Sustainability Planning and Assessment: Identifying and Evaluating Community Capital in the District of North Vancouver

by

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Ethics Statement

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Abstract

In order to achieve global sustainability targets, there is a need for concerted effort at local and global levels. To date, there has been no consensus regarding the tools that should be used for sustainability assessment at the local level. While sustainability assessment and monitoring tools that are easy to understand and agreed-upon have been proposed, implementation has been challenged by the complexity of local planning, with its diverse stakeholders as well as a myriad of social, economic, and environmental factors and departmental silos. In this mixed methods research project, an opportunity was taken to operationalize the United Nations Sustainable Development Goals in a local setting. One multi-criteria analysis sustainability assessment approach, the Community Capital Framework and associated tool, the Community Capital Scan, aligned well with the Sustainable Development Goals and subsequently was tested as a sustainability assessment tool by a Canadian community, the District of North Vancouver. The implementation strategy, the challenges and successes, and the results of the sustainability assessment are described. Findings will be useful for others committed to contributing locally to global sustainability goals.

Keywords: sustainability assessment, sustainable development, sustainable development goals, community planning

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List of Acronyms

CCF	Community Capital Framework
CCT	Community Capital Tool
CC Scan	Community Capital Scan
DNV	District of North Vancouver
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas Emissions
ICLEI	International Council for Local Environmental Initiatives
ICSP	Integrated Community Sustainability Plan
IAEG-SDGs	The Inter-Agency and Expert Group on SDG Indicators
LA21	Local Agenda 21
MCA	Multi-criteria Analysis
MDGs	Millennium Development Goals
OCP	Official Community Plan
PI	Principle Investigator
SA	Sustainability Assessment
SCD	Sustainable Community Development
SD	Sustainable Development
SDGs	Sustainable Development Goals
SDSN	Sustainable Development Solutions Network
SEA	Strategic Environmental Assessment
SFU	Simon Fraser University
UCLG	United Cities and Local Governments
UN	United Nations
USA-SCI	USA Sustainable Cities Initiative

Chapter 1. **Introduction**

1.1. Background and Context

The concept of Sustainable Development (SD) addresses the interconnectedness between human activities and increasing environmental degradation. The 1987 Brundtland Report first popularized the term, stating that SD is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987).

In recent years, SD principles have been incorporated into many levels of governance and international policy (Roseland, 2012; Ness, 2006). In 1992, the United Nations (UN) Conference on Environment and Development established Local Agenda 21 (LA21), a framework for focusing sustainability on the community level, and calling upon local authorities to create their own LA21 strategies for SD. LA21s have been described as participatory, long-term and strategic SD planning processes that can be implemented by local government bodies.

In 2015, 193 nations committed to the UN Sustainable Development Goals (SDGs), an ambitious set of goals, targets, and indicators to end extreme poverty, fight inequality and environmental injustice as well as mitigate climate change. The SDGs provide a comprehensive framework for SD that may be utilized by multi-level governance bodies and community stakeholders as a blueprint for regional and community planning. For elected officials and planners working to enhance quality of life in urban environments, the SDGs provide a framework for achieving SD (Kanuri et al., 2016). The UN SDGs are discussed at length in Chapter 3.

There is now widespread agreement that city planning processes are needed to secure a sustainable future and achieve implementation of global sustainability targets (Barnett and Parnell, 2016). With scores of humans living in urban areas, cities may be visualized as sources of opportunity for implementing SD. All of the SDGs have targets that are directly related to the work of local and regional governments (SDSN, 2016). Since the adoption of the SDGs, local governments have utilized SD principles as tools to identify planning priorities and achieve development outcomes that balance the

economic, environmental, and social assets of the community (City of New York, 2015; Kanuri et al., 2016; Iyer et al., 2017).

For the agreements reached at global environmental summits such as LA21 and the UN SDGs to be implemented, concerted action will therefore be required at the local level. Although not the only agencies charged with community planning and development, municipal governments are locally elected, representative, and accountable bodies responsible for decision-making that affect the lives of citizens on a daily basis (Roseland, 2000). For elected officials and planners working to enhance quality of life in urban environments, the SDGs provide a roadmap for achieving SD (Global Taskforce of Local and Regional Governments, 2016).

Many cities across Europe, the United States, and Canada, are using SD principles to re-examine urban planning and land use policies, and to set requirements for urban and metropolitan level action. In the European Union, research projects such as TRANSFORM, CitInES, CITYOPT, and SUDPLAN focus on multi-scale decision-making tools to optimise urban energy efficiency in order for local governments to define long-term planning strategies and translate ambitious into tangible actions (Gargiulo et al., 2017).

In the United States, several cities have engaged in extensive sustainability planning processes that focus on aligning local level goals and targets with global-level aspirations. *OneNYC*, New York City's ambitious comprehensive long-term plan establishes a blueprint for ensuring a dynamic, inclusive economy, a healthier environment, more affordable housing, and more reliable and resilient infrastructure by 2030 (City of New York, 2015). In Baltimore, the Mayor's Office of Sustainability has committed to linking the strategies and concepts from the *Baltimore Sustainability Plan* to the global SDGs (Iyer et al., 2017). Across the continent, the City of San José has similarly adopted *Envision San José 2040* as its latest iteration of an ongoing commitment to advancing an innovation-based economy, developing and implementing environmental policies, and the utilization of land use planning best practices for its future (City of San José, 2015).

In British Columbia, several municipalities have prioritized sustainability planning: the Resort Municipality of Whistler forged Whistler 2020 through the Natural Step'

(Resort Municipality of Whistler, 2012); the District of North Vancouver (DNV) facilitated a community engagement process entitled Identity 2030 (District of North Vancouver, 2011); and the City of Vancouver set targets for the goal of becoming the world's greenest city by 2020 (City of Vancouver, 2012).

Like the SDGs, the broad goals established in the aforementioned urban planning initiatives are inherently connected and depend on each other. For example, increasing density in an urban centre depends largely on the availability of adequate transportation systems, and may have an effect on GHG emissions if fewer citizens are driving cars. Yet historically, planners and policymakers tend to operate in silos (Lu et al., 2015, Costanza et al., 2016). For example, different provincial ministries handle energy, agriculture and health. If sustainability targets are approached one by one, they risk perverse outcomes and failure to reach stated goals (Nilsson, 2016). Indeed, one of the SDG targets is 'policy coherence'. Policymakers may lack adequate tools to verify which interactions are the most important to tackle, in addition to evidence that particular interventions and policies propel or impede progress (Nillson, 2016). There is therefore an opportunity to explore the potential synergies of global sustainability goals and further investigate their implementation at the local government level. Moreover, an opportunity exists to "localize" the global sustainability goals.

Sustainable Community Development (SCD) is the application of the concepts of SD in a local context (Roseland, 2012). As an alternative to traditional approaches to development, SCD emphasizes the integration of economic, social, and environmental objectives for a particular place (Roseland, 2012). SCD also requires democratic decision-making, placing emphasis on community engagement throughout the planning process (Hermans, Haarmann and Dagevos, 2011). In essence, SCD is a holistic, integrated concept that communities can use on their path to achieving local sustainability.

Community planners thus have a critical role to play in promoting dialogue around sustainability and in creating policy solutions that promote SCD (Berke and Conroy, 2000). Planners and the communities they work in should move beyond symbolic use of the SD concept toward comprehensive development guidance strategies that balance the core values of diverse stakeholder groups. For projects, plans, and policies to achieve multiple economic, social, and environmental goals,

planners need a rubric for thinking systematically about the numerous interactions of targets, beyond simply identifying trade-offs.

Given the global efforts to achieve urban sustainability, community planners are faced with a need to set goals and targets and track progress towards sustainability outcomes (Cohen, 2017). Across Canada, an increasing number of municipalities are attempting an integrative approach to sustainability through the adoption of a high-level planning document known as an Integrated Community Sustainability Plan (ICSP) (Stuart et al., 2014). The main goal of an ICSP is to establish a framework for action on a broad range of sustainability objectives. While ICSPs are being adopted across Canada, studies have shown a disconnect between holistic definitions of sustainability and concrete actions (Ling et al., 2009).

Chapter 2. **Research Problem**

2.1. Overview

For nearly three decades, local governments around the world have been developing and testing new planning processes and tools to give operational meaning to SD (Roseland, 2012). Few, however, have succeeded in establishing a comprehensive planning and management system that could ensure a single local community would identify, agree on, operationalize, and monitor implementation of the measures that are necessary to set development on a sustainable trajectory (Roseland, 2012). There is therefore a need for frameworks and tools that integrate SD with traditional planning to assess and catalyze SD at the local level.

Sustainability assessment (SA) tools provide objective criteria indicative of sustainability (Cohen, 2017), and may be used to guide local planning efforts towards SD. At the local level, SA usually revolves around the identification and measurement of indicators, and the literature on indicator frameworks is ample (Cohen, 2017). There is a well-established body of research on SA for the urban context, which is examined in Chapter 3.

Although there are many different potential SA frameworks (Olalla-Tárraga, 2006), there is no consensus regarding one framework that best guides local SA as the literature has primarily targeted global scales (Davidson et al., 2012). Local governments have difficulty carrying out integrated sustainability decision-making because of the silos that exist within and between municipal departments (Dale, 2001; (Zoeteman et al., 2016), and cause breakdown of horizontal and vertical communication. For example, most governments include separate ministries that manage water, energy, and agricultural production (Weitz et al., 2014. Each ministry sets policies and plans separately, yet these sectors are inextricably linked through local, regional, and global water, carbon and energy cycles (Weitz et al., 2014. Federal, provincial, and municipal governments “silo” approaches to natural resource management have historically led to unsustainable policy and development (Weitz et al., 2014). This approach to the complex, interconnected issues of water, energy, food, and social systems is insufficient if humanity is to meet global SD targets.

Many urban SA tools that scholars and planners have developed and tested often follow a “three-silo” approach, selecting and organizing sustainability indicators by economic, social, and environmental concerns which erodes the ability to perceive the interconnectedness of each domain (Cohen, 2017). Such an approach to sustainability has been criticized as reductionist and an oversimplification of a complex problem (Davidson et al., 2012). Others have expanded this criticism to claim that urban SA must move beyond a three-pillar approach and consider spatial, chronological and logical dimensions (Ding et al., 2015).

Analysis tools that enable the integration of the traditional economic, social, and environmental dimensions to be assessed holistically will be fundamental if progress towards the goals is to be made. Gargiulo et al. (2017) note a trend in the EU to move from policies and professional tools that cover only one particular sustainability dimension toward tools with an integrative and multidisciplinary planning approach. New typologies that capture the interconnectedness of SD are therefore necessary to allow community planners and decision-makers to make holistic assessments of obstacles to sustainability and establish informed responses (Davidson et al. 2012).

Aside from integration, there is a clear need for simple, transparent tools able to support decision-makers to tackle global issues of sustainability through a holistic and localized perspective (Gargiulo et al., 2017). SCD is a complex process that requires mobilizing citizens and their governments to strengthen community capacity to achieve ambitious sustainability goals (Roseland, 2012). Many planning tools designed to facilitate and oversee the complexity of local planning processes do not integrate sustainability principles, specific community priorities and long-term thinking with a simple assessment of community capacity.

The Community Capital Tool (CCT) is a decision-support and assessment tool designed to facilitate community dialogue about integrated sustainability planning at local scales (Roseland, 2012). The CCT is composed of two related instruments, the Community Sustainability Balance Sheet, and the Community Capital Scan (CC Scan). Each CCT instrument is built from a shared analytical Community Capital Framework (CCF) consisting of six forms of capital, each broken down into a set of smaller stocks and requirements used to measure capital capacity and progress toward achieving SD

goals (Roseland, 2012). The CC Scan is currently in its beta form, and this research project sought to identify various ways to build upon it.

2.2. Research Objectives

This project was the first iteration of a larger two-phase project[1], and took place from October 1st, 2017 to January 30th, 2018. The first phase sought to demonstrate the impact of the use of an Multi-Criteria Analysis (MCA) tool, the CC Scan, in the District of North Vancouver (DNV). The DNV was motivated to participate in SA and evaluate progress towards stated sustainability goals at both local and global scales. The project aimed to assist planners and policy-makers to evaluate the impact of projects, plans and policies on SCD during the Official Community Plan (OCP) revision process.

More specifically, the key purpose of this project was to inform traditional local community planning and provide a case for integrating global sustainability goals into local policy plans using an MCA tool which aims to consider sustainability dimensions while providing engaging participatory methodology. By testing the CCF in the DNV and highlighting connections between local planning goals and the global SDGs, this research contributes to maintaining the DNV's international obligation to connect local development with global commitments to achieve long-term sustainability.

Specific objectives include:

- Introduce District staff to the goals and methods of the CCF
- Examine the related literature and best practices of other municipalities for SA
- Align DNV OCP goals and policies with the CCF and SDGs
- Contribute to the development a prototype sustainability framework with principles and focus areas that will support the DNV in sustainable decision-making

[1] The second phase of this research project is being undertaken by another SFU researcher. The focus of the second phase involves the customization of a research-based tool for sustainability assessment to support decision-making and policy-making in the District of North Vancouver by evaluating the impact of policies and projects holistically while involving the community.

2.3. Research Questions

This project is designed to answer the following overarching question:

- How can we represent SD (integrated economic, social, and environmental goals and objectives) at the local level?

Subsidiary research questions are as follows:

- How can we better represent progress toward long-term integrated SD goals at the local level?
- How can an MCA tool such as the CC Scan contribute to the alignment with the SDGs at the local level?
- How can an MCA tool such as the CC Scan be operationalized in a way that ensures scalability, flexibility, and communicability?

This project conceives of the term 'scalability' as referring to the ability of an MCA or SA tool to be implemented at multiple scales, such as local, regional, and federal. The term 'flexibility' refers to an SA or MCA tool that may be updated, and allow for new criteria to replace old ones. Finally, 'communicability' means whether or not an SA or MCA tool is able to communicate results efficiently and in a manner that allows a diverse group of participants to comprehend.

To operationalize these research questions, this project examined the contribution of municipal local area planning documents and development applications to SCD using the CC Scan, a web-based tool created by the Centre for Sustainable Development (CSD) at Simon Fraser University (SFU) in Canada, in collaboration with Telos: the Brabant Centre for Sustainable Development in the Netherlands.

The products of this study include an evaluation of the SCD contributions of the Edgemont Area Plan, a municipal planning document, and two development applications. A package of tools and strategies that citizens and local governments may use to advance specific SCD objectives was developed, including suggestions for future use of the CC Scan.

Chapter 3. **Integrative Sustainable Development Planning**

"Cities are where the battle for sustainable development will be won or lost"

(High Level Panel of Eminent Persons on the Post-2015 Development Agenda, 2013)

3.1. Overview

Traditional planning frameworks are not designed to tackle the complex problems of SCD (Roseland, 2012). SD planning is aimed not only at the reduction of impacts, but at steering a plethora of stakeholders with different and often conflicting values towards the achievement of shared long-term objectives or targets (Roseland, 2012). The SDGs have come into effect at a time when little over half the global population resides in cities, leaving planners and decision-makers with some of the world's most complex development challenges. Nevertheless, local governments are also now faced with the opportunity to integrate the SDGs into their local planning processes and evaluate progress towards their achievement.

This chapter provides a literature review of the growing field of SA in order to answer the following overarching research question: *How can we represent sustainable development (integrated economic, social, and environmental goals and objectives) at the local level?*

Section 3.2 examines the growing field of SA. Section 3.3 details the importance of aligning local planning processes with global scale goals and targets. Section 3.4 discusses pioneering literature around the underpinnings for identifying SA criteria, finally sections 3.5 to 3.7 describe the UN SDGs and their implications for urban planners.

3.2. Sustainability Assessment

SA is any process that directs decision-making towards sustainability (Bond and Morrison-Saunders, 2011). Many have labeled SA as the third generation of impact

assessment, after environmental impact assessment (EIA) and strategic environmental assessment (SEA), although it is also true that it has emerged from other fields such as planning and natural resource management (Bond and Morrison-Saunders, 2011).

SA has been defined by Devuyset et al. as a “tool that can help decision-makers and policy-makers decide which actions they should or should not take in an attempt to make society sustainable” (Sexton and Linder, 2014). Ness et al. (2007) suggest that SA can provide decision-makers with an “evaluation of global to local integrated nature-society systems in short and long-term perspectives in order to help them to determine which actions should or should not be taken in an attempt to make society sustainable”.

SA frameworks are increasingly recognized as important policy making and public communication tools, providing information on federal, provincial, and municipal government environment, economic, social, and technological performance (Sing et al., 2012). Such frameworks for implementing, monitoring, and assessing sustainability are comprised of principles and indicators that guide a community’s path toward achieving its goals (Joss et al., 2015).

SA frameworks are being implemented in cities to evaluate the success of plans, policies, and regulations aimed at achieving sustainability in practice (Berke and Conroy, 2004). These frameworks assist decision-makers in translating SD objectives into tangible actions by supporting evidence-based policy making, promoting knowledge exchange and social learning (Joss, 2012). Indeed, the primary objective of SA is to support decision and policy-making: to help develop, implement, and assess an initiative based on vision, values, and evidence, while providing decision-makers with a “whole-systems” view of the initiative from a sustainability perspective throughout the entire implementation process (Kates, Parris and Leiserowitz, 2005; Tanguay et al., 2010; Roseland, 2012; Joss et al., 2015). By using such frameworks, vision, values, and evidence can be assessed across social, environmental, and economic dimensions using both quantitative and qualitative data.

Since there is no unanimous consensus on how sustainability should be put into practice (Olalla-Torraga, 2006; Roseland, 2012; Lamorgese and Geneletti, 2013) theoretical frameworks and sustainability-based decision criteria have been proposed (Gibson, 2006).

The most common approaches to SA utilize indicator or index-oriented frameworks, followed closely by rating system frameworks (Sumner, 2004; Davidson et al., 2012 Chesson, 2013; Cohen, 2017). Although these frameworks are indeed the most common (Cohen, 2017), SA practitioners must be cautious in applying such protocols, as there are concerns in the literature that any SA approach must be grounded in clear sustainability principles, and that indicators for urban SA should be chosen through an integrative approach (Gibson, 2010; Ding et al., 2015).

Gasparatos and colleagues (2009) suggest that a consensus has emerged about the desirable attributes of SA, which are summarized in table 1 below.

Table 1. Attributes of Sustainability Assessment (Gasparatos et al., 2009).

Integrated evaluation	Predictive capacity	Conservative bias	Stakeholder participation
Combined assessment of effects on environmental quality and public health, social well-being, economic welfare, and institutional issues as well as their interdependencies.	Consideration of the future effects of present actions or inactions	Acknowledgement of uncertainties about future consequences of present actions and recognition of the concomitant need to proceed with caution and prudent watchfulness.	Meaningful engagement of stakeholders, including the general public

Despite recommendations in the literature that call for clear, integrative sustainability principles to guide urban SA, much of the literature focuses on complex indicator systems that neglect the fundamental principles of sustainability science (Gibson, 2006; Cohen, 2017). According to Cohen (2017), Gibson (2006) provides the clearest framing of generic criteria for SA, which have been applied in two recent studies (Lamorgese and Geneletti, 2013; Stuart et al., 2014). Nevertheless, there is still no consensus for principle-based urban SA frameworks (Cohen, 2017).

Cohen (2017) found that the most common framing for the selection of SA and indicator frameworks is the traditional three-pillar approach, with environmental, economic, and social plus additionally proposed dimensions at the forefront. Unsurprisingly, many scholars have criticized this as a simplified, reductionist approach to complex problems that may lead to the selection of data based merely on availability and convenience (Davidson et al., 2012; Sala et al., 2015). This finding is in line with calls in the literature for clear, integrative sustainability principles to lead SA processes.

The literature shows a very clear gap within the range of SA tools available concerning the integration of sustainability principles, specific community priorities, and long-term thinking combined with stakeholder engagement (Roseland, 2012).

3.3. Sustainable Community Development: From Global to Local Scales

Urban areas are facing the combined challenges of widening social inequity, climate change, growing ecological footprints, and population pressures (Davidson et al., 2012). Regional and community planners are concerned with addressing these complex challenges through the integration of environmental, social, and economic dimensions with land use to improve the built and social environment (Davidson et al., 2012). Given the international efforts to achieve global sustainability, there is a need to set goals and targets and track progress towards urban sustainability outcomes (Cohen, 2017).

