WALKING THE GULLY:
Designing Journey Pathways with the Ngauranga Gorge

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ABSTRACT

The ongoing outward expansion of cities and desire to make them pedestrian friendly faces difficulties when confronted by certain landscapes, especially when a car dominant highway infrastructure has a grasp on the use of these gully landscapes. Disconnection of pedestrians is frequently observed in highway infrastructure; however, it becomes exaggerated by the large and steep topography of gullies. This displays the lack of walkability that has resulted in the overlap of designed highway infrastructures within urban gully landscapes.

This project researches how the body used as a design tool can attend to the sublime quality present in urban gully landscapes and enhance the transit of walking by means of a journey to connect the bodily and temporal experiences to the severed landscape. The overall ambition for this research is to empower the pedestrian within infrastructural spaces that currently do not favour them, whilst connecting the walker experience to the gorge landscape.

Taking the Ngauranga Gorge north of Wellington City as a testing ground for this proposition the research spans three scopes:

1. Strategic focus ensured integration of wider infrastructural influences of hydrology and movement corridors;
2. Hydrological focus provided design potential for movement routes and aesthetic qualities of intimate walking experiences to develop whilst advancing stormwater management;
3. Attendance to body relationships and intimacy of walking through a journey rather than designing to get from point A to B methodologically.

The research is a strongly process driven, to create a methodology that aims on improving the walkability of the urban gully landscape. The methodology led to the design of two pathways, from nine proposed paths in the network scheme for the site.
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1.0 INTRODUCTION

This design-led research investigates the walkability of a highway infrastructure dominant gully landscape through the bodily experience of journey pathways.

This exegesis discusses the design-led research through a series of chapters that describe and reflect upon the project proposition, approach, outcomes and implications. It begins with an outline of the projects' scope and field within landscape architecture and affirms the importance of site in the framing of the design-led research. Additionally, it reviews precedents and theoretical ideas from within the landscape discipline to frame the investigation and develop the projects significance. The chapters to follow also describe and reflect upon the four-phased design methodology innovated across three scales of investigation. Further, results of this design process, two designed pathways, will be explored.

The scope of the research focuses upon the experience and walkability of an urban gully landscape dominated by infrastructure, with a methodology developed to provide tailored means for designing pathways. In this way, much of the exegesis attends to be process oriented. Given the constraints of this exegesis, not all work undertaken in designing the pathways can be included. The exegesis will however ensure reflective attendance to design tactics developed in the process of designing the pathways at a variety of scales as part of the design method created.
Fig. 1.1. Locating map for research site within New Zealand and Wellington context.
Fig. 1.1.3. Ngauranga Gorge research site boundary map.
The design-led research takes place in the site of the Ngauranga Gorge, an urban gully landscape pierced by a six-lane highway. This site displays the pedestrian disconnect that occurs with a dominant road corridor/gorge relationship. This physical disconnect is exaggerated by the acute steep topography arising in this landscape and the 'dead-ended' separation of the residential areas that surround the gully.

The research site is restricted to the section of Wellington’s State Highway 1 – Centennial Highway at Ngauranga, north of Wellington City. (see fig. 1.1.2.)

The Ngauranga Gorge is bounded by residential development on the hilltops of the gorge itself. The extent of the research site reaches from the Newlands Road off-ramp to the north down the gully to Glover Street and the off-ramp to the south. (see fig. 1.1.3.)

The site itself covers a 141-hectare area of the Ngauranga suburb, with most of it being steep vegetated or regenerating vegetated slopes. Half of the suburb is undeveloped, bare land and the other half is a mix of various industrial uses, residential housing, and the transportation systems of highways, railway lines and pedestrian lanes. (see fig. 1.1.4.)

Fig. 1.1.4. Ngauranga Gorge photograph displaying three influential impacts in the gully landscape.
Fig. 1.1.5.1. (top) Collage expressing the largeness of the gorge landscape.

Fig. 1.1.5.2. (bottom) Collage expressing the textural and crumbly nature of the gorge landscape.
Site Conditions

You can feel as you walk through the valley of the Ngauranga Gorge the largeness of the steep gorge topography resonates with you while you walk through it, moving up against the exposed fractured patterned texture of the geology that draws you in closer. Scattered vegetation peeks through the cracks and recesses in the slopes that continue upwards resulting in the need to strain your neck upwards to see the extent of the hillsides and the accumulative vegetation residing, perceived from within the highway corridor. However, travelling down the narrow footpath that flanks the highway corridor, you feel uncomfortable and even fearful as the vehicles rush buy you at great speed without any separation bar the shallow gutter creating the only distinction. (see fig. 1.1.5.1. & 1.1.5.2.)

The influence of the built form and infrastructure has developed overtime incrementally more disruptive and destructive on the gorge landscape thus negatively effecting the connection pedestrians can traverse or occupy most of the environment. The gorge facilitates the bulk vehicle movement through the highway corridor, the site also acts as a basin for established water systems, and the increasing built forms and land-use shifts have increased the capacity of this urban location. With the ever-increasing residential development surrounding the gorge, there is a mounting desire to increase the pedestrian access throughout this area. In addition, the increase in development should infer a need for sustainable water management for the new areas of built fabric and public space for urban domains.
The Ngauranga Gorge research site is of value to Wellington City as a substantial area of land that can facilitate the capacity for urban growth. The site is slowly being encroached by development at the flat or shallow sloped areas (like the current Newlands residential extension). This encroachment is arising from the demand for new land to become available for building, but at the same time restricted due to the steep geomorphology of the landscape. (see fig. 1.1.6.1.)

The site and its immediate surroundings have a varied district plan land-use allocation with a substantial area being zoned as open space [refer to definitions] for public use. However, there is an overlap of business use of commercial areas which restrict the access or occupation of land. Additionally, the dominance of vehicle movement and connection in the gully, established for this commercial use, is at the expense of the pedestrian access or consideration for attempting to use the space for recreational use. (see fig. 1.1.6.2.)
Fig. 1.1.6.1. Land-use map of Ngauranga Gorge of industrial, business and residential areas 1:10,000.
Ngauranga Industrial:
- unique industrial / business
- quarry, freezing works, concrete contractor
- major cut-out land modification
- hillside & flora destruction
- large area of impact
- unaccessible & dangerous

Ngauranga business 1:
- mixed big-box / warehouse / business
- varying building programmes
- flat-land appropriation & cut-out modification
- little growth potential

Ngauranga business 2:
- industrial business warehouses
- metal product retail
- left-over land from highway
- cut-out land modification

Newlands suburb:
- unbuilt - presumed low density residential
- suburban extension
- subdivision into available land
- hill-top land allocation
- some room for further growth
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Quarry open space:
• mixed land use with business area 2
• land modified area - resource gathering
• smaller patches of vegetation
• one patch of native planting
• doesn’t act as an accessible open space - parts are fenced off

Khandallah conservation:
• named Tyers Stream Reserve
• native vegetation dominant
• no access or tracks through
• subdivision started to take away open space land
• nestles between varied land ownership and use

Ngauranga open space three:
• mixed land use with business area 2 & outer residential
• has a plot of pine tree forestry indicated as the exotic vegetation block
• has varied vegetation types
• not an accessible or public space
• has had some land modification

Newlands rural area:
• rural zone that has further residential housing to be built
• has large quantity of scrub vegetation with parts of brown grass
• new zoning and parcels to come
• includes the eastern side of the Ngauranga Gorge
• land modification for the subdivision on top of the gorge
• not a public space
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**Dense & developing native gully ecosystem**
- variety of trees species
- shrubs squeezing into difficult spots
- very situational to the terrain

**Low & developing native cliff ecosystem**
- restrained tree species
- shrubs are mainly weeds growing up the cliff or at the base edge
- creation of tiers of vegetation groups
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1.2 IDENTIFIED PROBLEM

I have identified a severe disconnect and lack of integration or priority for pedestrian walking through the urban highway gully landscape – it is neither comfortable nor safe for anything other than the car. Highway infrastructure has the tendency to be hostile for the slower modes of transit with the constant danger of high-speeds, noise and toxic fumes. These negative influences are exaggerated in any gully landscape where highways have been built running through them as the pedestrian quality becomes much less of priority due to the difficult landscape topography.

This severing of walking connection is a major issue for both physical engagement and the production of meaningful relation with this landscape and curbs the potential use of the area. While cities are growing in size, the overlap of highway infrastructure and the urban development requires strong design decisions to accommodate the growing needs of pedestrian movement.
1.3

PROPOSITION

This project emerges from two interrelated issues:

FIRSTLY, In the twentieth-century transportation prioritised car travel profoundly changed landscapes and shaped the fabric of urban environments. Until recently pedestrian needs were largely overridden in urban and transportation planning (Gehl & Gemzoe, 2001). However, there is emerging awareness in both public health and planning disciplines that environments that support walking, both as an alternative to driving and as a leisure activity, is beneficial for human wellbeing. This affirmation of walking has found ground in landscape discourse producing many design approaches to support walking in the urban landscape. This has even given rise to the expression by professionals as designing ‘Walkable Cities ’ [1.].

SECONDLY, Urban highways frequently traverse gully landscapes [2.] and are one of the most disruptive infrastructures to landscape continuity. Gullies are critical landscape elements within the physical identity and legibility of urban environments, yet within the design of highway corridors, provision for the pedestrian or walker is forgotten. The interface between dominant highway infrastructure and loss of walker amenity becomes most apparent in the steeper landscape conditions of gullies or gorges. As this typology of landscape inherently provides access via its valleys rather than slope or ridgeline, the highway corridor in these instances, installs a disconnect for the walker and curtails intuitive movement in the urban landscape.

This project investigates how the design of pathways can attend to the sublime quality of urban gully landscapes impacted by roading infrastructures that obliterate walkability. Transforming transit (walking) to journey (experience), by way of landscape design, has the potential to connect the bodily experience of walking to the conditions of landscape otherwise made antagonistic by car infrastructure. I propose that designing pedestrian access from the perspective of the experiential journey affords attentiveness to the sublime and reactivates diverse engagement in the life of the urban gully, at the same time, affording pedestrian space in a car-dominated environment. The overall ambition for this design-led research is to empower the pedestrian within infrastructural spaces that currently do not favour them, whilst connecting the walker experience to the gorge landscape.
The largeness of the Ngauranga Gorge site was difficult to approach; therefore testing this proposition spans three scopes:

1. Strategic design focus ensured integration of wider infrastructural influences of hydrology and movement corridors across broad and intimate scales whilst maintaining landscape orientated experiences for walkers in the modified urban highway-gorge landscape;

2. Hydrological design focus provided design potential for movement routes and aesthetic qualities of intimate walking experiences to develop whilst advancing stormwater management;

3. Attendance to body relationships and an intimacy of walking through a journey rather than designing to get from point A to B.

This scope methodologically supports the investigation of close and bodily relationships of introduced elements and the existing character of the gorge landscape typology. The body is a useful design tool as it influences strongly the temporal and affective qualities within the design of a spaces or structures that have meaning for walkers of the landscape.

[1.] The use of the term 'walkability' for cities, as a goal for designing the urban landscapes to be pedestrian focused. Written by Michael Southworth in his article 'Designing the Walkable City' he defines the idea of walkability: "Walkability is the extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network." (Southworth, 2005).

[2.] Three examples of local gully landscapes that have highways built within them. First, Ngaio Gorge located just north of Wellington City (and south of the Ngauranga Gorge) with it having issues of multiple closures due to slips that heavily disrupt transit flow (Hunt, 2017). Second, Manawatu Gorge east of Palmerston North in the lower North Island with this highway route being closed April 2017 and planning to be reopened in 2024 due to major slips consistently occurring on a large scale (Irwin, 2018). Third, Grafton Gully located east of the Auckland CBD having a motorway built in the gully through 2001-2003 (Grafton Gully, 2018) and an extension to the Northwestern Cycleway opening in 2014 creating a shared cycle and pedestrian track connecting popular locations (Auckland Transport).
1.4 AIMS & OBJECTIVES

The overall goal of this design-led research is to provide a methodology of how to design walking experiences through pathways so priority can be given within these urban gully infrastructure landscapes. In this way, it is my aim that these landscapes become valuable for all modes of transit and connection for the developing urban environment.

