Performative Conservation

An exploration of the potentials of architecture for ecological conservation.

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“They are our national monuments. They are our Tower of London, or Arc de Triomphe, our pyramids. We don’t have this ancient architecture that we can be proud of and swoon over in wonder but what we have is something that is far, far older. No one else has kiwi, no one else has kakapo. They have been around for millions of years, if not thousands of millions of years. And once they are gone, they are gone forever. And it’s up to us to make sure they never die out.”

Don Merton (1939 – 2011)
New Zealand Ornithologist

Figure 0.1: The critically endangered Kapapo. Endemic to New Zealand there is only 124 known surviving birds.

Since the arrival of humans around 1,000 years ago almost half of New Zealand’s endemic fauna have become extinct. With much of what remains endangered, the role of ecological conservation is vital for the survival of these threatened animals. However, this conservation is complicated by an increasing redirection of resources, away from ecological conservation, to areas considered more economically valuable.

This project investigates how architecture has the potential to act as a medium to enable and promote ecological conservation. The research explores the site of the Otago Peninsula as a case study. Rich in biodiversity, its ecologies are often challenged by eco-tourists who access the area. Poorly educated in appropriate behaviour and lacking infrastructure to properly manage the interaction, the presence of the eco-tourist is often detrimental to the biota. The project addresses these issues by exploring the ability of architecture to provide solutions to these problems.

Through the site-specific research it became apparent that problems with the assessment and attribution of value are similar to those experienced within built heritage. The project challenges these perceptions and subsequently looks at how the architectural form can create value within these often-undervalued areas.

In conclusion this research project creates a proposition that through the promotion of these fragile objects, be they heritage buildings or endangered animals, we provide the ability to conserve. By revealing the object and providing a direct, yet sensitive, connection we allow the object to be valued, preserved and treasured. This enables the conservation necessary to ensure that our fragile biota is part of our present and future ecologies.
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1.0 Introduction

1.1 Research Question

How can architecture enable and promote ecological conservation while providing a link between its centralised and localised requirements?

1.2 Aims and Objectives

The first human stepped onto New Zealand’s shores around 1,000 years ago. Since then almost half of the once rich and unique endemic fauna is now extinct. With much of the remaining biota endangered the importance of ecological conservation has gained increasing recognition, particularly over the last 30 years. The realities of ecological conservation, however, are often at odds with the ideals. Misguided intent combined with a lack of resources and infrastructure often hinder good outcomes. Further complication lies within the prioritisation of the limited resources. What should be protected and at what price? This research project explores how architecture can provide a remedy for some of the problems facing ecological conservation.

The project’s programmatic aim is to facilitate eco-tourist access, with minimal impact, into fragile ecological habitats on the Otago Peninsula. The Peninsula is considered to be the wildlife “capital” of New Zealand. As a result, ecotourism is a major industry for the neighbouring City of Dunedin. The ecological biodiversity of the Peninsula is fundamental to the city’s identity. Also fundamental to Dunedin’s identity is its built heritage.

These identities are faced with challenges. Eco-tourists eager to view the biodiversity can, unintentionally, damage the peninsula’s fragile ecologies. The built heritage is also faced with issues relating to questions of value and conservation, particularly relating to new seismic strengthening requirements.

The proposed architectural interventions will address these issues. Fundamental to this project is an exploration and analysis of the greater site through David Leatherbarrow’s
“extended horizon” analysis\(^2\). This allows a broader understanding of the problems and potentials that exist across the site.

The interventions are created through the establishment of spatial management using the concepts of threshold, boundary and barrier. The interventions also investigate how additional “performances”\(^3\) can be incorporated to create a more lively and involving environment. In so doing it is hoped that the architecture will provide a better-resourced infrastructure for the centralised and localised requirements of ecological conservation.

1.3 **Scope and Limitations**

The scope of this project is to design facilities and structures for ecological conservation which also manages and educates tourists on ecological conservation. The architectural interventions may include viewing structures, viewing platforms, viewing hides, and conservation and visitor centres. The emphasis of the project is on how these structures enable and promote ecological conservation while, where possible, also promoting the built heritage of the associated area.

The project is limited by the information available on how endemic fauna perceive their world. Their perception is relevant as fauna see and experience the built structures which we inhabit. Due to their uniqueness there is a lack of information available about these animals. Relative to this uniqueness it is difficult to draw conclusions from similar species. Therefore, generalisations have to be made in order to create a solution.

The process of ecological conservation is complex. A generalised interpretation has been applied in order to provide information to enable the design process.

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\(^2\) This analysis examines the activities, or performances, which occur under the extended horizon of the site. A greater explanation is provided in section 2.2.

\(^3\) This is a term relevant to Leatherbarrow’s “Extended Horizon” analysis, which is fundamental to the development of the project.
1.4 Methodology

The methodology of this project was undertaken through the following three frameworks:

Research through site analysis

The architectural response relied on a thorough understanding of the activities, or performances, of ecological conservation undertaken across the site. Therefore, while topographic analysis was particularly important to the effectiveness of the solutions, it was also important to understand the different groups and organisations that are fundamental to ecological conservation and ecotourism within the area. As a result meetings with those who are involved, or have potential to be involved, were important to gain a complete grasp of the issues in order to create a solution.

Research through literature

Literary research was undertaken in two parts: theory and precedents. Theoretical literature related to ecological conservation and also to architectural theory around site, spatial management and movement. It was also important to examine existing architectural responses. Precedent analysis provided examples of spatial organisation and movement, both within and outside the field of ecological conservation. Further analysis also provided responses of built form relating to the interpretation of the needs of endemic species. The combination of these helped to establish the implementation of architectural strategies.

Research through design

While the previous frameworks informed and guided the design process, it was research by design that allowed for the exploration of the architectural strategies. Concept drawings, computer modelling and physical modelling were used in the exploration.
2.0 Existing Knowledge

2.1 Ecological Conservation

2.1.1 Zealandia to New Zealand

Around 80 million years ago the continent Zealandia\(^4\) separated from the supercontinent Gondwanaland. Zealandia’s plant and animal life evolved quite unlike anywhere else in the world. With no mammalian predators, as these had not evolved prior to Zealandia’s separation, the flora and fauna did not require predator defence mechanisms. Around 1200AD humans, bringing with them other animals, reached the shores of New Zealand. With this introduction of mammalian predators it is estimated that over the following 750 years almost half of New Zealand’s indigenous vertebrate fauna became extinct.\(^5\)

Fortunately New Zealand still possesses a great deal of endemic biota. To place it in an international context, half a dozen islands in the Hauraki Gulf have a greater level of endemism than the whole of Great Britain.\(^6\) However, there is still a need for further conservation efforts.

Lucy Blake and Raewyn Peart of the Environmental Defence Society identify some of New Zealand’s issues:

- More than 3800 terrestrial, freshwater and marine species are listed as threatened; almost four times as many as were listed in the 1990’s.

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\(4\) Also known as Tasmantis. Over time the subcontinent slowly sank leaving approximately 7% of the original landmass above water. New Caledonia, New Zealand, and its sub-Antarctic islands, are some of the above sea remnants.


- Almost two-thirds of New Zealand seabirds are listed as threatened with extinction.

While predators have had a major impact on our flora and fauna, issues also relate to the way humans live. An increasing population places an increased demand on resources. Land used for development potentially removes habitats of native flora and fauna. Of New Zealand’s entire land area, 63% has been converted for human occupation and use. It is estimated that nearly 90% of all wetlands have been modified for land development. Between 1997 and 2002 native fauna land cover decreased by 16,500 hectares.\(^7\)

Without some level of intervention, species of endemic flora and fauna will continue to disappear. This intervention and the overarching system of protection is known as “conservation”.

2.1.2 Conservation and Ecology

Identification of the need for conservation is not a modern concept, and neither are conservation actions. Around 400BC, in Ancient Greece, Plato recognized that the loss of forests contributed to erosion and proposed the prevention of further felling. Circa 50AD Pliny the Elder was concerned that the Romans, through deforestation, were desertifying the Mediterranean.\(^8\) In 1487 the first European conservational reserve was declared in Switzerland to protect certain game species whose potential eradication was seen to be an “offence to God’s order”.\(^9\)

The modern conservation movement began during the nineteenth century. During the 1840’s the British government encouraged the protection and preservation of lands in some of

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\(^7\) Ibid., p. 5-8.
its colonies. In 1872 the United States of America established the world’s first national park at Yellowstone in order to preserve the area’s natural beauty from commercial development.\textsuperscript{10}

In 1866 German biologist Heinrich Haeckel created the term “ecology”. A term fundamental to conservation, ecology is defined as the study of the relationships and interactions between living organisms. It includes humans and their natural and built habitats.\textsuperscript{11} The field of ecology helped to create an understanding of human impact on the environment, and the subsequent need for conservation.

Today ecological conservation can be divided into two fields: utilitarian and non-utilitarian. Utilitarian arguments focus on the saving of biodiversity because it has value to people through potential products and services. It is often economically focused. Non-utilitarian arguments are based around the saving of species because of their intrinsic right to survive and be protected. Clive Hambler states that neither argument is sufficient in itself and the importance of each will vary on a case-by-case basis.\textsuperscript{12}

2.1.3 Conservation in New Zealand

The ecological impact of the arrival of humans in New Zealand was enormous. The need for ecological conservation has often been seen to be at odds with that of development. While New Zealand established its first national park, Tongariro, in 1878\textsuperscript{13} it would take over 100 years to create a government department to oversee conservation requirements within New Zealand. Prior to the establishment of the Department of Conservation a series of state-led initiatives were implemented in order to provide some protection of the natural environment and its flora and fauna.

\begin{itemize}
  \item \textsuperscript{10} Hambler, \textit{Conservation}, p. 8-9.
  \item \textsuperscript{12} Hambler, \textit{Conservation}, p. 21.
\end{itemize}
The 1987 Conservation Act legally established the Department of Conservation (DOC). The Act defines conservation as: “the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations”.14

Celebrating its 25th anniversary in 2012, DOC has had a problematic existence. A series of restructures has tried to manage the ongoing problem of doing more with less while actively maintaining the safety of the people who are enjoying New Zealand’s natural environment.15

The most recent restructure occurred in 2012 when $54 million was cut from DOC’s budget.16 Today DOC controls, or has governance over, around one-third of all land within New Zealand. How then can this land be managed while facing constricting financial resources? Taking what can be described as a utilitarian conservation approach, the restructure acknowledges that conservation requires additional resources. As a result, the restructure has seen DOC split into three wings; one which focuses on conservation services, another which focuses on the establishment of conservation partnerships, and the third focusing on iwi partnerships. The partnership divisions have been established so that other organisations can fund and resource conservation initiatives. Through this initiative it is hoped that DOC can do more with its resources. This is an expansion of ideas from previous restructures within DOC which have seen the work of some frontline conservational work replaced by volunteers.

There are also conservation services and partnerships with many public organisations and trusts undertaking conservation initiatives. These are vital for ecological conservation as they allow DOC’s resources to be used in other places. A localised perspective of these is

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15 Department of Conservation, Doc’s 25th Anniversary Exhibition, p. 33.
Figure 2.1.3: A Department of Conservation ranger prepares to release a juvenile Yellow-eyed Penguin back onto the Otago Peninsula.
2.1.4 Conservation: why bother?

There have been five mass extinctions since life began on earth. The worst, the Permian, occurred about 245 million years ago and wiped out almost 95% of earth’s entire animal kingdom. While Nature has recovered from these mass extinctions, it took millions of years to do so.

Some scientists believe that we are currently facing a sixth cycle of mass extinction. It has been predicted that if humans continue over the next century to decimate habitat at the current rate, it would take at least 10 million years for animal life to recover. However, it is also thought that we may be eradicating not just species, but the “Theatres of Evolution”. These are the natural environments in which evolution can begin to re-create biological diversity. Unlike other mass extinctions, where blame lay at the fault of catastrophic events, the blame for this one would lie directly with humans.

Mass extinction highlights the theory of ecology. To not manage, protect and conserve the endemic flora and fauna has the potential to have catastrophic results. We simply do not understand the repercussions if a species is removed from an ecological community. While we may be denying our children the chance to see unique flora and fauna in the future, we are also potentially denying our children a future.

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18 Created by Howard Odum this theory proposes that all energies within an ecology are cyclical. To upset one of the energies, or to remove one entirely, dramatically affects all other energies within that ecology.
2.2 Interpretations of site: David Leatherbarrow’s “Extended Horizon”

Architectural theories of site are predominantly focused around the built form. As Stan Allen and Marc McQuade state, architecture is tied to boundaries. Ecologies, however, are not. Ecologies are related to landscapes and as Robert Melnick asks, “where does a landscape begin and end?” Faced with understanding the issues and influences on ecological conservation within a particular area a broader analysis of site is required.

David Leatherbarrow in *Uncommon Ground: Architecture, Technology and Topography* places a different perspective on site. Leatherbarrow uses the term ‘horizon’ to consider the broader topographical reaches of a site. Within this extended horizon many different characteristics exist. These he refers to as performances. “Analogies or similarities” can be discovered within these performances and then integrated into the design, creating a more active and lively building.

In a later work Leatherbarrow states that this topographic integration within architecture is extremely important in order to understand the greater milieu of a site. A building can then serve as a meeting point, or knot, for the different characteristics across the site. This “knot or nexus” provides a distribution, or connection point, among these differences. Key to Leatherbarrow’s interpretation is that a building should not be solely about itself. When the topographical horizon is extended into the built form, the form accepts the surrounding conditions, as well as altering and adapting them where needed.

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22 Milieu – a person, or objects, surrounding and environment.
Leatherbarrow likens the architectural exploration of this to the mannerist and baroque artistic term “contrapposto”. Contrappostic figures in art were those appearing physically pulled between equally alternative forces. Leatherbarrow argues that a feeling of freedom occurs within a built form when differences in surroundings are made known to the user. The more choices the user is faced with, the more the user is torn between the choices. But, if the built form recognises these differences and provides a clear definition of choices, then the choices become self-determined. This, Leatherbarrow believes, creates the perception of freedom within space. This architectural connection of the different performances can “prompt, animate, and conclude a building’s performance”.24

Leatherbarrow also argues that if the form is more engaged with the wider performances, as opposed to being determined by its own function, it provides greater potential for other performances to occur outside of those initially envisioned.25

This provides particular interest for the project. Key to the success of the project is the acceptance of other performances. This is explored in greater detail in section 2.5. Additionally, Leatherbarrow’s concept regarding the extended horizon is interesting as it allows for the consideration of that which affects not only the built form, but also how it is used. The prospect of proximity allows for the chance of greater education on the requirements of conservation. It also allows the performance of conservation to be brought into contact with people’s everyday performances.

24 Ibid., p. 66.
25 Ibid., p. 64.
2.3 Spatial Management

The following concepts have been investigated in order to examine spaces within the landscape and the architectural form. It is important to have concepts which exist in both areas because ecological conservation operates in both. These have been termed “spatial management” as the concepts combined help to form an overall interpretation and impression of space.