Urban SA is a quickly growing subfield of SA. This research project seeks to better understand how practitioners might operationalize urban SA to guide local planning processes toward sustainable urban development.

The total human population living in urban areas is expected to rise to two-thirds by 2050 placing enormous pressure on municipal services such as local energy resources, waste management, sewer systems and transport infrastructure (Roseland, 2012). It is therefore vital that urban areas are planned and managed in harmony with the natural environment while supporting and sustaining human populations and economic growth. With 60% of their area still to be built before 2030, there is opportunity to proactively guide the shape of future cities to bring our global resource use within planetary boundaries and reach global sustainability goals and targets (Roseland, 2012; UNTST, 2012).

One of the driving political forces of SCD was the Rio Earth Summit in 1992, which set forth a series of actions for achieving sustainability locally, known as LA21. LA21s are SD action plans that promote multi-stakeholder engagement, ecosystem protection, sustainable urban planning, a holistic sustainability viewpoint, participatory decision-making, and the establishment of a monitoring framework (Bayulken et al. 2015). Local governments have since been encouraged to complete LA21 campaigns

and strategies and to report the result to both the UN Commission on Sustainable Development and to the International Council for Local Environmental Initiatives (ICLEI) (Roseland, 2000). Despite the fact that over 6400 communities worldwide had committed to LA21s by 2002, as of 2012 less than half had actively moved beyond the planning stage (Rok and Kuhn, 2012). After the Rio+20 Earth Summit, communities worldwide were faced with an implementation issue, as sustainability plans were adopted without being able to mobilize citizens and apply a holistic approach to implementing their actions (Roseland and Spiliotopoulou, 2016).

With a little more than ten years left for the SDGs to achieve their intended targets, local governments will become the laboratories for the monitoring and evaluation of the ambitious set of global goals, and may be the best chance for humanity to mitigate the environmental impact form human activity (Woodbridge, 2015).

3.4. Multi-Criteria Analysis and Sustainable Development

One method being used to align multiple sustainability objectives is MCA. Maclaren (1996) defines MCA as starting with the key dimensions of sustainability and identifying criteria and indicators for each. MCA is a well-known evaluation method used for decades in decision-making. It has been defined as a discipline which studies decision-making with multiple and conflicting criteria or objectives (Jayaraman et al., 2015). Due to the obvious fact that economic sustainability comes at an ecological cost and ecological sustainability may have an economic cost, integrative MCA frameworks are needed to address issues of sustainability (Munda, 2005).

The UN SDGs are being used as MCA tools in cities around the world such as Baltimore (Iyer et al., 2017), New York City (New York City, 2015) and San José (Karuni et al., 2016). The CCF is an example of an MCA tool that describes six forms of community capital that are essential for sustainable communities: natural, physical, economic, human, social, and cultural. They are referred to as capital, because sustainable communities should strive to live off the interest rather than drawing down the capital in each of these areas. The framework defines sustainability as a balanced development of all six capitals (Roseland, 2012). A detailed overview of the CCF is offered in Chapter 4.

The SDGs, the CCF, and other MCA tools provide objective methods to identify gaps in integrating SD targets into local planning processes, and can assist local governments in prioritizing sustainability objectives into projects, plans, and policies. Each of the aforementioned assessment methods are further explained in the following sections, while the CCF is explained in Chapter 4.

SD includes the ideal of simultaneous achievement of harmonisation of economic growth and environmental concerns (Munda, 2005). SD is indeed a multidimensional concept, but it can be nearly impossible to maximize conflicting objectives at the same time. As such, compromise solutions must be sought.

The objectives of any planning process vary considerably from micro to macro scales, making it necessary to define clearly what the scope of assessment is and what questions need to be answered. This implies that different instruments should be used depending on each case (Sala et al., 2013). In sustainability planning, neither an economic reductionism nor an ecological one is possible (Munda, 2005; Gibson, 2006). MCA has demonstrated utility in many sustainability policy and management issues (Munda, 2005), and may be considered as a useful tool for implementing sustainability policy.

To assess progress towards sustainability, there are many ways to design frameworks for understanding urban sustainability that seek to balance multiple criteria (Dagevos, 2012; Roseland 2012; Roseland and Spiliotopolou, 2016; Cohen, 2017). One example, from Forman and Wu (2016) establishes seven impact areas of urban development: natural vegetation, agricultural land, clean water, jobs, housing, transport, and communities. In this framework there is a balance between urban impact on basic human needs and livelihoods, natural resources and natural services.

As a method for sustainability policy management, MCA has proven useful due to its various evaluation criteria having a direct translation in terms of plurality of values (Munda, 2005). In other words, MCA as a decision-making support framework has implications for participatory and democratic decision-making.

The literature reveals that MCA tools are useful in sustainability policy evaluation (Munda, 2005). The CC Scan is one example of an MCA tool that offers a way to assist stakeholders in the evaluation of planning decisions against a set of basic sustainability

criteria, known as capitals and stocks. The CC Scan in the context of the SDGs provides a clear, common set of criteria to be used in local SA processes. The CC Scan and the role it plays in the CCF are explained in Chapter 4.

3.5. Identifying Criteria for Sustainability Assessment

Cities are complex and dynamic systems nested within unique ecological systems (Cohen, 2017). As each city is defined by its own unique historical and cultural context, it can be challenging to select from hundreds, if not thousands of indicators to apply an assessment to all urban areas around the world (Gonzalez et al., 2011). It may prove more beneficial to instead design a generic urban SA method around a common set of guiding principles that provide a foundation for criteria to be designed unique to each individual city (Cohen, 2017).

According to Gibson et al. (2005), SA processes must force decision-makers deliberating potentially significant initiatives to give attention to sustainability requirements. The processes must apply decision criteria for progress to sustainability as the main test of proposed policies, plans, practices, and designs (Gibson et al. 2005) In their study, Gibson et al. (2005) found that SA processes must apply the following process elements:

- Identifying appropriate purposes and options for new or continuing undertakings
- Assessing purposes, options, impacts, mitigation and enhancement possibilities, and so on;
- Choosing (or advising decision-makers on) what should or should not be approved and done, and under what conditions; and
- Monitoring, learning from the results and making suitable adjustments through implementation to decommissioning or renewal
- Defining the sustainability needs in the familiar but separate categories of ecology, politics, society, economics and culture perpetuates fragmentation.

Gibson (2006) theorized that in conventional decision-making, trade-offs between narrowly biophysical or ecological considerations and competing social and economic objectives may be made outside the assessment framework. By contrast in SA, all policy

commitments and development objectives should be considered holistically, and the trade-offs are only acceptable as a last resort.

The focal point of sustainability may be considered as the maximization of multiple, mutually reinforcing, adaptable, and lasting contributions to human and ecological well-being, while simultaneously minimizing or avoiding adverse effects (Gibson, 2006). Municipal planning strategies may be considered sustainable only when it is at least acceptable socially, environmentally and economically, without relying on trade-offs (Gibson, 2006). This is of particular importance to the achievement of the SDGs, which offer a clear set of criteria to be used for SA.

In a recent analysis of the literature, Cohen (2017) found that no clear organizational structure for SA exists, but rather there is an array of methods and frameworks nor was there agreement on what constitutes categories, themes and indicators. The majority of urban SA frameworks are not grounded in clear guiding principles of sustainability. This suggests that an integrative approach where core sustainability principles are utilized to guide a goal-based framework should be employed (Cohen, 2017). Cohen (2017) also found that Gibson (2006) provides the clearest framing for SA by offering clear and generic criteria for SA.

Cohen (2017) recommends a standardization of terms and concepts across urban SA studies and argues that future studies must explore the usage of a common lexicon for SD. The UN SDGs provide a common language for diverse stakeholders to assess federal, regional, and local sustainability endeavours.

3.6. The United Nations Sustainable Development Goals

With the adoption of the SDGs, new standards for a global commitment to the interrelated objectives of environmental sustainability, economic development, and social inclusion were established (SDSN, 2016). The SDGs are a set of seventeen goals that establish a global aspiration for the world to collectively achieve by 2030. One hundred and sixty-nine targets and 232 indicators within each goal have been set to allow for the measurement of progress towards each goal (Kanuri et al., 2016). The intent is for UN member states to use the SDGs to frame both domestic and international agendas for policy development through 2030. The SDGs are an evolution of the

Millennium Development Goals (MDGs) which were adopted in 2001 (Kanuri et al., 2016), and are intended to achieve what the MDGs did not. For an overview of the goals themselves, see Figure 1 below.

Figure 1. The UN SDGs

Source: SDSN, 2016

Goal 1: End poverty in all its forms everywhere;

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture;

Goal 3: Ensure healthy lives and promote well-being for all at all ages;

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all;

Goal 5: Achieve gender equality and empower all women and girls;

Goal 6: Ensure availability and sustainable management of water and sanitation for all;

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all;

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;

Goal 10: Reduce inequality within and among countries;

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable;

Goal 12: Ensure sustainable consumption and production patterns;

Goal 13: Take urgent action to combat climate change and its impacts;

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development;

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss;

Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels;

Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

The global framework centres around five themes, titled the Five Ps of Sustainable Development, which are summarized in Table 1 below (Iyer et al., 2017):

Table 1. The Five Ps of Sustainable Development

People	Planet	Prosperity	Peace	Partnerships
The commitment to ending extreme poverty, hunger, and economic and gender inequality;	The commitment to protect the planet from degradation through sustainable development, production, consumption, and natural resources management practices, and to address the causes and effects of climate change;	The adoption of consumption and production patterns that are sustainable for future generations and result in equitable growth and participation for all members of society;	The promotion of good governance, rule of law, anti-corruption, human rights, and the equal protection under the law for all members of society;	The coordination of a multitude of stakeholders, including national and local governments, multinational corporations, NGOs, and other members of global civil society to implement the SDG agenda with accountability and transparency

Source: Iyer et al., 2017

The SDGs also reflect advancement in the field of development since the adoption of the MDGs, and applies the following five principles into development strategies (Iyer et al., 2017):

Inclusivity: the SDG agenda stands on the principle that no one is left behind, and therefore requires the engagement of stakeholders across all levels of society in order to effectively account for and respond to the needs and interests of all;

Universality: In order to achieve global targets for development, the involvement of developed and developing countries is required. Understanding that development contexts vary worldwide, the SDGs are designed to be adapted to local situations;

Integration: the SDG agenda addresses the complexity of long-term solutions, by recognizing the interconnectivity of development policies and investments and building on existing relationships between stakeholders across the three dimensions of SD: economy, environment, and society;

Technologically-driven: Local achievements in SD and the SDGs require support, action and coordination from communities and local governments. In this respect cities are critical centers of sustainable change due to their population density and economic needs and output.

3.7. Implementing the SDGs in Cities

While the SDGs were adopted by governments at the national level through the UN, local governments will be at the forefront of making policy to achieve them (Kanuri et al., 2016). Nearly all seventeen SDGs contain specific targets that depend on local action, which places a major emphasis on municipal government authorities and communities in the promotion of SD.

A large amount of implementation and monitoring is already occurring at the local level. ICLEI Local Government for Sustainability (ICLEI) published briefing documents and the United Cities and Local Governments (UCLG) published literature introducing the SDGs (ICLEI, 2015; UCLG, 2015). The Sustainable Development Solutions Network (SDSN) published a guide for local practitioners to implement the SDGs locally (SDSN, 2016). Numerous other guidelines have been developed to support local activities.

The SDGs can be a way to establish a long-term approach to municipal planning by providing clear, common objectives that may be continuously pursued regardless of political cycles (SDSN, 2016). Across the world, many cities are beginning to translate the global SDGs into their local planning processes. In this section, the local efforts of three U.S. cities are briefly examined: Baltimore, New York City, and San José.

Baltimore:

In 2015, as part of the USA Sustainable Cities Initiative (USA-SCI) Baltimore was selected as one of three cities to pilot implementation of the 17 SDGs (Iyer et al., 2017). The pilot project began with an exercise to review existing plans and initiatives relating to SD. Each municipal planning document was reviewed, and the alignment of targets and goals with the SDGs was compiled. The research team found that in the effort to become a more just and equitable city, Baltimore faced significant gaps in achieving certain targets (Iyer et al., 2017).

NYC:

The New York City planning department, in partnership with the UN SDSN authored *A City with Global Goals* (New York City, 2016), a report that illustrates the connections between the SDGs and the visions, goals, initiatives, and indicators that form *OneNYC,* the local government's blueprint for a sustainable future that focuses on four interconnected visions: growth, equity, sustainability, and resiliency (New York City, 2015). In combination, the long-term planning efforts mandated by *OneNYC* offer a clear example of how cities can contribute to the achievement of the SDGs.

San José:

The City of San José has a long history of policy-making strategies focused on sustainability that complement the SDGs (Kanuri et al., 2016). As a result of a partnership between San José State University and the UN SDSN, a 6-month project to evaluate the city's current policies to assess alignment with the SDGs was undertaken. The goals of the project were as follows (Kanuri et al. 2016):

1. Map policies and initiatives to the SDGs, including an evaluation of alignment between San José's General Plan and the SDGs;

2. Consult with key stakeholders to identify additional goals and targets to achieve the SDGs that the City could undertake through existing initiatives;

3. Present recommendations for next steps

Local governments must understand their current capacity to identify problems and achieve SD locally (Kawakubo et al., 2017). The Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs) proposed two-hundred and thirty-one indicators to support the efforts of local governments and key stakeholders to assess global progress towards the SDGs (IAEG-SDGs, 2016). However, these indicators are largely biased toward the national level. Translating global initiatives such as the SDGs into local actions is therefore required, however an assessment method to monitor progress at the local level is currently lacking (Kawakubo et al., 2017). Such a method would support local initiatives in cities towards the achievement of the global SDGs.

Based on the overview of the aforementioned city-level initiatives for implementing the SDGs, it is clear that the SDGs provide a shared language for understanding the concept of global SD as the local level. This finding coincides with the recommendation provided by Cohen (2017) that future SA studies must explore a common lexicon for the field.

3.8. Implications for Urban Planning

Local planning and development decisions have a significant impact on global environmental sustainability. While cities are at the core of sustainability challenges due to the quantity of resources they consume, they also signify hope for a sustainable future (Kanuri et al., 2016). Municipalities have significant authority to set policy for waste management, land use planning, water, energy, food production, transportation, habitat preservation, education, economic development and other SD issues. All of the SDGs have targets that are directly related to the work of local governments (SDSN, 2016). Planners therefore have a critical role to play in promoting dialogue around sustainability and in creating policy solutions that promote SCD. For projects, plans, and policies to achieve multiple economic, social, and environmental goals, planners need a rubric for thinking systematically about the numerous interactions of targets, beyond simply identifying trade-offs.

The SDGs act as a common language for both local governments and citizens, representing a shared ideal to be pursued at the city-level (Iyer et al., 2017). This project proposed the usage of the CC Scan as a way of aligning local level planning efforts with the global SDGs. The results of this project aspire to better inform local planning efforts by assessing the implementation of the CC Scan using the SDGs as analysis criteria.

Chapter 4. **The Community Capital Framework**

4.1. Overview

The Community Capital Framework (CCF) was developed to consider the effects of decision-making on six forms of community capital. The framework envisions a community as consisting of natural, physical, economic, human, social, and cultural capital (Roseland, 2012). This conceptual framework is useful for exploring the assets and resources present in a community that can be leveraged to promote change (Anglin, 2015). The CCF has been piloted in British Columbia, the US, Bolivia, and in over 75 municipalities in the Netherlands.

The CCF was designed with systems-thinking perspective that regards each form of community capital as a sub-system of the larger whole community system. It is important to understand that an increase in a single capital can generate multiple benefits across the other forms of capital (Roseland, 2012). For example, an increase in economic capital through successful community economic development initiatives may create opportunities for more jobs (human capital) and generate financial resources to maintain and replace aging community infrastructure, such as roads and public buildings (physical capital). If economic development initiatives thoughtfully consider the needs of the community, they can also increase social and cultural capital. This flow of resources across capitals has been termed the “upward spiral” of community capital (Anglin, 2015). Of course, this same effect can occur as a “downward spiral” when one form of capital becomes eroded, then others will likely decrease (Roseland, 2012).

The six capitals of the CCF are broken down into a set of small stocks and requirements used to measure capital capacity and sustainability progress. The stocks are sub-systems that influence the state and development of each capital account and can be considered as assets. These stocks have universal components and aspects that can be adapted according to context, and were chosen based on their ability to accurately and efficiently represent the health of the capital they represent. Within each stock is a set of requirements that are chosen by the community that more closely represent the local needs and priorities of the community or the specific initiative being measured. Lastly, each requirement is measured by one or more indicators. Indicators

are specific, measurable entities (such as GHG emissions, unemployment rates, etc.) that “indicate” the status of each requirement. They are selected based on the ease (and cost) of their data collection, their correlation to the requirement being measured, and the reliability and integrity of their other data sources.

4.2. The Capitals

Natural Capital

Natural capital refers to any stock of natural assets that yield a flow of valuable goods and services into the future. This includes non-renewable resources such as fossil fuels and minerals, renewable resources that can provide goods and services (food, clean water, energy) over the long run if managed sustainably, and the capacity of natural systems to continue providing critical goods and services while absorbing our pollutants and emissions (such as the atmosphere’s capacity to regulate the planet’s climate). Enhancing a community’s natural capital means living within its ecological limits: using less of nature; minimizing waste; and generally ensuring that human actions do not degrade the functional integrity of ecosystem services.

The basic stocks for natural capital are: Land (as it relates to the natural environment), Soil, Groundwater, Surface Water, Air, and Minerals and Non-Renewable Resources.

Physical Capital

Physical capital is the infrastructure that helps people obtain their basic needs, such as shelter, access to clean water, unspoiled food, and a supply of energy. It also creates an opportunity for people to be productive by providing stocks of material resources such as equipment, buildings, machinery and other infrastructure that can be used to produce goods and a flow of future income. The design of the physical environment has a significant impact on the other forms of capital because it directly serves human needs (water infrastructure meets the need for drinking water) and affects the natural environment (public transit reduces traffic congestion and consequently air pollution)

There is a strong relationship between physical capital and human capital. Insufficient physical capital can limit human capital by requiring more effort to satisfy basic needs and achieved productivity. Improving physical capital includes focusing investment (financial and non-financial) on community assets such as public facilities (i.e. hospitals and schools); water and sanitation; efficient transportation; safe, quality housing; adequate infrastructure, and telecommunications.

The basic stocks for physical capital are: Infrastructure, Land (specifically land use), Transportation, Housing and Living Conditions and Public Facilities.

Human Capital

Human capital consists of the knowledge, skills, competencies and other attributes embodied in individuals that facilitate the creation of personal, social, and economic well-being. It contributes to the labour productivity of a community and may represent a person's ability to pursue and achieve individual livelihood objectives. Health, education, skills, knowledge, leadership and access to services all constitute human capital.

Increasing human capital requires focus on health, education, nutrition, literacy, and family and community cohesion, as well as increased training and improved workplace dynamics to generate more productive and innovative workers; basic determinants of health such as peace and safety, food, shelter, education, income, and employment are necessary prerequisites.

The basic stocks for human capital are: Education, Health and Well-being.

Economic Capital

Economic capital refers to the ways in which we allocate resource and make decisions about material values. It is essential for building a stable and viable economy. There are two distinct types of resources within economic capital: *financial* and *business.* Individuals and organizations use *financial resources*, like money and access to affordable loans to achieve well-being and generate wealth through goods and services production. *Business resources,* such as locally owned and operated companies, are the suppliers and consumers within a community that generate employment and income.

They transform community resources into products and services that encourage the circulation of money within the community.

Strengthening economic capital involves focusing on the maximization of existing resources (i.e. waste as a resource), circulating the flow of dollars within a community, making things locally to replace imports, creating new products, trading fairly, and developing community financial institutions.

The basic stocks for economic capital are: Labour, Financial Resources and Economic Structure.

Social Capital

Social capital is the community cohesion, connectedness, reciprocity, tolerance, compassion, patience, forbearance, fellowship, love, commonly accepted standards of honesty, discipline and ethics; commonly shared rules, laws, and information. Often referred to as the glue that holds communities together, social capital is different from the other forms of capital. It is not limited by material scarcity, meaning that its creative capacity is limited only by imagination. Social capital does not wear out upon being used, and if unused, social capital deteriorates at a relatively rapid rate. It is non-transferable, cannot be created instantly, and the very fact of trying to consciously create it or direct it can create resistance.

