COMMUNICATING ARCHITECTURAL LEGACIES IN VIRTUAL REALITY

In order to communicate the significance of historical architecture, the connection between the tangible and intangible heritage is paramount. Where a building's intangible qualities communicate the social, cultural and historical significance; created through the use of a building throughout the building's lifetime or from a specific moment in its history. And the tangible is the phenomenon of touching a physical object. This is experienced as the sensation of touch or an interaction governed by mass and collision (Seichter, 2005). The research investigated how virtual realities alter the experience of the tangible and intangible, and how these environments can still communicate tangible and intangible heritage. In order to understand how these experiences can be digitally reconstructed to preserve their meaning, this project examined the methodology and techniques of digital heritage as the results of digital processes enrich virtual environments with intangible value which presents opportunities to preserve and access heritage in meaningful ways.

The Gordon Wilson Flats, a Modernist apartment building — with, due to the misunderstood style of Modernism and consequent neglect, contested heritage value — in Wellington, New Zealand, was used as a case study to understand how the historical significance of a building can be communicated within virtual realms. The research used a range of digital technology to document, represent and disseminate the Gordon Wilson Flats. The purpose of this research was to develop digital representations of the Gordon Wilson Flats using a digital heritage methodology. Each stage sought to capture the tangible and intangible qualities and embraced the results of digital technology — as these do not replicate reality, but represent it. A degree of abstraction, however, leads to an open interpretation of heritage (Schnabel and Aydin, 2015), which not only offers users an insight into the building's history and consequent significance, but allows them to decide their stance on the debate surrounding the building.

Recently, this research was included in the exhibition Immersive Legacies: The Making of Digital Heritage. Immersive Legacies was an exhibition that presented this research to the public. Although a curated exhibition within a museum, it aimed to present the virtual experiences of the Gordon Wilson Flats for the public's subjective interpretation. To do this, the exhibition followed the research's methodology: documentation, representation, dissemination. As a result, each stage builds upon the next to contextualise the final experiences and virtual architectural experiences that communicate architectural significance. This poster illustrates how this methodology, which builds the connection of the tangible and intangible in each stage, is communicated in an exhibition; showing the outcome of each stage and final experience for the user.
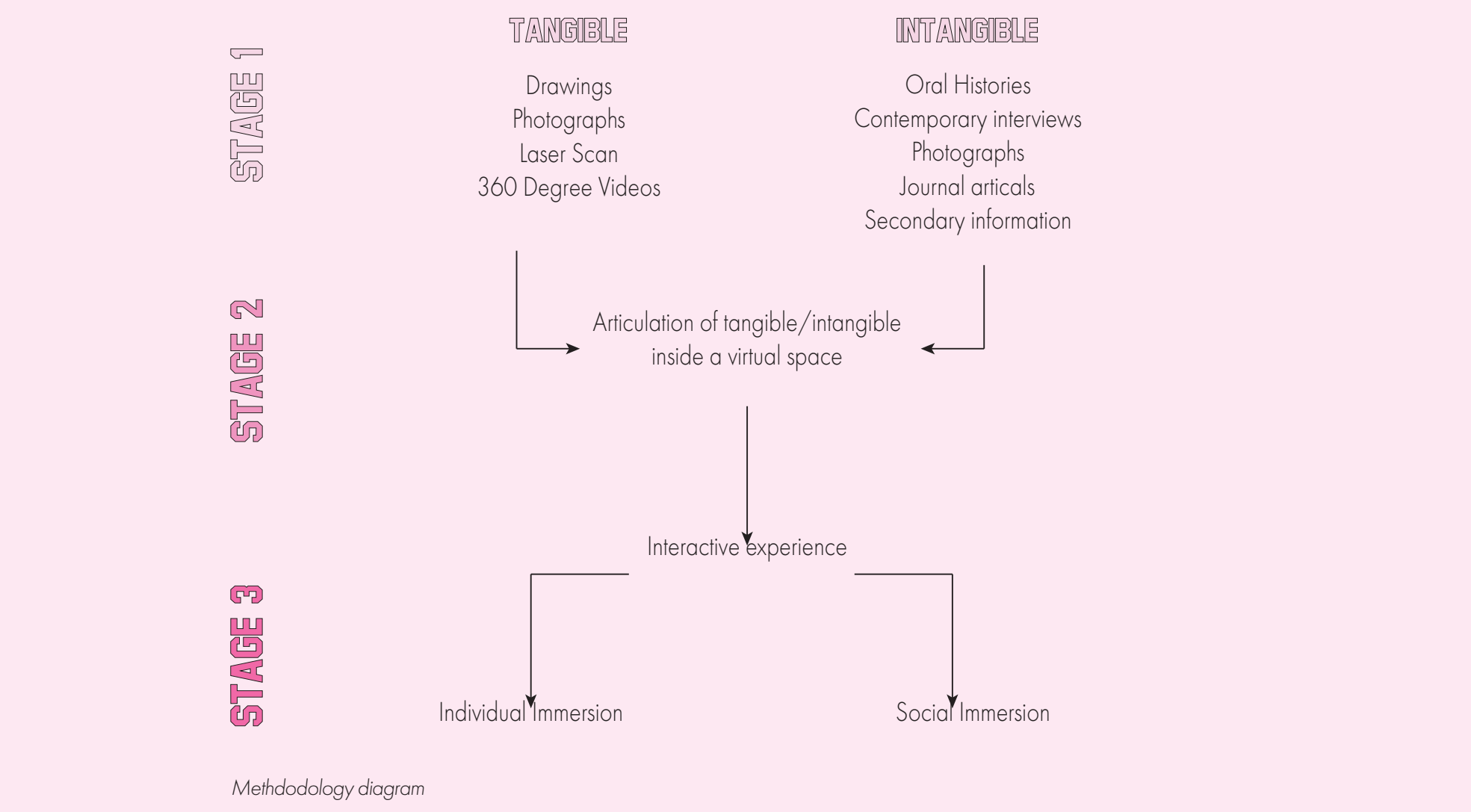
1 0 DOCUMENTATION

