ENDEMIC LIGHT

Sarah Tyrrell

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[^] Figure 0.01 *Public intervention*

Abstract

This thesis explores endemic light and atmosphere through the shifting scales of three architectural interventions. These interventions are guided by site and theoretical research, providing justification for the notion of endemic light. This notion develops upon the concept of site specific architecture and place. It is the synthesis of site context – combining both ephemeral and phenomenological qualities to create engaging and evocative architectural experiences. Analysis of the Mackenzie Basin site established an overarching understanding of the atmospheric, physical, social and historical contexts of the area. Peter Zumthor, Steven Holl, Juhani Pallasmaa and Christian Norberg-Schulz provide key justifications for the theoretical investigation of light, atmosphere, and place; as well as ongoing precedence for the research through design process.

This process explores three interventions, moving up in scale from an installation, to a domestic dwelling, and finally a public building. The installation operates at an interactive scale, exploring abstract concepts of condensing light within a space, through manipulation of light, colour and texture. The domestic scale expands on this research, developing condensed light and atmosphere at a habitable scale. Through designing for light and atmosphere the dwelling becomes a device for endemic atmospheric experiences in a domestic context. The final scale explores a public building in the form of a town centre for Twizel. This intervention adapts the notion of condensing light within interior spaces, instead exploring at an urban scale, intensifying them externally through courtyards and exterior building form. The thesis concludes, that successful and immersive architectural experiences are generated through strong ephemeral and phenomenological connections and engagement with site and endemic light.

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Firstly, to my supervisor, Simon Twose, for your invaluable guidance throughout the year.

To the class of 2017, it's been a blast.

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And finally, to Mum and Dad.
Thank you for everything.

Contents

	<i>Abstract</i>	III
	<i>Acknowledgements</i>	IV
One	INTRODUCTION	1
Two	SITE	9
Three	LITERATURE	61
Four	INSTALLATION	85
Five	DOMESTIC	137
Six	PUBLIC	193
Seven	CONCLUSION	243
	<i>Works Cited</i>	252
	<i>Figure List</i>	255

One : INTRODUCTION

One: INTRODUCTION

< Figure 1.01 Abstract atmospheric collage
> Figure 1.02 Mackenzie Basin Landscape

One: INTRODUCTION

1.1 Motivations and Aim

In New Zealand, architecture has a tendency to prioritise picturesque views, and direct physical connection to landscape, over the evocative use of light and atmosphere, when situating itself within a wider context. Light qualities vary enormously depending on their site and utilising this can add a layer of depth to the architectural experience that would otherwise be neglected. That is the motivation for this research. To better understand the importance of using site specific endemic light through abstract architectural techniques to enrich architectural experience in a New Zealand context.

I have always been fascinated by the presence, or absence of light. As a child terrified of the dark, light was my safe place. As a teenager, dusk and dawn were the bookends of adventure, and as a university student, a reminder that all-nighters were not always the best idea. This fascination has understandably spilled over into my architectural education. The fact light cannot be held, cannot be entirely controlled, is so singular and quite literally out of this world, can have such a significant influence on your experience of a space.

Peter Zumthor's *Thinking Architecture* (2011) and *Atmospheres* (2006) have had a profound influence on the way I observe light in architecture. *Experiencing architecture in Europe* (figs. 1.03, 3.02, 3.11) highlighted, in my opinion, how under-utilised light and atmospheric qualities are within New Zealand architecture. Particularly in the central South Island - the Mackenzie Basin. This observation provides this research with a site for architectural exploration.

The overall intention for this thesis is to develop and explore light-based architectural methods for improving atmospheric qualities and experiences within New Zealand architecture.

1.2 Scope

The scope of this research investigates site, theory, and design as research.

Through site analysis the atmospheric experience of the Mackenzie Basin will be defined, as well as the geographical location, and social and historical context of the area.

Research into theory of Light, Atmosphere, Place and Dwelling will establish a definition for endemic light and the architectural applications of these concepts.

Other than discussing foreign literature, precedents and case studies, the scope of the design context will not exceed the Mackenzie Basin area.

Through design as research, methods of spatial manipulation will be explored. Establishing understanding of light and atmospheric behaviours in three interventions to explore shifting scales, and ephemeral and phenomenological experience. These interventions will establish a relationship between place and architecture, through exploration of abstract endemic light qualities.

This research operates through investigative modes of development, rather than establishing a research question to direct the process. As Jane Rendell discusses, “in much design research the process operates through generative modes, producing works at the outset that may then be reflected upon later” (2004). This reflective process will be undertaken at the end of each chapter, providing direction for following explorations.

Assumptions will be made in regards to the “Twizel in 50 years” scenario in the exploration of a public building. There is justification in the form of current social and economic climates in the area, but this clearly is simply a prediction.

One: INTRODUCTION

^ Figure 1.03 *Light qualities in MACBA, Barcelona*

1.3 Structure

^ Figure 1.04 Thesis Structure

One: INTRODUCTION

Two : SITE

Two: SITE

< Figure 2.01, 2.02, 2.03 Landscapes at Ohau B Canal
> Figure 2.04 Mackenzie Basin Boundary

Two: SITE

Two: SITE

^ Figure 2.05 Site Structure

2.1 Introduction

The Mackenzie basin provides an atmospherically intense and engaging site for this research investigation. Situated within the central South Island of New Zealand (fig. 2.06), it is surrounded by rugged, mountainous landscapes, tussock covered plains, and brilliant blue lakes. (fig 2.07, 2.08) As a site for an architectural intervention, the Mackenzie Basin provides numerous possible design drivers to inform and inspire development of architecture that connects with the site in both ephemeral and phenomenological ways.

For architecture to exist, it must occupy a space, real or imagined. This space is the site, and this site defines the context of the architecture. Site creates parameters for design, it can influence orientation, scale, form, material, and/or programme. Sites relationship to place is one of past and present tense, it has been argued that architecture is a place maker – it gives meaning to a site (Norberg-Schulz, 2000). Christian Norberg-Schulz suggests that site is the location at which something – in this instance, architecture – is situated. While place is what it becomes. (1980) Using this logic, site could be defined in past tense, place in the future.

This leads to the question; how can site and place operate in the context of ephemeral atmospheres in architecture? A physical site has physical qualities, but how can these qualities generate something felt rather than seen? And Place? Place is the blending of contexts, social, historical, physical, and emotional. To investigate these questions, this chapter explores the experience of the Mackenzie Basin (figs. 2.04, 2.06) and its uniquely complex atmospheric, physical and social contexts.

Two: SITE

^ Figure 2.06 Location of Twizel and Mackenzie Basin

TWO: SITE

^ Figure 2.07 Ben Ohau and Southern Alps, from southern shore of Lake Ohau

^ Figure 2.08 Intersection of Ohau and Pukaki Canals

Two: SITE

^ Figure 2.09 Rhoboro Hills in Winter

^ Figure 2.10 Rhoboro Hills in Winter

2.2 Poetic Site

Atmospheric Context

This site was selected for its unique atmospheric conditions. Conditions that I first experienced many years ago as a teenager, long before I had any knowledge of, or desire to, explore its relationship to architecture. Light acts as a narrative in the Mackenzie Basin, its interaction with landscapes, both natural and man-made, create shifting variations in atmosphere that you feel, but can't always explain.

This section presents a depiction of my experiences of the area over the course of several visits throughout 2016 and early 2017. It would be near impossible to illustrate every single atmosphere or abstract light quality within the basin, it is a constantly changing, kinetic experience. Drastic changes between summer and winter are clear, however it is subtly changing diurnal conditions that are the true joy of the area. Mark Major supports this notion and suggests; “*It is perhaps this less tangible, more ephemeral side to light that creates memorable and enjoyable places and experiences.*” (2005). As a notable philosopher of place and atmosphere, Christian Norberg-Schulz provides further justification for the importance of light and atmosphere within the experience of a place:

Light is not only the most general natural phenomenon, but also the least constant. Light conditions change from morning to evening, and during the night darkness fills the world, as light does during the day. Light, thus, is intimately connected with the temporal rhythms of nature which form a fifth dimension of understanding. (Norberg Schulz, 1980)

The light qualities of the Mackenzie Basin are transformed when you enter Twizel, the most populous and central town within the basin. Twizel feels like a time capsule, like you've stepped back into 1984. It's a surreal feeling; the isolation, stillness, even the scent, is so removed from anything you experience in a city you can't help but think you've somehow stepped back in time. These feelings, and atmospheres, make Twizel and the Mackenzie Basin ideal locations for the exploration of architectural interventions that embrace light and atmosphere.