Within the design method a strong influence of the bodily experience with the landscape was taken as this approach can be a strong catalyst for designing spaces, interventions and movements that can improve and revitalise a physical and reflective connection. This becoming an important tactic with designing walkable spaces within this urban environment. The focus upon the body can provide a strong feeling of place and intimacy a walker has with the landscape. It involves the consideration of the senses and the mind to travelling as a journey that can also shift the focus away from the disruptive highway conditions.

My approach to the heavy influence the highway infrastructure on the site is accepting that the motorway in its current form is there to stay, despite the expectation of reduced dependency on independent vehicular transportation in decades to come. [3.] Therefore, this project offers insight with a process for developing pedestrian and walking transit for urban sites and cities that are shifting away from vehicular transport dominance. It offers a focus on developing existing urban highway gullies in providing and reinforcing essential links through walking, rather than promoting new highway corridor creation. In this way, the research leads with a design-led approach, being a solution of remediation to the landscape. In the context of Ngauranga, this approach can also be seen to improve potential permeability and non-vehicular transit options for the growing north-eastern suburbs access into Wellington.

Whilst it is beyond the immediate bounds of this research project, its results suggest potential considerations to how the planning and arrangements of residential lots and streets can be modified to allow greater permeability in difficult gully/infrastructure landscapes.
With the existing development occurring in the north-east suburb of the site, the consideration of adding the additional access points or easements for pedestrian routes could be established in time. The project also suggests a potential shift in housing density in the suburb to become higher, as walkability improves in the area. Potentially, as my project gestures, the orientation of the housing can shift to include the Ngauranga Gorge and bring ownership to the residence of the suburbs.

A further extension to the research is the inclusion and improvement of cycle integration with the suburbs, streets and the journey pathway network. To further, articulate the reliance away from personal vehicle use in urban areas.

The design-led research objectives are the following:

• **Develop a design methodology and parameters for creating walking experiences within the urban gully landscape.**

• **Design walking experiences from the perspective of the body and the landscape.**

• **Explore the use of the sublime through bodily and spatial qualities afforded by the site of research.**

[3.] As expressed in the Wellington Regional Land Transport Strategy 2010-40, under their Vision: "In urban areas there will be viable alternatives to travel by private car for most trips. Walking or cycling will be an attractive option for short and medium length trips. Pedestrian and cycling networks will be convenient, safe and pleasant to use." Also adding an importance of the major commuting routes: "Public transport will provide an attractive option for an increasing number of people, particularly at peak times along key commuter corridors" (Wellington Regional... 2010, pg2)
Research Question

How can landscape architecture create walking experiences in an infrastructure dominant landscape?
1.5
METHODOLOGICAL APPROACH

This research is structured by an overall strategy introduced as follows:

Firstly, critical understanding of the site conditions was undertaken. This facilitated discernment of both relevant precedents and theoretical knowledge which is reflected upon the conditions that the landscape presents at both context scale and site scale.

Such framing led to the spatial and written design parameters (I call Design Operators) collated as a collection of design drivers for approaching the particularities of landscape and the research of designing walking pathways.

The design-led research then splits the investigations into three scales that can deal with the different requirements that a network of experiential pathways demands. The three scales use a range of landscape design tactics that build upon creating outcomes for designed pathway spaces or interventions that create intimate experiences with the steep gorge landscape. Having three scales of investigations allows for different levels of accuracy or detail established in an appropriate fashion while also dealing with the two scales within the Design Operators.

The three scales involve; the strategic scale that focuses on the movement and access of pathways through the site, the bodily scale that concentrates on the on-ground experience the body can have with the landscape and introduced elements, and thirdly the hydrological system scale which introduces a component of water infrastructure for the wider site and catchment scheme and also relating to some of the small spaces designed along the journey pathways.

This process somewhat leaves out a middle scale of traditional site design, as the scale of the site becomes unreasonable to create such clear design choices along the entire length of the pathways. The focus, being a schematic pathway design with detailed bodily interventions located at points along the pathways.
Thus, the design-led research deals with the three scales simultaneously. The design operators set out the design criteria. This method evolved from my approach across the strategic, hydrological, and bodily scales. These three scales associate between each other and is expressed within the design of the two pathways resulted from the design methodology.

Fig. 1.5.1. Design-led research methodology.
Fig. 1.5.2. The set design operators used as parameters for design testing.
The design method phased is as follows:

**Phase One: Design Operators.**

This initial stage determined the frame of investigation across three forms: Site Fieldwork, Literature study, Precedent study. From this investigation *design operators* were evolved to advance the strategic-scale and bodily-scale of the landscape pathway-scale and human-scale respectively.

The pathway-scale *design operators* of: ‘sight breaks’, ‘threshold’, ‘sequence’ and ‘release’ determined the pathway network and the logics for individual pathways within the network. The strategy for the journey-pathways located moments and interventions from consideration of particular landscape conditions.

The human-scale *design operators* of: ‘framing’, ‘compression’, and ‘exposure’ investigated smaller site moves and interventions within the journey-pathways. The investigations of different aspects of design were tested against these operators separately then merged as the individual designs.
Fig. 1.5.3. An initial concept strategy for pathways through the site.
Phase Two: A Strategic-Scale.

This phase sets out movement for the site extents organising the pathway network and access. It uses the pathway-scale design operators to integrate the contextual situation, the infrastructure and gorge typology responding from the intimate scale, or perspective of the walker. This phase is critical to gaining understanding how the walker can access and relate to site as a whole.
Fig. 1.5.4. Site photograph of the qualities of the landscape seen at a close scale.
Phase Three: Bodily - Scale.

This phase discovers and develops intimacy through spatial design techniques. Methods of planting with consideration to slope composition, structure, abstraction, materiality, colour and form developed concepts then refined outcomes according to criteria set out in the design operators. The series of rigorous investigations through the methods mentioned are formalised together from findings into concepts that facilitate many of the components into the one small space design. These become effective in a journey when a series of spaces (moments) are designed upon a pathway, to link the other two scales in harmony.
Fig. 1.5.5. Stormwater catchment and system map for the Ngauranga stream.
Phase Four: Hydrological System Scale.

This phase runs parallel with both the strategic scale and the bodily scale, as the hydrological system reaches the large extent of the site while expressing the intimacy created within small space design on site. The urban stormwater network revealed a strong relationship to the highway infrastructure and walking modality spanning across the scales and within the design goals, supported minimising highway dominance. From this understanding, a stormwater scheme was designed to enhance water quality and resilience of the network with rainfall collection and improved quality of discharge. Devices of wetlands and weir mechanism were generated to enhance the designed moments.
I have undertaken a study into two example projects to seek potential learnings for close body relationships designed within a larger landscape context. The analysis of these two projects affirm the method of using the body as a tool for designing and can give a point of difference to reflect upon similar tactics used within the context of the research site.

The investigation into these following projects explore the spatial qualities observed in the structures and their immediate landscape conditions that provide further incite for the designed spaces. The use of overlay drawing as a technique to give expression and definition to the physical and reflective connections was created within the precedent projects.
This project is situated in the Swiss Alps and presented an opportunity to analyse the designer’s approach to bring a new experience and knowledge about the expansive mountainous landscape. The two structures located upon one of the mountain peaks provided spatial indications for experiencing the landscape in directed and unique ways that compress or expose the user with their surroundings.

Through drawing out spatial bodily components used in the Landscape Promontory, it helped to express designed forms into as an example of how space is shaped to express and enhance the expansive landscape of the Swiss Alps. It also conveyed the same feeling of space of the ‘shift in scale’ that was identified by literature on sublime in this design-led research.

Fig. 1.6.1.1. & 1.6.1.2. Cardada landscape promontory structure piercing through the forested slope.
For example, the technique of restricting and closing the walkway towards the platform with the use of the existing tall trees which focuses the users inwards while moving to the end of the platform. This intensifying of the opening and expanse that occurs as you past out of the trees and out to the wider deck at the end of the platform, looking out over the vast landscape all around. These spatial qualities extracted from this precedent gives design clarity and affirmation that the bodily experience was considered even in the design of the structures and not only the pathway or journey that led up to this platform piercing the tree canopy. In the Landscape Promontory, here the design techniques identified were compression, release and framing. These become core techniques, which create bodily relations to the landscape, even at the larger sense of the vast landscape.
The Cardada precedent’s second structure located higher up the Mountainous landscape is the Geological Observatory. Built on one of the rocky peaks it provides a nearly 360-degree view of the Swiss Alps. The design of the structure is a circular concrete pad and various inserts of rock features into the concrete. The cobble paved walk up to the Geological Observatory creates the sense of anticipation when getting off a gondola ride. The circular pad form and location allows for an extreme prospect over the vast and intense Alp landscape, but the pairing of the short climb (walk) to the pad itself enhances the experience, as the shift of focus from carefully walking the path. The attention to what to step on contrasted by the standing on the very flat concrete slab to focus outwards on the vast scale and beauty of the landscape. This design-led research is investigating and testing the experience of the shift in attention and scale to the landscape displayed and designed in this precedent.

Fig. 1.6.2.1. & 1.6.2.2. Cardada geological observatory intervention sitting within the rocky Swiss Alps.
The two structures by Paolo L. Bürgi mountainous Cardada village are part of a recreational area above a collection of Swiss towns to the south. The location of the interventions is not in an urban context and is not part of a commuter connection between towns. The investigation of these structures was specifically identifying the potential of built forms in a steep landscape for walkers (mainly) can generate the attentive spaces that shift in scale with the landscape through materials and manipulation of spatial qualities. This differs from the proposition for the design-led research as it does have a focus of connecting people and places through walking with less of a focus on creating a recreational space (or tourist attraction). What was analysed in this precedent was the two structures in particular but a stronger understanding of the journey or wider pathway & gondola network of the mountainside could have provided stronger insights for the pathway designs developed in this design-led research.
Bali Memorial at Kings Park  
Perth, Australia, by donaldson + warn Architects

This small intervention within Kings Park sits on the ridge of Mount Eliza to provide a secluded pause for people to reflect over the city and harbour. The simplicity in the creation of the intimate space by the use of the curved wall form that diverts the attention off the path running perpendicular to it.

The Bali Memorial design creates a moment of reflection with an open relationship to the wide expanse of the city landscape below. The creation of the small and intimate space again used the techniques of compressing and focusing the space to direct the attention outwards when standing at the edge of the space. The built elements used in this precedent express a similar intent but constructed differently. The design has subtly used tall walls that curves and direct the space inwards to the small ledge that provides for the prospect over the landscape. The space becomes a place for self-reflection and memory to become at the forefront of one’s attention, which is an outcome that is significant to help connect a person to the landscape experientially. One critical feature that this precedent does is create a singular intimate moment to be established even though a major path more the larger Kings park runs directly adjacent to it. This careful use of space and proximity has been done precisely which is something that is used within the design process in this thesis.

Fig. 1.6.3.1. Bali Memorial in Kings Park Perth looking over the city and harbour upon a planted hill.
Kings Park in Perth is a substantial recreation area for the city with a large amount of residential area to the west and the city centre to the east so it can be seen as a park that can facilitate pedestrian commuter movement towards the city. It provides an array of walking or pedestrian tracks and walkways while also facilitating some vehicular access without dominating the park experience. With the Bali Memorial in particular its short diversion to the side of a walking track that leads around the eastern edge of the park, creates a surprisingly secluded and intimate space. It acts as a recluse and moment to have a reflection over the city and harbour. Again, this precedent uses a rougher grade path to led up to the structure to stand and look out from.

