Nature-Based Solutions for Human Wellbeing: A Case Study of The Forks in Winnipeg, Manitoba

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Capstone Report

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Executive Summary

This capstone report explores the human wellbeing benefits of nature-based solutions (NBS) through a case study of The Forks in Winnipeg, Manitoba. Recognized as a historically and culturally significant site, The Forks has transformed into a vibrant urban space that blends natural features with social and commercial amenities.The study explores how to understand how physical design features at The Forks contribute to human wellbeing, focusing specifically on the role of The Forks Market as a central node for social engagement and connection to nature. Using a mixed-methods approach, the research included structured surveys (n = 85) and on-site observations for eleven days.

The design features, particularly its accessibility, seating areas, and integration with natural elements, were found to mediate visitors' experience of wellbeing. While the space encouraged both social interactions and solitary reflection, respondents highlighted a need for improved seating and accessibility features. This indicates that while The Forks successfully fosters community and cultural vibrancy, inclusive design remains a crucial area for enhancement.

This report concludes by emphasizing the importance of integrating NBS with thoughtful urban design to promote inclusive, restorative, and culturally resonant public spaces. Recommendations support design interventions that prioritize comfort, accessibility, and cultural expression, providing guidance for future urban planning practices.

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1.0 INTRODUCTION

1.1 Context

More than half of the world's population now lives in urban areas, a trend that is becoming a major global issue with significant impacts on both biodiversity and the well-being of city residents (Vetrivel et al., 2024). This urbanization has contributed to climate change, which, in turn, has affected the enivronment and directly impacted people's well-being (Manes et al., 2022). In Canada, the effects of climate change are already visible on the environment and this has resulted in higher tree mortality from drought, wildfires, and insect infestations, shifts in ecosystems and species, and the thawing of permafrost that releases greenhouse gases (Seddon et al., 2020). As a result of climate change, in the past ten years there has been focus on using nature-based solutions to help reduce greenhouse gas emissions (Daniels, 2022).

In recent years, the Canadian government has increasingly embraced these nature-based solutions as a means of addressing environmental concerns and enhancing biodiversity (Government of Canada, 2024). Key initiatives include a $3 billion investment over ten years to plant two billion additional trees and $630 million dedicated to nature-based climate solutions (Nature Canada, n.d.). Such efforts are seen as vital to preventing species extinction and curbing global warming (Nature Canada, n.d.). According to a report by Nature United, nature-based solutions could reduce Canada's greenhouse gas emissions by up to 78 million tonnes annually by 2030, over 10% of the country's total emissions (Nature United, 2021). However, most of the existing research has focused primarily on their environmental impact (IPCC, 2013; Nero et al., 2017), with limited attention given to their social wellbeing benefits, particularly in urban spaces like The Forks in Manitoba.

Nature-based solutions are defined as living solutions supported by natural mechanisms and procedures that strive to address a variety of environmental issues while also providing numerous benefits to societies, economies, and ecosystems (European Commission, 2015). Nature-based solutions are being used to restore nature in cities and improve their resilience (Frantzeskaki, 2019). Urban planners and policymakers are increasingly interested in such solutions, leading to a rise in research that maps their benefits (Brink et al., 2016).

While the benefits of nature-based solutions are widely acknwolegded, ranging from climate mitigation and biodiversity, their their social wellbeing impacts, particularly those shaped by physical design, have received far less attention in research. Design elements such as green spaces, water features, pedestrian pathways, and communal areas are more than visual enhancements; they significantly influence how people feel, behave, and connect with others in a space (Mitchell & Popham, 2008; White et al., 2010). These features shape the quality of interaction and the emotional comfort experienced within NBS. In places like The Forks in Winnipeg, where people from diverse backgrounds gather, the thoughtful integration of these design elements is crucial to maximizing the social benefits of visitors expriences.

To address these gaps, this capstone seeks to assess the wellbeing benefits people derive from visiting The Forks, with a focus on how its physical design features contribute to promoting these benefits.

1.1 Research Questions

This study explores the following questions:

a) What human wellbeing benefits do people get from visiting The Forks?

b) How do the physical design features of The Forks contribute to human wellbeing benefits?

1.2 Research Contributions

The proposed research seeks to assess the wellbeing benefits that individuals derive from engaging with The Forks, while also examining how the physical design features of the space contribute to these benefits. Informed by urban planning and community wellbeing literature, this research aims to enhance our understanding of how public spaces like The Forks can foster social connections, cultural expression, and individual wellbeing. The findings of this study are intended to inform future urban planning practices, encouraging the development of public spaces that prioritize inclusive and culturally enriching experiences. This report's recommendations will help city planners and developers to consider socio-cultural wellbeing as a key factor in the design and maintenance of public spaces.

1.3 Document Overview

This Capstone report is organized into five main sections, beginning with this introduction. Section two offers a comprehensive literature review. Section three outlines the research methodology employed, while section four presents' findings and analysis. Section five provides the discussion of the findings.

1.4 Description of The Study Area

The Forks, located at the confluence of the Red and Assiniboine Rivers in Winnipeg, Manitoba, is a site of profound historical, cultural, and social significance. For over 6,000 years, it has functioned as a traditional meeting place, first for Indigenous peoples, including the Cree, Ojibwa, and Nakoda, and later for European fur traders and settlers (Parks Canada, 1995). Archaeological findings reveal that it served as a seasonal site for trade, ceremonial gatherings, and social interaction long before colonial contact (Parks Canada, 1995). With the arrival of European traders in the 18th century, The Forks became a key node in the fur trade network. Fort Rouge, established in 1738 by La Vérendrye, marked one of the first European settlements in the area (Coutts, 1988).

Throughout the 18th and 19th centuries, trading posts operated by the Hudson's Bay Company and the Northwest Company further solidified its strategic importance (Parks Canada, 1995). The late 19th century saw a shift toward industrialization as The Forks evolved into a major railway hub. Beginning in 1886, it became a center for multiple rail lines, including the Northern Pacific and Manitoba Railway, Canadian Northern, and Grand Trunk Pacific, which introduced significant infrastructure such as rail yards and terminals (Coutts, 1988).

Figure 1.1 Aerial view of The Forks

Source: (Tourism Winnipeg, 2025, https://www.tourismwinnipeg.com/things-to-do/attractions/display,listing/06206/the-forks)

Today, The Forks represents a successful model of urban redevelopment. It has been transformed into a vibrant public space combining historical preservation with contemporary amenities, including markets, museums, green spaces, and cultural venues. Over four million people visit The Forks annually, The Forks exemplifies the potential of nature-integrated urban design in promoting cultural heritage and community wellbeing (The Forks, n.d.).

The selection of The Forks as the focus of this study is informed by its unique position as a publicly accessible, culturally inclusive, and ecologically designed space. Its physical design and layered uses provide an ideal setting to explore how urban green and blue spaces contribute to various dimensions of human wellbeing. The Forks includes a variety of features that reflect its role as a multifunctional, inclusive, and nature-based public space. These features support environmental, recreational, cultural, and social goals.

2.0 LITERATURE REVIEW

The concept of "nature-based solutions" (NBS) is broad, and this literature review focuses on aspects most relevant to the current investigation. The review explores various forms of NBS in urban settings, drawing on scholarly publications. It also examines how different nature-based solutions relate to wellbeing. Additionally, the review defines wellbeing, its types, and how it is measured, along with the key drivers of wellbeing in NBS.

A conceptual framework is provided to illustrate how these themes are interconnected. The review concludes by summarizing key points and identifying gaps in the literature that require further research.

2.1 Overview of nature-based solutions

In 2008, the World Bank introduced the concept of NBS (Mackinnon et al., 2008). By 2013, researchers began investigating how these solutions could support biodiversity conservation, while also addressing climate change (Sowińska-Świerkosz & García, 2021). The term NBS emerged in environmental research and conservation organisations like the IUCN and World Bank as a green approach to reduce global warming, support viable livelihoods, and safeguard biodiversity (Eggermont et al., 2015). Using the same method, NBS has been applied as a related concept which emphasises how preserved areas can help address socioeconomic problems like desertification and climate change (Dudley et al., 2010).

Lo et al. (2022), noted that there is no generally accepted definition of NBS and that definitions vary greatly depending on context and usage. But the IUCN and European Commission definitions have become the most widely accepted (Sowińska-Świerkosz & García, 2022). In 2015, the European Commission formally defined NBS as acts that address issues related to the environment, society, and economy using nature's advantages, whether motivated or backed by nature. (European Commission, 2015) . Similarly, the IUCN described nature-based solutions as acts that safeguard, manage, and rebuild ecosystems in ways which tackle societal concerns, while increasing human wellness and biodiversity (IUCN, 2020) . The European Commission's latest report further highlights nature-based solutions as an innovative approach to balancing social, environmental, and economic resilience (Dumitru et al., 2021).

This study defines nature-based solutions by drawing from both the IUCN's and European Commission definitions. I define nature-based solutions as actions that use natural systems to address social and cultural issues that improve the wellbeing of the users. Figure 1 below highlights key turning moments in the development of the NBS concept.