Two: SITE

Redacted

^ *Figure 2.11 Winter in the Mackenzie Basin*

^ *Figure 2.12 Winter Dawn in the Mackenzie Basin*

Redacted

- ^ Figure 2.13 *Spring at Lake Tekapo*
- ^ Figure 2.14 *Autumn in the Mackenzie Basin*
- ^ Figure 2.15 *Winter Dawn over Lake Ohau*

Two: SITE

^ Figure 2.16

^ Figure 2.17

^ Figure 2.18 Landscapes surrounding Ohau B canal

Two: SITE

^ *Figure 2.19*

Through this collaged abstraction of site photos I have explored a more personal experience of the tussock covered landscape and weir. It is through this method that I aim to intensify the visual atmosphere of these photos to more closely align this visual representation with my own experience.

Two: SITE

^ *Figure 2.20*

This abstraction explores atmospheres experienced on and around Lake Ruataniwha. As well as the surreal iridescent blue of the water, the lake can at times be a very confusing place. Buoys line the rowing course, willows and wilding pines line the banks. Combining many sensory stimuli creates a complex, difficult to define atmosphere.

Two: SITE

- ^ Figure 2.21 Rowing Buoys in Lake Ruataniwha
- ^ Figure 2.22 Shoreline of Lake Ruataniwha
- ^ Figure 2.23 Island in Lake Ruataniwha

Two: SITE

^ Figure 2.24 Pine trees above Lake Ruataninba

^ Figure 2.25 Track following shore line of Lake Ruataninba

^ *Figure 2.26*

This abstraction is a representation of the experience of the northern shoreline of Lake Ruataniwha. Surrounded by wilding pines and willows, with partial glimpses of the sky through gaps in the trees, this creates an intense atmospheric experience. Your senses are overwhelmed in this environment, which at times can be rather disorienting.

Two: SITE

- ^ Figure 2.27 Ohau River
- ^ Figure 2.28 Detail of Ohau Weir
- ^ Figure 2.29 Ohau Weir

Two: SITE

- ^ Figure 2.30 Oban B Canal
- ^ Figure 2.31 Oban B Power Station
- ^ Figure 2.32 Oban B Power Station

Two: SITE

^ Figure 2.33 Ohau B Canal

^ Figure 2.34 Ohau B Canal Water Level

Two: SITE

^ Figure 2.35 Obau B Canal Salmon Farm
^ Figure 2.36 Obau B Canal

Two: SITE

- ^ Figure 2.37 Mackenzie Basin from Lake Ohau Road
- ^ Figure 2.38 Mackenzie Basin from Lake Ohau Road
- ^ Figure 2.39 Mount Cook from Ohau B Canal

^ Figure 2.40 Locations of figures 2.06 - 2.34 across wider Twizel area

A - fig. 2.06

B - fig. 2.27 - 2.29

C - fig. 2.08

D - fig. 2.09 - 2.10

E - fig. 2.37 - 2.38

F - fig. 2.24 - 2.25

G - fig. 2.21 - 2.23

H - fig. 2.11 - 2.13, 2.39

I - fig. 2.30 - 2.36

Two: SITE

2.3 Geographic Site

Physical Context

Located on an ancient glacial moraine, the tussock covered Mackenzie Basin is surrounded by a vast, mountainous landscape. Aoraki Mount Cook, and the Hooker and Tasman Glaciers lay beyond the northern head of Lake Pukaki. To the North East is Lake Tekapo and Mount John - a notable area within the Aoraki Mackenzie International Dark Sky Reserve. To the West, the Ben Ohau Range, Dobson Valley, Mount Sutton and Ohau Range. The southern boundary of the basin is bordered by the Ewe, Wether, and Diadem Ranges, enclosing Omarama and the entrance to the Lindis Pass. To the East, the Cuthbert and Benmore ranges flank the Waitaki valley and Lake Benmore. (Fig. 2.41)

Lakes and waterways within the Basin are recognised for their brilliant turquoise water, a phenomenon produced by quartz and feldspar sediments suspended in meltwater, also known as glacial flour (Gielstra, 2003). The lakes of the Mackenzie Basin are connected by a series of canals; all part of the Upper Waitaki Hydroelectric Scheme, constructed during the 1970s. This generates a fascinating landscape, combining both impressive man-made and natural features. One of the most prominent man-made features is Lake Ruataniwha, formed through the damming of the Ohau River. It is the closest of the four main lakes (Ohau, Pukaki, Tekapo and Ruataniwha) to the township of Twizel, the most populous urban area within the Basin. (Fig, 2.41)

The town itself is a strange landscape of winding roads and cul-de-sacs, dotted with cookie-cutter 'hydro' houses from the late 1960s (fig. 2.44). The towns layout was based on a Scandinavian concept of a central hub with a surrounding ring road and streets radiating from it (fig. 2.43). 24km of streets were laid out in this radial pattern, with over 1300 sections and over 500 hydro houses occupying many of them (TPDA, 2016). The town itself is named after the nearby Twizel river, which is fed by a series of small streams joining just north of the township to then flow South East down to Lake Benmore.

^ Figure 2.41 Aerial Image of Mackenzie Basin Area and surrounding Mountain Ranges

Two: SITE

Two: SITE

Two: SITE

Two: SITE

> Figure 2.43 *Twizel Town Boundary with proposed sites for intervention*

Two: SITE

Two: SITE

2.4 Occupied Site

Social and Historical Context

This section discusses the timeline of the short, yet controversial history of Twizel and Lake Ruataniwha:

- 1968 Twizel was established in 1968 by the Ministry of Works and Development - MWD, on land previously a part of Ruataniwha Station. (fig. 2.46, 2.47) It was to provide housing and services to the workforce constructing the Upper Waitaki Hydroelectric scheme. (TPDA, 2016) (fig 2.45, 2.48, 2.49)

- 1975 By 1975 Twizel's population was estimated between 5000 and 6000 inhabitants (Te Ara, 2016). At peak construction, there were 1224 family homes and 800 single men's cabins, as well as commercial, recreational and social services. Services included a large primary school, secondary school, community centre complex, shopping centre, and around 100 clubs and societies. (Taylor, 2000)

- 1978 In the late 1970s, as construction of the scheme slowed, rumours of the National governments intention to disperse the workforce began circulating, with the future of Twizel becoming uncertain.

- 1981 1981 saw the launch of a campaign by the Mackenzie County Council to develop permanent infrastructure and retain the township. During this period strike action and much controversy surrounded Twizel's future.

- 1982 Frustrated by the governments actions, MWDs project manager for the scheme, Max Smith, proposed the development of a rowing course on a lake formed through the damming of the Ohau River. The new lake – Lake Ruataniwha, officially opened as a public facility on April 24, 1982, with construction of rowing facilities following soon after. (Cannan, 2013)

- 1983 During 1983, several hundred homes and garages were removed from the town as the population declined. (Bendien, 1983)

cont. >

- 1984 In 1984, the Mackenzie County Council took over management of Twizel from the MWD, officially declaring it a county town. (fig 2.44)
- 1987 By the late 1980s most MWD workers had left, with the remaining population consisting of retirees and beneficiaries due to low cost housing. (Taylor, 2000)
- 1990 Since the early 1990s the permanent population has hovered around 1200, with the summer population trebling due to holidaymakers and the rowing season. In recent years, the summer population has seen further growth due to the increasing popularity of the area as an affordable holiday and tourist destination, compared with other southern locations such as Queenstown and Wanaka.
- Today Twizel's current position is one I observe with great interest. Due to its central location and growing popularity amongst tourists, as well as proposed upgrades of the hydroelectric scheme, the future of the town looks bright. How its basic infrastructure – particularly the community and shopping centre complexes – will cope is questionable. This provides an interesting scenario to explore in chapter 6 - the design of a public building – a new town centre for Twizel?

Two: SITE

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< Figure 2.45 Upper Waitaki Hydro-electric Scheme

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[^] Figure 2.46 Transportation of houses from Otematata to Twizel 1968.

TWO: SITE

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[^] *Figure 2.47 Early Twizel Township 1968.*

Two: SITE

Redacted

- ^ *Figure 2.48 Pukaki Control Gates*
- ^ *Figure 2.49 Ohau C Power Station*

^ Figure 2.50 *View from Benmore Dam and Power Station*

Two: SITE

- ^ Figure 2.51 Twizel Area School Grounds
- ^ Figure 2.52 Twizel Area School Grounds
- ^ Figure 2.53 Town Centre Northern Carpark

TWO: SITE

^ Figure 2.54 Outdoor Sports Courts

Two: SITE

^ Figure 2.55 *Town Centre Shadows 1*

Two: SITE

^ Figure 2.56 Town Centre

^ Figure 2.57 Town Centre Play Area

^ Figure 2.58 Town Centre Shadows 2

Two: SITE

- ^ Figure 2.59 Town Centre Landscaping
- ^ Figure 2.60 Outdoor Sports Courts backing onto Swimming Pool
- ^ Figure 2.61 Town Centre Shadows 3

^ Figure 2.62 Town Centre Shadows 4

Two: SITE

< *Figure 2.63 Mackenzie Drive Streetscape, 2017*

Two: SITE

2 .5 Reflection

Establishing a comprehensive understanding of the context of a site, through atmospheric, physical, social and historical contexts establishes a greater appreciation for the endemic light and atmosphere of an area.

