



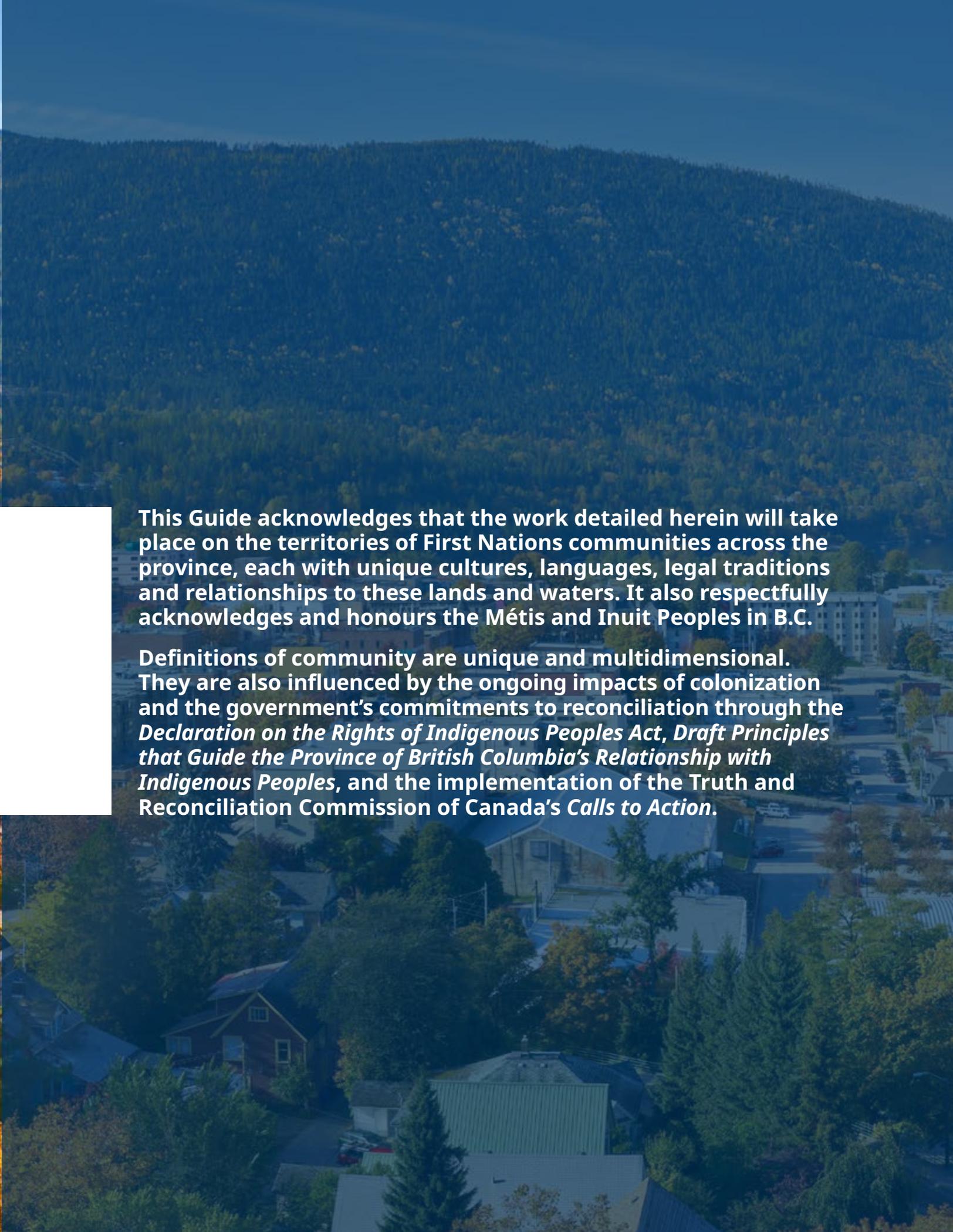
**cleanBC**  
our nature. our power. our future.

# Complete Communities

A guide to geospatial land use assessments for British Columbia's communities



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An aerial photograph of a residential neighborhood in British Columbia, Canada. The foreground shows several houses with dark roofs and green lawns, interspersed with trees. In the background, a large, densely forested hillside rises, its trees showing some autumnal colors. The sky is a clear, pale blue. The text is overlaid on the left side of the image, partially obscuring the houses and trees.

**This Guide acknowledges that the work detailed herein will take place on the territories of First Nations communities across the province, each with unique cultures, languages, legal traditions and relationships to these lands and waters. It also respectfully acknowledges and honours the Métis and Inuit Peoples in B.C.**

**Definitions of community are unique and multidimensional. They are also influenced by the ongoing impacts of colonization and the government's commitments to reconciliation through the *Declaration on the Rights of Indigenous Peoples Act, Draft Principles that Guide the Province of British Columbia's Relationship with Indigenous Peoples*, and the implementation of the Truth and Reconciliation Commission of Canada's *Calls to Action*.**

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Prepared by the B.C. Ministry of Housing with the technical support of Urban Systems Ltd.

All photos and figures by the Government of B.C. or Urban Systems Ltd. unless otherwise noted.

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### **Concept in practice**

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# 1 | INTRODUCTION



## Introduction

- 1.1 What are complete communities?
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Each community in British Columbia has its own context, geography, and history that has shaped the way it has grown and developed.

While each community is unique, local governments across the province have identified many consistent priorities to address critical issues and create more vibrant and livable places. For example, the results from a survey conducted in Fall 2022 by the Integrated Cadastral Information (ICI) Society indicate that diversifying housing options, reducing infrastructure costs, reducing greenhouse gas (GHG) emissions, and increasing walkability are common goals for many local governments in British Columbia (B.C.).

Recognizing the interrelationships between these priorities is important. Increasing the walkability of a community can have an impact on both long-term infrastructure costs and reducing GHG emissions. Considering the location of future housing, in proximity to both daily needs and transportation options, can also leverage existing infrastructure and will have a long-lasting impact on community goals such as the viability of aging in place. Taking action to create more complete communities can support many of these identified goals.

Considering a community's future, while examining the interrelated outcomes of identified priorities, can be supported through planning and land use decisions. The lenses communities can use as part of informing these decisions include:

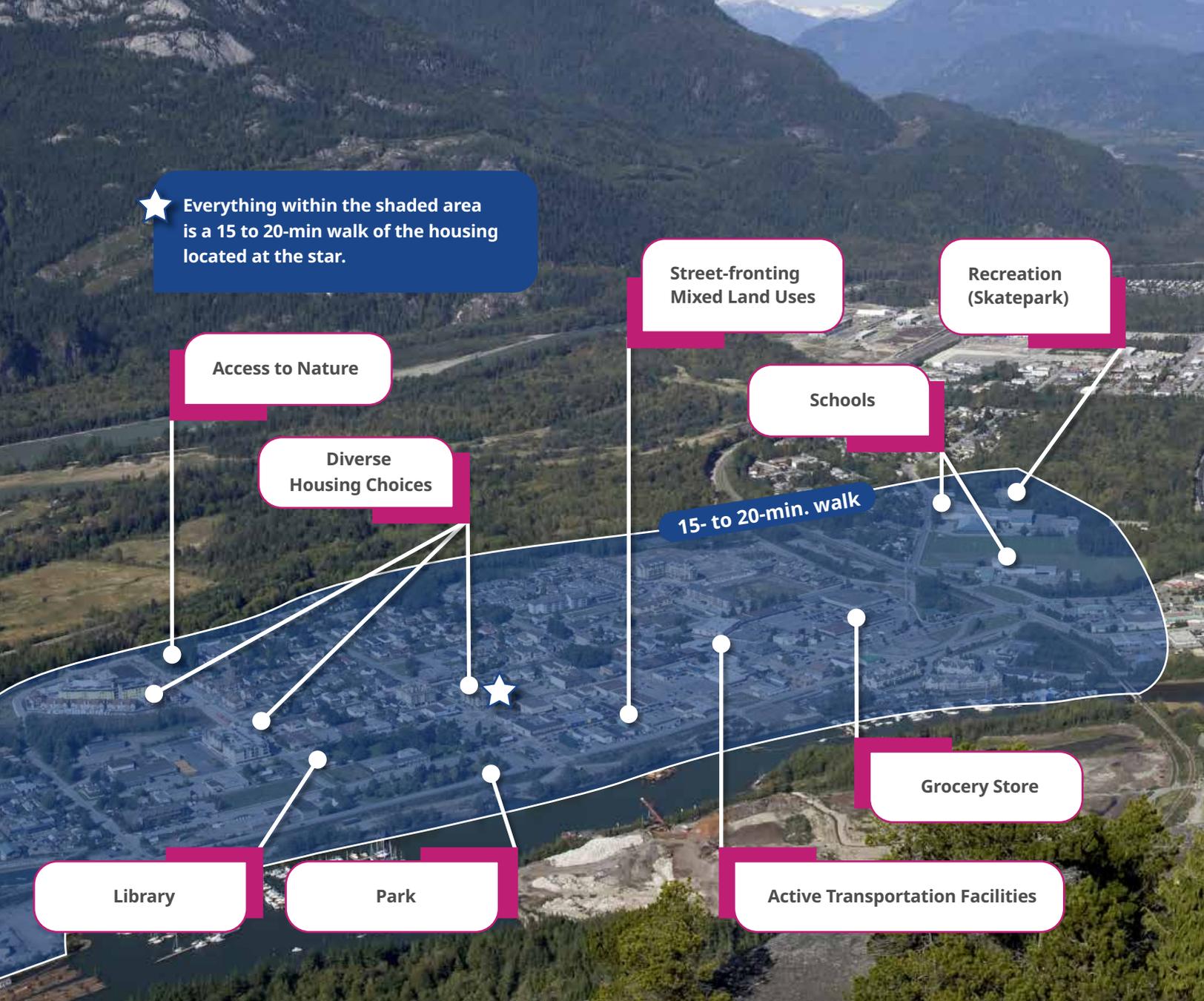
- Housing
- Daily Needs
- Transportation
- Infrastructure

This Guide is intended to support local governments in advancing identified community goals through creating more complete communities. It focuses on the process of undertaking assessments to inform land use decision-making, including consideration of housing need, supply, and location; providing transportation options including increased walkability; and making connections to infrastructure investment and servicing decisions. It is intended to be a resource that provides a pathway to elevating the conversation about complete communities in B.C., assistance in developing a scope of work to seek technical advisory services (if desired), and guidance for technical staff who are completing work "in-house".

## 1.1 What are complete communities?

**Complete communities** is a broad concept and can be defined in several different ways. For the purposes of this Guide, complete communities are communities – or areas within a community – which provide a diversity of housing to meet identified community needs and accommodate people at all stages of life, and provide a wider range of employment opportunities, amenities, and services within a 15-20 minute walk.

This definition of complete communities is intended to operate as an overall goal, recognizing that complete communities may look different across regions. In larger urban areas, creating more complete communities might focus on each neighbourhood within a municipality. In a small town, a town centre might form the main hub of daily needs, with most housing nearby. And in a regional district, complete communities could be seen as the hubs that are part of a connected network. The creation of more complete communities may look like enhancements of "hub areas", whether incorporated or unincorporated centres with a range of needed services and amenities. All communities have the potential to be more complete, regardless of their existing context and physical characteristics.



★ Everything within the shaded area is a 15 to 20-min walk of the housing located at the star.

Access to Nature

Diverse Housing Choices

Street-fronting Mixed Land Uses

Recreation (Skatepark)

Schools

15- to 20-min. walk

Grocery Store

Library

Park

Active Transportation Facilities



### A CLASSIC CONCEPT

The concept of complete communities aligns with, or is closely related to, many historical and recent community development and land use planning concepts such as the streetcar suburb, transit-oriented development (TOD), smart growth, and 15-minute cities/neighbourhoods. These terms emphasize creating communities where people can travel to most daily needs within short walking or cycling distances and connect to other services and amenities using transit or other transportation options.

## WHAT ARE SOME OF THE BENEFITS OF CREATING MORE COMPLETE COMMUNITIES?

Creating more complete communities can support a range of identified community goals and offer many interrelated benefits, including (but not limited to):

- More housing and transportation options.
- Increased walkability, accessibility, age-friendliness, and equity.
- Greater efficiency with servicing and infrastructure.
- Environmental sustainability, including reduced GHG emissions, largely from transportation.
- Preservation of the natural environment by reducing sprawl.

## WHAT ARE THE KEY ELEMENTS AND CHARACTERISTICS OF COMPLETE COMMUNITIES?

More complete communities have several key elements: **diversity of housing types**, **proximity of housing and employment to daily needs**, **transportation options**, and **efficient use of infrastructure** (each element is described below). These elements are used as “lenses” through which to assess a community later on in this Guide. They also often have both strong public realms and connections to the natural environment.

Creating more complete communities works best when these elements are considered together. Assessing a community’s completeness through mapping and analyzing these key elements, and their relationship to each other, can support advancing a community’s identified goals. For example, an assessment could connect housing location to key amenities, including transportation options, and consider parcels that will maximize existing infrastructure.

This work is about enhancing the existing community. For example, rural communities might add amenities to existing hubs so more people can access more of their daily needs in one place or within a short distance of other amenities, even if they need to cycle, drive, or take transit from their home to the hub.

There are many recognizable characteristics or features of complete communities. The scale and mix of these may change based on a community’s size and context, but each is relevant.



## 20-MINUTE NEIGHBOURHOODS



(Victoria State Government)

*Plan Melbourne* is the State of Victoria Government's long-term planning strategy, guiding the way Melbourne, Australia, will grow and change to 2050. *Plan Melbourne* is guided by the [principle of 20-minute neighbourhoods](#). Research shows that 20-minutes is the maximum time people are willing to walk to meet their daily needs locally. These daily needs may include:

- Local health facilities and services
- Schools
- Supermarkets

The 20-minute neighbourhood is all about living locally – giving people the ability to meet most of their daily needs within a 20-minute walk from home, with safe cycling and local transport options. These connected and walkable places are where people can live, work and play; buy their bread and milk; work from home or at a local business; access services; and meet their neighbours at community gathering places.



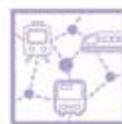
**Hallmark 1:**  
Safe, accessible and well connected for pedestrians and cyclists to optimise active transport



**Hallmark 2:**  
High-quality public realm and open spaces



**Hallmark 3:**  
Provide Services and destinations that support local living



**Hallmark 4:**  
Facilitate access to quality public transport that connects people to jobs and higher order services



**Hallmark 5:**  
Deliver housing/population at densities that make local services and transport viable



**Hallmark 6:**  
Facilitate thriving local economies

(Victoria State Government)

To establish the features of a 20-minute neighbourhood as policy, the state government developed criteria to demonstrate “hallmarks” of a 20-minute neighbourhood.

A pilot program was launched to test principles in selected neighbourhoods based on 800 m catchment areas, which represents a 20-minute round-trip walking distance.

## Diversity of housing options

- A diverse mix of housing types and tenures that can accommodate people at all stages of life and support aging in place.
- Housing within walking distance of key amenities (daily needs).
- Housing in proximity to viable transportation options.
- Mixed use parcels. This might include ground floor commercial or institutional use and housing above, or a range of commercial and institutional uses throughout.

## Proximity to daily needs

- A diverse mix of land uses within walking distance of housing (and employment) and integrated with a range of transportation options.
- Key daily needs are within walking distance of most residents. These include grocery stores, restaurants, daycares, playgrounds, clinics, and community facilities.
- Land uses that support employment opportunities are connected to sustainable transportation options and housing options.

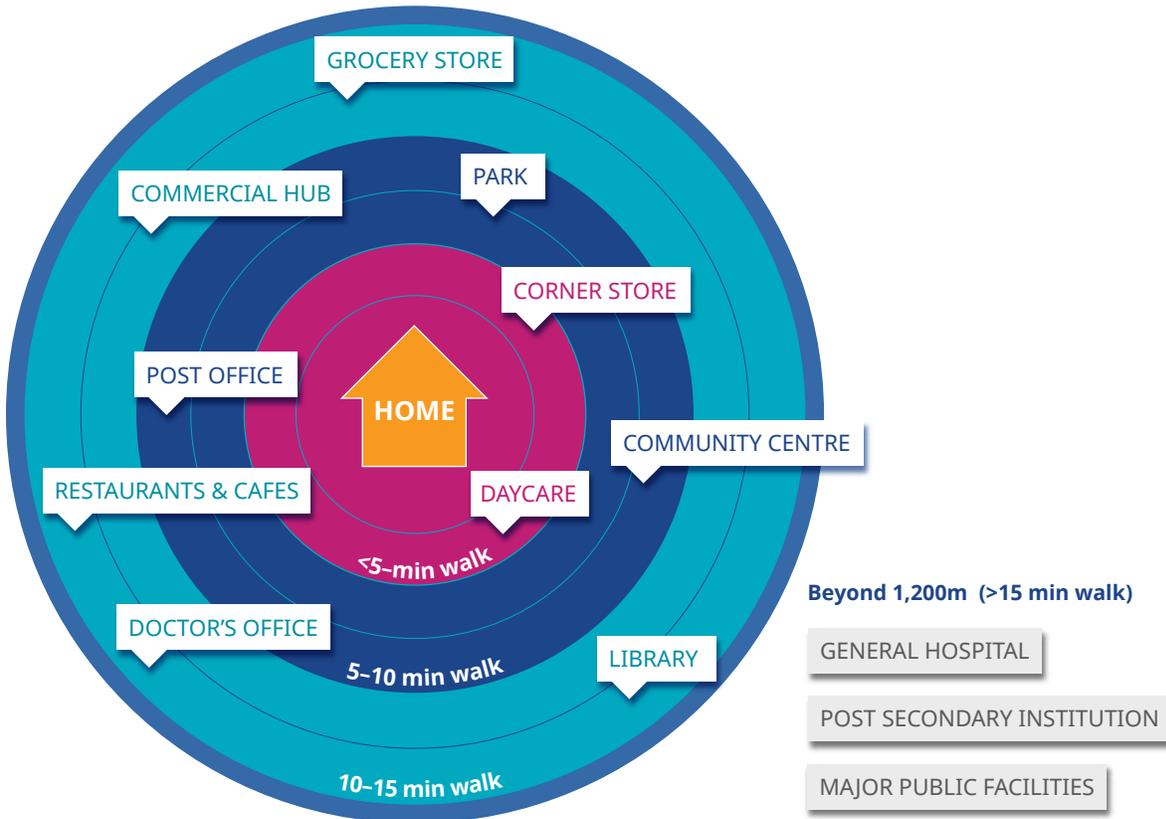


### PROXIMITY TO DAILY NEEDS ENABLES AGING IN PLACE

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Living in proximity to daily needs is not only convenient – it can also provide multiple benefits to one’s quality of life and well-being. Aging in place has become increasingly topical as the population of older adults increases in many communities across the province. Bowling and Stafford (2007) found that older adults who live in amenity rich areas are more likely to have high levels of social connectedness and remain active, which provide health benefits and can contribute to living a longer life.<sup>1</sup>

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Not every destination needs to be within walking distance for all residents. The goal in creating more complete communities is that more daily needs should be accessible within a 5- to 15-minute walk. Some destinations, like post-secondary institutions, sports arenas, or hospitals, have larger service areas. Ideally, these destinations are accessible by cycling and transit, where possible, and ideally situated in hubs with other amenities to increase transportation viability and options for residents of all ages and abilities.<sup>2</sup>

Well-connected cycling and transit networks can extend the accessible distance to amenities. For example, in 15 minutes people can typically walk about 1.2 km, but can cycle 3.8 km (over three times as far). When land use planning and transportation networks consider integration of cycling and transit options, residents can access a broader range of destinations without having to rely on driving.