This precedent has a much stronger connection to the urban fabric and a pedestrian link into the city, as it provides evidence that an intimate moment of scale shift can occur nearby a pedestrian movement into the city. The Kings Park topography, even though it is raised above the city by a significant height, it is a relatively flat landscape which does allow the walkway network to be extensive and connected. The design-led research attempts to bring this intimate space making close and within the pedestrian pathways, while still keeping the same principles of designing spaces to have that shift in scale and reflection or pausing moment.

Fig. 1.6.3.2. Diagram of spatial elements creating a small secluded space for self-reflection over the city.
**Precedent Reflection**

The precedents chosen and analysed were strong examples that expressed the techniques of spatial design that affirmed the use of design parameters for this researches method (e.g. compression, framing, release) of having agency in creating strong intimate experiences in the landscape for walkers, in particular as felt and understood through the body. Both projects also provide a contrast between the pedestrian connection with the landscape and the urban context to consider against my research site. To this end, critically analysing these projects propelled my efforts to discover means for designing from and for the pedestrian as a way to propel better physical and reflective connections with the Wellington landscape that is interrupted through the construction of the state highway corridor. As identified within the issues for the city and the site of research, the focus on the pedestrian within the urban gully landscapes are neglected and disrupted by infrastructure like highways. The projects express the strong relationship a pedestrian (a walker) as integral points within the journey that shift the experience and perception of the landscape and feeling into a moment that is reflective and enhancing.

The precedents chosen focus on creating temporal and experiential spaces for walking paths, and show a different type of design approach than creating transit by walking connections. This experiential approach for designing pathways is common in locations like Cardada in the Swiss Alps, but when designing in urban conditions the focus is diminished when other transit movements are overlapped. The natural character or landscape is compromised for the efficient use of space and usually focused upon vehicle users not the pedestrian.
The design-led research aimed to create journeys in the landscape whilst understanding the potential for diversity of walking experience. To expand my understanding and develop the means for the creation of design tools I have reviewed a range of literature with a focus on landscape aesthetics, the notion of the encounter, and the sublime. These ideas propelled the discovery towards a body of knowledge for building up a vocabulary and representation of experiential qualities to develop into spatial parameters within landscape architecture design.

I needed to understand walking and theorise the bodily experience in the landscape as an innate relationship that resonates between the two when in the mode of walking. To progress these ideas (of journey, walking, encounter, sublime, aesthetics) in the wider landscape discipline an approach of specifying how they translate into design moves, in a spatial manner, was key for allowing investigations to develop and express the experiences created for. This spatial understanding of theoretical ideas developed into the framework (design operators) that related the context and situation of the site to facilitate design-led investigations to be applicable for the urban landscape of the research site.

The influence of creating these design parameters that guide the design of the landscape developed initially from two books and ideas extracted within: Form and Fabric in Landscape Architecture: A Visual Introduction by Catherine Dee, and Opening Spaces: Design as Landscape Architecture by Hans Loidl & Stefan Bernard. Both these texts formalise and give expression to the range of landscape architecture design principles & tactics that have developed in the discipline. The authors have not only described the many factors and techniques to design spaces in the landscape, but also visually presented the tactics through sketches and diagrams. These articulate the ideas to become useful tools that can easily transition into the design process of spaces for a landscape architecture designer.
The use of developing a set of design parameters, based upon the existing landscape architecture design principles that have a visual explanation, becomes a very useful approach in the design process of complex situations and landscapes. Selecting a concise set of design techniques that are appropriate to express the intent of designing within a certain landscape is critical in the design process. For example modifying the ideas of, ‘Ledge paths’ (pg 94) or ‘Vegetation paths’ (pg 99) of Form and Fabric in Landscape Architecture: A Visual Introduction, by Catherine Dee (2001).

This design-led thesis develops the traditional landscape design tactics into the ‘design operators’ as a specific set of criteria. They have been refined and developed with the purpose to enhance and express the urban gorge landscape, which has a sublime quality that desires attention for creating walking experiences.

The use of a set of body experience focused parameters support the articulation of the design testing and outcomes to facilitate directly the walker’s temporal and affective relation with the landscape qualities. A selection of design tactics informed the base of the design parameters, but a second stage of refinement was added. This reinforced the tactics to tailor for the specific condition of landscape and for designing walking experiences. These following landscape ideas were chosen as they added an important layer of complexity and specificity to the set of design operators. The following definitions and intents written respond to their incorporation have their significance on enhancing the walking experience through the body and the gully landscape in this design-led research.
The idea of sublime first appeared in the design-led research as an adjective for the gorge site, yet through research it became evident that this meaning could transform into a design-based tool to inform design testing when distilled into a tangible definition that refers to a spatial quality. In this design-led research, it is defined as ‘the shift in relative scale between close and far’.

The understanding and articulation was influenced particularly from the description by Bruce Janz in a section of the article about ‘Awe and Wonder’. It referred to sublime as the contrast of one’s self and space is not solely about this distance or size difference, but about what the difference in temporal spatial qualities that affect the human body. (Davidson, C, 2018, pg 148)

This particular definition was integral as it resolved the importance of the use of the body as a tool for designing within the gully landscape, as to me the research site expressed this quality. The establishment of the different range of scales through the design method also developed here. Providing a design scheme at the wider (far) scale simultaneously to a close bodily-scale established the position for the design methodology for creating walking experiences.

The design operators that advanced using the sublime scale shift recognition of the close bodily-scale tactics in particular compression, framing, and exposure. These three tactics synergise together providing a spatial reference of the shift in scale of the body and mind within the landscape.
The Deleuze notion of the encounter presented a further depiction of the mind influencing our actions at a point of change. When faced with a change (in environment for example) that point in time the mind takes priority to ‘think’ about a decision, which has been ‘forced’ upon us. This encounter moment has been described with the word chance. (Zourabichvili, F 2001)

The notion of encounter is then expressed within the design of walking spaces through the premise of ‘thought’ and the ‘mind’. This translated in the design operators, of shifts in direction and material use at points or intersects. Indicating the force to think about the space and moment you are engaged in. Integrated in the pathway-scale with thresholds (indicating the shift) and sight breaks (expressing chance or uncertainty by visually impairing).
A consideration to the experiential quality of design was essential for the design research of walkways. The experience of a space became evident that it was more than a visual quality. Meyer was arguing landscapes should be designed for more than their visual perception, and the use of the word ‘aesthetics’ applies to more than purely visual, but in fact an entire sensory connection to the landscape (Meyer, E. K. 2008, Meyer, E. K. 2015).

The realisation that designing for experience includes a multi-sensory approach, which adds a stronger relationship with the landscape. Therefore, in the research and bodily scale testing phase attention was made to allow for the space and paths to have a sensory quality that associates the body with the landscape.
Journey & Walking

An explanation of how this thesis interprets a journey through the perspective of walking provides some background for the decision to address the walking condition in the site over the other modes of transit present in the research site.

The ‘Journey’ as expressed in its dictionary definition it has association with time and travelling to occur (Dictionary.com). The process of moving over time is a key component for the use of the journey in this thesis, and with further partnership with walking; it becomes a driver for the research.

Walking described as, a “travel on foot at a moderate speed” by a form of locomotion or transit on the ground conducted by a pedestrian (Dictionary.com). The particular attention to the speed of moving becomes important when describing transit and a journey.

The explanation for a journey has developed for this research, described as a bodily experience of transit by the act of walking through space where the time taken to progress allows for the senses and mind to perceive and think about the environment moved through. The pace of walking is the driver for deep experiences in the landscape to occur on the journey, as the mind can contemplate and imagine the space. (Gros, Howe, & Harper, 2014, pp. 35-38)
Literature Reflection

This section of the research brought together a collection of ideas and interpretations within the landscape architecture discipline that required deeper understanding to be carried out for this research to be impactful. An important discovery that I found was the deep thinking and articulation that the temporal connection that correlates between people to the environments qualities. For me, the temporal and sensory aspects that many authors wrote about required an expression to be made into the design realm where Meyer's writing does this effectively. With my goal to give some design conceptualisation to these notions, as this was difficult to conceive in a spatially or design focused realm. The difficulty and time consuming part of the research process was formulating an understanding for the ideas to be expressed as design tactics for creating walking experiences in an urban gully landscape. The compilation of the theoretical ideas was chosen as they had a strong resonance to the approach for this research, but another difficulty was the visualisation and representation as a clear idea or parameter that is established as a beneficial tool for design and not a distraction or disturbance.

Additionally, I understand there is a level of personal interpretation to the expression given in the creation of the design operators. However, this was a critical requirement that allowed the design process and methodology to develop and create designed outcomes that had a meaning and assertion to each part of the designed spaces (moments).
PHASE 1: DESIGN OPERATORS

This first phase of the design methodology involves the finalisation of the set of parameters or criteria the designing testing works from and reflects back to. The design criteria developed in this design-led research as mentioned is an assimilation from landscape architecture design tools with combination from theoretical ideas in the landscape architecture discipline. Additionally, the research site had an important role of determining and resolving the final set of design operators. Which has been extracted and carefully considered as physical and verbal 'operators' that reflects the proposition of designing pathways through the perspective of the body and walker.

The design operates developed in this research have been put together in two scales, these provide intimate and bodily experiences that shift between smaller and larger scales for design testing. To create an attentive walking experience seamlessly between the existing gorge site and the designed pathway spaces. The urban gully landscape offered many possibilities to approaching testing for walking experiences, it was determined that enhancing and designing with the existing sublime character of the Ngauranga Gorge was integral for providing strong experiences for the walker.

Fig. 2.0.1. (opposite page) Collage expressing the steep vegetated slopes continuing flanking the highway corridor.
2.1 SITE FIELDWORK

The research site has major influence upon the forming of the design operators, and how the design outcomes respond to the situation of the researched landscape. Deep analysis & engagement into the site through remote mapping & research and personal site exploration & discovery for this research provided integral knowledge and rationale for the approach. A thorough discovery and analysis process was required within the approach of this research, dealing with a large-scale site alongside the fine details & qualities that make this landscape unique and engaging.

Fig. 2.1.1. (opposite page) Initial fieldwork photography study down the primary pedestrian footpath adjacent to the highway carriage-way.
Fig. 2.1.2. Existing site walking routes and conditions map showing the limited walkability over the large area 1:12,000.
The site fieldwork & investigation was collected through external data collection and compiling for mapping purposes, to understand the complexities of the site through its physical forms. These being spatial compositions of the terrain (like steepness and elevation), vegetation groups, open water passage and vehicle & pedestrian movement flows. This part of the site investigation relied upon mapping and aerial overlays as the primary method of displaying and learning the synergies of the landscape and conditions that influence it. Additionally, using contour data collected to transform into a three-dimensional digital model allowed navigation and visualisation of the site remotely through a slightly different lens was a beneficial addition to the fieldwork.
new experience of getting close to open water

allowing access across through small pedestrian bridges

giving access to the stream by putting paths over the terrain
Fig. 2.1.3.1. Site condition diagram Section A expressing perceived features, experiences, issues and initial design response with key map.
Fig. 2.1.3.2. Site condition diagram Section B expressing perceived features, experiences, issues and initial design response.
Section C, C’

Land features
vegetated slope

Experiences
widened vision
rock fall
angrily close

Issues
raised walkway
additional lane

Design response
wide prospect over the site, and connection to the gorge
additional lane to help with commuter traffic issues

Fig. 2.1.3.3. Site condition diagram Section C expressing perceived features, experiences, issues and initial design response.
raised pathway for a feeling of power of the vehicles
Fig. 2.1.3.4. Site condition diagram Section D expressing perceived features, experiences, issues and initial design response.
The second method of site fieldwork was investigated through personal participation and immersion with the site by the act of walking the site myself. Visiting the site on multiple occasions and interacting with certain conditions and areas at each visit created a body of understanding about the site that collated together through analysis drawings after each trip to site. The method of extracting information and qualities of the site and the landscape was engaging personal experiences and feelings when walking through the site at each stage.