Knowledge gained through each section of this chapter generates ephemeral and phenomenological understanding that contributes to future engaging architectural interventions. To develop this knowledge further, a theoretical enquiry into the relationship between light, atmosphere, site, place and dwelling will be explored in the following chapter.

Knowledge of the site gained through this chapter, as well as personal experiences within it, will be clarified through literary justifications, creating a basis for the development of architectural interventions at multiple scales in later chapters.

Two: SITE

Three : LITERATURE

Three: LITERATURE

< Figure 3.01 *Movement Study*
> Figure 3.02 *Jewish Museum, Berlin*

Three: LITERATURE

^ Figure 3.03 Literature Chapter Outline

3.1 Introduction

Exploring light as a design driver requires knowledge of it in both scientific and theoretical contexts. This chapter explores notions of both light and perception, as well as their complex relationships with atmosphere and place.

Countless architects, philosophers, theorists, poets, artists and writers, have used light as inspiration throughout their careers. Many have written extensively on the topic, and for this chapter I have chosen to focus on a select few, whose work, architectural or otherwise, has captured my attention and provided precedent and knowledge closely related to the direction of this research.

^ Figure 3.04 Interior sketch - Daeyang Gallery and House

Three: LITERATURE

^ *Figure 3.05 Eye study 1*

3.2 The (basic) Science of Light and Perception

To develop a thorough understanding of light in an architectural context we first need to understand it as fact. Knowledge about the ways light is interpreted by the brain, and how our eyes receive and process this information allows a much greater appreciation for it as an architectural device.

Light and perception have a close and complex relationship. The way we visually perceive the world is due to light. Lam discuss this process of visual perception and the means in which light is interpreted in their text *Perception and Lighting as Formgivers for Architecture*. Light travels through the lens of the eye to nerve cells that make up the retina. In this state, light received has no real meaning, until the retina converts this light into raw sensory data to be transferred through electrical charges via the optic nerve, to the brain. In the brain this data is interpreted, classified, and given meaning by association through what they refer to as the ‘experience filter’ “*that part of the unconscious memory which stores data about all past experience*” (1992) resulting in a detailed image of world around us.

Perception works in tandem with light to provide information about our position in relation to an object, and vice versa. Lam refers to this as *Shape Constancy* (1992). This is the notion that the apparent shape of an object, pattern, or view is modified by changes in viewpoint, illumination, or distance. Nonetheless, we are still able to recognise it even though the optical image – as if traced from a photograph - is something other than the associated or recognised shape of the object (Lam, 1992).

Brightness is fundamental to our entire experience of viewing the world (Michel, 1996). In the context of visual perception, brightness plays a vital role in our ability to define near from far, light from dark, or the ability to observe texture on a surface. Brightness should not be confused with ‘luminance’ which can be measured quantitatively using a photometer. Brightness as defined by Lou Michel as “...*the subjective impression of light illuminating one surface as compared with another surface. By this definition, brightness requires two or more surfaces or objects to consider one as brighter than the other.*” (1996).

In an architectural context, this concept of brightness relates to what Michel refers to as *Comparative Brightness*. Where the relationships between colour, texture, and location of surfaces in space will be related to the location, quantity and quality of light sources within a space. This in turn provides a wonderfully relevant piece of advice for any designer focusing on light in design - “*Do not design with light, design with the effects of light*”. (1996)

Three: LITERATURE

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Three: LITERATURE

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Three: LITERATURE

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3.3 Perceiving Architecture

Steven Holl

Perception of space plays a fundamental role in the experience of architecture. To understand perception in the context of this research I have divided it into three brief sections.

The first follows Steven Holl's interpretation of perception. In *Parallax* he proposes the concept of 'Complete Perception'. That which relates to the architectural ability to create an experience that engages all the senses, leading to greater psychological engagement with a space. This engagement relies on the presence of both ephemeral and haptic qualities – a considered and thoughtful synthesis of material, light, surface and space. (2000) All of which are evident in both his Chapel of St Ignatius (Fig. 3.07) and his more recent Ex of In House (Fig. 3.06).

Holl also raises the idea of perception in relation to time and duration. Referencing Henri Bergson's text *Matter and Memory*, he discusses the concept that within architecture we can only speak of duration "*it is a fluid flowing time entwined with an experience of being where past, present and future merge.*" (2000) This is a sentiment held by both Juhani Pallasmaa (2014) and Peter Zumthor (2006). Who in their respective works refer to the passing of time within a space as duration, a flowing entity, rather than the hand position on a clock.

Pallasmaa's notion of duration fits within his wider concept of 'Atmospheric Perception'. In Pallasmaa's description of this, he considers duration one of many alternate senses, outside of the five recognised Aristotelian wits. They are categorised as sensations of orientation, gravity, balance, stability, motion, duration, continuity, scale and illumination. These senses are perceived in what he describes as a "*diffuse, peripheral and unconscious manner*". (2014)

These theoretical interpretations of perception lend themselves to my evolving understanding of light's role in the perception and experience of designed space.

3.4 Atmosphere

Peter Zumthor

When discussing atmosphere and its relationship to architecture Peter Zumthor's work and writing always comes up. Zumthor's vision revolves around the creation of atmospheres through use of light, material, shadow and scale. He considers atmosphere an aesthetic category (Atmospheres, 3), and questions whether it is even possible to imagine things without light? (Thinking Architecture, 89).

Successful architecture should move people – in the first moments of entering a space, you should have a feeling about it, the architecture evokes an emotional response. This, in Zumthor's view is achieved through designing for atmosphere. (Thinking Architecture, 10) Pallasmaa supports this view, he suggests that atmospheric intelligence is part of our cognitive capacity, and as such, should be considered when designing architecture (238).

In the context of light and landscape; Zumthor expresses his enjoyment of Richard Neutra's Californian homes. Their use of natural light qualities and connection to the surrounding landscapes is a characteristic he values and discusses in the text Thinking Architecture:

"If I remember rightly, I have seen buildings of classical modernism that celebrate the light and the landscape. Richard Neutra's houses in California for example. Shadows do not seem to loom large in these architectural compositions. But brightness does, light and air and the outdoor view, the sensation of living in the landscape, or having the landscape flow into or through the rooms inside – the landscape with all of its lights and shadows." (90)

In the context of Neutra's buildings, light is the focus when interacting with surface, shadow becomes a secondary response through the light/surface interaction. It does not attract focus – yet remains a part of the experience. Through this atmospheric relationship, you acquire a sense of scale and dimension. (Thinking Architecture, 89)

Architectural atmospheres have many parallels that can be drawn with music. Music can move us to tears, it can create a sense of joy and delight inside us. Atmospheres have this ability too. Zumthor likens composers to architects, both artists in their own respect. Their craft requiring years of practice and hard work. “the idea that the task of creating architectural atmospheres [or composing a sonata] comes down to craft and graft. Process and interests, instruments and tools – all part and parcel of architectural work.” (2006) Again Pallasmaa supports Zumthor’s notion, music, like architecture is atmospheric, they can influence our experience regardless of our intellectual understanding of musical composition or architectural form. (2014)

Regarding daylight and artificial light, Zumthor observes the superior emotive qualities generated by natural daylight over artificial: “Thinking about daylight and artificial light I have to admit that daylight, the light on things, is so moving to me that I feel it almost as a spiritual quality. When the sun comes up in the morning - - and casts its light on things, it doesn’t feel as if it quite belongs in this world.” (2006)

Sensory knowledge expands possibilities of atmospheric design. It allows a natural progression of iteration through development of spatial desires, rather than generating spaces to fit a pre-conceived form or outcome. This knowledge is invaluable in establishing an understanding of light and atmosphere, and their relationship to meaningful architectural experiences.

Three: LITERATURE

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Three: LITERATURE

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Three: LITERATURE

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3.5 Place and Dwelling

Christian Norberg-Schulz

Place means more than an abstract location; it is a totality made up of material substance, shape, texture and colour; these determine an “environmental character” which is the essence of place.

(1980)

Phenomena make up the ‘environmental character’ of a space; the ‘atmosphere’ that defines place. A ‘total’ phenomenon. This atmosphere cannot be divided by its individual phenomena or parts without losing the essence of what makes a ‘place’. (1985) These phenomena include not only the physically tangible realms of people, nature, and civilisation; but also, the intangible phenomena of feelings and emotion – these combined are what Norberg-Schulz defines as “the ‘context’ of our existence.” (1980).