## WHAT IS A “REASONABLE WALKING DISTANCE”?

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Based on average walking speeds, the typical adult can walk about 400 m in five minutes.<sup>3</sup> This means that in 15- to 20-minutes, they can walk approximately 1.2 to 1.6 km. Children, older adults, and people with reduced mobility typically have slower walking speeds, which should be considered when situating some community destinations.

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### Transportation options

- Grid street network patterns, with block lengths of 200 m or less.
- Highly connected street networks.
- Sidewalks that are at least 1.8 m wide and 2.0 to 4.0 m in areas with high pedestrian volume.
- Frequent crossing opportunities.
- Access to transit, where feasible with transit stops that are accessible.
- All Ages and Abilities (AAA) cycling networks (see page 11).
- Bicycle parking and, where appropriate, end of trip facilities.
- Micromobility, carsharing and electric vehicle (EV) use is supported.



## ENHANCING STREET CONNECTIONS

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Research has found that highly connected street networks with higher intersection densities (e.g., more intersections per area) can support a greater range of transportation options, and increase walking, cycling and transit use. Schlossberg et al. (2009) used a student travel survey to highlight how higher intersection densities increase students’ chances of walking by up to five times.<sup>4</sup> Ozbil et al. (2009) found that street connectivity is essential for transit users, especially at an 800 m distance from transit facilities which can increase the opportunity to use transit.<sup>5</sup>

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## ALL AGES AND ABILITIES AT FACILITIES

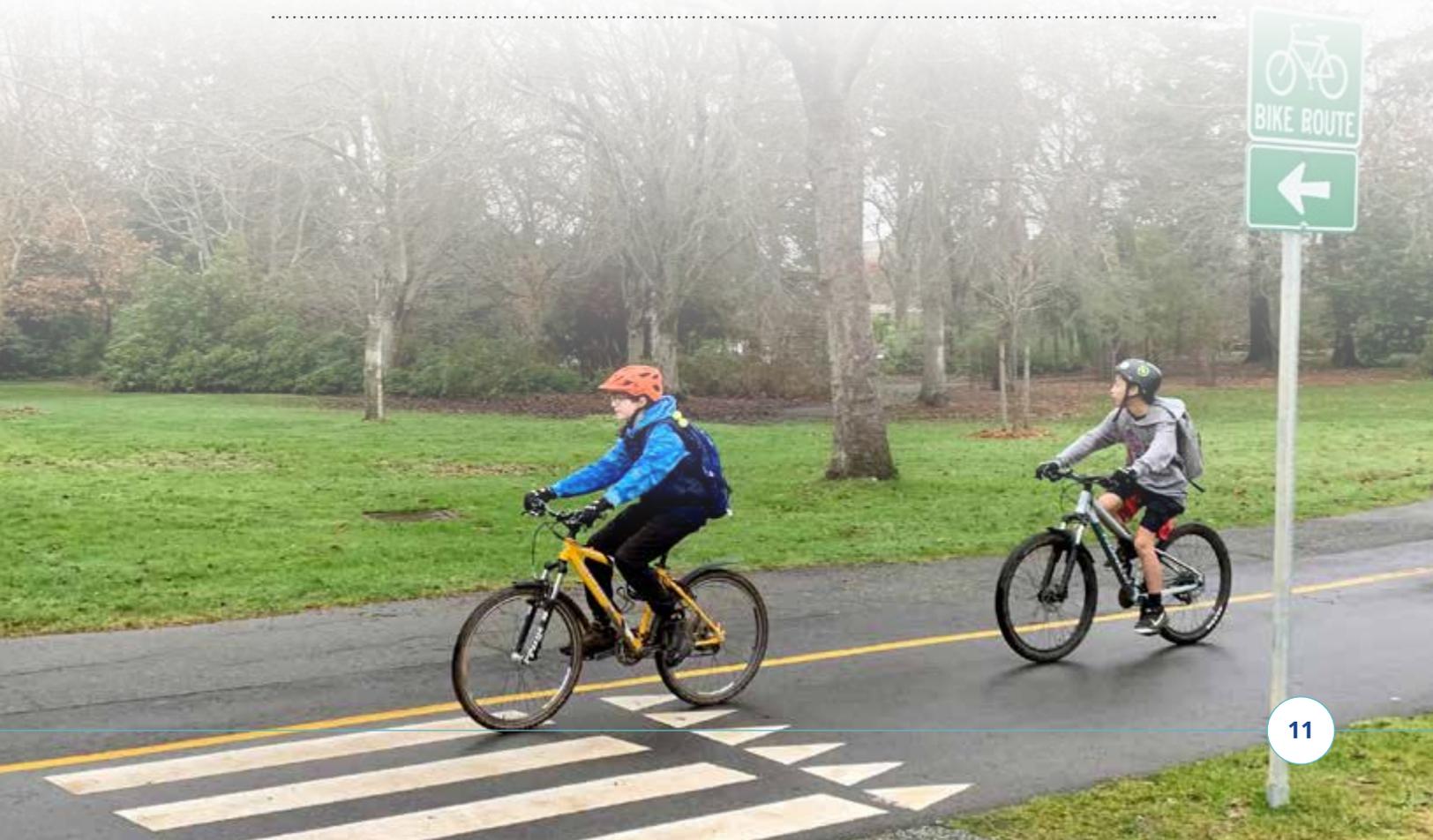
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All Ages and Abilities or “AAA” refers to active transportation facilities that are comfortable, convenient, safe, and attractive for everyone, regardless of age or ability. Designing and providing AAA facilities strengthens community connections and supports a more accessible and equitable transportation system for a broader range of users.

For walking and rolling using a wheelchair or mobility device, AAA design means providing physical separation from the roadway in the form of sidewalks and multi-use pathways. For cycling, skateboarding, scooters, and other similar devices, AAA design is dependent on context. On streets with low traffic speeds and volumes, it may be comfortable for people cycling to share the road with motor vehicles – a facility often referred to as a neighbourhood bikeway. However, on busier streets with higher traffic speeds and volumes, AAA design means providing physical separation in the form of off-street, multi-use pathways or protected bike lanes.

The [B.C. Active Transportation Design Guide](#) provides additional detail on AAA facility selection and design.

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## Efficient use of infrastructure

- Lifecycle costing considered when making decisions regarding development.
- Investments have been made in good asset management practices.



### WHERE TO FIND GUIDANCE ON ASSET MANAGEMENT

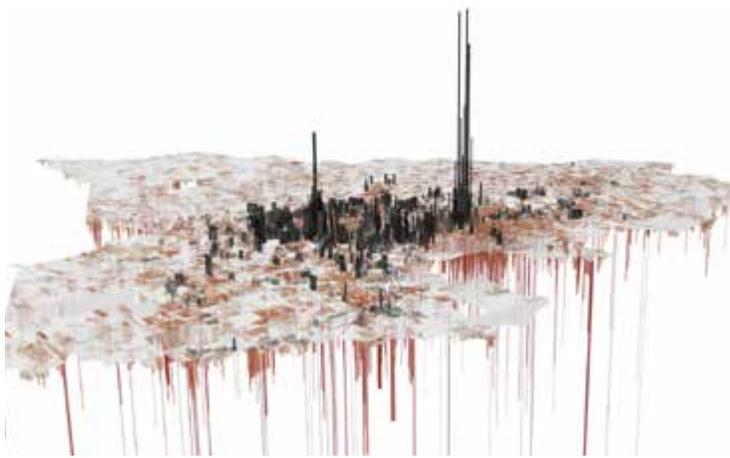
There are many asset management resources available to help communities ensure that cost of services are being recovered. The [BC Framework for Sustainable Service Delivery](#) is a useful reference document to understanding the what, why, and how of asset management.<sup>6</sup> The Federation of Canadian Municipalities has an [asset management resource library](#) available on its website that includes a collection of guides, case studies, educational resources, and other tools.<sup>7</sup>





## ECONOMIC PRODUCTIVITY

Urban3 performed an analysis of Lafayette, Louisiana, comparing the cost of service delivery throughout the city with the economic productivity of different land use patterns, as measured by property tax revenue per acre. The areas represented in black are revenue positive and the areas in red are revenue negative. In this model, the taller the black spike, the greater the contribution towards the city's infrastructure servicing costs, illustrating that the costs of providing infrastructure services to less complete (in this case, lower-density) areas appeared to be subsidized by more complete areas (in this case, the downtown core).



(Urban3)

## Additional elements

Other important elements include natural environment and the public realm. Both enhance health and well-being, quality of life, and social interaction through a well-connected built and natural environment that offers many options for active living and connections between people including safe, inclusive, and universally accessible open spaces.



### THE 3-30-300 RULE

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Some communities have started to consider adopting the 3-30-300 rule to promote equity, health, and wellbeing. This concept was introduced by Konijnendijk (2021) as a response to both the COVID-19 pandemic and climate change.<sup>8</sup> The 3-30-300 rule is the idea that everyone should be able to see at least three trees from their home, communities should ensure there is a 30 percent tree canopy in all neighbourhoods, and that everyone should be living within 300 m of a park.

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### PROXIMITY TO THE NATURAL ENVIRONMENT

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Research shows that living near natural environment enhances well-being and quality of life. For example, McPherson et al. (2011) found that seeing trees and nature from one's residence may help improve mental health.<sup>9</sup> Proximity green spaces can also play a role in physical wellbeing.<sup>10</sup>

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## DESIGNING EQUITABLE AND INCLUSIVE SPACES

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Public spaces have a significant role in enhancing community life and can provide many benefits. Access to public space can foster social connections, improve health and well-being, and provide opportunities for physical activity and recreation (UN Habitat, 2016).<sup>11</sup> It is important to recognize that public spaces are experienced and perceived differently by different groups and individuals. The design of a public space can directly contribute to people's access and comfort within these spaces.

Applying an intersectional, equity-focused lens to the planning, design, and implementation of public spaces is essential to ensure that these spaces are inclusive, safe, and accessible for everyone in the community.

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## 1.2 Why do a complete communities assessment?

A first step in aligning and advancing community goals through creating more complete communities is to assess the current state of completeness. This assessment can assist in determining potential strengths, challenges, and opportunities for advancing a community's identified goals, which might include accommodating additional housing capacity, tackling community emissions from transportation, supporting infill and reducing sprawl, supporting local small businesses, and ensuring infrastructure decisions take lifecycle costing into account.

The purpose of this Guide is to support communities in conducting complete communities assessments, which might be undertaken as part of:

- **Aligning plans to meet multiple objectives.** For example, to inform alignment between an official community plan and a climate plan, or between housing strategies and transportation master plans.
- **Community planning processes.** For example, to inform an update to a local government's official community plan, regional growth strategy, zoning bylaw, or neighbourhood/secondary plan; housing needs report; an asset management or natural asset management plan; a master plan (e.g., an active transportation plan); or as part of another strategic or service planning process, such as the achievement of council or board priorities or monitoring progress on an existing plan or policy.
- **Ensuring equity in community planning.** For example, understanding the current landscape and how the built environment (housing, transportation, and other community infrastructure) affects different demographic groups.
- **A dedicated complete communities study.** For example, some local governments may see benefit in conducting a standalone complete communities assessment to step back and look comprehensively at opportunities to achieve goals identified in their official community plan, regional growth strategy, council or board strategic plan, climate action plan, or other strategies.

An assessment could be used to inform decisions about:

- **How to plan for identified housing needs.** For example, adding a spatial element to an existing or future housing needs report to help identify where locating needed housing might support additional community goals (walkability, small business economy, equity, etc.).
- **How to improve connections between destinations.** For example, to identify new sidewalk connections, cycling infrastructure, or improve transit frequency between destinations to create a range of options for all ages and abilities.

- **Where to direct growth.** For example, where to diversify housing options, encourage a greater mix of land uses, allow mixed use development, focus amenities and services, and/or allow currently undeveloped areas to be developed, or redeveloped.
- **Whether to proceed with specific developments or investments.** For example, to support decisions on re-zoning applications, where to site new major facilities, or where to focus investments in other community infrastructure.

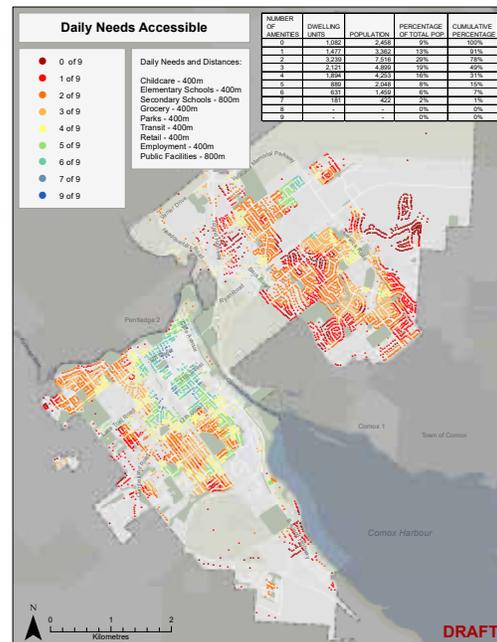
The concepts, examples, methods, and information offered in the Guide can also be woven into organizational or community discussions about a community’s planning processes and the opportunities to become more complete to support their identified goals.



## INFORMING THE COMMUNITY PLANNING PROCESS

The City of Courtenay recently updated its official community plan. As part of the process, the City engaged with residents about the future of Courtenay, including about many elements that make up complete communities.

The City also conducted a spatial analysis of several indicators of the built environment, demographics, and travel behaviour to inform conversations for its official community plan review process. The analysis provided council, local government staff, and residents a broader understanding of the community’s strengths, opportunities, and challenges.



(City of Courtenay)



## SUPPORTING REGIONAL GROWTH STRATEGY GOALS

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The [Comox Valley Regional District \(CVRD\) regional growth strategy](#) provides a shared vision for managing growth and community impacts in their diverse urban and rural neighbourhoods. It is a commitment made by the CVRD, the City of Courtenay, the Town of Comox, and the Village of Cumberland to work together to promote communities that are socially, economically and environmentally sustainable for generations to come. One of core themes of the regional growth strategy is complete communities. The CVRD developed a [performance dashboard](#), which focuses on monitoring progress towards achieving each of the eight regional growth strategy goals and underlying objectives.

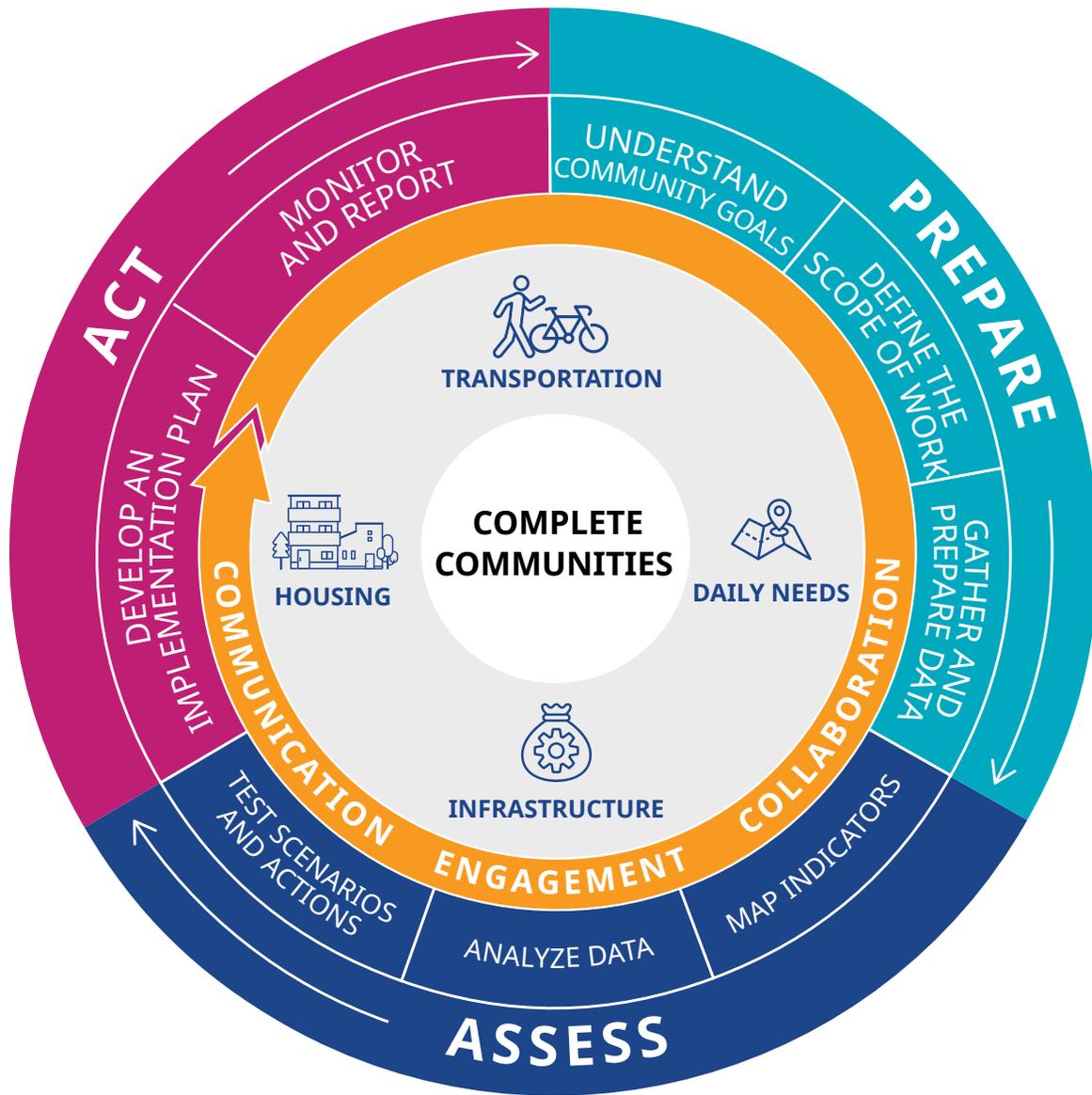
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### 1.3 What is the assessment process?

