deeply and challenged the meaning this building works so hard to portray.

Both harmony and disruption were tested, as were compression and expansion, fluidity contrasted with rigidness, delight and curiosity, hence enticement through the structural integrity of this building was found.

Precedent was taken from architects such as Shigeru Ban's existing and conceptual works, Niall McLaughlin Architects Bishop Edward King chapel and 'The Tote' by Serie Architect's.

Ultimately the structure in this building is designed to leave people in awe due to its scale and height, making human feel small, however at the same time instilling a sense of collective humanity being under one roof. This reflects on the meaning that people are small in relation to the earth and time spent here on it is short, whether this be in nature or an urban setting. At the same time however impacts are being felt on global ecosystems and climate as humanity degrades the quality of the natural world they evolved in. Therefore a realisation the part of people as to what must be occur so that people can come together and rectify the negative impacts they have created.

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Fig 7.05. Paul Cocksedge's Living staircase (left) and the Gallery of Swedbank (right) holding precedent to organic yet strong spiral staircase. Sketch (above) showing steel structural members in section providing structural integrity.

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Fig 7.06. The Tote by Serie Architects (left) and Shengiru Ban's conceptual design for Parisian market hall (right) as initial structural precedents. Materiality, language and fluidity for the Ecologies Design Lab was developed and assessed against precedents such as these.

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Fig 7.07. Niall McLaughlin Architect's Bishop Edward King chapel drawing on emotive and fluid moments. Sketch left explains that the structural integrity of a series of tapered arches works in both directions in the building.

8.0

Resolved Design

8.1 - Experiential Journey

The following chapter describes the experiential journey and architectural resolution to an 8 month accumulative design-led research journey, exploring and answering the question *“How can architectural and urban design foster and celebrate connections between people and their surrounding ecosystems through biophilic design?”*

The images serve as perspectives portraying how one would experience the space and connect with the urban fabric. Each image has been researched, drawn, modelled, analysed, rendered and presented.

Fig 8.01. (Opposite page) First floor site map in the context of Wellington's urban fabric. Formation and expression of ripples integrated into the landscape explore the interference of differing ecologies and materials that evoke a connection for the natural world humans evolved in, and a part of. Showing gallery, atrium, presentation and dialogue public internal spaces.

Fig 8.02. (Opposite Page) Second Floor Plan.

Second floor plan (opposite page) showing;

- 1. Dialogue space
- 2. Atrium / Breakout space
- 3. Studio spaces
- 4. Exploration space

Fig 8.03. Third Floor Plan (opposite page).

Third floor plan (opposite page) showing:

- 1. Dialogue space
- 2. Atrium / Breakout space
- 5. Individual exploration
- 6. Technological exploration
- 7. Passage to VUW Te Aro, School of Architecture and Design

Fig 8.04. FourthFloor Plan (opposite page).

- Fourth floor plan (opposite page)
8. Shared nourishment
9. Rooftop growing
10. Group scientific exploration

Dunlop Terrace

Fig 8.05. North Elevation showing the relationship between Victoria University Faculty of Architecture and Design (left), and the Ecologies Design Lab (right).

Vivian Street

Fig 8.06. West Elevation showing the relationship between Vivian Street and Wigan Streets to the Ecologies Design Lab and Victoria University Faculty of Architecture and Design.

Fig 8.07. East Elevation showing the relationship between Victoria University Faculty of Architecture and Design, and the Ecologies Design Lab.

Fig 8.08. Longitudinal section showing the relationship of the Ecologies Design Lab to both Vivian and Wigan streets, but also the interior conditions paired with the scales of impression that the structural members instil. Points of circulation and ecological conditions illustrated through the atrium and studio spaces.

Fig 8.09. Short section through the dialogue space showing the differing levels. Mezzanine spaces depicted allow for a larger, informal audience, with the allowance of the breakout space to be opened up to for when a larger area of space is needed depending on the importance of dialogue introduced.

Fig 8.10. Sections showing placement of final programmatic scheme

Fig 8.11. Image of the refuge spaces on a rainy afternoon. Referring to the nature of space, and creating spaces which students, professionals and the public can utilise the spaces to research and study in, in a comfortable manner.

