

Engaging with Local Communities in the Ōtākaro Avon River Corridor with Rephotography

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Table of Contents

Executive Summary	i
1.0 Introduction.....	1
2.0 Literature Review	1
2.1 Our Knowledge of Rephotography.....	1
2.2 Contribution of Concepts to Project Design.....	1
3.0 Methods	2
4.0 Results	3
4.1 Key Examples.....	6
5.0 Discussion	8
5.1 Conditions of Rephotography	8
5.2 Photograph Sources	8
5.3 Interactive Map	8
5.4 Community Engagement and Involvement.....	9
5.5 Limitations	9
5.6 Contributions and Implications	10
6.0 Future Recommendations.....	10
7.0 Conclusion	11
Acknowledgements.....	11
References.....	12
Appendix A - Regeneration Plan Greenprint	1

Executive Summary

- Following the 2010-2011 Canterbury earthquake sequence, approximately 8000 households were relocated from the residential red zone in Christchurch due to severely damaged land unsuitable for living.
- Many changes are about to take place as projects associated with the Ōtākaro Avon River Corridor Regeneration Plan come to life.
- A set of criteria, established for selecting rephotography sites, identifies existing photographs, suitable accessibility, attractiveness to the community, capturing the change of key interests (social, cultural, ecological, recreational, historical), and site persistence into the future.
- The methodology followed included reviewing the literature, creating criteria for site selection, exploring photography archives to identify sites, and consultation with community contacts to narrow down the selection of rephotography sites.
- Eight key rephotography sites have been identified and displayed on an interactive map. Each represents various local community interests.
- The COVID19 lockdown was a limitation to this research. It created difficulties meeting as a group and significantly reduced face-to-face interaction, restricting opportunities to engage with the community.
- The rephotography of the Ōtākaro Avon River Corridor (OARC) can engage with local communities through ongoing community and mana whenua consultation. Community engagement is essential and can be achieved through focus groups and the implementation of GapFiller frames.
- Our framework can help identify the local context and narratives in the OARC and support communities to reinvest in their social memory by implementing a stable rephotography framework.
- Our research highlights a unique opportunity to bridge a gap in managed retreat research by introducing rephotography as a method of capturing climate-related landscape change.

1.0 Introduction

Following the 2010/2011 Canterbury earthquake sequence, 8000 households were relocated due to severe damage to residential properties. Areas near the Ōtākaro Avon River and the Waimakairiri River were deemed unsafe as a result of significant liquefaction. These areas were categorised as the residential red zone (Hoang & Noy, 2020; Noy, 2020). Managed retreat programs relocated infrastructure and residential properties within the red zone, intending to prevent future risk. It is one of the most extensive managed retreat programmes in New Zealand's history (Hoang & Noy, 2020) and the most significant example of urban managed retreat globally (Hart et al., 2020; Rogers, 2021). The Ōtākaro Avon River Corridor (OARC) Regeneration Plan details the short-term and long-term objectives for land use. The Minister of Energy and Resources, Hon Dr. Megan Woods, approved the plan on 23 August 2019 (DPMC, 2021), and development is underway in some parts of the OARC.

The Ōtākaro Living Laboratory Trust intends to establish a 'world-leading living laboratory, where we learn, experiment and research; testing innovative ideas and ways of living' (Regenerate Christchurch, 2019). In addition, the trust is compiling research in a publicly accessible and online location, providing a platform for ongoing environmental and social monitoring programs. In close collaboration with Eric Pawson, a voluntary founding member of the trust, a co-designed framework for capturing change with rephotography within the regeneration zone of the OARC has been created. Rephotography will provide an enduring record of future changes and contribute to the education of a wider group of people. In addition, it will aid in the prevention of lost disaster history and the memory of recovery and inform post-disaster recovery efforts related to biodiversity loss and global climate change.

Our research investigates how rephotography can contribute to local community engagement. In addition, capturing the development and landscape change will allow documentation of the managed retreat process in the OARC and the significant community-led changes it is about to undergo. This report outlines the methods used to establish a rephotography network, to locate potential sites using the OARC Regeneration Plan as the central resource. A desktop analysis approach was taken for this research. Based on this literature, a set of criteria was created to ensure that these sites were appropriate given the red zone's evolving nature and the community's interests and needs. The results consist of the framework and criteria used to identify a network of sites, an interactive map displaying these locations, and key examples at these locations. Finally, the report discusses the limitations of the project and our recommendations for future action.

