Investigating the use of a web-map survey tool for heritage planning

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Heritage planning is critical for preserving places of value to community members. Citizen participation is necessary so that the public can have a voice in matters that directly impact their own communities. Public participation has traditionally been in the form of public meetings, workshops, interviews, analog surveys, and questionnaires. However, often only a subset of local residents take part in these physical means of participating in their local community's decision making. There is a need for the use of web-mapping for gathering citizen input. This study investigated how map-based survey tools can support public participation in built heritage planning in Stratford, Ontario using a web-map tool called Heritage Planner. The main functionality of Heritage Planner was to use its web-map and survey capabilities together to consider heritage value at property- and neighbourhood scales. Due to the Covid-19 pandemic, citizens could not be recruited from Stratford. Instead, students from the Environment Faculty at the University of Waterloo were recruited to provide feedback on the app. Participants who had not visited Stratford before were more inclined to comment on the larger sized properties in the city, while participants who had visited the city before were more inclined to comment on properties influenced by the neighbourhoods they visited. Due to the limitations in this study, the main direction to take for future research would be to implement an improved Heritage Planner app amongst citizens in Stratford and implement similar studies in Ontario and Canada.

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List of Abbreviations

HCD: Heritage Conservation District

CHL: Cultural Heritage Landscape

GIS: Geographic Information System(s)

GPS: Global Positioning System(s)

PGIS: Participatory Geographic Information System(s)

PPGIS: Public Participation Geographic Information System(s)

VGI: Volunteered Geographic Information

AGOL: ArcGIS Online

EB: Experience Builder

ESRI: Environmental Systems Research Institute (maker of ArcGIS)

Chapter 1: Introduction

1.1 Introduction

Heritage planning is critical for preserving places of value to community members. Heritage planners are responsible for facilitating the preservation and enhancement of structures, properties and places that have local, cultural, or historical value and for conveying their local importance to residents and visitors. In this way, not only are individual heritage properties important, but so are the districts that are made up of these properties. Heritage Conservation Districts (HCDs) are composed of areas or neighbourhoods composed of multiple buildings and properties that have local historical significance or special characteristics that differentiate them from their surrounding environment (Ontario Ministry of Tourism, Culture and Sport, 2017).

The Ontario Heritage Act, Planning Act, and Provincial Policy Statement provide a framework for identifying, conserving, and protecting cultural heritage resources in HCDs (Ontario Ministry of Tourism, Culture and Sport, 2017). Under the Ontario Heritage Act (1975), if any alteration is to be made to an identified heritage structure, then a heritage permit is required from the respective city's planning department (The Corporation of the City of Stratford, 2014). The 2005 Ontario Planning Act regulates how the land use planning system works, who makes the decisions, ways to resolve conflict and seek public input, and provincial and municipal roles in the planning administration (Ontario Ministry of Tourism, Culture and Sport, 2017). The Provincial Policy Statement explains that important built heritage resources and significant heritage districts are to be conserved.

According to Shipley et al. (2011), there are two weaknesses to the HCD designation process in Ontario. The first weakness is that heritage committee members are mainly volunteers and they only have an advisory role. The second weakness is that the actual designation of areas is on

a consensus basis. Hence, there is a need for citizen participation, so that heritage planners can base their decision making on built heritage from the general public.

Citizen participation consists of a range of processes that enable the public to contribute to the decisions and affairs of policy-setting bodies (Rowe & Frewer, 2005). Citizen participation is necessary so that the public can have a voice in matters that directly impact their own communities. Public participation has traditionally been in the form of public meetings, workshops, interviews, analog surveys, and questionnaires. However, often only a subset of local residents take part in these physical means of participating in their local community's decision making. Public participation is based on the idea that those who are affected by a decision have the right to be informed on how their input affects the decision-making process (International Association of Public Participation, 2018).

Citizen participation is crucial to heritage planning in two important ways. First, they can contribute to identifying individual properties and structures that are of local value. Second, citizens' input is important to delineating the boundaries of HCDs. Citizen input regarding heritage planning has usually been gathered through means such as public meetings, surveys, interviews, and requests for building changes (Kovacs et al., 2014). While these methods have generally satisfied the goal of maintaining and preserving properties, traditional survey methods have not provided the geographical data required to gage citizen satisfaction levels across geographic space (Galvin et al., 2012).

1.2 The value of a digital map-based approach

There should be an online plan of collecting citizen data in a more efficient manner. This is because the distributed character of online participation processes can promote the scaling of public participation to those who normally do not answer in-person or mailed surveys (Jankowski et al., 2017). The nature of public participation has changed in the last decade (Sieber et al., 2016). Public Participation Geographic Information Systems (PPGIS) empower users to have tools just like experts. PPGIS refer to methods that integrate public knowledge of places to inform land use planning and decision making (Brown, 2012). These tools can be used to create spatial data with examples such as drawing or sketching boundaries (Sieber et al., 2016).

PPGIS is implemented through crowdsourcing. This is a process in which citizens can be viewed as sensors where people voluntarily contribute geographic data and open new avenues for spatial research (Levin et al., 2017). Brabham (2009) states that crowdsourcing occurs when the public searches for ideas and solutions to specific problems and challenges. During a public participation process, the city would clarify the problem to the public in the form of a crowdsourcing call and provide data to the public in the form of a website (Brabham, 2009). The public would then provide their ideas on the website and be empowered to participate in the decision-making process. Experts would then be able to see ideas that they may not have thought of and implement these in the planning process (Brabham, 2009).

Hence, there is a need for the use of web-mapping for gathering citizen input. Brown (2015) states that using PPGIS methods can gather information with regards to the current importance of land use and future preferences for land uses. Brown (2015) argues that PPGIS can be used to provide a means to translate public judgement into spatial data for land use decisions. PPGIS can

be used to collect a wide range of spatial attributes such as place values, development preferences, place qualities, and participant experiences (Brown, 2015). During the land use planning process, it is necessary to gather a diverse range of participants' sense of place and participants should be geographically diverse. For this to happen, a web-mapping approach has to be used because this approach can reach a wider audience over a larger geographic space.

Web mapping consists of displaying geographic depictions of space on a digital plane. These web map displays can then be connected to feedback surveys in an online space, that a wide array of users can access. Web mapping has been used somewhat infrequently in heritage planning contexts but more routinely in general urban planning. Web mapping methods can scale public participation more effectively than public meetings (Jankowski et al., 2017). Web map participatory methods have been touted to overcome some shortcomings of town hall meetings, based on the assumptions that the distributed character of online participatory processes can promote the scaling of public participation to those who normally do not participate in the decision-making process (Jankowski et al., 2017). Participatory planning processes involving the public may diagnose the needs of experts better than non-participatory processes that are run exclusively by experts and result in more equitable solutions (Jankowski et al., 2017). These online web map survey tools can allow municipalities to actively participate in shaping their communities (Alfazan et al., 2017). In the context of heritage planning, experts can make use of web mapping tools to get a sense of what the community feels about built heritage in their urban spaces.

This study is important due to aspects of site (property) and situation (neighbourhood) where people can see heritage properties in relation to one another. This also applies to heritage districts where web-mapping can be used to capture aspects of place that are challenging to quantify and

to gather using traditional survey methods. PPGIS can be used to capture sense of place and place attachment (Brown et al., 2015). Sense of place is defined as a person's relationship with a place where they live. It is a living ecological relationship between a person and a place as well as a lens through which people experience and make meaning with their experiences in and with that place (Adams, 2013). Place attachment refers to how strong of a connection that citizens have with a specific place and captures the difference between goods and services provided by that place and emotional relationships citizens form with place (Brown et al., 2015). These connections can be positive or negative depending on a citizen's experiences with a specific place and place attachment can be conceptualized as personal, environmental, and social interactions depending on purpose of study. Brown et al. (2020) recommend that in order to advance the mapping of place attachment, intensity and structure of place attachment should be assessed, better mapping precision should be offered, place attachment should be associated with mapped landscape values, and place attachment behaviour should relate to place-inspired behaviour.

In the context of this study, it is crucial to see how the surrounding neighbourhood or community can impact people's opinions of individual heritage buildings and how individual heritage properties can impact citizens' input on heritage districts.

The use of web-mapping in this study is also suitable for people who cannot or do not want to gather in a public forum and can instead participate from home due to the current Covid-19 situation. The results from this study will contribute to a greater understanding of place and built heritage assessments. Williams and Vaske (2003) state that landscapes, places, and spaces are more than containers of natural resources or areas for activities. They are a collective of elements in the form of locations filled with history, memories, emotional and symbolic socio-cultural

meanings. In the heritage context, sense of place can deal with historical significance of locations and the memories or feelings that citizens in communities associate with these places. Individual heritage properties and streetscapes make up heritage conservation districts to create a meaning in the sense of place that citizens associate with these unique urban areas.

Researchers have discovered that web-mapping tool capabilities in data collection, map making, and spatial analysis have allowed the technology to move past experts and be used by the general public (Sieber et al., 2016). These tools can be used to create spatial data, and this is an active form of participation as it occurs in a formal network with examples such as drawing or sketching boundaries (Sieber et al., 2016). Czepkiewicz et al. (2016) indicate that geoquestionnaires, which are a web-mapping method to collect user-generated data, present questions in connection with an interactive web map allowing users to answer survey questions linked to geographical features in the web map. Similar in this thesis, a web-mapping tool is being used in the hopes that when citizens provide feedback, they will acknowledge factors relating to the surrounding neighbourhood when looking at a web map rather than a paper survey with a property address on it. The visualization of the surrounding area in 2D and 3D will help in this regard in addition to visuals of the property and surrounding streetscape.

2D and 3D visualization is another important reason for this study as it accommodates different capacities to understand maps and local geographies. Dubel et al. (2014) state that when planning a 2D or 3D visualization, designers must consider if 2D or 3D visualization is more suitable for certain tasks and data sets and compare 2D and 3D visualization to determine their advantages and disadvantages. Previous user studies relating to the evaluation of 2D and 3D visualization techniques indicate that there is still more to learn about what and how 2D and 3D should be used for and the relative benefits (Dubel et al., 2014). It will be important to see from

this study whether visualizing heritage sites in 2D or 3D in the web mapping tool influences feedback that participants provide.

1.3 Objectives

The purpose of this study is to investigate how map-based survey tools can support public participation in built heritage planning using a web-map tool called Heritage Planner. This study aims to develop our understanding of how citizens consider both site (property) and situation (neighbourhood) factors when considering the merits of individual heritage properties and structures. A pilot study is being conducted in the city of Stratford, Ontario, with the aim of providing insight that could be applicable to other cities throughout Ontario and Canada. The research question for this study is:

How can web based PPGIS help heritage planners to identify properties valued by community members and delineate heritage conservation districts in Stratford, ON?

The hypotheses that underlie this research are:

1) Participants will incorporate neighbourhood factors in their feedback more often than property-specific factors when using a map-centred approach.

2) Interest in a specific heritage property is positively correlated with individuals' personal attachment to, or investment in, a neighbourhood and a community to a lesser degree.

Regarding the first hypothesis, the feedback provided in web mapping tools can be compared to see the number and strength of comments for neighbourhood factors against property-specific factors.

Regarding the second hypothesis of interest in a specific heritage property being positively correlated with individuals' personal attachment to, or investment in, a neighbourhood and a community to a lesser degree, this will help in understanding aspects of place attachment related to urban heritage. The benefit of this web-mapping tool is that when citizens are looking for properties to provide feedback on, they will be more inclined to choose those they have personal connections with. This will in turn provide more in-depth data on how place attachment is connected to urban heritage.

The objectives of this study are to:

a) Design and build a web/mobile application to provide users to rate, comment and provide feedback for the various heritage properties and heritage conservation districts in Stratford,

b) Analyze users' comments to infer how heritage conservation districts and individual heritage properties contribute to their place identity and place attachment, and

c) Provide recommendations to the city of Stratford on data collection methods (remote and in-place participation) using web/mobile applications.

It is important to note that this research study is a proof of concept to demonstrate how this web map survey tool and its methods can be applied to heritage planning rather than being an examination of heritage planning itself in Stratford.

1.4 Thesis Structure

Chapter 2 is a literature review that outlines the work that has been done before in the areas of built heritage planning, citizen participation, and PPGIS and gaps in knowledge that are to be addressed in this study.

Chapter 3 presents methodology that was used to achieve the research objectives of this study. It provides an overview of the study area of Stratford, Ontario. There is a discussion of the data that was needed to build the web mapping tool that would be used to collect data from participants. The chapter then goes into how the web map survey tool is built and how users will use the tool to provide their feedback on built heritage. Finally, there is an explanation on how participants are to be recruited in the study and the process they will follow to provide us with their input.

Chapter 4 is the results and discussion, which stem from the data that is collected from users as described in Chapter 3. This chapter shows the significance of the data that is collected from participants and what it means in how it ties back to the hypotheses of this research study. It will be determined if citizens will incorporate neighbourhood factors in their feedback more often when using a map-centred approach than property-specific factors. Also, it will be seen if interest in a specific heritage property is positively correlated with individuals' personal attachment to, or investment in, a neighbourhood and a community to a lesser degree. Results are shown from each of the four surveys in the tool: about you survey (personal/background information), individual heritage properties survey, heritage conservation district survey, and post-survey (feedback after using tool). Mixed in throughout the chapter will be a discussion of the results in Chapter 4 and how significant they are in terms of what has been done in the past. It is explained how these results address the gap in knowledge of using web mapping tools to collect user-generated data in the context of urban built heritage planning.

Chapter 5 is the conclusion and directions for future research. The chapter provides a reflection of the work that has been done and if the objectives have been satisfied. There is also a look ahead to how this study can be done in other Canadian cities apart from Stratford, Ontario.

Chapter 2: Literature Review

Geographic Information Systems (GIS) technology has been used to increase public input in land use planning. GIS software allows for public participation to take place in ways that it has not been done before. Traditionally, planners gather public feedback through face-to-face meetings, public town hall gatherings or through mail. Web GIS allows for these land use planning issues to be presented to the public virtually, hence, citizens can provide their feedback online and do not have to attend in-person meetings. GIS applications can also be used to present data to the public visually in ways which people can see urban infrastructure in their cities. This data can be presented in 2D or 3D and it is of interest as to which visual data type users are interested in looking at to provide their feedback on urban infrastructure. Another interesting application of web GIS is seeing which device users prefer to provide their input on whether it be web or mobile. These concepts will be discussed towards the end of the chapter.

Heritage planning is a type of urban land use planning that is critical for preserving places of value that are found in urban areas. Heritage planners are responsible for keeping cultural and historical value alive in communities whenever redevelopment occurs in cities. In addition, heritage planners are also responsible in providing educational context in conveying historical, cultural and local importance of properties, structures and places for residents and visitors. Citizen participation is crucial in determining the decisions that heritage planners make when redevelopment proposals come in. The public should have input into what value they feel these heritage properties have in their communities. Citizens have a sense of place with the communities and neighbourhoods that they live in. Hence, it is important for planners to gage what value residents place in these heritage sites throughout urban areas. Heritage conservation districts are a critical component of heritage planning. This chapter will outline what has been

done in the field of heritage planning using web GIS technology in order to gather citizen feedback. There will be a focus on how GIS technology has been used for public participation in relation to heritage planning and the associated methods and data types that GIS software uses.

This chapter will begin with a discussion of heritage planning, what it is, why it is important, and how it provides context for this study. This will be followed by a discussion on citizen participation, what it is, why it is important, what has been done in the past, and how it can be applied to heritage planning. From here, the chapter will discuss Public Participation GIS (PPGIS), what it is, why it is important, how it has evolved from citizen participation using GIS technology, methods used, and how it applies to urban heritage planning. The chapter will end with a wrap up on how PPGIS is being used with heritage planning to collect user-generated data that can help citizens and municipalities work together to improve their communities.

2.1 Heritage Planning

2.1.1 Heritage Conservation Districts

It is important to understand that cultural heritage protection and enhancement has a long history and is recognized worldwide. For instance, the United Nations have identified World Heritage Sites as areas with legal protection for having cultural or historical significance. Cultural heritage protection is also recognized across multiple scales of nation, province, region, city, neighbourhood, and property/structure. For the context of this thesis, there is a focus on heritage conservation districts on the provincial scale of Ontario and the city scale of Stratford as this is the pilot site of this study. According to the Provincial Policy Statement, which will be discussed in the legislative framework section of this chapter, a heritage conservation district (HCD) is made up of buildings, streets, and open spaces, that when combined, are a complete asset for a

community of residents (Ontario Ministry of Tourism, Culture and Sport, 2017). It has special characteristics that distinguish it from its surrounding environment. A city can protect the unique characteristics of an area throughout the course of time by designating it as an HCD (The Corporation of the City of Stratford, 2014). Heritage designation recognizes the importance of the site to the local community, protects the property's cultural heritage value, encourages good stewardship, and conservation, and promotes knowledge and understanding about the property (Ontario Ministry of Tourism, Culture and Sport, 2017).

HCDs are composed of areas that contain multiple groups of properties and buildings or a municipality that contains heritage resources with historical significance or special characteristics that differentiates it from its surrounding environment (Ontario Ministry of Tourism, Culture and Sport, 2017). HCDs can be found in either rural or urban landscapes, including industrial, commercial and residential areas, rural environments or villages with features that contribute to sense of place and time, and contribute to the understanding of the cultural identity of a local community, region, province, or nation (Ontario Ministry of Tourism, Culture and Sport, 2017). The importance of HCDs goes past built heritage, structures, streetscapes, landscapes, and other physical elements, in order to include significant views between structures and spaces between districts. The quality of the district depends upon the diversity of lifestyle and traditions of citizens who work and live in these areas (Ontario Ministry of Tourism, Culture and Sport, 2017). A majority of Ontario's HCDs are commercial or residential districts that are situated on main streets such as major roadways in the downtown area. The benefits of designating a district include a unique framework for planning, higher quality of life and sense of place, cultural and economic prosperity, and healthy tourism (Ontario Ministry of Tourism, Culture and Sport, 2017).

2.1.2 Cultural Heritage Landscapes

Since HCDs are on the provincial and city scales, it is important to know that cultural heritage landscapes are on the regional scale. HCDs are more urban in nature while cultural heritage landscapes are more rural in nature. Cultural heritage landscapes (CHLs) include designed landscapes that are designed intentionally, transformed landscapes that have evolved through use by people and whose activities have shaped the landscape, and associative landscape with powerful religious, artistic or cultural associations. CHLs are designed landscape and natural landscapes that are associated with aesthetic, historical, and socio-cultural uses (Ontario Ministry of Tourism, Culture and Sport, 2017). CHLs contain a framework of elements including natural features such as landforms, topography, water courses, landscapes and built structures such as pathways and streets, landmarks, intersections, approaches and edges. There is an idea of visual consistency through elements such as building scale, height, mass, material, colour, and proportion that communicate a sense of place and time and distinctive features that allow landscapes to be recognized against their surrounding environment (Ontario Ministry of Tourism, Culture and Sport, 2017).

2.1.3 Cultural Heritage Value

Cultural heritage value of structures is expressed through their design, physical, historical, associative, or contextual values (Ontario Ministry of Tourism, Culture and Sport, 2017). Heritage values that contribute to HCD characteristics are expressed as historical, natural, architectural, aesthetic, scientific, scenic, social, cultural or spiritual values. Heritage assets and values that are associated with HCDs are reference points from which communities can look to the past, understand the present, and plan (Shipley & Snyder, 2013). Heritage districts can also

be evaluated as areas that have been created, have transformed, or have associated cultural heritage value. Developing government policies and guidelines for persevering heritage districts requires an understanding of these values (Ontario Ministry of Tourism, Culture and Sport, 2017).

Previous research regarding HCDs can be categorized into five areas: reasons for designating historical areas, aesthetic and design issues, effect of designation on property values, planning and political issues arising around historical conservation, and economic consequences of heritage conservation (Shipley & Snyder, 2013). Regarding economic benefits of heritage conservation, it can provide sustainable ways to use existing resources found in urban areas. In this way, heritage conservation can provide both cultural and economic values to cities (Shipley & Snyder, 2013).

2.1.4 Legislative Framework for Heritage Policy Making

The Ontario Heritage Act, Planning Act, and Provincial Policy Statement provide a framework for identifying, conserving, and protecting cultural heritage resources in HCDs (Ontario Ministry of Tourism, Culture and Sport, 2017). Under the Ontario Heritage Act (1975), if any alteration is to be made to an HCD, then a heritage permit is required from the respective city's planning department (The Corporation of the City of Stratford, 2014). The Ontario Heritage Act gives the city the right to preserve important heritage elements in its infrastructure through future redevelopment (The Corporation of the City of Stratford, 2014). The Ontario Heritage Act gives cities the ability to designate historical areas which it calls HCDs (Shipley et al., 2011).

The 2005 Ontario Planning Act gives regulations on how the land use planning system works, who makes the decisions, ways to resolve conflict and seek public input, and provincial

and municipal roles in the planning administration (Ontario Ministry of Tourism, Culture and Sport, 2017). The Ontario Planning Act also contains a policy for the conservation of key built heritage resources. Built heritage resources are identified through historical research, site survey and analysis as well as evaluation. Built heritage resources include properties with important built heritage resources, protected heritage properties, and important built heritage resources identified as part of a proposal for development or site alterations (Ontario Ministry of Tourism, Culture and Sport, 2017). Lands adjacent to heritage properties must lower their impact on heritage characteristics of designated heritage sites. This links to why GIS can help in that GIS tools can be used to visualize the impact of structures that are close in spatial proximity to heritage sites. The Heritage Impact Assessment involves historical research, site analysis and evaluation, identification of significance and heritage characteristics of cultural heritage resources, description of proposed development or alteration, measurement of development of site alteration impact, consideration of alternatives, conservation methods, monitoring, summary statement, and conservation recommendations (Ontario Ministry of Tourism, Culture and Sport, 2017). The Conservation Plan requires the identification of conservation principles, analysis of cultural heritage resources, recommendations for conservation measures and interventions, schedule for conservation work, and monitoring of cultural heritage resources (Ontario Ministry of Tourism, Culture and Sport, 2017).

The Provincial Policy Statement explains that important built heritage resources and significant CHLs are to be conserved. Also, development and altering the site may be allowed on adjacent lands to protect heritage properties where proposed development and site alterations have been evaluated and it has been proved that heritage characteristics of protected heritage properties will be preserved (Ontario Ministry of Tourism, Culture and Sport, 2017).

Regarding the review of alteration, construction, and demolition of HCDs, the Ontario Heritage Act gives cities the ability to decide whether altering, redeveloping or demolishing a site can take place within a designated HCD (Ontario Ministry of Tourism, Culture and Sport, 2017). If alterations are requested by a site owner, a permit is handed in to the city and the city get back to them within a 90-day window. The key is to follow the objectives of designating a district and respecting heritage values of the HCD plan (Ontario Ministry of Tourism Culture and Sport, 2017).

2.1.5 Opposition to Heritage Planning

According to Shipley et al. (2011), there are two weaknesses to the HCD designation process in Ontario. The first weakness is that heritage committee members are mainly volunteers and they only have an advisory role. The second weakness is that the actual designation of areas is on a consensus basis. It is crucial to understand how opinions can be gathered on HCD boundaries, what people value about designated HCDs and individual properties, how these data can be captured using web GIS, and how varying perspectives on area designation can be examined spatially. This is where web GIS technology can be used to have citizens sketch out where they believe these HCD boundaries to be and then to spatially analyze how similar and different the average consensus is. It is important for there to be consensus because if there is even a small amount of citizen opposition, the effort can get derailed. Reasons for opposition may include loss of one's control over property, bureaucratic processes, and loss in property value. However, benefits such as establishing high standards of design, shared community values, and the potential for higher property values, are not perceived (Shipley et al., 2011).

Heritage conservation has been opposed by citizens for reasons such as restrictions on what can be done to heritage properties are thought by some to limit potential buyers and lower

property values (Kovacs et al., 2009). Sometimes, areas that are to be designated as HCDs have an external organization's interests associated with them as they may want to demolish and redevelop structures in these areas. In these cases, opposition against heritage designation rises (Kovacs et al., 2009).

According to Shipley et al. (2011), important issues in districts can include a lack of education and awareness in citizens about HCDs, external development pressure, lack of funding available to property owners, lack of community involvement, lack of district expansion, and lack of place reference. Place reference refers to being able to distinguish heritage characteristics and building features within an HCD (Shipley et al., 2011).

2.1.6 Research Methodologies for evaluating Heritage Districts

Kovacs et al. (2014) conducted a study in which they looked to answer six questions evaluating the success of HCDs in Ontario. Kovacs et al. (2014) explored answering whether the original HCD plan goals were met, whether residents were satisfied living in HCDs, how district designation affected property values, whether it was difficult for citizens to make changes to their properties, how HCDs performed when compared to each other, and important issues in heritage districts. Kovacs et al. (2014) took four research approaches to answer these questions.