The complete communities assessment process described in this Guide outlines how a local government can assess a community's current completeness to gain insights into strengths, opportunities, and challenges related to its built environment and determine what types of actions could support identified community goals through creating more complete communities. The process involves spatial assessment methods and communication and engagement to look at the community through the four lenses of Housing, Daily Needs, Transportation, and Infrastructure, which reflect the key elements and characteristics of complete communities identified above.

The process is ongoing and iterative, as opposed to linear: once actions have been taken, communities may want to repeat the process as part of ongoing monitoring and adaptation to understand whether actions taken are achieving the desired result(s) and if changes to actions may be needed.

The assessment process includes eight steps over three phases:



## 1.4 How does a community's context fit in?

A community's context and the local government's organizational capacity play a role in determining the scope of an assessment. The processes and tools used in the Guide are not one-size-fits-all. Local governments may choose to adapt components of the process to their own context, to reflect specific decisions they need to make or outcomes they hope to achieve. The assessment process is intended to be flexible and can be adapted to fit each community's needs – the choice of which elements, indicators, and types of analysis are most important will depend on the goals of the community.



### OUR SACRED LAND

First Nations governing bodies may choose to undertake a complete community assessment themselves, or in partnership with neighbouring local governments. When conducting complete communities assessments First Nations governing bodies and local governments may wish to incorporate aspects of [Our Sacred Land: Indigenous Peoples' Community Land Use Planning Handbook in BC](#). For example, they may wish to conduct community mapping that includes Traditional Use Studies or Use and Occupancy Map Surveys, and land capacity and constraints analysis.

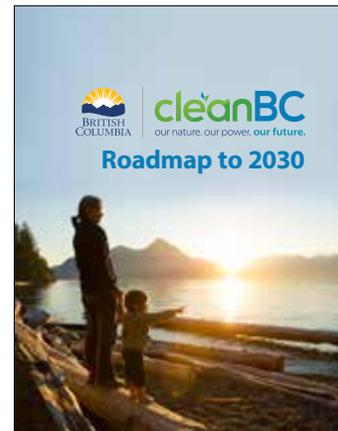


## 1.5 How does this connect to other Provincial strategies?

### **CleanBC Roadmap to 2030**

This Guide aligns with commitments identified in the [CleanBC Roadmap to 2030](#). The roadmap is the Province’s plan to achieve its emissions reduction targets while building a cleaner economy that benefits everyone.

The roadmap’s “communities pathway” highlights the important role B.C.’s local governments play in meeting provincial climate targets. Local government land use decisions affect people’s daily lives and play a large role in shaping how communities will look, feel and function in the future. This Guide is part of the Provincial commitment to support local governments in aligning land use and transportation planning to build connected, mixed use communities where more people can live closer to jobs, services and transportation choices, and helping to reduce commute times and GHG emissions.

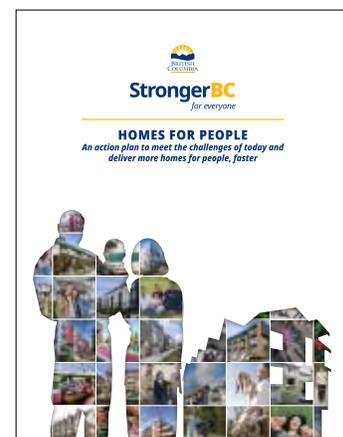


### **BC Climate Action Charter**

All B.C. local governments are signatories to the [B.C. Climate Action Charter](#). This Guide supports signatories to fulfill their commitment to create complete, compact, and more energy efficient communities. Applying the approaches and actions offered in the Guide may enable local governments build on progress that is already being made.

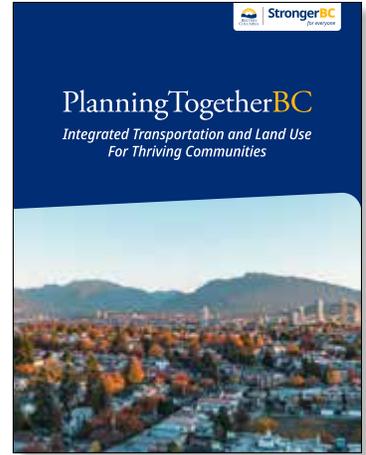
### **Homes for People**

The [Province's Homes for People](#) plan focuses on delivering the homes people need more quickly and building more vibrant communities throughout B.C. The action plan outlines a framework to create the quantity and diversity of housing needed through actions that include: delivering more middle-income small scale, multi-unit dwellings and delivering thousands of new homes near public transit.



## Integrating land use with sustainable transportation

Planning Together BC (PTBC) is a provincial initiative to align transportation and land use decisions and investments with broader government objectives. PTBC is advancing an integrated transportation planning approach to better align transportation and land use planning by enhancing current planning processes to help focus government policy, and coordinate with local governments and First Nations on economic development and land use planning initiatives. This initiative supports the concept of creating more complete communities by looking at the built environment as a complete system to proactively direct community growth, improve access, and generate economic prosperity. Creating more complete communities – particularly in supporting active transportation, transit infrastructure, and related investments – is a focus of the PTBC framework.





## 2 | PREPARE



## Phase 1: Prepare

Step 1: Understand the community's goals

Step 2: Define the scope of work

Step 3: Gather and prepare the data



Phase 1 involves considering:

- Which identified community goals would be advanced by creating more complete communities?
- What types of goals will the assessment support?
- Why do an assessment now?
- Who will be involved in the process? How will they be involved?
- What current strengths and opportunities does the community have that it would like to leverage?
- What information sourced from the community and/or engagement processes might support the assessment?
- What types of challenges is the community encountering when trying to create more complete communities?
- Will the assessment process be a standalone project, or part of another study or planning process?

## STEP 1: UNDERSTAND THE COMMUNITY'S GOALS

Identifying a community's goals is an important part of preparing to do a complete communities assessment. These goals will inform the scope and scale of an assessment, as well as the data inputs needed to undertake the project. These goals can also provide the rationale for moving towards complete communities and act as a basis for monitoring future actions.

To identify the community's goals that may be supported by creating more complete communities, compile and review strategic documents (e.g., official community plan, regional growth strategy) and other plans and strategies (e.g., an asset management plan, climate action plan, housing strategy, and council/board-identified priorities). Key questions to answer as this review is undertaken include:

- What vision for the community is articulated in the document(s)?
- How current is/are the document(s)? Do the goals articulated in the document(s) reflect the community's current goals and values? What are the community's goals related to the following:
  - Housing
  - Transportation
  - Climate
  - Infrastructure
  - Health and well-being?
- What progress has already been made towards these goals? Are there previous actions that could be evaluated through an assessment?



## CONNECTING OTHER PLANS TO COMPLETE COMMUNITIES

[The City of Burnaby's transportation plan](#) describes a vision for the transportation system: the system “will contribute to a vibrant and prosperous community by connecting people, places and goods; provide safe, accessible, healthy and sustainable transportation options and choice for all people; and, support the ecological integrity of the environment.” This vision is supported by six goals:



(City of Burnaby)

Many of these goals relate to creating more complete communities by encouraging walkability and sustainable forms of transportation. They also respond to the relationship between housing and transportation costs by integrating land use and transportation considerations. Finally, they prioritize public realm and placemaking.

Specific examples of linkages to complete communities in the plan include the focus on integrating housing and transportation options. The plan recognizes that housing and transportation costs are often the two largest expenditures for households and there is a trade-off between household location and transportation costs. Housing options located where households have access to sustainable, cost-effective transportation options and that are in proximity to places of employment and daily needs may reduce overall household costs.

While many communities have similar goals, each may want to use different strategies to reach them. These various approaches allow for informed and context specific decision-making about how to create more complete communities. For example, desired levels of housing density or transit service may be quite different in large urban centres compared to smaller or more rural communities.

## STEP 2: DEFINE THE SCOPE OF WORK

Determining the scope of the assessment will ensure the project is properly resourced and the outcomes are achievable.

### Define the assessment purpose

To help define the purpose of the complete communities assessment, consider:

- Why is this assessment needed, and why is it needed now?
- What specific decision(s) will the outcomes of the assessment help inform?
- Will the assessment be undertaken as part of another study or planning process, or as a standalone process?

### Assemble the project team

Undertaking an assessment is an interdisciplinary task, relying on the expertise of staff from various disciplines including engineers, land use planners, operations staff, finance staff, geospatial technicians, and others.

When building a team to undertake an assessment, consider:

- Which business unit will take the lead and who will manage the project?
- Is there a project sponsor? Is there clear support or endorsement of council, the board, or other decision-makers to conduct this assessment?
- Who should be on the team to provide interdisciplinary expertise? The team's collective expertise should align with the complete community elements selected for the scope of the assessment.
- What project decision-making structure and processes will the team be using?

Brainstorm and confirm the priorities, purpose of the assessment, and scope with input from team members. Their perspectives will help ensure the assessment is informed.



## AN INTERDISCIPLINARY EXERCISE

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Assessments are exercises in “sense-making” and should not be done by a single department. The following are examples of potential project team members common to local governments:

- **Engineering** may bring knowledge on completeness of infrastructure information and information on why certain areas are serviced the way they are. The department might also have data on servicing, infrastructure capacity, maintenance, or traffic impacts.
  - **Finance** may offer more detail on how infrastructure and services are paid for.
  - **Planning and/or Development Services** may add more detail on current and past developments, land use decisions and challenges, and encumbrances.
  - **CAO or City Manager** might be able to comment on why various applicable decisions were made. They are also important in championing the assessment process.
  - **Public Works or Operations** may point out issues with infrastructure and provide input on how well services and amenities are meeting needs based on service calls they receive.
-

## Define the study area

The assessment process outlined in this Guide is intended to be flexible and scalable so it can be conducted for a neighbourhood, town, city, or region. Assessments could be conducted for a single area, or for multiple areas. The study area(s) should be tailored to ensure the assessment is achievable and at a reasonable scope, scale, and level of detail. Examples include:

- **Community A's** priorities are encouraging economic development in the downtown core, avoiding sprawl (low density, segregated uses, greenfield development), and supporting more housing. The project team may select a study area that focuses on the core area.
- **Community B** is studying multiple areas and corridors to support their recently adopted official community plan which prioritizes an 'urban centres and corridors' approach to managing growth and creating transportation options. The assessment will allow them to focus in detail on each of these future urban centres.
- **Community C** is opting to assess its entire footprint within its boundaries. They are considering an upcoming official community plan review and are incorporating the findings of their housing needs report. The assessment will be a key technical input and conversation-starter for both the official community plan and a potential housing strategy, particularly on the topic of encouraging housing to address their current and anticipated housing needs.

When defining the study area, consider if the community is geographically separated or adjacent to other communities in a metropolitan region. Base maps, Provincial Digital Road Atlas, and administrative boundaries data are useful for illustrating a regional context.



## WHAT DOES “RURAL” MEAN?

The term “rural” covers a range of community types. The [B.C. Active Transportation Design Guide](#) defines three categories of rural contexts: **developed rural cores**, **outer developed rural**, and **basic rural**. These categories do not necessarily align with municipal or regional district boundaries, but rather are based on development patterns:

- **Developed Rural Cores** are regional centres with concentrations of residents, services, businesses, and community destinations. Improving the completeness of these areas can help achieve many types of goals, even if people still need to travel some distance from their home to the developed rural core.
- **Outer Developed Rural** are small communities from which people travel to developed rural cores for employment, services, shopping, school, or recreation. It is important to consider connectivity between outer developed rural communities and developed rural cores.
- **Basic Rural** are communities with limited social or economic links to developed rural cores, and with large distances between communities and destinations. In this context, many roadways may be under Provincial jurisdiction, particularly for unincorporated rural communities. There is likely limited development in basic rural communities.



Conceptual Rural Classifications – Armstrong, Enderby, and Spallumcheen Area

## Develop a communication and engagement plan

Throughout the assessment process, it is helpful to be intentional about who is engaged, how, and when. A communication and engagement plan may be developed at the outset and then implemented, monitored, and adjusted throughout the assessment process, as required.

The [International Association for Public Participation \(IAP2\) spectrum of participation](#) includes **inform, consult, involve, collaborate**, and **empower** levels of engagement. The desired level of engagement in the project will depend on the purpose of the assessment and the community's interest in the assessment outcomes. The level of engagement may vary throughout the project. For example, early in the assessment process, community members may be engaged at an "involve" level to participate in data gathering (walking audits) and to survey their perceptions of strengths, opportunities, and challenges of the study area.

Key questions to consider in undertaking a comm and engagement plan are:

- What are the objectives and measures of success to guide the approach to communication and engagement?
- Who are the individuals and/or groups who may be interested in the assessment, and/or can help influence identified actions and potential outcomes?
- Are there some groups who may be underrepresented in community engagement processes? Are there ways to increase inclusivity in outreach and engagement?
- What are each party's interests? Empathy mapping can be a helpful exercise to encourage looking at the assessment from different perspectives.
- Where on the IAP2 spectrum would each type of participant be engaged through each phase of the assessment process?
- What are the key messages?



## INCORPORATING INPUT FROM PUBLIC ENGAGEMENT

As part of the City of Ottawa's Official Plan review process, the City conducted a combined public engagement and spatial analysis related to the City's goal of creating more 15-minute neighbourhoods. The City conducted a public survey to help define key amenities residents thought were most important to have within walking distance of home. The survey included 4,000 responses and asked the following questions:

- What do people prioritize within their neighbourhood?
- What is missing?
- How do people get around?
- What factors and elements affect people's safety and enjoyment of walking?



**Housing**  
(i.e., low, medium and high rise)



**Retail, Commercial and Health Services**  
(e.g., grocery stores, pharmacies, doctor's offices)



**Public Service Facilities**  
(e.g., recreation facilities, libraries, indoor community centres)



**Education**  
(e.g., schools, licensed child care)

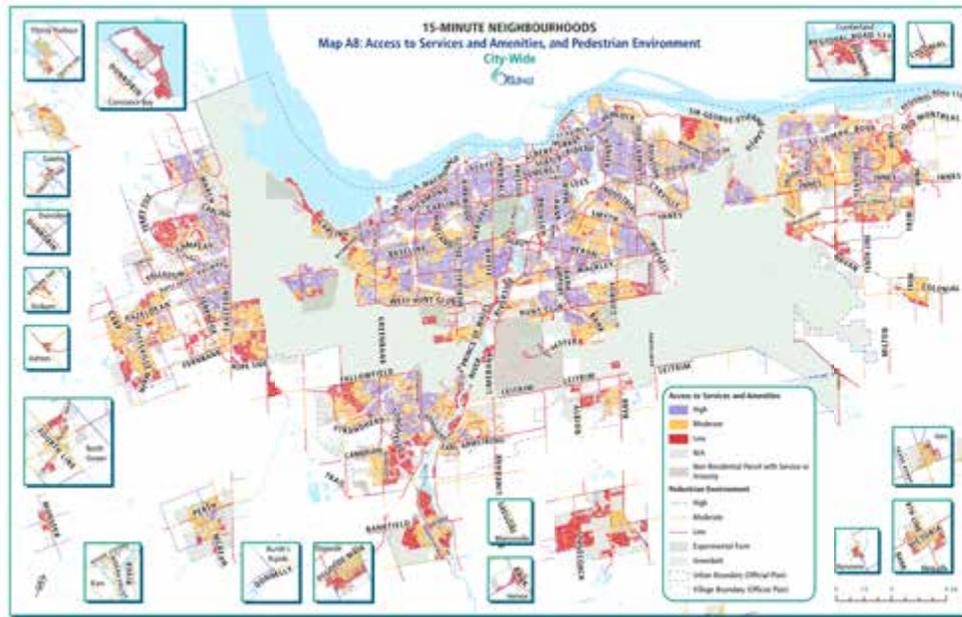


**Parks and Greenspaces**  
(e.g., playgrounds, pathways)



**Sustainable Mobility**  
(e.g., cycling facilities, sidewalks, transit)

(City of Ottawa)



(City of Ottawa)

The analysis linked postal codes to survey responses to understand results and priorities based on location. Grocery stores were the highest priority amenity city-wide, followed by parks, retail or commercial uses, and bus stops. The most important factors in creating a safe and enjoyable walking experience were good maintenance, safe intersections, and protecting and buffering pedestrians from vehicle traffic. The City also conducted a supplementary rural survey to understand unique issues in rural contexts.