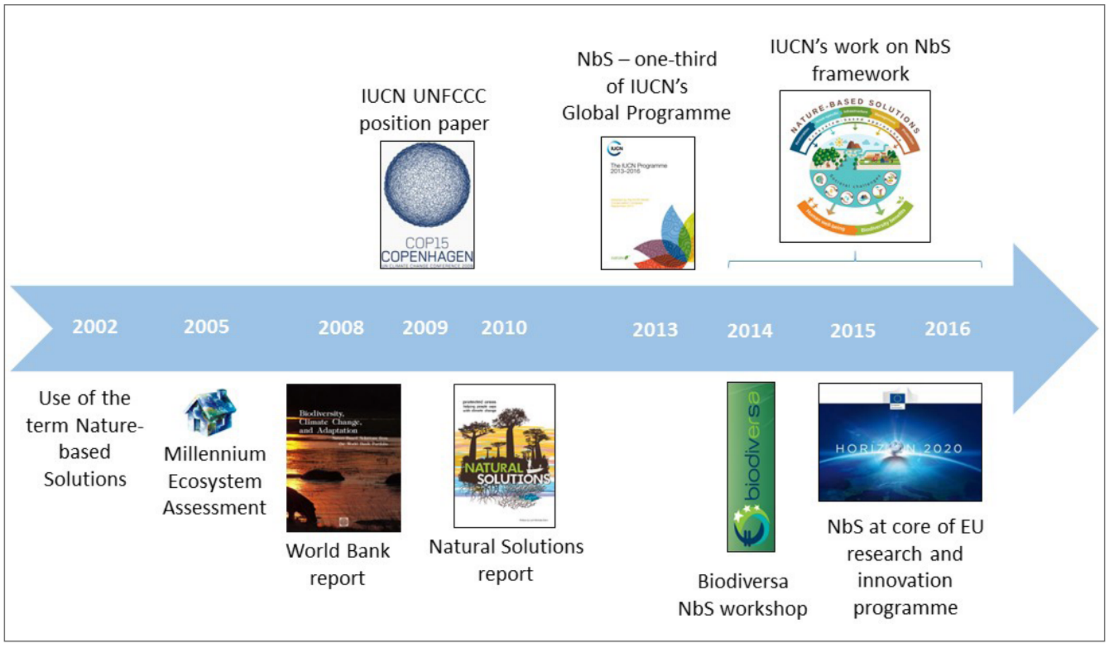

Figure 2.1 Timeline of Nature-Based Solutions Concept Development

Source: (Cohen-Shacham et al., 2016)

2.2 Types of Nature-base solutions in global urban settings

NBS covers a broad scope of approaches, and reseachers and practitioners have differing ideas about what specifically constitutes a nature-based solution. Eggermont et al. (2015), developed a classification of NBS (see Figure 2) that classifies them according to the amount of ecosystem services and stakeholders that a particular solution seeks to address, and the degree that engineering is applied to ecology and biodiversity. According to the authors, the Type 1 involves the better use of established ecosystems with low or no action to maintain or enhance the services. Examples include creating marine protected zones to preserve biodiversity, while sustaining fishing grounds and preserving mangroves to lower the danger of extreme weather (Grorud-Colvert et al., 2014). Type 2 entails modifying already-existing ecosystems to improve the delivery of ecosystem services. The creative planning of agricultural landscapes to increase their versatility is one example of this.

Type 3 entails actively maintaining ecosystems by making major changes or developing brand-new ecosystems. Examples include: (green roofs, street trees, rain gardens, green alleys, hedges/green fences, urban parks, community gardens, riparian buffer zones, blue infrastructure, and vineyards). My study adapts the Type 3 grouping of NBS as proposed by Eggermont et al. (2015). The choice to adapt the Type 3 classification, is based on its comprehensive and adaptable nature, as well as the fact my study area, The Forks, shares similar features as listed above.

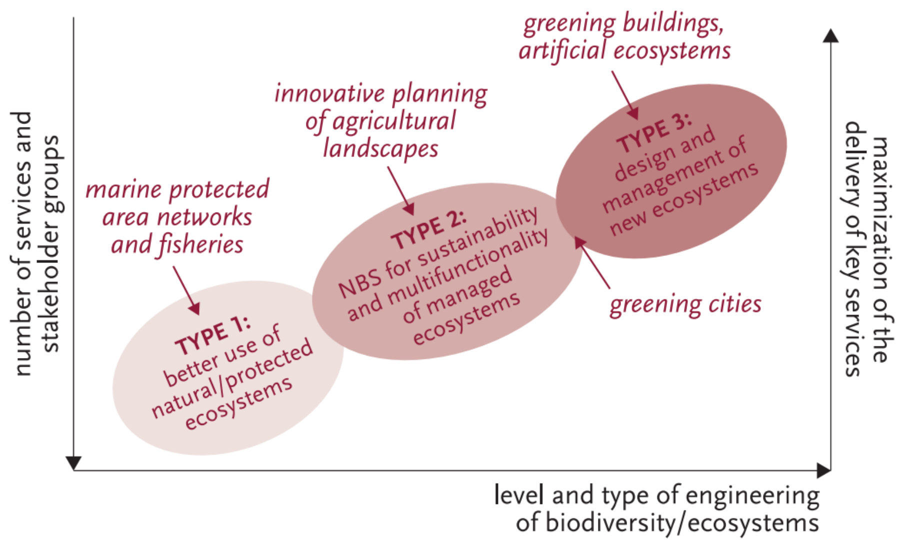

Figure 2.2 Nature-Base Solutions Typology

Source: (Eggermont et al., 2015, p.245)

2.3 The concept of human wellbeing

Human wellbeing is a broad concept that encompasses various aspects of life, including physical health, work, recreation, social connections, and personal safety (Mcgillivray & Clarke, 2007). While the term can be described, Swierad & Huang (2018), highlighted that the concept lacks a universally accepted definition, which often affects interpretations. Despite numerous efforts, a precise and practical definition of wellbeing is still hard to pin down (Jarden & Roache, 2023). This challenge has persisted over time, affecting both public understanding and academic discussions across various fields

(Swierad & Huang 2018). As Hone and colleagues noted, while many researchers have created different models of wellbeing and believe that it is a complex idea, this is where the agreement stops (Hone et al., 2015).

The definition of wellbeing that is most frequently used is as follows: “wellbeing can be understood as how people feel and how they function both on a personal and social level, and how they evaluate their lives as a whole”(Michaelson et al., 2012 p6). From the literature review, most researchers view wellbeing as a multidimensional concept that includes the diverse benefits humans gain from nature, such as social, cultural, economic, and environmental advantages. However, for this study, I define human wellbeing as the social and cultural benefits people receive from interacting with nature-based solutions.

2.4 How different types of nature-based solutions relate to wellbeing benefits

Nature-based solutions are increasingly recognized for their wellbeing benefits across various domains, including urban ecosystems, mental health, and water quality improvement. Recent studies have demonstrated how different nature-based solutions contribute to wellbeing through multiple pathways (European Commission, 2015; Hartig et al., 2014). For instance, urban nature-based solutions, such as increased vegetation and water bodies, enhance psychosocial co-benefits by improving perceived health and social interactions, particularly in urban public spaces (Herranz-Pascual et al., 2025)

Moreover, nature-based solutions that are used for urban microclimate regulation, such as tree plantings and green roofs, significantly reduce urban heat stress, thereby lowering risks to human health by maintaining optimal temperature levels below 30°C (Semeraro et al., 2024). In the realm of water management, integrating nature-based solutions like vegetated ditches in urban drainage systems enhances water quality by reducing pollutants such as organic matter, nutrients, and bacteria, thereby mitigating negative health impacts (Gomez et al., 2024). Additionally, nature-based solution are being integrated into healthcare, particularly in Child and Adolescent Mental Health Services (CAMHS), where they provide therapeutic benefits by fostering engagement with nature (S. B. Mitchell et al., 2024).

Also, the access to green spaces like parks, trees, and water features can promote social cohesion among individuals (Jarden & Roache, 2023). According to Gehrels et al. (2016), this foster stronger community bonds and can even help improve interracial relationships and social empowerment among the users. Jennings & Bamkole (2019), also highlighted that parks and community gardens, provide opportunities for individuals to meet new people, engage in social activities, and contribute to community development. Additionally, research have shown that even just viewing natural elements can have positive effects on individuals physical and mental health (Gehrels et al., 2016). For instance, Ulrich's study (1998 cited in Fink, 2016) found that patients with a view of trees recovered faster from surgery and used fewer medications. Similarly, Honold et al.

(2016) found that people living in places close to NBS, such as greenspaces, had lower levels of cortisol and stress hormone.

Engaging with nature can promote spiritual wellbeing and inspire a sense of awe and connectedness of people (Keniger et al., 2013). For example, a research involving travellers on wildlife excursions in Spain and America discovered that observing wildlife helped people feel a profound feeling of amazement and focus completely on the current moment (Curtin, 2009). These experiences can enhance wellbeing and provide spiritual fulfillment (Keniger et al., 2013). According to Swierad & Huang (2018), people who are connected with nature often experience increased attention and mindfulness, which is associated with attention restoration.

While there is significant research on how different types of NBS relate to wellbeing, most studies focus on general types of nature-based solutions such as parks and green spaces in a single environment. However, the nature-based solutions at places like The Forks in Manitoba have not been studied. The Forks, with its mix of natural and cultural elements, and commercial offers a unique opportunity to explore how features like riverbanks, paths, and community gardens contribute to wellbeing in this area.

2.4 Types and Measures of Wellbeing

Researchers have categorized wellbeing into different types, each offering a unique perspective on what it means to live a fulfilling life. One of the most widely recognized perspectives is hedonic wellbeing, which emphasizes pleasure, happiness, and the absence of pain (Kahneman et al., 1999). This approach is often measured through cognitive assessments such as life satisfaction and emotional evaluations of positive affect (Diener, 2000). In contrast, eudaimonic wellbeing, a concept introduced by Aristotle and later expanded upon by Ryff (1989), takes a different approach by emphasizing personal growth, and self-realization. According to this concept, wellbeing is derived not merely from the pursuit of pleasure, but from fulfilling one's potential and living a life aligned with one's values and deeper purpose (Ryff & Singer, 2013).