Multiplying social capital contributes to stronger community fabric, and establishes bonds of information, trust, and inter-personal solidarity, whereas a loss, or deficit of social capital results in high levels of violence and mistrust.

The basic stocks for social capital are: Citizenship and Safety.

Cultural Capital

Cultural capital is the product of shared experience through traditions, customs, values, heritage, identity, and history. It is the cultural and traditional resources of a community, including built and natural heritage, as well as a sense of place and identity. Policies that preserve, promote and maintain built cultural heritage and subsidize arts, culture and recreation help to enhance cultural capital.

The basic stocks for cultural capital are: Cultural Heritage, Identity and Diversity.

4.3. The Community Capital Tool

The Community Capital Tool (CCT) was developed to operationalize the CCF and help communities reach their sustainability goals. The CCT allows communities to holistically assess progress toward their goals and better focus on plans, policies, and projects that reflect multiple priorities (Roseland, 2012).

The CCT comprises two complementary instruments: the Community Capital Scan (CC Scan), a dialogue- and decision-support tool, and the Community Capital Balance Sheet (Balance Sheet), a quantitative sustainability assessment tool.

The CCF delivers the final results of both the CC Scan and Balance Sheet into a graphical reporting package that reports on the health of each capital and their constituent stocks. Community leaders, planners, and citizens can use this information to compare the current sustainability status of their community with past results, and with other, comparable communities. The CCF is based on strong sustainability principles (Roseland, 2012). It focuses on the issues specific to each individual community, but does so in a way that recognizes each community's regional and global impact on the environment and on society at large. The CCF is also designed to incorporate the democratic input of citizens in terms of values and priorities, and provides planners and decision-makers with a tool that helps them ensure that these values and priorities are reflected in their policy decisions. A description of each of the six capitals follows below.

4.3.1. The Community Capital Scan

The instrument used for this project is the CC Scan, a web-based tool for early stage evaluation of expected impacts of projects and policies. The CC Scan is a dialogue and multi-criteria decision-support tool. Communities can use it to gauge decision-maker and stakeholder perceptions of proposed projects and policies across the six community capitals.

The CC Scan has a broad application. The scan is particularly useful for evaluating plans or developments at an early stage, before investments are actually made (Roseland, 2012). During this phase there is usually still enough room to adjust

the plans. The idea is not to make extra work for a group of stakeholders, such as a community planning team, but rather to assist participants in thinking holistically and from a sustainability lens. For municipal planning, it should be emphasized that the CC Scan is not for every type of development application. The scan may also be used to make a SWOT analysis of a community or region (CC-Scan, 2013).

Table 2. Community Capital Scan Stocks and Requirements

Capitals	Stocks	Requirements
Natural	Soil	Eliminate all pollutants and contaminants
		Expand the preservation of fertile agricultural land
		Eliminate soil erosion or instability
	Groundwater	Eliminate all pollutants and contaminants
		Preservation of existing reservoirs and replenishment through natural processes
	Air	Eliminate all pollutants and contaminants
		Reduce greenhouse gas emissions
	Surface Water	Eliminate all pollutants and contaminants
		Ensure that surface water quality is suitable for human and agricultural use
	Minerals and Non-Renewable Resources	Reduce the extraction rate of non-renewable resources
		Use only environmentally safe extraction practices
	Land	Ensure protection of biodiversity
		Increase preservation of natural and sensitive ecosystems by parks or conservation areas
Physical	Infrastructure	Provide safe and reliable water to all citizens
		Ensure that waste management systems are clean and efficient
		Ensure that energy is transmitted through a safe, efficient, and reliable system

Capitals	Stocks	Requirements
		Provide adequate access to reliable telecommunications systems for all citizens
	Land	Suitable land available for different uses, including housing, industry, and agriculture
	Transportation	Create a robust and reliable public transportation system
		Provide safe, efficient, and well-maintained rail and road infrastructure
	Public Facilities	Ensure adequate facilities for schools, hospitals, community centres, etc.
	Living Conditions	Ensure adequate access to housing, food, and clothing for every citizen
Economic	Labour	Balanced labour market that includes a variety of job types and salary ranges
		Adequate training for workforce
		Work is safe, healthy and allows for appropriate work life balance
		Wages are adequate to provide decent livelihoods
	Financial Resources	Circulating money within the community
		Debt reduction or elimination
		Reduced likelihood of depletion
	Economic Structure	Local companies are able to make sufficient profit and investment
		A good mix of productive and service industries
		Constant economic regeneration through new enterprise development and re-location to the community
		Companies are investing in emissions and pollution prevention and reducing the use of non-renewable resources
Human	Education	Opportunities meet the needs of both society and individuals
		Opportunities are high quality and easily accessible
	Health and Well-Being	Citizens are physically, mentally, and spiritually healthy

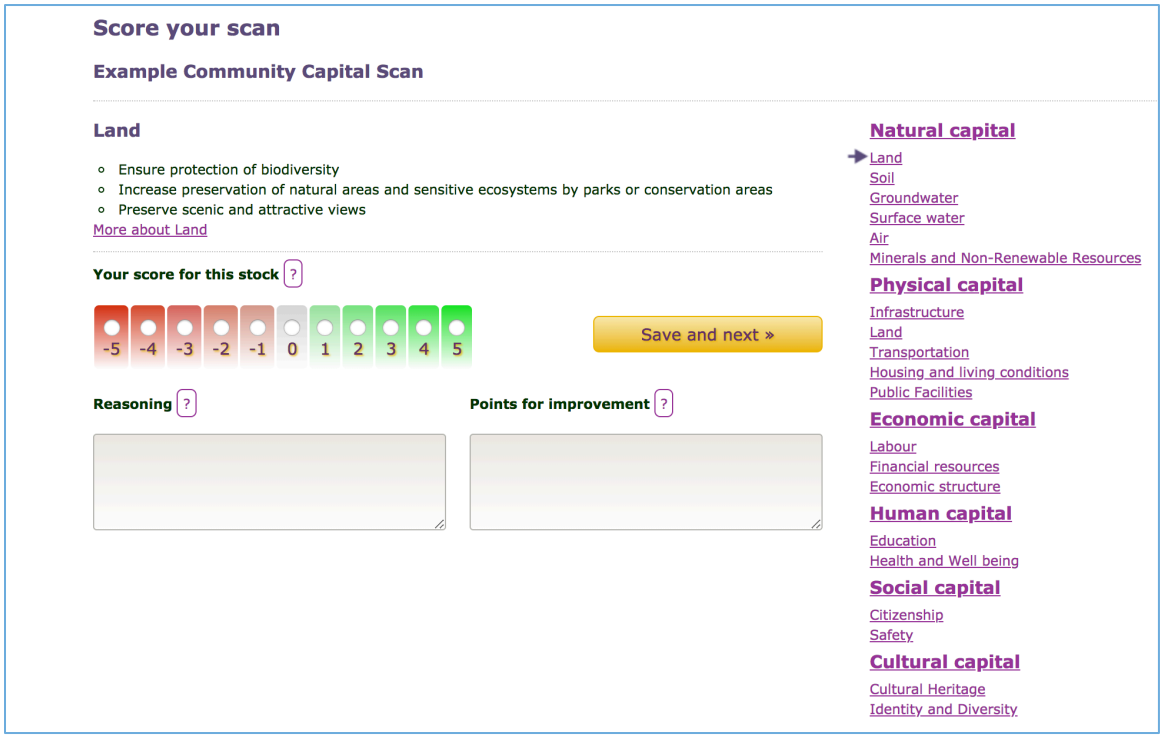
Capitals	Stock	Requirements
		All citizens have access to health care services for illness prevention and treatment
Social	Citizenship	Community has social cohesion
		Social solidarity between citizens
	Safety	Citizens feels safe and have access to support systems which encourage safety
		No violent crime
Cultural	Cultural Heritage	Art is encouraged and celebrated
		Community acknowledges traditions and celebrations
		A diversity of culture and tradition is present
		Cultural heritage is preserved
	Identity and Diversity	Citizens are encouraged to express individual identity while not restricting others freedom of expression
		The community has a defined identity

Source: Roseland, 2012

To assess a project or plan in terms of its sustainability impact we are actually asking ourselves: Does this plan/project contribute to the realization of the long-term goals which we have formulated for each of the stocks? And if so, to what extent? This is why it must be specified for each stock whether the project concerned will have a positive, negative, or no effect on the realization of the long-term goals which relate to that stock. In the case of stock “Land”, this concerns the issue of whether the project contributes to and/or has an impact on the preservation of biodiversity, and that nature is preserved as far as possible and strengthened where possible etc.The impact is shown by each participant filling in a score on a scale ranging from -5 to +5. The more positive the impact, the more the score shifts towards +5, the more negative the impact, the more the score shifts towards -5. If there is no impact or a neutral impact, the score 0 is filled in.

The Scan offers participants and decision-makers the opportunity to further comment on the score that is given in the reasoning section (Figure 2). Suggestions may also be made to improve aspects of the project. The long-term goals have deliberately been formulated in broad terms. It may sometimes be practical, useful and sometimes even necessary for a specific project to further elucidate or particularize the long-term goals.

Figure 2. Community Capital Scan Data Entry Window



Source: Roseland, 2012

The CC Scan is most successful when combined with community engagement (Roseland, 2012; CC-Scan, 2013). There are two types of methodological paradigms for determining strategies for sustainable community development: expert-led (top-down) and community-based (bottom-up) (Reed, Fraser, and Dougill, 2006). The CC scan has the potential to combine the scientific rigor of the expert-led, top-down approach with the collaborative engagement process of the bottom-up participation of community members to lead communities towards sustainable development (Roseland, 2012). CC Scan participants may be selected to provide a representation of the whole community based on their knowledge of the community, local expertise, stake in a capital, and their ability to represent a distinct population within the community.

The combination of a community-based and expert-led participation is beneficial for several reasons. Clearly, community input is vital to arrive at a sustainability vision. The community participants, along with professional experts, define the relevant stocks of the regional socio-economic and ecological system that need to be synergized. Then, all participants help formulate the requirements and targets for each stock, which ultimately define a desirable future for the community. Community visioning is a subjective and normative process and input from community stakeholders is therefore indispensable.

4.3.2. The Sustainability Balance Sheet

The other instrument within the CCT, the Sustainability Balance Sheet, allows a community to assess progress toward their goals over time using measurable indicators. It can also be used to highlight progress toward goals for a specific policy or project. No one set of indicators is perfect for every policy or project, especially given the complex nature of systems and sub-systems in a community (Meadows, 1998; Joss et al., 2015); however, at least some criteria need to be met so that indicators can be an effective decision-making tool: relevant and meaningful, measurable and feasible, sufficient, timely, and consistent, scale appropriate, participatory, systemic and flexible (Meadows, 1998; Henderson, 2006; Bond, Morrison-Saunders and Howitt, 2013; Holden, 2013;

4.4. Identifying and Evaluating Community Capital

Additionally, indicator and data types are now more malleable in the CCT to fit each municipality's local context and to avoid concerns related to the accessibility, timeliness, and reliability of data. Adapting indicators to fit a local context may also help account for factors related to social values and visions, community development, and culture, which may otherwise disconnect data from reality (Kitchin, 2015).

As mentioned, each of the six capitals, or assets, is subdivided into pieces called stocks. These may be referred to as aspects of the community. The functioning of these stocks, both individually and in conjunction with the others, determines the development of the six capitals. Long-term goals have been formulated for each of these stocks in the CC Scan, which are called "requirements". For an overview of the capitals and stocks in the Scan, see Table 2 below. Added together all these objectives provide a picture of how a sustainable community might look. For example, the long-term goal for the stock "Land" in the natural capital is that biodiversity must be preserved, that nature must be maintained as far as possible and strengthened if possible and that scenic and attractive views should be preserved.

Long-term goals have been formulated for each of these stocks. Added together all these objectives provide a picture of how a sustainable community might look. For example, the long-term goal for the stock "Land" in the natural capital is that biodiversity must be preserved, that nature must be maintained as far as possible and strengthened if possible and that scenic and attractive views should be preserved. To assess a project or plan in terms of its sustainability impact, the CC Scan asks participants (CC-Scan, 2013):

> Does this plan/project contribute to the realization of the long-term goals which we have formulated for each of the stocks? And if so, to what extent?

It must be specified for each stock whether the project concerned will have a positive, negative, or no effect on the realisation of the long-term goals which relate to that stock. In the case of stock "Land", this concerns the issue of whether the project contributes to or has an impact on the preservation of biodiversity, and that nature is preserved as far as possible and strengthened where possible etc. The impact is shown by each participant filling in a score on a scale ranging from -5 to +5. The more positive

the impact, the more the score shifts towards +5, the more negative the impact, the more the score shifts towards -5. If there is no impact or a neutral impact, the score 0 is filled in.

The CC Scan elicits answers to the following questions:

- Is the project or the policy/proposal expected to have influence on the fulfilment of the requirements or long-term goals as defined the Community Capital Tool?
- Is this influence positive, negative or neutral?
- Do the expected effects give reason for a more thorough investigation?
- Is adaptation or even stopping of the project required or can one go on without changing the project or proposal?
- At the level of capital: is there a balanced development or not?
- At the level of a stock: one gets an insight in the expected positive or negative effects of the project on the fulfillment of the long-term goals
- Distribution of answers/results: consensus or not?
- Differences between interest groups or not?

The scan offers the opportunity to further comment on the score that is given (Figure 2). Suggestions may also be made to improve aspects of the project. The long-term goals have deliberately been formulated in broad terms. It may sometimes be practical, useful and sometimes even necessary for a specific project to further elucidate or particularise the long-term goals.

Research using the CCT is valuable as it conceptualizes communities as dynamic systems comprised of community capitals, and the tracking of changes in capital assets over time has the potential to present an informative representation of systems change in progress (Anglin, 2015). This project presupposes that the CCT can be an effective tool for helping municipal planners and politicians align OCP goals while using a common, focused language regarding sustainability and set goals.

Chapter 5. **Research Design**

5.1. Overview

This chapter introduces the research methodology implemented in this project (Table 3). It also explains some methodological decisions made during the research process.

Addressing the project objectives involved a literature review to derive a set of common criteria for evaluating sustainability progress at the local level. This was followed by the piloting and evaluation of the CC Scan in the District of North Vancouver (DNV). To determine if the CC Scan was applicable to community planners at the DNV, and whether or not the six community capitals were addressed in plans and policies, focus groups and surveys with planners, municipal officials, and citizen advisory groups were implemented. After the data collection phase, a policy alignment exercise whereby the SDGs were aligned with the DNV OCP goals was implemented.

Table 3. Research Design Schematic

Research question	Method	Outcomes
How can we represent sustainable development (integrated economic, social, and environmental goals and objectives) at the local level?	Literature review	Criteria for best representation of SD at the local level
How can we better represent progress toward long-term integrated sustainable development goals at the local level?	Case study methodology (Yin, 2009) to apply the Community Capital Scan in the DNV to assess: • OCP • Policy plans • Development applications	• Demonstration of CC Scan implementation • Synopsis of progress towards SD at the local level
How can an MCA tool such as the CC Scan or CCF contribute to the alignment with sustainable development goals at the local level?	Policy alignment exercise to align SDGs with DNV planning goals. Next, aligned DNV policies with CCF capitals and stocks.	• Visual categorization of local policies against CCF criteria • Visual categorization of local policies against SDGs
How can an MCA tool such as the CC Scan be operationalized in a way that ensures scalability, flexibility, and communicability?	Case study (Yin, 2009) and surveys to determine how the CC Scan may be improved	• Discussion of experience using CC Scan in DNV • Recommendations for future implementations and versions

This research was conducted in three phases. First, a literature review on SCD and MCA was conducted focusing specifically on determining a basic set of clear criteria for implementing SD at the local level. The literature reviewed was composed of academic papers, books, websites, and organizational reports available to the general public. This step in the research process was vital for the identification of assessment tools that may prove to be effective for SD evaluation at the local government level. In section 3.5 it was determined that the SDGs provide a clear, integrative framework for analyzing SD at the local level.

In the second phase of the project one particular MCA tool, the CC Scan, was tested using case study methodology. The unit of analysis was the municipal level with a view to improve the tool so that it is scalable and relevant to other jurisdictional levels and that it involves all interested parties (Rajaonson and Tanguay, 2009). The case study location was selected on the basis of an "information-oriented" strategy (Flyvbjerg, 2006).

5.2. Rationale for Approach

This project utilized a case study design (Yin, 2009), with a combination of deductive and inductive methods, based on the premise that an integrative, interdisciplinary analysis of a case study is the most suitable approach for SCD research (van Kerkhoff, 2014). This particular approach was chosen to elicit a broad range of responses from participants and to utilize data gathered through field work to identify, develop and integrate SA concepts (Corbin, 2017). Case study research builds on multiple sources of evidence (quantitative data from archival sources and qualitative data from the interaction with communities and from document analysis) and uses a constructivist approach that is deductive while testing the MCA tool and inductive while looking for theory to emerge from the analysis of the case study (Yin, 2009).

As mentioned in Chapter 4, the CC Scan was designed to stimulate early-stage communication, create awareness of SCD, promote broad and innovative thinking about how projects or proposals may be improved, reveal distribution of opinion, identify areas of agreement and flag neglected items before projects are completed, and to make decision-making more transparent (Dagevos, 2012). The CC Scan was originally designed to emphasize fast collection of top-of-mind opinion from stakeholders, insights about the general theme and distribution of opinion and participant reasoning and suggestions rather than statistically rigorous measurement. The CC Scan was selected for this case study due to its ability to facilitate dialogue, stimulate communication, and allow participants to think holistically about the impact of plans, policies, and projects on the SD of their community.

Results of this project help to develop inform if the CCT can be used to implement, and assess local sustainability initiatives while providing decision-makers with a systems-based measurement of their goals.

5.3. Study Site

5.3.1. District of North Vancouver

The DNV was chosen for this case study due to its ongoing commitment to sustainability, a willingness to implement a SA framework and senior planning staff willing to champion SD in their community.

The DNV is one of four municipalities and two First Nations on the North Shore. Together, these areas function as a sub-region of Metro Vancouver, sharing key infrastructure such as roads and utilities, and also share a partnership in the delivery of emergency and recreation services. The DNV covers a vast 160km^2 ranging from 0 to 1400 metres above sea-level (District of North Vancouver, 2011).