## PART 2

**STEP 3: GATHER AND PREPARE THE DATA**

A complete communities assessment involves compiling, analyzing, and making sense of a variety of data, so it is important to ensure that adequate data are available to support the assessment. Geospatial data (data that is associated with geographic locations) are a key input to the assessment process. It is also important to consider community demographics and data about the physical environment in the assessment, as they provide context for the analysis and identification of potential actions.

**Data Types and Sources**

Data types typically required for an assessment include:

- Census data (Statistics Canada)
- Provincial Digital Road Atlas (DRA)
- BC Assessment Actual Use Codes
- Transit data (BC Transit and TransLink General Transit Feed Specification)
- Sidewalk and walking trail data
- Official community plan land use designations
- Zoning (geospatial maps of zones)
- Infrastructure data such as location and replacement cost
- Tax revenue data

It could also include:

- Topographic maps
- Flood maps
- Environmentally sensitive areas
- Natural hazard areas
- Agricultural Land Reserve (ALR)
- Federal and Provincial Crown Land

When gathering data, consider:

- What data (geospatial and other) is available or is easy to acquire?
- What data is available but needs to be converted to geospatial format?
- What data needs to be collected in geospatial format?
- What will be the level of effort involved to collect that data?

Based on answers to the above questions, the assessment scope may need to be refined to include data collection, digitizing, and/or conversion to geospatial file format.



## LEVERAGING PUBLICLY AVAILABLE DATA

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The assessment process makes use of datasets that are commonly maintained by local governments as well as existing publicly available datasets. The lenses and indicators in this Guide were selected to minimize the need to collect new data; however data collection may be necessary. The Province is working with the [Integrated Cadastral Information \(ICI\) Society](#) to assemble publicly available data that local governments and First Nation governing bodies can access and download to conduct assessments.

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## Review demographic and other contextual data

Complete communities assessments analyze the built environment. The built environment impacts people in certain ways, such as influencing travel behaviour and distance travelled to access jobs and services. It can be helpful to also consider a community's demographics when undertaking an assessment, such as considering:

- How has the community's population changed over the past decade or two? Where is the population concentrated and where is it dispersed? Are there associated impacts related to the demand for housing options, transportation, and services.
- Does the demographic information demonstrate the need to support people aging in place? What are the trends related to younger age groups? How might these demographic trends influence community priorities?

Much of this data is available through Statistics Canada's Census Profiles for a range of geographic scales (dissemination area, census tract, etc.). Census data can also be supplemented by local data, such as from public surveys.

Understanding demographics supports considering equity in an assessment. Equity can be defined as "the fair distribution of opportunities, power, and resources to meet the needs of all people, regardless of age, ability, gender, income, education level, or cultural background."<sup>12</sup> This may mean providing support based on an individual's level of need, instead of providing everyone the same amount of support.

Many people experience barriers when travelling to or accessing services and amenities, whether caused by age, ability, ethnicity, faith, national origin, socio-economic status, sexual orientation, or gender identity. By taking steps to understand and remove barriers, local governments and their communities can make it easier for everyone to access the opportunities they need to thrive. Considering equity from the start of the assessment process will help ensure it is part of the analysis and potential actions.

Other important contextual considerations include the physical environment and vacant and underutilized land.

Physical Environment:

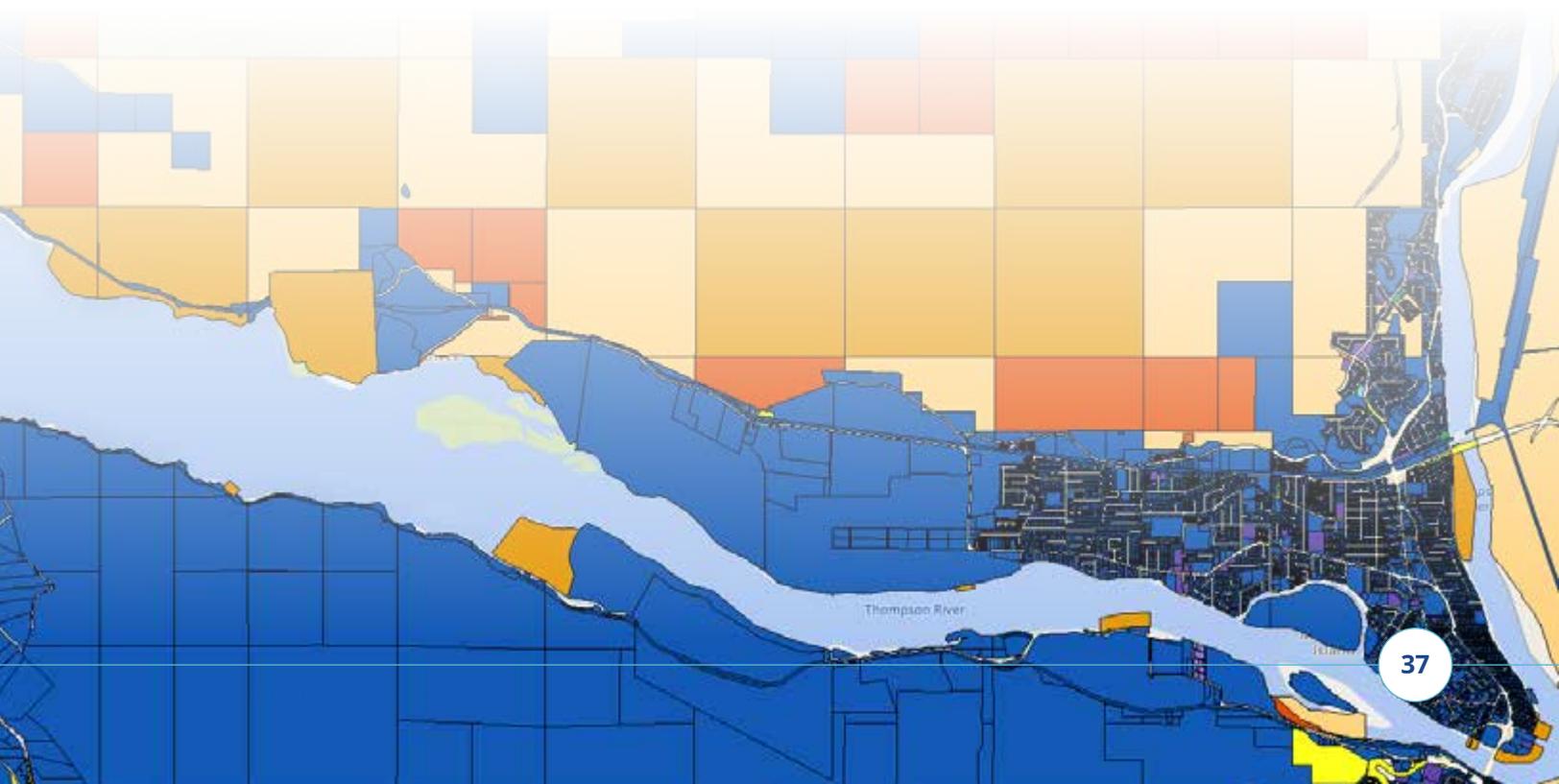
- What topographic and environmental conditions shape the assessment? Is there steep topography, watercourses, floodplains, environmentally sensitive areas, or lands within the Agricultural Land Reserve, that constrain the buildable area of the community?

Land ownership:

- What land is owned by the local government?
- What land is owned by other public jurisdictions?
- What land is privately owned?

Vacant and underutilized land:

- Which parcels in the community are currently vacant? BC Assessment data can be used to identify parcels with a vacant use code.
- Which parcels in the community are underutilized? This relates to identifying parcels that could be redeveloped (infill) and relies on the local knowledge of the project team members. Economic development plans and the community's official community plan may also be a resource.





## INCORPORATING EQUITY

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In a growing region like Metro Vancouver, incorporating social equity into regional growth planning is crucial to ensuring that the region moves forward in an equitable and inclusive manner. In 2021, Metro Vancouver conducted a [“Social Equity and Regional Growth Study”](#) to identify how social equity considerations can better inform regional growth planning.

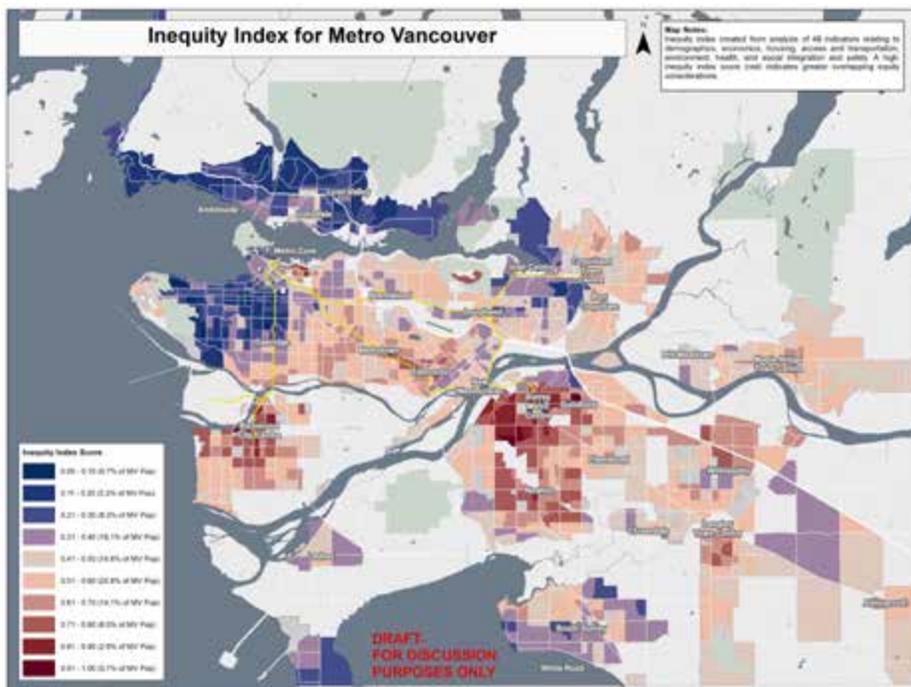
The specific goals of this study were to:

- Develop a quantitative and spatial understanding of the existing inequities within the Metro Vancouver region, as these relate to growth management.
- Develop a qualitative understanding of how social equity context experts would like to see equity defined and addressed within long-range land use policies.
- Create an approach to synthesize the findings from the previous two items into an analysis and a set of clear, actionable recommendations for incorporating social equity considerations into new and existing policy language and implementation practices, including the development of a social equity analysis tool that could be applied to Metro Vancouver’s updated regional growth strategy.

The quantitative spatial research undertaken in the study was developed by mapping a series of 49 social equity indicators, producing an inequity baseline. This was the first inequity baseline developed for Metro Vancouver, and one of the first of its kind in Canada to bring together the data in this way. Indicators were divided into the following categories:

- Demographics-related indicators
- Conditions-related indicators
  - Economics
  - Housing
  - Education
  - Environment
  - Access and transportation
  - Social integration and safety
  - Health

While working towards social equity is an ongoing process that requires collaboration, partnerships, and consideration of the varied and changing communities throughout the region, the research and mapping were key considerations in the development of [Metro 2050, Metro Vancouver’s new regional growth strategy](#).



(Metro Vancouver Regional District)



## HEALTHY CONNECTED NEIGHBOURHOODS

The City of Portland is developing a Healthy Connected Neighborhood Strategy, with an aim to build a healthy, connected city. Portland defines complete neighbourhoods as “places that support the health and well-being of Portlanders of all ages and abilities.”

Today, only about half of Portlanders live in complete neighbourhoods. Increasingly, it is lower income households and Portlanders of colour who are not able to live in complete neighborhoods. Growth over the next 25 years can be used to give more Portlanders access to more complete neighborhoods: the City’s goal is that 80 percent of the population will be living in complete neighborhoods by 2035.

To be considered a complete neighbourhood, five of the following seven factors are required:

- **Pedestrian:** Streets with sidewalks on at least one side.
- **Bicycle:** ¼ mile (400 m) to a trail or greenway.
- **Transit:** ½ mile (800 m) to rapid transit, ¼ mile (400 m) to frequent transit, or 1/8 mile (200 m) to regular transit service.
- **Parks:** ½ mile (800 m) to a neighbourhood park and 3 miles (~5 km) to a community centre.
- **Healthy food:** ½ mile (800 m) to a store.
- **Commercial services:** ½ mile (800 m) to business/service cluster.
- **Elementary school:** 1 mile (1.6 km) to a public elementary school.





# 3 | ASSESS



## Phase 2: Assess

Step 4: Map indicators

Step 5: Analyze the data

Step 6: Test scenarios and actions



Once the project has been scoped, the community's context and goals understood, and the data gathered, it is time to begin the assessment. The next steps in the process are:

- Look at your community through each of the lenses, both individually and together, by measuring each indicator.
- Bring all the maps together to analyze and assess the community, including identifying strengths, opportunities, and challenges.
- Explore different actions and scenarios for creating more complete communities.

### STEP 4: MAP INDICATORS

Project teams can use indicators to assess communities then to identify strengths, opportunities, and challenges. In this step, data is used to map and measure each of the indicators nested under each lens (housing, daily needs, transportation, and infrastructure). The output will be a series of datasets, one for each indicator, including spatial maps, community input, and other observational data gathered through the process.

Each indicator dataset generated from this step could prompt useful conversations about the community's completeness. However, the value in the assessment process comes from bringing together all the information generated through the assessment process to make connections *between* the indicators and lenses. This enables a more *complete* conversation about strengths, opportunities, and challenges before exploring and deciding which actions to take.

The content in this step is organized by lens, and describes the following:

- What is the lens and why is it important?
- Indicators to measure each lens spatially.
- Steps to complete the indicator.

16 key indicators, organized among the four lenses, are included in the assessment process. These indicators provide foundational knowledge and, for many, publicly available data can be used. This Guide also suggests additional indicators for consideration in the assessment if the resulting information will contribute to the purpose of the assessment. The resources and data to measure the additional indicators may not be a priority in every community. Beyond the indicators identified in this Guide, communities are encouraged to identify and measure additional indicators that will contribute to their assessment's purpose.

Most of the key indicators can be classified in one of these ways:

- **Proximity:** the ability for residents to reach services and amenities such as commercial areas, parks, and transit. Proximity is typically expressed as the percentage of people in the measurement area that are within a defined travelling distance to that indicator (% population in the measurement area).
- **Density:** the quantity of something within a defined area, such as density of dwellings or intersections. Density-type indicators are expressed as the quantity of the indicator divided by the measurement area (quantity/area).
- **Mix:** the degree to which various types of things are present within a defined area, such as a mix of housing types within an area. Mix-type characteristics are expressed as a decimal value between 0 and 1, where 1 indicates the presence of all possible characteristics and 0 represents the presence of a single characteristics over the measurement area.
- **Proportion:** the ratio of one thing relative to all other things in the same category, such as the ratio of primary rental housing units to total housing units, in each measurement area. Proportion-type indicators are expressed as a decimal value between 0 and 1, where 0 represents no presence of the characteristics and 1 represents complete presence of the characteristic. They could also be expressed as a percentage.

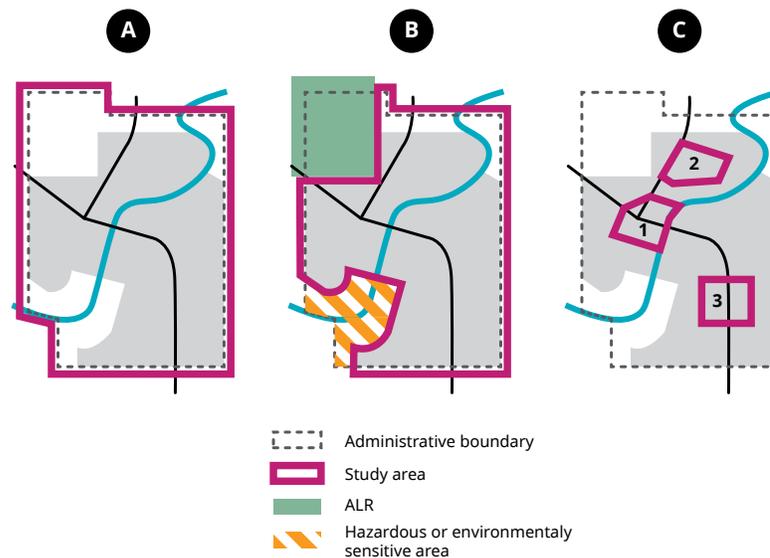


## CHOOSE ANALYSIS GEOGRAPHY

As noted in phase 1, an assessment can be conducted for different study areas and at different scales, depending on the purpose of the assessment. Analyses may also use various buffer distances.

**Study areas** could include the area around a node or cluster of amenities and services, a defined neighbourhood, areas where additional density (commercial or residential) could be supported, or the entire land area within a local government's boundaries. Incorporating multiple study areas allows for comparative analysis. Consider excluding large areas of undeveloped Crown land, land in the Agricultural Land Reserve, and hazard lands (floodplain, wildfire interface, hazardous slopes, etc.) from both the overall assessment area and the smaller measurement areas.

In example A, the community has selected the entire footprint within its administrative boundary as the study area. In example B, the community has removed ALR and hazard lands from the study area. In example C, the community has selected its downtown core and two other nodes of interest.



To facilitate the layering of geospatial data for each indicator, use a consistent **measurement area** for the spatial assessment. This does not preclude doing additional analysis at different scales if that aligns with the overall community goals. For most communities, a meaningful measurement area for comparison would be at a scale between a census dissemination block and a neighbourhood. Measurement areas that are too small may produce results that are homogeneous, while measurement areas that are too large can obscure valuable detail about how the community functions. The measurement area will be influenced by the size of the study. For example, large neighbourhoods or areas designated as focal points for growth (centres, nodes, etc.) in an official community plan may require more detailed analysis to capture important nuances. Communities may choose to conduct the analysis at multiple measurement areas to determine which scale provides the most meaningful results.