An important form of representation used to express the site conditions came through photography studies, displaying the travel in the spaces of the site, and additionally focusing on details of the landscape. For example, the footpath up against the slopes & highway carriageway, the detail & composition of the rocks of the hillsides, and the groupings of vegetation ecologies that were created in the varied topography of the gorge. The photographs collected were base material that could help give an idea of the site conditions. By adding layers overtop or cutting parts out of the photos it added depth to the images to give expression to how the space was perceived and felt while walking. As seen in figures 2.1.4.1 to 2.1.4.3 these photo-overlays help express the conditions that was experienced while walking down the pedestrian footpath of the highway corridor. Specifically noting how intense and tight the footpath feels up against the steep rocky slopes, defined by the highway corridor in parts of the gorge.

Fig. 2.1.4.1. to 2.1.4.3 (top to bottom opposite page). Photo-overlay study analysing showing the various relationships the pedestrian on the footpath has within the Ngauranga Gorge highway.
Pathway-scale

Sight Breaks

Creates a sense of uncertainty to what will show itself walking along a path.

Threshold

Creating edges either side of points that can give subtle indication to the change in the space.

Sequence

Creation of continued events that will keep interest along a long path.

Release

An expansive prospect opportunity to occur which follows from compression previously experienced.
2.2

PATHWAY-SCALE, HUMAN-SCALE

The design operators develop a two-scaled approach for engaging and enhancing the site for walkers. To allow for both the bodily experience and journey experience to be expressed so detail at these different scales can test the site-specific designs.

The first scale of the design operators is the pathway-scale; it outlines the tactics for creating pathways as journeys, for walkers to engage. They act as four considerations required for the length of each designed pathway to facilitate and provide integration with both the landscape and the moments (points of interests). These design operators look at the composition of the pathways plus how the points of intervention integrate into a series along the journey. These operators are the following: Sight Breaks; that creates a sense of uncertainty by limiting the sight down the paths, then Threshold; to create a transition around the points along the path, next Sequence; to provide a constant interest to move along the path, and Release; the complete widening of a portion of path to give prospect outside of the path. These criteria facilitate the pathway design at a larger holistic scale, for a scheme to follow that considers what experiences can occur at the closer scale and how the moments can be enhanced leading up to these points.

Fig. 2.2.1.1. (opposite page). The pathway-scale set of design operators used as parameters for design testing.
Human-scale

Framing
Allows for the restricted opening of views and perception at specific points.

Compression
Creating tension in the space through narrowing the width of movement.

Exposure
Opening a proportion of a covered path creates a break from the continual condition.
The second scale is the human-scale, focused upon the design tactics at individual points (moments) along the pathways using close scale criteria that create intimacy by enhancing the landscape at points of interest. The three operators are the following: Framing; to allow restricted but directed view shafts, then Compression; to create tension through narrowing the space, and Exposure; the opening or widening the space giving opposition to the compressed spaces. These three tactics as a combination provide criteria for spatial & bodily conditions for a walker to experience when encountering the designed moments, especially under the bodily scale testing.

The design operators developed through written and visual form, which clearly indicate the intent of testing at the two scales. The operators are developed specifically to enhance the gorge landscape for walking experiences to be tested and developed at a wider scale. Additionally for the pathways to develop schematically to facilitate close bodily conditions for the walker to engage intimately with the unique landscape.

Fig. 2.2.1.2. (opposite page). The human-scale set of design operators used as parameters for design testing.
2.3 REFLECTION

A difficulty faced through the process of engaging at a personal level with the site was the limited access and movement that was available within the site. This was due to the fact the site and its hillsides are very steep and in places unsuitable to walk, for safety reasons. However, the attempt to access the site in places that had similar conditions to parts that were accessible was taken to help provide an idea and feeling of what potential experiences could occur in those spaces not explored directly. For example, the hillside track that travels across one of the eastern slopes was walked and documented to engage with a similar experience of the site.

The creation of the design operators was a method that I thought was appropriate to set out criteria and parameters for testing the unique sublime quality of the type of landscape seen in the Ngauranga Gorge. The basis of the development of the design operators come from the sublime quality that the site expressed itself when choosing this site to research. This led to further definition to establish using other ideas in landscape theory to accompany and form an understanding that was required for grounding in design testing through the perspective of the body. This translation of theoretical ideas or notions into design-led testing parameters was formulated in particular to attend to walking experiences within the urban gully landscape typology.

I discovered that through the difficult process of defining the various ideas into a collective criterion was successful as a process and outcome, as it added a justified scope that can best enhance the bodily experience of walking through the research site and its landscape typology. Again, the use of relevant precedents that deal with a similar landscape condition helped significantly to visualise and understand the spatial qualities associated with the body in the landscape.

Fig. 2.3.1. (opposite page). Photo of a gravel driveway and the old access from Spenmoor St Newlands down to Centennial Hwy (1) in the Ngauranga Gorge.
3.0
PHASE 2: STRATEGIC SCALE

This initial scale for the design methodology sets out the overall design intentions at a strategic level of the site, introducing the walking movement routes across the landscape through a schematic approach. The design testing relied upon the on-ground explored conditions of site and applying a holistic design scheme for the overall site movement that establish and form the access and pathway network. The considerations that influence the strategic scale and the pathway network and primary focus for this phase, are locations of access through the surrounding residential areas, points or locations within the landscape that express a unique & interesting quality (moments), and the steepness & form of the topography to traverse across.

The goal of this scale is to provide a logic for specific design testing & outcomes of the individual pathways that support and authorise strong walking conditions within the gully landscape. The pathway network has been established as nine journey pathways that intersect each other as it spans across the landscape into the residential bounds of the site. The journey pathways are conceived by using two access points (either existing or proposed) which meet up in both directions to a moment within the landscape, this creating a link through the landscape for walkers to manoeuvre.
Fig. 3.1.1.1 to 3.1.1.5. A sample of access locations surrounding the fringes of the site.

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3.1 ACCESS, MOMENTS

Two explorations into the site were required before establishing the journey pathways throughout the extent of the research site. The two key explorations were the access points into the site and points of interest; the moments connect to a walking path experience. Both the access points and moments required findings from the on-ground site analysis and remote aerial mapping as primary tactics for finding the potential locations for documentation and testing for the pathway network scheme. The collection of the wide range of accessible locations allows for greater permeability for walkers to the proposed pathway network and the gorge. Each journey pathway requires a destination or moment to be located. This also provides the character and experience of each individual journey pathway.
Access

To discover the existing and potential locations for access points for the pathways, a method of close interrogation of land parcel and high definition aerial maps was completed. Additionally, the investigation of the site was done as another part of the fieldwork.

The existing site had a single established connection through the residential fringe, where a path led down the eastern valley to the end at the highway. However, the rest of the existing breaks through the residential area were determined by a break in the land parcel passing between private resident's properties. Identified as intended lane ways, or where the streets were not blocked by a residential property. Shown as the 12 blue markers on the adjacent map (fig. 3.1.2.).

To increase the reach and spread of access into the site a selection of additional points were proposed. The proposed access points pierced through the residential parcels or the quarry (open space & business parcel), to extended from the streets to the edge of the site boundary. An assumption is made that additional access points can be implemented through existing land parcels (properties), as it would add value to the residential character and permeability in this developing are of the city. As it could benefit from the connection to the open space that the gorge can provided. The 11 orange markers display the locations of these proposed access points.

Fig. 3.1.2. (opposite page). Existing and proposed access points on site fringes map 1:12,000.
Fig. 3.1.3. Entrance strategy map displaying the location of the post indicators in the adjacent residential area 1:5,000.
Entrance Strategy

An extra part of the strategic scale that compliments the access to the site is a strategy to provide an indication network within the residential suburbs to lead walkers to the entrances of the pathways. The developed navigation strategy outlined the walker’s directions taken to locate the entrances of the pathways at the outer edge of the residential boundaries. The method for the placement of the indicators was to locate them at street intersections, to direct walkers down the required streets towards the street the pathway connects from. This strategy would be implemented for access points within the residential areas, with consideration needed when access points and their indicators have overlaps in the same residential area. The makers would be located in the street berms as they can be easily noticed and built.
A continuation of the entrance strategy was to develop the marker designs that lead the walker toward the pathway entrances on the suburb fringe. The testing of a post marker established a handful of options, with the intent of the marker design to indicate a direction in a simple way. A varied use of coloured strips within the posts and the use of different orientations created unique options for the post element. (Further testing in appendix 1-M)

**Fig. 3.1.4.** Iteration drawings of the post indicator forms and directions.
A) Points of **Open Extensive Exposure**:  
#4 - Hilltop harbour expanse  
#6 - View down the gorge  
#7 - View across the vegetated steep slopes  
#9 - Expansive gorge view  

B) Points of **Interior Water Seclusion**:  
#1 - Gully stream seclusion  
#8 - Open stream strip ecology  

C) Areas of **Varying Landscape Fabric**:  
#2 - Exposed rock terraces  
#3 - Raised valley formation  
#5 - Flat vegetated pocket valley  

Fig. 3.1.5. (top). Moment locations map of viewing points and interest areas speculated 1:12,000.  
Fig. 3.1.6. (below). Categorised moment graphic, after being refined down to 9 ordered locations.
Moments (points along the journey)

The moments (points of interest) that the pathways focus experientially towards, dictate the type of designed elements and feeling along the journey of the walking pathway. As it was determined in the research that this method was integral for creating walking experiences within this urban gully. A process of discovery and imagination through the site visits and aerial map inspection was carried out to determine unique and interesting experiences or locations within the gorge that the pathways can enhance and develop. The initial inspection of the site created numerous locations or areas that could be of interest, described by either, ‘a point involving views’, or ‘areas of interesting land’. These two simple categories were refined into three specific categories and the option of locations (for pathway testing) was also narrowed down and precisely located within the site. These three developed categories are described as follows:

‘Open Extensive Exposure’, which expresses the openness and prospect the site can provide at its higher elevations on the slopes.

‘Water Interior Seclusion’, which guides walkers within close proximity to an open piece of water, small streams within the smaller gullies or depression formations.

‘Varying Landscape Fabric’, which looser definition describes the quality of space that allow the expression of both natural formations of the gorge landscape and human modified formations, (for example moving people along a terrace rock cut created through the process of widening the highway corridor).
Fig. 3.2.1. Photo of the CNC foam model with aerial map overlay made for testing pathway iterations in 3D with pins and thread.
The development and testing of the journey pathways followed the strategy of connecting two access points with a moment through the landscape. Again, this creates a journey to establish when walking along the pathway beginning from a point of access, rather than just creating travel from point A to point B. This usually dismisses the experience of travelling through the landscape or environment overtime. The definition of a focal point; a moment, added a character or singular experience, built upon the landscape and specific intensity of the pathway. The basic premise of the journey (of entry to destination and back) developed the designed pathways to be described as ‘arcs’. That the pathways can span across the gorge, which linked two areas together, firstly from a simple gestural sense. Then followed by the refined pathway design tests, which was based upon the character identified in the landscape and moment.

The final part of the strategic scale addresses was to step down scale for the individual journey pathway designs. This research developed two of the nine pathways in the proposed network. It gave expression of the process developed from the design method for creating walking experiences by pathways in the gully landscape. This stage took into consideration the design operators at the pathway-scale most dominantly, which drove the strategic design outcomes.