The first one was townscape surveys, which involved land-use mapping and streetscape assessment. Streetscape views were assessed according to 25 criteria such as pedestrian friendliness, traffic safety, vitality, legibility, edge quality, cleanliness, signage, maintenance, public and private plantings, conservation work quality, quality of new development, neglected features and conserved elements. For each view, criteria were rated between 1-5 by citizens, and scores for the entire HCD were aggregated to give an impression of each criterion and provide an

overall score for each district (Kovacs et al., 2014). Aspects of this rating system are being improved upon in this thesis through the implementation of different types of ratings for users to fill in such as five stars, best score out of 10, or a slider going from least preferred to most preferred. The criteria will be different in this study as heritage aspects such as architecture, sense of place, and impact of structure on community is being investigated.

The second approach was residential surveys and stakeholder interviews. Stakeholder interviews were conducted with planners, community associations, municipal heritage committees, and business improvement area associations, and they were asked whether the original district plan goals were met and if there were any issues. Residential surveys were conducted, and mail was sent to citizens. Questions for citizens included experiences and level of satisfaction living in HCDs (Kovacs et al., 2014). The way in which this will be improved upon in this study is that instead of having multiple avenues to collect data, this thesis will work to combine these various traditional analog methods into one digital method of the web/mobile tool which will be designed to collect citizen opinion.

The third approach was real estate value analysis, in which the impact of HCD designation on property values was evaluated and individual sites were compared to sale histories of non-designated buildings in nearby neighbourhoods. Kovacs et al. (2014) graphed individual sales with average sales of non-designated buildings in accompanying neighbourhoods to show if individual properties within the HCD performed above, at, or below average. In addition, Kovacs et al. (2014) showed how property values behaved after the HCD was designated in relation to market fluxes.

The fourth approach was the district plan and document analysis, in which the district plans were analyzed for strategic goals and municipal documents with information on property

modification requests were analyzed. The goal was to identify how many applications for property alterations were made, how many were approved or rejected, how much time the application process took, and what alterations the applications were for (Kovacs et al., 2014).

Mainly, the research approaches taken by Kovacs et al. (2014) were based on traditional and analog methods of data collection. The research approaches in this thesis look to improve upon the amount of data that can be collected in a less labour-intensive manner by designing a participatory web GIS tool which will collect citizen input on heritage sites and HCDs within urban areas. The study by Kovacs et al. (2014) focused on satisfaction of citizens living within heritage districts. This thesis will focus on citizen opinion on heritage districts within the city regarding where the boundaries should be and what constitutes a heritage district. In addition, there will be a focus on individual heritage sites throughout urban centres and if heritage districts should be expanded to include some of these sites that are not included within the original boundary.

2.2 Citizen Participation

Citizen participation is increased involvement of the public in the decisions and affairs of policy-setting bodies (Rowe & Frewer, 2005). There are various mechanisms for enabling citizen involvement. These range from simple citizen surveys to complex approaches involving citizens taking part in public meetings, which attempt to structure the debate and provide balanced information on the issue (Rowe & Frewer, 2005). Citizen participation involves information being shared between the public and experts. There is a degree of dialogue that takes place in a group setting, which can either involve representatives of both parties or only representatives of the public who receive additional information from experts prior to responding (Rowe & Frewer,

2005). Rather than just raw public opinion being conveyed to experts, dialogue and negotiation transforms opinions in members of both parties. Citizen participation is necessary so that the public can have a voice in matters that directly impact their own communities. Public participation has traditionally been in the form of public meetings, town hall meetings, city hall meetings, workshops, interviews, analog surveys and questionnaires. However, often only a subset of local residents take part in these physical means of participating in their local community's decision making. Public participation is based on the idea that those who are affected by a decision have the right to be informed on how their input affects the decision-making process (International Association of Public Participation, 2018).

2.2.1 Conceptual Models of Public Participation

Innes and Booher (2004) reframe public participation by identifying five purposes to justify public participation. One purpose is for decision-makers to find out what the public's preferences are so that they can play a part in their decisions (Innes & Booher, 2004). A second purpose is to improve decisions by incorporating citizens' local knowledge into decision-making and a third purpose is to advance fairness and justice into decision-making. A fourth purpose is to get legitimacy for public decisions and a fifth purpose is to have participation occur because the law requires it (Innes & Booher, 2004).

There are various models that have been created by researchers that outline the process of public participation. Arnstein (1969) created the first conceptual model for citizen participation in the form of a ladder. The bottom two rungs of the ladder are termed as Manipulation and Therapy by Arnstein (1969). These rungs describe levels of non-participation that have been seen by some to be actual participation. Their true objective is to allow stakeholders to educate participants, but not to enable people to participate in planning programs (Arnstein, 1969). The

next two rungs, Informing and Consultation, progress to levels of tokenism that enable citizens belonging to vocal minorities to hear and have a voice. Citizens can hear and be heard when they are deemed by stakeholders to be the total extent of participation. However, under these conditions, they do not have the power to make sure that their views will be heard by those in power. When participation is restricted to these levels, there is no follow-through, therefore, there is no assurance of changing the status quo (Arnstein, 1969). The next rung up the ladder, Placation, is a higher-level tokenism because the rules enable citizens belonging to vocal minorities to advise but retain the continued right to decide for stakeholders. Farther up the ladder are levels of citizen power with increasing amounts of decision-making power (Arnstein, 1969). Citizens can enter into a Partnership that allows them to negotiate and engage in trade-offs with traditional stakeholders. At the highest rungs of the ladder at the top, Delegated Power and Citizen Control, citizens belonging to vocal minorities obtain most of the decision-making power (Arnstein, 1969).

Another model is one that is created by Wiedemann and Femers (1993). This ladder of public participation increases public involvement as follows: the public's right to know, the public being informed, the public's right to object, public participation in determining agenda, public participation in assessing risks and determining solutions, and public participation in final decision (Wiedemann & Femers, 1993). Following this model, Dorcey et al. (1994) came up with another conceptual ladder of public participation. This ladder increases citizen control as follows: informing the public, educating the public, gathering information from the public, defining issues, consulting on reactions from the public, seeking advice from the public, seeking consensus from the public, and the public being involved in an ongoing process (Dorcey et al., 1994). Finally, Connor (1988) came up with another ladder of public participation which

involves both leaders and the general public. For the general public, the ladder increases citizen control as follows: education, information feedback and consultation (Connor, 1988). For leaders, the ladder increases public involvement as follows: joint planning, mediation, litigation, and resolution (Connor, 1988).

Schlossberg and Shuford (2005) state that it is crucial from these various models for PPGIS scholars to know who the public is and how that public should be selected. There are many differences in how a public is selected and incorporated into a PPGIS project depending on the frame of reference that is used (Schlossberg & Shuford, 2005). In this thesis, it will be important to know that there are multiple publics in neighbourhoods such as families, parents, and seniors that are concerned about property values.

Reed et al. (2018) have created an updated model in the form of a wheel of participation that allows for all forms of participation to be available, but selection is based on understanding of what works in terms of desired outcome from engagement. Reed et al. (2018) recommend that time should be taken to understand context to determine the type of engagement approach to be used and adapt it to be used in context. All affected parties should be involved in dialogue as soon as possible to develop goals and outcomes in the best interests of all parties involved (Reed et al., 2018). Power dynamics should be managed so that every participant's contribution is valued, and all have an equal opportunity to contribute (Reed et al., 2018).

2.2.2 Public Engagement and Heritage Planning

Grassroots organizations, local groups, and individuals are often concerned about protecting their neighbourhoods and being actively involved in decisions that are made for their communities. Key stakeholders in heritage conservation include interest groups that have stakes in heritage

buildings, whether they are for personal or financial benefit (Elsorady, 2012). It is important to take into consideration that the commitment the public shows when trying to preserve heritage best represents the characteristics of those special communities. New heritage districts are established by cities that determine the areas within the municipality that contain multiple buildings that have heritage characteristics and need to be preserved. In the past, there has not been a lot of public engagement on this front. Planners need to have the public participate in the decision-making process so that all members of the community feel comfortable with the boundaries that have been established for a heritage district. This study will be addressing this gap in research using GIS technology in combination with public engagement.

Regarding social factors of heritage conservation, Yung et al. (2017) suggest that sense of community and cultural identity play a big role. Sense of community is a feeling that citizens have of belonging, being of importance to one another and the group, and a shared feeling that their goals will be met by staying together (Yung et al., 2017). Heritage conservation strengthens residents' understanding of their communities and contributes to a unique sense of place and community tradition. Hence, citizens' sense of community and feeling belonged is empowered (Yung et al., 2017). HCDs can be common ground to connect citizens to their roots as these sites help develop cultural identity of individual residents as groups of people within different places (Yung et al., 2017). Using GIS technology in combination with public engagement to capture sense of place with heritage districts is crucial so that more citizen feedback is collected when establishing these HCDs.

2.2.3 How Public Participation fits into Heritage Planning

Experts typically drive the heritage planning process through municipal heritage committees and municipal councils, and they solicit public input as part of the process. Regarding designation of

individual heritage properties, the province of Ontario has a process that lists the steps taken to designate individual heritage sites (Government of Ontario, 2007).

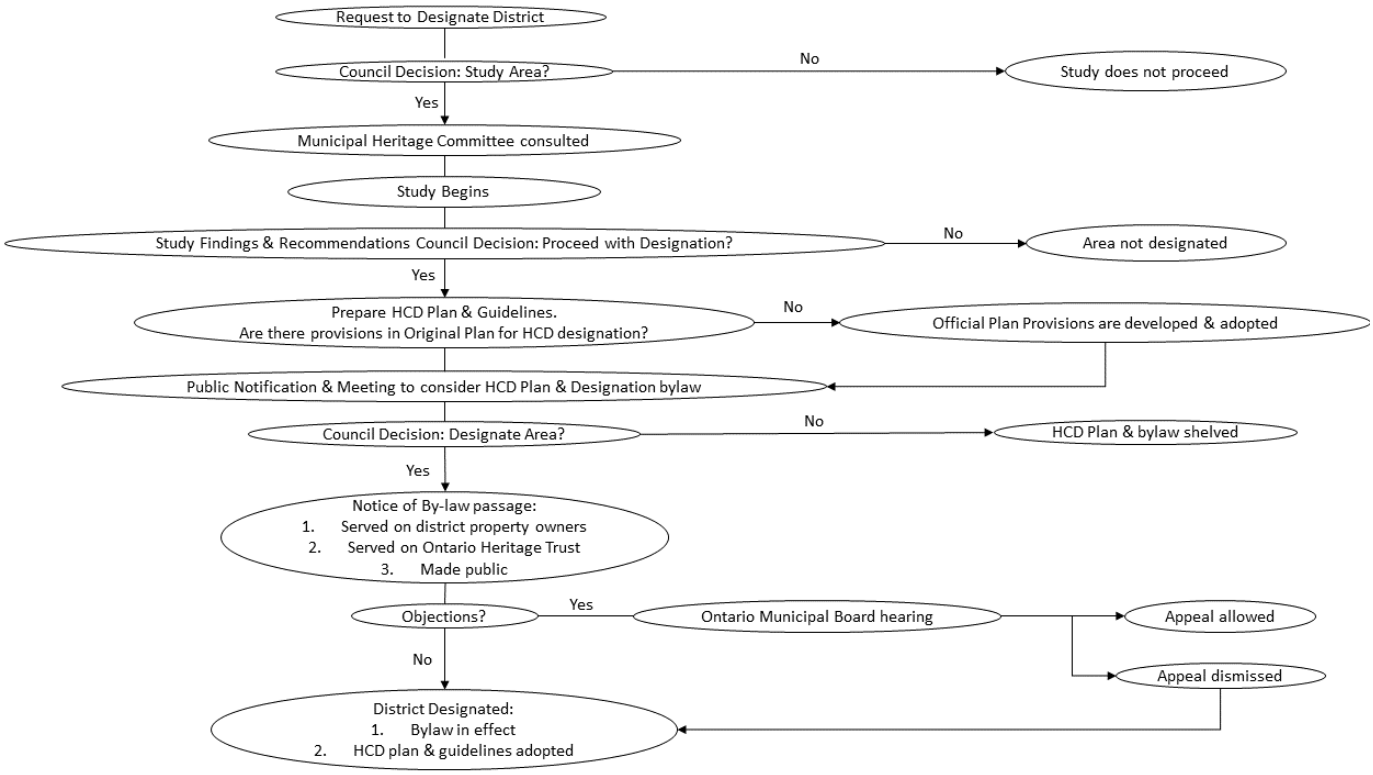

Figure 2.1: Flowchart depicting HCD Designation Process

Adapted from: Government of Ontario. (2006). Heritage Conservation Districts. *Queen's Printer for Ontario.* Retrieved from: untitled (gov.on.ca)

Public participation comes into play during Step 3 of the designation process: Serving Notice of Intention to Designate (Figure 2.1). If a municipal council wants to designate a property, it has to let the owner know as well as the Ontario Heritage Trust and publish a Notice of Intention to Designate in a local newspaper (Government of Ontario, 2007). The notice should include a description of the property, a statement of cultural heritage value which identifies the property's heritage significance, and description of heritage attributes detailing features that

should be protected for the future (Government of Ontario, 2007). Public participation can come in the form of public meetings at this step, where citizens are asked if the property should be designated.

Regarding the setup, review and designation of an HCD, the province of Ontario has a process that lists the steps taken to designate HCDs (Government of Ontario, 2006). Public participation comes into play during Step 6: Delineation of the boundary of an HCD and Step 7: Public consultation of the designation process (Figure 2.1). Step 6 involves delineating boundaries of heritage districts based on historic factors, visual factors, physical features, and legal/planning factors (Government of Ontario, 2006). Final definitions of boundaries come from the municipal council's research findings and community consultation process. Public participation in the form of public meetings comes at this step, where citizens can provide input on where HCD boundaries should be formed. Step 7 involves public meetings that can be conducted in the following ways (Government of Ontario, 2006). The initial meeting allows municipal heritage committee members to explain the process for district designation and receive initial comments and views. The second meeting allows for discussion of the proposed boundary and other results of the study. The third meeting provides opportunity for review of the plan and guidelines (Government of Ontario, 2006). This study introduces a digital map-based approach to gathering public input in these steps.

2.3 Public Participation GIS

Advancements in GIS and handheld GPS devices have allowed planners and decision makers to evaluate participation with mapping technologies (Sieber et al., 2016). Researchers have discovered that GIS system capabilities in data collection, map making, and spatial analysis have

allowed the technology to move past experts and be used by the general public (Sieber et al., 2016). Both Participatory Geographic Information Systems (PGIS) and Public Participation Geographic Information Systems (PPGIS) derive their roots from government mandates to include the general public in decision making processes (Sieber et al., 2016). P(P)GIS give citizens a voice and allow a degree of empowerment through access to map tools and data (Verplanke et al., 2016).

Participatory Geographic Information Systems (PGIS) refer to spatial participatory methods that are intended to improve public participation for land use planning and call upon citizens to participate in planning activities that require spatial knowledge and understanding of place (Zolkafli et al., 2017). An important research question to investigate is how new spatial participatory methods can be implemented in an effective manner with a non-expert public, while building capacity for public engagement in future planning activities. The rapid evolution of PGIS methods has outpaced the research needed to fully assess their effectiveness (Zolkafli et al., 2017). The goal of PGIS is to allow for the public input of knowledge and experiences relative to land use planning, especially from local marginalized citizens like ethnic minorities and indigenous communities in decision-making processes (Zolkafli et al., 2017).

Public Participation Geographic Information Systems (PPGIS) refer to methods that integrate public knowledge of places to inform land use planning and decision making (Brown, 2012). PPGIS is a form of crowdsourcing as it is a method that collects spatial data from groups of people for public engagement (Levin et al., 2017). Crowdsourcing is a process in which citizens can be viewed as sensors where people voluntarily contribute geographic data and open new avenues for spatial research (Levin et al., 2017). Brabham (2009) states that crowdsourcing occurs when the public searches for ideas and solutions to specific problems and challenges.

During a public participation process, the city would clarify the problem to the public in the form of a crowdsourcing call and provide data to the public in the form of a website (Brabham, 2009). The public would then provide their ideas on the website and be empowered to participate in the decision-making process. Experts would then be able to see ideas that they may not have thought of and implement these in the planning process (Brabham, 2009).

Haklay (2013) places a critical focus on Volunteered Geographic Information (VGI) and presents the power of the individual participant and their input into the project as being an important factor for consideration. VGI is a form of crowdsourcing where ideas are solicited for a certain project from a group of people, especially an online community, using technology such as the geoweb and online location-based services (Levin et al., 2017). See et al. (2016) state that VGI can be passive or active and may or may not relate to a specific issue. Crowdsourced geographic information provides an idea to the experts on the issues that are most important to citizens and the different solutions they can provide that can be used in the planning process (See et al., 2016). Haklay (2013) presents a framework in which citizens playing volunteer roles drive the purpose of participatory mapping projects. The drivers are not just technical, but social as well, with an increase in the number of leisure hours and a rise in serious leisure pursuits. Haklay (2013) presents four levels of participation and engagement in participatory mapping projects. Level 1 is 'Crowdsourcing' and it involves citizens playing the roles of sensors and volunteered computing. Level 2 is 'Distributed Intelligence' and it includes citizens playing the roles of basic interpreters and volunteered thinking. Level 3 is 'Participatory science' and it involves participation in the definition of the problem and the collection of data. Level 4 is 'Extreme Citizen Science' and it includes collaborative science, which involves problem definition, data collection, and analysis. Through describing these four levels of participation and engagement in

participatory mapping projects, Haklay (2013) challenges the way science involves the general public or specific audiences.

The nature of public participation has changed in the last decade (Sieber et al., 2016). PPGIS empowers users to have tools just like experts. These tools can be used to create spatial data, and this is an active form of participation as it occurs in a formal network with examples such as drawing or sketching boundaries (Sieber et al., 2016). There will be active participation in this thesis as users will be sketching boundaries for HCDs. However, there has been more passive participation in the last decade, which includes more location-enabled social media data (Verplanke et al., 2016). The difference between PPGIS and VGI is that PPGIS is an active process that uses tools and data to give opportunities to users to have a say (Verplanke et al., 2016). Meanwhile, VGI is passive data that is created on its own and it can or cannot be used in studies (Verplanke et al., 2016). Public Participation GIS is difficult because the nature of participation and the way users participate is always changing.

2.3.1 PPGIS Research Issues and Priorities

PPGIS is more of a top-down approach that is led by city officials than a bottom-up approach that is led by citizens. Citizens need to see that there are valuable outcomes for their community by using PPGIS tools. There are lower participation rates if all focus is placed on only tool development (Kahila-Tani et al., 2019).

It is necessary to fully exploit the potential of public engagement to be used for land use decisions and this can be done by refocusing the development and implementation of public participation methods (Brown, 2015). Factors that cause public engagement to fail include a lack of independence, a lack of diversity, and a small crowd size. Brown (2015) states that using

PPGIS methods can gather information with regards to the current importance of land use and future preferences for land uses. Brown (2015) argues that PPGIS can be used to provide a means to translate public judgement into spatial data for land use decisions. PPGIS can be used to collect a wide range of spatial attributes such as place values, development preferences, place qualities, and participant experiences (Brown, 2015). During the land use planning process, it is necessary to gather a diverse range of participants' sense of place and participants should be geographically diverse.

Brown (2015) states that a big challenge in using PPGIS as support for decision-making is identifying which of the diverse public input should influence land use planning. PPGIS can act as a planning decision support system through the process of identifying areas with high potentials of land use conflicts (Brown, 2015). Despite the benefits and potential of public engagement, there is no evidence according to Brown (2015) that public input obtained through PPGIS can result in better land use planning decisions than that of experts. Challenges with the use of PPGIS include the digital divide and public resistance to participation, but benefits are that PPGIS methods are efficient in identifying place-based social values and PPGIS allows data to be analyzed in better ways (Brown, 2015).

Concerns, needs, and perceptions of planners and experts need to be considered when designing PPGIS tools (Slotterback, 2011). Planners may reluctantly adopt new approaches to planning practices if they lack the capacity, skills, and motivation to support these innovations. PPGIS tools can be used to provide information, promote public discussion, and gather feedback (Slotterback, 2011). These tools attract more participants if there is anonymity. PPGIS technology offers several opportunities and challenges, which stem from technological development and implementation. There are concerns that data visualization can lead to

misrepresentation and inaccuracy in representation of spatial data (Slotterback, 2011). Planners perceive that different functionalities of technological innovations can influence levels of participation. PPGIS tools that provide information can have more public engagement than tools that are designed to stimulate public discussion (Slotterback, 2011). There are considerations of whether quality or quantity of participation should be increased. PPGIS technology may not effectively allow key concepts underlying planning projects to be explained. Hence, understanding users of a specific public engagement method is crucial (Slotterback, 2011).

Current public participation methods are difficult, reach few participants and are not effective in gathering usable data for planning purposes. This situation usually leads to a lack of trust and a lack of satisfaction in the process and outcome. Kahila-Tani et al. (2016) discuss important conditions for meaningful use of PPGIS tools to support the making of a master plan in Helsinki, Finland. With the use of PPGIS tools, the public's insights of the living environment can be used by experts during the planning process. In addition, data and analysis can support representativeness, independence, early involvement, transparency, and influence. However, planners and citizens need to understand the benefits of these tools.

The study conducted by Kahila-Tani et al. (2016) demonstrates that even though planners and experts found the collected data and analysis to be significant, they still lacked the skills and to use the data in an effective way. The results of this study point out that when PPGIS tools can be integrated into the mainstream planning practices, the tools can evolve into a more complete participatory planning support system. Data collection interventions should be supported by the integration of the data to the GIS that is used in the city, and further expanded upon by other analytical and visualization tools that are open to the public. This integration would make the gathered data simpler for planners and experts to use and for citizens to communicate and

explore. To reach this goal, experts and planners need to be committed to use the feedback that is gathered from the public. In addition, future development of technology is needed to ease the combination of different datasets and tools (Kahila-Tani et al., 2016).

2.3.2 Participatory Web Application Methods

Geoweb applications scale public participation more effectively than public meetings (Jankowski et al., 2017). Geoweb participatory methods have been touted to overcome some shortcomings of town hall meetings, based on the assumptions that the distributed character of online participatory processes can promote the scaling of public participation to those who normally do not participate in the decision-making process. Participatory planning processes involving representative groups may diagnose the needs better than non-participatory processes that are run exclusively by experts and result in more equitable solutions (Jankowski et al., 2017).

Several issues related to online participation including bridging the educational gap, the digital divide, and focusing the attention of participants on a specific issue at hand remain unresolved. Future studies of online participatory methods should focus on the usability of online participation tools among older adults. Jankowski et al. (2017) state that another problem to explore is the potential of online methods and tools for supporting other participation functions in addition to assessing and commenting. There is proof that tools developed for mobile platforms can support actionable VGI (Jankowski et al., 2017). Another area that is worth researchers' attention is the exploration of the intersection between spatial range and spatial representativeness. Exploring this connection can provide answers to questions such as: what is appropriate scale for participation in local decision-making, who should participate, whose voices should be considered? Further research should focus on broader societal outcomes of

online participation, including developing long-term relationships, creating trust and transparency, or mitigating conflict (Jankowski et al., 2017).

A geoquestionnaire is an example of a geoweb method that can be used to collect user-generated data. It presents questions in connection with an interactive map allowing respondents to contribute answers to survey questions that are linked to geographical features in the map (Czepkiewicz et al., 2016). There are problems of participation rates, demographic and spatial sample biases, and data quality as central research objectives. Czepkiewicz et al. (2016) provide examples of types of data that can be collected from the public as they look to answer the questions of whether some recruitment methods are more successful than others in achieving better sample representativeness of the target population, higher level of participant engagement effort, and higher quality data from comments.

A geoquestionnaire usually includes questions about people's values, perceptions, and preferences related to place with a study area. The geoquestionnaire is an online survey that relates to an interactive web map for collecting two types of data: those directly linked to spatial features, and those with no spatial reference (Czepkiewicz et al., 2016). The geoquestionnaire respondents either draw geographical features on a map, as part of their answers to questions, or select map features from an active map layer. The features can be represented by points, lines, or polygons. Each spatial feature may be linked to a set of questions, which in turn relate to a feature's location.