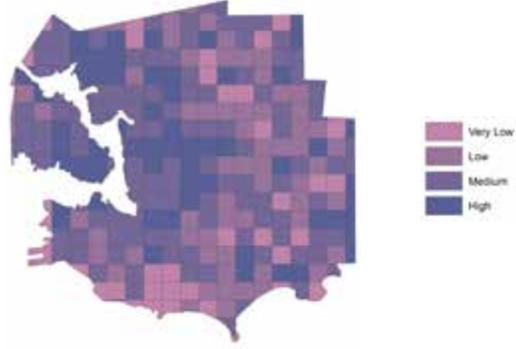
Census dissemination areas



Census dissemination blocks



Neighbourhood geography defined by local government



Analysis grid

The figure below shows the Land Use Mix indicator (Daily Needs lens) mapped in four different types of measurement areas.

A **buffer** is a zone that is delineated around any feature (point, line, or polygon) that encompasses the area within a specified distance of the feature. Buffers are used to measure certain indicators. For example, buffers can be used to represent walking distances from different types of destinations, such as a transit stop. A typical 5-minute walking distance for most people is 400 m. For most daily needs, a 400 m to 800 m buffer distance is suggested, representing a 5- to 10-minute walk. For less-frequent destinations, a range of 800 to 1,600 m might be considered. There is flexibility in the process for local governments to choose which buffer area to apply based on their local context and goals. Where relevant, guidance on choosing buffer areas is provided for each indicator.

When calculating buffer areas, the distance should be calculated using the transportation network features, rather than direct or “crow-fly” distance, as shown below. Buffer areas using the transportation network should be based on road network data and, if available, trail data to ensure all pedestrian connections are captured. Buffer areas using the transportation network provide a more accurate indication of the actual walking distance between two points.

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## THE STREET NETWORK AND COMMUNITY COMPLETENESS

As part of preparing its new official community plan, the City of Courtenay engaged with residents about the future of Courtenay and what elements are part of complete communities. This included providing information on the role of street network design in determining walkability and walking distance. In the examples below, the downtown grid (left) provides the shortest walking distance to the perimeter of the circle, while the large block grid and curvilinear network (middle and right) require longer walking times to reach the same distance from the origin point.



5th Street

Moray Ave

Perth Place

5-minute walk

7-minute walk

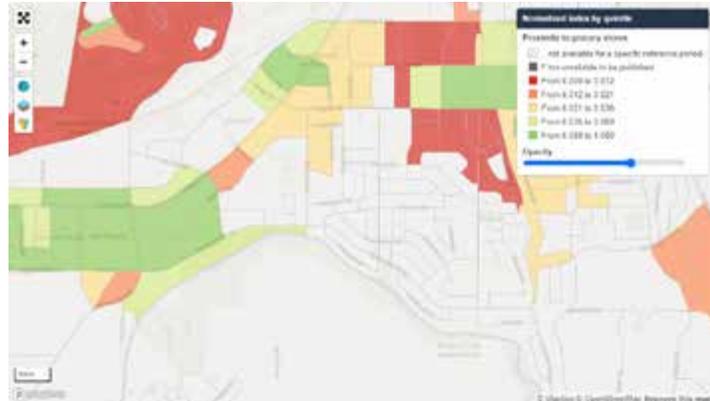
14-minute walk



## PROXIMITY MEASURES DATABASE

In 2020, Statistics Canada and the Canadian Mortgage and Housing Corporation developed the [Proximity Measures Database \(PMD\)](#), a database of spatial proximity measures to services and amenities. The PMD covers the entirety on Canada and the dissemination block scale, providing values for all blocks where data inputs are available.

The PMD includes the following 10 types of amenities and services to which proximity from each dissemination block is measured:



- Employment
- Grocery stores
- Pharmacies
- Health care
- Childcare
- Primary education
- Secondary education
- Public transit
- Neighbourhood parks
- Libraries

The PMD also includes a composite indicator (amenity density) that combines some of the individual proximity measures.



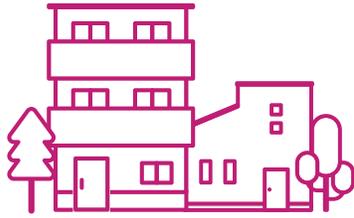
## BUILD ON LEARNINGS FROM YOUR HOUSING NEEDS REPORT

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All local governments in British Columbia are required to prepare a housing needs report every five years. These reports can help local governments better understand and respond to current and future community housing needs. Preparing a housing needs report involves collecting information to identify current and projected housing needs and using that information to prepare and publish an online housing needs report which shows current and projected housing needs for at least the next five years.

Housing needs report information is a key resource for long range planning activities such as updating an official community plan or regional growth strategy. A housing needs report is also a great starting point for assessing a community's completeness as it relates to housing. Some questions that are relevant to a complete communities assessment that should be able to be answered based on a housing needs report are:

- What is the current state of your housing stock?
    - What built-form housing options are available?
    - What housing tenure options are available?
  - Who is currently most in need of housing?
    - Who is most need (renters, families, people with special needs, seniors, individuals experiencing homelessness, etc.)?
    - What population groups are experiencing the highest rates of core housing need?
    - How does current housing (by type and tenure) serve these populations? What might be missing?
    - What tenure and forms of housing are best suited to serve these populations?
  - Where might this housing best be located to serve current needs? For example, in proximity to daily needs and transportation options.
  - What are your community's future housing needs?
    - Consider your projections. What do they tell you about tenure, household type, and unit size?
    - Where might those future housing needs be accommodated?
- .....



## HOUSING LENS AND INDICATORS

Housing is an essential human need. A more complete community can better support the housing needs of everyone who chooses to live there through varied housing types and tenures; for people of different incomes, family sizes, and ages; and at all stages of life.

When diverse housing types and tenures are located in proximity to amenities and services, people of a range of incomes, family sizes, ages, and stages of life can benefit from having their daily needs met close to where they live. Looking at the housing indicators together with transportation indicators can illustrate the extent to which housing and transportation infrastructure decisions have been integrated.

Including housing as an assessment lens allows local governments to build on the findings of their housing needs report and understand how those findings could be analyzed spatially. Considering housing options together with information generated through the other lenses can support more integrated planning and decision-making and help to ensure that new supply of housing is in locations that are close to daily needs and transportation options.

## Summary of indicators and supporting data

Housing needs reports provide the data required to assess housing in a community, as well as other demographic and economic data. While some communities may have access to more robust data sets (e.g., core housing need by demographic group is only available in larger communities from Canada Mortgage and Housing Corporation), all communities will have access to the supporting data on which the key indicators are based.

Key Indicators	Supporting data
<ul style="list-style-type: none"> <li>• Mix of housing types</li> <li>• Proportion of multi-unit housing (existing)</li> <li>• Proportion of multi-unit housing (permitted)</li> <li>• Housing density</li> <li>• Proportion of rental housing</li> </ul>	<ul style="list-style-type: none"> <li>• BC Assessment actual use codes</li> <li>• Local government zoning maps</li> <li>• Non-Profit Housing Association members</li> <li>• BC Assessment conveyance values</li> <li>• Statistics Canada census data</li> <li>• Local government housing needs report</li> </ul>



### Mix of housing (existing)

Mix of housing types for each measurement area. This is expressed on a scale of 0 to 1, with 0 indicating no mix of housing types and 1 indicating a mix of housing types. Areas that result in higher values indicate greater housing mix. This includes housing that is permitted in zones that are not labelled as residential such as mixed use zones.

#### Why measure it?

A greater mix of housing types (and tenures) has potential to offer a range of housing options to accommodate people of all ages, abilities, and income levels and at all stages of life.

Reviewing Mix of Housing indicators with indicators in the Daily Needs lens may help identify areas that currently have a lower mix of housing types, but a higher proximity to daily needs. Focusing housing diversification in these areas can result in better access to services for households with diverse incomes, family compositions, ages, and at different stages of life.

#### Steps

- 1 Collect data
  - Actual use codes (BC Assessment)
  - Parcel Fabric (local government or ICI Society)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Identify the housing types of interest and associated actual land use codes. Choose three to six housing types of interest based on the community's goals and assign the actual use codes in your community to these actual use codes. Typical housing types that can be considered as part of this indicator are single detached (including with suites); duplex and semi-detached; multiplex / townhouse, small apartments (< 5 stories), large apartments (> 5 stories), manufactured homes. Each study area should have a minimum of three housing types of interest. Some communities may have more housing types of interest, including both types of apartment buildings.
- 3 Assign the codes. If using your own parcel fabric, assign the appropriate actual use codes to the data. If your parcel data already contains this information, skip this step.
- 4 Calculate the entropy index value and subsequent indicator score for each measurement area. The total number of housing types used for the calculation should match the overall housing types of interest for the community, and not be limited to the housing types present in each measurement area. As these calculations are slightly more complex, more guidance can be found in Appendix A.
- 5



## Proportion of Multi-Unit Housing (existing)

The proportion of existing housing stock that is multi-unit housing, including small scale multi-unit housing, expressed as percentage of all housing, for each measurement area. This includes housing that is permitted in zones that are not labelled as residential such as mixed-use zones. This indicator is based on BC Assessment actual use codes to reflect what multi-unit housing exists as compared to what is permitted based on zoning data.

### Why measure it?

Most housing needs reports identify a need for diverse housing options that serves households at all stages of life, and multi-unit housing can play a role in providing these options. Multi-unit housing can allow for greater number of people to live in proximity to services and amenities. Generally, there is a positive relationship between the vitality of retail areas and nearby population density: the higher the nearby population density, the greater number of potential pedestrians in a business' walkshed (up to 15- to 20-minute walk), and therefore a greater number of potential customers and employees.

This indicator can be directly compared with the measurement of the Multi-Unit Housing (Allowed) indicator to help understand the relationship between what multi-unit housing exists and what is allowed under current zoning, and whether the proportion of multi-unit housing meets the community's housing needs.

### Steps

- 1 Collect Data
  - Actual use codes (BC Assessment)
  - Parcel fabric (local government or ICI Society)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Census dissemination areas (StatsCan) or selected scale of measurement area
- 3 Determine the total number of residential parcels in each measurement area based on BC Assessment actual use codes.
- 4 Determine total number of multi-unit residential parcels in each measurement area based on BC Assessment actual use codes.
- 5 Determine the proportion of residential parcels in the measurement area that are currently used for multi-unit housing per measurement area.



## Proportion of Multi-unit Housing (permitted)

Proportion of residential parcels that allow multi-unit housing, including small scale multi-unit housing, expressed as percentage of all housing, for each measurement area. This includes housing that is permitted in zones that are not labelled as residential such as mixed use zones. This indicator is based on zoning data to reflect what is possible, as compared to BC Assessment actual use codes to reflect what actually exists.

### Why measure it?

Higher percentages of multi-unit housing that are allowed under the current zoning bylaw indicate opportunities for directing growth, transportation options, and services. This helps create conditions for both increased service and social sustainability.

If the community's housing needs report has identified a need for more diverse tenure options, and housing that serves households at all stages of life, multi-unit housing can play a role in providing these options. Multi-unit housing also allows for greater number of people to live in close proximity to services and amenities, which can help support walkability and make efficient use of infrastructure. This indicator can be directly compared with the Proportion of Multi-Use Housing (Existing) indicator to help understand the relationship between what multi-unit housing exists and what is allowed under the current zoning bylaw, and whether this meets the community's housing needs.

### Steps

- 1 Collect data
  - Geospatial zoning map
  - Parcel fabric (local government or ICI Society)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Determine the total number of parcels that permit residential use in each measurement area based on zoning.
- 3 Determine the number of parcels in each measurement area that are zoned for multi-unit housing.
- 4 Determine the proportion of all residential parcels in each measurement area that are zoned to allow multi-unit housing, relative to the total number of parcels that are zoned to allow any type of housing.



## Housing Density

Total housing units per hectare in each measurement area.

### Why measure it?

Generally, there is a positive relationship between the vitality of retail areas and nearby population density: the higher the nearby population density, the greater number of potential pedestrians in a business' walkshed (up to 15- to 20-minute walk), and therefore a greater number of potential customers and employees. Decisions about housing density, particularly when considering infill development, may provide opportunities to make more efficient use existing infrastructure. Areas with higher housing density may also signal where to focus new infrastructure investment.

This is a data input into a Walkability Index.

### Steps

- 1 Collect data
  - AddressBC (ICI Society)
  - Actual use codes (BC Assessment)
  - Parcel fabric (local government or ICI Society)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Identify residential-only addresses using AddressBC and actual use codes to identify the total number of residential properties.
- 3 Determine the residential density of residential parcel area within each measurement area as units per hectare.



## Proportion of Rental Housing

Proportion of parcels used for primary rental housing (according to actual use codes) for each measurement area, expressed as the ratio of parcels used for primary rental housing to the total number of residential parcels. Primary rental housing refers to purpose-built rental housing. This analysis captures the proportion of purpose-built rental housing in a community; it does not provide information on the secondary rental market (e.g., suites in single detached houses).

### Why measure it?

If a community's housing needs report has identified a need for more diversity of tenure options (e.g., more rental housing), this indicator can illustrate the extent to which this type of tenure option currently exists.

### Steps

- 1 Collect data
  - Data advice (BC Assessment)
  - Actual use codes (BC Assessment)
  - Parcel fabric (local government or ICI Society)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Identify rental residential-only addresses using Address BC and actual use codes to identify the total number of residential properties.
- 3 Determine the proportion of rental residential parcels/addresses within each measurement area as a proportion of total residential addresses.



## DAILY NEEDS LENS AND INDICATORS

Complete communities support people where they live by providing greater proximity to daily needs. This means that local governments may want to ensure that their community or communities include a mix of land uses, including residential, so that it is easier for people to choose walking, cycling or transit to access those destinations.

In this context, “daily needs” refers to services and amenities that people typically access daily or weekly. This includes grocery stores, schools, daycares, and other community facilities which should be within a reasonable walking or cycling distance of home. Ideally, these destinations are also within a reasonable walking distance *of each other*, creating convenient clusters of services and amenities. Needs may also include less frequent destinations such as medical services or arts and culture facilities. The types of services and amenities community members need changes throughout their lives. A complete community should strive to meet the needs of people at all stages of life.

## Summary of indicators and supporting data

Key indicators	Additional indicators	Supporting data
Land use mix	Activity clusters	Statistics Canada census data
Proportion of commercial space	Employment lands	Statistics Canada proximity measures data
Proximity to daily needs (individual or mix of needs)		BC Assessment actual use codes
		Spatial boundaries (such as local government or neighbourhood boundaries)
		Parcel fabric
		Zoning bylaw and maps
		Official community plan land use designations
		Parks and natural areas data



## Land Use Mix

This is both the mixture and diversity of land uses. It is expressed on a scale of 0 to 1 for each measurement area, with 0 indicating no mix of land use and 1 indicating the most diverse mix of land uses. Areas that result in higher values indicate greater land use mix.

Similar to the Mix of Housing Types indicator, measuring Land Use Mix can be done for both current and permitted using land use codes and zoning, respectively.

### Why measure it?

Allowing for a more diverse mix of land uses, including residential use, can increase the livability of a community through better access to services, jobs, and amenities. It encourages economic investment and promotes more efficient use of infrastructure, including transportation is a common and well-established factor in walkability assessments, including the Walkability Index.

### Steps

- 1 Collect Your Data
  - Actual use codes (BC Assessment)
  - Parcel Fabric (local government or ICI Society)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Each daily need (an amenity or service) is a land use type. Identify the land use types of interest and associated actual use codes. Choose as many, or combinations or individually land use types of interest and assign the actual use codes in your community to these land use types.
- 3 Assign the codes to the measurement areas. If using your own parcel fabric, assign the appropriate actual use codes to the data. If your parcel data already contains this information, skip this step.
- 4 Calculate the entropy index value and subsequent indicator score for each measurement area. The total number of land use types used for the calculation should match the overall land use types of interest for the community, and not be limited to the land use types present in each measurement area. As these calculations are slightly more complex, more guidance can be found in Appendix A.



## Proximity to Daily or Occasional Needs

Population within reasonable walking distance (400 m, 800 m, 1,600 m) of different services and amenities. For the purposes of this indicator, a household is identified as being within close proximity to their daily needs if 80 percent of the land uses identified by the local government as 'daily needs' are within a 400, 800, or 1,600 m buffer of the household.

Higher values indicate greater numbers of people within close proximity to the identified daily needs in accordance with the community's goals. Note that lower values may appear in areas where a density of services or amenities may not be appropriate.

Local governments may choose several buffer areas (e.g., 400 m, 800 m, or 1,600 m, etc.), particularly for analyzing individual amenities (e.g., daycares or grocery stores) to explore how the maps differ across distances.

A community may want to determine proximity to specific types of amenities such as:

- Grocery Stores
- Daycares
- Libraries
- Health care
- Pharmacies
- Community centres
- Seniors centres
- Parks or natural areas
- Arts and culture facilities
- Sporting venues
- Professional services

The data availability for each type of specific daily need will vary and may include BC Assessment Data Advice information or local government strategies or secondary plans. Other information may need to be generated or collected as needed.

### Why measure it?

Ensuring that there is access to more of these additional services and amenities is important for creating a more complete community. People in areas that are not in close proximity to amenities may commute elsewhere for access. This may result in outcomes such as increased travel distances, traffic congestion, and GHG emissions.

## Steps

- 1 Collect data
  - AddressBC (ICI Society)
  - Parcel fabric (local government or ICI society)
  - Streets (local government data)
  - Footpaths (local government data)
  - Bike lanes (local government data)
  - Parks and open spaces (local government data)
  - Actual use codes (BC Assessment)
  - Census dissemination areas (Statistics Canada), or selected measurement areas
- 2 Select land use types of interest (e.g., those associated with a community's goals) using BC Assessment actual use codes.
- 3 Consolidate the transportation network to include pathways, trails, streets, sidewalks, and bike lanes.
- 4 Determine the areas within the specified buffer distance (example: from 400 to 1,600 m) of each land use types using the consolidated transportation network.
- 5 Determine the proportion of the population within these areas.