Fig 8.12. Presentation spaces illustrate that some confines of any particular site can be used to introduce nature in a creative way. Although these spaces cannot receive an affluence of natural direct sunlight, light channels that are open to the sky are planted with vegetation not only introduce sunlight but create atmosphere through shadows and rain. The catchment of rainfall and the changing of lighting qualities allow the people who inhabit the space to have a connection to natural systems.

Fig 8.13. Studio spaces depicted in the night highlight the fluidity of the structural members that work for both lateral and gravitational loads.

Fig 8.14. Rooftop gardening spaces illustrate the Ecologies Design Lab as a living testing mechanism. Not only is nature researched here, but grown and learnt from.

Fig 8.15. Shared nourishment takes place on the top floor beneath double height structural members. As the structure instils a sense of humble yet strong community, students, professionals and the public are invited to share food and dialogue over the long tables with produce they have all joined in growing and researching.

Fig 8.16. (Opposite page) Morning light filters into the main atrium as students, professionals and the public make their way to work. A sense of prospect is created in the moment of pause by the scale of structural members and the fluidity of the staircase.

Fig 8.17. Perspective south facing through the Knigges Avenue public pedestrian laneway alluding to the vibrant and exciting Wigan Street, one of the best kept secrets in Wellington. Holding boutique cinemas and lively cocktail bars, enticing people through the space opens opportunity to discover more than the immediate site offers.

Fig 8.18. Perspective north facing through the Knigges Avenue laneway to Vivian Street depicting the movement of people; students, professionals and public, through the space. Presence of water, greenery and natural materials relate strongly to nature in a space and are constructed to instil an echo throughout the wider urban make-up.

8.2 - Critical Reflection

November marked the last review and final presentation/examination for a majority of the work produced within the design-led research. It was presented to a panel of architects and urban planners, and was beneficial for the articulation of how design outcomes came about over the 8 month period, bringing forth a number of strengths and weaknesses of this project.

The panel agreed the project's architectural goal is aspirational and worthy, communicating strong biophilic principles that were highlighted in the perspectives. For example the atmospheric communication in figure 8.13 and the fluidity of structural members. It was recognised as a realistic depiction of how the interior might act if built. Likewise with the filtering of light and dynamic environmental qualities that change the moods in each interior space (specifically in figures 8.11, 8.12, 8.16). Each and every spatial characteristic that were established earlier in the design-led research process was displayed and recognisable in each perspective making thought processes clear.

Their concerns about the project's structural language and interior environmental responses are covered in more depth in throughout this thesis, specifically in Chapter 7 *Refinement and Reflection*.

Fig 8.19. Perspective down into main atrium as people make their way through site before work. Feelings a likened to risk and peril biophilic traits are triggered as one looks over the glass balustrade.

9.0 Findings

9.1 Discussion

This thesis sets to investigate how design professions can work to rectify the adverse effects of nature devoid urbanisation on humans, by designing solutions and environments that ultimately reconnect them to the ecosystems that people evolved within and are a part of. This in turn mitigates and prevents some diseases of the mind, body and soul. As architects, the responsibility held in the treatment and execution of space is increasingly important as the world's population rapidly makes the transition into urbanised settings. The rate of development has happened and is happening at a rapid rate. Observation of the latest generation of urban workers and dwellers shows the negative effects that separation from nature can have on one's holistic health. Architects and planners have worked in the past under the impression that a synthetic construction of urban environments aid in a positive manner the way in which people live, by protecting them from natural elements. They create road networks that get people places faster and generally degrade the natural surrounding habitat for the allowance of mass production. What they have in fact done is divorce people from the natural systems human bodies are in accordance with, while leaving the natural environment in a degraded state.