2.3.1 Threshold

A threshold in its simplest built form is a doorway. It allows passage, or physical entry, from one space to the next, acting as a point of transition. However, the concept of threshold holds far greater power than merely creating a point of entry. Simon Unwin states that while most doorways are perceived subliminally, they also have the potential to heighten the “level of implied separation between spaces”.

Italian architect and designer Ettore Sottsass created the 1972 sculpture ‘Doorway to enter into darkness’. The piece explores “what lies beyond the door, what will happen?” Unwin states that within Sottsass’ sculpture the threshold also heightens the level of separation between the light and the shade. The establishment of a point of threshold creates a perceptual boundary around the threshold.

Transitions, or thresholds, are integral to our spatial experience of the world and are not limited to the built environment. The mountain pass, or the two trees that provide access into a clearing, are just some examples of thresholds that occur in nature. What is key to these examples, and potentially to all thresholds, is their relationship in the establishment of place and context. A threshold provides an arrival point for a destination: a place. Unwin states that through the establishment of place, architecture is linked with life.

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29 Unwin, Doorway, p. 16.
30 Analysing Architecture, p. 81.
How then can thresholds be perceived at a greater level? Positioning of a threshold can help to establish dominance or submission within a space, as can scale. These treatments are relatively elemental. Unwin identifies light and its manipulation within architectural design as a way in which to identify place and to provide it with particular character.31

Juhani Pallasmaa states: “deep shadows and darkness are essential, because they dim the sharpness of vision, make depth and distance ambiguous, and invite unconscious peripheral vision and tactile fantasy”.32 The power of light and shadow hold particular potential within threshold design, especially if orientation can be re-established after a period of disorientation.

2.3.2 Boundary

Simon Unwin states; “frames define boundaries”.33 For Unwin humans operate in frameworks. A framework provides and defines a space, and in doing so creates a setting in which a task, or frame, can establish place. A boundary is more than a single architectural element; it is instead a composite of elements. As to which has greater importance, the frame or that which is being framed, Unwin believes that they are symbiotic, each benefits and owes its existence to the other.34 An example of this is the performance of living where the framework of sleep occurs in the frame of the bedroom. While different frameworks may have varying degrees of occupation there is a unifying element to all frames. Each frame is entered, occupied and left. These frames are formed by the boundary of the spaces and are entered and exited by a threshold to additional connecting spaces. The arrangement of these connecting spaces establishes the progression, or journey, a person must take in order to reach their destination. These frameworks are essential to our everyday life and, as a result, constitute our architectural environment.

31 Ibid., p. 45.
33 Unwin, Analysing Architecture, p. 104.
34 Ibid., p. 106.
When considering perception relating to the concept of boundary Ching states that vertical planes have a greater presence in our visual field than horizontal planes. Vertical planes help to define the edges or boundary of the space providing “a common boundary between the interior and exterior environments”. While the vertical forms may visually define the space, the horizontal planes also play an important part in the overall composition of the boundary. Unwin states one of the most powerful ways of identifying a place is to enclose it with walls topped by a roof, separating it from everywhere else.

Boundaries are not confined to the built world. Topographically, boundaries occur within landscape. A flat plain flanked by mountains defines a boundary that establishes the place of the valley. Leatherbarrow uses the analogy of stairs, likening land to be viewed as a landing, flanked not by treads and risers, but by lakes, rivers and oceans.

Bruno Zevi drew a series of diagrams in the 1970’s in order to illustrate the Modernist movement’s breaking open of traditional architecture’s box. He investigated De Stijl’s elimination of the third dimension in “decomposing the box, breaking it into panels”. Through his investigation Zevi dismembered, and then extended the planes, in order to generate more fluid forms to “flow in a moving continuum”. Through emphasis being placed on the planar forms of the box, as opposed to the definition of the space inside, the manipulation of the planes is promoted. This creates decreased definition of space in order to create a greater connection with the exterior, bringing the exterior into the interior. No longer is the boundary of space physically defined by its exterior elements. It begins to give rise to a perceptual boundary combining with the physical. This was not new within architecture. The use of intermediary

spaces has long been used, particularly around points of transition, within traditional and classical architecture. What was new was the opening of what Zevi described as the coffin-like nature of traditional architecture’s box. Boundary within architecture began to shift from a predominantly physical form to one which is increasingly perceptual. Here it can be seen that boundary can be a *soft* architectural element, in that it allows progression. It is not necessarily physically limiting.

This in itself is not without problems. A lower level of barrier between the exterior and the interior, while blurring the spatial definition of the boundary, also blurs the climatic boundary. Traditionally, vernacular architecture adapted over time to ensure the boundary of the space also helped to provide an adequate climatic environment. Torben Dahl states that the standardisation of architectural expression during the modern movement led to the standardisation of the interior climate by mechanical means. This removed architectural expression relevant to local climatic conditions.39

Michael Hensel highlights possibilities around the multiplication and expansion of the climatic boundary, or the edges/envelope of the built form. He states: “not only do they aid in blurring the boundary of the space” but the “degrees of permeability can serve to articulate sequences of transitions from exterior to interior and vary degrees of non/discreteness”.40 The expansion of the climatic boundary is not an example of an expansion of a threshold. It is instead the creation of a new space. By expanding the threshold to become a climatic device, it creates an additional place to inhabit. The ability to break the climatic envelope down, to decrease the diurnal temperature change between immediate spaces, helps to provide the establishment of places, as opposed to place. With small gradient changes between spaces the experiential nature of each space would differ from the next, and help to increase the establishment of sequential places, as opposed to blurred spaces.


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Figure 2.3.6: Sketch through landscape displaying definition of spaces by naturally occurring objects. The edges of the valley define the interior of the space of the valley, while additional landscape elements, like trees, can create smaller spatial definitions within the greater space.
Hensel sees considerable potential for performance-orientated architecture as it involves interaction between surroundings. The possibility of exploring the perceptual boundary is particularly interesting when considering a form’s connection to its greater context. Undoubtedly certain frameworks require specific frames. However, allowing some frames, or boundaries, to become more porous and consider their connection with other boundaries provides possibilities within architecture.

2.3.3 Barrier

Unwin states that “barriers establish possession and keep people, things and places apart”. Whether physically or climatically related, this highlights the essential quality of a barrier, its ability to separate. While a boundary provides the framework or space, and a threshold provides a point of transition between spaces, a barrier halts the direct transition between frameworks.

A series of barriers can create a boundary. In its most fundamental form this concept can be applied to a room. Generally, within our most intimate spaces we require barriers to keep people out and provide us with security. This feeling of security is integral to the framework of the space and also helps to establish its place.

While barriers have the ability to affect people positively, they can also do so negatively. The field of barrier-free design is one where visitability or universal design processes are employed to allow people with differing levels of physical ability access or entry into the built environment. The New Zealand Disability Strategy states that a disabling built environment is a form of discrimination. From this we can see the psychological power that barriers can present. They have the ability to separate and even ostracise. It is for this reason that architectural barriers have sometimes been politicised, like the Berlin Wall. Even though

41 Ibid., p. 74.
42 Unwin, Doorway, p. 19.
the Wall was removed almost 25 years ago, the psychological power of its level of separation still remains within public consciousness. While the physical separation has been removed, the aftermath of the social, cultural and economic divisions created by the Wall still remains today.

Juhani Pallasmaa states: “the eye is the organ of distance and separation”.44 If a barrier allows a viewer to be able to see an object in the distance, but the barrier limits the viewer’s physical progression to it, this creates visual porosity within the barrier. If the theory of movement is applied, the barrier then forces the viewer to divert or to seek alternative routes to progress to their desired destination. Furthermore, if a viewer is able to see others in a space, but they cannot, or are unable to, access it, then the barrier potentially becomes more powerful. The feeling of place is strengthened through the creation of “here” and “there”. This is due to not being able to complete the physical movement that the visual recognition established.

While changes in level can be classed as a threshold, threshold can also act as a barrier. If the change in level is too great to be directly transitioned then it becomes a barrier. Cliffs and escarpments are examples of barriers within the landscape. Water can also be considered a barrier. Humans are not as adept as seals or penguins who have a greater ability to move underwater than they do on land.

Barriers affect us psychologically on many levels, both positively and negatively. They can establish curiosity, encouraging progression, but can also ostracise. When designing barriers a framework will require specific characteristics which will define its level of connection and enclosure. It is the barrier’s ability to meet this need which will help to establish the sense of place.

#### Figure 2.3.8: Sketch displaying a change in thresholds ability to act as a barrier. A visual porous barrier also has the ability to create feelings of isolation.

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2.4 Building Conservation

Building conservation focuses on preserving the life of buildings which possess important cultural values so they may be enjoyed by future generations. The 19th century architectural theorist Eugene-Emmanuel Viollet-le-Duc promoted the concept of “restoration.” “Restoration” focused on the restoration of a building not to preserve, repair, or rebuild it, but instead promoted the building’s reinstatement to a condition of completeness that could never have existed at any given time.45

Key to this was the understanding of the full intention of the original architect. New materials could be substituted as and when they were deemed applicable, but this could only be done if employing the designer’s structural intent for the original material. The building was to be restored and preserved with its original integrity intact. Should any addition be required it was to also retain the integrity, mimicking and melding seamlessly with the original design.

John Ruskin’s “anti-restoration” opposed Viollet-le-Duc’s “restoration”. Ruskin’s sixth lamp in his Seven Lamps of Architecture focused on memory. For Ruskin there were two duties which he considered of utmost importance. “The first, to render the architecture of the day, historical; and the second, to preserve, as the most precious of inheritances, that of past ages”.46 Ruskin promoted the care of monuments, rather than allowing them to fall into disrepair and then require restoration. For Ruskin restoration was a lie, as it removed the life and history from the built form. To restore, for Ruskin, should it be required, was to do only enough to preserve the building in its current form. “Better a crutch than a lost limb”.47

Fred Scott states: “alteration is the medium between preservation and demolition.” He attributes obsolescence within buildings to wider societal changes. Buildings change as the

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47 Ibid., p. 252-55.
city changes”. The collapse of the industrial era in the second half of the 20th century created a large number of obsolete monuments to the industrial era. If the theory of “restoration” was applied to these factories and warehouses, these buildings would be restored to perform an obsolete task, or framework. If the theory of “anti-restoration” were applied, these tracts of land would become waiting areas for the wrecking ball.

During the 20th century theories in opposition to the “tabula-rasa” approach gained momentum. Modernist ideology had function intrinsically tied to the built form. Therefore, once the function of the building became obsolete, so did the building. Aldo Rossi speaks of the importance of the “collective memory” of a city. He likens the union between past and present in architectural form to be like that of memory within a person. The collective architecture of the city creates identity and individuality within the urban structure as a whole. It references that which was, and that which is now.

Fred Scott also shared this philosophy, as he did the idea of buildings within the city acting as silent monuments. Scott and Rossi believed that these buildings could withstand a change of function, and still remain an important part within a city’s history and its urban structure. This is what is known as “adaptive reuse” and is defined as “the process of adapting old structures for new purposes”.

It is also important to note that, in terms of sustainability, heritage buildings hold a certain amount of embodied energy within their form and structure. The loss, and/or demolition and replacement, places further dependency on already limited energy sources.

Key to the process of adaptive reuse within building conservation is identifying those buildings that are worthy of being the “silent monuments” within our urban form. Statutory acts have established mechanisms to help identify these buildings. If a building is considered to have sufficient value within its urban structure, then it is classified as a “silent monument”. This attribution of value is discussed in section 2.5.2.
2.5 A question of “value”

2.5.1 Value within ecological conservation

Value helps define that which we cherish and establish that which we wish to protect. Clem Tisdell states that “valuing objects is a major preoccupation of human beings”, something which sets humans apart from many other species. He also states that the valuation of objects is complicated by the fact that many “are culturally determined and alter historically as societies change and as ethical standards develop”.54

In 2006 Tisdell undertook an economic analysis of the financial benefit that “wildlife tourism” on the Otago Peninsula provides to the economy of Dunedin City. He identified


Figure 2.5.1: The Yellow-eyed penguin on the New Zealand $5 note.
tourism’s indirect net economic contribution to be in excess of $100 million annually.\textsuperscript{55} This provides a quantifiable attribution of value for ecological conservation within Dunedin City, and justification for an ongoing programme of conservation. Tisdell also states there is potential for expansion. This illustrates the benefit which tourism, especially eco-tourism, brings to conservation.

DOC defines its purpose as providing “conservation leadership for a prosperous New Zealand”, with prosperous representing a country that is flourishing socially, economically and environmentally.\textsuperscript{56} Here, DOC can be seen promoting value within conservation: through conservation, New Zealand prosbers.

Tisdell applied an economic value to each Yellow-eyed Penguin and Royal Albatross which resided on the Otago Peninsula, relative to the annual spend on eco-tourism. The Royal Albatross and the Yellow-eyed Penguin are two of the most popular animals for eco-tourism on the Peninsula. Animal behaviourist Temple Grandin states: “if you’re going to preserve wild animals, you have to make the animals economically viable to the people in the countries where animals live”.\textsuperscript{57} Grandin had used third world examples to demonstrate the necessity of economic value within conservation. Due to the adoption of non-utilitarian conservation ideals the economic benefit from the conservation of the biota was removed. In doing so the mechanism for the management of the habitat was also removed, leading to population collapses. Tisdell provides a definitive economic value for the animals and therefore identifies them as valuable objects.

Within DOC’s recent restructure staff have been redistributed into a new division,

\textsuperscript{55} Ibid., p. 282.
\textsuperscript{57} Temple Grandin and Catherine Johnson, Making Animals Happy : How to Create the Best Life for Pets and Other Animals (London: Bloomsbury 2010 ), p. 257.
taking more numbers away from frontline conservation. While a business development network looks to establish wider lines of revenue, where is this revenue to be spent? Yellow-eyed Penguins and Royal Albatross are not the only endangered endemic species on the peninsula. While attributing value to species could be argued as positive for the purpose of ecological conservation, there is a risk that these species will be prioritised ahead of the needs of others. The businesses will desire to get the best value from their conservational spend. What then happens to the flora and fauna which are not deemed as valuable. Should protection be guaranteed for a species which may be deemed to have little value to our society at present? While the unfortunate reality of conservation is that it costs money, there need to be ways in which value can be established across conservation, as opposed to value being attributed relative to species.

2.5.2 Value within the built environment

As stated in section 2.4, a series of mechanisms have been established to recognise value within a city’s urban form. The ICOMOS New Zealand charter is used as a framework by organisations like the New Zealand Historic Places Trust (NZHPT), DOC, and local and regional councils to help aid decision-making on heritage issues. The aim of the document is to ensure that “the place and its value are passed on to future generations”. It also promotes the full consideration of both “tangible and intangible values” generated through human activity in order to protect the cultural heritage values of its place.