2.0 Literature Review

2.1 Our Knowledge of Rephotography

Capturing the development of the OARC will assemble visual documentation that captures the memory of what once was, a journey through time from pre-earthquake to post-earthquake. Rephotography is the process of taking consecutive photographs to analyse change (Rieger, 1996). It can capture community development, historical events, and cultural change (Klett, 2020); engage communities by provoking memories and connecting people; and is a significant factor for social memory (Kalin, 2013). West et al. (2013) discuss collaborative rephotography and the notion that anyone can contribute using mobile phones and the internet. One such example is the use of an app to guide the user to rephotography sites. This approach allows people to capture and share memories of places of personal value within the OARC. Three approaches for repeat photography capturing social change are rephotography of locations over time, rephotography of participants, and rephotography of events and activities (Rieger, 1996). Rephotography of locations/places can capture and document the development of a community (Kalin, 2013).

2.2 Contribution of Concepts to Project Design

A living laboratory describes using a natural setting to study complex development and evaluate interactions (Alavi et al., 2020). However, the literature regarding living laboratories is limited as it lacks a prominent definition (Dell'Era & Landoni, 2014). One definition of a living laboratory is an area where you can gain unique

insights from user-centered design (Keyson et al., 2017), which suggests a living laboratory is an area where the community can be observed without interference from people in power. There is an opportunity to define further what a living lab is through rephotography.

Previous studies on the use of empty spaces after natural disasters are associated with temporary housing (Johnson, 2007; Zhang et al., 2014). In Christchurch, following the 2010-2011 earthquakes, temporary uses of urban sites were not meant as substitutes for permanent urban development but as envisioned types of urban design (Wesener, 2017). This envisioned design has been taken into consideration when choosing locations for rephotography, where community-led gap fillers have created the best rephotography locations. Conceived design involves constant change and development in line with the community's aspirations and can be enhanced through rephotography.

Across the literature, community engagement is fundamental. The studies on social memory, bicultural landscapes, and ecological restoration are all about honouring the needs of various groups. In the case of bicultural landscapes, concepts within the literature that have contributed to the project design include incorporating and improving the natural environment among urban areas (Marques et al., 2018; Marques et al., 2019; Marques et al., 2020). The rejuvenation of the natural environment has the potential to incorporate Mātauranga Māori (indigenous knowledge), as a solution to relinking Māori and non-Māori to the natural settings through the concepts of *ki uta ki tai*, from the mountains to the sea, and *hiko*, a traditional form of 'walking and talking with the land exhuming meaning' (Marques et al., 2018). Collectively, the literature identifies social memory as a key determinant of a community's resilience following a disturbance (Wilson, 2013).

The concepts explored in the literature review contribute to the project design but fail to bridge one fundamental gap in the literature. There were no examples in the literature of managed retreat rephotography projects in urban areas. Christchurch is in a unique position, as the 2010-2011 earthquakes have created the most significant opportunity for urban regeneration in New Zealand's history (Hanna et al., 2017; Matthewson & Goode, 2020). This is also the most extensive urban managed retreat to date (Hart et al., 2020; Rogers, 2021). Our report can bridge this gap in the wider literature.

3.0 Methods

Firstly, reviews of existing literature were undertaken to better understand this project's underlying themes and concepts. Initial studies of existing literature provided the foundation required to create a set of criteria used to select the rephotography sites among the OARC. The importance of community engagement in restorative projects was emphasised in the literature (Fox & Cundill, 2018; Metcalf et al., 2015) and guided the creation of the following criteria:

1. Past photography is available, or there is enough demand for the site to be established;
 2. The site is practical and accessible to the community;
 3. It is attractive for the community to engage with;
 4. Captures landscape change of key interests;
 5. Will persist into the future as the area is developed.
- *Past photography is available, or there is enough demand for the site to be established.* Having photographs from pre-earthquake, post-earthquake, and present-day is ideal for understanding the changes that have already taken place. Historical photography provides the best understanding of that landscape and how it may differ in the future (Ayaß, 2020); however, establishment can be considered where there is enough demand for the site without previous photographic documentation. An example of this is a site where large-scale development is planned.
 - *The site is practical and accessible to the community.* The emphasis on community engagement in the literature suggests that the rephotography sites need to be as inclusive as possible. Ensuring sites are practical and easily accessible to the community is essential for encouraging community participation in

the rephotography. Placing sites in locations with high foot traffic and easily accessed, such as near a footpath, cycleway, or road, will assist accessibility.