In addition, psychological wellbeing includes elements such as autonomy, environmental mastery, purpose in life, and positive relationships (Ryff, 2013). Subjective wellbeing is often linked with happiness and involves cognitive judgments of life satisfaction and affective evaluations of emotions people drive (Diener et al., 2018). On the other hand, social wellbeing focuses on the quality of an individual's social life, including social integration, acceptance, and actualization (Keyes, 1998). The study utilizes the Social Wellbeing framework due to its closely related variables, such as social interactions and cohesiveness, which align with the primary goals of this research. Below is a summary of various measures of wellbeing discussed in the literature: Table 2.1

Summary of measurement instruments of wellbeing;

Table 2.1 Summary of measurement instruments of wellbeing

Type of Wellbeing	Measurement Instruments	Description	References
Hedonic Wellbeing	Positive and Negative Affect Schedule (PANAS) Satisfaction with Life Scale (SWLS	Focuses on happiness, pleasure, and the absence of pain. Assessed through evaluations of life satisfaction and emotional states.	(Watson et al., 1998); Diener et al. (1985)
Eudaimonic Wellbeing	Psychological Wellbeing Scales (PWBS)	Emphasizes personal growth and self-realization. Measure's purpose in life, personal growth, and other dimensions of human functioning.	(Ryff 1989) (Ryff & Singer, 2013)
Psychological Wellbeing	Ryff's Scales of Psychological WellBeing	Includes factors like autonomy, environmental mastery, and positive relationships. Assesses efficacy in managing life and environment.	(Ryff, 2013)
Subjective Wellbeing	Diener's Subjective Wellbeing Scale	Involves individual assessments of happiness and life satisfaction, combining emotional and cognitive judgments.	(Diener et al., 1999)
Social Wellbeing	Keyes' Social Wellbeing Scales	Assesses the quality of social interactions and integration, measuring social acceptance, actualization, and coherence.	(Keyes, 1998)

2.5 Drivers of wellbeing in nature-based solutions

The wellbeing of individuals who interact with nature-based solutions is influenced by several of factors (Rastkhadiv et al., 2024). Studies such as those by Holtan et al. (2015), show that well-maintained and accessible walkways make natured-base solutions such as parks and community gardens more inviting and usable for all, including those with mobility challenges. They argue that these features promote social engagement of the community members in urban areas (Holtan et al., 2014). Similarly, studies by Herzog & Strevey (2008) found that features like walkways, trees, rivers, and seating areas encourage people to spend more time outdoors, which promote physical activity and social connections.

In addition, Ward Thompson et al. (2016), further highlighted that the ease of access, whether through walkways and reliable transportation options directly correlates with more frequent visits to nature-based solution. This in turn support both physical and mental health wellbeing of individuals who engage with nature-based solution. Cohen et al. (2016), also pointed out that well-equipped sports facilities within nature -based solution can foster higher levels of community engagement and collective wellbeing. Also, Kuo & Sullivan (2001), highlighted that effective lighting improves safety and security in these areas which normally encourage the greater use of these spaces, which positively impacts mental health and community interaction.

Despite the clear connection between these features and wellbeing in nature-based solutions in the literature, there is still a gap concerning how specific design elements in different contexts, such as at The Forks in Manitoba, uniquely contribute to the human wellbeing. Further exploration into these localized and culturally significant spaces could provide valuable insights into how physical design features can enhance social interactions, foster a sense of community, and improve overall wellbeing in such environments.

2.6 Conceptual framework

The conceptual framework argues that Nature-Based Solutions (NBS) at The Forks enhance the wellbeing of users through facilitated interactions, such as connectedness to nature, social engagements, and community cohesion. Central to the framework is the role of physical design as a mediator. This element emphasizes that the benefits of NBS are significantly influenced by the way physical spaces are structured and designed. According to the framework, user experiences at The Forks can yield either positive or negative outcomes. Positive experiences, characterized by satisfaction with the environment and the amenities provided, are likely to encourage repeat visits and further engagement with The Forks. Conversely, negative experiences, which may arise from poor design or inadequate facilities, could deter users from returning, thereby diminishing their interaction with the space and its intended benefits.

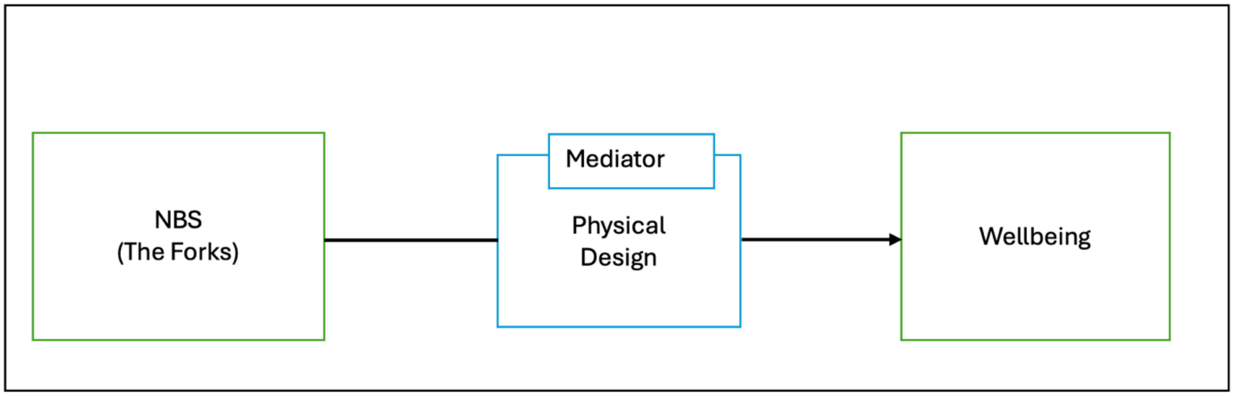

Figure 2.3 Conceptual framework for the study

Source: Author's Model, November 2024

3.0 METHODS

This section outlines the research methods used to study visitor experiences at The Forks. It outlines the design, data collection, sampling, and analysis processes that guided the investigation.

3.1 Research Design

This study employed a mixed-methods approach, integrating both quantitative and qualitative data collection and analysis. The primary method was a structured survey, allowing for statistical analysis of visitor engagement, demographic patterns, and perceived wellbeing outcomes. Complementing this, site observations provided contextual insights into behavioral patterns and the use of physical space. The mixed-methods design was chosen to capture both measurable trends and experiential dimensions of the study area. While the survey provided breadth and comparability, observations helped uncover aspects of spatial behavior and informal interactions that might not be expressed through formal questionnaires.

3.3 Data Collection Methods

3.3.1 Survey Method

The survey instrument was prepared during the initial stages of the Capstone project in Fall 2024 (Appendix C). It comprised a combination of closed-ended, open-ended, and ranking questions designed to collect data on visitor demographics, reasons for visiting The Forks, frequency of use, and perceptions of wellbeing benefits linked to physical features such as green spaces, walkways, seating areas, and water elements. As part of the ethics review process, I completed the TCPS2 CORE certification, and a formal application was submitted to the University of Manitoba's Research Ethics Board (REB2) in October 2024. Supporting materials included a verbal recruitment script (Appendix A), a recruitment poster (Appendix B), survey questionnaires (Appendix C), and a consent form (Appendix D). Ethical approval was granted on December 18, 2024, and the survey was hosted on the Qualtrics platform.

Initially, I intended to collect the data using both in person and online using my personal social media account. However, based on the recommendation from my external supervisor, this strategy was revised to prioritise more in-person engagement at The Forks. The purpose was to enhance my familiarity with the study area and facilitate meaningful participant interaction with the respondents engaged at The Forks. Despite the shift in focus, I still shared the anonymous survey link via my personal social media platforms as a supplementary measure. I removed the online posts on February 21, 2025, when the data collection period officially ended.

I started collecting the data on January 24, 2025, at The Forks, and continued until February 21, 2025, for eleven non-consecutive days. During the first three days, I visited The Forks at 9:00 a.m. to reach early visitors. From the fourth to the seventh day, data collection occurred at 12:00 noon. The final four days was focus on weekends to capture a broader and more diverse visitor population with a starting time at 3pm. A total of 85 respondents completed the survey and this was done using either a QR code or an anonymous online link. This method was selected to ensure both convenience and participant confidentiality. The QR code was used to allow respondents to quickly access the survey on their mobile devices while on-site, while the anonymous link offered an alternative for those who preferred not to use scanning technology.

3.3.2 Site Observations

In addition to the survey, I conducted site observations to gain qualitative insights into respondent behavior, spatial usage, and the overall experiential qualities of The Forks. This method provided contextual depth, complementing the quantitative data collected through the survey. I carried out observations for eleven separate days, including both weekdays and weekends, and at various times of day to capture a representative range of visitor activity. I used a non-participant and unobtrusive approach to record the data. My focus was on documenting behavioral patterns, social interactions, movement flows, and how people engaged with different physical features throughout the site.

3.4 Sample Size Determination

The research used a sample size of unknown because it was difficult to determine the exact number of visitors to The Forks in 2023 or 2024. Although the website reported that approximately four million people visited The Forks each year (The Forks, n.d.), this number could not be directly applied for certain reasons. First, the reported figure was an annual estimate, and it did not accurately reflect the number of visitors during the specific seven-month period in which the study was conducted. Visitors' numbers fluctuate seasonally, with certain months experiencing higher or lower traffic, so using the annual estimate could have led to skewed results. The sample size was calculated using these formulae for unknown population (Cochran, 1977).

$n=z^2 \cdot \sigma^2 / E^2$

Z-score = 1.96

Margin of Error (E) = 1.96%

Standard Deviation (σ) = 10

Simple Size (n)=100

3.5 Sampling Techniques

The study employed two modes of data collection: in-person visits to The Forks and an online survey. During the in-person phase, convenience sampling was employed, This method offered a practical and time-efficient approach to reaching individuals who were actively engaged with the site and willing to share their immediate experiences (Golzar et al., 2022).

For the online survey, purposive sampling was used to target individuals with previous familiarity with The Forks. This included respondents who had visited the site in the past and could offer reflective insights based on their experiences. This method ensured that participants were selected intentionally based on their relevance to the research topic, thereby increasing the depth and contextual significance of the responses collected through the digital platform.

3.6 Data Analysis Procedures

The survey was concluded on February 21, 2025, after which the data from completed responses were exported for analysis. Out of the 100 surveys distributed, 85 were completed and analyzed, resulting in a response rate of 85% (0.85). Quantitative data was analyzed using descriptive statistics. Frequency distributions, percentages, and graphical representations were used to highlight key trends in participant engagement with The Forks. This analysis provided insights into visitation patterns, social interactions, and the significance of The Forks' physical and natural environments.

Correlation analysis was also used to determine associations between key factors such as visit frequency and social interactions, participation in community events, and views of The Forks' design aspects. The strength and direction of these relationships were examined to understand how different factors influence the overall visitor experience. While my primary data collection methods were the survey and site observations, several respondents informally shared their experiences while completing the survey. Although these were not formal interviews, I documented their comments and used them as qualitative quotes to help illustrate key themes in the analysis.