Identity 2030, the District's Official Community Plan (2011), addresses a broad range of planning issues affecting the community. Developed as an ISCP, its intention is to synergize with other municipal planning and policy documents to ensure an integrated approach to realizing the social, economic, and environmental goals identified by the community (District of North Vancouver, 2011). An overview of DNV OCP goals is summarized in Figure 3 below:

Figure 3. DNV OCP Goals by Chapter

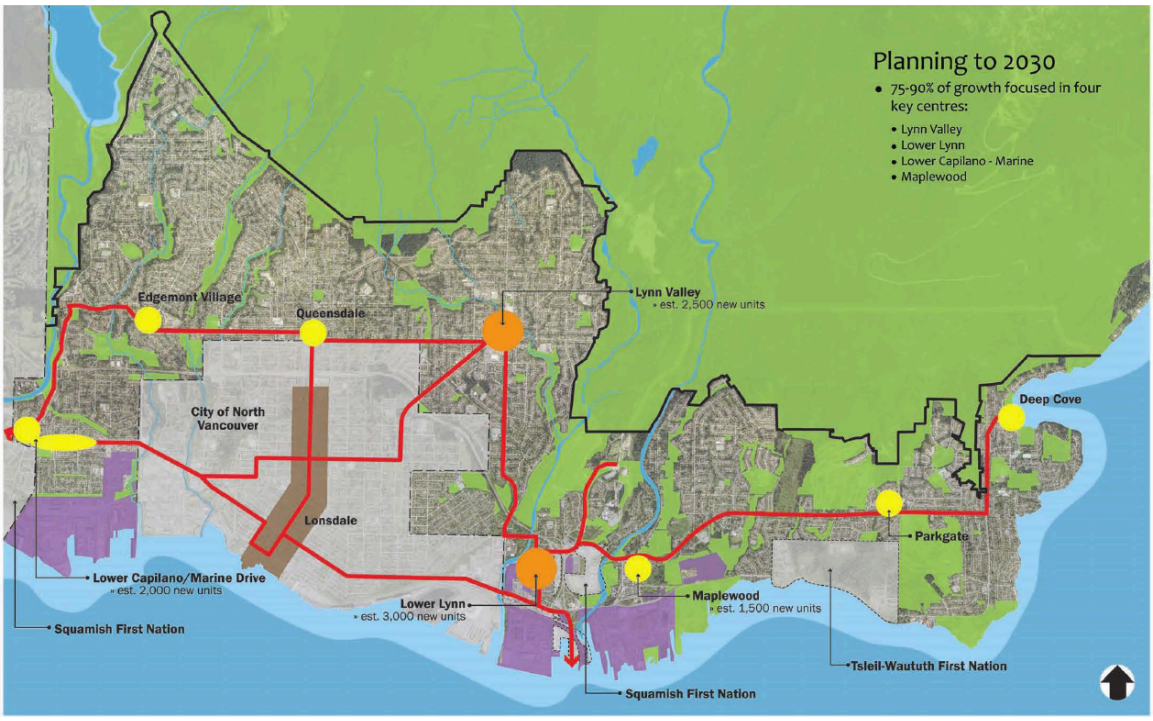
1. Create a network of vibrant, mixed-use centres while enhancing the character of our neighbourhoods and protecting natural areas
2. Encourage and enable a diverse mix of housing type, tenure and affordability to accommodate the lifestyles and needs of people at all stages of life.
3. Foster a safe, socially inclusive and supportive community that enhances the health and well-being of all residents
4. Support a diverse and resilient local economy that provides quality employment opportunities
5. Provide a safe, efficient and accessible network of pedestrian, bike and road ways and enable viable alternatives to the car through effective and coordinated land use and transportation planning
6. Conserve the ecological integrity of our natural environment, while providing for diverse park and outdoor recreational opportunities

7. Develop an energy-efficient community that reduces its greenhouse gas emissions and dependency on non-renewable fuels while adapting to climate change
8. Provide infrastructure to support community health, safety and economic prosperity, and facilities that enhance recreational opportunities, cultural activity and artistic expression

Source: District of North Vancouver, 2011

The urban structure of the District is comprised of the two Centres of Lynn Valley and Lower Lynn as well as six Village Centres: Lower Capilano-Marine, Queensdale, Maplewood, Parkgate, Deep Cove and Edgemont. For an overview of the DNV network of centres, see Figure 4 below. The District is projecting growth on the North Shore at approximately 40,000 additional inhabitants by 2030 (2011), which makes these six Village Centres vital for community planning as they serve as important areas of densification as the community grows in population. In fact, the OCP has established a growth management target of 75-90% of new residential units located within the key centres by 2030 (District of North Vancouver, 2011).

Figure 4. District of North Vancouver Network of Centres



Source: District of North Vancouver, 2011

As of 2017, the District has formed an OCP Implementation Monitoring Committee made up of volunteer community members. The purpose of the committee is to provide observation regarding:

- Community engagement in implementing the OCP Network of Centres and other relevant Council Policy
- The direction of OCP implementation to ensure consistency with the OCP Vision and Goals
- Other key aspects of the OCP such as housing diversity
- A review of the OCP monitoring program to ensure meaningful and appropriate indicators for monitoring progress on OCP targets.

The District's OCP outlines a pathway to strengthen the dimensions of the vibrant, sustainable, and livable community that it aspires to be. This project used the CC Scan in an initial demonstration of how the District's planning goals can be integrated in a holistic and measurable manner. It provides a unique opportunity to inform key aspects of the committee's decision-making and goal-setting by providing a framework for decision-criteria that is rooted in the CCF and UN SDGs.

5.3.2. Sustainability in the District of North Vancouver

The DNV has long shown municipal leadership in sustainability planning. In 2004, Council adopted the Natural Step Framework to solidify a sustainability mandate. Over the next 4 years, the municipality developed a definition of sustainability that was shared by all divisions and individuals within the local government. The District describes its 20-year sustainability vision as (2011):

> *"Our vibrant neighbourhoods and centres are framed by our mountain backdrop, forests, streams and shorelines. We live in an inclusive and supportive community that celebrates its rich heritage and lives in harmony with nature.*
>
> *Our neighbourhoods include people of all ages, cultures and incomes. All are equally welcomed, valued and actively engaged in community life. Our young have safe and healthy environments in which to grow and succeed; our seniors can remain in the community with their needs met in a dignified way.*
>
> *Our network of well designed, livable centres provides a wide range of housing options and opportunities to shop, work and gather. Our local*

businesses are resilient and diverse, providing the services we need and an array of employment opportunities.

Education, art, culture and recreation enrich our daily lives; we are an active, healthy and creative community.

Our enviable pedestrian and cycling network connects us to our destinations and our unparalleled natural environment. Many people walk, cycle and take transit, leaving their cars at home as viable alternatives are available.

Our community is effectively addressing and adapting to the challenges of climate change.

Our air is clean, our water is pure, our waste is minimal: our lifestyle is sustainable. We have ensured the District remains a great place to live, learn, work and play for generations to come."

5.3.3. Study Site: Edgemont Village

Edgemont Village is a commercial precinct located in the Upper Capilano neighbourhood of North Vancouver (District of North Vancouver, 2011). The Edgemont Plan (District of North Vancouver, 2014) is the neighbourhood's guide to development which regulates the design of buildings and public realm improvements in and around the Village Centre (see Figure 5) while simultaneously supporting the vision, goals, objectives, and principles outlined in the District's OCP. The document contains policies and guidelines with both qualitative and quantitative recommendations for future development projects. The intent of the Edgemont Plan is to direct development in a way that strengthens the character of the Village Centre via enhancement of urban design and public realm and respecting the low-rise scale (District of North Vancouver, 2014).

Figure 5. Edgemont Village Centre

Source: District of North Vancouver, 2014

5.4. Method

To assist DNV planners in the evaluation of strategic planning documents and development applications, CCF capitals, stocks, and requirements were closely examined. Other recent applications of the CC Scan (Bird, 2012; Hernandez & Mollinedo 2012; Lowry, 2012; Lowery, 2013, Ardis, 2016) were also researched prior to the project commencement.

In stage I, quantitative and qualitative data from publicly available municipal planning and strategy documents were gathered.

To support CC Scan participants in their understanding of the tool, a CC Scan User's Manual adapted from http://www.ccscan-ca.cscd.sfu.ca was drafted. This document was distributed to DNV Community Planning staff prior to each CC Scan session (Appendix A).

As mentioned in section 5.3.2, the District has shown a strong commitment to SD, which made the implementation of this project seamless. Key stakeholders were first identified through discussions with DNV planning staff and management. A select group of DNV community and development planners as well as the Edgemont and Upper Capilano Community Association (EUCCA) were identified as relevant CC Scan participants. The EUCCA was selected as they participated in the drafting of the Edgemont Plan and showed a genuine interest in the project. Introductory meetings

were facilitated by DNV planning staff, wherein the EUCCA gave their consent to participate in this case study.

In stage II, the key stakeholders were involved in the application of the CC Scan to assess the impact of community plans, policies and development applications on the sustainable development of the community using the criteria embedded in the CCF. This served as a baseline sustainability assessment to offer opportunity for staff and community stakeholders to gain insight into how the plans and applications were expected to contribute to the SD of their community. This insight was obtained by asking all the relevant stakeholders involved to give their opinion through the CC Scan structured questionnaire. Through focus groups utilizing the CC Scan, and direct observations of events such as OCP Implementation Committee and Council meetings, additional qualitative data was collected to further inform theory and practice.

To initiate a CC Scan, each participant was invited to the session via e-mail and were given a unique scoring code to ensure anonymity. Once all participants were in the room, a CC Scan was facilitated by the principle investigator (PI). This involved leading the participants through a consideration of all six capitals, each of which is broken down into a number of stocks. For a given capital and stock, the following question would be asked:

> "Does the area plan / development application contribute to the realization of the following long-term requirement?"

Each question was adapted to the relevant capital and stock. For example, if the group was focused on the Land stock of Natural Capital, the question would be modified to:

> "Does the area plan / development application contribute to the:
>
> - Preservation of biodiversity;
> - Preservation of natural areas and sensitive ecosystems by parks or conservation areas;
> - Preservation of scenic or attractive views?"

Each participant then inputted their score for each requirement, ranging from -5 to +5. As a decision rule, the groups agreed that the lowest value of -5 meant the participant "strongly disagreed". Conversely, a participant that selected the highest value

of +5 “strongly agreed” with the proposed question. It was also decided that a score of 0 was a neutral response, indicating that the participant found no evidence to either agree or disagree.

While completing the scan, each participant entered all of their values into the data entry boxes and gave their reasoning as well as points for improvement. Illustrative graphs were generated for each group scan result, which allowed for a discussion period to take place. The discussion period was facilitated by the PI, and it was during this discussion period that participants discussed points of agreement and disagreement. A detailed analysis of participant responses and overall CC Scan results is offered in Chapter 6.

It is important to note that the CC Scan is currently in its beta form, and that this project sought to identify various ways to build upon it. Consequently, the CCF stocks and requirements were not modified prior to the implementation during focus groups. This allowed CC Scan participants to experience how the tool functions in essence and acknowledge that if a requirement was inapplicable to the Edgemont Plan or development applications being assessed, it did not necessarily mean that the stock was flawed; but rather that the subject being evaluated did not affect that particular stock.

Once this was explained to all CC Scan participants, the evaluations commenced. As noted in the screenshot in Figure 2 above, participants have the opportunity to provide reasoning for scoring and suggesting points for improvement. Points for improvement were elaborated upon by participants in the surveys administered post focus group (Tables 8 to 11). An overview of the survey responses is provided in Chapter 6, section 6.7.

After stakeholders completed the CC Scan, the web-based platform generated a printable report which includes graphs that display the frequency, range, and medians of participant responses along with anonymized comments and suggestions for improvement that participants offer on each stock as it relates to the project. This type of analysis offered a preliminary, evidence-based read on how and whether the project, program, or policy has contributed to the six forms of community capital and associated stocks. In addition, the CC Scan highlighted areas of community capital that DNV

planning documents and development applications were potentially not focusing on, with a view to suggesting possible improvements.

In stage III, CC Scan participants were surveyed to determine what they found useful from the CC Scan and what they did not find useful. This data is summarized in tables 10 to 13. These recommendations will assist further researchers in refining the CCT.

Chapter 6. **Community Capital Scan Results**

6.1. Testing the Community Capital Scan

The case studies portrayed in this Chapter address the question, *How can we better represent progress toward long-term integrated sustainable development goals at the local level?,* by examining the impact of the Edgemont Plan and two unique development applications using a participatory approach to MCA.

The CC Scan was implemented at the local government level to assist planners and community stakeholders in integrating sustainability dimensions (environmental, economic, and social) into local planning initiatives.

In this chapter, results of the CC Scan are presented as applied to the Edgemont Plan, a village centre planning document, and two separate development applications for 3260 Edgemont Blvd., located within the village centre of Edgemont, and 875 Wellington Drive. The Edgemont Plan was analyzed with the EUCCA and DNV community and development planning staff, while each development application was evaluated with community and development planning staff.

Each section is structured as follows: first, the graphical results from the CC Scan web-based interface are presented. Next, the anonymous CC Scan responses of each participant are presented in tables 3 to 6. Lastly, anonymous participant survey responses are offered at the end of the chapter.

Each case is briefly introduced in relation to the DNV community planning context. Then each case is analyzed in terms of the capitals and stocks of the CC Scan, following the methodology outlined in Section 5.6. The graphics that follow each set of CC Scan graphical results display anonymous participant ratings from -5 to +5 on the stock of each capital, alongside optional evidence for reasoning and means of improvement. Each analysis includes six circle charts and one sustainability hexagon. If participant total score was positive, the circle charts are shaded green, while negative values are displayed in red and neutral values in grey. A more intense shade of green and red denote values that are farther from the neutral baseline of zero. Finally, the

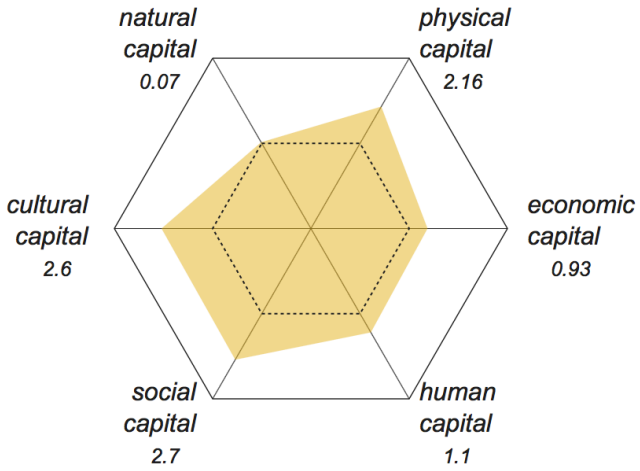
sustainability hexagon displays per-capital averages for each of the six capitals, displayed numerically at the tip of each axis and through the shape that either expands or contracts from the grey dotted line, suggesting either an increase or decrease from the neutral baseline (CC-Scan, 2013).

As noted in Chapter 4, Section 4.4, the CC Scan prompts participants to offer points of improvement on each case being evaluated. During the CC Scan focus groups, participants were given the option to provide points for improvement, and in some cases these sections were left blank. The results from each CC Scan focus group are analysed in detail in Chapter 7.

6.2. The Community Capital Scan Applied to the Edgemont Plan

The Edgemont Plan (District of North Vancouver, 2014) guides development throughout the neighbourhood with the aim to provide guidelines for the design of buildings and public realm improvements in and around the Village Centre. As an area planning document, its subsequent objective is to support the vision, goals, objectives, and principles outlined in the District OCP. The plan also contains policies and guidelines with both qualitative and quantitative recommendations for future development projects.

Figure 6. Edgemont Plan: DNV Planners CC Scan Graphs



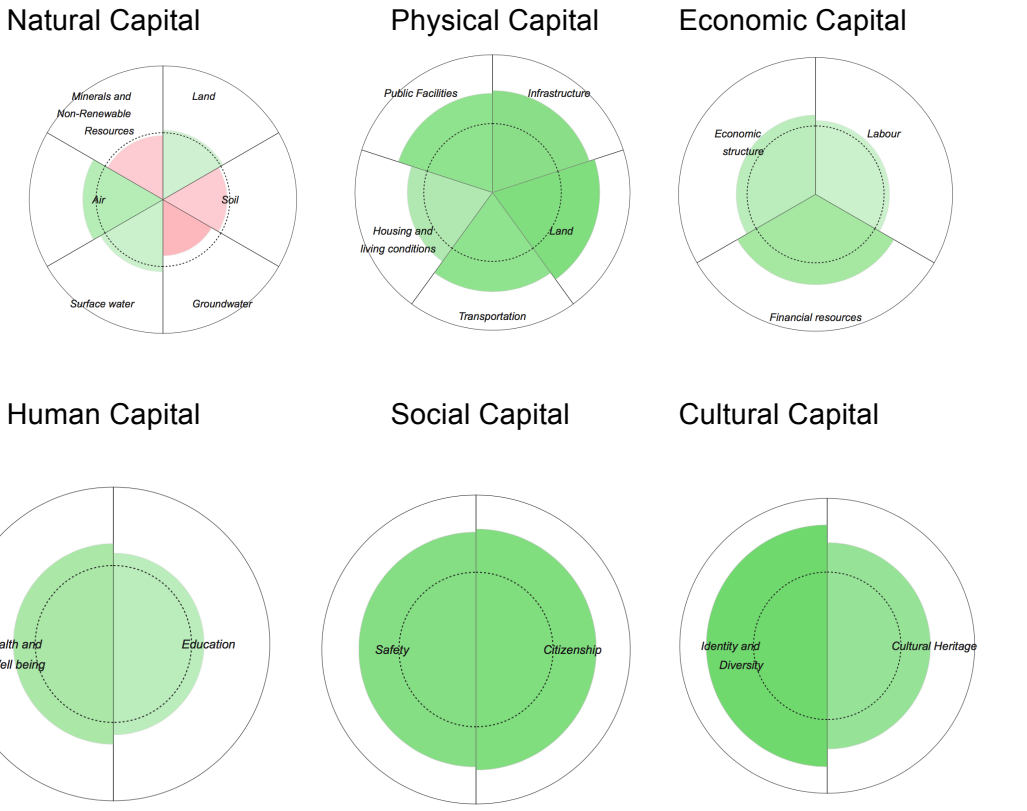


Table 4 shows the reasoning for this scoring in more detail.

Table 4. Edgemont Plan: DNV Planners CC Scan Responses

Capitals and Stocks	Reasoning	Points for Improvement
Natural		
Land	Offers general statements about built, social and economic but little specific directions Preserves views to mountains	Greater specifics on building sustainability and green spaces
	Section 2.9 and 5.6 talk about sustainability. Some reference to views	No information on parks or conservation areas
	Strong focus on preserving scenic views in the NS mountains	Score isn't higher because policy language is very genera; for example, types of tree species are not listed, and storm water management design is not described. No identification of nearby parks. Natural areas or trails. Sense of place is related to the environment but not described. No mention of historical relationship to the land in the centre, or surrounding natural/land-based resources
	Seeks to protect views along select streets, and public views of mountains	
Soil	Two gas stations. Site remediation needed before development	Does not have much that extends to OCP sustainable objectives for land
		Urban agriculture needed
	Not mentioned; other policies/bylaws apply (i.e. DPAs)	Very little mention of ground water quality or erosion management
Groundwater	Not addressed in plan Section 5.6 refers to storm water management	
		Very little mention (only p.47) of groundwater quality management Could mention how to mitigate impacts of basement/underground parkade construction on groundwater flows
	Not mentioned in plan. A development after the plan encountered issues with groundwater/water flows.	

