# Retrofitting Suburbia:
# Surrey Central City Twenty Years Later

**by**

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# Abstract

This research study investigates the Surrey Central City shopping mall retrofitting project located in central Surrey, B.C and the surrounding neighborhood within a 500-meter radius. The study area is part of a sprawling suburban region that has undergone significant changes since the redevelopment of the Surrey Place Mall in 2003. A mixed methods approach including analyzing development patterns and taking inventory of the existing built environment is used to critique the degree of consistency the mall retrofit project and surrounding area compares with literature-based goals and objectives of retrofitting suburbia over the past twenty years.

Takeaways show that some progress has been made towards a more pedestrianized environment in the study area through piecemeal development projects and municipal infrastructure improvements such as divided bike lanes and improved public spaces. However, the present-day built environment around Surrey Central City does not conform to the principles and objectives of retrofitting suburbia utilized in the Surrey Central Mall project and instead continues to propagate vehicle-centric approaches of the past. These results suggest that integrating large-scale retrofitting projects into surrounding neighbourhoods is a complex task that requires more than simply focusing on one major element in the area. Recommendations for the City of Surrey include adopting a more proactive approach to implementing retrofitting principles to encourage a more inclusive, lively, and pedestrianized neighbourhood for residents and visitors, particularly within a region expected to experience continued growth and expansion.



**Keywords**: urban design; retrofitting suburbia; surrey central city; shopping mall

*To Lesley, for always pushing me outside my comfort zone.*

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# List of Acronyms

| | |
|---|---|
| AADT | Average Annual Daily Traffic |
| CNU | Congress for New Urbanism |
| CoHSAT | Coalition for Healthy Streets and Active Travel |
| IMI | Irvine Minnesota Inventory |
| LEED | Leadership in Energy and Environmental Design |
| MIPIM | March International des Professionels de l'Immobilier |
| NIMBY | Not In My Back Yard |
| OCP | Official Community Plan |

# Chapter 1. Introduction

Suburban retrofitting is a theory and practice that has gained popularity over the past thirty years, promising a solution to sprawl without abandoning or destroying the suburbs entirely. The debate over sustainable urban forms should not continue to denigrate suburbs, but instead recognize the possibility of improving upon their inefficient forms (Alawadi, Khanal & Al Hinai, 2021). Understanding that the appeal of suburban lifestyle is still very prominent, there are a variety of urban design solutions that can be utilized to retrofit suburbia from regreening projects to diversifying housing choices to repurposing abandoned or dying commercial areas.

In this research project, Surrey Central City was chosen as a case study in part because of its recognized success as a retrofitting project. The mall retrofit included a new university campus, easy connection to the light rail transit system, the largest office building in Metro Vancouver, and spectacular architecture by Bing Thom (Dunham-Jones & Williamson, 2011). While the mall was chosen as an example of a successful retrofitting project in isolation from its surroundings, this study finds that its integration into the present-day surrounding neighborhood does not adhere to the principles and objectives of retrofitting as defined in this study. Overall, access to the site is not as pedestrian friendly as it could be, despite the municipal desire for a more pedestrianized downtown Surrey. Today, the Central City area is still vehicle-centric with several multi-lane roads, many surface-level parking lots, and little green space. These failures are the guiding focus of this study. Since change is largely developer and market driven, it could be years or decades before the area realizes municipal vision; therefore, this assessment only evaluates the Surrey Central City area as it exists today while acknowledging that the area is rapidly evolving and will continue to do so.

## 1.1. Suburban Sprawl

Suburban sprawl can be defined as development located along the edges of existing urban areas. The process of suburban sprawl is often driven by urbanized areas outpacing the population growth and is a major component of metropolitan areas since the second World War (Burchfield, Kramer & Guyadeen, 2015; Han, Graham & Tsenkova ,2019). Areas of suburban sprawl are characterized by an abundance of

congested highways, strip malls, office parks, twisting dead end cul-de-sacs and little street connectivity, where driving is a necessity for most activities (Dunham Jones & Williamson, 2012; Tachieva, 2010). This reliance on vehicle-centric mobility is often the by-product of single-use zoning that goes hand-in-hand with areas of sprawl. In this study, the term “suburban” is synonymous with urban sprawl - a multifaceted concept that includes the spreading outwards of a city to low-density, auto-dependent development (Earth Science Data Systems, 2023). There is an abundance of negative implications of urban sprawl including high costs in developing and maintaining services and infrastructure, increased air and water pollution, and the loss of open space and natural areas, among other significant economic, environmental, and social impacts (Han, Graham & Tsenkova, 2020). Suburban sprawl is a major problem for North American cities, and Canadian cities are no exception. Between 2006 and 2016, suburban areas accounted for 73% of growth in Canada’s eight largest cities, with nearly two thirds of Canada’s population now living in suburban areas (Gordon, 2018). Sprawl can be measured by density-based analysis; using this measurement, Canadian “built up areas increased 150% from 1971 to 2011, significantly faster than the number of inhabitants” (Pourali, Mehrdokht, et al.2022). In Canada, Edmonton, Calgary, and Ottawa have experienced huge suburban population growth of 23.4%, 23.3% and 21.4% respectively, while Metro Vancouver has experienced a 9.5% increase in its distant suburbs, with “distant” defined by a distance of 30 minutes or more from a downtown city centre (Statistics Canada, 2021). The comparatively lower growth in Metro Vancouver can partially be explained by geographical constraints of the surrounding ocean and mountains, resulting in the majority of sprawl occurring in the distant suburbs away from the City of Vancouver. Suburban sprawl is a major mid-twentieth century development trend which desperately requires interventions to address pollution, congestion, pedestrian immobility, pedestrian safety, and transit accessibility in nearly every North American city, to ensure it can be sustainable now and in the future.

Retrofitting existing suburban infrastructure such as malls and parking lots is offered as a solution that can both densify and repair sprawl. Retrofitting is the process of taking an existing development and repurposing it for a new use, typically in the form of mixed-use developments including multi-family, commercial and civic spaces. If done well, the retrofitting of existing suburban spaces can help reverse some of the negative implications of suburban sprawl by reducing automobile reliance, increasing walkability,

and creating human-scaled communities. One of the goals of retrofitting is to install the necessary infrastructure to densify single use developments. Such infrastructure may include bike lanes, wider and more frequent sidewalks, transit, increasing connection points, crosswalks, and new amenities such as libraries, community centres, and public spaces. Once installed, pedestrian infrastructure can greatly increase the level of integration and connectivity by adding multiple modes of connection to the surrounding areas that previously only favoured the automobile for access. However, this can also lead to increased rents, displacement, or other outcomes associated with gentrification, forcing long-term residents to move.

This study focuses on a specific suburban typology that frequents the literature around retrofitting: the shopping mall. The Surrey Place Mall retrofit into what is now called Surrey Central City was heralded as a great success when it first opened in 2003. The project won some accolades, such as awards for engineering accomplishments and most notably the Special Jury Prize at the 2004 March International des Professionels de l'Immobilier (MIPIM Awards). This prize is awarded to a project that satisfies the following criteria: infrastructure and facilities access, site integration, originality of the concept, technical and architectural qualities, and integration of services (Canadian Architect, 2004). The project is also touted as a successful example of retrofitting in suburbia and praised by June Williamson and Ellen Dunham Jones in their book Retrofitting Suburbia (2009). Since completion in 2003, the project acted as a catalyst for the City of Surrey to update and enhance their official community plan (OCP) to focus on mixed use development for a new downtown. Despite the popularity of retrofitting in urban studies and urban planning literature, there is not a lot written about the effects on a neighborhood post-retrofit. Retrofitting is often discussed through a positive lens, but in execution this may not be the lived experience of residents or people who visit for a variety of reasons such as displacement or unsatisfactory incorporation of the retrofit into the surrounding area.

With sprawl predominantly designed around the automobile, vast tracts of land require huge amounts of resources to build and maintain. Car-dependence has also created political and institutional barriers to change. The last century of car-dependent growth has created large constituencies of residents and businesses with a stake in the status quo (Cleveland, 2023). In this study, retrofitting is offered as a solution for adapting existing infrastructure to create suburban areas that are more connected,

efficient, and walkable. This research takes an in-depth look into a retrofitting project in suburbia and its integration into the surrounding area. The literature reveals a large body of work on the topic of urban design and suburban sprawl, as well as the more recently emerging field of suburban retrofitting. The literature also reveals hundreds of examples of largely North American retrofitting projects that have been completed, but little written about specific successes or failures of individual projects post completion, particularly within their suburban neighborhood contexts. Although guidelines exist for the successful design of retrofit projects, there are few case studies that illustrate the effectiveness or ineffectiveness of a project in terms of integration with its surrounding area or its measured success years or decades after completion. A greater understanding of the failures and successes of retrofitting projects and how they relate to their surrounding context is required in order to guide municipalities, developers, and architects during and after future development and build stages. The findings produced in this study contribute to the body of retrofitting literature within a local context, decades after initial construction.

## 1.2. Research Question

The research question for this study is based on the theory and practice of retrofitting suburbia and how the retrofitting of the original regional suburban Surrey Place Mall is now incorporated into the surrounding area, twenty years after completion. Incorporation into the surrounding area is measured by counting and mapping the frequencies of pedestrian-focused infrastructure such as sidewalks, bike lanes, and number of intersections using the Irvine Minnesota Inventory (IMI), a method of cataloguing urban design features. This study asks: How did the 2003 retrofit of Surrey Place Mall and the City of Surrey fulfill principles and objectives of retrofitting suburbia in the twenty years following its redevelopment?

The objective of this study is to understand and evaluate the built environment of the study area in its present-day condition to identify deficiencies and failures. Sub research questions ask: What are the commonalities between the objectives and outcomes of retrofitting a suburban mall and the integration of the surrounding neighborhood within 500-meters? To what degree has systemic, long lasting, transformative changes been implemented within the study area?

A 500-metre walking radius was chosen as a boundary for this study because according to the Coalition for Healthy Streets and Active Travel (CoHSAT), 500 metres is an accepted standard in walkability research representing about 5 minutes of walking at 4.5 km/h (CoHSAT, 2021). Actual walking times can be affected by physical and geographical barriers, street and crosswalk networks, intersection frequencies and individual physical abilities. The 500-metre radius also represents a workable scope for masters-level data collection. The walkability of an area is affected by many factors including geography, road and foot path network, physical barriers, and quality of the urban environment, which all influence how far someone is willing to walk (Ohnemus, 2016). These factors are discussed further in the conceptual framework chapter.

## 1.3. Context

For most of the twentieth century, Surrey was a suburban, car-centric area of Metro Vancouver with a few strip shopping areas. In 1972 Surrey Place Mall was built, which became the future 2003 Surrey Central City project through an iconic development by Bing Thom Architects. The City of Surrey had an official community plan in 1991 that designated a future downtown area around an existing network of extensive strip malls in the same area as the Surrey Central City; however, the project was not initially intended as a piece of this larger plan. Surrey's original 1991 OCP was rarely referenced by developers in the area over the next decade. It was not until the completion of the Surrey Place Mall retrofit in 2003 (the Surrey Central City project, Figure 1) and its popularity that the City of Surrey acknowledged the development as starting to change the energy of the downtown core. This emergent change resulted from a greater presence of employees and students in the core area, thanks to increased office space, the university addition and, a tranist station. On July 24, 2006, the city proceeded with an update to the original 1991 OCP. Today, the City of Surrey states that the "Surrey City Centre is undergoing a significant transformation, what was once a suburban town centre is developing into a walkable, transit-oriented downtown serving south of the Fraser River" (City of Surrey, 2021).

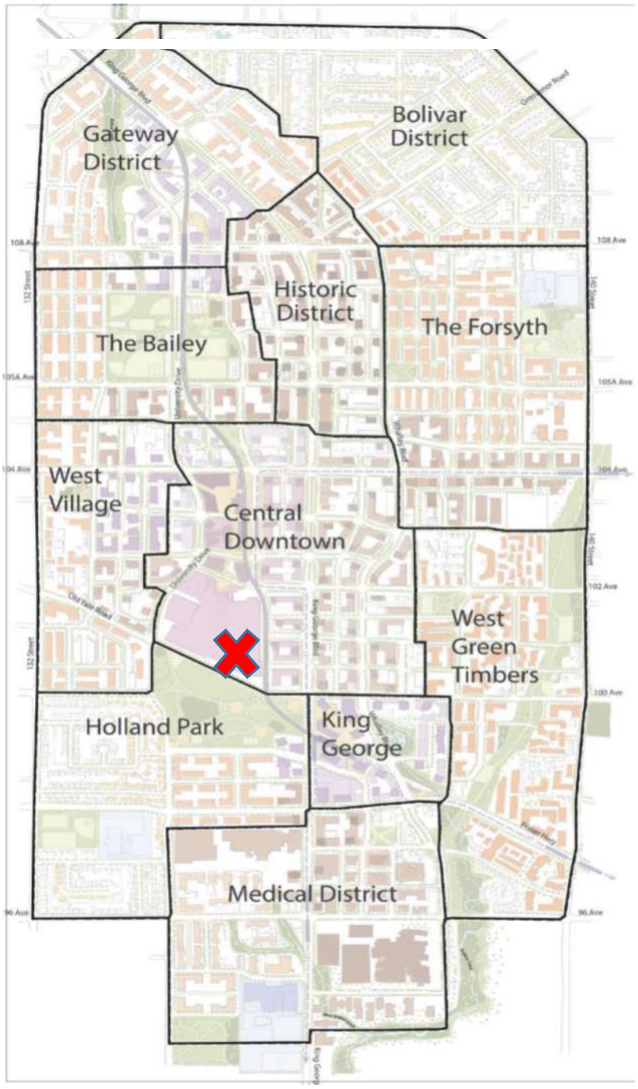



**Figure 1. City Centre Districts & Neighbourhoods. City of Surrey, 2017**

The City of Surrey is one of 21 municipalities in Metro Vancouver, located on the south side of the Fraser River and sharing a border with the United States of America. Surrey is situated on the traditional, ancestral, and unceded territories of the Salish Peoples, including the ḳiċəy̓ (Katzie), ḳʷɑ:ṅƛəṅ (Kwantlen), and Semiahma (Semiahmoo) land-based nations. Within Metro Vancouver, Surrey is the largest city in land area, and second most populous city with a population of more than 517,000 (2016 census data). Surrey is comprised of urban, agricultural, and rural areas and is one of the fastest growing, culturally diverse cities in Canada. The City of Surrey is made up of six communities: Cloverdale, Fleetwood, Guildford, Newton, South Surrey, and Whalley/City Centre (see figure 2).

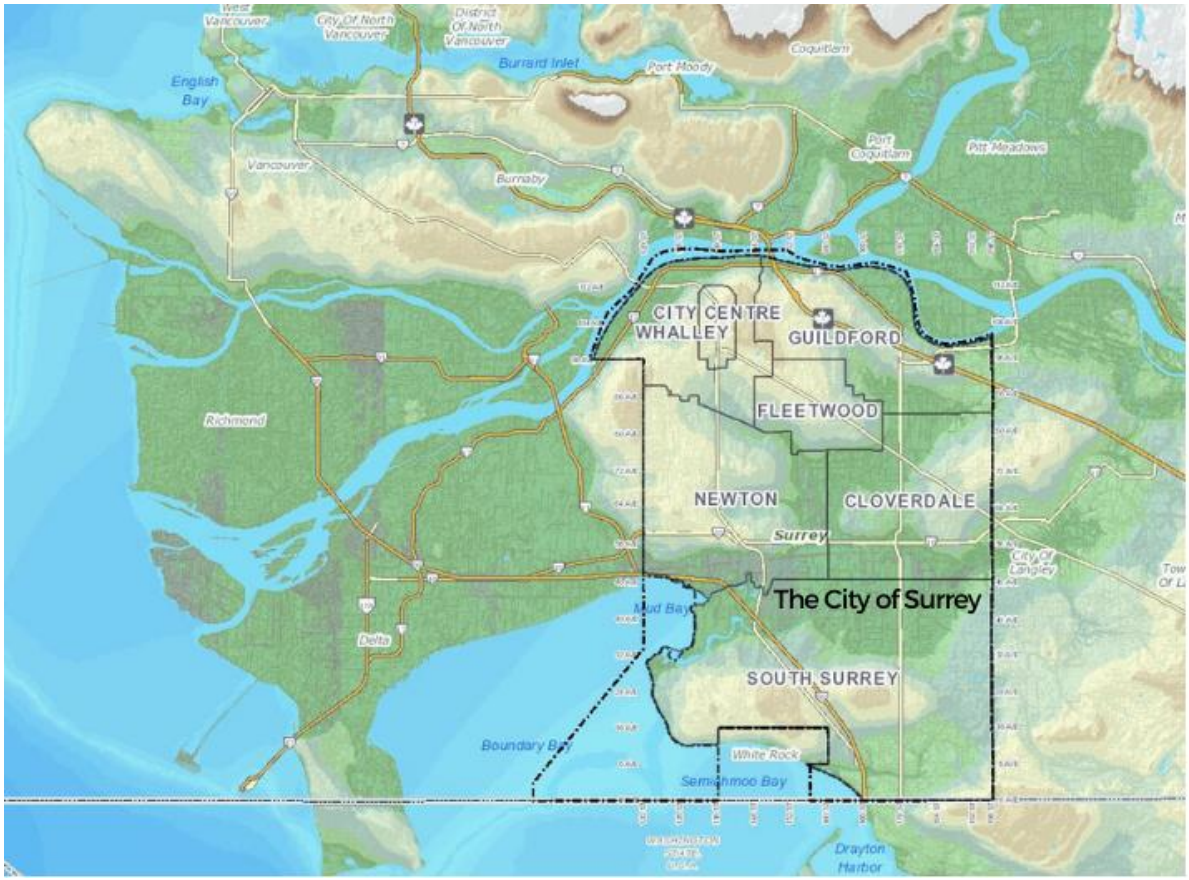



**Figure 2. Map of Surrey BC and Surrounding Area. COSMOS, 2023**

The City Centre is an area of Whalley neighbourhood bookended between 132 Street and 140 Street to the west and east and extending north to 112 Avenue and south to 94 Avenue. Once a suburban town centre, the City Centre area has been the focus of significant development within the City of Surrey and Metro Vancouver. City Centre is

home to Surrey Central Mall, City Hall, Civic Plaza, City Centre Library, Simon Fraser and Kwantlen Polytechnic University campuses, recreation centres, Surrey Memorial Hospital, Holland Park (location of an annual music festival), plus two Expo Line SkyTrain stations. In 2016, the population of City Centre was 26,945, 5% of Surrey's total population (2016 census). It is projected to grow to 109,730 in the next 30 years (City of Surrey, 2016).

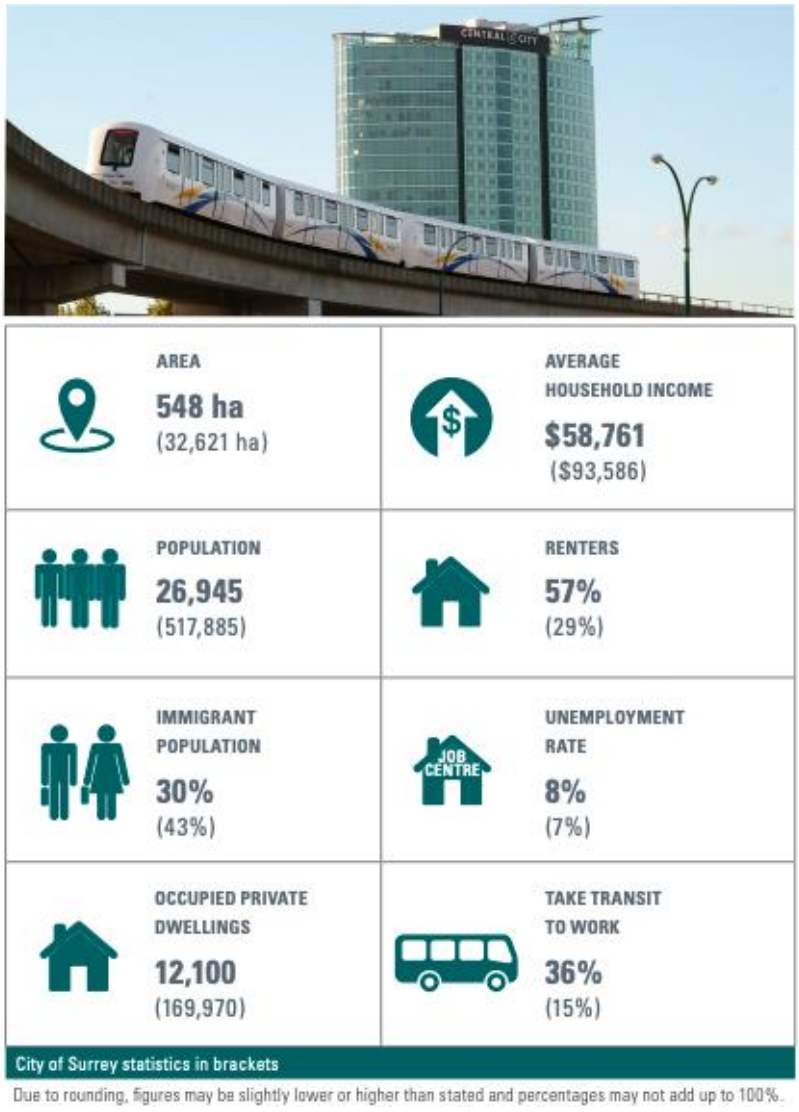



**Figure 3. City Centre Neighbourhood Profile. City of Surrey Census Data, 2016**

Surrey's downtown is approximately 1,300 acres, and rectangular in shape with King George Boulevard running through its centre. Situated at the heart of the Lower Mainland of Vancouver region, Surrey's City Centre area is designated as the region's

second metropolitan centre in the Metro Vancouver 2040 Regional Growth Strategy (City of Surrey, 2017). Surrey Central City is located at the southern end of Surrey's downtown area which is located in the north end of Surrey.

The City of Surrey states that its downtown is undergoing a major transformation from a suburban centre into a walkable, high density, transit oriented downtown. The city envisions itself as the "Fraser Valley's metropolitan centre, connected to major regional destinations by rapid transit and an efficient road network designed to support walking, cycling, and transit. It will be a centre for major employment; services; higher-density housing; and commercial, cultural, entertainment, and institutional activity" (City of Surrey, 2017). The following synopses of the plans for Surrey City Centre illustrate how the City of Surrey adapted its planning from the initial plan in 1991 to accommodate and integrate the area into the surrounding neighborhoods with increased development, beginning with retrofitting the Surrey Place Mall.

### 1.3.1. Surrey City Centre Plan (1991)

The first plan for Surrey's city centre was completed in 1991. Key recommendations of the 1991 plan included concentration of density at the SkyTrain stations, construction of a ring road system, and implementation of urban design and streetscape features. The City of Surrey recognized the need for a plan to organize development along its suburban commercial corridor and thus developed a plan that in broad terms would create a general land use concept. The 1991 plan provided direction for transportation, social and utility infrastructure (City of Surrey, 2006). The plan was divided into an original five goals: environmentally responsible development, an affordable human scaled place, safe and accessible public spaces, a vibrant spirited place and a connected together place. These five goals were expanded in 1993 to promote goals that led to a higher quality urban environment which included gateways to major areas, natural features, walkable streets, appropriate setbacks from curbs and street orientated buildings (City of Surrey, 2006).

As mentioned, Surrey's central goal was to create development leading to a compact and identifiable city centre. Development after the adoption of the 1991 plan ranged between almost no activity to periods of intense activity, which was not always concentrated at or near the SkyTrain stations. The resulting ad-hoc development pattern

did not create a complete and identifiable City Centre (City of Surrey, 2006), and therefore the next plan was revealed in 2006.

### 1.3.2. Surrey City Centre Plan (2006)

When the redevelopment of the Surrey Central Mall was completed in 2003, it was one of the first major developments that occurred inside the city centre area which adhered to some of the 1991 plan intentions. This development helped to spur a renewed interest from the city in revisiting and updating the original OCP. The introduction of the Simon Fraser University Campus was a catalyst to update the 15-year-old plan to provide a guideline for future development in this area, so in 2006 city council proceeded with a plan to "establish and reinforce a desirable development pattern" (City of Surrey, 2017).

The updated 2006 City Centre Plan identified twelve issues that needed to be addressed since the 1991 plan took effect (City of Surrey, 2006):

**Table 1. Identified Issues from 1991 Surrey City Centre Plan. City of Surrey, 2006**

| Issue | Action |
|---|---|
| Image of the Area | Change the perception of the area from one that is in decline. The perception (in 2006) is an area that is unsafe, has high poverty and homelessness, is physically divided by a highway, and has a high crime rate. |
| Quality of Development | Establish a positive sense of place through quality design |
| An Identifiable City Heart | Create a memorable, identifiable focus for the heart of the City of Surrey |
| Identifiable Neighborhoods | Create identifiable neighborhoods with their own characteristics to enhance a sense of place |
| Interface with Adjacent Neighborhoods | Create convenient connections and transitions between the city centre and surrounding neighborhoods |

| | |
|---|---|
| Growth Forecasts | Plan for future populations and growth to manage City preparedness in the coming years |
| Arterial Street Corridors | Provide better connectivity between east and west sides of the highway to prevent significant physical division |
| Multi-modal Transportation Network | Provide safe and attractive circulation for pedestrians, cyclists, buses and vehicles |
| Parking | Provide long-term parking solutions for residents while also reducing surface parking lots |
| Opportunities for Sustainability | Encourage mixed-use developments and incorporate green design principles while promoting cycling and walking through the provision of amenities |
| Servicing and Amenity Requirements for a Vital Downtown | Employ amenities and utilities that will attract people and accommodate upcoming technologies (e.g wireless internet, undergrounding of utilities) |
| Residential Development Densities | Discourage low-density development while providing incentives to assemble smaller properties for larger scale projects |

It is through the identification of these twelve issues that the City of Surrey hoped to address and improve the city centre while also enforcing its vision with the 2006 new guidelines. Ultimately, the intent was to ensure the 2006 City Centre Plan would not be ignored the way the 1991 plan had been.