Once a building or area has been recognized as having appropriate heritage value it is scheduled within the district plan and may be listed on the historic places register. These stand as mechanisms for the protection of “silent monuments”. Within cities like Dunedin there has been an increased recognition that some of its built form is not properly recognised. Buildings that have been previously overlooked, like those of the art-deco era, are now increasingly recognised for their value. As times change, so too do the things we value culturally.

Additionally, further regulations threaten that which is, or could be, of heritage value. In the aftermath of the Christchurch earthquake new building code requirements require all heritage buildings to meet a minimum 34% of the National Building Standard (NBS) by the year 2028. If a building does not meet this, then it will have to be demolished.60 If the building is incapable of economically sustaining the re-strengthening, then it is unlikely that the building will be brought up to code, thereby guaranteeing its demolition. Like ecological conservation, built heritage is likely to be lost as economic value may outweigh the importance of cultural value. This is a particular problem in those areas that have large areas of built heritage as this often coincides with a lower level of economic development.

While it is important to recognise our built heritage, its recognition can become too problematic to maintain. The regulations and guidelines, which establish and manage value, are often seen as extremely restrictive for the reuse of buildings. The specifications around adaptive reuse can render a building incapable of meeting the needs of a new generation. Therefore, while it is important to maintain some original integrity of a heritage building, it is also important to ensure that it has a future.

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3.0 Precedents

3.1 Conservation House, Wellington

Situated in central Wellington, Conservation House is the head office of DOC. When it opened in 2006, the refurbished 1980s cinema complex was hailed as New Zealand’s flagship “environmentally pro-active” building. The building utilise a number of passive, mechanical, and staff behavioral strategies in order to achieve DOC’s sustainability goals.

The main space of the central atrium operates well. The space, by cutting through all floor plates, defines its own perceptual boundaries. This also connects the levels by allowing visual porosity between the floor plates. The atrium space acts as a hinge between the two wings of the building, linking the office spaces together. The upper boundary of the atrium culminates in a glazed roof which allows natural light to flood into the interior of the building, further connecting the levels.

Progression and openness is encouraged through the circulation of the building. The atrium is bridged by additional spaces at each level that create points of congregation. These spaces are then linked by a circulation space which ties the floors together. Again focusing on perceptual rather than physical boundaries, it allows visual recognition of the route of progression and encourages movement between levels.

While the building is an open and efficient office space, its overall design is exclusive rather than inclusive. The building is located in a busy central Wellington street. Its entry, or threshold, provides access into a long, cranked corridor. This elongated space acts as a tunnel, opening at the end into the main atrium space. While the compression within the tunnel and the expansion in the main atrium create a sense of arrival inside the atrium, there is no visual connection from the street to the destination. Without this identification of destination the tunnel

62 Ibid., p. 4.
does not encourage entry into the building.

The public space boundaries are defined by the street edges. The space of Conservation House is bounded by its glazed double-layer façade. While sustainably efficient the façade does not allow a visual connection from the street into the interior. The climatic boundary provides no visual porosity and, with the tunnel space establishing a clear separation between staff and public, the façade almost acts as a barrier at the street edge. The feeling of separation from the street is reinforced by the fact that all DOC staff are located above the ground floor, away from the public realm.

If DOC’s new direction is to encourage public connection then its architecture should reflect this. While the spatial management of the interior creates an effective working environment, its disconnection to the space of the public realm fails to create any form of connection. The head office for DOC promotes a private, insular organisation, operating discretely away from the eyes of the people with whom it wishes to engage.
3.2 Penguin Place, Otago Peninsula

Penguin Place is a private, tour-based, funded conservation project located on the eastern coastline of the Otago Peninsula. Over its 30-year history the project aims to create a sanctuary for nesting Yellow-eyed Penguins, one of the world’s rarest species of penguin.

The sanctuary has many basic structures designed to allow viewing of the extremely shy penguin with minimal impact. The built form has evolved over time through trial and error as little is known about how Yellow-eyed Penguins perceive their world. Humans gain access to the sanctuary by bus, then on foot along a track. The boundary of the reserve is defined by stock fences which keep the farm stock out. Penguins can get through the fence, but predominantly stay under the shade of the replanted areas. This shade is vital to their on-land survival.

Upon entry into the reserve humans walk through partially submerged walkways with camouflaged canopies. The overall feeling is constrictive, which invokes quietness (mostly) amongst the users. The layout of the tunnels is confusing: when walking through it is difficult to ascertain your location. Narrow tunnels open into small hides capable of holding up to 25 people at a time. The hide boundaries are very defined, being enclosed in solid wooden structures with viewing of the penguins provided through viewing slots. In spite of the sometimes quite close proximity, the penguins seem relatively unperturbed by the human presence. This is at odds to their normal behaviour where contact with humans causes the penguins a great deal of distress.

Architecturally, the uniqueness of this facility is that the needs of humans are subservient to those of the penguins. The tunnels are small and at times quite confined. However, the compression followed by the expansion provides a clear sense of arrival, especially when combined with the sometimes panoramic views provided through the viewing slots. While the design of
Figure 3.2.2 (left): *Walkway leading to viewing hide.*
Figure 3.2.3 (below): *Section through viewing hides.*
the structures may appear ad hoc, the network of structures creates a level of respect for and subservience to the penguins being observed.

Figure 3.2.4: Viewing slit in hide.
3.3 Orokonui Eco-sanctuary - Dunedin, New Zealand

Positioned on a hillside overlooking Blueskin Bay near Dunedin is the Orokonui Eco-sanctuary which was established with the aim of restoring a forest eco-system to its pre-human state. The reserve, which opened in 2007, is the only one of its kind on the mainland of the South Island allowing native birds, animals and insects a predator-free habitat. An 8.7km pest-proof fence protects the reserve and this has allowed species of animal long extinct from the South Island, like Takahe, to be reintroduced.

A visitor centre for the reserve was opened in 2009. Designed by Dunedin-based architectural practice Architectural Ecology, the initial design concept was based around the idea of a big shed housing a series of interpretative displays under a large roof. As the concept evolved and the site moved further up the hill the centre became increasingly enclosed to meet the sometimes inclement climatic conditions.

Solid boundaries formed by recycled shipping containers are juxtaposed with larger, more open boundaries of the main gallery. Defining the edges of the building, the containers act as servant spaces to the gallery. Their scale and treatment reinforce this. The threshold into the gallery, while open and visually porous, only allows visual connection into part of the gallery space. This visual connection is limited by carefully placed solid display panels dividing the larger space into smaller areas. Only when further inside does the viewer become aware of the gallery’s curved roof which lifts the spatial boundary above the other forms. Pointing towards the hill Mokonui, the gallery’s raised boundary provides a contextual relationship to the hill which is the remnant of the extinct volcano that formed the area where the reserve sits. The careful treatment of each edge of the boundary also provides an interesting sense of progression. On arrival, the scale of the gallery space in reference to the container spaces encourages entry into the gallery. However, once inside the gallery space, the opening of the boundary establishes visual connection to the reserve, placing it in subservience to the space of the reserve.

While the building is extremely successful at establishing the relationship of the building to the reserve, the physical connection between the two is not as successful. Access to the sanctuary is by an exterior walkway that follows the curve of the eastern glazed wall.

Figure 3.3.1: Orokonui Eco-sanctuary plan. Orange indicates view out into the reserve from interior of visitor centre, while entry gate is located in top left corner of image.
Figure 3.3.2 (inset): Disconnection of entry gate from visitors centre.
The view of the deck from the interior establishes the visual connection to the access way into the reserve. However, once the deck reaches the ground the track diverts uphill, away from the building. This leads to a gate whose position and location appears to have had little thought or consideration to its connection. As a result the physical movement into the reserve is jarring. In spite of this the building is an excellent example of architecture’s potential for ecological conservation. While it does highlight the importance of the extension of design both inside and outside the built form, it also provides an area for ecological education with a visual connection to that which the education serves, the eco-sanctuary.

Figure 3.3.3 (left): Entrance into visitors centre.
Figure 3.3.4 (below): View out from deck towards Mopanui with curved glazed façade of visitor centre of left.
3.4 Museo di Castelvecchio – Verona, Italy

The Castelvecchio was originally constructed in the thirteenth century as a fortified castle. It then served as a military barracks during the Napoleonic wars. In the 1920’s it was gifted to the city of Verona and converted into a museum. The initial restoration followed 19th century French and Italian models. However, the decoration applied during the restoration competed with the art works. In the late 1950’s a new director appointed Carlo Scarpa as architect for a new restoration. Scarpa was not interested in returning the building to its original state, but rather to allow a natural progression of the building over time, similar to Ruskin, allowing gradual changes that would make it “whole”.

The Sculpture Gallery

Located on the ground floor in the Napoleonic Barrack wing, the level that houses the Sculpture Gallery originally contained eight bays. The first bay acts as an entrance, while the following five bays provide gallery space. A strong perspective links the five rooms of the gallery to the entrance, with six arched openings on a clearly defined axis. The openings are flanked with slabs of rough pink Prun stone which increase the scale of the arches and also emphasise the threshold between spaces.

In order to increase the floor to ceiling height on the floor above, the original ceilings, which were deemed unsafe, were lowered. Structurally the ceiling was supported by two shallow concrete beams supported in turn by a rolling steel cylinder which transferred its load to a double steel beam. In perspective this beam appears to run the length of

63 Carlo Scarpa et al., Carlo Scarpa, Architect : Intervening with History (Montreal, Quebec: Monacelli Press; Canadian Centre For Architecture, 1999), p. 228.
64 Ibid., p. 13.
the galleries, reinforcing the axis and connecting the gallery spaces together.

To limit the directional movement encouraged by the axis, Scarpa inserted a new floor several centimetres above the original. The orthogonal floor runs against the axis, encouraging people to pause within each space of the gallery. The careful positioning of the sculptures further emphasises this. By establishing relationships between the sculptures Scarpa invites the viewer to move around the sculptures rather than directly through the space. The sculptures are observed from multiple points of view. The spaces, the boundaries and the treatment of the thresholds combine to respect the displayed object, while also providing guidance of movement.

**Cangrande della Scala**

One of Scarpa’s bolder moves was the removal of the final bay of the Napoleonic wing, thereby separating it from the medieval Reggia. The cut creates a defined junction, while revealing the archeology of the buildings. Within the junction Scarpa positioned the statue Cangrande della Scala. Considered an outstanding example of 14th century Veronese sculpture, Scarpa’s desire was to have the statue discovered by patrons observing the art.

While the statue is not large, its positioning dominates the void. It sits on an elevated pedestal with a series of platforms and stairs surrounding it. These not only provide circulation between the surrounding galleries but also provide multiple viewing points. He positions the statue askew on the pedestal to show that it is “part of the whole (of the building), yet it still lives its own separate life”.

An extension of the existing roof provides the statue with protection from the elements. This helps to define the perceptual boundary of the space, while also representing the old and the new through the use of different materials.

Scarpa’s refurbishment of the Castelvecchio deals with a layering of the history of the building. Through demolition, change and modification he establishes a dialogue between the old and the new. He also establishes a dialogue between the artwork and the building.

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65 Ibid., p. 70.
The building respects the art that it houses. This enlivens the building. The way in which the architecture encourages movement through the spaces allows the art to be experienced more fully. The building has been altered to meet the needs of its new purpose, respecting that which went before it, but also respecting the possibility of that which still may come.
3.4 Lincoln Centre, New York

The Lincoln Centre was envisioned in the early 1950’s as a centralised cultural campus that would create large-scale urban renewal, revitalising the Upper West Side of Manhattan. The scheme was envisaged to establish New York as “the modern Athens of the Western world” but on completion the complex was almost universally panned with the Modernist design principles deemed socially elitist.

In spite of this, the centre would over time become an icon of New York, and within 20 years the centre had gentrified the Upper West Side. However, the static and insular nature of the buildings failed to adapt to changing attitudes in the role of the Arts within contemporary society. With aging façades, obsolete infrastructure and increasingly deserted public spaces, the centre was in need of a major refurbishment.

In 2002 Diller, Scofidio + Renfro (DS+R) were selected as the architects for the refurbishment. Rather than replacing the image of the cultural icon with one alien to it, the design team devised a strategy to work with the ready-made and amplify its most successful features.

The North Plaza & Hypar Pavilion

These public spaces lacked the life and vitality of the interior of the buildings. The North Plaza defined the major North-South campus axis between 62nd to 65th Streets. The plaza had a 46-centimetre gradient, the change managed by a set of shallow steps opposite the Avery Fisher Hall. Located in the centre of the Plaza was a 43-metre reflecting pool.

DS+R replaced the steps with a gradual slope across the entire plaza. The height of the reconfigured zero-edge pool was aligned to the centre of the slope, leaving half of the pool above ground and half of the pool below. It was also narrowed in order to create a level of subserviency to the plaza’s dominance. This creates an optical illusion within the pool. While it

67 Ibid., p. 15.
sits flat, the dominance of the slowly sloping surface of the plaza makes the pool appear as if it is angled relative to the plaza’s surface.

The Hypar Pavilion is positioned at the northern end of the North Plaza. A large, flat and inert public space, DS+R were faced with addressing the Lincoln Centre’s requirements of providing a public space for the school, space for a destination restaurant, and also a screening room for the film society. Initially, it appeared that the space could only accommodate one of the needs. However, through stacking of the needs the requirements could be met. The upper surface of the plaza was lifted and distorted through the application of a Hypar\(^6\). The form of the Hypar was carefully considered to allow an easily maintained green roof, while providing the much-needed public space. Below the green roof, the destination restaurant and film centre were inserted, providing views of both the plaza and of 65th Street. The scale of the project provides all the programmatic requirements, while not approaching the monumentality of

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68 A hyperbolic paraboloid made up of straight lines.
the other buildings. However, the saddle-like surface, dipped at the southern end to provide pedestrian movement, gives additional drama to the space.

**Juilliard School & the Alice Tully Hall**

The Juilliard School by Pietro Belluschi sits with its front door facing away from the centre. This did not reflect the progression of the student’s education in Juilliard to their professional life in the Lincoln Centre. Deep within the Juilliard is the Alice Tully Hall, one of the major performance venues within the Lincoln complex. The original Juilliard provided a cross-block connection, linking the street to the Hall. However, a 1990’s renovation removed this connection. As a result the entry was hidden and the street level atrophied. The School also required increased floor space to provide facilities for its diversifying range of contemporary performance arts. The main aim was to turn an inwardly focused building into one that met with the demands of a performance art school.

The building could not be added to due to seismic strengthening requirements. The only space available was a small, triangular streetside plaza. In order to activate the plaza and the Alice Tully Hall, the lower levels of the lobby were removed and replaced with sheer glass walls. This created much-needed congregation spaces, while also establishing a visual connection to the Alice Tully Hall. The final move was to lift the far corner of the plaza to create a public grandstand. While it allowed the public to watch the “performance” of the school in operation, when combined with a cantilevered extension to the school above the plaza it created a clear definition of the boundary. This helped to further enliven the plaza and increase street presence.