3.2 ARCS, PATHWAYS
Fig. 3.2.2. Multi-loop pathway sketch iteration plan (rejected).
Pathway Strategy

The network of nine pathways went through a series testing and iteration stages, as it went through many forms of media to determine a final strategy. The initial pathway testing started from drawing over site maps, firstly to make series of loops that connected access points with the moments. However, the results did not fit or articulate the character and feeling of the arc pathways.

The pathway testing process then shifted to use a 1:3000 scale physical model, made with a CNC machine into a large piece of hard foam that provided a three-dimensional object that expressed the steepness and geomorphology of the landscape. The use of pins and thread was placed into the model to create various path formations, connecting the access points and the moments. The process provided better success than simply drawing over flat plans previously done, as the extreme topography could be visualised and understood clearer plus imagining the journey become clearer.

Fig. 3.2.3. Photo showing the two designed pathways in the foam landscape model with thread and pins.
Parameters:
- Creating an engaging pathway that runs along the higher condition of the slopes, having prospects down into the gorge.
- Adding in additional paths to facilitate walkers from the residential into this pathway.
- Paths will try to be shallow in slope, with few switchbacks possible.

Fig. 3.2.4.1. Set of photographed pathway testing for Iteration 1: Loops.

Parameters:
- Using all of the existing and proposed access points into the site.
- Connecting these points to create as many possible loops without crowding the site.
- Connecting the tops of the slopes and the bottom of the valleys together.
- Also making the paths not too steep.

Fig. 3.2.4.2. Set of photographed pathway testing for Iteration 2: Loops.
During the process of placing the paths with thread onto the model it became evident that the idea of the arc pathway was still lost, and the unique three categories of movements through the landscape was not expressed as intended. So a shift back to the gestural approach of drawing basic curved arches over a site plan was completed. It gave a guide for the use of the physical model to create the refined pathways onto the terrain. Displayed in the ‘pathway – refined topography network’ map displayed with contours and the network of pathways coloured in orange. (see figure 3.2.6.1. and 3.2.6.2.)

An important feature of the pathway network was the facilitation of the individual pathways to overlap, which created intersections for walkers to cross between the pathways. This can allow users to make their own unique or multiple journeys across the landscape. The intersections allow for the encounter of a different situation (another pathway experience) to establish. The locations and elevations that the paths intersect are simply indicated at this strategic scale phase of the design method, with specific definition on the location, elevation and slope grading to be resolved in the design of the individual pathways strategy.

Fig. 3.2.5. Diagram expressing two one-direction movements combining to create an arc with a destination in the centre.
'ARCS'
GESTURAL MOVEMENT SCHEME
SUBLIME MOMENTS IN THREE CATEGORIES:
A. OPEN EXTENSIVE EXPOSURE
B. WATER INTERIOR SECLUSION
C. VARYING LANDSCAPE FABRIC

Fig. 3.2.6.1. Gestural movement arcs map for connecting two access points through a moment point.
Each pathway arc have their own affective quality to them which is influenced by the moment and landscape condition they associate with. Creates a new front and connection inside the whole gorge landscape.
Fig. 3.2.7. Hilltop Harbour Expanse - pathway 4 scheme with access and moment points located.

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The two individual journey pathways schemes were developed as Arc #1 – Gully Stream Seclusion and Arc #4 – Hilltop Harbour Expanse. At this scale and portion of the method, the *design operators* were introduced as parameters that dictated the formation of the journey strategy along the pathway.

The individual path was designed with a long distance between each access points for the walker to travel across. The strategy to design a multitude of points along the path up to the moment of the journey was the method approached when designing the pathway strategy. It used the operators of ‘sequencing’ and ‘sight breaks’ for the initial concept of composing the path. It provided a notion of movement or continuation along the walking journey. These translated onto the site and paths as pause points placed continually that drew the walker along, these smaller moments allowed for a designed element or space that enhanced the communication between the walker and the landscape. The moments take on-board the human-scale operates in depth in the next design method phase of the Bodily Scale. Additionally, the moments developed the character for each pathway, which are dependent on the route taken through the landscape, ensuring the range of varying landscape moments to be experienced and discovered.
3.3 REFLECTION

An important process that was fore-fronted within the strategic scale a necessary shift of media when developing the pathways networks, as the two-dimensional nature of plans or maps restricted the precision for locating the pathways and character into the landscape. The manual task of locating the paths onto a physical model became a crucial part of the process of designing the pathway strategies. The pins and thread allowed adjustments to be made while placing the paths in the landscape form, where decisions could be tested upon the how the path could and should move across gorge terrain. This process required plenty of care and time to create the refined pathways network, as the gradients of the slopes were considered, as this was essential for the network and overlaps to be feasible with a degree of accuracy.

The three categorised sublime moments were developed to give a variation in the experiences to walk the site. A synthesis of nine moments was an ideal number to the size of the site and conditions. The intent for the three separate condition types of pathways was first seen as the most important influence on the design of the journey pathway, but further through the individual design of the two example pathways it was used as a catalyst upon designing the smaller moments and sublime moments. As identifying the importance of creating the individual moments to design in such a manner to express the character of the landscape and journey in the next phase, the bodily scale.

Fig. 3.3.1. (opposite page). Cement supplier and State Highway 1 settled in the gully of the Ngauranga Gorge.
4.0

PHASE 3: BODILY SCALE

The third phase of the design methodology shifts down scale focusing on the experiences and interactions the body has with the site and pathways. Investigations made within this bodily scale explore methods of creating intimate spaces that enhance the experience of the gorge landscape through the act of walking. A range of design tactics were tested through many components for designing spaces and experiences, which attend to many sensory and aesthetic elements and materials. The tactics and investigations range from manipulating the existing landscape and adding elements (for example planting or materials) that help enhance the feeling and intensities the landscape offers.

The body is used within the research and in this phase particularly. Due to the innate relation the body and senses have with one another, which is enhanced and realised through the mode of walking a landscape or space. The pace and intent of walking especially on a journey, one’s mind and sense become capable of focusing and perceiving textures, smells and feeling a space affords [4.]. Compared to a user in a vehicle and in particular a vehicle user on a highway, the attentiveness becomes restricted or directed in towards the act of driving. What is absent is the mind being able to pick up subtle or small features that may lead to the mind to wonder and imagine. This understanding become evident to myself through my own experience of moving through the site as both a walker and a vehicle user in the site. With the ambition to design temporal relationships with the landscape for the walker.

The components and design tactics that follow articulate and construct physical changes within the landscape that express and enhance the sensory experience of the landscape through the perspective of a walker through designed spaces.

The following subcategories in this chapter describe and reflect upon the use of various tactics of design, grouped in five parts due to the amount of investigations and findings in the design process.

[4.] Within the chapter of Slowness, from the book A Philosophy of Walking by Frédéric Gros. He affirms the pace and slowness of walking affords the body (and senses) to become more attentive to the landscape. (Gros, Howe, & Harper, 2014, pp. 35 - 38)
Slope Ratios & Path Width:
These slope ratios reflect three of the common slope percents that this pathway deals with while moving along the hillside from either side access points. The 2 metre path is defined as it easily allows two people to pass past each other.

Fig. 4.1.1. The three base section slope cuts for testing vegetation structures on top for pathway #4.
4.1 SLOPE STUDY

This bodily scale tactic used for a series of investigations involved developing three typologies of section slopes or terrain conditions displayed in the landscape of the two pathways, one focusing on the steep hillside slope and the other a relationship to the stream of the gorge.

This tactic tested sections at 1:50 scale, with notably a 2-metre wide path cut into the slopes. The 1:50 scale section drawings were found to be effective at representing and testing the relationship the body can possibly have with the iteration of plant types on the three slopes. The two metre wide path was an appropriate size of path for many plants to hang over to interact with the person.
Fig. 4.1.2. Diagrams displaying the method of compression and vision making through the use of various vegetation structures, with an analysis tool and table of results.
The technique established in the first series of tests (for pathway 4), of using a selection of vegetation structural types arranged along the three slope sections to create compression and vision (glimpses). I discovered that some tests on the steepest slope (of 3:1 ratio) was not a viable solution at all for the use of vegetation. Due to the very open or separated planting locations on the slope. The findings where assimilated into a basic concept that composed various plants onto two of the slopes (slope 2:1 and 1:1), where they could be tested and developed as a space in three-dimension (see appendix 1-A and 2-C).

**Hillside Section**

The technique established in the first series of tests (for pathway 4), of using a selection of vegetation structural types arranged along the three slope sections to create compression and vision (glimpses). I discovered that some tests on the steepest slope (of 3:1 ratio) was not a viable solution at all for the use of vegetation. Due to the very open or separated planting locations on the slope. The findings where assimilated into a basic concept that composed various plants onto two of the slopes (slope 2:1 and 1:1), where they could be tested and developed as a space in three-dimension (see appendix 1-A and 2-C).
Final Iteration:
- Smoother slope of gravels down towards the planted waters edge.
- Ferns on slope of the dense planting creating a cleaner condition.
- Line of fern & short grass making a distinct waters edge and softer division.

Final Iteration:
The combination of the canopy from the small tree and the undergrowth tall grass and ferns create a dense boundary that enhances the open and minute planting that sits along the waters edge, that restricts the access to the stormwater influenced stream.
The three stream typology sections (for pathway 1) tested again the same structural vegetation. It followed a similar approach from the plant composition seen in the planting moment concept (the 1:1 slope section). The aim was also to provide compression and vision; however, the orientation of the vision was focused lower towards the stream located slightly below the path. These tests used denser vegetation composition along the hillside, then a variation of lighter or smaller plants of the waters side of the slope.

Upon reflection, a simple graphic overlay onto the section tests helped indicate their success for compression and vision.
Final Iteration:

- Slightly lowered gravel path, with gravels extending down to the wetland.
- Left-side planting dense & close.
- Right-side planting a spread of taller thin trees and small grasses.

The use of the smaller tree to the left of the path with combination of the thin trees to the right creates compression for the path with their foliage. Also the thin trees being spread apart and low grass planting provides an elegant connection to the wetland below.
Final Iteration:
- Slightly shifted the left-side planting closer to the path to become tighter.
- The thin tree shifted to the base of the right slope to narrow the canopy.
- Condensed the short grass and fern planting on the right-side slope.

Final Iteration:
Compression of the path created from the dense left-side planting with the small tree & thin tree canopy. The thin tree, short grasses and ferns provides porosity for a connection to the stream to be established, but still keeping the distance and restriction to the pathway.
Reflection Tool

This simple graphic overlaying the section compression & vision slope tests provided an ongoing feedback to occur through the iterations. This basic technique was just a simple idea that developed in the process of representation and the need to measure the success of the planting compositions against the two parameters. It evolved from the initial analysis tool in the single vegetation vs slope investigation. The basic proposition for the graphic overlay is to give an indication of openness of views and compression of space created with the vegetation types. The angular cone form extruding out expresses what is available to look out to, and the circular stroke gives indication to the feeling of tightness or enclosure of the space.

Fig. 4.1.4. (both pages) Series of sketch slope & plant pathway section iterations with the developed analysis tool of a filled cone and dashed ring.
4.2 AESTHETIC PALETTE

In the bodily scale phase, the aesthetic quality for both the landscape and designed structures required strong consideration to ensure an immersive walking experience with the landscape. The attention to create a sensory experience was explored through materiality and qualities of objects. These qualities took into account more than just purely visual, with the consideration of touch and sound included. A palette of material qualities was developed to guide the design testing at the body scale. The palette acknowledges the senses that a walker can experience, which is formed to enhance the journey of walking through the landscape primarily. Three components of Coloured Panels, Physical Elements, and a Material Palette were explored to support design concepts at the sensory level.
These precedents are references of forms to test for how adding colour and prevalence to the structures that are incorporated in the moments.