Table 3.1: Summary of key variable

Research Questions	Variables	Source of Data	Data collection Tool	Analytical Tool
What human well-being benefits do people get from visiting The Forks?	social benefits (e.g., community interaction, cultural experience, connection with nature)	Survey Observation	Structured questionnaires Observations guide	Distributive Statistics Frequency Colorations Co -tabulation Quotes
How do the physical design features of the Forks contribute to human wellbeing benefits?	Greenspaces Walking and biking paths Public seating areas Accessibility features Riverfront spaces	Observation Field Survey	Structured questionnaires Observations guide	Distributive Statistics Frequency Colorations Co-tabulation Narrative Quotes

Source: Author’s Construct, 2025

4.0 FINDINGS AND ANALYSIS

This section presents the study's results, followed by an explanation and interpretation of their meaning. The analysis is guided by the collected data and aims to clarify the topic further.

4.1 Demographic characteristics of respondents

Gender, age, and ethnicity are presented as key demographic characteristics of the respondents from the survey. These factors are important in understanding how different groups interacted with and perceived nature -based solution at The Forks.

4.1.1 Gender of the respondents

A total of 85 participants responded to the survey, with their gender identities categorized as shown in Table 4.1. The results indicate that male respondents made up the largest proportion of the sample at 46%, followed closely by female respondents at 43%. This near balance suggests gender equity in participant representation. Notably, 5% of participants identified as non-binary or third gender, while an equal (5) percentage opted not to disclose their gender identity. A marginal percentage (1%) selected the category "Others.

Table 4.1 Gender of Respondents of residents

Gender		Frequency	Percent
	Male	39	46
	Female	37	43
	Non-binary / third gender	4	5
	Prefer not to say	4	5
	Others	1	1
	Total	85	100

4.1.2 Age of respondents

As shown in Table 4. 2, the largest portion of the sample fell within the 25–34 age range, accounting for 40% of participants. The next most represented group was 18–24 years (27.1%), followed by those aged 35–44 years (20%). Participants aged 45–54 made up 8.2% of the sample, while both the 55–64 and 65 or older categories comprised 2.4% each.

4.1.3 Ethnicity of respondents

The sample reflected Winnipeg's diverse population. Nearly half identified as White (45.9%), followed by Black (16.5%) and South Asian (10.5%) respondents. Indigenous participants made up 8.2%, while Filipino and Latin American groups each represented 4.7%. Chinese respondents (3.5%) and Southeast Asians (2.4%) were also present. Meanwhile, West Asian and Arab respondents each accounted for 1.2%. A few participants (1.2%) either chose not to disclose their background or selected the

"Others" category. This range of ethnic identities highlights the multicultural appeal of The Forks as a shared community space.

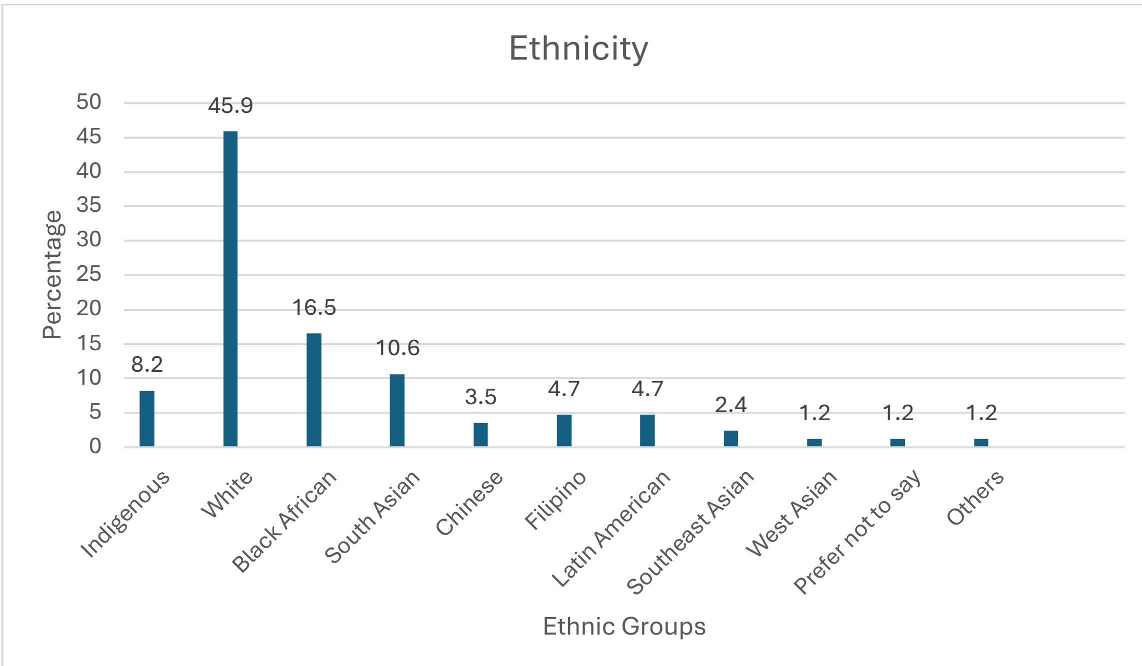

Figure 4.1 Summary of Respondents Ethnicity

4.2 Respondents Engagement at The Forks

4.2.1 Frequency of Visits to The Forks.

Survey responses revealed a range of visitation frequencies to The Forks. 43.5% of respondents reported visiting occasionally. 20% indicated weekly visits, while 17.6% selected monthly visits. 7.1% of participants noted daily visits, and 11.8% reported rare visits. The correspondence analysis shows associations between age groups and visitation frequencies. Respondents aged 18–24 were mainly linked with occasional visits. The 25–34 group aligned with weekly visits. Respondents aged 35–44 and 55–64 appeared near the cluster of daily visitations. Those aged 45–54 was associated with monthly visits, while individuals 65 and older primarily selected occasional visitation. According to The Forks' official site, the destination receives over 4 million visitors annually, reflecting a broad range of use across different demographics (The Forks, n.d.).

4.2.2 Reasons for Visiting the Forks

Survey respondents identified a variety of reasons for visiting The Forks. The most frequently selected activities were shopping or dining (19.8%) and attending events or festivals (19.4%). Nature observation followed at 16.9%, while walking or jogging was selected by 15.5% of participants. Other common reasons included picnicking (12.6%) and biking (10.4%). A smaller percentage indicated shelter (2.9%) or other reasons (2.5%).

Participant A noted, “There’s always something going on, at The Forks, which makes you want to come back.”

Table 4.2 Reasons why People Visit the Forks

Reasons	Responses (N)	Percent (%)
Walking or jogging	43	15.5
Biking	29	10.4
Picnicking	35	12.6
Attending events or festivals	54	19.4
Nature observation	47	16.9
Shopping or dining	55	19.8
Shelter	8	2.9
Others	7	2.5

4.3 Human Wellbeing Benefits of The Forks

This section of the report examines the human wellbeing benefits of The Forks, focusing on its role in promoting connection to nature and fostering social interactions and cohesion.

4.3.1 Social Interactions of people at The Forks

The survey results show that 30.6% of respondents indicated visiting The Forks with family or friends sometimes, 27.1% indicated often, and 10.6% selected always. Meanwhile, 24.7% reported visiting rarely with others, and 7.1% indicated they never visit with family or friends. Regular social interactions contribute to emotional wellbeing, as social connections are positively associated with mental health benefits (Wickramaratne et al., 2022).

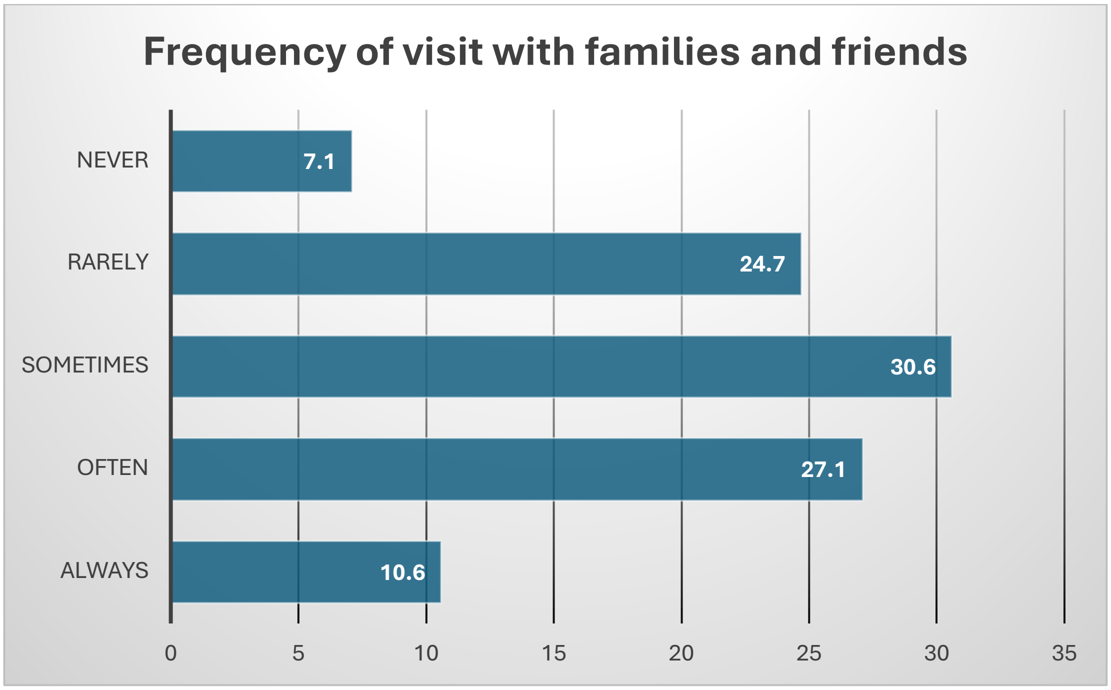

Figure 4.2 Frequency of visit with families and friends

In addition, the data on social interaction during visits to The Forks revealed a similar trend. While 40% of respondents reported interacting with others every time or "most visits, 50.6% stated that they interacted less frequently, selecting occasionally or rarely. Additionally, 7.1% of respondents indicated that they did not interact with others during their visits.