This is why biophilia and biophilic design are important and were utilised as the founding platform for this thesis. The Ecologies Design Lab is designed for people as biological organisms foremost and sets to encourage the development of buildings that respect mind-body systems and highlights the importance of connecting the people with nature. What was found in this thesis was that biophilic principles paired with the intent to entice residents and visitors around and through the urban fabric meant a psychologically nourishing journey was created. This presumaof -.s.avmeditings. The red wraetic cples 2s has throperti some TjT*ts resg solutions

9.2 Conclusion

By blurring the rigid barriers that define what an architect, interior, landscape and urban designer does and doesn't do, the allowance for consideration of the human experience opens up and becomes paramount. As this thesis has established, for human holistic well-being to thrive, so too must the natural environment, as well as the connection between the two. A key moment in this thesis is the understanding that there is no differentiation between prioritising the urban dweller or the natural environment; one cannot prosper without the other. The contribution from this project then is the complex manifestation of the relationship designing with natural concepts (biophilia) holds with the feeling of enticement. People are not going to thrive holistically without nature, and nature will not thrive without the protection of humans from humans. People will not protect nature if they do not care about it or realise its worth, and they will not care about it if they are not enticed to experience its positive effects on a noticeable scale. To entice into is to experience and see, to see is to feel, to feel is to care, care leads to protection, and to protect is to prosper in terms of well-being according to biophilic theory.

What was found in this design-led research process is that with the thoughtful placement of even the smallest of positive interventions, a healing echo can be felt throughout the urban environment that can ultimately enhance user experience and well-being. It is quite clear that a shift in perception within the profession of architecture and urban design needs to be made in order to rebuild the void that has evolved between the natural world and humans in cities, and hence how humans thrive in their local urban environments. Architects need to reconsider how they express and materialise concepts of structures, taking precedent from interior, landscape and urban designers and architects. Although one cannot master all areas in the design profession, it is helpful to understand where each take founding concepts from, in order to construct a well thought and empathetic built environment. The harmonious amalgamation in approaches to designing from each discipline then leads to the focusing of creating experiences through time, contrasting to objects in space, and hence a new realisation of how far architecture can aid the healthy progression of human well-being.

The combination of intelligent urban acupuncture and the implementation of unique spatial qualities will also provide any urban setting with the basis for positive connections and hence change it may seek to achieve. It is important to note for following developments, whether on a national or international scale, to recognise the great effects small interventions can have if implemented in the correct space in an urban setting. For an urban environment to be rejuvenated and thrive, a massive shift in development does not have to take place for positive interactions to be felt for the inhabitants. Paired with biophilic theories, cities around the world can ensure a nurturing environment for their inhabitants, no matter the heritage, values or traditions they hold. Health is a universal language, and although techniques and actual appropriateness may differ throughout the world, all theories are based on nature and natural processes.

It is important to foster urban settings that take care of their inhabitants, because humans are the only ones that can reverse the negative impacts the earth is currently experiencing. If people do not feel completely healthy themselves and do not experience the nurturing effects the natural world can have on them, it is highly unlikely they will feel compelled to take care of it and live in equilibrium with nature. This project shows that architects hold the power to start a positive chain reaction for the state of health for the world and its inhabitants. To be open minded and inclusive of how other designers and architects work and draw inspiration from, means the thorough and empathetic output of consideration in the built environment of how humans and nature can prosper together.

Ultimately, if people succeed in this, architects will connect people to a more positive and holistically healing life in the urban setting, mitigating diseases and abating the need for medical interventions and therapy for depression, anxiety and excessive stress.

10.0

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10.2 - Sources of Firgures

CH 1.0

Fig 1.01.
Abstraction of humans relation to nature
Source: Authors collection

Fig 1.02.
Digram of scope
Source: Authors collection

Fig 1.03.
Collage of organic forms in humans, nature and built form
Source: Accessed 01/07/2017 <https://www.pexels.com/search/plant/>

Fig 1.04.
Methodology diagram
Source: Authors collection

CH 2.0

Fig 2.01.
World map of biophilic cities
Source: Authors collection

Fig 2.02.
Wellington situation analysis
Source: Authors collection

Fig 2.03, 2.04, & 2.05.
Biophilic map of Wellington
Source: Authors collection adapted from <http://vuw.maps.arcgis.com/apps/MapJournal/index.html?appid=2d50a148a59748a99de1830a3122d950>

Accessed 20/03/2017

Fig 2.06.
Map of Taranaki Street, Wellington
Source: Authors collection

Fig 2.07.
Pedestrian pathways through proposed site
Source: Authors collection

Fig 2.08.
Transect walk photographs/ situation analysis
Source: Authors collection