- *It is attractive for the community to engage with*, so it should take some form that is eye-catching and intriguing.
- *Captures landscape change of key interests*. Sites should capture landscape change of at least one of five key interests identified, with these being the social, cultural, ecological, recreational, and historical change.
- *Will persist into the future as the area is developed*. This project's long-term success depends on the rephotography sites persisting into the future as developments take place. The locations of future projects planned should be considered when choosing sites.

In addition, five fundamental significance categories have been decided - social, cultural, ecological, recreational, and social. These categories best represent the broader community interests when selecting and implementing rephotography sites.

Each category refers to the type of land use and how people interact with this environment (Metternicht, 2018). *Social* relates to people and their interpersonal interactions. *Cultural* refers to mana whenua and their values, such as taonga and mahinga kai, and any relevant New Zealand ideas, customs, or social behaviours. *Ecological* relates to flora and fauna and their relationship to the environments they inhabit. *Recreational* refers to the leisure activities of people, such as walking, picnicking, and kayaking. Finally, *Historical* sites have previously been used for notable uses or have persisted in a specific location for an extended period.

Based on the OARC Regeneration Plan Greenprint map (Appendix A), the area was divided into four areas of interest and is further detailed in Table 1. Possible site locations were then identified, and photography archives were explored to access existing photographs at these locations. Online archives Ceismic, QuakeStudies, and Google Street View were the primary sources of these images. Google Street View, in particular, provided consistent comparisons over time (Mabon, 2016). Twenty-five initial sites were identified. This selection was narrowed to eight sites based on the criteria requirements and feedback from our community partner Eric Pawson and community contact Hayley Guglietta of the Avon Ōtākaro Network.

4.0 Results

Our research focused on reviewing existing literature, consulting community partners, establishing the site selection criteria, and applying these criteria to narrow down the 25 potential rephotography sites identified within the OARC. The results consist of eight rephotography sites perceived to best represent the different interests in the OARC. Table 1 outlines these locations; including their pre-earthquake and post-earthquake uses; the potential for rephotography; and significance based on the criteria established.

An interactive map was created in Google Earth (Figures 1) to display the locations and photographs of the sites selected, and polygons have been used to highlight the different areas of interest within the OARC. Pins for both the sites considered but not used and the top eight rephotography sites identified have been created. Clicking on a green flag (top eight sites) displays photographs from either pre-earthquake or immediate post-earthquake, alongside a more recent photograph of what the site looks like at present (Figure 2). There is a gap of roughly a decade between photographs for most sites, with additional photographs in between to show meaningful changes.

Table 1. Proposed rephotography locations in the Ōtākaro Avon River Corridor

Section	Name	Pre-Earthquake Use	Current Day Use	Rephotography Potential	Summary of Criteria Significance
Horseshoe Lake Reach (Travis Landing to Wainoni Landing)	Rowing Club	Rowing Club and former hockey grounds at Porritt Park	Club sheds rebuilt; rest of park cleared	Enhanced recreation on the river	Cultural Recreational Social/Community
	Horseshoe Lake Waikākāriki	Wetland reserve, significant Māori settlement pre-European times	Wetland reserve	Restored wetland system	Cultural Ecological Recreational Social/Community
Ōtākaro Loop Reach (Avon Loop Landing to Wainoni)	Richmond Community Garden	The residential area of Avonside	Cleared site, community garden project space	Development and evolution of urban green space	Ecological Recreational Social/Community
	Medway Street Bridge	Link between communities	Warped during EQ, iconic twisted footbridge removed	Evolution of urban infrastructure: bridge rebuild and repurpose of structural pieces for a memorial	Heritage/Historical Social/Community
Eastern Reaches (North of Rāwhiti Landing)	East x East Learn to Ride Track	The residential area of Burwood	Cleared site, community space	Development and evolution of urban green space	Recreational Social/Community
	Kate Sheppard Retirement Village	Retirement Village	Cleared site, under routine maintenance for mowing and weed control	Regeneration of mahinga kai exemplar	Cultural Ecological Heritage/Historical
Eastern Reaches (South of Rāwhiti Landing)	Ōtākaro Place, Bexley	The residential area of Bexley	Cleared site, under routine maintenance for mowing and weed control	Bund removal and wetland restoration	Ecological Social/Community
	The Bower Hotel	Hotel and pub, established in 1860	Demolished and replaced with 18 steel shipping containers. Temporary consent expired April 2021	Uncertain future, wetland regeneration beyond the Hotel	Heritage/Historical Social/Community