Personal observation supports this distribution. During my multiple site visits, I observed individuals and pairs quietly walking along the river, and some sitting alone in green spaces. These visitors appeared to be engaged in personal reflection or recreational solitude. This aligns with a respondent's comment: “I go there when I need to clear my head”. I also saw people engaging in small conversations with people at The Forks Market and skating trails. These observed behaviour reflect the variety of social interactions captured in the survey data.

These findings suggest that while The Forks serves as a social gathering space for many, it also functions as a setting for personal reflection and solitude. The balance between social engagement and personal time is important for overall wellbeing, as both forms of experience contribute to different aspects of mental health and life satisfaction & Deci, 2001).

A correlation analysis revealed a statistically significant positive relationship between the frequency of visits with family or friends and the level of interaction with others ($r = 0.582$, $p < 0.001$), indicating that individuals who visit The Forks more often with others tend to report more frequent social interaction. However, the survey did not differentiate whether these interactions occurred solely within one’s own group or extended to other visitors. Therefore, the nature of these interactions, whether confined to familiar social circles or inclusive of new connections, remains unclear from the data alone.

4.3.2 Cultural Diversity and Community Cohesion at The Forks

The survey findings indicate that The Forks serves as a space where individuals from diverse backgrounds can interact. A total of 57.7% of respondents reported encountering individuals from different cultural or ethnic backgrounds, either on every visit (21.2%) or frequently (36.5%). Conversely, 3.5% of respondents stated that they never experienced such interactions. This high level of cultural engagement not only enriches the social fabric of The Forks but also enhances its role in fostering community cohesion. Gopalkrishnan (2018), asserts that interactions among individuals from different cultural backgrounds promote understanding and reduce prejudice, ultimately benefiting overall wellbeing in the community. Additionally, urban studies research suggests that public spaces like The Forks facilitate social integration by providing environments where diverse groups can come together (Qi et al., 2024).

Personal observations further support these findings.I observed a rich tapestry of cultural expressions. On weekends, especially around 3:00 p.m., I noticed the space becoming increasingly lively and diverse. I saw families and groups from various cultural backgrounds gathering, some speaking different languages, and others wearing traditional clothing. These moments reflected a strong sense of shared space among people from different backgrounds and highlighted the multicultural nature of The Forks at that time of day.

Another key aspect revealed by the survey is the opportunity for visitors to reconnect with friends or meet new people at The Forks. The data show that 37.6% of respondents agreed or strongly agreed with the statement, "I have met new friends or people I have not seen in a long time at The Forks," while 31.8% remained neutral, and 23.5% disagreed. From my observations, the social layout of the site, particularly around the market, skating trails, and seating areas, appeared to encourage spontaneous interaction. During most of my visits, I saw people greeting each other with enthusiasm and immediately engaging in conversation. These moments were consistent with a respondent's response: *"I ran into a childhood friend here last summer. We had not talked in years."* Similarly, two visitors from the same country shared that they unexpectedly met each other at The Forks.

These findings are in line the with existing research that characterizes The Forks as a "cosmopolitan canopy," a term used to describe public spaces that foster convivial interaction among socially and culturally diverse populations (Bookman, 2023). According to Bookman (2023), the design of The Forks market, which functions like a modern common, encourages people to gather, talk, and spend time together. This setup supports both planned meetups and unexpected encounters, helping to build a sense of community and making visits more socially rewarding.

Although a few individuals indicated that they never interacted with others or met new friends during their visits, some still expressed a sense of connection to the space. For instance, one respondent stated that, "Sometimes I just come here to look at people, maybe talk to someone. It feels open". This sentiment suggests that, even without direct engagement of people at The Forks, The Forks is still perceived as a socially inviting space, that fosters a sense of belonging through mere proximity to others.

Participation in community events at The Forks also varied among respondents. While 38.8% of respondents reported attending events "sometimes," 29.4% stated that they "rarely" participated, and 7.1% indicated that they had "never" attended any events. On the other hand, 4.7% of respondents reported participating in events "always." These results suggest that while The Forks offers a variety of events and attracts visitors for this reason (see Table 5.3), participation rates vary, and not all visitors engage in these activities regularly.

4.3.3 Sense of Belonging at The Forks

The survey data indicates a strong sense of community at The Forks with 81.2% of respondents agreeing that The Forks fosters a sense of community and belonging. Specifically, 30.6% of respondents strongly agreed, and 50.6% agreed with this statement. These findings suggest that The Forks is perceived as a space that not only brings people together but also enhances their connection to the broader community. Research supports the idea that having a strong sense of belonging is beneficial for mental health, as It can alleviate stress, boost happiness, and enhance overall life satisfaction (Haim-Litevsky et al., 2023). I also experienced this sense of community during my visits to The Forks. I observed people greeting one another, sitting in groups, and spending time together around the market and along the river. Even strangers exchanged smiles in shared spaces.

This perception is further supported by statistical analysis. A Pearson correlation coefficient of $r = 0.917$ was found between the perceived importance of The Forks for connecting with friends and family and the belief that it fosters a sense of community and belonging. The correlation was highly significant ($p \approx 8.87 \times 10^{-35}$), indicating a strong relationship between these two variables. This suggests that people who view The Forks as important for social connection are also more likely to experience it as a community-oriented space.

However, not all respondents shared this experience. One participant stated, *"I do not really feel part of anything when I come here."* This comment reflects a minority viewpoint and highlights that, although the majority perceive The Forks as inclusive and communal, individual levels of connection and engagement can vary.

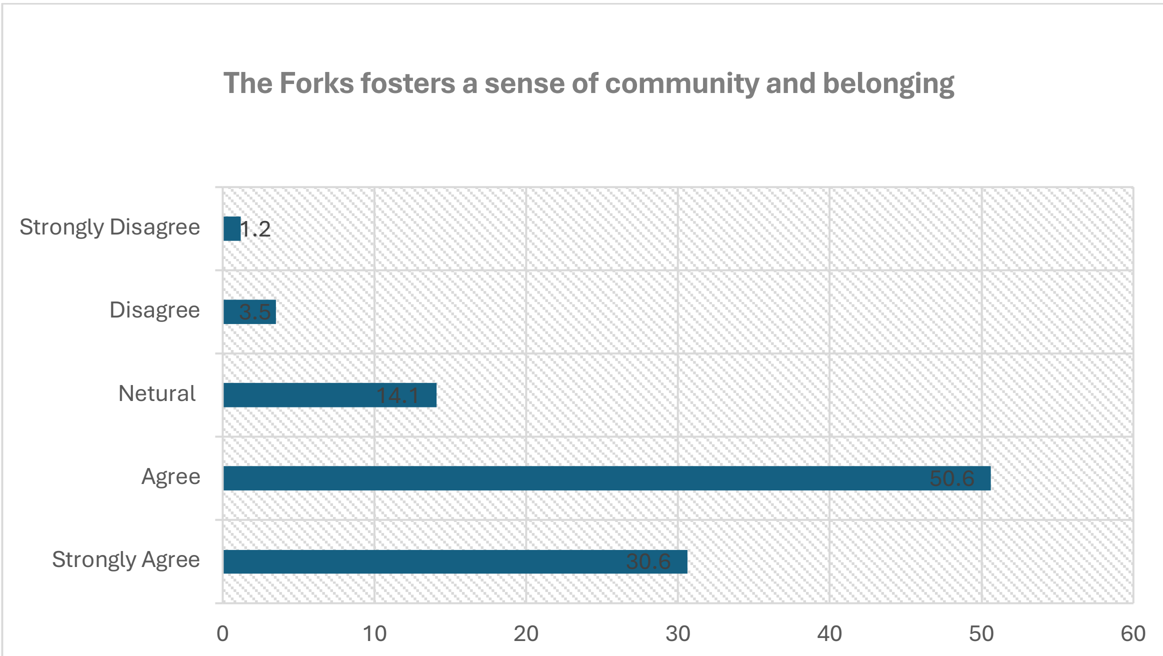

Figure 4.3 Sense of Belonging at The Forks

4.4 Connection to nature at The Forks

The Riverwalk emerged as the most frequently cited natural element, with 23.0% of respondents selecting it as a key space they spend time in. This was closely followed by the waterfront (21.4%), green spaces or lawns (19.8%), and gardens or landscaped areas (18.9%). These results indicate that a wide range of natural elements are valued by visitors and contribute to their use of the space.

Parks or playgrounds were selected by 13.2% of respondents, reflecting their appeal, particularly among families or those visiting with children. Only a small proportion of respondents (2.5%) reported not spending time in any natural areas at The Forks, and 1.2% selected others.

During my visit, I noticed the river was frozen, and the usual flow of water along the waterfront had come to a seasonal pause. Yet, the riverwalk remained lively in its own quiet way. I saw visitors strolling along the snow-cleared paths and some stopping to take photos. Even without flowing water, the area felt peaceful and beautiful, surrounded by snowbanks. The frozen river had also become a place for activity, I saw people putting on skates and gliding across the ice for my evening visits. This change shows how the space adapts to season, which blend nature and recreation in a way that keeps The Forks lively, even in winter.

Table 4.3 Natural Features Respondents spend time with

Natural Features		**Responses**	
		N	Percent
	Riverwalk	56	23.0%
	Green spaces or lawns	48	19.8%
	Gardens or landscaped areas	46	18.9%
	Waterfront	52	21.4%
	Parks or playgrounds	32	13.2%
	I don’t spend time in natural spaces at The Forks	6	2.5%
	Others (please specify)	3	1.2%
Total		243	100.0%

The level of engagement among these natural spaces is notably high. The survey results show that 40.5% of respondents engage in nature-related activities, while 31% engage occasionally**.** This suggests that The Forks could serve as a valuable recreational space where city residents can regularly interact with nature, which can lead to promoting both physical activity and mental wellbeing.

In addition, the impact of these interactions goes beyond recreation, with seventy-four percent of participants affirming that their visits to The Forks have strengthened their connection to the natural environment. This strong positive response highlights the effectiveness of The Forks in making nature accessible and enjoyable in an urban setting, thereby fostering greater ecological awareness and connectivity.