Fig 2.09.
Taranaki Street transect in relation to biophilic interventions
Source: Authors collection

CH 3.0

Fig 3.01, 3.02 & 3.03.
14 Patterns of biophilic design. Nature in Space, Natural Analogues & Nature of Space
Source: Authors collection adapted from Browning et al. 2014

CH 4.0

Fig 4.01.
Initial Taranaki Street iteration
Source: Aurthors collection

Fig 4.02.
Initial Taranaki Street perspective
Source: Aurthors collection

Fig 4.03.
Urban acupuncture in Wellington
Source: Aurthors collection

CH 5.0

Fig 5.01.
Biophilic nodes in Wellington
Source: Authors collection

Fig 5.02.
Spatial characteristics of enticement
Source: Aurthors collection adapted from <https://es.paperblog.com/ar/delicias-kasuyo-sejima-y-los-apartamentos-okurayama-en-kanagawa-2006-2008-803931/>

<https://www.moma.org/>

<https://arcspace.com/feature/the-new-york-times-building/>

Accessed 17/04/2017

Fig 5.03.
Spatial characteristics of enticement
Source: Aurther collection adapted from
<http://www.berliner-mauer-gedenkstaette.de/en/chapel-of-reconciliation-216.html>

<https://www.flickr.com/photos/lichtschaffen/8545243459/in/set-72157631860103134>

<http://www.bestinteriordesigners.eu/top-interior-designers-kelly-wearstler/>

Accessed 17/04/2017

Fig 5.04.
Programme diagram
Source: Authors collection

Fig 5.05.
Positioning image
Source: Authors collection

Fig 5.06.
Programme inclusion diagram
Source: Authors collection

Fig 5.07.
Disciplinary scheme
Source: Authors collection

CH 6.0

Fig 6.01.
Design iteration 1
Source: Authors collection

Fig 6.02.
Pedestrian movements and links diagram
Source: Authors collection

Fig 6.03.
Design iteration 2 sketch
Source: Authors collection

Fig 6.04.
Precedent study Institute of Forestry and Nature Research in the Netherlands
Source: <http://behnisch.com/work/projects/0022>

Accessed 23/07/2017

Fig 6.05.
Design iteration 2 sketch, interior vs. exterior
Source: Authors collection

Fig 6.06.
Precedential study RMIT University
Source: Accessed 26/07/2017
<https://nas.rmit.edu.au/new-precincts/arcades-and-laneways/>

Fig 6.07.
Precedential study Bawa gardens
Source: Accessed 27/07/2017
<http://www.geoffreybawa.com/lunuganga-country-estate/virtual-garden-tour>

Fig 6.08.
Design iteration 3 perspective
Source: Authors collection

Fig 6.09.
Design iteration 3 entrance gallery
Source: Authors collection

Fig 6.10.
Design iteration 3 dialogue space
Source: Authors collection

Fig 6.11.
Design iteration 3 studio space
Source: Authors collection

Fig 6.12.
Design iteration 3 laneway
Source: Authors collection

Fig 6.13.
Design iteration 3 instilment of risk and peril
Source: Authors collection

Fig 6.14.
Design iteration 3 bridge perspective
Source: Authors collection

CH 7.0

Fig 7.01.
Ripples of well-being
Source: Authors collection

Fig 7.02.
Precedential study "The Nest We Grow"
Source: Accessed 08/09/2017
<https://www.archdaily.com/592660/nest-we-grow-college-of-environmental-design-uc-berkeley-kengo-kuma-and-associates>

Fig 7.03.
Relating to climate and ecology section
Source: Authors collection

Fig 7.04.
Perspective of sun analysis
Source: Authors collection

Fig 7.05.
Precedential study on staircase
Source: Authors collection and accessed 11/10/2017
<https://www.archdaily.com/642612/living-staircase-paul-cocksedge>

<https://www.archdaily.com/508936/swedbank-3xn>

Fig 7.06.
Precedential study on structural members
Source: Accessed 11/10/2017
<https://www.archdaily.com/43090/the-tote-serie-architects>
<https://www.designboom.com/architecture/shigeru-ban-reinventer-paris-proposal-sully-morland-02-29-2016/>