### 1.3.3. Surrey City Centre Plan (2017)

Since the completion of the City Centre Plans in 1991 and 2006, the City of Surrey introduced the complete City Centre Plan to guide development over the next 30 years (City of Surrey, 2017). The latest City Centre Plan vision is to create a major regional destination and metropolitan centre. The City of Surrey envisions “distinct and vibrant neighbourhoods including a dynamic and innovative business sector, university, hospital, civic and historic districts will form the framework of the City Centre. Each of these areas will have its own unique character that will create a diverse, authentic, and interesting downtown. The downtown will be known for its green urban infrastructure of parks & plazas, greenways, and planted boulevards” (City of Surrey, 2017. p16).

For most of its existence, downtown Surrey has consisted of large arterial roads, strip malls, super blocks (large urban blocks with no intersecting streets), and suburban housing. The 2017 plan aims to dismantle the core and create a desirable downtown by redeveloping old commercial areas and breaking up some of the larger blocks. There is a clear need for this plan to be updated and implemented, since the City of Surrey has recognized that street and block sizes are a problem coinciding with pedestrian and cyclist safety. Surrey’s street network is based on one-mile (1600m) gridded intervals with many short and discontinuous connector roads, creating very large blocks servicing highway-style retail fronted by large street facing parking lots (City of Surrey, 2017). Large block sizes have contributed to safety issues for pedestrians and cyclists; the City Centre is a “study in contrasts”, containing some areas of mixed use, transit, and pedestrian friendly walkable neighborhoods and other areas with few pedestrian crossings where sidewalk cycling is common, increasing injury risks for everyone (City of Surrey, 2017). The 2017 City Centre Plan outlines its vision for a new urban centre using eight guiding principles to direct future growth in the area. Through these principles, Surrey aims to create a more vibrant and greener downtown (City of Surrey, 2017). The following eight principles support Surrey’s goal of becoming Fraser Valleys downtown.

An Animated City Centre: The first principle is focused on creating an animated City Centre where residents can work, play, and live in their neighborhood. The principle of building density and mixed use provide easy access to urban amenities, shopping, entertainment, education while supporting walking, cycling and transit use (City of Surrey, 2017).

Housing Diversity: The second principle encourages housing diversity. The city will promote a range of housing types to provide more options for all types of residents, such as families, students, seniors, and vulnerable populations. These options will be provided in a spectrum of tenures which includes social housing (City of Surrey, 2017).

Smaller Blocks: The third principle breaks up block sizes. Smaller block sizes encourage pedestrian movement with shorter walking and cycling distances. Smaller blocks also allow for better transit flexibility, this fine-grained street network is ideally made up of blocks no larger than 80 to 100 meters before connections are provided (City of Surrey, 2017). Figure 4 illustrates future planning to divide some of the larger blocks into more walkable streets.


**Figure 4. Breaking Up Block Sizes. City of Surrey, 2017**

Multi-modal Transportation: The fourth principle is centered around designing roads for multiple modes of transit for all age groups to use safely. Streets in City Centre are “designed to serve multiple roles: connecting people, improving the public realm, sustaining a healthy tree canopy, and supporting economic activity” (City of Surrey, 2017

p.19). Arterial roads will still be maintained but improved to facilitate all users while promoting safer speeds and safety (City of Surrey, 2017).

Vibrancy: The fifth principle aims to create vibrant urban spaces. A high-quality public realm is an important factor in providing vibrant streetscapes, high quality architecture, amenities, street furniture and green infrastructure. The pedestrian scale is the most important feature focusing on weather protection, and active retail uses for interest and rhythm (City of Surrey, 2017). Figure 5 illustrates the potential for social, pedestrianized and green spaces.

**Figure 5. Vibrant Urban Spaces. City of Surrey, 2017**

Greening the Downtown: The sixth principle is focused on greening the downtown by giving access to natural and recreational spaces which contribute to urban livability. Natural areas will be protected including “two fish bearing creeks located in the City Centre: Bolivar Creek in the north and Quibble Creek in the south. As development occurs, these creeks will be protected as parkland though riparian setbacks and will provide enjoyment for residents through the development of viewing areas, pathways, and natural area rehabilitation projects” (City of Surrey, 2017, p.20).

Employment: The seventh principle encourages office and employment as a key factor defining the city centre. The existing Skytrain and future light rail provide convenient access to the downtown core and helps to promote investment into more office, retail, cultural and other employment uses. Redevelopment also increases investment into urban amenities such as public art, plazas, and parks (City of Surrey, 2017). Figure 6 imagines a future employment centre with office opportunities, part of which is under construction today.

**Figure 6. New Office and Employment. City of Surrey, 2017**

Sense of Place: The eighth and final principle promotes identity and sense of place. The downtown core is larger and therefore sectioned into neighborhoods that are small enough to have its own identity, form, and function. The intention is to blend areas with existing character and history with the completely new areas to create a downtown that is authentic and memorable (City of Surrey, 2017).

## 1.4. Redevelopment at Surrey Central City

Despite the guidelines released in 1991, Surrey's Central City area remained largely unchanged until the development of Surrey Central City in 2003. Since the redevelopment of the mall, the immediate area has undergone significant changes over the past twenty years. The area has seen significant construction of key public sector developments including the Central Library opened in 2011, the RCMP E Division in 2013, expansion of the Surrey Memorial Hospital and Outpatient Care Facility in 2011 & 2013, and the City Hall and Civic Plaza in 2014 (City of Surrey, 2017). From 2006 to 2016, over 4,100 new residential units have been built and the area has approximately 10 million square feet of office and commercial space. There are currently over 40 major projects underway in the City Centre. This increasing density is creating an impetus to re-shape the area with a finer-grained road network and greenways to enable safer walking and cycling (City of Surrey, 2017).

**Figure 7. Surrey Place Mall. Surrey Archives, 1975**

**Figure 8. Surrey Place. Surrey Archives, 1971**

The original mall shown in figures 7 and 8 consisted of a sprawling superblock stretching from Old Yale Road to 102 Avenue in the south and north and University Avenue and King George Boulevard in the west and east. A major feature of Surrey Place Mall was the extensive surface parking lots; many of which persist today as illustrated in figure 9.

**Figure 9. Surrey Central City Surface Parking. Brad Ingram, 2023**

### 1.4.1. Redevelopment Inside the Study Area

This research project encompasses a 500-meter study area situated around Surrey Central City, which encompasses a large percentage of the study area. There has been some major progress on compact, walkable growth in places, but has yet to complete the transition. The area is marked by large areas of parking lots, wide roads, or single-use buildings from its earlier life (Cleveland, 2023). A major construction project occurred with the redevelopment of the mall, a tower and several levels were added on top of the old mall. The development also added a parking garage, but maintained many of the surface parking lots around the mall. Since the mall was retrofitted in 2003, further development in the study area has been minimal with a few exceptions such as a new thirty storey building recently completed at the corner of 102 Avenue and Whalley Boulevard, part of a 9-tower future development by Anthem Properties, and the recently completed SFU Sustainable Energy Engineering building. The area surrounding the mall still largely consists of single-family homes, row housing, older condo buildings, strip malls, and parking lots.

In 2017, the City of Surrey released updated plans for the Central City area which provide an optimistic view of the potential future development prospects for the area immediately surrounding the mall. The City of Surrey states in its City Centre Plan 2017 Update:

Over the longer term, the Central City Mall property will be redeveloped to create a site that has improved interface and connection to Holland Park as well as a broader range of mixed uses. The retail uses in the parking lot areas along King George Boulevard will intensify and include office and residential components. The redevelopment will provide mixed-use buildings with retail at grade, office on second and third stories, and residential above. The interface along Holland Park will also be improved with redevelopment of the parkade structures into high density residential buildings and a redesign that creates direct connection through the mall site to Holland Park.

Figure 10 illustrates the existing buildings in yellow around the Central City area with potential buildings occupying existing surface lots today. These developments could help resolve issues such as the existing auto-centric nature of the site today if they provide pedestrianized infrastructure outlined in the conceptual framework.

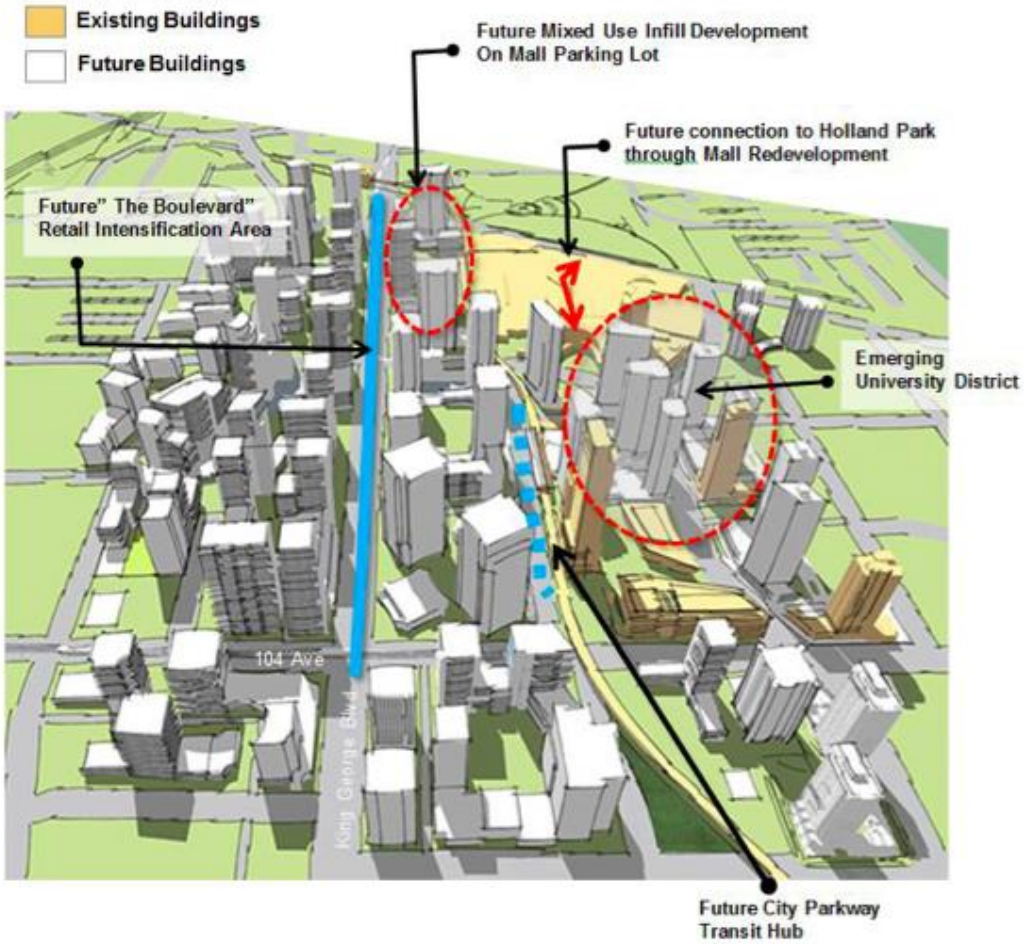



**Figure 10. Potential Future Scenario Showing 3D View of Central Downtown Looking South. City of Surrey, 2017**

### 1.4.2. Redevelopment Outside the Study Area

Development outside the 500-meter study area of this research project has progressed at a faster pace than within the study area, particularly around the new city hall and library just north of the Surrey Central Mall. The majority of recent development took place to the north of Surrey Central City, with several tall residential towers completed and many more under construction resulting in rapid densification.

The population of the central downtown area of Surrey (which includes the area immediately surrounding Surrey Central City) is currently 2,740 people with a projected increase to nearly 10,000 by 2043 (City of Surrey, 2017). Figure 11 shows the Surrey City Centre area as it looks today, versus in the 1970's (Figure 12).


**Figure 11. Surrey Central City Arial View. Google Earth, 2022**

**Figure 12. Surrey Place Aerial View. Surrey Archives, circa 1970**

# Chapter 2. Conceptual Framework

Retrofitting suburbia is a broad term that includes a variety of solutions, theories, and concepts which the following conceptual framework draws on to examine principles and ideas found in the literature. The literature review examines definitions of retrofitting suburbia and will be refined through the discussion of common themes which have been identified and presented in this study. It is important to understand why specifically one mall is a major feature of the suburban urban fabric, and why malls represent a key opportunity for redevelopment evidenced in the literature. Next, the exploration of the role of urban design is important as a driving factor and basis for many retrofitting projects. Finally, an exploration of retrofitting design principles guides the reader through common themes in the literature that assist in forming the basis for measuring retrofitting success. The same guide is used later in the data analysis phase of this project.

## 2.1. Defining Suburban Retrofitting

The key to retrofitting suburbia is adding complexity to create the ideal neighborhood, as Christopher Leinberger (1998) explains:

> Convenience and privacy, while still important, are no longer enough. People want a sense of community, a sense of place, a sense of history, and a connection to nature. The ideal is to walk out your back door and have privacy; walk out your front door and have community; walk a few blocks for services, maybe for work; and walk a few blocks further for a nature preserve. It is also important to have easy car or transit connections to other parts of the metropolitan area, including other businesses and cultural resources (p.36).

For the purposes of this study, suburban retrofitting is defined as the “rehabilitation or adaptive reuse (of existing buildings) to encompass the idea of systemic, long-lasting, transformative change” (Dunham-Jones & Williamson, 2011). Rehabilitation and adaptive re-use of existing sites and buildings is a method that can add complexity to single use suburban neighborhoods, and achieve Leinberger’s description of the ideal neighborhood. This definition is consistent with other authors such as Tachieva (2010), Talen (1996, 2008, 2015) and Armstrong & Ali (2012) whose outcomes of retrofitting include mixed-use communities that bring together education, recreation, and live work functions where people live better, drive less, and save energy.

Retrofitting suburbia is a method of achieving the principles of New Urbanism that reconfigures sprawling suburbs into communities of real neighborhoods and diverse districts, along with the conservation of natural environments (Congress of New Urbanism, 2022). Over the past few decades, the study of suburban retrofitting has become an important field, accumulating a body of academic literature. The need for suburban retrofitting is born from the expansive sprawl encompassing most North American cities whose core components are backyards, shopping centers, and dispersed employment based on personal mobility (Talen, 2015). Suburban retrofitting aims to repair problems associated with sprawl such as pollution, traffic congestion, obesity, and auto dependence through thoughtful interventions that take advantage of underperforming areas to create more livable cities (Tachieva, 2010; Dunham-Jones & Williamson, 2011). Suburban retrofitting is not the equivalent of building something new to replace the old; rather, it is a concept that includes the insertion of missing elements in suburbia such as density, public space, and connections (Tachieva, 2010). Retrofitting is also the re-inhabitation, redevelopment, and regreening of suburbia (Dunham-Jones & Williamson, 2011), resulting in the systematic modification of repairable areas to create walkable neighborhoods and town centres (Tachieva, 2010). The purpose of suburban retrofitting is not creating one-off developments that alter the use of that particular location, but rather aims to create systemic, long-lasting, transformative change (Dunham-Jones & Williamson, 2011), a guiding focus of this study.

Dead and dying shopping malls represent one of the most ideal opportunities for suburban retrofitting due to their large property area, existing structures, and expansive parking lots. “Dead and dying” are terms often referenced in the literature regarding shopping malls when referring to the closure of stores, lack of patrons, or the complete closure of the mall (Dunham-Jones & Williamson, 2011). One of the first examples of suburban retrofitting is the 1980’s Mashpee Commons in Cape Cod, Massachusetts. The 1980’s retrofit project replaced a dead mall from the 1960’s with a mixed-use town centre. This was considered a radical intervention at the time, and gave rise to the term “suburban retrofit” (Tachieva, 2010; Steuteville, 2016). Since the completion of the Mashpee Commons retrofit, the narrative among academia has been consistently in support of retrofitting projects as a strong solution addressing the issues of sprawl. Some of the issues considered included in the Mashpee project were walkability, traffic

congestion, transit access, safety, environmental repair, and single use density (Dunham-Jones & Williamson, 2011; Sim, 2019; Tachieva, 2010; Talen, 2015).

Retrofitting suburbia is a relatively new field of study and will need to be analyzed further to understand the long-term outcomes and influences on suburbia (Dunham-Jones & Williamson, 2011; Talen, 2015). In the past, planners tried to curb sprawl through sprawl restrictions, not repair; this resulted in the need for "spatial triage" (Talen, 2015), because it is important to note that not all areas of sprawl can be repaired through retrofitting alone. Spatial triage means that by treating key locations with the principles of retrofitting, suburban neighborhoods can be repaired with mixed use redevelopments that create pedestrian-friendly nodes with sprawl between them. Retrofitting should be undertaken in key areas as a method that encourages the urbanization of the suburban (Dunham-Jones & Williamson, 2011; Talen, 2015), and offers an opportunity to redevelop the suburban landscape through both small and large-scale projects. Most feasible projects will be incremental retrofits, but regardless of scale, it will be important to prioritize and leverage tactics to stimulate better urbanism in strategic locations (Dunham-Jones & Williamson, 2011; Talen, 2015). Retrofitting suburbia is a term that encompasses a way of thinking about life in an urban area which is focused on the human scale and accommodates density and diversity of building types and uses (Talen, 2015; Sims, 2019). This means that a suburban retrofit is focused on physical connections, walkability, cycling, and transit. Local government participation is necessary to support developers through deliberate planning, rather than reactive planning, to encourage the success and proliferation of retrofitting projects (Dunham-Jones & Williamson, 2011).

The work of the authors discussed above is largely focused on American examples, however, the lessons discussed equally apply in the Canadian context. Suburban areas are a feature of every Canadian city and make up approximately 80% of Canada's metropolitan population and 66% of the total Canadian population (Gordan and Janzen, 2013). In the Greater Toronto Area, edge cities represent an opportunity to retrofit large swaths of suburban sprawl into vibrant "mega mixed use" areas. Edge cities are cities that have grown up over time at the outer edges of large cities like Toronto. These "mega" projects intend to retrofit spaces such as Square One Mall in Scarborough with condos and mixed-use communities, and an abandoned coal-fired power plant on Mississauga's waterfront into an entire community (Ruddy, 2020). Due to the enormous

stock of existing suburbs, rising populations, and a growing interest in reducing the extent of future sprawl, there is an interest in retrofitting suburbia through redevelopment of vacant lots, abandoned malls and big-box stores, inner city surface-parking lots, abandoned industrial (brownfield) sites and decaying older suburbs (Thompson, 2013).

## 2.2. Malls as Candidates for Retrofits

A dying suburban mall becomes the central locale for suburban retrofitting by occupying vast tracts of centrally located land with large areas of surface parking lots, which provide a simpler retrofitting experience than other projects that propose more invasive solutions (for example, clearing of suburban homes to make way for new infrastructure is considered an invasive retrofitting solution). The modern suburban shopping mall typology began in 1956 as an idea by architect Victor Gruen, who wanted to create a cleaner, neater, and suburban version of a downtown. Gruen's vision was to provide a community center as well as a place to shop (Bix, 2013; Southworth, 2005). Suburban shopping malls are typically a central feature of most suburban sprawl areas that are classified as low-density and large-land consuming properties (Moccia, 2012). Because malls are located along major arterial roads, they are the most promising contenders for transformation into town centres, urban cores, and mixed-use developments (Dunham-Jones & Williamson, 2011; Tachieva, 2010). Shopping malls act as regional centres for the surrounding sprawl; they have far-reaching effects such as bringing people together into a common space, but also create traffic chaos, pollution and occupy large quantities of land for structures and parking (Dunham-Jones & Williamson, 2011; Tachieva, 2010). Mall typology caters to the automobile while pedestrians are secondary (Southworth, 2005), a feature still prevalent in modern day developments. In most mall projects, pedestrians are not considered as part of the mall exterior. Michael Southworth (2005) elaborates:

> The mall superblock is an island surrounded by heavily trafficked arterials and highways or physical barriers such as railroad tracks. Transit stations, if present at all, are usually distant and uncomfortable. Sidewalks usually go nowhere beyond the expansive parking lot. Even when pedestrian access is theoretically possible, the paths are circuitous and boring treks through sunbaked parking lots or semi-derelict vacant land (p.159).

Since the 1950's the shopping mall typology has gone through extreme periods of proliferation; today, many are in decline or already dead. Over time the shopping mall

has added many attractions from churches to roller coasters, enticing visitors and creating a sense of destination (Dunham-Jones & Williamson, 2011). F.D Moccia (2012) explains that the introversion of the enclosed mall has the pedestrian connection inside, designed as strictly interior space. Outside of the physical buildings, land is devoted to parking and becomes an expansive asphalt surface. Moccia identifies the central problem of the shopping mall: this introversion causes the outside spaces to be unused and abandoned. With the advent of online shopping, the single-use shopping mall typology is largely dying out; therefore, the remaining physical remnants represent an opportunity to reinvigorate a suburban icon into a transit focused, mixed-use, walkable urban centre that is designed, managed, and lived in (Tachieva, 2010; Moccia, 2012). The process of redeveloping existing urban and suburban sites is never simple, but the vast suburban swath of 40 or more open, developable acres that a dead mall generates is appealing (Dunham-Jones & Williamson, 2011). Mall retrofitting success is dependent on local government playing a central role because redevelopment is more complex than a single initiative (Moccia, 2012). It is vital for the success of suburban retrofitting that governments and planning departments support the development of retrofitting projects through zoning changes that eliminate single family zones, off-street parking requirements, and overly wide streets. These changes allow suburban areas to take advantage of retrofitting projects, thus reinvigorating areas affected by sprawl (Dunham-Jones & Williamson, 2011).

## 2.3. The Importance of Well-Designed Retrofits

In this section I show that quality urban design as discussed in the literature is required to revitalize dead or dying shopping malls and the surrounding area. Quality urban design is the search for “an ever-changing fit between people, time and place” (Brown, L. J., & Dixon, D., 2014). The need for placemaking and pedestrian-focused design is more important than ever as climate change, sprawl, and traffic congestion are becoming more severe, and health and safety more vulnerable (Dunham-Jones & Williamson, 2011; Talen, 2012; Sim, 2019; Tachieva, 2010). Everything from walkable block sizes, environmental repair, accessible sidewalks, appropriate street types, improved connectivity, and durable high-performance architecture (Williamson, 2015) are urban design essentials integral to the human experience of urban form. In the past, much of urban planning, especially in the suburbs, has focused on compartmentalizing

functions into distinct single-use zones which divide people and places (Williamson, 2015; Sim, 2019). The goal of retrofitting suburbia is to blur the line between distinct zoning practices and even combine them, creating a human scaled urban environment (Dunham-Jones & Williamson, 2011; Talen, 2012; Sim, 2019).

European cities are traditionally more dense than North American cities and there is much to learn from their approaches to urban design. The Danish concepts of Hygge (cozy) and Dense-Low introduced new forms of urbanism focused on individuality and the community through village-like patterns during the 1970's (Sim, 2019). Hygge is a term defined as a quality of cosiness and comfortable conviviality that engenders a feeling of contentment or well-being (Altman, 2016), while Dense-Low is an architectural movement balancing the individual and the shared needs of the residents; individuality and community (Sim, 2019). The core components of Hygge and Dense-Low concepts have been applied through suburban retrofitting projects over the past few decades by breaking up large urban blocks, creating village centres from dead malls, densifying zoning, and creating mixed-uses (Tachieva, 2010; Williamson, 2015). The following principles of retrofitting are introduced to offer suburban retrofitting the best chance for success from design stages to construction and into the future, and to avoid repeating mistakes of the past.

## 2.4. Design Principles of Retrofitting

This section discusses design principles found in the literature and observed in past retrofit projects such as those presented by Ellen Dunham-Jones and June Williamson (2011). Dunham-Jones and Williamson are the preeminent authors in the retrofitting literature and are often referenced in discussions by other authors in the literature review when discussing retrofitting projects. The literature review found that many concepts of retrofitting were derived from other urban design concepts such as New Urbanism, which was conceived and promoted as an anti-sprawl movement that emphasized compact, higher-density, mixed-use development (Garde, 2020). The broader field of urban design has been extensively researched and discussed in the literature whereas retrofitting is still a relatively new topic area. The principles outlined below were derived to address the specific needs of retrofitting suburbia as introduced by Dunham-Jones and Williamson. For the aforementioned reasons, this study focuses on the principles and work of Dunham-Jones and Williamson.

Shopping malls in Canada are declining - the ten largest shopping malls reporting a 42% decrease in foot traffic from 2019 to 2020 - and it is estimated that a quarter of American shopping malls will close in the next three to five years (Gallici, 2022). Because dying or dead suburban shopping malls represent huge potential in both the amount of land available and locations acting as regional hubs, they can be redeveloped into colleges, hotels, libraries, and civic spaces while creating public spaces such as gardens and parks (Dunham-Jones & Williamson, 2011; Tachieva, 2010). Prior to redeveloping any dying mall there are several deficiencies that can be addressed through design principles noted in the literature (Dunham-Jones & Williamson, 2011; Tachieva, 2010; Talen, 2012; Mocchia, 2012). Parking is one of the largest occupiers of land; lots are over scaled, underutilized, and often referred to in the literature as “greyfields”, in reference to the sea of asphalt that surround shopping centres (Dunham-Jones & Williamson, 2011; Tachieva, 2010; Mocchia, 2012).

It is important to consider design principles when retrofitting a space as large as a suburban shopping mall because the retrofit can have wide ranging effects on the surrounding neighborhoods and region. Re-inhabitation, redevelopment, and regreening, introduced by June Williamson and Ellen Dunham-Jones (2011), represent the foundation of the design principles presented next. The following principles have been discussed by several authors in the literature to varying degrees, and offer a suburban retrofit the best chance for success from design stages to construction and into the future. These principles are outlined in the table below.