Above the plaza in the new extension is the eastern façade. Clad entirely in laminated glass it provides light deep into the solid mass of the travertine-clad brutalist building. It acts like a surgical cut, running parallel to the street providing visual connectivity into the interior. The minimalism of the original façade is reflected in the detail of the elevation with 50-foot long glass curtain walls hung from a large-tub steel beam. The glass curtain walls on the interior are supported by five-ply glass fins, resisting the lateral force of wind loading.
Overall the refurbishments have been a success. While some have called the moves muted, with additions fragile in relation to the monumentality of the other buildings, most reviews have been positive. DS+R have managed to enliven the exterior of the complex, while reconnecting the interior. In doing so they allow a cultural icon to be explored and enjoyed by another generation.

Figure 3.5.5: A series of models displaying DS+R’s “striptease sequence” revealing the Alice Tully Hall. Image 1 – Lower-level stone is removed to expose theatre. Image 2 – Juilliard’s upper floors are extended to Broadway creating spatial definition of plaza below. Image 3 – Extension of Juilliard glazed to reveal inner workings of school. Image 4 – Sheer glass walls create Tully’s new lobby space. Image 5 – Corner lifted to define edge of plaza.
4.0 Project Definition

The Otago Peninsula has been selected as the site location for this research enquiry. While only one of many areas of significant biodiversity within New Zealand, the peninsula is unparalleled with respect to its accessibility from Dunedin city.

Being located close to Dunedin has both positives and negatives for the ecology of the peninsula. The urban centre provides a number of resources for ecological conservation. However, eco-tourists can easily access the area and unmanaged ecotourism negatively affects the wildlife on the peninsula. Some people question whether eco-tourists should be allowed to view the fauna at all.

As this project relies heavily on site, site analysis will play a pivotal role in the understanding of the problem and the generation of a solution.

4.1 Site Analysis Summary: The Extended Horizon of Ecological Conservation on the Otago Peninsula

In order to answer the architectural question, three areas of exploration were identified to gain an understanding of the issue. These were:

- How ecological conservation operates on the peninsula
- What hinders ecological conservation
- What ventures, activities or performances occur which indirectly affect conservation on the peninsula, or have potential for development.

Applying David Leatherbarrow’s extended horizon analysis and analysing the

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69 “How can architecture enable and promote ecological conservation while providing a link between its localised and centralised requirements?”
Existing cycle and walking trails
Centralised site locale
Railway line
Edge of urban area
performances which occur within the horizon of the peninsula allowed for a comprehensive understanding of the many and varied influences of ecological conservation within the area. While the full analysis can be found in Appendix 9.1, a summary of the analysis follows.

Ecological conservation operates on two levels. This project has categorised these levels as **Centralised** and **Localised**. **Centralised** refers to the administration, management and establishment of the roles and rules surrounding conservation. Often undertaken in an urban setting, the performances define and create the actions relating to ecological conservation. **Localised** refers to those performances that occur around the habitat of the flora and fauna. Including ecological conservation at work, these performances directly impact the habitat.

**Centralised** organizations include DOC, the Yellow-eyed Penguin Trust, Kai Tahu ki Otakou, the Dunedin City Council and the Otago Regional Council. These groups are heavily involved in the protection of flora and fauna on the peninsula through the planning and management of resources. This planning is then implemented at a localised level.

These groups, along with several departments of the University of Otago, undertake most of the research of the area’s biodiversity. Through this research Kai Tahu has identified that a lack of awareness, inadequate legislation and the under-resourcing of local authorities leads to a prioritisation of regulatory actions. They also assert that more communication is needed between interest groups, as well as within local agencies. There is a need for the differing performances to operate as a cohesive whole.

This can also be extended to DOC’s prioritisation of citizen-based conservation initiatives. If the public is to be involved, then the work should be undertaken on a more public level. This will allow for a greater understanding of and respect for conservation efforts.

Over the last quarter of a century the Otago Peninsula has seen a substantial increase in ecotourism. With this increase in popularity comes a change in the demographics of eco-tourists.

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71 Ibid., p. 45.
Eco-tourists are now less knowledgeable and therefore less respectful of fragile ecosystems. A greater percentage search out unmanaged ecotourism options in order to access an uninhibited connection to the flora and fauna. This usually occurs in areas with minimal infrastructure to manage tourists and is often detrimental to the biota. It is further complicated through the development of social media, as this information, or misinformation, can be easily and rapidly spread. Kai Tahu identifies the need for improvements to infrastructure in order to meet the increasing demands of tourism. This represents a necessity for increased education of eco-tourists.

As organisations already lack resources there is an issue surrounding the possible implementation of this research project. New infrastructure is required to educate, manage and facilitate ecological conservation, but with little to no additional funding available implementation seems problematic. This infrastructure should also not compete with that which already exists. Penguin Place, for example, provides a managed ecotourism operation with intimate experiences of fragile fauna. The entrance fee to access this also provides resources essential for the conservation of the Yellow-eyed Penguin. It is important that initiatives to manage ecotourism do not challenge that which already exists. In doing so it would remove funding and place a greater strain on ecological conservation.

4.2 Criteria

Criteria were identified to help establish the programme. This provides the basis for the project in order to meet the localised and centralised needs relevant to the architectural question.

Enabling Conservation

The architectural solution must enable ecological conservation at a centralised and localised level. Centralised conservation requires increased communication and education among groups and the general public. Localised conservation requires better resources and infrastructure in order to manage and protect.

Figure 4.1.2: Unmanaged ecotourism in action. Tourists await the arrival of Yellow-eyed Penguins to shore at Sandfly Bay, Otago Peninsula. Unbeknown to the tourists the penguins will not return to shore with humans visible on the beach. The human presence is extremely stressful for the Yellow-eyed Penguin.
**Promoting Conservation**

A greater understanding is required among the public on the importance of ecological conservation and its value on a cultural and economic level. However, the lack of resources currently available hinders the creation of new infrastructure. Therefore, exploring the potential of incorporating other performances becomes essential for the project’s success.

4.3 Programme

To focus on one or other of the *centralised* and *localised* fields would fail to answer the architectural question. For example, to only provide a *centralised* solution runs the risk of encouraging more eco-tourists to visit the area. Without additional infrastructure between humans and fauna at the point of a localised connection the conservation problems would be exacerbated. Therefore, the *centralised* and *localised* fields of conservation require two individual yet harmonised solutions.

4.3.1 Centralised Programme: Eco-hub

The research project is concerned with how architecture can act as the medium to create value, culturally and economically, within ecological conservation. The design aim of the *centralised* solution is to develop an urban-based administrative eco-hub. The architecture aims to develop a dialogue between organisations involved within ecological conservation. It also aims to establish a relationship with the public, creating an understanding of the importance and value of ecological conservation. This will be explored through establishing relationships between performances that occur under Dunedin’s extended horizon.

The architectural program will serve three purposes.

- To provide an administrative and eco-touristic hub for ecological conservation
- To provide an educational visitor centre
- To provide a Dunedin base for the National Cycle Trail, *Nga Haerenga*

The following programmatic requirements will be incorporated into the design:

- Office space – For DOC, Yellow-Eyed Penguin Trust and other organisations involved in the administration of ecological conservation
- Workshop & storage – Facilities suitable for storage and maintenance of plant
- Ecotourism and cycling visitor information centre
- Retail and cycling service spaces
- Café
- Toilet facilities
- Urban space

4.3.2 Localised Programme: Yellow-eyed Penguin Reserve

The design aim of the localised solution is to explore how architecture can spatially manage human interaction with fragile fauna. The programme, where appropriate, will use the National Cycle Trail as a generator of additional infrastructure. The Yellow-eyed Penguin has been selected due to the identified problem with the interaction with humans. The architecture, through the positioning of structures and interventions, will provide a more respectful encounter with the bird around areas of unmanaged ecotourism.

The following programmatic requirements will be incorporated into the design:
- Cycle trail
- Entry point into reserve
- Viewing platform(s)
- Viewing hide(s)
- Additional structures to manage “unmanaged” eco-tourists
- Potable water facilities
- Toilet facilities
5.0 Centralised Project Development

5.1 Site Selection

Before the selection of site the requirements of the programmes were analysed under the “horizon” of Dunedin city, in order to identify a site locale. The cycle trail was given priority in the selection, as it was this “performance” that would bring increased public interaction to ecological conservation’s centralised requirements.

Dunedin’s harbourside heritage precinct was the selected site locale for the following reasons:

- Positioned at an area where the Otago Harbour cycle trail is closest to the CBD, less than ten minutes walking distance from the Octagon, the centre of Dunedin
- Located beside the Dunedin Railway Station, the end of the Central Otago Rail trail
- Beside the Warehouse Precinct, an area currently under redevelopment
- Close proximity to the harbour edge for harbour-based eco-tourism operations

5.1.1 Historical Analysis

Due to the performance of heritage within Dunedin it was important to understand the site’s cultural significance to the city. The analysis was undertaken to understand these values particularly in relation to the locale.

Maori have a long history with Dunedin’s upper harbour. Its mud flats, rich in kaimoana, provided a bountiful food resource and, therefore, could sustain permanent habitation. At the time of European arrival it was thought that there were around 1000 Maori living on the peninsula.

A permanent European settlement was established at Dunedin in 1848. In 1861 gold was
discovered at Gabriel’s Gully, inland from Dunedin. Almost overnight the city was transformed. By 1863 its population had grown from 2,000 to 20,000 and by 1865 it was New Zealand’s largest city by population.

Between 1861 and 1871 the Otago goldfields produced £23 million worth of gold. As transport around the country was only by sea, access to the goldfields was predominantly through Otago Harbour. As gold began to dwindle the miners turned their hands to the development of the pastoral hinterlands. This sustained Dunedin’s economic momentum, with the harbour remaining the focus of the city’s commerce.

Tied to the city’s prosperity was the growth of business and industry. The harbour did not have suitable flat land to meet the demand for commercial development. Over the next century 363 hectares of land would be reclaimed from the upper harbour at the expense of the mudflats and its kaimoana. However, this economic progress created some of New Zealand’s most recognised businesses. Briscoes, Hallensteins, Fletcher Construction and Hudson’s (later Cadburys) were some of the businesses founded on Dunedin’s wealth. This period of economic success would also fund many grand buildings.

During the 20th century New Zealand’s commercial activity began to drift northwards. As a result Dunedin’s economy stagnated. In the early 1990’s the Dunedin City Council (DCC) rebranded the city in a bid to stem population and economic decline. It refocused the city’s image on two key strengths, the ecology of the Otago Harbour and the city’s built heritage. The economic stagnation of the 20th century had prevented the demolition of many of the buildings built in the 19th century. The DCC began to investigate ways to manage and conserve the built heritage. One important area identified was the Harbourside precinct. The area was once the industrial hub of the city with a steel-manufacturing and engineering core.

In 2005 conservational architects Salmond Reed were commissioned to provide an independent assessment of heritage values of the area. Jeremy Salmond stated that the active industrial nature provided the precinct with a sense of vitality. The general practice of the informal use of the street

Figure 5.1.1 (upper) & 5.1.2 (lower): Two photographs of Princes Street taken nine years apart. The lower image taken in 1870 shows the dramatic change the goldrush brought to the cities built form.
Figure 5.1.3: Aerial view of the Harbour Basin area circa 1930s. Solid line denotes original shoreline, dotted lines denotes the second stage of reclamation undertaken in early twentieth century. NZLMA building partly obscured at right front of image while Sheds P and Q sit in foreground (shed P is yet to be extended).
was said to “animate the spacious streets”. Unlike other heritage precincts within New Zealand Dunedin’s harbourside precinct remained in continual use throughout the period of decline.

In 2008 the DCC proposed a rezoning of this area from its classification of Port and Industrial to mixed-use to protect many of the original buildings in the precinct. This led to submissions from businesses operating within the precinct who opposed the plan change as it was believed that the change would render businesses economically unsustainable should gentrification occur. As a result the plan change was rejected.

Today two buildings in the area are scheduled within the District Plan and the Historic Places trust. These are the former New Zealand Loan and Mercantile Agency (NZLMA) building and the former HM Custom House (HMC) Building. Both mark the entry at the Wharf Street corner of the precinct. Salmond states that there are many other good examples of 19th century industrial architecture within the precinct. While having a variety of styles there is also a consistency of scale among the buildings, and a general tendency to align the buildings to the street edge.

5.1.2 Value Assessment

Alexander Trapeznik states that the preservation of evidence of the past is central to individual and collective identity. He argues for the preservation of all types of buildings, not because of architectural merit, but to preserve a full reference of socio-cultural relics. Salmond states that successive generations gain a sense of continuity from physical surroundings which have survived functional change.

Trapeznik also states that the Dunedin harbourside precinct is a cultural landscape that has helped to shape social relations and institutions over the past century and a half. The ‘performances’ of heritage and ecological conservation are important to the city. While the initial development of the wharves and the industrial area detrimentally affected the ecology of the upper harbour, these performances are now faced with similar issues around economic value versus socio-cultural value.

While the precinct has played an important role in the formation of Dunedin and New Zealand, the harbour and its wharves have provided infrastructure vital for the area’s development. The selection of site should look to meld these performances in order to respect the values of the city as a whole. It should also look to protect the performances that already occur under the horizon.

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74 This plan change fitted with the original use of the area with residential originally present on Creswell Street.
5.1.3 Centralised Site Selection

Early within the site analysis it became apparent that the southwestern corner of the precinct provided the best potential for the site. This was because of the area’s proximity to existing commercial, tourist and pedestrian performances. Two buildings were identified as potential sites under the criteria identified in section 5.1. The first was the NZLMA Building. Construction began on the grain and wool store in 1872, before the Fryatt Wharf area had been fully reclaimed. In 1885 architect Robert Lawson extended the building with a classically inspired design. The building sits at the southwestern point of the area and dominates the head of the precinct. Considered one of the more architecturally valuable buildings of Dunedin, it is currently used as storage.

The second site identified is the Fryatt Street Wharf Sheds. Construction of the wharf dates back to 1860 and the first Wharf Sheds were constructed in the 1870’s. By the 1920’s the original structures did not meet the new demands of shipping. Sheds P and Q were rebuilt in their current form with an addition to Shed P in the 1940’s. While wharf sheds originally lined the entire edge of the Steamer Basin, of the original sheds only P and Q remain today. While little to no pedestrian traffic passes the sheds, the Port Chalmers to Taiaroa Head cycle trail runs beside the entire length of the building. The sheds also provide a direct connection between the harbour and the land. Like the NZLMA Building the Wharf Sheds are currently used as storage.