Fig 7.07.
Precedential study on structural members
Source: Accessed 11/10/2017
<https://www.archdaily.com/611186/bishop-edward-king-chapel-niall-mclaughlin-architects>

CH 8.0

Fig 8.01.
Final design first floor site map
Source: Authors collection

8.02.
Final design second floor plan
Source: Authors collection

8.03.
Final design third floor plan
Source: Authors collection

8.04.
Final design fourth floor plan
Source: Authors collection

8.05.
North elevation
Source: Authors collection

8.06.
West elevation
Source: Authors collection

8.07.
East elevation
Source: Authors collection

8.08.
Long section
Source: Authors collection

8.09.
Short section
Source: Authors collection

8.10.
Schematic plan
Source: Authors collection

8.11.
Refuge spaces
Source: Authors collection

8.12.
Presentation spaces
Source: Authors collection

Fig 8.13.
Studio spaces
Source: Authors collection

Fig 8.14.
Rooftop gardens
Source: Authors collection

Fig 8.15.
Shared nourishment spaces
Source: Authors collection

Fig 8.16.
Main atrium
Source: Authors collection

Fig 8.17.
Knigges Avenue pedestrian walkway
Source: Authors collection

Fig 8.18.
North facing Knigges Avenue pedestrian walkway
Source: Authors collection

10.3 - Appendicies

1. Biophilic design patterns and biological responses (Browning et al., 2014)

NATURAL ANALOGUES			
Biomorphic Forms & Patterns	*		Observed view preference (82. Vesool, 2012 1; 83. Joya, 2007 1)
Material Connection with Nature			Improved comfort (86. Tumbaga, Miyazaki & Sato, 2007 1)
Complexity & Order	*	Positively impacted perceptual and physiological stress responses (87. Salazar, 2012 1; 88. Aydi, 2007 1; 89. Taylor, 2006 1; 90. S. Kaplan, 1988 1)	Decreased diastolic blood pressure (84. Tumbaga, Miyazaki & Sato, 2007 1) Improved creative performance (85. Lichtfeld et al., 2012 1)
NATURE OF THE SPACE			
Prospect	*	Reduced stress (95. Grah & Sogard, 2010 1)	Improved comfort and perceived safety (91. Heroy & Byre, 2007 1; 98. Wang & Taylor, 2006 1; 99. Petherick, 2000 1)
Refuge	*		Improved concentration, attention and perception of safety (100. Grah & Sogard, 2010 1; 101. Wang & Taylor, 2006 1; 102. Petherick, 2000 1; 103. Ulrich et al., 1993 1)
Mystery	*		Induced strong pleasure response (104. Sederman, 2011 1; 105. Sederman, Benroy, Larcher et al., 2011 1; 106. Item, 2005 1; 107. Blood & Zetser, 2001 1)
Risk/Peril	*		Resulted in strong dopamine or pleasure responses (108. Kohn et al., 2013 1; 109. Wang & Tsai, 2011 1; 110. Zah et al., 2008 1)