The first stage was the documentation. In this phase, information was collected from a range of sources, which required many different skills and techniques; both digital and analogue data was retrieved. A range of technology captured digital recordings, while historical research uncovered records from the construction of the building through to today.

2 0 REPRESENTATION

This stage brings together the data from the documentation stage. Combining the tangible and intangible data, the information combines to present multiple stories within multiple environments. This stage embraces the results of documentation — incomplete or distorted results of scanning are combined. These will present a range of representations for interpretation, which fills in gaps of information to inform users.
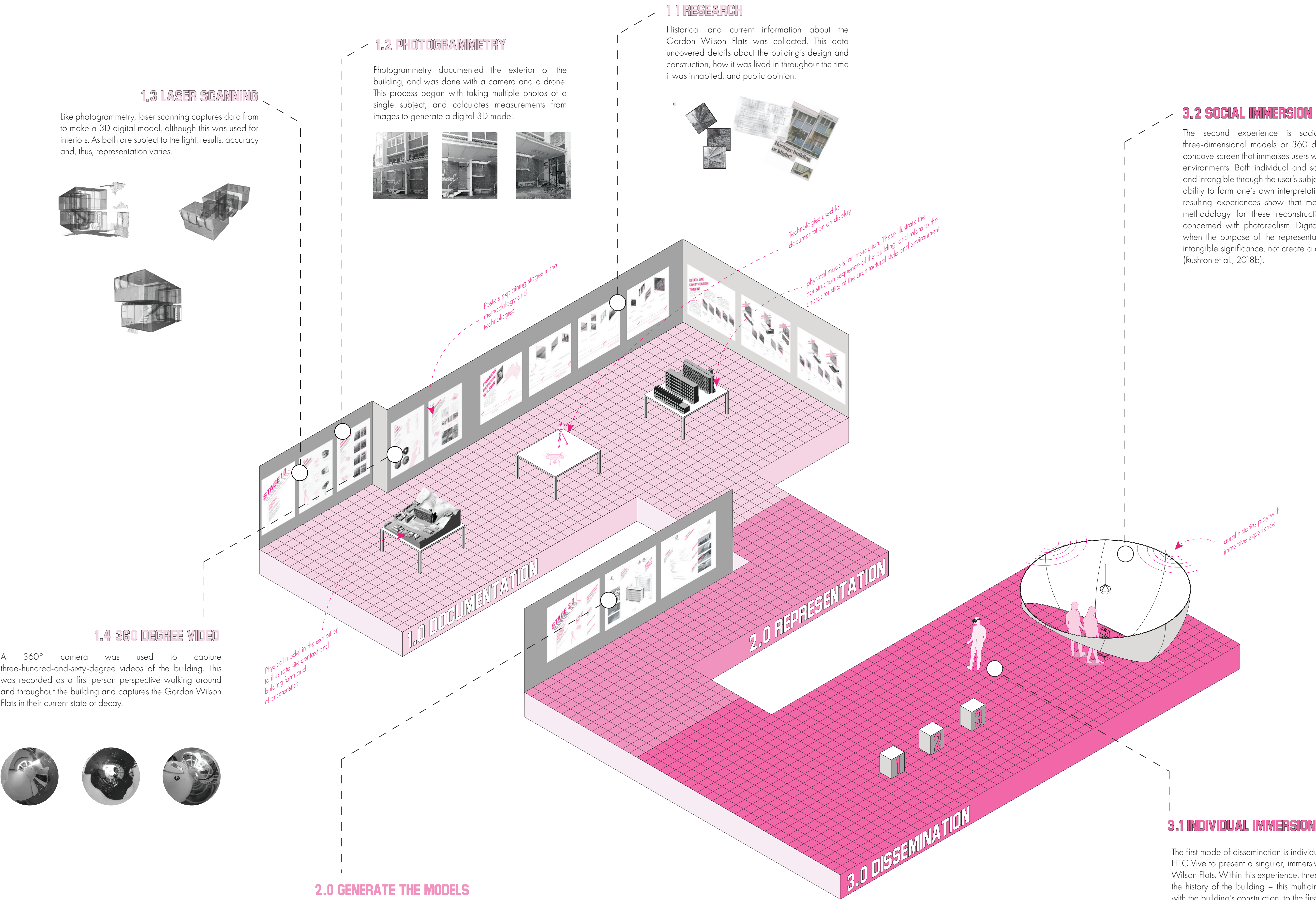
3 0 DISSEMINATION