Surface Water	Recommends best practices for stormwater management	Very little mention of surface water management. As with the last 2 questions, more description of existing conditions and proper management requirements should be included.
Air	Encourage bigger pedestrian space and reallocation of road space for bikes Plan refers to transit and active transportation. Walkable community. GHG emissions regulated under Development Permits. Encourages sunlight penetration, encourages green buildings	Planting of trees needed. Too many cars/parking spots. Denser development, and subsequent higher population will enable more frequent transit – hopefully encouraging more people to get out of their cars. No mention of air quality management or natural (treed) buffering between high vehicle traffic intersections and busy pedestrian locations.
Minerals and Non-Renewable Resources	Not much vehicle reduction i.e. Parking Does not reduce parking or car use Removal of some trees – planting of others. Minimal change.	
Physical		
Infrastructure	Plan does not specifically talk about this, but this is embedded in other plans, bylaws, etc. Through redevelopment, infrastructure will be improved, however, direct mention of this in the plan is negligible Densifying an existing mixed-use village centre means that infrastructure is used more efficiently (users per linear distance). Road network intended to be used by transit, bikes, goods delivery, and private vehicles, not greenfield development	Add fibre optic network

Land	Recommends higher density buildings	
	All land uses are commercial and housing	Limited park and institutional uses
	The primary uses in the Edgemont Village centre of mixed-use commercial and residential, and institutional. Most of the existing uses are retained, with some added density. I think this is the best use of the land.	
	Not a greenfield development. Mixed use including a variety of housing types (apartment, townhouse, multiplex, retail and commercial (including a grocery store) fairly close to new recreation centre	No mention of encouraging urban agriculture (garden plots) for local food production
Transportation	Density too low for transit. No rail system.	Transit plan is very light and doesn't suggest much except a future frequent transit network. This could be elaborated on.
	Improved cycling, and road network are all described, increasing multi-modal opportunities encourages more sustainable travel choices.	
		Would have been beneficial to do a transportation study at the same time as the plan to develop a cohesive network plan.
	On the future frequent transit network. Hub for different bus routes, including buses to downtown Vancouver.	Active lanes concept is high level.
	Newer development will need to meet parking standards (many of the older buildings don't). Policies to develop the cycling network.	
Housing and Living Conditions	Diversity of housing for built form but not tenure such as non-market or rental	
	Housing too expensive. Even townhomes are not affordable.	Need to talk about non-market housing and rental housing.
	Increase in multi-family housing. Increase in diversity can result in some more affordable options	More multi-family housing, and non-market housing targets.
	Increases amount and diversity of housing type but doesn't have policies for a range of housing income needs (i.e. Non-market not mentioned), especially when we have local retail and service sector jobs.	Include non-market component
Public facilities	Poor connections to new Delbrook recreation centre, some recommendations to connections to Highland Elementary	
	New Delbrook not in but close to Edgemont	More community amenities – child care, family space needed
	Does allocate land to the existing institutional uses	Doesn't describe all the nearby public facilities and amenities.
	Village has a library, close to elementary school, and fairly close to new rec centre	

Economic		
Labour	No recommendations	
	Provides some retail jobs in local stores	Consider more office uses.
	The type of commercial uses within Edgemont are not very diverse (service and product businesses). However, many of the businesses are small. The small footprint commercial unit are encouraged through retention of existing form and character of commercial streets.	
	Plan seeks to have mix of retail and service jobs in village, however does not provide housing for a range of employee incomes.	
Financial Resources	Does not address	
	Increasing tax base will benefit District finances	
	Support for maintaining small scale, local businesses that characterize the village through design guidelines for small scale store fronts	
Economic Structure	Mix of local services, not much innovation	
	Retail is the main economic driver	
	Many retail and service jobs	
Human		
Education	Education is a provincial mandate, so plan does not speak to this directly	
	Transit from Edgemont to North Vancouver and Vancouver post-secondary institutions is currently poor. An FTN will improve this, however, there is no mention of improving connections to routes necessary to reach the institutions.	
	Short walking distance to elementary school	
Health and Well-Being	Facilitates walking and biking	
	Compact, walkable communities. Safe routes to school	
	Same as education comments	
	Not much mentioned	Could mention need for seniors downsizing and wanting to age in their community. Could reference proximity to parks and natural areas for outdoor recreation and exercise

Social		
Citizenship	Active residential advisory group Community engagement process fostered social capital. Plazas foster social capital and meeting people. I've heard that the Edgemont Community Association was very involved in the development of the plan. Storefront design and mixed-use forms encourage social interaction. Plan mentions the social cohesion of the village and seeks to build on that by developing public plazas, gathering spaces, active storefront, improved public realm for walking and making casual social connections'	Include daycare spaces and needs
Safety	Sidewalk safety improvements. CPTED policy Plan references Crime Prevention by Design Eyes on the street through mixed-use design Encourages following CPTED, and well-designed buildings and public spaces	
Cultural		
Cultural Heritage	Public art recommendation but no diversity Public art. Plazas and lanes will be used for festivals and markets Public art and engaging street walls are encouraged Supports inclusion of public art; supports building on the eclectic architectural styles of the existing buildings.	Nothing about First Nations culture. More description about the importance of historical architecture (west coast modern) in this area Doesn't mention historical or heritage designated buildings (if applicable)
Identity and Diversity	Defined identity of what Edgemont is Edgemont has a clearly defined identity Flexibility around design but with reasonable form-based requirements References 'sense of neighbourliness' and seeks to build on it with improved public spaces and public realm. Seeks to increase diversity of housing for various household types.	Not much diversity in population More description on identity i.e. significance of candy cane lights, and other defining features. Add non-market housing, could suggest possibility of other forms of housing such as co-housing

6.3. Edgemont Plan: Edgemont Upper Capilano Community Association (EUCCA)

Figure 7. Edgemont Plan: EUCCA Participants CC Scan Graphs

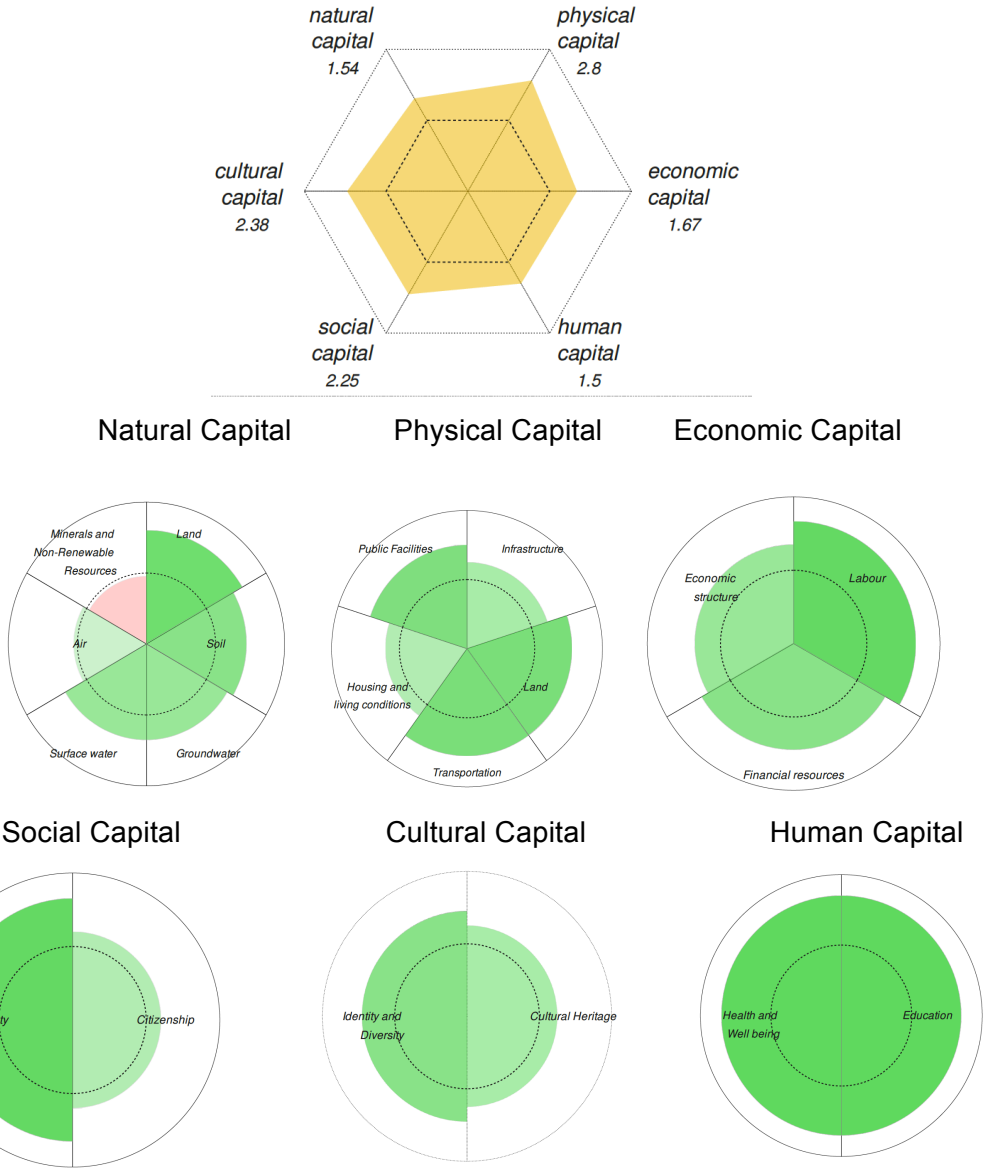


Table 5 shows the reasoning for this scoring in more detail.

Table 5. Edgemont Plan: EUCCA Participant CC Scan Responses

Capitals and Stocks	Reasoning	Points for Improvement

Natural		
Land	Addition of tree views to be preserved by building setbacks	
	Some views diminished by taller buildings in commercial core	Identify key view corridors
	Opportunities for replacing dated land uses (70 years)	Too broad a category
Soil	Natural swales for storm water collection	
	New development in commercial core requires retention of rain water, but large new single-family homes with deep basements pump rain and ground water into storm drain system that drains into creeks	
	Opportunity to update soil impacts from earlier developments	
Groundwater	Deep foundations/basements will impact on high groundwater levels	
	Opportunities for improving ground water management	
Surface Water	Better collection swales	
	Increased opportunities to avoid surface water contaminates	
Air	Modern, more energy efficient buildings more trees to capture carbon dioxide	
	Increased construction activity has temporarily reduced air quality through truck traffic and dust	
	Opportunities to improve transportation services, a transit hub	
Minerals and Non-Renewable Resources		
Physical		
Infrastructure	Modernization of the buildings will improve reliability of all services	
	Waste management basic only telecommunication towers (cell)	
Land	Land uses are identified for housing and commercial purposes	
	Focuses new housing in commercial core limiting impact	
Transportation	Should result in Village being served by rapid transit corridor	
	Numerous (2) bus routes	
	Edgemont commercial core is a transit hub, very accessible for walking	
	Supports and reinforce the transit hub	

	services (246, 232, etc.)	
Housing and Living Conditions	Plan does not provide for lower income residents No major food stores Lacks subsidized housing but otherwise provides a good mix of housing types (single family, townhomes, condos) Enables a degree of densification, improves/maintains convenient access to shopping, goods, services	
Public Facilities	Not addressed by plan but available locally Hospital been improved Excellent access to schools, churches, community centre Preserves resident access to schools, parks, community centres, library	
Economic Capital		
Labour	Lots of small independent shops, services, and professional offices Sustains local commercial services – banking, medical etc. reasonably good commute to commercial downtown	
Financial Resources	Rents too high due to property values Provides a convenient centre for financial services – banking credit unions, legal services	Identify opportunities for subsidized or rental housing
Economic Structure	High business turnover due to business failures Limited number of business Provides useful local shopping and services The Plan provides the framework for updating older properties/infrastructure	
Human Capital		
Education	Library is a good resource Very good elementary/high school/college/university While the plan doesn't directly address education, a mix of housing enables families to live in the Edgemont area where there is access to quality public schools Supports increased population access established quality schools, kindergartens	
Health and Well-Being	Healthy lifestyles supported lots of health care services readily available, churches supply spiritual needs Good hospital but long wait times Provides convenient access to parks recreation sports facilities	

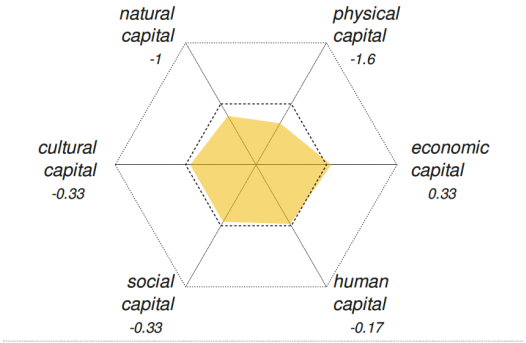
Social		
Citizenship	Plan is not inclusive as close interaction is not encouraged Good community spirit The above score is reduced to a 2 because some people who grew up in Edgemont are now excluded due to the high cost of housing	
Safety	Framework for future Area in general is relatively safe as generally low activity at night Very low crime rate General sense of safety/security, comfortable to walk about at ease	Could have community policing station
Cultural		
Cultural Heritage	Traditions preserved, and public space allocated for activities, celebrations, etc. Edgemont not diverse While public art is encouraged what exists lacks connection to the community, it stands alone. The built environment is not particularly unique to any specific cultural heritage	
Identity and Diversity	Enables a mix of traditions Attempts to ensure redevelopment is sympathetic to and enhances the unique identity Community not very diverse Edgemont is friendly and feels like a small town People seem comfortable to express their individual identities	

6.4. The Community Capital Scan Applied to Development Applications

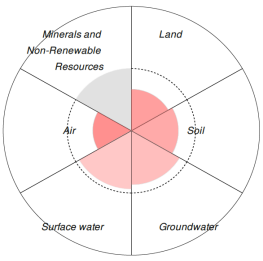
6.5. 875 Wellington Drive

An estate-sized single-family lot in Upper Lynn valley, located at 875 Wellington Drive was the subject for the first development application evaluation using the CC Scan. The application involved the subdivision of a single parcel of land, currently zoned residential into nine single family strata lots. The site sprawls 1.14 hectares and is currently covered in mostly dense forest.

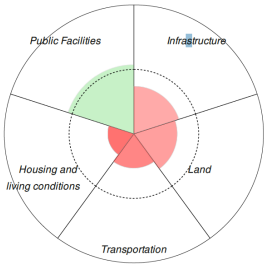
Figure 8. 875 Wellington Drive Participants CC Scan Graphs



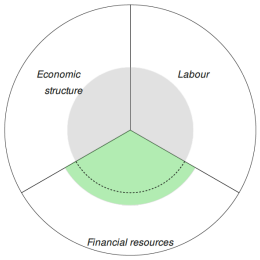
Natural Capital



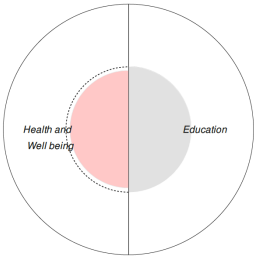
Physical Capital



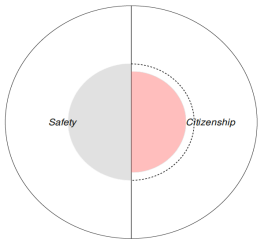
Economic Capital



Human Capital



Social Capital



Cultural Capital

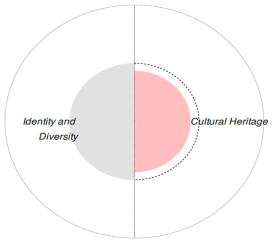


Table 6 shows the reasoning for this scoring in more detail.

Table 6. Development Application: 875 Wellington Drive

Capitals and Stocks	Reasoning	Points for Improvement
Natural		
Land	Clearcutting forest Tree preservation likely very difficult due to steep grade requiring cut and fill in order to develop. Wildfire DPA also requires that a 10-meter buffer be achieved around new homes, which may result in further tree removal Does not increase preservation of forested area	Perhaps maintain green buffer zone in application Try and maintain some of the trees
Soil	Slope of 20% may cause soil erosion during development OCP section 9.2.6. – Urban forest and Soil system. Prevent soil erosion. Development of a largely 'greenfield' site could have negative impacts on soil erosion	Given the 20% slope some soil erosion may occur
Groundwater	Section 9.3 Encourage rain water to remain on site. Section 9.3.6 – manage amount of rain water pumped into District infrastructure.	Rain gardens in subdivided lot and a large stormwater retention pond in the common area are proposed to address issues relating to stormwater management. Storm water plan ambitious given terrain.
	Development increases non-permeable surfaces	Development could be mitigated by providing system(s) for rainwater infiltration on site and limit groundwater pumping
Surface Water	No creeks	
Air	Reduction in trees = poorer air	

	quality Far from transit hubs = more cars = worse air quality Section 9.5 – air quality. Removal of trees would reduce air quality. More homes away from transit increases reliance on cars. Tree removal for development. Site not close to centres (for destinations) or frequent transit, so likely most travel will be by car.	
Minerals and Non-Renewable Resources	N/A	
Physical		
Infrastructure	More single detached outside of village centres More costs to create infrastructure outside centres Not near a centre, not close to transit	Need more affordable housing and diverse housing forms
Land	Use would be for single family homes and does not allow for diverse housing forms or any other uses Does not diversify land use as currently have many large lots for single-family houses	
Transportation	The site is not located on any transit network, far from any bus route. Residents will require vehicles to access. No transit service, bike lanes or sidewalks Not near many transit routes or centres	Density in centres allows for more transit, bike lanes, etc.
Housing and Living Conditions	No relation to existing neighborhood character. Application adds more unaffordable housing stock (for the majority of us) Homes would be sold for $4M (approx.) Not affordable.	Consider diverse housing forms including rental
Public Facilities	Would contribute to taxes for	

	public facilities Provides tax revenue
Economic	
Labour	Does not create jobs, except short term construction jobs
Financial Resources	Tax revenues Would increase tax revenue Contributes to tax revenue
Economic Structure	N/A
Human	
Education	
Health and Well-Being	Neighbourhood not walkable
Social	
Citizenship	No interface with street. Little connection with neighbours. Housing not very affordable.
Safety	Are they following Crime Prevention by Design principles?
Cultural	
Cultural Heritage	N/A No public art required with subdivisions
Identity and Diversity	Fits into the status quo identity of single-family neighbourood, but does not contribute to diversity

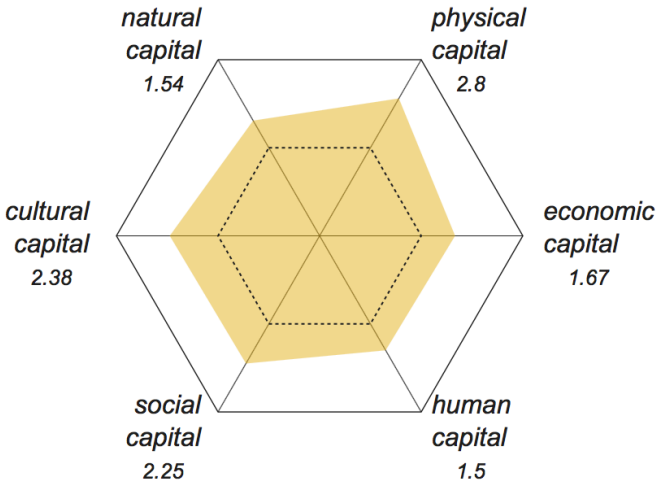
6.6. 3260 Edgemont Blvd

Grosvenor Edgemont Holdings submitted a detailed application to rezone the 2.12-acre site at 3260 Edgemont Boulevard in order to develop a mixed-use, commercial/residential building. The site is located at the north end of Edgemont Village and is currently occupied by a grocery store, Highlands Professional Centre, and four residential properties.

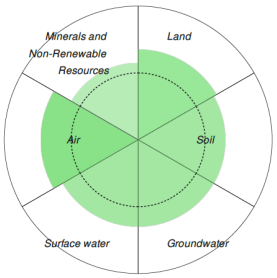
- The development application proposed:
- 82 residential units consisting of 23 one- and two-level townhomes and 59 apartments

- A height of three storeys, with a partial fourth storey in one location
- 371 underground parking stalls with access of Ayr Avenue
- 159 bicycle parking spaces
  Approximately 63,400 square feet of new commercial space including a grocery store and a potential new restaurant

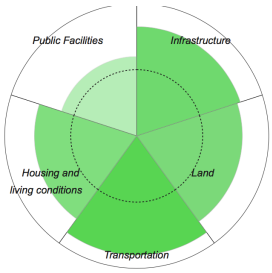
Figure 9. Development Application: 3260 Edgemont Blvd. CC Scan Graphs



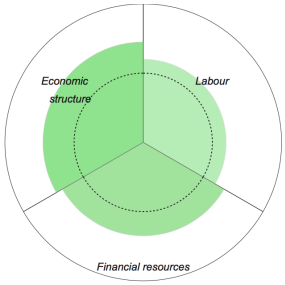
Natural Capital



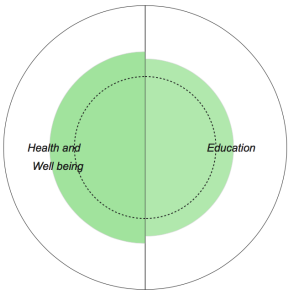
Physical Capital



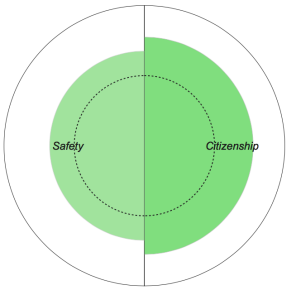
Economic Capital



Human Capital



Social Capital



Cultural Capital

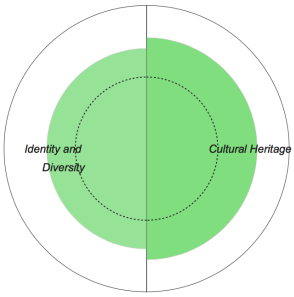


Table 7 shows the reasoning for this scoring in more detail.

Table 7. Development Application: 3260 Edgemont Blvd.