14 Patterns		Stress Reduction	Cognitive Performance	Emotion, Mood & Preference
NATURE IN THE SPACE				
Visual Connection with Nature	*	Lowered blood pressure and heart rate (28. Brown, Burton & Caldwell, 2013 1; 29. van den Berg, Hartig, & Staats, 2007 1; 30. Tumbaga & Miyazaki, 2006 1)	Improved mental engagement/ attentiveness (31. Sederman & Vessel, 2006 1)	Positively impacted attitude and overall happiness (42. Burton & Povey, 2010 1)
Non-Visual Connection with Nature	*	Reduced systolic blood pressure and stress hormones (33. Park, Tumbaga, Karseni et al., 2009 1; 34. Hartig, Evans, Jamner et al., 2003 1; 35. Oregan-Smith, Mowen, Payne et al., 2004 1; 36. Ulrich, Simons, Lento et al., 1991 1)	Positively impacted cognitive performance (37. Herta, Zou & Cheema, 2012 1; 38. Lundberg, Neely & Lundberg, 2004 1)	Perceived improvements in mental health and tranquility (39. Li, Katsouris, Inagaki et al., 2012 1; 40. Jandroas, et al., 2011 1; 41. Tumbaga, Park, & Miyazaki, 2010 1; 42. Kim, Ren, & Fieding, 2007 1; 43. Sogard & Grah, 2003 1)
Non-Rhythmic Sensory Stimuli	*	Positively impacted heart rate, systolic blood pressure and sympathetic nervous system activity (44. Li, 2009 1; 45. Park et al., 2006 1; 46. Kohn et al., 2008 1; 47. Beachamp, et al., 2003 1; 48. Ulrich et al., 1991 1)	Observed and quantified behavioral measures of attention and exploration (49. Wadhager et al., 2011 1)	
Thermal & Airflow Variability	*	Positively impacted comfort, well-being and productivity (50. Heermgen, 2006 1; 51. Thom & Willem, 2005 1; 52. Wigal, 2006 1)	Positively impacted concentration (53. Hartig et al., 2003 1; 54. Hartig et al., 1991 1; 55. R. Kaplan & Kaplan, 1989 1)	Improved perception of temporal and spatial pleasure (alliesthesia) (56. Parkinson, de Dear & Cardello, 2012 1; 57. Zhang, Anze, Huijenga & Hai, 2010 1; 58. Anze, Zhang & Huijenga, 2006 1; 59. Zhang, 2003 1; 60. de Dear & Brager, 2002 1; 61. Huijenga, 1979 1)
Presence of Water	*	Reduced stress, increased feelings of tranquility, lower heart rate and blood pressure (62. Alvarsson, Wiens, & Nilsson, 2010 1; 63. Pleasant, Fisher, Wirth et al., 2010 1; 64. Sederman & Vessel, 2006 1)	Improved concentration and memory restoration (65. Alvarsson et al., 2010 1; 66. Sederman & Vessel, 2006 1)	Observed preferences and positive emotional responses (69. Wadhager, 2011 1; 70. Burton & Povey, 2010 1; 71. White, Smith, Humphrey et al., 2010 1; 72. Karsness & Hamel, 2008 1; 73. Sederman & Vessel, 2006 1; 74. Heermgen & Orama, 1993 1; 75. Russo & Huijenga, 2003 1; 76. Ulrich, 1983 1)
Dynamic & Diffuse Light	*	Positively impacted circadian system functioning (77. Figueroa, Boas, Flinck et al., 2011 1; 78. Bockatz & Roden, 2009 1)	Enhanced perception and psychological responsiveness (67. Alvarsson et al., 2010 1; 68. Hunter et al., 2010 1)	
Connection with Natural Systems	*	Increased visual comfort (79. Elzeadi, 2012 1; 80. Kim & Kim, 2007 1)		Enhanced positive health responses; Shifted perception of environment (81. Kelen et al., 2009 1)

2. Additional four original spatial characteristics of enticement

Banca Popolare di Verona. Carlo Scarpa

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K2 Design home in rural Japan

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Please consult the print version for access.

Buddhist shrine, Tangshan. Arch Studio

This content is unavailable.
Please consult the print version for access.

Husk, Wellington NZ. Pelorus Architecture Limited

This content is unavailable.
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2. Extended Walls (Narrative). Relating to the continuation of space and the shift in focal points beyond the immediate existing space (Muller 2009).

7. Anticipation (Biophilia). Creating architectural spaces that are able to be viewed in part but not reach reachable again relates to our subconscious need to uncover mystery as a sense of reward. (Browning et al., 2014)

9. Lowered Ceiling (Biophilia). Compression of architectural spaces relates to the feeling of refuge, retreat and withdrawal meaning the subconscious reasoning that we are safe if we are closely protected by 3 or more sides of our being. Refuge spaces feel protective however not disengaging. (Browning et al., 2014)

10. Scent (Biophilia). Relating to other senses in the body other than sight, smelling fragrant fauna or brewing coffee is preferable to our non-visual connection with nature. Projections and presence of scents with positive correlations brings a feeling of being balanced and fresh. The scents can be perceived as complex and variable however at the same time familiar and comfortable depending on the person experiencing them (Browning et al., 2014)

3. Photographs of physical model