A site inspection revealed Sheds P and Q and the NZLMA buildings are the only buildings without a present use in the southwestern corner. From an economic value perspective some form of revenue generation would help to meet seismic strengthening requirements. The heritage status of NZLMA building, while not ensuring its future, provides some form of mechanism to ensure its protection. The Wharf Sheds are without any current protection status and could be considered as architecturally unremarkable. However, these sheds have played an important part in the development of Dunedin. Additionally, from an urban design perspective, at over 300 metres long, the forms of the sheds have defined the street and harbour edge for almost a century and a half. With no current use and no heritage protection these buildings could potentially be lost within the next 15 years. Their demolition would remove an important
part of the socio-cultural value to the performance of heritage within Dunedin. It is for this heritage value, combined with their waterside location, proximity to the city centre and position beside the current cycle trail that the Wharf Sheds have been selected as the centralised site.

Figure 5.1.6: Panorama of Steamer Basin.
(Images from left to right, top to bottom) Figure 5.1.7: Painting of Otago Harbour, circa 1840. Figure 5.1.8: 1858 photo of Dunedin taken from Bell Hill. Bell Hill was removed during the 1860’s with its spoil used to reclaim the industrial precinct area. Figure 5.1.9: A cartload of rabbit skins arrives at Q shed, circa 1920s. Figure 5.1.10: The industrial precinct. The Rattray Street rail crossing would remain until the 1960’s when it was removed to allow increased rail traffic. Photo circa 1930s. Figure 5.1.11: The “Wyatt Earp” outside Shed P on one of its final stop offs on its Antarctic expedition, December 1933. Figure 5.1.12: A Centaurus Flying Boat, Steamer Basin, January 1938. Figure 5.1.13: Steamer Basin, January 1961. Figure 5.1.14: Sunset on Shed P and Q, Steamer Basin 2012.
5.2 Urban Design

5.2.1 Urban Analysis

The built form of the precinct is of a consistent scale and aligned to the street edge. Architecturally diverse, the buildings vary in style and age, reflecting the industrial nature of the area. While there are some modern buildings, the majority were constructed prior to 1950. Interspersed throughout the area are outdoor storage and engineering spaces which may give an overall appearance of dereliction. On closer inspection, however, most of the buildings are currently occupied.

In spite of the informal business activity along the street edge there is a lack of pedestrian activity. This can be attributed to the main trunk railway line that separates the central business district from the harbourside area. While originally the central city streets extended into the precinct the railway line severed this connection in 1878 when Dunedin was connected to Christchurch by rail. Today only two vehicular links connect the precinct to the city.

Dunedin’s harbour edge was predominantly used by shipping which serviced the city’s commercial and industrial sectors. With much of the shipping relocated to the deeper waters of Port Chalmers the Steamer Basin now mostly provides mooring space for boats. Combined with a pedestrian connection to the area there lies potential for a central city harbour connection, thereby increasing pedestrian activity within the area. Many recreational performances are undertaken on the harbour.

Since the late 1970’s neglected waterfronts throughout the world have been redeveloped in the hope of creating dynamic public spaces. While some have succeeded, many have failed due to the attempt to replicate a successful formula generated elsewhere. Richard Berman states that there is an inherent contradiction in attempting to replicate or create a formula for executing successful urban design around a waterfront, when an element of that formula

Figure 5.2.1: The consistent scale and alignment to the street edge of the built urban form of the heritage precinct. Fryatt Street with Wharf sheds along left of image.
The working industrial nature of the Dunedin Harbourside precinct provides it with its uniqueness.

Dunedin’s economy is struggling. The city with a population of 120,246 (2013) has witnessed over 150 redundancies in a 24-month period with at least a further 75 redundancies likely. Daniel Williams states that today designers must think about the common good, while protecting the public and private good. As mentioned earlier the heritage precinct has had continued occupation throughout the 20th century yet faces a tenuous future due to increased overheads. Therefore, the design must respect the economic performances that already occur under the horizon of the harbourside precinct. If socio-cultural values are to be increased then it should not be done at the expense of economic values.

5.2.2 Urban Design Solution

The intent of the proposed building is to create a lively and inclusive architecture that makes opportunities for connection, interaction and education on ecological conservation. To respect the existing commercial and industrial performances of the precinct, development and pedestrian connection have been focused on the southwestern corner. This area has very little current use and, therefore, faces the greatest risk of demolition.

The following moves have been undertaken to provide an urban design solution:

1. The proposal of two stitch parks tying the industrial precinct back to the city providing a pedestrian link. The first stitch, located between the

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80 Confirmed redundancies: Delta – 38, NZ Post – 73, KiwiRail Hillside Workshops – 44. Proposed redundancies: Ad Research – 75,
Dunedin Railway Station and Toitū, the Otago Early Settlers Museum, rises and crosses the rail line. Using the City to Sea Bridge in Wellington as a precedent the low gradient provides ease of movement linking the city to the industrial area. The second stitch is the reconnection of Rattray and Fryatt Streets. A ground-level park links the Queens Gardens to the wharf at Fryatt Street. With no vehicle access the park would cater for pedestrians and cyclists. The railway would be crossed at a level crossing.

- The proposal for a tramline to run from the city centre through the Queens Gardens’ stitch and past the wharf sheds along Fryatt Street to bring increased public transport into the area. The tram would return to the city at the Fryatt and Mason Street intersection where an educational facility is proposed.

- The creation of a hospitality and accommodation quadrant at the southwestern entry of the precinct. By including a boutique hotel in the repurposed NZLMA building the quadrant would attract people into the precinct outside of weekday working hours. This would support existing hospitality in the neighbouring Wharf Hotel and the HMC buildings.

- A proposal to make Fryatt Street a shared street allows even use between vehicles, pedestrians, cyclists and public transport. It was initially considered that the street would exclude vehicular traffic, however, doing so would disregard the existing industrial and commercial operations on Fryatt Street.

- The use of ramps to draw pedestrians and cyclists up onto the wharf.

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83 This site is an extremely important tourist site in Dunedin having been cited as New Zealand’s most photographed building.

84 It is noted that there was a 27-storey hotel proposed on Thomas Burns Street. Due to the rejection of that resource consent application it has not been considered within the urban design process for the purpose of this project.
directing movement away from the street and providing increased connectivity to the harbour.

- Heavy traffic is diverted from Fryatt Street along neighbouring Willis Street with connections to Fryatt Street along Fish and Tewsley Streets minimising heavy vehicle traffic along Fryatt Street.

- The creation of a plaza at the western end of Fryatt Street to act as an area of arrival linking the Queens Gardens stitch to the “Eco-hub”.

- With the floor plates of both sheds too large for the “Eco-hub” alone, Shed P will house the “Eco-hub”. With an identified need for increased communication and interaction between the National Marine Studies Centre and organisations involved in ecological conservation Shed Q is proposed as the new site for the Marine Centre and aquarium. With both Sheds P and Q focusing on the understanding and management of ecology it utilises an existing synergy between the two performances and aims to encourage interaction through the connection of the sites.

- The eastern end of the wharf will retain its existing performance of commercial fishing. With the incorporation of the performance of industry this, through the creation of connection, encourages ecological education to occur within industry as well.

By establishing relationships between these performances and inserting them into the existing urban fabric it creates the potential for a more lively and effective architecture.
5.3 Spatial Management

5.3.1 Movement

Threshold, boundary and barrier are experienced by movement. To create a successful and lively architecture the design needed to incorporate multiple performances. With the project’s success reliant on creating increased pedestrian activity, an understanding of the approach or movement to the site was required. An analysis of the existing spatial qualities was undertaken at multiple levels across the wider and then the immediate site. This provided a better understanding of the approach to the site and then allowed the journey to be implemented revealing the performances.

Figure 5.3.1: Existing spatial qualities of public areas across wider site. Depth of colour references the prominence of the space relative to the surrounding spaces.

Figure 5.3.2: Sectional spatial analysis of immediate site. Depth of colour references the prominence of the space relative to the surrounding spaces.
With the approach established, three performances were identified as fundamental to the project: the arrival point, the education centre, and the conservation at work area. The journey through the site positioned these performances sequentially. The order was selected as it was deemed the most effective in providing conservational education through proximity. Additional performances and their frameworks were inserted between these spaces to accentuate the transition between the three key performances. An example is the transition between the arrival point and the education centre. Through the design process the education centre was moved from the wharf to its own space floating on the harbour of the Steamer Basin. This provided it with its own identifiable location which previous iterations had failed to address. The performances of water-based recreation and hospitality were inserted to establish a destination which would draw people down onto the pontoon. The proximity between these performances and the education centre would create a greater likelihood of generating opportunities for education through the incorporation of the performances. Its sequential positioning following from the performance of education enforces the recognition of the importance of the conservation at work performance.

Figure 5.3.3: The journey through the site revealing the performances.

<table>
<thead>
<tr>
<th>Cycling</th>
<th>Conservation at work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor Centre</td>
<td></td>
</tr>
<tr>
<td>Arrival</td>
<td></td>
</tr>
<tr>
<td>Hospitality</td>
<td></td>
</tr>
<tr>
<td>Water Recreation</td>
<td></td>
</tr>
<tr>
<td>Conservational Educational</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.3.4: An early iteration of the positioning of Shed P in relation to the education centre. With form derived from the mirroring of the shed the positioning of the visitor centre lacked a visual connection from the point of arrival.

Figure 5.3.5: A later iteration with the education centre given equal prominence to the conservation at work area.
The three-dimensional generation of the journey created some challenges. The threshold connections became problematic particularly between the wharf edge and the pontoon. Designing a threshold that could traverse the maximum 3.3-metre height change between the wharf edge and the water was challenging. Stairs would create a physical barrier for some people. Additionally the static form of stairs or elevators would not manage the pontoon’s 1.8-metre tidal variance. The only viable option was to use ramps, but their required length complicated the creation of a visual connection to the destination. To prevent the elongated threshold taking dominance away from the destination, the pontoon, the boundary edges of the threshold were manipulated. By using the edges of the space to create areas of contrast through light and shadow, while also exploring the use of visual porosity, the threshold elements were able to not only ensure the continuation of the journey but also to enhance the point of arrival at the pontoon.

Figure 5.3.6: A series of sketches exploring the threshold connection between the wharf and pontoon.
5.3.2 Dominance and Subservience

As discussed above, the establishment of destination was key to the interpretation of movement through the site. While the insertion of additional performances created a more lively architecture it was important they did not compete with the performances which were fundamental to the success of the design. Some spaces needed to allow the power of destination to lie in the following space in order to encourage progression. Key to this was creating a boundary and a threshold which acted subserviently to the spaces of the more important performance.

An example of this occurred on the exploration of form on the pontoon between the performances of water recreation and conservational education. In Doorway into Darkness Ettore Sottsass showed the power a physical threshold can provide in creating perceptual boundaries. Combining this with Ching’s theory about the dominance vertical planar forms have over horizontal planar forms, the boundary design process explored the possibilities that the combination of physical and perceptual boundaries could play in creating a dominant threshold. By using the solid planar forms to define the edge of the threshold this established dominance of the boundaries surrounding the threshold, and the dominance of the connecting space. Then by partially removing the upper segment of the boundary separating the two spaces it allowed light to spill through into the top of the space, drawing people along the journey through to the desired location. This was then reinforced by lifting the lower planar to rise towards the threshold, creating a directional pull to the threshold.

In certain spaces, particularly those relating to the existing built form, it became clear that some spaces needed to exert dominance over others. Most notable was the Wharf shed. The built form of the Wharf shed defines the edge of the Fryatt Street streetscape. Due to the length of the form, it reads as a boundary of the streetscape rather than a boundary of the shed’s own space. In order for the shed to assert dominance over the street and establish destination within the early stages of the journey, the street was pulled back from the edge of the building. Figure 5.3.7 shows the insertion of a lowered garden to create an additional space between the street and the building, thereby separating the form from the streetscape and thus asserting its identity as a destination. This new space is then bridged at key points, creating a definitive threshold to the Eco-hub.

Figure 5.3.8: A series of images exploring the generation of threshold between a subservient to dominant space
5.3.3  The climatic envelope

Threshold, boundary and barrier were used to define the spaces along the journey. The generation of the built form created the boundaries around the spaces. Initial design concepts unconsciously focused on rigid climatic boundaries for the frames. These rigid envelopes did not allow for the integration of additional performances. Hensel’s questioning of the climatic boundary highlighted the need to challenge the climatic requirements of each framework.

The site is exposed to both easterly and westerly winds. However the existing built form provides some shelter, most notably the Warehouse Precinct, which provides shelter to the western end of the Steamer Basin. The performances of ecological conservation at work and its frameworks of workshop and offices require a moderately rigid envelope in order to maintain a comfortable internal working environment. The requirements of the education centre allowed more flexibility in the design of its envelope. By breaking down the climatic envelope additional performances and frameworks were able to be incorporated. Continuing with the example in section 5.3.2, the exposed nature of the eastern edge of the pontoon meant that the form needed to be able to provide some form of shelter from the easterly wind. The creation of a climatic envelope provided wind shelter for the performances of conservational education, hospitality and water-based recreation. Without the same requirements for shelter, the climatic envelope at the western edge of the pontoon could be layered, generating a series of spaces which could allow other performances to infiltrate the form, thereby creating a more lively architecture.

Figure 5.3.9: Section of the design of the climate envelope. With the predominant wind being due east, the folding glass doors on the Eastern side provides shelter; when needed, from the prevailing wind. The sheltered nature of the western edge allows the climate barrier to be stretched creating multiple occupiable spaces inside the stretched envelope.
5.4 Creating and respecting value

This project focuses on two key performances for Dunedin city; ecological conservation and the preservation of the city’s built heritage. This section deals with how the performances are implemented into the design process.

5.4.1 The silent monument

As discussed in section 2.4 the theories of Viollet-le-Duc and Ruskin provide little help in determining the approach for the repurposing of Shed P. The theories of Scott and Rossi present greater possibilities. As discussed earlier Scott stated buildings change as cities change. With the form of Shed P so closely tied to its original function, due to its function being obsolete, the building is also.

If the building is to employ the concepts of adaptive reuse then the design needs to recognise the socio-cultural value of the building. As discussed in section 4, the shed acts as a silent monument having played a formative role in the development of the heritage precinct, Dunedin, and in some respects New Zealand.

The precinct buildings have been experienced predominantly through their external form, or envelope, creating and defining the boundaries of spaces.

Figure 5.4.1: The breaking up of the floor plate. The four images display the approach to the segmenting of the floor plates so that sections could be lowered to connect the interior of the building to the street and to the wharf.
within Dunedin’s urban fabric. With the internal space of Shed P predominantly inaccessible, the socio-cultural value of the interior was deemed of lesser importance than the exterior.

In Section 5.3.1 the difficulties surrounding the creation of the journey through the various height changes were highlighted. The extension of the journey into the form of the shed also proved a problem. The building required increased thresholds to allow visual and physical connections into the interior space.