Capitals and Stocks	Reasoning	Points for Improvement
Natural		
Land	Green roofs. Focusing growth and development in the centres Given that development is best placed in centres, and helps to preserve UCB, this development makes an effort with green roofs, landscaping, views preserved on corridors with setbacks By focusing growth in the town centre, development of land outside of the town centre are reduced which in essence helps increase preservation of natural areas	Native plant species for beers, etc.
Soil	Walkable town centre concept to reduce car pollutants. Needed to remove underground oil tanks. Any underground oil tanks would have to be removed. The applicant would have been required to remediate any on-site underground oil storage tanks and any contaminated soil.	
Groundwater	Issues with ground water on site. Section 5.6 of the Edgemont Plan speaks to best practice for stormwater management, etc. LEED gold building including water reduction strategies, however 3 storey parkade – unsure if there were any ground water concerns on this site. Building is LEED gold. They were also required to have a stormwater management plan.	
Surface Water	Section 5.6 of the Edgemont Plan speaks to best practices for stormwater management, etc. N/a Same as prior	
Air	OCP focuses growth in the centres, which promotes walkable, transit-oriented communities Part of LEED designation: green roofs, low VOC emitting materials, located in Town Centre near destinations (grocery store on site) to reduce trips, by future frequent transit network to enable fewer car trips Focusing growth in a town centre, encourages walking to amenities and thus hopefully reducing GHG emissions associated with driving vehicles. The project will incorporate low VOC emitting materials for improved air quality N/A	
Minerals and		

Non-Renewable Resources		
Physical		
Infrastructure	Don't know Development located in a centre with existing infrastructure and makes better use of infrastructure per linear foot with denser development – infrastructure and utilities renewed with development	
Land	Mixed use development that includes: 82 residential units consisting of 23 one-and-two level townhomes and 59 apartments, a height of three storeys, with a partial fourth storey in one location, 371 underground parking stalls with access off Ayr Avenue, 159 bicycle parking spaces, approximately 63,400 square feet of new commercial space, including a grocery store and potentially a restaurant Mixed use development located in a centre with retail, grocery, housing This is a mixed-use development which incorporates commercial and residential uses with green space for residents and public plazas	Consider increasing jobs, besides retail
Transportation	Making improvements to the bus stop in front of site. Focusing growth in centres creates more walkable, transit-oriented communities. Building bike lane in front of site. Bike lanes, transit hub, transit stop improvements, on future FTN The development will incorporate an improved bus stop and pull out area. No overall improvements currently anticipated for transit services. Roads and sidewalks are to be improved and a dedicated bicycle lane will be added along one of the property frontages	Enable future ability for pay parking
Housing and Living Conditions	Provides a mix of housing forms, 82 residential units consisting of 23 one-and two-level townhomes and 59 apartments followed Accessible Design Guidelines Increases supply of multi-family with THs and apartments The site provides a total of 82 residential units with a mix of unit types and sizes. While there are no affordable units on site, the mix of units within a town centre, close to transit, contributes to the overall affordability. There is a grocery store on site for residents of the development and surrounding area to access.	Rental and/or affordable housing All strata, market housing (Edgemont Plan did not address non-market housing)
Public	Churches and schools nearby	

Facilities	Provides CAC $ to be used elsewhere While the development does not provide any on-site public facilities, a new community rec centre was recently developed within walking distance to this site. There is also an elementary school, secondary school. Day cares and churches within walking distance. By creating housing close to these services, accessibility to these services is improved.	
Economic		
Labour	Provides some short-term construction jobs May have some home-based businesses Grocery store and restaurant will provide jobs Provides retail jobs, not much diversity in salary ranges or types The grocery store and other commercial space on site provides jobs within the community which may provide employment for students or others	
Financial Resources	Increased number of housing units means more property taxes. DCC's, CACs, permit fees, Contributes to off-sites, DCCs, CACs The development was required to contribute substantial CACs and DCCs which feed back into development and improvement of community amenities and services. Jobs would have been crated throughout the construction process, supporting workers and local businesses Buildings meets GHG requirements	
Economic Structure	Appears commercial units for retail, but has some diversity (grocery, restaurant, retail outlets) On-site grocery and other commercial uses will provide a mix of services in the village. In addition, the grocery store will attract more people to the village and likely draw business back to other local businesses	Need more clarity in bullets points for these questions
Human		
Education	Creates family housing so more children in schools. Close to existing schools and child care centres N/A The development will be within walking distance to both an elementary and secondary school, which may lead to increased investment in both facilities	
Health and	Focusing growth in the Edgemont Centre which is a	

Well-Being	walkable, transit-oriented community, which promotes mental and physical health. There are a number of coffee shops to meet at. The application is building 3 plazas for people to gather which promotes mental health through connection with others. Not considered in this development Some units will incorporate accessibility features	
Social		
Citizenship	Process for creating the Edgemont Plan engaged the community in a meaningful way. The working group included members of the community association. The CA is active in current development application reviews. Provides multifamily housing in neighbourhood of largely single-family houses: provides options for seniors downsizing from houses – outdoor public plaza space for gathering – development guided by Edgemont Plan, which was done with lots of public engagement to build vision for village More people, grocery store will revitalize the village	
Safety	Edgemont Design Guidelines encourage development projects to follow CPTED principles Development to have well designed public spaces (presumably with sufficient lighting) interior courtyard is secured for residents	
Cultural Heritage	Site required to provide 3 public art installments Public art to be in corner plaza Approximately 3 local public art installments on-site	Consider First Nations art to promote reconciliation
Identity and Diversity	Strong identity in Edgemont Development based on Edgemont Plan, which built community vision and identity for future of village	Need more diversity

6.7. Surveys

In this section survey responses which reveal how the CC Scan assisted DNV planners and community groups in Edgemont Plan and development application evaluation are presented. After each CC Scan was conducted, participants were sent an e-mail link to an SFU Web Survey to answer a set of questions surrounding their experience with the tool. Their responses are summarized below in tables 8 to 11.

Table 8. Edgemont Plan: EUCCA Survey Comments Summarized

Positive Comments	Negative Comments	Suggestions for Improvement
It helped to indicate strengths and weaknesses of the plan and put some focus on where improvements could be made to better the community.	It is too broadly based. it would help if could be tailored to the community.	Allow it to be customized.
Encourages an improved focus on elements where participants may begin with varying opinions.	Some components had too much diversity in the elements. No opportunity to 'weight' the components, consequently could drift responses to a neutral position. We were considering a comparatively small area which was essentially a 'redevelopment' area. This tends to slant the focus and misses out some of the wider ranging topics (i.e. the Edgemont Refresh) had essentially no undeveloped land to consider. The previous Upper Capilano Local Area Plan which covered the area from Grouse Mt to Hwy #1 and Capilano Rd to Delbrook could have produced some interesting results	As previously commented: - focus some of the elements - consider 'weighting' between components - maybe a pre-meeting of participants to agree weighting
Examples thought provoking	More focused toward industrial type applications than residential/commercial	Develop an urban version for residential/commercial/institutional projects/plans. Develop an industrial version for heavy/light industrial applications

Table 9. Edgemont Plan: DNV Planners Survey Comments Summarized

Positive Comments	Negative Comments	Suggestions for Improvement
I like the web-based application and that we got real time results. I liked filling out the information as a group on our own computers. It was good to have a facilitator walk us through the scan.	Some of the questions were not applicable to the Edgemont Plan. It may be applicable to a development application.	On the last question. Separate out questions about diversity and identity. They are different concepts.
The actual questions distill complex questions into short and simple questions - the results are presented graphically so easy to digest both for professionals but especially the public. -	Not all the questions fit the contents of particular plans, would be good to customize for each plan focus	Tailor the scan to each plan - ensure participants have reviewed the materials beforehand
I liked that the CCS was holistic; going through the exercise allows you to gain a new perspective or interpret in a new way something you may already be familiar with.	I thought the CCS's major weakness was a lack of specificity. Being so open to interpretation allowed for radically different scoring depending on your viewpoint.	A possible solution would be to keep the CCS's categories general at a higher level but have more specific guidelines depending on the plan/document being assessed. I.e. human capital is broadly defined as X, but in the context of community plans it is X
Gets the participant thinking about sustainability.	It was too general, so you need to be quite familiar with the plan. Often as staff you don't work with every aspect of the plan. Also, there are things that seemed like more implementation questions (how it is working). For example, I wanted to be answering questions based on what I know about the neighbourhood as opposed to just what's included in the plan. It was very time consuming.	Link questions to sections from the plan. Connect the plan to other policies that may inform the development of the area, on topics not included in the plan. In question 2 'I found the CC Scan useful for asses.....": I think the scan doesn't go far enough on each topic to necessarily assess anything. It doesn't include any indicators or 'measures of success'. Including indicators would be helpful.

Table 10. 3260 Edgemont Blvd Participants Survey Comments Summarized

Positive Comments	Negative Comments	Suggestions for Improvement	Planning Stage
I like [the] easy to use web-based tool and the real time results.	It is better to conduct a scan in the early stages of a development application review. We conducted this review after this application/ rezoning was approved. It is also more useful to have the tool customized to included details on DNV policies, guidelines, etc.	Perhaps this is more useful to assess community plans and establish a baseline prior to developing a new plan. It could be utilized by community planning perhaps when they are assessing an application, but again, it is so subjective, I'm not sure how helpful it would be.	At the early stages.
the questions are short, and the output provides a nice graphical summary	the topics are quite broad and high level and not all relevant to development applications or area plans		at the preliminary stage of assessing the proposal vs the area plan - post occupancy with planners and perhaps residents

Table 11. 875 Wellington Drive Participants Survey Comments Summarized

Positive Comments	Negative Comments	Suggestions for Improvement
Easy to use. Real time results. Quantifiable measures.		Would be good to customize it to the DNV- i.e. put in the relevant sections of the OCP so we don't have to look them up. Would be good to include specific questions regarding accessibility for people with disabilities/ elderly/ children in the built environment. Would be good to apply a family/child friendly lens to some of the question. Would be good to include a First Nations lens.
Comprehensive topics. Provides nice visual at the end to summarize.		suggest being able to mark a capital as n/a, as well as option to mark it as 0, since 0 as no impact can differ from does not apply - identity isn't the same as diversity, so suggest splitting them up or rename - suggest having an age and ability capita

Chapter 7. **Analysis of CC Scan Using the SDGs**

7.1. Overview

In this chapter the results of the policy alignment exercise are discussed, followed by an analysis of the CC Scan as tested in the DNV. The policy alignment exercise seeks to address the research question:

- How can we better represent progress toward long-term integrated sustainable development goals at the local level?

The CC Scan analysis is carried out on two levels: a micro-level analysis of the CC Scan as applied in the DNV, and a macro-level analysis of the DNV case study using the SDGs as assessment criteria.

The analysis of the application of the CC Scan in the DNV context will address the remaining research questions:

- How can an MCA tool such as the Community Capital Scan (CC Scan) contribute to the alignment with sustainable development goals at the local level?
- How can an MCA be operationalized in a way that ensures scalability, flexibility, and communicability?

The first of these three questions is addressed below in section 7.2, which discusses the results of the policy alignment exercise using DNV policies, the CCF, and the UN SDGs. The second and third questions will be addressed in sections 7.3 to 7.5, in which the Edgemont Plan is analysed in terms of impacts on SCD in the DNV. Preliminary impressions based on discussions during CC Scan de-brief sessions and survey responses are reported in section 7.3. Finally, the CC Scan's utility as an MCA tool is provided in section 7.4, and an analysis of the utility of the CCF to integrate the SDGs is discussed in section 7.5. Suggested adjustments to help ensure the CC Scan supports relevant sustainability planning objectives and priorities are offered in Chapter 8.

7.2. Aligning Local Policy with Global Goals

In order to establish local priorities, existing local plans and programs should be examined with the aim of identifying the needs, priorities, gaps, and cross-sectoral linkages with the SDGs (SDSN, 2016). Local planning documents must define visions and strategies based on an integrated and multi-dimensional approach to SD.

The policy alignment exercise involved the mapping of the UN SDGs to the DNV policy goals and targets. Reviewing *Identity 2030,* the District's OCP, through the lens of the SDGs was an important step due to the importance this policy document holds for the District's long-range development and the legal requirement that policies such as planning documents, zoning, and development applications must be consistent with the adopted OCP (*Local Government Act*, 2006). Additionally, because the OCP serves as the comprehensive road map guiding the District's development through 2030, this assessment provides insight into current capacity related to sustainability.

The most important step in both setting and monitoring an agenda for sustainability is the identification of the goals that establish a community's vision for sustainable development (Hermans, Haarmann, and Dagevos, 2011). These requirements allow stakeholder groups to find common ground in shared interests, as well as provide guidance to the indicators that may be used to measure the stocks of community capital into the future (CC-Scan, 2013).

To begin the policy alignment exercise, the long-term goals established in planning documents across various DNV departments were reviewed and categorized in spreadsheets. In total, six documents were consulted, including the OCP and departmental specific plans such as the Transportation Plan and Corporate Plan. The plans were scanned for their goals and strategies, which were then compiled and categorized into the six community capitals and the twenty-five stocks that comprise them.

This consultation of plans was an iterative process and involved the collaboration between another SFU researcher also working with the DNV as part of a larger project. District staff also provided input to the addition or removal of plans that were relevant, redundant, or outdated.

This process was meant to reshape the contemporary planning goals of the DNV through the lens of the CCF, and was concerned with measuring and optimizing the critical stocks of natural, social, human, cultural, economic, and physical capital at the community level (Roseland, 2012).

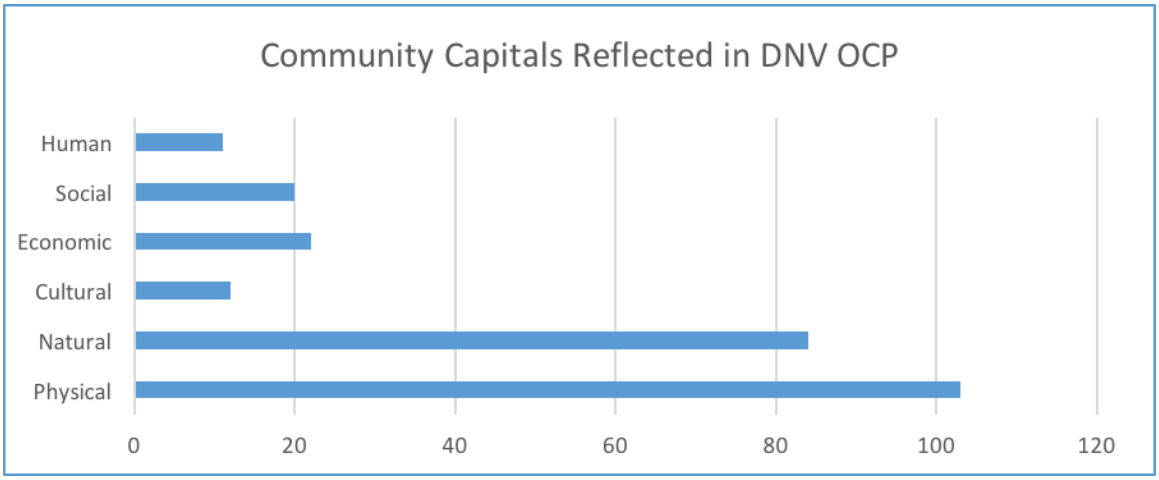
Table 12. Example of DNV OCP Alignment with CCF Capitals and Stocks

2030 Target	DNV Policies	CCF Capital	CCF Stock	Target
75-90% of new residential units located in 4 key centres within the Network of Centres	Accommodate growth and development within the existing built area and maintain the District's Urban Containment Boundary as shown on the Land Use Map	Physical	Housing	i.e. 10,000 new units by 2030

Table 12 shows that through a simple alignment exercise, the CCF may be embedded into any local level planning document to integrate SD principles local policy goals. Simialrly, this process allows for key city initiatives to be evaluated against the six capitals, yielding a holistic assessment of current capacity for sustainability. In this example, the DNV OCP target for 2030 that aims for 75-90% of new residential units to be located within the four key centres aligns with the housing stock of physical capital.

Identity 2030 addresses a broad range of the community capitals within its policy set. Figure 10 below depicts the six community capitals as represented within the plan, and shows an alignment with each one of the six capitals, with the strongest representation in physical and natural capital.

Figure 10. DNV OCP Alignment with CCF



Each set of long-term planning goals was then evaluated using the SDGs and SDG targets as an assessment tool. Whenever there was an alignment between one or more of the SDGs and the DNV's own planning goals, the linkage was captured in a matrix. In some cases, specific SDG targets were aligned with specific objectives listed within DNV planning documents. However, in many cases, objectives within high-level policy and planning documents did not align perfectly with specific SDG targets (see Table 14). Nevertheless, if the objectives were aligned with one of the seventeen SDGs in a broad context, this was compiled in the matrix. Table 13 reveals a fair balance of SDG alignment with the OCP while Table 14 provides examples of the policy alignment exercise using the CCF capitals and stocks, in addition to the UN SDGs.

Table 13. SDGs Represented in DNV OCP Chapters

Identity 2030 Chapters (District of North Vancouver, 2011)								
SDGs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1								
2								
3					■			
4								
5								
6						■		
7								
8				■				
9								■
10			■					
11	■	■	■	■	■	■		
12								
13								
14						■		
15						■		
16								
17								

Table 14. Example of DNV OCP Alignment with CCF Capitals, Stocks, and the SDGs

SDG	SDG-Target	CCF Capital	CCF Stock	DNV Goal	DNV Target
Ensure healthy lives and promote well-being for all ages	3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents	Physical	Infrastructure Transportation	OCP Goal 5: Provide a safe, efficiency and accessible network of pedestrian, bike and road ways and enable viable alternatives to the car through effective and coordinated land use and transportation planning	Investments in high priority intersection and corridor improvements will target reduction in crashes in the District and improve road safety

Table 15. DNV OCP Alignment with the SDGs (SDG 17 omitted)

Sustainable Development Goal	Level of Alignment with DNV OCP
1. No Poverty	No explicit goals, policies, or actions related to this SDG
2. Zero Hunger	Detailed set of goals and policy recommendations aimed at achieving food
3. Good Health and Well-Being	Extensive set of goals and policy recommendations aimed at good health and
4. Education	Indirect policy alignment influence from OCP Goal 8.1 to encourage education
5. Gender Equality	No explicit goals, policies, or actions related to this SDG
6. Clear Water and Sanitation	Detailed set of goals and policy recommedations focused on stormwater
7. Affordable and Clean Energy	No explicit goals, policies, or actions related to this SDG
8. Decent Work and Economic Growth	Detailed set of goals and policy recommendations focused on economic
9. Industry, Innovation, and Infrastructure	Detailed set of goals and policy recommendations focused on community
10. Reduced Inequalities	Detailed set of goals and policy recommendations focused on inclusivity and
11. Sustainable Cities and Communities	Extensive set of policies for housing supply, diversity, and affordability, as well as neighbourhood walkability and sustainability
12. Responsible Consumption and Production	No explicit goals, policies, or actions related to this SDG
13. Climate Action	No explicit goals, policies, or actions related to this SDG
14. Life Below Water	Detailed set of goals and policy recommendations focused on ocean health and
15. Life on Land	Extensive set of goals and policy recommendations aimed at environmental
16. Peace and Justice Strong Institutions	No explicit goals, policies, or actions related to this SDG

Table 15 summarizes the areas of alignment and gaps between *Identity 2030* and the SDGs. Areas that are well represented in the plan are highlighted in green, those that indirectly align are in light green, those which are present but less detailed are in yellow, and those which are not mentioned in the plan at all are in red.

Identity 2030 is a detailed long-range ICSP that intends to guide the District toward a sustainable future. There are many areas where the stated goals, policies, and actions align closely with the SDGs. This reveals the importance of SD for stakeholders in the District and the fact that many stakeholders participated in the drafting of the plan.

At the present time, the District's established goals align most closely with SDGs focused on healthy, happy citizens (SDG 3), sustainable cities (SDG 11), and terrestrial ecosystems (SDG 15). The results of the policy alignment exercise show that the DNV

faces many gaps in terms of municipal goals and targets that match the global SDGs. Many of the policy statements in the DNV OCP are high-level and difficult to measure and evaluate progress against. The OCP and subsequent high-level policy documents include dozens of recommendations and statements for a sustainable future, however very few correspond to actionable, measurable targets that easily align with the SDGs. In addition, some of the SDGs may not be contextually relevant to the DNV.

Figure 11: SDG Representation in DNV OCP

Regardless of the state of progress toward the global SDGs, the DNV OCP, *Identity 2030,* provides a sound framework for understanding the key priorities of the District related to SD. As shown above, specific policies and initiatives in the plan can be integrated directly into the SDGs, and specifically, can identify SDG-aligned measurable targets to effectively implement and evaluate OCP guidance. Understanding how the current OCP aligns with the SDGs may provide context for moving the District toward specific sustainability goals and targets that can be effectively measured and tracked against the SDGs.

7.3. The CC Scan Applied to Edgemont Plan and Development Applications

The CCT was designed for application to integrated and pro-active community planning initiatives such as developing or modifying an OCP, and to neighbourhood-level, re-active processes such as proposal evaluation and development applications (Roseland, 2012). In the DNV case study, the CC Scan clearly proved its versatility when applied to the evaluation of policy planning documents.