A geoquestionnaire usually involves multiple pages. The interactive map offers easy-to-use navigation tools such as zoom in, zoom out, and pan functions, in addition to selection of base map layers (Czepkiewicz et al., 2016). The data input formats include single- and multiple-choice questions, slide bars, and open-ended questions. A combination of online and paper

surveys provided a good representation of the city population by age groups in the study conducted by Czepkiewicz et al. (2016). The most underrepresented in both case studies and data collection and recruitment modes were those between 45 and 60 years of age, and younger than 20 years of age. Participants recruited through social media performed better on mapping tasks than those who learned about the study from local media and neighbourhood councils, which can be due to a younger age and better computer skills of the former (Czepkiewicz et al., 2016). These methods would be used by researchers and scholars in collaboration with experts, planners and local governments.

2.3.3 Web GIS for Protecting Heritage Districts in Urban Heritage Planning

Regarding the protection of heritage buildings, human-induced changes in urban areas threaten the visibility of heritage buildings (Lopes et al., 2019). The protection of cultural-heritage sites must consider the surrounding environment of protected buildings as it plays an important role in defining historical urban landscapes. According to Lopes et al. (2019), protection zones are ineffective in preventing negative visual intrusions to heritage sites. Co-visibility and vantage points are important factors in determining visual intrusions to HCDs (Lopes et al., 2019). Lopes et al. (2019) develop a 3D analysis tool, which allows them to identify both positive vantage points and co-visibility for evaluating intrusions to heritage sites. This tool allows anyone to quantitatively define areas in the surrounding environment around heritage structures that would affect the protected historical urban landscape. The hardship in visually analyzing urban areas lays on the 3D aspects of space. A tool like the one developed by Lopes et al. (2019) that identifies visual obstructions can benefit heritage policy making. Protective zones include the heritage properties in addition to elements in close proximity of these properties, the distant influential elements that are not close to heritage sites but participate in historical visual

perspectives, and non-visible distant elements (Lopes et al., 2019). The tool developed by Lopes et al. (2019) helps assess protective zones and allows planners to evaluate the effectiveness of adopting visibility cones as tools to protect the visual composition of the cultural urban landscape.

2.3.4 Difficulties in enhancing public engagement

It is usually difficult to achieve principles of enhanced participatory planning in political and professional environments (Wilson et al., 2019). Early involvement in planning processes has a higher impact in decision making in local governments. Merits of digital participation approaches are that they address issues of technical language usage in planning processes and therefore, participants can easily understand planning processes to help shape their communities (Wilson et al., 2019). Participants can readily report issues without needing to understand the organizational structure of municipal councils. However, digital technology needs to be actionable and user-friendly in that it captures vocal minority voices and this data is used by experts (Wilson et al., 2019). Digital applications simplify participatory methods as there is higher participation due to participation being done at the convenience of citizens (Wilson et al., 2019).

Online tools can allow municipalities to actively participate in shaping their communities (Alfazan et al., 2017). Online tools refer to web-based and social media technologies. It is crucial that planning authorities select the appropriate tool or there can be issues (Alfazan et al., 2017). The high number of technologies available to gather feedback can be overwhelming for municipalities. Local governments still face challenges in incorporating participatory processes in their decision-making. This is crucial as it relates to a general challenge for public participation and a specific challenge for web mapping approaches for community heritage

planning. Factors to consider include organizational capacity, community capacity, planning problem and participation goals, norms and regulations, and tool capacity (Alfazan et al., 2017).

2.4 Outlook for PPGIS/VGI

Brown et al. (2014) state that a review of public participation for environmental assessment and decision making concluded that when done well, it can improve quality of decisions, build capacity to engage in policy making processes, increase understanding of participants, and lead to better results for environmental quality and social goals. PPGIS and VGI provide methods for engaging multiple publics in public land use decision making. Brown et al. (2014) state that PPGIS and VGI methods should include scientific sampling to ground-truth voluntary participation. Expanding the public engagement process to include most public land stakeholders through random sampling is consistent with the empowering philosophy of PPGIS and is required for improving public participation for public land use decision making processes (Brown et al., 2014).

2.4.1 Using PPGIS to measure Sense of Place and Place Attachment

PPGIS can be used to capture sense of place and place attachment (Brown et al., 2015). Sense of place is defined as a person's relationship with a place where they live. It is a living ecological relationship between a person and a place as well as a lens through which people experience and make meaning with their experiences in and with that place (Adams, 2013). Place attachment refers to how strong of a connection that citizens have with a specific place and captures the difference between goods and services provided by that place and emotional relationships citizens form with place (Brown et al., 2015). These connections can be positive or negative depending on a citizen's experiences with a specific place and place attachment can be

conceptualized as personal, environmental, and social interactions depending on purpose of study. Brown et al. (2015) recommend that in order to advance the mapping of place attachment, intensity and structure of place attachment should be assessed, better mapping precision should be offered, place attachment should be associated with mapped landscape values, and place attachment behaviour should relate to place-inspired behaviour.

2.4.2 Landscape Values Measured using Web Mapping

People are place-makers and learn to distinguish space from place by giving value to space (Brown & Donovan, 2014). Places become spaces where values are attached that emerge from past experiences and are impacted by different cultures. Values that relate to place are important to both individual and collective decisions about land use planning at different scales (Brown & Donovan, 2014). Human value formation involves held and assigned values. Held values are ideas that are important to people and take the form of beliefs about a specific mode of conduct. Assigned values express the significance of an object relative to another object (Brown & Donovan, 2014). Landscape values are an operationalized form of place value used for environmental planning scenarios. A landscape value is like a relationship value that connects held and assigned values (Brown & Donovan, 2014). In associating meaning to place, held value that is personally important to an individual combine with conceptions of assigned value that is important to an individual in a physical landscape. Land-use changes from human development can significantly impact the distribution of landscape values (Brown & Donovan, 2014). PPGIS can be used in the form of geoquestionnaires to assess landscape values from citizens that reside in these urban areas.

2.4.3 Measuring Sense of Place with Public Participation

Public participation is crucial in communities to ensure that local action is effective. In order to ensure this, participants need to have the necessary skills to address community issues (Chavis & Wandersman, 2002). Leaders need to be effective at directing the organization, the government needs to be supportive of the organization's growth, and the organization needs to address issues of self-interest of members (Chavis & Wandersman, 2002).

Individual connection with place is not only a function of experience with nature or social interactions with friends and community members, but also how individuals create their identities through residential histories (Raymond et al., 2010). Spatial location and context of population being measured influences the power of place attachment.

2.4.4 Sense of Place in relation to PPGIS and Heritage Planning

Williams and Vaske (2003) state that landscapes, places, and spaces are more than containers of natural resources or areas for activities. They are a collective of elements in the form of locations filled with history, memories, emotional and symbolic socio-cultural meanings. Sense of place can be viewed as being amorphous as it has different dimensions. There are several ways to approach measuring it by collecting data from humans as both individuals and groups.

Sense of place can be measured using GIS. GIS is integrated with space to start to visualize how sense of place can be measured. GIS technology revolves around space as measurements of sense of place and various geographic phenomena in the real world are broken down into themes and layers. True location must be considered as objects in space have to be in the correct location and if not, how much they are off by. However, it is challenging to blend with GIS technology as sense of place can be subjective. Currently, PPGIS is being used to

gather user-generated content that is subjective and can capture sense of place of citizens in certain urban areas. Mapped place values are best understood as relationship values, are closely related to “place attachment” and “sense of place” concepts, are correlated with participant attitudes to land use, are associated with physical landscape features, are generally stable over time, are valid at multiple geographic scales, and show higher similarities than differences across areas and populations (Brown et al., 2020).

Place has become important in the realm of the geoweb as citizens are more engaged in producing place-based information (Roche, 2016). Personal places are being self-staged by using people’s words and perceptions. Roche (2016) states that citizens relate more to the concept of place (points of interest, place names, events, vague characteristics) than the concept of space (geographic coordinates). As a result, sense of place can be extracted through the analysis of spatial activity generated by citizens through avenues such as social media (Roche, 2016).

In the heritage context, sense of place can deal with historical significance of locations and the memories or feelings that citizens in communities associate with these places. Individual heritage properties and streetscapes make up heritage conservation districts to create a meaning in the sense of place that citizens associate with these unique urban areas.

When capturing sense of place of heritage sites using PPGIS technology, it is important to know what medium users prefer to provide feedback on: desktop or mobile. Adepu and Adler (2016) conduct a study in which they determine that user performance is more effective on desktop than it is on mobile as users can perform tasks more efficiently on desktop computers with a larger screen size than they can on mobile smartphones. On the other hand, users prefer to use mobile smartphones over desktop computers as mobile smartphones provide touchscreen

features, portability, and ease of use (Adepu & Adler, 2016). It will be crucial to see if this stays true to this study when participants are providing their feedback on heritage sites in the geoweb.

It is also important to consider if users prefer to visualize heritage sites in 2D or 3D when capturing sense of place using geoweb software. Dubel et al. (2014) state that when planning a 2D or 3D visualization, designers must consider if 2D or 3D visualization is more suitable for certain tasks and data sets and compare 2D and 3D visualization to determine their advantages and disadvantages. Previous user studies relating to the evaluation of 2D and 3D visualization techniques have not led to significant conclusions (Dubel et al., 2014). It will be important to see from this study whether visualizing heritage sites in 2D or 3D in the web mapping application influences feedback that participants provide.

2.4.5 Public Participation GIS for Heritage Planning

This thesis looks at conducting a pilot study of evaluating public opinion on heritage planning in the city of Stratford, ON, however, this methodology has been implemented across the province of Ontario. Galvin et al. (2012) conduct a study in which they look at whether HCDs in Ontario have been successful heritage planning initiatives over a certain period. Specifically, Galvin et al. (2012) consider if the goals set out in the District Plan have been met, if it is difficult making building alterations in HCDs, if residents are satisfied living in HCDs, if property values have been impacted by district designation, and key issues in the district. The City of Stratford in Ontario established its HCD in 1997 through the enactment of a municipal bylaw which states that the city has the right to preserve important heritage elements in its infrastructure through future redevelopment (The Corporation of the City of Stratford, 2014). The downtown core HCD in the city of Stratford is made up of 190 commercial buildings and is located within a triangle plot of land between St. Patrick Street, Downie Street, and Lake Victoria (Galvin et al., 2012).

Regarding methodology, Galvin et al. (2012) conducted residential surveys, townscape survey, stakeholder interviews, analyzed real estate data, and requests for building changes. Galvin et al. (2012) discovered that the goal to maintain and preserve properties in Stratford appeared to have been met, however, residents were not surveyed, so data regarding citizen satisfaction levels were missing. Overall, there was a lack of data from the Stratford Downtown Core HCD. Therefore, Galvin et al. (2012) recommended applications for building changes should be tracked in a more easily accessible way and the plan should be provided online with a detailed list of addresses. This thesis looks at investigating using Public Participation GIS technology to gage citizen and planner opinion and sense of place on the heritage value of heritage sites and the HCD in the city of Stratford, ON. Web-based tools are being used to capture a better representation of the communities that take part in these land use planning decisions.

2.5 Literature Review Wrap-Up

This thesis is investigating how web based PPGIS technology can help heritage planners to identify heritage properties valued by community members and delineate heritage conservation districts in urban areas. Sense of place is a key part of determining the value that citizens place on heritage sites and HCDs in their communities. This study is being conducted in the city of Stratford, ON. Stratford is a small to medium-sized city that has many heritage sites within the city and a large HCD in the downtown core of the city. Past studies have been conducted in the city, however, there has been no public data that has been collected from citizens regarding the value that they place on heritage structures and the HCD in the city (Galvin et al., 2012). This study looks to address this gap in past research. This is a pilot study that is being conducted in

Stratford. However, the methods and results of this research can be applied to other cities in Ontario.

Chapter 3: Methods

This chapter outlines the methodology that is employed to get results to accomplish the objectives set out for this thesis. This chapter starts by providing context for the study area in which this project is conducted, including demographics, and built heritage within the city. Then there is a discussion on the data that was used to accomplish the objectives of this study. From there, there is an outline of the methods used to create the web map survey tool. Then, there is a discussion of the survey questions that users are asked in the tool. This chapter ends with a discussion of how participants are recruited and the steps they must follow to use the tool.

3.1 Study Area

Figure 3.1: City of Stratford, Ontario

Stratford is a small sized city located on the Avon River within Perth County in southwestern Ontario, Canada (Figure 3.1). The city was settled by English, German, Scottish, and Irish immigrants, in equal numbers, in the 1830s and 1840s. Most became farmers. Even today, the area around Stratford is known for its dairying, hog production, and mixed farming (The Corporation of the City of Stratford, 2019). The area was settled in 1832, Stratford was incorporated as a town in 1859 and as a city in 1886. The town and the river were named after Stratford-upon-Avon, England. The swan has become a symbol of the city and each year, 24 white swans are released in the Avon River (The Corporation of the City of Stratford, 2019).

Furniture manufacturing and railway locomotive repairs were the most important parts of the employment sector by the 20th century. The Grand Trunk Railway locomotive repair shops were the major employer for many years, employing approximately 40 percent of the population (The Corporation of the City of Stratford, 2019).

In 1976, the Stratford City Hall was designated as a National Historic Site of Canada. In 1992, Stratford Armoury was recognized as a Federal Heritage building on the Registrar of the Government of Canada Heritage Buildings. In 1993, Stratford's VIA Rail Station was designated as a Federal Heritage building (The Corporation of the City of Stratford, 2019).

According to the 2016 Canadian Census, the population in Stratford is approximately 31 thousand (StatsCan, 2016).

Regarding economic characteristics of the study area, Stratford is in a successful agricultural area and has some auto parts manufacturing, but tourism is the most significant aspect. The city is known for the Stratford Festival, which performs Shakespearean plays and other genres from

May to October (The Corporation of the City of Stratford, 2019). Higher education also has a place in the city as the University of Waterloo has a satellite campus in the downtown core.

3.1.1 Built Heritage

Galvin et al. (2012) investigated whether Heritage Conservation Districts (HCDs) in Ontario were successful heritage planning initiatives. Specifically, they consider if the goals in the District Plan were met, if it is difficult making building alterations in HCDs, and if residents are satisfied living in HCDs. They also consider if property values have been impacted by district designation and key issues in the district.

Stratford established its HCD in 1997 through a municipal by-law to conserve important elements of the City's heritage characteristics from future development (The Corporation of the City of Stratford, 2019). Currently, the City has established its HCD in the downtown core where there is a large concentration of historical infrastructure. The Downtown Core HCD is in a triangle of land between St. Patrick Street, Downie Street, and Lake Victoria. The district is made up of 190 commercial buildings (Galvin et al., 2012).

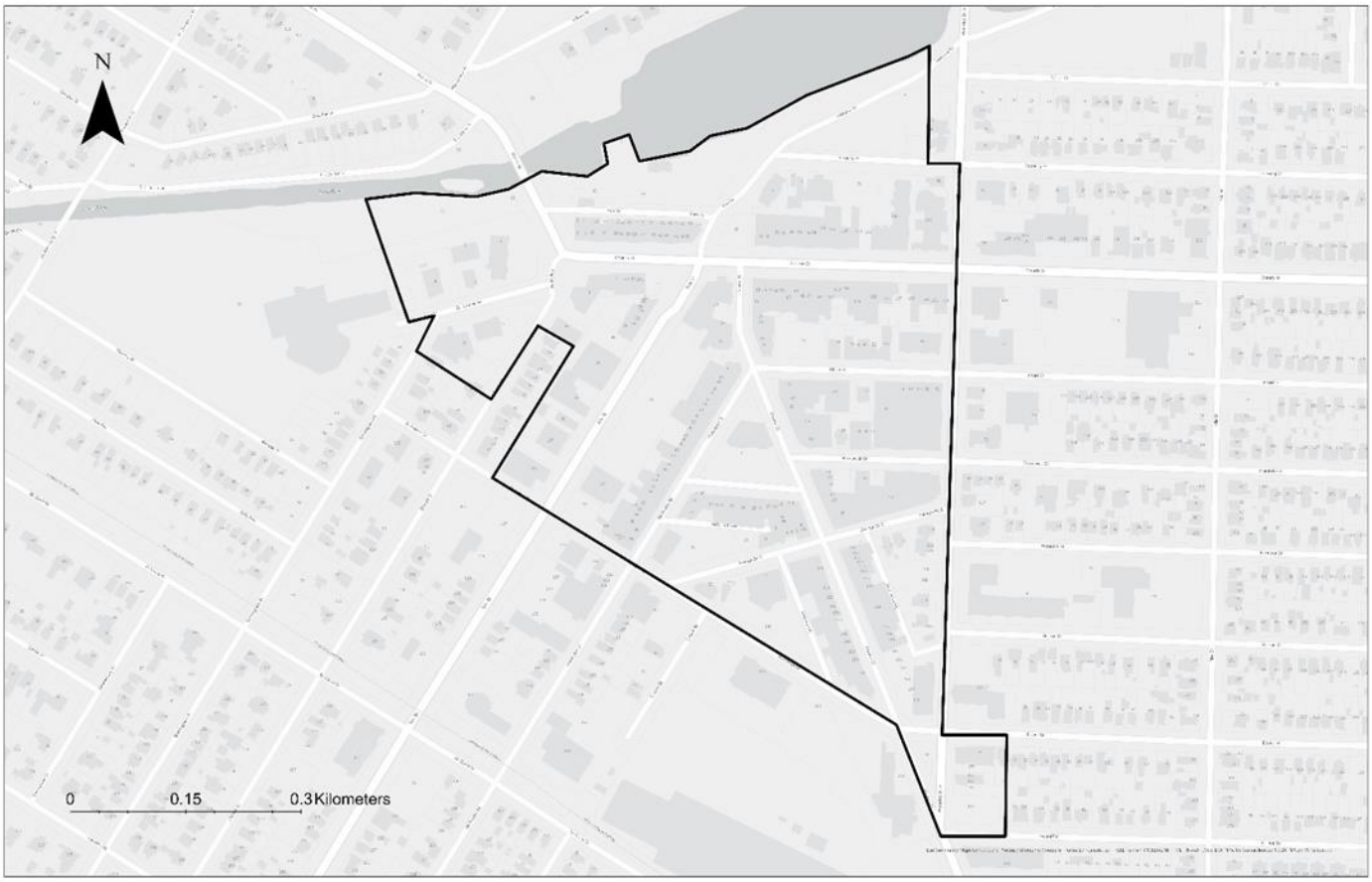

Figure 3.2: Current HCD Boundary in Stratford, Ontario

The HCD is made up of single heritage properties (Figure 3.2). These heritage properties are either designated or non-designated. Designated heritage properties are ones whose key structural characteristics cannot be changed without permission under the Municipal Heritage Register (The Corporation of the City of Stratford, 2019). Designation of heritage properties provides a process to make sure that the heritage attributes of those properties are conserved over time. The municipal heritage committee, the property owners, and municipal staff work together to make sure that changes to these heritage properties respect their heritage value (Government of Ontario, 2007).

Non-designated properties are ones that are of cultural heritage value not yet designated by the municipality, but the municipal council believes to be of interest. Non-designated properties promote knowledge of the community's cultural heritage, demonstrate a commitment to preserve cultural heritage resources in the city, provide a database of properties of cultural heritage value to land use planners, are a planning document consulted by municipal decision makers when reviewing development proposals, and are a way to introduce property owners to the Ontario Heritage Act (The Corporation of the City of Stratford, 2019). There is a need for spatial data that contains both designated and non-designated heritage properties to accomplish the first objective of this thesis.

3.2 Data Processing

This section outlines how the designated and non-designated heritage property data is obtained and how it is optimized for use in the Heritage Planner web map survey tool.

Table 3.1: Data used for the Heritage Planner web map survey tool

Data Theme	**Source**	**Key attributes of data**
Heritage buildings polygon	City of Stratford	Designated Heritage Site Attributes: designated as Part IV or V heritage site, land use
Building parcels feature class	Geodatabase from Stratford city officials	Land Use
Non-designated heritage sites feature class	Building parcels feature class	Stratford city officials provided information on non-designated buildings throughout the city, and these were extracted from building parcels feature class
Address Information Attribute	ArcGIS Online Geocoder Tool	Addresses of all designated and non-designated heritage sites had to be added to both feature classes using Geocoder
Additional Information on Designated Heritage Sites	Heritage Stratford Website (https://www.stratford.ca/en/live-here/designated-properties.aspx)	Year built, architectural description and photos of each site
Additional Information on Non-designated Heritage Sites	Excel sheet provided by Stratford city officials listing all non-designated sites in the city (https://www.stratford.ca/en/live-here/resources/Heritage_Stratford/Non---Designated-Properties/Final-City-of-Stratfords-non-designated-properties-included-within-the-Municipal-Heritage-Register-December-4-2019.pdf)	Year built, heritage attributes and photos of each site
LiDAR Point Cloud Data	Land Information Ontario (https://geohub.lio.gov.on.ca/maps/mnrf::ontario-classified-point-cloud-lidar-derived/explore?location=45.701348%2C-81.330450%2C6.63)	Surface of point cloud data providing an elevation surface to create 3D buildings
Building Roof Form Extraction Package	ArcGIS Online (Extract roof forms for municipal development | Learn ArcGIS)	Tool containing scripts and data templates to provide a visual display of distinct roof forms on all 3D heritage buildings

Table 3.1 outlines all the data that is gathered for the web-map survey tool. A geodatabase containing feature classes for building parcels and heritage buildings in Stratford is obtained from city officials. Heritage site data and building parcel data is downloaded into ArcGIS Pro as a geodatabase. Heritage site data contains designated heritage site information containing attributes such as being designated as a part IV (single designated heritage site) or V (part of the heritage conservation district) heritage site, land use and address (Table 3.1). The heritage building data contains all data for designated heritage sites throughout the city, while non-designated heritage site data have to be extracted from the building parcel information. Building parcel data contains information such as land use. Address information has to be geocoded using the ArcGIS Online Geocoder tool. Address information has to be added to all heritage properties as well as additional information on all sites.

3.2.1 Data Editing

The City of Stratford provides additional information on designated and non-designated heritage sites such as year built, heritage attributes and photos of each site on the Heritage Stratford website. Not all heritage sites in the dataset are listed on the Heritage Stratford website. Therefore, there are some heritage sites on the web map that are missing some of this additional information in their popups. Extracting non-designated site information from building parcels requires geocoding addresses on to the parcels using address information provided on all non-designated sites in Stratford from the city's website. Adding photos to designated heritage sites involves pdfs from the Heritage Planner website and adding photos to non-designated heritage sites in the city requires using thumbnail photos provided on the Heritage Stratford website. Having gone through this data editing process, a 2D web map of heritage sites containing both designated and non-designated sites, is created.

The heritage property data is in 2D format. Hence, it has to be converted to 3D to test 2D and 3D representations to see which users prefer. For 3D data creation, LiDAR point cloud data for the entire city of Stratford is obtained and a Building Room Form Extraction package is installed from ArcGIS Online into ArcGIS Pro. LiDAR point cloud data is used in conjunction with a Roof Form Extraction tool downloaded from ArcGIS Online onto ArcGIS Pro to create a 3D web scene of designated and non-designated heritage sites visible in 3D with distinct roof forms. This LiDAR point cloud data is used to infer the height and 3D structure of all heritage properties in the city and the Roof Form package is used to have distinct roofs on the buildings in 3D. Once the web map and web scene are created, they could be incorporated into a web map survey tool, which is described in the next section.

3.3 Tool Development

This section provides an overview of the software architecture and why ArcGIS Online, Experience Builder, and Community Hub are selected.

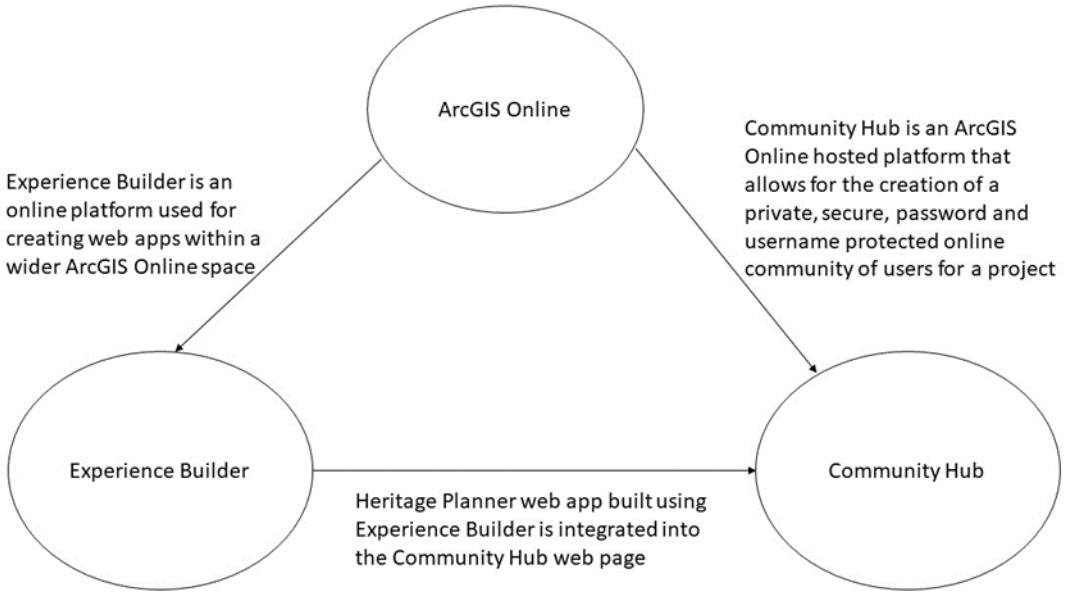

Figure 3.3: Flowchart showing connections between ArcGIS Online, Experience Builder and Community Hub

The first objective of this thesis is to design and build a web/mobile application to provide citizens in Stratford with the ability to rate, comment and provide feedback for the various heritage properties and heritage conservation districts in the city. ArcGIS Online would be the best option to use to create a web application because it is used to create online maps and apps. Due to development constraints of time and programming demands, the Experience Builder platform is selected to create the web app. Experience Builder would not require a lot of coding, so this would save time in creating the web map tool.