His rationale for the intangible phenomena in this ‘context’ is supported by Heidegger’s historic concept of dwelling. He suggests that dwelling is the purpose of architecture, it is more than shelter, it is the spaces where intangible phenomena - life - occurs. These are spaces with a spirit of place – their *Genius Loci*. (1980)

Pallasmaa interprets the *Genius Loci* in a more modern context. His definition explores: “*Cultural, social, work place, family, etc. interpersonal atmospheres. Atmosphere of social situations can be supportive or discouraging, liberating or stifling, inspiring or dull.*” (2014) In his eyes, these make up the spirit of a place – they are where life and dwelling occur. In the context of establishing atmosphere within architecture, this would provide justification that the presence of ‘atmosphere’ denotes the existence of ‘place’ as well.

^ Figure 3.10 *Skylight, Wellington*

Three: LITERATURE

^ Figure 3.11 MACBA, Barcelona

3.6 Endemic Light

Through the preceding site analysis and theoretical research, it is evident that the relationship between site and atmosphere is a complex and vital element of successful architecture and place making.

This relationship relies heavily on unique light conditions to define an atmosphere, and could simply be described as site-specific light. However, I feel this lacks emphasis of the atmospheric context, and would be much better suited to the label of Endemic Light. As the key premise of this research, the notion of endemic light is one that embodies light's ability to define an atmosphere at a chosen site.

In the context of the Mackenzie Basin, this endemic light is truly unique. As this light becomes part of an architectural intervention, it brings with it the ability to experience atmosphere. Mark Major states in *Made of Light*: "The built environment is designed to not only provide light, but to be experienced in light." (2005). Predominantly natural daylight; defined by site and its diurnal rhythms. Daylight is unpredictable, uncontrollable; we must build for, rather than against it.

Endemic light is a synthesis of site context, and daylight. Site, as previously stated in chapter 2 is the fusion of atmospheric, physical, and social/historical contexts. According to Pallasmaa, meaning is always contextually grounded (2014). By this logic, meaning, then, is directly related to endemic light.

It could be argued for architecture to have meaning, it must embrace the endemic light of its site.

Three: LITERATURE

^ *Figure 3.12 Eye Study 2*

3.7 Reflection

Through defining light and atmospheric qualities via theoretical concepts; a deeper appreciation for the Mackenzie Basin site is established. Utilising scientific, philosophical, and personal preconceptions of light and atmosphere allows for a clear direction for the following design explorations to take.

For architecture to have meaning it requires a connection to its context, this connection will be explored through an installation in the following chapter, and will develop further through connections to and analysis of relevant case studies.

Knowledge gained through this chapter also establishes justification for the atmospheric experiences explored in the previous chapter. Site takes on a new meaning when explored in the context of place, and the relationship this has to atmosphere and endemic light.

Three: LITERATURE

Four: INSTALLATION

Four: INSTALLATION

Four: INSTALLATION

^ Figure 4.03 Installation Chapter Outline

4.1 Design Intent

Introduction

This chapter centres on the development of a 1:1 scale installation, the smallest of the three scales explored within this design research. Working at this scale will allow an in-depth investigation of abstract light qualities to be undertaken in a phenomenological context. Material, surface, shadow, colour and other physically tangible qualities of light will be explored, and aid in establishing an understanding of abstract light qualities and their behaviour.

Aim

As the first of three explorations of scale, this installation aims to establish a broad understanding of the medium of light, both natural and artificial, and their relationships to:

- surface and threshold,
- materiality,
- spatial perception,
- establishing ephemeral atmospheres in an architectural context.

This preliminary range of explorations will act as investigative drivers for each subsequent design experiment. It will narrow the focus from a wide range of light qualities and behaviours, to a select relevant few. This will provide basis for informed and thoughtful development of architectural interventions through each successive scale.

Four: INSTALLATION

^ Figure 4.04 *Installation Interior*

4.2 Case Studies

The following range of case studies intersect with the development of the installation design through their explorations of abstract light qualities, using a variety of methods and mediums. Initial explorations focus on the interaction of light and surface in relation to kinetic thresholds and the ways in which this operates to establish boundless spaces. Through evaluations of the following case studies this train of thought can be developed into an exploration of light and place and how these two design drivers can be better utilised in creating meaningful architectural experiences.

Several of James Turrell's works provide precedence for the exploration of both artificial and natural light at various scales within an installation.

- Afrum (Pale Pink) (1968)
- Wedgework 3 (1974)
- Virga (1974),
- Blue Planet Sky (2004)
- Apani (2011)

Turrell's work, particularly that involving natural light informs a more focused exploration of what I define as endemic light, and the unique ways in which natural light behaves within a specific site/place or defined area. These qualities will be explored through the development and iteration of an installation, utilising colour and natural light to establish "endemic" qualities.

To develop this thinking further, in the context of natural light and landscapes, I will explore a series of Grahame Sydney's paintings – situated within the landscape surrounding the Twizel/Lake Ruataniwha sites (Fig 4.14).

- Hawkdun Spring (1996),
- Evening at Ben Ohau (1994),
- Ida Valley Moon (2012),
- Twizel (1995).

These contribute to an stronger understanding of atmosphere in the Mackenzie Basin. To have a visual cue showing an interpretation of the area other than my own, provides justification for the atmospheric qualities that will be explored and developed through this installation.

Four: INSTALLATION

Redacted

“A Turrell Projection is created by projecting a single, controlled beam of light from the opposing corner of the room.”
(Projection Pieces)

Four: INSTALLATION

Redacted

"In a Turrell Wedgework, the use of projected light creates an illusion of walls or barriers."
(Wedgeworks)

Four: INSTALLATION

Redacted

“A Turrell Veil combines the use of natural and artificial light to create a slowly changing curtain, or veil, of light.”
(Veils)

Four: INSTALLATION

Redacted

“A Turrell Skyspace is a specifically proportioned chamber with an aperture in the ceiling open to the sky. Skyspaces can be autonomous structures or integrated into existing architecture. The aperture can be round, oval or square.”
(Skyspace)

Four: INSTALLATION

Redacted

“Turrell creates a similar experience of “Ganzfeld”: a German word to describe the phenomenon of the total loss of depth perception as in the experience of a white-out.”
(Ganzfeld)

Through his installations, James Turrell challenges perceptions of space and boundary through light. In his Wedgework, Virga and Afrum series he establishes spatial divisions and illusions through the precise use of projected light onto and across surfaces. Establishing walls, barriers, and forms, where none formally exist. These installations provide a relevant precedent when discussing the relationship of light to surface, and the ability to establish tangible visual boundaries without physical barriers.

“[Turrell] could cause light to cleave a room into two separate spatial “textures”. While creating these textures, the light itself takes on substance and position.”

Turrell’s installations explore the visual and visceral experience of space, how the viewer perceives depth, colour, and light when presented in the controlled environment of a gallery space. Through this highly-curated experience, the viewer is led through a journey of atmospheres, defining perception through light and colour. The gallery space determines and defines how the installation is viewed, and the context in which you gather an understanding of it. It challenges the viewers learnt perception of spaces using contrasting light and shadow, as well as colour.

Turrell’s work succeeds in challenging the viewer and their learnt perception of depth, colour, light and space. However, when projection is translated into an architectural language, it could be argued the work fails to generate an architecturally evocative response due to such control. The use of artificial light lacks the fluid, kinetic ritual of natural sunlight, a unique quality that can be difficult to attain through means other than utilising natural light in design.

Four: INSTALLATION

Redacted

Under the Hawkduns

In the evening first a rainbow
straddling the brown hills
that bounded the world of my youth

then late towards the end of dusk
a gusty wind began to blow
shaking the tussock

and bronze clouds rose
behind the startled face
of the moon paravanning

like a high load poised
over the wheel of a cart

Brian Turner, 2010

Redacted

Four: INSTALLATION

Redacted

Four: INSTALLATION

Redacted

Four: INSTALLATION

Redacted

The subject matter of Grahame Sydney's work is acutely relevant to this research. His evocative and atmospheric paintings take inspiration from the rugged landscapes of Otago and South Canterbury. These landscapes are a sight to behold in person; through his paintings, Sydney effortlessly captures their surreal sense of isolation, and vitally, the atmospheres they evoke. To capture atmosphere within an image, let alone a painting, takes skill. Sydney's ability to translate atmosphere through his work creates an engaging and immersive experience, much like the intentions of this design research.