While ramps connected the wharf to the street, connecting the interior of the building to the exterior was more complicated. With a one-metre height difference between the wharf and the street, the interior needed to directly connect to both exterior levels in order to activate the interior of the shed. To allow the building to be approached from multiple angles, an additional gridline to the existing structural grid was rotated 30 degrees on the northern façade and 60 degrees on the southern. The original floor plate, level with the wharf, used these new grids to break the floor plate into smaller sections. These smaller sections were then lowered, creating additional boundaries within the interior of the shed. This not only helped to humanise the interior space but also allowed other frameworks to be included inside the original form of the building. To recognise the original use of the building the original axes were retained, where possible. This provided visual and physical connections through Shed P. Height changes between the floorplates were managed by small ramps linking these axes. An example of the insertion of new frameworks occurs within the performance of the cycle trail where bike stands and a covered seating area are provided inside the original structural form of the shed but outside the new climatic envelope of the visitors centre.
While the original interior function of the silent monument may be obsolete, part of the exterior function still remains. The wharf no longer handles the shipping of goods but it still provides mooring space for commercial boats. Respecting the grittiness of the earlier function of the area is important if it is to be a silent monument to the greater site’s industrial performance. Perry Lethlean uses the term “waterfront amnesia” to describe the sterilisation of redeveloped waterfronts.86 He discourages the whitewashing of the industrial heritage which often occurs if developments fail to acknowledge the site’s original uniqueness. To remove that which is unique to the area creates a blandness of redevelopment. Therefore the retaining of the wharf as a mooring point for vessels retains some form of the original use. While the creation of the pontoon could be argued as being disrespectful to the harbour basin, it creates an opportunity to activate the area, allowing more people to come in contact with the wharf. In effect it allows the wharf and the sheds to change as the city changes while still acting as a silent monuments.

5.4.2 Structure and Services

While the project seeks to create socio-cultural value in Dunedin’s overlooked built heritage the design must also address the realities of repurposing these buildings. This includes the seismic strengthening requirements. While the form of the shed appears consistent its structure is in two separate sections. The structure of the original shed is constructed in concrete column and beam with in situ concrete panels. The structure of the eastern extension is a timber frame, clad in corrugated iron. Consistent across both sections is the 16-foot structural grid on which steel roofing trusses sit. In its current state the shed does not meet current building code requirements.

David Leatherbarrow states “buildings do accommodate practical purposes – yet if we predicate the life of buildings on use, we assign them a borrowed existence”.87 How the insertion of new structure is addressed could determine the flexibility of the future use of the Shed.

As was discussed earlier the decision was made to respect the outer form of the shed

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over that of the interior. This defined the positioning of the new structure inside the existing form. The new structure was to respect the spatial qualities of the interior while employing a vernacular that reflected the utilitarian nature of the precinct. To ensure that the shed is not faced with future obsolescence the design of the new structure is approached on two levels. The first is to preserve what is there. A steel column and beam structure is inserted inside the existing shed. The existing structure and walls are tied back into this new structure. Inserted steel beams running either side of the existing truss provide lateral support by tying the walls together across the building. New structural walls are then inserted to cross the 12.2-metre width of the shed, running parallel with new ramps which connect the street to the wharf. The second structural approach addresses the building’s ability to address future changes of use. Mezzanine levels can be inserted, or removed, depending on the requirements of the space. The new mezzanines are attached to the new steel structure.

As Dunedin evolves in the future it is important that the shed can meet these changes. In doing so it hopefully minimises the chances of future obsolescence. This flexibility should also extend to the services within the building. Where possible these services will be exposed. For example using overhead electrical cable trays to meet the infrastructural requirements of the frameworks allows for future retrofitting, when required.

5.4.3 The envelope

The insertion of two ramps across the building to connect the street to the wharf provided an opportunity to allow natural light into the building. Aligned with a structural bay the entire envelope above the ramp was removed. While creating natural lighting for the interior and encouraging physical connection between spaces, the new threshold space would create a wind tunnel. A new glazed façade is positioned above the existing structure of the shed. The new glazed façade with independent structure wraps across the roof and down onto the wharf to provide shelter from the southerly winds. Acting as a lightwell for the interior spaces, it also acts as a visual identifier of thresholds through the building.

Due to the elongated floor plate of the shed the new lanterns could not provide sufficient natural light into the interior of the shed. Additional fenestration was required in the
northern and southern façades. Several design iterations were explored examining surgical incisions or extrusion of form. However these tended to compete with the original form of the existing shed. The selected iteration drew inspiration from the way in which the new fenestration was inserted by DS+R in the Juilliard School extension. By analysing the building stock of the heritage precinct it was found that the variety of ages and styles could all be characterised by their geometric nature. By taking this geometry, overlaying it, and then applying it to the façade of the building it generated outlines for the insertion of fenestration. Providing natural light and visual connectivity into the building, it could be also be read as a new insertion while still respecting the original form.

This geometric language could then be applied to the climatic envelope. In certain areas the new glazed façades required some form of solar gain prevention. By layering the geometric panels over the glazed façades this minimised the solar gain. The same design philosophy was employed on the pontoon in order to create an architectural consistency between the old and the new forms. This geometric pattern would also prove to be integral to the success of the localised design solution. This is covered in greater detail in section 6.4.

Figures 5.4.6 -7: Facades of the industrial precinct.

Figure 5.4.8: The geometric pattern found within the facades was then used as a reference for the generation of fenestration within the existing façade of Shed P.
6.0 Localised Project Development

6.1 Site Selection

In Section 4.2 the need for increased resources and infrastructure within localised ecological conservation was discussed. This would allow better management and protection of fragile biota. To gain an understanding of the current localised situation an analysis was undertaken of Sandfly Bay. The extended horizon analysis, Section 9.1, identified the bay as a problematic area for ecological conservation on the Otago Peninsula and for this reason Sandfly Bay has been selected as the localised site.

The bay, a habitat for the Yellow-eyed Penguin (YEP), is an example of unmanaged ecotourism. DOC identified the bay as an area in which the public could go and view the YEP in its own habitat with no entry fee. With entry accessed from both sides of the bay and with no guides and no tours to manage the eco-tourists, the expansive area invites relatively uninhibited movement. However, as this is a nesting ground for the YEPs, human interference often disturbs and negatively affects the birds. This has been proven to hinder breeding success rates of an endangered endemic species.

The southern access point is the most popular entry into the area. Limited infrastructure exists to manage eco-tourists on their progression down into the bay. A viewing platform provides views down into the bay while the walls around the platform provide instructions on how to view the penguins. This information is often missed due to people focusing on the view, or continuing along the track without stopping at the platform.

The only other significant infrastructure within the bay is two hides located at the northern end of the beach. Positioned above the beach the hides allow viewing of the penguins as they come ashore. However, in order to access the hides from the southern entry, the eco-tourists must walk along the entire length of the beach. The YEPs cross this beach to return to their nests in the coastal bush and scrub. The human activity often prevents them from returning to their
nests, which also delays feeding of their chicks.

With no visual connectivity between the viewing platform and the hides a progression of movement is not established. Therefore within the eyes of the eco-tourists the beach is the destination, not the viewing hides. Additionally, with the freedom of movement the eco-tourists experience throughout the bay, there is little to remind them that their needs are secondary within the space to that of the ecological biota. Increased infrastructure is required for areas of unmanaged ecotourism to not only manage the eco-tourist, but also to remind the tourist they are entering a sensitive area. This section of the document will focus on the provision of architectural devices that will provide a form of spatial management within this unmanaged ecotourism area.

6.2 The Link

Ursula Ellenberg, in her research on the YEP, states that areas like Sandfly Bay should be closed off to the public in order to protect fragile endemic biota. The unfortunate reality is that if humans wish they will seek out other areas where they are able to see the species. Once this new area has been discovered social media allows this information to be shared. Therefore, rather than barring people from entry into areas like Sandfly Bay, it makes greater sense to provide some form of localised ecotourism management in order to provide viewing of the YEP.

YEPs are unique in the genus of penguins, as they do not nest communally but separately under the cover of bush. Being extremely large for a temperate climate penguin the YEPs need shade. Without it they are prone to heat stress, which can cause death. With the arrival of humans on the peninsula and the subsequent clearing of bush much of the penguins’ habitat was removed, forcing penguins to nest in less suitable areas. The birds are prone to attacks by predators, and trampling from wandering farm stock complicates nesting. This identifies the need to create predator-free areas where biota like the YEP can reside without interference.

Figure 6.2.1: (Above): A Yellow-eyed Penguin protects its habitat. Figure 6.2.2: (Opposite): Map of Dunedin City and Otago Peninsula displaying proposed Dunedin leg of the National Cycle Trail.
Proposed cycle and walking trails

Centralised site

Localised Site
The design of a predator-free fence must ensure all predators are unable to scale it. A cleared platform is also required in front of the fence and this platform provides a suitable surface for the cycle trail. As discussed earlier the New Zealand Cycle Trail, *Nga Haerenga*, was identified as the performance that would provide the link between the localised and centralised design solutions. With cycling gaining increasing popularity in Dunedin and on the Otago Peninsula, the cycle trail provides the economic impetus for the generation of new infrastructure. The creation of a peninsula-wide cycle trail, connecting the existing trails and linking back to the “Eco-hub”, would allow tourists increased access to areas of ecological biodiversity. This may appear detrimental to ecological conservation. The increase in tourists could bring added pressure to the biota. However, it also presents the opportunity for increased financial rewards. The growth of ecotourism on the peninsula creates greater economic value and therefore creates a greater need for ecological conservation. Through sharing the generation of new infrastructure between the two performances this provides opportunities for the protection of the fragile biota and increased education. It also protects the socio-cultural value of the endemic flora and fauna, which would also be attracting the eco-tourist to the area.

6.3 Spatial Analysis

Sandfly Bay is expansive. With a beach over a kilometre long and with sand dunes that stretch up to 1.5 kilometres inland, the area is a complex series of interconnecting naturally occurring spaces. Topographical analysis failed to provide an understanding of the complexities of the landscape. As the spatial experience evolves as a viewer progresses towards the bay, personal experience was used to understand the existing journey and to help understand the spatial qualities. Several site visits were undertaken in order to ascertain the current spatial qualities of the area. On each visit the bay was approached from its southern entry because the remoteness of the northern entry means it is rarely used.

The bay is approached from a road which descends from the ridge of the peninsula and ends at a parking lot where access across farmland is provided by a walking track. The track slowly falls to the viewing platform where the land rapidly drops away towards the bay. With the track turning before the platform is reached, eco-tourists often do not access the platform.
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they were to do so, they would be able to see the beach and then visually identify the destination. This is the final point on the progression where the boundary of the bay is the dominant space.

After the platform the access track rapidly descends to a small gate. This provides access into a path cut between the bush and scrub. As the track progresses it opens up into smaller spaces. The landscape combined with the flora allows the smaller spaces to assert dominance over the space of the bay. Previously in the journey the bay was the dominant space.

Up to this point the boundaries of the spaces were defined perceptually by the rise and fall of the landscape, but here the bush provides boundaries that act as barriers forcing the viewer to move onto the next space. These clearly defined threshold spaces continue until the track opens into the sand dunes. Once again the greater bay is visible, however the spatial qualities between the dunes exert dominance. Within this space there is freedom of movement except for the boundaries of the space defined by the scrub. The spaces become larger culminating in the space of the beach. The dominance of the space exerts itself as the destination. With no signage or directions for the progression of movement, the user feels they are able to wander the beach freely, unaware of the damage they are doing to the YEP.

Figure 6.3.7: Long section through Sandfly Bay.
Figure 6.3.8: Existing site map of Sandfly Bay.
6.4 Localised design solution

6.4.1 Design development

The approach to this design solution was based around the generation of infrastructure to facilitate the responsible management of currently unmanaged ecotourism. Taking account of the lack of resources DOC faces, the initial design iterations explored how infrastructure could be adapted to solve a multitude of problems occurring at the point of connection between the biota and the eco-tourist.

The exploration of prefabricated structures became the focus of this iteration. The lightweight modules could be fabricated in Dunedin and transported to the problematic areas. The hexagonal design could be manipulated to meet the tasks required whether it be the creation of a track, a platform, a bridge, or a hide. The main driver behind the design was creating modules that DOC staff and/or volunteers would be able to maintain, move, or adapt as and when required.

As the design progressed and materiality began to be investigated it became apparent that this design approach would fail to address some fundamental issues. Sturdy durable materials, like fibreglass, that could meet the demands of climate, produced potentially expensive solutions. The scale of the modules meant it was unfeasible for DOC staff and volunteers to manipulate and maintain them. Ultimately the iteration would not enable ecological conservation but would rather stretch currently limited resources even further.
Figures 6.4.1 - 6: Exploration of the modular design concept.
6.4.2 Final design solution

The next iteration took a more contextual approach. Understanding the site-related problems and creating infrastructure that solved these problems became the focus. The spatial analysis within Section 6 described the spatial qualities of the area. The next stage was to identify and define the problems generated by the ecology within the site.

The main problem identified was the lack of physical objects and forms that created spatial awareness and influenced movement within Sandfly Bay. Humans currently have the ability to explore the bay at their own will. While the topography of the landscape defines the spaces and limited movement to some extent, nothing had been placed in the bay that could physically control humans’ progression through the area. There are also no unnaturally occurring barriers, boundaries or thresholds to remind the humans that they are within an area in which their needs are secondary to that of the fragile fauna.

As discussed earlier, a pest-proof fence would be constructed with the cycle trail to enclose the bay. Not only would this fence create a predator-free area, the scale and form of the fence would provide a physical reference throughout the bay reminding the eco-tourist they are within a reserve, thereby making them more conscious of their behaviour and activity.

With the overall space defined by the proposed fence, the next step was to consider the degree of freedom humans could have to move throughout the bay. The need for infrastructure to limit this movement became the next focus of the design. One of the delights of Sandfly Bay is its expansiveness. To restrict movement across the entirety of the beach would remove part of what makes the beach enjoyable. The design needed to create a balance between providing the penguins with space to return freely to their nests while still providing humans some freedom to move about on the beach. It was hoped that providing objects of spatial management within key locations would better control the behaviour of humans within the bay.

The journey into the bay is lineal. Therefore the interventions are progressively revealed to the eco-tourist during the journey. The first intervention encountered is the entry, or threshold. This threshold consists of a building that is a meeting point outside the pest-proof

Figure 6.4.7: Proposed site plan – Sandfly Bay
fence for the performances of unmanaged ecotourism and cycling. With its form generated as a shelter from the inclement prevailing south-easterly winds, the building acts as a valve into the reserve. While unstaffed, the building contains information panels providing education on the correct behaviour around the YEP. These panels contain clear, internationally recognisable graphics that provide information outlining the appropriate behaviour around penguins. With the Otago Peninsula becoming increasingly popular with international eco-tourists, there have been difficulties arising around how the transfer of information occurs between languages. The use of clear graphic panels provides the most effective form of international education. The building also contains ablutions and the provision of drinking water to meet the increasing demands of eco-tourists.