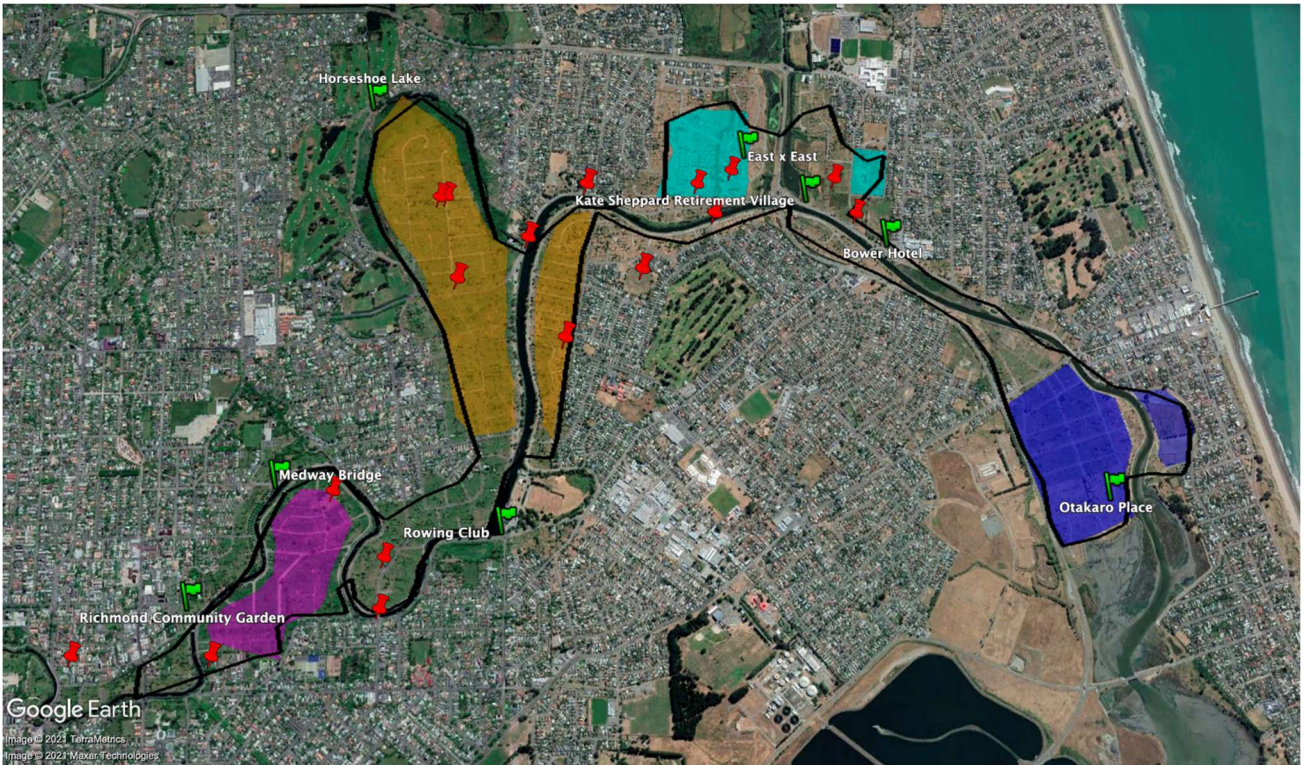


Figure 1. Interactive map of the 25 rephotography sites identified. The coloured polygons represent the four key areas of interest. Red pins mark the rephotography points that were considered but not used. Green flags represent the final eight sites selected for establishing the rephotography network.