## Proportion of Commercial Space

The proportion of commercial space, expressed as the ratio of the total commercial floor area of a building to the land area of the property it is built on, for each measurement area. Higher values indicate a greater density of commercial floor space, which may contribute to greater walkability, proximity to daily needs and economic activity.

### Why measure it?

Commercial floor area is a common and well-established factor in walkability assessments, including the Walkability Index. Commercial space is required to enable the provision of services that residents need as well as employment opportunities. The indicator describes the degree to which parcels are mixed use (combined commercial or mix of commercial and other uses such as residential).

### Steps

- 1 Collect data
  - Building footprints (local government data or Statistics Canada Linkable Open Data Environment - Open Database of Buildings)
  - Actual use codes (BC Assessment)
  - Parcel fabric
  - Census dissemination areas (Statistics Canada), or selected scale of measurement area
- 2 Identify commercial properties using BC Assessment actual use codes.
- 3 Identify total built commercial area using identified commercial parcels and building footprint data.
- 4 Determine ratio of commercial area to total commercial parcel area in each measurement area.

## Additional Indicators

The following additional indicators may be included depending on the assessment's scope and whether data is available or can be gathered.



### Access to Major Activity Clusters

The proportion of the population that lives within 400 m to 1,600 m of major nodes of activity per area, including:

- Town Centres or downtowns
- Major employment areas
- Major commercial areas
- Rapid transit stations
- Post-secondary institutions
- Community facilities

Activity clusters draw people to a location, for employment (offices and institutions), transportation (rapid transit stations) or other purposes (destination shopping areas) and act as magnets for development. These areas have populations which generate demand for high concentrations of commercial services and other daily needs. People living near these areas can benefit from being in closer proximity to a greater concentration of services compared to other areas.



### Proportion of Employment Lands

The proportion of land area designated/zoned for employment use (industrial, commercial, etc.) per capita, in each measurement area. Ensuring there is an adequate supply of employment lands is important for reducing commute times and fostering the local economy.



## TRANSPORTATION LENS AND INDICATORS

More complete communities facilitate travel by walking, cycling, transit, and emerging modes of transportation, including micro-mobility and shared mobility. Creating a more complete and connected multi-modal transportation network provides people with a range of options to meet their daily needs. This can reduce reliance on motor vehicles, which helps achieve mode shift and transportation related GHG reduction outcomes. It is important that these options are safe, convenient, and accessible for people of all ages and abilities.

The Daily Needs lens speaks to how far people travel to reach services and amenities. These distances to destinations are a key factor in mode choice. However, proximity alone may not encourage people to use these modes. The travel experience (“Do I feel comfortable on my trip?”) also influences mode choice. The available infrastructure and connecting trip origins to destinations often determines that level of comfort. This infrastructure includes sidewalks, multi-use pathways, bike lanes, cycle tracks, multi-use pathways, and trails. It can also include providing access to transit (including rapid or frequent transit services), shared mobility services (carshare and bike share), and electric mobility (electric vehicle charging).

### Summary of indicators and supporting data

Transportation indicators focus on the street network, trail connections, and proximity to various levels of transportation services. While some communities may have access to more robust data sets such as local sidewalk and cycling network data in a geospatial format, all communities will have access to the external data sources which cover the core indicators.

Key indicators	Additional indicators	Supporting data
<ul style="list-style-type: none"> <li>Street Network Intersection Density</li> <li>Street Network Connectivity</li> <li>Street network density</li> <li>Sidewalk coverage</li> <li>Proximity to cycling facilities</li> <li>Proximity to transit</li> </ul>	<ul style="list-style-type: none"> <li>Proximity to frequent transit</li> <li>Transit service levels</li> <li>Cycling network coverage</li> <li>Proximity to shared vehicles</li> <li>Proximity to shared bicycles</li> <li>Proximity to electric mobility</li> </ul>	<ul style="list-style-type: none"> <li>Digital Road Atlas</li> <li>TransLink or BC Transit bus route and bus stop datasets (including service frequency and bus stop amenities)</li> <li>TransLink or BC Transit service hour data</li> <li>Canadian Bikeway Comfort and Safety metrics data</li> <li>Carshare operator data regarding car share vehicle availability</li> <li>Bike share operator data regarding public bicycle availability</li> <li>PlugShare data (EV charging stations)</li> <li>Local government street network dataset (including street classifications)</li> <li>Local government sidewalk dataset</li> <li>Local government bicycle network dataset</li> </ul>

## PART 3



### Street Network Intersection Density

Number of intersections per square km for each measurement area. This is a data input into the Walkability Index.

#### Why measure it?

Areas with a higher proportion of high connectivity intersections are more walkable and offer the highest potential to enable conditions for creating more complete communities. A more connected transportation network makes moving through the community easier for more modes of transportation and can make better use of infrastructure investments. Note that areas with land uses that require larger parcels (agricultural, industrial, etc.) may have a lower intersection density.

#### Steps

- 1 Collect data
  - Street Network (Digital Road Atlas)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Use the existing street and trail network to determine the number of intersections in each measurement area.
- 3 Determine the overall density of intersections (example: per square km) per measurement area.



## Street Network Connectivity

Ratio of cul-de-sacs and three-way intersections to four- or more- way intersections, for each measurement area.

### Why measure it?

Areas with a higher proportion of high connectivity intersections are more walkable and offer the highest potential to enable conditions for creating more complete communities. A more connected transportation network makes moving through the community easier for more modes of transportation and can make better use of infrastructure investments.

### Steps

- 1 Collect data
  - Street Network (Digital Road Atlas)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Use the existing street and trail network to determine the number of intersections with four or more road connections (high connectivity intersections).
- 3 Determine the overall density of high connectivity intersections per measurement area.

## PART 3



## Street Network Density

Total length of streets divided by total area, in each measurement area.

### Why measure it?

A denser street network is easier to navigate with active modes and can make better use of infrastructure investments. Areas with a higher road length to area ratio are more walkable and offer the highest potential to enable conditions for creating more complete communities. Note that areas with land uses that require larger parcels (agricultural, industrial, etc.) may have a lower intersection density.

### Steps

- 1 Collect data
  - Street network (Digital Road Atlas or local government data)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Calculate the total length of road centerline within each measurement area.
- 3 Divide the total road length (km) by the total assessment area (ha), per measurement area.



## Sidewalk Coverage

Proportion of streets with a sidewalk or multi-use pathway on at least one side of the street, in each measurement area (in rural areas, this could include walkable shoulder). This is a data input into a Walkability Index.

### Why measure it?

Areas with a higher proportion of sidewalks are typically more walkable and accessible. Better sidewalk coverage also supports commercial areas and employment/service clusters through improved access and a more pleasant pedestrian environment.

### Steps

- 1 Collect data
  - Sidewalks (Local government data)
  - Street network (Digital Road Atlas or local government data)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Determine the length of streets that have a sidewalk or multi-use pathway on at least one side of the street.
- 3 Determine the proportion of sidewalk/multi-use pathway adjacent streets compared with the whole road network per measurement area.

## PART 3



## Proximity to Cycling Facilities

Proportion of population that lives within 400 m of a bicycle route, per measurement area.

### Why measure it?

Higher proportions of people in proximity to cycling routes creates better mobility equity through additional transportation options. Proximity to cycling facilities also improves proximity to daily needs and housing while reducing traffic congestion.

Communities where more people are in proximity to cycling facilities are more likely to have a higher cycling mode share. This measure could be adjusted in each community depending on the context, consider factors such as traffic volumes, land use, and the types of cycling facilities that are present. For example, a community may instead want to focus only on proximity to [All Ages and Abilities](#) cycling facilities.

### Steps

- 1 Collect data
  - Cycling facilities (Canadian Bikeway Comfort and Safety metrics data or local government data)
  - Street network (Digital Road Atlas or local government data)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
- 2 Determine the areas within 400 m of each bicycle route (or All Ages and Abilities bicycle route, if desired).
- 3 Determine the proportion of the population that has easy proximity to bicycle routes per measurement area.



## Proximity to Transit

Proportion of population that lives within a selected buffer distance of a bus stop, for each measurement area.

### Why measure it?

Transit is a primary alternative to vehicle trips in many communities, when destinations are further than a reasonable walking and cycling distance. Ensuring proximity to transit supports providing options other than driving. Note that this measure does not necessarily focus on the quality of transit service. If that additional measure is important for your community goals, it could be included in the assessment (see additional indicators below). Higher proportions of people in proximity to transit may create better mobility equity through additional transportation options. Proximity to transit may also improve access to daily needs and housing.

### Steps

- 1 Collect data
  - Street network (Digital Road Atlas or local government data)
  - Census dissemination areas (Statistics Canada) or selected measurement area
  - Transit Stops (BC Transit or TransLink)
  - AddressBC (ICI Society)
- 2 Consolidate the transportation network to include pathways, streets, sidewalks, and bicycle facilities.
- 3 Determine the areas within 400 m of each transit stop as made possible by the consolidated transportation network.
- 4 Determine the proportion of the population that is in proximity to transit per measurement area.

## PART 3

## Additional Indicators

The following additional indicators may be included depending on the assessment's scope and whether data is available or can be gathered.



### Proximity to Frequent Transit

Proportion of population that lives within a specified buffer distance of a transit stop served by frequent transit service, for each measurement area



### Transit Service Levels

Annual transit service hours per capita, for each measurement area



### Cycling Network Coverage

Total km of cycling infrastructure divided by total land area, for each measurement area



### Proximity to Shared Bicycles

Number of public bike share bicycles per capita, for each measurement area



### Proximity to Shared Vehicles

Number of carshare vehicles available per capita, for each measurement area



### Proximity to Electric Mobility

Number of electric vehicle charging stations per capita, for each measurement area



## SUPPLEMENT YOUR SPATIAL ASSESSMENT WITH OTHER DATA

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Mapping the Transportation indicators may raise questions about the transportation network, such as:

- How safe is the transportation network?
- How equitable is the transportation network? Who are the people using each transportation mode, and how do these demographics compare to the community overall?
- How do community members feel about different transportation facilities? Do you understand their priorities?

Additional methods to supplement the spatial assessment could include:

- **Monitoring travel patterns** may include conducting user counts and origin-destination mapping that can help reveal local and regional travel patterns. Beyond the census data described above, local travel surveys and on-the-ground counts (through manual counts, video, and other techniques) can provide data. Mobile data (TomTom, Strava, etc.) can be used to understand trip origin and destination. Collecting disaggregated data is key to applying an equity lens and understanding travel patterns based on different demographics.
- **Site visits and walking audits** are a way to gather eye-level observations and better understand multi-modal transportation patterns and infrastructure. Including stakeholders, partners, and community members of all ages, abilities, and identities can help see the community through diverse perspectives.
- **Community engagement** through online and intercept surveys, open houses, pop-up events, and other techniques can help the project team better understand community priorities and interests.
- **Infrastructure requests** are records of when community members request sidewalks, crosswalks, and other forms of transportation infrastructure. Assessing these requests may give insight into areas where community members are seeing infrastructure gaps. These requests may not be fully representative of all areas in need and may be considered as one of a number of inputs.

- **Public space/public life studies** are a way to study how public life unfolds in a community and to understand the needs and demands for public realm improvements. These studies often include a mix of intercept surveys and observational surveys, looking at both who (demographics) and how (transportation mode, activity type, etc.) people use and travel through public spaces.
  - **Pilot/tactical urbanism** projects can be used as a form of engagement where projects are implemented rapidly with low-cost, flexible materials, giving the community the opportunity to experience a design and provide feedback which can be incorporated into the design.
  - **ICBC collision data** shows historic collision locations, including those involving people walking and cycling. Safety plays a large role in encouraging active transportation, so high collision areas can be used as an indicator for safety gaps in the transportation network.
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## INFRASTRUCTURE LENS AND INDICATOR

Infrastructure is required to deliver services, such as water, sanitary, stormwater, solid waste and transportation, to every community. Decisions about where and how a community grows, where important facilities are built, and how people move around, have implications for the infrastructure needed and the costs to construct and sustain it.

If service needs and associated infrastructure costs are not understood or adequately planned for decisions can result in high upfront, ongoing and decommissioning costs, in addition to environmental costs (e.g. materials, energy and increased GHG emissions) that are needed to sustain and deliver services.

Creating complete communities involves considering how to efficiently use land and infrastructure. As part of this, understanding the relationship between infrastructure, its costs, and land use characteristics in planning and decision making can help local governments contain long-term costs, manage risks, and deliver more efficient provision of municipal infrastructure services in a way that optimizes expenditure to achieve desired community goals.

## Summary of indicators and supporting data

Key Indicators	Supporting data
<ul style="list-style-type: none"> <li>• Infrastructure Lifecycle Cost</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Road Atlas</li> <li>• AddressBC</li> <li>• Asset inventory (geospatial)</li> <li>• Statistics Canada census data</li> <li>• Estimated net new capital costs, operating/maintenance costs, and decommissioning costs</li> <li>• Asset management plan, replacement forecast, or investment plan</li> <li>• Local government tax information</li> <li>• Local government land use designations and zoning</li> <li>• 5-year financial plan</li> <li>• Annual budgets</li> </ul>



### Infrastructure Lifecycle Cost

Lifecycle Cost is the total average annual lifecycle investment cost for each area where alterations to services will be needed to support more complete communities. Lifecycle infrastructure costing help local governments estimate the lifecycle cost of infrastructure, such as water, sewer and transportation, for different land use patterns. [The CLIC \(Community Lifecycle Infrastructure Costing\) tool](#), which was developed in collaboration with local governments and other agencies, assists local government planners, engineers and financial officers in comparing the infrastructure costs (including development, maintenance, servicing, and repair) of different development scenarios. CLIC may be used to assess annual lifecycle costs for each measurement area. Due to the level of detail used in CLIC, communities may use a larger measurement area for this indicator (such as census tracts or an entire study area if multiple study areas are being used).

### Why measure it?

Infrastructure lifecycle costs are among largest recurring community expenses over time but are necessary to ensure service delivery. Knowing which areas of a community have the greatest average annual infrastructure lifecycle costs can help local governments make more informed decisions about land use and make progress on creating more complete communities.

### Steps

- 1 Collect data
  - Infrastructure network (local government data)
  - Street network (Digital Road Atlas or local government data)
  - Local government asset management assumptions (e.g., replacement lifespan)
  - Census demographic data (Statistics Canada)
  - Census dissemination areas (Statistics Canada) or selected scale of measurement area
  - AddressBC (ICI Society)
- 2 Create CLIC scenario for each measurement area
  - Select scenario template that is a “best fit” for the measurement area
  - Specify cost variables and modify defaults as necessary
  - Specify revenue variables
  - Specify allocation of costs
  - Specify cost savings and replacement period
  - Specify user-defined costs and revenue assumptions
- 3 In the CLIC model, the key output is under “Annualized Lifecycle Costs” for each measurement area (“Total Development”)
- 4 Normalize output (per capita or per household). In the CLIC model, the key output is under “Annualized Lifecycle Costs” for each measurement area (“Residential Portion, \$/hh” [dollars per household]).

### Alternative approaches to this indicator

As an alternative, communities may consider using proxy indicators, such as:

- Linear infrastructure normalized per area: This indicator includes identifying linear infrastructure (pipe, street centerline) length per measurement area. This can then be normalized by household within the measurement area, or by hectare. This approach is less complex than the CLIC tool but still uses geospatial infrastructure asset layers.

**PART 3**

- Household or population by street/roadway segment: This indicator includes using address points to count households along each street/roadway segment per measurement area. This approach assumes that the number of households is representative of the type of infrastructure present, but it does not require geospatial infrastructure asset layers.

## STEP 5: ANALYZE DATA

The previous step will generate spatial information in the form of mapped indicators. Note that these should not be viewed as the “results” of complete communities assessments. These indicators can be supplemented with data from other sources (e.g., community walking audits, public life studies, surveys). **Step 5** involves looking at the mapped indicators and analyzing the interrelationships between different maps (both between specific indicators and across lenses). This analysis will result in identified strengths, opportunities, and challenges that can inform potential actions for creating more complete communities and advancing community goals. Testing potential actions is discussed in **Step 6**.

One way to approach the analysis is to:

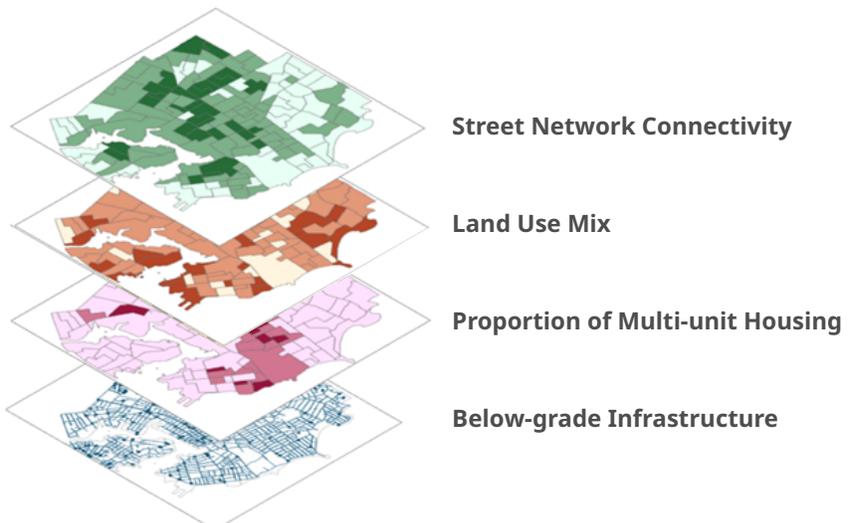
- 1 Select and use various tool(s) and approach(es) to analyze the data.
- 2 Consider prompting questions when analyzing and discussing the maps and other information. Interrelationships will be key to this analysis, particularly when combining two or more indicators or lenses.
- 3 Review the community’s goal(s) to contextualize the analysis.
- 4 Identify potential actions.