The Heritage Planner web application is developed using the ArcGIS Online Experience Builder platform. Experience Builder is an online platform for developing web apps within the wider ArcGIS Online space which uses various widgets that can interact with both 2D and 3D data (Esri, 2020). This platform can be used to create a web experience on different formats such as web, mobile or tablet. Multipage apps with scrolling pages can be created with many different

widgets that can interact with both 2D and 3D web mapping elements (Esri, 2020). These 2D and 3D map elements can then be connected to accompanying surveys that ask for feedback from users. This web application is incorporated into an Esri ArcGIS Online Community Hub (Figure 3.3). The purpose of the Hub is to allow users from outside of the University of Waterloo ArcGIS Online organization (citizens from Stratford) to access the Heritage Planner data and app.

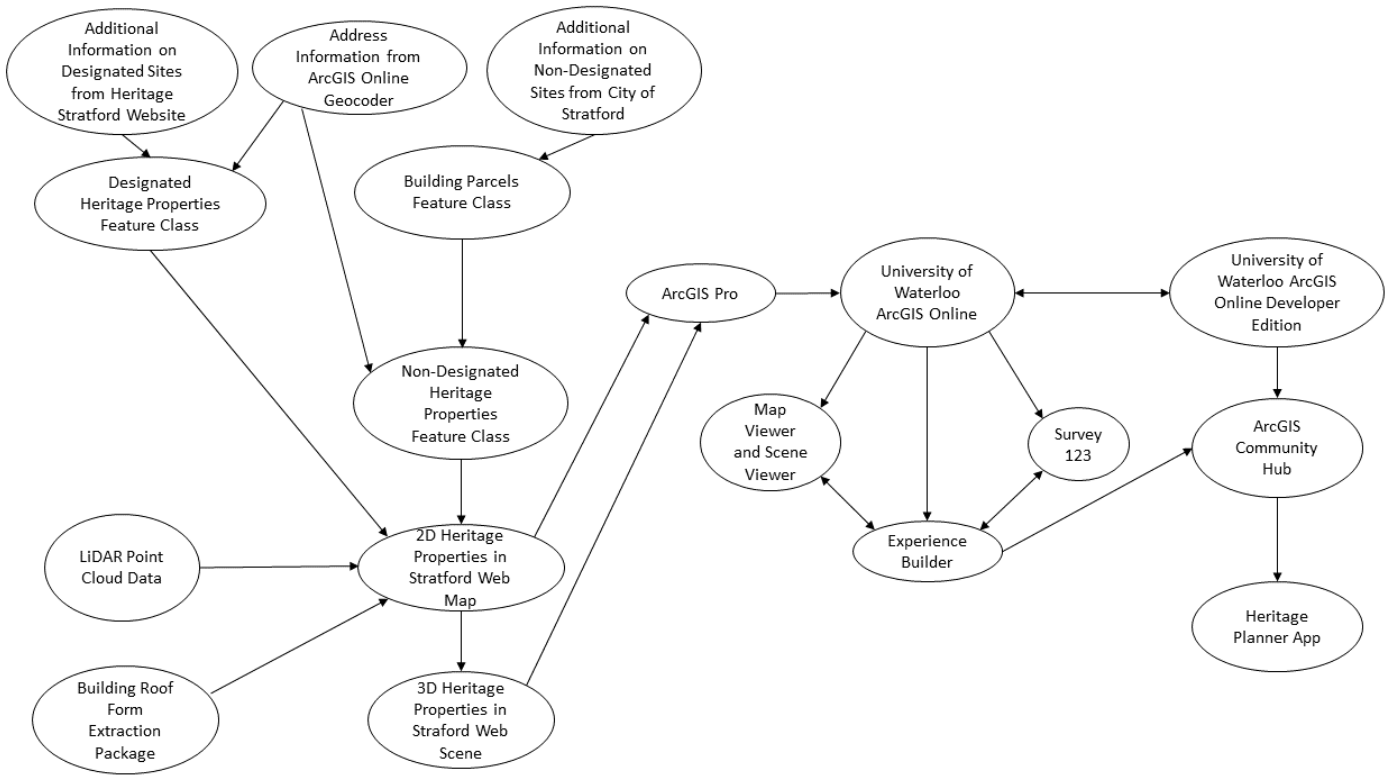

Figure 3.4: Flow Diagram of Main Steps taken to get to a finished Heritage Planner app

There was a very specific process that was followed to develop the Heritage Planner web application (Figure 3.4). Feature classes of both designated heritage properties and building parcels were obtained from the City of Stratford. Additional information on designated heritage properties from the Heritage Stratford website was added to the attributes of the feature class.

Additional information on non-designated heritage properties from the City of Stratford was used to extract the non-designated heritage properties feature class from the building parcels feature class. This additional information was also added to the attributes of the non-designated heritage properties feature class. The designated and non-designated heritage properties feature classes were merged into the Stratford heritage properties feature class displayed in a 2D map in ArcGIS Pro. To get a 3D scene, LiDAR point cloud data from the province of Ontario were used to get heights for all heritage properties in the city and make the buildings 3D. The Building Roof Form Extraction package from ArcGIS Online was used to give the 3D properties distinct roof forms. The result was a 3D scene of heritage properties in Stratford displayed in ArcGIS Pro.

The 2D map and 3D scene were exported from ArcGIS Pro and shared to University of Waterloo's ArcGIS Online organization. The 2D map was displayed in the Map Viewer and the 3D scene was displayed in the Scene Viewer. Survey123 was used to create the surveys that participants were to answer in Heritage Planner. Experience Builder was used as the app development platform to connect the survey elements with the 2D web map and 3D web scene elements. The ArcGIS Community Hub was created on University of Waterloo's ArcGIS Online Developer organization. The purpose of the Hub was to allow users from outside of the University of Waterloo ArcGIS Online organization (citizens from Stratford) to access the Heritage Planner data and app. The web app developed using Experience Builder that is made available through ArcGIS Online was presented to users who signed up to participate in the study.

3.3.1 Tool Characteristics

There are multiple web pages on the Heritage Planner website made using Experience Builder. There is an About page where users are introduced to the issue of heritage planning and the

research study being conducted in Stratford. There is a How-To page that gives users step-by-step instructions on how to navigate through using the website from start to finish. These instructions are expanded upon on the survey web page in the Hub as well.

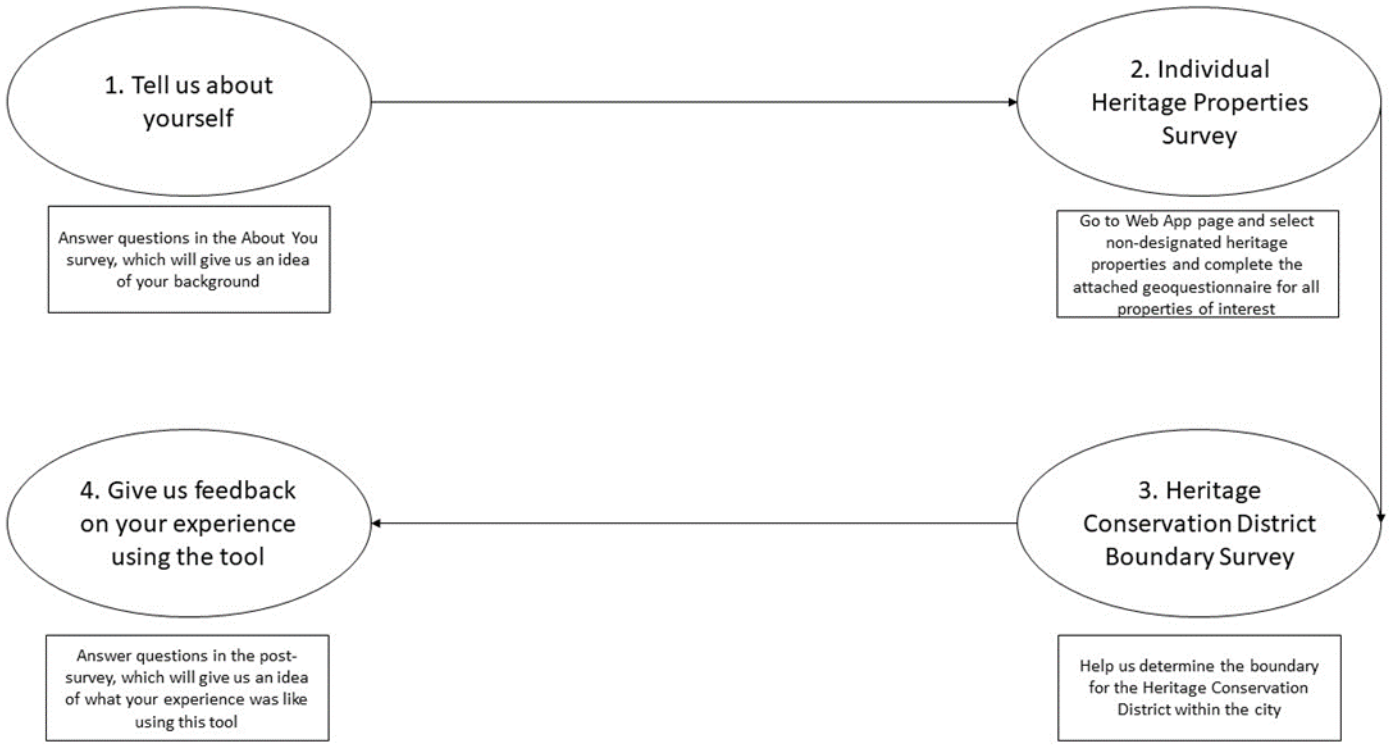

Figure 3.5: Heritage Planner web app workflow

The workflow of the Heritage Planner tool design is four main survey pages for users to go through: About You survey, Web App page containing the Individual Properties Survey, Heritage Conservation District Boundary survey, and Post-Survey (Figure 3.5).

There is an About You survey page where users are asked to provide personal details and prior knowledge of heritage planning and web GIS tools (Appendix A.1). The purpose of this survey is to understand the opinion that participants have on web mapping tools and heritage before using the tool based on demographics such as age and term of residency in the city.

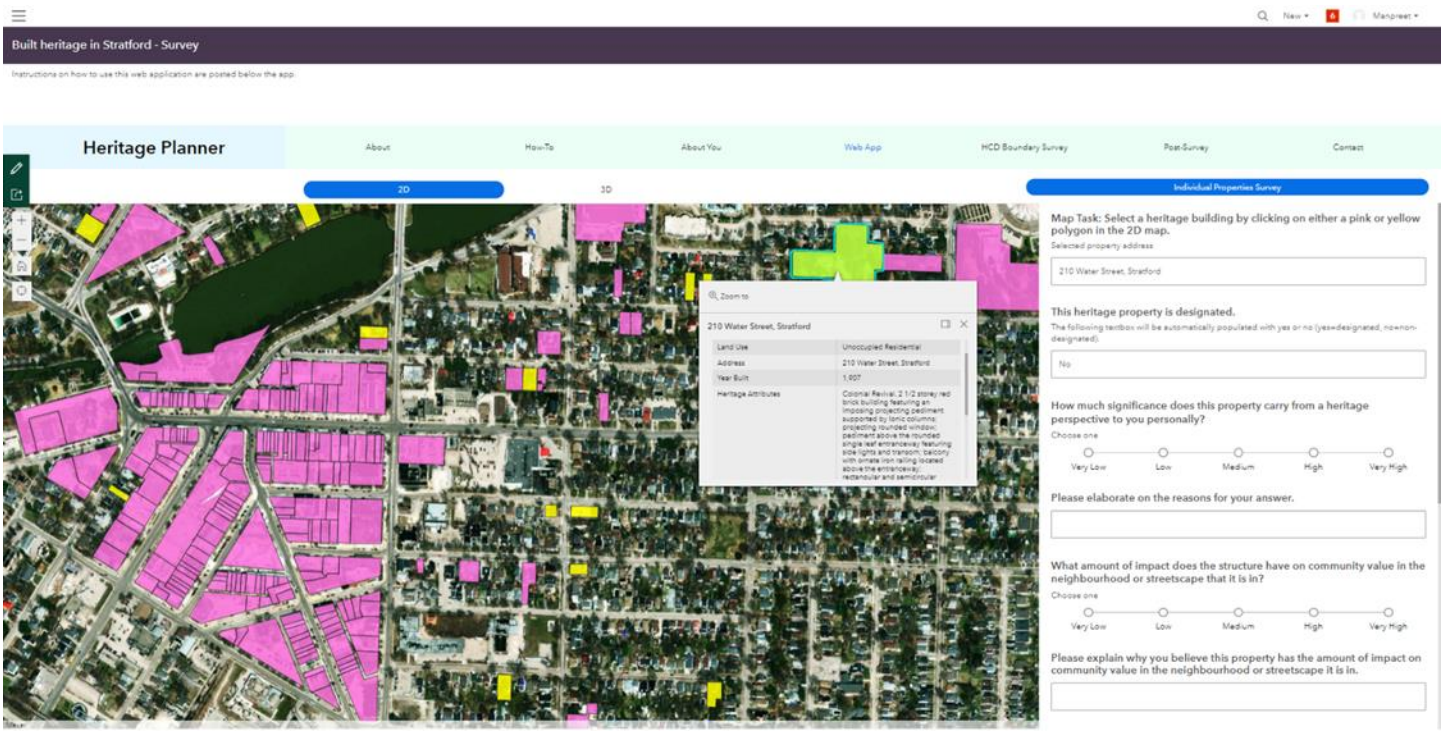

Figure 3.6: Heritage Planner web app user interface

Users spend most of their time on the Web App page, where they select individual heritage properties on the web map and answer questions in the connected Individual Properties Survey (Figure 3.6).

There is the main web app page, where the user sees a 2D map view (Appendix A.2) and 3D scene view (Appendix A.3) of the designated and non-designated heritage sites throughout the city. This is where users can choose what view they would like to see of buildings they provide feedback on, and which visual display works better for them to provide the feedback they have on a particular property.

Connected to the 2D map view is a questionnaire which asks the users questions based on the site that they have selected (Appendix A.4). The survey automatically populates with the property's address and whether the property is designated or not. Selecting the property in the 2D

web map provides a popup with information to the user. This information includes year built, heritage attributes and photos of each site on the Heritage Stratford website. This is related to both the first and second objective of the thesis as we are interested in the attachment participants have with heritage sites that they choose to provide input on. Questions are asked to users on how the individual site they select impacts the situation (neighbourhood) that it is located in.

There is a Heritage Conservation District (HCD) survey which asks users to sketch a boundary of what they believe the HCD to be (Appendix A.5). Users sketch boundaries only if they believe there should be modifications to the current boundary and if there should be any additional boundaries in the city. The user looks at the map of the current HCD boundary and answers questions pertaining to whether they believe the current boundary is appropriate and if there is a need for modifications to the current boundary or additional HCDs in the city. If the user believes that there needs to be modifications to the current HCD or additional HCDs, they then draw out the appropriate boundaries that they believe in.

There is a post-survey page which asks users feedback on the tool and any knowledge they have gained in heritage planning after using the tool (Appendix A.6). The purpose of this survey is to find out if the participants have gained further understanding of heritage planning and knowledge on web mapping tools after providing feedback using this tool. There is also a contact page for further information on the author of the tool.

This tool allows for users to answer questionnaires and interact with web map data. Two questionnaires are stand-alone and ask users for personal details before using the tool and feedback after using the tool. Two surveys are geo-questionnaires, which are questionnaires that are connected to web map elements. One of the geo-questionnaires is the Individual Heritage Properties survey, which asks users questions on individual sites that they select on the web map.

The other geo-questionnaire is the HCD Boundary Survey, which asks users to draw a boundary of what they believe the HCD to be within a web map element if they do not agree with the current boundary or if they believe there is a need for more heritage districts in the city.

This tool provides both 2D and 3D map elements with survey tools. There is a web design interface that users interact with. The focus of this tool is to gather feedback from users on heritage planning, which includes individual heritage sites and the HCD, within a city. This would address each of the three objectives set for this thesis. This tool is designed for users to provide their input on both heritage sites and the heritage district. The questions that are asked in the survey portions of this tool allow us to analyze if individual heritage properties have impacts on the neighbourhood that they are situated in, the personal attachment and sense of place that participants associate with these properties. The 2D and 3D visual displays of the properties allow the user to decide which option they prefer, and which option allows them to provide better input on the properties that they are interested in providing feedback on. The next section provides a description of the questions that participants are asked and how they are vital to the objectives of this thesis.

3.4 Questionnaire Development

There are four different questionnaires that have been developed: About You survey, individual heritage property survey, HCD survey, and post-survey. The surveys have been developed based on findings in Chapter 2 of what has been done previously. Survey123, which is an Esri cloud-based questionnaire creator, is used to create these surveys (Esri, 2020). Survey123 is used because it is connected to ArcGIS Online and this is where all the data used in the Heritage Planner website is being stored.

3.4.1 Questions

In the About You survey, users are asked about their personal and background information (Appendix B). Demographic information such as age and how long the participant has lived in the city helps to determine how familiar they are with the study area. This helps determine how much knowledge they have of the built heritage in their city in addition to if they have familiarity with using web mapping tools. It is important for us to understand where participants are coming from before they provide their feedback using the tool. Postal code information is asked for to provide a spatial dimension to participant feedback to see if users live near the properties, they choose to provide feedback on and if this has an impact on the quality of feedback they provide.

In the individual heritage property survey, users are asked to answer questions based on individual sites selected on the web map element that is associated with the survey (Appendix C). This is the main part of the tool that we are interested in because this is where the feedback would come in that would help with the first objective of this thesis. In addition, it helps answer the hypotheses of if users incorporate neighbourhood factors in their feedback more often than property-specific factors when using a map-centred approach, and if interest in a specific heritage property is positively correlated with individuals' personal attachment to, or investment in, a neighbourhood and a community to a lesser degree. The questions asked in this section help to analyze how the site (property) that the participants select to provide feedback on is affected by the situation (neighbourhood) it is located in and if the surrounding neighbourhood is affected by the sites the participants choose. This section also helps to answer the second objective of the personal attachment and sense of place that participants associate with the properties they select to provide feedback on.

Kovacs et al. (2014) conduct townscape surveys in their study in which they photograph and examine streetscape views in a heritage district. They select criteria to evaluate these streetscapes such as pedestrian friendliness, traffic safety, vitality, and legibility, and they rate these criteria between one and five. The scores of the heritage district are aggregated to give a general impression of each criterion and to provide an overall score for the district (Kovac et al., 2014). In the Individual Properties Survey of the Heritage Planner app, this idea is expanded upon for individual heritage properties instead of heritage district streetscapes. Questions are asked to users to identify the level of significance of the property, the impact the property has on the surrounding streetscape, and the sense of place they associate with the property they select. Each of these questions are asked with a Likert scale, where users would provide a rating from a level between one and five, like the study done by Kovacs et al. (2014).

In the HCD survey, users are asked to use the sketch tool in the web map element to draw out a boundary of what they believe the HCD to be after identifying if they agree with the current boundary and if any changes or additions should be made (Appendix D). This helps with the first and second objective of this research study as it can be analyzed what participants' feelings are towards the current heritage district and if any changes they want to make are affected by their attachment or identity with a certain neighbourhood (situation) in the city.

Galvin et al. (2012) state that there is sometimes a resistance to HCDs from citizens due to concern about loss of control over one's property, impact on property value and bureaucratic processes. However, the benefits of HCDs, establishing high standards of design and maintenance, allowing the development of shared community value and the potential for increasing property value, are not widely perceived as might be the case (Galvin et al., 2012). Kovacs et al. (2009) conduct a study in Kitchener, Ontario, where they have door-to-door

surveys done to ask citizens what their perception is of the HCD in their city. They conduct two visits to Kitchener and receive a 58 percent survey response rate (Kovacs et al., 2009). In the HCD Boundary Survey of the Heritage Planner app, this is expanded as a web app is used to gather responses online instead of door-to-door surveys in person to increase the response rate. In addition, participants are given context of the current HCD in Stratford, whether they agree with it, and if they believe there should be modifications, there is an option for them to sketch what they believe the new HCD(s) should be.

In the post-survey, users are asked to provide feedback on using the tool and any knowledge they have gained on heritage planning (Appendix E). The purpose of this is to find out if participants have gained knowledge on heritage planning and understanding of how to use web mapping tools to provide feedback on planning issues in their cities. This also addresses the third objective of providing a summary of results to those who have participated and to the City as well. The next section outlines how participants are recruited for this study and the process they follow to provide their feedback using this tool.

3.5 Participants

Participants in this study are adults ranging from 18 years of age to 65 years of age. The original plan is to share the Heritage Planner website with the heritage committee in Stratford and members from this committee provide feedback on the tool. The heritage committee then introduce us to potential participants, ranging from citizens living mostly in non-designated heritage sites to citizens living near major designated heritage sites in the downtown core.

However, due to time constraints caused by the current Covid-19 situation, members from the city cannot be recruited. A back-up plan is implemented to recruit students from senior

undergrad and grad Geomatics and Planning courses as participants. An email is sent out to professors of these courses to get permission to ask students if they are interested in participating in the study. If professors give the go-ahead, a power point slide is posted on Learn to give students an idea of the study. However, this is done, and no students sign up from any of the classes. Then, a decision is made to send out a mass email to all undergrad and grad students in the Faculty of Environment at University of Waterloo. This mass email includes the power point side with some information to give students an idea of the study in addition to a recruitment video to get students interested in signing up for the study. This method is successful in recruiting both undergrad and grad students throughout the faculty.

If students are interested, they go to a sign-up website designed using Community Hub, where they enter their email address to access the Heritage Planner web mapping tool. The students are then given access to the web mapping tool to provide feedback once they have agreed to the ethics requirements of participating in the study. An appreciation letter is sent out to those who participate in the study. Students provide feedback on the Heritage Planner tool and heritage properties/HCD they have knowledge of. This feedback is then compiled to be sent to the City of Stratford, indicating how effective the tool would be in gathering feedback on heritage planning from citizens living in the city.

The following is the workflow that potential participants would be following to provide feedback using the Heritage Planner web map survey tool. The Hub has two web pages. The first web page is a sign-up page where potential participants would read what the study is about and what would be required of them to participate in the study. If they agree to participate in the study, the user indicates this in the sign-up survey and provides their email address. The

participant would then be sent login information to access the survey page where they would then provide their feedback on the Heritage Planner app.

An instructions page provides a step-by-step workflow for participants to follow through the four survey pages. The first survey page asks participants about their general demographic characteristics, their familiarity with heritage planning and web map tools. The second survey page presents a web map with 2D and 3D views and a connected survey titled Individual Properties survey. The main steps on this web page are a) The participant clicks on one of the heritage properties on the map. A small popup dialog gives the participant basic information about the property including a photo. b) The participant completes the survey for the selected property. c) The participant repeats a) and b) for as many heritage properties as they have interest in providing feedback on. After commenting on individual heritage properties, the user advances to the third survey page which asks them if the current HCD boundary is appropriate and provides an opportunity to sketch new district boundaries. The final survey page asks participants to reflect on the app and, if their participation has provided them with a greater understanding of heritage planning and web GIS.

3.6 Methodology in context with objectives

The first objective is to design and build a web/mobile application to provide citizens in Stratford with the ability to rate, comment and provide feedback for the various heritage properties and heritage conservation districts in the city. This chapter outlines the steps taken to find the data that was needed to accomplish this objective. The data is edited so that it can be displayed to citizens in a user-friendly way. After editing the data, the application is created using a web user interface and the edited data is incorporated into a web map within the application. This web map is then connected to a survey. Once completed, this web map survey tool provides users

with the opportunity to provide input on both single heritage properties and the heritage district in the city.