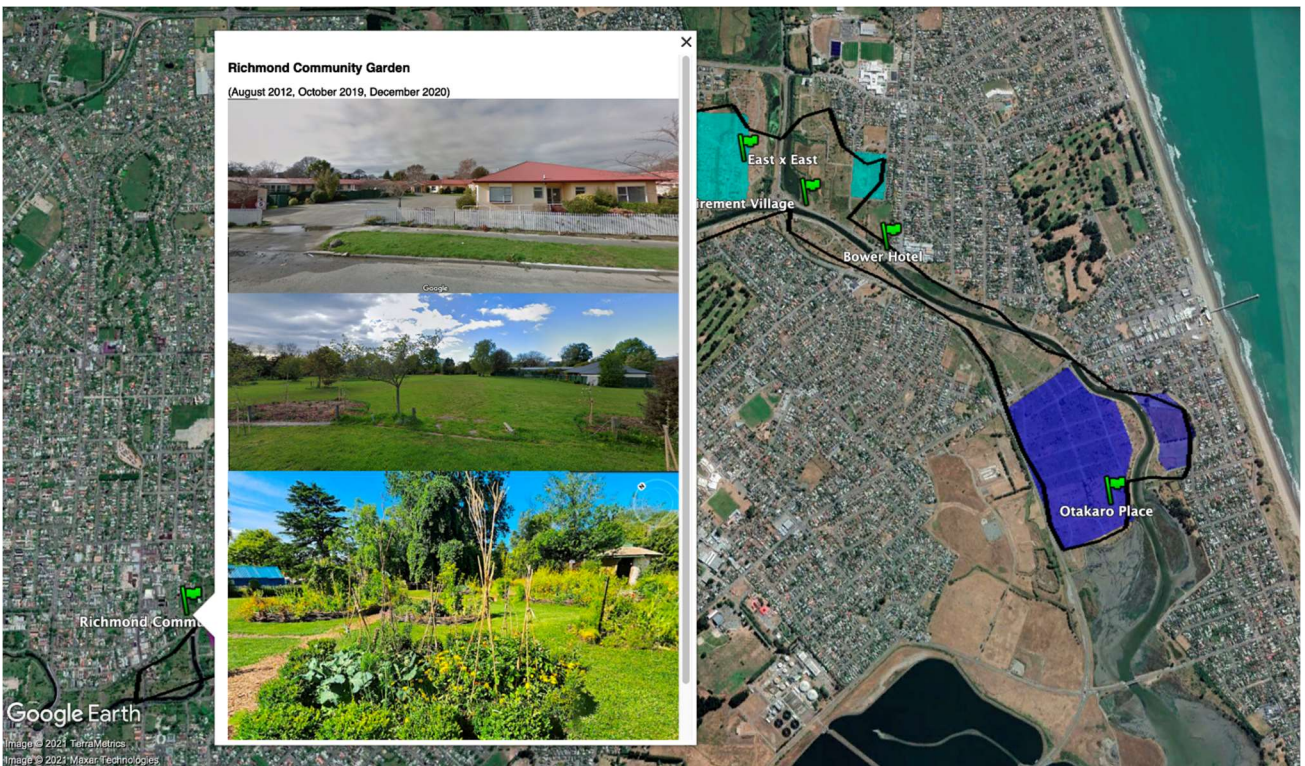


Figure 2. Example of the interactive aspect of the map. By clicking on the green flag for the Richmond Community Garden, three photographs show the changes between August 2012 and December 2020.

4.1 Key Examples

The results focus on three of the eight chosen for the rephotography network. These locations represent a combination of the five key interests in the criteria – social, cultural, ecological, recreational, and historical – and are detailed in Table 1.

Ōtākaro Place

Ōtākaro Place (Figure 3) is a location that embodies predominantly ecological values and incorporates cultural and historical aspects. The plan with Ōtākaro Place is to let the area completely flood over and restore it to a historical ecological state. Despite being recently suburban, this area is highly flood-prone, and there is reason to argue this location should have been left in its natural state. The flooding can be shown by seasonality. This reintroduction of a wetland is also significant to Māori, with areas nearby with similar terrain being classed as pā sites. The OARC areas damaged after the 2010-2011 earthquakes were highly prone to flooding (Orchard, 2017). One example of flooding is evident in the image comparison of Waitaki Street, Bexley (Figure 6). Depending on the weather conditions, areas can be flooded over for significant periods of the year.



Figure 3. Comparative photographs looking down Ōtākaro Place from the corner with Velsheda Street, Bexley. These photographs are from August 2012 and October 2019, both obtained from Google Street View.

Medway Bridge

Medway Bridge is a location, and an iconic symbol, of connection with much history attached to it. During the 1940s, the bridge was low and prone to flood hazards. Sometime later it was re-constructed high above the water level. After the initial 2010 earthquake, the bridge underwent significant twisting that became a prominent exemplar of the earthquake's power. The bridge became a popular site for photography following the 2010-2011 earthquakes (Figure 4). Honouring this history while rebuilding the bridge can attract people for rephotography.