The manufacturer’s design requirements for a pest-proof fence specify that it must be separate from a building. This is to prevent predators from scaling a building and traversing a fence. Therefore the physical threshold of the gateway is distanced from the building. Aligned

Figure 6.4.8: Section through entry building with pest-proof fence on left.
on a separate axis from the points of arrival, the entry threshold is elongated creating a greater sense of arrival once the initial threshold into the reserve has been passed.

Now inside the reserve the eco-tourist proceeds along the existing trail. The next intervention encountered is a viewing platform. The platform provides a visual connection to the final two interventions at the end of the journey on the beach below. Positioned at the site of the existing platform, the new platform diverts all eco-tourists from the existing track, drawing them through an enclosed threshold. Compression, followed by expansion, reveals the bay, visually establishing the destination situated on the beach below. The platform then returns to the original track. After exiting the platform the tourists are confronted with a series of panels located around the track. Similar to those within the entry building these panels help to reinforce that initial information. The decision was made to position the panels outside the platform structure as currently the eco-tourists on the existing platform focus on the view and tend to overlook the information panels. Separating the information from the platform allows the chance for greater attention to be paid to the information.

Figure 6.4.9: Plan of proposed viewing platform. The diversion of journey onto the platform establishes the visual connection to the final destination on the beach below.
The journey through to the final two interventions, situated at the beach, uses the existing track which operates relatively effectively. The YEPs nest throughout the sand dunes, so diverting the track would raise the possibility of disturbing their nests.

The main stretch of beach is the largest and most open space within the bay. This is also the area where the penguins return from the water to their nests. The boundaries of the terrain between the sand dunes restrict the visual connectivity between the spaces leading to the beach. Therefore the journey allows eco-tourists to move down the dunes to the waters edge. The northern entry to the beach is closed providing a human free area along the length of the northern end of the beach. A barrier spatially separates the northern and southern areas.

The barrier’s design was complicated by the point of connection between the YEP and humans and needed to relate to the sensory perceptions of both YEP and humans. Understanding the sensory perception of the YEP is difficult because so little is known about these birds, as with most of endemic biota. YEP are quite unlike any other genus of penguins, therefore it is difficult to draw analogies with other more researched penguins. What can be drawn from this research however, is that as with other penguins, YEP have exceptional eyesight. It allows them to stay in the water when they see human activity on the beach. They are also visual feeders. To be able to see underwater the penguins have colour vision. However their spectrum is sensitive to violet, blue, and green wavelengths of light. This allows them to determine greater subtleties between various shades of blue and green but also means they are less capable of determining differing shades of red.

The avian eye is similar to a human eye. Like humans, the overlapping of the visual field provides binocular vision and creates depth perception. However, binocular vision often only occurs when the visual field of each eye overlaps. The positioning of the eye on the head helps to determine this depth perception. With YEP eyes positioned almost on opposite sides

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Figure 6.4.11: The panel barrier.
of the head there is a possibility that there is a flatness to their vision. This may mean that partially obscured objects are not discernible to them. This possibility is supported by anecdotal evidence gained from staff at Penguin Place who believe that because eco-tourists are obscured by the viewing hides at Penguin Place the YEP are more relaxed around the presence of humans.

The sensory perception of both humans and the YEP shaped the design of the barrier. The second iteration was selected because it provided increased masking of the human form. The post and panel structure provides an architectural link with a consistency in form across the localised and centralised solutions. The panels also take a material link to the centralised solution with some panels constructed from weathering steel (eg. Cor-ten). The red-orange of the steel mean the panels will be less likely to be noticed by the YEPs, while for humans it will enhance the visual connection from the viewing platform to the beach. Running from the dune to below the low tide mark the panels allow viewing of the northern beach while also establishing a visual connection to the final intervention.

The final intervention is a new viewing hide positioned on the sand dune providing an overview of the beach. Visually located behind the barrier, movement is encouraged to the hide by the track accessed from behind the barrier. Providing the best view of the beach the hide is the last point of progression along the journey, establishing itself visually and physically as the final destination.


7.0 **Design Outcome**

This project explored how architecture has the potential to enable and promote ecological conservation with the provision of a link between the centralised and localised requirements. The project applies research derived from existing theories to the contextualities of site to create an architecture that creates recognition of the importance and value of ecological conservation.

7.1 **Centralised**

The centralised investigation focuses on the development of an “Eco-hub”. The facility aims to encourage increased communication and interaction between the groups and organisations involved in ecological conservation by creating an architectural form which houses all groups and organisations.

The “Eco-hub” is split across two buildings. The ecological conservation centre is positioned within an unused wharf shed on the edge of the Otago Harbour. The design repurposes the building, which is a part of the city’s built heritage, and addresses the issues of creating socio-cultural value in building stock which is often defined only by its economic value.

The exploration of the issues surrounding built heritage found similarities with those faced by ecological conservation. The second building, the ecological education centre, provides an area where an increased understanding of the value of ecological conservation can be achieved. The centre is positioned on a floating pontoon beside the wharf shed to provide a heightened connection to the ecology of the area.

The design also aims to address the lack of recognition towards the work undertaken to protect the endemic biota. This is achieved by bringing more people into contact with the facility. David Leatherbarrow’s extended horizon analysis was undertaken to provide an understanding of the performances which occur across the greater site. Analogies were examined between these performances and ecological conservation. These analogies were then used to establish relationships that could be explored architecturally.

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Figures 7.1.1 - 2: *Ground floor and First Floor plans of Eco-hub.*
The incorporation of additional performances creates a lively and interactive form by bringing more people into contact both with ecological conservation and undervalued built heritage. The success of this design hangs on the effectiveness of the establishment of the journey and how these performances spatially interconnect. The concepts of threshold, boundary and barrier provide the architectural articulation of this connection, thereby revealing the performances as the site is explored.

Ultimately the centralised design focuses on the generation and recognition of value. By addressing and challenging the commonly held perceptions of value the project creates an architecture which is beneficial not only to ecological conservation but also to the city in which it stands.

Figure 7.1.3: An early perspective of the proposed design from Wharf Street.
7.2 Localised

The localised investigation seeks to provide an architectural response around the point of connection between fragile fauna and humans. Accepting the lack of resources available, particularly around that involved with frontline conservation, the design explores how architecture can provide a form of management around the unmanaged eco-tourist.

The design of the site works within the existing landform with the insertion of four interventions addressing four site-specific problems. Enhancing the existing journey, the interventions seek to remedy these problems by spatially managing the threshold, boundary and barrier of spaces within key sections of the journey through the site. The interventions (point of entry, viewing platform, barrier, viewing hide) seek to remedy these problems by spatially managing the threshold, boundary and barrier of spaces within key sections of the journey through the site. The overall design, particularly within the two latter interventions, addresses the need to provide a design solution respectful of the needs of the Yellow-eyed Penguins in order to provide a sensitive point of contact between humans and endemic fauna.

Figure 7.1.4: The proposed barrier at the localised site looking out towards the viewing hide.
8.0 Conclusion

This project set out to answer the question; “How can architecture enable and promote ecological conservation while providing a link to its centralised and localised requirements?” The research presents an underlying theme questioning how we recognise and respect our objects of value. It arrives at the conclusion that in order to create value we need to challenge how we interact with our fragile and at risk objects. To create value we need to reveal it, display it and allow people some level of interaction with it. In doing so we create an understanding and respect for the object and thereby enhance its value. As a species, humans treasure that which we value. Therefore, by creating value, we enable conservation.

Ecology is intrinsically tied to site. David Leatherbarrow’s extended horizon analysis provided a thorough understanding of the complexities across the combined centralised and localised sites. Within these complexities it became apparent that the issues surrounding the recognition of value within ecological conservation were also shared by the conservation of built heritage. Value is generally determined economically. Yet this economic value often challenges, or does not represent, the socio-cultural value of the object. This project explored how we create value within these often overlooked areas of ecological conservation and built heritage. Architecturally this project investigated how this lack of respect can be addressed through the revealing of ecological conservation and built heritage by placing it in the eyes of the public.

This revealing of conservation is applied at both a centralised and localised level. Both are fundamental to the success of conservation efforts. While localised activities provide the direct connection to the endemic biota, centralised activities provide the initiatives that drive the ecological conservation effort. A lack of communication between organisations often compromises the efforts before they begin. For ecological conservation to prosper it is a case of making the best of what you have. In a field of limited resources this research project challenges the disparateness of the conservation organisations and through the designed form encourages them to communicate.
The ability to design forms that respond to the sensory perceptions of the animal was particularly important for the localised elements of the design. While there is a lack of definitive research about our endemic biota, what was able to be ascertained provided an insight into the very rich potential that ecological conservation has within the field of architecture. It provides the potential to challenge what is arguably a design process centred around the generation of built form. Greater recognition of the importance of the perception of the animal could create an increasingly effective architectural response to ecological conservation.

In conclusion, this research project provides an architectural proposition that demonstrates how architecture can promote ecological conservation. Acting as an enabler, architecture can provide humans with a sensitive and direct connection to endemic flora and fauna. With architecture as the medium the flora and fauna is valued, treasured and preserved as a living entity. This enables the conservation necessary to ensure that our fragile biota is part of our present and future ecologies.
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11.0 Appendix
Appendix 1: Extended horizon analysis: Ecological Conservation on the Otago Peninsula

This section identifies the organisations, businesses and groups who use, or operate on, the Otago Peninsula. Using David Leatherbarrow’s “extended horizon” analysis it acknowledges those that affect ecological conservation.

There are two levels on which ecological conservation operates. These have been categorised as Centralised and Localised. Centralised refers to groups who establish the roles, management and guidelines of conservation. These “performances” define and create the actions relating to ecological conservation. Localised refers to those “performances” that occur around, and directly impact, the habitat of the flora and fauna. This includes ecological conservation at work.

11.1 Centralised

DOC – Department of Conservation

DOC manages and oversees the conservation of the ecology across Dunedin and the Otago Peninsula. Their offices are located in Dunedin’s CBD. Facilities include a visitor centre, an office and an offsite workshop. The latter also provides space for storage and maintenance of the fleet and plant. The plant is considerable. Most notable is the firefighting equipment with DOC being New Zealand’s largest firefighting organisation.

While older, the Dunedin office of DOC has a similar character to Conservation House in Wellington. Remote from the public, this building does not engender inclusiveness and stands at odds with the new direction of DOC.

While DOC is the area’s cornerstone for conservation, the organisation is also tied to ecotourism. With around 10% of the peninsula area managed by DOC, ecotourism operators are legally required to get permission to enter these areas. This is done through the granting of concessions, which allows DOC to provide a level of scrutiny over the operators.

The Otago Conservancy of DOC is one of the most affected by the 2013 national
restructure. Dunedin was originally the base for its own conservation region, Otago, which stretched from Coastal Otago to the Southern Lakes District. This conservancy is now split in two, Central Otago being amalgamated with Southland and Coastal Otago amalgamated with Canterbury. Christchurch is the conservation services’ base for the new region, while the business partnership base has been established in Dunedin. In spite of the establishment of the new wing the total number of DOC staff based in Dunedin has been reduced from 39 to 30.91 This places increased importance on citizen-based conservational initiatives. While DOC provides the leadership for conservational efforts, with the restructure taking effect in September 2013 there is still a level of uncertainty as to how this leadership will be structured and implemented.

**DCC – Dunedin City Council**

As the local council authority, the DCC is statutorily required under the Resource Management Act (RMA) to prepare and administer plans and strategies for the city’s development. The DCC is specifically responsible for managing the effects of land use activities on the environment within Dunedin City, and for providing infrastructure and services essential for the operation of the city.92 It is also responsible for the protection of areas of significant habitat and indigenous fauna. The DCC released a biodiversity strategy in 2007. The non-statutory document provides vision and goals to ensure protection and respect for biodiversity.93

The DCC is faced with a difficult balancing act around development. Development is important for the future of Dunedin City when considering the general contraction of regional economies. Often development is seen to be in conflict with the values that the council is keen to protect. A current contentious issue is the proposal for gas and oil exploration off the coast of Dunedin. While having potential economic benefits, an error could be disastrous for the peninsula’s biodiversity.

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93 Ibid.
The council has been keen to promote the Otago Peninsula. With the area recognised as a hot spot for biodiversity it provides a strong marketing tool for tourism. The council recognises the importance of this resource and the need for its protection. In total, the DCC administers around 1000 hectares on the peninsula, which DOC manages on their behalf. This allows the public access to areas on the peninsula. The DCC also provides a visitor information centre in central Dunedin, close to where council offices are located.

**ORC - Otago Regional Council**

The purpose of the ORC is to promote the sustainable development and enhancement of the region’s resources. Like the DCC, the ORC is statutorily required under the RMA to prepare and administer plans and strategies for Dunedin and also Otago. The ORC is specifically responsible for waste and pollution management, air and water management, pest control, and coastal and harbour management. To encourage biodiversity enhancement the ORC has a biodiversity fund to assist private landowners in Otago with voluntary protection of areas of biodiversity.

The council’s office space is currently located on the edge of the CBD. However, the council is investigating a move to the southern edge of the harbour basin.

**Kai Tahu**

Maori are said to be the first people of the land, arriving in the area around 1000 years ago. The takata (tangata) whenua (people of the land) associated with Dunedin City are generally referred to as Ngai Tahu, or Kai Tahu in the southern dialect. The traditional settlements are located at Puketeraki (Karitane) and Otakou near Taiaroa Head on the peninsula.
Maori were drawn to the rich food resources of the harbour, with the kaimoana making the peninsula an ideal habitation site.\(^9\) When Europeans arrived in the early 1800’s there were thought to be over 1000 Maori living on the peninsula, a large population when the population of Sydney at the time was just 3000.\(^9\) While initially successful with trade and business, Maori became increasingly marginalised due to the heightened European influence. Within a quarter of a century their land was all but gone.

Today Kai Tahu has had their “kaitiaki”, or responsibility of guardianship, legally recognised. The 1991 Resource Management Act (RMA) identified the local Maori as having a role in the protection of the land, sea and water resources for future generations. Kai Tahu ki Otago Ltd is the operating arm of the Kai Tahu ki Otago Charitable Trust and are mandated by their runaka (runanga) to have input into the local and territorial planning processes. Kai Tahu ki Otago have also produced a series of planning documents relating to biodiversity management. The goal is to protect the opportunities of the peninsula for future generations. Kai Tahu have a working relationship with local councils in order to ensure input into land and sea-based management and development.\(^1\)

Kai Tahu’s office is located in Dunedin’s CBD.

**Yellow-eyed Penguin Trust**

Operating at both a centralised and localised level, the trust is seen as a national model for citizen based conservational initiatives. Formed in 1987 the trust was established to protect the Yellow-eyed Penguin. The trust works closely with DOC and has recently moved into Dunedin’s Conservation House in order to be located closer to DOC.

The trust relies on funds and grants from businesses and work from volunteers in order to undertake their key points of focus, the protection of the Yellow-eyed Penguin, the

\(^{9}\) Kai Tahu ki Otago Ltd, *Biodiversity Management on Otago Peninsula - a Community Perspective*, p. 30.