I personally experienced this connection during my morning visit to The Forks. I found myself pausing to watch the trees and listening to the quiet around the frozen river. The stillness of the scene felt peaceful and grounding. In that moment, I realized how easily nature can be felt, even in the centre of the city. This feeling echoed what one respondent shared: *"I come here to slow down and feel connected; the Forks is where I go when I need a break from everything."* Together, these experiences highlight how The Forks offers a calming space within the city, allowing visitors to reconnect with nature in simple but meaningful ways.

Furthermore, the value of these natural settings is reflected in their contribution to the overall visitor experience. 85% percent of respondents rated natural features as either important or very important to their enjoyment of The Forks. This strong appreciation suggests that visitors not only recognize the beauty and function of these spaces but also view them as essential for enhancing urban life and deepening their personal connection to nature.

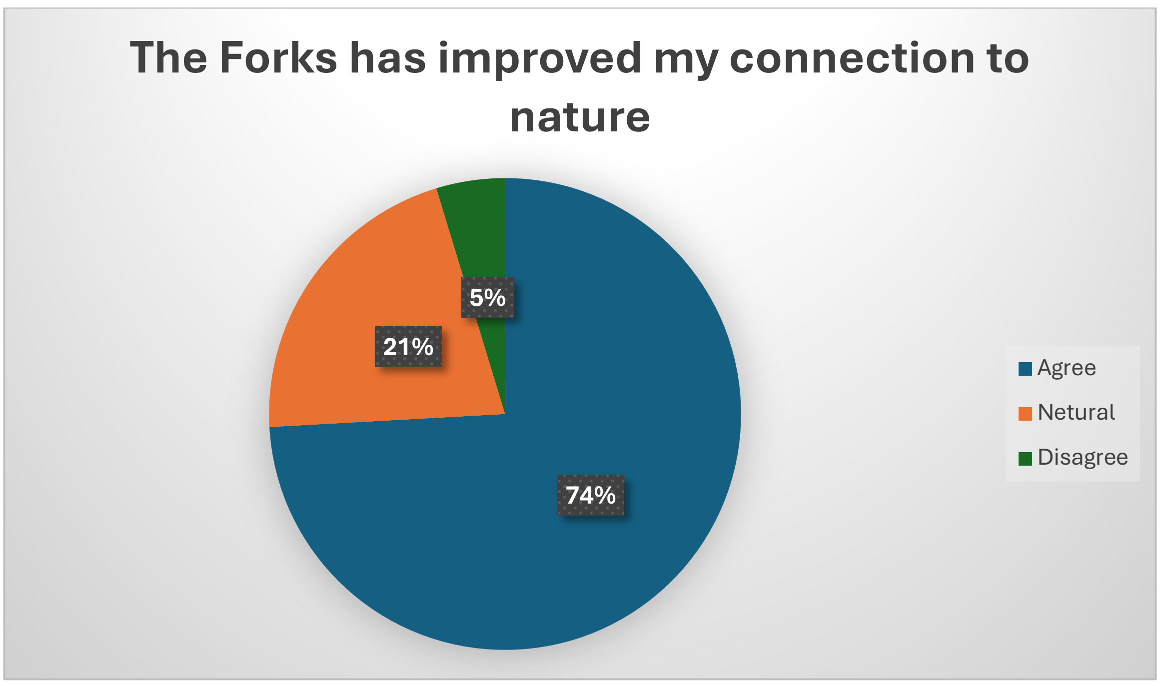

Figure 4.4 The Forks has improved my connection to nature

Quantitative analysis supports these findings and observations. Based on the Pearson correlation matrix below, which explores the relationships between how often people engage in nature-related activities at the Forks, has visiting The Forks improved connection to nature, and the perceived importance of the natural environment at The Forks. The analysis reveals a significant relationship (Pearson Correlation: 0.488, p <

0.001) between the frequency of engaging in nature-related activities and the improvement of respondents' connection to nature at The Forks. This correlation suggests that consistent engagement at The Forks natural environment such as activities like walking or bird watching or simply enjoying the greenspaces can strengthen visitors' bond with the natural world.

Additionally, the analysis indicates a significant, though weaker, positive correlation (Pearson Correlation: 0.288, $p = 0.008$) between the frequency of these activities and the importance respondents attribute to the natural environment at The Forks. This relationship highlights that those who frequently participate in nature-based activities not only develop a stronger bond with nature but also value these environments more highly. Although this correlation is weaker, it indicates that frequent engagement in natural settings can enhance the value visitors place on these areas.

Furthermore, a strong positive correlation (Pearson Correlation: 0.563, $p < 0.001$) exists between respondents' enhanced connection to nature and the value they place on the natural environment The Forks. This finding is particularly significant as it illustrates a reciprocal effect: a deepened connection to nature at The Forks leads to a higher valuation of the natural environments at the space, which in turn likely influences behaviors and attitudes towards environmental conservation and sustainability.

Table 4.4 Correlation Analysis

		Engage in nature-related activities	Improved connection to nature	Importance of natural environment
Engage in nature-related activities	Pearson Correlation	1	.488**	.288**
	Sig. (2-tailed)		<.001	.008
	N	85	85	85
Improved connection to nature	Pearson Correlation	.488**	1	.563**
	Sig. (2-tailed)	<.001		<.001
	N	85	85	85
Importance of natural environment	Pearson Correlation	.288**	.563**	1
	Sig. (2-tailed)	.008	<.001	
	N	85	85	85
**. Correlation is significant at the 0.01 level (2-tailed).				

4.5 Design Features at The Forks

Among the design features that contribute most to visitors' experiences at The Forks, the river and public art installations stood out as the most frequently selected, with 74 respondents each identifying them as important. This highlights their strong visual and emotional impact on the space. The natural presence of the river and the creative, cultural elements of public art appear to leave a lasting impression. One respondent reflected this by saying, *"The river and the art make the whole place feel alive."* During my visit, I also noticed how people regularly paused to admire the art, take photos, and even discuss the pieces with others. It was clear these features added something meaningful and memorable to the overall atmosphere.

Accessibility features and seating areas followed closely, each selected by 73 respondents, showing that comfort and inclusivity are essential components of the visitor experience. Walking and biking paths were selected by 71 respondents. Although slightly lower, green spaces such as lawns and parks still received 68 responses, confirming their steady role in shaping the site's appeal. Only 5 respondents selected others. Additionally, 69.4% of respondents feel that The Forks design promotes social interactions and 78.8% believe it strengths their connection to nature.

Table 4.5 Design feature at The Forks

Design Features	**N**
Green spaces (e.g. lawns, parks)	68
Walking and biking paths	71
Seating areas	73
River	74
Public art installations	74
Accessibility features (ramps, wide paths)	73
Others	5

In terms of which features should stay the same, improved, and removed, 82.9% of respondents believe seating areas at The Forks should be improved, making it the most pressing concern among the surveyed physical features. In contrast, only 17% preferred seating to remain the same, and no respondents advocated for removal. This significant demand for better seating suggests that the existing options may be insufficient in number, comfort, or accessibility. Urban design research emphasizes the importance of diverse and strategically placed seating to enhance public space usability (Mehta, 2014). The absence of sufficient seating can lead to shorter visitor stays, reduced inclusivity for elderly or mobility-impaired individuals, and fewer opportunities for social engagement (Mensah, 2014). I also paid attention to seating areas for my observation. I noticed that benches and sitting areas were often full for the weekends at night-time when they temperatures were low. Some people sat on steps and low walls when no benches were available.

Also, a significant proportion of respondents (58.8%) expressed a need for improvements in accessibility features such as ramps and wide paths, while 35.3% believed the current infrastructure is sufficient. Research highlights that inclusive and barrier-free design in public spaces is important for fostering independence, social inclusion, and equal access (Imrie & Hall, 2003).

5.0 DISCUSSION

This section interprets the study’s findings in relation to broader themes in nature-based solutions (NBS), wellbeing, and physical design. It emphasizes how social, cultural, and spatial dynamics at The Forks contribute to the wellbeing experiences of its visitors.

5.1 Key Findings

From the survey respondents reported experiencing strong social ties, opportunities for cultural exchange, and a deepened connection to nature. These wellbeing benefits manifested in both interpersonal ways, such as meeting friends or encountering people from diverse backgrounds, and intrapersonal ways, such as solitude, reflection, and emotional clarity. Additionally, most respondents highlighted the importance of natural features like the riverwalk, green spaces, and gardens, suggesting that these elements play a restorative and grounding role. The riverwalk emerged as a highly valued space for nature engagement.

Importantly, participants identified design features such as public art, seating areas, and pathways as essential to enhancing their experience. While many praised the layout and aesthetic quality of the site, a significant proportion expressed a desire for improved seating and better accessibility, indicating that wellbeing outcomes can be hindered by overlooked design limitations.

5.2 Demographic of Respondents

The respondents' demographics shows a nearly equal gender distribution, with males comprising 45.9% and females 43.5% of the respondents. This equitable representation suggests that The Forks appeals broadly across gender lines, supporting a diverse range of activities and interests. Such balance is important as this indicates that The Forks amenities are finely tuned to attract and accommodate both diverse genders. Contemporary research, such as that by Salcedo-La Viña et al. (2023), supports the idea that gender-balanced usage at nature-based solution is indicative of well-considered design and programming that acknowledges different interests and needs across genders.

Furthermore, the ethnic diversity of respondents at The Forks shows the multicultural identity of the place with a significant representation from White, Black, South Asian communities, and among others. This diversity not only enriches the visitor experience but also promotes greater social cohesion and community resilience which are key aspects of successful nature-based solutions. Aslanoğlu et al. (2025) emphasize that nature-based solution must embrace and celebrate cultural diversity and to facilitate interactions among various ethnic groups to enhance community ties and foster a sense of belonging. The presence of Indigenous peoples and Filipinos further highlights The

Forks as a cultural hub, illustrating its role in bringing together diverse groups within a shared natural space.