### Select tools and approaches for analysis

A range of tools and approaches can be used individually or in combination to visualize data in a map and provide a base for further analysis. These include, but are not limited to, layering, composite mapping, and radar plots.

#### Layering

Layering helps identify patterns and relationships across indicators. Layering can be done using geospatial information systems software or printouts of datasets. Software allows users to view information in different ways, while physical maps can bring people together in a room to talk about what they notice.



### Composite mapping

While layering helps identify patterns and relationships, composite mapping and indexing are tools for understanding overall levels of completeness by quantitatively considering two or more indicators together. The output of composite mapping or indexing is an overall score for the selected indicators. Higher values likely signal greater completeness than areas with lower values. A composite map or index can be created by weighting all indicators equally, or by assigning unique weights to each indicator. This approach would be particularly useful when comparing different areas.



## WALKABILITY INDEX

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As part of the development of *Metro 2040*, the Metro Vancouver Regional District's previous regional growth strategy, [Metro Vancouver developed a Walkability Index for the region](#). One of the five goals of the regional growth strategy was to develop complete communities that are walkable and have mixed use with a range of sustainable transportation choices.

To help quantify walkability, a geospatial Walkability Index was developed as a key performance measure for the plan. Walkability was defined as a measure of how friendly an area is to walk. [The Walkability Index score was derived from physical characteristics of the urban environment that support walking, including the following five indicators:](#)

- Residential density
- Sidewalk completeness
- Land use mix
- Commercial Floor Area Ratio (FAR)
- Intersection density

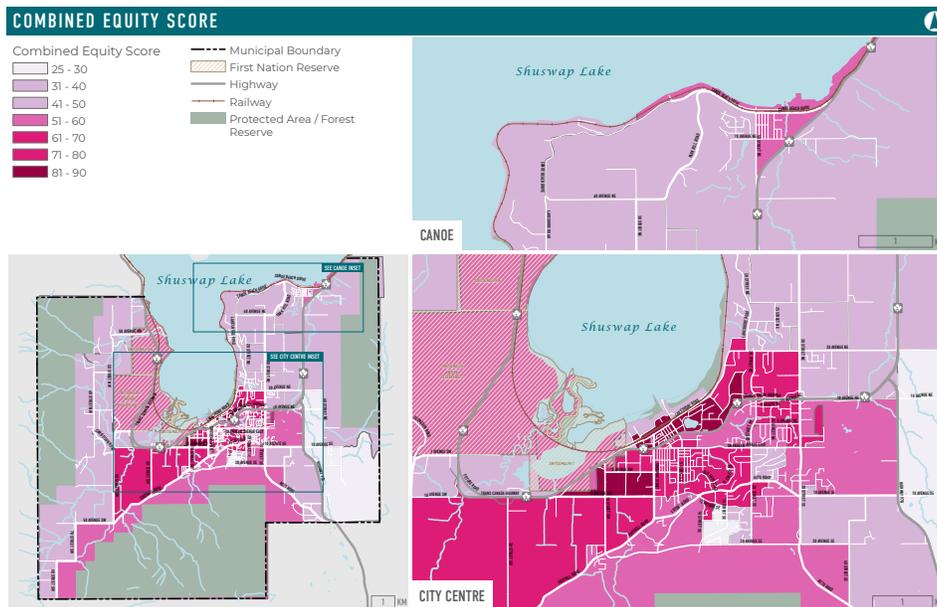
The index incorporates each of these indicators, aggregated to give each parcel in the region a single score. The analysis also allows for updates over time to assess whether walkability is improving and to track progress towards meeting the goals of the regional growth strategy. In 2023, Metro Vancouver adopted *Metro 2050*, a new regional growth strategy that continues to prioritize walkability and creating more complete communities as core goals for the region.

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## EQUITY ANALYSIS AND COMPOSITE EQUITY SCORE

As part of its [Connect Salmon Arm active transportation network plan](#), the City of Salmon Arm conducted a geospatial equity analysis to develop a transportation network that serves all areas of the city and provides equitable access for all residents. A geospatial equity analysis was used to identify neighbourhoods where there were higher concentrations of equity-priority groups. The analysis identified underserved areas where there were opportunities to make strategic investments to improve transportation equity. The equity analysis used 12 indicators based on data from Statistics Canada and Interior Health that mapped spatial patterns in vulnerability, including vulnerability to climate change-related health hazards. These variables were then combined to determine an overall equity score for each area, in terms of access to the transportation network.



(City of Salmon Arm)

## PART 3

**Radar plot**

A radar plot is a graphical method of displaying data in a chart representing various points on axes that all originate from the same point. Each spoke represents an indicator. The position of a given indicator on its spoke is proportional to the magnitude of the value of that indicator relative to the maximum magnitude of the variable across all data points. A line is drawn connecting the indicator values for each spoke, giving each plot its own unique shape. Generating a radar plot can help to visualize in one diagram the relative scoring of several indicators and to compare information generated for different areas. The shape of the plot may be different for different areas assessed.



## FINDING A GOOD SCALE FOR ANALYSIS

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At larger scales, such as census tract or census subdivision, the data values reflect an average for a broad area, which tends to obscure localized variations that may be useful to capture and understand in the analysis. For example, in measuring transportation equity, Salmon Arm used dissemination areas to understand how socioeconomic conditions and equity vary across the community. While dissemination areas are often not aligned to locally understood neighbourhood boundaries and vary in size with population density, they provide a right-size resolution to view the data. They are also readily available from Statistics Canada as a census geography product, align with census data tables, and provide insight on variations between areas of Salmon Arm. An alternative would be to use census tracts, but there are too few census tracts to make the analysis useful from a transportation perspective.

Alternatively, a very small scale, such as a parcel or single block, may not be useful in certain cases. When viewed on a map, too small a scale may reveal an excessive amount of detail and make working with the data more challenging.

A community may use or prepare its own geography at a customized scale. This may involve using defined local neighbourhoods, if available, or using the local street network to divide the community in geographic units that are similar in scale.

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## Prompting questions

Questions that the project team may want to ask could fall into two categories: general observations and community goals.

### General observations

- What are the relationships between the lenses, or more specifically the indicators?
- What do the maps show that supports identified community goals? Where are there opportunities to create these conditions elsewhere to achieve greater outcomes?
- What do the maps show that might be hindering progress towards identified goals?
- Are there areas that feature high measurement values based on indicators selected? Low measurement values?
- What conditions helped create these patterns of development? What plans and policies are in place that contributed to these patterns?
- For strengths, where and how might these conditions be created elsewhere to help achieve community goals?
- Where are there key gaps in terms of a particular indicator?
- Where are there key gaps in composites (such as a Walkability Index)?
- Where can existing infrastructure be leveraged? Or where might additional infrastructure be needed?
- Where could there be stronger connections between nodes and hubs?
- If considering demographic information, are there areas where some populations are underserved by transportation infrastructure or key amenities?
- What are the differences between current uses and permitted uses across zones? In a composite map, is there a difference in outcomes? What different zoning scenarios might be tested? What other actions might be tested to increase completeness in a particular area? (see **Step 6**)
- How does the spatial information generated align with or differ from other data, such as community input or observational data?

### Community goals

- Are residents in the study area(s) able to access a specific daily need (or combinations of key amenities) within a reasonable walking distance? Cycling distance? Frequent transit?
- Are seniors able to age in place? Is seniors housing in proximity to specific daily needs to support creating more age friendly communities?
- How well does public transit support the existing and future needs of the community?

## PART 3

- Is there a range of transportation options for travel to and from employment centres?
- Is there access to a mix of amenities and services in proximity to employment centres to support workplace populations?
- Where does current zoning allow for different types of housing? How does this help meet identified housing needs in the community?
- Does infrastructure life cycle costs vary by housing mix and density?
- Where are there parcels for infill (housing, commercial, institutional, or mixed use development)? Which parcels are more connected to existing amenities or could support an increase of land use mix in a particular area?
- Are major community facilities such as recreation centres located within walking distance of housing or transit stops? Or do residents need to drive and park at the facility? What impact does this have on lifecycle costs and GHG emissions?
- Where can investments in the public realm support walking, cycling, and transit infrastructure (benches, tree canopy, lighting, complete streets, etc.)?
- Where are there opportunities to increase connections to the natural environment?

### Review community goals

As discussed in **Step 1**, focusing on what the community is trying to achieve supports the analysis of the mapped indicators. These goals might include: increasing mode split, increasing walkability, increasing ability to age in place, increasing housing diversity, etc. Each goal can prompt specific questions to support the analysis.

## Identify actions

Each community in B.C. has its own context, geography, and history that has shaped the way it has grown and developed. The analysis of mapped information and interrelationships between indicators can vary between communities, and even neighbourhoods. Community goals will also vary so there will be a range of potential actions to test and implement.

## Typologies

The following three typologies illustrate the range of environments a local government may be analyzing and how imagined results of mapped indicators could inform potential actions for creating more complete communities and addressing specific community goals.

### 1 | SMALL TOWN, STRONG CORE, ACTIVE POTENTIAL

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This community is a small town, adjacent to a highway with a grid network of streets in the historic core. The core includes a cluster of low-medium density commercial buildings. Most dwellings surround the core and are largely single-detached, with some residential units located above historic commercial buildings. The town has good sidewalk coverage, with the exception of the connection to several larger amenities located at town periphery or in an adjacent electoral area. Some regional services are in adjacent towns. These are not connected by active transportation infrastructure, but there is some regional transit service. The community is surrounded in part by ALR and Crown land.

High walkability in most of the core is a strength for the community. The lack of green-field land and the difficulty in developing contaminated or brownfield parcels in key locations could be a challenge for future development – or, from a different perspective, the land constraint could be a strength in terms of containing long-term servicing and infrastructure needs and supporting further development of the existing town centre. Overall, this community has strong bones for creating a more complete community, and many complementary goals.

## PART 3

**Identified community goals might include:**

- **Act on housing needs report findings**, specifically supporting seniors from within the community and surrounding area who are hoping to downsize and move closer to their daily needs. Accommodating downsizing could include updating zoning to enable a greater range of housing types and tenures, from luxury to subsidized units, in close proximity to senior-specific needs such as health care.
- **Be more age-friendly and support aging in place** by increasing housing options, as above, and providing more opportunities for seniors-related activities through recreation centres.
- **Support increasing cycling as a safe and convenient form of transportation and recreation** by building bike paths and active transportation networks to connect the historic downtown core with amenities in the town periphery and, if possible, adjacent electoral areas.

**Potential actions might include:**

- Capital planning for creating more complete streets and, potentially, regional trail networks.
- Changes to zoning bylaws, if necessary, to allow for mixed use development in core or in proximity to existing clusters of key amenities.
- Identifying candidate sites for redevelopment to include housing to support identified housing need as well as key amenities to support the additional housing.
- Undertaking infrastructure capacity analysis to determine state of current service infrastructure in the community. Identify where there is capacity in the system to accommodate land use change. An additional step could be capital upgrades and infrastructure investments.
- Engaging partners in areas outside of local government control to discuss future service and amenity siting, brownfield remediation, and future active transportation infrastructure.

## 2 | AMENITY RICH NODE SEEKING ENHANCED CONNECTIONS AND PUBLIC REALM

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The study area is a neighbourhood within a larger community, with a cluster of amenities at the intersection of key arterials. The surrounding street network is more curvilinear, with low residential density (single detached homes on large lots), and partial sidewalk coverage. The arterials provide good transit connections to other commercial nodes, but the pedestrian and cycling environment has been identified by residents as unsafe due to high vehicle traffic volumes, narrow sidewalks, and few safe crossing options. The local government has identified the arterial area as an increasingly important amenity hub in the larger community, or region, due to its proximity to larger institutional employment hubs.

One strength is the well-connected node with a large number of daily needs. The challenge is that the cluster of amenities is not in a pedestrian or cycling friendly environment and the surrounding street network has inconsistent sidewalk coverage.

### Identified community goals might include:

- **Vision zero.** To increase road safety for all.
- **Reduce GHG emissions from transportation.** This includes supporting a mode shift from private vehicles to walking, cycling, and public transit and supporting EV uptake.
- **Increase housing options for neighbourhood and region.**
- **Increase place-making, to improve public realm, and create a “town centre” around amenities.**

### Potential actions might include:

- Capital planning for AAA infrastructure, including sidewalk widening along key arterials to provide a greater range of transportation options to other key nodes in the larger community and region and to enhance public realm to allow for seating or street trees.
- Changes to zoning bylaws, to increase range of housing options near amenity dense node.
- Engaging partners in areas outside of local government control to discuss future service and amenity siting, brownfield remediation, future active transportation infrastructure.

### 3 | POTENTIAL FOR BUILDING ON REGIONAL TRANSIT STRENGTH

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The study area includes a buffer around a high-frequency transit node. Through this node, the area is connected to key regional employment centres and other destinations. The area within 800 m of the node is low to medium density residential, on a largely grid street network. The majority of daily needs are located arterials at the edge of the study area, more than a 10-minute walk from the transit node.

The key strength in this area is the established regional transit network hub. Its location away from key commercial arterials could be considered a challenge. Exploring opportunities to knit the transit hub into the fabric of the community by slowly increasing amenity and residential density in close proximity could be considered. To support this, a better understanding of neighbourhood travel patterns and experiences may be needed.

#### Identified community goals might include:

- **Increase walkability.** Community identified creating more complete communities to increase overall walkability.
- **Supporting transit-oriented development.** Regional plan includes supporting the creation of transit supported nodes that include both higher commercial and residential densities.
- **Increase equity in resilience such as climate adaptation supports (e.g., cooling centres) and adequate tree canopy coverage.**

#### Potential actions might include:

- Changes to zoning bylaws, to increase range of commercial/institutional uses near transit node.
- Changes to zoning bylaw to increase dwelling density at node or on arterials between node and amenities.
- Prepare a neighbourhood plan, origin destination studies, or walking audits to better understand current and future resident needs and experiences.
- Conduct a commercial and retail strategy. Identify where there is commercial space in the community and the types of services being offered. Identify demand for services and strategies for providing those services.
- Develop an urban tree strategy, including an inventory.



## THE ROLE OF INDUSTRIAL LAND

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Industrial land is used for the primary purpose of conducting industrial manufacturing and assembling processes and their ancillary uses.<sup>13</sup> Industrial land is vitally important to our economic performance. In Metro Vancouver, for example, almost one-quarter of all jobs are housed on industrial lands.<sup>14</sup>

Lands zoned for industrial use play an important role in employing residents and providing space for industrial functions like logistics, shipping and manufacturing. Preserving industrial lands that are located in areas with good transportation connections is integral to accommodate growth without inducing further sprawl; ensure a balanced, sustainable economy; and prosperity for future generations.

The B.C. Ministry of Citizens' Services has developed the [Community Investment Opportunities Tool \(CIOT\)](#). CIOT is a visual tool that showcases investment land opportunities including agricultural, industrial and commercial properties throughout the province and enables rapid analysis of investment decisions by incorporating community asset information with digital and other infrastructure data. The tool is designed to be utilized by municipalities to promote opportunities in their region and attract investment.

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## CITY OF KELOWNA'S URBAN CENTRES ROADMAP

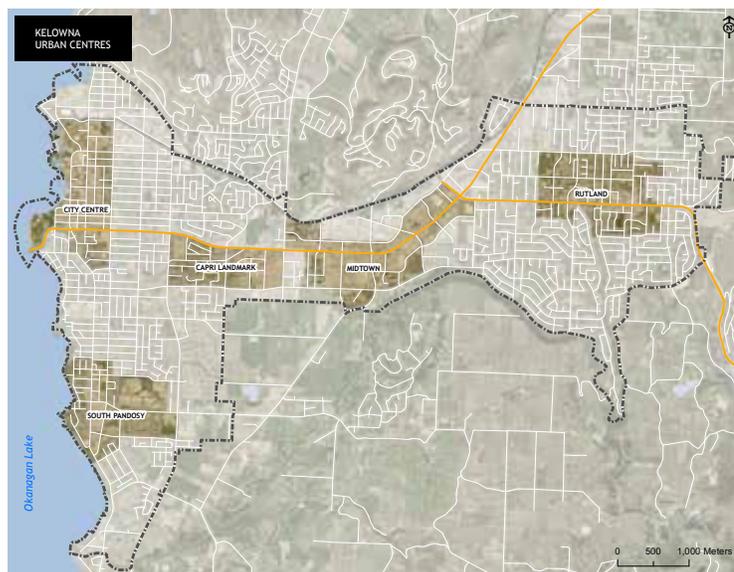
Kelowna's 2030 Official Community Plan established five urban centers that are expected to accommodate 44 percent of the city's future growth. To inform future detailed plans, the Urban Centres Roadmap serves as a framework to guide future planning in the community.

A current state assessment analyzed development potential, demographics, population density, employment density, major parks and public spaces, existing active transportation corridors, frequent and rapid transit stops, and housing split proportion (single/multi-unit).

This analysis informed an overall profile of the strengths and challenges for each urban centre, and they were mapped according to their current phase of early, developing, or mature. Key decisions were identified for each stage.

General principles for urban development were created which include: mix of land uses, places for people, diversity of housing, social public spaces, place-making, environmental sustainability, active transportation, and walkability.

Future urban centre planning will be the primary way that the principles and targets are used. In addition, a tool to assist staff and development applicants integrate the key ideas from the Urban Centres Roadmap was developed for infill, mid-size, and game changer (largest) developments.



(City of Kelowna)

## STEP 6: TEST POTENTIAL ACTIONS THROUGH SCENARIOS

This step provides suggestions on ways to use scenario planning to test actions relative to the current state as reflected in the assessment. It also includes considerations for how to engage the community in broader conversations about growth patterns.

Testing potential actions through scenarios helps to estimate their impact. Through this process, local governments and the community can explore the trade-offs between taking different actions to better inform recommendations for moving forward.