Four simple forms that have been created to determine what type of form will provide the brightest or high contrast when located up in the vegetated gorge slopes, from the highway corridor below.

Existing Billboard Precedents
The strategy to introduce an aspect of colour into this phase was realised from the aesthetic influence it has on the perception of space. However, the use of colour in this tactic is aimed primarily towards the vehicle user on the highway rather than the walker on the pathway. The intent was to visually intrigue the other modality of transit to an external influence on the pathway, with the purpose to add a level of curiosity to the pathway network in the landscape. The claim for this was that the design of the pathways was to integrate them into the landscape subtly as possible. Therefore, a touch of bright colour into the landscape would be a small way of invoking the vehicle users that this landscape is not only facilitated for their use, but another type of transit or (temporary) occupation.

A study into existing coloured structures in the landscape reflected the importance the form of the coloured element had on the boldness of the colour. This influenced an investigation into a range of colours against four shapes (forms). A range of orange, red, and pink colours where chosen for testing onto the darker green coloured landscape, as they provided effective contrast. The result from the testing concluded that a rectangular form and bright colour provided the strongest contrast for the relatively small size that they were used as compared to the large landscape. The rectangle coloured panels would be introduced into a limited quantity of interventions along the pathway network. The colour choice also has a small influence within other interventions, as an indication mechanism within the pathways.

Coloured Panels

The strategy to introduce an aspect of colour into this phase was realised from the aesthetic influence it has on the perception of space. However, the use of colour in this tactic is aimed primarily towards the vehicle user on the highway rather than the walker on the pathway. The intent was to visually intrigue the other modality of transit to an external influence on the pathway, with the purpose to add a level of curiosity to the pathway network in the landscape. The claim for this was that the design of the pathways was to integrate them into the landscape subtly as possible. Therefore, a touch of bright colour into the landscape would be a small way of invoking the vehicle users that this landscape is not only facilitated for their use, but another type of transit or (temporary) occupation.

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The reason for selecting three colours is to represent the different ability or difficulty for the nine pathways display in this site. It also gives the contrast against the landscape for highway users to notice.

Testing will involve overlaying the seven different colours by the four different forms, creating a matrix of colour tests.

Three Colour Choices

The reason for selecting three colours is to represent the different ability or difficulty for the nine pathways display in this site. It also gives the contrast against the landscape for highway users to notice.

Coloured Pathway Example
Fig. 4.2.3. Three selected coloured rectangle panels displayed overtop of site photographs.
Fig. 4.2.4. Diagrams showing the physical elements that are created to represent the spatial conditions of the design operators.
A tactic to further articulate and enhance the design of the moments through the design operators, was the addition of physical elements. The physical elements are selected from the design palette and formed into simple components to alter the feeling by manipulating space slightly.

For example, the use of vertical posts gives indication to the shift of space, which expresses the pathway-scale threshold operator. Another integration of an operator and a physical element was the use of lined vegetation alongside the pathways after a designed moment. The use of medium height plants on the outer edge of the paths restrict vision down or across paths as they swerve along the topography. This becomes essential to create compression and the sense of anticipation by the restriction of movement between the series of moments. These additional elements develop the individual moments as a continued series of spaces experienced along the pathways.

**Physical Elements**
Fig. 4.2.5. Site geology and vegetation quality collage diagrams displaying the highly textural materiality existing for the aesthetic design palette.
Material Palette

Specific attention to the aesthetic qualities for designing with resulted in the formulation of a material palette, for enhancing and communicating the gorge landscape condition. The collection of materials was chosen for their sensory qualities and potential feelings alongside the site’s landscape character. External materials specifically facilitate a sense of immersion, exploration and precariousness, which the landscape afforded already. The material palette has two parts, the first being the current landscape condition and second, the introduced materials and forms that are added to the landscape as enhancements.

Describing and understanding the existing landscape materiality had a major influence upon the decisions for the selection of introduced materials. The crumbly and fractured trait the geology was a notable qualities discovered through fieldwork. Additionally, the variety in vegetation groups was an important site feature. The textural and unstable quality of the rocky hillsides with a variety of medium native sized vegetation and small weeds create a unique condition to design the pathways within. The goal is to express these unique qualities of the landscape through the designed spaces and material choices. A technique of exposing more of the geology to the walker was tested in conjunction with the additional materials in moment designs.
Series of external material and aesthetic qualities to introduce into the pathway design for intimate and temporal walking experiences.
The set of external materials and form making ideas compliments the site conditions and walking experiences. The palette introduced simple and light structural forms, exposure to rocky textures, and objects of attraction (e.g. furniture or colour). The choices for materials and forms considered their sensory potential. An example is the material of steel grating as floor panels. The porous quality of the grating provides a visual attention through the material, and the steel pattern facilitates the strength to walk. The steel grate floor panels was used in the façade structure on the hillside pathway, allowing the walker to move across the rocky slope and establish a safe interaction to the crumbly rock face the structure spans. (see fig 6.0.3. pg 174)
4.3 PANEL ABSTRACTION, SEATING

This group of testing explored the modification and adding detail into the panels and seats for the intervention structures in a number of moments. The goal for testing was to adapt simple panel forms and create seats, which respond and have dialogue with the qualities in the landscape. The technique for the panel modification used two forms of abstraction for the shelter moment and façade moment. The seating design to have a response to the different landscape conditions through the material choices.
Shelter Porous Panels

Replicating the fractured geology form

Variety of cuts

Simplifying

Spreading out the forms

Facade Porous Panel

Modular square panels

Trimmed pattern

4 panel series

Fig. 4.3.1.1. & 4.3.1.2. Diagrams showing the use of site geology as base forms to abstract as cuts into the metal panels creating porosityness.

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Panel Abstraction

The first panel abstraction idea was to add porousness to the simple panels, as a method of creating a level of visibility outwards for these moments. A technique of simplifying the rocky geology into a pattern for cutting wholes into the panels was tested for both façade and shelter moments. The forms create a dialogue between the introduced material and the existing landscape. I found the diffusion to look through the panels also expressed the idea of the sublime of the shift in scale between of close and far.
Fig. 4.3.2. Section iterations exploring panel (black stroke) placement with the trace of removed slope angle as the orange dash line.
The second panel abstraction technique to create dialogue between the walker and the landscape was the arrangement of the shelter panels. The technique of ‘tracing’ the existing slope section to position the panels around the pathway, to form the shelter structure. This translation of the slope angle into a built element gives the walker a sense and a visual hint of the slope condition contrasting the flat waking path. I discovered adjustments were required for the panel angles to provide enough height and width for a pedestrian and bicycle to move underneath.
Fig. 4.3.3. Sketch concepts of two uses of materials as bench designs within the pathway moments.
Seating

Seating was an important feature within the moments, as it provides a point for pause at each moment. The seats are orientated to face outwards from the slopes, either over the vast gully landscape or over a stream of water. The seat provides time to reflect and take-in the experience travelled through the landscape. The material choice was an important aspect when considering the application of seating in the variety of moments for both pathways. I found that using a material from the palette, which reflected the materiality of the landscape of the moment, was a method to add another sensory and temporal connection to the landscape.
4.4 BRIDGES, DISCOVERY DECK

Two specific designed moments were required for the two designed pathways. These two designed spaces were tested separately from the other pathway moments, as these are peak moments in the journeys. They are larger spaces or structures that require separate testing to create bodily walking experiences. However, there are similarities in design techniques used between the discovery deck and suspension bridges that express these peak moments. The focus for the structures was experiencing and being aware to the unique at these peak moments, and not distracted by the built form standing on.
Fig. 4.4.1. (top) Iteration plan and sketches of a curved suspension bridge.
Fig. 4.4.2. 3D visualisation of a digital model of the bridge design crossing the highway across the gully.
Suspension Bridge

The design intent for the form and materiality of the pedestrian bridge was inspired upon a thin & light structure that conveys a feeling of excitement passing over the highway corridor. A series of hand sketch explorations through various bridge forms was reflected. It led to the decision of a suspension styled bridge form, as it was ideal in creating a thin but strong structure to span a section of the gully.

Further sketching developed an overall bridge deck form with support components. Development continued as simple physical models that tested variations of structural ability, plus overall look and feel. (see fig 4.4.3.)

The curved bridge deck design used a triangulated truss-like structure, as the shape provides strength and a light appearance. The bowed shape, which widens in the centre to 5 meters, has two surface materials distinguished by two halves. It provided additional space for walkers to pass over (the timber-boarded side) and pause (on the steel grated side). I found the separation of sides through the bridge deck material was an effective and simple technique to utilise the sensory quality of these materials for giving a sense of preciousness over the highway. (see fig 4.4.4.)
Fig. 4.4.3. Series of curved suspension bridge physical model tests the structures strength and form.
Fig. 4.4.4. Sketches detailing the structural form and materials for the pedestrian bridge design.
Fig. 4.4.5. Discovery deck concept development sketches, adding the social space behind the main concrete deck.
Discovery Deck

The ambition for the discovery deck was to provide a focal point on the hilltop pathway that provides a prospect moment over the gorge. The basic form for the discovery deck of the large circle deck was inspired from the Geological Observatory of the Cardada project by Paolo L. Bürgi [refer to precedents chapter]. An open circle plate form on a peak builds a strong feeling of openness and prospect to the wider landscape projected upon.

To advance the concept of the expanse and experience at the discovery deck smaller, design tests were carried out. For example making the deck a slight cantilever and using a thin handrail that skirted the concrete deck edge. These propel the mind out into the landscape.

I discovered after the concept drawings that this peak location had a contradiction in the feeling within the space. The experience of prospect has an internal feeling, whereas the open space afforded gathering to occur. Therefore, a separate social space was added to facilitate both user groups at this point. The social space is set back into the hill with vegetation surrounding it creating division and seclusion from the main deck.
REFLECTION

Through the investigations and testing at the bodily scale the use of media shifted between many forms of representation as it was difficult to articulate and display the sensory and experiential qualities created. I found success through section drawing technique for exploring the slope and vegetation relationships. Additionally moving from line-based sections to image based sections after improved to convey the spatial qualities at the body scale. I also moved away from just drawing two-dimensional lines drawings into perspective views, where the technique to combine hand sketching and Photoshop collage presented a stronger representation of the designed moment spaces.

Another beneficial media addition for this design process was in the inclusion of three-dimensional digital modelling. This was valuable for testing the pathway spaces, in particular the moments of the stream pathway, as it was not possible to access and photograph this area of the site to obtain images for hand sketch and digitally perspective drawings. However, an issue that appeared from the digital model was the consideration to the vegetation, soil and rock cover, which in that respect the attention of the particular landscape condition, was dulled down.

A point of improvement that was realised after designing the moment spaces was the unclear articulation between the individual investigation outcomes and the designed outcomes. The series of tests were used in combination to develop the design moments, with many smaller decisions that were made to develop and detail were not explained through drawings.
5.0

PHASE 4: HYDROLOGICAL SYSTEM SCALE

This scale of the design methodology encompasses the wide scale rainfall catchment of the Ngauranga Stream. A hydrological system scale approach proposes improvement of the current stormwater network. As the current runoff, flows into the Wellington harbour at the base of the Ngauranga Gorge untreated and significantly disconnected from interaction at any level. This scale identifies a system of moving the contaminated water through the existing network, but establishing the potential for the capacity to clean the stormwater runoff through a series of wetlands and increasing the open channel capacity to detain water. The improved stormwater system has an overlap with the pathways to allow aesthetic connection to occur and provide the walker an interaction with the stream.
Fig. 5.0.1. Ngauranga Stream catchment and arterial stormwater movement system map 1:16,000.
Fig. 5.0.2. Current stormwater system map showing sub-catchments and detailed open channel and pipe network 1:8000.
Fig. 5.1.1. (above). Diagram depicting the current stormwater system of the Ngauranga stream & catchment.