**Table 2. Retrofitting Principles Explained. Brad Ingram (2023).**

| Retrofitting Principle | Intent and Definitions |
|---|---|
| Adaptive Reuse of Existing Buildings | Adaptive reuse is the repurposing of old buildings into new uses |

| | |
|---|---|
| Environmental Repair | Environmental repair involves removing constructed surface and rehabilitating the earth underneath through the installation of parks, repairing creeks, and creating a place for plant life to thrive. |
| Revised Zoning | Revised zoning requires changing municipal policy to allow mixed-uses and higher densities in previously single use zones. |
| Improved Connectivity and Walkability | Connectivity is vital for suburban sprawl areas where walking can be difficult due to older large block sizes, long winding streets and cul-de-sacs. |
| Quality Architecture | Quality architecture is defined by buildings that are well designed from the human scale at the street level which transition to interior public spaces which transition to private spaces, combining to create much more enticing places to visit. |
| Placemaking | Placemaking aims to create places that invite greater interaction among people while fostering healthier and more economically viable communities (Madden, 2011). |
| Destination Access | Destination access is defined as the accessibility of a place by walking, cycling, taking transit, or driving. |
| Human Scale and Density | Human scaled design is defined as urban form designed around activity at street level and includes creating inviting spaces and buildings that encourage interaction and community by utilizing dimensions rooted in the human senses. |

## 2.4.1. Adaptive Reuse of Existing Buildings

Adaptive reuse is the repurposing of old buildings into new uses. Reuse is the most environmentally responsible way to create new infrastructure; rather than demolishing and building from scratch, something new is created from existing infrastructure and far less waste is transferred to landfills (Dunham-Jones & Williamson, 2011). For shopping mall retrofitting projects, this means reusing the old mall as a base for additional structures on top of or adjacent to the existing mall structure while transforming existing spaces into new functions (see figure 13). Often times structures left behind from closed big box stores can be repurposed as civic community spaces such as libraries or community centres because they already consist of large open structures that are easily adapted for these purposes (Williamson, 2015). This concept can be utilized for projects large and small in the surrounding area.

**Figure 13. Sprawl Repair, Adaptive re-use of an old mall. Tachieva, 2010**

## 2.4.2. Environmental Repair

Environmental repair involves removing constructed surface and rehabilitating the earth underneath through the installation of parks, repairing creeks, and creating a place for plant life to exist. Regreening as environmental repair is a concept rooted in the reclamation of previously developed land into carefully designed landscape engineering projects which manage stormwater runoff with bioswales, rain gardens and green roofs (Dunham-Jones & Williamson, 2011). Fourth Ward Park in Atlanta (see figure 14) is an

example of quality spaces created by regreening a place previously occupied by concrete and other hard surfaces. Environmental repair can also include greener buildings which must meet high standards of environmental performance, complemented with attractive, high-performance landscapes that can function as stormwater

**Figure 14. An Example of Regreening: Fourth Ward Park, Atlanta. Phillip Jones, 2018**

infrastructure (Williamson, 2015). Green building programs such as LEED (Leadership in Energy and Environmental Design) and Passive Haus (high efficiency, airtight building envelopes) can ensure a building meets environmental standards according to the building industry. Each building that is built to higher energy efficient standards adds to the overall effects of reducing pollution, greenhouse gasses and more pleasant interior environments.

### 2.4.3. Revised Zoning

Revised zoning requires changing municipal policy to allow mixed-uses and higher densities in previously single-use zones. Zoning can be used to encourage mixed-use developments that promote walkability while discouraging single use, car dependant places (Williamson, 2015). Municipalities are encouraged to eliminate segregated single-family zoning and overly wide streets that make walking difficult and unpleasant (Dunham-Jones & Williamson, 2011; Williamson, 2015). Shopping malls provide excellent rezoning opportunities affecting a large single-use space by creating a more inviting and pedestrian friendly place (figure 15); as large parking lots are replaced with various street typologies, green spaces are added, and pedestrian friendly walkability is introduced. Zoning can also be used to facilitate desirability in surrounding neighborhoods, promoting population variation, architectural articulation, and mixed-use development.


**Figure 15. Rezoning an old single use commerical area: Wyandanch, Long Island, New York. Torti Gallas & Partners, 2020**

## 2.4.4. Improved Connectivity and Walkability

Connectivity is vital for suburban sprawl areas where walking can be difficult due to older large block sizes, long winding streets, and cul-de-sacs. For a retrofitting project to be successful, connections to the surrounding existing urban fabric are important so that multiple modes of transportation can easily access the space (Williamson, 2015). Improved connections provide opportunities to create complete streets, defined as “a movement that encourages and provides for safe access to destinations for everyone, regardless of age, ability, income, ethnicity, or mode of travel” (Williamson, 2015, p.115). Complete streets have been implemented in some cities where a formerly sprawling neighborhood with little variety has potential to add density, multifaceted pathways, and connections to the surrounding area which promote interconnected places (Figure 16).

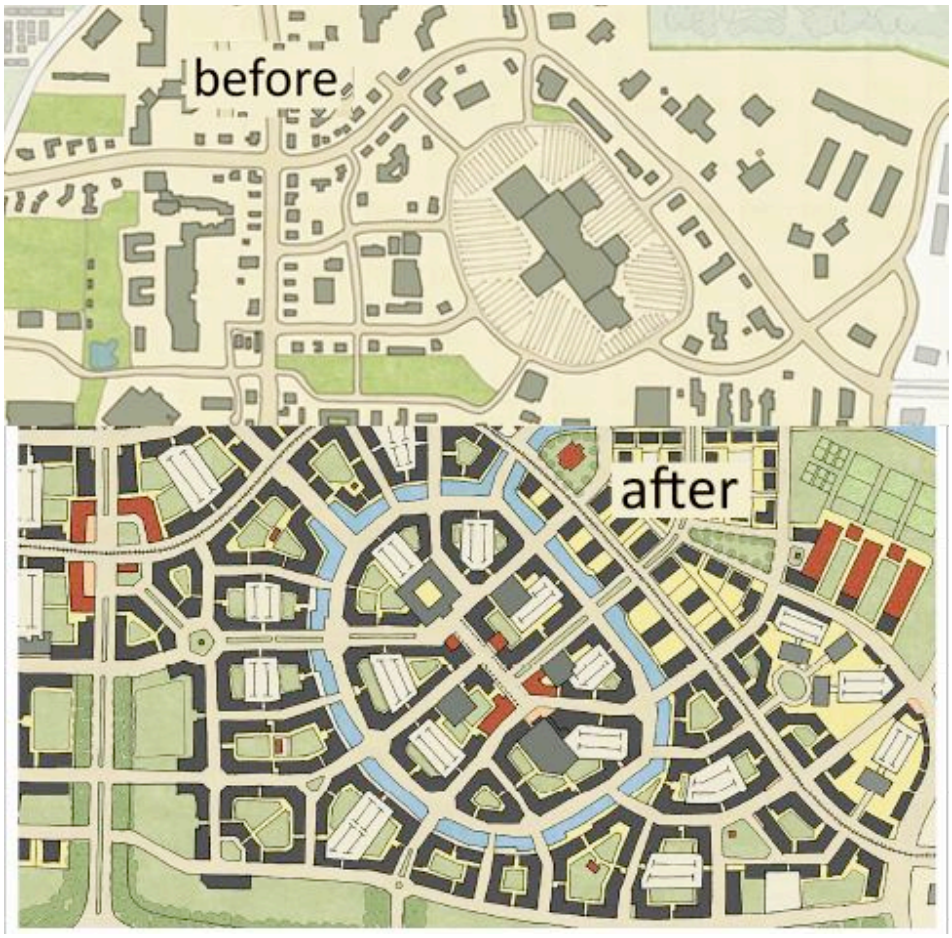



**Figure 16. Improved Connectivity. Tachieva, 2010**

Any retrofitting project benefits from considering the future development of new street typologies, neighborhoods, transit, and civic buildings such as libraries and community centres that could be surrounding the newly retrofitted space, and how these new structures integrate into the larger urban fabric. There can be barriers such as NIMBY-ism (not in my back yard) when a retrofitting project is undertaken; therefore, tactics such as providing easements for future connections and pre-emptively installing infrastructure in anticipation of future projects can ensure successful integration (Williamson, 2015).

Attention to street typology and hierarchy can also help future neighborhood infrastructure. Street typology is defined as the hierarchy of street types surrounding any development project and is an important factor in creating pedestrian friendly connections and environment such as streets with wide sidewalks, cycling lanes and public squares. Street types can range from laneways and pedestrian-only streets to multi-lane connector roads and multi-lane regional highways. Many suburban areas have streets that are overly wide, lack sidewalks and few crosswalks and bike lanes are present (Williamson, 2015). Wide streets are more difficult to cross and are often dangerous for pedestrians and cyclists to navigate (Sim, 2019; Dunham-Jones & Williamson, 2011). Streets and blocks simply organized around narrower streets with

**Figure 17. Varied Street Typology: Lancaster Boulevard before and after. City of Lancaster, 2009 & 2011**

medians to promote traffic slowing and safer pedestrian movement are ideal for walkable

neighborhoods. Streets consisting of multiple lanes in both directions provide an opportunity to create bike lanes, wider sidewalks, traffic slowing measures, and more green spaces (see figure 17). These infrastructure interventions can vastly improve walkability, discussed next.

Walkability is one of the most important factors in the success of retrofitting projects because it can influence one's sense of place and encourage more people to leave their cars at home. Higher density and mixed-use spaces encourage walking over driving since shopping, restaurants and other services are easily accessible on foot. Attractive natural and built environments are important to encourage walking, while monotonous facades, vast parking lots and large roadways discourage walking (Dunham-Jones & Williamson, 2011). Walkability extends beyond outdoor spaces to buildings infrastructure as walk-in, walk-through and walk-up buildings extend the feeling of connection to the urban environment and add to a sense of place (Sim, 2019). Spaces that are walkable not only allow pedestrians to get from one point to another, but can be destinations themselves and create lively, interesting places.

### 2.4.5. Quality Architecture

Quality architecture is defined by buildings that are designed at the human scale to incorporate easy transitions from the street to the interior, creating enticing places to visit and explore. An important piece in the success of a retrofitting project is the quality of the built form. Bland architecture and environments featuring monotonous facades, monotone colours, little to no articulation, and expanses of paving does little to encourage a sense of place. Articulation of architecture is important for the overall visual enjoyment of a place because it breaks up monotonous, repetitive facades that otherwise contributes to a bland environment. Quality architecture has the power to become a destination while creating a synergistic environment of mixed-uses (Dunham-Jones and Williamson, 2011). Quality architecture can have a dramatic effect transforming a place into an exciting destination, enticing locals and visitors to enjoy the space. For example, OCT OH Bay Retail Park, Shenzhen, China (figure 18) showcases quality architecture that has resulted in well-utilized, quality spaces. It is important to note that quality architecture and quality neighborhoods do not require brand-new buildings and large mega projects to succeed; instead, neighborhoods that intermingle

old and new buildings, with a good mixture of older ones, allow small and large businesses to thrive and people of all incomes to mix (Jacobs, 1961).

**Figure 18. Quality Architecture, Quality Spaces: OCT OH Bay Retail Park, Shenzhen, China. Yanlong Tong, 2021**

## 2.4.6. Placemaking

Placemaking is a basic goal of many retrofitting projects, in particular large-scale developments such as shopping malls. Placemaking aims to create places that invite greater interaction among people while fostering healthier and more economically viable communities (Madden, 2011). During the creation of the Congress for New Urbanism (CNU), several practices were advocated to guide placemaking. The neighbourhoods included in the CNU are urban places defined by architecture and landscape, diverse in use and population, and communities designed for pedestrians, transit and cars, accessible public spaces, and community institutions (Heath et al.,2010). A sense of place is an important factor in urban design, as it is more than just buildings, streets, and addresses. Well-designed spaces have a tangible sense of place; to achieve this, urban designers should include multi-functional urban streets, well-integrated transit, use building articulation, varied building heights and designing housing for a diverse community (Brown & Dixon, 2014). Building articulation is the manipulation of building

facades to create visual interest and to break up monotonous urban environments, which can add to the vibrancy of a place through architectural variation. Placemaking is a people-focused principle - how they experience surroundings and well-designed spaces will entice people to walk more to experience public art, public spaces, and embrace activities that spill onto the street such as outdoor dining (Brown & Dixon, 2014). Figure 19 illustrates the multitude of qualities that make a place.

Existing spaces can be redesigned to create desirable places. A subtle rebalancing of space is required for traffic and pedestrians to co-exist, assuming enough space is given to pedestrian uses to avoid corralling people and allow freedom of movement (Carmona, 2018). It is essential that retrofitted projects incorporate spaces that are diverse, well delineated, engaging, and robust (adaptable), as these are the qualities that improve the previous life of the space (Carmona, 2018).


**Figure 19. Diagraming Placemaking. The Town of Lincoln, 2023**

## 2.4.7. Destination Access

Destination access is defined as the accessibility of a place by walking, cycling, taking transit, or driving. Successful retrofitting projects encourage pedestrian focus and support placemaking. For places to function well, access should be provided that encourages walking - not just that it is possible to walk, but entices people to walk (Brown & Dixon, 2014). Good transit access is also especially important for large retrofitting projects that create a destination, with a variety of mixed uses and functions encouraging more people to leave their personal vehicles at home. Transit should be a focus of urban design and not hidden from view; when done well, a transit station can contribute and celebrate community character such as the World Trade Center

Transportation Hub in New York by Santiago Calatrava (figures 20 & 21). Providing easy and convenient access to a place brings a higher concentration of people by foot, transit, and bikes, thus energizing spaces and providing more opportunities for community and commerce (Brown & Dixon, 2014; Campoli, 2007). Destination access is as important as the place itself, because the first impression of a place is often formed at the place of arrival. (Carmona, 2018). Buildings, landscape, and infrastructure help define the physical limits of external public spaces, the land uses surrounding those spaces will dictate what sort of places they will be.

**Figure 20. Santiago Calatrava's Oculus at the World Trade Centre. Hufton + Crow, 2017**

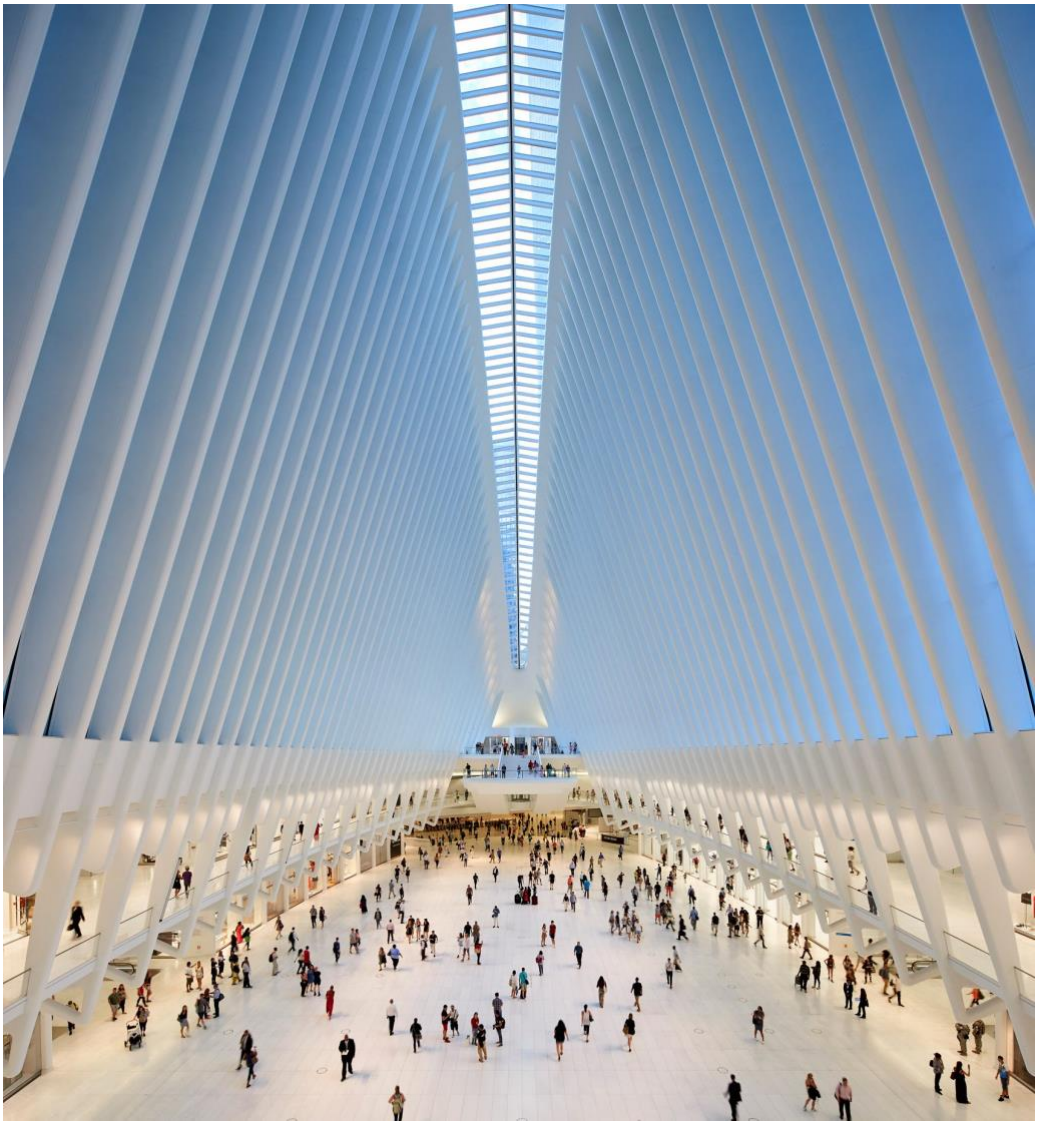


**Figure 21. Santiago Calatrava's Oculus at the World Trade Centre. Hufton + Crow, 2017**

Urban design strategies, such as those illustrated in figure 22 for a project in Istanbul, provide solutions for dealing with multiple modes of transportation in a heavily trafficked area by creating innovative layering strategy to ease congestion. This strategy allows for the free flow of transit, pedestrians and vehicle traffic that is safer for all modes and offers much more connectivity.

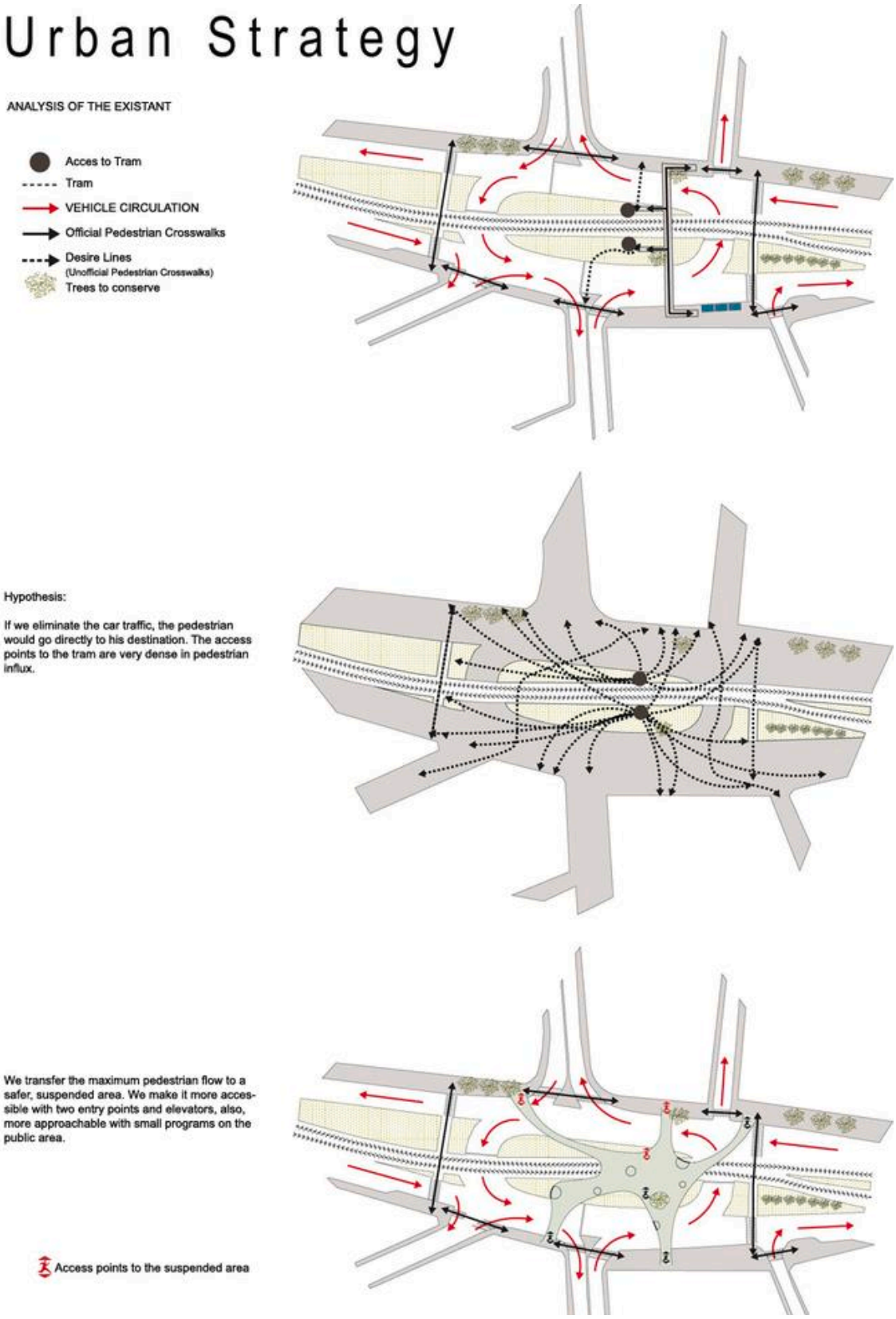



**Figure 22. Strategy to Introduce Additional Connectivity: Project for Footbridge Competition in Istanbul, Turkey. Jordana, 2011**

### 2.4.8. Human Scale and Density

Human-scaled design is defined as urban form planned around activity at street level, and includes creating inviting spaces and buildings that encourage interaction and community by utilizing dimensions rooted in the human senses. Most importantly are forms occurring at eye level because what takes place within the first vertical ten feet is extremely important to our experience of space (Sim, 2019). Density does not have to include towering facades crowding the street; instead, density can be provided in many forms from basement suites to townhouses to apartment buildings. The guiding principle behind retrofitting suburbia are based on refocusing the city more on people and less on auto dependencies of the past. To be successful, a retrofitting project should include the element of human scale which can be achieved by building density in layers (articulation of facades), opening the ground floors for a variety of functions, creating spatial diversity, and incorporating large buildings without breaking the small-scale rhythm and life of the street (Sim, 2019).

## 2.5. Summary

In reviewing the background and history of the suburban shopping mall and the role urban design and retrofitting principles play in creating a successful retrofitting project and its integration into the surrounding area, the conceptual framework for this study is informed. The literature shows that in order for a shopping mall retrofitting project to be successful in the context of its immediate neighborhood, a variety of factors should be fulfilled from supportive government zoning policy and infrastructure support to urban design that allows for mixed-used, human focused development of good architectural quality. If Surrey Central City and the surrounding neighborhood is to be considered a successful example of suburban retrofitting, then it must aim to meet or exceed these standards.

# Chapter 3. Methodology and Data Collection

This study uses a mixed methods approach to evaluate the Surrey Central Mall retrofitting project and the 500 meters of surrounding neighborhood. Data collection is through direct observation of the study area, in combination with secondary data analysis. The focus of this study is to understand the effectiveness of a suburban retrofitting development in its present state, twenty years after completion.

Much has been written about the positives of suburban retrofitting, but little has been written about outcomes of large-scale retrofitting projects and their effects on the surrounding suburban form. The data collection methods are outlined in the sequence they were employed within the study, as one method prepares the reader for the next.

## 3.1. Secondary Data Analysis

Secondary data analysis evaluates quantifiable spatial variables and metrics for the study area and examines specific ways the Surrey Central City area meets or does not meet urban design guidelines identified in the literature (Ohnemus, 2016). This study uses quantifiable metrics to evaluate the presence or lack thereof of features that relate to the principles of retrofitting suburbia discussed earlier. Pedestrian connectivity is an important metric in evaluating the success of a suburban retrofit because it indicates the ability of people to move around without the necessity of a vehicle. 500 metres was chosen as the study area because it represents a reasonable distance someone would be willing to walk to a destination, approximately a 5 to 8-minute walk in a straight line (Ohnemus, 2016).

There are several quantifiable variables and metrics that were analyzed to evaluate how the Surrey Central City area meets the design guidelines of retrofitting. The secondary data analysis considers the physical features that most impact pedestrian connectivity with the suburban retrofit of the old Surrey Place Mall. Walk route distance, block size and intersection densities are examined in addition to land uses, population, traffic data, and accident data using Surrey's COSMOS GIS, ICBC public data, and national census data. Each of these metrics were chosen because they provide data illustrating existing conditions which can add context to the retrofitting principles introduced in chapter two such as connectivity and walkability, destination

access, and human scale and density. Land uses plus traffic and accident data add statistical context to the built conditions observed during the IMI. The land use and accidents statistics illustrate why retrofitted suburban communities are needed, vehicle centric places have high occurrences of vehicle, pedestrian, and cyclist accidents. Once the data was collected and analyzed, findings are illustrated through a series of maps and diagrams alongside a walkability score to describe the physical make-up of the 500-metre study area.

## 3.2. Semi-Structured Observation

Semi-structured observations are utilized to observe the 500-metre radius through the use of Google Satellite aerial images and Street View to set up the context for analysis. Photographs and note taking were utilized during site visits to identify specific areas of interest and set up the context for the structured observation section. A checklist of attributes based on suburban retrofitting design principles guided observations and is applied in conjunction with the urban design inventory outlined below to aid in constructing the narrative of findings.

Urban design inventory analysis is a method used for structured observation of the 500-meter study area. The Irvine Minnesota Inventory (IMI) is a comprehensive method of cataloguing the existing built environment and offers an abundance of data to analyze. The IMI was developed in 2003 by researchers measuring a wide range of built environment features that are potentially linked to active living, especially walking (Day et al., 2006). Active living and walkability are the focus or at least a component of each retrofitting design principle introduced in chapter two.