Figure 4. Comparative photographs of the Medway Bridge, Richmond. The 1940s: River in flood with debris (Christchurch City Libraries, 2013); August 1992: snow in winter (Kete Christchurch, 2016); October 2010: iconic twist (David Collins, 2010); and August 2020: bridge removed with remaining infrastructure in the background and vegetation regeneration (Google Street View).

East x East

Significant community-led activity is currently taking place at the East x East. This location represents social and recreational aspects; with activity happening, and tied to, the other three categories. Figure 5 shows an example of a ‘learn to ride’ area set up in an abandoned cul de sac. There are other similar activities like this being set up following the concept of a living laboratory.



Figure 5. Comparative photographs of the East x East learn to ride bike track, in Corserland Street, Burwood. These photographs are from August 2012 (Google Street View) and October 2021 (Wade Zervos).

5.0 Discussion

5.1 Conditions of Rephotography

The pictures captured within the OARC can tell varying stories among identical landscapes. The changing conditions associated with seasonality and time of day are important factors when carrying out successful rephotography. Time of day can determine the lighting in the photograph, determined by the angle of the sun and the photographers orientation. Seasonality shows different characteristics of the environment (Figure 6). For example, flooding is best captured in winter, seasonal bloom in spring and summer, and changing tree colours can be observed in autumn. Frequency is dependent on the nature of each location and would be best decided on a case-by-case basis. Therefore, we suggest that rephotography four times annually and at the same time of day, at a minimum, would be most consistent.



Figure 6. Waitaki Street, near Ōtākaro Place, emphasises the impact of seasonality in rephotography. Left: photograph taken in October 2019 (Google Street View). Right: photograph taken in August 2021 (Wade Zervos), capturing the street's flood-prone nature in winter.

5.2 Photograph Sources

Two online photography libraries Ceismic and QuakeStudies contained valuable photographs. Both libraries consisted of contributions from several photographers, providing a broader pool of images to explore. However, a lack of structure as to how the photographs are stored on these sites made them challenging to navigate.

Using photographs sourced from Google Street View proved beneficial, allowing accurate photographs and enhancing the comparisons made between consecutive years; however, Google intentionally reduces the size of photos with low traffic as a data management exercise. The availability of high-quality photographs for the years between 2012 and 2020 was low. Some earlier photography was of low resolution (pixelated and blurry), making it difficult to accurately interpret the images' detail and show the landscape change occurring. It is also important to note that Google Street View can only capture photographs from streets. This source may not be suitable for all future rephotography sites due to accessibility issues.

5.3 Interactive Map

The map intends to be indicative and developed further as more rephotography sites are added to the network. The fundamental concepts of the map, such as location pins, polygon overlay, image overlay, the addition of text information, and the removal of unnecessary Google Earth place names, can be applied and strengthened with the use of task-specific GIS programs such as ArcGIS, ArcMap, and less time limitations. In addition, the Ōtākaro Living Laboratory Trust is in the process of setting up a website to store and centralise data for multiple projects, and we recommend that the map resides at this interface, ensuring maximum community exposure.

5.4 Community Engagement and Involvement

Co-Governance

Public participation will allow the people of Christchurch to contribute to their community, engagement necessary for successful ecological restoration, wellbeing, and resilience of communities. 'Successful regeneration is dependent on a relationship between governance structure and communities' (Regenerate Christchurch, 2019). Land Information New Zealand (LINZ) is currently transferring land into Christchurch City Council (CCC) ownership and, once complete, CCC will decide the future of the OARC in partnership with local iwi and the community.

A co-governance strategy will enable community participation in the decision-making regarding land use. This collaboration is essential for rephotography because acknowledging and granting communities the opportunity to act as curators and decision-makers regarding the landscapes encourages continued participation and effort. This participation will ultimately drive the processes that create the change in the landscape, which rephotography will capture.

Engaging with Māori

Acknowledgment and incorporation of Māori cultural processes and knowledge of the landscape can benefit the progression and completion of the project's objectives. Therefore, a form of community engagement stems from mana whenua consultation and participation regarding, but not excluded to, sites with a strong relationship to Māori culture (e.g., mahinga kai exemplar).