The second objective is to analyze citizens' comments to infer how heritage conservation districts and individual heritage properties contribute to their place identity and place attachment. Within the web map survey tool, there are questions asked to users that would allow us to infer the attachment or identity they associate with the properties and districts they provide feedback on.

The third objective is to provide recommendations to the city of Stratford on data collection methods (remote and in-place participation) using web/mobile applications. This objective is addressed by compiling a summary of the results to be sent to Stratford.

Aspects of 2D vs. 3D visualization techniques are addressed within the web map survey tool as there is a web map with 2D and 3D visual options and users can provide their input using whichever option they prefer.

The data that is collected from participants is analyzed in the next chapter, Results. This chapter has outlined all the steps that have been taken to get the results that will be analyzed in Chapter 4. These methods have been designed in a way that they can be repeated in another city other than Stratford.

Chapter 4: Results and Discussion

This chapter presents and discusses the data gathered from the study participants. The chapter is organized around the four surveys that comprise the Heritage Planner workflow. Information about participants' background characteristics is presented first. Next, the discussion turns to the Individual Property survey data which describe how participants assessed the heritage value of selected properties. Next is a discussion of the HCD Boundary surveys and if users agree or do not agree with the current boundary. The chapter ends with a discussion of the feedback that participants provided for Heritage Planner, and their self-assessment of whether they gained a greater knowledge of heritage planning or web GIS tools.

4.1 Participant characteristics

Out of a pool of thirty-four participants, thirty-three students (29 graduate, 4 undergraduate) from Waterloo's Faculty of Environment logged into the Heritage Planner website. Thirty-one participants completed the About You survey. Of these 31 participants, 21 were male, 9 were female, and 1 chose not to identify their gender. Nine participants were in the 19-24 age group, 20 were between 25-34, and 1 each were in the 35-44 and the 45-54 age groups. None of the participants indicated that they lived in Stratford. Twenty-one participants indicated they have a graduate degree, 8 participants indicated they have a college or university bachelor's degree, and 2 participants indicated they have a high school diploma.

Interest in local built and cultural heritage spanned all categories with a three-way tie with interest levels of "somewhat", "moderately", and "quite a bit" being the most frequently selected options. Despite these indications of interest, only 6 participants reported that they have provided feedback on heritage planning. This likely reflects the student participant pool because

more students were interested in participating due to their knowledge of web GIS than heritage planning. All 31 participants indicated that they use computer-based maps at least sometimes in an average month. The modal class monthly rate of using computer-based maps was “very frequently”. This suggests that participants were quite familiar with Google Maps, MapQuest, GIS software, or similar web maps before using the Heritage Planner app. Most participants agreed that a web map tool such as the Heritage Planner app could be an effective method to gather public input from citizens in a city like Stratford.

In terms of breakdown of the survey being completed on a desktop or mobile device, 29 participants indicated that they completed the survey on a desktop computer and 2 participants indicated that they completed the survey on a mobile device.

4.2 Individual Heritage Properties Survey

This survey allowed users to select as many of the 304 designated or non-designated properties from the map as they desired, inspect their characteristics (attributes, relative location), and comment on their heritage value. A total of 97 responses submitted for the Individual Heritage Properties survey. Due to a technical problem with the configuration of University of Waterloo’s ArcGIS Online environment, 11 of the 97 responses had blank fields in place of an expected generic username. It is not clear if this error was confined to one participant or several.

To deal with this issue, all responses without a username were examined. Based on a comparison of timestamps and the content of the free form text fields, 8 of these 11 responses were associated to a specific username. The remaining three responses were excluded from the data analysis. Going forward, the discussion is based on the 94 named survey responses.

Twenty-four participants evaluated a total of 51 different heritage properties from a set of 304 available to be selected within the study area. The number of properties evaluated by a user ranged from 1 to 18 with an average of 2 heritage properties per user. Figure 4.1 below shows all of the user selected heritage properties in Stratford, Ontario. Participants were attracted to provide comments on the bigger, more prominent heritage properties in the city.

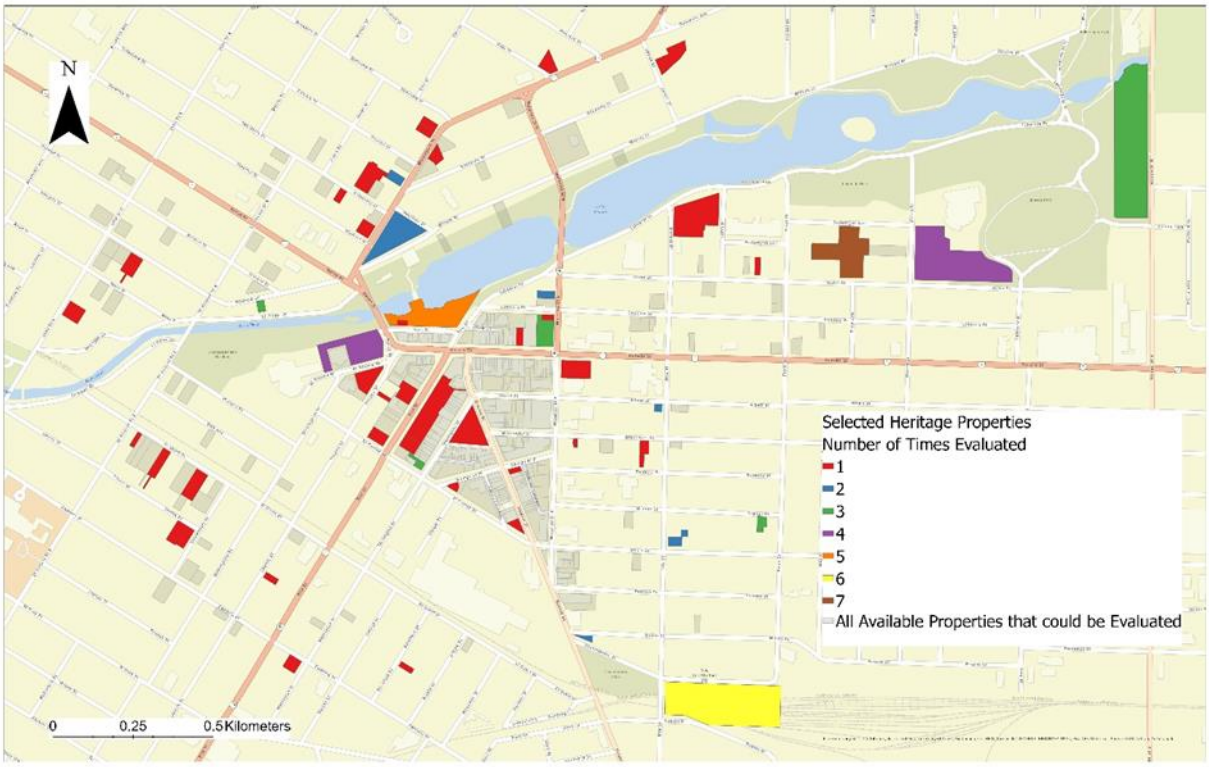

Figure 4.1: Counts of user evaluations for heritage properties in Stratford

Table 4.1: Heritage properties evaluated more than once

Address of Heritage Property	What is at the address?	Times Evaluated
210 Water Street	Caverhill Manor (residential addiction recovery and wellness centre)	7
101 Shakespeare Street	VIA Rail Train Station	6
Lakeside Drive	Park, Green Space and Trail	5
5 Huron Street	Court House	4
270 Water Street	Parkland and Teacher's College (Stratford Normal School)	4
94 Wellington Street	Soup Surreal Restaurant	3
145 Grange Street	Single Detached Dwelling	3
54 Romeo Street Gallery	Museum/Art Gallery	3
142 Ontario Street	Religious Organization (Knox Presbyterian Church)	3
59-61 Douglas Street	Semi-Detached Dwelling (Crown House Bed and Breakfast)	3
68 Nile Street	Plums Executive Extended Stay Apartments	2
6-8 Shakespeare Street	Two-Storey Commercial Building	2
151 Nile Street	Bed and Breakfast Inn	2
41 Mornington Street	St. James Anglican Church	2
74 Mornington Street	Singled Detached Dwelling	2
30-32 Waterloo Street South	Orr Insurance and Investment Financial Services	2

Figure 4.2: Screenshot of 210 Water Street taken from Google Maps Street View

210 Water Street was the heritage property that was evaluated the most often (Table 4.1). It was the Caverhill Manor, which is currently a residential addiction recovery and wellness centre (Figure 4.2). Users who provided their feedback for this site stated that its physical architecture stood out to them, but they did not have a lot of strong feelings about it. User 24 stated, "*No personal connection to this property but serves historical significance*," in addition to "*The unique appearance adds appeal to the streetscape*." Looking at Figure 4.1, this building is one of the larger uniquely shaped buildings in the northeast area of the city, with quite a bit of open space surrounding it, which also attracted users to provide feedback on it. User 17 stated, "*No significant buildings. Open space. Green area. Recreational park, green area close to lakeside*."

Figure 4.3: Screenshot of 101 Shakespeare Street taken from Google Maps Street View

The VIA Rail Station at 101 Shakespeare Street was the second most frequently evaluated property because it is a public transit transportation hub in the city (Figure 4.1). The users who provided feedback for this site had strong feelings as they stated many citizens used this spot for their public transit travel (Figure 4.3). User 40 stated, "*This is a building that has many residents of all ages would've gone through and therefore there is an attachment there*." Looking at Figure 4.1, this heritage property was one of the larger buildings located in the southern part of the city with not many other heritage properties surrounding it, which attracted participants' attention to it.

Figure 4.4: Screenshot of Lakeside Drive taken from Google Maps Street View

Lakeside Drive was also evaluated because participants had fond memories of the waterfront when they traveled to the city as visitors or tourists (Figure 4.4). User 28 stated, "*Everyone who knows stratford knows this park. It's a core part of many children's memories. I didn't even grow up in Stratford and even I have some strong memories from going there on a class trip once*." Looking at Figure 4.1, it was also a larger uniquely shaped heritage property that attracted users to provide feedback on it due to its proximity to the river and the open green space. User 17 stated, "*Limited usage. Importance of being near to green spaces and the lakeside. Importance from an aesthetics point of view*." This highlights the importance of open public space as part of urban heritage.

Figure 4.5: Screenshot of 270 Water Street taken from Google Maps Street View

270 Water Street is the former Stratford Normal School (Teacher's College) It was evaluated because of its architecture/setting and users who provided feedback for this building stated that while they did not visit Stratford, the historical significance of this building stood out to them (Figure 4.5). It was also adjacent to the main Stratford Festival building. User 24 stated, "*While I have no family that would have gone here, I have a lot of teachers in my family so I place some emphasis on the importance of this building in regards to its history*." Looking at Figure 4.1, it was one of the larger heritage properties in the northeast area of the city surrounded by green space, which attracted participants to it. User 17 stated, "*School near the lakeside and green spaces*."

Figure 4.6: Screenshot of 5 Huron Street taken from Google Maps Street View

5 Huron Street was evaluated as well because the users who provided feedback for this site had an admiration for its heritage landmark, the courthouse, and the park/open space (Figure 4.6). It was a larger uniquely shaped heritage property located close to the downtown core of the city (Figure 4.1). User 20 stated, "*the court building on this property is a landmark of Stratford, located at the intersection of some of Stratford's main roads, and I have always seen and admired it every time I have visited Stratford*." The researcher of this study and his supervisor

walked to this building on their original pre-Covid-19 walkabout, and it was a visual anchor for the streetscape of Ontario Street.

Coding was used to analyze users' free-form text comments for the three open-ended questions in the Individual Heritage Properties survey (Appendix C). These questions were centred on the themes of the significance of each heritage property, the impact of the property on the neighbourhood or streetscape, and sense of place. Coding is the process of assigning either alphabetical or numeric values to data collected through surveys so that these data can be processed using a computer (Lavrakas, 2008). In this case, thematic categories were derived from previous literature and were used to classify the qualitative text feedback provided by participants on individual heritage properties. Each text comment was assigned to one or more thematic codes.

For this thesis, there were 12 tags that were created based upon concepts, key terminology, themes, ideas, and feelings highlighted thus far. The main thematic codes that were highlighted at the start included "Building", "Built Heritage", "Community", "History", "Neighbourhood", "Open Space", "Sense of Place", "Streetscape", and "Tourism". The tag "Building" was chosen because this was a term that appeared in a lot of the participants' comments. "Built Heritage" was chosen because this tag represented the heritage properties that users were selecting to provide feedback on in Heritage Planner. "Community", "Neighbourhood", and "Streetscape" were chosen due to the contextual environment surrounding the individual heritage properties. "History" and "Open Space" were chosen based on attribute information located within the popups of individual heritage properties within the Heritage Planner app. "Sense of Place" and "Tourism" were chosen because they related to the

second hypothesis of interest in a specific heritage property being positively correlated with individuals' personal attachment to a neighbourhood.

Child elements were added in some cases to recognize different dimensions of a given theme. For example, the parent “Building” has child tags of “Building Architecture” and “Building Landmark”, while “Community” has a child tag “Community Cohesion”. The “Building Architecture” child tag was chosen because architecture was a major component of the physical characteristics of the heritage sites. “Building Landmark” was chosen as a child tag because some of the larger heritage properties were truly seen as physical landmarks in their neighbourhoods. “Community Cohesion” was chosen because it represents the togetherness and bond between members of the community.

Taguette, an open-source qualitative research tool that allows users to import documents and tag text fragments with codes, was used to analyze the free-form text data (Rampin et al., 2021). All the free-form text feedback was organized by username and free-form text question under each username and was gathered in one document. This document was then imported into Taguette. The 12 tags were created manually within Taguette and then each comment was assigned one or more tags. This coded text was then exported and is presented in Appendix F.

Table 4.2: User and Total Occurrence Counts of thematic Coded Tags for Open-ended responses on Individual Heritage Properties in Stratford, Ontario

Tag	User Count	Total Occurrence Count
Building	11	36
Building.Architecture	10	30
Building.Landmark	9	23
Built Heritage	14	31
Community	12	24
Community.Cohesion	6	11
History	13	46
Neighbourhood	6	14
Open Space	6	19
Sense Of Place	17	41
Streetscape	5	16
Tourism	10	29

Table 4.2 shows the user count and total occurrence count of coded tags in free-form text feedback on individual heritage properties. The user count represents the count of the number of users whose coded comments can be associated with each tag. The total occurrence count represents the number of times the coded tag appears within all participants' text feedback on individual heritage properties. In terms of the significance of each heritage property, the modal class tags for user count were "History", "Sense of Place", and "Building". Total occurrence count was used to narrow down these three tags from most to least frequent within participants' free-form text feedback.

The "History" tag had the highest total occurrence count within the participants' free-form text comments with over half of the users noting the historical significance of the heritage properties that they provided feedback on. Participants who were not familiar with Stratford may have been influenced by the supplementary information provided in Heritage Planner for each of the heritage buildings that related to the history of the site. "Building Architecture" was another tag that was associated with almost half the participants' feedback. In some cases, this was

related to the "History" tag because architectural information on the building was found along with the historical information in the supplementary information section of each heritage building. Architecture relates to styles, materials, and designs, often of a time. In addition, there were some participants that had indicated they visited Stratford before, and the architecture of these heritage buildings is what really caught their eye when they were in the city. As User 40 noted for the Modo Yoga Stratford yoga studio, "*It is one of the first heritage buildings you see when you enter this district of Stratford. It showcases the city's architecture and culture*."

The "Sense of Place" tag had the second highest total occurrence count within the participants' written text feedback. This related back to the second hypothesis in that interest in individual heritage properties was tied to individuals' personal attachment to a neighbourhood or community. Sense of place and personal/place attachment are related in this way. Sense of place relates to the characteristics of a place and one's perceptions of it which are informed by their world views and experiences (Adams, 2013). Place attachment can be seen as a component of sense of place that deals with the emotional ties one has to a place (Brown et al., 2015). Participants who visited Stratford before provided some in-depth feedback on some of the heritage properties. As User 20 noted for the Perth County Court House, "*I have always seen this building when I have visited Stratford, so my sense of place is related to my previous visits and experiences in Stratford, which can easily be represented by the landmark building on this property*."

The "Building" tag had the third highest total occurrence count within the participants' written text feedback. In terms of the impact of the property on the neighbourhood or streetscape, "Community" and "Built Heritage" were also two tags that occurred in almost half the users' comments. Built heritage refers to a property that contains cultural value. The way in which it

relates to architecture and history is that when a building has heritage value, it has a unique physical design to it. This design often comes from a unique period in history and this in turn allows the building to have heritage value.

The "Building" tag occurred more frequently in users' comments than the "Community" tag. In addition, the "Built Heritage" tag occurred more frequently in users' comments than either of the "Neighbourhood", "Open Space", and "Streetscape" tags. This disproves the first hypothesis of this study. The first hypothesis was that users incorporate neighbourhood factors more than property-specific factors into their feedback when using a map-centred approach. However, in this case, users incorporated the property-specific factors of "Building" and "Built Heritage" more than the neighbourhood factors of "Community", "Neighbourhood", "Open Space", and "Streetscape" into their feedback when using Heritage Planner. This was because users focused on larger, more prominent individual heritage properties when using a mapping approach rather than look at the surrounding areas to determine the buildings they would select to provide feedback on.

This applied with 78 % of users who had not visited Stratford before. Participants who visited Stratford before (22% of users) considered the surrounding environment to influence the properties they chose to provide comments on. This study indicated that more participants did not visit Stratford than those who had. Property factors of buildings that users selected to provide feedback on had an impact on the neighbourhoods they were located in. There were comments of how the heritage properties that were selected had an impact on the surrounding landscape such as parks, open spaces, and green spaces. As User 24 noted for Stratford Normal School (teacher's college), "*Older buildings such as this one add an important architectural appeal to*

the streetscape as they are aesthetically pleasing compared to modern utility buildings (convenience stores, gas stations, etc.)."

Overall, the comments made by participants who visited Stratford before and have had some direct exposure to the city's built heritage (289 words per user) were more detailed than those without that experience. The participants who have no experiences visiting the City of Stratford provided more shorter straightforward comments (130 words per user) based on the data available on the web map within Heritage Planner. In the absence of local knowledge, these participants were able to use the map data containing photos and attributes that provided more information on each property. However, the photos could have been moved to the top of each popup when a participant selected each property so they would not miss the information they needed to provide feedback on the properties they selected. In addition, there were also pdf documents that were provided as attachments for each designated building containing additional information. However, these were also located towards the bottom of each popup and could have been moved up as well.

4.3 HCD Boundary Survey

The HCD boundary survey was designed for participants to let us know if they agreed with the current HCD boundary and if any modifications or additions should be made to its geographic extent. Twenty-three participants answered questions in this survey and 8 participants offered changes to the boundary. Ten participants agreed that the current boundary was appropriate, while 8/23 participants felt neutral about the current boundary. Five participants disagreed that the current boundary was appropriate.

The reasons why participants agreed with the current HCD boundary was that they felt that the current boundary encapsulated a vast majority of the heritage buildings in the downtown core of the city and any heritage buildings outside the boundary were scattered and could be addressed individually. For example, user 30 stated, "*Seems that the majority (>90%) of designated heritage sites are within the boundary,*" and user 40 stated, "*I agree with the current HCD as it contains most of the heritage buildings in the city. The other heritage buildings are scattered across the city and can be individually addressed - don't seem to require a district to manage the character of the area.*."

The reasons why five participants disagreed with the current HCD boundary is that they believed that there were heritage properties outside of the current HCD boundary that should be included within an HCD. For example, user 20 stated that, "*Many valuable heritage is outside of the current HCD boundary*," and user 36 stated that, "*There are many old homes outside of the heritage boundary that can have heritage value*." Therefore, they believed there should either be modifications to the current boundary so that it could be enlarged or there should be additional districts added so that they could encapsulate the heritage buildings outside the current HCD boundary throughout the city. Participants could address this in the subsequent HCD boundary sketch survey.

In terms of the breakdown of whether participants believed there should be additional HCDs or modifications to the current HCD, 9 participants believed there should be modifications/additional HCDs, and 14 participants believed that there was no need for modifications/additional HCDs. The 9 participants who believed there should be modifications/additional HCDs included the 5 participants who disagreed with the current HCD boundary and 4/8 participants who felt neutral about the current boundary. The 14 participants

who believe that there was no need for modifications/additional HCDs included the 10 participants who agreed that the current boundary was appropriate and 4/8 participants who felt neutral about the current boundary.

Four participants believed there should be modifications to the current HCD boundary. Another four participants drew more than one boundary, meaning that they believed there should be modifications to the current boundary as well as additional boundaries in the city to encapsulate more heritage buildings.

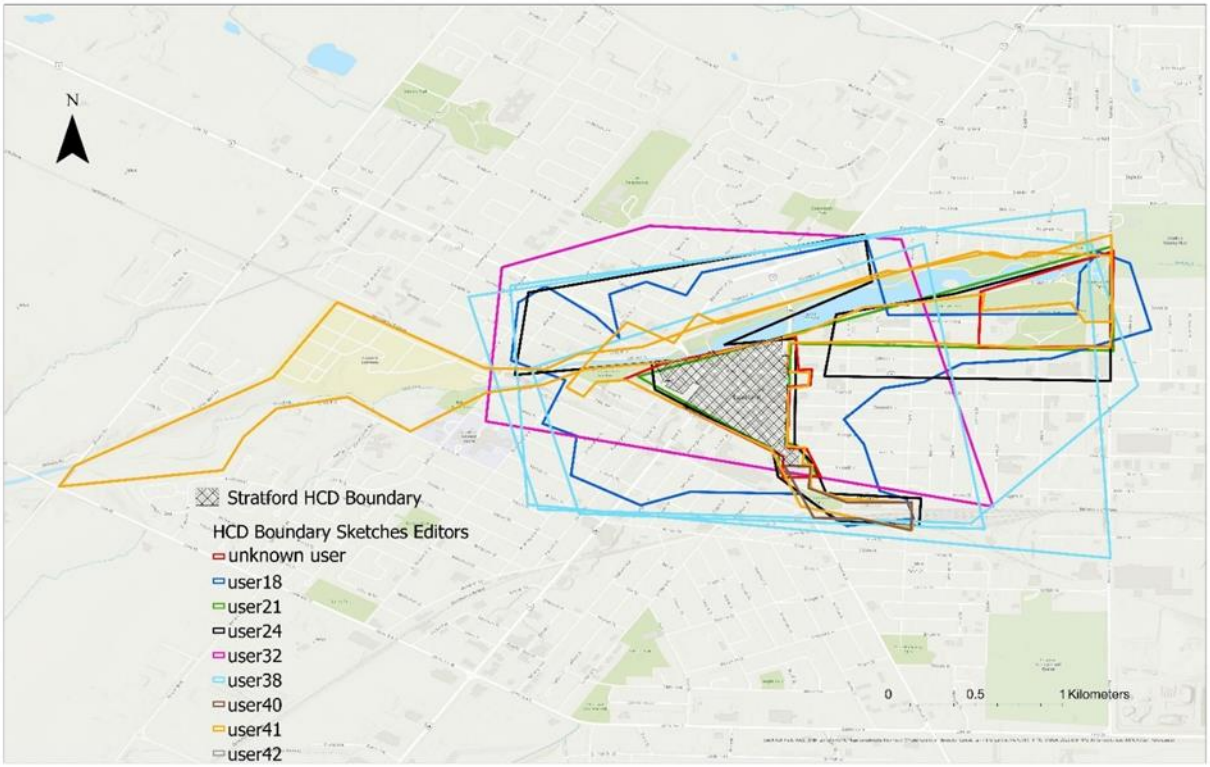

Figure 4.7: HCD Boundary Sketches in Stratford, Ontario drawn by participants in study

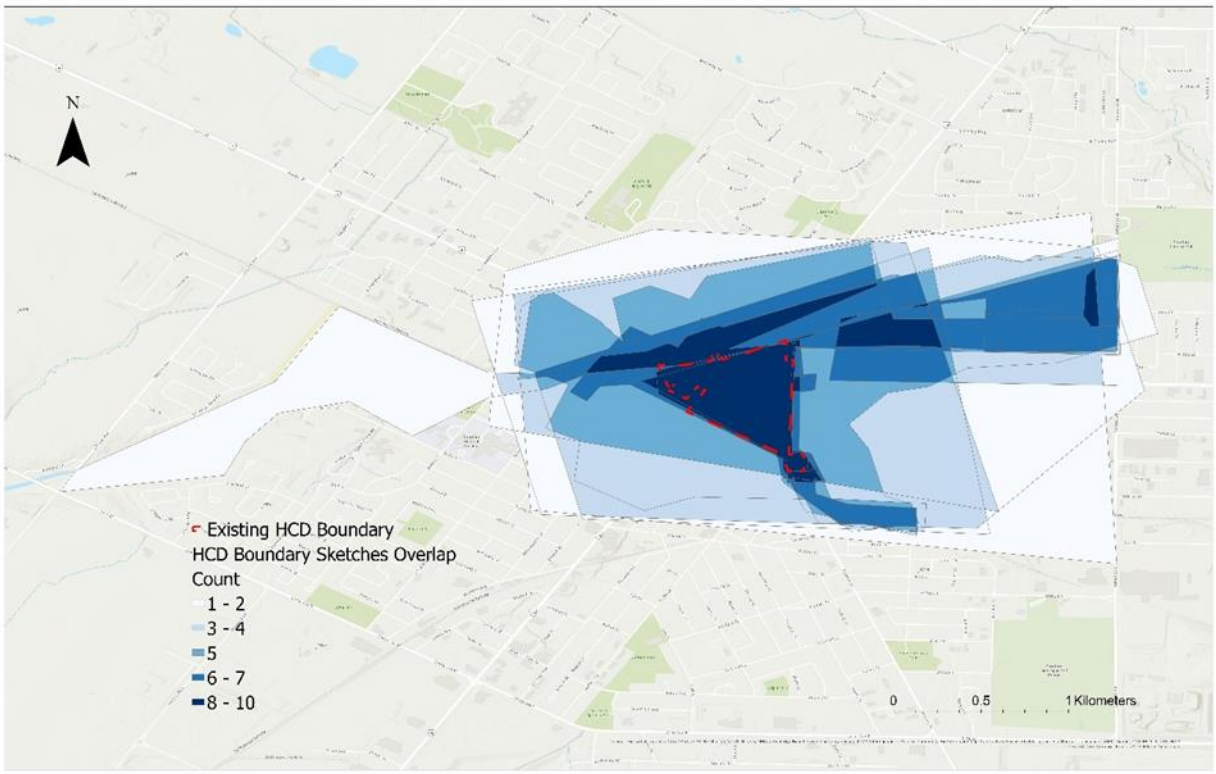

Figure 4.8: Count of Overlapping HCD Boundary Sketches in Stratford, Ontario

Figure 4.7 shows the HCD boundary sketches made by 8 users. By looking at the count of the number of overlapping polygons, the most agreement of what the HCD boundary should be was in the centre of the downtown core of Stratford, where most designated heritage buildings were located surrounding the city hall building (Figure 4.8). The least agreement of where the HCD boundary should be was the area to the west of Stratford, where there was only one polygon drawn and there were no overlapping polygons there (Figure 4.8). According to user 41, "*The river bank and other historic artifacts along the river should also be considered as a part of the heritage boundary. Also have more parts of the city turned into heritage spaces*."