Sydney's landscapes (fig. 4.10-4.13) illustrate the clear atmospheric changes across the Mackenzie Basin and Ida Valley areas. These atmospheres represent those I will explore through the following installation explorations. The neutral purples of twilight in *Ida Valley Moon* (fig. 4.12), dry barren plains of *Twizel* (fig. 4.13), and the warm and cool mountainous landscapes of *Evening at Ben Ohau* (4.11) and *Hawkdun Spring* (4.10).

Translating atmospheres through art and architecture is something both artists and architects have acknowledged for centuries. J.M.W. Turner declared "*Atmosphere is my style*" (ref. in Zumthor, 2011), as Zumthor has also stated, "*atmosphere is an aesthetic category*" (2006). Sydney has not, to my knowledge, made such a declaration. However, it would be justified to categorise his work as atmospheric. His landscapes may have a photorealistic element to them through their accuracy and proportions, but his use of colour and tone to establish ambience and atmosphere is much more evocative for a viewer.

The imagery of a painting is integrated by an overall atmosphere of feeling, the most important unifying factor in paintings is usually their specific feel of illumination and colour, more than their conceptual or narrative content (Pallasmaa, 2014)

Additionally, Sydney's work has a close relationship to poetry. Brian Turner's piece *Under the Hawkduns*, was inspired by the same landscapes as Sydney's paintings, both featuring in the collaborative book *Timeless Land*. This introduces yet another element to the landscapes, to be able to experience them through paintings and literature creates a deep-set connection with the work, and the subject.

Sydney's work transcends art, architecture and literature, to an experiential realm few artists reach. His work provides relevant precedent for the integration of atmospheric qualities within architectural interventions in the Mackenzie Basin.

Four: INSTALLATION

4.3 Method

Explorations for this installation make use of model making, sketching, photography, digital manipulation, and recorded media. Model making acts as a physically tangible mode in which to explore light - the experience of which is challenging to display through sketches or still images. Sketching acts as a translator for the development of initial concepts to physical models. Photography then allows a digital record of the models to be kept, while enabling an exploration through digital manipulation to further explore light and colour within the photographs. Informing possible further additions, adjustments or changes to the physical models.

Ongoing referral to key case studies and precedents provides direction for the initial explorations and help to formulate meaningful justifications for design decisions. The following pages are a record of the process in which light explorations are developed and refined to create a final 1:1 scale installation.

< Figure 4.14 Aerial image of locations of Sydney's paintings in the context of the Mackenzie Basin

4.4 Process

Exploration One: Spectrum

Dawn and dusk, summer and winter, day and night; ever changing colours within the landscape of the Mackenzie Basin provide the catalyst for this exploration. Bringing multiple atmospheric experiences together, within one installation.

This exploration investigates the relationships between colour, light, and shadow. How they generate thresholds and spectrums; and combine multiple atmospheres in a way that creates multi-layered experiences of the light within the Mackenzie Basin. James Turrell's work (fig. 4.05-4.09) provides a key generalised precedent for understanding how light and colour can be manipulated to create artificial atmospheres in the context of an installation.

^ Figure 4.15 Connecting key concepts

Four: INSTALLATION

This spectrum installation explores the blending qualities of light, shadow and colour. Using two light sources, each illuminates a different colour representative of Mackenzie Basin light qualities. The lights are directed at right angles either side of a partition, blending at a central focal point (fig 4.17).

Four: INSTALLATION

^ Figure 4.18 Developed diagram of exploration one model

^ Figure 4.19 Sketch of exploration one model set up

^ Figure 4.20 Section diagram of set up

Four: INSTALLATION

- ^ Figure 4.21 Developed diagram of 3D exploration one set up
- ^ Figure 4.22 Developed section diagram of exploration one set up

The developed spectrum installation is altered to shine each light source between two vertical slits in a black surface, this provides more direct control over the direction of the light and angle at which the sources meet. (fig 4.18-4.22)

Four: INSTALLATION

^ Figure 4.23 Colour, light and shadow explorations 1

The resulting physical model explores varying intensity of illumination and the effect this has on the colour spectrum produced by the blending lights. Shadows formed by the directional light sources also generate a spectrum of their own, between harsh and soft, dark and light. (fig 4.23, 4.24)

Four: INSTALLATION

^ Figure 4.24 Colour, light and shadow explorations 2

This exploration contributes valuable knowledge of the behaviour of, and interaction between, multiple light sources, colours, and shadow. This can now be developed further to explore atmospheric and light qualities in a more engaging context.

Exploration Two: Kaleidoscope

Reflected and refracted, diffuse or direct; light can be manipulated in numerous ways. This manipulation is key to creating engaging architectural atmospheres (fig. 4.26). Outside of an architectural context, refraction of light through a prism – splitting into its spectral colours – is one of the purest forms of light manipulation. Through investigating a range of spectra in the previous exploration, I chose to reverse this notion and condense light within an object.

This initial concept led to experimentation with a standard kaleidoscope (fig. 4.27). Incorporating the form of a prism (fig. 4.25), with the reflective function of a kaleidoscope, led to the development of an integrated perceptual device (fig. 4.28). Condensing and abstracting exterior light conditions in a seemingly endless space (fig. 4.30).

^ Figure 4.25 Prism study

Four: INSTALLATION

^ Figure 4.26 *Light condition photographic study - MACBA, Barcelona*

^ Figure 4.27 *Kaleidoscope study*

Four: INSTALLATION

^ Figure 4.28 Kaleidoscope model and development sketches

Constructing a box, enclosing an acrylic prism within, to condense and distil exterior light conditions. Iterations of the box explored directional colour introduced through slits in the box, each slit introducing a different colour informed by abstract light qualities in the Mackenzie Basin.

Four: INSTALLATION

^ Figure 4.29 *Kaleidoscope Model*

Four: INSTALLATION

^ Figure 4.30 *Kaleidoscope Model coloured light explorations*

This exploration has led to a greater understanding of conditions required to condense abstract light qualities and/or atmospheres within an object. In further explorations, this mode of condensing atmosphere can be developed. The notion of 'Takeaway Twizel' and creating atmosphere within a perceptual device.

Four: INSTALLATION

^ Figure 4.31 *Kaleidoscope Model alternate light source explorations*

Exploration Three: Object as Atmosphere

This exploration investigates scale and perception in the development of condensed atmospheres. Building upon the knowledge gained in exploration two this will further develop the notion of “Takeaway Twizel” discussed in relation to figure 4.30.

Initial developments of this exploration adapt the concept of a kaleidoscope, through the theoretical use of angled mirrors within a cube to create an optical illusion of infinite space. This concept also raised a question of scale. How would one interact with this cube, would it be large enough to stand in? Or small enough to pick up and handle? Changing the scale of such an object also changes the perception of space within it.

This notion of perception developed into an object which explored perception through manipulation of scale, depth, colour and texture within a cube.

^ Figure 4.32 Object as atmosphere “Takeaway” Box

Four: INSTALLATION

These iterative sketches explored possible forms within the cube. How angled mirrors could manipulate space, and how curved or rough surfaces can eliminate rational depth perception.

Four: INSTALLATION

> Figure 4.34 Model interactions

4.5 Design Outcome

Development

The third exploration *Object as Atmosphere* investigated the manipulation of depth perception. Combining this with the initial concept of “Takeaway Twizel”, interior forms were developed to evoke a variety of atmospheres influenced by experiences of the Mackenzie Basin. Exploring scale within the cubes led to the development of three separate objects, each containing a condensed “atmosphere”. The three atmospheres consisted of the orange and browns of the landscape in summer, the purple and grey of twilight, and the blue and green of the lakes and canals.

Through colour and material experimentation with acrylic plastics, cardboard, fabric, paint, and cellophane, interior forms were enclosed within each object. These forms were then lit from a different angle, through a sheet of frosted translucent plastic on one side of the cube (fig. 4.39, 4.40, 4.41).

The changing scale of each cube toyed with the notion of perception – lacking a sense of depth perception visually – yet perceiving scale through more haptic sensations. This development resulted in the final form of three white cubes. Landscape within a 100x100x100mm cube, twilight within a 150x150x150mm cube, and water within a 250x250x250mm cube. (fig. 4.37)

Four: INSTALLATION

> Figure 4.35 Interior development sketches

> Figure 4.36 Model interiors

The modelling process began with the construction of the three cubes. Colour, surface and materials were then explored and adapted through multiple iterations, resulting in the desired atmosphere and light qualities within the cubes.

Four: INSTALLATION

^ Figure 4.37 *Developed atmospheric devices*

Final Design

^ > Figure 4.38 *Individual Atmospheric Devices*

Four: INSTALLATION

Four: INSTALLATION

Landscape - this cube condensed the atmosphere of the Mackenzie Landscape. Lit from above the forms within evoke mountain ranges and tussock covered plains, whilst the materiality manipulates depth perception.