The original Irvine Minnesota Inventory “includes 162 items, organized into four domains: accessibility (62 items), pleasurability (56 items), comfort (31 items), and safety (15 items)” (Day et al., 2006, p.144). Domain names or IMI questions within the four domains that could be viewed as subjective were either removed or replaced with similar, more objective questions. For example, the IMI domain “pleasurability” is intended to rate the perceived attractiveness of a neighborhood by observing the prevalence of businesses such as coffee shops, restaurants, corner stores and other places for residents to visit, all of which can contribute to the development of a neighborhood. Since the intention of the IMI is to observe the existence of these

amenities, the “pleasurability” domain was renamed “amenities” to reflect the presence of amenities and therefore removing the subjective nature of “pleasurability”. The IMI domain “comfort” is evaluated by cataloguing the physical condition of a neighborhood by observing instances of graffiti, abandoned buildings, and maintenance of buildings and landscapes. The “comfort” domain was replaced with “maintenance” to remove the subjectivity of the word comfort. Maintenance is then objectively assessed by observing the physical condition of a property by noting broken windows, condition of paint, the presence of garbage, etc. The condition can then be described as good, poor, or neutral. As discussed above, not all the questions asked under each domain are applicable to this study due to their subjective nature, therefore, a modified version of the inventory was created based on observation to better suit the objectives of the study (see table 4 for an example of the IMI chart before alterations, and table 5 for the chart after site visits). Table 5 is color coded to represent the two observers (white and yellow) and any squares highlighted in red represent a discrepancy in answers between observers. During data collection, an item is only considered an occurrence when both observers agreed on the item’s occurrence across the 15 segments surveyed, expressed in a percentage. Item occurrence is defined by the number of questions related to those items.

In this study the four domains each relate to one or more Irvine Minnesota Inventory question and one or more principle of retrofitting. The inventory is set up so that it can be adapted for a variety of urban areas and can compare multiple settings or a single setting only. The IMI allows the observer to inventory macro and micro scale physical environment features. At the macro scale the inventory allows for the observation of the entire study area while the micro scale allows the study of a specific block or segment. The inventory allows for the documentation of the existence of many components in an urban landscape; in total, 99 questions and documented responses were used to create indicators of each of the four domains listed above.

I have assigned each principle and IMI question to a domain, and these relationships are illustrated in the table below.

**Table 3. Relationship Between IMI Domains and Retrofitting Princples. Brad Ingram (2023).**

| Domain | Question number | IMI Questions | Related Retrofitting Principles (can be represented in more than one domain) |
|---|---|---|---|
| Accessibility | 8a-b, 9<br>17-18b,<br>19-20b,<br>44, 47b | Pedestrianized streets<br>Road Type<br>Barriers (environmental or man-made)<br>Sidewalks | Improved Connectivity<br>Environmental Repair<br>Placemaking<br>Destination Access |
| Amenities | 7, 12a-c,<br>13a-13b,<br>14-16,<br>18c-e,<br>22-27,<br>31-36,<br>49-53 | Type of amenity (schools, stores, services, parks)<br>Type of land use<br>Cycling lanes<br>Sidewalks<br>Art<br>Historic buildings | Adaptive Re-use of Existing Buildings<br>Human Scale and Density<br>Revised Zoning<br>Environmental Repair<br>Placemaking<br>Quality Architecture<br>Destination Access |
| Maintenance | 18c, 28-30 | Condition of buildings<br>Graffiti<br>Garbage<br>Dumpsters<br>Broken sidewalks<br>Lighting | Environmental Repair<br>Quality Architecture<br>Placemaking<br>Destination Access |
| Safety | 1-6, 10,<br>18a,18f,<br>20a-b,<br>21a-b,<br>45-47a | Lighting<br>Crosswalks<br>Signals<br>Signs | Improved Connectivity<br>Placemaking<br>Quality Architecture |

## Table 4. Irvine Minnesota Inventory Checklist Example. Day et al., (2006)

| | | | | | |
|---|---|---|---|---|---|
| **Observer** | | | | | |
| **Segment #** | | | | | |
| **Answer questions 1-6 based on this end of the segment** | | | | | |
| **Intersection** | | | | | |
| **Neighborhood Identification** | | | | | |
| 1. Are there **monuments or markers** including neighborhood entry signs that indicate that one is entering a special district or area? | 1 | yes = 1; no = 0 | | | |
| **Street Crossing** | | | | | |
| 2a. Consider the places on the segment that are **intended** for pedestrians to cross the street. Are these places marked for pedestrian crossing? | 2 | all = 3; some = 2; none = 0; NA = 8 | | | |
| 2b. What type of **marking** do the crosswalks have? Mark all that apply. | | | | | |
| White painted lines | 3 | yes = 1; no = 0 | | | |
| Colored painted lines | 4 | yes = 1; no = 0 | | | |
| Zebra striping | 5 | yes = 1; no = 0 | | | |
| Different road surface or paving (e.g. tiles, colored concrete, marble, etc) | 6 | yes = 1; no = 0 | | | |
| Other | 7 | yes = 1; no = 0 | | | |
| 3. Are there **curb cuts** at all places where crossing is expected to occur? | 8 | all = 3; some = 2; none = 0; NA = 8 | | | |
| 4. What type of **traffic/pedestrian signal(s)/system(s)** is/are provided? Mark all that apply. | | | | | |
| Traffic signal | 9 | yes = 1; no = 0 | | | |
| Stop sign | 10 | yes = 1; no = 0 | | | |
| Yield sign | 11 | yes = 1; no = 0 | | | |
| Pedestrian activated signal | 12 | yes = 1; no = 0 | | | |
| Pedestrian crossing sign | 13 | yes = 1; no = 0 | | | |
| Pedestrian overpass/underpass/bridge | 14 | yes = 1; no = 0 | | | |
| 5. For an individual who is on this segment, how **safe (traffic wise)** do you think it is to cross the street from this segment? | 15 | pretty/very safe = 1; not very safe/ unsafe = 0; cul de sac = 8 | | | |
| 6. For an individual who is on this segment, how **convenient (traffic wise)** do you think it is to cross the street from this segment? | 16 | pretty/very convenient =1; not very/inconvenient= 0; cul de sac = 8 | | | |
| **Answer questions 7-11 while standing at the beginning of the segment** | | | | | |
| **Neighborhood Identification** | | | | | |
| 7. Does the segment have **banners** that identify the neighborhood? | 17 | some/a lot = 3; few = 2; none = 0 | | | |
| **Street Characteristics** | | | | | |
| 8a. Is this a **pedestrianized** street? | 18 | yes = 1; no = 0 | | | |
| 8b. Is the street a … | 19 | one way = 1; two way = 2 | | | |
| 9. Is this segment an **alley**? | 20 | yes = 1; no = 0 | | | |
| 10. How many **vehicle lanes** are there for cars? (Include turning lanes). | 21 | six or more = 6; five = 5; four = 4; three = 3; two = 2; one = 1; NA (no lanes for car travel) = 8 | | | |
| **Views** | | | | | |
| 11a. Is this segment characterized by having **a significant open view** of an object or scene that is not on the segment? The view must be a prominent one. | 22 | yes = 1; no = 0 | | | |
| 11b. How attractive is the open view? | 23 | attractive = 3; neutral = 2; unattractive = 1; NA (no views) = 8 | | | |
| **Begin walking along segment to answer questions 12-68** | | | | | |
| 12a. What types of land uses are present on this area? Mark all that apply. | | | | | |
| **Residential** | | | | | |
| Single family home - detached | 24 | yes = 1; no = 0 | | | |
| Single family home/duplex - attached (2 units or fewer) | 25 | yes = 1; no = 0 | | | |
| Town home/condo/apartment housing (3 units or more) | 26 | yes = 1; no = 0 | | | |
| Mobile homes (includes manufactured homes) | 27 | yes = 1; no = 0 | | | |
| Residential, other | 28 | yes = 1; no = 0 | | | |
| **School** | | | | | |
| Elementary, middle or junior high school | 29 | yes = 1; no = 0 | | | |
| High school | 30 | yes = 1; no = 0 | | | |
| University or college (includes all types of building forms) | 31 | yes = 1; no = 0 | | | |

**Table 5. Irvine Minnesota Inventory Checklist Modified Example (Sample Portion) Brad Ingram (2023).**

| COMBINED (L then B) | | Date: | 21-Aug-22 | | | | | | | | 22-Aug-22 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Segment number: | 9 | 9 | 11 | 11 | 14 | 14 | 18 | 18 | 2 | 2 | 23 | 23 |
| | | Intersection (segment | 98B & | 98B & | 98B & | 98B & | 100 AVE | 100 AVE | 100A | 100A | OLD YALE | OLD YALE | 133 ST & | 133 ST & |
| Answer questions 1-6 based on this end of the segment. | | | | | | | | | | | | | | |
| **Neighborhood Identification** | | | | | | | | | | | | | | |
| 1. Are there monuments or markers including neighborhood entry signs that indicate that one is entering a special district or area? | 1 | yes = 1; no = 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Street Crossing** | | | | | | | | | | | | | | |
| 2a. Consider the places on the segment that are | 2 | all = 3; some = 2; none = 0; NA | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 3 | 0 | 0 |
| 2b. What type of marking do the crosswalks have? | | | | | | | | | | | | | | |
| White painted lines | 3 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| Colored painted lines | 4 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Zebra striping | 5 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Different road surface or paving (e.g. tiles, colored | 6 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Other | 7 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. Are there curb cuts at all places where crossing is | 8 | all = 3; some = 2; none = 0; NA | 3 | 3 | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 3 | 2 | 0 |
| 4. What type of traffic/pedestrian signal(s)/system(s) | | | | | | | | | | | | | | |
| Traffic signal | 9 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Stop sign | 10 | yes = 1; no = 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yield sign | 11 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian activated signal | 12 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Pedestrian crossing sign | 13 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Pedestrian overpass/underpass/bridge | 14 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5. For an individual who is on this segment, how safe | 15 | pretty/very safe = 1; not very | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| 6. For an individual who is on this segment, how | 16 | pretty/very convenient =1; not | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| **Answer questions 7-11 while standing at the Neighborhood Identification** | | | | | | | | | | | | | | |
| 7. Does the segment have banners that identify the | 17 | some/a lot = 3; few = 2; none = | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 |
| **Street Characteristics** | | | | | | | | | | | | | | |
| 8a. Is this a pedestrianized street? | 18 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8b. Is the street a ... | 19 | one way = 1; two way = 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 9. Is this segment an alley? | 20 | yes = 1; no = 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10. How many vehicle lanes are there for cars? (Include | 21 | six or more = 6; five = 5; four = | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 |
| **Views** | | | | | | | | | | | | | | |
| 11. Is this segment characterized by having a significant | 22 | yes = 1; no = 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

As Ohnemus (2016) explains, the unit of analysis is the segment defined as a block face including both facing sides of the street, and a yes/no question is asked in each of the domains regarding the presence of certain elements within a segment. An accurate illustration of existing conditions was created based on this analysis of the segments shown in figure 23 during multiple site visits to the study area. This final piece of data collection helps tie together a complete picture of existing conditions in the area. Documenting the absence or inclusion of selected items in each of the four domains (accessibility, amenities, maintenance, and safety) along each observed segment forms an understanding of the components which make up the urban fabric in the 500 metres surrounding the Surrey Central City mall retrofit.

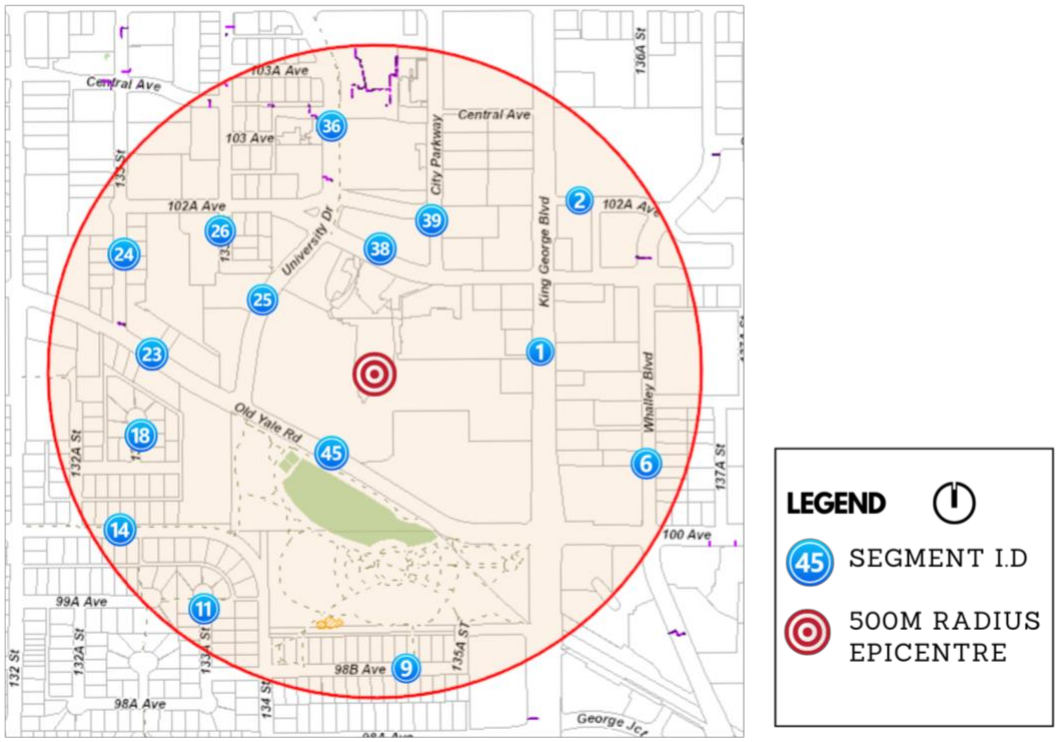



**Figure 23. Irvine Minnesota Inventory Sampled Segments. Contains information licensed under the Open Government License – City of Surrey. Brad Ingram via COSMOS, 2023**

Prior to the site visits, a 500-meter radius was established with the epicentre at the Surrey Central Mall, and a map created to identify each of the segments within the radius (see figure 23). Each segment is assigned a number from 1 through 43. In accordance with Day et al., (2006), when choosing segments, a maximum of three adjacent segments can be skipped if physical features are too similar; for example, a street faced on both sides with single family homes. The intention is to sample as many varying segments as possible within the 500 meters. The IMI requires a minimum of 20% of the total number of segments to be sampled. In this study, a total of 35% or 15 of the 43 segments were identified as unique and therefore utilized for data collection, eliminating similar segments up to three times before selecting the next one. The segments removed were visually confirmed to have similar characteristics to the chosen segments and therefore removed to avoid data duplication. Three separate visits were conducted on August 21, 2022, August 22, and September 17, 2022, by two observers: the author, and an assistant. Each researcher began at the intersection identified at

each segment, observed the segment, and answered questions on both sides of the street as they proceeded to the other end of the segment. Each question required either a yes or no answer (represented by 1 for yes and 0 for no) or a rating of none, some, or many (marked by an assigned number representing those answers).

The observers visited each segment at different times to avoid contamination of the observations. The IMI consists of a total of 178 questions divided into the four domains mentioned previously: accessibility, pleasurability, comfort, and safety, with "pleasurability" and "comfort" recategorized as "amenities" and "maintenance" to lessen subjectivity. Not all questions in the IMI were relevant to the study area, and some were deemed subjective. Prior to visiting the site, the IMI was modified to remove a total of five questions considered too subjective to be included. Questions removed were 11b, 46, 53, 54 and 55, which all pertain to attractiveness and perceived safety ("how attractive is the view", "rate the attractiveness of the segment", "how safe do you feel", "are there any loose or barking dogs that seem menacing" and "is the dominant smell unpleasant") respectively. The removal of these questions brings the total number of questions per segment down from 178 to 173.

A 70% agreement threshold is established for reliability by Day et al.,(2006). To verify this threshold, three rounds of reliability tests were performed on the data collected during the site visits to confirm all 173 questions met the required 70% agreement threshold: (1) answer-to-answer, which compares answers for the same question by the two observers; (2) for each observed segment; and (3) for each question. For the first reliability test (answer-to-answer), a total of 2329 questions were answered as part of the inventory (173 x 15 segments). Reliability across all questions was high – out of 173 questions, 155 had matching responses, equalling an agreement rate of 89.7%. However, in accordance with Day et al (2006), questions that had no answer (ie. Answered with a "0") were deemed not present on the segment and therefore removed from further analysis. In a situation where a disagreement occurred, the question was removed without further deliberation because the data recorded would require another site visit to verify. This data could be corrupted or skewed by the knowledge of what the other observer recorded, in addition to possible changes on site. A total of 74 questions were removed from the IMI bringing the total number of questions answered for each segment down from 173 to 99.

The second reliability test was conducted for each observed segment. This reliability test analyzed the answers given by each observer over the 99 questions. Agreement rates across all 15 segments were above the 70% threshold ranging from 71% to 97.6% allowing all 15 segments to be reliably included for further analysis.

The third reliability test studied the reliability of each question. Across 15 segments, 11 matching segments (73.3%) were required to meet the minimum agreement threshold established by Day et al., (2006). A total of 12 questions that did not have matching answers between the two observers (below 70% agreement) were removed from the results. However, these 12 questions were the same ones identified during the first reliability test (answer-to answer). Therefore, the final questions retained for further analysis remained at 99.

Using the IMI Codebook, the results of the reliability tests were divided into their respective domains: (1) accessibility, (2) amenities, (3) maintenance and (4) safety to be further analyzed. The collected urban design inventory data was evaluated in an original table outlining the literature guidelines alongside findings in each of the four categories defined by the Irvine Minnesota Inventory. This chart helps organize the findings so they can be easily compared with the literature guidelines.

There are several limitations of the IMI method of data collection. First, the amount of time required to collect data is substantial – each round of data collection required each observer 10-25 minutes to answer all questions on each segment, times 15 segments. This time constraint could be detrimental for efficient data collection. Second, there is a substantial amount of data collected – depending on the sample area, thousands of answers need to be organized and analyzed when segment data collection is complete, and due to human error, occasionally questions might get missed. Third, a significant amount of training and instruction needs to be completed to ensure that each observer is aware of the specific feature the IMI is asking to identify in each question. Certain features can be too open to interpretation – for example, when the IMI asks if there are dumpsters present, this could be interpreted to mean any garbage containers and not just the commercial kind.

Table 6 summarizes the relationship between indicators, principles of retrofitting, data collected and method of collection.

**Table 6. Primary and Secondary Data Collection and Relationship to Retrofitting Criteria. Brad Ingram (2023)**

| Retrofitting principles | Indicator | Methods of Data Collection | Data Collected or Observed |
|---|---|---|---|
| Adaptive Re-Use of Existing Buildings | Land Use | Observation/ IMI | Heritage retention, reusing older buildings for new uses (shopping malls) |
| Environmental Repair | Land Use | Observation/IMI | Maps and observation of parks, city trees, water courses, bioswales, reduction of asphalt or other impermeable surfaces |
| Revised Zoning | Land Use and Residential Density | City of Surrey COSMOS GIS | City zoning maps |
| Improved Connectivity | Walk Route Distance,<br>Block Size,<br>Traffic and Accident Statistics | City of Surrey COSMOS GIS<br>Observation/IMI | Barriers, Cycling maps, sidewalk maps, transit stops, type of transit, roadways |
| Quality Architecture | Land Use | Observation/IMI | Architecture that creates a sense of place. Architecture |

| | | | |
|---|---|---|---|
| | | | that provides places to gather and socialize |
| Placemaking | Land Use and Residential Density | Observation/IMI | Spaces that are welcoming and encourage socialization, relaxation, activities, events and celebration |
| Destination Access | Walk Route Distance, Block Sizes, Intersection Density | Observation/ IMI, City of Surrey COSMOS GIS, Walkability Website | Cycling maps, sidewalk maps, transit stops, type of transit, roadways. |
| Human Scale and Density | Block Sizes, Intersection Density, Land Use and Residential Density Population Growth | Observation/ IMI, City of Surrey COSMOS GIS | Density maps. Buildings and other infrastructure that relate to the human form. Open plazas and spaces that are scaled to human perceptions. |

# Chapter 4. Secondary Data Analysis

Data was collected from a variety of sources including The City of Surrey COSMOS system, Walkscore, and ICBC in order to create an accurate analysis of the existing conditions at the time the study was conducted.

## 4.1. Walk Route Distance / Block Size / Intersection Density

Physical features of a neighborhood such as block sizes, intersections, and land use impact pedestrian experience when determining the route taken to a destination. These features correspond to the retrofitting principles of improved connectivity and walkability, human scale and density and destination access. A pedestrian's experience with their physical environment is altered with shortcuts, crosswalks, walking distances, and the amount of time it takes to walk, influencing a person's decision to walk versus driving.

The Surrey Central City area is dominated by its devotion to the automobile, as the mall is still surrounded by parking lots and ringed by wide roads of at least four lanes. Devotion to the car is the principal feature despite the addition of the regional SkyTrain station just outside the mall, making walk routes longer, less safe, and less pleasant. However, sidewalks are present on most streets, usually on both sides and are in good general repair. Most destinations are reachable on foot, but frequent intersections are not present, forcing a pedestrian to walk much further than if presented with a straight connection or more frequent options. Jane Jacobs (1961) was a proponent of the value of frequent streets and short blocks because of the fabric of intricate cross-use that they permit among the users of a city neighborhood. Specifically, the area south of Old Yale Road features many cul-de-sacs and large unconnected blocks forcing a pedestrian to travel much farther to reach Surrey Central City.

As shown in figure 24, the majority of existing sidewalks (grey lines) follow major roads and wind around outer suburban streets, and many of the existing suburban streets to the south and west of Holland Park were constructed without any sidewalks whatsoever. However, Holland Park does provide an opportunity to shortcut through a variety of pathways as shown in purple. Figure 24 also illustrates a missing network of

pedestrian connectivity as illustrated in the absence of grey lines on the map, indicating both the lack of sidewalks and the infrequency of intersections.

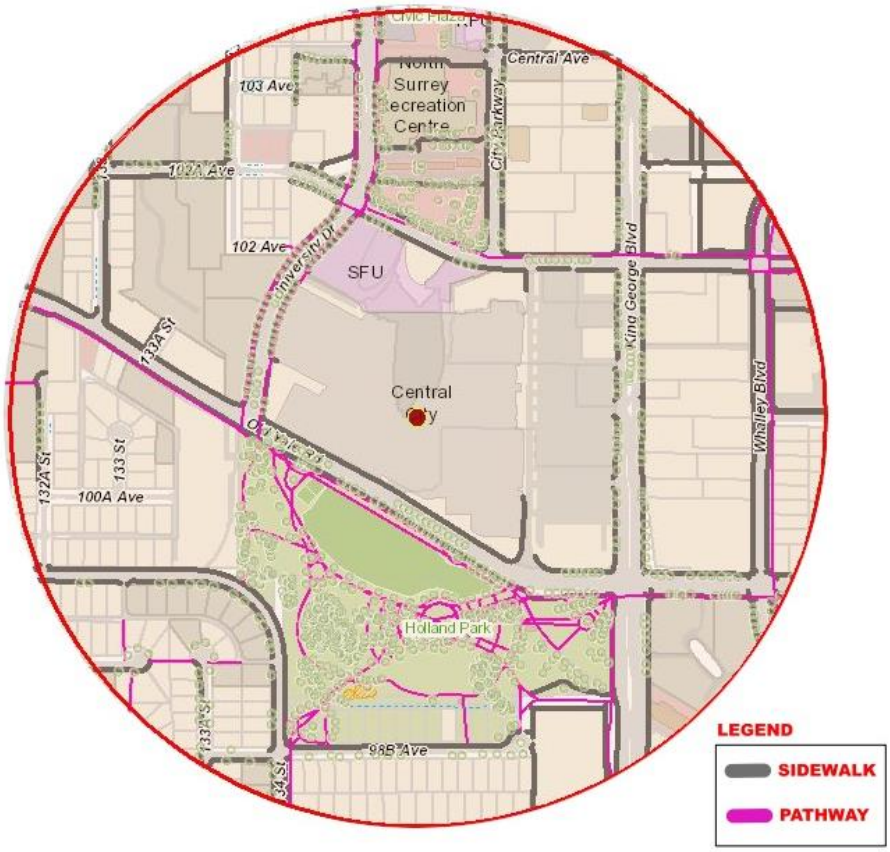



**Figure 24. Surrey City Centre Sidewalks and Pathways. Contains information licensed under the Open Government License – City of Surrey. Brad Ingram via COSMOS, 2023**

Intersection frequency is an indication that block sizes are too large and create mobility and connectivity problems for pedestrians. A small block size is determined to be 200 by 200 feet, while large sizes can be 200 by 600 feet and larger (Dagenhart, 2008). Blocks are defined as the area bordered by named streets. Block sizes in the study area range between approximately 1265 by 970 feet at the largest to 480 by 330 feet. In most cases within the study area, intersections occur between each block. The advantages of shorter blocks are simple: more intersection frequency allows a person to take different routes for different errands, promoting more commercial activity and neighbor interactions. By contrast, longer blocks force people to follow monotonous repetitive paths to a given point creating isolation, stagnation, and boredom (Jacobs,

1961), as illustrated in figure 25.