Fig. 5.1.2. Stormwater train diagram with additions proposed to improve the system and improve water quality and capacity.
IMPROVED STORMWATER SYSTEM

The proposed system improvements were through an ecological approach into the existing stormwater network, for the Ngauranga Gorge stream catchment. Through the site fieldwork, it was evident that the quality and condition of the visible stormwater system (the stream and open channels) within the site was of poor quality. The decision to manage the stormwater at the capacity of the average yearly rainfall was considered most appropriate for the scope of the research alongside the design of the pathway network.

The existing stormwater system within the Ngauranga Gorge contains a fragmented transition of pips and open channels leading down the gully out into the harbour. As the assumption for an increased quantity of stormwater within the current network (due to continuing residential development). The improvement tested an increase in the water retention capacity and ecological filtration process.

The overall strategy for improving the stormwater system tested an increased volume of the individual open channels by widening them, to retain the capacity of the yearly rainfall. It could be suggested that the increase in the dimension and retention capacity of the open channels would help deal with further increases of water volume in storm events.

Fig. 5.0.3. (following page). Proposed improved stormwater system map with volumes potential volumes for both planted open channels and small wetlands 1:5000.
Expanded open channel swales

Rainfall wetlands

3517 m³

2144 m³

1160 m³

1210 m³

97.5 m³

303 m³

3226 m³
Expanded open channel swales
The wetland capacity for the high average measured 596 m³, however a slightly larger capacity was established of 735 m³. This increase can cater for the increase of water volume in the future.

Fig. 5.1.2. Stormwater wetland and water control concept drawings to indicate the separation of water flow to move through the wetlands first.
The proposed series of wetlands have been calculated and sized to deal with the rainfall of the Ngauranga Gorge stream catchment [refer to Appendix 1-N]. The five wetlands dimensions were tested within the stream corridor, with splitting the wetland into separate cells. This placement of the separated wetland cells within the widened sections of the stream created the potential for the pathway to move adjacently to it, adding a different connection the walker can experience with the water.

For example, in the Stream Pontoon moment (of pathway 1), I discovered that the pooling of water at those points was not deep enough; it required a small test to modify the contours to keep a sustained quantity of water present. Therefore, the concept of having a short weir at the lower end could help this situation. Which translated into the method of delivering water into the wetlands as well (see fig 5.1.2.)
5.2 REFLECTION

Throughout this phase of the methodology, I found that this scale had much less testing than anticipated. I did not explore other approaches or methods dealing with the hydrological situations that I had aiming to resolve or improve. This resulted in a lack of direct integration between the hydrological system and the pathway network, and especially through the bodily scale, for design potentials. The small discoveries that resulted through the process of designing the stormwater system was not articulated clearly as individual investigations. It could have added another beneficial element to the walking experience. For example, the consideration of water levels (volumes) and the modification of land with the pathways should have become a design investigation at the bodily scale.

As mentioned, further exploration into the hydrological system could have added to both the strategic scale and bodily scale phases, however it may have extended or shifted parts of the investigation out of the intended scope for this research.

The investigations where limited within this phase, drawing and representation of ideas lacked expression and justification for how the designing and decision making of the system was made in the site and pathway moments. Refined solution drawings with additional media of the technicalities and progression through time was clearly required to supplement the work established in the testing and strategies for this research.

Fig. 5.2.1. (opposite page). Photograph of a concrete open channels leading down into the Ngauranga Stream below.
6.0 DESIGN OUTCOMES

Pathway 4 - Hilltop Harbour Expanse

The design outcomes for pathway 4 Hilltop harbour expanse was designed as an opportunity to walk along the high slopes which allows the Wellington harbour and the Ngauranga gorge to be seen and feel the scale of them. The opportunities to achieve that experience was tested to become enhanced at the moment points and obstructed between the moments to pause.

The following will exhibit the drawing outputs of this pathway design, in the sequence from moving from the north entrance to the discovery deck at the peak location.

Fig. 6.0.1. (opposite page). Hilltop harbour expanse site feature collage.
Fig. 6.0.2. Pathway 4 strategy map 1:4000, indicating the route for the path and the locations for types of moments, plus an illustration of the moment section slope angles.
Fig. 6.0.3. Perspective image for the facade moment design on the 3:1 slope angle.
Fig. 6.0.4. Facade moment on pathway 4 plan 1:100.
Porous panels

Concrete foundations

Steel framing & grated floor panels

2000 mm

3600 mm
Fig. 6.0.5. Facade moment on pathway 4 section 1:50.
SHELTER MOMENT - 2:1
Fig. 6.0.6. Perspective image for the shelter moment design on the 2:1 slope angle.
Modular panel shelter structure

Compressed path planting
Fig. 6.0.7. Shelter moment on pathway 4 plan 1:100.
Concrete foundations

Porous panels

3150 mm

2300 mm

2000 mm
Fig. 6.0.8. Shelter moment on pathway 4 section 1:50.
Fig. 6.0.9. Perspective image for the planting moment design on the 1:1 slope angle.
Fig. 6.0.10. Planting moment on pathway 4 plan 1:100.
Solid inner planting

Rock seats

2000 mm
Porous outer planting

Fig. 6.0.11. Planting moment on pathway 4 section 1:50.
Fig. 6.0.12. Perspective image for the approach to the discover deck design.
Social Seating Space & Discovery Deck
Fig. 6.0.13. Perspective image looking from the social space at the discovery deck.
Fig. 6.0.14. Discover deck moment on pathway 4 plan 1:100.

- Social Seating Space
- Compressed path planting
- Discovery Deck
Low vegetation cover 

Concrete cantilever pad

Timber Posts

8000 mm
Surrounding vegetation

Rock seats

4000 mm

Fig. 6.0.15. Discovery deck moment on pathway 4 section 1:50.
Pathway 1 - Gully Stream Seclusion

The design outcomes for pathway 1 gully stream seclusion was designed as an opportunity to walk up from the residential edge across the highway and gully to delve into the uncharted stream corridor below the noise and sight of the highway for a chance to engage with the stream in an intimate landscape.

The following will exhibit the drawing outputs of this pathway design, in the sequence from moving from the north pedestrian suspension bridge down along the stream.

Fig. 6.0.16. (opposite page). Gully stream seclusion site feature collage.
Fig. 6.0.17. Pathway 1 strategy map 1:4000, indicating the route for the path and the locations for types of moments.
Fig. 6.0.18. Perspective image for the pedestrian suspension bridge design on the highway corridor.
Fig. 6.0.19. Pedestrian suspension bridge on pathway 1 plan 1:250.
Fig. 6.0.20. Pedestrian suspension bridge on pathway 1 section (left) and elevation (right) 1:25.
PLANTED SLOPE DESCENT
Permeable Decline

Fig. 6.0.21. Perspective image for the planted slope decent design in pathway 1.
Fig. 6.0.22. Planted slope decent on pathway 1 plan 1:100.
Revealing slope geology
Exposed lower level

Blocking planting

Gravel chip path

Fig. 6.0.23. Planted slope decent on pathway 1 section 1:25.
Fig. 6.0.24. Perspective image for the stream pontoon moment in pathway 1.
Fig. 6.0.25. Stream pontoon moment on pathway 1 plan 1:100.
Walkable gravel bank

Dense slope planting

2000 mm

5050 mm
Fig. 6.0.26. Stream pontoon moment on pathway 1 section 1:25.
Recess

Fig. 6.0.27. Perspective image for the resting bay moment in pathway 1.
Overflow control weir

Rock seating space

Timber post transition elements
Fig. 6.0.28. Seating bay moment on pathway 1 plan 1:100.
Rock seats

2000 mm

4100 mm
Fig. 6.0.28. Seating bay moment on pathway 1 section 1:25.

- Stormwater wetland
- Overflow channel
- Dense slope planting
- Small vertical separation

2000 mm
6.1 CONCLUSION

This design-led research responds to the problem of the lack of walkability in urban gully landscapes that have a dominant infrastructure corridor. Vehicular infrastructure in gully disrupt the balance between vehicle users and pedestrian movements exaggerated by steep gully terrain.

The project has developed a methodology that responds to the experiential quality of the body in the landscape as a means to address the issues identified and answer the research question. The following identifies and consolidates the research discoveries:

Through the investigation and fieldwork of the research site, it became clear that the large scale of the site required the design methodology to divide the approach into three scales.

The strategic-scale deals worked well to connect walking movements across the site and the fringes in the creation of the pathways across the large site. As it allowed focusing upon a few design aspects (e.g. access points) and the beginning use of the pathway-scale design operators with individual pathway schemes. This supported the bodily-scale testing and design to fit directly into the pathway schemes, as the design operators facilitated the incorporation of the two scales. It was realised upon conceptualising designs in the bodily-scale that the task of accurately designing the series of nine-pathway network was a substantial task to achieve. Therefore, I found that the method to create a scale difference was an essential skill to develop when dealing with such large sites, as it is important (and affirmed in this research) to design at the close bodily-scale with the body and landscape together, while facilitating an informative plan for integration and implementation into the large complex site.
2.
In addition, I learnt that designing through the perspective of the body advanced the testing tactics and experiential & sensory moment designs. Therefore, the body became a fundamental part of the design process and an essential approach for the design methodology, to mobilise the temporal and affective qualities within the creation of spaces and structures for walkers in this landscape.

This shift of design tactics to use the perspective of the body was not created within this thesis. However, I utilised and adapted for the specific landscape condition presented in this design-led research. The attention to the body was influenced by the debate Elizabeth Meyer spoke of in her texts on aesthetics & beauty (Meyer, E. K. 2008, Meyer, E. K. 2015), and additionally my affective perception the site presented itself (as I described to be sublime).

I discovered the importance of the sensory qualities both materials and the landscape can affect the designing of spaces. It is a vital consideration in the bodily-scale phase to allow success in the methodology.

- E.g. the series of slope studies process focused on small adjustments and/or additions of a variety of vegetation structures and textures to expresses the feeling of compression.
3. Throughout the research, I discovered the importance of moving between and adapting styles of media for experimentation and representation purposes. I found there was constant need to rethink and change the style and media both at the bodily experience or landscape conditions within the site, while dealing with the shifts in scales, bodily experience and the detailed variance of the landscape terrain.

As the method changed towards the perspective of the body, the consideration of materials, textures, form, and senses required a shift in the way I express these qualities through drawing techniques. A repeating trend I found was the difficulty and need to express the landscape, spaces or experiential qualities, with the use of three-dimensional media.

A range of three-dimensional media styles were explored throughout the three scales, with particular methods more successful in representing ideas. It was useful moving between a digital model, perspective collages, and even physical modelling as it created a close understanding and presentation of the designed spaces (especially with the difficulty of the large scale of the site).

- E.g. the style of perspective drawings for the moment spaces was to use a simplistic collage expressing the textures and forms which dictate the feeling of the spaces.
The research was able to reveal the untapped value of the gorge landscape has for both immediate walkers whilst affirming the particularity of the gorge landscape for the Wellington region.

The design outcomes established through the design methodology revealed the uniqueness for walkable and experiential spaces within the difficult urban gully landscape. The design outcomes and research displays a potential method for increasing the walkability of the urban gully landscape, in spite a dominant highway infrastructure disrupting the landscape for pedestrian inclusion. The method is characterised by and from the perspective of the body using ‘moments’ along a journey to create walking experiences. The developed design methodology reveals the variety of experiences and journeys (routes) that is enabled for the walker as a place for connection physically but also temporarily. With only two of the pathways designed at the closer scale, further involvement with the site is anticipated.