Four: INSTALLATION

< ^ Figure 4.39 Atmospheric Landscape Device

^ > Figure 4.40 Atmospheric Twilight Device

Four: INSTALLATION

Twilight - this cube condensed the atmosphere of the twilight hours within the Mackenzie Basin. Dawn and dusk informed that the interior be lit from the side, the materials and colour are to evoke a calm, cool atmosphere, without the heat of the day, or the crisp night air.

Four: INSTALLATION

Water - this cube condensed the atmosphere experienced in the waters of the Mackenzie Basin lakes and canals. Lit from behind a curved surface, depth perception is manipulated and removed, not unlike the experience of observing the water itself.

< ^ Figure 4.41 *Atmospheric Aquatic Device*

Four: INSTALLATION

^ > Figure 4.42 Human interaction with three atmospheric devices

Four: INSTALLATION

The changing of scale between the three cubes explores the perception of space between the sensation of holding an object and the perceived size and depth of what is witnessed inside.

Four: INSTALLATION

4.6 Reflection

This chapter explored the notion of condensing atmosphere within defined space. This perception of “Takeaway Twizel” leads to numerous explorative possibilities in the following chapters. As well as understanding condensed atmospheres, this chapter also explored methods of spatial manipulation through light.

Case studies exploring James Turrell’s work provided exceptional precedent for this in the context of immersive installations. Modes of representation of atmosphere through various mediums were also developed, through Sydney’s paintings, and Turrell’s use of light and colour.

The final installation establishes three defined atmospheres, each with the ability to lend itself to a domestic intervention to create engaging, condensed atmospheres within habitable space.

Four: INSTALLATION

Five : DOMESTIC

Five: DOMESTIC

< Figure 5.01 Domestic exploration sketch
> Figure 5.02 Roof form experiment

^ Figure 5.03 Domestic Chapter Outline

5.1 Design Intent

Introduction

This chapter expands on the concepts and ideas developed in chapter four. Through increasing scale to that of a domestic dwelling, I will explore endemic light within an occupied, liveable space. One in which a body can move through and inhabit, rather than observe as an installation.

Aim

The aim of this chapter is to develop a greater understanding of endemic light in an architectural context – as opposed to within an installation. Through development of and experimentation with formal architectural conventions, light will be manipulated and atmospheres condensed through iterative processes, resulting in a dwelling that evokes the endemic light of its site.

Five: DOMESTIC

Redacted

5.2 Case Studies

Ex of In House *Steven Holl*

Steve Holl's Ex of In house explores spatial overlap and "inner energy", where spherical and linear forms intersect, generating a house that challenges current conventions of architectural space. Holl's rationale behind the design relates to his "Seven Point Manifesto for explorations of "In"." (2016), which theoretically provides some interesting intentions for space. However, in the context of this research I am interpreting the house from a purely atmospheric point of view. Through alternative use of forms and rich materiality, the interior spaces generate engaging atmospheric qualities. These forms provide precedence for the development of a domestic space, which condenses exterior atmosphere and intensifies endemic light qualities.

Redacted

Garden Courtyard House
Megumi Matsubara and Hiroi Ariyama

Garden Courtyard House toys with perceptions of interior and exterior. The architects utilise light as means to define space without the use of physical boundaries. They establish defined atmospheres within the courtyards through light and shadow, generated by the subtly angular roof forms. The relationship between interior and exterior is blurred as daylight moves across interior space, creating visual and thermal connection to the exterior through daylight.

Precedent from this design comes in the form of the courtyard spaces, their positioning divides the overall form into three defined areas. In the context of this research this could be interpreted in the form of three atmospheres – as explored in the final exploration of chapter four.

Redacted

FIVE: DOMESTIC

Redacted

^ *Clockwise from top left*
Figure 5.08 Courtyard connection
Figure 5.09 Interior space
Figure 5.10 Exterior Screen
Figure 5.11 Groundfloor plan

Kaufmann (Desert) House
Richard Neutra

The floor plan of Kaufmann House makes use of a cross arrangement, splitting the building into four wings, ensuring each receives adequate daylighting. This emphasises the architectural importance of natural light within the house. The success of the building is in part thanks to this arrangement, aligning natural light qualities with areas of the house used at different times of day - the house takes on its own daily ritual in sync with the sun. This provides a strong precedent for the exploration of domestic space in this chapter – the ritualistic element of dwelling informs the spatial arrangement of a house. It is desirable for living spaces to have a northerly orientation allowing maximum daylight, bedrooms are more suited to east and service areas to the south.

Regarding the ephemeral relationship of light and surface, Kaufmann House provides a clear precedent for the success of such architectural techniques. Daylight through the house is in a constant state of flux, changing how space is occupied in light or shade, dividing spaces through sunlight and creating visible boundaries on surfaces.

Redacted

FIVE: DOMESTIC

Redacted

^ *Clockwise from top left*
Figure 5.13 Exterior view
Figure 5.14 Bedroom view
Figure 5.15 Groundfloor plan

Five: DOMESTIC

5.3 Method

This exploration of space in a domestic context makes use of sketching, photography, model making – physically and digitally, diagramming, as well as digital manipulation and rendering. Each mode of exploration allows for various qualities to be explored. As exploration of light and atmosphere is key to this research, digital rendering of models to explore sun paths and light behaviour was invaluable to the development of ideas. Working backwards and forwards between physical sketching and modelling, and digital diagramming and rendering, allowed an efficient work-flow to generate numerous explorative outcomes.

Throughout the process, a range of general precedents and case studies provided inspiration and direction for continuing iterative explorations.

5.4 Process

Exploration One: Twizel House

This exploration investigates the adaptability of the original hydro houses. Through analysis of their features, such as window size, orientation, layout, and relationship to context (fig. 5.17), I developed a process of atmospheric absorption – a litmus test if you will, through placement of the house on three individual sites (fig 5.19), and allowing it to “absorb” the atmosphere - condensing the endemic light and atmospheric qualities of each site within the house.

^ Figure 5.16 Twizel “Hydro House” floorplan

The notion of condensing atmospheres, previously explored through the installation, resulted in the selection of the three unique sites (fig 5.20). Each site possesses its own unique qualities, resulting from their orientation and/or proximity to the canals, lakes, or urban area (fig. 5.19-5.22). To develop a greater understanding of the sites, I explored them through illustration of my perceived experience of atmospheric intensity at each (fig. 5.23).

Five: DOMESTIC

^ Figure 5.17 Twizel "Hydro House" 3D plan and features

Five: DOMESTIC

^ Figure 5.18 Hydro Houses, Mackenzie Drive, 2016

Five: DOMESTIC

Five: DOMESTIC

> Figure 5.19 Atmospheric Sites/Connections

Five: DOMESTIC

Five: DOMESTIC

^ Figure 5.20 Canal Site

^ Figure 5.21 Township Site

^ Figure 5.22 Lake Site

> Figure 5.23 *Illustrations of Atmospheric Intensity and connections*

Five: DOMESTIC

Five: DOMESTIC

^ Figure 5.24 Mackenzie Drive Shadow silhouettes

^ Figure 5.25 Mackenzie Drive House Orientations

Five: DOMESTIC

^ Figure 5.26 Hydro House Orientation - 8 hour Sun Studies

Analysis of shadow forms, and orientation of Mackenzie Drive houses established a more tangible understanding of their current relationship to site (fig. 5.24). I then undertook a sun study of exterior shadows of the hydro house, in relation to diurnal rhythms, and orientation. to establish the optimum orientation for the original house. Understandably the houses with the living area in a northern orientation received the most direct sun, however this also resulted in the southerly oriented kitchen lacking any sunlight. (fig. 5.26)

The exploration of orientation informed the need to rearrange the programme of the house. This was explored diagrammatically on each site, again taking into consideration the surrounding landscape, atmosphere and endemic light qualities. (fig. 5.27, 5.28)

Five: DOMESTIC

Canal

Township

Lake

- > Figure 5.27 Manipulated floorplan diagrams in response to site orientation
- > Figure 5.28 Colour Key

Analysis of these three sites resulted in forms of a very similar nature. As such, I made the decision to narrow the focus of this exploration to one site. – The lake site (fig 5.29).

Five: DOMESTIC

Living

Kitchen

Laundry

Bedroom

Bathroom

Exploration 2: Primitive Light

Further developing the notion of condensing atmospheres at the lake site, I questioned how to introduce three individual endemic qualities – as had been explored through the installation.

Exploring the concept of dwelling, and what it entails, I concluded that dwelling is a primitive activity. Historically a dwelling is where one sleeps, eats and bathes. These three activities align strongly with the three key atmospheres explored in the developed installation.

These activities also inform the physical form each space should take:

- Sleeping – Enclosure, safety, morning light.
- Eating/(Living) – Exposure, views of surrounds, all day light.
- Bathing – A combination of enclosure/exposure, privacy and views.