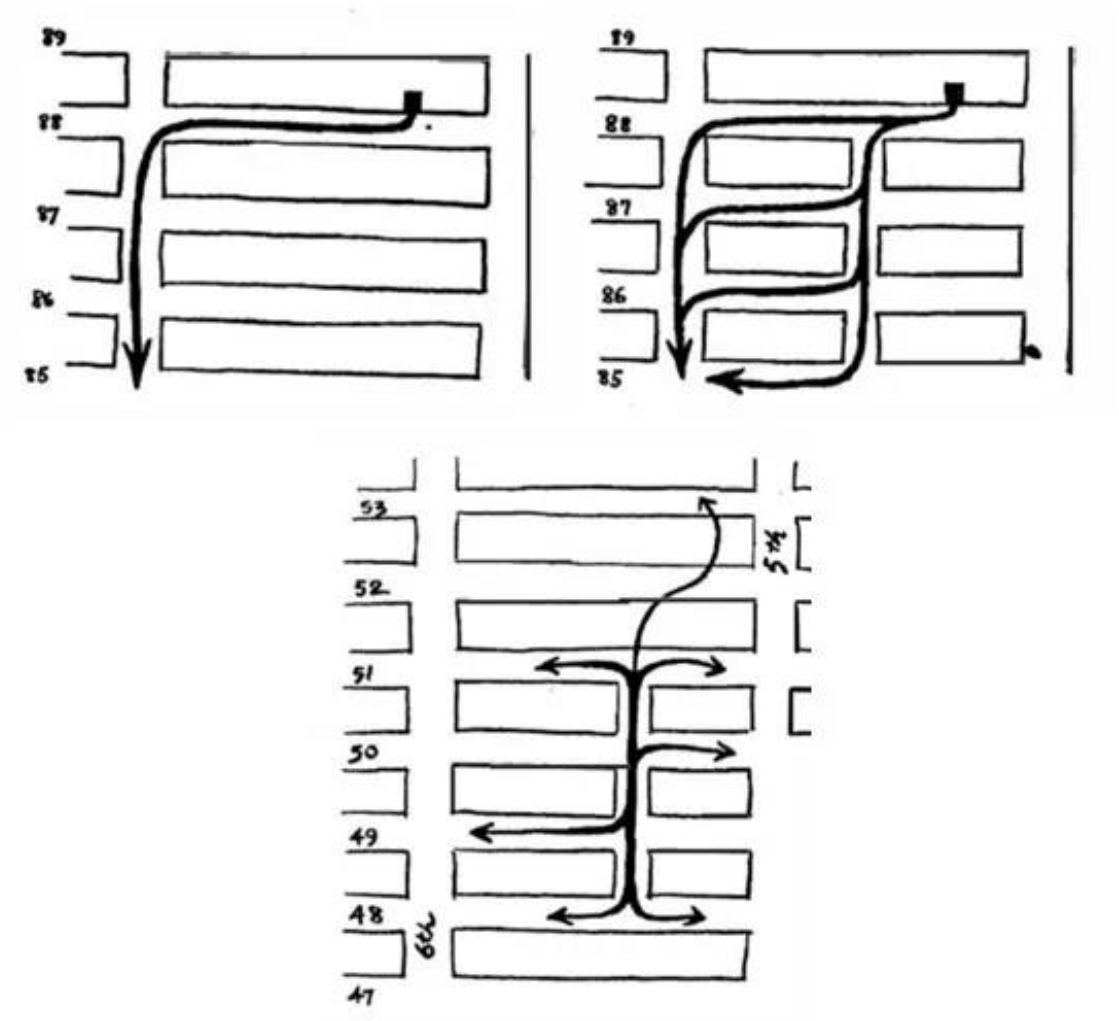



**Figure 25. Diagrams of Short Blocks in The Death and Life of Great American Cities. Jacobs, 1961**

Large block sizes effectively wall off any possibility of connectivity with the surrounding neighborhoods. However, intersection density is a more significant variable than street connectivity, as walkability may be limited even if connectivity is excellent when blocks are long. High intersection density and great street connectivity shorten access distances and provide more routing options for transit users and transit service providers (Ewing & Cevero, 2010). The City of Surrey has indicated in the 2017 OCP that intersection frequencies should occur between every 80 to 100 meters. In the study area illustrated in figure 26, intersection occurrences under 100 meters only happen once with the rarest instance occurring after 384 meters. Each of the intersections are

identified by the City of Surrey's COSMOS system with a yellow circle with an "x" in the middle.

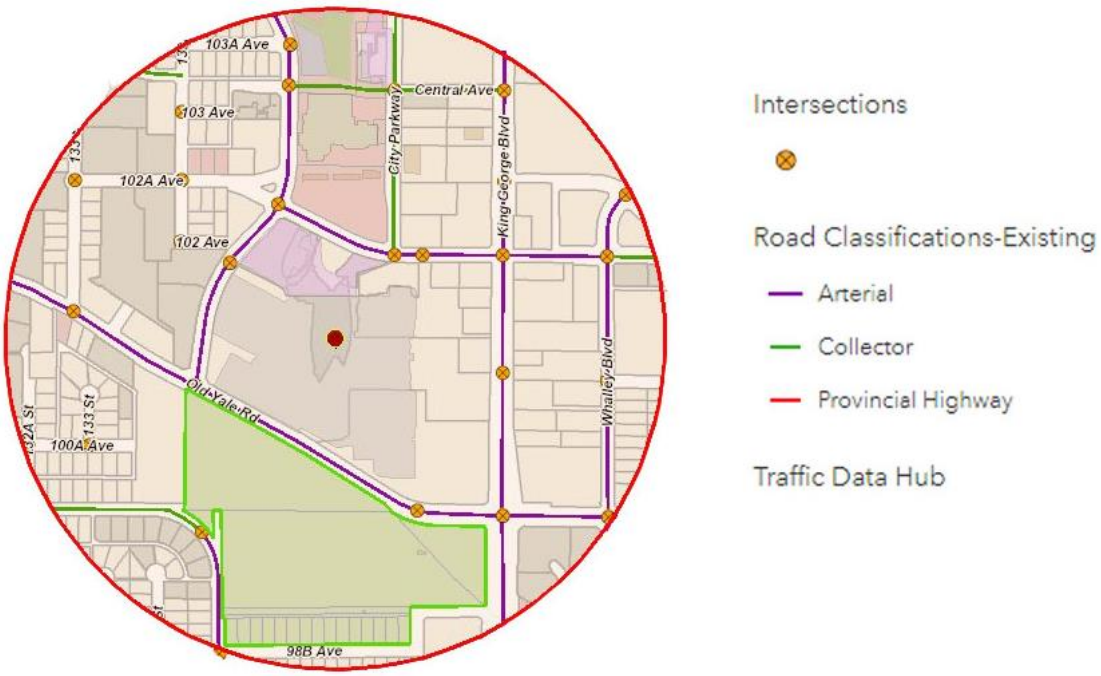



**Figure 26. Surrey City Centre Intersection Locations. Contains information licensed under the Open Government License – City of Surrey. Brad Ingram via COSMOS, 2023**

The website Walk Score is a tool used by realtors, renters, and residents to determine if an area they are interested in is walkable. The score provided allows a person to see how connected a neighborhood is to amenities such as transit, restaurants and other goods and services. Walk Score measures the walkability of any address using a patented system that analyzes hundreds of walking routes to nearby amenities. Points are awarded based on the distance to amenities in each category. Amenities within a 5-minute walk are given maximum points. A decay function is used to give points to more distant amenities, with no points given after a 30-minute walk (Walk Score, 2022). Walk Score also uses metrics discussed previously such as block length and intersection density. Once points are calculated, the area is given a score as shown in the chart below. In addition, Walk Score gives a transit and bike rating which identifies the effectiveness of the transit system and cycle network in a particular radius.

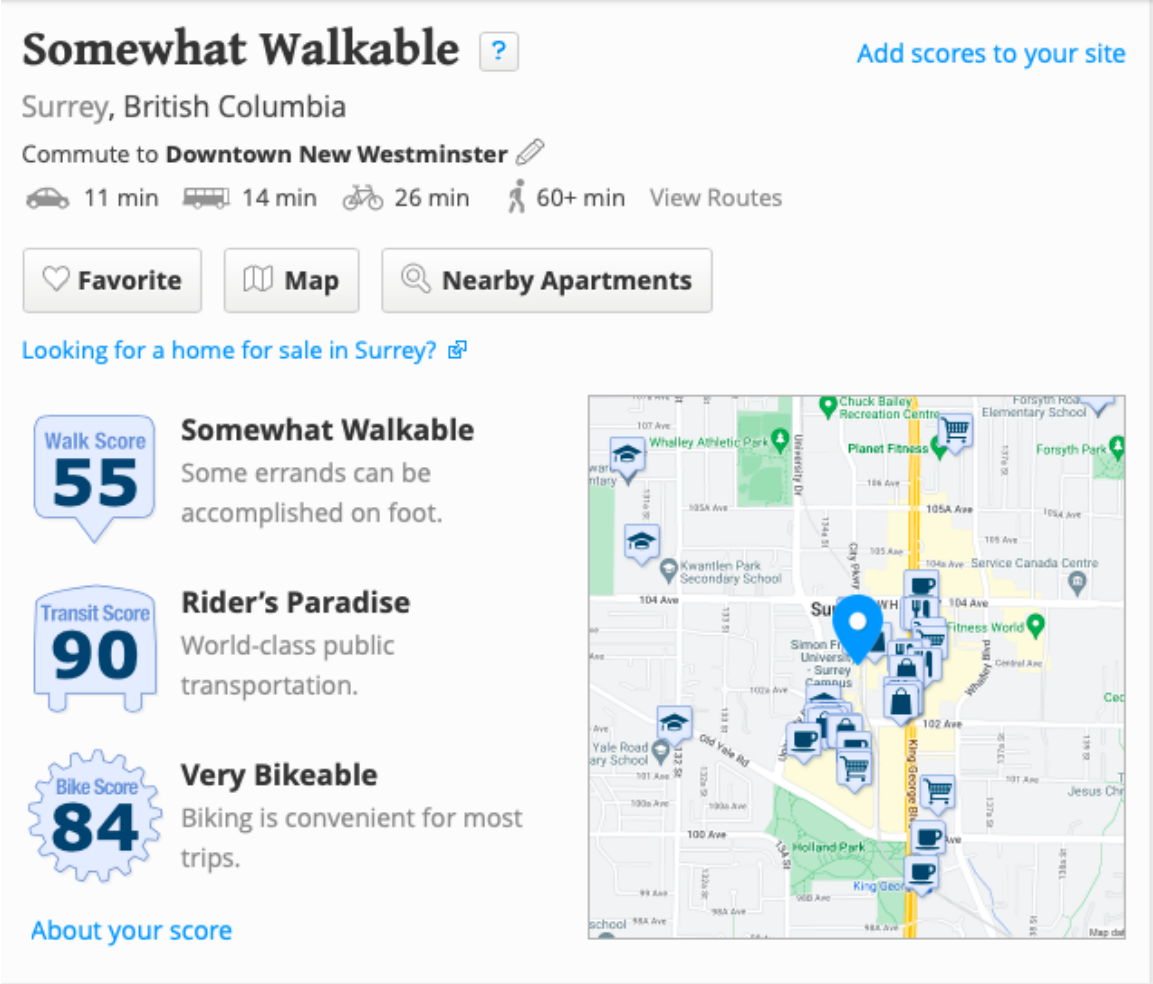
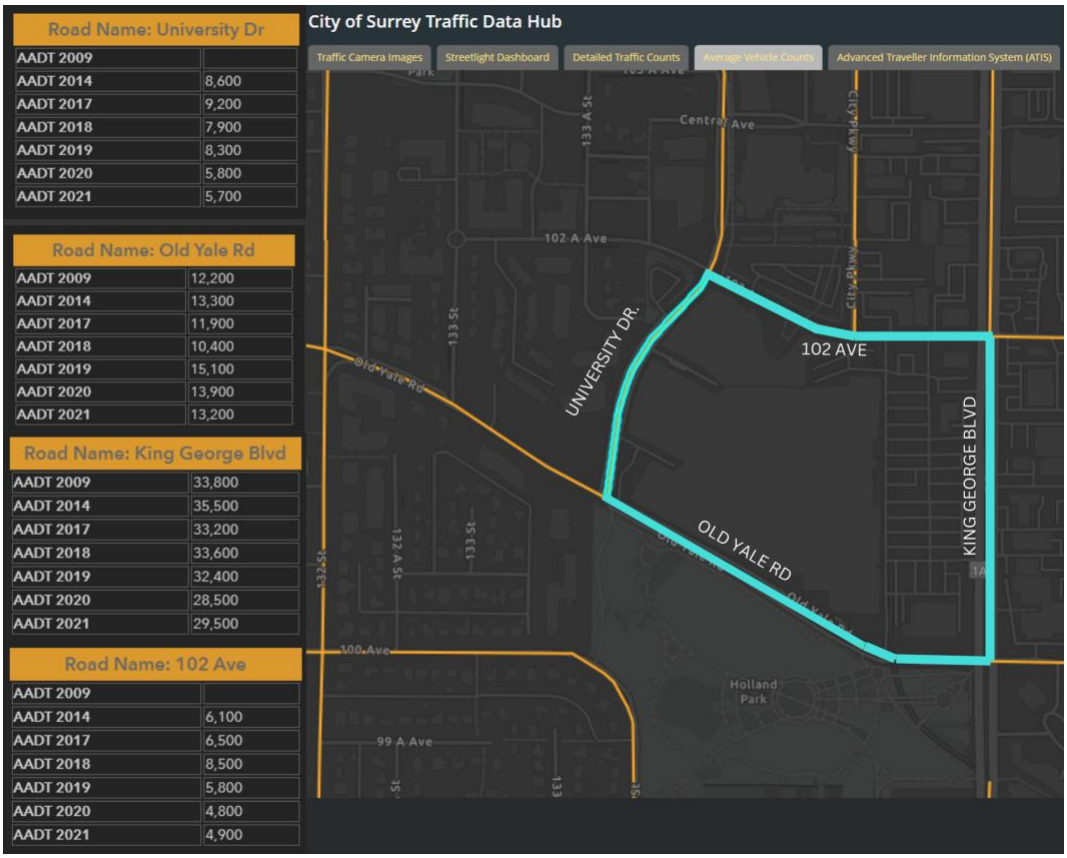



**Figure 27. Surrey City Centre Walkscore. Walkscore.com, 2022**

The walk score for the area immediately surrounding the Surrey Central Mall area is considered “somewhat walkable”, with a score of 55 out of a possible 100. The area scores well for transit with a 90 out of 100, and bikeability of 84 out of 100. Walk Score does not take into account condition, quality, or safety of walkable and bikeable routes analyzed - it simply records the possibility of a person walking or cycling a particular route.

## 4.2. Traffic and Accident Statistics

The Surrey Central City study area has significant roadways throughout, each with a minimum of four lanes and up to eight lanes. Vehicle traffic is a major obstruction for pedestrianized neighborhoods as it creates busy and unsafe spaces which should be addressed to allow a more walkable and bikeable neighborhood. Analyzing existing traffics patterns and accident statistics adds context to the understanding of improved connectivity and walkability, destination access and future connectivity and adaptability retrofitting principles. The two largest roadways bisecting the study area (King George Boulevard running north-south, and Old Yale Road running east-west) have substantial traffic of nearly 30,000 and 13,000 vehicles travelling as per the average annual daily traffic (AADT) counts respectively. University Drive and 102 Avenue are smaller roads




| Road Name: University Dr | |
|---|---|
| AADT 2009 | |
| AADT 2014 | 8,600 |
| AADT 2017 | 9,200 |
| AADT 2018 | 7,900 |
| AADT 2019 | 8,300 |
| AADT 2020 | 5,800 |
| AADT 2021 | 5,700 |

| Road Name: Old Yale Rd | |
|---|---|
| AADT 2009 | 12,200 |
| AADT 2014 | 13,300 |
| AADT 2017 | 11,900 |
| AADT 2018 | 10,400 |
| AADT 2019 | 15,100 |
| AADT 2020 | 13,900 |
| AADT 2021 | 13,200 |

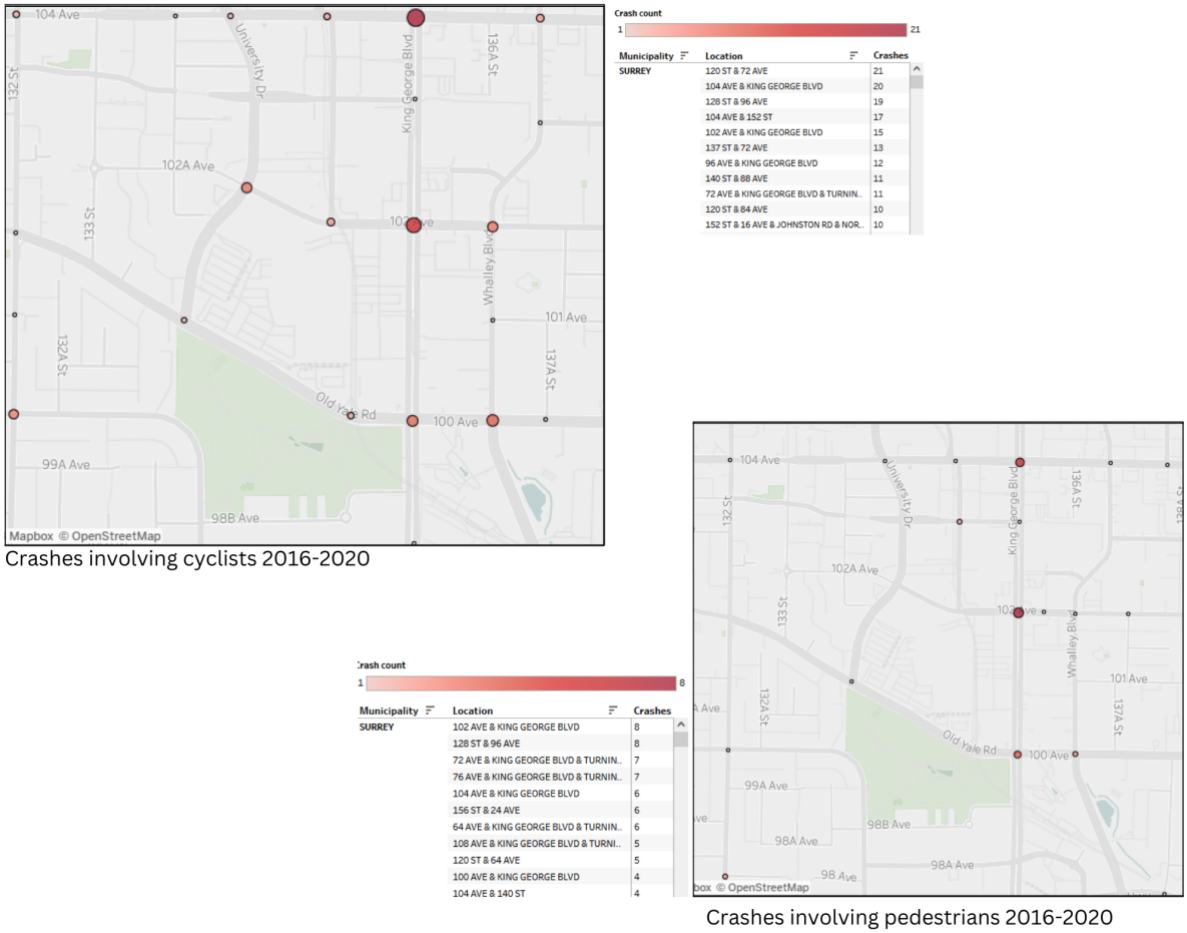
| Road Name: King George Blvd | |
|---|---|
| AADT 2009 | 33,800 |
| AADT 2014 | 35,500 |
| AADT 2017 | 33,200 |
| AADT 2018 | 33,600 |
| AADT 2019 | 32,400 |
| AADT 2020 | 28,500 |
| AADT 2021 | 29,500 |

| Road Name: 102 Ave | |
|---|---|
| AADT 2009 | |
| AADT 2014 | 6,100 |
| AADT 2017 | 6,500 |
| AADT 2018 | 8,500 |
| AADT 2019 | 5,800 |
| AADT 2020 | 4,800 |
| AADT 2021 | 4,900 |

**Figure 28. Surrey City Centre Traffic Data. Contains information licensed under the Open Government License – City of Surrey. Brad Ingram via COSMOS, 2023**

with four lanes each, but still see vehicle traffic at 5000 AADT (see figure 28).

Intersection densities, number of lanes and average daily traffic contribute to the frequencies of accidents between pedestrians, cyclists, and vehicles. As figures 29 and 30 illustrate, the number of accidents increases as intersection sizes and lanes increase. Between 2016 and 2021 the number of vehicle accidents at all intersections surrounding the study area is high, specifically along King George Boulevard. Pedestrian and cyclist accidents are correspondingly high in each of the major intersections along King George Boulevard and other intersections in the study area. This is likely due to an increased number of student and transit traffic travelling to the SFU Campus and the mall. Streets need to make pedestrians safe and comfortable, so it is important to slow traffic, which is best achieved by designing streets to make it feel dangerous to drive fast. This could be achieved by reducing lanes, increasing the separation of cycling lanes, increasing

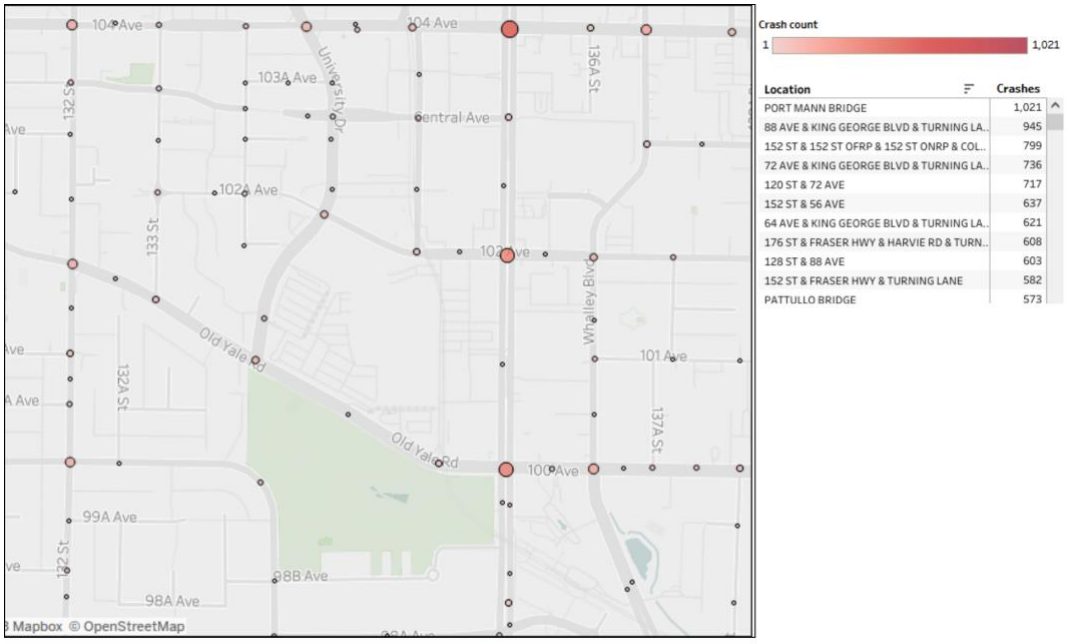


Crashes involving cyclists 2016-2020

Crashes involving pedestrians 2016-2020

**Figure 29. ICBC Traffic Accident Statistics. Contains information licensed under ICBC's Open Data Licence. https://www.icbc.com/about-icbc/newsroom/Pages/Statistics.aspx, 2023**

pedestrian pathway options, tight turns, restricted sight triangles and street edges full of objects (benches, trees, on-street parking) (Cleveland, 2023).




Total crashes involving property damage and casualties 2017-2021

**Figure 30. ICBC Traffic Accident Statistics. Contains information licensed under ICBC's Open Data Licence. https://www.icbc.com/about-icbc/newsroom/Pages/Statistics.aspx, 2023**

## 4.3. Protected Bike Path Network

A well connected, unbroken, and protected cycling network is an indicator of how pedestrian friendly an area is. Cycling provides a person another mode of transport option that may remove a car from the road if they had otherwise driven. Successful retrofitting projects will include good walkability as discussed in the previous section, but safe cycling pathways can be just as important. Walking paths need to be easy, safe and convenient; the equivalent is true for cycling paths. Ideally, cycling paths are given their own section on roads, with painted markings and barriers to vehicle traffic to provide safe and efficient routes for cyclists. Protected bike pathways can indicate physical barriers to vehicle traffic or completely independent paths from motorized vehicles. Protected bike lanes provide a more comfortable bicycling experience than conventional bike lanes. Studies also indicate that protected bicycle lanes may be dramatically safer than basic bike lanes, with only one-ninth the risk of comparable streets (Zimmerman &

Kramer, 2013). Figure 31 shows the limited protected cycling network in the 500-meter study area; painted bike lanes are indicated in red, while protected bike lanes are shown in blue. The protected cycling network is sporadic in this area, the locations indicated in blue only occupy a small number of streets at Whalley and 101 Ave, a few streets in the northwest section of the map and 102 Ave and Whalley Boulevard. The east end of 102 Ave on the map provides a good example of how a single development has constructed a segment of excellent protected bike path, but only for a short distance before a cyclist is forced back onto the road with vehicle traffic and no barriers at King George Boulevard.