Through the designed pathways, the benefit of this walkable landscape can be seen for the urban area, and its potential to spark further change in the design of the surrounding urban fabric is noticeable. To carry through the method on developing the rest of the pathways in the network of nine, further unique walking experiences could be designed. Further cohesion with the surrounding land-use and residential parcels could also add to the potential development for this area of Wellington.
Constraints and Limitations

The following highlights some of the difficulties and constraints that arose in the course of the research. The first constraint faced was site accessibility. I had an issue of limited access walking or moving through a majority of the site. This was due to either the inherent condition of the gorge landscape, as most of the site was very steep naturally or modification of slopes from the highway creation and quarry site. It heavily restricted the personal interaction I could experience and document within the fieldwork study most notably.

The limited access and interaction I did achieve in the site was used as an example of the experiences of certain places. As the exact locations that the pathways and moments propose could not be reached or documented closely. To overcome this I used a combination of 3D, 2D, and site visits to anticipate and make informed decisions for the range of experiences or locations that the pathway designs could be located.

This lack of documentation of the areas in the site also restricted the method in which I developed the site design drawings (in particular, the perspective collages). Therefore, the use of photographs of similar conditions was a step around this issue for one pathway. With the use of digital renders from a 3D model was another technique used around the issue, with both having better results in different cases.

A limitation that came from the design process was the number of designed pathways with input from the bodily-scale from the proposed nine-pathway network. The design of more pathways could have produced further findings, for the bodily-scale design tactics to explore. It may have added further opportunities to test the sensory and experiential potentials the site and body can establish. Additionally, as the network was split into three categories of conditions, it would have been ideal to complete the third condition. It would have added a lot to the design testing and for the walking pathway designs.
6.2 CONTRIBUTION

This research has explored an alternative way of designing for walking movements through a highway corridor, using the gully landscape and the body as design drivers. The pedestrian pathways it created offer integral sources of connection and travel through this vast landscape for either recreation, or commuting between suburbs or into the city. The research contributes both design solution and design methodology to facilitate walkability in urban gully landscapes effected by highway infrastructure. The research signals to landscape discourse, in a minor way, possible improvements to facilitate more sympathetic urban expansion with regards to important landscapes and walkers. In which the findings can guide landscape architects, but also have benefit for councils and roading authorities (such as NZTA). The design methodology developed provides a framework and exemplar for designing walking experiences particularly tailored to steep and large landscapes. The Ngauranga Gorge, a site that expresses the issues for pedestrians in this unique piece of urban fabric has been the test design and case-study design.


FIGURE LIST


Fig. 4.2.1.1. - Is the Golden Gate Bridge red or orange? [Golden Gate Bridge Spanning San Francisco Bay]. (2018, February 7). Retrieved August 15, 2018, from https://www.quora.com/Is-the-Golden-Gate-Bridge-red-or-orange

Fig. 4.2.1.2. - Pukeko14 [Pukeko Bridge Across Auckland Puhoi Toll Road]. (2012, March 8). Retrieved August 2, 2018, from https://iwot.wordpress.com/2012/03/08/pukeko-bridge/#jp-carousel-171


Fig. 4.2.6.2. - Elesi. (n.d.). Filet de protection contre les chutes de pierres, treillis métallique de sécurité dans les montagnes. [Ockfall protection netting, safety wire mesh in the mountains]. Retrieved August 14, 2018, from https://fr.123rf.com/photo_69718577_filet-de-protection-contre-les-chutes-de-pierres-treillis-metallique-de-securite-dans-les-montagnes-.html


Fig. 4.2.6.4. - Barnette, J. (2016, August 30). Linville, NC [The view walking along the Mile High Swinging Bridge at Grandfather Mountain in Linville, NC]. Retrieved August 14, 2018, from https://photography.southeasterntraveler.com/North-Carolina/Grandfather-Mountain/i-fZCpKR7


APPENDIX 1 - TESTING IMPLEMENTED
Appendix 1-A. Pathway 4 1:1 slope Planted moment iterations
Appendix 1-B. Pathway 4 3:1 slope facade moment concept and iterations
Appendix 1 - C. Pathway 4 concept moments development sketches 1
Appendix D. Pathway 4 concept moments development sketches 2
Appendix 1-E. Drawing style change to hand/digital collage perspective
Appendix 1-F. Pathway 4 plant and slope testing sections
Appendix 1-G. Pathway 4 plant and slope testing section results table
**Iteration testing Aim:**
- Determine an arrangement of plant structures within the stream path that creates compression and connection to the adjacent wetland.
- Use of the 2m stream path cross-section.
- Plant form consideration.
- Ground plain & material consideration.
- Wetland relationship created.

**Concept Section:**
- 2m path +1m above the wetland.
- Light covering planting.
Iteration 1:
- Path +1m above the wetland.
- Open & low planting on both sides.
- Simple gravel path.

Iteration 2:
- Slightly lowered path height.
- Left-side planting medium density.
- Right-side planting open & low.
  Simple gravel path.

Iteration 3:
- Lowered path, extended gravels down.
- Left-side planting medium density.
- Right-side planting spread of thinner trees.

Iteration 4:
- Lowered path, extended gravels down.
- Left-side planting dense & closer.
- Right-side planting spread of thinner trees.
Iteration testing Aim:
- Planting arrangement that expresses the exposure & openness of the stream at the pooling or similar sections.
- Walkable connection down to the waters edge (not in however).
- Use of the 2m stream path cross-section.
- Plant form consideration.
- Ground plain & material consideration.
- Stream relationship created.
Iteration 1:
- Gravels follow slope down to the planted edging.
- Dense left-side planting to create a hard boundary.
- Light right-side planting to the water edge.

Iteration 2:
- Gravels continue from path down to the planting edge.
- Condensed group of ferns along waters boundary.
- Dense left-side planting.

Iteration 3:
- Gravels again lead up to the planting edge at the water.
- Single row of tall grasses on waters edge.
- Same dense right-side planting.

Iteration 4:
- Smoother slope of gravels down towards the planted waters edge.
- Ferns on slope of the dense planting creating a cleaner condition.
- Line of fern & tall grass on waters edge.
Iteration testing Aim:
- Determine an arrangement of planting the enhances the tightness of this stream section through the compression of space.
- Provide a relationship with the stream moving past.
- Use of the 2m stream path cross-section.
- Plant form consideration.
- Stream relationship created.

Concept Section:
- A 2m gravel path +1 above the stream channel.
- Enclosed canopy with small trees.
- Porous right-side planting of short grasses down to the stream.
Iteration 1:
- Same dense left-side planting of tall grasses & small trees.
- Canopy lighter & higher on the right-side with thin trees used.
- A spread of short grasses down to stream.

Iteration 2:
- Same dense left-side planting.
- Single thin tree canopy line.
- Tall grass stream edge for a clear division of space.

Iteration 3:
- Cleaner left-side planting edge with the ferns.
- Combination of short grasses & fern on the slope to the stream.

Iteration 4:
- Short grasses in the left-side planting for coherent plant form.
- Adjusted the short grass & fern placement.
Appendix 1-K. Pathway 1 Stream moment sequence concept plan
Appendix 1. Sketch concepts of bridge forms and structures.

Using tension cables from the cliff side as a method to hold up the structure rather than columns or concrete blocks. Does have a larger area of structure, but is very thin as they are only cables. An extra long/thin triangular bracing for the deck to keep it rigid enough but can allow for some swing.

The curved truss below the bridge deck would be quite thin vertically, but is it strong enough for the long span?
Need large concrete foundation/footings on either end to hold up all the structure.

This grid frame structure does need more vertical elements that run down from it, this doesn’t work so well for the motorway being below the bridge. Is a very thin construction method vertically besides the columns.

The triangular bracing structure adds a bit of height to it, but does ensure it is strong along the deck. Also the wider ends to the deck can allow for better movement over the bridge, and some variation in dimensions over the long span.
The arched truss near the ends of the bridge provides a ground connection that is strong, and sort of acts as a cantilever for the deck to extend out further. So would be much thinner in the centre of the bridge compared to the edges.

Having a curved bridge does create a different and unique experience while moving along it. It does require some vertical elements like masts and cables to hold it up, but these are only minimal. It would have a rigid truss structure as the deck which can be thin.

The arch at the end could be split into two halves to help improve its stability if these trusses are thin. The deck also has an element of floating when it continues over the arches to the ground at the ends.

A large tube is acting as the main structure to hold the deck up, which may be wider than other beams, but can be a main structural component on its own. At the end the tube splits into three pipes that spread out and connect to the ground or hill, stopping the bridge to fall over.
Appendix 1-M. Post indicator iteration sketches
Nov 2017 - Nov 2018 Rainfall: Measured data at Khandallah Library from GWRC
- Year rainfall of 1174mm (close to overall average Wellington rainfall.

The goal for this wetland system is to be able to deal with the capacity of the yearly rainfall runoff.
- Any flooding or storm events will bypass the wetlands as an open channel or semi natural stream channel.

Lowest rainfall month = Jan @ 34.2mm C = 34.2 / 30 days / 24 hours = 0.0475 mm/hr
Mean rainfall month = month @ 97.8mm C = 97.2 / 30 days / 24 hours = 0.134 mm/hr
Highest rainfall month = March @ 184.4mm C = 184.4 / 31 days / 24 hours = 0.24 mm/hr

Q = CIA
C = 0.4 , I = hourly Rainfall , A = 875 h

Volume of runoff = Q x t = Flowrate x time

Volume accommodated the rainfall over a 24hr period

LOW
Q = CIA = 0.4 x 0.0475mm/(1 hour) x 875 hectare x 10,000 m³ / ha x (1 m / 1000mm) x (1 hour / 3600 sec)
Q = (0.4 x 0.0475 x 875 x 10,000) / (1 x 1000 x 3600) = 0.0461m³/sec
V = 0.3461 m³/sec x 24 hours x 3600 sec / hour = 3,983.04 m³ = 3,983,040 Litres

MEAN
Q = CIA = 0.4 x 0.134mm/(1 hour) x 875 hectare x 10,000 m³ / ha x (1 m / 1000mm) x (1 hour / 3600 sec)
Q = (0.4 x 0.134 x 875 x 10,000) / (1 x 1000 x 3600) = 0.13m³/sec
V = 0.13 m³/sec x 24 hours x 3600 sec / hour = 11,232 m³ = 11,232,000 Litres

HIGH
Q = CIA = 0.4 x 0.24mm/(1 hour) x 875 hectare x 10,000 m³ / ha x (1 m / 1000mm) x (1 hour / 3600 sec)
Q = (0.4 x 0.24 x 875 x 10,000) / (1 x 1000 x 3600) = 0.23m³/sec
V = 0.24 m³/sec x 24 hours x 3600 sec / hour = 19,872 m³ = 19,872,000 Litres

Wetland Volume:

Wetland delas with 3% of the water catchment

High Rainfall volume = 19,872 m³ (over a 24hr period)

19,872 m³ x 0.03 = 596.16 m³
APPENDIX 2 - TESTING DISCARDED
Appendix 2-A. Diagrams attempting to represent the sublime visually
Appendix 2-B. First stage pathway design scheme and sectional iterations

Iteration Testing

Path Typology

Path Typology Study:
- As there is existing terrace along the highway corridor, paths to be integrated.
The combined planting and raised path can create such a different and unique experience while moving through the site. As the planting provides some aesthetic touch to the bland rock faces and also helps with slip protection. The raised path enhances the experience of being above the road and the ground, which would be a new feeling than what currently occurs. Additional planting on the rock face will also help with stabilisation.
Appendix 2-C. Pathway 4 2:1 slope retaining wall concept and iterations
Appendix 2-D. Pathway 4 Retaining wall concepts 2 (shelter moment)
Appendix 2 - E. Straight suspension bridge concept sketch plan
Appendix 2 - F. Double curve suspension bridge concept sketch plan