This rationale resulted in an iterative model of three defined forms – each condensing and evoking its own endemic quality. (fig. 5.30) These atmospheres were then explored through abstract collages of digitally manipulated watercolour paintings (fig 5.31-5.33)

Formal planning developed through an iterative sketching process. The objective was to create spatially distinct, simple plans, to allow the primitive nature of the dwelling rationale to be projected. (fig. 5.34-5.37)

Five: DOMESTIC

^ Figure 5.29 Lakeside Site

Five: DOMESTIC

Five: DOMESTIC

< ^ Figure 5.30 Domestic Model Massing Explorations

Five: DOMESTIC

< Figure 5.31 Abstract Atmospheric exploration - Landscape - Eat

> Figure 5.32 *Abstract Atmospheric exploration - Water - Bathe*

Five: DOMESTIC

Five: DOMESTIC

< Figure 5.33 *Abstract Atmospheric exploration - Twilight - Sleep*

Five: DOMESTIC

> Figure 5.34 Floorplan and section sketch developments

Five: DOMESTIC

Five: DOMESTIC

- > Figure 5.35 Interior light studies and renders
- > Figure 5.36 Elevation development sketches
- > Figure 5.37 Roof form development sketches

Five: DOMESTIC

Five: DOMESTIC

^ Figure 5.38 Roof form iterative renders

5.5 Design Outcome

Development

Through the sketched explorations, the three-dimensional form introduced more complicated elements. The need for enclosure vs. exposure defined wall and glazing positioning, and the manipulation of light and condensing of atmospheres generated and defined roof form. Through sketch iterations and digital light studies, skylights were introduced to the roof form to allow for directional control of daylighting and establishing desired atmospheres within each space.

Due to the southerly orientation for the lake site, these skylights became key to connecting the dwelling with the endemic light qualities of the Mackenzie Basin area.

The enclosed bedroom spaces required soft morning light from the east – skylights were oriented in this direction.

The living/kitchen space utilised exposure through wrap around glazing to the west and south, however required a directional source from the north, skylights were oriented to both the north and west to ensure adequate light qualities to generate a condensed atmosphere.

The bathroom did not require direct daylight, and its southerly orientation with full height glazing met the exposure criteria for the space, as a result the skylight was oriented to the south – and creating a sculpturally interesting roof line as well as desired atmospheres within.

The resulting dwelling acknowledges and connects with its context, in both ephemeral and pragmatic ways. It generates condensed atmospheres within through its robust relationship with the endemic light and atmospheric qualities of the site.

Five: DOMESTIC

^ Figure 5.39 Floorplan in site context

Five: DOMESTIC

> Figure 5.40 Tonal Atmospheric Perspective

Five: DOMESTIC

Five: DOMESTIC

Final Design

^ Figure 5.41 Interior - Eat/Live

Five: DOMESTIC

^ Figure 5.42 Interior - Central Spine

^ Figure 5.43 Interior - Sleep/Bathe

Five: DOMESTIC

^ Figure 5.44 Tonal view - Eat/Live

^ Figure 5.45 Tonal view - Sleep/Bathe

> *Figure 5.46 Exterior - Lakeside track*

Five: DOMESTIC

Five: DOMESTIC

5.6 Reflection

This chapter focused on the manipulation of light at a habitable scale. Domestic rituals were utilised as design drivers, to define and manipulate light and atmospheric qualities of the interior. Through the increase to a domestic scale, explorations in the previous chapter could be used to inform and develop the atmospheric qualities within this intervention.

Analysis of existing typologies of the original hydro houses developed an understanding of the external atmospheric factors that were neglected in their design. This knowledge provided evidence and justification for the design decisions made in this chapters' final domestic intervention.

Additional development of such an intervention could take further design cues from the surrounding hydroelectric systems, part of a highly-engineered landscape. This exploration could inform design at both domestic and public scale, and will be considered in the following chapter.

Five: DOMESTIC

Six : PUBLIC

six: PUBLIC

- < Figure 6.01 *Courtyard section exploration sketch*
- > Figure 6.02 *Abstract atmosphere of Courtyard 1*

^ Figure 6.03 Public Chapter Outline

6.1 Design Intent

Introduction

This chapter explores the development of a public building in Twizel. Moving up in scale from the domestic dwelling, I pondered what form a large-scale building would take within the context of the town. As previously illustrated in chapter two; Twizel's town centre leaves much to be desired. It is a dated, sleepy kind of place, and an architectural intervention to rejuvenate the space would greatly improve the area. As such this chapter will develop a new town centre for Twizel, based on the programmatic requirements of the town in 50 years' time.

Aim

The aim of this chapter is to generate ephemeral qualities of endemic light within a structured, pragmatic programme – a town centre. This will combine previously gained knowledge of architectural interventions to utilise light and atmosphere, with programmatic and formal analysis of the site and its future needs.

6.2 Case Studies

The following three case studies explore form at various scales and the influence this has on atmosphere and endemic light.

- The Lisbon school of music embraces the use of a grassed plaza/central courtyard (fig. 6.06, 6.07) allowing daylight into the surrounding practice rooms (fig. 6.04). The way in which light interacts with the stark white surfaces create sharp, contrasting shadows, and embraces the natural light endemic qualities of Lisbon.
- The Toblerone house, although at a smaller scale than a public building, utilises screens and reflective surfaces to create defined atmospheric qualities both inside and outside the dwelling (fig. 6.08, 6.11). This, unlike previously discussed case studies in chapter 5, clearly defines a permanent threshold between interior and exterior.
- Ricardo Bofill's La Muralla Roja utilises colour and form in a way few architects are bold enough to do. Colourful, angular forms extend throughout the building (fig. 6.12, 6.13), creating an array of shadows in constant flux, altering perception of the overall structure.

These case studies each have a quality applicable to the development and design of a new town centre for Twizel. Their methods of interaction with their individual contexts are varied, however all embrace the endemic light and atmosphere of their surrounds, and utilise this to create powerful, evocative spaces.

Lisbon School of Music
João Luís Carrilho da Graça

Redacted

- ^ Clockwise from top left
Figure 6.04 Rehearsal Room
Figure 6.05 Covered Plaza
Figure 6.06 Exposed Grassed Courtyard
Figure 6.07 Exposed Grassed Courtyard

Six: PUBLIC

Toblerone House
Studio MK27

Redacted

^ Clockwise from top left
Figure 6.08 Exterior Reflection
Figure 6.09 Exterior form
Figure 6.10 Exterior surface
Figure 6.11 Internal screen

La Muralla Roja
Ricardo Bofill

Redacted

^ *Clockwise from top left*
Figure 6.12 Exterior Form
Figure 6.13 Roof Form

^ Figure 6.14

6.3 Method

Exploration of endemic light in the context of a public building utilises both abstract and pragmatic methods. Through sketching and diagramming, programme and form are developed. Iterative processes such as these result in a wide range of explorative outcomes, which are then refined through additional sketch development to inform a physical model, establishing a three-dimensional form. Photography supplements this process and allows further exploration through overlaying of programme and editing through digital manipulation.

Digital modelling is then utilised to establish further understanding of light behaviours through sun path studies and perspective renders. To develop further atmospheric understanding, abstract representation of space is explored through watercolour paintings and curation of form within these. Using a wide range of methodologies allows for a broad exploration of possible outcomes for the public building.

6.4 Process

+ 50 years

To provide a level of justification for such a large-scale public development, in a small town such as Twizel, I envisaged a hypothetical scenario: What will Twizel be like in 50 years? As discussed in chapter two, Twizel's population has the potential to grow exponentially in coming years, due to its central location to numerous tourism hot-spots, as well as affordable property for holiday homes. The likely upgrade of the Hydroelectric scheme also has the potential to attract new residents. Seasonal fluctuations in resident numbers will continue, due to the rowing season and hot summer climate.

This influx of new residents will require services not currently available in the town. The development of a town centre – a central hub containing a dense programme of community based services will be vital to the success of the growing town.

Initial explorations resulted in the following list of possible basic programmes to occupy a new town centre:

- Civic services
- Retail
- Hospitality
- Community Hub
- Sport facilities – arena/gym etc.
- Supermarket
- Hotel

This range of programmes, across such a large site (fig 6.16) create some interesting possibilities for the development of form, as well as responding to the three key endemic light qualities explored previously. These lines of enquiry were explored through initial master planning and diagrammatic sketches of the site, leading into developing a form which responded to the intended atmospheric qualities of the site.