The CC Scan assisted DNV planners and community groups to identify the strengths and weaknesses of the Edgemont Plan with reference to the perceived impact on community sustainability. The scan also assisted participants to identify domains of sustainability that required improvement. For example, natural capital was scored the lowest by the DNV community planners group. This was due to the use of general policy language throughout the plan. For example, there are no specific tree species listed in the plan itself, nor is there reference to storm water management design. Moreover, DNV community planners found that the plan does not mention the historical relationship to the land throughout Edgemont or the surrounding natural resource base.

Through survey results, CC Scan responses, and participant observations and discussions, the CC Scan clearly proved its versatility and adds value when applied to the sustainability evaluation of policy planning documents, but does not necessarily apply to specific project or development applications.

In other words:

- 100% of CC Scan participants indicated that the CC Scan was useful in evaluating planning documents and that it specifically offered insight into how the Edgemont Plan impacted community sustainability in the DNV.
- 100% of CC Scan participants would like the CC Scan to be customized to DNV context

One CC Scan participant noted:

> It's a good exercise in pulling out every single one of our policies that applies to [the Edgemont Area Plan]. When I was doing RFP for the Heritage policies, I was asking, what other policies at the DNV even talk about Heritage? There is a Parks and Recreation Plan that talks about it. Yet I wouldn't have known that unless I did that exercise. There's lots of policies in the woodworks, like the Local Area Plans… a lot of us think they are not applicable. We need to dig those out and read them.

Another participant responded that:

> This tool echoes back what your gut feeling says, but now you have it all in one place. It provides more justification for decision-making.

Alternatively, participants had suggestions on how the CC Scan could be improved as a plan evaluation tool. For example:

> The item on AIR - it does not pose a formal question but simply states:" Eliminate all pollutants and contaminants" and "Reduce greenhouse gas emissions." The LARCO site was vacant for about 20 years prior to being redeveloped, so developing this site is increasing the GHG emissions and air pollution on the site and in the neighbourhood. However, if we compare future residents of this site with the average District residents, their per person GHG load and pollution load will be far less – but I haven't done that math so can't tell you how much less. So, depending how I read and answer this question the scores could be hugely diverse – literally one end of the spectrum or the other.

As a SA tool applied to the evaluation of municipal development applications, the CC Scan did not measure up in the eyes of the stakeholders. Participants responses towards the Scan in this regard showed concern for its practicality in assessing stand-alone development applications:

> I have projects next door at the beginning stages. I am philosophically opposed to a system that ranks an application that is doing everything they are doing right, poorly, just because the site they are developing (which is in accordance to our plans) does not have a community centre, or a job base, or food production… that's not a way of judging an application. We judge them based on how they relate to our policy. Our policy is supposed to be our base.

Upon reflection of the CC Scan in evaluating the development application for 875 Wellington Drive, one participant noted:

> One thing we learned was that looking at the application in isolation is not necessarily helpful, we would need to rate the application against the Edgemont plan. Without relating it specifically to the plan…. Testing it against it back against the Plan itself is perhaps more helpful to highlight how Community Planning can beef up certain areas. Looking at a development application in isolation may not be the most helpful, for example it may not have a green space, while the development adjacent does – should be more community wide.

As a development application evaluation tool, the CC Scan's major weaknesses were the subjective nature and lack of specificity. For example, the CC Scan questions are very broad and may not be relevant to all types of development applications. As a subjective, dialogue facilitation tool, the CC Scan questions are open to interpretation, allowing for radically different scoring depending on the viewpoint of the participant. More often than not, participants suggested that the CC Scan would be more useful if it was allowed to be customized to the local context where it is being applied.

Although there is pressure for policy-makers to create SD initiatives, there are also barriers to implementation, especially at the local level (Mclean and Borén, 2014). While the CC Scan proved to be a useful and valuable exercise for DNV community planning staff and community advisory groups to evaluate the impact of planning policy on the SD of the community, the response from the development planning team was less positive. A high degree of subjectivity, misunderstanding of the intent of the CC Scan, and unpracticality combined with an extreme workload were a few of the themes that arose during participant discussion when using the CC Scan for standalone development applications.

As noted previously, the primary goal of the CC Scan is to gain input from a group of participants and garner discussion on the impact that plan, project, or development may have on each of the six community capitals. It is intended to be implemented early in the planning stage in order to highlight areas of improvement that better satisfy the community's goals for sustainability. Instead of using quantifiable indicators, such as in the Sustainability Balance Sheet, each stock in the CC Scan utilizes dialogue criteria to guide what a participant may consider when evaluating a specific plan, project, or development. The results of the CC Scan questionnaire assist planners and policy-makers by providing qualitative feedback in the form of written reasoning for scoring and areas of improvement. It also provides a numerical score on a Likert scale. Where there is agreement amongst participants, numerical scores will be

grouped closely together. Meanwhile, where there is disparity, the visual results of the CC Scan will be critical for participants to highlight and discuss where greater dialogue or focus is required.

Nevertheless, participant feedback during the CC Scan evaluations for development applications seemed to misinterpret the utility of the tool. One participant stated:

> So depending on the day I fill it in and how much sleep I've had the night before, and depending on my training, the development planners all have different backgrounds etc., my responses would be drastically different. If you don't ask specifically "Are you planting more trees," or "Are you cleaning the soil, supporting the local ecosystem," or "What percentage of the site has been planted?", you won't get all of those things. You might get one or two of them. People are going to rush through unless you're specific. We are so overworked. How will they know if you cleaned the soil or planted bee-bird friendly landscaping? We try to make it better and have planting and clean the soil from contamination. So every single one of my projects in some ways would rate the same. There may be some that go a little bit further because they're on a site next to a creek so we have a setback, but that doesn't mean the project that isn't next to a creek should score poorly.

Participant feedback indicates that the CC Scan is almost unfair to be used to evaluate standalone projects, as one participant emphasized:

> If the point is to come up with questions that you then apply to everything, why does site remediation make a project score higher? All that's telling you is not that the end result is any better, but that one project had commercial activity in the past that created contamination, so therefore they had to remediate it. One site had this issue or it didn't. Then I come back to, what is this tool really trying to achieve in terms of your goals and your way of judging the OCP? Maybe it is reasonable to see that we've cleaned up 10 sites from contamination, maybe that is a good indicator, but if you just get a number at the end, i.e. this is 75, or therefore its achieved sustainability rating gold vs silver, is it fair because this one had a creek, this one had a job component or this one had a previous contamination issue? That is really set by your original visions and context plan. It is more about the implementation plan. If the implementation plan has policies to protect creeks, and have design guidelines to help us be more diverse, then that's where we should be judged by points.

The participant feedback regarding the CC Scan as a dialogue support tool for standalone development applications reveals a number of findings related to change management. First, each participant was given a *CC Scan Manual (*Appendix A), which

included detailed instructions on the purpose of the tool, as well as rationale for its use as a dialogue support tool, and not a quantitative assessment. Based on the participant comments above, incorporating SA methods into day-to-day traditional planning is challenging. Individuals struggle with change, especially when it impacts their daily tasks.

These and other participant responses provide valuable feedback as to when and how the CC Scan could be implemented at the local level, and how future versions of the tool may be improved. Suggestions for improvements to the tool itself are detailed in section 7.4 below.

7.4. The Community Capital Scan as Multi-Criteria Analysis Tool

Munda (2005) quoting Roy (1985) posits that the main objective of MCA is not to discover a solution, but rather to create something which is liable to assist an actor taking part in a decision process either to shape or transform his preferences, or to make a decision in conformity with his goals. In this light, the CC Scan accomplished this. The CC Scan enabled participants to collaboratively think through the broader implications of the Edgemont Plan and how it may be adjusted to account for better, more context specific sustainability outcomes. It also highlighted areas of consensus and disagreement, reinforcing the framework's original purpose as a dialogue facilitation tool. Therefore, application of the CC Scan produced reflections on the experience of using the tool that may assist other organizations with the shared goal of evaluating policy goals.

If SA is truly any process that steers decision-makers towards sustainability (Bond and Morrison-Saunders, 2011), then the CC Scan has proven a useful tool. The stocks are seen as distinct subcomponents nested within sustainability dimensions and are necessary for supporting dialogue around community development (Roseland, 2012). The capitals and stocks embedded in the beta version of the CC Scan helped participants reflect upon the implications of the Edgemont Plan and two development applications on the Sustainable Community Development of the District.

At the local level, the CC Scan tool assisted the participants in thinking holistically about their community through a lens of sustainability. In regards to the user-friendliness and accessibility of the CC Scan, participants found the tool easy to use, and enjoyed how it offered graphical results. In other words:

- 71% of CC Scan participants liked the way the web-based tool is currently designed

As an MCA tool, it encouraged an improved focus on elements of a plan or development application while seeking to balance a criterion of twenty-five stocks within six capitals. To that effect, the holistic element of the CC Scan allowed participants to gain a new perspective on something they have already been familiar with. In addition, the CC Scan was very effective in strengthening individual understanding of the interconnectedness between ecology and community.

At the same time, the CCF revealed many of the sustainability assessment attributes identified in the literature. Table 16 below provides a brief overview of how the CC scan as applied in the DNV directly met two of the four *Attributes of Sustainability Assessment* as defined by Gasparatos et al. (2009), and partially met the other two.

Table 16. Attributes of Sustainability Assessment (Gasparatos et al. 2009) Revealed in the CC Scan

Integrated evaluation	Predictive capacity	Conservative bias	Stakeholder participation
The CC Scan provided a holistic view of the DNV through the six capitals and subsequent stocks including environmental quality and public health, social well-being, economic welfare, and institutional issues as well as their interdependencies.	The CC Scan indirectly forced participants to consider the future effects of present actions or inactions such as the implications of a strategic planning document or development application	The CC Scan did not directly provide acknowledgement of uncertainties about future consequences of present actions and recognition of the concomitant need to proceed with caution and prudent watchfulness.	The CC Scan directly facilitated meaningful engagement of stakeholders.

More broadly, the CCF offered an appropriate assessment tool for this project due to its ability to guide a focused, high-level inquiry into whether and how planning initiatives and development applications are contributing to the District's progress towards the UN SDGs. As shown in tables 12, 13, and 14, the CCF allows for an easy integration of the SDGs into the six community capitals. The integration of the SDGs into the CCF is discussed next in section 7.5.

7.5. Analysis of Community Capital Framework Using the SDGs

Local governments have the power to ensure progress towards the SDGs is achieved. The SDGs offer a goal-based framework for addressing global issues at the local level. In order to realize these goals, they must be integrated into local policy planning initiatives. Policy planning establishes priority lines at the local level and sets momentum for organizational development. If the SDGs are incorporated directly into the policy planning process, they can offer a unique approach to boost the quality of local ICSPs.

The CCF provides a valuable contribution to the evaluation of the broad sustainability goals established in the UN SDGs as it is based on a set of decision criteria for each community capital and stock by way of a structured questionnaire. MCA

tools such as the CC Scan provide guidance for checking and improving the sustainable development outcomes of decisions, and may assist participants in overcoming the gap between stated intentions and strategies. The CCF also allows for integration of the SDGs by allowing the goals to be categorized into each of the six capitals by theme.

In many ways, the CC Scan assisted DNV planners in the development of a shared language towards sustainability. As Gibson (2006) found, SA encourages decision-makers to assess purposes, options, impacts, mitigation and enhancement possibilities and identify appropriate purposes and options for continuing undertakings such as development applications or plans. The CC Scan allowed for the assessment of purposes, options, impacts, mitigation and enhancement possibilities of the unit of analysis, advised participants on what should or should not be improved upon, and perhaps most importantly, the definition of the sustainability needs in the familiar but separate categories of ecology, politics, society, economics and culture in an integrated manner.

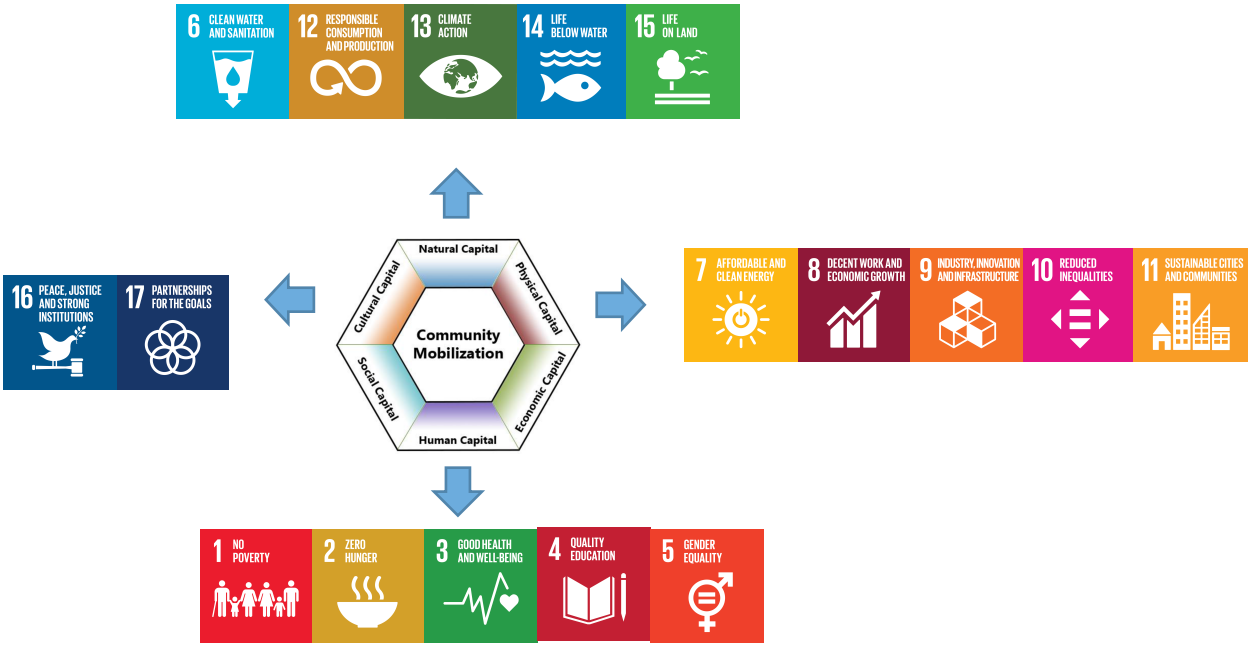
The process of conducting a CC Scan forced participants to pay serious attention to sustainability requirements. By applying decision criteria in the form of CCF capitals and stocks, the CC Scan acted like a sustainability test of the Edgemont Plan and the two development applications.

SCD literature asserts that the holistic approach taken to evaluate local development initiatives must be firmly rooted in the local context to effectively mobilize citizens (Roseland and Spiliotopoulou, 2016). The SDGs places a major emphasis on the power of bottom-up SA in their ability to abandon the traditional, siloed approach to problem-solving and instead focus on issues and aspirations that transcend the social, economic, and ecological boundaries. While the results of this project are unable to directly comment on the CC Scan's ability to dissolve governmental silos, the tool succeeds in bringing stakeholders together to view planning initiatives from a sustainability lens and stimulate thoughtful discussion around the integration of all SD dimensions.

Figure 11 below shows the integration of the SDGs into the six capitals of the CCF. The six capitals of the CCF: natural, physical, economic, human, social, and cultural (Roseland, 2012) offer an existing clustering of the multitude of themes

represented in the SDGs and reveal a direct link between the two frameworks. As a goal-based framework (Maclaren, 1996), the SDGs require the identification of sustainability goals for a community, followed by the creation of one or more indicators for each goal. Goal-based frameworks such as the SDGs are best suited for dealing with the distinction between local and global sustainability issues (Maclaren, 1996). The strength of integrating the SDGs into the CCF is that it allows users of tools like the CC Scan to evaluate movement towards or away from the SDGs, as was discussed in section 7.2.

Figure 11. Integration of the SDGs and CCF (Roseland, 2012)



SA tools can be prescriptive and have the potential to undermine local initiatives and limit a communities' ability to define their own objectives for SCD (Reed et al., 2006). While the SDGs are inherently universal, they place major emphasis on local implementation. This project proposes the use of the CCF as a way to operationalize the SDGs at the local level. Figure 11 below shows that the SDGs are easily grouped into the various community capitals. For instance, SDGs 6, 12, 13, 14 and 15 align with natural capital and its subsequent stocks. SDGs 7, 8, 9, 10, and 11 are linked to physical and economic capital, and SDGs 1, 2, 3, 4, and 5 correspond with human capital.

This research serves as a preliminary step in an essential conversation of how the SDGs can serve as a framework to guide local government planning and decision-making to achieve global aspirations for SD. As was seen in the case study results in Chapter 6, the DNV OCP provides evidence that the community views sustainability as vital to ensuring the healthy future of the District, and that an MCA tool such as the CC Scan allows for stakeholders to identify gaps in policy plans in the ambitious pursuit of sustainability. This research suggests a future use of the CCF as a tool for “localizing” the SDGs into policy planning processes.

Chapter 8. Conclusions and Recommendations

This project explored the topic of urban SA through a research partnership with the DNV. The District community planning department had expressed interest in investigating MCA tools to potentially be incorporated into the 2019 OCP review process. The literature surrounding SA processes reveals that approaches must be grounded in a shared, common lexicon (Cohen, 2017). This research project explored the use of the UN SDGs as this basic set of criteria and the implementation of the CCF to operationalize them. It presented an overview of the application of one MCA tool, the CC Scan, applied to the DNV community planning department to evaluate plans and development applications and ground discussion around SCD, with the objective of providing recommendations for future research and implementation using the CC Scan. This final chapter presents reflections on the application of the CC Scan in the DNV and offers recommendations for future research and iterations of the tool.

8.1. Reflections on CC Scan Application

This project further illustrates that while many governments are on track with aligning local policy to include as many aspects of the SD goals as possible (City of New York, 2015; City of San Jose, 2015; Iyer et al., 2017), there are still gaps to implementation. The implementation of an SA analysis tool in this project faced challenges. While participants found that the CC Scan allowed systematic analysis and promoted stakeholder communication surrounding established sustainability criteria, should planners aim to continue the integration of SA in future planning, efforts must be made to manage that change.

On one hand, municipal planners face an increasingly demanding work load. As professionals they are required to meet standards set out by legislation and a variety of regulatory bodies, and their work must reflect this. As was mentioned in participant feedback, to add yet another form of analysis to an already overburdened planner can prove to be cumbersome and may be met with resistance. At the same time, without a strong mandate from Council, a local government may find it easier to keep to business as usual, with sustainability merely an afterthought. If SA tools such as the CC Scan are to be most effective, local governments will need to use collaborative decision-making

and problem-solving. Without such efforts, the traditional silo approach to government decision-making will continue to be an obstacle for progress towards SCD. Local governments must hold their plans and policies accountable to the SDGs by making them a part of the policy discussion. Inclusive citizen engagement will also be critical to continued progress towards local SDG implementation. Without belief in the necessity of achieving sustainability, SA may be seen as a burdensome add-on.

At the local level, this project has enhanced research surrounding the both the CCF and the CC Scan. The dialogue that occurred following each CC Scan revealed a need for the incorporation of distinct stocks to be used as criteria for future policy evaluation in the DNV context, such as the inclusion of a First Nations stock in cultural capital and an accessibility stock within physical capital. Participant feedback also revealed that the CC Scan proved very useful in evaluating whether or not local policy incorporated multiple sustainability criteria in the form of capital stocks. The other major finding from the application of the CC Scan at the DNV is that in its beta form it is not currently suitable for development application evaluation. The results of this study show that the CC Scan should be implemented during the preliminary revision of high-level policy planning documents such as OCPs and neighbourhood plans. In these situations, the CC Scan excels in providing participants with a holistic view of the plan in question, with opportunity for participants to focus on areas of group disagreement, and potentially make changes in areas that could potentially strengthen and balance multiple capital stocks. At its very core, the CC Scan should be used as a dialogue support tool and must not be considered a quantitative assessment tool.