The development of a mahinga kai exemplar at the former Kate Sheppard Retirement Village site offers Māori the opportunity to engage with their whakapapa, kaitiakitanga, and the other fundamental values that are an integral part of the Māori worldview. In addition, capturing the successful regeneration process through rephotography will provide a powerful resource to assist with storytelling.

Several Mātauranga Māori concepts have been identified and incorporated due to the similarities with objectives set within the rephotography framework and the OARC Regeneration Plan. For example, Hiko aligns with the documentation and preservation of the stories and landscapes within the OARC. At the same time, ki uta ki tai mirrors the purposes of the 'City to Sea' pathway detailed in the OARC Regeneration Plan (Regenerate Christchurch, 2019).

Community engagement through social memory, bicultural landscapes, and ecological restoration contributed to the project design by looking for areas with a strong sense of urban history, significance to Māori (pā sites), and where there will be significant land change. Recording and sharing stories throughout the corridor, as intended by the rephotography project, will further contribute to engagement of Māori.

GapFiller Frames

The original GapFiller Frames were part of an installation run by the GapFiller placemaking agency, utilising vacant spaces in urban Christchurch generated by the 2010-2011 earthquakes. The purpose of the frames is to catalyse people's engagement with the environment and emphasize urban scenes changing over time. Repurposing the available frames allows the community to engage similarly in the OARC by highlighting the site for rephotography and focusing the photographer on the intended view.

We suggest installing frames at sites that best meet the rephotography criteria of our framework. We propose a tour of the City to Sea walking/cycle pathway that comprises four or five frames placed at the designated sites (Table 1). Each frame will contain information about the site, instructions on taking a photo, uploading an image to the rephotography repository using a QR code, and the location of the next frame. By installing the frames along the pathway that follows the river, they can catch the attention of individuals leisurely using the river, who may later investigate the attraction further.

5.5 Limitations

COVID19 lockdown and restrictions limited our research approach and ability to carry out fieldwork in the OARC. The general lack of face-to-face interaction made it difficult to collaborate as a team and to engage with

community members. Lockdown began at the critical stage in the project, where input from community members would have been beneficial for steering our approach to site selection. These restrictions meant that the group could not engage with local Christchurch residents and community leaders to access private photography archives.

There may have been an element of bias present, as, despite our thorough rationale for choosing rephotography sites, some subjectivity with personal preferences exists. These biases, however, are unlikely to have significant consequences for the outcome of this project, as there are shared views among the community of what the rephotography should capture among the different locations.

5.6 Contributions and Implications

Our critical contributions to the community and the research include creating a set of criteria and a framework for choosing the sites for rephotography. In addition, our study highlights the importance of capturing change and provides a foundation for future visual documentation.

The literature makes a novel connection between the five focus subthemes of the research, social memory and its impact on community resilience, bicultural landscapes, cultural and community engagement in ecological restoration, climate change-focused living laboratory projects, and community engagement through rephotography.

Notably, we have been unable to find any examples of managed retreat rephotography in New Zealand or overseas. Capturing the changes within the variety of projects among the landscape is essential because there is a gap in the literature regarding the rephotography of large-scale managed retreat in an urban area. Our research suggests that rephotography can fill this gap by documenting large-scale managed retreat in the OARC.

6.0 Future Recommendations

Our recommendations stem from the central idea of furthering the engagement of communities among and visiting the OARC. We have identified several recommendations to promote rephotography and landscape change research, as summarised below.

1. Focus groups - running community focus groups and face-to-face consultation with the local Runanga to validate the site selections and criteria, investigate other sites, and tap into community photograph archives.
2. Map - we recommend further development and investigation into a web-based interface; and the possibility of automating map features such as time-lapse transitions.
3. GapFiller Frames - to further enhance the active engagement of people visiting the OARC, we suggest that all frames exhibit:
 - a) Photograph/s that best highlight the contrast between the landscape of the past and present;
 - b) A map displaying the locations of the other frames within the rephotography network;
 - c) A link to the Ōtākaro Living Laboratory Trust website with information about the rephotography project and the finalised interactive map;
 - d) And an option for people to suggest/vote on the next rephotography location/s.

7.0 Conclusion

Engaging with local communities in the Ōtākaro Avon River Corridor with rephotography offers many benefits for all groups who make up the community and a broader context. While honouring past social memory, rephotography allows people to actively use the land to express themselves and document how the land is being used. Our method included a desktop analyse approach, and sites were selected using a new framework and criterion created based on the literature and the OARC Regeneration Plan. The results show the network of sites chosen displayed on an interactive map. There were no available examples of large-scale managed retreat photography projects in New Zealand, and this research provides an opportunity to address this gap. Further research and documentation of managed retreat rephotography are required on a global scale.