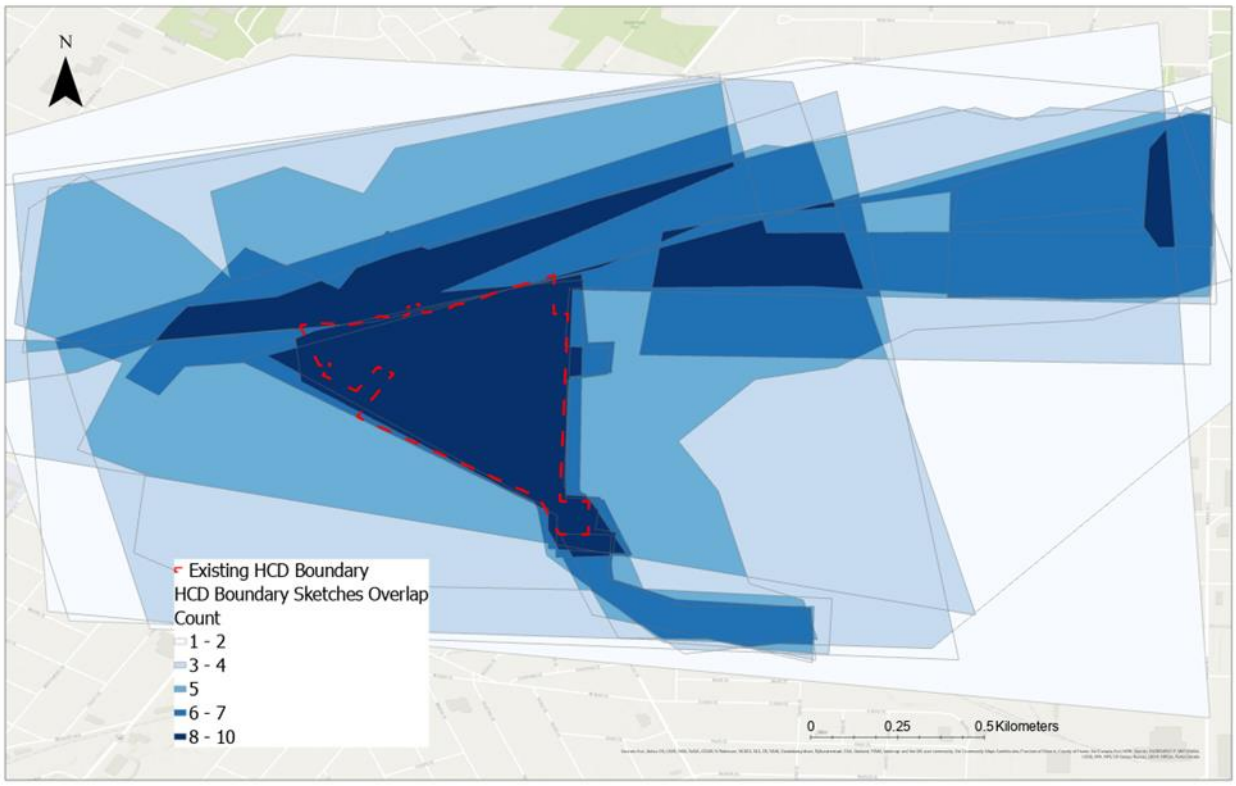

Figure 4.9: Detail of Overlapping HCD Boundary Sketches in Stratford, ON

Some users were not satisfied with the current HCD boundary and therefore suggested areas outside the downtown core such as the river and open spaces throughout the city should be included in the boundary as well (Figure 4.9). New areas that were suggested to be added to the current HCD included major heritage properties such as, Lakeside Drive, 41 Mornington Street St. James Anglican Church, 151 Nile Street (bed and breakfast inn) and 68 Nile Street (technical and trade school), along the river north of the current HCD in addition to larger sized heritage properties, 54 Romeo Street Gallery (museum), 270 Water Street (teacher's college) and 210 Water Street (Caverhill Manor), located east of the current HCD.

A heritage conservation district is composed of areas that contain multiple groups of properties and buildings or a municipality that contains heritage resources with historical

significance or special characteristics that differentiates it from its surrounding environment (Ontario Ministry of Tourism, Culture and Sport, 2017). The additional areas suggested by participants to include in the HCD or have their own HCDs contain many of the properties that have significant historical characteristics that distinguish them from their surrounding neighbourhoods or streetscapes. These suggestions match up well with what a HCD is, except that these properties are isolated or are located near one or two other major heritage sites. Hence, the areas that these additional properties make up may not be large enough to be designated as their own HCDs. However, these areas can be added to the current HCD without having to be close enough to the downtown core, so the area of the current HCD can be expanded. This indicates that the participants in this study believe these areas outside the current HCD contain properties that are too important not to be designated within a new HCD.

4.4 Feedback and Learning Responses

Twenty-four participants provided feedback on the Heritage Planner app and changes in their understanding of heritage planning and/or web GIS tools. Sixteen participants agreed that their level of understanding in heritage planning increased after using the Heritage Planner app. Galvin et al. (2012) state that while analog surveys and public meetings have generally satisfied the goal of maintaining and preserving properties, traditional survey methods have not provided the geographical data required to gage citizen satisfaction levels across geographic space. After using the Heritage Planner app, 16/24 participants agreed that their understanding of heritage planning increased. The online platform that this app was hosted on was able to give enough information to participants who did not have an understanding of heritage planning before using Heritage Planner, so that they could answer questions related to individual heritage properties even if they had not visited Stratford before.

Twenty participants agreed that this web map approach to gathering feedback was better than other methods such as traditional surveys and public meetings. Czepkiewicz et al. (2016) conducted a study in which they noted that the most underrepresented age groups using a geoquestionnaire were those between 45 and 60 years of age, and younger than 20 years of age. Participants recruited through social media performed better on mapping tasks than those who learned about the study from local media and neighbourhood councils, which can be due to a younger age and better computer skills of the former (Czepkiewicz et al., 2016). This relates to the results of this study as most participants agreed that the web map approach to gathering feedback was better than other methods such as analog surveys and public gatherings. This may be attributable to the participants being either undergraduate or graduate students and their comfort with digital data and applications.

Thirteen participants agreed that they had a better understanding of web GIS tools after using the Heritage Planner app. 10 participants felt neutral about this and 1 participant disagreed with this. The reason why 10 participants felt neutral about this was because 22/31 participants indicated that they used computer-based maps very frequently monthly, and 25/31 participants agreed that web map tools would be an effective method to gather feedback from citizens before using the Heritage Planner app. Hence, there was more of an even split between participants who felt neutral and agreeing to having a greater understanding of web GIS tools after using the Heritage Planner website. In terms of 2D vs. 3D breakdown, 16 participants indicated that they preferred using the app in 2D, while 8 participants indicated that they preferred using the app in 3D. In terms of desktop vs. mobile breakdown, 23 participants indicated that they preferred using the app on a desktop computer and 1 participant chose not to answer.

There were many commonly mentioned improvements for the tool. These improvements were organized under three categories: user interface issues, data, and missing features. Regarding user interface improvements, participants suggested that the app could be made more mobile-friendly. Some of the free-form text box questions had a 255-character limit and some participants indicated they would have liked more space to write their answers. Some participants believed the step-by-step instructions could have been integrated into the app better rather than having them as a large block of text beneath the app on the Hub website, while other users appreciated the detailed instructions that explained how to use the app clearly. Some participants believed the user interface of the app could be improved as the HCD Boundary Survey page was a bit crowded and the registration process could be made a bit simpler. Users were also confused by the three different maps provided to draw one boundary on each map and would have preferred one map to draw multiple boundaries. Selecting 3D buildings could have had an autofill option for the building address in the attached survey to allow more users to prefer the 3D option.

Regarding data improvements, some users would have liked more transparency in the buildings polygons so they could see the basemap underneath and some users indicated that when zoomed in all the way, the basemap became greyscale. Regarding improvements on missing features, some participants would have liked a Google StreetView option where they could see the context around the buildings on the street. Some users would have liked the option to have a textbox that explained why that area was chosen accompanying any HCD boundaries they drew in the sketch survey.

Chapter 5: Conclusion

5.1 Reflection of Work

This thesis was designed to investigate how map-based survey tools could be used to support public participation in built heritage planning. A web mapping tool called Heritage Planner was developed to improve local knowledge on how citizens consider both property (site) and neighbourhood (situation) factors when considering the merits of individual heritage buildings. A pilot study was designed to be conducted in the city of Stratford, Ontario, with the goal of providing knowledge that could be applied to other cities in Ontario and throughout Canada. The purpose of this study was to answer the research question: How can web based PPGIS help heritage planners to identify properties valued by community members and delineate heritage conservation districts in Stratford, Ontario? It is important to note that this research, especially the Heritage Planner app, is a proof of concept to illustrate how this tool and methods could be applied to heritage planning. It is not an examination of heritage planning itself in Stratford due to the effects of Covid-19, which prevented the study from being conducted in the City.

Two hypotheses were made at the start of this study, and both were addressed with the results. The first hypothesis was that participants will incorporate neighbourhood factors in their feedback more often than property-specific factors when using a map-centred approach. However, the results proved the opposite was true. Users incorporated the property-specific factors of “Building” and “Built Heritage” more than the neighbourhood factors of “Community”, “Neighbourhood”, “Open Space”, and “Streetscape” into their feedback when using Heritage Planner (Table 4.2). Participants who never visited Stratford before considered site-specific factors in their written comments and participants who had visited Stratford before considered situation-specific factors in their text feedback. Seventy-eight percent of participants

who provided feedback in the Individual Properties survey indicated that they have never visited the city and 22% indicated that they had visited the city before.

The second hypothesis was that interest in a specific heritage property is positively correlated with individuals' personal attachment to, or investment in, a neighbourhood and a community to a lesser degree. This appears to be somewhat true based on the small sample size of participants who indicated they visited Stratford before (22% of the participant pool). One of the most important aspects of how participants who visited Stratford before chose the heritage properties they commented on was the emotional ties they had to those properties. Brown and Donovan (2014) state that people are place-makers and learn to distinguish space from place by giving value to space. Places become spaces where values are attached that emerge from past experiences and are impacted by different cultures (Brown & Donovan, 2014). Williams and Vaske (2003) state that landscapes, places, and spaces are more than containers of natural resources or areas for activities. They are a collective of elements in the form of locations filled with history, memories, emotional and symbolic socio-cultural meanings (Williams & Vaske, 2003). Roche (2016) states that citizens relate more to the concept of place (points of interest, place names, events, vague characteristics) than the concept of space (geographic coordinates).

In the heritage context, sense of place can deal with historical significance of locations and the memories or feelings that citizens in communities associate with these places. All participants in the study who stated they visited Stratford before mentioned having an emotional connection to the properties they visited and therefore selected those properties to provide feedback for. Participants in the study who stated they have never been to Stratford mentioned similarities to heritage buildings they see in their own cities and the emotional attachments they have with them. For example, User 22 stated for the St. James Anglican Church, *"This building*

reminds me a bit of a building from where I grew up (Stewart Hall, Pointe-Claire). They are different materials and styles, but it that reminds me of home because of its grand nature. Strong because of that and the memories I have of home."

5.2 Satisfying the Objectives

This thesis was defined by three main objectives outlined at the start of the study. The first objective was to design and build a web/mobile application to provide users to rate, comment and provide feedback for the various heritage properties and heritage conservation districts in Stratford, Ontario. This objective was accomplished by developing the Heritage Planner web app and testing it with a student participant group.

The second objective was to analyze users' comments to infer how heritage conservation districts and individual heritage properties contributed to their place identity and place attachment. To analyze feedback provided on individual heritage properties, it was seen which properties were commented on the most. Results showed that participants were attracted to provide comments on the bigger, more prominent heritage properties in the city. Jankowski et al. (2017) stated in their findings that geoweb applications scale public participation more effectively than public meetings. This proves to be true in this study because due to Covid-19, it was not possible to have public meetings and instead Heritage Planner proved to be an extremely valuable tool in gathering participant feedback. Czepkiewicz et al. (2016) stated in their findings that digital approaches to gather user feedback increases bias towards younger population and there needs to be analog methods such as paper questionnaires to reach older populations. Previous studies done by Galvin et al. (2012) and Kovacs et al. (2014) that collected data from citizens on heritage planning used traditional methods such as townscape surveys, stakeholder interviews, residential surveys, and plan and document analysis. This study addresses the digital

gap of gathering data from citizens in the field of heritage planning and introduces the Heritage Planner which can be implemented in different locations in Ontario.

Coding was used to analyze users' free-form text comments and how they related to the themes of each of the questions that were asked in the Individual Heritage Properties survey. This survey allowed for a mixed-methods research approach with the open-ended questions providing useful qualitative data where participants elaborated on previous answers to multiple-choice questions.

To analyze feedback provided on the HCD, it was seen which areas outside the current HCD had the most consensus. The Heritage Planner app illustrated one way that heritage planners can provide information about HCDs to citizens in a way that is accessible and helps them to understand the property and neighbourhood dimensions. Municipalities should provide information on their HCD(s), including the district plan(s), list(s) of address(es), and map(s) on their website (Shipley et al., 2011). Heritage Planner addresses this research gap by providing participants with these details to help them determine if they believe the HCD is appropriate or if there is need for change.

Out of the small group of participants who disagreed with the current boundary, the consensus was to include areas outside of the current HCD that contained the bigger, more prominent heritage sites that were more openly spaced out and not located close together. Shipley and Feick (2009) noted in their study that there was community consensus towards the centre of the cultural heritage landscape they were investigating. This is like this study in that there was clear consensus with the downtown core HCD at the centre with exceptions being major heritage properties located around the downtown core. Kovacs et al. (2009) stated in their findings that residents they got feedback from regarding the HCD they lived in were

knowledgeable about it. This was not the case in this study as all participants were students and more in-depth feedback could be gathered for the HCD if residents were recruited.

Crowdsourced data can have limitations in terms of spatial data quality and sampling bias (Levin et al., 2017). This study had the limitation of having only student participants and data quality of student feedback of those unfamiliar with Stratford (78% of participant pool) not being as high as it would be if citizens in Stratford participated. This was due to Covid-19 and in a future study, this limitation would be resolved by employing an improved Heritage Planner amongst residents in Stratford. Wilson et al. (2019) stated in their findings that deploying an in-situ participation-based app led to participants thinking critically about the areas they inhabit and pass through. This can be employed as an improvement in this study when Heritage Planner is deployed for citizens to have both remote and in-place participation options to get richer feedback.

The third objective was to provide recommendations to the City of Stratford on data collection methods (remote and in-place participation) using web/mobile applications. There are three recommendations that can be provided to heritage planners in Stratford based on what was learned from building and using Heritage Planner. The first recommendation is to have an appropriate method for participants to draw out HCD boundaries in Heritage Planner if they believe the current one needs to be modified or if there need to be additional boundaries. In this study, participants were confused with there being three maps available to draw one boundary on each depending on if they wanted to modify the current boundary or draw up to two additional boundaries. A better option would be to have one map available for participants to draw up to three boundaries if they wish. Participants who had not visited Stratford before were unsure on how to answer the short answer questions in the Individual Properties survey. However, this will

not be an issue for citizens in Stratford who participate as they will be familiar with the heritage buildings in their city.

The second recommendation is to have an autofill option for the building address in the attached survey when selecting 3D buildings in Heritage Planner Individual Properties survey web map/scene to allow more users to use and prefer the 3D option. In this study, participants had to manually fill in the address of the building they selected to provide feedback on if they were using the 3D scene, which was not the case for the 2D map. Hence, there were some participant records in the data that were missing addresses. In addition, there were designated heritage properties that were missing supplementary information on the Heritage Stratford website that were implemented in this study. A recommendation is made to heritage planners in Stratford to have a complete database for designated heritage buildings in the city.

The third recommendation is to have a method of restricting web commenting to residents. In this study, ArcGIS Hub was used to create a registration process for student participants to have their own accounts to log in to access Heritage Planner. A similar methodology is suggested for heritage planners to adopt when implementing Heritage Planner in Stratford. For example, the Heritage Stratford website can be used to host the app to be implemented for citizens. Citizens can create their account and have a user login process set up on the website, so that planners can make sure only residents are accessing the app.

It is important to note here that web-map survey tools such as Heritage Planner can play a crucial role in the heritage planning process. Experts generally drive the heritage planning process (designating individual heritage properties and HCDs) through municipal heritage committees and municipal councils and they gather public feedback as part of the process. Public participation comes into play during the public meetings phase of designation processes for both

individual heritage properties and HCDs. Geoquestionnaires similar to Heritage Planner can assist with data gathering in these public meeting steps of the process. In addition to having public meetings where only a select number of people can attend, tools like Heritage Planner can be used as well to reach a larger audience in a digital space. Tools similar to Heritage Planner can also provide an opportunity for participants to provide input on designating heritage properties by looking at a web map and delineate HCD boundaries using digital maps instead of paper maps. Another recommendation would be for the City to implement a geoquestionnaire like Heritage Planner during their public meetings so a larger group of citizens can be a part of the designation process.

5.3 Limitations

There was one major limitation that affected how the three objectives could be accomplished, especially the third objective. The major limitation was Covid-19. There were two aspects to this limitation. The first aspect was that University of Waterloo researchers could not interact with Stratford staff or citizens (or even students) in-person. This affected development and testing of Heritage Planner. Due to Covid-19 and a lack of collaboration with the city of Stratford, citizens could not be recruited to participate in the study. Instead, an alternative solution was to recruit undergraduate and graduate students from the Faculty of Environment at the University of Waterloo due to time constraints. This affected the first two objectives in that students were providing feedback on heritage properties and the HCD instead of citizens. This meant that the students' feedback would not be as detailed as it would be from citizens due to a lack of local knowledge of the city. In addition, the third objective was severely affected. Instead of providing recommendations to the City, user feedback would be used to improve Heritage Planner so it could be implemented better amongst citizens in the future.

The second aspect was that participants could not easily or safely visit the properties and neighbourhoods. Participants could not experience the heritage directly or gain firsthand knowledge. In this case, students could not visit the city for the purpose of providing feedback on heritage buildings. Only remote participation could be conducted and there could be no in-place participation. This meant that participants who were not familiar with the city could not visit it to get a better understanding of the heritage properties within it and therefore they could not provide more detailed feedback. Since there was only remote participation, most users provided feedback on Heritage Planner through their desktop computers. Without in-place participation, more users could not use their mobile devices to provide feedback on Heritage Planner by visiting the heritage properties they were interested in providing input for.

There were also limitations for other data. There were some designated heritage properties that were missing photos and additional architectural and historical information. This information was retrieved from the City of Stratford Heritage website, and it did not have this information for all the designated buildings that were provided in the data. In addition, non-designated heritage properties could have had larger higher quality photos. The photos provided on the City of Stratford Heritage website were thumbnail size. Some users would have liked more transparency in the buildings polygons so they could see the basemap underneath and some users indicated that when zoomed in all the way, the basemap became greyscale.

There were limitations on program features that could not be implemented. Participants suggested that Heritage Planner could be made more mobile-friendly. Some of the free-form text box questions had a 255-character limit and some participants indicated they would have liked more space to write their answers. Selecting 3D buildings could have had an autofill option for the building address in the attached survey to allow more users to prefer the 3D option. Some

participants would have liked a Google StreetView option where they could see the context around the buildings on the street. Some users would have liked the option to have a textbox that explained why that area was chosen accompanying any HCD boundaries they drew in the sketch survey.

5.4 Directions for Future Research

Due to the limitations in this study, the main direction to take for future research would be to implement an improved Heritage Planner app and test it with citizens in a heritage planning context within Stratford. Suggestions from the participants of this study can be taken to further improve Heritage Planner so citizens have no issues in understanding how to use it. There would need to be more collaboration with the city of Stratford and its Heritage Planning Committee to refine the app including functionality, provided data and survey questions. Feedback from heritage planners could be used as well to improve upon the app and then recruit citizens from Stratford who are interested in providing feedback on heritage properties and the HCD within their city. The feedback from citizens can then be used to provide recommendations to the city on if the remote or in-place participation data collection method was better and if a desktop or mobile device was used more to provide feedback (Adepu & Adler, 2016). The city would also have a better idea of which heritage properties citizens value the most and whether there needs to be changes to the current HCD boundary. In addition to being implemented in Stratford, this tool could be implemented in other cities throughout Ontario and Canada. Even though this is a pilot study being conducted in Stratford, it is meant to be a basis for which similar studies can be implemented to use web map tools for heritage planning in Ontario and Canada.