At the global level, this project has shown that an MCA framework such as the CCF proves useful in aligning the UN SDGs with local planning policy. This research shows where the sustainability planning efforts of one local government are strong and where there are gaps that require improvement if the community is to reach its stated goals for both local and global sustainability. Using the SDGs as a lens to evaluate key planning initiatives can ensure a structured manner in measuring, tracking, and ultimately achieving the broad goals established in high-level planning documents. Through the initial mapping exercise of the DNV OCP goals detailed in section 7.2, and by nesting the SDGs within the CCF in order to analyze them, it is clear that there is overlap between the goals in the OCP, the SDGs, with a strong representation of each capital. Given that the DNV OCP is up for revision in 2019, now is an ideal time to

establish measurable targets, identity what is needed for tracking progress, and develop an appropriate platform to communicate and engage with the community. Specific recommendations for the DNV are offered in section 8.3.

8.1.1. Future Use of the Community Capital Scan

As revealed section 6.7, there is room for improvement to the current beta version of the CC Scan. Based on the participants' survey responses and CC Scan de-briefing discussions, the following improvements should be considered when improving the CC Scan for use by a municipal planning department:

- Customization: prior to the implementation of each plan, tailor the questionnaire to the local context. For example, insert the relevant sections of the OCP or relevant planning document directly into the questionnaire.
- Include accessibility issues in the built environment. For example, include specific questions regarding accessibility for citizens with disabilities or senior citizens with mobility issues.
- Modification to Human Capital: Add a child and family friendly stock to Human Capital, as these dimensions of a community are currently under-represented in the CCF.
- Modification to Cultural Capital: Consider differentiating the stocks Identity and Diversity, as an overwhelming amount of CC Scan participants found them confusing and difficult to conceptualize. Consider the inclusion of a First Nations stock, especially when initiating a CC Scan in a region with rich indigenous history.

For the CC Scan to be implemented at the municipal level, it must be customized to the local context. More specifically, the CC Scan could be improved by tailoring the questions to the unit of analysis. For example, should the Edgemont Plan be reviewed in the future, an improved version of the CC Scan may consider tailoring each stock-level question to the Edgemont Plan itself. In addition to this, future versions of the CC Scan should also consider connecting the questions to OCP policies that may inform the participants of topics not included in the plan of analysis.

The results of the surveys reveal that participants felt it would be better to conduct a CC Scan at the very early stages of a development application review. If the CC Scan is to be used in the future for evaluating policy plans, it may be most useful to assess the plans as a baseline prior to the development of a new plan. In this regard the

CC Scan could be utilized by community planning staff in the early stages of the planning process.

In addition, future iterations of the CC Scan would benefit from the inclusion of an online video tutorial that guides individual or group users in general usage of the Scan, including how to adapt the stocks and questions to the local context. It is also recommended that the CC Scan be emphasized as a counterpart to the Sustainability Balance Sheet, with links to the relevant web platform.

8.1.2. CC Scan Application in the DNV

This research served as a case study for the implementation of the CC Scan in the DNV. Moving forward, should the DNV utilize the CC Scan in future revisions of high-level planning documents, the following should be considered.

One recommendation for the DNV to consider with regard to future sustainability planning is to improve how tracking and progress on *Identity 2030* goals is reported. The SDGs strongly emphasize data, monitoring and evaluation in order to ensure clear outcomes to allow decision-makers and stakeholders to track progress (SDSN, 2016). As mentioned in Section 7.2, many of the goals in the DNV OCP are broad and non-specific, which makes any form of evaluation difficult. The DNV could define more specific, measurable targets that may be tracked using quantitative indicators. In addition, a website or online application where local stakeholders can track data and information that helps them understand progress towards the long-term sustainability goals could be developed to improve progress towards sustainability. For example, the City of Surrey uses a *Sustainability Dashboard* to track progress on each of their OCP sustainability goals, whereby interested stakeholders can examine macro data in detail in a user-friendly manner.

To ensure a wide range of multi-sector stakeholder input, the DNV could establish a formal and clear mechanism to ensure ongoing community engagement. For example, to elicit the most possible feedback, community planning staff could engage community groups in multiple CC Scans via the online web platform. In a hypothetical scenario, planners could release draft versions of the revised planning documents via the municipality's website, and provide direct links to the CC Scan portal. Interested

participants would have the opportunity to read the *CC Scan Manual* (Appendix A) prior to initiating a CC Scan, and then could then work through the questionnaire on their own time. This would allow community groups or individual citizens to provide specific recommendations to strengthen the policy document, and take ownership of the sustainability in their own community.

Finally, the DNV could consider establishing specific, measurable SDG-aligned targets under each of the six community capital categories, and propose feasible indicators for tracking. This may require a continued research partnership between the DNV and the CSD at SFU.

8.2. Research Limitations

The most transparent limitations to this research were time and resources. SCD is not a fast process. Indeed, it requires a great deal of time, effort, and community engagement combined with scientific analysis. This project intended on analyzing three separate development applications in the original research design stage. However, due to complications at the DNV municipal hall, only two development applications were subject to CC Scan implementation. Further, due to time constraints, this research project only engaged one community group for application of the CC Scan. In the future, a larger sampling size of municipal planning staff and community groups would strengthen research on CC Scan implementation processes.

8.3. Concluding Remarks

Sustainable community planning requires that planners and decision-makers view their work holistically, and address multiple planning concerns across many forms of community capital simultaneously, to consider the effects of plans at broader scales, and to involve citizens in efforts that support the ecological, economic, and social health of communities. The examination of three different community planning initiatives evaluated through the lens of the CC Scan offered evidence of its usefulness as an assessment tool for evaluating local planning documents. In addition, the alignment between the DNV policies with the UN SDGs provided a foundation for future planning

initiatives to work towards achievement of the 17 global goals. Further, the nesting of the SDGs within the six community capitals of the CCF proved the ability of the framework to integrate itself with global goals, and operationalize them at the local level.

This project confirms that the CC Scan stimulates early-stage communication, raises awareness around SD, promotes broad thinking about how proposals, plans, and initiatives may be improved, reveals consensus and disagreement amongst participants, and adds transparency to decision-making (Dagevos, 2012). The original creators of the CC Scan emphasize that it was intended for fast collection of top-of-mind opinion from stakeholders, insights about the distribution of opinion and reasons behind participant responses, as opposed to rigorous quantitative measurement of opinion. The insights provided by the CC Scan on how participants perceive the effects of a given policy or project on the six capital stocks are invaluable for the sustainability of the community in context.

Although the CC Scan is clearly useful at gaining advance insight and grounding dialogue around stakeholders' expectations of how a given plan or project will unfold, it is not a quantitative tool.

As mentioned above, this project fits into the context of a larger two-phase project and has provided the foundation for the delivery of a complete sustainability assessment framework with performance indicators. The facilitation of CC Scans combined with the alignment of DNV policies with CCF capitals, stocks, and the UN SDGs have assisted DNV staff and the community in perceiving the global picture of holistic SA.

The outcomes of this project may facilitate a continued application of the CCT at the DNV. District staff and community stakeholders should continue to build on these outcomes in a participatory planning effort, such as those recommended in section 8.3. It is envisioned that advocates for a holistic vision of sustainability at the District can demonstrate how SA processes may be achieved and showcase how the District's existing capacity in sustainability planning may be leveraged into a more integrated planning process with intent on aligning current planning goals and aspirations with the global SDGs.

The key innovation of this project is the collaboration between academic researchers, key decision-makers at the local level, and community stakeholders to identify and assess gaps that may hinder progress towards achieving a sustainable future. In addition, this research substantiates calls in the literature for a clear, common set of criteria to be used in urban SA by nesting the global SDGs within the six capitals of the CCF in a simple manner.

To conclude, this project exemplifies a small yet integral step towards how the District's planning initiatives may create a locally designed framework for sustainable community development using the CCT under municipal leadership and community stakeholder participation. With continuous stakeholder engagement and support, local planning efforts may largely benefit from the outcomes of an integrated MCA tool like the CC Scan. As phase 2 of this project continues, it is hoped that citizens and municipal staff will continue to demonstrate the benefits of SA across the District and identify further strategies to build on the current sustainability agenda in an integrated path towards a more sustainable DNV.

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Appendix A.

The Community Capital Scan Manual

Introduction

The Community Capital Scan (CC Scan) is a web-based application developed by the Centre for Sustainable Community Development (CSCD) of Simon Fraser University (SFU) and Telos, the Brabant Centre for Sustainable Development of Tilburg University in the Netherlands. The scan offers the opportunity to gain an advance insight into how projects or plans are expected to contribute to the sustainable development of a community or region. This insight is obtained by asking all the relevant stakeholders involved in a project or program to give their opinion of it by means of a structured questionnaire. The questions centre around the six capitals of the community capital framework (discussed below). In this framework six capitals, or assets, of a community are distinguished: natural, physical, economic, human, social and cultural. Sustainable community development is seen as the balanced development of these capitals. To facilitate interpretation, the results of the scan are presented graphically. Lastly, the scan offers an opportunity to make a wide range of suggestions for improvement or adjustments of the project or plan in question.

Who should use the Community Capital Scan?

The CC Scan has been developed so that the expected impact of a project or program on the sustainable development of a community can be discussed within a group of stakeholders at an early stage in a structured manner. If implemented at an early stage, it is then possible to make adjustments to the project if the results of the scan suggest that this is necessary.

When should the CC Scan be used?

The CC Scan has a broad application. The scan is particularly useful for evaluating plans or developments at an early stage, before investments are actually made. During this phase there is usually still enough room to adjust the plans. The idea is not to make extra work for a group of stakeholders, such as a community planning team, but rather to assist participants in thinking holistically and from a sustainability lens. For municipal planning, it should be emphasized that the scan is not for every type of development application. In recent applications, it has proven best for major area plans, major development applications, and high-level policies. The scan may also be used to make a SWOT analysis of a community or region.

How does the CC Scan work?

The CC Scan is one of two instruments that make up the Community Capital Framework. The framework visualizes sustainable development as the balanced development of the six community capitals. With the aid of the CC Scan an evaluation is made of whether a project contributes to the basic principle of a balanced development of the six community capitals.

Each of the six capitals, or assets, is subdivided into units called stocks. These may be referred to as aspects of the community. The functioning of these stocks, both individually and in conjunction with the others, determines the development of the six capitals. Please refer to pages 4-7 for a more detailed description of each capital.

Long-term goals have been formulated for each of these stocks. Added together all these objectives provide a picture of how a sustainable community might look. For example, the long-term goal for the stock “Land” in the natural capital is that biodiversity must be preserved, that nature must be maintained as far as possible and strengthened if possible and that scenic and attractive views should be preserved. To asses a project or plan in terms of its sustainability impact we are actually asking ourselves: Does this plan/project contribute to the realisation of the long-term goals which we have formulated for each of the stocks? And if so, to what extent? This is why it must be specified for each stock whether the project concerned will have a positive, negative, or no effect on the realisation of the long-term goals which relate to that stock. In the case of stock “Land”, this concerns the issue of whether the project contributes to and/or has an

impact on the preservation of biodiversity, and that nature is preserved as far as possible and strengthened where possible etc. The impact is shown by each participant filling in a score on a scale ranging from -5 to +5. The more positive the impact, the more the score shifts towards +5, the more negative the impact, the more the score shifts towards -5. If there is no impact or a neutral impact, the score 0 is filled in.

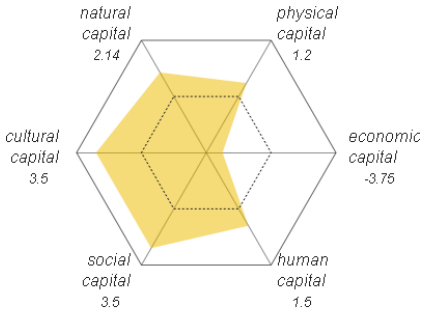
The scan offers the opportunity to further comment on the score that is given (reasoning). Suggestions may also be made to improve aspects of the project. The long-term goals have deliberately been formulated in broad terms. It may sometimes be practical, useful and sometimes even necessary for a specific project to further elucidate or particularise the long-term goals.

Results:

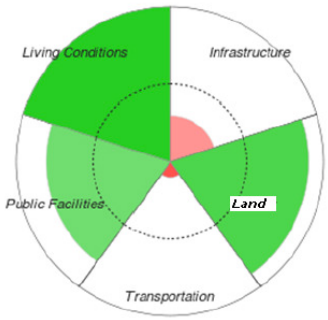
Once a participant has given all of the stocks a score, he/she can then see what the individual result is. It is not possible to view the individual result until all the stocks have been scored. The individual result consists of 3 components:

1. **Sustainability Hexagon**

   The sustainability hexagon shows whether there is balanced development. In the figure this is expressed through a change in shape to the dotted line of the original equilateral hexagon: it becomes larger or smaller. Or asymmetrical, to illustrate that there is an imbalance in the development of one or more of the community capitals. Figure 1 below shows that all capitals, with the exception of the economic capital, are growing. In the eyes of the stakeholders involved, the project has a very negative impact on the development of the economy.



2. Pie Charts



Pie charts show the stocks upon which the project is expected to have a positive impact (the green pie chart sectors) and those upon which a negative impact is expected (the red pie chart sectors). If the impact is neutral or if there is no impact at all, the sector is coloured light grey. The colour of the sector gives a first indication of the expected impact. The size of the sector is also important. The larger the green sector, the more positive the impact, the smaller the red sector, the more negative the impact.

Figure 2 above shows the impact of a project on the physical capital which consist of the stocks infrastructure, land, transportation, housing and living conditions and public facilities. It is clear at a glance that the project has a negative impact on the infrastructure and especially on transportation. On public facilities, land and especially living conditions the project has a positive impact.

3. Comments

The third result that the scan provides is an overview of the reasoning for scoring and points for improvement of the project. During the scoring, each participant has the opportunity to comment on his/her score. In addition, suggestions may also be made for improving the project. Figure 3 below shows a hypothetical example of one participant's reasoning and points for improvement for the physical capital stocks.

	Reasoning	Points for improvement
Physical capital		
Infrastructure	new transit infrastructure	expanded links to further reduce bus use
Land		
Transportation	Many snow days prevent students from arriving at class on time or at all. Buses sometimes drive in unsafe conditions.	
	Safer, more reliable, and faster transportation than status quo.	
Public Facilities	Will help provide transportation for the increased population expected on Burnaby Mountain.	
	Easier access to schools and facilities	
	Help for university facilities	
	Better access to a major university.	
Living Conditions	Better quality of life for students!	

The Community Capital Framework Explained

The Community Capital Framework (CCF) was developed to consider the effects of decision-making on each form of community capital. It has been designed with a systems thinking perspective that regards each form of community capital as a sub-system of the larger whole community system. It is important to understand that an increase in a single capital can generate multiple benefits across the other forms of capital. For example, an increase in economic capital through successful community economic development initiatives may create opportunities for more jobs (human capital) and generate financial resources to maintain and replace aging community infrastructure, such as roads and public buildings (physical capital). If economic development initiatives thoughtfully consider the needs of the community, they can also increase social and cultural capital. This flow of resources across capitals has been termed the “upward spiral” of community capital. Of course, this same effect can occur as a “downward spiral” too – when one form of capital becomes deeply eroded, then others will likely decrease.

The six capital accounts of the CCF are broken down into a set of small stocks and requirements used to measure capital capacity and sustainability progress. The stocks are subsystems that influence the state and development of each capital account and can be considered as assets. These stocks are for the most part universal and were chosen based on their ability to accurately and efficiently represent the health of the

capital they represent. Within each stock is a set of requirements that are chosen by the community that more closely represent the local needs and priorities of the community or the specific initiative being measured. Lastly, each requirement is measured by one or more indicators. Indicators are specific, measurable entities (such as GHG emissions, unemployment rates, etc.) that "indicate" the status of each requirement. They are selected based on the ease (and cost) of their data collection, their correlation to the requirement being measured, and the reliability and integrity of their other data sources.

The CCF then rolls up the final results into a graphical reporting package that reports on the health of each capital account and each of their constituent stocks. Community leaders, planners, and citizens can use this information to compare the current sustainability status of their community with past results, and with other, comparable communities. The CCF is based on strong sustainability principles. It focuses on the issues specific to each individual community, but does so in a way that recognizes each community's regional and global impact on the environment and on society at large. The CCF is also designed to incorporate the democratic input of citizens in terms of values and priorities, and provides planners and decision-makers with a tool that helps them ensure that these values and priorities are reflected in their policy decisions. A description of each of the six capitals follows.

Natural Capital

Natural capital refers to any stock of natural assets that yield a flow of valuable goods and services into the future. This includes non-renewable resources such as fossil fuels and minerals, renewable resources that can provide goods and services (food, clean water, energy) over the long run if managed sustainably, and the capacity of natural systems to continue providing critical goods and services while absorbing our pollutants and emissions (such as the atmosphere's capacity to regulate the planet's climate). Enhancing a community's natural capital means living within its ecological limits: using less of nature; minimizing waste; and generally ensuring that human actions do not degrade the functional integrity of ecosystem services.

The CC Scan basic stocks for natural capital are: Land (as it relates to the natural environment), Soil, Groundwater, Surface Water, Air, and Minerals and Non-Renewable Resources.

Physical Capital

Physical capital is the infrastructure that helps people obtain their basic needs, such as shelter, access to clean water, unspoiled food, and a supply of energy. It also creates an opportunity for people to be productive by providing stocks of material resources such as equipment, buildings, machinery and other infrastructure that can be used to produce goods and a flow of future income. The design of the physical environment has a significant impact on the other forms of capital because it directly serves human needs (water infrastructure meets the need for drinking water) and affects the natural environment (public transit reduces traffic congestion and consequently air pollution)

There is a strong relationship between physical capital and human capital. Insufficient physical capital can limit human capital by requiring more effort to satisfy basic needs and achieved productivity. Improving physical capital includes focusing investment (financial and non-financial) on community assets such as public facilities (i.e. hospitals and schools); water and sanitation; efficient transportation; safe, quality housing; adequate infrastructure, and telecommunications.

The CC Scan basic stocks for physical capital are: Infrastructure, Land (specifically land use), Transportation, Housing and Living Conditions and Public Facilities.

Human Capital

Human capital consists of the knowledge, skills, competencies and other attributes embodied in individuals that facilitate the creation of personal, social, and economic well-being. It contributes to the labour productivity of a community may represent a person's ability to pursue and achieve individual livelihood objectives. Health, education, skills, knowledge, leadership and access to services all constitute human capital.

Increasing human capital requires focus on health, education, nutrition, literacy, and family and community cohesion, as well as increased training and improved workplace dynamics to generate more productive and innovative workers; basic

determinants of health such as peace and safety, food, shelter, education, income, and employment are necessary prerequisites.

The CC Scan basic stocks for human capital are: Education, Health and Well-being.

Economic Capital

Economic capital refers to the ways in which we allocate resource and make decisions about material values. It is essential for building a stable and viable economy. There are two distinct types of resources within economic capital: *financial* and *business.* Individuals and organizations use *financial resources*, like money and access to affordable loans to achieve well-being and generate wealth through goods and services production. *Business resources,* such as locally owned and operated companies, are the suppliers and consumers within a community that generate employment and income. They transform community resources into products and services that encourage the circulation of money within the community.

Strengthening economic capital involves focusing on the maximization of existing resources (i.e. waste as a resource), circulating the flow of dollars within a community, making things locally to replace imports, creating new products, trading fairly, and developing community financial institutions.

The CC Scan basic stocks for economic capital are: Labour, Financial Resources and Economic Structure.

Social Capital

Social capital is the community cohesion, connectedness, reciprocity, tolerance, compassion, patience, forbearance, fellowship, love, commonly accepted standards of honesty, discipline and ethics; commonly shared rules, laws, and information. Often referred to as the glue that holds communities together, social capital is different from the other forms of capital. It is not limited by material scarcity, meaning that its creative capacity is limited only by imagination. Social capital does not wear out upon being used, and if unused, social capital deteriorates at a relatively rapid rate. It is non-transferable, cannot be created instantly, and the very fact of trying to consciously create it or direct it can create resistance.

Multiplying social capital contributes to stronger community fabric, and establishes bonds of information, trust, and inter-personal solidarity, whereas a loss, or deficit of social capital results in high levels of violence and mistrust.

The CC Scan basic stocks for social capital are: Citizenship and Safety.

Cultural Capital

Cultural capital is the product of shared experience through traditions, customs, values, heritage, identity, and history. It is the cultural and traditional resources of a community, including built and natural heritage, as well as a sense of place and identity. Policies that preserve, promote and maintain built cultural heritage and subsidize arts, culture and recreation help to enhance cultural capital.

The CC Scan basic stocks for cultural capital are: Cultural Heritage, Identity and Diversity.