\(^{1}\) Council, “Kai Tahu”.

Figure 11.1.5: Yellow-eyed Penguin Trust logo.
eradication of pests and the replanting of areas of habitat for the penguins.

**Department of Zoology – University of Otago**

The department undertakes much of the land-based research of the ecology on the peninsula. This centralised work is undertaken in existing facilities on the University of Otago’s campus. An example of the importance of their work is seen in their undertaking to try and provide a scientific explanation for the mass death event of the Yellow-eyed Penguins in 2012, when over 50 birds died for unknown reasons. Without the Department’s research little would be known of the local biota.

**National Centre of Marine Studies / Department of Marine Science – University of Otago**

This department undertakes much of the research into marine flora and fauna of the Otago Peninsula. Originally a more localised operation, the centre and its aquarium were located at Portobello. With seismic requirements leaving the building unsafe to occupy and uneconomic to repair the centre and aquarium are looking to relocate to Dunedin City. A new site is yet to be selected. The new facility will have very specific requirements, most notably having a close physical connection to the water to facilitate its research, while also providing mooring facilities for the research vessel, *Polaris II*. Ranging as far south as the sub-antarctic islands, this vessel undertakes much of the fieldwork for the marine research. This research is particularly important. Wildlife conservation is currently concentrated on the shorelines and nearby land areas of the peninsula. However, the importance of feeding grounds for the wildlife species in the offshore areas needs to be researched and managed.

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102 Portobello is a township located approximately halfway along the harbour coastline on the peninsula

NHNZ – Natural History New Zealand

NHNZ is a worldwide television production company based in Dunedin. Originally a division of Television New Zealand the company is now the second-largest natural history television provider in the world. Some of the company’s early work focused on the Otago Peninsula. This media exposure provided a greater understanding of New Zealand’s conservational requirements. While much of their work is now for overseas markets, their continued innovation provides potential for the delivery of educational material.

11.2 Localised

DOC – Department of Conservation

From its centralised base in Dunedin City, DOC undertakes localised fieldwork essential to the maintenance of the flora and fauna, and their habitat. This includes checking and monitoring the endemic flora and fauna on the peninsula.

DOC is also required to build and maintain infrastructure for the public to access areas controlled by DOC. The facilities must safely meet the needs of the users while also protecting the habitat.

Yellow-eyed Penguin Trust

The trust undertakes a variety of localised operations on the peninsula. Of greatest importance is the fieldwork the trust undertakes to protect the species on the mainland. The trust manages reserves in association with the DCC. Located on the Peninsula is the Okia Reserve and Otekiho near Taiaroa Head. Closed to the public, Otekiho is used for the trust’s conservation work and also as an area of display under guided supervision.

The trust also operates a nursery on the peninsula. The nursery grows many of the plants used in replanting initiatives along the southern coastline.

The New Zealand Sea Lion Trust

Similar to the Yellow-eyed Penguin Trust, this organisation protects the New Zealand
Sea Lion. Hunted almost to extinction, the animal is slowly returning to the peninsula. However, the total number of sea lions has halved since 1998 to just over 1500 animals. With no governmental management strategies for this animal, the work the trust is undertaking is extremely important.

The trust has no centralised location but if its work continues to grow, like that of the Yellow-eyed Penguin Trust, it is likely to require space in the near future.

**Otago Peninsula Trust**

The Otago Peninsula Trust is dedicated to the promotion and preservation of the Otago Peninsula, its landscape, wildlife and heritage values. Formed in the 1960’s to promote tourism on the peninsula, the trust owns and manages several tourism destinations. One is Glenfalloch, originally an early settler’s homestead, and now Dunedin’s premier wedding venue. Another venue is Fletcher House located at Broad Bay. The trust’s most popular destination is the Royal Albatross Centre at Taiaroa Head (see below).

**Kai Tahu**

Kai Tahu have an enduring presence on the peninsula. The Marae at Otakou provides an interesting blend of traditional Maori architecture, combined with a European vernacular.

**STOP – Save the Otago Peninsula**

The group began as activists opposed to two proposed aluminium smelters located on or near the peninsula in the early 1980’s. Today the organisation is focused around the prevention of the spread of invasive pests. Additional work includes revitalisation projects on the peninsula like Blue Penguin nesting boxes in Broad Bay and enhancing the habitat of the jeweled gecko. The organisation was fundamental in the establishment of the Yellow-eyed Penguin Trust.

**Otago Peninsula Biodiversity Group**

Also against the spread of invasive species, the group is currently working on the eradication of possums from the peninsula. With the city acting as a barrier to the movement of land-based animals it is hoped that the possums, which compete with native birds for food and habitat, can be removed from the peninsula. By engaging the community in the trapping process, the group has killed over 6000 possums in the last two years. Their goal is a pest-free peninsula.  

**Eco-tourists**

Ecotourism is a major industry for the city of Dunedin. In 1987 14,000-15,000 eco-tourists visited the peninsula. By 2006, this number had reached an estimated 200,000. J.E.S. Higham states that, as areas become increasingly popular, the people who frequent them are less knowledgeable and, therefore, less respectful to the needs of the fragile biota. In order to combat this, more resources are required to properly manage the situation. Failure to do so leads to animal species relocating to less suitable locations in order to gain isolation.

Ecotourism can be divided into two categories on the peninsula; “managed” and “unmanaged”. A “managed” example is when tours guide eco-tourists through fragile areas minimising damage to the local biota. Tour companies are allowed access by receiving concessions from DOC.

“Unmanaged” ecotourism occurs when eco-tourists enter fragile areas with no guides. While they may have good intentions, without a guide to manage their behaviour or infrastructure to control their movements, the eco-tourists can be damaging to the environment. Often these areas have very limited infrastructure due to a lack of resources.

As the demographic of eco-tourists change, an increased number do not wish to pay

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to gain access to ecotourism operations. Social media exacerbates this, allowing the spread of information of the best locations for “unmanaged” ecotourism.

For her PhD (Zoology) at the University of Otago (2009) Ursula Ellenberg assessed the impact of human disturbance on the Humboldt Penguin in Chile, and the Snares and Yellow-eyed Penguins in New Zealand. Through measuring the variations in heart rate of the penguins she was able to demonstrate the negative impact of human contact. The comparative study of two breeding areas of the Yellow-eyed Penguin found that the penguins at the site exposed to “unmanaged” ecotourism, Sandfly Bay, presented lower breeding success rates. Ellenberg attributed this to humans making trips to the beach and inadvertently having damaging effects on the native fauna, thereby hindering conservation efforts. She recommended that access be restricted on beaches where Yellow-eyed Penguins land and nest in order to protect the species.

Penguin Place

Founded in 1984 by Howard McGrouther, this “managed” ecotourism operation started as a private conservation project to protect the birds breeding on his farm. In 1991 the family opened the farm gates to the public. Today they receive up to 50,000 visitors a year.

The network of structures has evolved through experimentation and today provides close and intimate encounters with the extremely shy Yellow-eyed Penguin. In addition to conservation work, Penguin Place also provides a rehabilitation centre for sick and injured birds. In early 2013 a mass death of adult Yellow-eyed Penguins occurred. With the death of over 50 adults, many orphaned penguin chicks were in danger of starving to death. The hospital at Penguin Place fed, cared for and then released these chicks after they fledged.

The operation is privately funded through the guided tours. While Penguin Place is an ecotourism operation, its success is vital for the survival of the Yellow-eyed Penguin on the

Figure 11.2.3 Feeding starving Yellow-eyed Penguin chicks at the Penguin Place hospital.

109 Ibid., p. 104.
mainland of New Zealand.

**Royal Albatross Centre**

With 160 resident albatross the visitor centre provides access to the only mainland-breeding colony of the Royal Albatross in the world. Located at Taiaroa Head at the tip of the Otago Peninsula the “managed” ecotourism centre hosts more than 100,000 visitors a year. Almost 90 per cent of the visitors are from overseas. The centre also provides access to a Little Blue Penguin viewing platform where visitors can watch the evening procession of the birds returning to their nests. Unlike the yellow-eyeds, the blues are not as shy around humans and, therefore, are more easily accessed. Nesting in burrows and not nests means that viewing the blues is not as intimate as viewing the yellow-eyeds at Penguin Place.

Taiaroa Head was originally a pa used by the local Kai Tahu. A signal flagstaff was established in 1849 to mark the entrance to the harbour. By 1865 a lighthouse entered service. Its prominent site at the entrance of the harbour provided an ideal location for protection against the “Russian scare”, the perceived threat of Russia invading during the 1880s. Barracks and a disappearing gun were installed. Today the restored gun is part of the tour of the complex.

Another building in the complex is the Richdale Observatory which provides viewing of the albatross. The building is named after Lance Richdale who, from the 1930s through to the 1950s, undertook an exhaustive study on the Royal Albatross and the Yellow-eyed Penguin. Much of the information available on the birds today is from Richdale’s research. As visitor numbers have increased the albatross have nested further away from the observatory. Often these areas are less suitable for nesting, but provide more privacy for the birds. This has been described as spatial impact. It has been identified that if the facilities sat lower, and had covered walkways accessing the observatorium, it would lower the level of spatial impact.

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111 Sorrell and Warman, *Peninsula: Exploring the Otago Peninsula*, p. 64.
112 Higham, “Managing Tourism at Taiaroa Head Royal Albatross Colony,” p. 27.
Ecotourism operators

There are additional operators not covered. These have not been included as they are not as vital to ecological conservation on the Otago Peninsula. There are an increasing number of operators to match the demand of an increasing number of eco-tourists.

Farming

Today many of the original farms have been split into lifestyle blocks for those commuting to Dunedin City for work. As ecotourism has developed on the peninsula many of the farms that do remain have created businesses around this industry as secondary income streams. The most notable of these is Penguin Place.

The presence and expansion of farming has often occurred at the expense of the habitat of endemic flora and fauna. Today only five percent of the original native bush remains on the peninsula. The draining and infilling of wetlands to improve paddocks has removed much of the habitat of the biota which relied on tidal variation for their survival. In spite of this farming is still an important industry on the peninsula and has been identified as being an important component in the overall scenic beauty of the peninsula.

An Artist’s Colony

For a city of its size Dunedin has long had an enviable reputation for its cultural institutions. Dunedin was the home of New Zealand’s first art school and also the country’s first art gallery.

The city’s surrounding landscape also acts as cultural inspiration. Artists like McCahon, Angus, Woolaston and Hotere are some of the many New Zealand artists who have been influenced by the peninsula. The peninsula also influences music with some attributing the “Dunedin sound” of the 1980’s to the landscape of peninsula.

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113 Kai Tahu ki Otago Ltd, Biodiversity Management on Otago Peninsula - a Community Perspective, p. 23.
Today many of the harbourside villages of the peninsula retain a bohemian quality, thanks to the artists who reside there. While the landscape provides inspiration, the tourists who visit and purchase their work help to provide economic support.

*Ferries & Water Transport*

With roading infrastructure slow to develop across the peninsula the main source of access was via the harbour. The first ferry service was introduced in 1859. This allowed Dunedin residents the opportunity to escape to seaside resort villages. Communities like MacAndrew Bay, Broad Bay and Portobello were dominated by the holiday homes of Dunedin residents. Ferries also provided farmers easier access to the city markets for their produce. The introduction of a peninsula bus service in the 1920’s sealed the fate of the ferries. With the ferries prone to an occasional stranding on the harbour’s tidal mud flats, the bus provided a more reliable service. As commuting became easier, the dynamics of the villages also changed with more people living permanently in the villages and commuting into the city.

Today only two ferries ply the harbour. The “Monarch” and “Tiakina” provide harbour cruises and wildlife viewing tours. The boats provide a unique perspective of the biota. Set to return to service is the restored “Elsie Evans”. New Zealand’s oldest surviving pilot boat, the ferry will ply the quieter waters of the upper harbour. Looking to begin service in mid 2014 it is likely to provide water shuttle services around sections of the still-to-be-completed harbour cycle trail (see more on this in the cycling section below).

Future potential also exists for boat tours. The Otago Peninsula has been identified as one of three potential hot spots in which people can see the Southern Right Whale. Hunted almost to extinction, the whale is slowly returning to New Zealand waters. With Ngai Tahu operating a successful ecotourism operation in Kaikoura to view Sperm Whales, a future operation could have potential for Dunedin.

*Water Recreation*

With the long relatively sheltered harbour, residents of Dunedin have used its water as a playground. Examples include rowing, sailing, wind surfing and pleasure boating. Fishing is
also popular in the harbour. However, the flat fish and cockles, which were originally abundant in the upper harbour, are now gone due to the reclamation of land and the deepening of the harbour channel.

While rowing and boating facilities are available in various locations, the city centre lacks an immediate connection to its harbour. Less than a ten-minute walk from the city centre, the steamer basin would have potential to provide a central city access point. The Steamer Basin has been used previously for some events in the New Zealand Masters Games held bi-annually in Dunedin.

The Steamer Basin also provides wharf infrastructure for the ferries. The wharves were constructed when much of the city’s exports left from the upper harbour. But as the ships got bigger they could not sail up the harbour channel, forcing them to relocate to Port Chalmers. With most of the larger vessels no longer accessing the upper harbour, the scale of the Steamer Basin wharves is larger than required to meet the needs of the current users.

**Cycling**

Cycling is an increasingly popular activity on the peninsula. The quality of the area’s trails is also recognised internationally. The Otago Peninsula was named the world’s best cycling destination in the *Lonely Planet Best in Travel Guide 2010.* The DCC plans to spend more than $47 million to create a cycle network across the city over the next five years. With sections already completed, one of the major trails will link Port Chalmers to Dunedin and then continue onto Taiaroa Head.

Also under consideration is Dunedin’s connection to the New Zealand Cycle Trail, *Nga Haerenga.* One section of the national trail is the Otago Central Rail Trail, which runs

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150 kilometres from Clyde to Middlemarch (79 kilometers inland from Dunedin). The trail is connected to Dunedin via the Taieri Gorge Railway, a tourist train which operates daily with return trips from Dunedin to Middlemarch. The train departs from the Dunedin Railway Station.
Appendix 2: Examination Presentation

Site Locale: Dunedin and the Otago Peninsula.
11.2.1 Centralised Solution

Site plan: The industrial precinct of Dunedin.
Axonometric: Exploded axonometric of Eco-hub.
The Arrival: **Perspective of the arrival point of the Eco-hub.**

The Pontoon: **Perspective of pontoon looking into education centre.**
Section: Section through visitors centre, wharf, ramp to pontoon and education centre.
11.2.2 Localised Solution

Site plan: Sandfly Bay, Otago Peninsula.
The Entry: Perspective, plan and section of entry into conservation reserve.
The Viewing Platform: *Perspective, plan and section of the viewing platform overlooking the beach.*
The Viewing Hide: Perspective, plan and section of the viewing hide.