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Appendix A: Heritage Planner App Survey Pages

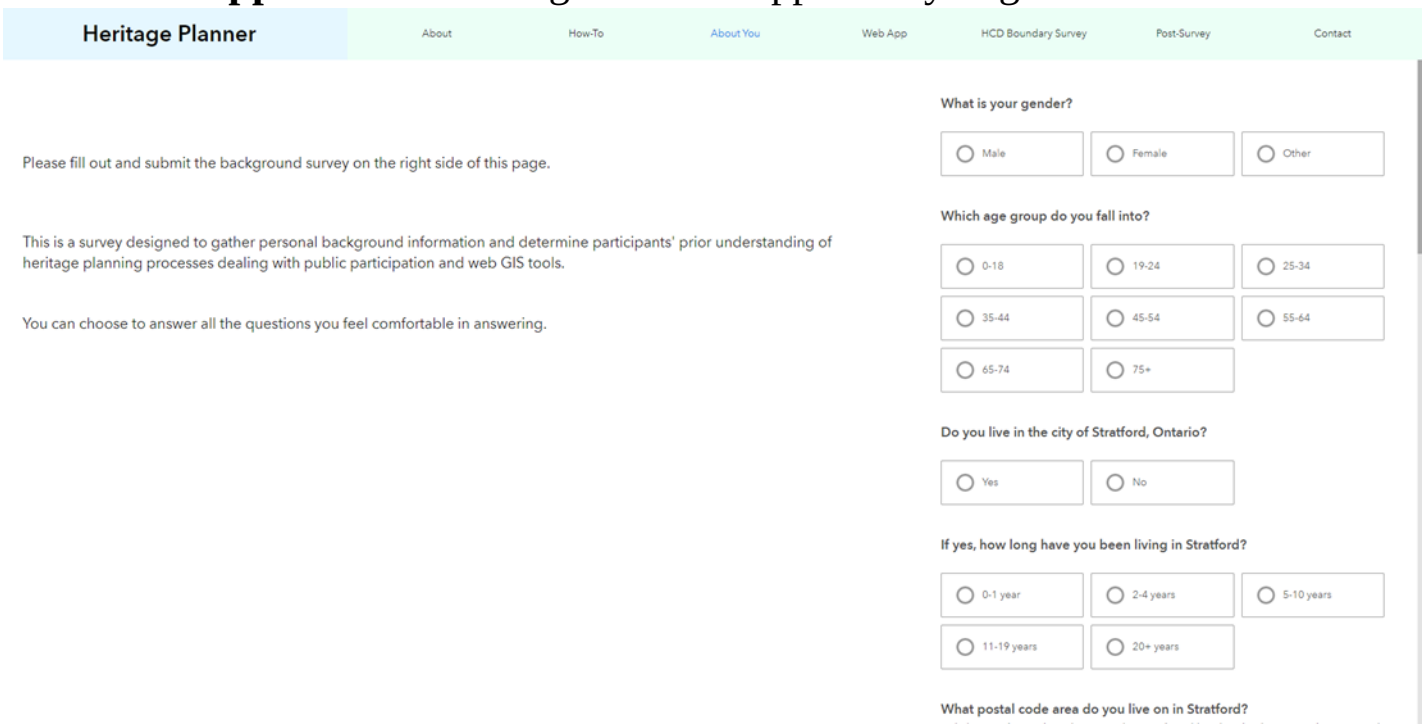

Figure A.1: About You Survey Page in Heritage Planner web map survey tool

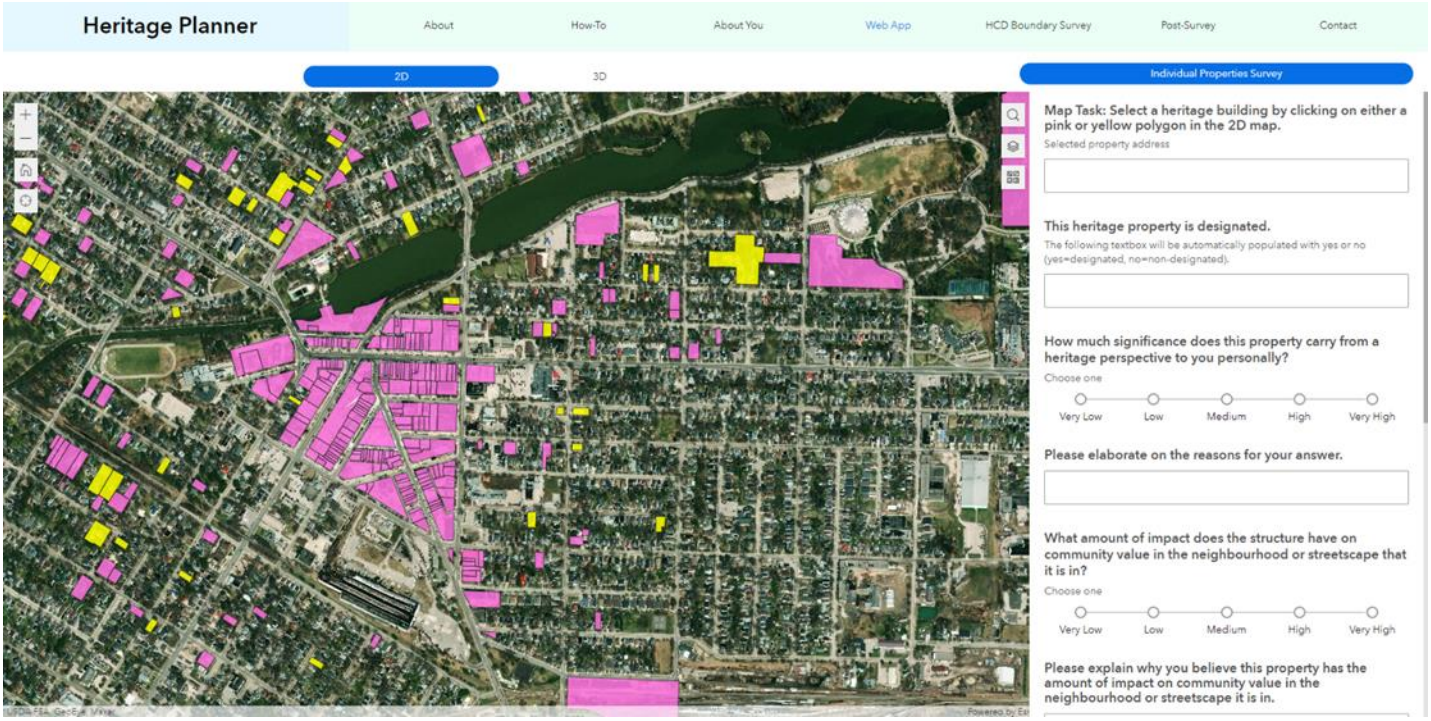

Figure A.2: Individual Properties Survey shown in conjunction with heritage building data in 2D

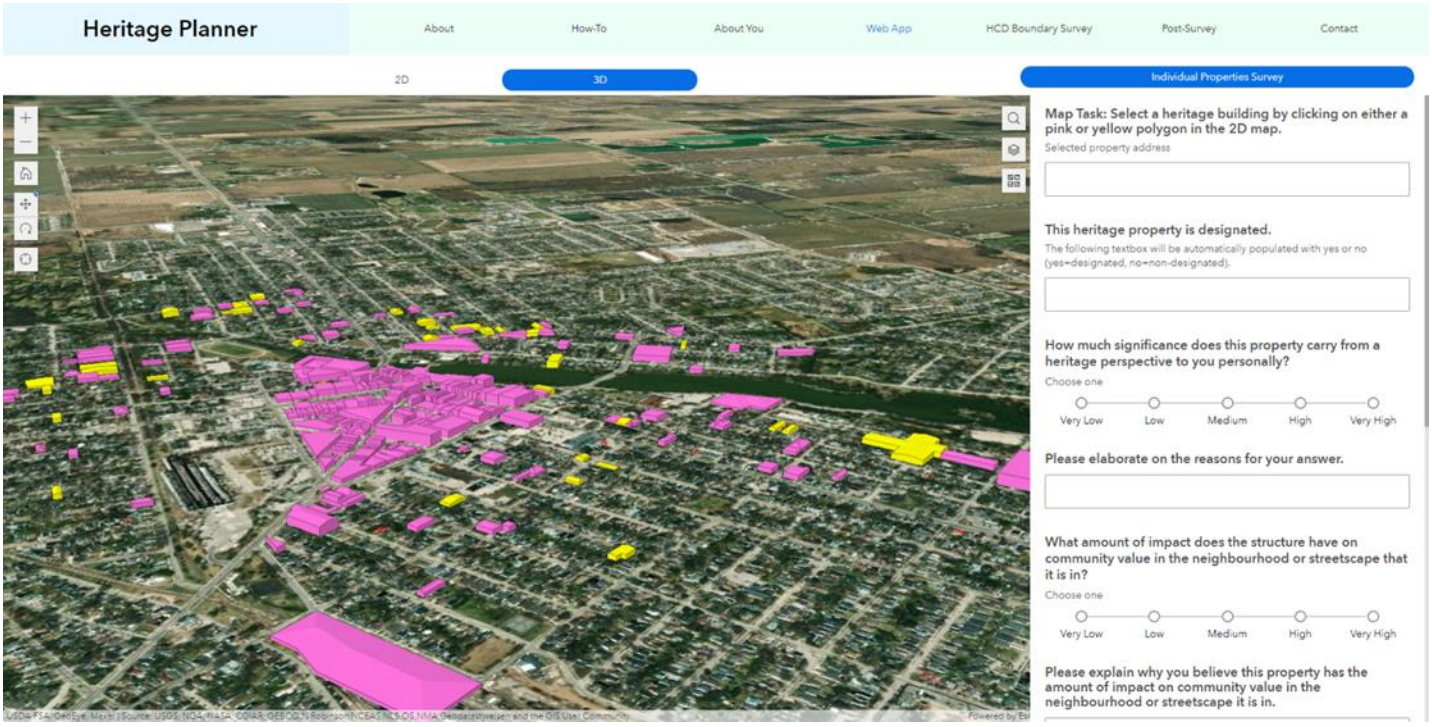

Figure A.3: Individual Properties Survey shown in conjunction with heritage building data in 3D

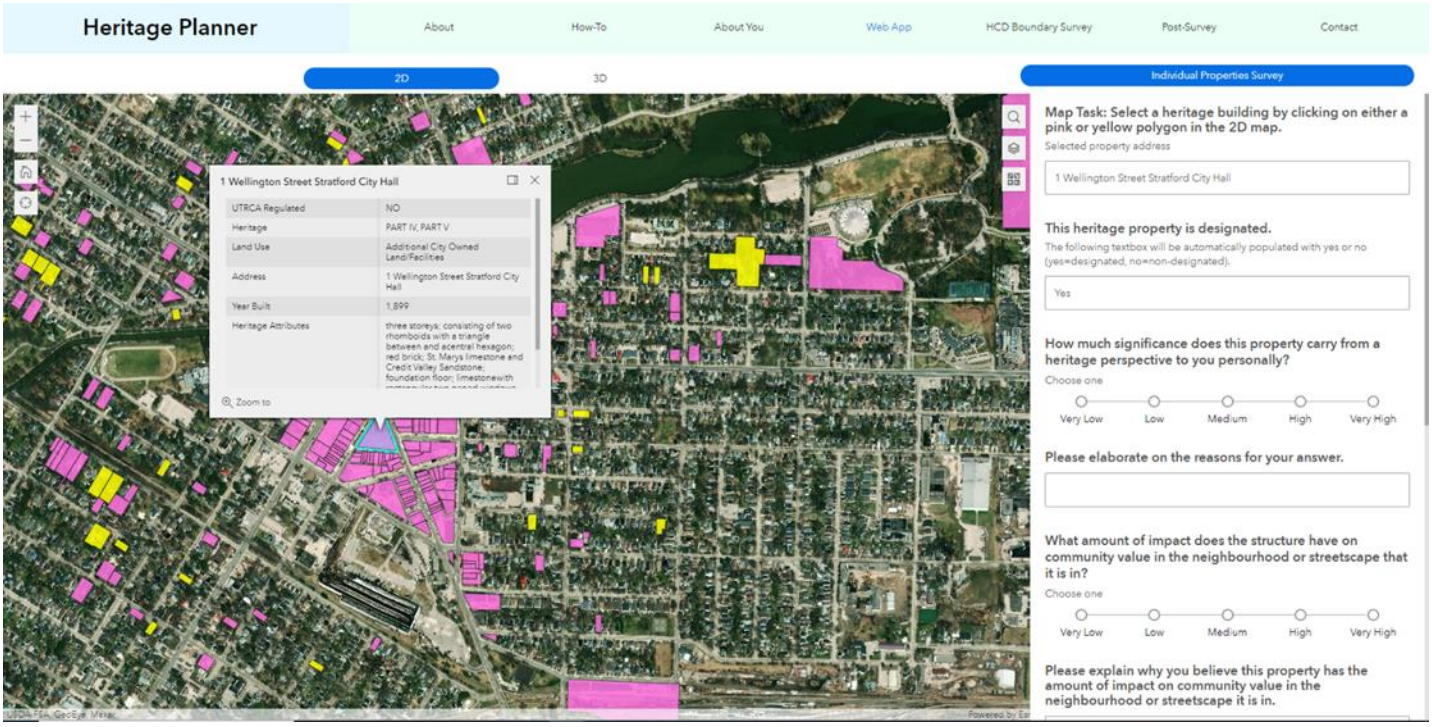

Figure A.4: Individual Properties Survey shown with selected property

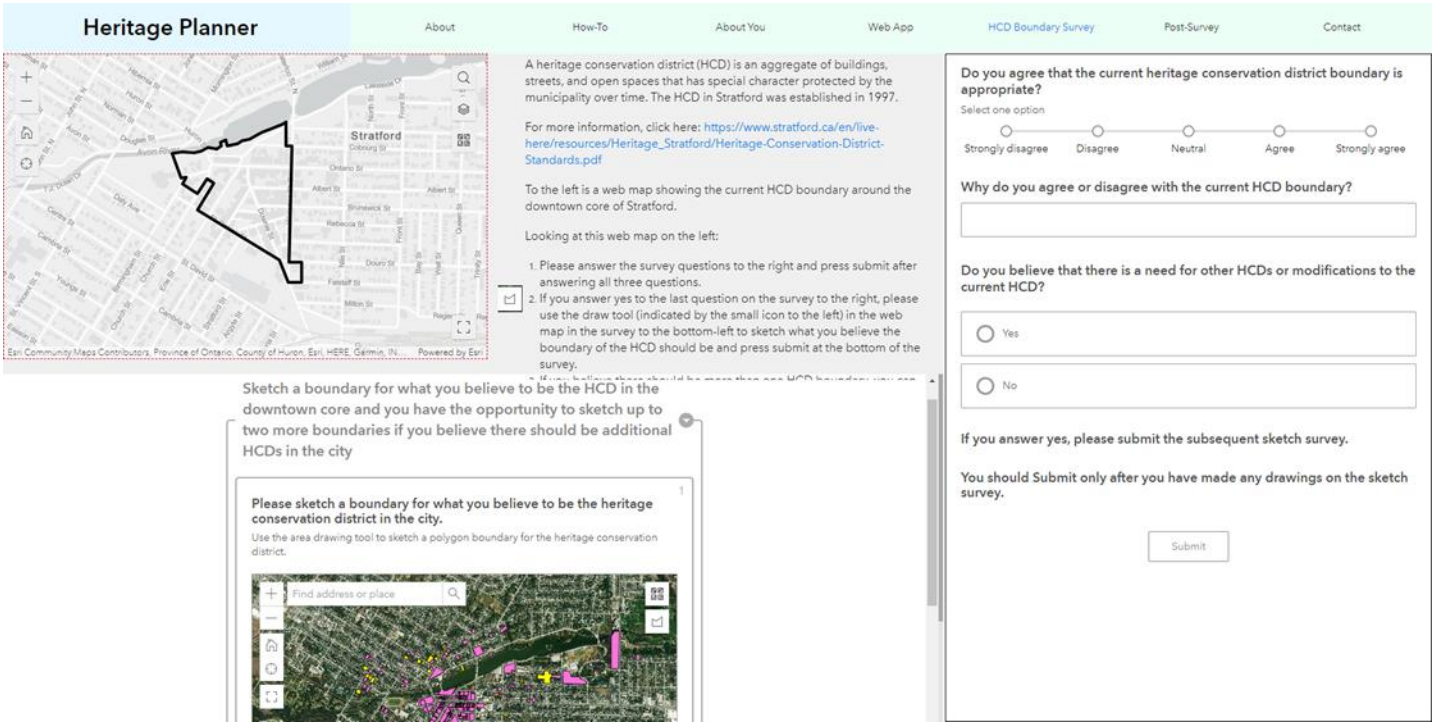

Figure A.5: HCD Boundary Survey web page in Heritage Planner web map survey tool

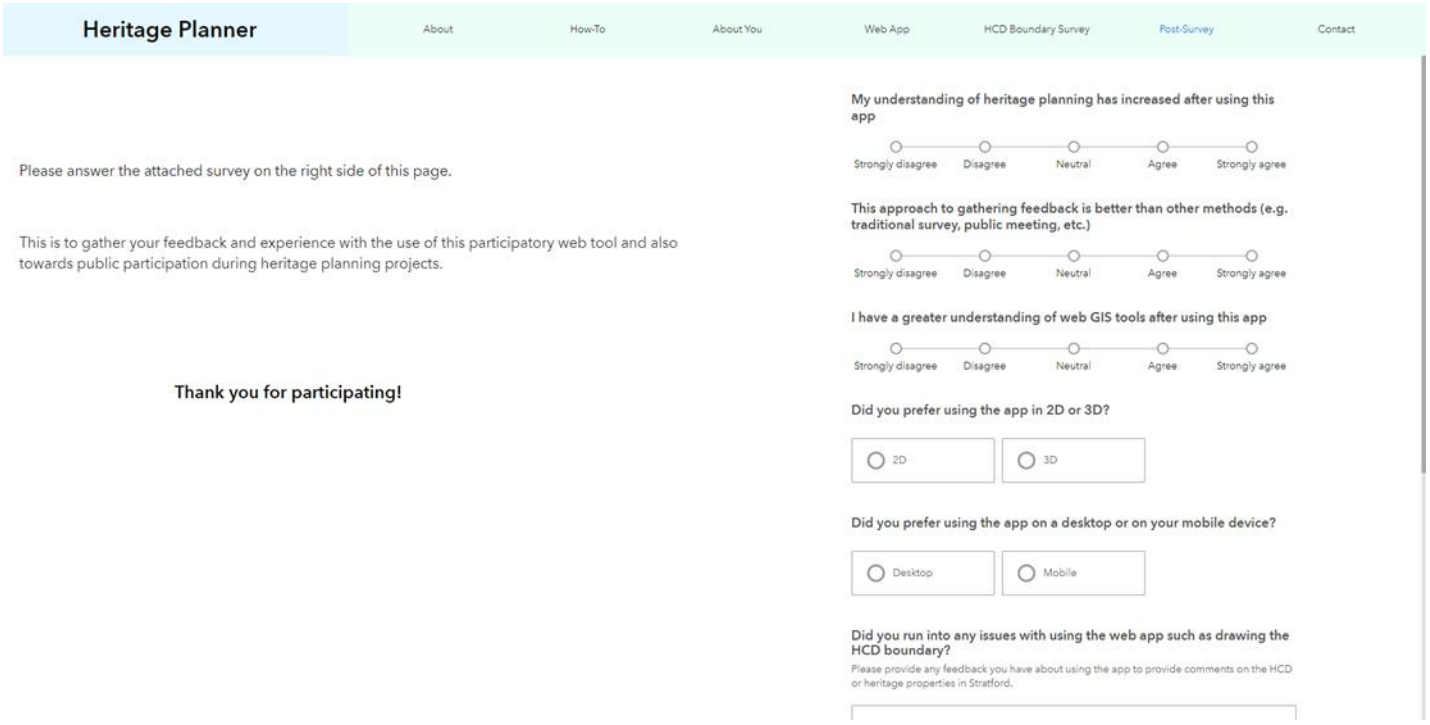

Figure A.6: Post-Survey webpage in Heritage Planner web map survey tool

Appendix B: About You Survey Questions

What is your gender?

a) Male b) Female c) Other

Which age group do you fall into?

a) 0-18 b) 19-24 c) 25-34 d) 35-44 e) 45-54 f) 55-64 g) 65-74 h) 75+

Do you live in the city of Stratford, Ontario?

a) Yes b) No

If yes, how long have you been living in Stratford?

a) 0-1 year b) 2-4 years c) 5-10 years d) 11-19 years e) 20+ years

What postal code area do you live on in Stratford?

To help us understand attachment to places and neighbourhoods, please provide your postal code.

What is highest level of education that you have achieved?

a) Some high school education
b) High School Diploma
c) College or University Bachelor's Degree
d) Graduate Degree

How often have you provided feedback to the City over the past five years on community planning or operations (e.g. zone changes, etc.)?

a) Never b) Sometimes c) Regularly d) Often e) Very Often

How interested are you in local built and cultural heritage?

a) Not at all interested
b) Somewhat interested
c) Moderately interested
d) Quite a bit interested
e) Very interested

How often have you provided feedback on heritage planning?

a) Never b) Sometimes c) Regularly d) Often e) Very Often

How often do you get community information from online sources in an average month (e.g. government websites, local newspapers, Facebook and other social media)?

a) Never b) Sometimes c) Regularly d) Frequently e) Very Frequently

How often do you use computer-based maps in an average month (e.g. Google Maps, MapQuest, GIS Software, web maps)?

a) Never b) Sometimes c) Regularly d) Frequently e) Very Frequently

Web map tools are an effective method to gather public input from citizens

a) Strongly disagree b) Disagree c) Neutral d) Agree e) Strongly agree

Are you completing this survey on a desktop or mobile device?

a) Desktop b) Mobile

Appendix C: Individual properties survey questions

Map Task: Select a heritage building by clicking on either a pink or yellow polygon in the 2D map.

Selected property address

This heritage property is designated.

The following textbox will be automatically populated with yes or no

(yes = designated, no = non-designated).

How much significance does this property carry from a heritage perspective to you personally?

Choose one

a) Very Low b) Low c) Medium d) High e) Very High

Please elaborate on the reasons for your answer.

What amount of impact does the structure have on community value in the neighbourhood or streetscape that it is in?

Choose one

a) Very Low b) Low c) Medium d) High e) Very High

Please explain why you believe this property has the amount of impact on community value in the neighbourhood or streetscape it is in.

What is your level of sense of place (emotions, feelings, attachments) that you have with this heritage site?

Choose one

a) Very Weak b) Weak c) Intermediate d) Strong e) Very Strong

Please explain why you have the level of attachment that you do with this property.

If you have a comment about a specific part of the property or neighbourhood fit, please provide an image.

If you have uploaded a photo, please provide a comment about it.

Appendix D: HCD Boundary Survey Questions

Do you agree that the current heritage conservation district boundary is appropriate?

Select one option

a) Strongly disagree b) Disagree c) Neutral d) Agree e) Strongly agree

Why do you agree or disagree with the current boundary?

Do you believe that there is a need for other HCDs or modifications to the current HCD?

a) Yes b) No

If you answer yes, please submit the subsequent sketch survey.

You should submit only after you have made any drawings on the sketch survey.

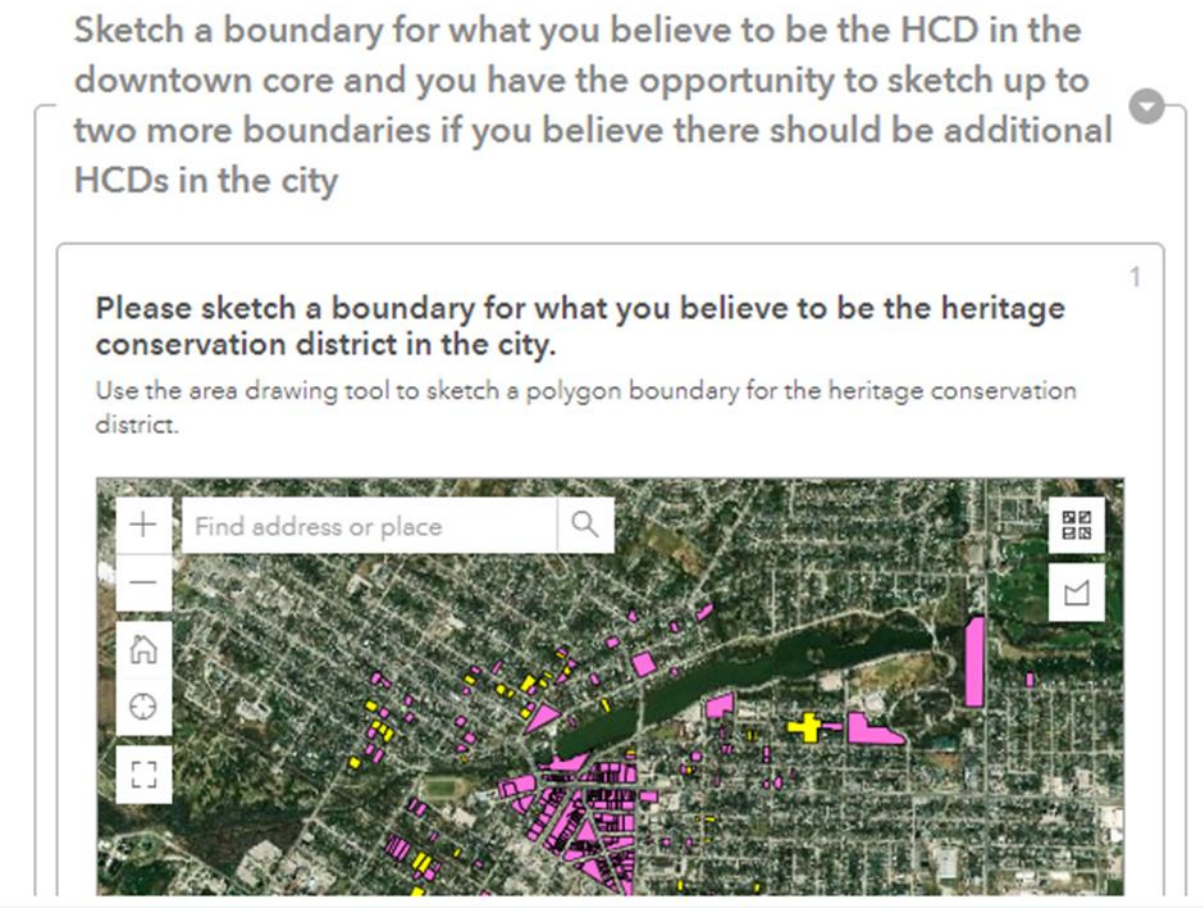

Figure D.1: HCD Boundary Survey questions

Appendix E: Post-survey questions

My understanding of heritage planning has increased after using this app

a) Strongly disagree b) Disagree c) Neutral d) Agree e) Strongly agree

This approach to gathering feedback is better than other methods (e.g., traditional survey, public meeting, etc.)

a) Strongly disagree b) Disagree c) Neutral d) Agree e) Strongly agree

I have a greater understanding of web GIS tools after using this app

b) Strongly disagree b) Disagree c) Neutral d) Agree e) Strongly agree

Did you prefer using the app in 2D or 3D?

a) 2D b) 3D

Did you prefer using the app on a desktop or on your mobile device?

a) Desktop b) Mobile

Did you run into any issues with using the web app such as drawing the HCD boundary?