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Appendix A - Regeneration Plan Greenprint

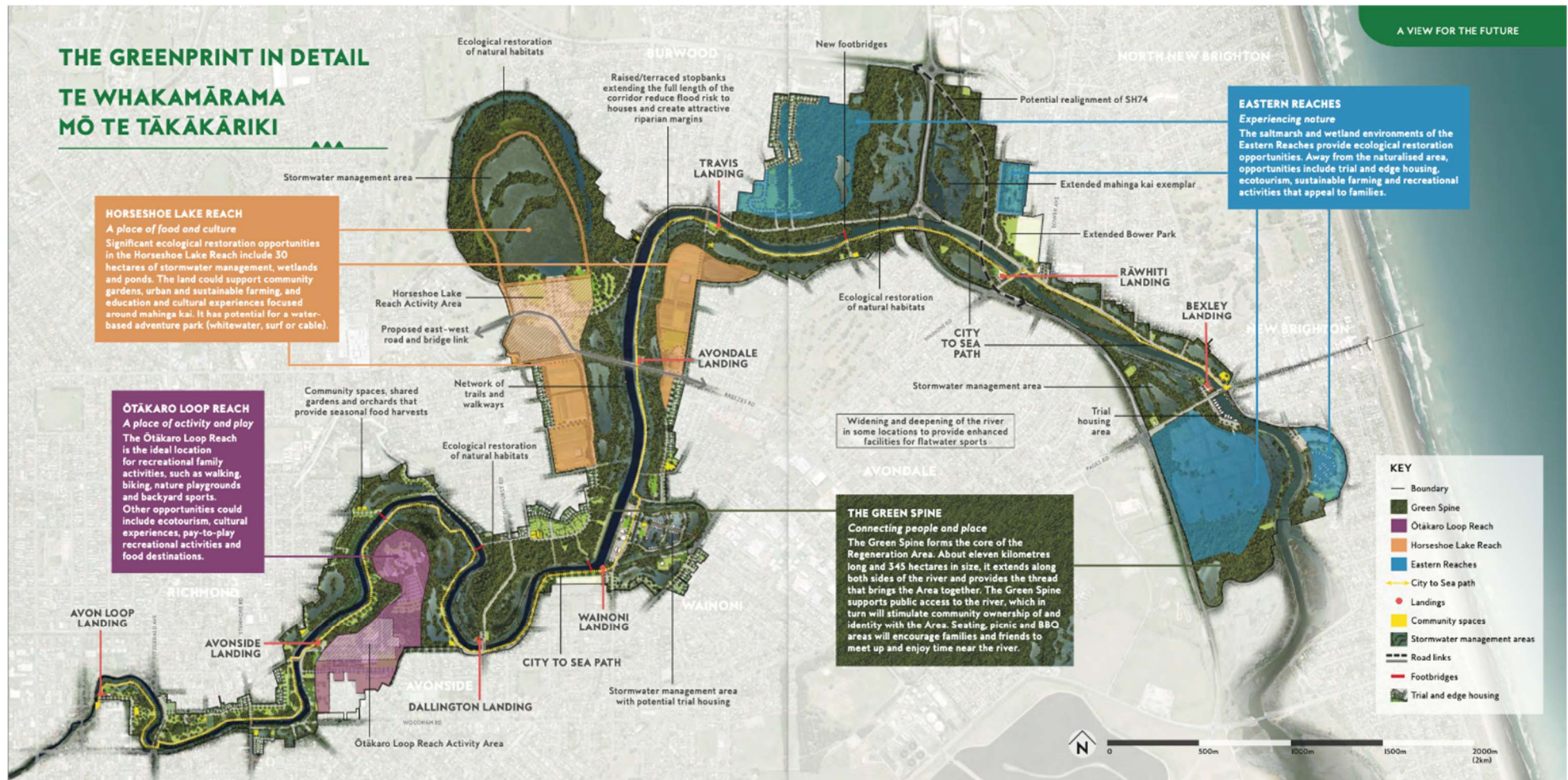


Figure A. 1. Greenprint map from the Ōtākaro Avon River Corridor Regeneration Plan (Regenerate Christchurch, 2019).