Scenarios may include single or combined actions. For example, if a community has goals related to increasing mode split, reducing GHG emissions from transportation, or increasing transportation equity, alternative scenarios could include those that explore the potential impact of extending cycling infrastructure, increasing sidewalk connectivity, and/or adjusting land use to allow more mixed use and amenities.

Analysis of indicators in **Step 5** may have included a comparison of existing use with permitted use. Scenarios can test other variations on permitted uses, such as increasing the number of parcels where mixed uses are permitted or changing permitted residential density.

## Scenario analysis steps

Steps the project team can take to prepare and analyze scenarios are:

- 1 Identify the indicators and associated data sets that will be influenced by potential actions. For example, for a scenario that involves increasing sidewalk connectivity, the indicator would be Sidewalk Coverage.
- 2 Create scenarios for analysis and re-map each indicator that would be influenced. This can be accomplished by using a scenario planning tool, or the following approach:
  - Generate a “base case” (current state) scenario: the base case scenario was generated from completing **Steps 4 and 5** of the assessment process, having mapped the chosen indicators and then layering them and/or creating composite maps or indexes.
  - Select the potential actions to be tested (e.g., a zoning bylaw would be changed, sidewalk coverage would be increased, an active transportation network would be expanded).
  - Update the indicator maps by re-mapping the chosen indicators (**Step 4**), as if the actions to be tested have been implemented (e.g., as per above: the zoning bylaw change has been implemented, sidewalk coverage has been increased, an active transportation network has been expanded). This step provides “future case” scenarios.
- 3 Compare/contrast the base case and future case scenarios to determine the potential impact of the chosen actions. These scenarios can also inform growth pattern discussions with the community.



### CHOOSING A RANGE OF OPTIONS IN SCENARIO TESTING

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Scenario testing can be an opportunity to imagine a range of growth patterns and land use possibilities for a community. It can be helpful to define degrees of actions and scenarios along a spectrum to allow for different levels of investment to make them possible. This “bookending” approach to defining scenarios can support the exploration of trade-offs and conversations with both decision-makers and the broader community.

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## WHAT DO COMMUNITY MEMBERS WANT TO SEE IN SCENARIOS?

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Scenario testing supports conversations about how potential actions might help achieve a community's identified goals. It can be beneficial to involve community members in a discussion about actions and scenarios. This can be done in different ways, including gathering community input in the previous assessment steps, exploring the strengths and challenges experienced by the community with current land use, housing, transportation, access to amenities, etc., and where improvements could be made.

When engaging with the community in discussions about scenarios and actions, it is important to emphasize that these are *potential* actions. **Defining scenarios and actions at this point is not a commitment to implementing them, but rather a process of imagining futures that better meet the community's needs and achieve their goals.**

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### Comparing and evaluating scenarios

One approach to comparing scenarios is to use multiple account evaluation. This approach involves comparing each alternative scenario (or individual potential action) to the base case using a predetermined scale – for example, a score of -3 to +3, where -3 means much worse than base case, and +3 means much better than the base case, when considering strengths, opportunities, and challenges of each. The results of the comparison can be colour-coded to visually illustrate the results. An example of what the outcome of this comparison could look like is shown in “**Evaluating long range community planning scenarios**” below.



## EVALUATING LONG RANGE COMMUNITY PLANNING SCENARIOS

As part of engagement for the City of Nanaimo’s 2022 official community plan, three draft scenarios were provided to the public for consideration to inform the focus of new growth and planning (Current Path, Mobility Hubs, and Central Focus).

### SCENARIO 3: CENTRAL FOCUS OVERVIEW



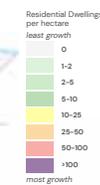
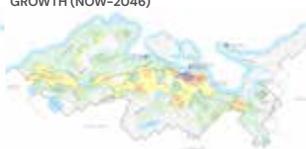
#### OVERVIEW

Central Focus encourages most new growth and higher-density housing within a focused urban core bounded by Downtown, the Hospital, and Vancouver Island University. It would lead to a more urban, walkable, and vibrant central core with less growth and change (though still some) in areas beyond this core.

#### AT A GLANCE



#### POTENTIAL PATTERN OF NEW GROWTH (NOW-2046)



#### PRELIMINARY LAND USE MAP



#### LEGEND

[Open the Land Use Glossary for more details and examples of the land uses listed below](#)

- **Town Centre - Core**  
A mix of retail, office, institutional, and multi-family residential uses including high-rises in a walkable area with good transit, cultural and recreational opportunities, and lots of activity
- **Town Centre - Transition**  
Similar to Town Centre - Core, but with lower building heights stepping down to adjacent neighbourhood areas
- **Neighbourhood**  
Primarily residential area with single-family homes and a mix of secondary suites, townhomes, duplexes, and fourplexes and potential for a small amount of neighbourhood-supporting retail
- **Neighbourhood Infill**  
Similar to Neighbourhood, but with a greater mix of secondary suites, townhomes, duplexes, fourplexes, and potential for some low-rise apartments
- **Urban Reserve**  
Lands not currently connected to city water or sewer, allowing only homes on large lots. Potential for long-term development consideration
- **Industrial**  
Employment-focused lands with no residential
- **Employment Lands**  
A mix of regional-scale industrial, office, and retail uses with no residential
- **Parks & Open Space**  
Neutral or recreational lands
- **Environmental / Agricultural Protection**  
Agricultural or Environmentally Sensitive Lands protected for their values
- ★ **Neighbourhood Centre**  
Local-scale shopping centres, future residential encouraged
- Lands Outside Urban Containment Boundary**  
Protected lands not suitable for development
- **ESN Corridor**  
Transportation corridor
- **Primary Transit Route**  
Planned rapid or frequent transit route
- - - **City Boundary**

(City of Nanaimo)

ACCOUNT		THIS SCENARIO		
		SCENARIO 1: CURRENT PATH	SCENARIO 2: MOBILITY HUBS	SCENARIO 3: CENTRAL FOCUS
GREEN	<b>GHG Reduction</b> <i>Potential to move us closer to GHG reduction targets.</i>			
	<b>Land Conservation</b> <i>Potential to preserve open space from urban development.</i>			
	<b>Reduced Water Consumption</b> <i>Potential to help reduce the average per capita water use.</i>			
	<b>Watercourse Health</b> <i>Potential to reduce contaminants sent to watercourses.</i>			
HEALTHY	<b>Housing Diversity</b> <i>Encourages more diversity in housing options.</i>			
	<b>Housing Affordability</b> <i>Supports housing forms that may be affordable to more people.</i>			
	<b>Homelessness Reduction</b> <i>Creates opportunities for combined housing forms and services that support vulnerable populations.</i>			
CONNECTED	<b>Proximity to Daily Needs</b> <i>Encourages new growth close to existing services.</i>			
	<b>Proximity to Elementary Schools</b> <i>Encourages new growth close to existing elementary schools.</i>			
	<b>Walk, Bike &amp; Transit Supportive</b> <i>Encourages more neighbourhoods that have enough population to support walking, biking, and transit investment.</i>			
	<b>Growth in Town Centres &amp; Corridors</b> <i>Encourages new growth in desired locations to support vibrant, walkable urban areas.</i>			
EMPOWERED	<b>Proximity to Parks</b> <i>Encourages new growth close to existing park spaces.</i>			
	<b>Proximity to Recreation Facilities</b> <i>Encourages new growth close to existing recreation facilities.</i>			
ENABLED	<b>Proximity to Employment Centres</b> <i>Encourages new growth close to existing employment areas.</i>			
	<b>Industrial Designated Lands</b> <i>Identifies areas to accommodate industrial growth.</i>			
COST	<b>Financial Resilience</b> <i>Has fewer life-cycle cost implications that could increase taxation. (NOTE: evaluation scale: \$ lowest costs to \$\$\$\$ highest costs)</i>	\$\$\$	\$\$\$	\$

(City of Nanaimo)

Growth patterns of residential dwellings per hectare, major movement patterns, and a preliminary land use map was provided for each scenario. High-level categories of analysis were: green, healthy, connected, empowered, enabled, and cost. Each scenario was rated according to its performance in key accounts among each category, such as housing diversity and proximity to daily needs.

Official community plan goals informed by the key draft scenario concepts include environmental (urban tree canopy, natural areas), access & mobility (connected communities, complete streets, sustainable transportation networks) and community wellbeing and livability (affordable housing).



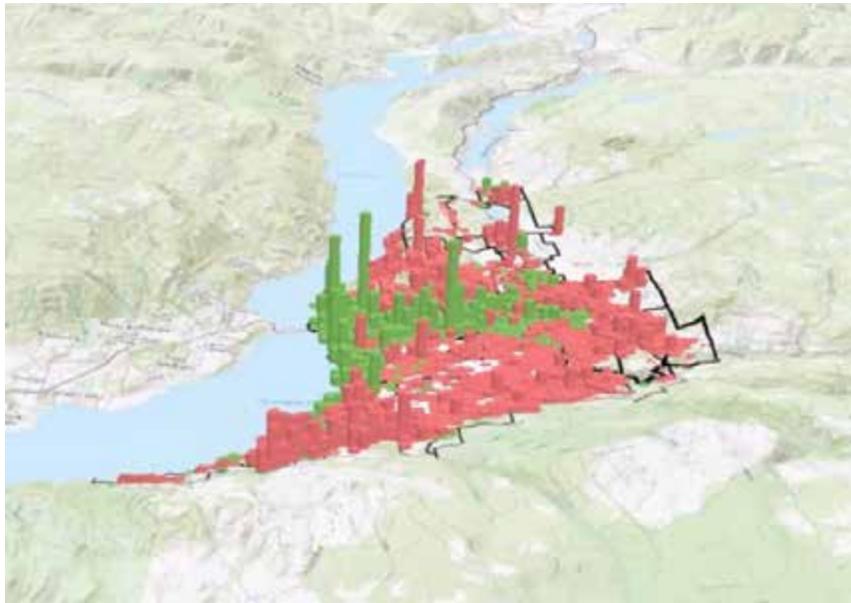
## INTERSECTIONS BETWEEN LAND USE AND INFRASTRUCTURE

The City of Kelowna developed the Model City Infrastructure (MCI) tool to analyze the long-term financial performance of the Model City, a digital model of Kelowna's neighbourhoods and infrastructure. The tool helps in evaluating the long-term infrastructure implications of critical land use decisions by comparing the amount the City spends on long-term infrastructure in different neighborhoods with the tax revenue and utility fees collected from them. The use of MCI highlights the connections between land use planning and the management of long-term infrastructure assets.

The analysis found that three primary factor were:

- Proximity to the ModelCity's core area.
- Residential density of a neighborhood.
- The presence of commercial/industrial development.

In the MCI image below, areas of the Model City that are revenue-positive (tax and user fee revenue is higher than the cost of servicing) are shown in green. Areas that are revenue-negative are shown in red (revenue is lower than the cost of servicing).



(City of Kelowna)



# 4 | ACT



## Phase 3: Act

Step 7: Develop an implementation plan

Step 8: Monitor and report



### STEP 7: DEVELOP AN IMPLEMENTATION PLAN

The implementation plan outlines the necessary steps resulting from the assessment to help meet the identified community goals. In a complete communities assessment, the implementation plan could be structured to include the following information:

- **Type of Action:** There are a range of actions that may be identified to meet community goals and move towards more complete communities, as a result of the assessment and scenario planning. The plan could identify and categorize implementation by type of action. For example:
  - Bylaw or regulatory changes
  - New policies, or changes to existing plans or policies
  - Capital upgrades and infrastructure investments
  - Additional data collection and monitoring
  - Partnership opportunities

- **Connection to goals:** Indicate which community goal(s) each action will support. This can assist in communicating the importance of each action with staff, elected officials, and community members.
- **Priority level:** Based on the results of the scenario analysis in Phase 2, prioritize actions (as high, medium, or low priority). This can be useful when making decisions about trade-offs during annual capital planning and budgeting.
- **Implementation tool:** Outline which tool (e.g., zoning bylaw) would be used to implement the action.
- **Resource requirements:** Identify the resources required to carry out the action. This can support the conversation about trade-offs. Significant potential gaps or limitations in resources could impact the scope of the plan – ensuring the plan is feasible is important.
- **Responsibilities:** Identify leads (or who has primary responsibility) for the implementation of each action and who is required for additional support. Implementation could require collaboration across departments or with other agencies or levels of government.
- **Timelines:** Develop a timeline for each action and, where possible, tie the action to existing parallel processes, such as updates to relevant bylaws, plans, policies or strategies.



## PRIORITIZE ACTIONS TO ACHIEVE THE GREATEST IMPACT

It is helpful to have clear prioritization criteria and to ensure the prioritization process is collaborative, so there is broad support for the resulting direction. Example prioritization criteria include:

- **Connection to goals:** Magnitude of contribution to community goal(s) and number of goals impacted.
- **Support:** The extent to which the action and resulting change are supported by identified community goals.
- **Cost vs. benefit:** Resources required to undertake the actions versus anticipated benefit in reaching identified goals.
- **Dependencies:** Whether the action is required prior to other actions.

The process to develop prioritization criteria and to prioritize actions can include the parties potentially involved in implementation (e.g., local government departments), community members, and elected officials.



## INTEGRATING PLANS FOR IMPLEMENTATION

To support action implementation, include a review of the implementation plan at least during the annual capital planning and financial planning process. Ensure identified actions are incorporated as required so resources are allocated and can be advanced on the desired timeline.

### STEP 8: MONITOR AND REPORT

The capstone step in the complete communities assessment process is to develop a monitoring and reporting framework to track the actions taken as a result of the assessment process and monitor their real-world impacts. This framework will set a foundation for future assessments and potential adaptive actions.

Similarly to the assessment process, monitoring and reporting frameworks should be scoped to reflect available resources and the community's goals. Monitoring and reporting frameworks can take many forms. One possible version is described below. Note that the indicators within the context of the monitoring and reporting framework (key performance indicators, as discussed below) are different from those featured earlier in the Guide to undertake the assessment.

### Creating a monitoring framework

This example of a monitoring framework is based on key performance indicators (KPI). KPIs are quantifiable indicators of progress towards an intended result – in this case, identified community goals. KPIs can be divided between two types: leading and lagging indicators.

- **Leading indicators** measure ongoing progress (or actions taken) to achieve a goal. For example, a community wants to decrease GHG emissions, and decides to increase sidewalk coverage to encourage more walking. Sidewalk coverage would be a leading indicator, as the action of increasing sidewalk coverage is intended to result in a decrease in GHG emissions.
- **Lagging indicators** measure the outcomes resulting from actions taken to achieve a goal. Continuing the example above, GHG emissions would be a lagging indicator because it is influenced by the action of increasing sidewalk coverage.

**Steps:**

- 1 Identify KPIs:** Review the goals guiding the complete communities assessment and identify the KPIs (leading and/or lagging) that will be used to measure progress towards each goal. Note that these KPIs may have already been identified in existing plans and strategies developed to meet community goals (housing strategies, active transportation plans, climate action plans, etc.).
- 2 Determine the monitoring frequency.** This will depend on the nature of the goals, KPIs, and the resources and time required to implement actions. Some progress on KPIs may be monitored annually, while other KPIs may be monitored less frequently (for example, every five years).
- 3 Determine how best to report on progress,** including both progress on implementing actions and progress towards achieving community goals. Consider how progress could be reported to different audiences in the community (elected officials, senior management, other staff, and community members, etc.). Various methods could include updates to community annual reports, the local government website, annual staff reports, and local newsletters.

**Implementing the reporting framework**

This step involves reviewing the findings from ongoing monitoring, reporting on progress, and creating a feedback loop where those findings inform future actions and assessments.

- 1 Measure progress towards goals** using the identified KPIs at the selected monitoring frequency. Consider: Were the results better than expected? Worse? Are any changes required to the actions being taken to get better outcomes? Adapting and adjusting actions forms the connecting point of the continuous loop that is the complete communities assessment process.
- 2 Share results with the community.**

## ENTROPY CALCULATION EXAMPLE

1

- Identify the total number of overall land uses of interest for the community as a whole.
- Calculate the natural logarithm (ln) of the number of land uses of interest.

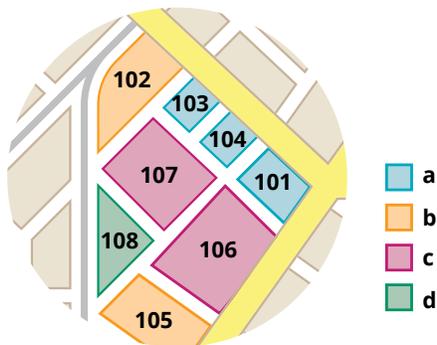
Number of Land Uses of Interest: 5

ln (of Number of land uses of interest): 1.609437912



2

- Assign each parcel a land use.
- Measure the area of each parcel.
- Add up the total area of all the parcels.



Total Land Uses Represented: 4

Parcel ID	Area (m <sup>2</sup> )	Land Use
101	670	a
102	8,000	b
103	350	a
104	400	a
105	2,000	b
106	30,000	c
107	20,000	c
108	7,000	d

TOTAL AREA 68,420

3

- Add up the total area assigned to each land use.
- Calculate the ratio of the area assigned to each land use relative to the overall area.
- For each land use, calculate the natural logarithm of the area ratio.
- For each land use, multiply the area ratio by the natural logarithm of the area ratio.
- Add up the resulting values for all of the land uses.

Land Use	Area (m <sup>2</sup> )	Ratio	Natural Log (ln)	Ratio x ln
a	1,420	0.020754165	-3.875008308	-3.875008308
b	10,000	0.146156095	-1.923080087	-1.923080087
c	50,000	0.730780474	-0.313642174	-0.313642174
d	7,000	0.102309266	-2.27975503	-2.27975503
<b>TOTAL:</b>	68,420	1		-0.82393608

4

- Divide the sum by the natural logarithm of the number of land uses of interest.
- Multiple by negative 1.

#### Final Entropy Index Calculation

$$-1 \times ( -0.82393608 \div 1.609437912 ) = 0.51194027$$

## ENDNOTES

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BRITISH  
COLUMBIA