5.3 Nature-Based Solutions and the Promotion of Wellbeing

The findings from the survey affirm and extend the growing recognition that NBS significantly promote human wellbeing in urban settings. While prior research has predominantly focused on the environmental benefits of NBS, such as climate mitigation, biodiversity enhancement, and urban temperature regulation (IPCC, 2013; Nero et al., 2017), there is still a discernible gap in understanding their human wellbeing in terms of social cohesiveness, interactions and connectiveness to nature, particularly within the context of Canadian mid-sized cities. The Forks, as examined in this study, demonstrates that such spaces do more than provide environmental relief; they also cultivate opportunities for emotional restoration, social interaction, and cultural inclusion. In this regard, the study aligns with with a growing body of environmental psychology literature that argues for a broader understanding of NBS benefits, encompassing not only physical health but also the emotional and interpersonal dimensions of human wellbeing (Bratman et al., 2019; Jennings & Bamkole, 2019).

The data also indicate that these benefits are not simply derived from the passive presence of natural elements, but rather from embodied and relational interactions within the space. Participants' reflections revealed that wellbeing is generated through a range of lived experiences, ranging from solitary reflection to shared social moments and seasonal recreational activities. This interpretation aligns with the work of Raymond et al. (2017), who contend that place-based wellbeing emerges through dynamic, relational engagements between individuals and their environments. In the context of The Forks, elements such as the riverwalk, lawns, and landscaped gardens were not only visually appreciated but actively inhabited, evoking feelings of calm, introspection, and social connectedness. These findings reinforce the position that the wellbeing value of NBS is not inherent to nature per se, but is shaped through patterns of use, user perception, and spatial inhabitation.

Additionally, the findings also support a multi-dimensional conceptualization of human wellbeing. The wellbeing benefits were not experienced in isolation, but often in overlapping ways. Participants described using the space for personal mental restoration while simultaneously encountering others and engaging in shared activities. Such interwoven experiences suggest that wellbeing cannot be cleanly divided into discrete categories, as is often the case in existing literature (Jennings & Bamkole, 2019). Instead, this study highlights that wellbeing unfolds as an integrated and cumulative process, enhanced by the opportunity to simultaneously interact with nature, people, and space.

The findings also draw attention to the pivotal role of cultural and community context in influencing wellbeing outcomes within urban nature-based spaces. Respondents asserted that The Forks is an inclusive environment that naturally attracts and accommodates individuals from diverse cultural and social backgrounds. This aligns with (Bookman, 2023), concept of the "cosmopolitan canopy," wherein public spaces facilitate informal, yet meaningful, social interactions among people who might not otherwise engage. The spatial layout and programming of The Forks appear to support these interactions, which reinforce its role as a node for both personal restoration and collective belonging (The Forks, n.d.).

5.4 Role of Physical Design Features in Mediating Wellbeing Benefits

While the presence of natural elements such as green roofs, blue infrastructure, and greenspaces form the foundation of nature-based solutions (NBS), it is ultimately the physical design, its layout, structure, and spatial organization, that shapes how people interact with those features and what they derive from them. From the findings, The Forks offers compelling evidence that wellbeing outcomes are not simply the result of proximity to nature but are actively mediated through the design choices that govern access, usability, and experiential quality.

Findings from this study indicate that specific design features at The Forks, such as the riverwalk, seating areas, walkable paths and greenspace, play a central role in determining the site's effectiveness as a space for promoting wellbeing. For instance, while the riverwalk was widely regarded as the most appreciated natural element, its impact on wellbeing was clearly tied to the ease of movement along its path and the availability of resting points. Similarly, public art installations were valued not just for their aesthetic appeal, but for their capacity to create emotional resonance and stimulate social interaction, functioning as informal gathering points and conversation starters.

By linking user satisfaction directly to design elements, this study shows that design is not merely decorative or secondary, but rather an active agent in producing positive wellbeing outcomes. The Forks works not just because it includes nature, but because the way those features are available through thoughtful, layered, and dynamic ways.

However, limitations in physical design, particularly with respect to seating and accessibility were identified by participants. The lack of adequate, comfortable seating discouraged prolonged visits, while barriers to accessibility restricted engagement for older adults and individuals with mobility challenges. These observations are consistent with the work of Francis et al. (2012), who emphasize that inclusivity and comfort are prerequisites for public space effectiveness.

6.0 CONCLUSION

This chapter revisits the research questions, summarizes key findings, and offers practical recommendations to guide future urban planning initiatives that incorporate nature-based solutions (NBS) for enhanced human wellbeing. It also outlines study limitations and suggests avenues for further research.

6.1 Revisiting Research Questions

a) What human wellbeing benefits do people get from visiting The Forks?

The findings of this study reveal that visitors to The Forks experience a wide range of human wellbeing benefits, both social and personal. Socially, The Forks fosters a strong sense of community, cultural exchange, and opportunities for meaningful interaction. Survey results showed that majority of respondents regularly visit with family or friends, interact with people from diverse backgrounds, and attend events that contribute to a sense of inclusion and belonging. These experiences promote emotional wellbeing, reduce feelings of isolation, and enhance community cohesion.

On a more individual level, The Forks also offers space for solitude, reflection, and stress relief. Respondents frequently reported using the site to "clear their heads," and observations supported the presence of quiet, contemplative activities along the riverwalk and green spaces. This dual function as both a site for social engagement and personal restoration illustrates how urban nature-based spaces can support multiple dimensions of wellbeing simultaneously

b) How do the physical design features of The Forks contribute to human wellbeing benefits?

The physical design of The Forks plays a central role in enabling these wellbeing outcomes. Elements such as the riverwalk, green lawns, public art, accessible paths, and seating areas were consistently highlighted as key contributors to visitor satisfaction. The river and public art installations were especially appreciated for their aesthetic and symbolic value, creating a space that is not only functional but emotionally resonant. At the same time, features like wide walkways, ramps, and strategic seating placements were crucial for inclusivity, allowing people of different ages and mobility levels to engage comfortably with the space.

6.2 Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance the wellbeing benefits of nature-based solutions (NBS) in urban settings:

- While many visitors expressed overall satisfaction with The Forks, several identified specific areas for improvement. Chief among these was the need for more seating, particularly benches that are both comfortable and strategically located to provide opportunities for rest and observation. In addition, pathways should be designed to be smooth, wide, and navigable for individuals using mobility aids such as wheelchairs, walkers, or strollers. The inclusion of clear signage, ramps, and barrier-free routes is essential to fostering a more inclusive environment where all users feel welcomed and supported.

- Respondents emphasized the importance of spaces that cater to a wide range of needs and preferences. The Forks was praised for facilitating both solitude and social interaction, visitors could enjoy moments of quiet reflection as well as community events and gatherings. Future nature-based spaces should incorporate both quiet, contemplative zones and open, flexible areas that accommodate group activities, play, and cultural programming. Such a dual-purpose approach ensures that nature-based spaces are responsive to the full spectrum of human wellbeing needs.
- Public art, cultural symbols, and storytelling features emerged as highly valued elements among visitors. Murals, sculptures, and interpretive signs that reflect the histories and identities of local communities, particularly Indigenous Peoples, can deepen a space's cultural resonance and foster a sense of pride and belonging. Integrating these features not only enhances aesthetic appeal but also affirms the diverse social and cultural dimensions of wellbeing.
- Lastly, looking forward, municipal and regional planning bodies should explicitly incorporate human wellbeing considerations into the design, evaluation, and

implementation of nature-based solutions. This involves moving beyond environmental performance metrics to include indicators such as emotional resilience, social connection, cultural relevance, and inclusivity. Policy frameworks and urban design guidelines should be updated to reflect the evidence that thoughtfully designed NBS can deliver multidimensional benefits, environmental, social, and psychological, especially in densely populated or rapidly changing urban areas.

6.3 Limitations

While this study provides valuable insights into the wellbeing impacts of nature-based solutions (NBS) at The Forks, it is not without limitations. The most significant is its focus on a single site within a limited timeframe. The Forks is a unique urban space with a distinct cultural, ecological, and historical context, making it difficult to generalize findings to other cities or nature-based spaces. Additionally, data collection occurred during winter months, potentially influencing how people interacted with the site's natural features, such as the riverwalk or gardens. Seasonal variations may lead to different patterns of use and perception that were not captured.

Another limitation lies in the methodological scope. Although the study included both surveys and observations, it did not incorporate in-depth interviews or participatory methods that could have revealed deeper narratives about place attachment, cultural meaning, or intergenerational experiences. Lastly, while informal participant quotes were used, these were not systematically gathered through qualitative interviews, which limited the depth of analysis regarding individual stories and reflections.

6.4 Future Research Directions

This study offers valuable insights into the role of nature-based solutions (NBS) in promoting human wellbeing, but it also opens several pathways for further inquiry. One key direction is the need for comparative studies across multiple urban sites. By examining different types of nature-based spaces across geographic, climatic, and cultural contexts, future research can explore how design and local conditions influence wellbeing outcomes. For instance:

- How do seasonal variations affect the use and perception of NBS features in cold-climate cities like Winnipeg?
- What design elements consistently promote wellbeing across different urban environments?

Another promising area of exploration is the integration of ecological restoration into the social and educational dimensions of urban green spaces. At The Forks, restored riparian landscapes and natural elements offer opportunities not only for environmental benefit but also for engaging the public in ecological learning and stewardship.

- How can urban restoration projects foster stronger connections between people and local ecosystems?
- What are effective strategies for involving the public in monitoring and caring for restored natural areas?

Lastly, Incorporating the Indigenous history and cultural significance of The Forks is another vital avenue for future research. As a place of deep ancestral importance, The Forks holds untapped potential as a site for place-based education and cultural learning. Future investigations could explore how Indigenous ecological knowledge, language, and history might be more visibly and meaningfully integrated into the site's design and interpretation.

- How can urban nature-based spaces better reflect and honour Indigenous worldviews and histories?
- What forms of land-based programming or storytelling could enrich public understanding of The Forks as a gathering place?

6.5 Conclusion

In conclusion, this study shows that the physical features of urban areas such as The Forks area are essential in enhancing the positive effects of nature-based solutions on wellbeing. The study advances a more sophisticated knowledge of how urban design may support social cohesion and human health by recognising and evaluating these characteristics. These realisations can guide future urban planning initiatives that address environmental issues while improving the quality of life for city dwellers.

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List of Appendices

Appendix A

University of Manitoba

Verbal Script

Hi there!