Please provide any feedback you have about using the app to provide comments on the HCD or heritage properties in Stratford.

Do you have any other comments or suggestions?

For example, you can provide any suggestions you have for improving the tool.

Would you like a summary of the results to be emailed to you once this study has been completed?

a) Yes b) No

Appendix F

Open-ended question Text Comments for Individual Heritage Properties

Themes for Coding: Building, Building Landmark, Building Architecture, Open Space, Sense of Place, Streetscape, Built Heritage, Community, Community Cohesion, History, Tourism, Neighbourhood

Questions:

1. Please elaborate on the reasons for your answer to how much significance does this property carry from a heritage perspective to you personally.

2. Please explain why you believe this property has the amount of impact on community value in the neighbourhood or streetscape it is in.

3. Please explain why you have the level of attachment that you do with this property.

heritage_user10

Q1. N/A - I do not live in Stratford and am not familiar with this property. (15 Morenz Drive William Allman Memorial Arena)

Q1. N/A - I don't live in Stratford. (59-61 Douglas Street, Stratford)

Q2. I believe this structure brings social value by building a sense of belonging and community cohesion for the locality. (15 Morenz Drive William Allman Memorial Arena)

Q2. I believe that this property provides a sense of history and potentially a tourist attraction for the community. (59-61 Douglas Street, Stratford)

Q3. N/A - I do not live in Stratford. (15 Morenz Drive William Allman Memorial Arena)

Tags: *tourism, building, sense of place, community, community.cohesion, history*

heritage_user12

Q1. Train stations often present historical traces through architecture and design which holds a unique characteristic for a city/town etc. (101 Shakespeare Street VIA Rail Station)

Q1. I have never been there (5 Huron Street)

Q2. often considered as a landmark. Also, people travelling in the city via train will have first experience of the neighborhood starting from the station (101 Shakespeare Street VIA Rail Station)

Q3. I have never been to this particular site but train stations are always a part of pleasant memories associated with visiting a city/town (101 Shakespeare Street VIA Rail Station)

Tags: *sense of place, building.architecture, history, neighbourhood, building.landmark, community*

heritage_user13

heritage_user16

Q1. I am no super familiar with it (210 Water Street, Stratford)

Q2. Old building add personality to the landscape (210 Water Street, Stratford)

Q3. I have never visited it (210 Water Street, Stratford)

Tags: *building, streetscape*

heritage_user20

Q1. Some inside details can be found in the website. (20 Caledonia Street, Stratford)

Q1. Similar to the neighborhood, and it seems to be not so special. (74 Mornington Street, Stratford)

Q1. Interesting design (No Address Listed)

Q1. George Kennedy's story is detailed and interesting. (35 Caledonia Street, Stratford)

Q1. the court building on this property is a landmark of Stratford, located at the intersection of some of Stratford's main roads, and I have always seen and admired it every time I have visited Stratford (5 Huron Street)

Q1. Roderick Lean's story is interesting. (27-29 Church Street, Stratford)

Q1. Impressing large yard and front portico, built by George McLagan (No Address Listed)

Q2. as a landmark it has a very high value, an easily recognizable building, and it represents the municipality and an institution (5 Huron Street)

Q2. It still works as a bed and breakfast inn, and I can see many details from its website. (20 Caledonia Street, Stratford)

Q3. I have always seen this building when I have visited Stratford, so my sense of place is related to my previous visits and experiences in Stratford, which can easily be represented by the landmark building on this property (5 Huron Street)

Q3. Interesting shape of the polygon. (151 Douglas Street, Stratford)

Q3. Double house, I'm quite curious about the owner of the two houses. (59-61 Douglas Street, Stratford)

Tags: *building.architecture, building.landmark, neighbourhood, building, tourism, history, community, built heritage, sense of place*

heritage_user18

Q1. architectural value (30-32 Waterloo Street South, Stratford)

Q1. it look's like new (145 Grange Street, Stratford)

Q2. It can effect on the community economical perspective by attracting more tourists (30-32 Waterloo Street South, Stratford)

Q3. I have not lived here before. but for the community members who are raised there it can have a sense of place (30-32 Waterloo Street South, Stratford)

Tags: *community.cohesion, building.architecture, sense of place, community, tourism*

heritage_user22

Q1. Since I am not from Stratford, I can't speak personally or really determine how significant it is. However, it clearly is an important building for the city so that's why I chose Medium. (1 Wellington Street Stratford City Hall)

Q1. Since I am not from Stratford, I can't speak personally or really determine how significant it is. However, pesonally I love water fronts, so thats why I chose medium. (Lakeside Drive)

Q1. Since I am not from Stratford, I can't speak personally or really determine how significant it is. The built look of the buildings is clearly old and grand in nature. That's why I chose medium. (5 Huron Street)

Q1. Since I am not from Stratford, I can't speak personally or really determine how significant it is. I chose medium because of its grand nature and built style. (41 Mornington Street St. James Anglican Church)

Q1. Since I am not from Stratford, I can't speak personally or really determine how significant it is. Medium because of its style, it is different and unique compared to what else is in yellow. (77 John Street North, Stratford)

Q1. Only reason I chose Low and not Very Low was because of its age. I don't believe it has much value other than the materials and age. (145 Grange Street, Stratford)

Q1. It is an interesting style. Of the other yellow polygons, this is the only Edwardian styled building. (74 Mornington Street, Stratford)

Q1. The style and look is interesting. Knowing more on the original occupant would be interesting to know and could increase its heritage. (30-32 Waterloo Street South, Stratford)

Q2. Since its near the water, downtown and Lakeside Drive, it has more of a community and streetscape impact than other non-designated buildings. (30-32 Waterloo Street South, Stratford)

Q2. Since it is City Hall, it is arguably the center of the city, one of the most grand and old structures in Stratford. It is the heart of the city and is a clear example of built heritage. (1 Wellington Street Stratford City Hall)

Q2. Any type of waterfront, especially with a statue, is always important for a community. It is a local park, has an area to walk along the river, and benches to sit and relax, taking in the view. (Lakeside Drive)

Q2. Old looking and large buildings in the center of town are always important for the streetscape. Clearly, the County Courthouse is a massive and old building making it important for the streetscape. (5 Huron Street)

Q2. This is the only yellow polygon I feel should carries heritage. The style, the construction. It is so different (colonial structure) than anything else in Stratford. It makes it unique to the neighbourhood and streetscape.. (41 Mornington Street St. James Anglican Church)

Q2. To the streetscape it is unique. It reminds me of a tudor house built by FL Wright. Tudor is a unique style that I feel you don't find often. (77 John Street North, Stratford)

Q2. It's a common style and a good distance from other heritage buildings. I don't believe it does much for adding value to the community. (145 Grange Street, Stratford)

Q2. For community, not much because its far from anything, no real appreciation other than looking at it is possible. For streetscape, of course it has an impact. It is an interesting style of house. (74 Mornington Street, Stratford)

Q3. I tend to think that having a sense of place, you need to experience it. A house that can't be experienced, to me, is hard to get any level of attachment. The only attachment is if you live nearby, walk or drive past it. (74 Mornington Street, Stratford)

Q3. Nothing, I don't feel much other than its age. I might be biased, because I'm comparing to heritage buildings in Montreal that have more character and are unique. (145 Grange Street, Stratford)

Q3. The only emotion I get from this building is its unique to the streetscape. I don't think I can attach any sense of place with it, especially if its somewhere I can't enjoy. (77 John Street North, Stratford)

Q3. This building reminds me a bit of a building from where I grew up (Stewart Hall, Pointe-Claire). They are different materials and styles, but it that reminds me of home because of its grand nature. Strong because of that and the memories I have of home. (41 Mornington Street St. James Anglican Church)

Q3. Since I don't live there I can't really form a sense of place. I chose weak because I love old and grand looking buildings. And it's beside a park, making it even more of an attraction. Sitting, relaxing and enjoying some heritage is nice.. (5 Huron Street)

Q3. Since I don't live there, I can't really express my sense of place. However, I love waterfronts and enjoy sitting, relaxing, drinking and eating on a nice summers day. Parks are integral to community wellness. (Lakeside Drive)

Q3. I can't really have a sense of place because I don't live there. I put weak since I can somewhat imagine how I would feel if I did live there. Since its downtown, the center of the city, I would presumably be in that area often. (1 Wellington Street Stratford City Hall)

Q3. Like I said for the value it has, its near the heart of the city, the water and Lakeside Drive, making it more impactful on my sense of place. (30-32 Waterloo Street South, Stratford)

Tags: *open space, building.landmark, building.architecture, sense of place, streetscape, built heritage, community, community.cohesion, history, tourism, neighbourhood, building*

heritage_user17

Q1. Heritage of the building style and architectural style. Continue to be in use. (101 Shakespeare Street VIA Rail Station)

Q1. Limited usage. Importance of being near to green spaces and the lakeside. Importance from an aesthetics point of view. (Lakeside Drive)

Q1. Architectural style (5 Huron Street)

Q1. Religios building (142 Ontario Street)

Q1. The entire area represent the old town with some buildings with aesthetic and architectural value. Mixed styles in construction. (161 Ontario Street Queen's Inn)

Q1. Architectural landmark and school (270 Water Street Stratford Normal School (Teacher's College))

Q1. Architectural value and gallery (54 Romeo Street Gallery)

Q1. No significant buildings. Open space (210 Water Street, Stratford)

Q2. Green area (210 Water Street, Stratford)

Q2. Close to an important transportation node to communicate with the rest of the country (101 Shakespeare Street VIA Rail Station)

Q2. Limited usage. Basic appliance as green space and scenery. (Lakeside Drive)

Q2. Service Ontario office in the vicinity (5 Huron Street)

Q2. Sense of community (142 Ontario Street)

Q2. Old town create a strong sense of belonging and bring a sense of identity and historic value to the area (161 Ontario Street Queen's Inn)

Q2. School (270 Water Street Stratford Normal School (Teacher's College))

Q2. Art gallery serve as community creation and recreation, workshops and green area (54 Romeo Street Gallery)

Q3. Space for artisitic creation and architectural landmark (54 Romeo Street Gallery)

Q3. School near the lakeside and green spaces (270 Water Street Stratford Normal School (Teacher's College))

Q3. Importance in the creation of a sense of community and belonging to the people and their history. (161 Ontario Street Queen's Inn)

Q3. Government offices and as landmark for future references. Aestetics and close to lakeside (5 Huron Street)

Q3. Limited usage. Aesthetics and close to green space and lakeside. (Lakeside Drive)

Q3. Even though, the architecture has nothing remarkable in style, the importance of the station is unquestionable for the community (101 Shakespeare Street VIA Rail Station)

Q3. Recreational park, green area close to lakeside (210 Water Street, Stratford)

Tags: *sense of place, community, built heritage, history, community.cohesion, building, building.landmark, building.architecture, open space*

heritage_user26

Q1. Not personally related (210 Water Street, Stratford)

Tags: *sense of place*

heritage_user19

heritage_user29

Q1. I randomly chose a feature. (126 Ontario Street)

Q1. libraries are one of the few places that are safe, welcoming and free community spots (19 St. Andrew Street)

Q1. green spaces are always important in urban environments (Huron Street Bridge)

Q1. year built (235 St. Patrick Street)

Q1. very old building, the gothic style is always great to see (68 Nile Street, Stratford)

Q2. educational building (68 Nile Street, Stratford)

Q2. it's a parking space, I assume you pay for it (126 Ontario Street)

Q2. historical buildings provide the town's story and good for visitors to be immersed in it (151 Nile Street)

Q2. add character to the neighbourhood (77 Brunswick Street)

Q2. looks like a nice big landmark (235 St. Patrick Street)

Q3. I got excited to see that there was a botanical garden in the area. (Huron Street Bridge)

Q3. I am a not familiar with this town. (151 Nile Street)

Q3. I do not know this building particular but I hold great respect for libraries (19 St. Andrew Street)

Tags: *tourism, neighbourhood, building, building.landmark, building.architecture, open space, sense of place, built heritage, community, history*

heritage_user32

heritage_user24

Q1. While I have no direct attachment to the building - personally I see it as an important heritage property as it was constructed in the early 1900s and see it as an important aspect of history. (270 Water Street Stratford Normal School (Teacher's College))

Q1. No connection personally (357 St. David Street)

Q1. No personal connection to this property but serves historical significance (210 Water Street, Stratford)

Q2. The unique appearance adds appeal to the streetscape. (210 Water Street, Stratford)

Q2. Older buildings such as this one add an important architectural appeal to the streetscape as they are aesthetically pleasing compared to modern utility buildings (convenience stores, gas stations, etc.). (270 Water Street Stratford Normal School (Teacher's College))

Q2. Like the unique appearance (357 St. David Street)

Q3. Enjoy the historical context (357 St. David Street)

Q3. While I have no family that would have gone here, I have a lot of teachers in my family so I place some emphasis on the importance of this building in regards to its history. (270 Water Street Stratford Normal School (Teacher's College))

Q3. The historical appearance of the building evokes a historical connection. (210 Water Street, Stratford)

Tags: *built heritage, sense of place, streetscape, history, building, building.landmark, building.architecture*

heritage_user38

Q1. Because its a museum which im assuming has art which will host different topics that can be helpful in perserving heritage (54 Romeo Street Gallery)

Q3. Ive never been so I wouldn't have any emotions attached! (54 Romeo Street Gallery)

Tags: *built heritage, sense of place*

heritage_user39

Q1. I don't live in Stratford so seeing this as a teachers college shows little significane to me. It doesn't show me much historical importance to the city of Stratford (270 Water Street Stratford Normal School (Teacher's College))

Q2. Is it a building the community utilises a lot? If not, then there really isn't an impact it holds to both the value and streetscape of the community. (270 Water Street Stratford Normal School (Teacher's College))

Q3. I'm not from Stratford nor did the description of the heritage building tell me the significance of the building itself (270 Water Street Stratford Normal School (Teacher's College))

Tags: *streetscape, community, history, sense of place, building, built heritage*

heritage_user28

Q1. I always park here. this is my spot. (107 Erie Street)

Q1. The city square is really the heart of the city. Without it, Stratford loses what it is. (94 Wellington Street)

Q1. It is a resturant that I travel from Waterloo to occasionally, specifically to get soup from this location. (94 Wellington Street)

Q1. Everyone who knows stratford knows this park. It's a core part of many children's memories. I didn't even grow up in Stratford and even I have some strong memories from going there on a class trip once. (Lakeside Drive)

Q1. I have been here twice and I enjoyed it. It's defintely a memorable characteristic of the city but it isn't the main drawing factor for me, personally. (55 George Street West)

Q2. The store itself is very aesthetically pleasing. I also like the idea of what it provides. It's the kind of place I would love to have gone to as a kid and the kidn of place I'd like to bring my kids to one day. (55 George Street West)

Q2. its nicely hidden but right in the heart of the city, with ample parking. (107 Erie Street)

Q2. It's a drawing factor of the city. I have gone to Stratford, and recommended others go there as well, just to get soup from soup surreal. I've also been told by several others to go and try it, not knowing I have gone already. (94 Wellington Street)

Q2. You come to stratford for some good food, the city square and the riverside. And well, this is one third of those factors. It's a core component to the city of Stratford and without it, the city would not have the same feel to it. (Lakeside Drive)

Q3. I haven't spent much time there but I remember each time I've gone there. It's just memorable and enjoyable. (Lakeside Drive)

Q3. I really like the soup and its part of the stratford experience to me. Getting soup here is like getting fish n chips in England. (94 Wellington Street)

Q3. This square is a big reason why I go to Stratford. (94 Wellington Street)

Q3. its my spot. (107 Erie Street)

Q3. I have only been twice, but the store felt like a magical little candy store. Defintely memorable. (55 George Street West)

Tags: *built heritage, building, building.landmark, building.architecture, open space, sense of place, tourism*

heritage_user23

Q1. I am unfamiliar with the location (101 Shakespeare Street VIA Rail Station)

Q2. I believe that Railway stations have a historical importance, particularly through what was once Lower/Upper Canada, as the railway shaped the geography of much of Canada (101 Shakespeare Street VIA Rail Station)

Q3. Not being super familiar with the location, I don't have a strong attachment to the location. (101 Shakespeare Street VIA Rail Station)

Tags: *community, sense of place, built heritage, history*

heritage_user36

Q1. the age of construction and colonial model (210 Water Street, Stratford)

Q1. the year it was built (144 Water Street, Stratford)

Q1. the year it was built and the unique character of the home (36 Mornington Street, Stratford)

Q1. Associated with transportation of the public which is becoming more prevalent. The heritage building has purpose. (101 Shakespeare Street VIA Rail Station)

Q1. the year it was built and the model (305 St. David Street, Stratford)

Q1. although it is the only flat-iron building in the city, I don't know how that is significant (6-8 Shakespeare Street)

Q2. the year it was built and the uniqueness it brings to the neighbourhood. (305 St. David Street, Stratford)

Q2. unique homes from early 1900s provide character and uniqueness to a neighborhood, especially if people are tearing down homes and making new ones. (210 Water Street, Stratford)

Q2. This is positive for the community. As traffic in the building increases, more people will become aware of its heritage value. (101 Shakespeare Street VIA Rail Station)

Q2. its age and model of the home. (36 Mornington Street, Stratford)

Q3. N/A (36 Mornington Street, Stratford)

Q3. no attachment (144 Water Street, Stratford)

Tags: *built heritage, sense of place, neighbourhood, history, community*

heritage_user30

Q1. Little personal connection to the site, not practicing of any particular religion (142 Ontario Street)

Q1. No personal connection to the site (220 Mornington Street)

Q1. No prior knowledge or personal experience with the site (129 Brunswick Street)

Q1. Graduate student, sees value in higher education and education spaces (270 Water Street Stratford Normal School (Teacher's College))

Q2. Still an active source of local and foreign engagement (probably) (270 Water Street Stratford Normal School (Teacher's College))

Q2. Aesthetic beauty, historical value for long time residents, viable communal space for gathering, place of worship (142 Ontario Street)

Q2. While the aesthetic and heritage attributes are appealing, a single detached dwelling offers little to community value beyond the residents living in it (220 Mornington Street)

Q2. Small local business, communal space for residents and tourist (129 Brunswick Street)

Q3. While no personal experience with this particular site, Bed and Breakfast inns offer a unique local living experience (129 Brunswick Street)

Q3. No prior known knowledge of the property (220 Mornington Street)

Q3. I have no personal connection to this site in particular, but this should not diminish the historical, cultural, religious, and architectural value of Churches (142 Ontario Street)

Q3. know prior knowledge of the site before this survey (270 Water Street Stratford Normal School (Teacher's College))

Tags: *community.cohesion, community, built heritage, sense of place, building.architecture, building.landmark, building, tourism, history*

heritage_user31

heritage_user41

Q1. It just looks like a place to rest. The heritage attributes aren't that interesting. However if there was some historical significant as to why it is at the edge of the river that might make it more meaningful to me. (Lakeside Drive)

Q2. The structure is located right at the edge of the river and there seems to be a nice place to hang out. There is a parking lot too so it seems like it may be an interesting place to visit. Also this cultural spot seems just minutes away from other sites. (Lakeside Drive)

Q3. I have never been there before. However I would like to visit it because it is located besides the river and the rest of the heritage sites (Lakeside Drive)

Tags: *open space, tourism, history, built heritage*

heritage_user40

Q1. It is one of the first heritage buildings you see when you enter this district of Stratford. It showcases the city's architecture and culture. (164 Downie Street)

Q1. A railway station is one of the most important buildings in a city as it connects it to the outside world. Many residents of the city would've gone through the buildings, whether they are old or young. (101 Shakespeare Street VIA Rail Station)

Q1. It's a nice home and a showcase of Stratford's architecture but not much aside from that. (43 Stratford Street, Stratford)

Q1. It showcases the city's and more broadly, Ontario's cottage style architecture. (335 St. David Street)

Q1. It is nice to have spots that show the industrial history of the city. It shows the growth of the city, where it was to where it is now. (258 Wellington Street)

Q1. It is a landmark of the city, and so carries a lot of heritage value. (6-8 Shakespeare Street)

Q1. It's historical building that is more than 150 years old. (68 Nile Street, Stratford)

Q1. This was home to a Supreme Court Justice. (57 James Street)

Q1. It's a nice house that was built a long time ago but does not seem to offer much else. (59-61 Douglas Street, Stratford)

Q1. It's a historic building near the greenery of the city. It is right along the river. (54 Romeo Street Gallery)

Q1. It's a nice building that showcases some of the city's wealthier residents. Aside from that, it does not offer much in terms of heritage. (210 Water Street, Stratford)

Q2. It's a nice building that improves the streetscape but does not offer much impact on community value. (210 Water Street, Stratford)

Q2. It is the one of the first buildings you see when you get enter this district of Stratford and therefore, sets the expectations for the streetscape/ neighbourhood. (164 Downie Street)

Q2. In terms of streetscape, it is a very nice building architecturally. In terms of the neighbourhood, it has a lot of impact as it allows the residents to get to places further away easily. (101 Shakespeare Street VIA Rail Station)

Q2. It's a nice house and well built, but it does not stand out from the others on the street. All of the houses have their own distinct look. (43 Stratford Street, Stratford)

Q2. It is unique among the other houses on the street and does improve the streetscape. It sets a tone for the community it is in as a wealthy community. (335 St. David Street)

Q2. It is out of place in a residential neighbourhood. (258 Wellington Street)

Q2. It's a landmark building, it's an old building, it's unique, it's close to the railway so everyone has past it has some point. It offers a lot of value to the community. (6-8 Shakespeare Street)

Q2. It stands out among the buildings on the street and shows a distinct architectural style. (68 Nile Street, Stratford)

Q2. It's a nice building in a nice neighbourhood. In terms of community value, it is important historical with the establishment of the Shakespearean Festival. (57 James Street)

Q2. It's a distinct building on the street, but does not offer much more. (59-61 Douglas Street, Stratford)

Q2. It important to the neighbourhood it is in as it showcases the city's history. (54 Romeo Street Gallery)

Q3. This is a building that showcases the city's history and is located along the river/greenery. (54 Romeo Street Gallery)

Q3. This does not seem like an important heritage property and carries little attachment. (59-61 Douglas Street, Stratford)

Q3. An important resident of Stratford, a Supreme Court Justice, lived in this house. (57 James Street)

Q3. It's an interesting building. (68 Nile Street, Stratford)

Q3. It's a landmark of the city. (6-8 Shakespeare Street)

Q3. While it is nice to the industrial history of a city, this building feels out of place in a residential neighbourhood. There are more useful things that could be build here. (258 Wellington Street)

Q3. It is a nice house and unique among other houses on the street. It showcases Ontario's cottage style architecture. (335 St. David Street)

Q3. It's someone's home. (43 Stratford Street, Stratford)

Q3. This is a building that has many residents of all ages would've gone through and therefore there is an attachment there. (101 Shakespeare Street VIA Rail Station)

Q3. I feel strongly about it as it showcases the city's atmosphere and culture. (164 Downie Street)

Q3. It does not offer much in terms of heritage. (210 Water Street, Stratford)

Tags: *neighbourhood, building, building.landmark, building.architecture, open space, sense of place, streetscape, built heritage, community, community.cohesion, history, tourism*

heritage_user42

Q1. Everyone says when you go to Stratford, to get the soup there. It is a large heritage/tourist attraction there. (94 Wellington Street)

Q2. Brings lots of tourists in the area. (94 Wellington Street)

Q3. I go there when I go to Stratford. (94 Wellington Street)

Tags: *tourism, built heritage, sense of place*

heritage_user43