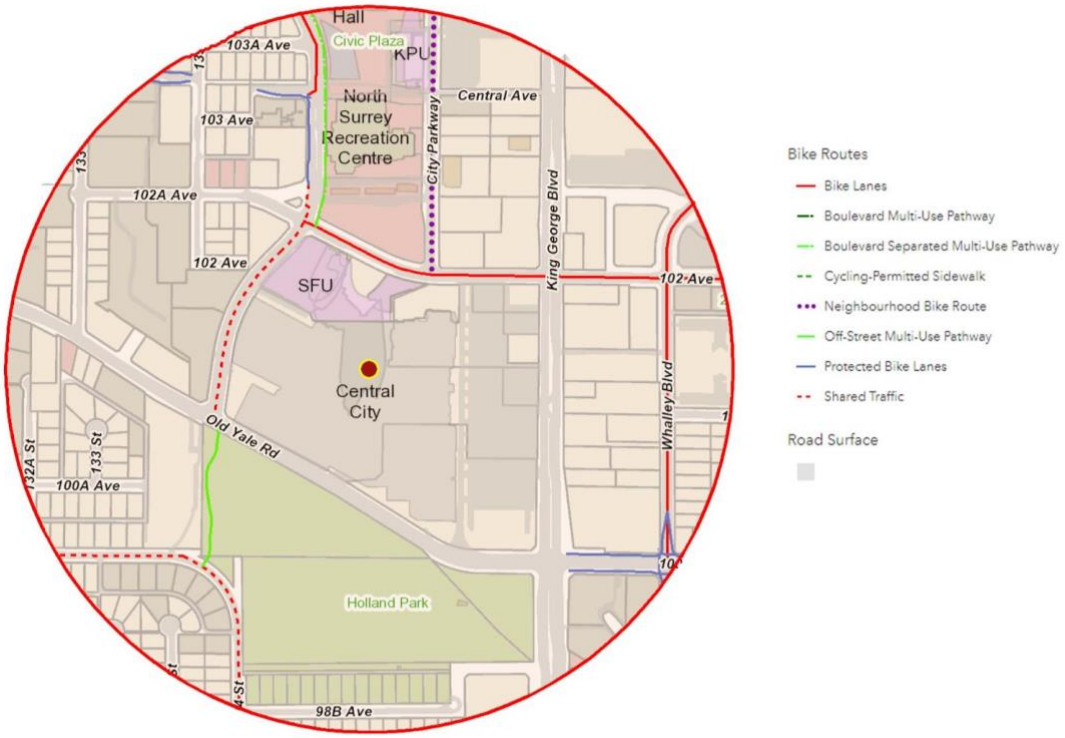



**Figure 31. Surrey City Centre Bike Routes. Contains information licensed under the Open Government License – City of Surrey. Brad Ingram via COSMOS, 2023**

## 4.4. Land Use and Residential Density

Surrey Central City and the surrounding 500 meters is now largely zoned for much higher densities than in the past. The zoning map (figure 32) provides a visual map for Surrey's plan to accommodate a potential of 10,000 residents by 2043 in the

new downtown. Within figure 32, the mall area and municipal buildings to the north form a new central business district shown in dark blue, and mid to high rise mixed use residential shown in purple and pink. Brown indicates the surrounding suburban single family, town house, and small apartment building developments. The pink areas indicated to the right of King George Boulevard currently exist as the old strip mall commercial areas that made up the business area of the original suburban neighborhood. The area is now zoned as either mid to high rise residential or mixed-use high rise, reflecting Surrey's desire for much higher densities than in decades past. The turquois strip running from the Surrey Central City entry plaza towards City Hall to the north (outside the study area) illustrates the municipal desire to connect the new central business district through a connected plaza network that is yet to be completed.

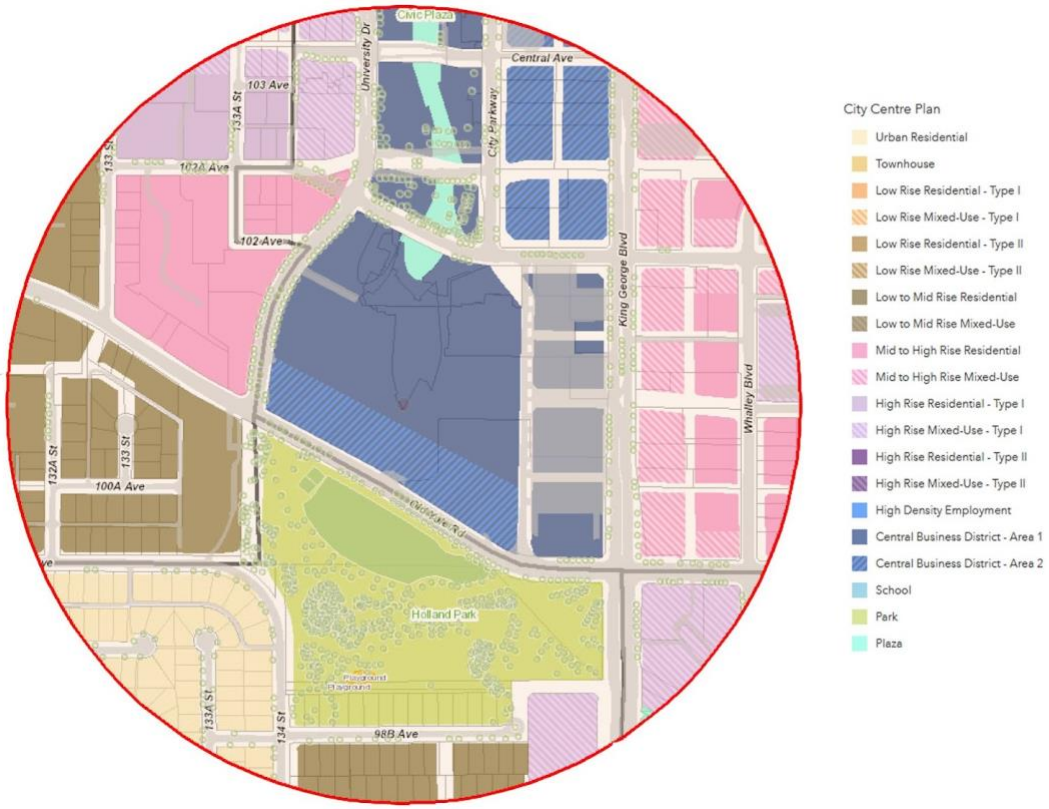



**Figure 32. Surrey City Centre Land Use Map. Contains information licensed under the Open Government License – City of Surrey. Brad Ingram via COSMOS, 2023**

## 4.5. Population Growth

The population of Surrey City Centre has grown from 28,280 in 2011 to 47,820 in 2021 (Canada Census, 2021). Population projections predict the downtown City Centre population growing to 127,650 by 2051 (City of Surrey, 2021). The population growth of the City Centre has outpaced the growth of the rest of Surrey by seven percent from 2011 to 2016. The City Centre area was once dominated by single family housing, but as of 2016 only fifteen percent of the area contained single family housing with the remainder being low-and high-rise dwellings (City of Surrey, 2016). The rapid population growth this area is experiencing, and is predicted to continue into the future, is contributing to traffic and pedestrian congestion, highlighting the need for more intervention from the government to achieve the goals outlined in the OCP.

## 4.6. Summary

The secondary data analysis illustrates the current and past conditions surrounding the Surrey Central City study area and depicts an area in need of more intervention to create the walkable and lively neighborhood the City of Surrey illustrate in their plans for downtown. There are some positives such as good transit and rezoning creating the potential to meet Surrey's goals and objectives in the future; however, at the time of this study, the analysis shows that large block sizes, multi-lane roadways, inconsistent sidewalks and cycling lanes maintain the suburban fabric of the area that has persisted for decades.

# Chapter 5. Urban Design Inventory Analysis

## 5.1. Findings

Table 7 summarizes the items catalogued during the IMI data collection stage and how often each item occurred. Table 7 also condenses the 99 questions into their respective categories, organized by domain. The average occurrence was calculated by taking the number of items observed in each category over 15 segments and dividing by the total number of items tested in that category. For example, “bicycle lanes” in the domain of accessibility represents 2 items tested across 15 segments for a total of 30 tests. This resulted in a 30 percent observed bicycle lane occurrence in the 500-meter study area. Table 7 also allows for easy cross referencing of the findings, and access to which items were prevalent or not during the data collection. Table 8 shows the summary of findings and compares them with corresponding domains introduced previously and the literature discussed in the conceptual framework. Each domain and its corresponding findings are discussed in more detail following table 8.

## Table 7. IMI Item Occurrence Over 15 Segments. Brad Ingram (2023)

**Summary of item occurance findings in Irvine Minnesota inventory**

| Domain | Category | Number of items tested over 15 segments | Total Number of items on final inventory over 15 segments | Average occurance in final inventory ( %) over 15 segments |
|---|---|---|---|---|
| Accessibility | Neighborhood Identification (beginning of segment) | 1 | 15 | 1 of 15 = 0.6 |
| | Neighborhood Identification (end of segment) | 1 | 15 | 1 of 15 = 0.6 |
| | Street Crossings (beginning of segment) | 15 | 225 | 70 of 225 = 31.1 |
| | Street Crossings (end of segment) | 15 | 225 | 70 of 225 = 31.1 |
| | Bicycle Lanes | 2 | 30 | 9 of 30= 30 |
| | Sidewalk Amenities | 6 | 90 | 13 of 90= 14.4 |
| | Sidewalks | 9 | 135 | 44 of 135= 32.5 |
| | Mid-block Crossings | 6 | 90 | 7 of 90= 0.7 |
| | Steepness | 1 | 15 | 0 of 15= 0 |
| | Parking Structures | 1 | 15 | 2 of 15= 13.3 |
| | Garage Doors facing the Street | 1 | 15 | 5 of 15 = 33.3 |
| | Prominance of Garage Doors | 1 | 15 | 5 of 15 = 33.3 |
| | Driveways | 1 | 15 | 11 of 15= 73.3 |
| Amenities | Banners | 1 | 15 | 1 of 15 = 0.6 |
| | Street Characteristics | 4 | 60 | 26 of 60= 43 |
| | Views | 1 | 15 | 1 of 15= 0.6 |
| | Residential | 5 | 75 | 18 of 75= 24 |
| | School | 4 | 60 | 3 of 60= 0.5 |
| | Public Space | 2 | 30 | 4 of 30 =13.3 |
| | Recreational/Leisure/Fitness | 3 | 45 | 1 of 45 = 0.6 |
| | Public/Civic Building | 4 | 60 | 1 of 60 = 0.6 |
| | Institutional | 3 | 45 | 0 of 45= 0 |
| | Commercial | 6 | 90 | 14 of 90= 15.5 |
| | Office/Service | 3 | 45 | 3 of 45 = 0.6 |
| | Industrial | 3 | 45 | 1 of 45 =0.2 |
| | Transportation | 2 | 30 | 3 of 30= 10 |
| | Other | 5 | 75 | 5 of 75= 0.6 |
| | Distinctive Retail Types | 4 | 60 | 7 of 60= 11.6 |
| | Other Land Uses | 4 | 60 | 1 of 60= 0.16 |
| | Gathering Places | 6 | 90 | 10 0f 90= 1.1 |
| | Nature Features | 8 | 120 | 2 of 120= 0.16 |
| | Architecture/Design-Historic Buildings | 1 | 15 | 0 of 15 = 0 |
| | Barriers | 7 | 105 | 0 of 105= 0 |
| | Street Trees | 2 | 30 | 18 of 30= 60 |
| | Buildings with 1-2 Storys | 1 | 15 | 7 of 15= 46.6 |
| | Building with 3-4 Storys | 1 | 15 | 1 of 15= 0.6 |
| | Buildings with 5 or more Storys | 1 | 15 | 3 of 15= 20 |
| Maintenance | Windows With Bars | 1 | 15 | 0 of 15=0 |
| | Buildings with Blank Walls | 1 | 15 | 3 of 15= 20 |
| | Neutral Maintenance | 1 | 15 | 8 of 15= 53.3 |
| | Good Maintenance | 1 | 15 | 3 of 15= 20 |
| Safety | Lighting | 1 | 15 | 13 of 15= 86.6 |
| | Freeways | 1 | 15 | 0 of 15= 0 |
| | Traffic Features | 9 | 135 | 24 of 135= 17.7 |
| | Other Features of the Segment | 3 | 45 | 1 of 15 = 0.6 |
| | Many People Present | 1 | 15 | 4 of 15= 26.6 |
| | A Few People Present | 1 | 15 | 7 of 15= 46.6 |

* 0 answer = did not occur

**Table 8. IMI Summary Findings. Brad Ingram (2023)**

| DOMAIN | CATAGORIES | LITERATURE GUIDELINES | FINDINGS |
|---|---|---|---|
| ACCESSIBILITY | LAND USE | Diverse use of land including retail, housing, parks, plazas, multi-functional urban streets, and well integrated transit all easily accesible within walking distance | The area is majority single and multi family residential with pockets of single story commercial. The area lacks multi-functional urban streets and is mostly divided by land use type. |
| | PUBLIC SPACE | Public space is key for providing leisure, community, identity. The spaces allow people to relax, play sports, shop and take part in community events. | The neighborhood is mostly dedicated to vehicle uses and lacks smaller public spaces which could allow for easier access. Holland Park does provide a large area for recreational sports and leisure but could be better connected to the surrounding areas. Barriers such as major 6 lane roads border two sides. |
| | COMPLETE INFRASTRUCTURE | Continuous infrasturcture such as barier free bike lanes and complete sidewalks scaled appropriatly are essential for encouraging alternate modes of transportation other than cars. | While bike lanes do exist, dedicated lanes are often broken up or only partially divided from major road networks. While sidewalks are generally in good repair, they are often narrow and only found on one side, limiting easy access. |
| AMENITIES | ENVIRONMENT | Environmental repair, rehabilited creeks, regreening of reclaimed areas, bioswales rain gardens and green roofs are important in creating healthy environmental urban areas | Holland park is the major area of green space in the Surrey Central City area. While there are some green spaces they modtly consist of grass lawns. Future developments could provide more bioswale areas, green roofs and regreening through innovative urban design. |
| | PUBLIC AMENITIES | Creating inviting spaces at the human scale are part of place making. Street trees, outdoor restaurants, public seating public art, wide sidwalks and special pavements add to the quality of spaces | The area consists mostly of older residential and commercial areas which have given little thought to the pedestrian and are mosstly vehicle focused. Some new areas surrounding the SFU campus have provided wider sidwalks, seating areas and public art. Future projects should focus on human scaled activities and activating sidewalks for better quality spaces. |
| | PARKING | Eliminating surface parking lots and creating parking that is underground or contained in well designed parking garages helps create pedestrianized urban areas | Parking surface lots are a major feature of the area. Street parking is permitted on most streets. Most newer developments have underground parking. Incorporating more parking underground or in well designed parking garages will make better human spaces. |
| MAINTENANCE | CONDITION | Keeping infrastructure well maintained; free from significant damage encourages people to use them. Keeping buildings well maintained and the streets clean add to a places vitality | Most of the area is maintained in a usuable condition, however many sidewalks are old and narrow. Most buildings are in good condition with pockets of older more run down buildings. Some of the newer buildings add to the areas vitality. |
| | LIGHTING | Well lit streets add to an areas functionality after dark and an element of saftey. Light can be used in unique ways to create a sense of place and destination for community. | Basic street lighting is present in the majority of the area. Future development could use innovative and artistic forms of lighting to create interest. |
| SAFTEY | SAFE CROSSINGS & CONNECTIONS | Well lit and frequent marked crossings help to create a pedestrian focused and walkable neighborhood. People can move more easily from one place to another. | Marked crossings were at most major interesections, but large block sizes in some areas did not have mid block crossings. Older residential areas had many non connected streets making walkable connections difficult. |
| | TRAFFIC CALMING | Round abouts, curb extensions, speed bumps are traffic calming measures that help to slow the rate of traffic creating a less noisy and calming affect to the area | The majority of roadways are multi-lane and vehicle dense. Other than traffic lights there is little to slow traffic with the exception of speed bumps in front of the Surrey Central Mall area. Traffic calming measures and lane reductions would benefit the area. |
| | PEDESTRIAN ONLY AREAS | Removing vehicles completely from specific areas creates pedestrian focused areas where community events and social activities are not inhibited by cars. | The plaza in front of Surrey Central City is one of the few areas that are pedestrian only. Future developments could create a larger focus on pedestrian only events and activities which would enhance the area significantly |

## 5.1.1. Accessibility

Retrofitting suburbia principles focused on built environment features linked to accessibility include land-use mix, places for exercise and activity, integration of uses, public transportation, street patterns, slope of streets and walkways, and physical barriers and amenities for walking or cycling (Day et al., 2006). The accessibility domain was assessed by cataloguing land uses, public spaces, and completeness of existing

infrastructure. The retrofitting principles of improved connectivity, placemaking, destination access and human scale and density can be measured though the IMI questions aimed at documenting the existence of physical features that directly relate to those principles.

The presence of large super blocks in the study area creates an accessibility challenge, forcing pedestrians to travel much further when traveling on foot. Many of these large blocks do not have mid-block crosswalks, forcing long walking distances or dangerous jaywalking, with mid-block crossings only present 23% of the time. Older residential areas still have cul-de-sacs and unconnected streets, and sidewalks are often only present along one side of the street creating additional challenges for people with disabilities. Many existing cycling lanes consist of a mixture of divided, partially divided, and painted indications on the street; however, the bicycle lane network is not yet consistent nor is it well connected making it inconvenient for cyclists. The findings show under 40% of streets had sidewalks or cycling lanes. Public space is mostly limited to these pedestrian walking or cycling areas while the majority of the space is devoted to vehicle traffic. Though the study area has some diversity of land use types, it is also largely single use, which can be seen in the many strip malls and large commercial only areas. Many shops and services are spread out over large areas with vast parking lots in between, making a vehicle more convenient than walking on foot while visiting multiple locations in a single trip.

The Surrey Central Mall neighborhood is undergoing significant changes, however at the time of this study it consists of a mix of residential housing typologies, some office space, low density commercial mostly located in spread out strip malls and a large shopping mall containing the SFU campus. This diversity could appeal to a broad population. A variety of residential options and employment opportunities provide the area with good accessibility to both live and work for those who have little or no commute. The SkyTrain and transit centre offers good accessibility for transit located near Surrey Central Mall. However, it could still benefit from better integration with the ground plane. Currently, transit users must traverse a large surface parking lot to reach the mall and descend a several storey station.

### 5.1.2. Amenities

Accessibility of amenities addresses the needs and wants of local residents by providing built environment features that enhance the form and function of a neighborhood. Accommodating human needs in ways that increase the livability of an area is an important factor in retrofitting a suburban area. For example, the presence of street vendors or the availability of outdoor dining addresses the need to eat while also increasing urban vitality (Day et al., 2006). Amenities are defined as shops, restaurants, parks, civic buildings, and other places that provide goods and services. In the Irvine Minnesota Inventory amenities are catalogued across 77 questions, identifying the presence of particular amenities that are related to the retrofitting principles of adaptive re-use of existing buildings, human scale and density, revised zoning, environmental repair, placemaking, quality architecture and destination access. The Surrey Central Mall area provides a significant number of amenities, since the mall was retained, and the area previously had significant commercial activity which has also been maintained. Holland Park provides an extensive park space while the commercial areas provide plenty of restaurants, shopping, and services.

While these amenities do exist, they are compartmentalized into specific areas mostly consisting of single land uses. Available amenities are often spread out over large areas and setback from large surface parking lots. When examined in isolation, the Surrey Central Mall itself provides a good mix of goods and services located in a relatively centralized location. However, because it is surrounded by surface parking lots and bordered by wide six lane roads, the effect on the surrounding area can be limiting for accessibility. It is not enough that amenities exist, architectural variety of various amenities is also an important factor in the quality of spaces. The juxtaposition of different appearances can contribute to a sense of place, making for more interesting sensory experiences and greater feeling of identity for individuals and for a community (Sim, 2019).

### 5.1.3. Maintenance

The condition of the built environment can enhance or diminish the quality of a neighborhood. In places where the built environment has deteriorated and is not maintained, people are less likely to travel to or through. The IMI identifies these areas

with questions on condition, the prevalence of vacant lots, amount of litter, and presence of graffiti. These questions help establish the current conditions of the study area and can be linked to the retrofitting principles of environmental repair, quality architecture, placemaking, environmental repair, and destination access. The study area has a wide variety of buildings and infrastructure in various stages of maintenance and condition. The observational data collection noted that the majority of the built environment was of neutral condition, meaning that it was neither well maintained nor poorly maintained. Maintenance was determined by observing if any aspect was crumbling or in need of repair. The area is undergoing significant redevelopment and has several new buildings, sidewalks and other features that are in excellent condition and are well maintained providing quality urban environments. Many areas are old, of poor-quality construction and have not been well maintained adding to a deteriorated and dated quality. 13.3% of the buildings along the segments were noted to have blank walls creating monotonous and uninviting streetscapes. The condition of some of the spaces is the likely a reason few pedestrians are noted during the data collection phase of this study.

### 5.1.4. Safety

Safety is determined by a number of factors in the IMI, mainly perceived safety from traffic and perceived safety from crime. Perception in the context of this study is based on physical attributes that have the ability to provide safety. However, safety features can be ignored by carelessness of individual human behaviors, and psychological safety is not considered in this study as it was considered too subjective and therefore removed. Built environment features linked to perceived traffic safety include features that create physical barriers to high traffic speeds (e.g., low speed limits, angled parking); features that divert vehicle traffic from a setting (e.g., cul-de-sacs, neighborhood entry monuments that discourage through traffic in residential areas); features that allow safe street crossing for pedestrians and cyclists (e.g., stop and yield signs, curb bulb-outs); features that separate pedestrians and cyclists from vehicles (e.g., bike lanes, sidewalks); and features that increase the interaction of pedestrians and cyclists with drivers, thereby encouraging drivers to pay greater attention (Day et al., 2006).

The IMI catalogued individual physical features that pertain to safety such as barriers, cul-de-sacs, bike lanes, street lighting and signage. As noted previously, the

data suggests that though cycling lanes are present they are not well connected nor are they consistently divided. This means that safety barriers are inconsistent and could discourage a cyclist from using the lanes. The same is also true for consistency in sidewalks - they are often present, but typically observed only on one side of a street and pedestrians are either forced to walk lengthy distances to cross streets or walk on muddy or grassy terrain. The lack of mid-block crossings also presents a safety challenge as jaywalking increases on larger blocks. There are few traffic calming measures such as speed bumps or curb bulb-outs to slow the rate of traffic, which means traffic travels at a higher rate than the posted speed through the area. Multi-lane roads, some as many as six lanes, also present a challenge for pedestrians and cyclists since it encourages traffic to travel at higher rates of speed and as noted previously, there are many pedestrian vehicle accidents in the areas where large roads intersect with pedestrian traffic. Each of these safety features relate to the retrofitting principles of improved connectivity, placemaking and quality architecture.

## 5.2. Summary

At the centre of the study area is Surrey Place Mall, a redevelopment through retrofitting that is successful in many ways: the reclamation and reinvigoration of a dying mall, the addition of a university campus, offices, and a SkyTrain station. The mall has been thoroughly repositioned from a stand-alone, auto oriented, closed-in windowless box to a fully-engaged participant in a transit-oriented mini-city, illustrating the potential to approach suburban retrofitting as part of a new synergistic world (Dunham-Jones & Williamson, 2011). The results from the IMI show that the built environment of the Surrey Central City study area has many of the elements that are encouraged in a suburban retrofitting project such as a variety of land uses and amenities, sidewalks, cycling lanes, and transit accessibility. Nonetheless, these elements are often incomplete or not easily accessible in the 500 meters surrounding the mall. Ease of movement can be problematic when pedestrian modes of transportation are interrupted or of poor quality. Safety from traffic is a major concern since large roadways wrap around and through the 500-meter area studied. These issues do not create a built environment that encourages walking or cycling, which is a key principle of a retrofitting project. The map below illustrates the most common features found on each segment surveyed during the IMI.

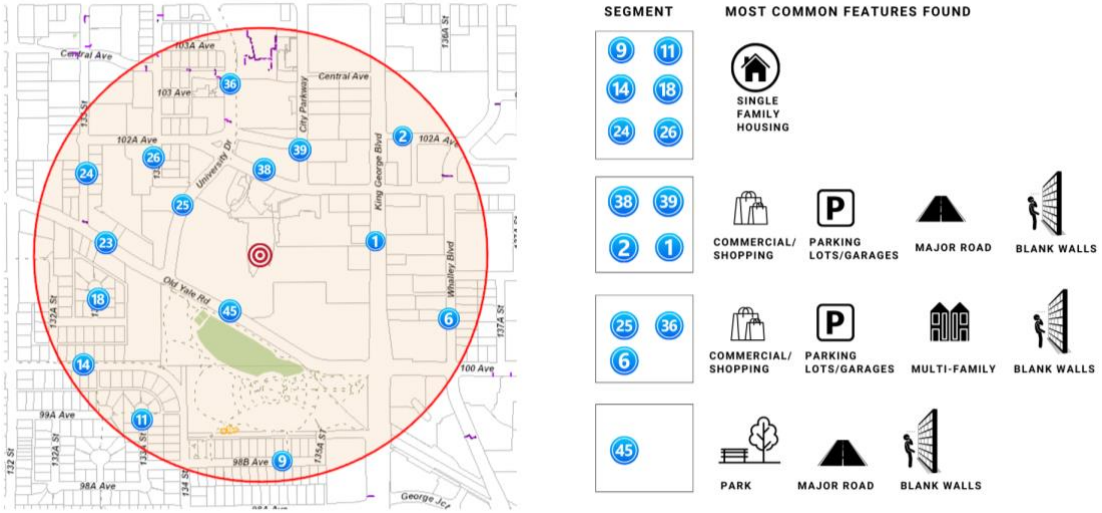



**Figure 33. Most common features found during the IMI. Brad Ingram**

The IMI has shown that many of the features discussed in the retrofitting principles introduced in chapter two are missing or sporadically represented. There is significant room for improvement in each of the four domains to be able to consider the Surrey Central Mall retrofitting project a success within the larger neighborhood-built environment and retrofitting principles.

# Chapter 6. Design Discussion

The redevelopment of the Surrey Place Mall encouraged the City of Surrey to re-evaluate their Official Community Plan (OCP) for the downtown area after observing the original plans were not being implemented in the way planners had intended. The mall's redevelopment has had a positive impact over the last couple of decades on the surrounding area by encouraging new development, better transit connections, and more pedestrianized areas. The goals and objectives of the OCP reflect the municipal desire to promote many of the same ideals of retrofitting principles such as well-developed pedestrian and cycling networks, mixed-use zoning, walkability, and quality architecture. However, many goals and objectives stated by the City of Surrey still only exist on paper for the future.

There are several similarities between the eight objectives outlined in the Surrey City Centre Plan discussed in chapter one and the eight principles of retrofitting suburbia. These similarities and the findings from the IMI assessment are summarized in table 9 and discussed in each principle.