My name is Rudolph Nsoh, and I am a Master of City Planning candidate in University of Manitoba. I am conducting a study on how individuals' connection to nature and social interactions at The Forks influence their overall wellbeing for my capstone project. I am inviting visitors like you to participate in a brief online survey, which will take about 10 to 15 minutes to complete.

Your responses will help me understand how spaces like The Forks can be designed to enhance both connection to nature and community interaction. The survey is completely anonymous and confidential. This study has been reviewed and approved by a Research Ethics Board at the University of Manitoba.

Would you be interested in participating? I can give you a link to the survey, and you can complete it whenever is convenient for you. My advisor's name is Prof. Rae St. Clair Bridgman.

Thank you for considering helping with this important research!

Appendix B

Poster

Study Title:

Nature-Based Solutions for Human Wellbeing: A Case Study of The Forks in Winnipeg, Manitoba

Student Principal Investigator

Rudolph Nsoh

Master of City Planning Candidate, University of Manitoba

Email: nsohr@myumanitoba.ca

Student Advisor

Prof. Rae St. Clair Bridgman

Professor

Department of City Planning, University of Manitoba

Email: rae.bridgman@umanitoba.ca

About the Study:

We invite you to participate in a study exploring how connection to nature and social interactions at The Forks impact overall wellbeing. Your insights will help shape better urban spaces that foster both individual and community wellbeing. This study has been reviewed and approved by a Research Ethics Board at the University of Manitoba.

What to Expect:

- Participants will complete a brief online survey using the Qualtrics platform. The survey will take approximately 10 to 15 minutes to complete.
- All responses will be confidential and anonymous**,** ensuring that no individual participant can be identified from the survey data.

Eligibility

- Anyone who has visited or engaged with The Forks is eligible to participate.
- 18years old and above

If you are interested to participate in this survey, please Click the link to participate: [Survey Link] Please note that the survey link will expire on January 31, 2025. Thank you for your support!

Together, we can enhance our community spaces! 💚 #TheForks #WellBeing #UrbanDesign #CommunityEngagement #ResearchSurvey

Appendix C

University of Manitoba

Survey Questions

A. Have you visited or engaged with The Forks before?

- Yes
- No

Section 1. Demographic Questions

1. What is your age?
   - 18-24
   - 25-34
   - 35-44
   - 45-54
   - 55-64
   - 65 or older

2. What is your gender?
   - Male

- Female
- Non-binary
- Prefer not to say
- Other (please specify)

3. What is your ethnicity?

- Indigenous (First Nations, Métis, or Inuit)
- White
- Black
- South Asian (e.g., Indian, Pakistani, Sri Lankan)
- Chinese
- Filipino
- Latin American
- Southeast Asian (e.g., Vietnamese, Cambodian, Laotian)
- West Asian (e.g., Iranian, Afghan)
- Other (please specify): ___________
- Prefer not to say

Section 2. Visiting The Forks

4. How often do you visit The Forks in a week?

- Daily
- 1-2 times

- 3-5 times
- 6-8 times
- More than 8 times

5. Why do you visit The Forks? (Select all that apply)

- Walking or jogging
- Biking
- Picnicking
- Attending events or festivals
- Nature observation
- Shopping or dining
- For Shelter
- Other (please specify) ....

Section 3: Social Interactions and Cohesion

6. How often do you visit The Forks with friends or family?

- Always
- Often
- Sometimes
- Rarely
- Never

7. How often do you interact with other people (e.g., friends, family, strangers) when visiting The Forks? *(Please select one option)*

- Every time I visit
- Most visits
- Occasionally
- Rarely
- Never

8. How often do you participate in community events or activities at The Forks?

- Always
- Often
- Sometimes
- Rarely
- Never

9. How often do you encounter people from different cultural or ethnic backgrounds during your visits to The Forks?

(Please select one option)

- Every visit
- Frequently
- Occasionally
- Rarely

- Never

10. I have met new friends or people I have not seen in a long time at The Forks.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

11. How important is The Forks for you in terms of connecting with friends and family?

- Very important
- Important
- Neutral
- Unimportant
- Very unimportant

12. The Forks fosters a sense of community and belonging.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Section 4: Connection to nature

13. Which natural spaces at The Forks do you spend time in? *(Select all that apply)*

- Riverwalk
- Green spaces or lawns
- Gardens or landscaped areas
- Waterfront
- Parks or playgrounds
- Other (please specify): ___________
- I don’t spend time in natural spaces at The Forks

14. How often do you engage in nature-related activities (e.g., walking, bird watching) at The Forks?

- Always
- Often
- Sometimes
- Rarely
- Never

15. Visiting The Forks has improved my connection to nature. (Please indicate your level of agreement)

- Strongly agree
- Agree
- Neutral

- Disagree
- Strongly disagree

16. How important is the natural environment at The Forks to your overall experience?

- Very important
- Important
- Neutral
- Unimportant
- Very unimportant

Section 5: Physical Design features

17. What physical design contribute the most to your overall positive experience at The Forks? (rank from most to least)

- Green spaces (e.g. Lawns, parks)
- Walking and biking paths
- Seating areas
- river
- Public art installations
- Accessibility features (ramps, wide paths)
- Other (please specify) ....

18. What physical design features contribute the least to your overall positive experience at The Forks?

- Green spaces (e.g. Lawns, parks)
- Walking and biking paths
- Seating areas
- river
- Public art installations
- Accessibility features (ramps, wide paths)
- Other (please specify) ....

19. The physical design of The Forks encourages social interactions.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

20. The physical design of The Forks strengthens connection to nature

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

21. The following physical features should:

Physical Feature	Stay the same	Improved	Removed
Green spaces (e.g. Lawns, parks)			
Walking and biking paths			
Seating areas			
Public art installations			
River			
Accessibility features (ramps, wide paths)			
Other (please specify)			

22. What do you love about visiting The Forks?............................

23. What would improve your experience of visiting The Forks?

Appendix D

Participant Informed Consent Form

Study Title: Nature-Based Solutions for Human Wellbeing: A Case Study of The Forks in Winnipeg, Manitoba.

Student Principal Investigator: Rudolph Nsoh

Master's Student

Department of City Planning

Email: nsohr@myumanitoba.ca

Student Advisor: Rae St. Clair Bridgman

Professor

Department of City Planning

Email: rae.bridgman@umanitoba.ca

Conflicts of Interest and Undue Influence: There is no conflict

You are being invited to participate in a research study. This consent form, a copy of which you can download or print, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, feel free to ask any of the people named above. Please take the time to read this document and any accompanying information carefully. It is very important that you understand:

- what is being asked of you,
- what the risks and benefits of participation are, and
- how the information you provide will be used and stored

Purpose of the Study

I am conducting this research as part of my capstone project under the supervision of Rae St. Clair Bridgman. The study focuses on Nature-Based Solutions for Human Wellbeing, using The Forks in Winnipeg, Manitoba as a case study. Our goal is to explore how nature-based elements influence human wellbeing, particularly in terms of connectedness to nature and social interactions and cohesion. We will also examine the physical design features at The Forks and how these contribute to the overall wellbeing of visitors based on these measures**.**

Study Procedures

If you decide to take part in the study, you will be asked to complete an online survey through Qualtrics. Please note that the survey link will expire on January 31, 2025. The survey should take about 10 to 15 minutes to complete.

Study Risks

This survey is minimal risk, meaning that the risks are no greater than what you might encounter in your daily life.

Study Benefits

There are no direct benefits to you by participating in this study, but we hope to learn more about how nature-based solutions can enhance human wellbeing. By understanding the relationship between connectedness to nature and social cohesion at The Forks, we aim to develop strategies that improve public spaces in the future. This research will help us better understand how design features contribute to wellbeing, guiding future planning and development of urban areas to create more sustainable and socially cohesive environments.

Compensation

There is no compensation for this study.

Use and Storage of Information

Your information will be stored on a secure platform approved by the University of Manitoba. When we share the results of this study, we will combine everybody's responses. This means other people won't see your answers. Your information may be shared outside of the University of Manitoba with researchers, other organizations, and/or made publicly available. The information is being shared for further analysis or testing, as part of the research study, and/or because it is required by a journal.

Dissemination

The study results will be shared through 1) the publication of a capstone; 2) journal publications and presentations in relevant academic fields; and/or 3) a summarized report of the study results to be sent to interested participants.

Withdrawing

Your participation in this research study is voluntary. You can choose to do only the activities and/or answer only the questions that you are comfortable with. You may withdraw from the study for any reason up until you submit your responses. You can do this by exiting the browser. You do not have to explain why. You will not be penalized in any way. Due to the nature of the study, once you submit your responses, we will not be able to remove your information as it cannot be linked back to you.

Summary of Results

The full copy of the report will be available on (https://umanitoba.ca/architecture/department-city-planning/student-work) when the study has finished. Which will be made available on this platform on June of 2025.

Questions or Concerns

Questions or Concerns Designated University of Manitoba personnel may check that this study is being done safely and properly. To do this, they may review the research records. This study has been reviewed and approved by a Research Ethics Board at the University of Manitoba. However, this does not mean that participation is risk-free. If you have questions about your rights as a research participant, you may contact the Office of Human Research Ethics at humanethics@umanitoba.ca or (204) 474-7122. If you have any questions, concerns, or complaints about this study, you may contact any members of the research team listed on the first page or the Office of Human Research Ethics.

Consent

By participating in this study, I agree that:

- I have read the above information.
- I have had the opportunity to ask and have answered all of my questions.
- I understand what is being asked of me.
- I will be taking part in a research study.
- I may freely stop or leave the research study activities at any time.
- My information may be shared outside the University of Manitoba.
- I do not waive my legal rights by participating in the study

Notice Regarding Collection, Use, and Disclosure of Personal Information

Your personal information is being collected under the authority of The University of Manitoba Act. The University of Manitoba is committed to preserving your right to privacy.

The information you provide will be used by the University to support our research. Your personal information will not be used or disclosed for other purposes, unless permitted by The Freedom of Information and Protection of Privacy Act or The Personal Health Information Act. If you have any questions about the collection of personal information: Ph: 204-474-9462 or Email: *fippa@umanitoba.ca*

I agree to participate in this study	☐YES ☐ NO

Only individuals aged 18 years and above are allowed to undertake this study Are you 18 years of age or older?	☐YES ☐ NO