Dissemination is the presentation and circulation of the virtual environments made in the representation stage. The digital 3D models placed in game engines can now be explored at 1:1 scale. Two methods are used to disseminate the virtual recordings and reconstruction of the Gordon Wilson Flats. Although the encounter with these is different, each offers an immersive experience.
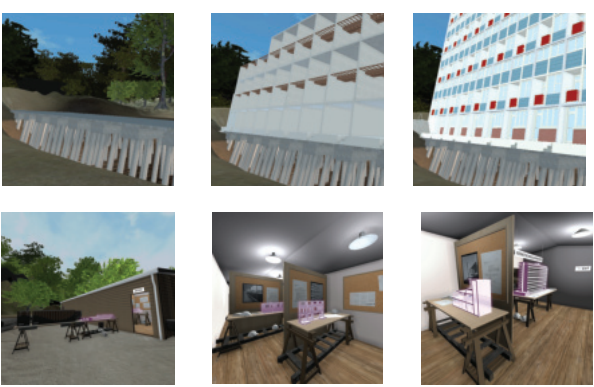
	TANGIBLE	INTANGIBLE
STAGE 1	Drawings / Photographs / Laser Scan / 360 Degree Videos	Oral Histories / Contemporary interviews / Photographs / Journal articls / Secondary information
STAGE 2	Articulation of tangible/intangible inside a virtual space	
STAGE 3	Interactive experience → Individual Immersion / Social Immersion	

Methodology diagram

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1.3 LASER SCANNING

Like photogrammetry, laser scanning captures data from to make a 3D digital model, although this was used for interiors. As both are subject to the light, results, accuracy and, thus, representation varies.

1.2 PHOTOGRAMMETRY

Photogrammetry documented the exterior of the building, and was done with a camera and a drone. This process began with taking multiple photos of a single subject, and calculates measurements from images to generate a digital 3D model.

1 1 RESEARCH

Historical and current information about the Gordon Wilson Flats was collected. This data uncovered details about the building's design and construction, how it was lived in throughout the time it was inhabited, and public opinion.

1.4 360 DEGREE VIDEO

A 360° camera was used to capture three-hundred-and-sixty-degree videos of the building. This was recorded as a first person perspective walking around and throughout the building and captures the Gordon Wilson Flats in their current state of decay.

Posters explaining stages in the methodology and technologies

physical models for interaction. These illustrate the construction sequence of the building, and relate to the characteristics of the architectural style and environment

Technologies used for documentation on display

Physical model in the exhibition to illustrate site context and building form and characteristics

aural histories play with individual experience

2.0 GENERATE THE MODELS

Here, a range of computer software was used to represent the data within as multiple models and prepare it for dissemination. The CAD model, generated from the construction drawings, represented a pristine version of the flats, following construction. The photogrammetry and laserscan models, which are more abstract, not only capture the current state of the flats, but represent the current decaying condition of the building.

Photogrammetry   laser scan   CAD model

3.2 SOCIAL IMMERSION

The second experience is social immersion, which projects three-dimensional models or 360 degree videos onto a spherical, concave screen that immerses users within these digitally reconstructed environments. Both individual and social immersion link the tangible and intangible through the user's subjective experience. Each offers the ability to form one's own interpretation — or construct meaning. The resulting experiences show that meaning is constructed when the methodology for these reconstructions of heritage sites are not concerned with photorealism. Digital depictions are more effective when the purpose of the representation is to connect tangible and intangible significance, not create a copy of the tangible architecture (Rushton et al., 2018b).

3.1 INDIVIDUAL IMMERSION

The first mode of dissemination is individual immersion, which used the HTC Vive to present a singular, immersive experience of the Gordon Wilson Flats. Within this experience, three scenes take the user through the history of the building – this multidimensional experience begins with the building's construction, to the first inhabitation, until today. Not only does this capture the decay of the tangible building, but the intangible experience due to the social influences of the design and construction, and now, deteriorating condition. Using the HTC Vive, a head-mounted display with ear audio speakers and hand controllers, an individual can experience the Gordon Wilson Flats.

The user begins in 1959, during the building's construction and switches throughout the construction phases of the building to completion at 1:1 scale. There is also a curated exhibition of photographs and models that allow the user to understand the construction stages in more details. This scene is accompanied by aural histories that are related to the stages of construction and initial habitation.

The next stage is within the building which gives the user the ability to switch between the different representations, CAD and laser scan -- old and new. This scene is accompanied by aural histories that are related to early inhabitants and later inhabitants, contextualising the decay.

In this scene, the user can fly around and inside laser scan , photogrammetr and CAD models. It illustrates the contrast between the different representations. This scene is accompanied by aural histories, once again related to the building at different times, focused on the exterior.

SCENE 1

SCENE 2

SCENE 3