**Table 9. Comparison of Surrey City Centre Plan and Retrofitting Principles. Brad Ingram 2023.**

| 8 Guiding Principles of the Surrey City Centre Plan (2017) | Corresponding Principles of Retrofitting | Analysis of Existing Conditions |
|---|---|---|
| An Animated City Centre | Improved Connectivity and Walkability | Walkability is a requirement of an animated city centre. While some newly developed areas are providing better walkability, the area still consists of large blocks and major high-speed roadways. The study area is still in need of improvements to consider it an animated area |

| | | |
|---|---|---|
| Housing Diversity | Quality Architecture | Quality architecture is not only about providing buildings that have great curb appeal. Architecture that performs multiple functions such as providing social spaces, commercial spaces, and homes. Housing diversity provides adaptability for future populations in a rapidly densifying city centre. The study area consists of single-family homes to high-rise condo buildings but could use more middle housing such as town homes or low-rise buildings that are creatively mixed to provide quality architectural environments. |
| Smaller Blocks | Human Scale and Density | Street typology creates a hierarchy of streets and lanes that break up larger blocks into smaller more inviting for pedestrians. The study area needs more street layers to break up blocks that are still too large |
| Multi-modal Transportation | Destination Access | Quick, easy transportation on foot, by train, bus, cycling lanes or car creates a network of improved connectivity for all modes of transport. The study area does well in transportation due to a SkyTrain line but lacks in well-connected streets and bike lanes |
| Greening the Downtown | Environmental Repair | Environmental repair is essential for greening the downtown, there is still a lot of work to do to reclaim vast areas of paved surface. Holland Park does provide a large green area; however, it would be beneficial to disperse more green space throughout the downtown |
| Employment | Revised Zoning | The development of Surrey Central City ushered in diverse employment opportunities over top of a formally single use building. The city has done well rezoning more mixed-use zones into the study area, however, new developments have yet to take advantage of this new zoning. |

| | | |
|---|---|---|
| Sense of Place | Placemaking | Placemaking aims to create places that invite greater interaction among people while fostering healthier and more economically viable communities (Madden, 2011). Placemaking provides a sense of place to those who live and visit the community. |
| Vibrancy | Adaptive Re-use of Existing Buildings | Adapting and re-using older building to create new vibrant spaces is a sustainable and environmentally friendly way to make the existing infrastructure perform functions it never had in the past. Surrey Central city is an example of utilizing an old mall and converting it into a vibrant place, with plazas and social spaces. |

The following section provides further discussion of the physical structure of the area alongside secondary data findings.

As development continues to occur in and around the 500-meter study area, an opportunity exists to address failures and weaknesses which would help a stand-alone retrofitting project such as Surrey Central City be more successful in its integration with the surrounding area. Below, I further evaluate the current built environment based on the evidence collected through secondary data and observation through the lens of eight retrofitting principles introduced in the conceptual framework: adaptive reuse of existing buildings, environmental repair, revised zoning, improved connectivity, quality architecture, placemaking and pedestrian focus, destination access and human scale and density. Examples (or lack) of each principle were identified in the study area and are discussed in more detail below.

## 6.1. Adaptive Re-use of Existing Buildings

Adaptive reuse is the recycling of existing buildings into new uses. Reuse is the most sustainable way to create new infrastructure and it is more environmentally responsible (Dunham-Jones and Williamson, 2011). The Surrey Central City mall is a large-scale example of adapting and reusing an existing building, transforming from a sprawling suburban mall surrounded by vast parking lots into a vibrant mixed-use centre

complete with transit. The mall was the only example noted of adaptive re-use during the IMI survey of existing infrastructure. Figure 34 shows the new expansive public plaza area, and Figure 35 shows the transformation of the rear side of the mall with the new office tower and parking structure.

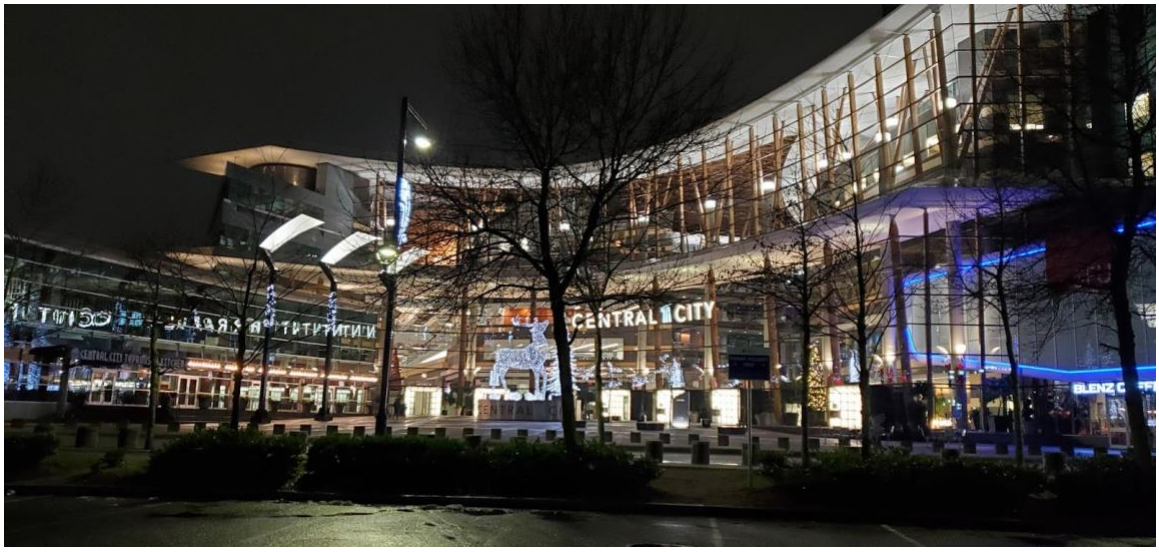



**Figure 34. Surrey Central City Plaza © Brad Ingram, 2022**

**Figure 35. Surrey Central City Parking Structure © Brad Ingram, 2022**

Strip malls are common surrounding the Surrey Central City area and could provide opportunities for adaptive reuse without significantly changing the overall structure or parking lots while adding opportunities to linger on outdoor patio seating, new planting, and bright paint or art create more vibrant communities (Dunham-Jones &

Williamson, 2011). Figure 36 illustrates the extensive number of strip malls and single use buildings shown in red that exist in the 500 meters around the Surrey Central City mall available for potential adaptive re-use.


**Figure 36. Strip Malls & Single-Use Buildings Around Surrey Central City © Brad Ingram via Google Maps, 2022**

The typical condition of the spaces found between strip malls and buildings (see Figure 37) presents a unique opportunity to adapt, reuse, and take advantage of the spatial configurations of the existing area. During the IMI survey, parking structures made up 13.3 percent of the area, and another 27.8 percent contained retail and other single use commercial buildings. Given that these spaces are abundant, they make for great candidates for adaptive re-use. Figure 38 shows a rendered example of the possibilities of converting strip mall spaces into vibrant mixed-use destinations. Strip mall interventions are a unique method of retrofitting that could be utilized in place of rezoning for large high-rise developments.

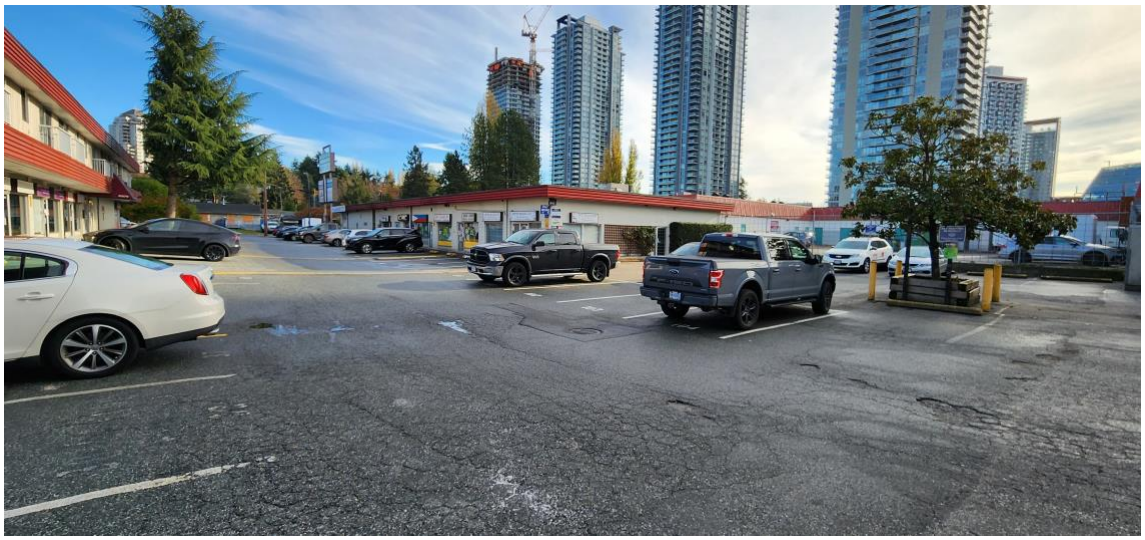


**Figure 37. Typical space between strip malls and single-use buildings © Brad Ingram, 2023.**

**Figure 38. Strip Mall Conversion Opportunities. https://www.citizen-times.com/story/news/local/2019/01/15/asheville-mall-redevelopment-project-heads-city-council/2568245002/, 2019.**

The Surrey Central City study area contains the retrofitted mall which provides an exemplary model of adaptive re-use; however, the surrounding area remains as it has existed for decades or is already cleared in some lots for high rise developments completely disregarding the potential of re-use and adapting existing infrastructure. It should be noted that the cost of reusing existing buildings or adapting older

infrastructure can be more costly than building new, so projects should be encouraged through municipal incentives to encourage more adaptive reuse in new development.

## 6.2. Environmental Repair

Environmental repair means removing constructed surface and rehabilitating the earth underneath through the installation of parks, repairing creeks and creating a place for plant life to exist. Regreening is a concept rooted in the reclamation of previously developed land into carefully designed landscape engineering projects which manage stormwater runoff with bioswales, rain gardens and green roofs (Dunham-Jones & Williamson, 2011). The study area contains Holland Park, which covers 25 acres providing extensive green space for the area. Holland Park is the only example of a park within the study area. Other natural features that were noted during the IMI include street trees that were present 60 percent of the time while other nature features such as grass or streams were only noted 0.16 percent of the time. The predominant features of the study area are paved parking lots, large roadways, and buildings that occupy the remaining space with little left over for green infrastructure. Even lots that have been redeveloped in recent years have incorporated large, pedestrianized spaces such as plazas and wide sidewalks, but failed to utilize the opportunity to regreen. Regreening can provide a network of green infrastructure systems such as open green spaces, trails, community gardens, tree nurseries for neighborhood use, urban agriculture, flood control and parks. Strategies such as these can lead to environments that are of higher quality for the people who use them, in addition to adding to the filtration of stormwater runoff, providing bird habitats, and increasing local biodiversity (Dunham-Jones & Williamson, 2011). Therefore, integrating green spaces and infrastructure rather than only isolating green spaces in specific park areas could have a greater effect on the local environment and people.

Considering the City of Surrey's desire to create a new downtown which includes the study area, there is a missed opportunity to require all new buildings to provide green roofs to replace the extensive footprint that has consumed green spaces. Rooftops without green roofs in high-density areas contribute to a significant increase in the heat island effect (the collective heat absorbed and reflected from pavement, buildings and other hard surfaces), which can significantly increase the temperatures of the surrounding areas. The heat island effect is the collective increase in temperature of

an urban area caused by extensive coverage of concrete and asphalt surface areas. Figures 39 and 40 show the existing parks in the study area and the potential roof surface area that provide opportunities for green roofs which could vastly expand the amount of green infrastructure in the city centre.

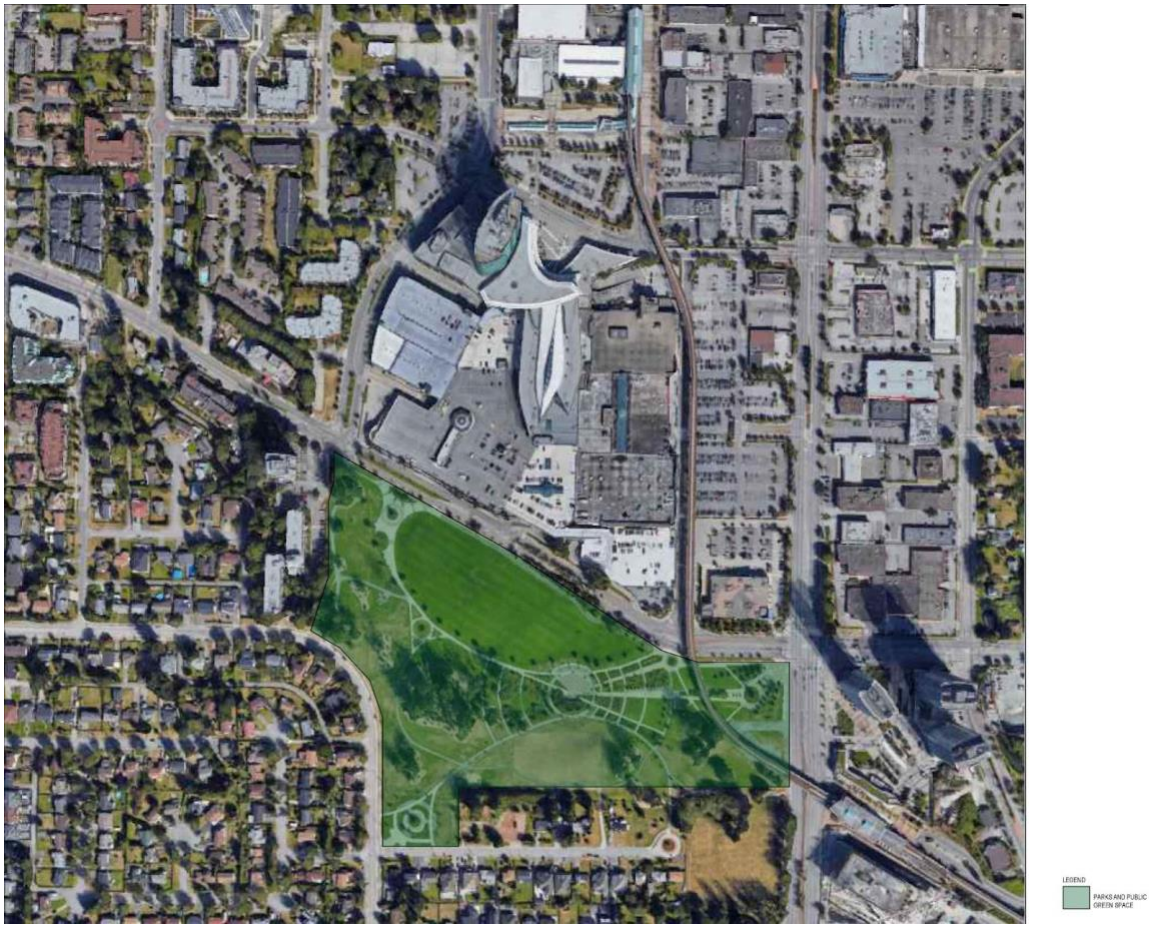



**Figure 39. Existing parks in the study area © Brad Ingram via Google Maps, 2023**

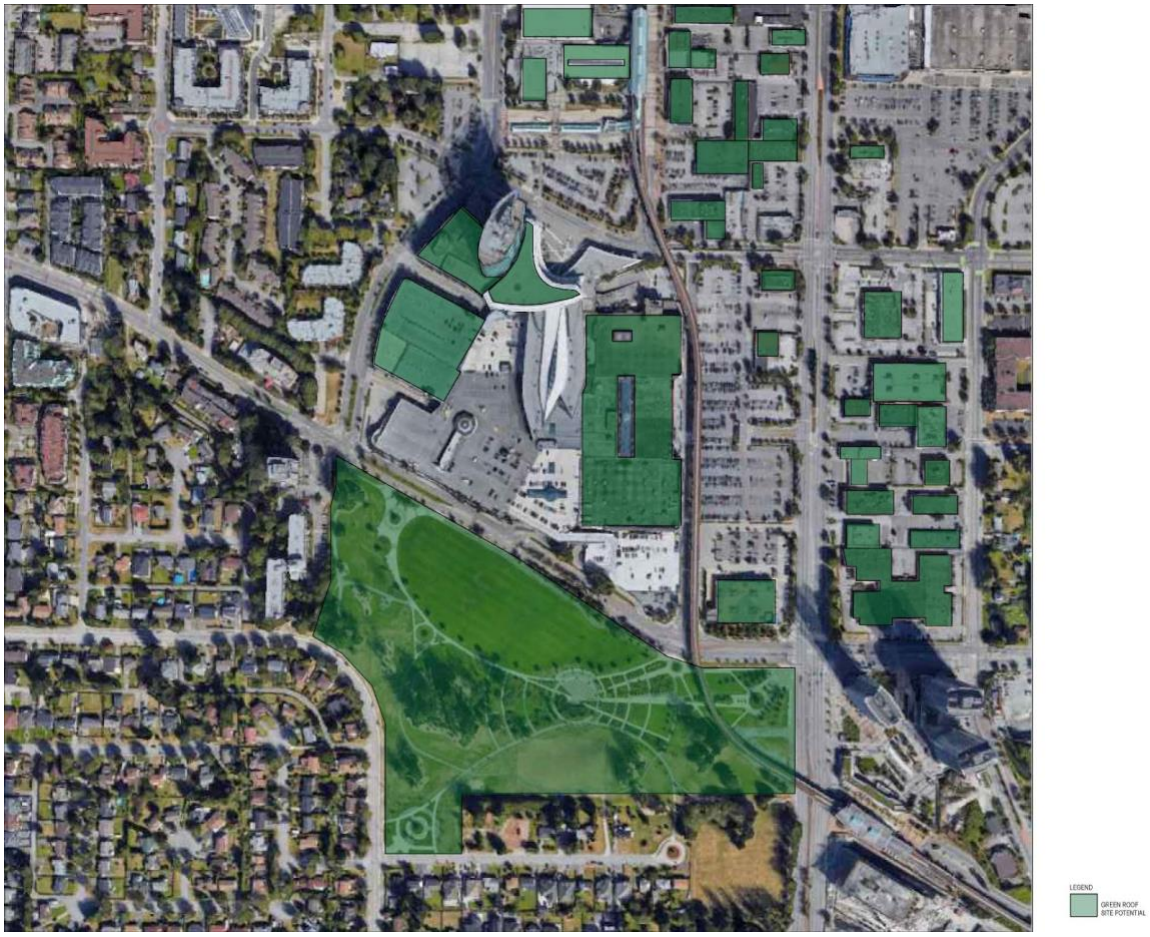



**Figure 40. Potential Green Roof Opportunities. Brad Ingram via Google Maps, 2023**

## 6.3. Revised Zoning

Revised zoning requires changing municipal policy to allow mixed-uses and higher densities within previously single-use zones. Zoning can be used to encourage mixed-use developments that promote walkability while discouraging single-use, car dependent places (Williamson, 2015). Municipalities will need to change segregated single-family zoning and overly wide streets that make walking difficult and unpleasant (Dunham-Jones & Williamson, 2011; Williamson, 2015). Surrey has removed the majority of the original single-use zoning and has provided a road map for future development projects by providing mixed-use zoning. Referencing the zoning map in chapter four, the majority of the study area has been rezoned for mid to high-rise development, with a small amount of the original suburban area retaining its low-rise zoning. Revised zoning changes are exemplified by the newly constructed residential

towers seen inside and outside the study area with more being built currently and in the future. These changes will only be seen over long periods of time as developers will determine the building pace.

## 6.4. Improved Connectivity and Walkability

Connectivity is vital for suburban sprawl areas where walking can be difficult due to traditional large block sizes, long winding streets and cul-de-sacs. For any retrofitting project, connections to the surrounding existing urban fabric are important so that multiple modes of transportation can easily access the space (Williamson, 2015).

Complete streets encourage people to use modes of transportation other than their cars by offering well-connected pedestrian pathway options that allow for convenient means of travel. During the IMI, sidewalks were present 32.5 percent of the time while cycling lanes were present in 30 percent of the area. The study area needs improved connectivity as it is still heavily automobile focused. Multi-lane roads in both directions were observed along most streets, the secondary data research in chapter four noted that high traffic roads with large intersections had significant numbers of accidents with both pedestrians and vehicles. A pedestrian trying to traverse the 500 meters from the south-west existing suburban residential area to the commercial strip malls in the north-east would experience a long and circuitous walk or cycle through multi-laned streets, heavy traffic and disconnected sidewalks and bike lanes. The sidewalk and cycling maps introduced in chapter four illustrate the current challenges pedestrians and cyclists' encounter. Dedicated bike lanes do exist, but are not well connected; a cyclist is forced to move between divided, semi-divided and unprotected bike lanes to travel from one end to another (figure 41). Divided bike lanes are only being built with individual projects creating segmented sections that often in some cases only run for half a block. The slow integration of cycling lanes will take a substantial timeline of years or decades to complete. The City of Surrey would benefit by taking a more proactive role in connecting divided bike lanes and pedestrian pathways to reduce reliance on personal vehicles to access goods and services, rather than relying on piece-meal redevelopment projects.

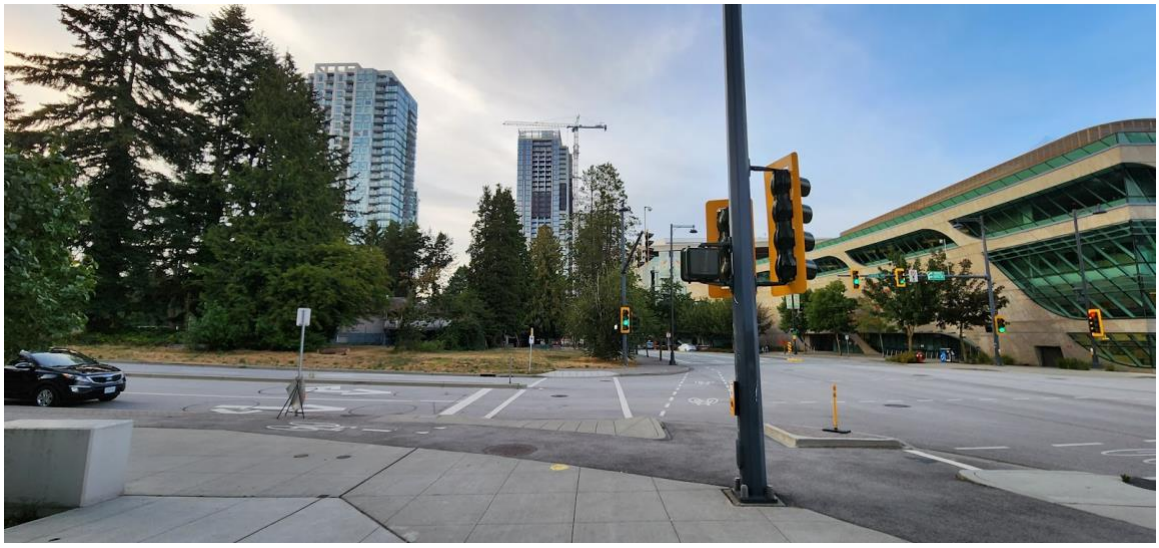


**Figure 41. Example of bike lane switching from on street to divided © Brad Ingram, 2022**

In any retrofitting project it is beneficial to consider the future development surrounding the project and its adaptability to be integrated into the urban fabric. There can be barriers such as NIMBY-ISM when a retrofitting project is undertaken. Therefore, tactics such as providing easements for future connections in addition to pre-emptively installing infrastructure in anticipation of future projects can ensure successful integration (Williamson, 2015). Providing infrastructure such as the SkyTrain line through the study area (figure 42) constructed in 1994, is an example of providing future connectivity for anticipating development and higher densities. The SkyTrain connection was a proactive step to encourage future development and to provide quick and easy access to transit. However, while an elevated rail network is great for quickly travelling from point A to point B, it does not animate the street in the same way at grade transit can and is not as feasible to create a more complete transit network throughout Surrey in the future (Cleveland, 2023). The City of Surrey's OCP for downtown illustrates the desire to create more infrastructure that will encourage future connectivity and provide residents with a well-connected city. As referenced in figure 41, the city is taking a piecemeal approach to providing connectivity by creating a patchwork of disconnected or poorly connected infrastructure which may result in a long-term solution of connectivity. However, a shorter-term solution such as building a fully divided cycling network now could encourage future adaptability as seen with the SkyTrain line prior to the existing redevelopment. The decision to keep the SkyTrain elevated has created its own connectivity issues; future projects could consider incorporating the trainline into a

redevelopment that enhances connectivity with the ground plane and create a more productive use of space, perhaps combined with future localized transit options such as light rail streetcars.

Adding complete connectivity such as divided bike lanes would allow the city to become more adaptable and at the same time, reduce the potential impact of implementing other connectivity strategies such as reducing traffic lanes and pedestrianizing certain areas to encourage other modes of transport than the car.

**Figure 42. SkyTrain line built in 1994 running through study area © Brad Ingram, 2022**

Street typology is the hierarchy and street type surrounding any project and is an important factor in creating pedestrian-friendly connections and environment. In many suburban areas, streets are overly wide, lack sidewalks, have few crosswalks and few bike lanes (Williamson, 2015). Streets and blocks should be simply organized around narrower streets with medians which promote traffic slowing and safer pedestrian movement. Wide streets are more difficult to cross and are often dangerous for pedestrians and cyclists to navigate (Sim, 2019; Dunham-Jones & Williamson, 2011). The prominent features of the study area are vehicle traffic, large intersections, parking lots and roads (figure 43). Some intersections such as Old Yale and King George Boulevard have nine lanes each, creating a large expanse of pavement for pedestrians to cross and containing massive volumes of vehicle traffic.


**Figure 43. Intersection of Old Yale Rd and King George Blvd. Google Maps, 2023**

The map shown in figure 44 illustrates the large arterial and collector roads surrounding the study area. Arterial roads are considered to be the main roads through the city, while collector roads are considered to be roads that traverse large neighbourhoods and town centres. The size and number of these roads with few smaller pedestrian friendly roads creates large block sizes, fewer intersections and higher speeds making pedestrian movement inefficient and unsafe.