^ Figure 6.15 Twizel Town Centre - site for development

Six: PUBLIC

< Figure 6.16 Twizel Urban Area Diagram

Six: PUBLIC

> Figure 6.17 Town Centre planning and form finding exercise 1

Six: PUBLIC

Masterplanning was developed through sketching and massing of potential programmes on the Twizel site. This resulted in the division of the site into three zones, each exploring a different endemic quality. Building form was informed by these light and atmospheric qualities to create defined areas of enclosed, exposed, warm, or cool, light or dark spacial experiences.

Six: PUBLIC

> Figure 6.18 Town Centre planning and form finding exercise 2

Six: PUBLIC

Formal exploration also took into consideration the integration of the surrounding landscape, town layout and axis, and connections to the existing town centre. Further development of detailed plans for the site were not undertaken as they fell outside the scope of this research.

Sectional and three dimensional development of form was also undertaken through an explorative sketching process.(figures 6.19 - 6.21)

> Figure 6.19 Town Centre Development of Form - Courtyards

Six: PUBLIC

How should light conditions be intensified within the tessellated square?

↳ Screens → hide the formal elements of shop-fronts/entrances.

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> Figure 6.20 Town Centre Development of Form - Hotel and Plaza

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^ Figure 6.21 Town Centre Development of Form - Mackenzie Drive Elevation

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^ Figure 6.22 Development of Form - 1:1000 scale model process

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6.5 Design Outcome

Development

A design outcome was reached through the development of sketches to models - both physical and digital. These models allowed programme to be assigned to three dimensional spaces. (fig.6.26) Sun studies of the three-dimensional form allowed for clarification and development of endemic light and atmospheres in the three defined areas. (fig. 6.27)

These areas consist of a covered plaza and two courtyards. The plaza, situated at the southern end of the site connects the internal courtyards to the street. The largest courtyard evokes a feeling of exposure and openness, with low buildings surrounding it and a sloping gradient lifting you one floor up at its northern edge. The second courtyard connects to the northern corner of the first, and induces a feeling of enclosure surrounded by taller buildings and covering a smaller footprint. (fig. 6.29)

Moving down in scale, the exploration shifts to developing an indicative floor plan for the southern end of the form (fig. 6.28). These floor plans define spaces for commercial office activity, retail and hospitality, and a boutique hotel hovering above the plaza (fig 6.26). Surrounding the central and largest courtyard, the form of these buildings responds to the exposed nature of the Mackenzie Basin landscape. Covered in tussock, the courtyard provides a taste of the landscape beyond the boundary of the town.

Scaling down once more, a general floorplan of the boutique hotel is developed. (fig. 6.30-6.31) The form of this plan integrates concept of courtyards through light shafts exposing and establishing connection to the plaza below. This in turn establishes another atmospheric quality of dappled light within the plaza itself.

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^ Figure 6.23 Development of Form - 1:1000 scale model

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^ Figure 6.24 Assigning Programme

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^ Figure 6.25 Programme Key
 < Figure 6.26 Town Centre Programmes

^ Figure 6.27 Town Centre 10 hour Sun Study

six: PUBLIC

^ Figure 6.28 South end development - indicative floorplan arrangements

^ Figure 6.29 South end development - Render form

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^ Figure 6.30 Hotel development - Floor plan sketches

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^ Figure 6.31 Hotel development - Floor plan arrangement

> Figure 6.32 *Abstracted Atmospheres 1 - Watercolour process to generate surfaces at various scales*

A brief watercolour exploration developed abstract atmospheres taken from perspectival views of the models. These could be perceived at multiples scales as a larger wall surface, or small scale texture - these notions lend themselves to the development of screening devices around the central courtyard in the form of a brise soleil, obscuring store frontages and entrances, and intensifying the pure atmospheric qualities.

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> Figure 6.33 *Abstracted Atmospheres 2 - Watercolour process to generate surfaces at various scales*

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Final Design

> Figure 6.34 Central Tussock Courtyard

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- ^ Figure 6.35 *Moving from Mackenzie Drive to Southern Plaza*
- ^ Figure 6.36 *Within Plaza - vertical perspective through hotel light shafts*
- ^ Figure 6.37 *Moving from Plaza to Courtyard 1, daylight creates kinetic boundaries through shadow*

Atmosphere can often be interpreted through abstract representation (fig. 6.35-6.40). These images take you on a journey from the southern edge to the northern point of the site, and experiencing the wintery grey and blue atmospheres of Twizel.

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- ^ Figure 6.38 *At the northern corner of Courtyard 1 - vertical perspective between buildings*
- ^ Figure 6.39 *Moving towards Courtyard 2 - view shaft to Field*
- ^ Figure 6.40 *The eye is drawn out to the Field by the gentle curvature of the Northern buildings.*

six: PUBLIC

^ Clockwise from top left

Figure 6.41 Circulation space within hotel - vast surfaces penetrated vertically by light shafts

Figure 6.42 Light enters hotel suites through the shafts, columns support the structure and interact with light and shadow

Figure 6.43 Outer edge suites open to panoramic vistas of Twizel and the surrounding landscape

The above figures explore the hotel interior - utilising atmospheric qualities of the tussock landscape of the Mackenzie basin and introducing multiple sources of daylighting through vertical light shafts and horizontal translucent screens.

[^] Figure 6.44 View South from Northern most point of site, at the edge of the Field

At the northern most point of the site the field has the effect of diminishing the perceived scale and mass of the buildings.

^ Figure 6.45 Courtyard 1 form and atmospheric representation

^ Figure 6.46 Courtyard 2 form and atmospheric representation

Rendered iterations of the three atmospheres (fig. 6.45-6.49), which have been explored throughout the broader design process from site analysis, through three scales of the installation, domestic dwelling, and now a public building and town centre for Twizel.

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- ^ Figure 6.47 Plaza View North East
- ^ Figure 6.48 Plaza View West
- ^ Figure 6.49 Plaza View North West

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6.6 Reflection

This chapter focused predominantly on the use of form to establish intensified atmospheric qualities in keeping with the those developed through chapters four and five. The potential for further intensive development of this exploration could lead to the integration of more sculptural elements. And taking present from chapter five. The establishment of visual connections to the mountainous landscape surrounding could be developed through use of horizontal view shafts – as a complementary feature to the vertical light shafts integrated into previous explorations.

With further development of form and interior spaces, evocative and compelling sections can be developed to further communicate the atmospheric conditions of this exploration. This building has the potential for significant further development. The notions of endemic light and atmosphere within a New Zealand context also highlight many further potential possible explorations at other sites.

These possibilities will be further explored in chapter seven to discuss future directions for this research.

six: PUBLIC

Seven : CONCLUSION

Seven: CONCLUSION

< Figure 7.01
> Figure 7.02

Seven: CONCLUSION

7.1 Discussion

This thesis explored numerous possible interventions to establish an understanding of endemic light in a New Zealand context. Through site exploration and analysis, a base of knowledge for further development was established. This knowledge fed into further theoretical investigations of light, atmosphere, perception, place and dwelling, which in turn established a more complex understanding of the previously explored site. Giving new meaning to the atmospheres experienced in the Mackenzie Basin.

From these initial investigations, a design as research process explored three interventions at installation, domestic and public building scales. Preconceptions of the explorations led to the investigation of light, colour and texture, and their roles in establishing artificial atmospheric qualities – “Takeaway Twizel”. The notion of a takeaway atmosphere developed into a habitable exploration of domestic space and these atmospheric qualities relationships with primitive dwelling behaviours.

Through the exploration of condensed atmospheres in a domestic dwelling, these qualities were expanded to a public scale, exploring their relationship to exterior form and experiences. The public building, centred around the programme of a town centre for Twizel in 50 years’ time. This development applied dense programmatic requirements to the site, as well as investigating atmospheres from an alternate perspective of intensification externally. This resulted in explorations of form and light, however excluded material qualities and interior development due to the immense scale of the area.

7.2 Reflection

Knowledge gained through this thesis is particularly relevant to the future of architecture in New Zealand. Establishing methods for the development of architecture by utilising endemic light qualities and atmospheres to create engaging spatial experiences, less the necessity for huge picture windows and vistas to establish connection with site.

In the context of urban intensification and construction of medium and high density housing, the ability to introduce exterior atmospheres and connection to place through manipulation of light is a particularly relevant design feature. If the opportunity arose to further develop this thesis, the exploration of a public scale intervention would alter the focus towards more detailed exploration of material interaction with light and atmosphere, rather than form – as Peter Zumthor discusses in *Atmospheres*, form should be secondary to designing for atmosphere, it is through considered arrangement of material light and void that creates appealing architectural experiences.

To conclude, this thesis has developed and expanded my preconceived notions and knowledge of light in architecture. It is the kind of knowledge that is not specific to any area of expertise, rather knowledge that can be applied to any architectural challenge that I may encounter in the future.

Seven: CONCLUSION

Seven: CONCLUSION

Seven: CONCLUSION

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