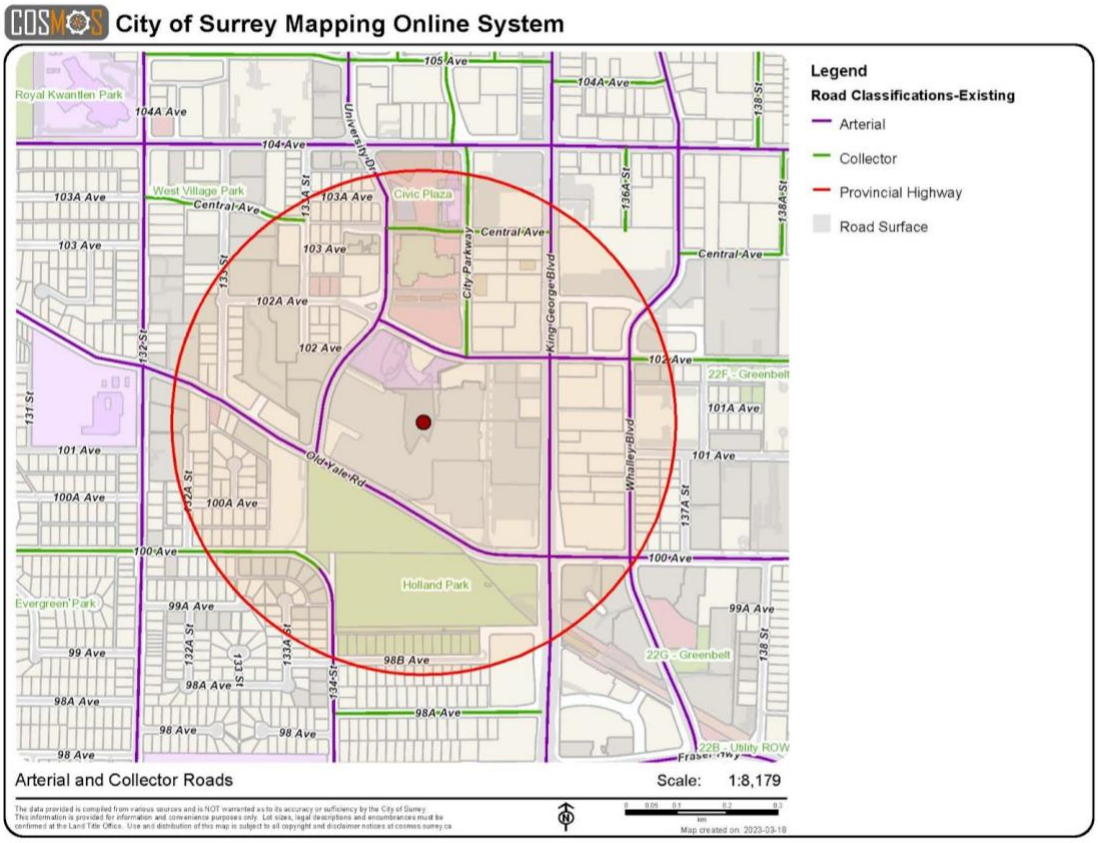



**Figure 44. Arterial and collector roads of the study area. Contains information licensed under the Open Government License – City of Surrey. Brad Ingram via COSMOS, 2023**

The current network of roads in the study area consists of arterial, collector, and suburban roads and cul-de-sacs. Many of these limit pedestrian movement with sidewalks only on one side or none at all, few crosswalks and multiple lanes (figure 45).

**Figure 45. Cul-de-sac with no sidewalks and dead end © Brad Ingram, 2023.**

Additional pedestrian friendly typologies such as streets with wider sidewalks, street furniture, more trees, improved crossings, curb bulbs and speed bumps could vastly improve connectivity and encourage people to walk more. It has been observed that slower car traffic has a positive effect on the local economy, where people walk more and drivers discover businesses (Sim, 2019). Walkability is one of the most important factors in the success of retrofitting projects because it can influence a person's sense of place and encourage more people to leave their cars at home. Density and mixed-use places encourage walking over driving since shopping, restaurants and other services are easily accessible. Attractive natural and built environments are important for encouraging walking while monotonous facades, vast parking lots and large roadways discourage walking (Dunham-Jones & Williamson, 2011). Walkability extends to buildings, not just outdoor spaces, as walk-in, walk-through and walk-up buildings extend the feeling of connection to the urban environment and add to a sense of place (Sim, 2019).

The study area contains pocket areas of good walkability, specifically in the Holland Park area and Surrey Central Mall itself. Holland Park is a 25-acre green space that provides multiple pathway options and connects well with the surrounding suburban neighbourhood, yet barriers still exist for connections to the north. Surrey Central City is located directly adjacent to Holland Park's north border and provides many amenities for residents to walk in, walk through and walk up. However, parts of the original mall still exist along the facade that runs adjacent to Holland Park, presenting a

two-storey windowless wall that runs nearly 1200 feet (figure 46) along Old Yale Road. This large blank wall creates a significant barrier to the walkability of the area. Blank walls were found along 20 percent of the streets in the study area during the IMI.

**Figure 46. Windowless facade bordering Holland Park © Brad Ingram, 2023.**

Other areas that have recently been redeveloped offer good walkability by providing wide sidewalks, trees, divided bike lanes, benches, and lighting (figure 47).

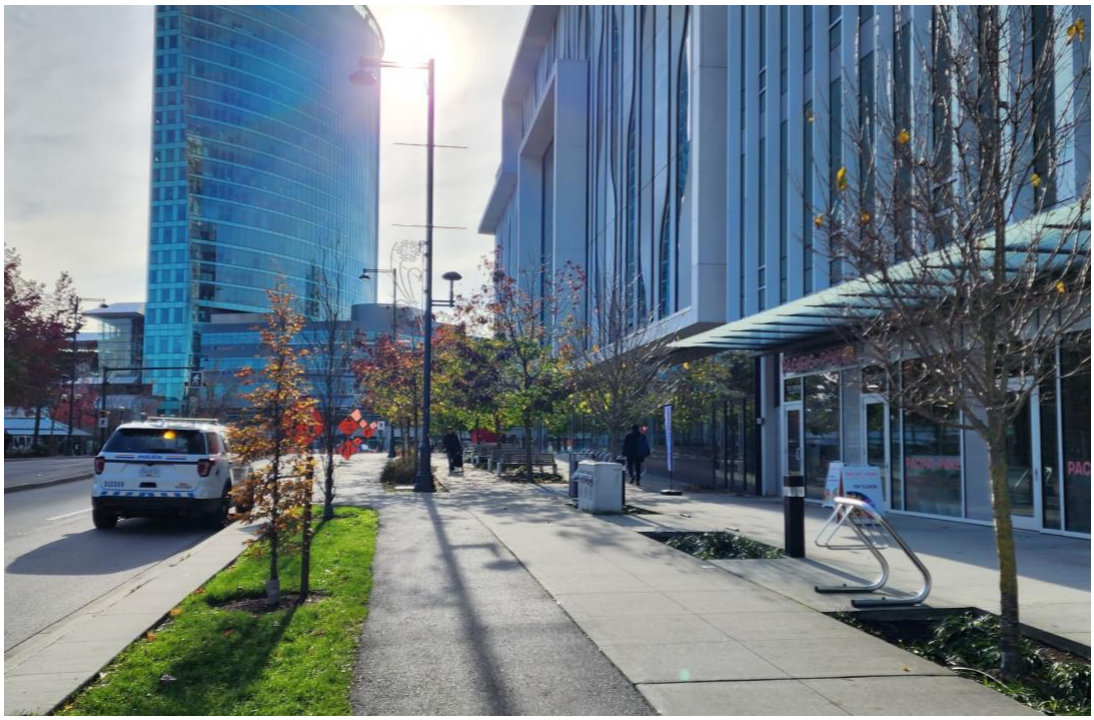


**Figure 47. Recently redeveloped area © Brad Ingram, 2023.**

While some improvements have been made to increase the walkability of the study area, there are still large portions that are devoted to parking lots, no sidewalks, wide roadways, and few crossings (figure 48). Goods and services remain spread out, forcing a pedestrian to traverse a large distance to visit one place to the next.


**Figure 48. Expansive parking lots © Brad Ingram, 2023.**

While the area was found to be “somewhat walkable” in the walkscore data described in chapter 4, this score does not illustrate a complete understanding of the conditions on foot. Walkability is about connecting people to their neighbourhood, seeing what is available and having options to access it, with the goals of quick and easy access, convenience, spontaneous participation, and being able to get from one situation to the next. Walkability is just as important within buildings, and the frequency and position of windows, doors, halls, and passages is important to consider in new developments. More frequent doors mean easy spontaneous movement from one space to another, to inside and outside. Ultimately, walkability means comfortable, safe movement from building to building, block to block and neighbourhood to neighbourhood (Sims, 2019). At the time of this research, the study area only meets this definition in some pockets such as the Surrey Central Mall, however this area is still only partially

connected for pedestrians with spread out sidewalks, parking lots and superblocks to traverse. It remains to be seen if the City of Surrey can meet this definition of walkability in the future.

## 6.5. Quality Architecture

An important piece of a retrofitting project is the quality of the built form. What defines quality? Quality can be understood as a specific relationship to a place and is attributed to projects that represent a whole and fit into a unique context. According to the 2007 Danish Architecture Policy, architectural quality is experienced when form, function and building techniques are brought together and implemented in a complete, artistic idea. Architecture of a high quality relates to the surroundings as a co-player or as a challenger. A project may be evaluated externally using quality design criteria based on requirements for suitability to the surroundings, natural materials and a design that spreads joy to the users and visitors (Rönn, 2011).

Bland architecture and environments featuring monotonous facades, monotone colours, no articulation, and expanses of paving does little to encourage a sense of place. Articulation of architecture is important for the overall visual enjoyment of a place; it breaks up monotonous repeating facades that otherwise contributes to a bland environment. Architecture that is well designed from the human scale at the street by transitioning to inner public spaces and onto the private spaces create much more enticing places to visit. Good architecture has the power to become a destination while creating a synergistic environment of mixed-uses (Dunham-Jones & Williamson, 2011). In places that focus on the car, there is little incentive for developers to invest in expensive exterior walls or attractive environments, which is one reason that car-dependent strip malls, big box stores, and malls tend to have cheap blank external walls and empty, unadorned parking lots (Cleveland, 2023).

Quality architecture has the ability to create visual interest and enjoyable, diverse spaces for residents and visitors alike. The diversity of the built form and outdoor spaces, flexibility of space, creating human scale and a sense of place and identity are all features that create quality architecture and quality environments (Sims, 2019). A single project that encourages the presence of people on the street can provide the catalyst needed for developers to create shops, restaurants, and other businesses along

the sidewalk, which further contributes to creating a desirable, lively place to walk. The Surrey Central City retrofit is an example of using quality architecture to enliven and inject new life into a dying mall. The mall was converted into a transit oriented mini city by adding new high-density components in striking forms. The architects used local wood, metal panel skins and a dramatic tetrahedral space frame over the atrium to create a spectacular space (Dunham-Jones & Williamson, 2011). As Magnus Rönn (2011) suggests, projects both large and small should,

> "find an appropriate solution to a design problem. The connection is very important because it gives meaning to the concept of quality. Architecture is an applied art. Architects and clients should both meet the end-users' needs for a well-designed space. The global goal is use. The assignment should result in surroundings utilized by people. Clarity and coherency in the design of architectural and town planning projects are aesthetic preconditions for the future utilization of environs. Therefore, good solutions rely upon knowledge of the cultural setting where the project belongs" (p. 242).

The City of Surrey could utilize the concepts of quality discussed by Rönn to create their own guidelines of what makes quality architecture and space when reviewing future developments to assess how those projects meet those criteria.

## 6.6. Placemaking

Placemaking is a very broad concept and can have different implications and meanings from a macro scale down to the micro scale. A simple definition is that placemaking aims to create places that invite greater interaction among people while fostering healthier and more economically viable communities (Madden, 2011). Jan Gehl has been studying cities for decades stating "placemaking" is essentially physical intervention, cities should strive more generally on quality spaces for people in the city, putting emphasis on strategies on how to improve over 5-10-20 years, rather than creating "places" (TPBO, 2019). Surrey Central City is a study in contrasts, the retrofitted mall is a good example of how placemaking can revive what was a dying space into a vibrant mixed-use place. The university campus and offices provide a steady flow of people using the mall space for study, eating, socializing, and shopping.

Central City's entry court provides a well-lit space for public art, gathering and relaxing. The plaza was observed to be a social and vibrant space during the IMI inventory on each of the three site visits made during the study, one of the only places this was observed. The remainder of the study area is primarily spread-out shopping scattered amongst busy roadways, there are few areas for gathering or socializing. These spaces are primarily task oriented with the aim to get in and get out, they could be vastly improved by utilizing retrofitting principles discussed here such as densification, building mixed-use projects and replacing surface parking lots with human focused spaces such as parks, bioswales, and patios for restaurants.

The City of Surrey could explore several methods of placemaking in order to achieve quality spaces. Not all placemaking needs to be attempted on a large scale. Often small incremental placemaking interventions can be undertaken that can be extremely effective in creating quality spaces, these could be as simple as introducing food trucks to a designated area to draw excitement to a space. In his definition of placemaking, Mark Wycoff identified four different types of placemaking: standard, strategic, creative and tactical.

**Table 10. The Four Types of Placemaking (Adapted from Wycoff, 2014).**

| Placemaking Type | Definition |
|---|---|
| Standard Placemaking | This is the universal term, the process of creating quality places that people want to live, work, play and learn in. |
| Strategic Placemaking | Strategic Placemaking is targeted to achieving a particular goal in addition to creating quality places. Places that are *uniquely attractive,* so people want to be there and live there. |

| | |
|---|---|
| Creative Placemaking | In creative placemaking, partners from public, private, non-profit, and community sectors strategically shape the physical and social character of a neighborhood, town, city, or region around arts and cultural activities. Creative placemaking animates public and private spaces, rejuvenates structures and streetscapes, improves local business viability and public safety, and brings diverse people together to celebrate, inspire, and be inspired. |
| Tactical Placemaking | Tactical Placemaking is the process of creating quality places that uses a deliberate, often phased approach to change that begins with a short term commitment and realistic expectations that can start quickly (and often at low cost). It targets public spaces, is low risk, with possibly high rewards. It can be used continuously in neighborhoods with a mix of stakeholders. It includes a mix of small projects and short term activities. |

Figure 49 illustrates the relationships between the four types of placemaking and their effects on space (Wycoff, 2014).

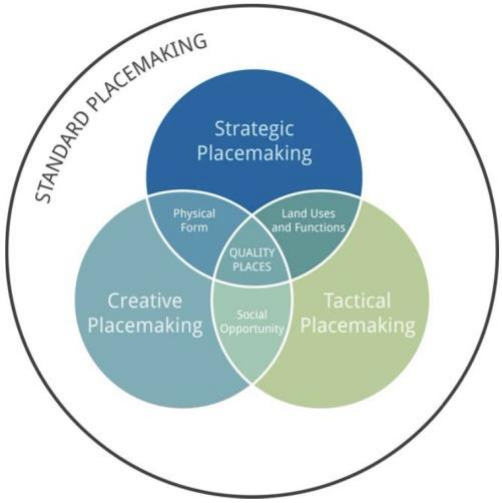



**Figure 49. Four Types of Placemaking, MSU Land Policy Institute, 2014.**

Through a macro lens, Surrey could utilize strategic placemaking elements of Wycoff (2014) such as plenty of recreation, arts and culture, multiple transportation and housing options, respect for historic buildings, public spaces, and broad civic engagement. At a micro scale, tactical placemaking could be applied in Surrey Central City to provide spaces that have small investment but large impact, such as pop-up markets and outdoor music events. These types of interventions may take longer to take hold, but their effects could be culminative. Creative placemaking improves the quality of spaces through the arts; possibilities for Surrey could include movie nights in Holland Park, while sculpture and art projects could entice more community involvement around the city.

## 6.7. Destination Access

Destination access is defined as the accessibility of a place by walking, cycling, taking transit, or driving. The secondary data collection and the urban design inventory found that large block sizes, inconsistent sidewalks and infrequent intersection occurrences do not provide easy destination access for a pedestrian or cyclist entering the area. Large block sizes are still a major issue found during the data collection in chapter four, Surrey's OCP suggests an ideal block size of no more than 100 meters however, this only occurs once in the study area. This makes destination access difficult for a person to walk resulting in more people opting for vehicles in turn resulting in more traffic. The SkyTrain transit station does provide efficient transit access to the Surrey Central Mall from the surrounding Greater Vancouver Area, however, the elevated train line is largely designed for people to travel large distances and not for convenient travel around the area. The transit station itself is elevated from the street level and above a parking lot, creating a disconnect from the street level which can affect ease of access if elevators or escalators are broken for anyone with mobility issues. In the future, this station and the parking lot surrounding it could be redeveloped into a multi-faceted transit hub that blends multiple modes of transportation into a place that is a destination itself. In 2020, the Surrey City Development Corporation (a development company operated by the Surrey municipal government) introduced plans to build a multi-tower office and residential area that includes a new transit hub that is integrated inside and connects the public spaces from Surrey City Hall south to Surrey Central City (Chan, 2020). The transit hub combined with finer grain road networks and pedestrian connections could help retrofit the neighborhood into a great destination, see figure 50.


**Figure 50. Artistic rendering of the "Centre Block" redevelopment, bus exchange and parking lot serving SkyTrain's Surrey Central Station. Surrey City Development Corporation (2020).**

## 6.8. Human Scale and Density

Human scaled design is defined as urban form designed around activity at street level and includes creating inviting spaces and buildings that encourage interaction and community by utilizing dimensions rooted in the human senses. One of the few spaces in the study area that provides a sense of community and human scale is the Surrey Central City Mall entry court and the new Simon Fraser Buildings nearby. As the remainder of the study area is redeveloped and Surrey's 2017 OCP is followed, human scale and density will improve over time. The IMI data showed that the majority of the area contains spread out commercial areas with major roads and parking lots dividing them. These areas provide few human scaled experiences and compete with vehicle centric uses of the area; over 40 percent of the study area consists of high blank walls, narrow sidewalks and parking structures and lots. However, these large spaces provide

**Figure 51. Artistic rendering of the "Centre Block" redevelopment, bus exchange and parking lot serving SkyTrain's Surrey Central Station. Surrey City Development Corporation (2020).**

opportunities for tactical placemaking and could be utilized for markets, food trucks and other pop-up events discussed in the placemaking chapter. The City of Surrey's

redevelopment company, Surrey City Development Corporation is proposing some big changes to the area around the SkyTrain transit station. Part of that proposal includes significant changes to the street level including retail and restaurants which should significantly improve the area, see the figure below (Chan, 2020).

## 6.9. Summary

The design discussion has provided an in-depth review of the design principles of retrofitting and how they apply to the current physical conditions in the Surrey Central City study area. The discussion shows that while some aspects of retrofitting principles are apparent such as those utilized in the redevelopment of the mall, there are still many opportunities to improve the area, as much of the original suburban fabric remains. In response to the research sub question, the study area has not seen any real systemic, long lasting, transformative change over the past twenty years since the Surrey Central City retrofit. The area is "half-complete, caught between the prevailing development logic of wide roads and parking lots, and a hoped-for future of shopfronts and restaurants lining lively streets" (Cleveland, 2023, 2). The IMI data collection showed that during three separate site visits to the study area, few people were observed walking with the exception of the spaces surrounding the mall entrance and the SkyTrain station.

City building is a process that takes a lot of time and despite twenty years elapsing since the Surrey Central City project was developed, there remains much work to be completed. Acknowledging that municipal OCP's are often updated over time, the City of Surrey could undertake a more aggressive and frequent monitoring program that utilizes observational methods to document the progress towards the central goal of a vibrant, animated downtown. How people use newly developed projects in conjunction with older areas will be important to answer questions such as: are people using benches and tables installed? If not, why not? Do people socialize in plazas? Are cyclists using cycling lanes? The website *Cities Alliance* created a monitoring tool for implementing a development strategy to answers these questions, specifically phase four which advises on three phases for municipalities: implementation and operation, monitor and evaluate, adjust and modify (Cities Alliance, 2016). These tools could keep Surrey up to date on progress and allow more flexibility to pivot when necessary. While the study area will see significant changes over the next few decades, it remains to be seen if the principles of retrofitting will be used to their full advantage.

# Chapter 7. Conclusions

In 1991 the City of Surrey released its first OCP, announcing the desire to create a new downtown centre that included the Surrey Place Mall, commercial strip mall, and residential areas around the arterial roads. During the first twenty years after this OCP release, change was slow and sporadic in the area until the completion of a large-scale retrofitting project that rejuvenated both the old mall and the city centre. Surrey Central City is recognized in the literature as a successful retrofitting project due to its multi-functional spaces, innovative architecture, and incorporation of transit-oriented design. The City of Surrey recognized the change in energy the retrofitted mall injected into the downtown core, and responded with an updated OCP in 2006; as a result, an influx of students, shoppers and employees breathed new life into the area. However, this study finds the mall retrofit project largely exists as an island surrounded by the remnants of suburban sprawl such as parking lots and strip malls. A truly successful and integrated suburban retrofit is about providing physical connections, walkability, cycling and transit, with local government support required to enhance such city projects through deliberate planning rather than reactive planning (Dunham-Jones & June Williamson, 2011). The SkyTrain line exemplifies deliberate planning which played a role in the Surrey Central City projects success, but few other successful examples exist in the study area. The OCP updates in 2006 and 2017 reflect Surrey's desire to create a more pedestrianized version for the new downtown and incorporate more urban design principles that make vibrant, human scaled spaces. This is especially true outside the study area to the north, where larger projects such as a new city hall and library have been built. Improvements are being made as each new development provides the city with an opportunity to install new infrastructure, but progress has been slow to connect cycling and pedestrian networks that are so vital to vibrant retrofitted spaces. If the City of Surrey continues in this fragmented development manner over the coming decades, it will be difficult to implement the changes desired in the most recent OCP.

This research study aims to answer the research question: How did the 2003 retrofit of Surrey Place Mall and the City of Surrey fulfill principles and objectives of retrofitting suburbia in the twenty years following its redevelopment? By examining how the existing built environment follows (or does not follow) the principles of retrofitting discussed in the literature, and utilizing the Irving Minnesota Inventory survey, an

accurate physical analysis of the study area was accomplished. The Surrey Place Mall retrofit was the catalyst for the city to re-establish an updated OCP that reflects many of the design principles discussed in this study. There are many approaches to retrofitting and many principles that could be utilized in retrofitting projects, and this study outlines only a few of them. The specific principles discussed were chosen because they provide the best chance for integrating the Surrey Central City project into the surrounding area. Since the mall retrofit was completed in 2003, the study area has evolved and densified substantially, and begun to resemble the OCP guidelines – but there is more to be done looking forward to the future. Surrey Central City represents an example of why it is important for the city to adapt and plan for major projects so that they are incorporated well into the surrounding neighbourhood, and shows that fragmentary fixes over decades does not provide consistent and integrated infrastructure throughout.

Based on the findings of this study, opportunities for improvement in the City of Surrey exist based on the retrofitting principles introduced here. The City of Surrey has previously outlined the objectives and principles they envision for the study area, which do largely align with many retrofitting principles. However, twenty years after the 2003 Surrey Place Mall redevelopment, many aspects of the area need work to achieve these goals. Moving into the future, the City of Surrey could consider taking on the role of developer to advance their goals and have more control over the types of projects built. The Surrey City Development Corporation is beginning to do this now with the proposal for the new transit station introduced in chapter six. This method contrasts with the majority of projects that are privately developed, which typically lead to long completion times and sporadic development patterns. Greater municipal involvement would also allow for more control in the type of projects built, while potentially promoting faster changes to the urban fabric and adherence to retrofitting principles such as breaking up block sizes, building well connected cycling paths and regreening the downtown. Governments could eliminate much of the pathological tension between car-dependence and walkability if they officially categorized urban areas for one design paradigm or the other, and established separate institutions for designing each. Separate street design standards could be developed for walkable and car-dependent areas, removing the need to mix the contradictory logic of both (Cleveland, 2023).

Limitations of rapidly densifying cities can often include a negative side effect of pushing original or lower-income residents out of the market. More control in

development projects could increase government flexibility in addressing housing issues such as providing more rent geared-to-income units or mixed income buildings. Cleveland (2023) notes that the contradictions between car-oriented and walkable interests create barriers to implementing walkability in full. This research study illustrates that in isolation, the Surrey Central City development can be perceived as an exemplary retrofitting project embodying the principles and objectives highlighted in the literature. However, its overall success should be evaluated in the larger physical neighborhood context and the surrounding car-oriented development. The physical features of the area surrounding large retrofitting projects are just as important as the project itself, and addressing these physical aspects lead to more well-rounded and complete neighbourhoods. As Cleveland (2023) recommends, governments can encourage walkable development by allowing more density, eliminate parking requirements, concentrate all public investments into one finite area near transit, gather developers to coordinate their plans, create a development authority to partner on projects in strategic places (as Surrey has done through its Surrey City Development Corporation), and offer tax breaks with a short deadline to spur immediate investment. Once walkable investment has started, officials can intervene to maximize the positive impact of walkable growth on future walkable growth, and minimize the impact of surrounding car-oriented development, by working with developers to position buildings strategically to block the view of highways and parking lots, and to create streets that are pedestrian-friendly on all sides.

During the literature review, a gap in retrofitting research was identified. This gap represents a lack of research on how retrofitting projects, and specifically their surrounding suburban neighborhoods, are affected over years or decades beyond the retrofit completion. As a research field, suburban retrofitting is relatively new. This study contributes to the field with the practical application of retrofitting principles and analyzing the built environment. This research also offers Canadian context to the retrofitting field of study, where currently the majority of the literature review consists of American examples. Additionally, this project aligns with the contribution to the urban planning literature on retrofits by Cleveland (2023) because it focuses specifically on sites where there is no single landowner — the focus of previous work on suburban retrofits such as Dunham-Jones and Williamson. The tools utilized in this study may not uncover every issue and may not be applicable to every retrofitting project, as each

location presents different physical features that would need to be evaluated case by case. The Irvine Minnesota Inventory is primarily a physical inventory of the built environment, so lived experiences of the people living in the area are not recorded. However, given personal experiences as a researcher during time spent in the area, the inventory illustrates aspects that are lacking in well-connected and pedestrianized neighborhoods such as smaller block sizes, frequent intersections, traffic slowing measures and easy pedestrian connections. The intention of the tools used in this study is to act as a litmus test to analyze the progress of municipal plans for the Surrey Central City area at the time of data collection. Any municipality could utilize this data and research method to understand shortcomings which still exist, and potential identifiable features that could be addressed.

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